On Clathrozoellidae (Cnidaria, Hydrozoa, Anthoathecatae), a new family of rare deep-water leptolids, with the description of three new species

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In memory of Koos den Hartog

Peña Cantero, A.L., W. Vervoort & J.E. Watson. On Clathrozoellidae (Cnidaria, Hydrozoa, Anthoathecatae), a new family of rare deep-water leptolids, with the description of three new species.
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Key words: Hydrozoa; Anthoathecatae; Clathrozoellidae; *Clathrozoella*; Antarctic; benthos; new species.
Three new species of Anthoathecatae (Cnidaria, Hydrozoa) of the rare genus *Clathrozoella* Stechow, 1921, *Clathrozoella abyssalis* spec. nov., *C. bathyalis* spec. nov. and *C. medeae* spec. nov., are described from New Zealand and Antarctic waters. Along with the previously known *C. drygalskii* (Vanhöffen, 1910) the genus *Clathrozoella* now numbers four species. Details of the skeleton, hydranths, nematocysts and gonophores are described and discussed, as is also the position of the newly established family Clathrozoellidae.

Introduction

During the German South Polar Expedition (1901-1903) a new and rare hydroid, *Clathrozoon drygalskii* Vanhöffen, 1910, was collected in the Antarctic waters of the Davis Sea. Vanhöffen (1910) referred this species to the family Hydroceratinidae. Later Stechow (1921) established the new genus name *Clathrozoella* for this species, due to important differences with *Clathrozoon wilsoni* Spencer, 1890, for which the family Hydroceratinidae was instituted. Since Vanhöffen's (1910) report there were no new records of *Clathrozoella*, until Vervoort & Watson (1996) reported new material of Vanhöffen's species from both New Zealand and Australian waters. Later, Vervoort (2000) provided new data from histological sections of the Australian material. He also indicated that the New Zealand material may include more than one species; though most of the material clearly belonged to Vanhöffen's species, the material from Stewart Island was tentatively considered a second species of *Clathrozoella.* This is here described as *Clathrozoella bathyalis* spec. nov. The huge Antarctic hydroid collection gathered by several US Antarctic expeditions, undertaken by the United States Antarctic Program (USAP), contained two undescribed species of *Clathrozoella*. Both species are described in the present paper as *Clathrozoella abyssalis* spec. nov. and *Clathrozoella medeae* spec. nov., increasing the number of known species of the genus to four, all of them from deep water distributed in the Southern Hemisphere in or close to the Antarctic Ocean. Clathrozoellidae fam. nov. is established to accommodate these rare and uncommon species.

Material and methods

The material was preserved in 70% ethanol. For the study of the material both light and electron microscopy were employed.

The material is deposited in the collections of the National Museum of Natural History (NMNH, Smithsonian Institution, Washington DC, US), in the National Museum of Natural History, Leiden, The Netherlands (RMNH), in the Museo Nacional de Ciencias Naturales (MNCN) of Madrid (Spain) and in the New Zealand Oceanographic Institute (NZOI, now incorporated in NIWA, New Zealand Institute of Water and Atmospheric Research).

Taxonomic account

Clathrozoellidae fam. nov.

Diagnosis.— Athecate hydroids with erect and branched stems; unbranched in young colonies. Stem resulting from addition of successive pseudohydrothecae[1]. Skeleton built of adherent perisarc tubes with a core of coenosarc. Each pseudohydrotheca inserting on previous one. Base of pseudohydrotheca consisting of external wall of previous pseudohydrotheca; without direct communication between successive pseudohydrothecae. External surface provided with nematothecae. One hydranth per pseudohydrotheca with conical hypostome surrounded by a whorl of filiform tentacles. Gonophores ovoid and situated in base of pseudohydrotheca beside hydranth; blastostyle completely reduced. Cnidome composed of microbasic mastigophores, microbasic euryteles, desmonemes and a fourth type of nematocyst provisionally identified as atrichous haploneme.

Sole genus: *Clathrozoella* Stechow, 1921.

Discussion and remarks.— Vanhöffen's (1910) report of the hydroids gathered by the German South Polar Expedition (1901-03) included the description of a rare hydroid, *Clathrozoon drygalskii* Vanhöffen, 1910, from the Antarctic waters of the Davis Sea. This species was referred by Vanhöffen (1910) to the family Hydroceratinidae, instituted by Spencer (1890) for the new genus *Clathrozoon*. Spencer (1890) and Vanhöffen (1910) considered *Clathrozoon* as a genus of athecate hydroids close to the Solanderiidae and Hydractiniidae. Stechow (1921) changed Hydroceratinidae to Clathrozoidae for nomenclatural reasons and instituted the new genus name *Clathrozoella* for Vanhöffen's species due to the considerable difference in the structure of the skeleton with *Clathrozoon wilsoni* Spencer, 1890. Stechow (1921) also included in

[1] The hydrothecae in Clathrozoellidae have a structure differing from those of Leptothecatae and are here described as 'pseudohydrothecae' throughout the text.

Clathrozoidae the genera *Nuttingia* Stechow, 1909 and *Keratosum* Hargitt, 1909. These were later removed from the family by Hirohito (1967). The presence of true hydrothecae containing the hydranth in *Clathrozoon*, and in Hirohito's (1967) genus *Pseudoclathrozoon*, made necessary to include the family Clathrozoidae in the thecate superfamily Lafoeoidea A. Agassiz, 1865 (cf. Bouillon, 1985). Hirohito (1967) and Bouillon (1985) considered the systematic position of *Clathrozoella* unclear and Hirohito excluded the genus from Clathrozoidae due to the lack of knowledge concerning the gonosome of *Clathrozoella*.

At present it seems clear that the genera *Clathrozoon* and *Pseudoclathrozoon* belong to the thecate hydroids (cf. Hirohito, 1967; Bouillon, 1985; Vervoort & Watson, 1996). However, the situation is completely different in *Clathrozoella*. As indicated by Vervoort & Watson (1996), in thecate hydroids the hydrotheca is formed by a continuous sheath of perisarc, secreted by the ectoderm of the developing hydranth. This is evidently not the case in *Clathrozoella*, with 'hydrothecae' composed of a mesh of perisarcal tubes.

In *Pseudoclathrozoon* distinct gonothecae have been described, whereas, as noted by Vervoort & Watson (1996), unprotected gonophores are present in *Clathrozoella*. These authors considered *Clathrozoella* to represent a genus of athecate hydroids, allied to the Hydractiniidae or Solanderiidae, though indicating that further study of both gonosome and cnidome in *Clathrozoella* could strengthen that conclusion.

