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Order Murrayonida Vacelet, 1981

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Murrayonida Vacelet (Calcarea, Calcinea) contains three families, three valid Recent genera, and only three Recent species from coral reef caves and deep fore-reefs, mostly from the tropical Indo-Pacific region, with affinities to a larger ancient group of fossil taxa. The order is characterized among Calcinea by a reinforced skeleton of a calcareous aspicular network, or calcareous plates, or spicule tracts generally composed of diapason triactines, reminiscent of the reinforced skeleton of fossil 'pharetronids'.
Keywords: Porifera; Calcarea; Calcinea; 'Pharetronids'; Murrayonidae; Paramurrayonidae; Lelapiellidae; *Murrayona; Paramurrayona; Lelapiella*.

DEFINITION, DIAGNOSIS & SCOPE

Synonymy

Murrayonida Vacelet, 1981: 314.

Definition

Calcinea with reinforced skeleton consisting of a rigid network of calcite, of calcareous plates, or of spicule tracts generally composed of diapason triactines. Canal system leuconoid.

Scope

Murrayonida contains three monotypic families with extant representatives, Murrayonidae Dendy & Row, 1913, Paramurrayonidae Vacelet, 1967b, and Lelapiellidae Borojevic *et al*., 1990.

History and biology

The order Murrayonida was proposed by Vacelet (1981) to include a small part of the 'pharetronids' – a polyphyletic grouping of mostly fossil Calcarea with a few surviving relict species. The definition of the order was subsequently modified (Borojevic *et al*., 1990) to include the family Lelapiellidae, although the affinities of this sponge are rather uncertain. These sponges, as well as other Recent hypercalcified Calcarea such as the order Lithonida in subclass Calcaronea, appear to be the rare relicts of a large ancient group, surviving in specific ecological conditions of submarine caves (Vacelet, 1991).

Remarks

The character of relicts of these 'living fossil sponges' justifies the distinction of three monotypic families. Triactine diapasons are shared with other 'pharetronids' presently classified in Calcaronea (order Lithonida or Baerida). This spicule probably represents an homoplasic character linked to the organization of spicule tracts.

KEY TO GENERA

(1) Skeleton including a rigid internal aspicular network ..... ***Murrayona***
Skeleton without an aspicular network, with spicule tracts 2
(2) With triactine diapasons in tracts and cortical plates ..... ***Paramurrayona***
With diactines in tracts and cortical tripods ..... ***Lelapiella***

FAMILY MURRAYONIDAE DENDY & ROW, 1913

Synonymy

Murrayonidae Dendy & Row, 1913: 741; Borojevic *et al*., 1990: 264; Reitner, 1992: 101.

Diagnosis

Murrayonida in which the basal skeleton is composed of a rigid calcareous, aspicular network. Cortex composed chiefly of overlapping calcareous scales in the oscular zone, and of small triactines in the pore-zone. Choanosomal skeleton including free diapason triactines.

Scope

Monotypic.

History and biology

The genus *Petrobiona* Vacelet & Lévi, 1958, which also has a massive calcareous skeleton, has been previously included in this family but is now assigned to the order Lithonida of Calcaronea.

MURRAYONA KIRKPATRICK, 1910

Synonymy

Murrayona Kirkpatrick, 1910c: 127.

Type species

Murrayona phanolepis Kirkpatrick, 1910c (by monotypy).

Diagnosis

As for family.

Previous reviews

Borojevic *et al*., 1990; Basile *et al*., 1984; Vacelet, 1977a; Vacelet, 1991; Reitner, 1992.

Description of type species

Murrayona phanolepis Kirkpatrick, 1910c (Fig. 1).

Synonymy. *Murrayona phanolepis* Kirkpatrick, 1910c: 127.

Material examined. Holotype: BMNH 1937.8.6.1 – Christmas Island. Other material. Several specimens from French Polynesia and New Caledonia.

Description. Globular, pyriform or lamellate growth form. Consistency hard, stony. Colour white. Lamellate specimens with a distinct inhalant and exhalant surface, globular ones with special generally equatorial inhalant areas. Cortical skeleton of the inhalant areas made up of a tangential reticulation of triactines. Exhalant surfaces covered by scales originating from equiangular triactines. Diapason triactines isolated under the scales, not building tracts. Osculum surrounded by a circlet of special triactines with long lateral actines. Basal skeleton reticulate, with a meandroid structure, made up of fused, irregularly shaped calcitic sclerodermites, generally without entrapped spicules. Aquiferous system leuconoid with basinucleated choanocytes. Embryo the blastula type.

