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Family Craticulariidae Rauff, 1893 (Recent)

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Craticulariidae Rauff (Hexactinellida, Hexactinosida), including Leptophragmidae Schrammen, [Laocoetidae] Mehl, contains a rich assemblage of fossil sponges with major abundance and diversity through the Upper Jurassic and Cretaceous, particularly in Europe. Present understanding and restriction of the family derives from Reid's (1964) clear distinction of diplorhyses in two closely related groups: the quadruncial arrangement of aporhyses in Craticulariidae and their quincuncial arrangement in Cribrospongiidae. Although three living species have been assigned to the Craticulariidae in recent years, only one, *Laocoetis perion* Lévi, remains an unquestionable Recent representative. Discovery of scopules and uncinates as free spicules of *L. perion* have finally enabled inclusion of this very important fossil family among the main group of scopule-bearing Hexactinosa.
Keywords: Porifera; Hexactinellida; Hexactinosida; Craticulariidae; *Craticularia*; *Laocoetis*; *Leptophragmella*.

DEFINITION, DIAGNOSIS, SCOPE

Restricted synonymy

Craticularidae Rauff, 1893. Euretidae Zittel, 1877 (in part). Leptophragmidae Schrammen, 1912. Craticularinae; de Laubenfels, 1936a. Leptophragmatidae; de Laubenfels, 1955b. [Laocoetidae] Mehl, 1992 (nom. error). (type genus: *Laocoetis* Pomel, 1872; type species: *Laocoetis crassipes* Pomel, 1872).

Definition

Hexactinosida with euretoid dictyonal framework channelized by diplorhyses; radial epirhyses and aporhyses each arrayed n quadrunx (longitudinal and transverse series; Fig. 1); epirhyses lines and rows are offset and staggered from aporhyses lines and rows, so that, in relation to aporhyses, epirhyses occur in quincuncial positions, centered in squares subtended by four aporhyses at corners; dermal skeleton of pentactins as free spicules insinuated in or fused to outer cortex forming a tangential veil; spiculation where known includes uncinates, scopules and discohexasters.

Diagnosis

See chapter on Fossil Hexactinellida.

Remarks

Although Pomel (1872) provided very clear description of his new genus, *Laocoetis*, Zittel (1877) chose his own creation, *Craticularia*, as the preferred name for the genus of Euretidae, but cited *Laocoetis* Pomel as synonym. Rauff's (1893) cleavage of *Craticularia* and relatives from Zittel's Euretidae (group a) to form the family Craticularidae was quickly accepted and became the standard treatment of the group, the corrected spelling of which, Craticulariidae, stems from Moret, 1952. Priority of *Laocoetis* Pomel over *Craticularia* Zittel was first noted by de Laubenfels (1955b), although he inexplicably chose Leptophragmatidae Schrammen as the preferred family name – a clear junior synonym of Craticulariidae Rauff. Recent suggestions by Mehl (1992) and Reiswig & Mehl (1994) to replace Craticulariidae with [Laocoetidae] contravene ICZN rules (Anon., 1999) and should be ignored – Craticulariidae remains the valid family name. Reid's (1962, 1964) clarification of the distinction between Craticulariidae (aporhyses in quadrunx) and Cribrospongiidae (aporhyses in quincunx) remains the basis of presently accepted understanding of these groups, with slight modification pointed out by Pisera (1997) due to subsequent reassignment of Reid's *Leptophragmella*. Three living species have been assigned to Craticulariidae, but only one survives. Ijima's (1927) *Tretorete incertum* has been reassigned by Reid (1963b) to *Stereochlamis* (Cribrospongiidae) and Reid's own (1963b) *Leptophragmella choanoides* has been reassigned to *Chonelasma* (Euretidae) by Reiswig and Mehl (1994). Lévi's (1986) *Laocoetis perion* remains as the single living member of the family.

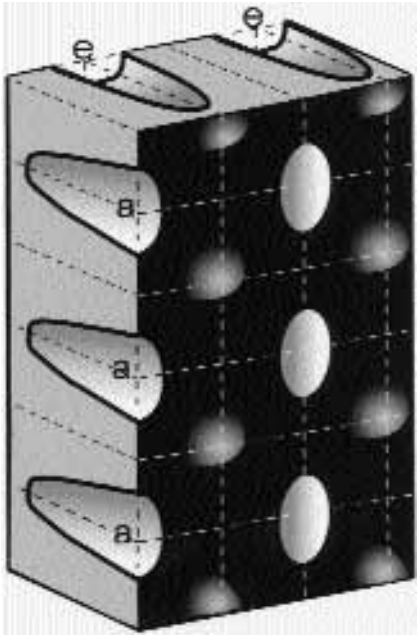

Fig. 1. Diagram of craticulariid wall structure viewed from the atrial (exhalant) side, growth direction upwards. Aporhyses (a) are arranged in longitudinal lines and transverse rows (in quadrunx) while epirhyses (e), represented on the atrial surface as light glow transmitted through their channels, are quincuncial in position with respect to aporhyses.

