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Revision of the genus *Acryptolaria* Norman, 1875 (Cnidaria, Hydrozoa, Lafoeidae)

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Abstract

The genus *Acryptolaria* is reviewed, with a complete redescription of the type specimens, with the exception of *A. andersoni* and *A. rectangularis* for which type material could not be located. The genus includes 16 valid species, though *A. andersoni* is insufficiently known. All records found in the literature have been checked. The cnidome proved to be a useful tool for species identification. A key for the identification of the species of the genus is also presented.

Keywords: Cnidaria, Hydrozoa, *Acryptolaria*, Cnidome, deepwater, hydroids, morphometry, systematics, taxonomy

Introduction

Acryptolaria Norman, 1875 is an easily recognizable genus of deep-sea benthic hydrozoans, but identification at the specific level is a difficult task. Many authors (e.g. Allman 1888; Ritchie 1911) have emphasized the paucity of characters for species differentiation in this genus. This, together with the poor original descriptions of many nominal species, makes identification at the species level almost impossible. The present taxonomic knowledge on the genus has become an impediment for any study including species of *Acryptolaria*.

In order to solve this problem, the revision of the type material of the known species of *Acryptolaria* has been carried out. In the present study, type material of most of the species has been examined and a redescription of the species is provided, together with new figures. Also included is information concerning the cnidome, which proved to be a useful tool for the identification of the species.

Material and methods

The material studied belongs to collections of the Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (IRSNB), the Natural History Museum, London, UK

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(BMNH), the Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA (MCZ), the Museum of Victoria, Melbourne, Australia (MV), the Zoological Institute of the Russian Academy of Science, St Petersburg, Russia (ZIRAS), the Zoologische Staatssammlung München, Munich, Germany (ZSM) and the Zoologisk Museum, Copenhagen, Denmark (ZMUC).

Types and additional material were examined, measured, drawn, and photographed with a compound microscope and a stereomicroscope. Measurements of nematocysts were made on undischarged capsules (discharged nematocysts were not observed). Other study methods for Lafoeidae are given in Peña and García-Carrascosa (1993) and Peña Cantero et al. (1998).

Results and discussion

We redescribe most of the known species of *Acryptolaria*, based on the study of their type-specimens. We realised that it was impracticable to confirm the majority of the identifications/records by previous authors. As already remarked, the paucity of characters in the species of *Acryptolaria* and the typically poor descriptions and figures provided by many authors, together with the lack of information concerning the cnidome, make it impossible to confirm identifications based solely on literature. The confirmation of every record demands detailed study of its voucher specimen, including cnidome information. For this reason, and intending to help future efforts on the study of the geographical distribution of the species of *Acryptolaria*, we have included all doubtful records in Appendix 1, indicating whether these records provide description and/or figures. The records indicated in the species below are those with enough characteristics to be identified exclusively based on literature data.

Family LAFOEIDAE Hincks, 1868

Genus *Acryptolaria* Norman, 1875

Scapus Norman 1875, p 173.

Parathecium Stechow 1919, p 852.

Oswaldaria Stechow 1923a, p 147.

Type species. *Acryptolaria andersoni* Totton, 1930.

Diagnosis

Lafoeidae with adult colonies consisting of branched polysiphonic stems with a central axial tube from which branches arise. Hydrothecae present only on central axes of stem and branches. Hydrothecae alternately arranged, forming two longitudinal rows, usually in one plane. Hydrotheca tubiform, partially adnate to branch; without a diaphragm. Nematothecae absent. Gonothecae aggregated to form a coppinia, with or without defensive tubes. Gonophores in the form of fixed sporosacs. Cnidome consisting of two categories of nematocysts: large putative macrobasic mastigophores and small putative microbasic mastigophore.

Remarks

The genus *Cryptolaria* Busk, 1857 was established by Busk (1857, p 173) for two species of hydroids from New Zealand: *Cryptolaria exserta* Busk, 1858 and *Cryptolaria prima* Busk, 1857 (Bedot 1910).

Norman (1875), studying a submarine-cable fauna, found a species he considered identical to *Cryptolaria exserta*. For him (Norman 1875, p 172) *C. exserta* “was devoid of the very characters on which the genus *Cryptolaria* had been established, the hydrothecae being much exserted, and standing out at a considerable angle from the stem”, concluding that “it is impossible that this species can remain in the same genus with *C. prima*”, the type species of *Cryptolaria*. Consequently, he proposed the genus *Acryptolaria* for its reception as “Zoophyte ramose, irregularly branched, branches composed of several tubes; hydrothecae rather distant, subspirally or alternately arranged, tubular, not contracted at the base and prolonged into the branch itself; mouth somewhat patulous” (Norman 1875, p 172).

Bedot (1912), however, argued that the diagnostic characteristics of the genus *Acryptolaria* (including *Cryptolaria exserta*) were also present in most species of *Cryptolaria* and, consequently, that the genus was unnecessary.

Stechow (1921) indicated that *Cryptolaria* is characterized by having hydrothecae arranged in more than two rows along the stem and by the presence of a hydrothecal diaphragm, as in the sertulariids *Selaginopsis* Allman, 1876 and *Staurotheca* Allman, 1888. He placed *Cryptolaria exserta* in the genus *Perisiphonia* Allman, 1888, but considered *Perisiphonia* as a junior synonym of *Acryptolaria*.

Stechow (1923a) regarded the taxonomic position of *Cryptolaria* in the family Lafoeidae as uncertain and considered it a doubtful synonym of *Selaginopsis*, indicating that *Cryptolaria* should not be used anymore. Stechow (1923a) included three species in *Acryptolaria*: *A. exserta* (Busk, 1858), *Acryptolaria pectinata* (Allman, 1888), and *Acryptolaria chazaliei* (Versluys, 1899). In addition, Stechow (1923a) introduced the new generic name *Oswaldaria* (type species *Cryptolaria crassicaulis* Allman, 1888) for the species of *Cryptolaria sensu* Allman, because the generic name *Cryptolaria* was not available. Previously, Stechow had used three species assigned to *Cryptolaria* as type species of the genera *Stegolaria* Stechow, 1913 (type species *Cryptolaria geniculata* Allman, 1888), *Cryptolarella* Stechow, 1913 (type species *Cryptolaria abyssicola* Allman, 1888), and *Parathecium* Stechow, 1919 (type species *Cryptolaria abies* Allman, 1877). The last was found to be a species of *Acryptolaria* and, therefore, the genus *Parathecium* is currently regarded as junior synonym of *Acryptolaria*.

Totton (1930) pointed out Stechow’s misconception of *Perisiphonia* being congeneric with *Acryptolaria*. Indeed, *Perisiphonia* is currently regarded as congeneric with *Cryptolaria*, widely accepted as a valid genus of the family Lafoeidae (cf. Millard 1975; Bouillon 1985; Rees and Vervoort 1987; Calder 1991), a position corroborated by a phylogenetic analysis (Marques et al. 2006).

Totton (1930, p 162) noted that the material recorded by Norman (1875) was distinct from *Cryptolaria exserta* [whose type material is unknown (cf. Totton 1930, p 161; Rees and Vervoort 1987, p 48–49)] and not congeneric with *C. prima* (which had been redescribed as *Perisiphonia quadriseriata* by Trebilcock 1928). Consequently, Totton gave the new name *Acryptolaria andersoni* to Norman’s (1875) material and designated that species as the type species of the genus *Acryptolaria*, at that time monotypic (Totton 1930, p 161).

Although the specimen selected by Totton (1930) as the holotype of *Acryptolaria andersoni* was deposited in the Natural History Museum of London, we could not locate it in its collection, and the registration number provided (Reg. No. 99.5.1.218) does not correspond to any material deposited either in the spirit or in the slide collections. In the Herbarium index, the material is registered on a file but the corresponding specimen was not found. Therefore, we consider the type material of *A. andersoni*, type species of the genus *Acryptolaria*, lost.

Totton (1930) also indicated that *Oswaldaria* Stechow, 1923 should be considered a junior synonym of *Acryptolaria*, because *Oswaldaria crassicaulis* and *Acryptolaria andersoni*, the two type species respectively, are congeneric and *Acryptolaria* has priority.

Norman (1875) also described *Scapus tubulifer* as a new species of epibiotic hydroid found on the colonies assigned by him to *A. exserta*. However, as already noted by previous authors (cf. Levinsen 1893; Stechow 1923a; Totton 1930), *S. tubulifer* actually corresponds to the coppinia of *A. andersoni*.

The following species were described in or referred to the genus *Acryptolaria*. Nevertheless, according to our diagnosis, only the species in bold belong to *Acryptolaria*. The remaining species belong to other genera of Lafoeidae (*Cryptolaria*, *Grammaria*, or *Zygophylax*).

***Acryptolaria abies* (Allman, 1877)**

***Acryptolaria andersoni* Totton, 1930**

***Acryptolaria angulata* (Bale, 1914)**

Acryptolaria arboriformis (Ritchie, 1911) = *Cryptolaria arboriformis* Ritchie, 1911

Acryptolaria borealis (Levinsen, 1893) = *Grammaria borealis* (Levinsen, 1893)

***Acryptolaria bulbosa* (Stechow, 1932)**

Acryptolaria chazaliei (Versluys, 1899) = *Cryptolaria chazaliei* (Versluys, 1899)

***Acryptolaria conferta* (Allman, 1877)**

***Acryptolaria corniformis* Naumov and Stepanjants, 1962**

***Acryptolaria crassicaulis* (Allman, 1888)**

Acryptolaria elegans (Allman, 1877) = *Cryptolaria elegans* Allman, 1877

Acryptolaria exserta (Busk, 1858) = *Cryptolaria exserta* Busk, 1858

***Acryptolaria flabellum* (Allman, 1888)**

***Acryptolaria gracilis* (Allman, 1888)**

***Acryptolaria longitheca* (Allman, 1877)**

***Acryptolaria minima* Totton, 1930**

***Acryptolaria minuta* Watson, 2003**

Acryptolaria normani Nutting, 1927 = *Zygophylax tizardensis* Kirkpatrick, 1890

***Acryptolaria operculata* Stepanjants, 1979**

***Acryptolaria patagonica* El Beshbeeshy, 1991 = *Acryptolaria operculata* Stepanjants, 1979**

Acryptolaria pectinata (Allman, 1888) = *Cryptolaria pectinata* Allman, 1888

***Acryptolaria pulchella* (Allman, 1888)**

***Acryptolaria rectangularis* (Jarvis, 1922)**

Acryptolaria symmetrica (Nutting, 1905) = *Cryptolaria symmetrica* Nutting, 1905

***Acryptolaria tortugasensis* Leloup, 1935**

Acryptolaria triserialis (Fraser, 1913) = *Grammaria triserialis* (Fraser, 1913)

The erect colonies of Lafoeidae may be divided into two basic kinds, according to the arrangement of the fascicular tubes and their branching. Although these two types were first noted by Allman (1888), subsequent authors gave little or no attention to their distinction (Marques et al. 2006). *Acryptolaria* differs from *Grammaria* in this character, the colonies of the former having a central axis from which all primary branches arise, the fasciculation being complemented by additional tubules with no branching. In *Grammaria*, however, the fasciculation is composed of many tubes from any of which the primary branches arise.

Although we consider that two categories of nematocysts characterized the species of *Acryptolaria* (large putative macrobasic mastigophores and small putative microbasic

mastigophore), only one category could be observed in a few species because of the almost complete absence of coenosarc in the type material examined and/or all the material was mounted in microslides.

As shown above, many species currently assigned to *Acryptolaria* were originally described in the genus *Cryptolaria*, but both genera are easily distinguishable by the presence of nematothecae in the latter.

Description of the species

Acryptolaria abies (Allman, 1877)

(Figures 1, 15A, 17A; Table I)

Cryptolaria abies Allman 1877, p 20, 21, Plate 13 Figures 1, 2.

Material examined

Lectotype: MCZ 9063, Atlantic Ocean, Gulf Stream Expedition, several fragments up to 20 mm long. Paralectotype: MCZ 9077, Atlantic Ocean, Gulf Stream Expedition, four fragments up to 18 mm long and one incipient stem ca 5 mm high. Other material: MCZ 45714, off Double-Headed Shot Key (23°57'30" S, 80°29'15" W), 315 fathoms (567 m), a vial with four fragments up to 9 mm included in the type material of *Acryptolaria longithecra*.

Description

“Hydrocaulus attaining a height of about two inches [50.8 mm], irregularly branched, with a pinnate disposition of the ultimate ramuli” (Allman 1877, p 20). Presently, lectotype material composed of several fragments up to 20 mm in length. Most fragments belonging to the strongly polysiphonic basal part of stem. Stem hydrothecae barely visible. Stem straight, giving rise to lateral branches at right angles, probably following an alternate pattern. Branches straight.

Hydrothecae alternately arranged in approximately one plane. Hydrotheca almost cylindrical; diameter sharply decreasing at basal part and, sometimes, slightly from the middle to the distal part. Hydrotheca gently curved abcaulinarily; adcauline wall approximately two-thirds adnate to internode. Adcauline wall convex; abcauline wall practically straight at basal half, concave at distal half. Hydrothecal aperture circular, parallel to longitudinal axis of branch or slightly directed upwards or downwards. Sometimes adcauline wall longer than abcauline one and, consequently, hydrothecal aperture oblique. Rim even, sometimes with few short renovations.

Coppinia not observed.

Remarks

The material described by Allman (1877) is presently divided into two lots, both held in the Museum of Comparative Zoology at Harvard University and, therefore, should be considered as syntypes of the species. We chose the material MCZ 9063 as the lectotype and MCZ 9077 as paralectotype of *A. abies* (International Commission on Zoological Nomenclature 1999, Article 74).

Allman (1877, p 20) already noticed that “the hydrothecae of this species [*A. abies*] are considerably smaller than those of either *C. conferta* or *C. longithecra*. They can be seen ... to

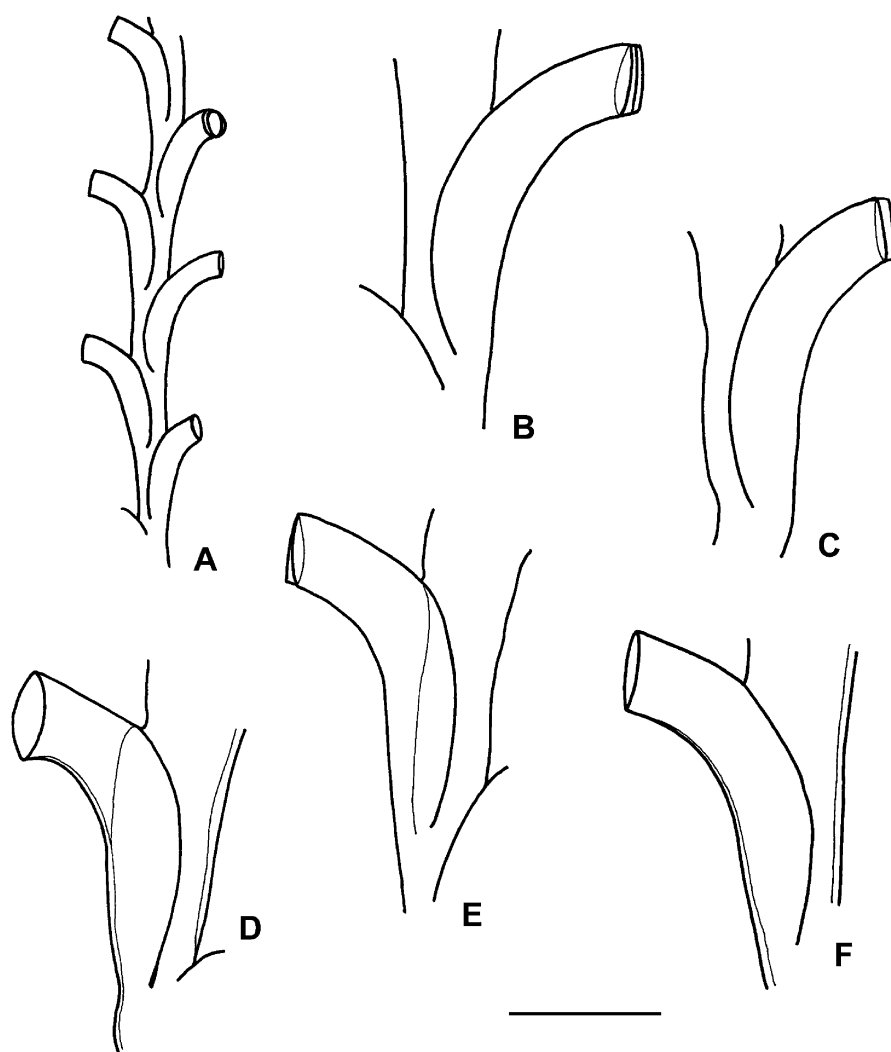


Figure 1. *Acryptolaria abies* (Allman, 1877). (A) Part of branch showing hydrothecal arrangement; (B–F) hydrothecae. (A–C, E) From the paralectotype; (D) from the lectotype; (F) from MCZ 45714. Scale bar: 1 mm (A); 400 μ m (B–F).

be of a very different shape from those of the two former species, being here of an elongated flask-shape, tumid below and gradually narrowing towards its orifice”.

Allman (1877, p 20) also pointed out that “Here [*A. abies*] also they [the hydrothecae] are plainly provided with a distinct floor, and in all respects resemble a typical sertularian hydrotheca”, and figured (Plate 13 Figure 2) the hydrothecae completely closed at their base. Nevertheless, the examination of type material leaves no doubt that the hydrotheca is devoid of a floor or diaphragm, as shown in Figure 1. The sharp decrease in diameter of the hydrothecae at the hydrothecal base could account for Allman’s (1877) mistake.

In the examined type material of *A. longithecra* (MCZ 45714), there was a small vial with four fragments up to 9 mm long which clearly belong to *A. abies*. In these fragments the

Table I. Morphometric data of the type material of *Acryptolaria abies* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	687.4 \pm 59.8	600–800	10
Length of free adcauline wall	324.4 \pm 55.9	220–380	9
Length of adnate adcauline wall	632.2 \pm 56.3	500–680	10
Length of adcauline wall	951.3 \pm 92.7	780–1056	9
Ratio adnate/free adcauline wall		1.7–2.7	
Diameter at aperture	185.5 \pm 16.5	152–216	10
Diameter at base	89.7 \pm 13.3	70–110	10
Nematocysts			
Larger group	11.2 \pm 0.5 \times 4.6 \pm 0.4	10.5–12 \times 4–5	10
Smaller group	6.3 \pm 0.4 \times 2.5	6–6.5 \times 2.5	2

branching is alternate in one plane and the angle between stem and branches is ca 45°. The shape and size of the hydrotheca is in complete agreement with the type material of *A. abies*.

Distribution

According to Allman (1877), the label belonging to the type material of *A. abies* was effaced, it not being possible to ascertain the exact locality and depth from which the specimen came. The material of *A. longitheca* here assigned to *A. abies* was collected at a depth of 567 m off Double-Headed Shot Key (23°57'30" S, 80°29'15" W), Florida.

Acryptolaria andersoni Totton, 1930

Acryptolaria exserta: Norman 1875, p 172–173, Plate 12 Figures 1, 2 [non *Cryptolaria exserta* Busk, 1858].

Scapus tubulifer Norman 1875, p 173–174, Plate 12 Figures 1, 3.

Acryptolaria andersoni Totton 1930, p 161.

Remarks

As stated above, the type material of *A. andersoni*, type species of the genus *Acryptolaria*, is presumably lost. Although there is little doubt that Totton's species actually belongs to *Acryptolaria*, it is impossible to assign any material to it without examining its type.

As indicated before, Norman (1875) did not recognize the coppinia of *A. andersoni*, wrongly describing it as a new species of hydroid (*Scapus tubulifer*).

Acryptolaria angulata (Bale, 1914)

(Figures 2, 17B; Table II)

Cryptolaria angulata Bale 1914, p 166–167, Plate 35 Figure 1; 1915, p 251; Stranks 1993, p 7.

Acryptolaria angulata: Schuchert 2003, p 155–156, Figure 14.

Not *Acryptolaria angulata*: Vervoort 1966, p 116–117, Figure 16 [= *A. rectangularis* (Jarvis, 1922)].

Not *Acryptolaria angulata*: Hirohito 1995, p 102, Figure 29a, b, Plate 6 Figure B [= *A. bulbosa* (Stechow, 1932)].

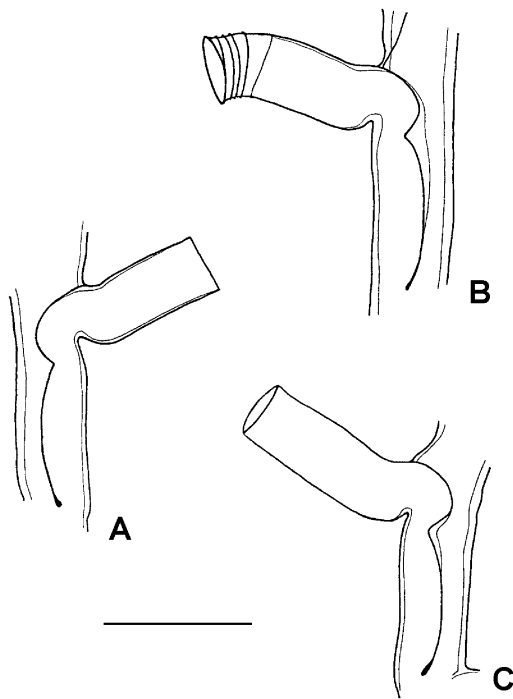


Figure 2. *Acryptolaria angulata* (Bale, 1914). (A–C) Hydrothecae. All drawings from the holotype. Scale bar: 400 μm .

Material examined

Holotype: three microslides from the Museum of Victoria, Melbourne, MV F58335.

Description

“Hydrophyton about three inches in height [76.2 mm], branched and re-branched in one plane; branches irregular, neither opposite nor alternate, slender, fascicle-tubes not numerous” (Bale 1914, p 166).

Table II. Morphometric data of the type material of *Acryptolaria angulata* (in μm).

	Mean \pm SD	Range	n
Hydrothecae			
Length of abcauline wall	850.4 \pm 72.2	784–952	7
Length of free adcauline wall	341.1 \pm 56.6	291–425	7
Length of adnate adcauline wall	615.1 \pm 106.7	392–719	7
Length of adcauline wall	948.3 \pm 114.1	706–1032	7
Ratio adnate/free adcauline wall		1.2–2.3	
Diameter at aperture	167.3 \pm 7.9	156–179	7
Diameter at base	88.0 \pm 9.1	78–101	7
Nematocysts			
Larger group	8.6 \pm 0.5 \times 4.9 \pm 0.5	7.7–8.8 \times 4.4–5.5	5

Hydrothecae alternately arranged approximately in one plane. Hydrotheca mostly cylindrical, but with two distinct constrictions due to sharp perisarc invaginations, narrowing hydrothecal diameter which, in any case, is smaller at the adnate part; diameter also decreasing at basal part. Hydrotheca curved twice: strongly abcaulinarily at distal part of adnate portion and slightly upwards just after the adnate wall becomes free. Abcauline wall straight but strongly inflected at approximately half of its length and provided with a sharp invagination at that point; basal half parallel to longitudinal axis of branch, distal half forming an angle of ca 70° with that axis. Adcauline wall adnate for approximately half its length, though hydrothecae with free part longer or shorter than adnate part also present. Adcauline wall convex at adnate part, with a strong invagination at approximately half of its length. Hydrothecal aperture circular, oblique, upwardly directed. Rim even, sometimes with several short renovations.

