

## Family Pseudoceratinidae Carter, 1885

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Pseudoceratinidae Carter (Demospongiae, Verongida), including *Druinellidae* Lendenfeld, is characterised in having a dendritic fibre skeleton in which bark elements are absent. Four nominal genera are included although only one is now considered valid. Species are distributed across the Indo-Pacific.

**Keywords:** Porifera; Demospongiae; Verongida; Pseudoceratinidae; *Pseudoceratina*.

### DEFINITION, DIAGNOSIS, SCOPE

#### Synonymy

Pseudoceratida Carter, 1885b: 204. *Druinellidae* Lendenfeld, 1889a: 425.

#### Definition

Verongida in which the fibre skeleton, which is sparse, is dendritic, is made up of fibres with no investing bark, simply pith elements which are usually clear, but which occasionally can incorporate isolated fragments of debris. The fibres are extremely irregular, knotted in places, expanding and contracting along their length and below the surface fanning out in brushes (Fig. 1A, C). Pigmentation is uniform throughout the sponge, the surface is conulose and the texture rubbery, flexible in ramose forms, tending to incompressible in massive species.

#### Scope

One genus is recognised, *Pseudoceratina* Carter (Fig. 1), including the synonyms *Psammaplysilla* Keller, *Korotnewia* Polejaeff and *Druinella* Lendenfeld, with distribution from the Red Sea across the Indian and Pacific Oceans as far east as Hawaii. The specimens which have until recently been referred to *Psammaplysilla* are diverse in overall habit and morphology (refer Bergquist, 1965: fig. 6a, b), but are totally consistent in internal characteristics. Recognition of further species and their description will require careful histological study. Nine species have been described under the four nominal genera.

#### History and biology

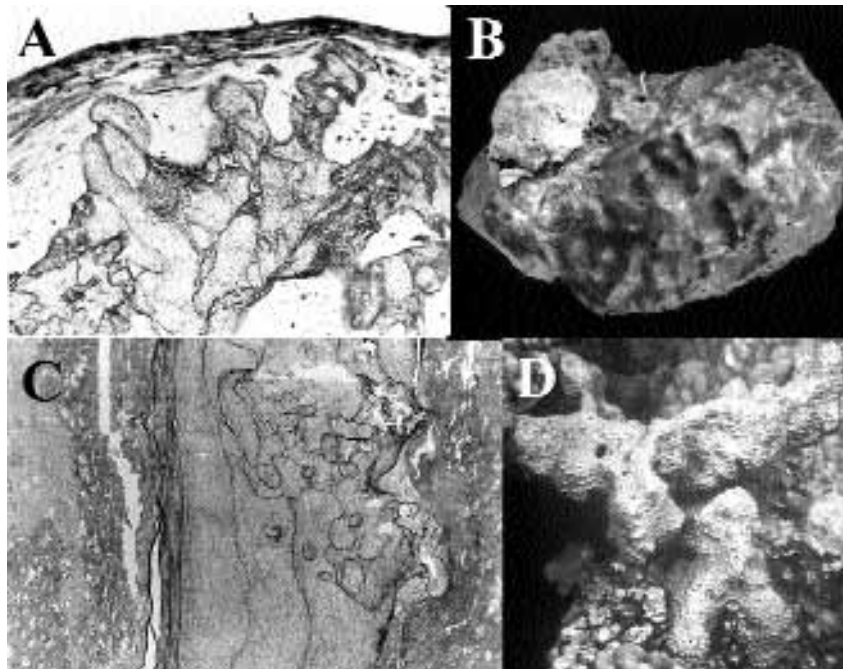
Carter (1885b) established a 'section' Pseudoceratida for two species, *Pseudoceratina durissima* and *P. crateriformis*, the latter subsequently referred to *Thorectandra*. This name must be emended to Pseudoceratinidae with the family name formed from the stem of the type genus (Article 29.1, ICZN; Anon., 1999). Carter did not mention his ideas on the affinities of this family, other than including it in an order Ceratina together with Luffaridae [=Thorectidae] and Aplysiniidae. He commented on the remarkable "granulo-flocculent grey substance" that formed the dense matrix of the sponge. Soon after, Lendenfeld (1889a)

erected *Druinellidae* for a single species *Druinella rotunda*, which he remarked was quite unique in his experience with no obvious affiliations, but with likeness to aplysiniid genera. In his description Lendenfeld emphasised two features, the knotted fibres and an elaborate canal system which featured very long exhalant canals grouped tightly in bunches throughout the choanosome. Lendenfeld gave a detailed diagram of the canal arrangement and the attention of later authors who tried to get a clear idea of the genus, in the absence of type material, was certainly diverted to looking for these structures, without success. The original diagram of the fibres figures a rather regular cross section which did not adequately draw attention to their large size and irregular outline. *Druinella* was consequently treated as unrecognisable, or as a synonym of *Psammaplysilla* Keller (Burton, 1934a; Bergquist, 1965, 1980b) and later of *Pseudoceratina* Carter (Bergquist, 1995). The reasoning and justification for these various assignments are to be found in Bergquist (1965) and Bergquist (1995) in particular.

Recognition that *Pseudoceratina* was a senior synonym of *Druinella* came with the preparation of good histological preparations of Carter's holotype of *Pseudoceratina durissima* when it became evident that the fibres had no bark, the refractile edges reported by Bergquist (1980b) are folds of pith. These preparations, and those of many other specimens collected in the period 1970–1995, confirm the constancy of the fibre structure and reveal Lendenfeld's depiction of the canal system of *Druinella* to be overstated. In densely collagenous sponges generally, the aggregations of choanocyte chambers are very marked, the canal system is however not remarkable. It is not possible to describe and differentiate species within this assemblage without proper histological preparations. Failure to take the time to make such slides has been responsible in large measure for the confusion over what actually is an easily characterised genus.