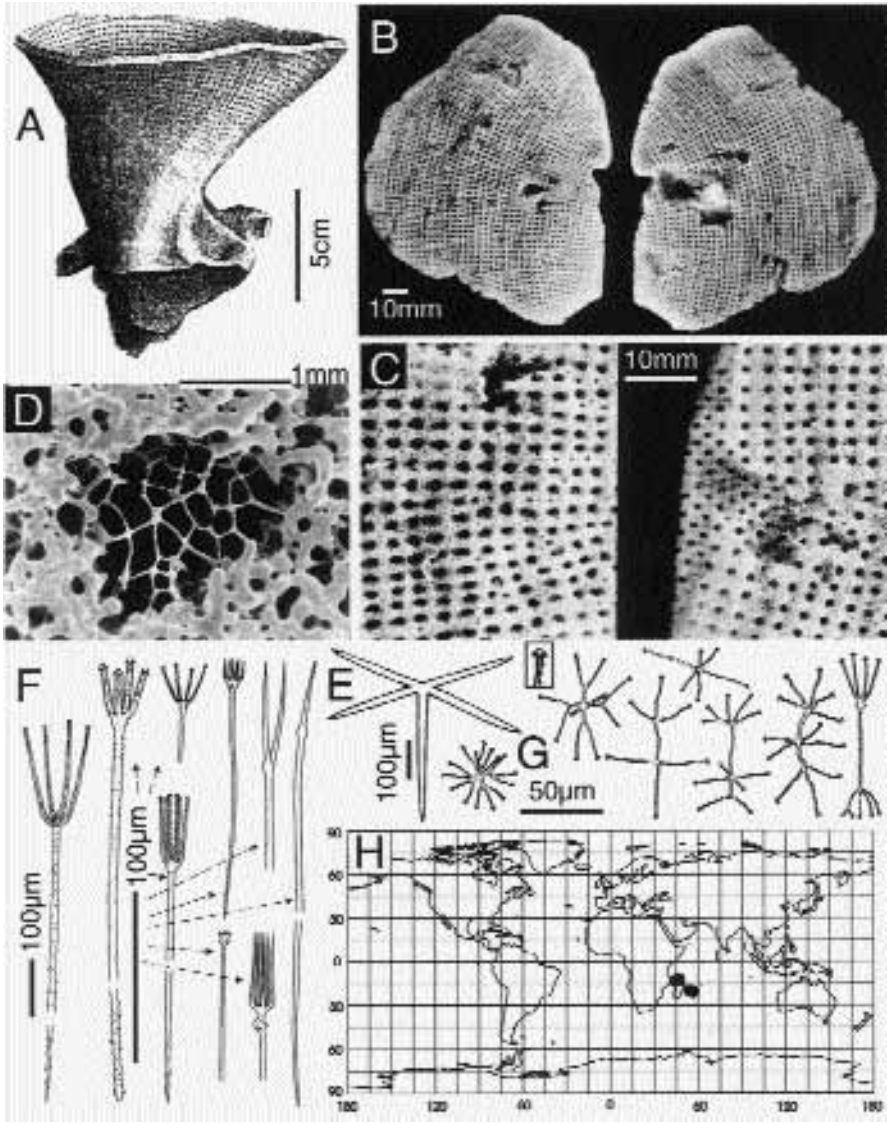

Fig. 2. *Laocoetis crassipes*† (A) and *L. perion* (B–H). A, the holotype of *L. crassipes*†. B, holotype of *L. perion*; view of dermal (inhalant) surface (left) and atrial (exhalant) surface (right). C, same in magnified view of dermal (left) and atrial (right) surfaces. D, aperture of epirhysis with synapticular grid surrounded by thickened cortex of dermal surface. E, dermal pentactin. F, variety of scopule forms. G, regular discohexaster (left) and derivative forms with magnified ray tip (inset). H, Distribution of *L. perion*. (A, from Pomel, 1872, pl. 1, fig. 1; B–D, from Lévi, 1986, pls 1–2; E–G, from Tabachnick & Lévi, 1997a, figs 1–11.)

Scope

Laocoetis Pomel, 1872 (for fossil genera see Fossil Hexactinellida chapter).

LAOCOETIS POMEL, 1872

Synonymy

Laocoetis Pomel, 1872: 93. *Craticularia* Zittel, 1877: 46.

Type species

Laocoetis crassipes† Pomel, 1872 (by subsequent designation; de Laubenfels, 1955b: E80).

Definition

See section in Fossil Hexactinellida.