Coppinia not observed.

Remarks

All material examined consisted of microslide preparations, making it difficult to find nematocysts. However, at least one category of nematocyst is present.

Although the material studied is in three whole-mount preparations, we believe it belongs to a single colony, as there is no indication that the original description (Bale 1914) was based on more than one colony. Therefore, we considered the three slides as parts of the holotype.

Bale (1914, p 166) characterized this species by the “sharply geniculate outward bend, with the noticeable crease in the angle, also by the distinct boss projecting into the hydrothecal cavity, opposite the crease. Immediately after the bend the axis of the hydrotheca is at a right angle with that of the lower portion, but it usually bends a little upward again, so that the distal half is not horizontal but slightly ascending”. The distinct adcauline invagination of perisarc was also found by Vervoort (1966) examining a slide-mounted specimen, which he believed to be Bale’s schizosyntype or schizoparatype, and by Schuchert (2003), who also examined type material of *Acryptolaria angulata* (three slides belonging to syntype).

Although the species *A. angulata*, *A. bulbosa*, and *A. rectangularis* share some similarities, we regard them as valid. However, confusion concerning these species may be found in the literature. At least two records of *A. angulata* refer to different species: Hirohito’s (1995) material, lacking the adcauline invagination, is here considered referable to *A. bulbosa* (see below), and the material described by Vervoort (1966) is here considered as *A. rectangularis* (see below).

Distribution

Acryptolaria angulata has been collected at depths from 180 (Bale 1914) to 324 m (Bale 1915) on bottoms of sandy mud and small stones (Schuchert 2003). At present, it is known only from the Great Australian Bight (Bale 1914, 1915) and the Kei Islands, Indonesia (Schuchert 2003).

Acryptolaria bulbosa (Stechow, 1932)

(Figure 3; Table III)

Cryptolaria bulbosa Stechow 1932, p 87.

Acryptolaria bulbosa: Yamada 1959, p 49.

Acryptolaria angulata: Hirohito 1995, p 102, Figure 29a, b, Plate 6 Figure B.

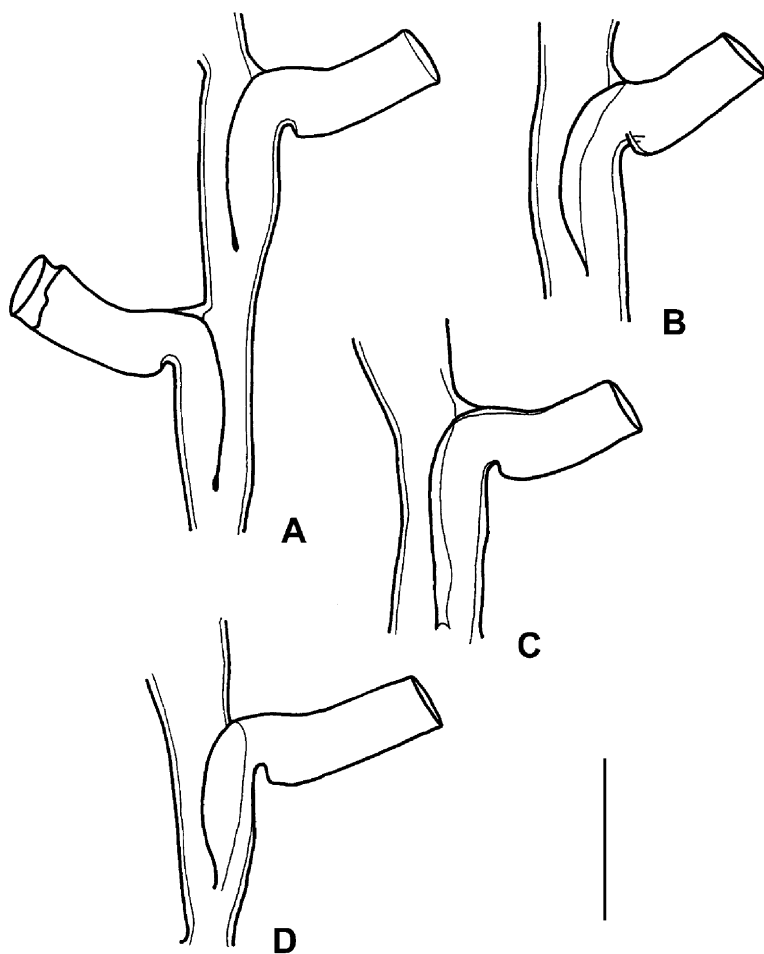


Figure 3. *Acryptolaria bulbosa* (Stechow, 1932). (A) Part of branch showing hydrothecal arrangement; (B–D) hydrothecae. All drawings from the holotype. Scale bar: 400 μ m.

Material examined

Holotype: Sagami Bay, Japan, “Doflein” Expedition 1904, on sponge, sterile specimen in two whole-mount preparations and in alcohol (ZSM no number).

Description

Several fragments up to 25 mm long (Stechow 1932, p 87). Polysiphonic almost throughout. Branches straight.

Hydrothecae alternately arranged, approximately in one plane. Hydrotheca mostly cylindrical; though diameter smaller at adnate portion and decreasing at basal part. Hydrotheca curved twice; strongly outwards at approximately half its length and later slightly upwards, clearly far from the point at which the adcauline wall becomes free. Adcauline wall slightly convex at basal part, extremely convex at approximately half its length and concave at distal third. Abcauline wall straight or slightly convex at basal and

Table III. Morphometric data of the type material of *Acryptolaria bulbosa* (in μm).

	Mean \pm SD	Range	n
Hydrothecae			
Length of abcauline wall	710.4 \pm 31.2	680–760	5
Length of free adcauline wall	360.0 \pm 57.7	280–440	5
Length of adnate adcauline wall	464.0 \pm 53.7	400–520	5
Length of adcauline wall	824.0 \pm 27.7	800–864	5
Ratio adnate/free adcauline wall		0.9–1.9	
Diameter at aperture	155.2 \pm 4.4	152–160	5
Diameter at base	78.4 \pm 6.7	72–88	5
Nematocysts			
Larger group	22.1 \pm 0.6 \times 6.4 \pm 0.3	21–23 \times 6–7	10
Smaller group	7.2 \pm 0.3 \times 3	7–7.5 \times 3	3

distal third, but provided with a sharp invagination at approximately half its length, forming a sort of hump. Approximately half of adcauline wall adnate to internode, though hydrothecae with free part either longer or shorter than adnate one also present. Hydrothecal aperture circular, oblique, upwardly directed. Rim even, sometimes with up to four short renovations.

Coppinia not observed.

Additional information

Hirohito (1995, p 102) described the gonosome of this species (as *A. angulata*), noting that the bottle-shaped gonothecae are aggregated into a coppinia, that the gonophores are in the form of fixed sporosacs, producing acrocysts, and that there are modified hydrothecae diverging and entangled with each other, forming a canopy.

Remarks

Acryptolaria bulbosa has been considered conspecific with *A. angulata* by several authors (e.g. Hirohito 1995; Vervoort and Watson 2003). Stechow (1932) considered that the species should be called *Cryptolaria angulata* var. *bulbosa* if transitions were found. Nevertheless, we consider both species as valid. Although the general appearance of the hydrothecae is similar, only *A. angulata* is characterized by the presence of the adcauline boss projecting into the hydrothecal cavity. Moreover, we have found clear differences in the size of the larger nematocysts in the cnidome of the type material of *A. angulata* and *A. bulbosa* (7.7–8.8 \times 4.4–5.5 μm and 21–23 \times 6–7 μm , respectively). There are also slight differences in the shape of the hydrotheca. In *A. angulata* the upward bending of the hydrotheca begins almost immediately after the adcauline wall becomes free, whereas in *A. bulbosa* it starts distinctly further, with a relatively long free portion of the adcauline wall forming an angle more or less perpendicular to the longitudinal axis of the branch. The abcauline side of the abcauline perisarc invagination is distinctly sharper in *A. bulbosa*, and the abcauline wall forms a much marked hump after it. Furthermore, the size of the hydrotheca in *A. angulata* seems to be larger, especially concerning the length of the hydrotheca (cf. Table XV).

The material from Sagami Bay described as *Acryptolaria angulata* by Hirohito (1995, p 102), who considered *Cryptolaria angulata*, *C. rectangularis*, and *C. bulbosa* conspecific,

clearly does not belong to Bale's species, as it lacks the adcauline invagination of the hydrothecal wall. The general shape of the hydrotheca conforms better with *A. bulbosa*.

The material described by Gravier-Bonnet (1979) as *A. rectangularis* is different from that described by Jarvis (1922) and Millard (1967, in part), and it is quite similar to *A. bulbosa* both in shape and size of the hydrotheca.

The material assigned to *A. rectangularis* by Millard (1967) apparently includes two species: *A. rectangularis* (ABD 15P) and *A. bulbosa* (AFR 1251D). Millard indicated that "the two samples have hydrothecae of very different sizes, though the proportions are similar". Moreover, it is possible to recognize both species in Millard's (1967) figures. If these records can be confirmed, the southwestern Indian Ocean would be an area of sympatry of *A. rectangularis* and *A. bulbosa*.

The material assigned to *Acryptolaria rectangularis* by Millard (1968) conforms more to the concept of *A. bulbosa* adopted here, particularly in the shape and the size of the hydrothecae. In *A. rectangularis* the free portion of the adcauline wall is straight, whereas in *A. bulbosa* it is concave and distinctly bends upwards, as described by Millard. Therefore, the two coppiniae described by her would be, actually, the still undescribed coppiniae of *A. bulbosa*.

The same applies to Millard's (1980) material of *Acryptolaria rectangularis*, which could belong to *A. bulbosa*. Although she provided neither figure nor measurements of the hydrothecae, she stressed that the "trophosome of these specimens agrees entirely with those previously described" (Millard 1980, p 138). She provided a detailed description of the coppinia, this time based on well-preserved material (Millard 1980, p 138–140). The structure of this coppinia is similar to that described by Hirohito (1995) in material assigned to *A. angulata*, and here considered conspecific with *A. bulbosa*.

Schuchert's (2003) material assigned to *A. rectangularis* agrees with Stechow's material of *A. bulbosa* here studied. The specimens are similar in the size of the hydrotheca, as well as in the size of the nematocysts ($23 \times 7 \mu\text{m}$ and $5 \times 3 \mu\text{m}$). However, Schuchert's figures are similar to *A. rectangularis* in the shape of the hydrothecae and, therefore, no decision seems possible at the moment.

Distribution

Apart from the many possible records, the species is only known with certainty from Sagami Bay (Stechow 1932; Hirohito 1995), where it was collected at 100 m (Hirohito 1995).

***Acryptolaria conferta* (Allman, 1877)**

(Figures 4, 15B, 17C, 19A; Table IV)

Cryptolaria conferta Allman 1877, p 17, 19, 20, Plate 12 Figures 6–10.

Material examined

Holotype: MCZ 45715, off Cojima, Cuba, 450 fathoms (810 m).

Description

"Hydrocaulus attaining a height of about two inches [50.8 mm], much and irregularly or subdichotomously branched, fascicled except towards the terminations of the branches" (Allman 1877, p 17).

Table IV. Morphometric data of the type material of *Acryptolaria conferta* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	801.4 \pm 74.4	700–944	10
Length of free adcauline wall	360.0 \pm 49.8	280–440	10
Length of adnate adcauline wall	646.2 \pm 56.9	560–760	10
Length of adcauline wall	1016.2 \pm 88.2	920–1200	10
Ratio adnate/free adcauline wall		1.4–2.4	
Diameter at aperture	192.4 \pm 8.7	180–208	10
Diameter at base	79.4 \pm 9.1	70–96	10
Nematocysts			
Larger group	20.3 \pm 0.5 \times 8.2 \pm 0.5	19.5–21 \times 7.5–9	6
Smaller group	6.8 \pm 0.4 \times 2.8 \pm 0.4	6.5–7 \times 2.5–3	2

Branches in distinct zigzag pattern. Hydrothecae alternate, more or less in one plane. Hydrotheca tubular, almost cylindrical in the free part; diameter softly decreasing towards basal part. Hydrotheca gently curved abcaulinarily; approximately two-thirds of adcauline wall adnate to internode. Adcauline wall convex, except the straight basal third. Abcauline wall concave, though practically straight at basal third. Sometimes, a ring of nodules visible at the base of the hydrothecae. Hydrothecal aperture circular, slightly directed upwards. Rim even, sometimes with short renovations.

According to Allman (1877, p 18), the fusiform coppinia consists of a mass of closely set, flask-shaped gonothecae provided with a distal neck ending in an even circular orifice. Each gonotheca gives rise to a single ovum, subsequently lodged in an acrocyst. The coppinia lacks defensive tubes.

Remarks

According to Allman (1877, p 17–18) the hydrotheca has a distinct floor, which possibly disappears with age, being completely absent in the older hydrothecae immersed in the fascicled stem. The examination of type material has left no doubt that the hydrotheca lacks any floor, as shown in Figures 4, 17C. However, as indicated above, a ring of nodules is sometimes visible at the base of the hydrothecae.

Ritchie (1911) proposed *Cryptolaria conferta* var. *australis*, differing from the nominotypical variety mainly in the growth-form and slightly smaller hydrothecae. Totton (1930) and Ralph (1958) considered the overlapping hydrothecae and the absence of any slight convexity at the base of the abcauline wall as the main diagnostic characters of the variety. Millard (1968) found those characters variable within a colony and, therefore, held that it was not justifiable to retain Ritchie's form as a separate variety or subspecies. Vervoort and Watson (2003, p 43) considered the subspecies *A. c. australis* and the nominotypical subspecies as conspecific.

Ramil and Vervoort (1992) described a new subspecies, *Acryptolaria conferta minor*, as it had smaller hydrothecae than the material referred to *A. conferta* in their collection and did not intergrade with it (Ramil and Vervoort 1992, p 46–48). Under the synonymy of this subspecies, Ramil and Vervoort (1992, p 43) included the records of *Acryptolaria gracilis* by Billard (1906b, 1906c) and Patrìti (1970), but not *Acryptolaria gracilis* by Totton (1930) and Ralph (1958), that would be synonyms of the valid species *Acryptolaria gracilis* (Allman, 1888) (see below). We believe that, without further

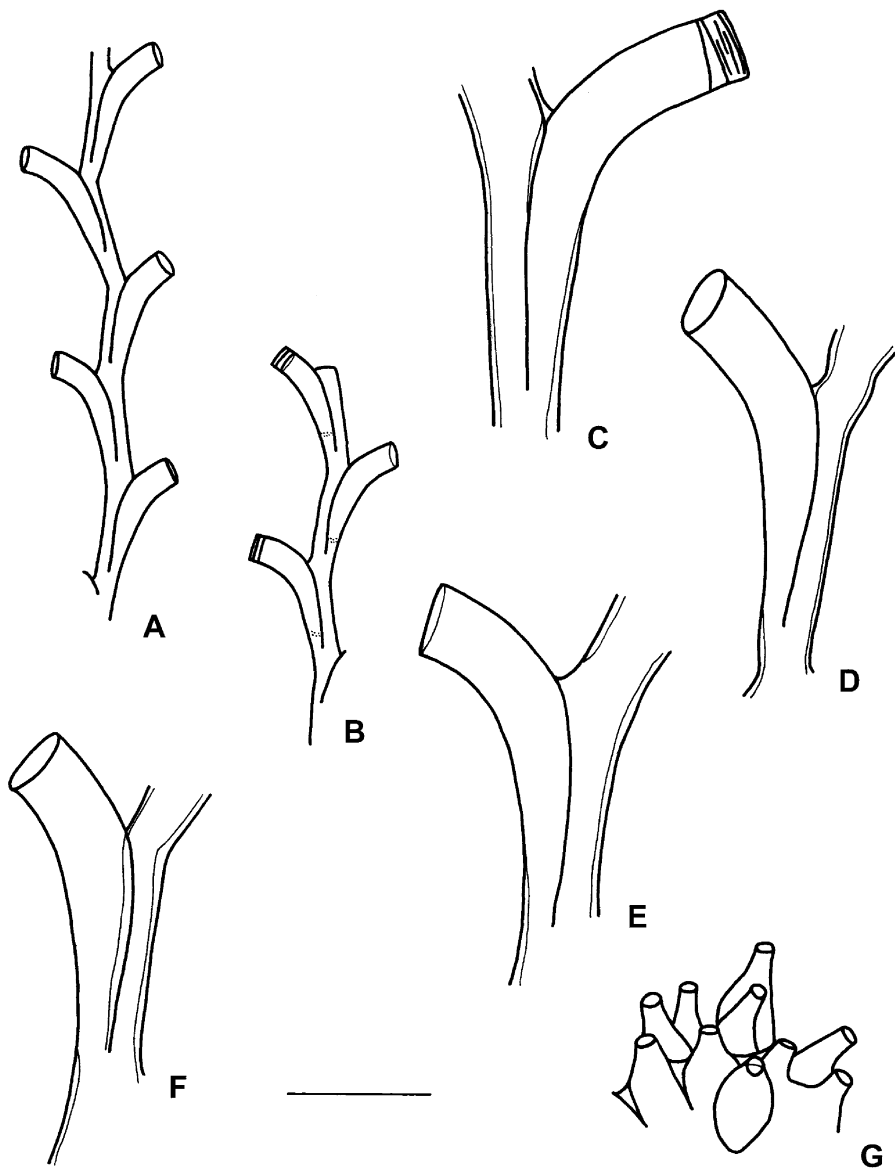


Figure 4. *Acryptolaria conferta* (Allman, 1877). (A, B) Branch fragments showing hydrothecal arrangement; (C–F) hydrothecae; (G) gonothecae. All drawings from the holotype. Scale bar: 1 mm (A, B); 400 μ m (C–G).

information on cnidome and a broader revision of the species records, the description of a new subspecies is premature.

The material assigned to *A. conferta* by Hirohito (1995) has several coppiniae, either with or without protective hydrothecae, branched in rare occasions. It is likely that Hirohito's material embraces more than one species. In fact, his material probably includes a new species of *Acryptolaria*, since the known species described so far, with the exception of *A. bulbosa* and *A. rectangularis*, lack defensive modified hydrothecae in the

coppinia, and in these species the structure of the coppinia, with the modified hydrothecae forming a canopy, and the shape of the hydrothecae are completely different.

Although *Acryptolaria conferta* is the most frequently recorded species of the genus, most of the records refer to sterile material and none gives information on the cnidome. Because the species has no clearly distinguishing features, we considered only the original record as representative of its geographical distribution.

Distribution

Off Cojima, Cuba, 810 m (Allman 1877).

Acryptolaria corniformis Naumov and Stepanjants, 1962

(Figures 5, 15C, 17D; Table V)

Acryptolaria corniformis Naumov and Stepanjants 1962, p 74, Figure 2; Stepanjants 1979, p 51, Plate 9 Figures 1–3.

Material examined

Holotype: ZIRAS 1/10322, Ob Sta. 44A, 65°50'03" S, 128°27' E, 18 March 1956, 320 m, silty sand, one distal stem fragment ca 20 mm long, without coppinia (in slide).

Description

“A small fragment of a colony (2 cm long) with polysiphonic caulus and alternative ramifications” (Naumov and Stepanjants 1962, p 73). Branches in a slight zigzag.

Hydrothecae alternately arranged in approximately one plane. Hydrotheca horn-shaped, diameter gradually decreasing from aperture to basal part. Hydrotheca slightly curved abcaulinarily; basal half to two-thirds of adcauline wall adnate to internode. Adcauline wall slightly convex; abcauline wall slightly concave. Hydrothecal aperture circular, strongly directed upwards, forming an angle of ca 35° with longitudinal axis of branch. Rim even, sometimes with few short renovations.

Coppinia not observed.

Table V. Morphometric data of the type material of *Acryptolaria corniformis* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	1745.0 \pm 167.6	1600–1900	4
Length of free adcauline wall	827.5 \pm 105.3	680–930	4
Length of adnate adcauline wall	1130.0 \pm 162.1	920–1300	4
Length of adcauline wall	1957.5 \pm 223.2	1770–2230	4
Ratio adnate/free adcauline wall		1.1–1.6	
Diameter at aperture	355.0 \pm 33.2	320–400	4
Diameter at base	110.0 \pm 10.0	100–120	3
Nematocysts			
Larger group	12.3 \pm 2.5 \times 4.3 \pm 1.2	10–15 \times 3–5	3

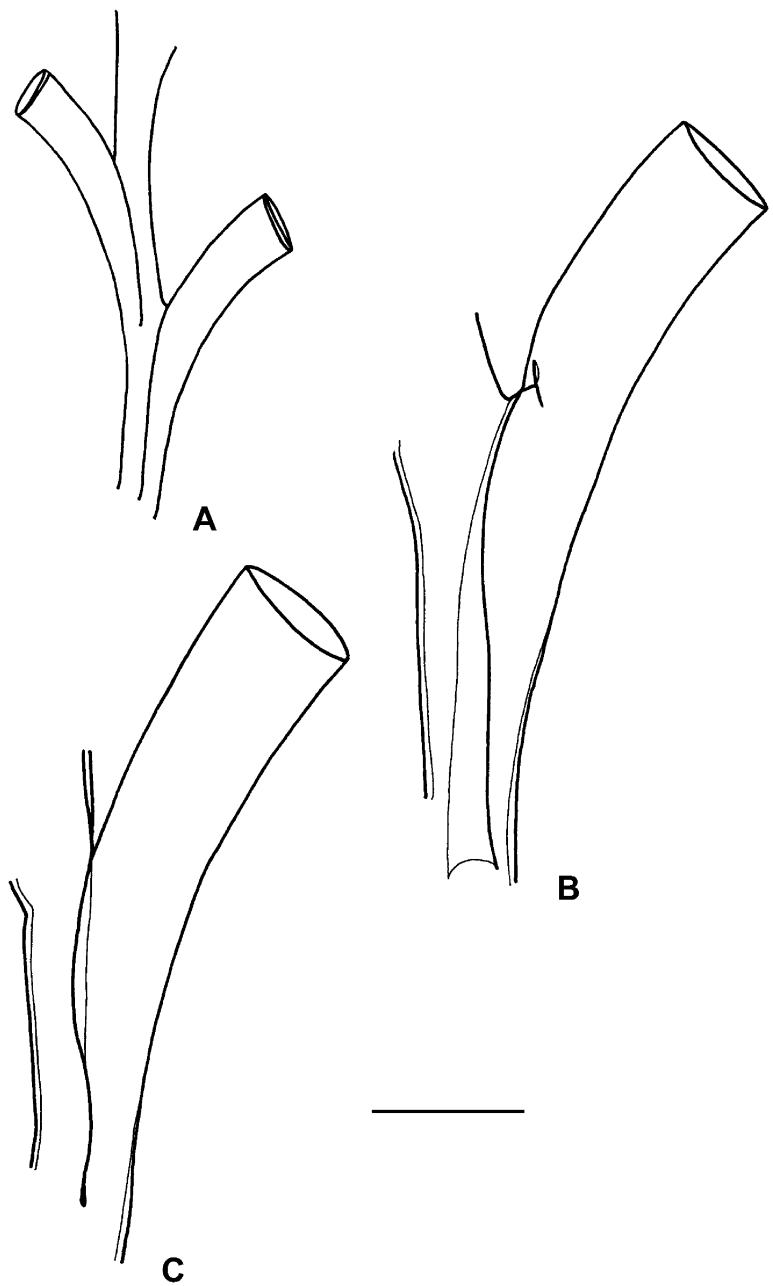


Figure 5. *Acryptolaria corniformis* Naumov and Stepanjants, 1962. (A) Branch fragment showing hydrothecal arrangement; (B, C) hydrothecae. All drawings from the holotype. Scale bar: 1 mm (A); 400 μ m (B, C).

