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Deep-water hydroids (Hydrozoa: Leptolida) from Macquarie Island

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A cruise conducted by RV *Southern Surveyor* between latitudes 53°0´S and 56°17´S and longitudes 158°30´E and 159°25´E sampled 11 sites by dredging at depths ranging from 364 to 1422 m off subantarctic Macquarie Island. Twenty-seven species of hydroids including six new, were identified from the collection. There was no discernible distributional pattern of species with depth. The most diverse hydroid assemblage was recovered from 500–600 m depth and the second richest at 1064 m.

Keywords Hydrozoa, Leptolida, Macquarie Island, hydroids, taxonomy

Introduction

In January 1999 the Australian Commonwealth Science and Industry Research Organisation (CSIRO) undertook a survey of subantarctic areas to the north, south and west of subantarctic Macquarie Island. Cruise SS01/99 by RV *Southern Surveyor* was conducted over a period of three days in the region 53°0´S–56°17´S, 158°30´E–159°25´E. While primarily designed to assess commercial fish stocks the cruise also included benthic sampling to provide a scientific basis for development of a Commonwealth of Australia Marine Protected Area around Macquarie Island (Butler et al., 2000). Sampling of the epifauna was undertaken by benthic sled at 11 sites at depths ranging from 364 to 1422 m (Table 1). Video imaging of the bottom revealed a barren rocky or debris-strewn bed with a sparse epifauna (Butler et al., 2000).

Twenty-seven species of hydroids including six new, and three probably new (but due to insufficient or poorly preserved material unidentifiable) were recorded (Table 2). *Calamphora quadrispinosa* sp. nov. and *Tulpa diverticula* Totton, 1930 were recorded from five stations; *Lafoea tenellula* Allman, 1877 and *Acryptolaria patagonica* El Beshbeeshy, 1991 at four stations; *Eudendrium ?cyathiferum* Jäderholm, 1904, *Tripoma arboreum* Hirohito, 1995 and *Zygophylax sagamiensis* Hirohito, 1983 at three stations. The remaining species were recorded at only one or two stations. No discernible distributional pattern of species occurred with depth, the richest fauna (14 species) coming from stn 44 at a depth of 500–600 m, the second richest haul being from stn 120 at a depth of 1064 m.

The most abundant free-growing species were large colonies of *Eudendrium ?cyathiferum* recorded from depths of

Table 1. CSIRO cruise SS01/99 stations (All material collected by benthic dredge)

Stn	Date	Latitude/Longitude, Start–Finish	Depth (m)
44	19 Jan 1999	56˚15.7´S, 158˚30.2´E–56˚18´S, 158˚28.7´E	500–600
46	19 Jan 1999	56˚15.7´S, 158˚30.2´E–56˚18.7´S, 158˚25.099´E	600–1300
63	22 Jan 1999	54˚40.8´S, 158˚38.999´E–54˚41.5´S, 158˚42.2´E	444
90	26 Jan 1999	54˚31.6° S, 158˚59.3° E–54˚35.5° S, 159˚0.8° E	818
94	26 Jan 1999	53˚55.8´S, 159˚5.5´E–53˚55.7´S, 159˚4.7´E	453˚
96	26 Jan 1999	53˚54.7´S, 159˚1.901´E –no finish data	1024
97	26 Jan 1999	53˚55.9´S, 158˚5.9´E–53˚54.9´S, 159˚2.2´E	364
119	30 Jan 1999	53˚38.1´S, 159˚9 599´E –53˚36.4´S, 159˚8.2´E	1046
120	30 Jan 1999	53˚38´S, 159˚9.5´E–53˚36.8´S, 159˚10.799´E	1064
122	30 Jan 1999	53˚37.2´S, 159˚11.299´E–53˚34.4´S, 159˚17.401´E	1158
130	31 Jan 1999	52 59.4´S, 159˚59´E–53˚2´S, 159˚58.2´E	1422

1046–1158 m, *Tripoma arboreum* at 444–1158 m, *Acryptolaria patagonica* at 453–1422 m and an arborescent species of *Halecium*. Smaller species epizoic on these and other hydroids included *Filellum conopeum* sp. nov. growing on haleciids and acryptolariids; *Tulpa diverticula* abundant on a variety of hydroid hosts, *Calamphora quadrispinosa* sp. nov. abundant on *Symplectoscyphus paulensis* and *Eudendrium*, and *Lafoea tenellula* on *Tulpa diverticula* and *Eudendrium*. The diverse fauna from stn 44 consisted of a tangled mass of hydroids growing on the stem of a dead primnoid gorgonian.

Type and voucher material is lodged in the Tasmanian Museum, Hobart (TM) and Museum Victoria, Melbourne (NMV).

Table 2. Species and their occurrence at stations

Species	SS01/99 Stn No.
Hydractinia sp.	44
Eudendrium ?cyathiferum Jäderholm, 1904	119, 120, 122
Eudendrium deforme Hartlaub 1905	44, 46
Eudendrium macquariensis sp. nov.	44
Eudendrium sp.	44
Tripoma arboreum Hirohito, 1995	63, 97, 122
Lafoea tenellula Allman, 1877	44, 90 119, 120
Lafoea dumosa (Fleming, 1828)	44
Lafoea annulata sp. nov.	44
Filellum conopeum sp. nov.	94, 119, 130
Zygophylax sagamiensis Hirohito, 1983	63
Acryptolaria conferta (Allman, 1877)	44
Acryptolaria patagonica El Beshbeeshy 1991	44, 90, 92, 130
Acryptolaria minuta sp. nov.	133
Halecium ralphae Watson and Vervoort, 2000	119
Halecium tenellum Hincks, 1861	120
Halecium ovatum Totton, 1930	120
Halecium delicatulum Coughtrey, 1876	119, 120, 122
Halecium sp.	90, 122
Calamphora quadrispinosa sp. nov.	44, 46, 94, 120, 130
Staurotheca affinis (Jäderholm, 1904)	44, 122
Symplectoscyphus paulensis Stechow, 1923	94, 120
Symplectoscyphus tuba Totton, 1930	94, 120, 122
Thyroscyphoides sympodialis sp. nov.	44
Gymnangium japonicum Watson and Vervoort, 2001	122
Tulpa diverticula Totton, 1930	44, 90, 94, 119, 120
Campanularia hicksoni Totton, 1930	44

Anthoathecata

Hydractiniidae L. Agassiz, 1862

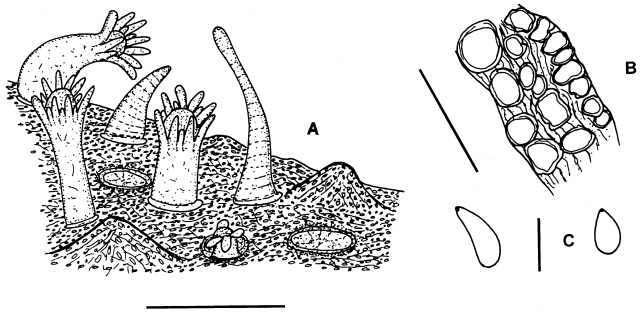
Hydractinia van Beneden, 1841

Hydractinia sp.

Figures 1A–C

Material examined. Stn 44, TM K2768, a small infertile colony on axis of dead primnoid gorgonian, spreading onto *Eudendrium* stem, specimen alcohol preserved.

Description. Hydrorhiza consisting of anastomosing stolons embedded in a fine trabeculate meshwork of perisarc to 1.4 mm thick; meshwork penetrated and in some places externally



Figures 1A–C. *Hydractinia* sp., stn 44. A, part of colony. B, trabeculate meshwork of basal perisarc. C, nematocysts, possibly euryteles, undischarged. Scale bar: A, 1 mm; B, 0.1 mm; C, 10 μm.

covered by coenosarc. Mature gastrozooids columnar, stout, emerging from perisarcal meshwork; hypostome dome-shaped, surrounded by c. 12 stubby, slightly tapering tentacles (preserved material); tentacles often alternately long and short. Tentaculozooids styloid, tapering, very extensible, arising from a broad base in perisarc meshwork. Bases of gastrozooids and tentaculozooids may be surrounded by a collar of coenosarc or erupt from a shallow pit in perisarc. Many short zooids bearing 4 or 5 tentacles just emergent above basal meshwork. No solid spines present but instead, hollow mounds of perisarc common, circular in cross-section and invested by the perisarcal meshwork.

Nematocysts of two sizes present, probably euryteles, none discharged: (i) bean-shaped, 11–12 × 4–5 μm, in body of gastrozooid and in tentaculozooid; (ii) elongate ovoid, 8–10 × 4–5 μm, in tentacles of gastrozooid.

Gonozooids absent.

Colour. Gastrozooids and tentaculozooids white, basal perisarcal meshwork shining golden-yellow.

Remarks. The hydrorhizal meshwork is composed of chitinous strands surrounding subcircular holes which vertically penetrate the meshwork. No structures which could be identified as spines occur, the scattered mounds and peaks being hollow protrusions of the perisarcal meshwork

Apart from Millard (1975) and Schuchert (1996) few authors have adequately described the cnidome of *Hydractinia*. Such knowledge would undoubtedly lead to easier identification of species. In the present formalin-preserved sample the nematocysts are undischarged and cannot be further identified.

Small zooids with four or five tentacles among the larger gastrozooids are probably developing gastrozooids; other unstructured white rings flush with the surface of the hydrorhizal meshwork may be introverted gastrozooids. The finely structured hydrorhizal meshwork investing the hydroid host bears a remarkable resemblance to the ectoderm of *Solanderia*. Despite careful search and examination of sections of perisarc, no gonozooids were found.

Stepanjants (1979) gave a key to the following Antarctic species of *Hydractinia: H. antarctica* Studer, 1879, *H. angusta* Hartlaub, 1904, *H. clavata*, Jäderholm, 1905, *H. parvispina* Hartlaub, 1905, *H. pacifica* Hartlaub, 1905 and *H. vallini* Jäderholm, 1926. The absence of basal spines in the perisarc

considerably narrows the possible matches to known species of *Hydractinia*, including those of the wider concept of *Hydractinia* of Bouillon et al. (1997) and Boero et al. (1998). The present specimen most closely resembles *H. angusta* but in the absence of reproductive structures it cannot be confidently assigned any of these species nor described as new.

Eudendriidae L. Agassiz, 1862

Eudendrium Ehrenberg, 1834

Eudendrium ?cyathiferum Jäderholm

Figures 2A–D

Eudendrium cyathiferum Jäderholm, 1904: 11.—Jäderholm, 1905: 10, pl. 4 figs 1–3.—Bedot, 1925: 184.—Stepanjants, 1979: 18, pl. 1 fig. 13.—Marques et al., 2000: 92, fig. 42.

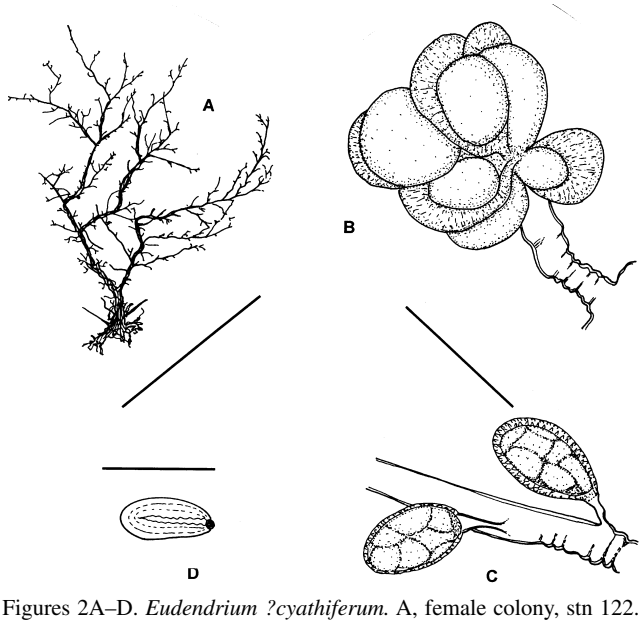
Material examined. Stn 120, NMV F91307, colony 50 mm high, attached to fragment of calcareous bryozoan, specimen alcohol preserved. Stn 122, TM K2769, four colonies, the largest 90 mm high and 50 mm wide, attached to a dead solitary coral, *Caryophyllia* sp., specimen alcohol preserved.

Description. Colonies arborescent with thick, heavily fascicled main stems up to 3 mm wide at base; hydrorhiza a mass of stolons entwining substrate, becoming erect as polysiphonic tubes of stem. Branching twiggy, in many orders, almost in one plane, polysiphonic tubes running almost to tips of branches but ultimate branches and branchlets (pedicels) monosiphonic, given off from within the mass of tubes. Pedicels short, arising more or less alternately from branches, with up to 10 clear basal corrugations, remainder of pedicel more or less rugose. No hydranths present on pedicels.

Several clusters of female gonophores on colony from stn 122; 6–10 immature gonophores in cluster completely replacing a hydranth, clusters seated on short, corrugated pedicels; gonophore encircled by a large spadix shed as gonophore matures; a single mature gonophore ovoid, borne on a slender peduncle with dish-shaped distal end, gonophore at this stage 0.4 mm long and 0.25 mm wide, enclosed in a distinct transparent pellicle, containing 6–8 developing ova.

No nematocysts seen on gonophores; a few undischarged euryteles present in coenosarc of stems; capsule small, droplet shaped, 8 × 4.5 μm.

Colour. Fascicled stems and branches shining brown, fading to yellowish on monosiphonic branches; gonophores were probably creamy-pink.



Figures 2A–D. *Eudendrium ?cyathiferum.* A, female colony, stn 122. B, cluster of immature female gonophores on colony. C, mature female gonophores with ova from same colony. D, undischarged eurytele from coenosarc of branch. Scale bar: A, 50 mm; B, C, 0.5 mm; D, 10 μm.

Distribution. Previously recorded from South Georgia (Jäderholm, 1905; Stepanjants, 1979) but now known to have a wider distribution in deep subantarctic and Patagonian waters (A. Marques, pers. comm.).

Remarks. There are two differences between the present specimen and available published and unpublished descriptions of *E. cyathiferum*. These are: (i) the length of the peduncle of the nearly mature gonophore; and (ii) the presence of only one size of eurytele in the cnidome.