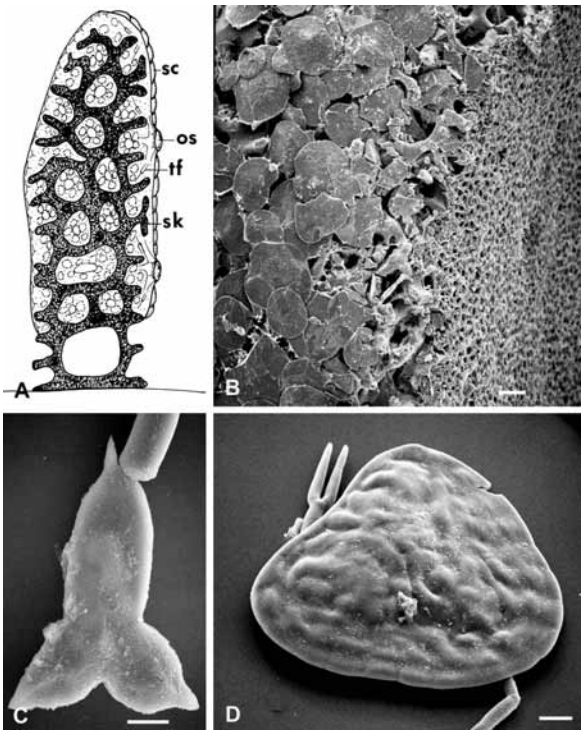

Fig. 1. *Murrayona phanolepis* Kirkpatrick, 1910c. A, diagrammatic section through a lamellar specimen supported by a dead basal part, with the inhalant face on the left and the exhalant one on the right (abbreviations: os, osculum; sc, calcareous scales; sk, aspicular calcareous skeleton; tf, tuning-fork triactine) (from Borojevic *et al*., 1990). B, SEM view of the inhalant and exhalant faces, and of the rigid skeleton (scale 200 μm). C, immature scale, deriving from triactine (scale 20 m). D, calcareous scale and diapason triactine (scale 10 m). B–D, specimen from Moorea, Central Pacific.

Distribution and ecology. Underwater caves and deep forereef of Eastern Indian Ocean (Christmas Island) and Western and Central Pacific, 2–83 m depth.

Remarks. The genus is monotypic. The meandroid structure of the basal skeleton resembles the stromatoporoid organization, and this skeleton may be able to fossilize. However, no fossil representative has yet been recognized (Reitner, 1992).

Distribution of genus

As for type species.

FAMILY PARAMURRAYONIDAE VACELET, 1967

Synonymy

Paramurrayonidae Vacelet, 1967b; Borojevic *et al*., 1990.

Diagnosis

Murrayonida with a choanosomal skeleton made up of fascicles of diapason triactines without any rigid structure. Cortical skeleton composed chiefly of a superficial layer of overlapping calcareous scales and an internal layer of free calcareous plates.

Scope

Monotypic.

Remarks

Paramurrayonidae differs from Murrayonidae mainly by the absence of a rigid aspicular skeleton, which is replaced by a cortical layer of calcareous plates. Such a cortical skeleton is slightly reminiscent of the external skeleton found in fossil and Recent 'sphinctozoans'. However, the plates are not fused but simply loosely joined by organic material, forming a non-fossilizable skeleton, and the body is non segmented.

PARAMURRAYONA VACELET, 1967

Synonymy

Paramurrayona Vacelet, 1967b: 49.

Type species

Paramurrayona corticata Vacelet, 1967b (by monotypy).

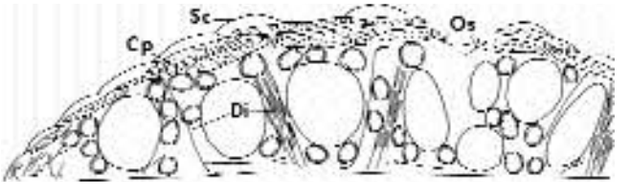

Fig. 2. *Paramurrayona corticata* Vacelet, 1967b. Diagrammatic section (abbreviations: Di, diapason triactines, single or in tracts; Cp, calcareous plates; Os, osculum; Sc, calcareous scales) (from Vacelet, 1967b).

Diagnosis

As for family.

Previous reviews

Borojevic *et al*., 1990; Vacelet, 1991.

Description of type species

Paramurrayona corticata Vacelet, 1967b (Fig. 2).

Synonymy. *Paramurrayona corticata* Vacelet, 1967b: 49; Vacelet, 1981: 324.

Material examined. Holotype: MNHN 28/9/1964. Paratype: BMNH 06015. Other material. Specimens from Madagascar, New Caledonia and Jamaica.

Description. Encrusting, roughly circular growth form, 2–5 mm in diameter, 0.5 mm thick. Colour brown, with a glistening, smooth surface. Surface covered with a layer of overlapping oval scales, 150–400 μm in maximum diameter, deriving from triactines. Underlying layer of calcitic plates, mostly rectangular, up to 1 mm in length and 50–100 μm thick. Choanosomal skeleton composed exclusively of diapason triactines, generally disposed in fascicles. Osculum 250 μm in diameter, approximately central in a zone devoid of scales and plates, surrounded by a circlet of special tetractines. Inhalant areas presumably located at the periphery of the sponge where are localized a few triactines, diapasons and tetractines. Aquiferous system leuconoid with basinucleated choanocytes. Embryo of the blastula type.