#### Remarks

Wiedenmayer (1989) reported the rediscovery of the type specimen of *Druinella rotunda* Lendenfeld in Berlin (ZMB 10403) and regarded this as a good genus and species with which *Psammaplysilla* Keller was synonymous. He retained *Pseudoceratina* Carter as a separate genus, from his descriptions the major distinctions were the form of the sponges and the presence of bark in the fibres in *Pseudoceratina*. Bergquist (1995) clarified the status of all of these genera, establishing *Pseudoceratina* as the senior synonym of both *Druinella* and *Psammaplysilla*.



**Fig. 1.** *Pseudoceratina*. A, *P. purpurea*, light micrograph showing knotted fibres fanning out in the sub-surface region. B, *P. durissima*, holotype BMNH 83.4.12.48, spirit preserved specimen. C–D, *P. verrucosa*. C, light micrograph showing the scattered, discontinuous debris in the fibres. D, holotype QMG 304701, *in situ*.

The further synonym, *Korotnewia* Poléjaeff features little in the literature. This clarification was greatly assisted by recognising the distinctness of the forms now classified within the Aplysinellidae.

#### Previous reviews

Lendenfeld, 1889a, c; Burton, 1934a; de Laubenfels, 1948; Bergquist, 1965; Bergquist, 1980b; Wiedenmayer, 1989; Bergquist, 1995.

#### PSEUDOCERATINA CARTER, 1885

##### Synonymy

*Pseudoceratina* Carter, 1885b: 204. *Psammaplysilla* Keller, 1889: 358. *Korotnewia* Poléjaeff, 1889: 366. *Druinella* Lendenfeld, 1889a: 425. Not *Aiolochoira* Wiedenmayer, 1977b: 74, for [*Dendrospongia*] Hyatt, 1875: 400 (a junior homonym of *Dendrospongia* Roemer, 1864).

##### Type species

*Pseudoceratina durissima* Carter 1885b: 204 (by subsequent designation; de Laubenfels, 1948).

##### Definition

Pseudoceratinidae with sparse fibre skeleton organised on a dendritic plan. Pith elements only are present in the fibres. The matrix of the sponge is extremely dense and heavily reinforced by collagen; the texture is hence firm, and often extremely hard and incompressible. The surface of the sponge is smooth, conulose or tuberculate.

#### Previous reviews

Lendenfeld, 1889a,c; de Laubenfels, 1948; Bergquist, 1980b; Wiedenmayer, 1989; Hooper & Wiedenmayer, 1994; Bergquist, 1995.

#### Description of type species

*Pseudoceratina durissima* Carter (Fig. 1).

**Synonymy.** *Pseudoceratina durissima* Carter, 1885b: 204. *Druinella rotunda* Lendenfeld, 1889a: 426. *Aplysina laevis* Carter, 1885b: 204. Not *Aplysina purpurea* Carter, *sensu* Wiedenmayer, 1987.

**Material examined.** Holotype: BMNH1883.4.12.48 – spirit preserved specimen. Other material. NMV 52074–8 and authors' collections – Port Phillip Bay, Westernport Bay, Victoria, and Port Jackson, NSW, Australia. The type species is distributed throughout SE Australia, Port Phillip Bay, Westernport Bay, Port Jackson, Tasmania, 20–60 m depth.

**Description.** Massive rounded sponge, hard, barely compressible in life, rock hard when dry, it has a smooth surface with scattered low mounds marking the points where fibre brushes intersect the surface. Most frequently the sponges are solitary mounds, but multilobate specimens have been recorded (Lendenfeld, 1889a; Wiedenmayer, 1989). The overall dimensions of the type specimen as given by Carter, are “2 inches high, 4 by 2 inches basally”, larger specimens up to 20 cm high have been observed. Colour in life is dull yellow with patchy green-purple areas, the pigment change so characteristic of Verongida takes place very quickly, the sponge becoming a uniform dark purple. Oscules are small, 2–3 mm in diameter and scattered over the upper half of the body, pores are tiny, scattered. Fibres are sparse in relation to the soft tissue, irregular in profile, composed only of pith elements, varying greatly in diameter along their length, range from 160–500  $\mu\text{m}$  in diameter

and, while typically clear of debris, may contain sand grains. Choanosome is densely collagenous, may incorporate debris and has typical choanocyte chambers, 15–20  $\mu\text{m}$  in diameter separated in islands in the matrix by dense collagen tracts.

**Remarks.** There are four species assigned to *Pseudoceratina*: *P. durissima* (Fig. 1B), *P. purpurea*, *P. arabica* and *P. verrucosa* (Fig. 1C–D). Holotypes, or designated neotypes, of all described species within the group have been examined and, where the material permits, histological preparations made. The only uncertainty relates to *P. arabica* where fasciculate fibres were described by Keller, examination of poor slides of the holotype (BMNH 1933.1.16.2a), reveal a structure identical to that found in *P. purpurea* with fibre

elements intertwined then divergent along their length. Fresh material from the type locality has come to hand recently but has not yet been studied. The species is retained pending that study. Bergquist *et al.* (1991b) noted the occurrence of a specimen of *Druinella*, (undescribed) from New Zealand. This record can be disregarded as collection of further specimens indicate that it does not belong to the Pseudoceratinidae.

#### Distribution

Red Sea, Indo-Pacific as far east as Hawaii, Australia, tropical and south eastern temperate waters.