Three species of *Eudendrium* with pedunculate (i.e. secondary pedicellate) female gonophores are known: *E. cyathiferum, E. vervoorti* Marques and Migotto, 1998 and *E. glomeratum* Picard, 1951 (see Marques et al., 2000). *E. glomeratum* was rejected as it is a temperate to tropical species (Watson, 1999), *E. vervoorti* is discounted because of the small size of the colony and the fact that the developing female gonophore lacks an encircling spadix. Although the "golf-tee" peduncle supporting the nearly mature female gonophore of the present specimen is typical of *E. cyathiferum* it is, however, somewhat longer and slenderer than that shown in a photomicrograph of the type specimen (Marques et al., 2000).

The cnidome of the holotype specimen of *E. cyathiferum* contains two size classes of euryteles, the smaller associated with the hydrocaulus and the larger with the gonophore (A. Marques, pers. comm.). In view of the limited amount of present material available for study it could not be ascertained if large nematocysts are always absent from the gonophore. The few nematocysts in the coenosarc are similar in size to those in the hydrocaulus of the holotype.

For the above reasons, together with the fact that the colonies are smaller than previously reported for *E. cyathiferum*, the present specimens are doubtfully referred to that species.

Eudendrium deforme Hartlaub

Figures 3A–D

Eudendrium deforme Hartlaub, 1905: 508, 514, 552, figs B', C'.—Bedot, 1925: 184.

Material examined. Stn 44, NMV F91308, many sparsely fertile colonies on dead stem of a primnoid gorgonian, colonies intergrown and entangled with *Tulpa diverticula*, sertularian and *Eudendrium* colonies, specimen alcohol-preserved. Stn 46, TM K2770, many colonies on dead stem of primnoid gorgonian, specimen alcohol-preserved.

Description. Colonies comprising many tangled stems up to 70 mm long and 0.3–0.4 mm diameter arising from a hydrorhiza entwining stem of host. Stems more or less straight to curved, monophonic, with 5–10 strong basal annulations and groups of annulations at intervals along stems.

Stems sparsely, alternately, but irregularly branched, more or less in one plane, occasionally secondary branching occurs; branchlets (pedicels) more or less alternate, spaced well apart, short to moderately long, beginning with up to 10 deep annulations; stems sometimes annulated throughout; perisarc otherwise smooth. A few hydranths in poor condition remain on colonies; hydranth large, with c. 24 tentacles. Perisarc of lower stems thick and smooth, thinning distally along smaller branches and pedicels.

Nematocysts all undischarged euryteles of one size: small, droplet-shaped, a few in coenosarc of stems and tentacles of hydranth, capsule 10×6 μm.

Male gonophores present on several colonies; clustered on short, smooth to corrugated pedicels near base of stems; up to 5 in a beaded chain, apical gonophore single, gonophores below paired; tentacles of hydranth partially resorbed and reduced in number, hypostome intact.

Colour. Lower stem shining in dark brown, fading distally to pale yellowish; gonophores white.

Distribution. Calbuco, Chile; Mar del Plata, Argentina (Hartlaub, 1905).

Remarks. Due to entanglement of the stems it is difficult to decide if one or many colonies are present. The few hydranths are in very poor condition, due either to damage during collection or senescence of the colony. The species is distinguished by its strictly monosiphonic, shining brown stems and paired chain of immature gonophores.

Although Hartlaub's description of the species is brief I have no doubt that the present specimens are referrable to *Eudendrium deforme*. Like much of the present material, Hartlaub's specimens apparently comprised bare stems lacking hydranths or reproductive structures. The thin brown stems, as described and figured by Hartlaub are characteristic. The species has not been recorded since its first description.

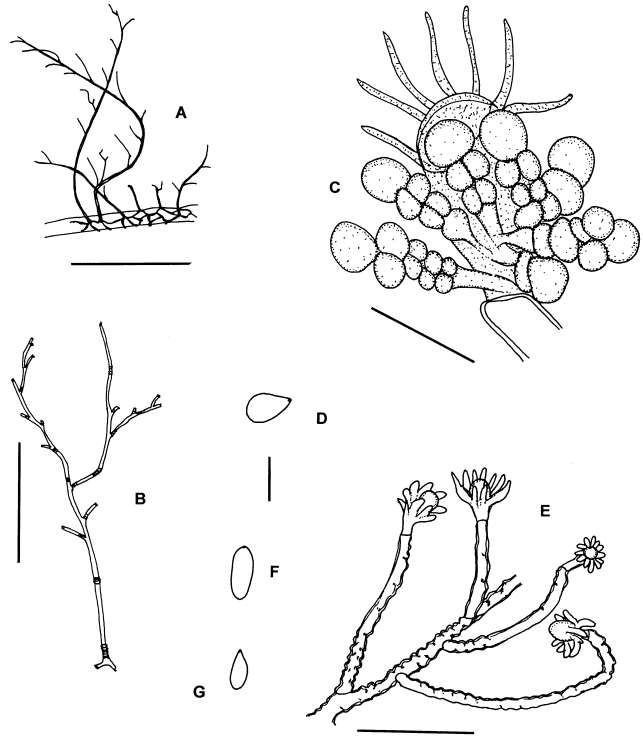
Eudendrium macquariensis sp. nov.

Figures 3E–G

Material examined. Stn 44, NMV F91309, holotype, abundant infertile colonies on stems and branches of other species of *Eudendrium*, specimen alcohol-preserved.

Description (of holotype). Stolons creeping over stems and branches of hydroid host, stems numerous, to 7 mm long; stems (pedicels) and stolons morphologically identical and 0.1 mm diameter. Stems monosiphonic, unbranched, straggling, straight or flexed, perisarc of stolons and pedicels distinctly to weakly rugose throughout. Hydranths very small, distal on pedicel, hypostome prominent, dome-shaped, surrounded by 10–14 tentacles. Perisarc of stolon and stems firm and of same thickness throughout.

Nematocysts of two kinds present, both undischarged: (i) small droplet-shaped euryteles, capsule $9–10 \times 4–5$ μm, very abundant in tentacles; (ii) bean-shaped capsule 9×4 μm, rare, site unknown.



Figures 3A–G. A, *Eudendrium deforme*. A, part of colony on dead branch of primnoid gorgonian, stn 46. B, single stem. C, cluster of male gonophores with paired immature gonophores and partially resorbed tentaclesof hydranth. D, undischarged nematocyst, probably eurytele from coenosarc of stem. E–G, *Eudendrium macquariensis* sp. nov., stn 44. E, stems from holotype colony on *Eudendrium deforme*. F, undischarged nematocyst from tentacles. G, undischarged nematocyst, site unknown. Scale bar: A, 25 mm; B, 10 mm; C, 0.5 mm; E, 1 mm; F, G, 10 μm.

Colour. Stolons white, stems clear pale yellowish, hydranths white.

Etymology. The specific name refers to the type locality.

Remarks. The colonies of *Eudendrium macquariensis* so thickly invest the stems and tips of branches of the hydroid host that when first examined they seemed to be part of the host colony. Closer examination revealed white stolons of *E. macquariensis* running along the brown perisarc of the host. The thick aggregations on the tips of the host permits this tiny species to occupy an exceedingly crowded microhabitat. As both stolons and stems are morphologically identical it is difficult to judge at what stage the stolon becomes an erect stem.

The species is unusual in that the straggling stolon-stems are almost entirely rugose. The rugosity is usually most conspicuous in the proximal pedicel region, as usual in *Eudendrium*. Although the hypostome is dome-shaped rather than annular, this may be an artefact of preservation; it is, however, quite constant throughout the material. If the dome-shape is diagnostic it sets *E. macquariensis* somewhat apart from other known species of *Eudendrium*.

Eudendrium sp.

Figures 4A–C

Material examined. Stn 44, NMV F91310, many sparsely fertile colonies intergrown with *Eudendrium deforme* on a dead branch of primnoid gorgonian, specimen alcohol-preserved.

Description. Colonies short, arborescent and shrubby, the largest 20 mm high and 20 mm wide. Main stem and branches strongly fascicled, branching irregular in many planes, polysiphonic tubes running up branches to distal region, ultimate branchlets (pedicels) monosiphonic, 0.1 mm in diameter, base of pedicel with up to 20 annulations, perisarc thereafter smooth to faintly corrugated.

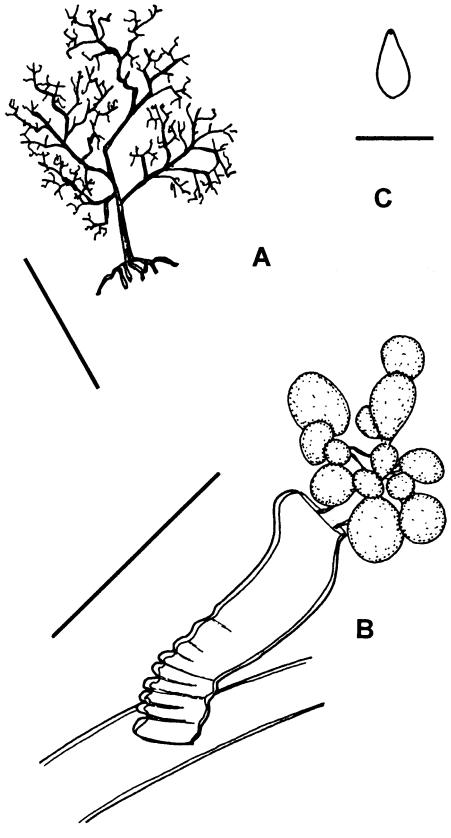
Few hydranths remain, all in poor condition; small, with 12–14 moderately long tentacles.

Nematocysts small euryteles in tentacles and coenosarc, droplet-shaped, capsule 8.5 × 4.5 μm, undischarged.

Male gonophores borne on a short, basally annulated pedicel; a small cluster in series of 3 or 4 surrounding a completely resorbed hydranth.

Colour. Lower stems pale honey-brown, fading to almost transparent on ultimate branches; hydranths white.

Remarks. While the small, shrubby colony with male gonophores surrounding a completely atrophied hydranth reduces the possible matches with known species, in the absence of hydranths and female gonophores and details of the cnidome, identification is not taken further.



Figures 4A–C. *Eudendrium* spec., stn 44. A, colony on dead branch of primnoid gorgonian, stn 44. B, cluster of male gonophores. C, undischarged nematocyst, probably eurytele; in tentacles and coernosarc. Scale bar: A, 20 mm; B, 0.5 mm; C, 10 μm.

Leptothecata

Campanulinidae Hincks, 1868

Tripoma Hirohito, 1995

Tripoma arboreum Hirohito

Figures 5A–C

Tripoma arboreum Hirohito, 1995: 98, figs 28a–e, pl. 6, fig. A.—Watson and Vervoort, 2000: 249, figs 1A–D, 2A–J.—Watson and Vervoort, 2001: 156, fig. 3a–b.

Material examined. Stn 63, NMV F91311, several infertile colonies, the tallest 40 mm high on a primnoid gorgonian, specimen alcohol preserved. Stn 97, TM K2771, specimens alcohol-preserved. NMV F91332, Stn 97, malinol-mounted microslide.

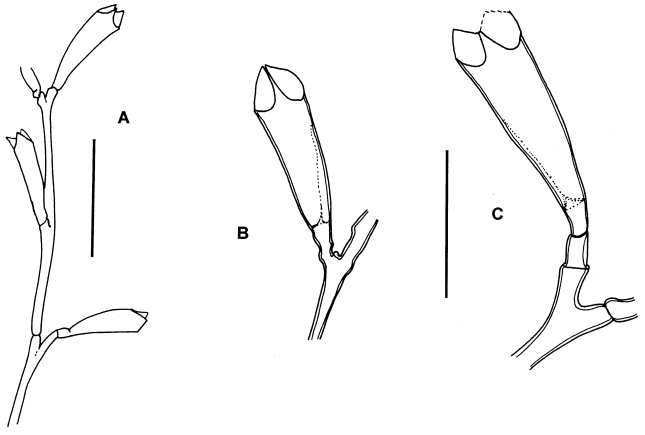
Description. Colonies erect, branched, the tallest 75 mm high. Hydrorhiza reptant on stem of host, tubular, undulating, sometimes contorted. Erect stems arising from hydrorhiza, some hydrothecae arising directly from stolon. Most stems polysiphonic, several younger stems monosiphonic and unbranched, older stems with increasingly polysiphonic. Stem internodes variable in length, cylindrical, smooth, nodes usually distinct, transverse to slightly oblique, marked by a constriction in perisarc. Apophyses alternate, long, distal on internode, directed upwards at c. 45° to internodal axis, often shifted slightly around stem, distal node of apophysis transverse, sometimes extended into two or three segments, each with deep transverse node.

Hydrothecae inverted conical, long, slender, slightly asymmetrical in section, arising from stem apophysis, usually a well to poorly marked internode between apophysial segment and hydrotheca; adcauline wall weakly convex, abcauline wall straight to weakly concave, a ring of tiny punctae near base of hydrotheca, a band of remnant tissue extending diagonally upwards into hydrotheca from desmocyte ring. Margin with 2 long, sharp triangular cusps separated by deeply scalloped embayments, demarcation between margin and hydrothecal body faint, operculum splits into at least 4 thin flaps. Perisarc of hydrotheca delicate, thinning markedly to margin.

Colour. Colony pale honey-yellow, distal parts and hydrothecae almost colourless.

Measurements (μm)

Hydrorhiza	
diameter	80–160
Stem	
length of internode	960–1200
width at node	59–86
diameter at node	72–88
adcauline length of proximal apophysis	52–100
diameter at proximal apophysial node	64–80
length of apophysis including extensions	80–200
Hydrotheca	
length including pedicel	770–941
length, base to apex of cusps	784–848
width of margin across base of cusps	200–264
depth of opercular embayment	136–160



Figures 5A–C. *Tripoma arboreum*, stn 97. A, part of stem. B, hydrotheca with closed operculum. C, hydrotheca with operculum open. Scale bar: A, 1 mm; B, C, 0.5 mm.

Distribution. Japan, Tasman Sea and Bass Strait, Australia (Watson and Vervoort, 2001).

Remarks. The material conforms to the descriptions of colonies of *Tripoma arboreum* given by Watson and Vervoort (2000, 2001). A feature not noted in previous descriptions is a line of very small punctae in some hydrothecae a short distance above the distalmost apophysial node, passing transversely to obliquely across the hydrotheca and then continuing upward as a line of granules, gradually merging with the hydrothecal wall below the margin. Tissue remnants attached to the granules in some hydrothecae suggest they provide support for the hydranth.