After studying histological sections of Australian material Vervoort (2000) confirmed the presence of gonophores in *C. drygalskii*, lying next to the hydranth and communicating with the coenosarc of the tubules. He also indicated the existence of desmoneme nematocysts in the cnidome.

During the study of the material presented in this paper, we have been able to confirm the presence of unprotected gonophores in the species of *Clathrozoella*. Also study of the cnidome has confirmed the presence of desmoneme nematocysts in *Clathrozoella*, as well as the existence of microbasic mastigophores, microbasic euryteles and a fourth type provisionally identified as atrichous haplonemes. These facts, together with the structure of the colonies clearly confirm the hypothesis that *Clathrozoella* should be considered a genus of athecate hydroids. It is also necessary to establish a new family, Clathrozoellidae, to accommodate the genus.

The scarcity of information concerning hydranths and gonophores makes it difficult to allocate the new family to any of the Anthoathecate superfamilies diagnosed by Bouillon (1985). Amongst the Filifera, to which it evidently belongs, it shows affinities with the superfamily Hydractinioidea L. Agassiz, 1862, with which it shares a number of characters [development of a perisarc skeleton, shape of hydranths and arrangement of tentacles, attachment of the hydranths and gonophores to the perisarcal tubes forming the skeleton, presence of defensive polyps (nematophores, dactylozooids)]. However, a phylogenetic analysis is needed before establishing its relationships with the other Filifera.

Clathrozoella Stechow, 1921

Diagnosis.— The same as that of the family.

Type species.— *Clathrozoon drygalskii* Vanhöffen, 1910 [Stechow, 1921: 252, by monotypy, as *Clathrozoella drygalskii* (Vanhöffen, 1910)].

Clathrozoella drygalskii (Vanhöffen, 1910)
(figs 1, 5A, 6A; tables 1-2)

Clathrozoon Drygalskii Vanhöffen, 1910: 292-294, fig. 14a-g.
Clathrozoella drygalskii; Stechow, 1921: 252; 1923: 71; Vervoort, 2000: 237-240, fig. 1.
Clathrozoella drygalskii p.p. Vervoort & Watson, 1996: 117-120, figs 1-2 (not the material from NZOI Stn D149).

Material examined.— NZOI Stn I25, SW Pacific, off North Island of New Zealand, 35°11.10'S 175°06.10'E, 675 m, 6 May 1975, one large, more or less fan-shaped colony, 100 × 100 mm (fig. 5A). (Material in collection NZOI; fragments in collection RMNH as RMNH-Coel. 28554; two slides no. 2251).

Diagnosis.— Branching frequent and irregular. Branches long and flexuous. Pseudohydrothecae alternately arranged in one plane, each pseudohydrotheca inserting approximately halfway along adcauline side of preceding one, cylindrical but strongly curved outwards, forming two longitudinal rows. Each pseudohydrotheca in contact with two others; aperture circular; rim even. Branches originating on distal half of free adcauline pseudohydrothecal wall. Nematothecae finger-shaped. Hydranths with c. 10 tentacles. One ovoid gonophore per pseudohydrotheca. Cnidome composed of microbasic mastigophores, microbasic euryteles, atrichous haplonemes and desmonemes.

Remarks.— This species was originally described by Vanhöffen (1910) from Antarctic material and had not been reported again until the record by Vervoort & Watson (1996). These authors re-described Vanhöffen's species after examining the type material (in the Zoological Museum of the Humboldt University, Berlin) and studying new material from off New Zealand and Australia. According to these authors, the pseudohydrothecae are either alternately arranged in one plane forming two longitudinal rows or less distinctly alternately arranged forming three or four rows. Vervoort (2000) provided extra information from the study of histological sections, indicating that the perisarc stolons contain a core of coenosarc and that the pseudohydrothecal bottom is formed by part of the preceding pseudohydrothecal wall. He also pointed out that the hydranth is attached to the base of the pseudohydrotheca, this hydranth being a simple, sac-like structure with a conical hypostome surrounded by a single whorl of filiform tentacles. Distinct gonophores were also observed, attached to the bottom of the pseudohydrotheca, quite separate from the hydranth and c. $^1/_4$ of its length. It is an ovoid structure without remnants of tentacles, containing apparently a single large egg. Preservation was such that no details of nematocysts could be ascertained, though Vervoort (2000) indicated the possible presence of desmonemes.

The SEM study has confirmed the previous descriptions of the species, and has provided new information concerning some features: the cylindrical pseudohydrothecae are strongly curved outwards (fig. 1A, B), the pseudohydrothecal aperture is almost parallel to the longitudinal axis of the stem (fig. 1A, 6A); each pseudohydrotheca is in contact with only two others (fig. 1B); the inner pseudohydrothecal wall is smooth; the branches originate on the distal half of the free adcauline pseudohydrothecal wall; there is practically no cementing perisarc at the axil of the pseudohydrothecae and the nematothecae are finger-shaped (fig. 1E, F; Table 1). Approximately eight nematothecae per 0.25 mm^2.