Remarks

The material available consists of a microslide preparation; nematocysts are extremely difficult to find. However, putative nematocysts were seen.

Naumov and Stepanjants (1962) indicated that *A. corniformis* is allied with *A. crassicaulis*, being different in the larger dimensions of the hydrothecae and the greater length of the free adcauline part in *A. corniformis*. Stepanjants (1979) again pointed out the similarity between *A. corniformis* and *A. crassicaulis*, but differentiated both species by the smaller hydrothecae, more curved longitudinal axis, and less pronounced difference between the diameters of the aperture and basal part in *A. crassicaulis*. Gravier-Bonnet (1979), however, considered both species conspecific based on the habit of the colony and measurements. After examining the type material of both species, we consider that they constitute two valid, clearly distinguishable species (see below under the discussion of *A. crassicaulis*).

Distribution

Off Sabrina Coast (Antarctica), 289 m depth (cf. Naumov and Stepanjants 1962; Stepanjants 1979).

Acryptolaria crassicaulis (Allman, 1888)

(Figures 6, 15D, 17E; Table VI)

Cryptolaria crassicaulis Allman 1888, p lvii, lxvii, lxviii, 41, Plate 19, Figures 3, 3a.

Material examined

Holotype: BMNH 1888.11.13.29, Challenger expedition, Sta. 344, off Ascension Island, 07°54'20"N, 14°28'20"W, 420 fathoms (756 m), volcanic sand. One colony consisting of several stems up to 65 mm long.

Description

“Colony attaining a height of four inches [101.6 mm], profusely and very irregularly branched main stem” (Allman 1888, p 41). Colony apparently composed of several stems growing tight together on a coral fragment. Longest stem ca 65 mm high.

Stem strongly polysiphonic; only distalmost branches monosiphonic. Stems branched more or less irregularly in one plane. Some basal branches becoming lower-order stems; branches up to five-order, sometimes anastomosing.

Table VI. Morphometric data of the type material of *Acryptolaria crassicaulis* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	1274.7 \pm 151.0	1144–1440	3
Length of free adcauline wall	509.3 \pm 161.7	416–696	3
Length of adnate adcauline wall	1045.3 \pm 72.2	976–1120	3
Length of adcauline wall	1554.7 \pm 172.8	1392–1736	3
Ratio adnate/free adcauline wall		1.5–2.7	
Diameter at aperture	245.3 \pm 12.2	232–256	3
Diameter at base	109.3 \pm 9.2	104–120	3
Nematocysts			
Larger group	15.2 \pm 0.8 \times 5.0 \pm 0.2	14–16.5 \times 4.5–5.5	10
Smaller group	7.5 \pm 0.7 \times 3.0 \pm 0.0	7–8 \times 3	2

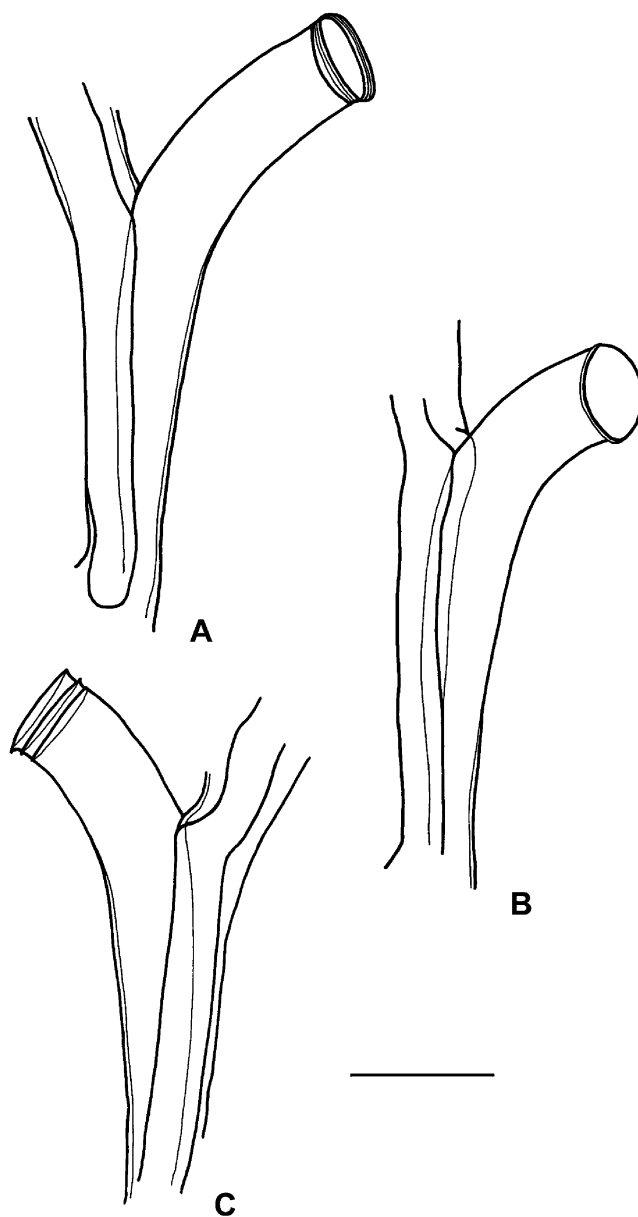


Figure 6. *Acryptolaria crassicaulis* (Allman, 1888). (A–C) Hydrothecae. All drawings from the holotype. Scale bar: 400 μm .

Hydrothecae alternately arranged in approximately one plane. Hydrotheca tubular, cylindrical in the free part; diameter softly decreasing towards basal part. Hydrotheca curved abcaulinarily, especially at distal part; ca two-thirds of adcauline wall adnate to internode. Free part of adcauline wall distinctly convex; adnate part only slightly convex. Abcauline wall straight basally, but clearly concave at distal third. Hydrothecal aperture circular, directed upwards. Rim even, sometimes with few short renovations.

Coppinia not observed.

Remarks

Allman (1888, p 41) characterized this species by the “profuseness and irregularity of its ramification, and for the great thickness of its stem and principal branches. The ultimate branches on the other hand are slender and flaccid. The hydrothecae are stout, and the exerted portion rather long. Here and there, and at uncertain intervals, slight constrictions may be noticed in the branches”.

As indicated above, *Acryptolaria crassicaulis* has been regarded by some authors as conspecific with *A. corniformis*. Nevertheless, we consider that both species are valid. *Acryptolaria corniformis* has distinctly larger hydrothecae (cf. Table XV) and the hydrothecae are not so bent abcaulinarily as in *A. crassicaulis*, in which they are strongly abcaulinarily directed at distal third.

A variety of the species, *Acryptolaria crassicaulis* var. *dimorpha*, was described for the genus *Cryptolaria* by Ritchie (1911) from Australian waters, based on the presence of single hydrothecae. The subspecies was subsequently recorded by Jarvis (1922) for Solomon Islands. Millard (1967, p 174) properly stated that “as the ability to produce solitary hydrothecae is a feature common to many, and possibly all, Lafoeidae, it is not necessary to retain Ritchie’s variety *dimorpha*”, a position adopted by Gravier-Bonnet (1979, p 20).

Distribution

Off Ascension Island, 07°54'20" N, 14°28'20" W, 756 m, volcanic sand (Allman 1888).

***Acryptolaria flabellum* (Allman, 1888)**

(Figures 7, 15E, 17F, 19F; Table VII)

Cryptolaria flabellum Allman 1888, p lvii, lxii, lxviii, 40, Plate 19 Figure 1a.

Material examined

Holotype: BMNH 1888.11.13.27, H.M.S. *Challenger*, Sta. 24, 18°38'30" N, 65°05'30" W, off Culebra Island, West Indies, 390 fathoms (702 m), pteropod ooze.

Description

“Colony attaining a height of about one inch [25.4 mm]; hydrocaulus rigid, rooted by a thick disc-like expansion, ramification in a single plane, and irregular” (Allman 1888, p 40).

Table VII. Morphometric data of the type material of *Acryptolaria flabellum* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	892.0 \pm 88.1	700–960	7
Length of free adcauline wall	358.2 \pm 110.1	230–504	10
Length of adnate adcauline wall	770.6 \pm 143.7	490–880	7
Length of adcauline wall	1073.1 \pm 106.4	840–1160	7
Ratio adnate/free adcauline wall		1.4–3.8	
Diameter at aperture	143.8 \pm 8.0	136–160	10
Diameter at base	95.2 \pm 11.5	75–104	6
Nematocysts			
Larger group	15 \times 5	15 \times 5	1

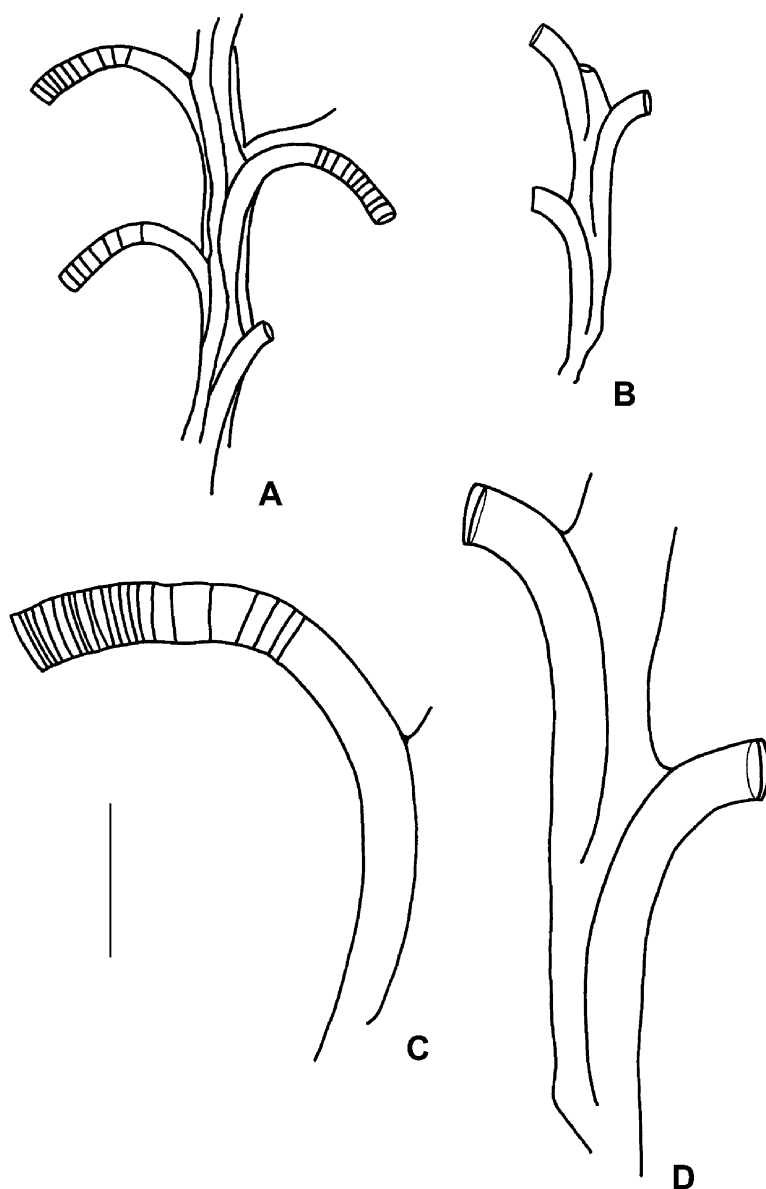


Figure 7. *Acryptolaria flabellum* (Allman, 1888). (A, B) Branch fragments showing hydrothecal arrangement; (C, D) hydrothecae. All drawings from the holotype. Scale bar: 1 mm (A, B); 400 μ m (C, D).

Stem completely polysiphonic, ca 20 mm in height. Hydrorhiza dish-shaped. Stem slightly geniculate with six first-order branches, one with incipient secondary branch. The three more basal branches also polysiphonic; polysiphony decreasing distally.

Hydrothecae alternate, more or less in one plane. Hydrotheca cylindrical, diameter only slightly decreasing at most basal part, gently curved abcaulinarily, especially at distal part;

from two-thirds to six-sevenths of adcauline wall adnate to internode. Adcauline wall convex. Abcauline wall concave at distal half, though practically straight at basal half. Hydrothecal aperture circular, parallel to longitudinal axis of branch or slightly directed upwards or downwards. Rim even, usually with numerous renovations (four to 90) which curve hydrothecal aperture downwards; the most distal hydrothecae with few short renovations. Hydrothecal perisarc longitudinally striated.

Coppinia not observed.

Remarks

The material examined lacked coenosarc, and it was almost impossible to find nematocysts; a single putative nematocyst was observed.

As noted by Allman (1888, p 40), the rigid habit, the ramification in one plane and, especially, the long curved hydrothecae make the species quite distinctive from other species of *Acryptolaria*.

The study of the type material of *Cryptolaria flabellum* has confirmed that it belongs to the genus *Acryptolaria*, as was already indicated by Fraser (1944) and Vervoort (1968), who based their opinions particularly on the alternate pattern of the hydrothecal arrangement.

Vervoort (1972) studied material of a species of *Cryptolarella* from deep waters of the tropical eastern Pacific, west of Peru, and considered it conspecific with Allman's *Cryptolaria flabellum*—this fact supported his decision in transferring Allman's species to the genus *Cryptolarella*. Although the material studied by Vervoort clearly belongs to the genus *Cryptolarella*, as can be concluded by the morphology of its gonothecae (cf. Marques et al. 2005), Allman's species is undoubtedly a species of *Acryptolaria*.

Naumov (1960) described rare material sampled in the Bering and Okhotsk Seas as *Cryptolaria flabellum*, but Vervoort (1972) regarded it as belonging to a new species, distinct from *Cryptolarella flabellum*, because of the shorter hydrothecal length, the more dense sets of hydrothecae, the lack of the initial arrangement in slightly displaced pairs, and the extremely high number of distal hydrothecal renovations. According to Marques et al. (2005), Naumov's material seems similar to the type species of *Cryptolarella abyssicola*, except for the presence of numerous renovations in the older (=basal) hydrothecae. This and the fact that Naumov's material was not sufficiently described (infertile material) makes it impossible to evaluate its specific status, although we consider plausible that it belongs, indeed, to *Acryptolaria flabellum*.

Distribution

Off Culebra Island, 18°38'30"N, 65°05'30"W, 702 m, pteropod ooze.

Acryptolaria gracilis (Allman, 1888)

(Figures 8, 15F, 18A, 19C; Table VIII)

Cryptolaria gracilis Allman 1888, p lvii, lxxv, lxxviii, 42, Plate 20 Figures 2, 2a.

Material examined

“Cotype” (part of the holotype), ZMUC no number, H.M.S. *Challenger*, Sta. 169, New Zealand, off East Cape, 37°34' S, 179°22' E, 10 July 1874, 700 fathoms (1260 m), three fragments 18, 13, and 12 mm long (13 mm fragment in bad condition).

Table VIII. Morphometric data of the type material of *Acryptolaria gracilis* (in μm).

	Mean \pm SD	Range	n
Hydrothecae			
Length of abcauline wall	846.6 \pm 40.5	760–920	13
Length of free adcauline wall	253.7 \pm 37.6	176–320	13
Length of adnate adcauline wall	790.8 \pm 31.8	720–864	13
Length of adcauline wall	1044.5 \pm 53.8	960–1184	13
Ratio adnate/free adcauline wall		2.4–4.5	
Diameter at aperture	211.9 \pm 9.4	200–232	13
Diameter at base	88.0 \pm 7.8	80–100	13
Nematocysts			
Larger group	24.8 \pm 1.8 \times 9.0 \pm 0	23.5–26 \times 9	2
Smaller group	6.8 \pm 0.4 \times 2.5 \pm 0	6.5–7 \times 2.5	2

Description

“Colony attaining a height of about two inches [50.8 mm]; stem slender, flaccid, much and irregularly branched, and with the distal portion for a great extent destitute of the peripheral tubes” (Allman 1888, p 42).

Stem fragments irregularly branched in several planes. Fragment 18 mm long with secondary branches. Accessory tubes almost reaching the most distal parts of branches.

Hydrothecae alternate, more or less one plane. Hydrotheca tubular, cylindrical at distal half, diameter approximately constant from hydrothecal aperture to the middle of hydrothecal length, then slightly decreasing up to become more or less constant, forming a kind of bottleneck at the most basal part. Hydrotheca gently curved abcaulinarily; approximately three-quarters of adcauline wall adnate to internode. Adcauline wall mostly convex, but concave at basal fourth. Abcauline wall straight or slightly convex at basal half, concave at distal half. Hydrothecal aperture circular, directed upwards, forming an angle of ca 45° with longitudinal axis of branch. Rim even, sometimes with up to five short renovations.

Coppinia not observed.

Remarks

There is some confusion regarding the naming of the type material of this species. Allman (1888) did not specify holotypes in his paper and part of the material studied by him is now deposited in the collections of the ZMUC (labelled as “cotype”) and the BMNH. The International Commission on Zoological Nomenclature (1999) considered that “cotype” is a term not recognized by the Code, formerly used for either syntype or paratype, and should not be used anymore in zoological nomenclature (Recommendation 73E); in the case of colonial material, cotype was also used in the sense of “part of the holotype material”. On the other hand, the BMNH material was referred as “holotype” by Vervoort and Watson (2003), who also referred to a “paratype” present in the collection of the Nationaal Natuurhistorisch Museum (RMNH). Although it is possible to consider the existence of split holotypes (with the same collection data of the original description of the species), “paratypes” may not be considered as valid, as there was no such designation by Allman (1888). In the case that the original material is regarded as being “syntypes”, a lectotype should be selected.

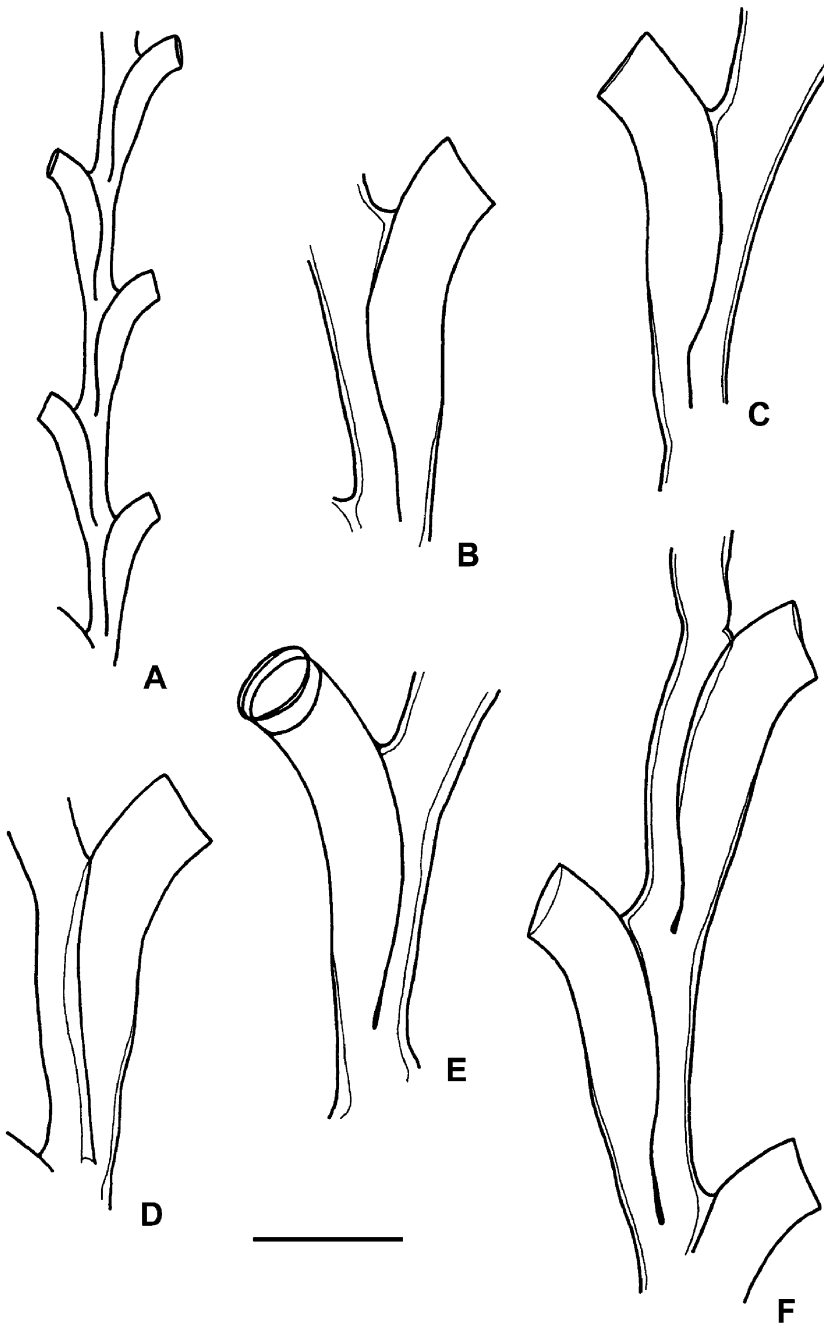


Figure 8. *Acryptolaria gracilis* (Allman, 1888). (A) Branch fragment showing hydrothecal arrangement; (B–F) hydrothecae. All drawings from the “cotype”. Scale bar: 1 mm (A); 400 μ m (B–F).