Lafoeidae A. Agassiz, 1865

Lafoea Lamouroux, 1821

Lafoea tenellula Allman

Figures 6A–C

Lafoea tenellula Allman, 1877: 12, pl. 8 figs 3, 4.—Ritchie, 1911: 820, pl. 88 fig. 5.—Stechow, 1913: 110.—Stechow, 1923a: 10.—Stechow, 1923b: 143.—Stechow, 1925: 453, fig. 23.—Leloup, 1940: 14.—Fraser, 1943: 90.—Fraser, 1944: 227, pl. 47 fig. 211.—Fraser, 1948: 232.—Deevey, 1954: 646.—Riedl, 1959: 646.—Yamada, 1959: 49.—Vervoort, 1968: 101.—Millard, 1973: 28.—Hirohito, 1995: 128, figs 36d–f.

Material examined. Stn 44, NMV F91312, specimen alcohol-preserved, NMV F91339, malinol mounted microslide of coppinia; fertile colonies on *Eudendrium* and on primnoid gorgonian. Stn 90, NMV F91333, malinol-mounted microslide, fragment detached from substrate. Stn 119, TM K2772, specimen alcohol-preserved, NMV F91334, malinol-mounted microslide, colony on *Eudendrium*. Stn 120, NMV F91313, sparingly fertile colony on *Tulpa diverticula* and *Eudendrium*, specimen alcohol-preserved.

Description. Hydrorhiza reptant on host hydroids, stolons crumpled, colony predominantly stolonal but sometimes a short length of stolon becoming free as an erect monosiphonic stem.

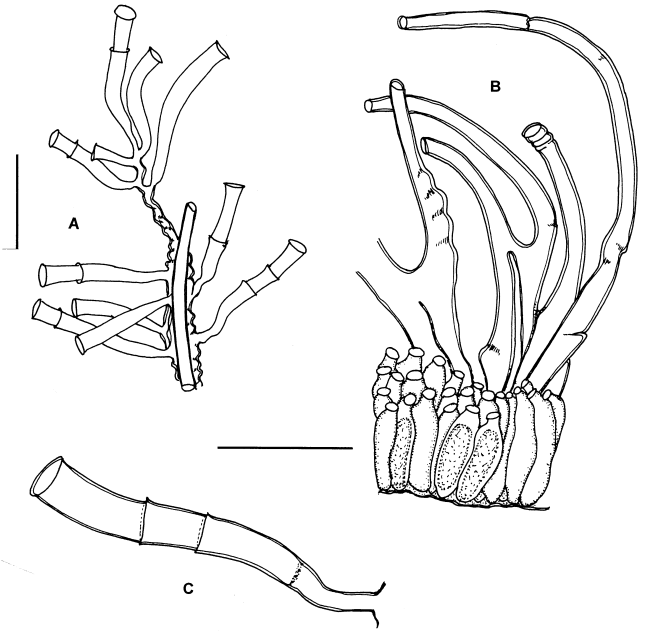
Hydrothecae given off irregularly in all directions from hydrorhiza; hydrothecae long, elongate conical, radially symmetrical, straight to faintly sinuous, no true pedicel but a tubular narrowing of hydrotheca. A faint transverse to slightly oblique ring of scattered punctae sometimes present marking distal junction of pseudopedicel with hydrotheca, sometimes a faint constriction in perisarc of hydrotheca at desmocyte ring. Margin transverse to hydrothecal axis, circular, rim weakly everted with up to seven, usually widely spaced, regenerations. Persiarc of hydrotheca moderately thick near base, thinning distally to margin. Hydranths not well preserved, deeply contracted into hydrothecae, but probably with eight to 10 tentacles.

Coppinia comprising a tightly packed circle of gonothecae seated on a thin, dish-shaped basal plate adherent to stem of hydroid host; protective nematophore tubules scattered in irregular groups around and throughout coppinia. Gonothecae small, crowded, flask-shaped, bases rounded, widening from base to shoulder, surmounted by a short tubular neck with transverse, slightly everted circular orifice; perisarc of gonothecae rather thin. Ovoid gonophores (or planulae) present in some gonothecae but too degenerate for description. Protective tubules varying in length from short to very long, tubular in section, single or bifid, some completely or partially conjoined proximally, straight or curved, narrowing from base to apex; terminal orifice circular; perisarc thick, usually smooth; some undulated; others showing scars from interruptions to growth.

Colour. Colonies and coppiniae transparent colourless; gonophores pale creamy white.

Measurements (μm)

Hydrorhiza	
diameter	68–88
Hydrotheca	
length of unregenerated hydrotheca	360–500



Figures 6A–C. *Lafoea tenellula*, stn 97. A, stolonal colony on branch of *Eudendrium*, hydrorhiza produced into free stolon. B, regenerated hydrotheca. C, longitudinal section through coppinia. Scale bar: A, 1 mm; B, C, 0.5 mm.

length of regenerated hydrotheca	1060–1440
width at puncta ring	76–112
diameter at margin	168–240
Coppinia	
overall length of gonotheca	320–440
maximum width of gonotheca	80–112
diameter of gonothecal orifice	48–60
length of nematophorous tubules	500–1700
width of tubule at base	96–104
diameter of orifice of tubule	48–56

Distribution. Australian east coast (Ritchie, 1911), California (Fraser, 1948), Carribean, West Indies (Vervoort, 1968), Japan (Hirohito, 1995). The geographical and bathymetric distribution of *L. tenellula* ranges from moderately deep tropical and temperate waters to deep subantarctic waters (this collection).

Remarks. The hydrothecae on younger parts of the colonies are less crowded than those on older regions. The hydranths are deeply contracted into the hydrothecae and the tentacles of reasonably well preserved ones appear to be enclosed in a sheath of tissue.

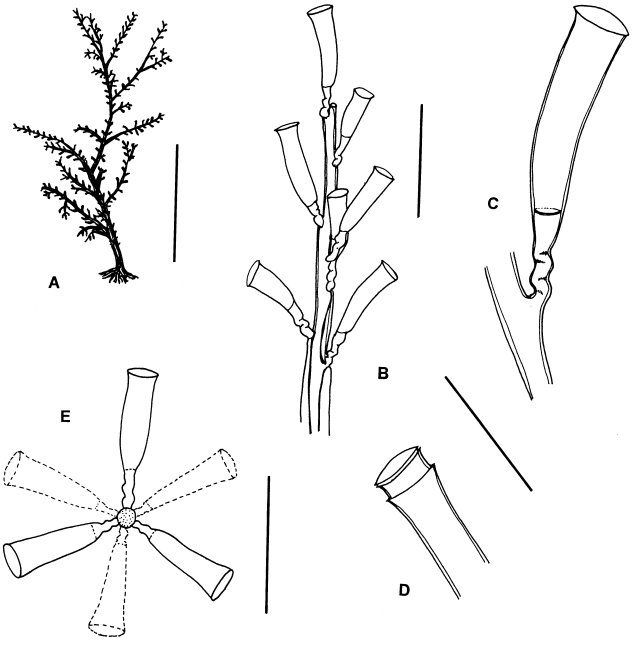
The present material generally matches the description, dimensions and figure of *Lafoea tenellula* given by Stechow (1925) for specimens from Madeira and the Canary Islands but conforms less well with the figure of hydrothecae given by Hirohito (1995) for the species from Japan.

Three coppiniae were found among colonies in the collection; one was attached to the stem of *Eudendrium* from Stn 119 and the others to a primnoid gorgonian stem (Stn 44). Because of intergrowth of the material with hydrorhizae of several other hydroid species the coppiniae are ascribed with some hesitation to *L. tenellula*, the gonosome of which is not known. Vervoort (1966) renamed *L. tenellula* recorded by Ritchie (1911) from off the Australian temperate east coast *Hebella ritchei*. I have examined Ritchie's material and other Australian east coast specimens held in the Australian Museum, Sydney; as they are identical with the present specimen, Ritchie's identification of *L. tenellula* is correct.

Lafoea dumosa (Fleming)

Figures 7A–E

Sertularia dumosa Fleming, 1820: 83 (nomen nudum).
Campanularia dumosa.— Fleming, 1828: 548–549.
Lafoea dumosa.—Hutton, 1904: 319.—Fraser, 1911: 51.—Billard, 1912: 464.—Stechow, 1912: 357.—Stechow, 1913: 30.—Fraser, 1914: 86.—Fraser, 1918: 333, 354.—Stechow, 1919: 80, fig. A1.—Fraser, 1921: 73.—Fraser, 1922: 5.—Stechow, 1923a: 10.—Billard, 1927: 331.—Fraser, 1927: 326.—Totton, 1930: 158, fig. 14.—Billard, 1931: 245.—Leloup, 1934: 8.—Fraser, 1935: 144.—Kramp, 1935: 123, figs. 52a, 53.—Fraser, 1937: 119–120, pl. 25 fig. 137.—Fraser, 1938: 110.—Fraser, 1939: 160.—Leloup, 1940: 14.—Vervoort, 1942: 285.—Fraser, 1944: 221, pl. 45 fig. 205, pl. 46 fig. 205.—Fraser, 1948: 229.—Teissier, 1950: 17.—Deevey, 1954: 270.—Hamond, 1957: 295, 307.—Ralph, 1958: 310.—Riedl, 1959: 646.—Yamada, 1959: 50.—Leloup, 1960: 221.—Naumov, 1960: 276, fig. 165.—Rees and Thursfield, 1965: 79.—Teissier, 1965: 19.—Redier, 1967: 389.—Vervoort, 1968: 100.—Calder, 1970: 1524, pl. 5 fig. 3.—Christiansen, 1972: 296.—Calder, 1975: 299, fig. 3D.—Cornelius, 1975: 385, fig. 4.—Millard, 1975: 185.—Millard, 1977a: 15.—Millard, 1978: 195.—



Figures 7A–E. *Lafoea dumosa*, stn 44. A, colony. B, part of branch. C, hydrotheca with typically twisted pedicel and diaphragm. D, hydrotheca with replicated margin. E, radial arrangement of hydrothecae around stem. Scale bar: A, 10 mm; B, E, 1 mm; C, D, 0.5 mm.

García Corrales et al., 1979: 19, fig. 8.—Millard, 1980: 131.—Stepanjants, 1980: 116.—Hirohito, 1983: 6, 21.—Stepanjants, 1985: 127, 131.—Antsulevich, 1987: 49, fig. 11B.—Rees and Vervoort, 1987: 40, figs 7–8.—Cornelius, 1988: 76.—Llobet et al., 1988: 38, fig. 4E.—Gili, Murillo and Ros, 1989: 23.—Gili, Vervoort and Pagès, 1989: 73, fig. 3B.—Cornelius and Ryland, 1990: 135, fig. 4.13.—El Beshbeeshy, 1991: 84, fig. 20.—Peña Cantero, 1991: 70, pl. 5 figs a–d.—Calder, 1992: 1080.—Cornelius, 1992: 254, 257.—Ramil and Vervoort, 1992: 55.—Boero and Bouillon, 1993: 263.—Branch and Williams, 1993: 10.—Cornelius, 1995: 261, fig. 60.—Hirohito, 1995: 126, figs 36a–c, pl. 8 fig. A.—Medel and López–González, 1996: 198.—Peña Cantero and García Carrascosa, 1995: 23, figs 4A–D.—Stepanjants et al, 1996: 7.—Peña Cantero and García Carrascosa, 1999: 212.—Schuchert, 2000: 413.—Schuchert, 2001: 67, figs 54 A–D, 55, 56.

Lafoea ?dumosa.—Ralph, 1958: 310.
Campanularia fruticosa M. Sars, 1850: 131, 138.
Campanularia gracillima Alder, 1856: 361, pl. 14 figs 5, 6.
Lafoea gracillima.—Ralph, 1958: 310, figs 1y, 2a–c.
Lafoea capillaris G.O. Sars, 1874: 115, pl. 4 figs 4, 5.
Lafoea elegantula Broch, 1903: 5–6, pl. 1, figs 5, 6, pl. 2, figs 7–9.

Material examined. Stn 44, TM K2773, NMV F91314, specimen alcohol-preserved. NMV F91340, malinol-mounted microslide from colony, abundant infertile colonies on primnoid gorgonian.

Description. Colonies arborescent, delicate and rather lax, the largest 25 mm high and 15 mm wide across the branches, stem 0.8 mm wide above base; smallest colonies 3–5 mm high. Hydrorhiza thread-like tubular stolons reptant on substrate; stolons bunched at base of complex colonies. Smallest stems monosiphonic, taller colonies with 2 or more polysiphonic tubes running up stem and along branches. Colonies branched

at acute upward angles but in no particular order around stem; branches fascicled proximally, becoming monosiphonic distally, perisarc smooth without nodes. In proximal stem region of larger colonies tubes rather twisted, gradually becoming more or less parallel.

Hydrothecae given off from stem and branches, on monosiphonic branches (hydrocladia) arranged in whorls of three at an angle of c. 120° around hydrocladium, but occasionally an opposite pair; each hydrotheca well separated from its neighbour; in polysiphonic branches where hydrothecae given off from outer tubes of stem or branch this verticil arrangement obscured. Hydrothecal pedicel long, directed at an acute upward angle to hydrocladium, tubular, expanding distally to merge smoothly into hydrotheca, pedicel undulated with to 1–4 bends; a thin transverse line of punctae marking junction of hydrotheca with pedicel, a small annular internal ledge in hydrothecal wall at puncta line. Hydrothecae long, narrowly conical, widening smoothly to margin; body typically asymmetrically bent, adcauline side weakly convex in proximal third, then becoming almost straight or faintly sinuous to margin; abcauline side straight to weakly concave; both walls expanding a little below margin. Margin of hydrotheca circular, perceptibly everted but with no outrolling of rim; some hydrothecae with two or three marginal replications, basalmost replication typically at some distance below margin. Most hydrotheca contain remnants of hydranths with c. 12 tentacles.

Perisarc thickest on lower stem and branches, thinning distally along branches, hydrothecae very thin and smooth.

Colour. Colonies pale yellowish in lower regions, becoming translucent distally. Hydrothecae transparent, shining.