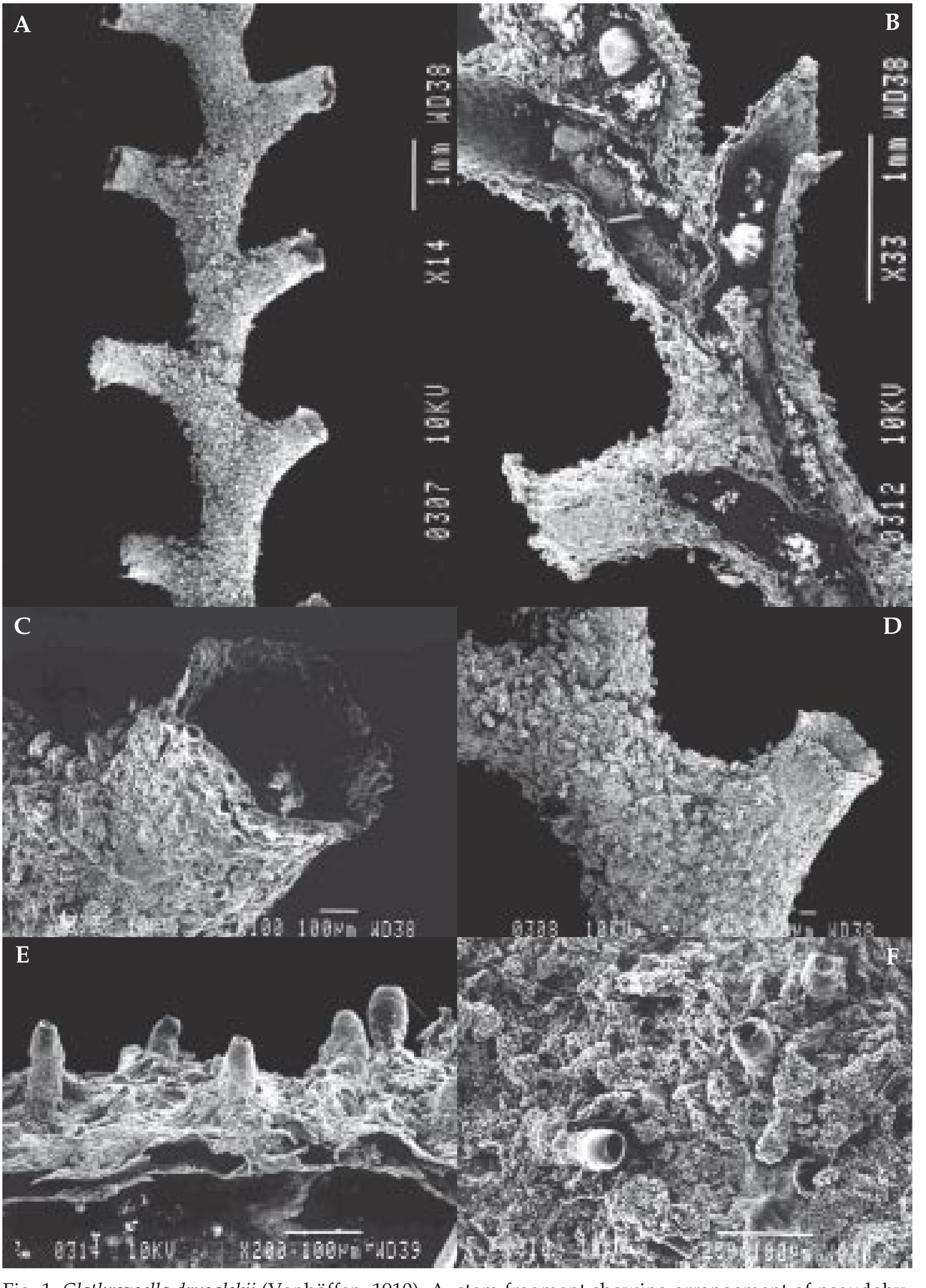

Fig. 1. *Clathrozoella drygalskii* (Vanhöffen, 1910). A, stem fragment showing arrangement of pseudohydrothecae; B, longitudinal section of stem fragment to show internal structure of pseudohydrotheca (note origin of pseudohydrotheca); C, aperture of pseudohydrotheca; D, exterior of pseudohydrotheca showing presence of nematothecae; E, F, details of nematothecae.

Cnidome composed of microbasic mastigophores (45.5-50.1 × 14.3-16.3 µm), microbasic euryteles (8.5-9.8 × 4.6 µm), atrichous haplonemes (9.1 × 4.6 µm), and desmonemes (5.2 × 2.6 µm) (measurements include those from additional New Zealand material).

Ecology and distribution.— *Clathrozoella drygalskii* is a deep water species found from 385 m (Vanhöffen, 1910) to 1169 m depth (Vervoort & Watson, 1996). It seems to grow on hard substrata.

Clathrozoella drygalskii is known from the southern part of the Pacific Ocean. It has been reported from the Davis Sea, in Antarctica (Vanhöffen, 1910) and off New Zealand and the south-eastern part of Australia (Vervoort & Watson, 1996).

Clathrozoella abyssalis spec. nov.
(figs 2, 5B, 6B; tables 1-2)

Material.— USAP, Stn 4/115, 58°28′- 58°26′S 60°38′- 60°33′W (Drake Passage), 3074-3093 m, 23 July 1962, three stems c. 25, 23 and 20 mm high, with a few hydranths and gonophores. Holotype is the 25 mm high specimen (collection USNM 1003098); the remaining two specimens are the paratypes of which one, a 20 mm high stem, is in RMNH (RMNH-Coel. 30626), as well as slide 4401 with a fragment and slide no. 4860 with sections.

Diagnosis.— Branching sparse and irregular. Each pseudohydrotheca inserting approximately halfway on adcauline side of preceding one, in contact with two others. Pseudohydrothecae alternately arranged in one plane in distinct zigzag fashion (angle c. 90°), forming two longitudinal rows. Pseudohydrotheca straight and cylindrical, but slightly widening distally, aperture even or slightly laterally depressed. Nematothecae inverted conical. Hydranths with c. 10 tentacles. One ovoid gonophore per pseudohydrotheca. Cnidome composed of microbasic mastigophores, microbasic euryteles, and atrichous haplonemes.

Description of the holotype.— One complete stem c. 25 mm high, detached but provided with a discoidal hydrorhiza indicating its attachment to hard substratum (figs 5B, 6B). Stem composed from addition of pseudohydrothecae. Pseudohydrotheca inserting approximately halfway on adcauline side of preceding one, cylindrical and straight, but slightly widening distally (figs 2A-B, 5B, 6B). Pseudohydrothecal aperture laterally depressed. No direct communication between pseudohydrothecae (fig. 2E). First two pseudohydrothecae strongly upwardly directed, though curving distally and directed to the same side. Remaining stem pseudohydrothecae approximately straight and alternately arranged in one plane, forming two longitudinal rows (figs 5B, 6B). Fifth and seventh pseudohydrotheca on stem provided with a secondary pseudohydrotheca (corresponding to an incipient secondary stem) (figs 5B, 6B). After fifth pseudohydrotheca, plane of pseudohydrothecae turned 90° in relation to preceding ones. After seventh pseudohydrotheca, there is a less marked change in pseudohydrothecal plane. From fifth pseudohydrothecae onwards pseudohydrothecae are strongly arranged in zigzag fashion, at an angle of, or larger than 90° (figs 5B, 6B).

Pseudohydrothecae, and consequently stems, formed by a network of tiny fused stolons. Internal surface of pseudohydrotheca relatively smooth (fig. 2D-E). External surface of stems irregular and provided with tiny, dispersed, inverted conical nematothecae (fig. 2C, F; table 1); approximately nine nematothecae per 0.25 mm^2.