Vervoort and Watson (2003), after examining part of the supposed “holotype” in the Natural History Museum (88.11.13.31), found this species to be quite near to *Acryptolaria conferta*, noting that it was extremely difficult to define characters by which the two could be distinguished. Finally, they pointed out that both species may well be conspecific. Actually,

the association of nominal records of *A. gracilis* and *A. conferta* is long known in the literature, such as the synonymy of the records of *A. gracilis* by Billard (1906b, 1906c) and Patriiti (1970) (cf. Ramil and Vervoort 1992, p 43; see above). In our opinion, however, both species are clearly distinguishable. Although the hydrothecae are of similar size (cf. Table XV), in *A. conferta* the free portion of the adcauline hydrothecal wall is distinctly longer, its hydrothecae lack the basal bottleneck (the most distinctive character for *A. gracilis*), and the branches form a clear zigzag. Finally, *A. gracilis* has larger nematocysts ($19.5\text{--}21 \times 7.5\text{--}9\text{ }\mu\text{m}$ in *A. conferta*).

Distribution

Off East Cape, New Zealand, $37^{\circ}34'$ S, $179^{\circ}22'$ E, 1260 m, mud.

Acryptolaria longithec (Allman, 1877)

(Figures 9, 16A, 18B; Table IX)

Cryptolaria longithec Allman 1877, p 18, 19, 20, Plate 13, Figures 4, 5; Clarke 1879, p 240, 244, Plate 2 Figures 7–13.

Material examined

Holotype: MCZ 45714, off Double-Headed Shot Key, 315 fathoms (567 m), numerous small fragments up to 15 mm long.

Description

“Hydrocaulus attaining a height of about two inches [50.8 mm], pinnately but not profusely branched” (Allman 1877, p 19). Presently, type material consisting of numerous small fragments up to 15 mm in length. Fragment 15 mm long belonging to basal part of stem, completely polysiphonic, slightly geniculate and with a basally flat hydrorhiza probably indicating attachment to hard substratum.

Hydrothecae alternately arranged almost in one plane, forming an obtuse angle. Hydrotheca tubular, cylindrical in the free portion, then diameter slightly decreasing to basal part. Hydrotheca strongly curved abcaulinarily; approximately half of adcauline wall adnate to internode. Free portion of adcauline wall practically straight, adnate part slightly convex.

Table IX. Morphometric data of the type material of *Acryptolaria longithec* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	1053.6 ± 69.5	940–1144	10
Length of free adcauline wall	548.8 ± 75.6	420–680	10
Length of adnate adcauline wall	740.0 ± 27.0	712–784	10
Length of adcauline wall	1288.8 ± 75.0	1180–1400	10
Ratio adnate/free adcauline wall		1.1–1.8	
Diameter at aperture	254.0 ± 12.1	240–280	10
Diameter at base	111.2 ± 9.4	100–128	10
Nematocysts			
Larger group	$22.0 \pm 0.6 \times 7.2 \pm 0.4$	$21\text{--}23 \times 6.5\text{--}8$	10
Smaller group	$8.0 \pm 0 \times 3.3 \pm 0.3$	$8 \times 3\text{--}3.5$	3

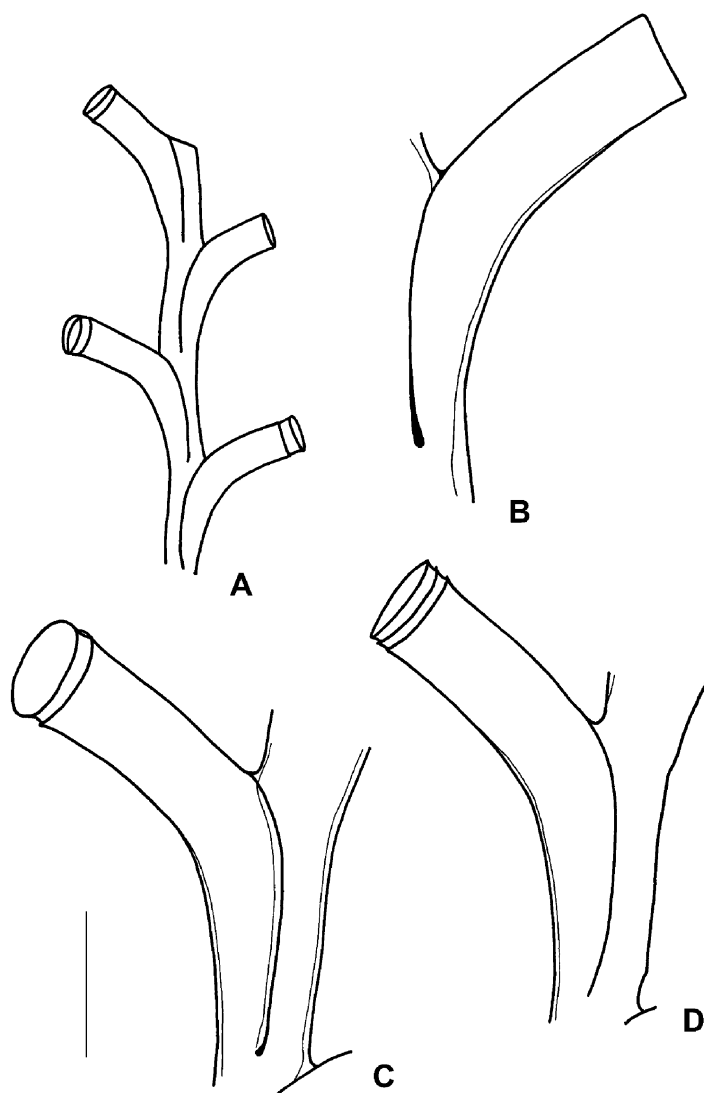


Figure 9. *Acryptolaria longithecata* (Allman, 1877). (A) Branch fragment showing hydrothecal arrangement; (B–D) hydrothecae. All drawings from the holotype. Scale bar: 1 mm (A); 400 μ m (B–D).

Abcauline wall concave. Hydrothecal aperture circular, directed upwards, forming an angle of ca 60° with longitudinal axis of branch. Rim even, sometimes with few short renovations.

Coppinia not observed.

Remarks

All material studied by us and assigned to *A. longithecata* seems to belong to the same colony that corresponds to the holotype of the species. The jar in which the type material of *A. longithecata* is preserved included a small, unlabelled vial with colonies of *A. abies*.

Allman (1877, p 19) indicated that “*Cryptolaria longithecata* is a far less profusely branched species than *C. conferta* and from this species it further differs in the pinnate disposition of its

branches and in being a stronger form with larger hydrothecae. The hydrothecae, moreover, ... are cylindrical throughout, presenting no diminution of their diameter towards the base as in *C. conferta*. They appear also to pass continuously into the tubes of the hydrocaulus, no distinct floor being apparent in the hydrothecae of any part of the specimen”.

Calder and Vervoort (1998) examined type material of *A. longithec*a and *A. crassicaulis*. They found nothing to warrant their separation and, consequently, considered *A. crassicaulis* conspecific with *A. longithec*a. Although we recognize similarities between the two species, we regard them as valid (see below). The material studied by these authors is similar to *A. crassicaulis*, because of the shape of the hydrothecae, softly curved abcaulinarily, and the much larger adnate proportion of the adcauline wall. In *A. longithec*a the hydrotheca is strongly curved abcaulinarily and approximately half of the adcauline wall is adnate to the internode. Unfortunately, no information concerning the cnidome of the material studied by those authors is available, and it is not possible, at present, to evaluate their identifications based on nematocyst characters.

*Acryptolaria longithec*a belongs to a group of *Acryptolaria* species characterized by large hydrothecae with a long free portion of the adcauline wall, and includes *A. corniformis*, *A. crassicaulis*, and *A. operculata* (cf. Table XV). However, it is clearly distinguishable from these species. *Acryptolaria operculata* has much larger general dimensions (the differences between them will be discussed below, when dealing with that species). *Acryptolaria corniformis* is also a larger species with hydrothecae slightly bent abcaulinarily, forming an angle of ca 35° with the long axis of branch, the free portion of the adcauline wall is distinctly larger (680–930 µm), and the larger size-group nematocysts are distinctly smaller (10–15 × 3–5 µm). *Acryptolaria longithec*a has strong affinities with *A. crassicaulis*, though it has slightly larger hydrothecae, with a larger proportion of the adcauline wall adnate to the internode and with distinctly smaller larger nematocysts (14–16.5 × 4.5–5.5 µm).

Clarke (1879) recorded *Cryptolaria longithec*a from off Tortugas. We considered Clarke’s record as valid, because it completely agrees with Allman’s species in shape and size of the hydrothecae, and in the free proportion of the adcauline wall. Clarke found coppinia and described them as “clustered upon the upper portions of the stem of one of the finest specimens were a number of peculiar bodies ... They are polygonal in form, largest at the distal end, tapering to the base, crowded so closely together that the walls of adjoining bodies are in contact throughout their length, and are provided with a small tubular orifice arising from the centre of the distal end; at the base they are connected by branching stolons”.

Distribution

Off Double-Headed Shot Key, 567 m (Allman 1877) and off Tortugas (25°33′ N, 84°21′ W), 181.8 m (Clarke 1879), Florida, USA.

Acryptolaria minima Totton, 1930

(Figures 10, 16B, 18C, 19B, D; Table X)

Acryptolaria minima Totton 1930, p 162–163, Figure 18a, b; Ralph 1958, p 315, Figure 3e, f.

Material examined

Holotype: BMNH 1929.10.10.3, *Terra Nova* Expedition, Sta. 134, near North Cape, New Zealand, alcohol, fertile specimen 9 cm in height, 11–20 fathoms (19.8–36 m).

Table X. Morphometric data of the type material of *Acryptolaria minima* (in μm).

	Mean \pm SD	Range	n
Hydrothecae			
Length of abcauline wall	444.8 ± 30.5	392–480	10
Length of free adcauline wall	92.8 ± 27.5	48–136	10
Length of adnate adcauline wall	452.0 ± 41.4	384–496	10
Length of adcauline wall	544.8 ± 30.7	496–592	10
Ratio adnate/free adcauline wall		3–10.2	
Diameter at aperture	129.6 ± 5.1	120–136	10
Diameter at base	76.0 ± 5.7	64–80	10
Nematocysts			
Larger group	$25.8 \pm 0.8 \times 9.8 \pm 0.4$	$25\text{--}27 \times 9\text{--}10$	10
Smaller group	$6.1 \pm 0.5 \times 2.4 \pm 0.2$	$5\text{--}7 \times 2\text{--}2.5$	10

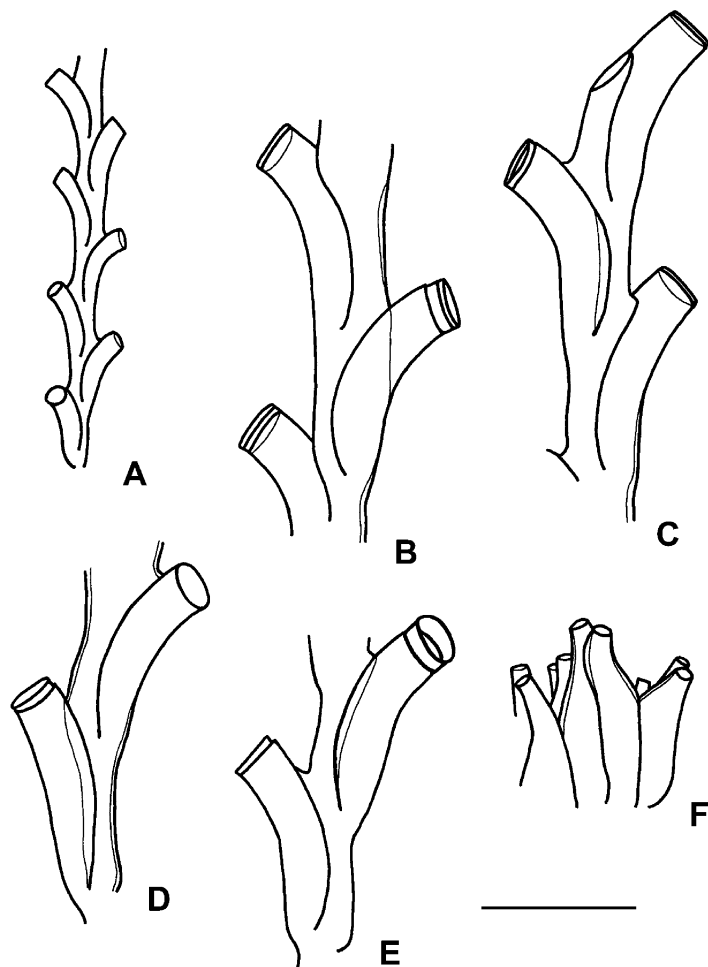


Figure 10. *Acryptolaria minima* Totton, 1930. (A) Branch fragment showing hydrothecal arrangement; (B–E) hydrothecae; (F) gonothecae. All drawings from the holotype. Scale bar: 1 mm (A); 400 μm (B–F).

Description

Palmate colony, ca 90 mm in height, composed of two main stems, one of them basally giving rise to a conspicuous secondary stem. Stems strongly branched, giving rise to numerous lower-order branches (up to fourth order). Stems almost completely polysiphonic, branches polysiphonic up to distalmost ends, though in most distal parts usually as a single tube. Colonies alternately branched in one plane, though sometimes branches arising either in decussate pairs or alternately in several planes. Branches frequently anastomosed.

Hydrothecae alternate, in one plane. Hydrotheca tubular, almost completely cylindrical; diameter slightly decreasing at basal part. Hydrotheca gently curved abcaulinarily, adcauline wall approximately four-fifths adnate to internode. Adcauline wall convex; abcauline wall mostly concave, but slightly convex at basal part. Hydrothecal aperture circular, directed upwards, forming an angle of 40–60° with long axis of branches. Rim even, usually one to two renovations in most distal hydrothecae; renovations more numerous at basal and polysiphonic parts.

Coppinia 13–20 mm long and ca 3 mm in diameter. Gonothecae closely aggregated, pyriform, with a circular distal aperture. Coppinia without defensive tubes.

Remarks

Acryptolaria minima is well characterized by the shape and size of the hydrothecae. In fact, it is the species with the smallest hydrothecae amongst the known species of *Acryptolaria* (cf. Table XV). By contrast, apart from *A. tortugasensis* (see below), it has the largest nematocysts. *Acryptolaria minima* is also characterized by having hydrothecae almost completely adnate to the branches (only one-fifth of the adcauline wall is free). The well-marked characters make it possible to corroborate some of the identifications made in the literature, such as that of Ralph (1958) for a specimen from Cook Strait, New Zealand.

Distribution

Acryptolaria minima seems to be a shelf species, having been found at depths between 20 (Totton 1930) and 180 m (Ralph 1958). Presently, it is known only from New Zealand waters, where it has been reported from off Cape North and Cape Maria van Diemen (Totton 1930) and from Cook Strait (Ralph 1958).

***Acryptolaria minuta* Watson, 2003**

(Figures 11, 16C; Table XI)

Acryptolaria minuta Watson 2003, p 163–164, Figure 13A–C.

Material examined

Holotype: NMV F 91338, Macquarie Island, Stn 130, 52°59.4'–53°02' S, 159°59'–159°58.2' E, 31 January 1999, 1422 m, one slide.

Description

“Small infertile colony of five small stems, two branched ... Tallest stem 9 mm high, broken off at tip, 3.5 mm wide at base; stems branched once in one plane; branched stems

Table XI. Morphometric data of the type material of *Acryptolaria minuta* (in μm).

	Mean \pm SD	Range	n
Hydrothecae			
Length of abcauline wall	541.5 \pm 59.4	465–650	17
Length of free adcauline wall	230.2 \pm 48.2	146–308	17
Length of adnate adcauline wall	419.9 \pm 33.2	353–463	17
Length of adcauline wall	650.1 \pm 67.3	554–756	17
Ratio adnate/free adcauline wall		1.5–3.1	
Diameter at aperture	109.3 \pm 7.5	95–119	17
Diameter at base	62.3 \pm 5.0	56–73	17
Nematocysts			
Larger group	16.7 \pm 1.3 \times 6.3 \pm 0.5	15.4–18.7 \times 5.5–6.6	10

arising from a small matted plug of stolons, simple stems from junction of stolonal tubes; taller stems with up to four polysiphonic tubes intergrown and rather contorted proximally, becoming linear distally; polysiphonic tubes running almost to top of stems; stems lightly fascicled; branches given off beside a hydrotheca” (Watson 2003, p 163).

Hydrothecae alternately arranged in one plane. Hydrotheca tubular, long and thin, diameter slightly larger at free part, clearly decreasing at basal part. Hydrotheca strongly curved abcaulinarily, ca two-thirds adnate to internode. Adcauline wall convex; abcauline

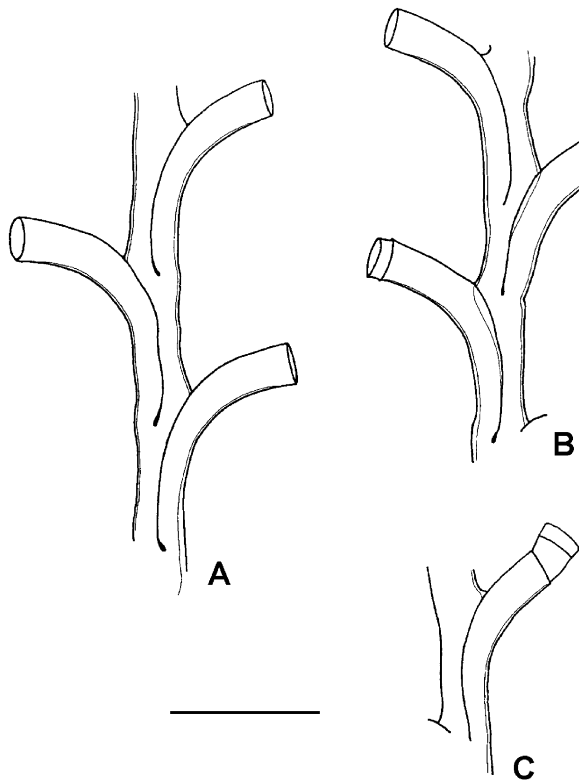


Figure 11. *Acryptolaria minuta* Watson, 2003. (A–C) Branch fragments showing shape and arrangement of hydrothecae. All drawings from the holotype. Scale bar: 400 μm .

wall markedly concave. Hydrothecal aperture circular, upwards and abcaulinarily directed, forming an angle of 60–90° with long axis of branches. Rim even, with few renovations. Coppinia not observed.

Remarks

According to Watson (2003, p 164), “their smaller dimensions and sparsely branched habit matches no other known species of *Acryptolaria*”. She considered this species similar to *A. patagonica* (see remarks for this name under the description of *A. operculata* below) in habit, though considerably smaller. Watson also indicated that “The slightly everted margin of the hydrotheca resembles *A. conferta minor* Ramil and Vervoort, 1992 but it is smaller and the hydrothecae are frontally directed in contrast to those of *A. conferta minor* which, according to these authors, lie in the plane of ramification of the branches” (Watson 2003, p 164).

Acryptolaria minuta is similar to *A. minima* in the size of the hydrothecae (cf. Table XV), though in the former the hydrothecae are larger and thinner, strongly curved abcaulinarily, and with a much larger proportion of their adcauline wall free. Moreover, the nematocysts are much smaller ($25\text{--}27 \times 9\text{--}10\text{ }\mu\text{m}$ in *A. minima*).

The material described as *Acryptolaria conferta* var. *australis* by Ritchie (1911) and Totton (1930) (the latter only the material from Sta. 96) might belong to this species.

Distribution

Acryptolaria minuta is known only from the Macquarie Island area ($52^{\circ}59.4'\text{--}53^{\circ}02'\text{ S}$, $159^{\circ}59'\text{--}159^{\circ}58.2'\text{ E}$), where it was collected at a depth of 1422 m on dead primnoid gorgonian.

***Acryptolaria operculata* Stepanjants, 1979**

(Figures 12, 16D, 18D, 19E; Table XII)

Acryptolaria operculata Stepanjants 1979, p 52, Plate 9 Figure 5A, B.

Acryptolaria patagonica El Beshbeeshy 1991, p 67–70, Figure 14 [*nomen nudum*].

Acryptolaria patagonica El Beshbeeshy in Watson 2003, p 162–163, Figure 12A–C; Vervoort and Watson 2003, p 51–53, Figure 7A–G.

Table XII. Morphometric data of the type material of *Acryptolaria operculata* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	2000.0 ± 141.4	1800–2100	4
Length of free adcauline wall	987.5 ± 84.2	910–1070	4
Length of adnate adcauline wall	1525.0 ± 150.0	1400–1700	4
Length of adcauline wall	2512.5 ± 158.4	2320–2670	4
Ratio adnate/free adcauline wall		1.3–1.9	
Diameter at aperture	412.0 ± 21.7	400–450	5
Diameter at base	206.7 ± 5.8	200–210	3
Nematocysts			
Larger group	$14.1 \pm 0.5 \times 5.0 \pm 0.2$	$13.5\text{--}15 \times 4.5\text{--}5$	10
Smaller group	$8.0 \pm 0.4 \times 3.1 \pm 0.2$	$7.5\text{--}8.5 \times 3\text{--}3.5$	5

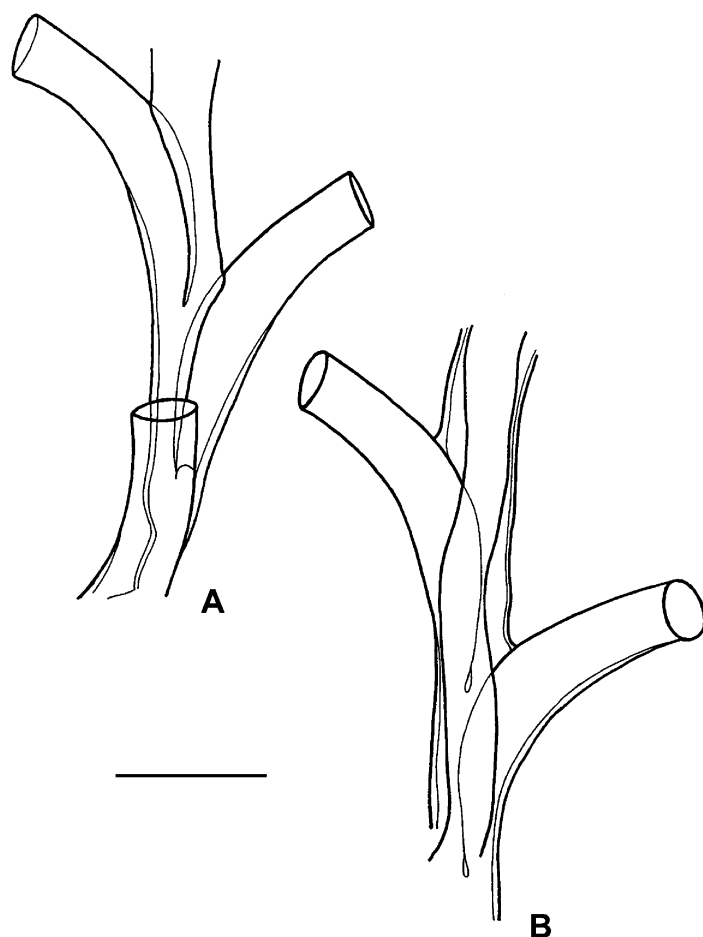


Figure 12. *Acryptolaria operculata* Stepanjants, 1979. (A, B) Branch fragments showing shape and arrangement of hydrothecae. All drawings from the paratype. Scale bar: 1 mm.