Measurements (μm)

Hydrorhiza	
width of stolon	88–120
Branch	
diameter of monosiphonic part	112–136
length from axil to first hydrotheca	680–720
Hydrotheca	
distance between successive hydrothecae on hydrocladium	240–464
length of pedicel to puncta line	240–280
diameter of pedicel	80–88
diameter at puncta line	96–112
length, puncta line to margin (including replications)	600–664
diameter at margin	176–232

Distribution. Near-cosmopolitan, in Atlantic, Pacific and Indian Oceans, Arctic and Antarctic, depth range from the sublittoral zone to deep sea (Cornelius, 1995; Schuchert, 2001).

Remarks. The hydrothecal pedicels are bent rather than twisted or smoothly annulated with up to 4 kinks; the perisarc is smooth throughout. Most colonies are fascicled, only the very youngest and shortest being monosiphonic. Single hydrothecae are abundant on the hydrorhiza between complex stems. The colonies are quite lax and unable to support their weight out of fluid.

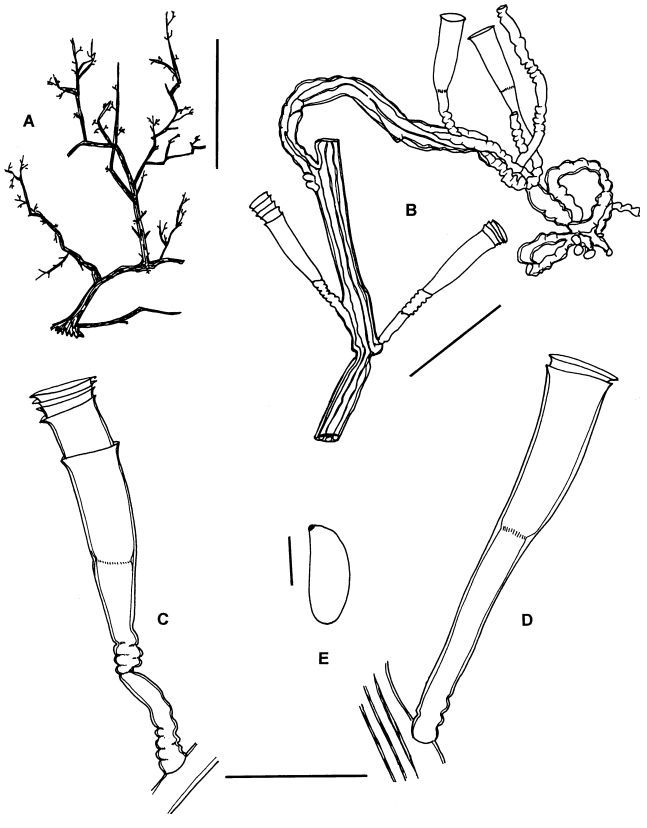
The present material conforms in most respects with earlier descriptions of *Lafoea dumosa*. It does, however, differ somewhat from most descriptions in having an almost invariable triseriate arrangement of the hydrothecae on monosiphonic hydrocladia, this condition usually being obscured in polysiphonic stems and branches, rather than the incipiently triseriate or multiseriate arrangement described by some authors.

Lafoea annulata sp. nov.

Figures 8A–E

Material examined. Stn 44, NMV F91315, holotype, specimen alcohol-preserved, NMV F91341 malinol-mounted microslide from holotype colony; infertile colony on a fragment of primnoid gorgonian, hydrorhiza intergrown with those of other hydroids.

Description (of holotype). Colony 70 mm high and 40 mm wide; hydrorhiza a broken tangled mass of tubular stolons coalescing to form polysiphonic tubes of stem; colony branched almost from base in disorderly flabellate fashion, base of stem and lowest branch 1 mm thick, both heavily fascicled, polysiphonic tubes almost linear, sometimes a little twisted in lower stem region then running up branches; distal region of some branches with 2 or more tubes, a few branches monosiphonic. Branches bent at various angles, becoming more or less straight distally; walls of ultimate branches smooth without nodes. Apical stolonisation occurring on several branches where a tube becomes free of branch, walls of free tubes contorted and undulated, sometimes rejoining branch.



Figures 8A–E. *Lafoea annulata* sp. nov., stn 44. A, colony. B, distal stolonisation at end of branch. C, hydrotheca with twisted and partially annulated pedicel. D, hydrotheca with almost smooth pedicel. E, undischarged nematocyst from coenosarc of branch. Scale bar: A, 25 mm; B, 1 mm; C, D, 0.5 mm; E, 20 μm.

Hydrothecae given off without apophyses from monosiphonic branches or from peripheral tubes of polysiphonic branches; hydrothecae in opposite pairs or in groups of three, one arising from each tube of branch, if three, the third arising close to opposite pair, forming an incipient whorl of 3, groups well separated at variable distances along branch. Hydrothecal pedicels tubular, length variable but mostly long, straight to bent, widening distally and merging smoothly into base of hydrotheca below puncta line; pedicels usually deeply annulated to almost smooth, frequently one side more deeply annulated than other.

Hydrothecae rather fragile, long, tubular, slightly asymmetrically bent with one wall slightly convex in basal third, opposite wall weakly concave to straight; diaphragm very thin, transverse to slightly oblique, saucer-shaped with central hydropore marked by an indefinite double ring of small scattered punctae; a slight thickening of hydrothecal wall at puncta line. Margin of hydrotheca circular, transverse to hydrothecal axis, rim smooth, noticeably everted, many hydrothecae with up to 5 everted marginal replications, usually well separated, some well below rim.

Perisarc in polysiphonic stem region and branches quite thick, thinning in monosiphonic parts; in branches with fewer tubes, perisarc of youngest tube markedly thinner than others; perisarc of hydrothecae thin, transparent and shining. Hydranths too poorly preserved for description; remnants emerging from many hydrothecae as a long strand of tissue.

Nematocysts large, bean-shaped, probably isorhizas, 21–22 × 8.5–9 µm, none discharged, but containing a long, probably isometric, closely coiled tubule; abundant in coenosarc of polysiphonic tubes of branches.

Colour. Colony translucent pale honey-yellow, monosiphonic branches and hydrothecae almost colourless.

Measurements (µm)

Branch	
diameter of monosiphonic branch	56–88
distance between groups of pedicels	900–2000
length of pedicel to puncta line	1720–4000
proximal diameter of pedicel	80–144
Hydrotheca	
diameter at puncta line	128–160
length, puncta line to margin (including regenerations)	520–704
diameter of margin (including eversion)	200–240

Remarks. An empty conical structure at the broken distal end of a branch may be a damaged gonotheca; the structure is transparent, adpressed to the branch with the wider end facing distally and is overgrown by several polysiphonic tubes; it could be an empty corophiid tube. The diaphragm at the puncta line of the hydrotheca may have a downwardly directed hydropore but because of its delicacy the actual structure could not be ascertained. The free stolons at the ends of several branches seem to have developed from hydrothecal pedicels which have reverted to polysiphonic tubes, growth then proceeding onward without development of a hydrotheca. The thin strands of tissue issuing from many hydrothecae may be collapsed protective sheaths of hydranths. Several hydrothecae have remnants of tissue adhering to the rim which could easily be mistaken for opercular fragments.

Similar species considered were *Lafoea fruticosa* (M. Sars, 1850), *L. gracillima* Alder, 1856, *L. capillaris* G. O. Sars, 1874, *L. elegantula* (Broch, 1903), *L. dumosa* Fleming, 1828 and *L. benthophila* Ritchie, 1909. While *L. annulata* has a hydrotheca with everted margin similar to *L. benthophila* that species has an upwardly directed pedicel so that the hydrothecae are held close to the branch. Similarly to *L. annulata*, hydrothecae of *L. dumosa* from western Europe are arranged in groups of two or three (Cornelius, 1995) but lack an everted margin. Vervoort (1972a) described the range of variation of South Atlantic *L. fruticosa* from latitudes 42° to 60° S. However, it is much smaller in critical dimensions of hydrotheca and pedicel and the hydrothecae have less everted margins than those of *L. annulata*. A small colony from the Ross Sea recognised as *L. gracillima* by Totton, 1930 approaches the dimensions of the present specimen but his figures do not show the annulated pedicels characteristic of *L. annulata*.

Filellum Hincks, 1868

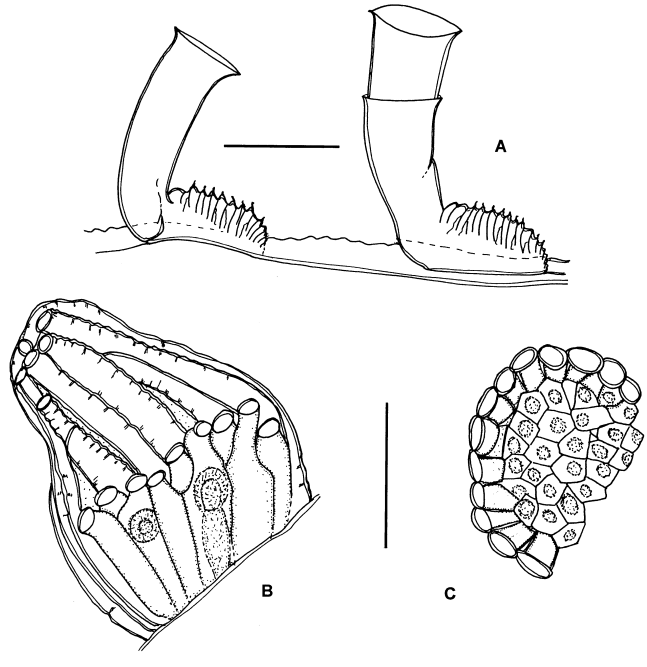
Filellum conopeum sp. nov.

Figures 9A–C

Filellum sp.—Watson and Vervoort, 2001: 161, figs 6a, b.

Material examined. Stn 94, NMV F91342, holotype, malinol-mounted microslide, sparse fertile colony on stem of *Acryptolaria patagonica*.

Description (of holotype). Hydrothecae stolonal, arising from a tunnel-shaped stolon with flattened base, wall rugose, perisarc thin. Proximal quarter to one third of hydrotheca adnate to



Figures 9A–C. *Filellum conopeum* sp. nov., stn 94. A, hydrotheca with ridged and frilled basal perisarc. B, lateral section through coppinia showing gonothecae and protective tubes. C, transverse section through coppinia. Scale bar: A, 0.2 mm; B, 0.5 mm.

stolon, dorsal abcauline wall furrowed by many close, sharp-edged ridges with minute ragged frill of perisarc; ridges fading on adnate wall. Adnate wall becoming free at a sharp upward bend, free part cylindrical or weakly expanding from bend to margin, free part straight to broadly curved, walls smooth, occasionally with several regenerations. Margin circular, transverse, with smooth, distinctly everted rim. Perisarc of walls fairly thick, thinning distally. Hydranth with c. 12 tentacles and clavate hypostome.

Coppinia bud-shaped, c. 1 mm wide and 1 mm high, comprising many tightly packed gonothecae enclosed within a cone of protective nematophorous tubules. Gonotheca flask-shaped (lateral view), base rounded, body expanding a little from base to shoulder then narrowing into a short straight or slightly curved neck tapering to a circular aperture; in transverse view gonothecae polygonal. Nematophorous tubules similar in length, not forked, conjoined just above gonothecae then becoming free, most narrowing distally and inwardly curved to meet above gonotheca; terminal orifice circular. Perisarc of gonothecae and tubes moderately thick; perisarc of tubes somewhat roughened. Planulae enclosed in gonothecae small, spherical.

Colour. Colonies colourless, planulae creamy pink.

Measurements (μm)

Hydrorhiza	
width	40
Hydrotheca	
dorsal length of adnate part	180–240
depth of adnate part	92–116
length of free part	320–420
width of free part at bend	88–128
diameter at margin	140–168
Coppinia	
diameter of nematophorous tubules	64–120
length of gonotheca	320–440
maximum width of gonotheca	128–160
diameter of orifice	64–80
diameter of planula	80–120

Etymology. Named for the cone of tubes protecting the gonothecae.

Remarks. Epizoic colonies of *Filellum conopeum* occur sparsely on the stem of *Acryptolaria*. The thin ragged perisarcal frill surmounting the abcauline ridges of the hydrotheca, together with the bud-shaped coppinia are characteristic.

The trophosome of *F. conopeum* resembles that of *F. serratum*, however, the coppinia of that species as described and figured by Peña Cantero et al. (1998) is quite different, the gonothecae being protected by a canopy of apically divided tubes, some of which originate from within the gonothecal mass. Watson and Vervoort (2001) reported a species of *Filellum* from the deep-water seamounts south-east of Tasmania, Australia, but as their material was infertile and dimensions somewhat greater than those of *F. serratum* (Clarke, 1879) (the only other known species with a wrinkled abcauline wall), they hesitated to identify it with that species. While the hydrothecae of *F. conopeum* are somewhat smaller than those of the Tasmanian specimens I consider the two are conspecific.

Zygophylax Quelch, 1885

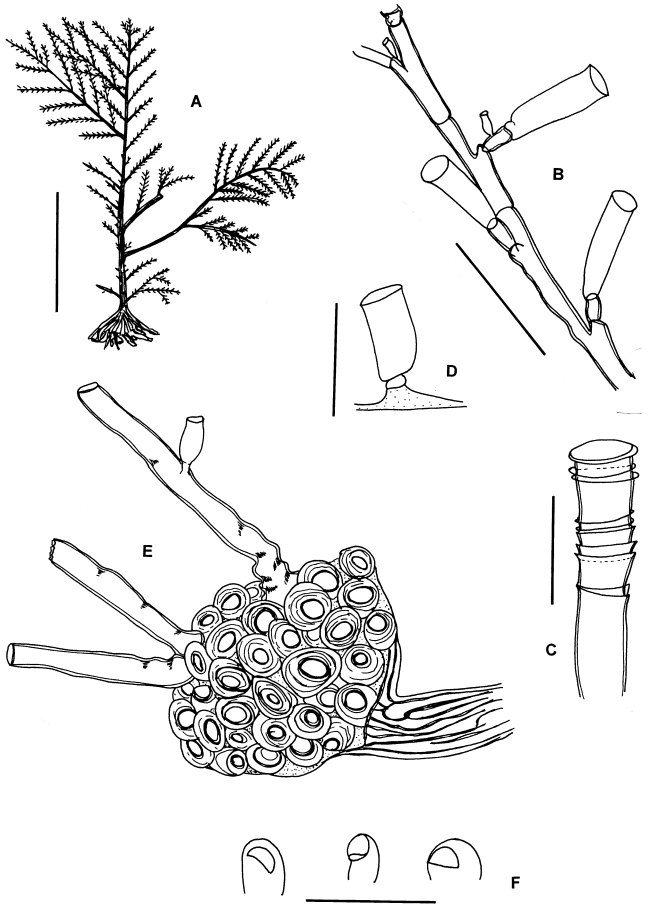
Zygophylax sagamiensis Hirohito

Figures 10A–F

Zygophylax sagamiensis Hirohito, 1983: 30, fig. 11.—Rees and Vervoort, 1987: 85.—Hirohito, 1995: 144, figs 44a–e, pl. 9 fig. C.