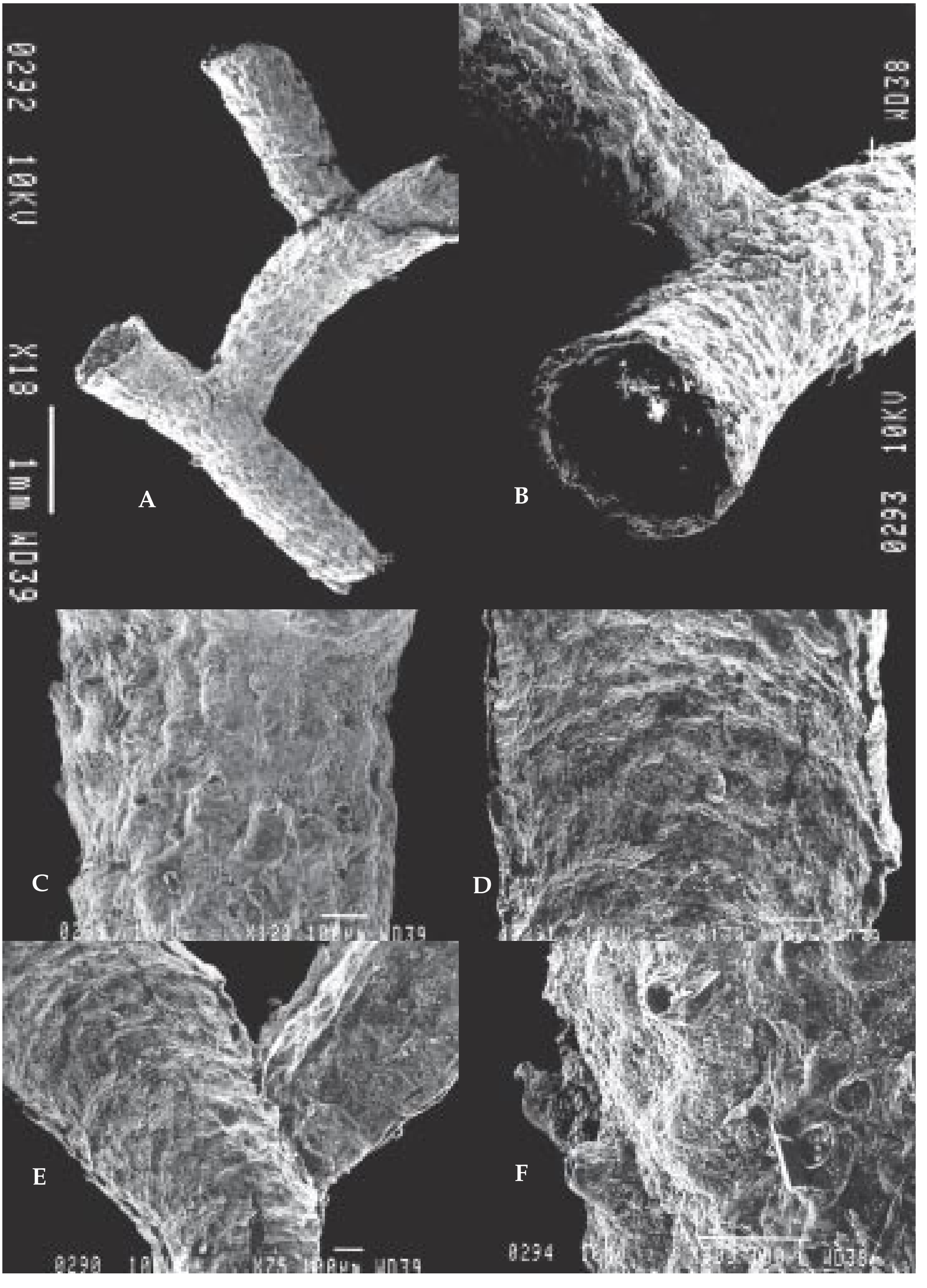

Fig. 2. *Clathrozoella abyssalis* spec. nov. A, stem fragment showing arrangement of pseudohydrothecae; B, aperture of pseudohydrotheca; C, external wall of pseudohydrotheca; D, internal wall of pseudohydrotheca; E, longitudinal section showing origin of pseudohydrotheca; F, detail of nematothecae.

Hydranth situated at pseudohydrothecal base, small, with conical hypostome and a whorl of c. 10 filiform tentacles.

One ovoid gonophore originating directly from pseudohydrothecal base and provided with a group of large nematocysts at distal end.

Cnidome composed of large microbasic mastigophores (38.5-41.1 × 12.6 µm), medium sized atrichous haplonemes (11.9-13.9 × 4.6-5.1 µm) and tiny microbasic euryteles (8.5-9.5 × 4.7 µm).

Description of the paratypes.— a) Stem, 23 mm high, basally broken and branched (fig. 5B). With a rotation of c. 30° in pseudohydrothecal plane after seventh pseudohydrotheca. Pseudohydrothecae also arranged in distinct zigzag fashion (angle c. 90°). Stem giving rise to two secondary branches (fig. 5B), the lower formed by two pseudohydrothecae distally broken and originating from primary-stem pseudohydrotheca; the second well preserved, formed by five pseudohydrothecae originating on fourth primary-stem pseudohydrotheca.

b) Stem, 20 mm high, basally broken and consisting of ten pseudohydrothecae. Possibly stem is broken just above hydrorhiza, since the first two pseudohydrothecae are arranged as in the holotype, strongly upwardly directed and curved to the same side. Remaining pseudohydrothecae alternately arranged in a strong zigzag pattern forming a plane perpendicular to that of previous two pseudohydrothecae.

Remarks.— *Clathrozoella abyssalis* spec. nov. resembles *C. drygalskii* in having two longitudinal rows of pseudohydrothecae as well as the single gonophore per pseudohydrotheca. However, whereas in *C. abyssalis* spec. nov. the pseudohydrothecae are straight and strongly arranged in zigzag fashion, in Vanhöffen's species the stem is straight and the pseudohydrothecae are strongly curved outwards. Moreover, *C. abyssalis* spec. nov. has inverted conical nematothecae much shorter than the finger-shaped nematothecae of *C. drygalskii*. Finally, *C. drygalskii* forms much larger branched colonies, completely different from those of *C. abyssalis* spec. nov., and the microbasic mastigophores are larger and the atrichous haplonemes smaller (cf. tables 1, 2).

No desmonemes were observed, probably because of the scarcity of well preserved hydranths.

Etymology.— The species name *abyssalis* refers to the great depths at which this species lives.

Ecology and distribution.— *Clathrozoella abyssalis* spec. nov. was collected at 3074-3093 m depth in the Drake Passage, Antarctic region (58°28′-58°26′S 60°38′-60°33′W) in July.

Clathrozoella bathyalis spec. nov.
(figs 3, 5C, 6C; tables 1, 2)

Material.— NZOI Stn D149, SW Pacific, south of Stewart Island, Macquarie Gap (49°10.50′S 166°51.00′E), 454 m, 14 January 1964, much fragmented stem c. 100 mm high (holotype, collection NZOI in NIWA, no. H-812; paratype, in collection RMNH as RMNH-Coel. 30628 and four slides of fragments under no. 4400).