Diagnosis

Craticulariidae of form of more-or-less flared cup or funnel; dictyonal framework nearly completely penetrated by epirhyses and aporhyses each arrayed in quadrunx but epirhyses positioned in quincuncial positions with relation to aporhyses; networks composed of fused hexactins, stauractins and synapticulae form superficial covers over epirhysis apertures (ostica); outer dictyonal surface covered by cortex of thickened beams spreading from basal skeleton; free spicules include dermal pentactins, uncinates, scopules with lonchiole derivative, and discohexasters with derivatives.

Remarks

Laocoetis (=*Craticularia*) represents the longest living genus of Hexactinellida, with accepted range from the upper Jurassic to the Recent.

Description of type species

Laocoetis crassipes† Pomel (Fig. 2A).

Synonymy. *Laocoetis crassipes* Pomel, 1872:93, pl. 1, fig. 1, pl. II, fig. 4.

Description (from Pomel, 1872). Sponge fixed by a thickened, embossed stem, more or less flattened onto the submarine substrate; cavity essentially crateriform extending deeply to just above the base of the stem; internal apertures round and very distinct in all parts of the cup where the surface is scarcely raised in riblets between the series; apertures of external surface equally round and often deformed by invasion of adventive root tissue which thus does not remain distinctly restricted; the very straight furrows of longitudinal series are likewise obstructed; upper margin of an examined broken specimen would measure over a decimeter in diameter in full spread; wall thickness 6–7 mm near margin; center–center spacing of apertures is about 2.5 mm; larger specimens are suggested by a foot-stem 6 cm from base to bottom of cup; channels from outer surface apertures penetrate nearly entire wall thickness; other samples indicate cup spread may not always be so significant; found in strata at Djebel Djambeida, Algeria, North Africa.

Description of Recent species

Laocoetis perion Lévi, 1986 (Fig. 2B–H).

Synonymy. *Laocoetis perion* Lévi, 1986: 437, pls 1–3; Tabachnick & Lévi, 1997a: 7, figs 1–12.

Material examined. Paratype: MNHN HCL 122 (fragment at RMM-I-4307) – Reunion Is., Indian Ocean. Holotype (not seen): MNHN HCL 121 – same locality.

Description. Overall body shape unknown; fragments to 125 mm diameter as sheets 5–7 mm thick, nearly flat or lightly curved, fragile and friable; both surfaces with oval to slit-like apertures 1–1.5 × 2 mm size arranged rectangularly in longitudinal lines and transverse rows (in quadrunx) as openings into blind-ended channels nearly penetrating entire wall but ending near opposite surface; apertures of epirhyses (inhalant side) covered by fine grid of synapticulae grown out from marginal dictyonal frame; apertures of aporhyses (exhalant side) uncovered; dictyonal ridges between apertures 2–5 mm wide; center–center spacing of apertures 3–3.5 mm longitudinally, 2–2.2 mm transversely; internal primary dictyonal frame of subcubic, quadrangular meshes with sides 300 × 400 μm; peripheral frame with smaller, more irregular, triangular meshes of 200 μm long sides; beams fine-spined, 20 μm thick but thickened on inhalant surface to 100 μm as hypersilicified dermal cortex; spurs likewise thickened to 100–150 μm; free spicules located within skeletal meshes, uncertain if normal positions or displaced during collection; fine-spined dermal pentactins surrounded by, but not fused to, external frame beams, tangential rays 280–350 × 15–18 μm; atrialia are absent in the small spicule-bearing fragment but may yet be discovered when larger samples are available; uncinates as broken fragments 10–12 μm thick; scopules in great variety assessed as completely spined (most numerous) and completely smooth types; spiny scopules with very small discs on tine ends occur in 3 forms: (1) with 8 tines 30–40 μm long, total length 200–490 μm with 3 bosses at base of head, (2) with 6 rather divergent times 30–50 μm long, total length 190–370 μm occur in small packets, (3) very large, thickened forms with 4 tines, 790–915 μm total length; smooth scopules in 3 forms: (1) lonchiole-forms with 1–2 pointed tines 35–60 μm long, total length 320–590 μm, (2) sarule-forms with bouquet of short, pointed divergent tines, 700×12 μm total dimensions, (3) forms with numerous oxy-tipped tines 5–40 μm long lying parallel or slightly convergent; microscleres as regular discohexasters or irregular derivatives; regular discohexasters 50 μm diameter with 10 μm long primaries each carrying 2–4 very spiny, thin, sinuous, 15 μm-long secondary rays ending in very small toothed discs; derivatives as hemidiscohexasters, some of syngramme form with secondary branching restricted to one axis; the species is known only from the western Indian Ocean near Reunion Island and northwest of Madagascar from depths of 290–750 m.

Remarks. Recent discovery and description of spicule-bearing fragments of *L. perion* by Tabachnick and Lévi (1997a) moves the Craticulariidae from its previous *incertae sedis* position into the scopule-/uncinate-bearing Hexactinosida. It is the only known living member of this once very successful and paleontologically still very important family.