Material examined. Stn 44,TM K2775, infertile colony fragment 10 mm high, specimen alcohol-preserved. Stn 63, TM K2774, specimen alcohol-preserved, NMV F91335, malinol mounted microslide from fertile colony fragment 10 mm high on primnoid gorgonian stem. Stn 122, NMV F91316, specimen alcohol-preserved, NMV F91336 malinol-mounted microslide, complete branched colony 60 mm high and 50 mm wide, detached from substrate.

Description. Hydrorhiza a mat of stolons running along axis of gorgonian, bunching together at base of colony then passing upwards to become fascicular tubes of stem. Polysiphonic stems stiff, sparingly subalternately branched, primary branches widely spaced, occasionally secondary subdichotomous branching, one or two polysiphonic tubes running halfway to two thirds along branch or hydrocladium; branch



Figures 10A–F. *Zygophylax sagamiensis*, stn 63. A, colony. B, distal part of branch. C, hydrotheca with multiple marginal replications. D, pedicellate nematotheca on hydrorhiza. E, coppinia. F, hooded gonothecae from coppinia. Scale bar: A, 25 mm; B, 0.5 mm; C, 0.2 mm; D, 0.1 mm; E, F, 0.25 mm.

and hydrocladia thereafter monosiphonic; a hydrotheca in axil of each branch. Hydrocladial internodes long, slender, perisarc moderately thick, smooth, nodes merely transverse constrictions, distinct when present, but often absent. Hydrothecae alternate to subalternate, widely spaced, facing frontally, 1 or 2 on internode, if one, about halfway to two-thirds up internode, if 2, one just below and the other just above node. Hydrocladial apophyses short, distal node transverse, deep.

Hydrothecal pedicel cylindrical, slender, variable in length, sometimes with one to several regenerations. Hydrothecae long, slender, slightly asymmetrical, adcauline wall convex, abcauline wall weakly concave, diaphragm distinct, clearly demarcated from hydrothecal wall, transverse or oblique (depending on angle of view) with central wide hydropore. Hydrotheca margin circular, transverse, rim distinctly everted, some hydrothecae with up to 8 marginal replications; perisarc of hydrotheca smooth.

Nematothecae numerous on peripheral tubes of fascicled stem, on hydrorhiza, on apophyses below hydrothecal pedicels, on surface of coppinia and on coppinial tubes; nematothecae small, vase-shaped, sometimes slightly asymmetric, pedicel very short, margin transverse, circular, rim slightly everted.

Coppinia (Stn 122) scarcely visible, embedded in polysiphonic tubes of stem between primary branches, marked by a faint swelling of the stem and numerous projecting nematophorous tubules. Gonothecae small, cylindrical, tightly packed, with low hooded semicircular orifice, a few with an apical peak, walls thick. Tubules issuing from coppinial mass, long, with one or two basal constrictions, some with one or two nematothecae, some with a few nodes along length and some incipiently branched.

Colour. Stems pale honey yellow, hydrocladia paler.

Measurements (μm)

Branch	
length of internode	360–392
width at node	36–52
Hydrotheca	
length of pedicel	108–120
length diaphragm to margin, including replications	392–600
diameter at diaphragm	56– 64
diameter at margin	116–148
Nematotheca	
length	76–108
diameter at margin	36– 40
Coppinia	
maximum length of tube	1050
diameter of tube	56–60
width of gonotheca	64–100

Distribution. Previously known from a depth of 300 m in Sagami Bay, Japan (Hirohito, 1995).

Remarks. Branches are given off from just inside the peripheral tubes of the stem. Hydrothecae in the axils of branches usually have long, undulated or regenerated pedicels. Hydrocladial nodes may be faint or altogether absent. As there is only one coppinia in the sample and the gonothecae are deeply embedded in the mass, sex could not be determined. Nematothecae are so numerous on the hydrorhizal stolons and peripheral tubes of the lower stem region that they impart a rough, prickly appearance to these structures. Hirohito (1995) mentioned the presence of nematothecae on the peripheral tubes of the stem but not on the hydrorhiza.

In all but arrangement of the hydrothecae the present specimens resemble *Zygophylax tottoni* Vervoort, 1987 in which the branching is strictly planar and hydrothecae are not frontally directed. As the present specimens generally conform with descriptions and figures of *Z. sagamiensis* given by Hirohito (1983, 1995) the material is referred to that species. Differences with the present specimen are: (i) the fewer apical peaks on the gonothecae; and (ii) the numerous coppinial nematothecae.

Acryptolaria Norman, 1875

Acryptolaria conferta (Allman)

Figures 11A–D

Cryptolaria conferta Allman, 1877: 17, pl. 12 figs 6–10.—Stechow, 1913: 30.—Jarvis, 1922: 335.—Keller et al., 1975: 148.

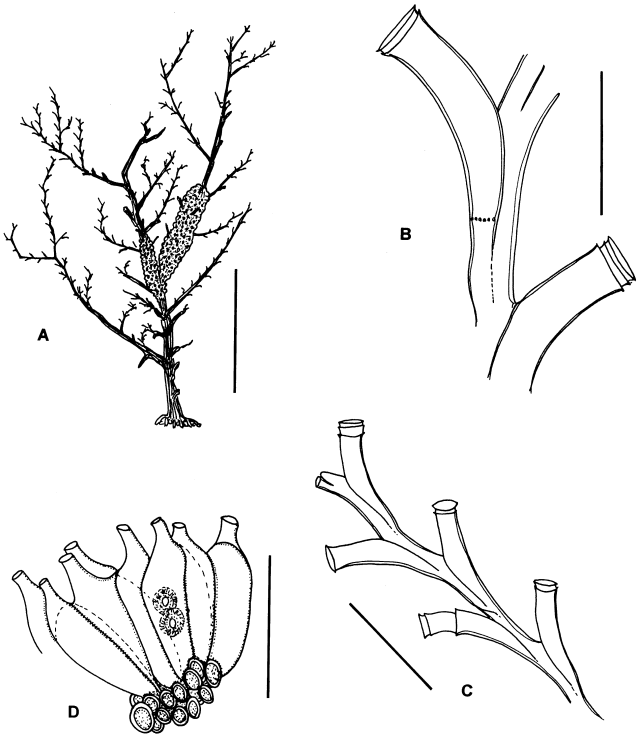
Grammaria conferta.—Broch, 1913: 10.—Broch, 1918: 17–18.

Cryptolaria conferta var. *australis* Ritchie, 1911: 826, pl. 84 fig. 2, pl. 87 fig. 1.—Jäderholm, 1919: 7, pl. 2 fig. 1.—Totton, 1930: 163, figs 19c–e.—Ralph, 1958: 315, figs 4a–g.—Yamada, 1959: 49.—Rees and Thursfield, 1965: 82, 194.—Millard, 1967: 172.

Oswaldaria conferta var. *australis*.—Stechow, 1923a: 11.

Oswaldaria conferta.—Stechow, 1923b: 147.—Leloup 1940: 15.—Picard, 1958: 193.—Marinopoulos, 1981: 176.

Acryptolaria conferta.—Totton, 1930: 164, figs 19a, b.—Kramp, 1932: 68, fig. 32.—Leloup, 1937: 4, 29, fig. 19.—Fraser, 1943: 90.—Fraser, 1944: 210, pl. 40 fig. 189.—Kramp, 1947: 8.—Fraser, 1948:



Figures 11A–D. *Acryptolaria conferta*, stn 44. A, colony with coppinia on stems and branch. B, hydrothecae. C, distal end of branch. D, lateral section through part of coppinia. Scale bar: A, 10 mm; B, 1 mm; C, D, 0.5 mm.

228.—Rossi, 1950: 201, fig. 4a.—Deevey, 1954: 270.—Kramp, 1963: 106.—Millard, 1964: 7, fig. 1A-C, E.—Millard, 1968: 253, 260.—Vervoort, 1968: 99.—Vervoort, 1972a: 41, fig. 12a.—Millard, 1973: 28, fig. 4c.—Millard, 1975: 169, fig. 56.—Millard, 1977b: 106.—Millard, 1978: 188.—Stepanjants, 1979: 51, pl. 9 figs 4A–G.—Millard, 1980: 131.—Hirohito, 1983: 6, 19.—Calder, 1991: 33, figs 19, 20.—El Beshbeeshy, 1991: 63, fig. 13.—Park, 1992: 287.—Boero and Bouillon, 1993: 263.—Calder, 1993: 67.—Blanco et al., 1994: 8, figs 4, 5.—Altuna Prados, 1995: 54.—Bouillon et al., 1995: 51.—Hirohito, 1995: 104.—Calder. 1997: 87.—Schuchert, 2001: 62, figs 48A, B.

Acryptolaria conferta var. *conferta*.—Ralph, 1958: 317.

Acryptolaria conferta australis Millard, 1964: 9, figs 1D, F–G.—Vervoort 1966: 115, fig. 15.—Rees and Vervoort, 1987: 37, fig. 6e.

Acryptolaria conferta conferta.—Vervoort, 1985: 282.—Ramil and Vervoort 1992: 41, figs 7a, b.

Material examined. Stn 44, TM K2776, NMV F91317, many colonies on pebbles and primnoid gorgonian fragment; one colony consisting of 2 large stems (one stem fertile) and several simple stems, other colonies of several large infertile stems, specimens alcohol-preserved.

Description. Simple and branched colonies connected by hydrorhiza reptant on gorgonian. Larger branched colonies flabellate, up to 50 mm high and 35 mm wide, stems to 1 mm wide at base; colonies arising from a thick plug of stolons, simple stems from single stolons. Stem and branches of flabellate colonies heavily fascicled, with roughly longitudinal polysiphonic tubes running upwards from stem and along branches; ultimate parts of branches (hydrocladia) monosiphonic. Branching irregular, of up to 3 orders, branches given off behind a hydrotheca, best seen in distal parts of colony. Monosiphonic branches weakly geniculate, given off from behind a hydrotheca.

Hydrothecae biseriate, alternate, scarcely overlapping, often frontally directed; on monosiphonic branches biseriate arrangement of hydrothecae sometimes replaced by incipient whorls of three around hydrocladium; on fascicled parts of stem and branches hydrothecae often not strictly alternate, immersed in polysiphonic tubes with only distal part or margin visible. Hydrocladial hydrothecae long, tubular, bending outwards at an angle of 40–50° to hydrocladial axis; adcauline wall convex, often a slight change in convexity where wall becomes free; free part about same length as adnate part, hydrotheca narrowing proximally along adnate wall, sometimes fading into a ragged septum. Abcauline wall curving smoothly into hydrocladium, usually a transverse ring of desmocytes just above narrowest part of hydrotheca, marking site of attachment of hydranth. Margin circular, rim transverse to hydrothecal axis, slightly but distinctly everted; up to seven marginal replications common. Perisarc of stem and branches firm, thinning a little on hydrotheca. Hydranths too poorly preserved for description.

Coppinia situated about halfway up stem, spreading for 10 mm along a branch and 5 mm along adjoining stem; coppinia cylindrical, diameter 2 mm, texture rather spongy. Gonothecae radially arranged within coppinia around polysiphonic tubes of stem and branch; flask-shaped, sides more or less straight, conjoined to neighbours, expanding from narrow base to a rounded shoulder surmounted by an erect tubular neck narrowing into a circular non-everted terminal orifice. No protective tubules present. Small spherical planulae visible in some gonothecae.

Colour. Colony translucent honey-gold; hydranths probably of same colour; gonophores creamy pink.

Measurements (μm)

Branch	
distance between hydrothecae on same side of branch	980–1160
width of hydrocladium at junction of free and adnate adcauline wall	144–192
Hydrotheca	
length of free adcauline wall including marginal replications	712–860
length of adnate adcauline wall to desmocyte ring	200–400
diameter at margin	184–200
Coppinia	
overall length of gonotheca	520–528
width of gonotheca across shoulder	136–192
length of gonothecal terminal neck	96–160
diameter of gonothecal terminal orifice	44–48

Distribution. Moderate to deeper waters of all oceans (Vervoort and Watson, 2003).

Remarks. The verticil of three hydrothecae occasionally present on monosiphonic hydrocladia approaches the generic definition of *Cryptolarella* Stechow, 1913 in which the hydrothecae may be triserially disposed around the stem. I cannot find in the literature any mention of the more consistent feature in the present specimens of the frontally directed hydrothecae, all descriptions reporting hydrothecae either lying in the plane of ramification or exceptionally, backwardly or forwardly directed at the base of each new hydrocladium (Ramil and Vervoort, 1992). However, as the colonies conform in all other respects with *Acryptolaria conferta*, the material is presently assigned to that species.

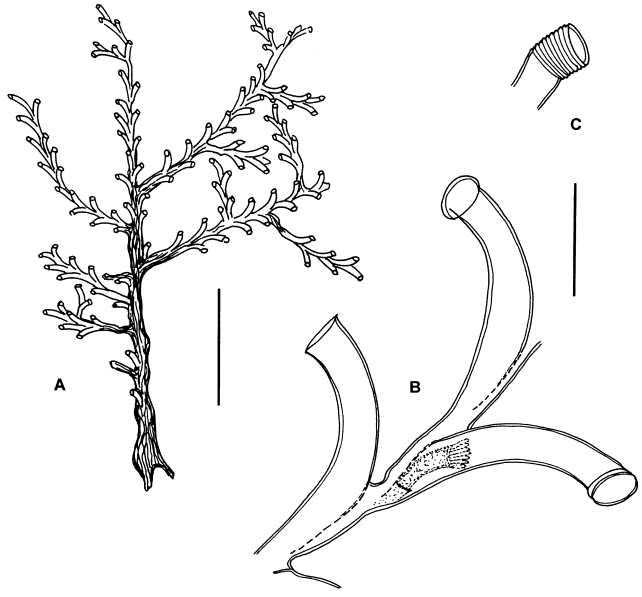
Acryptolaria patagonica El Beshbeeshy

Figures 12A–C

Acryptolaria patagonica El Beshbeeshy, 1991: 67, fig. 14.