Diagnosis.— Branching frequent, in one plane. Stem laterally flattened. Pseudohydrothecae alternately arranged in one plane, forming two longitudinal rows. Pseudohydrotheca cylindrical but strongly curved outwards, each in contact with four others. Main part of stem with strong perisarc development at axil of pseudohydrothecae. Pseudohydrothecal aperture circular; rim irregular. External surface encrusted with many foreign particles (sand, foraminiferans, etc). Nematothecae finger-shaped. Cnidome composed of microbasic mastigophores, microbasic euryteles, and atrichous haplonemes.

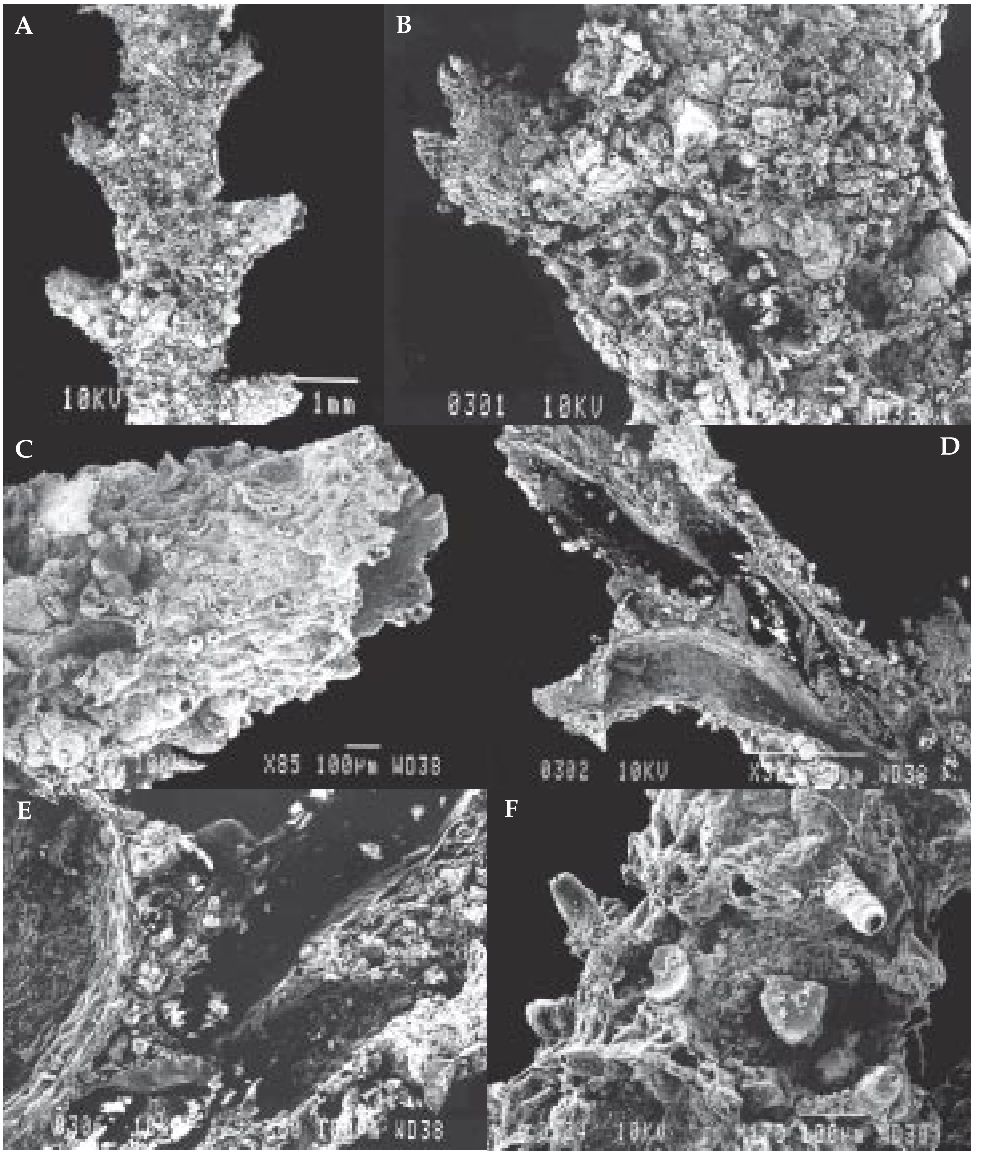

Fig. 3. *Clathrozoella bathyalis* spec. nov. A, stem fragment to show arrangement of pseudohydrothecae; B, part of external wall of pseudohydrotheca (note high density of foreign particles); C, aperture of pseudohydrotheca; D, E, longitudinal sections to show origin of pseudohydrotheca; F, detail of nematothecae.

Description of the holotype.— Much fragmented, branched stem c. 100 mm high, c. 5 mm diameter at base. Basal part flattened for attachment to hard substratum. Stem laterally flattened and thickly covered by diatoms, shell fragments, foraminiferans and sand grains (figs 5C, 6C). Stem formed by addition of pseudohydrothecae in two longitudinal rows arranged in one plane (figs 3A, 5C, 6C). Pseudohydrotheca tubular and curved outwards (fig. 3D). Pseudohydrothecal aperture circular and slightly upwardly directed; rim ragged (fig. 3A-C). Branching in one plane (fig. 5C); branches originating at axil between pseudohydrotheca and stem. Axillary portion of pseudohydrothecae almost completely filled with perisarc in central part of stem; only a small distal part of pseudohydrotheca free (cf. table 1). Internal wall of pseudohydrotheca smooth; external wall irregular and provided with finger-shaped nematothecae (fig. 3F; table 1); approximately eight nematothecae per 0.25 mm^2. In central part of stem nematothecae almost completely hidden by adventitous particles. Each pseudohydrotheca originating from the previous one on the same side (fig. 3D); it appears as though two independently originating rows of pseudohydrothecae are posteriorly set together. Each pseudohydrotheca is fused with four other pseudohydrothecae, base in contact with preceding pseudohydrotheca on the same side, whereas its adnate adcauline wall is fused with both the middle and the basal part of two pseudohydrothecae of the opposite row, and the base of the following pseudohydrotheca of the same row.

Cnidome composed of large microbasic mastigophores (53.7-56.9 × 11.1-11.9 μm), medium-sized atrichous haplonemes (16.6-17.8 × 5.9-6.3 μm) and small microbasic euryteles (8.7 × 4 μm). No desmonemes observed, probably as a result of the bad conservation of the soft tissues.