Material examined

Paratype: ZIRAS 2/9463, *Zund* Sta. 194, 43°56' S, 59°08' W, 27 May 1974, 140 m, one basally broken stem fragment ca 40 mm long, without coppinia.

Acryptolaria patagonica, one slide from Sta. 330, 40°57' S, 56°57' W, 23 February 1971, 980 m (Walter Herwig expedition 1971).

Description

Stem fragment ca 40 mm long, basally broken. No information concerning habit is available; other than its irregular branching.

Hydrothecae alternate, in two planes, making an obtuse angle. Hydrotheca tubular, fusiform; maximum diameter approximately in the middle of hydrothecal length, decreasing distinctly towards basal part. Hydrotheca curved abcaulinarily, half to two-thirds of adcauline wall adnate to internode. Adcauline wall convex; abcauline wall

concave. Hydrothecal aperture circular, directed upwards, forming an angle of 55–75° with long axis of branch. Rim even, with few short renovations.

Coppinia not observed.

Remarks

Acryptolaria operculata is characterized by the size and arrangement of the hydrothecae. It is the species with the largest hydrothecae (cf. Table XV) and it is also characterized by the hydrothecal arrangement in two planes, making an obtuse angle, though this feature is also present in other species of the genus (e.g. *A. tortugasensis*, see below).

Stepanjants (1979) also characterized this species by the presence of a one-flap operculum, pointing out the particular position of this species amongst the Lafoeidae. However, after studying many colonies of *Acryptolaria*, we have observed that the presence of that circular flap, in spite of being irregular, is quite common amongst species of *Acryptolaria*, being also common in species of another lafoeid genus, *Grammaria*. That valve should not be considered as an opercular apparatus in the sense of that present in other families of hydroids (e.g. Sertulariidae or Campanulinidae). By contrast, it seems to constitute a sort of deciduous structure to temporally protect the polyps when they are in a state of inactivity or regeneration, as has already postulated for other groups such as *Staurotheca* (cf. Peña Cantero et al. 1997).

In his PhD dissertation on hydrozoans from the Patagonian shelf, El Beshbeeshy (1991) included the description of 22 new species, as well as many re-descriptions and some nomenclatural considerations. Many subsequent papers (e.g. Peña Cantero et al. 1997; Peña Cantero and Marques 1999; Vervoort and Watson 2003; Watson 2003) have used the names employed by El Beshbeeshy (1991). However, according to the International Code of Zoological Nomenclature (1999), a thesis is not to be taken as published for the purposes of zoological nomenclature, and therefore the specific names proposed by El Beshbeeshy (1991) should be considered *nomina nuda*. According to the Code “A *nomen nudum* is not an available name, and therefore the same name may be made available later for the same or a different concept; in such a case it would take authorship and date [Arts. 50, 21] from that act of establishment, not from any earlier publication as a *nomen nudum*”.

Indeed, many nominal species of El Beshbeeshy were subsequently described by other authors and, in this case, these should become the authors of the valid names. Nevertheless, Article 50.1.1. of the Code establishes that “however, if it is clear from the contents that some person other than an author of the work is alone responsible both for the name or act and for satisfying the criteria of availability other than actual publication, then that other person is the author of the name or act. If the identity of that other person is not explicit in the work itself, then the author is deemed to be the person who publishes the work”. El Beshbeeshy (1991) described *A. patagonica* as a new species; the species was again reported by Watson (2003) and Vervoort and Watson (2003), and both papers clearly gave the authority of the species to El Beshbeeshy. Therefore, the species is herein assumed as “*Acryptolaria patagonica* El Beshbeeshy in Watson, 2003”. In any case, the species nominally described as *A. patagonica* would be characterized by its large hydrothecae and the arrangement of the hydrothecae in two planes, forming an obtuse angle. According to El Beshbeeshy (1991), *A. patagonica* differs from *A. operculata* by the absence of operculum, the shorter free part of the adcauline wall (672–858 µm), and the larger diameter at hydrothecal base (232–324 µm). Nevertheless, we have re-examined some slides of the material described by El Beshbeeshy and there are no differences between it

and the type of *A. operculata*. Additionally, both have similar dimensions of their nematocysts ($13.5\text{--}14 \times 4.5\text{--}5\text{ }\mu\text{m}$ and $8 \times 3\text{--}3.5\text{ }\mu\text{m}$ in *A. patagonica*). Therefore, we consider *A. patagonica* conspecific with *A. operculata*.

Vervoort and Watson (2003) also assigned material from New Zealand to *A. patagonica* and, again, the description fully agrees with the type material of *A. operculata*. Vervoort and Watson (2003) indicated that the most significant character in *A. patagonica* is that the conspicuous hydrothecae are not in one plane, but point obliquely frontally. As we have demonstrated before, this feature is also found in the type material of *A. operculata*, and it is clearly described by Stepanjants (1979) in her original description.

Distribution

Acryptolaria operculata seems to be a shelf and bathyal species, having been found at depths between 98 (El Beshbeeshy 1991) and 1422 m (Watson 2003). Watson (2003) found it on primnoid gorgonians. It is known to be distributed in sub-Antarctic waters, from the Patagonian shelf (Stepanjants 1979; El Beshbeeshy 1991), New Zealand (Vervoort and Watson 2003), and Macquarie Island (Watson 2003).

Acryptolaria pulchella (Allman, 1888)
(Figures 13, 16E, 18E; Table XIII)

Cryptolaria pulchella Allman 1888, p lvii, lxvii, lxviii, 40–41, Plate 19 Figures 2, 2a.

Material examined

Holotype: BMNH 1888.11.13.28, H.M.S. *Challenger*, Sta. ?, Honolulu, 20–40 fathoms (36–72 m), one stem ca 70 mm high, with coppiniaes.

Description

“Colony attaining a height of nearly three inches [76.2 mm], main stem irregularly branched, branches carrying regular, pinnately disposed, alternate ramuli” (Allman 1888, p 40).

Stem strongly polysiphonic, quite straight basally, giving rise to branches alternately arranged in one plane, sometimes in two planes making an obtuse angle. Distal part of

Table XIII. Morphometric data of the type material of *Acryptolaria pulchella* (in μm).

	Mean \pm SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	703.0 \pm 50.3	650–800	10
Length of free adcauline wall	214.0 \pm 31.7	150–260	10
Length of adnate adcauline wall	767.0 \pm 69.0	600–840	10
Length of adcauline wall	981.0 \pm 83.9	820–1090	10
Ratio adnate/free adcauline wall		2.7–5	
Diameter at aperture	269.0 \pm 13.5	250–280	10
Diameter at base	145.0 \pm 7.1	130–150	10
Nematocysts			
Larger group	22.0 \pm 1.0 \times 6.4 \pm 0.5	20–23 \times 6–7	10
Smaller group	7.0 \pm 0 \times 3.0 \pm 0	7 \times 3	2

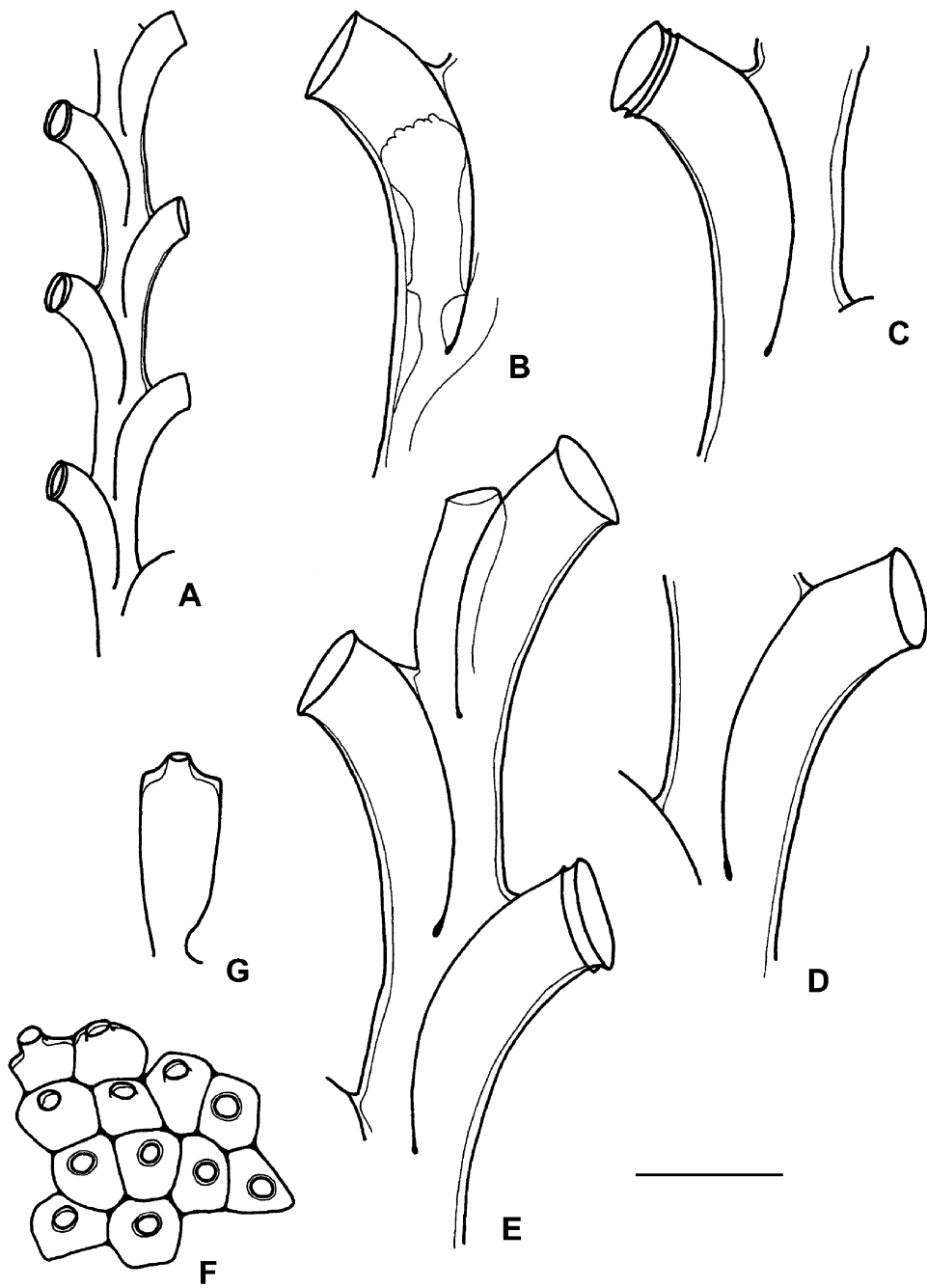


Figure 13. *Acryptolaria pulchella* (Allman, 1888). (A) Branch fragment showing hydrothecal arrangement; (B–E) hydrothecae; (F) coppinia fragment (dorsal view); (G) gonotheca (lateral view). All drawings from the holotype. Scale bar: 1 mm (A); 400 μ m (B–G).

colony with indefinite branching pattern; some areas with alternate branching, others with irregular arrangement. Basal part of stem with branches originating at ca 45°, but thereafter curving upwards.

Hydrothecae alternate, in one plane. Hydrotheca tubular, almost completely cylindrical; diameter only slightly decreasing at basal part. Hydrotheca gently curved abcaulinarily; four-fifths to three-quarters of adcauline wall adnate to internode. Adcauline wall entirely convex; abcauline wall concave. Hydrothecal aperture circular, directed upwards, forming an angle of 50–70° with long axis of branch. Rim even, with few short renovations.

Coppiniae without defensive tubes. Gonothecae fusiform, bottle-shaped, firmly aggregated. Diameter strongly decreasing at distal part forming a short distal neck bearing a circular aperture.

Remarks

“The very regularly pinnate disposition of the ramuli, and the absolutely distichous and regular disposition of the hydrothecae, give to this species an aspect of considerable elegance. It is a strong growing form with rather close-set, stout, and short hydrothecae” (Allman 1888, p 41). Although Allman (1888, p 41) indicated that the “gonosome [was] not known”, the type material examined has coppinia and afforded us an opportunity to describe the reproductive structures. *Acryptolaria pulchella* is characterized by the relatively short and wide hydrothecae, adnate to the branches by most of its adcauline wall, and by the large nematocysts.

Distribution

Pacific Ocean, Hawaii, Honolulu, 36–72 m (Allman 1888).

Acryptolaria rectangularis (Jarvis, 1922)

Cryptolaria rectangularis Jarvis 1922, p 335, Plate 24 Figure 3.

Acryptolaria rectangularis: Millard 1967, p 174, Figure 2B (in part).

Acryptolaria angulata: Vervoort 1966, p 117, Figure 17.

Description

“The material consists of a part of a colony 0.7 cm high and lacking both basal and distal portions. Fascicling tubes are few and limited to the proximal end of the stem. Branches are irregular, or perhaps opposite, and polysiphonic for a short distance beyond their origin. The hydrothecae are alternate, long and tubular, the proximal halves erect and adnate, the distal diverging at a right angle. The margin is smooth with several reduplications and circular aperture. A well-marked fold occurs in the lower wall of the hydrotheca at the point of divergence. Gonosomes absent” (Jarvis 1922, p 335–336).

Remarks

Unfortunately, it has not been possible to examine type material of this species. According to Vervoort and Watson (2003), the location of the type material of Jarvis' species is unknown.

The branches represented in Jarvis' (1922) figures have a zigzag arrangement. According to Vervoort (1966, as *A. angulata*) "The stems are erect and largely monosiphonic; there are some accessory tubes at the basal parts of some of the hydrocauli and some short hydrorhizal fibres".

As already noted, the species *A. angulata*, *A. bulbosa*, and *A. rectangularis* share similar hydrothecal morphology and may be phylogenetically closely related species. In fact, *Acryptolaria rectangularis* has been considered conspecific with *A. angulata* by several authors (e.g. Hirohito 1995; Vervoort and Watson 2003). Vervoort and Watson (2003, p 41), for example, indicated that they studied "great amount of material of this species [*A. angulata*] from all over its large area of distribution ... has convinced us that *Cryptolaria angulata* Bale, 1914 and *Cryptolaria rectangularis* Jarvis, 1922 are inseparable".

We found, however, that the three species are different, although sharing similar hydrothecae. *Acryptolaria angulata* is characterized by the presence of the adcauline boss projecting into the hydrothecal cavity. Jarvis (1922) made it clear that *A. rectangularis* differs from *A. angulata* in the straightness of the upper wall of the hydrotheca, in its divergent portion, and in the absence of an internal thickening opposite the fold. Gravier-Bonnet (1979, p 18) followed the opinion of Jarvis (1922) and Millard (1967, 1968, 1975) that this species is clearly distinguishable from Bale's species by the absence of the adcauline thickening of the hydrothecae. Schuchert (2003, p 155) also considered *A. rectangularis* and *A. angulata* as "separate species because both morphotypes were found not very far apart"; but he acknowledges, however, "the possibility that both could be only forms belonging to the same species".

The presence of the adcauline boss projecting into the hydrothecal cavity is clearly a distinct character of *A. angulata*. On the other hand, the absence of this boss makes *A. bulbosa* and *A. rectangularis* morphologically similar. However, the shape of the hydrotheca of these two species seems to be slightly different. Stechow (1932) indicated that *A. bulbosa* differs from *A. rectangularis* mainly in the stronger bend of the hydrotheca, the smaller diameter of the hydrothecal aperture and the shorter free portion of the hydrotheca (cf. Table XV). These differences, though small, prevent us from considering the two species to be conspecific. In addition, the hydrotheca of *A. bulbosa* is similar to that of *A. angulata*, it distinctly bends upwards after the adcauline wall becomes free. By contrast, *A. rectangularis* has the free portion of the adcauline wall straight, the diameter of the hydrothecal aperture larger, and the free portion of the hydrothecal wall longer than in the other two species.

Possible misidentifications of *A. rectangularis*, especially by Millard (1967, 1968, 1980), Gravier-Bonnet (1979), and Schuchert (2003), are listed under the discussion of *A. bulbosa*. On the other hand, Vervoort (1966) assigned to *A. angulata* material belonging to Jarvis' species. The material shares with *A. rectangularis* the shape and size of the hydrothecae and the absence of the adcauline notch so characteristic for Bale's species.

Distribution

Acryptolaria rectangularis seems to be a bathyal species, having been found from depths between 225 (Jarvis 1922) and 495 m (Vervoort 1966). It is certainly known from the

western Indian Ocean, off Providence Islands (Seychelles) and off Durban, east coast of South Africa (Vervoort 1966; Millard 1967).

***Acryptolaria tortugasensis* Leloup, 1935**

(Figures 14, 16F, 18F, 19G; Table XIV)

Acryptolaria tortugasensis Leloup 1935, p 13, Figures 3, 4; Bouillon et al. 1995, p 51.

Material examined

Holotype: IRSNB, IG 10497, 10 June 1925, Tortugas, Florida, USA, one colony (alcohol) and two microslide preparations.

Description

One colony composed of a distally truncated, erect stem ca 60 mm in height, completely polysiphonic except for distal ends of branches. Main stem giving rise to lateral branches in approximately one plane, usually in an opposite or sub-opposite pattern, but with irregularities. Branches directed upwards with an angle of ca 60° or larger. Lateral branches polysiphonic, up to third-order, usually alternate or sub-opposite in one plane.

Hydrothecae alternately arranged in two planes, forming a wide angle, sometimes close to 90°. Hydrotheca cylindrical, straight at adnate part, strongly curved outwards when it becomes free. Free part of adcauline hydrothecal wall convex. Abcauline wall straight basally, becoming concave at distal third with a marked inflexion point associated to a conspicuous internal cusp. Hydrothecal aperture circular, almost parallel to long axis of branch. Rim even, though slightly everted, with one or two short renovations.

Coppinia not observed.

Remarks

Although this species has been considered conspecific with *A. conferta* by several authors (e.g. Fraser 1944; Vervoort 1968; Calder 1991), it can be distinguished from all other species. *Acryptolaria tortugasensis* is unique in the internal cusp present in the abcauline hydrothecal wall. It is also characterized by the obtuse angle, close to 90°, formed by the

Table XIV. Morphometric data of the type material of *Acryptolaria tortugasensis* (in µm).

	Mean ± SD	Range	<i>n</i>
Hydrothecae			
Length of abcauline wall	708.0 ± 11.0	700–720	5
Length of free adcauline wall	262.2 ± 55.4	200–380	9
Length of adnate adcauline wall	652.0 ± 53.6	590–700	5
Length of adcauline wall	905.0 ± 30.4	865–950	5
Ratio adnate/free adcauline wall		2–3.5	
Diameter at aperture	157.8 ± 6.7	150–170	9
Diameter at base	78.8 ± 2.5	75–80	4
Nematocysts			
Larger group	29.3 ± 0.8 × 9.9 ± 0.4	28–30 × 9–10.5	9
Smaller group	5.5 ± 0.5 × 2.8 ± 0.3	5–6 × 2.5–3	5

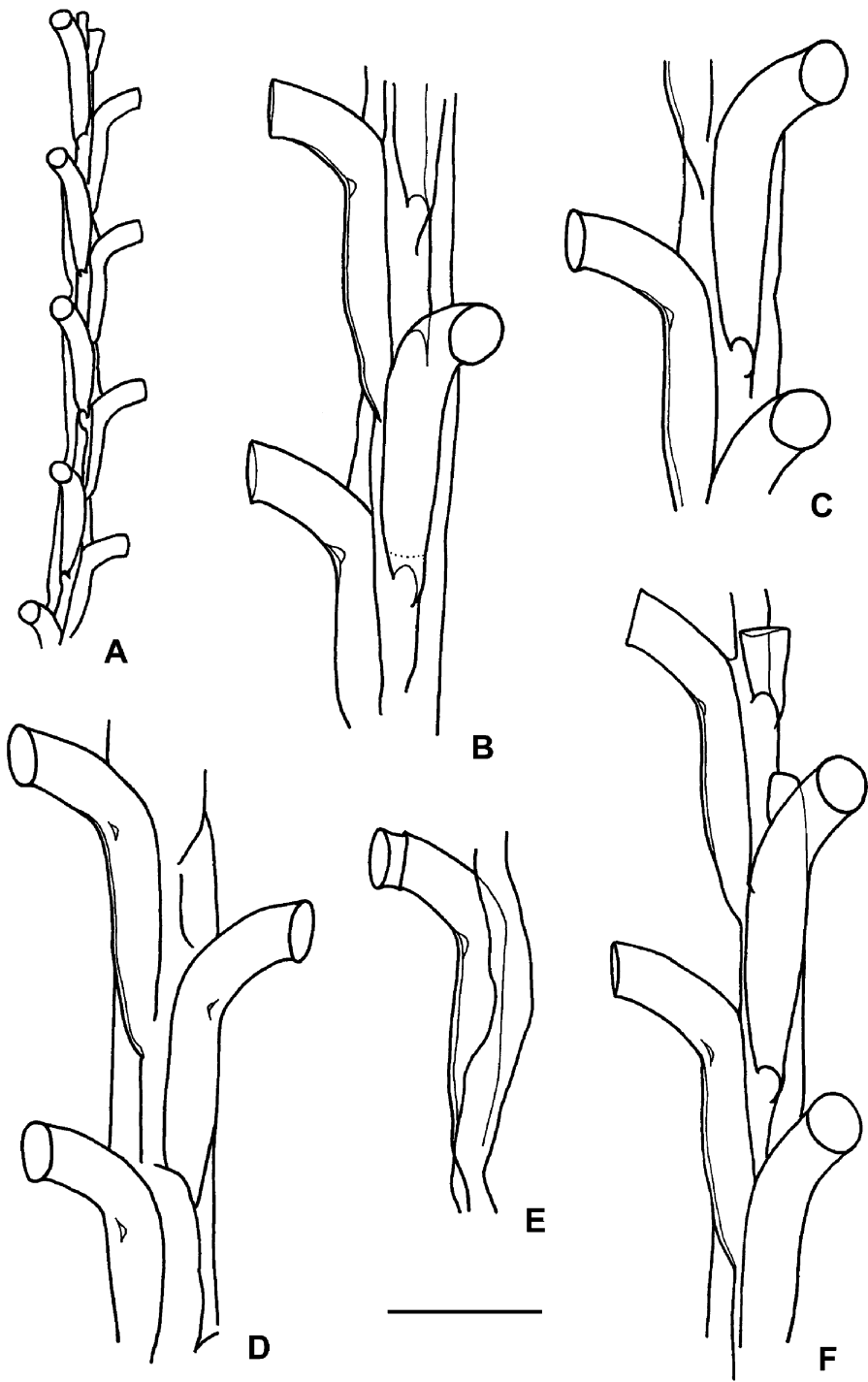


Figure 14. *Acryptolaria tortugasensis* Leloup, 1935. (A–F) Branch fragments showing shape and arrangement of hydrothecae. All drawings from the holotype. Scale bar: 1 mm (A); 400 μ m (B–F).