Material examined. Stn 90, TM K2777, stem 50 mm high, NMV F91318 stem fragments 5 mm high, all detached from substrate, specimens alcohol-preserved. Stn 90, NMV F91337, malinol-mounted microslide from stem fragment. Stn 94, NMV F91319, colony 100 mm high, two stems 50 mm high joined at base but detached from substrate, three stems to 5 mm high and stem fragment; on primnoid gorgonian, specimens alcohol-preserved. Stn 130, TM K2778, stem 50 mm high, detached from substrate, specimen alcohol-preserved.

Description. All colonies infertile. Stolons reptant on substrate, tubular, narrow, coalescing into erect, almost straight stems; sometimes single hydrothecae arising from stolons between stems. Taller stems to 2 mm thick at base, basal 5–10 mm unbranched; lower stem region strongly fascicled, polysiphonic tubes mostly linear, running up stem and along primary branches. Complex colonies with up to four orders of branching; branches more or less alternate, usually in one plane, primary and subsequent branches often originating just above a hydrotheca, ultimate branches (hydrocladia) and some branches in lower stem region monosiphonic.



Figures 12A–C. *Acryptolaria patagonica*, stn 44. A, colony. B, hydrothecae. C, multiple replications of hydrothecal margin. Scale bar: A, 12 mm; B, C, 1 mm.

Hydrothecae biseriate, tubular, subalternate, usually frontal on branch, long, gracefully arched outwards, abcauline wall concave, often a minor swelling in proximal wall; adcauline wall smoothly convex, one third adnate to hydrocladium, adnate part narrowing a little proximally and fading into hydrocladium; hydrocladium fairly narrow behind adnate hydrothecal wall. Margin circular, transverse to hydrothecal axis, rim slightly everted, almost parallel to hydrocladial axis; margin may have up to 14 close replications bending plane of rim away from axis of hydrotheca. Cauline hydrothecae partially immersed in polysiphonic tubes of stem and primary branches; tubes then often contorted around hydrothecae.

Hydranths contracted and wrinkled; with c. 20 tentacles and clavate hypostome; hydranth attached to base of adnate hydrothecal wall by a ring of tissue.

Perisarc of stem and branches thick and smooth, perisarc of hydrothecae thinner and shining.

Colour. Stems pale honey-yellow fading to almost colourless at tips of branches. Hydranths may have been deep golden-brown.

Measurements (μm)

Branch	
distance between hydrothecae on monosiphonic branch	900–1200
width of hydrocladium where adnate hydrothecal wall becomes free	104–136
Hydrotheca	
length (diagonal) of free adcauline wall including marginal replications	1500–1600
length of adnate adcauline wall from base of hydranth	880–1040
width at base of hydranth	232–256
diameter at margin	416–448

Distribution. Patagonian shelf (El Beshbeeshy, 1991). Also recorded from 415–1060 m at 39°–55°S, near Macquarie Island (Vervoort and Watson, 2003).

Remarks. The larger colonies are rather flexuous and the ultimate monosiphonic branches are quite lax out of fluid. The long, curved hydrothecae are characteristic. The free part of the hydrotheca is tubular but the adnate adcauline hydrothecal wall narrows, becoming increasingly indefinite and rather fibrous in appearance as it passes downward into the hydrocladium.

The frontally directed, long curvaceous hydrothecae resemble *Acryptolaria patagonica* more than any other known species of the genus. Although the habit of the present specimens differs somewhat from descriptions of *A. patagonica*, this may be due to immaturity of the colonies. It is unfortunate that the present material is infertile, since a coppinia would confirm its identity.

Acryptolaria minuta sp. nov.

Figures 13A–C

Material examined. Stn 130, NMV F 91338, holotype, small infertile colony of five small stems, two branched, on dead primnoid gorgonian, malinol-mounted microslide.

Description (of holotype). Tallest stem 9 mm high, broken off at tip, 3.5 mm wide at base; stems branched once in one plane; branched stems 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.

Hydrothecae biseriate, alternate, long, tubular, somewhat frontally directed, scarcely overlapping, curving gracefully outwards at an angle of 50–60° from hydrocladial axis; single hydrothecae on proximal region of larger stems partially immersed in fascicular tubes. Adcauline hydrothecal wall smoothly convex, free wall slightly more than half length of adnate wall; adnate wall narrowing proximally downwards into hydrocladium, base of wall ending in minute knot of perisarc; abcauline wall smoothly concave, passing without interruption into hydrocladium. Margin evenly circular, transverse to hydrothecal axis, very weakly everted, sometimes with several replications of rim. Perisarc of stem and branches firm, thinning a little on hydrotheca. Hydranths deeply retracted into hydrotheca; with c. 12 tentacles.

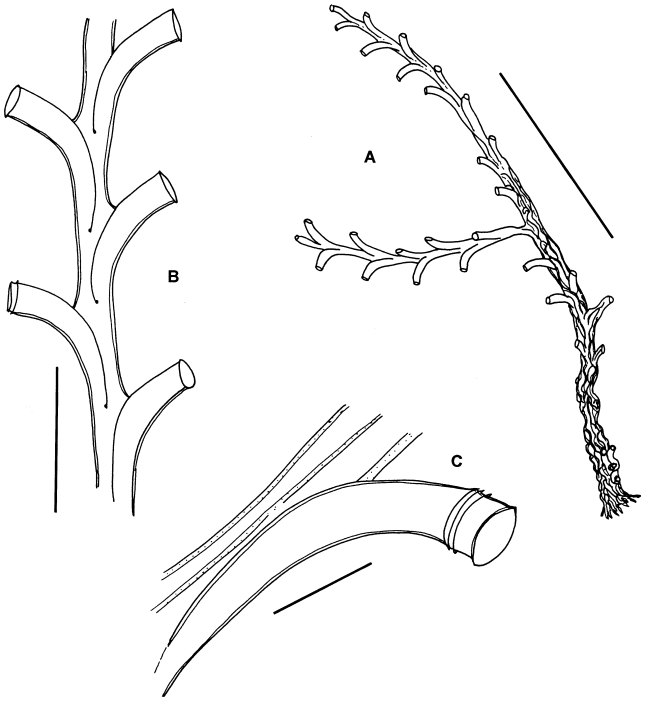
Colour. Pale honey-yellow to colourless.

Measurements (μm)

Branch	
distance between hydrothecae on same side	624–728
width at junction of adnate and free adcauline walls	152–168
Hydrotheca	
length of free adcauline wall including marginal replications	200–368
length of adnate adcauline wall	408–464
diameter at margin	104–128

Etymology. Describes the minute nature of the colonies.

Remarks. The habit of *Acryptolaria minuta* is similar to that of *A. patagonica* described above. The species is, however, considerably smaller in critical dimensions of the hydrocladium and hydrotheca. The slightly everted margin of the hydrotheca



Figures 13A–C. *Acryptolaria minuta* sp. nov., stn 133. A, whole colony. B, part of branch. C, hydrotheca with replicated margin. Scale bar: A, 3 mm; B, 0.5 mm; C, 0.2 mm.

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.

Even if the colonies are immature specimens of a larger species their smaller dimensions and sparsely branched habit matches no other known species of *Acryptolaria*.

Haleciidae Hincks, 1868

Halecium Oken, 1815

Halecium ralphae Watson and Vervoort

Figures 14A–D

Halecium beanii.—Ralph, 1958: 332, fig. 10e, pro parte.
Halecium sessile.—Hirohito, 1995: 27, fig. 7g, pro parte.
Halecium ralphae Watson and Vervoort, 2001: 162, figs 7a–e.

Material examined. Stn 119, TM K2795, infertile colony on dead solitary coral, specimen alcohol-preserved. Stn 44, NMV F91320, small infertile stem detached from substrate, specimen alcohol-preserved.

Description. Colony 60 mm high and 2 mm thick at base; smaller colony 30 mm high. Hydrorhizal filaments reptant on coral; colony aborescently branched in up to three orders, several branches broken off. Branching occurs from below a hydrotheca, stem and branches heavily fascicled, polysiphonic tubes almost linear to undulating, sometimes knotted around origin of branch, tubes running along branches, ultimate branches monosiphonic. Perisarc of stem and proximal branches thick, thinning out on monosiphonic parts.

Monosiphonic branches (hydrocladia) arising from polysiphonic tubes on an apophysis of stem comprising one to three subspherical segments with strong transverse nodes. Hydrocladial internodes long, cylindrical, smooth, widening distally, nodes slightly oblique, tilted away from hydrotheca, marked by a deep constriction and tumescence in perisarc, sometimes an additional short subspherical internode similar to apophysis above node.

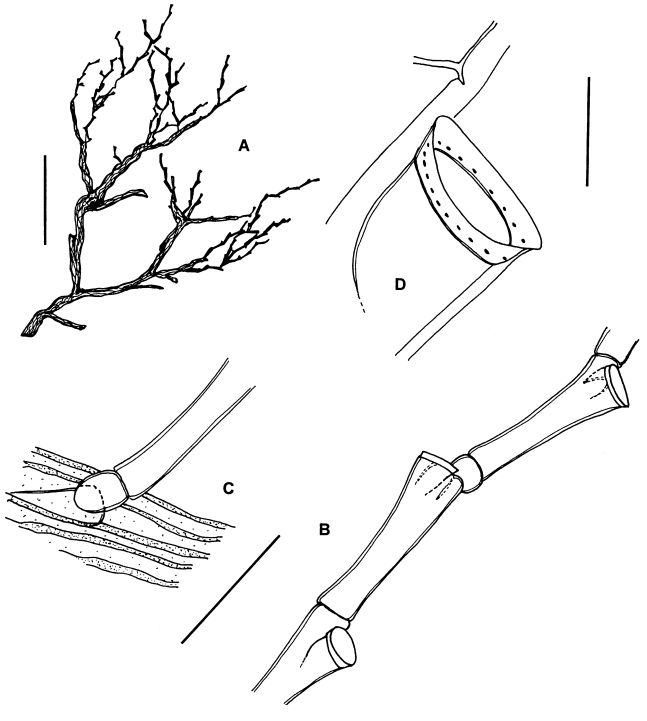
Hydrophores alternate, distal on internode, almost entirely adnate to internode, adcauline wall marked by a seam in perisarc, a semicircular thinning in perisarc below some hydrothecae; abcauline wall contiguous with wall of internode. Hydrotheca free, closely adpressed but not adnate to internode, very shallow, tilted at slightly away from internode, hydrothecal margin very weakly everted, diaphragm distinct, a ring of desmocytes above. Hydranths too poorly preserved for description.

Colour. Stem and fascicled branches honey brown; monosiphonic parts pale brown.

Measurements (µm)

Branch	
length monosiphonic branch internode	580–800
diameter at node	96–120
Hydrotheca	
length adnate wall to diaphragm	100–128
diameter at diaphragm	128–144
depth margin to diaphragm	30–38
diameter of margin	152–154

Distribution. Previously recorded from 475–512 m off the Chatham Islands (Ralph, 1958), shallow water in Japan (Hirohito, 1995) and from 700–1122 m south of Tasmania (Watson and Vervoort, 2001).



Figures 14A–D. *Halecium ralphae*, stn 119. A, colony. B, distal part of branch. C, apophysis of stem and proximal part of branch. D, hydrophore and hydrotheca. Scale bar: A, 5 mm; B, C, 0.5 mm; D, 0.1 mm.

Remarks. Some large undischarged bean-shaped nematocysts visible in the coenosarc of the branches could not be identified. The marginal rims of some hydrothecae have one or two obscure regenerations. Other than the noticeable thinning of the perisarc of the hydrophore below some hydrothecae the material conforms to the description and dimensions of *Halecium ralphae* given by Watson and Vervoort (2001).

Halecium tenellum Hincks

Figures 15A–C

Halecium tenellum Hincks, 1861: 252, pl. 6 figs 1–4.—Hartlaub, 1904: 13, pl. 1 fig. 5.—Hartlaub, 1905: 609, fig. 63.—Jäderholm, 1905: 13, pl. 4 fig. 8.—Hickson and Gravely, 1907: 28.—Ritchie, 1907: 525, pl. 2 fig. 4.—Vanhöffen, 1910: 320, fig. 36.—Hilgendorf, 1911: 540.—Linko, 1911: 26, 240, fig. 5.—Ritchie, 1913: 10, 14.—Broch, 1918: 46, fig. 20.—Jäderholm, 1919: 5, pl. 1 fig. 3.—Stechow, 1919: 41, figs J–K.—Stechow 1923a: 5.—Hargitt, 1927: 507.—Broch, 1927: 115.—Broch, 1928: 61.—Broch, 1933: 17.—Fraser, 1937: 110, pl. 23, fig. 121.—Leloup, 1937: 4, 17, fig. 8.—Fraser 1938: 133.—Fraser, 1939: 159.—Fraser, 1948: 225.—Dawydoff, 1952: 54.—Hamond, 1957: 307, fig. 14.—Millard, 1957: 193, fig. 5.—Vervoort, 1959: 229, fig. 8.—Yamada, 1959: 31.—Leloup, 1960: 220, 230.—Naumov, 1960: 454, fig. 344.—Mammen, 1965: 9, fig. 35.—Vasseur, 1965: 52, 70.—Millard, 1966: 471, figs 11C–F.—Vervoort, 1966: 102, fig. 2.—Millard, 1968: 253, 258.—Vervoort, 1968: 95.—Day et al., 1970: 12.—Hirohito, 1974: 8, fig. 2.—Leloup, 1974: 11.—Millard and Bouillon, 1974: 5, fig. 22.—Rho and Chang, 1974: 136, pl. 1 figs 1–4.—Vasseur, 1974: 158.—Cornelius, 1975: 409, fig. 12.—Millard, 1975: 156, figs 50F–L.—Millard, 1977a: 11.—Millard, 1977b: 106.—Rho, 1977: 252, 414, pl. 71 fig. 63.—Millard, 1978: 193.—Stepanjants, 1979: 104, pl. 20 figs 5A–V.—Millard 1980: 130.—Hirohito 1983: 5, fig. 11.—Stepanjants 1985: 137.— Antsulevich 1987: 106. - Gili, Vervoort, and Pagès, 1989: 81, fig. 10A.—Cornelius and Ryland, 1990: 140, fig. 4.—Calder, 1991: 22, fig. 14.—El Beshbeeshy, 1991: 40, fig. 6.—Ramil and Vervoort, 1992: 90, figs 21f, g.—Medel and Vervoort, 2000: 23.–Schuchert, 2001: 85, figs 70A–E.