Remarks.— *Clathrozoella bathyalis* spec. nov. shares with *C. drygalskii* and *C. abyssalis* spec. nov. the two alternately arranged rows of pseudohydrothecae; with *C. drygalskii* it shares the curved pseudohydrothecae and the finger-shaped nematothecae. However, it is easily distinguished from those species by several features. It differs from *C. drygalskii* as in that species each pseudohydrotheca is in contact with only two others, the pseudohydrothecal rim is even, there is no cementing perisarc in the axil between successive pseudohydrothecae and the external surface is not covered by sediment. Also in *C. drygalskii* the microbasic mastigophores and the atrichous haplonemes are distinctly smaller (cf. tables 1-2).

On the other hand, *C. bathyalis* spec. nov. clearly differs from *C. abyssalis* spec. nov. as the latter has straight pseudohydrothecae, strongly arranged in zigzag fashion (angle of c. 90°); the pseudohydrothecal rim is even or slightly laterally depressed; each pseudohydrotheca is in contact with only two others; there is no perisarc cementing the axil between successive pseudohydrothecae; the nematothecae are inverted conical and much shorter; there is no external cover of sediment particles, the branching is sparse and irregular and the microbasic mastigophores and atrichous haplonemes are distinctly smaller (cf. tables 1, 2).

Etymology.— The specific name *bathyalis* refers to the ocean floor where this species lives.

Ecology and distribution.— *Clathrozoella bathyalis* spec. nov. was collected at 454 m depth south of Stewart Island, Macquarie Gap, SW Pacific.

Clathrozoella medeae spec. nov.
(figs 4, 5D, 6D; tables 1-2)

Material.— USAP, Stn 6/439, 63º51'- 63º50'S 62º38'- 62º35'W (off Low Island, Bransfield Strait), 128-165 m, 9 January 1963, two stem fragments c. 20 and 18 mm long (USNM 1003099); Stn 12/993, 61°24.9'S 56°30.1'W (off Elephant Island), 295 m, 13 March 1964, one branched stem fragment c. 75 mm high, two complete stems c. 45 and 35 mm high attached to pebbles, and one basally broken stem fragment c. 30 mm long, with hydranths and gonophores (USNM 1003100); Stn 12/1081, 60º35'- 60º34'S 40º44'W (east off the South Orkney Islands), 621-630 m, 13 April 1984, one branched stem fragment c. 40 mm long (USNM 1003101). The 75 mm long specimen from Stn 12/993 is the holotype; the remaining specimens from that station are paratypes, of which one (45 mm long) in RMNH under RMNH-Coel. 30627 and a second (30 mm long) in MNCN. Two slides with sections under no. 4861 in collection RMNH.

Diagnosis.— Branching sparse and irregular. Stem cylindrical, formed by the fused basal parts of irregularly arranged pseudohydrothecae, cemented together by development of perisarc. Pseudohydrothecae curved upwards and outwards, with a long free portion; aperture circular, rim even. Nematothecae finger-shaped. Hydranths with 10-12 tentacles. Up to four ovoid gonophores per pseudohydrotheca. Cnidome composed of microbasic mastigophores, microbasic euryteles, atrichous haplonemes and desmonemes.

Description of the holotype.— Stem fragment c. 75 mm high, basally broken and provided with two secondary stems: one, c. 75 mm high, just arising at basal truncated part, and another, c. 60 mm long, arising c. 15 mm along stem. First secondary stem provided with three incipient third-order stems.

Stems formed by the basal parts of numerous long and curved pseudohydrothecae originating irregularly around stem (figs 4A, 5D, 6D). Pseudohydrotheca upwardly and outwardly directed (figs 4A, 5D, 6D), with long free part. Pseudohydrothecal aperture circular (fig. 4A-B; table 1). Internal surface of pseudohydrothecae smooth; external surface irregular and with finger-shaped nematothecae (fig. 4; table 1); approximately ten nematothecae per 0.25 mm^2. Some stems with sand grains embedded in the external perisarc wall.

One hydranth attached to base of each pseudohydrotheca (fig. 4C-D), large, cream-coloured, provided with a conical hypostome and a whorl of 10-12 filiform tentacles.

Hydranths surrounded by up to four ovoid gonophores also inserting at pseudohydrothecal base (fig. 4C-D). Blastostyle completely reduced. Each gonophore contained in a thin perisarc capsule.

Cnidome composed of large microbasic mastigophores (55.3-58.5 × 12.6-15.8 μm), medium sized atrichous haplonemes (19.8 × 6.3 μm), small microbasic euryteles (9.5-10.3 × 5.5 μm) and tiny desmonemes (5.2-6.5 × 3.3-5.2 μm).

Remarks.— *Clathrozoella medeae* spec. nov. is clearly distinguishable from the other species of the genus, being the only one with pseudohydrothecae inserted all around stem. Moreover, the pseudohydrothecae and nematothecae are much longer than in the other species (cf. table 1). It is also unique in that there is more than one gonophore per pseudohydrotheca (cf. table 2). *Clathrozoella medeae* spec. nov. also differs in the size of both the microbasic mastigophores and atrichous haplonemes: in *C.*