Distribution and ecology. Underwater caves and microcavities of coral reefs in Indian Ocean (Madagascar), Pacific Ocean (New Caledonia) and Caribbean (Jamaica).

Remarks. This monotypic genus has a remarkable distribution, found in the Indo-Pacific area as most of the 'pharetronids' and also in the Caribbean. The unique Jamaican specimen has exactly the same morphological characters as the Indo-Pacific ones (Vacelet, 1981), and is considered to belong to the same species.

Distribution

Indo-Pacific, Caribbean.

FAMILY LELAPIELLIDAE BOROJEVIC *ET AL*., 1990

Synonymy

Lelapiellidae Borojevic *et al*., 1990: 267.

Diagnosis

Murrayonida with choanosomal skeleton made up of fascicles of diactines without any rigid structure. Cortical skeleton composed chiefly of a layer of tripod triactines and curved diactines.

Scope

Monotypic.

Remarks

The single known species, *Lelapiella incrustans* Vacelet, 1977a was first assigned to the family Lelapiidae in Calcaronea, but was later recognised to have characters more similar to Calcinea (Borojevic *et al*., 1990). Its classification in order Murrayonida is based on some similarities in organization with Paramurrayonidae and the presence of spicule tracts. However, the sponge is devoid of diapasons and of a non-spicular complementary skeleton, and its affinities are unclear.

LELAPIELLA VACELET, 1977

Synonymy

Lelapiella Vacelet, 1977a: 358; Vacelet, 1981: 348; Borojevic *et al*., 1990: 267.

Type species

Lelapiella incrustans Vacelet, 1977a (by monotypy).

Diagnosis

As for family.

Previous reviews

Borojevic *et al*., 1990. Vacelet, 1991.

Description of type species

Lelapiella incrustans Vacelet, 1977a (Fig. 3).

Synonymy. *Lelapiella incrustans* Vacelet, 1977a: 358.

Material examined. Holotype: MNHN-J.V.-76-2 – Madagascar. Other material. Numerous specimens from the Indian Ocean and West Central Pacific.

Description. Encrusting growth form, up to 10 mm in diameter and 0.8–1 mm thick. Colour white, surface smooth, glistening. Osculum central, generally unique, with a slightly elevated margin, surrounded by a circlet of several rows of sagittal triactines. Cortical skeleton a dense layer of large tripods derived from equiangular triactines and curved diactines. Choanosomal skeleton fascicles of diactines running obliquely through the choanosome from the cortical layer to a basal layer made up by intermingled curved diactines. Canals lined by a few tetractines. Aquiferous system leuconoid with basinucleated choanocytes. Embryos unknown.

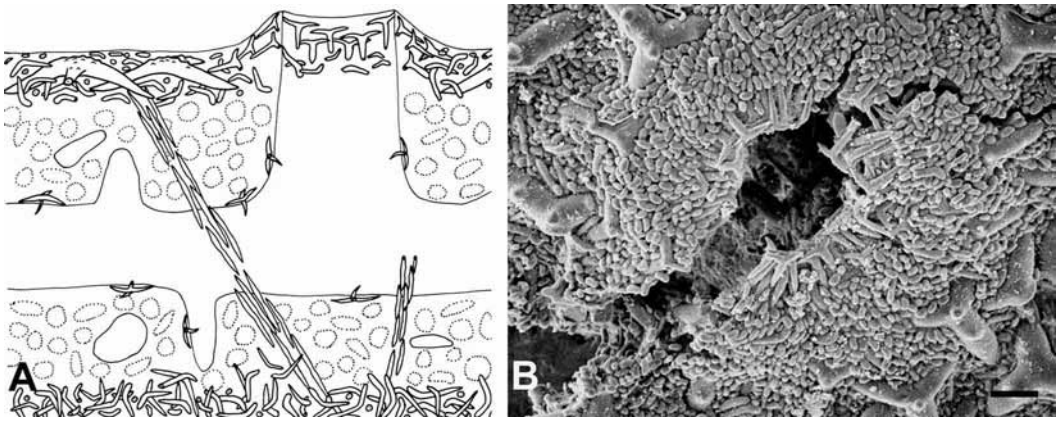

Fig. 3. *Lelapiella incrustans* Vacelet, 1977a. A, diagrammatic section (from Vacelet, 1977a). B, *Lelapiella incrustans sphaerulifera* Vacelet, 1977a. SEM view of the surface skeleton of tripods and reniform diactines, and osculum surrounded by a circlet of triactines, specimen from New Caledonia (scale 100 μm).

Distribution and ecology. Underwater caves and microcavities of coral reefs of Indian Ocean (Madagascar, Mozambique Channel), 3–14 m depth.

Remarks. The genus is monotypic. However, a subspecies of the type species, *L. incrustans sphaerulifera* Vacelet, 1977a has been described from the West and Central Pacific (New Caledonia, French Polynesia, Hawaii). It differs mainly by a thickening of the curved diactines which have a reniform or almost circular shape (Fig. 3B).

Distribution

Indian Ocean, West and Central Pacific.