Halecium (?) tenellum.—Ralph, 1958: 340, figs 11f, g.

Halecium geniculatum Nutting, 1899: 744, pl. 63 figs 1a–d (not *Halecium geniculatum* Norman, 1867 (= *Halecium halecinum* (Linnaeus, 1758)).

For full synonymy see Cornelius (1975).

Material examined. Stn 120, TM K2779, infertile colony of many stems on stem of *Eudendrium ?cyathiferum*, specimen alcohol-preserved.

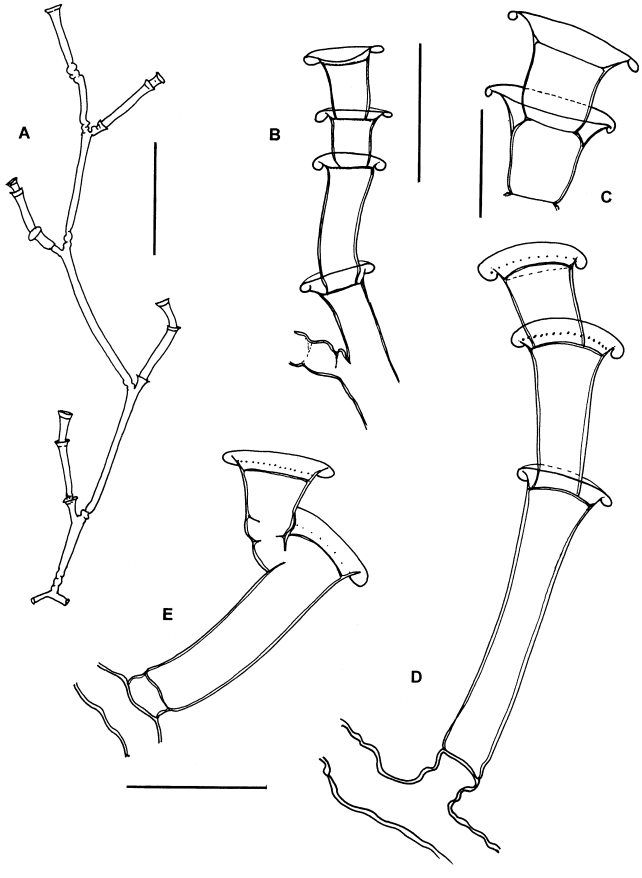
Description. Hydrorhiza tubular, undulating, reptant on hydroid host. Stems to 5 mm high, straggling, given off irregularly from hydrorhiza; stems monosiphonic, beginning with two or three deep transverse annulations, branching thereafter mostly alternate in one plane, straight to sympodial or irregularly dichotomous; stem internodes long, thin, cylindrical, variable in length, perisarc smooth, nodes oblique to transverse, marked by one to three distinct constrictions in perisarc.

Primary hydrophore given off below node, cylindrical, base contiguous with or inclined outwards from internode, variable in length but usually fairly short, hydrotheca moderately deep, diaphragm distinct, transverse, a slight thickening of hydrothecal wall around diaphragm, a faint ring of desmocytes above; margin wide, strongly everted with recurved rim. Hydrophores regenerated linearly up to 10 times, each arising from diaphragm of preceding one, regenerations similar to primaries but length highly variable; base contracted into diaphragm of preceding hydrotheca. Perisarc of hydrorhiza and proximal stem thinning distally, hydrothecal rim very thin.

Colour. White to colourless.

Measurements µm	
Hydrorhiza	
diameter	68–80
Stem internode	
length of proximal internode	1200–1600
length of succeeding internodes	440–1320
diameter at node	60–80
Hydrophore	
adcauline length of primary hydrophore	136–232
length of succeeding hydrophores	68–260
diameter of hydrotheca at diaphragm	78–80
depth, margin to diaphragm	24–36
diameter of marginal rim	130–150

Distribution. Near-cosmopolitan in Atlantic, Indian and Pacific Oceans (if all previous identifications of the species are correct). Depth range, 0–550 m (Millard, 1975). The present record (1046 m) is the deepest for the species.



Figures 15A–E. A–C, *Halecium tenellum*, stn 120. A, single stem from colony. B, linear series of hydrophores. C, hydrophores and hydrothecae with outrolled rims. D–E. *Halecium ovatum*, stn 120. D, linear series of hydrophores. E, secondary hydrophore given off below primary. Scale bar: A, 1 mm; B, 0.25 mm; C, 0.1 mm; D, E, 0.5 mm.

Remarks. The species is small and elegant. The diameter of the widely flared and outrolled, thin hydrothecal rim is twice that of the diaphragm. The desmocytes above the diaphragm are very faint and visible only under high magnification. Some stems have apical tendrils which revert to stolons.

Although the colonies are not strictly fascicled a few stems have one or two extra tubes that become free above the base as independent monosiphonic branches. Because of its small size and epizoic habit *H. tenellum* is easily overlooked and can be identified with certainty only when fertile. The present specimens conform reasonably well with descriptions and dimensions (where given by authors) of *H. tenellum*.

Halecium ovatum Totton

Fig. 15D, E

Halecium ovatum Totton, 1930: 143, fig. 3.—Vervoort, 1972b: 339, fig. 1.—Stepanjants, 1979: 103, pl. 20 figs 1a–g.—Peña Cantero, 1991: 48, pl. 2 figs g, h.—Blanco, 1994: 156.—Peña Cantero and García Carrascosa, 1995: 12, figs 2G, H.—Peña Cantero and García Carrascosa, 1999: 212.

Material examined. Stn 120, TM K2780, NMV F91321, sparse infertile colonies on *Halecium ralphae*, specimen alcohol-preserved.

Description. Colony minute, stolonal; stolons tubular, walls crumpled, thin. Primary hydrophore seated on a short apophysis of the stolon, a transverse to weakly oblique node at base; hydrophore relatively long, cylindrical, smooth, gradually expanding to hydrotheca.

Secondary and tertiary hydrophores arising in a series without basal node from diaphragm of preceding hydrotheca; successive hydrophores progressively shorter. Branching of hydrophore at right angles from below a hydrotheca common, secondary hydrophores shorter, with 2 or 3 partial basal constrictions. Hydrotheca shallow, expanding smoothly from well marked diaphragm to wide margin with strongly recurved and outrolled rim, a clear ring of desmocytes above diaphragm.

Perisarc of hydrorhiza very thin, that of hydrophores thicker, rim of hydrotheca thin.

Colour. Colourless.

Measurements (µm)

Hydrorhiza	
width of stolon	80–104
Hydrophore	
length of primary, proximal node to diaphragm	120–496
width, primary proximal node	59–62
length of succeeding hydrophores	142–316
diameter at diaphragm	120–136
depth, margin to diaphragm	32–44
diameter, marginal rim	176–208

Distribution. Antarctic (Stepanjants, 1979; Peña Cantero and García Carrascosa, 1999).

Remarks. The species is similar to *Halecium tenellum* for which it was originally mistaken in samples from Stn. 120. In size and habit of colony the present specimens most resemble *Halecium ovatum* Totton, 1930 redescribed and figured by Vervoort (1972b). Although the hydrotheca is narrower and shallower than that of *H. ovatum*, in the absence of gonosome the material is assigned to that species.

The stolons of *H. tenellum* and *H. ovatum* entwine on the same substrate and although difficult to differentiate, the two species can be distinguished by the strictly stolonal habit of *H. ovatum*, its broader, undulating and thinner-walled hydrorhizal stolons, branching of the subsidiary hydrophores from below the primary hydrophore, the greater overall cauline dimensions, the less strongly flared and outrolled rim and the ratio of diameter of hydrothecal rim to width of diaphragm (in *H. ovatum* 1.5:1, in *H. tenellum* 2:1).

Halecium delicatulum Coughtrey

Figures 16A–C

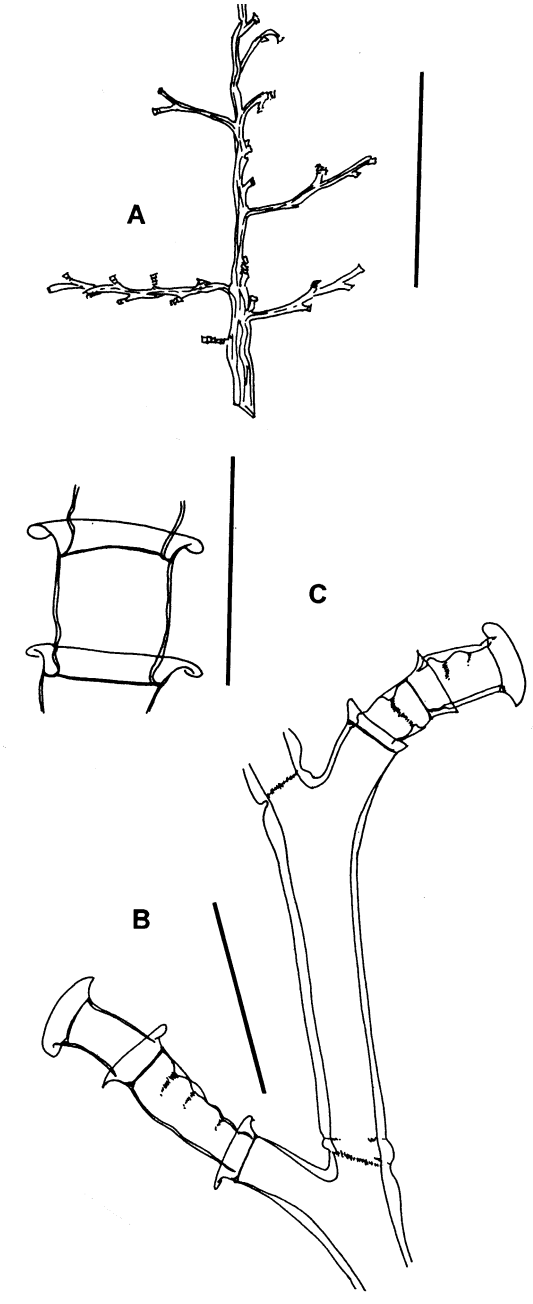
Halecium delicatulum Coughtrey, 1876b: 299.—Coughtrey, 1876a: 26, pl. 3 figs 4, 5.—Stechow, 1913: 144.—Stechow, 1913: 9, 79.—Stechow, 1923a: 5.—Bale, 1924: 235.—Ralph, 1958: 334, figs 11e, h–n, 12 a–p.—Pennycuik, 1959: 173.—Yamada, 1959: 31.—Naumov and Stepanjants, 1962: 94, figs 16, 17.—Rees and Thursfield, 1965: 106.—Millard, 1966: 464, fig. 10L.—Ralph, 1966: 158.—Millard, 1968: 253, 256.—Day et al., 1970: 12.—Blanco and Bellusci de Miralles, 1972: 7, figs 3–5.—Naumov and Stepanjants, 1972: 34, 52.—Stepanjants, 1972: 72.—Vervoort, 1972a: 27, figs 4, 5.—Vervoort, 1972b: 341, fig. 2a.—Watson, 1973: 166.—Leloup, 1974: 10.—Millard, 1975: 145, figs 47F–L.—Watson, 1975: 159.—Millard, 1977a: 7, figs 1C, D.—Millard, 1978: 193.—Stepanjants, 1979: 105, pl. 20 figs 4A–V.—Watson, 1979: 234.—Hirohito, 1983: 5, 11.—Rho and Park, 1983: 41, pl. 2 figs 1–3.—Aguirrezabalaga et al., 1984: 90.—Rees and Vervoort, 1987: 25, fig. 5.—Aguirrezabalaga et al., 1988: 222.—Ramil et al., 1988: 72, fig. 2; Gili, Vervoort, and Pagès, 1989: 78, fig. 7B.—Altuna and García Carrascosa, 1990: 54.—Genzano, 1990: 38, figs 2–5.—El Beshbeeshy, 1991: 32, figs 4a, b.—Roca et al., 1991: 70: 14.—Genzano and Zamponi, 1992: 40, fig. 17.—Park, 1992: 286.—Ramil and Vervoort, 1992: 82, figs 20a–c.—Branch and Williams, 1993: 11.—Genzano, 1994: 5.—Watson, 1994: 66.—Altuna Prados, 1995: 54.—Bouillon et al., 1995: 45.—Hirohito 1995: 20, figs 5a–c, pl. 1, fig. C.—Park, 1995: 10.-Genzano, 1996: 290.—Medel and Vervoort, 2000: 12.

Halecium flexile Allman, 1888: 11, pl. 5 figs 2, 2a.
Halecium gracile Bale, 1888: 759, pl. 14 figs 1–3
Halecium parvulum Bale,1888: 760, pl. 14 figs 4, 5.

Material examined. Stn 122, NMV F91343, NMV F91344, malinol-mounted microslides, colony of three damaged infertile stems, on *Eudendrium*.

Description. Two stems simple, stolonal, the other, the tallest 16 mm high, lightly fascicled. Tubes of fascicled stem running about two thirds distance up stem; stem thereafter monosiphonic with a few alternate branches standing out stiffly almost at right angles to axis, smaller branchlets arising at intervals along stem. Monosiphonic branch internodes long, nodes oblique to almost transverse, sloping almost parallel to primary hydrophore, weakly to deeply constricted, deeper nodes with tumescence above and below. Hydrophores alternate, distal on internode, a smooth, outwardly directed continuation of internode.