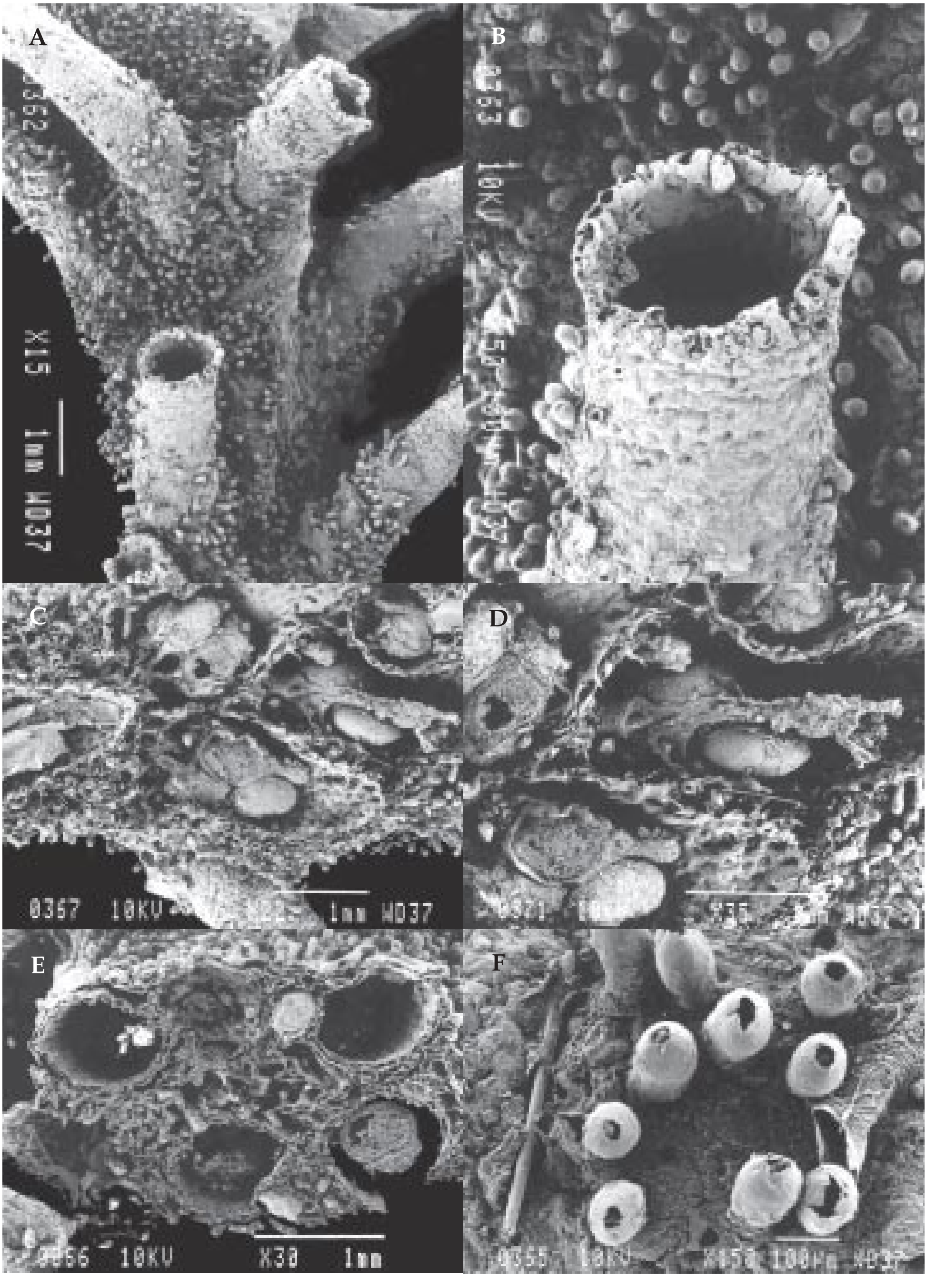

Fig. 4. *Clathrozoella medeae* spec. nov. A, stem fragment showing the arrangement of pseudohydrothecae (note high density of nematothecae); B, aperture of pseudohydrotheca; C, D, longitudinal section showing polyps and gonophores; E, cross section to show the high development of perisarc connecting pseudohydrothecae; F, detail of nematothecae.

bathyalis spec. nov. these nematocysts are slightly smaller, whereas in *C. drygalskii* and *C. abyssalis* spec. nov. they are distinctly smaller (cf. table 1).

Etymology.— This species is dedicated to Medea Peña Sancho, daughter of the senior author.

Ecology and distribution.— *Clathrozoella medeae* spec. nov. was collected from 128 to 630 m depth off Low Island, at Elephant Island, and east off the South Orkney Islands, in January, March and April.

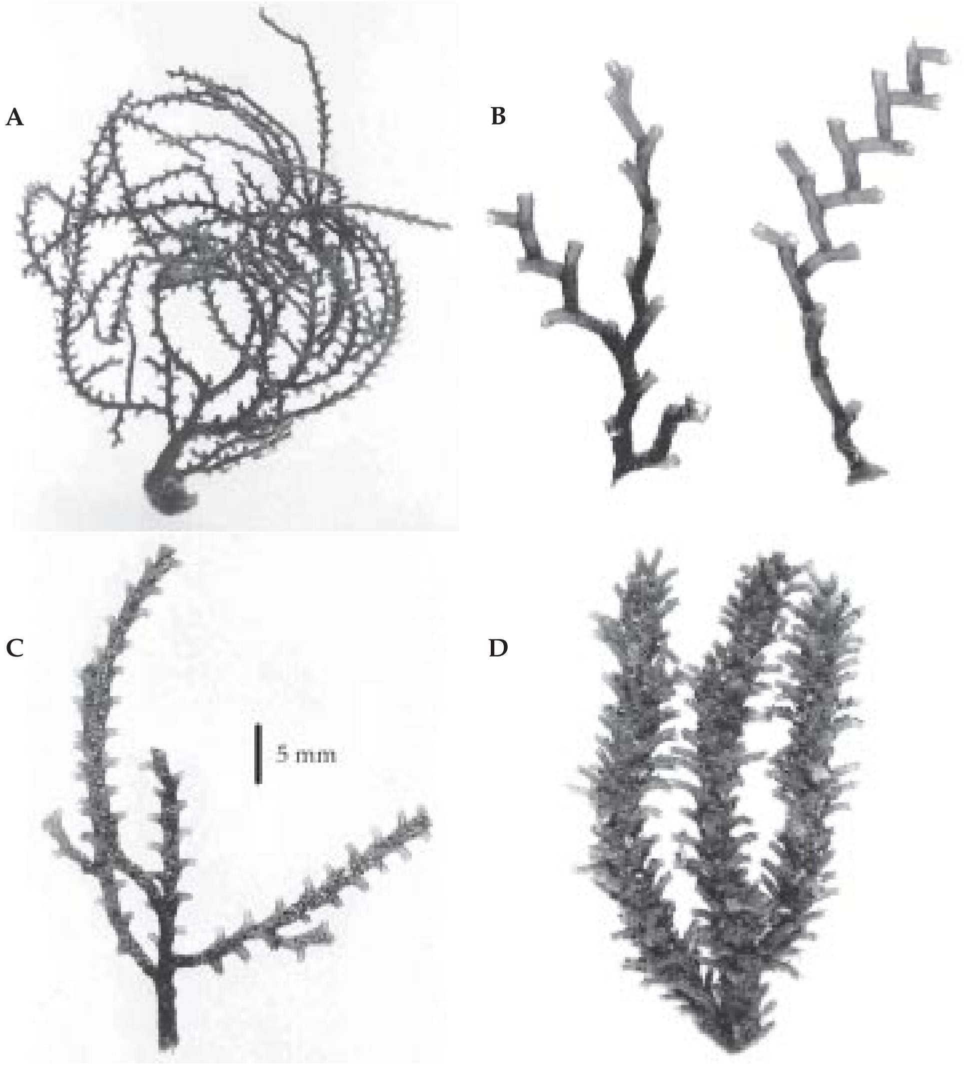

Fig. 5. A, *Clathrozoella drygalskii* (Vanhöffen, 1910), colony 100 mm; B, *Clathrozoella abyssalis* spec. nov., fragment left 23 mm, right 25 mm (holotype); C, *Clathrozoella bathyalis* spec. nov.; D, *Clathrozoella medeae* spec. nov., fragment 75 mm (holotype).