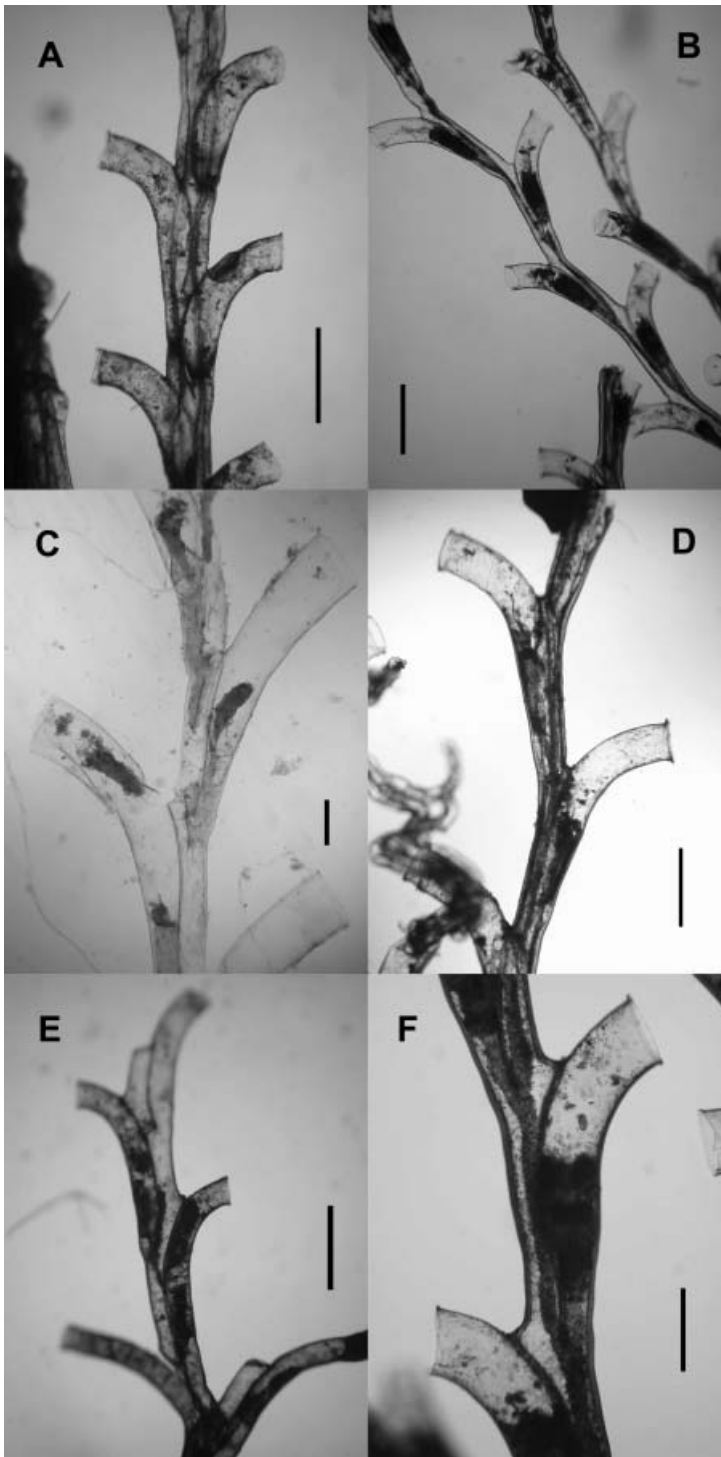


Figure 15. Hydrothecal arrangement in *Acryptolaria*. (A) *A. abies*; (B) *A. conferta*; (C) *A. corniformis*; (D) *A. crassicaulis*; (E) *A. flabellum*; (F) *A. gracilis*. Scale bar: 500 μm (A, B, D, E); 250 μm (C); 100 μm (F).

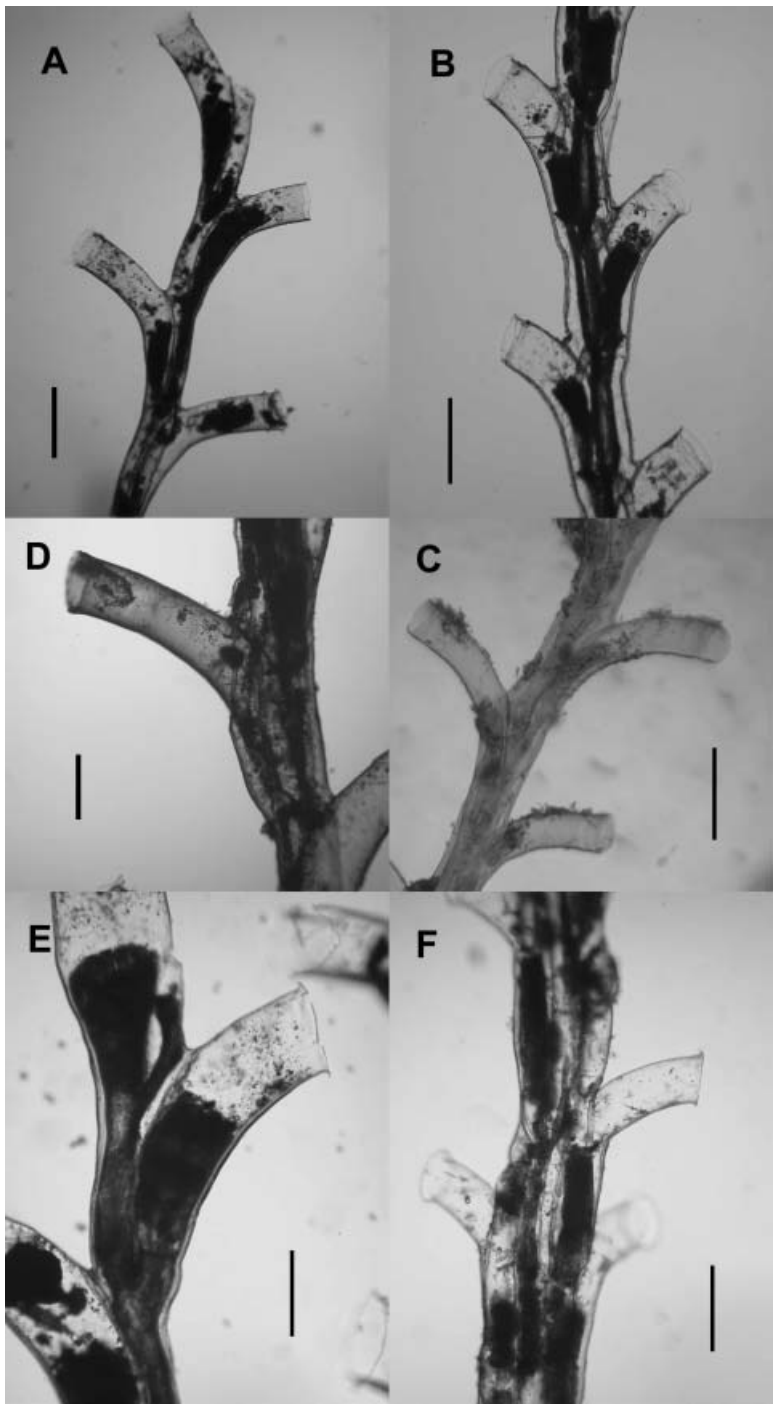


Figure 16. Hydrothecal arrangement in *Acryptolaria* (continued). (A) *A. longitheca*; (B) *A. minima*; (C) *A. minuta*; (D) *A. operculata*; (E) *A. pulchella*; (F) *A. tortugasensis*. Scale bar: 500 μm (A, D); 250 μm (B, C, E, F).

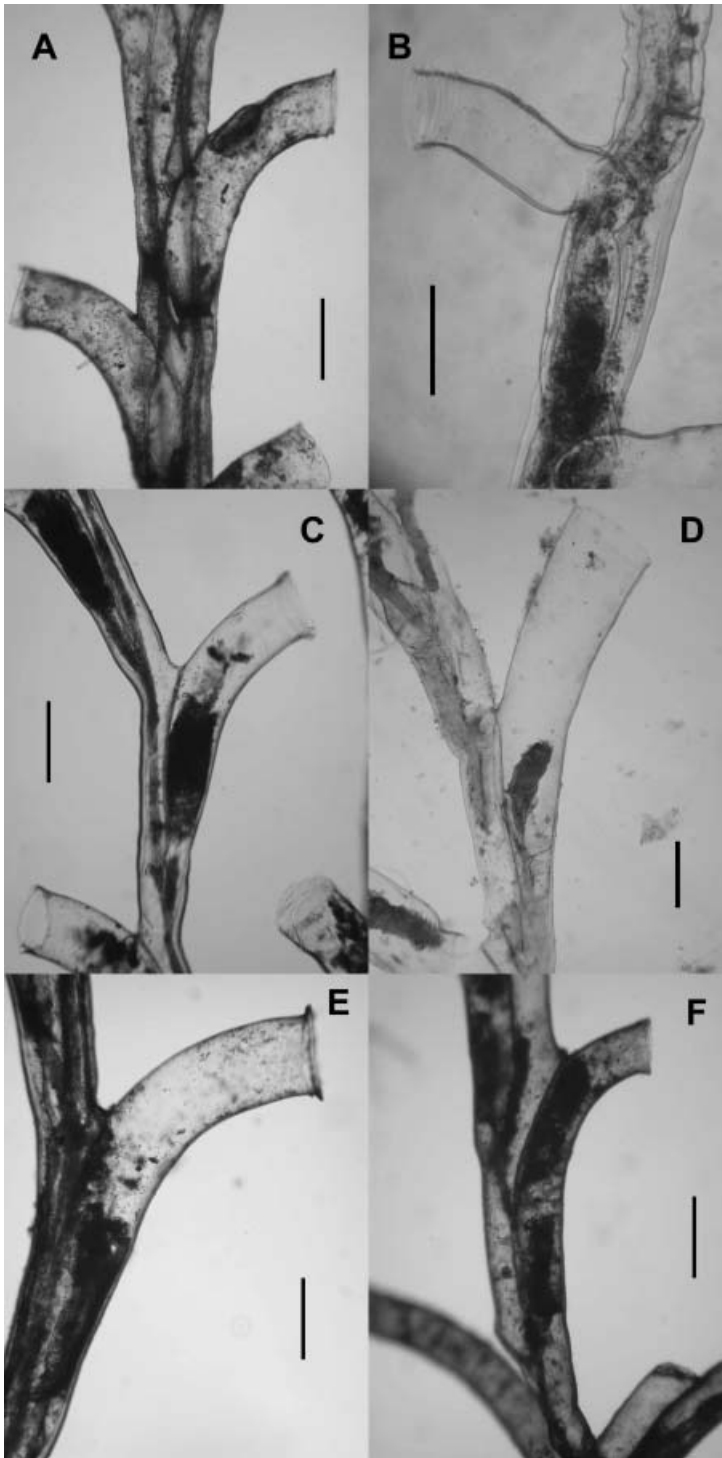


Figure 17. Shape of hydrotheca in *Acryptolaria*. (A) *A. abies*; (B) *A. angulata*; (C) *A. conferta*; (D) *A. corniformis*; (E) *A. crassicaulis*; (F) *A. flabellum*. Scale bar: 250 μm .

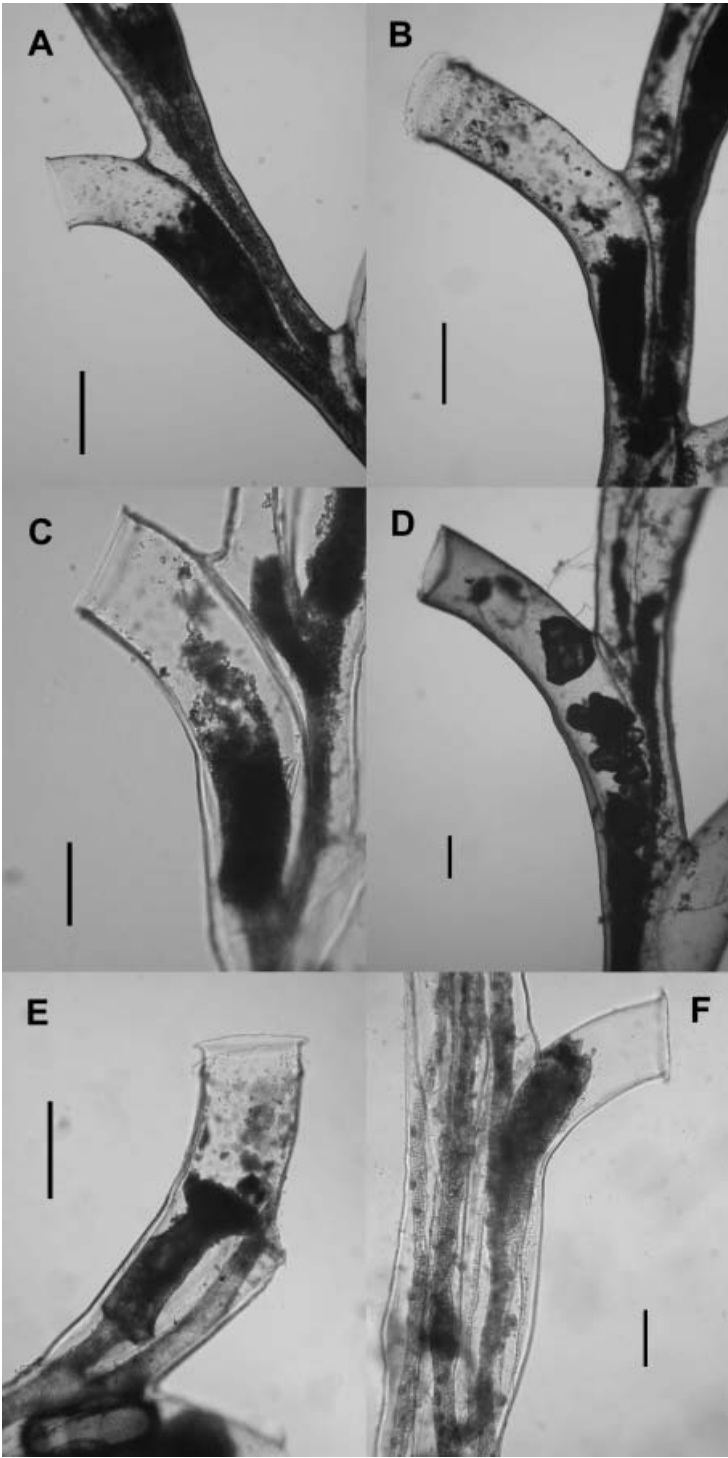


Figure 18. Shape of hydrotheca in *Acryptolaria* (continued). (A) *A. gracilis*; (B) *A. longithecata*; (C) *A. minima*; (D) *A. operculata*; (E) *A. pulchella*; (F) *A. tortugasensis*. Scale bar: 100 μm (A, C, F); 250 μm (B, D, E).

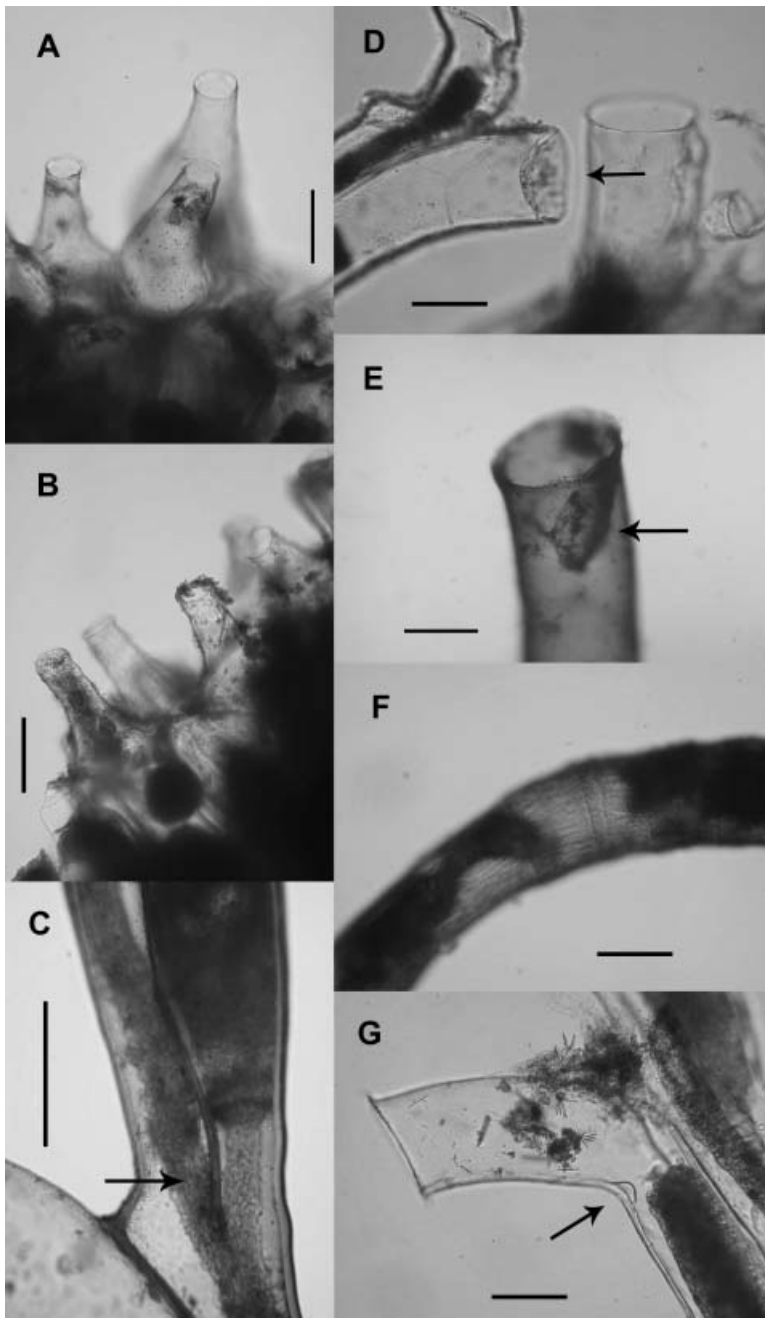


Figure 19. Shape of gonothecae: (A) *Acryptolaria conferta*; (B) *A. minima*. Detail of different structures: (C) bottleneck-shaped basal part of hydrotheca in *A. gracilis*; (D) opercular structure in *A. minima*; (E) opercular structure in *A. operculata*; (F) longitudinal striae in hydrotheca of *A. flabellum*; (G) intrathecal cusp of *A. tortugasensis*. Scale bar: 100 µm (A, B, D, F, G); 50 µm (C); 250 µm (E).

Table XV. Comparative morphometric data of the species of *Acryptolaria* (in μm).

	<i>A. abies</i>	<i>A. angulata</i>	<i>A. conferta</i>	<i>A. bulbosa</i>	<i>A. corniformis</i>	<i>A. crassicaulis</i>	<i>A. flabellum</i>	<i>A. gracilis</i>	<i>A. longitheca</i>	<i>A. minima</i>	<i>A. minuta</i>	<i>A. operculata</i>	<i>A. pulchella</i>	<i>A. rectangularis</i> ^a	<i>A. tortugasensis</i>
Hydrothecae															
Length of abcauline wall	600–800	784–952	700–944	680–760	1600–1900	1144–1440	700–960	760–920	940–1144	392–480	465–650	1800–2100	650–800	623–769	700–720
Length of free adcauline wall	220–380	291–425	280–440	280–440	680–930	416–696	230–504	176–320	420–680	48–136	146–308	910–1070	150–260	440–495	200–380
Length of adnate adcauline wall	500–680	392–719	560–760	400–520	920–1300	976–1120	490–880	720–864	712–784	384–496	353–463	1400–1700	600–840	366–513	590–700
Length of adcauline wall	780–1056	706–1032	920–1200	800–864	1770–2230	1392–1736	840–1160	960–1184	1180–1400	496–592	554–756	2320–2670	820–1090	806–1008	865–950
Ratio adnate/free adcauline wall	1.7–2.7	1.2–2.3	1.4–2.4	0.9–1.9	1.1–1.6	1.5–2.7	1.4–3.8	2.4–4.5	1.1–1.8	3–10.2	1.5–3.1	1.3–1.9	2.7–5	0.8–1	2–3.5
Diameter at rim	152–216	156–179	180–208	152–160	320–400	232–256	136–160	200–232	240–280	120–136	95–119	400–450	250–280	183–220	150–170
Diameter at base	70–110	78–101	70–96	72–88	100–120	104–120	75–104	80–100	100–128	64–80	56–73	200–210	130–150	92–110	75–80
Nematocysts															
Larger group	10.5– 12 × 4–5	7.7–8.8 × 4.4–5.5	19.5–21 × 7.5–9	21–23 × 6–7	10–15 × 3–5	14–16.5 × 4.5–5.5	15 × 5	23.5– 26 × 9	21–23 × 6.5–8	25–27 × 9–10	15.4–18.7 × 5.5–6.6	13.5–15 × 4.5–5	20–23 × 6–7	–	28–30 × 9–10.5
Smaller group	6–6.5 × 2.5		6.5–7 × 2.5–3	7–7.5 × 3		7–8 × 3		6.5–7 × 2.5	8 × 3–3.5	5–7 × 2–2.5		7.5–8.5 × 3–3.5	7 × 3	–	5–6 × 2.5–3

^aFrom Jarvis's (1922) figures.

alternate hydrothecae. It is also the *Acryptolaria* species with the largest nematocysts (cf. Table XV).

Distribution

Acryptolaria tortugasensis is only known from Tortugas, Florida, USA.