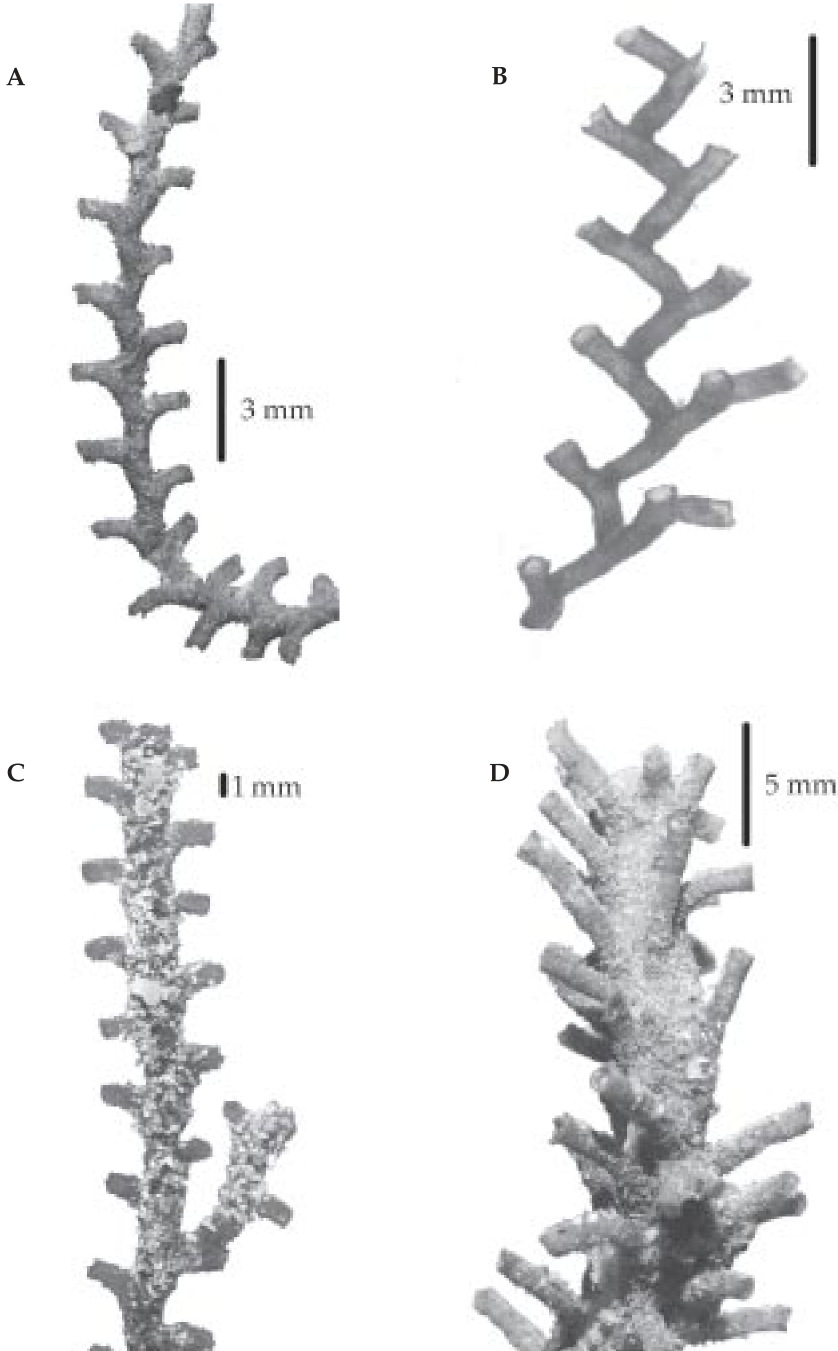

Fig. 6. A, *Clathrozoella drygalskii* (Vanhöffen, 1910); B, *Clathrozoella abyssalis* spec. nov.; C, *Clathrozoella bathyalis* spec. nov.; D, *Clathrozoella medeae* spec. nov.

Table 1. Measurements in the known species of *Clathrozoella* Stechow, 1921 (in µm).

	C. abyssalis spec. nov.	*C. bathyalis* spec. nov.	*C. drygalskii* (Vanhöffen, 1910)	*C. medeae* spec. nov.
Pseudoydrothecae				
Length of free part	c. 1000	c. 1100	1000-2000	c. 6000
Diameter at aperture	c. 870	625-750	c. 550	c. 1000
Nematothecae				
Height	c. 40	c. 110	c. 125	c. 175
Maximum diameter	c. 60	c. 60	c. 43	c. 100
Diameter at aperture	c. 20	c. 30	c. 27	c. 40
Nematocysts				
Microbasic mastigophores	38.5-41.1 × 12.6	53.7-56.9 × 11.1-11.9	45.5-50.1 × 14.3-16.3	55.3-58.5 × 12.6-15.8
Atrichous haplonemes	11.9-13.9 × 4.6-5.1	16.6-17.8 × 5.9-6.3	9.1 × 4.6	19.8 × 6.3
Microbasic euryteles	8.5-9.5 × 4.7	8.7 × 4	8.5-9.8 × 4.6	9.5-10.3 × 5.5
Demonemes	?	?	5.2 × 2.6	5.2-6.5 × 3.3-5.2

Table 2. Main features of the known species of *Clathrozoella* Stechow, 1921.

	Stem arrangement	Branching	Pseudo-hydrothecal arrangement	Rows of pseudo-hydrothecae	Pseudo-hydrotheca	Pseudo-hydrothecal rim	Additional pseudo-hydrothecae associated with each pseudo-hydrotheca	Cementing perisarc	Covering of foreign particles	Number of gonophores
C. abyssalis spec. nov.	zigzag	sparse	one plane	2	straight	even/ laterally depressed	2	No	No	1
C. bathyalis spec. nov.	straight	frequent	one plane	2	curved	uneven	4	Yes	Yes	?
C. drygalskii (Vanhöffen, 1910)	straight	frequent	one plane	2[(1)]	curved	even	2	No	No	1
C. medeae spec. nov.	straight	sparse	several planes	several	curved	even	numerous	Yes	No[(2)]	up to 4

[(1)] According to Vervoort & Watson (1996) the pseudohydrothecae may occasionally be less distinctly alternately arranged, forming three or four rows.
[(2)] Some stems with sand grains adhering to perisarc.

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