Key to the known species of *Acryptolaria* (*A. andersoni* excluded)

1. Hydrothecae abruptly abcaulinarily curved 2
- Hydrothecae homogeneously abcaulinarily curved 4
2. Hydrotheca curved once *A. rectangularis*
- Hydrotheca curved twice. Abcauline wall with a sharp invagination at approximately half of its length 3
3. Adcauline wall with a strong invagination at approximately half of its length *A. angulata*
- Adcauline wall without that invagination *A. bulbosa*
4. Diameter of hydrothecae clearly smaller at adnate part 5
- Diameter of hydrothecae more or less constant throughout 9
5. Basal part of hydrothecae bottleneck-shaped *A. gracilis*
- Diameter of hydrothecae in adnate part decreasing towards hydrothecal base (hydrothecae horn-shaped) 6
6. Hydrotheca large. Diameter at aperture $>300\mu\text{m}$ *A. corniformis*
- Diameter at aperture $<300\mu\text{m}$ 7
7. Half of adcauline hydrothecal wall adnate to internode. Free adcauline wall more or less straight *A. longitheca*
- Two-thirds of adcauline wall adnate. Free adcauline wall convex 8
8. Length of abcauline hydrothecal wall $<1000\mu\text{m}$. Length of larger nematocysts $>19\mu\text{m}$ *A. conferta*
- Length of abcauline hydrothecal wall $>1000\mu\text{m}$. Length of larger nematocysts $<17\mu\text{m}$ *A. crassicaulis*
9. Diameter of hydrothecal aperture up to $160\mu\text{m}$ 10
- Diameter of hydrothecal aperture larger 12
10. Length of adcauline hydrothecal wall $>1000\mu\text{m}$ *A. flabellum*
- Hydrothecae tiny. Length of adcauline hydrothecal wall $<800\mu\text{m}$ 11
11. Four-fifths of hydrothecal adcauline wall adnate. Length of larger nematocysts $>25\mu\text{m}$ *A. minima*
- Two-thirds of hydrothecal adcauline wall adnate. Length of larger nematocyst $<19\mu\text{m}$ *A. minuta*
12. Hydrothecae alternate in two planes 13
- Hydrothecae alternate in one plane 14
13. Hydrothecae with an abcauline internal cusp. Length of larger nematocysts $>28\mu\text{m}$ *A. tortugasensis*

- Hydrothecae without cusps. Length of larger nematocysts $<15\ \mu\text{m}$
. *A. operculata*
- 14. Two-thirds of hydrothecal adcauline wall adnate. Length of larger nematocyst
 $<12\ \mu\text{m}$ *A. abies*
- Three-quarters to four-fifths of adcauline wall adnate. Length of larger
nematocysts $>20\ \mu\text{m}$ *A. pulchella*

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Appendix 1. Records of species of *Acryptolaria* without enough information to be surely assigned to any of the redescribed species of the genus

Acryptolaria abies (Allman, 1877)

Cryptolaria abies: Fewkes 1881, p 127, 128, 130, Plate 1 Figures 3, 8 (doubtful record; without description. Caribbean Sea: Barbados, 94 fathoms; Grenada, 154–170 fathoms; Montserrat, 88 fathoms; Sta. Cruz, 508 fathoms).

- Cryptolaria abies*: Levinsen 1893, p 159, 173 (non-record).
Cryptolaria abies: Marktanner-Turneretscher 1895, p 398 (non-record).
Cryptolaria abies: Stechow 1923a, p 151 (non-record; change of genus).
Parathecium abies: Stechow 1923a, p 151 (non-record; change of genus).
Acryptolaria abies: Fraser 1943, p 89 (doubtful record; neither description nor figures. 24°17'30"N, 82°11'15"W, south of Marquesas, Florida, 140 fathoms; 24°20'30"N, 81°58'30"W, southwest of Sand Key, Florida, 125 fathoms; 24°17'N, 81°54'W, off Sand Key, 100 fathoms; off Sand Key, 120–152 and 129 fathoms; off Sand Key Light, Florida, 119 fathoms).
Acryptolaria abies: Fraser 1944, p 210, Plate 40 Figure 188 (non-record; reference to other authors).
Acryptolaria abies: Deevey 1954, p 270 (non-record; checklist—reference to other authors).
Acryptolaria abies: Vervoort 1968, p 99 (non-record; checklist—reference to other authors).
Acryptolaria abies: Cairns et al. 1991, p 24 (non-record; list of common and scientific names).

***Acryptolaria angulata* (Bale, 1914)**

- Acryptolaria angulata*: Blackburn 1942, p 111 (non-record; systematic list).
Acryptolaria angulata: Vervoort and Watson 2003, p 41–43, Figure 3C–F (doubtful record. Probably the record includes material of Bale's species, but according to the figures material of other species too. Far offshore of New Zealand: Chatham Rise, Hikurangi Trough and near Kermadec Ridge, 145–913 m).
Cryptolaria angulata: Stranks 1993, p 7 (non-record; catalogue of recent cnidarian types in the Museum of Victoria).

***Acryptolaria conferta* (Allman, 1877)**

- Cryptolaria conferta*: Clarke 1879, p 239, 244, Plate 3 Figures 14–20 (doubtful record. Part of the material could belong to *Acryptolaria conferta*, in particular that described as “an unusually large form of the same” (Clarke 1879, p 251). This form agrees with Allman's species in size and shape of the hydrothecae and in the slightly geniculate branches. The small form is closer to *A. abies*. 25°33'N, 84°21'W, 101 fathoms).
Cryptolaria conferta: Fewkes 1881, p 128–130 (doubtful record; neither description nor figures. Caribbean Sea: Barbados, 73–120 fathoms; Dominica, 118 fathoms; 41°29'45"N, 65°35'30"W, 1242 fathoms).
Cryptolaria conferta: Quelch 1885, p 1, 3, Plate 2 Figure 1 [= *Cryptolarella abyssicola* (Allman, 1888)].
Cryptolaria conferta: Agassiz 1888, p 136–137, Figures 434, 435 (doubtful record, from Cojima, Cuba, 450 fathoms; with coppinia).
Cryptolaria conferta: Levinsen 1893, p 164 (non-record).
Cryptolaria inferta Levinsen 1893, p 165 (non-record).
Cryptolaria conferta: Clarke 1894, p 71, 72, 76 (doubtful record; neither description nor figures. Off west coast of Central America).
Cryptolaria inferta: Marktanner-Turneretscher 1895, p 404 (non-record).
Cryptolaria conferta: Marktanner-Turneretscher 1895, p 403–404 (non-record).

- Cryptolaria conferta*: Nutting 1895, p 87 (doubtful record. Off Havana and Morro Castle, Cuba, 125–260 fathoms).
- Cryptolaria conferta*: Von Campenhausen 1896a, p 105 (?).
- Cryptolaria conferta*: Von Campenhausen 1896b, p 308–309 (doubtful record; no figures).
- Cryptolaria conferta*: Schneider 1897, p 518 (non-record).
- Lafoea conferta*: Schneider 1897, p 514 (non-record; remark on the coppinia).
- Lafoea (Cryptolaria) conferta*: Bonnevie 1899, p 63 (non-record; reference to the species).
- Cryptolaria conferta*: Versluys 1899, p 29, 32 (doubtful record. Off Testigos Islands, Venezuela, 40 fathoms).
- Cryptolaria conferta*: Pictet and Bedot 1900, p 4, 17, 55, Plate 2 Figure 3, Plate 3 Figure 7 (doubtful record. Off Azores: Sta. 226, 38°31'19" N, 30°54'45" W, 130 m; Sta. 234, 39°01'40" N, 30°15'40" W, 454 m; Sta. 247, 38°24' N, 30°21'40" W, 318 m).
- Cryptolaria conferta*: Lo Bianco 1903, p 247, 268, 277 (?).
- Cryptolaria conferta*: Jäderholm 1903, p 275 (doubtful record; neither description nor figures. Anguilla, Antilles, 70–200 fathoms).
- Cryptolaria conferta?*: Hartlaub 1904, p 4, 5, 13, Plate 2 Figure 1 (doubtful record. Antarctic Ocean—70°00' S, 80°48' W, 550 m).
- Cryptolaria conferta*: Hartlaub 1905, p 592 (non-record; list of species).
- Cryptolaria conferta?*: Billard 1906a, p 2 (non-record; list of species).
- Lafoea (Cryptolaria) conferta*: Billard 1906b, p 330 (non-record; reference to previous papers).
- Lafoea conferta*: Billard 1906c, p 157, 177 (doubtful record; neither description nor figures. Travailleur 8, Golfe de Gascogne, 411 m, on sponges and hydroids; Travailleur 34, Cap Spartel, 112 m; Talisman 10, Cap Spartel, 717 m, Talisman 18, Mazaghan, Morocco, 550 m, on sponges; Talisman 69, NW Cap Garnet, Sudan, 410 m).
- Cryptolaria conferta*: Browne 1907, p 29 (non-record; just indication that *Cryptolaria humilis* should be united with *C. conferta* and *C. crassicaulis*).
- Cryptolaria conferta*: Broch 1909, p 202 (non-record).
- Cryptolaria conferta*: Vanhöffen 1910, p 339, 340 (non-record; list of species).
- Cryptolaria conferta* var. *australis* Ritchie 1911, p 826–830, Plate 84 Figure 2, Plate 87 Figure 1 (doubtful record. Distinctly smaller hydrothecae; similar to *A. minuta*. Off Wata Mooli, Australia, 52–78 fathoms).
- Grammaria conferta*: Broch 1913, p 9 (doubtful record; neither description nor figures. West of Gibraltar, 1215 m).
- Cryptolaria conferta*: Stechow 1913a, p 30 (non-record; reference to other authors concerning the coppinia).
- Grammaria conferta*: Broch 1918, p 17–18 (doubtful record; neither figures nor measurements. Denmark Strait, 64°34' N, 31°12' W, 1300 fathoms, 66°35' N, 55°44' W, 88 fathoms, 66°35' N, 56°38' W, 318 fathoms, 60°37' N, 27°52' W, 799 fathoms, 64°44' N, 32°52' W, 976 fathoms).
- Cryptolaria conferta* var. *australis*: Jäderholm 1919, p 7, Plate 2 Figure 1 (doubtful record; no description, one figure. Sagami, Misaki, Japan, 200 fathoms).
- Cryptolaria conferta*: Jarvis 1922, p 335 (doubtful record; neither description nor figures. Providence Island, Seychelles, 50–78 fathoms).
- Oswaldaria conferta*: Stechow 1923a, p 147 (non-record; change of genus).
- Oswaldaria conferta* var. *australis*: Stechow 1923b, p 11 (non-record; reference to other authors).

- Cryptolaria conferta*: Stechow 1925, p 459–460 (doubtful record; without figures. 24°35.5'N, 17°4.7'W, between Cape Blanc and Cape Bojador, NW Africa, 2500 m. Coppinia in August).
- Acryptolaria conferta*: Totton 1930, p 164, Figure 19a, b (no description, but figured British Museum material from Porto Santo Island).
- Acryptolaria conferta* var. *australis*: Totton 1930, p 163, Figure 19c–e (doubtful record. Off Three Kings Islands, New Zealand, 549 m. The material from Sta. 96, North Cape, New Zealand, probably belongs to *A. minuta*).
- Acryptolaria conferta*: Kramp 1932, p 68, Figure 32 (doubtful record; neither description nor figures. 66°35'N, west of Greenland, 600 m).
- Acryptolaria conferta*: Leloup 1937, p 5, 29, Figure 19 (doubtful record. French Indochina: Baie de Nha Trang Bay, Tré Island, 15 m; Thuy Trien; Cape Saint-Jacques, 20 m).
- Oswaldaria conferta*: Leloup 1940, p 15 (doubtful record; neither description nor figures. Sta. 475, 37°52'N, 9°15'45"W, 552 m; Sta. 584, 38°31'–38°30'30"N, 26°49'15"–26°50'15"W, 845 m; Sta. 597, 38°27'N, 28°03'25"W, 523 m; Sta. 600, 38°30'35"N, 28°16'20"W, 349 m; Sta. 866, 38°52'50"N, 27°23'05"W, 599 m; Sta. 889, 37°57'30"N, 29°15'10"W, 208 m; Sta. 1116, 31°43'30"N, 10°46'45"W, 2165 m; Sta. 1302, 36°40'N, 14°09'45"W, 204 m; Sta. 1304, 36°41'N, 14°11'45"W, 208 m; Sta. 1540, 47°16'N, 5°16'W, 140 m).
- Acryptolaria conferta*: Fraser 1943, p 90 (doubtful record; neither description nor figures. 17°37'55"N, 64°54'20"W, off Santa Cruz Island, 115 fathoms; 30°58'N, 79°34'W, off southern Georgia, 265–290 fathoms).
- Acryptolaria conferta*: Fraser 1944, p 210–211, Plate 40 Figure 189 (doubtful record; description and figures. 41°43'N, 65°21'50"W, east of cape Cod peninsula, 1309 fathoms; 31°31'N, 79°38'30"W, off Jacksonville, Florida, 277 fathoms; 30°58'30"N, 79°38'30"W, off Jacksonville, 294 fathoms; off Havana, 100–200 fathoms; Antigua, Antilles, 70–200 fathoms).
- Acryptolaria conferta*: Kramp 1947, p 8 (doubtful record; neither description nor figures. Tangier and Josephine Bank, eastern Atlantic).
- Acryptolaria conferta*: Fraser 1948, p 228 (doubtful record; neither description nor figures. San Pedro Channel, California, 68–82 fathoms; off Long Point, Santa Catalina Island, 267–347 fathoms; SE off Church Rock, 280 fathoms).
- Acryptolaria conferta*: Rossi 1950, p 9, 201–202, Figure 4a (doubtful record. Golfo di Rapallo).
- Acryptolaria conferta*: Dawydoff 1952, p 55 (?).
- Acryptolaria conferta*: Deevey 1954, p 270 (non-record; checklist—reference to other authors).
- Oswaldaria conferta*: Picard 1958, p 193 (non-record; list of species).
- Acryptolaria conferta* var. *australis*: Ralph 1958, p 315, Figure 3g, 4a–g (doubtful record; with description and figures. After the figures and the dimensions, materials b–e may refer to *A. minuta*, though the hydrothecae seem slightly longer. The material from Figure 4a seems another species. New Zealand: Bay of Plenty, Mayor Island and Chatham Island. Figure 4d, e from Bay of Plenty, with female coppinia found in August).
- Acryptolaria conferta* var. *conferta*: Ralph 1958, p 317 (non-record; discussion on the species).
- Acryptolaria conferta* var. *australis*: Yamada 1959, p 49 (non-record; reference to Jäderholm's 1919 material).

- Acryptolaria conferta* var. *australis*: Ralph 1961, p 236 (non-record; checklist).
- Acryptolaria conferta*: Kramp 1963, p 106 (non-record; list of species).
- Acryptolaria conferta conferta*: Millard 1964, p 7, Figure 1A–C, E (doubtful record. Clear differences with the holotype, such as distinctly smaller hydrothecae. South Africa: Sta. AFR 736, 30°42.4'S, 15°59.2'E, 201 m; Sta. SCD 101, 34°33'S, 24°01'E, 131 m).
- Acryptolaria conferta australis*: Millard 1964, p 9, Figure 1D, F–G (doubtful record. Probably belonging to other species; similar to *A. pulchella*. South Africa: Sta. AFR 835, 35°09'S, 19°02'E, 188 m; Sta. SCD 101 34°33'S, 24°01'E, 131 m; Sta. SCD 103, 35°07'S, 22°15'E, 119 m; Sta. SCD 175, 34°20'S, 23°31'E, 110 m).
- Acryptolaria conferta* var. *australis*: Rees and Thursfield 1965, p 82, 194 (non-record; reference to Ritchie's 1911 material).
- Acryptolaria conferta*: Rees and White 1966, p 273 (non-record; reference to previous records).
- Acryptolaria conferta australis*: Vervoort 1966, p 115, Figure 15 (doubtful record. He included one figure and measurements of “schizosyntypes” and “schizoparatype” of Ritchie's 1911 subspecies. Tasman Sea, 45°51'S, 164°32'E, 4400 m).
- Acryptolaria conferta australis*: Millard 1967, p 172 (doubtful record; neither description nor figures. East coast of South Africa: 24°40'S, 35°28'E, 347 m; 29°42'S, 31°38'E, 350 m).
- Acryptolaria conferta*: Millard 1968, p 253, 260–261 [doubtful record; neither description nor figures. One sample, TME 24M, August, with a coppinia. Gonothecae as described by Allman, without modified hydrothecae or nematothecae. Stations TME 23U (29°47'30"S, 31°11'45"E, 64 m), 24M (29°48'30"S, 31°18'E, 219 m), 29K (30°02'30"S, 31°02'45"E, 164 m), 31F (29°54'25"S, 31°09'45"E, 124 m)].
- Acryptolaria conferta*: Vervoort 1968, p 99 (non-record; checklist—reference to other authors).
- Acryptolaria conferta*: Patrìti 1970, p 30, Figure 33 (doubtful record. “Vanneau” stations XXIX, XXXV, XXXVII, XLIII; from off Mazaghan and Casablanca, Morocco).
- Acryptolaria conferta conferta*: Vervoort 1972, p 44, Figure 12a (doubtful record, considered so by the author. Between Falkland Islands and Burdwood Bank, 52°41'S, 59°09'W, 108 m).
- Acryptolaria conferta*: Edwards 1973, p 587 (list of species; hosts of *Stegopoma fastigiatum*).
- Acryptolaria conferta*: Millard 1973, p 28, Figure 4c (non-record; example of auto-epizoism in South African species).
- Cryptolaria conferta*: Keller et al. 1975, p 148 (?).
- Acryptolaria conferta*: Millard 1975, p 169, Figure 56 (doubtful record; clearly including more than one species. South Africa, distributed from the west coast round the Agulhas Bank into Natal and Mozambique, 64–350 m).
- Acryptolaria conferta* var. *australis*: Smaldon et al. 1976, p 14 (non-record; list of type specimens).
- Acryptolaria conferta*: Millard 1977, p 106 (non-record; list of species).
- Acryptolaria conferta*: Millard 1978, p 188 et seq. (non-record; list of species).
- Acryptolaria conferta*: Stepanjants 1979, p 51, Plate 9 Figure 4A–G (non-record; reference to other authors).
- Acryptolaria conferta*: Millard 1980, p 130 (doubtful record; neither description nor figures. East coast of South Africa: SM 121—30°32.2'S, 30°52.8'E, 625–900 m, SM 131—30°43.2'S, 30°40.8'E 780 m, SM 162—32°55.0'S, 28°31.0'E 630 m, SM 185—33°39.3'S, 27°11.6'E 90 m, SM 226—32°28.6'S, 28°58.8'E 710–775 m, SM 228—32°29.5'S, 28°57.1'E 650–700 m, SM 232—32°14.9'S, 29°10.4'E

560–620 m, SM 233—32°15.2'S, 29°09.8'W 540–580 m, SM 237—32°15.4'S, 29°09.7'E 600–650 m, SM 239—32°14.8'S, 29°00.8'E 90 m, SM 255—31°37.8'S, 29°40.8'E 125 m).

Acryptolaria conferta: Stepanjants 1980, p 116 (non-record).

Acryptolaria conferta: Blanco 1981, p 275–276, Figures 3, 4 (doubtful record. Hydrotheca much curved outwards, with a much larger free adcauline portion and aperture. 42°55'S, 58°58'W, 368–380 m).

Acryptolaria conferta: García Carrascosa 1981, p 146–148, Plate 6 Figures a, b, Plate 30 Figure D (doubtful record. Distinctly smaller than the type material; probably belonging to a different species. Columbretes Islands. 67–80 m).

Oswaldaria conferta: Marinopoulos 1981, p 176 (doubtful record; neither description nor figures. French Mediterranean coast, 125–600 m).

Acryptolaria conferta: Hirohito 1983, p 6, 19 (doubtful record; neither description nor figures. Off Niiijima and Ōshima islands, in front of Sagami Bay, Japan).

Acryptolaria conferta conferta: Vervoort 1985, p 282–283 (doubtful record; neither description nor figures. Golfe de Gascogne, Stations 1/DS65, 2/CV38 and 2/CV40).

Acryptolaria conferta: Templado et al. 1986, p 98 (doubtful record; neither description nor figures. Off Alborán Island: 35°54'–35°52'N, 03°09'–03°05'W, 70–120 m; Seco de los Olivos, off Almería coast: 36°31'N, 02°51'W, 80–120 m; 36°31'N, 02°53'W, 100–200 m).

Acryptolaria conferta: García Carrascosa et al. 1987, p 367, Plate 1 Figures A, B (doubtful record; no description. Columbretes Islands).

Acryptolaria conferta australis: Rees and Vervoort 1987, p 37–39, Figure 6e (doubtful record. The material agrees with *A. pulchella* in shape and size of hydrothecae. Sta. 111, 05°04'18"S, 39°14'12"E, off Tanganyika coast, Zanzibar area, 73–165 m).

Acryptolaria conferta: Altuna and García Carrascosa 1990, p 54 et seq., Figure (non-record).

Acryptolaria conferta: Cairns et al. 1991, p 24 (non-record; list of common and scientific names).

Acryptolaria conferta: Calder 1991, p 33–35, Figures 19, 20 (doubtful record. It could belong to *A. crassicaulis*. Coppinia in July; without defensive tubes. SE of Castle Roads, Bermuda, 73 m).

Acryptolaria conferta: El Beshbeeshy 1991, p 63–66, Figure 13 (doubtful record. Clearly different from this species. Patagonian shelf, off Falkland Islands: 51°11'S, 56°57'W, 225 m; 53°44'S, 59°54'W, 535 m).

Acryptolaria conferta australis: Park 1991, p 545, Figure 5A–D (doubtful record. From Sogwip'o).

Acryptolaria conferta australis: Dawson 1992, p 15 (non-record).

Acryptolaria conferta: Park 1992, p 287 (?).

Acryptolaria conferta conferta: Ramil and Vervoort 1992, p 41–43, Figure 7a, b (doubtful record. From the Strait of Gibraltar, the Alboran Sea and off Cape Spartel and Rabat).

Acryptolaria conferta minor Ramil and Vervoort 1992, p 43–48, Figures 8a–c, 9a–c (doubtful record. Off Cape São Vicente, Cádiz, the Strait of Gibraltar, Cape Spartel, Rabat and the Alboran Sea).

Acryptolaria conferta: Boero and Bouillon 1993, p 263 (non-record; list of species).

Acryptolaria conferta: Calder 1993, p 67 et seq. (non-record; list of species).

Acryptolaria conferta: Altuna Prados 1994, p 131–134, Plate 16 Figures A, B (doubtful record. Basque coast. Coppinia in July).

Acryptolaria conferta: Altuna 1995, p 54 (non-record; list of species).

- Acryptolaria conferta*: Blanco 1994a, p 162 (non-record; identification key).
- Acryptolaria conferta*: Blanco 1994b, p 188 (non-record; reference to other authors).
- Acryptolaria conferta*: Blanco et al. 1994, p 8–9, Figures 4, 5 (doubtful record; it seems to belong to a different species. 42°55'S, 58°W, 368–380 m).
- Acryptolaria conferta*: Avian et al. 1995, p 18 (non-record; checklist).
- Acryptolaria conferta*: Bouillon et al. 1995, p 51 (non-record; museum catalogue).
- Acryptolaria conferta*: Álvarez Claudio and Anadón 1995, p 238 (non-record; list of species).
- Acryptolaria conferta*: El Beshbeeshy 1995, p 326–327, Figure 1C (?).
- Acryptolaria conferta*: Medel and López-González 1996, p 198 (non-record; catalogue—reference to other authors).
- Acryptolaria conferta*: Stepanjants et al. 1996, p 15, 19 (non-record).
- Acryptolaria conferta*: Boero and Bouillon 1993, p 263 (non-record; list of species).
- Acryptolaria conferta*: Hirohito 1995, p 104, Figure 29c, d, Plate 5 Figure c (doubtful record. Sagami Bay, shallow water to 200 m).
- Acryptolaria conferta*: Calder 1997, p 87 (non-record; reference to other authors).
- Acryptolaria conferta*: Genzano and Zamponi 1997, p 290 (non-record; list of species).
- Acryptolaria conferta*: Stepanjants et al. 1997, p 458 (non-record; list of species).
- Grammaria conferta*: Hansson 1998, p 7 (non-record; checklist).
- Acryptolaria conferta*: Schuchert 2000, p 413, 423 (doubtful record; neither description nor figures. Off Iceland: Sta. 2107, 67.836°N, 19.555°W, 905–903 m; Sta. 2257, 63.244°N, 26.486°W, 1209–1212 m; Sta. 2288, 62.387°N, 22.677°W, 1390–1410 m; Sta. 2291, 62.464°N, 22.673°W, 1206–1207 m; Sta. 2849, 62.830°N, 18.007°W, 976–1000 m).
- Acryptolaria conferta*: Lalana et al. 2001, p 159 (non-record; checklist—reference to other authors).
- Acryptolaria conferta*: Schuchert 2001, p 61–62, Figure 48A, B (doubtful record; it seems to belong to a different species. North, southwest, and south coasts of Iceland, 905–1400 m).
- Acryptolaria conferta*: Watson 2003, p 161–162, Figure 11A–D (doubtful record. Similar to *A. longithecata*. Coppinia in January. 56°15.7'–56°18'S, 158°30.2'–158°28.7'E, off Macquarie Island, 500–600 m).
- Acryptolaria conferta*: Schuchert 2003, p 156–157, Figure 15 (doubtful record. Kei Islands, 5.64°S, 132.43°E, 196 m).
- Acryptolaria conferta conferta*: Vervoort and Watson 2003, p 43–44, Figure 4A–C (doubtful record. Around New Zealand. Fertile in June, July, August, and September).
- Acryptolaria conferta*: Vervoort 2006, p 226–227 (doubtful record; off Azores, from the S of Madeira, off Fuerteventura, S of Hierro and SW of Palma, in the Canary Islands, off Razo, in the Cape Verde Islands, and off Mauritania, 52–2050 m).
- Acryptolaria conferta* var. *minor*: Vervoort 2006, p 228, Figure 11a–d (doubtful record; off NE of Flores, in Azores, S of Madeira, S of Fuerteventura, and S and SW of Hierro, in the Canary Islands, off Mauritania and off Cape Blanc du Nord and W of Cape Yubi, in Morocco, 150–1000 m).

***Acryptolaria corniformis* Naumov and Stepanjants, 1962**

- Acryptolaria corniformis*: Gravier-Bonnet 1979, p 22 (non-record, discussion of the species).
- Acryptolaria corniformis*: Vervoort and Watson 2003, p 44, Figure 4D, E (doubtful record, clearly belonging to a different species. Macquarie Gap, 51°06.00'S, 167°48.50'E, 216 m).

***Acryptolaria crassicaulis* (Allman, 1888)**

- Cryptolaria crassicaulis*: Driesch 1889, p 10 (non-record).
- Cryptolaria crassicaulis*: Pictet and Bedot 1900, p 17, 18 (non-record).
- Cryptolaria crassicaulis*: Browne 1907, p 29 (non-record; just indication that *Cryptolaria humilis* should be united with *C. conferta* and *C. crassicaulis*).
- Cryptolaria crassicaulis*: Ritchie 1911, p 833, Plate 87 Figure 4 (non-record; figure of type specimen).
- Cryptolaria crassicaulis* var. *dimorpha* Ritchie, 1911, p 830, Figure 126, Plate 87 Figures 5, 6 (doubtful record. Similar to *Acryptolaria operculata* in the shape and the size of the hydrothecae. Off Wollongong, Australia, 55–56 fathoms).
- Cryptolaria crassicaulis*: Stechow 1913a, p 11, 113, Figures 86, 87 (doubtful record. Description and figures of the coppinia. Okinosebank, Sagami Bay).
- Cryptolaria crassicaulis*: Stechow 1913b, p 144 (non-record; list of species).
- Cryptolaria crassicaulis*: Jäderholm 1916/17, p 5, Plate 1 Figure 4 (doubtful record; it could belong to either *A. crassicaulis* or *A. longithecata*. E Port Stanley, Falkland Islands, 150 m).
- Cryptolaria crassicaulis*: Jäderholm 1919, p 8, Plate 2 Figure 2 (doubtful record; no description, one figure. Kiushiu, Gotoinseln, Japan).
- Oswaldaria crassicaulis*: Stechow 1921, p 256 (non-record; assignation as type species of *Oswaldaria*).
- Cryptolaria crassicaulis* var. *dimorpha*: Jarvis 1922, p 335 (doubtful record; neither description nor figures. Salomon, Chagos, 60–120 fathoms).
- Oswaldaria crassicaulis*: Stechow 1923a, p 147 (non-record; change of genus).
- Oswaldaria crassicaulis*: Stechow 1923b, p 11 (non-record; reference to other authors).
- Cryptolaria crassicaulis*: Leloup 1932, p 146, Figure 16, Plate 16 Figure 3 [doubtful record. According to the dimensions, it could belong to this species. Leloup indicated the presence of a scapus, without accessory tubes; coppinia in April. Off Travancore Coast, Indes anglaises (9°N, 75°E), 260 brasses].
- Oswaldaria crassicaulis*: Leloup 1940, p 15–16 (doubtful record; neither description nor figures. Sta. 503, 47°12'N, 50°51'45"W, 748–1262; Sta. 578, 38°26'N, 26°30'45"W, 1165 m; Sta. 616, 38°46'35"N, 28°17'20"W, 1022 m; Sta. 663, 37°28'30"N, 25°31'45"W, 1732 m; Sta. 683, 38°20'N, 28°04'45"W, 1550 m; Sta. 719, 39°11'N, 30°24'15"W, 1600 m; Sta. 866, 38°52'50"N, 27°23'05"W, 599 m; Sta. 1116, 31°43'30"N, 10°46'45"W, 2165 m; Sta. 1349, 38°35'30"N, 28°05'45"W, 1250 m; Sta. 1420, 42°54'N, 28°30'45"W, 2460 m; Sta. 2034, 33°47'N, 14°21'W, 185 m; Sta. 2048, 32°32'30"N, 17°02'W, 1968 m; Sta. 2210, 39°25'N, 31°22'30"W, 1229 m; Sta. 2214, 39°26'10"N, 31°21'30"W, 650–914 m).
- Acryptolaria crassicaulis*: Yamada 1959, p 49 (non-record; reference to other authors).
- Acryptolaria crassicaulis*: Rees and White 1966, p 273 (non-record, reference to other authors).
- Acryptolaria crassicaulis*: Millard 1967, p 172–174, Figure 2A (doubtful record. From the figure and the size of the hydrotheca, particularly the diameter at the aperture, it could belong to *A. corniformis*. Off east coast of South Africa: 36°48'S, 52°08'E, 400 m. She dismissed the necessity of Ritchie's variety *dimorpha*).
- Acryptolaria crassicaulis*: Leloup 1974, p 8 (doubtful record; neither measurements nor figures. ESE off Isla Tac, Golfo de Ancud, Chile, 250–300 m).
- Acryptolaria crassicaulis* var. *dimorpha*: Smaldon, Heppell, and Watt 1976, p 14 (non-record; list of type specimens).
- Acryptolaria crassicaulis*: Millard 1978, p 188 et seq. (non-record; list of species).

- Acryptolaria crassicaulis*: Gravier-Bonnet 1979, p 18, Figure 34B, C (doubtful record; hydrothecae distinctly much larger. Probably belonging to *A. operculata*. Off Madagascar, 25°09'02"S, 47°22'06"E, 460–465 m).
- Acryptolaria crassicaulis* var. *dimorpha*: Gravier-Bonnet 1979, p 20 (non-record; just discussion on the variety *dimorpha*).
- Acryptolaria crassicaulis*: Vervoort 1985, p 283–285, Figure 1 (doubtful record. Hydrothecae clearly smaller than those of *A. crassicaulis*, being closer to *A. conferta*).
- Acryptolaria crassicaulis*: Ramil and Vervoort 1992, p 48–49, Figure 9d (doubtful record. Off Cádiz, Spain, 392 m).
- Cryptolaria crassicaulis*: Stranks 1993, p 7 (non-record; catalogue).
- Acryptolaria crassicaulis*: Altuna Prados 1994, p 134–137, Plate 17, Figures A–E (doubtful record. Off Basque coast, Spain, with coppinia).
- Acryptolaria crassicaulis*: Altuna 1995, p 54 (non-record; list of species).
- Acryptolaria crassicaulis*: Blanco 1994a, p 162 (non-record; identification key).
- Acryptolaria crassicaulis*: Blanco 1994b, p 188 (non-record; reference to other authors).
- Acryptolaria crassicaulis*: Blanco et al. 1994, p 9–10, Figure 6 (non-record; reference to other authors).
- Acryptolaria crassicaulis*: Bouillon et al. 1995, p 51 (non-record; museum catalogue).
- Acryptolaria crassicaulis*: Medel and López-González 1996, p 198 (non-record; catalogue—reference to other authors).
- Acryptolaria crassicaulis*: Genzano and Zamponi 1997, p 290 (non-record; list of species).
- Acryptolaria crassicaulis*: Vervoort and Watson 2003, p 44–46, Figure 5A–C (doubtful record, no figures. Probably belonging to *A. longithecata*, with which agrees in shape and size of hydrothecae. Off the Kermadec Ridge, north of New Zealand, 106–325 m).

***Acryptolaria flabellum* (Allman, 1888)**

- Oswaldaria flabellum*: Stechow 1923a, p 147 (non-record; change of genus).
- Acryptolaria flabellum*: Fraser 1944, p 212, Plate 41 Figure 191 (non-record; reference to Allman's material).
- Cryptolaria flabellum*: Naumov 1957, p 41 (non-record).
- Cryptolaria flabellum*: Naumov 1960, p 278–279, Figure 168, Plate 1 Figure 2 (doubtful record; with description and figure. From the Sea of Okhotsk, 628–2400 m).
- Cryptolaria flabellum*: Filatova and Barsanova 1964, p 90 (?).
- Acryptolaria flabellum*: Vervoort 1968, p 99 (non-record; checklist—reference to other authors).
- Cryptolarella flabellum*: Vervoort 1972, p 47–49, Figure 13a, b [= *Cryptolarella abyssicola* (Allman, 1888)].
- Cryptolaria flabellate*: Belousov 1975a, p 206 (non-record).
- Cryptolaria flabellum*: Belousov 1975b, p 655, Figure 1 no. 1 (non-record).
- Cryptolarella* cf. *flabellum*: Sheiko and Stepanjants 1997, p 439 (doubtful record; list of species. Commander Islands).

***Acryptolaria gracilis* (Allman, 1888)**

- Cryptolaria gracilis*: Farquhar 1896, p 461 (non-record; reference to Allman's record).
- Cryptolaria gracilis*: Hutton 1904, p 320 (non-record).
- Lafoea* (*Cryptolaria*) *gracilis*: Billard 1906b, p 330 (doubtful record; neither description nor figures. Mazagham, Morocco).

- Lafoea gracilis*: Billard 1906c, p 157, 178 [doubtful record; neither description nor figures. Mazagham (=El Jadida), Morocco, 33°11'N, 11°19'W, 550 m (= *Acryptolaria conferta minor* after Ramil and Vervoort 1992, p 43)].
- Oswaldaria gracilis*: Stechow 1923a, p 147 (non-record; change of genus).
- Acryptolaria gracilis*: Ralph 1958, p 314, Figure 3b–d (doubtful record; unspecified locality).
- Acryptolaria gracilis*: Patrìti 1970, p 30, Figure 34 (same locality as the record by Billard 1906c).
- Acryptolaria gracilis*: Dawson 1992, p 15 (non-record).
- Cryptolaria gracilis*: Stranks 1993, p 7 (non-record; catalogue).
- Acryptolaria gracilis*: Watson and Vervoort 2001, p 157–159, Figure 4a–c (doubtful record, considered so by the authors. Clearly different from *A. gracilis*. Tasmanian seamounts, 44.19–44.22°S, 147.02–147.05°E, 936–1018 m).
- Acryptolaria gracilis*: Vervoort and Watson 2003, p 46–47, Figure 6D, E (non-record; revision of the type material).

Acryptolaria longithec (Allman, 1877)

- Cryptolaria longithec*: Fewkes 1881, p 128 (doubtful record; neither description nor figures. Caribbean Sea: Dominica, 76 fathoms; Martinique, 334 fathoms; Barbados, 103 fathoms).
- Cryptolaria longithec*: Stechow 1913a, p 30 (non-record; reference to other authors concerning the coppinia).
- Lafoea* (*Cryptolaria*) *longithec*: Bonnevie 1899, p 63 (non-record; reference to the species).
- Lafoea* (*Cryptolaria*) *longithec*: Billard 1906c, p 178 (non-record; reference to the species).
- Oswaldaria longithec*: Stechow 1923a, p 147 (non-record; change of genus).
- Acryptolaria longithec*: Fraser 1943, p 78, 90, Plate 16 Figure 5, Plate 17 Figure 5 (doubtful record; with description and figures. With coppinia. 24°18'N, 80°58'30"W, south of Florida Keys, 324 fathoms; 13°11'54"N, 59°38'45"W, off Barbados, 73 fathoms).
- Acryptolaria longithec*: Fraser 1944, p 212, Plate 41 Figure 192 (non-record; reference to previous records).
- Acryptolaria longithec*: Deevey 1954, p 270 (non-record; checklist—reference to other authors).
- Acryptolaria longithec*: Vervoort 1968, p 99 (non-record; checklist—reference to other authors).
- Acryptolaria longithec*: Vervoort 1972, p 45, Figure 12b, c (doubtful record. Closer to *A. corniformis* both in the shape and size of the hydrothecae. Western Atlantic, east of South Carolina, 32°34'N, 74°21.5'W, 4681 m).
- Acryptolaria longithec*: Cairns et al. 1991, p 24 (non-record; list of common and scientific names).
- Acryptolaria longithec*: Calder 1996, p 1723, Figure 2d–f (doubtful record. Bermuda Pedestal, 32°35.0'N, 64°54.9'W, 3550 m; 32°34.3'N, 64°54.7'W, 3011 m, on hexactinellid sponges).
- Acryptolaria longithec*: Calder 1997, p 87 (non-record; reference to other authors).
- Acryptolaria longithec*: Calder and Vervoort 1998, p 22–25, Figures 9–11 (doubtful record. Mid-Atlantic Ridge: 15°35.33'N, 46°45.06'W, 3410 m; 15°28.56'N, 46°34.15'W, 3000 m, coppinia in March, lacking modified hydrothecae; 15°28.75'N, 46°33.56'W, 3289 m; 15°30.85'N, 46°38.24'W, 3902 m; 23°19.67'N, 45°14.65'W, 2500 m).

Acryptolaria cf. *longithecata*: Vervoort and Watson 2003, p 47, Figure 4F, G (doubtful record; closer to *A. flabellum*. 37°15.20'S, 176°51.20'E, Raukumara Plain, east of Coromandel Peninsula, New Zealand, 130 m).

Acryptolaria longithecata: Vervoort 2006, p 229–230, Figures 11e, 12a (doubtful record; off Azores, 37–38°N, 25–25.5°W, 1370–2850 m).

***Acryptolaria minima* Totton, 1930**

Acryptolaria minima: Hicks et al. 1991, p 7 (non-record; catalogue).

Acryptolaria minima: Dawson 1992, p 15 (non-record; list of species).

Acryptolaria minima: Vervoort and Watson 2003, p 47–51, Figures 5D–F, 6A–C, F (doubtful record. New Zealand: Norfolk Ridge west of Three Kings Islands, from off Whananaki, and from the Chatham Islands region, 50–130 m).

***Acryptolaria operculata* Stepanjants, 1979**

Acryptolaria operculata: Blanco 1994a, p 162 (non-record; identification key).

Acryptolaria operculata: Blanco 1994b, p 188–189 (non-record; reference to other authors).

Acryptolaria operculata: Blanco et al. 1994, p 10–12, Figures 7, 8 (non-record; repetition of Stepanjants' description).

Acryptolaria operculata: Genzano and Zamponi 1997, p 290 (non-record; list of species).

***Acryptolaria pulchella* (Allman, 1888)**

Cryptolaria pulchella: Driesch 1889, p 10 (non-record).

Cryptolaria pulchella: Clarke 1894, p 71, 72, 76 (doubtful record; neither description nor figures. West coast of Central America).

Cryptolaria pulchella: Thornely 1900, p 451 (doubtful record; neither description nor figures. Just indication that there is a species of *Cryptolaria*, probably *C. pulchella*. Southern Seas).

Cryptolaria pulchella: Nutting 1905, p 934, 947 (doubtful record. Neither description nor figures. Several localities in the Hawaiian Islands from 18 to 284 fathoms).

Cryptolaria pulchella: Stechow 1913a, p 11, 112 (doubtful record; neither description nor figures. From Okinosebank, Sagami Bay, 70–180 m).

Cryptolaria pulchella: Stechow 1913b, p 144 (non-record; list of species).

Oswaldaria pulchella: Stechow 1923a, p 147 (non-record; change of genus).

Oswaldaria pulchella: Stechow 1923b, p 11 (non-record, reference to other authors).

Cryptolaria pulchella: Fraser 1925, p 172 (doubtful record; neither description nor figures. Off Goat Island, San Francisco Bay, 10 fathoms).

Acryptolaria pulchella: Nutting 1927, p 210 (doubtful record; neither description nor figures. St. 5168, 04°56'30"N, 119°45'40"E, Observation Island, Tawi-Tawi group, Sulu Archipelago, 80 fathoms).

Acryptolaria pulchella: Fraser 1937, p 116, Plate 24 Figure 131 (non-record; reference to Fraser's 1925 material).

Acryptolaria pulchella: Fraser 1938, p 134, 136 (doubtful record; neither description nor figures. Off Barrington Island, Galapagos Islands, 73 fathoms; Sullivan Bay, 35–40 fathoms).

Acryptolaria pulchella: Fraser 1939, p 159 et seq. (non-record; paper on the distribution of hydroids).

- Acryptolaria pulchella*: Fraser 1943, p 90 (doubtful record; neither description nor figures. 24°20'30"N, 81°58'30"W, southwest of Sand Key, 125 fathoms).
- Acryptolaria pulchella*: Fraser 1944, p 213, Plate 42 Figure 193 (doubtful record. It seems to belong to a different species. 29°16'30"N, 79°36'30"W, off St. Augustine, Florida, 438 fathoms).
- Acryptolaria pulchella*: Deevey 1954, p 270 (non-record; checklist—reference to other authors).
- Acryptolaria pulchella*: Yamada 1959, p 48 (non-record; reference to other authors).
- Acryptolaria pulchella*: Vervoort 1968, p 99 (non-record; checklist—reference to other authors).
- Acryptolaria pulchella*: Austin 1985, p 56 (non-record; checklist).
- Acryptolaria pulchella*: Cairns et al. 1991, p 24 (non-record; list of common and scientific names).
- Cryptolaria pulchella*: Stranks 1993, p 7 (non-record—catalogue).
- Acryptolaria pulchella*: Hochberg and Ljubenkova 1998, p 27, Figure 1.11 (doubtful record; taxonomic atlas. Light description and imprecise figures).

***Acryptolaria rectangularis* (Jarvis, 1922)**

- Acryptolaria rectangularis*: Millard 1967, p 174, Figure 2B [the material apparently includes both *A. rectangularis* (ABD 15P) and *A. bulbosa* (AFR 1251D). Millard herself indicated that “the two samples have hydrothecae of very different sizes, though the proportions are similar”. AFR 1251D, 35°03'S, 44°12'E, Walters shoal, east coast of South Africa, 600 m; ABD 15P, 29°42'S, 31°38'E, east coast of South Africa, 350 m].
- Acryptolaria rectangularis*: Millard 1968, p 253, 261–262, Figure 2 (doubtful record. Closer to *A. bulbosa*. South Africa: 24N, 29°48'30"S, 31°18'E, ca 219 m; 27C, 29°59'S, 31°07'30"E, 232 m; 29F, 30°02'30"S, 31°02'45"E, 164 m. August).
- Acryptolaria rectangularis*: Millard 1973, p 28 (non-record; just discussion on the formation of solitary hydrothecae).
- Acryptolaria rectangularis*: Millard 1975, p 171, Figure 57A–D (doubtful record. Closer to *A. bulbosa*. Off the coasts of Natal and Mozambique, 110–495 m).
- Acryptolaria rectangularis*: Millard 1977, p 106 (non-record; list of species).
- Acryptolaria rectangularis*: Millard 1978, p 188 et seq (non-record; list of species).
- Acryptolaria rectangularis*: Gravier-Bonnet 1979, p 17–18, Figure 4A (doubtful record. Closer to *A. bulbosa*. 25°09'02"S, 47°22'06"E, off Madagascar, 460–465 m).
- Acryptolaria rectangularis*: Millard 1980, p 131, 138, Figure 4A (doubtful record. Neither description nor measurements. With coppinia figure. SM 121, 30°32.2'S, 30°52.8'E, coast of Natal, 625–900; SM 239, 32°14.8'S, 29°00.8'E, Transkei coast, 90 m, June; SM 250, 31°59.3'S, 29°22.5'E, Transkei coast, 150–200 m).
- Acryptolaria rectangularis*: Cairns et al. 1991, p 24 (non-record; list of common and scientific names).
- Acryptolaria rectangularis*: Schuchert 2003, p 154–155, Figure 13 (doubtful record. Kei Islands, Indonesia, 5.53°S, 132.6°E, 245 m).