Primary hydrophores variable in length, cylindrical, expanding a little to below hydrotheca, perisarc smooth; some older hydrophores on lower stem region deeply corrugated; a secondary hydrophore sometimes given off from primary; linear series of up to eight hydrophores common, each hydrophore



Figures 16A–C. *Halecium delicatulum*, stn 122. A, distal part of colony. B, monosiphonic branch. C, hydrophores, enlarged. Scale bar: A, 5 mm; B, 0.5 mm; C, 0.3 mm.

arising from diaphragm of preceding one, usually a strong basal constriction present, successive hydrophores usually becoming progressively shorter. Hydrotheca moderately deep, expanding smoothly to a wide, strongly everted margin with outrolled rim; diaphragm very strong, transverse, some concave with central hydropore, usually a row of desmocytes above.

Perisarc of polysiphonic tubes of stem quite thick, thinning along monosiphonic branches and hydrophore, becoming thin at hydrothecal margin.

Colour. Clear white (preserved material).

Measurements (μm)

Branch	
length of internode	549–765
width at node	109–152
Hydrophore	
adcauline length of primary, to diaphragm	78–117
length of succeeding hydrophores, base todiaphragm	78–312
diameter at diaphragm	137–164
depth, margin to diaphragm	32–59
diameter, marginal rim	220–257

Distribution. Circumglobal in tropical, subtropical and boreal waters (Vervoort and Watson, 2003).

Remarks. The rather stiff mode of branching in the largest colony does not precisely accord with the usually rather lax habit of *H. delicatulum* (pers. obs.) but may be an artefact of preservation. Although the hydrothecae are a little shallower than is normal for *H. delicatulum* I have no doubt the present material is referrable to that species.

Halecium sp.

Figures 17A–E

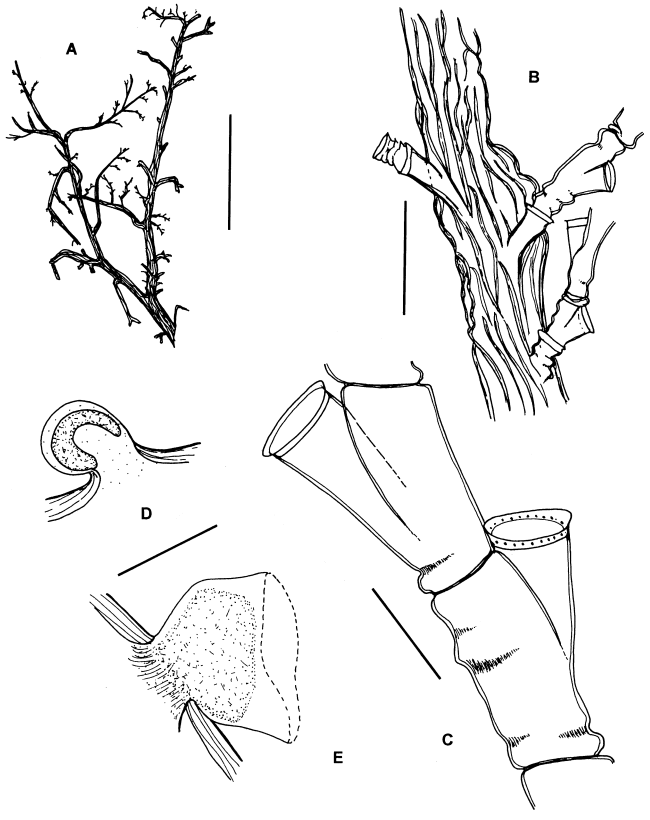
Material examined. Stn 122, NMV F91328, fragmentary remaining upper branches of a large fertile colony, specimen alcohol-preserved. Stn 90, TM K2791, specimen alcohol-preserved, NMV F91345, malinol-mounted microslide, from lower stem and denuded branches of very large colony broken off from base.

Description. Stem (or lower branch) from Stn 122, 5 mm wide at base and 150 mm high, rigid, irregularly branched; branches heavily fascicled, tubes running almost to tips of branches. Ultimate branches (hydrocladia) monosiphonic, irregularly alternate, short, hydrocladium issuing from inside a hydrotheca on peripheral tube of stem or polysiphonic tube of branch, perisarc of stem and proximal branches thick, thinner on hydrocladia. Proximal hydrocladial internode with 1 to 4 deep transverse septa, internodes thereafter short, more or less cylindrical, walls smooth to broadly undulated, nodes opposed, tilted away from hydrophore, deeply incised, internode tumid above and below node.

Hydrophores alternate, occupying distal half of internode, abcauline wall sloping smoothly outwards from axis at c. 30°, adcauline wall variable in length, adnate to below hydrotheca, free wall short. Hydrotheca shallow, free of internode, opposite to or just above node, tilted away from internodal axis at c. 110°, expanding slightly to a weakly everted rim; eversion more pronounced on adcauline than abcauline side; in frontal view hydrothecal margin slightly ovoid; diaphragm distinct, transverse to saucer-shaped with central circular hydropore, a circle of inward-facing thorn-shaped desmocytes above diaphragm. Hydranth with c. 16 tentacles, none well preserved.

Gonothecae arising without pedicel on proximal part of internode opposite a hydrophore; a few immature or broken gonothecae present, minute to small, base subspherical, perisarc very thin.

Colour. Colony from Stn 122 honey brown, fading to white on monosiphonic branches. Colony from Stn 90 pale yellowish-green.



Figures 17A–E. *Halecium* spec., stn 90. A, colony. B, polysiphonic stem with monosiphonic branches. C, monosiphonic branch with hydrophores. D, young gonotheca erupting from stem. E, more advanced gonotheca, distal end damaged. Scale bar: A, 50 mm; B, 1 mm; C, 0.2 mm; D, E, 0.1 mm.

Measurements (μm)	
Monosiphonic branch	
length of proximal internode	120–440
length of succeeding internodes	600–820
width at node	160–280
Hydrophore	
length of adnate adcauline wall	304–416
length of free adcauline wall	56–100
Hydrotheca	
diameter at diaphragm	232–264
depth margin to diaphragm	48–60
diameter at margin	304–320
Gonotheca	
width of immature gonotheca	120

Remarks. The heavily fascicled branches are woody and very brittle. There is little tendency to secondary branching and there are few regenerated hydrophores in the colonies. Although most hydrophores are oppositely arranged on the hydrocladium, there is a tendency to frontal displacement on some branches.

The few small gonothecae present were noted only during detailed examination of the material. They may be female, but the very thin perisarc is so collapsed and torn that the shape of the mature gonotheca could not be reconstructed or the sex determined. Species with strongly fascicled colonies considered were the near-cosmopolitan *Halecium beanii* (Johnston, 1838), *H. luteum* Watson, 1975 from Tasmania and *H. jaederholmi* Vervoort, 1972b, known from Antarctic and subantarctic waters. However, structure and dimensions of the hydrotheca and shape of the internode of these species all differ from the present specimen. As the material is fragmentary it is not to assigned to species.

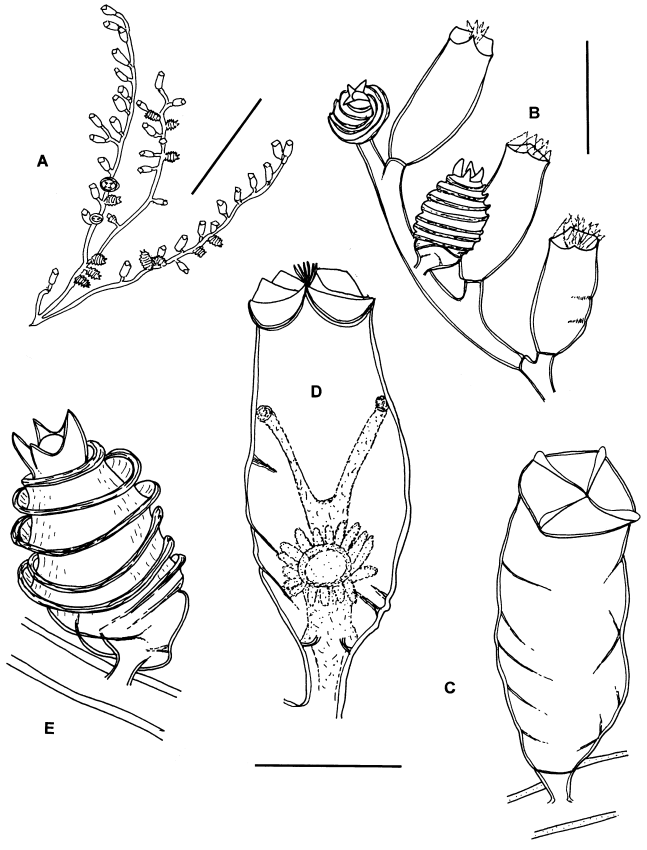
Sertulariidae Lamouroux, 1812

Calamphora Allman, 1888

Calamphora quadrispinosa sp. nov.

Figures 18A–E

Material examined. Stn 94, NMV F91325, holotype, specimen alcohol-preserved, NMV F91346 malinol-mounted microslide from holotype, large colony on *Symplectoscyphus*. Stn 44, TM K2783, paratype, small colony on *Eudendrium*, specimen alcohol-preserved. Stn 120, NMV F91324, paratype, colony on *Symplectoscyphus paulensis*, specimen alcohol-preserved. Stn 130, TM K2784, paratype, on dead coral fragment, specimen alcohol-preserved. Stn 46, TM K2785, small colony on *Eudendrium*, specimen alcohol-preserved.



Figures 18A–E. *Calamphora quadrispinosa* sp. nov., stn 94. A, three stems, part of colony. B, stem, enlarged. C, hydrotheca with intact flanged operculum. D, hydrotheca with ragged opercular valves after eruption of the hydranth; ligaments connecting hydranth to wall of hydrotheca. E, gonotheca. Scale bar: A, 10 mm; B, 1 mm; C, D, E, 0.5 mm.

Description (of holotype and paratypes). Stolonal colonies tangled amongst host hydroids. Stolons simple, tubular, smooth, perisarc moderately thick, smooth to undulated, firmly attached to host, becoming free at intervals as monosiphonic stems, sometimes sparingly branched.

Hydrothecae pedicellate, arising singly, more or less regularly along one side of stolon or branch; hydrothecae upright or inclined at various angles, barrel-shaped or slightly asymmetrical (depending upon angle of view), body narrowing a little below margin, walls smooth to weakly undulated, usually in proximal third; body narrowing into a tubular pedicel; diaphragm thick, transverse to slightly oblique, hydropore central, circular, with short upturned collar. Margin transverse to axis, quadrate, distinctly everted with four broad, sharply pointed cusps separated by low embayments. Operculum of 4 thin triangular valves; in immature hydrothecae valves meet in a low upturned flange decreasing in height from hydrothecal margin to centre; in mature hydrotheca remnants of valves meeting in a central, ragged, upturned tuft. Perisarc of hydrotheca moderately thick proximally, thinning distally.

Hydranth (preserved material), columnar, with c. 16 tentacles and a wide, annular hypostome; no diverticulum or annular fold but a long bifid ligament issuing from below tentacle ring, joining hydrothecal wall in distal third.

Gonothecae arising from stolon, usually beside a hydrotheca; pedicel short, thick; mature gonotheca barrel-shaped, body with six to nine deep flanges, deepest in distal third, shallower proximally; aperture a dome of tissue surrounded by four long, equidistant, more or less inwardly curved spines. Sex of gonophores could not be determined.

Colour. White (preserved material); may have been pale yellow in life.

Measurements (μm)

Stolon-stem	
diameter	192–216
distance between hydrothecal pedicels	1060–1040
Hydrotheca	
length pedicel, adcauline side	64–224
length diaphragm to margin	1100–1280
maximum width	506–561
diameter at diaphragm	184–216
diameter at margin	440–480
height of marginal cusp	70–80
Gonotheca	
length of pedicel	120–176
distal width of pedicel	160–200
maximum diameter	520– 640
depth of ridges	68–100
width across margin	208–240
height of marginal cusps	76–120

Etymology. Named for the four claw-like spines of the gonotheca.

Remarks. There are no nodes in either the hydrorhizal or free stolons, only infrequent constrictions marking probable sites of breakage and repair. The free stolons (branches) are predominantly monosiphonic with some tendency to polysiphony by fusion of two stolons over short distances. The branches are usually loosely curved, and this together with adherence of the stolons to the substrate results in considerable tangling around the stems and branches of the hydroid host. The hydrothecae are usually single but occasionally two may be given off from opposite sides of the branch. Although the hydropore is centrally located, the base of the hydranth sometimes appears to be attached beside, rather than through the hydropore; a ring of large granules (seen in partially cleared specimens) marks the site of attachment. The operculum is retained after eruption of the hydranth and becomes torn into apical tufts presumably from repeated movement of the hydranth. This difference between the flanged operculum of immature hydrothecae and the fragmented tufts of mature hydrothecae is striking, and if the two forms were not present on the same colony the hydrothecae could easily be mistaken for two different species. The bifid ligaments supporting the extended hydranth are visible only when the hydranth is retracted. Nematocysts present in the tentacles and coenosarc of the stolons could not be identified. The colonies are abundantly fertile, the claw-like marginal spines of the gonotheca being characteristic. As no ova were seen in the gonophores the sex is presumed to be male.

Genera considered were: *Sertularella* Gray, 1848, *Thyroscyphus* Allman, 1877, *Symmetroscyphus* Calder, 1986 and *Calamphora* Allman, 1888. *Sertularella* was rejected as the specimen has no clear abcauline diverticulum; as the material is stolonal *Thyroscyphus* was rejected; *Symmetroscyphus* was also rejected as the hydrotheca of that species is symmetrical.

Calamphora is said to possess a diverticulum situated on the adhydrorhizal side of the hydranth (Millard, 1975) which in a stolonal colony is assumed to be the adcauline side. No evidence of such a structure was found in the present material; it is possible however, that from some angles of view, strands of ligament in inadequate material could be mistaken for diverticula.

Although Vervoort (1968) considered *Calamphora* to be inseparable from pedicellate *Sertularella* it nevertheless seems useful to retain the genus for exclusively pedicellate sertulariid species.

Calamphora quadrispinosa is the most abundant species in the collection.

Staurotheca Allman, 1888

Staurotheca vanhoeffeni (Peña Cantero, García Carrascosa and Vervoort)

Figures 19A–E

Staurotheca vanhoeffeni Peña Cantero et. al., 1996: 1–10, figs 1–3.—Peña Cantero et al., 1997: 373, fig. 12.

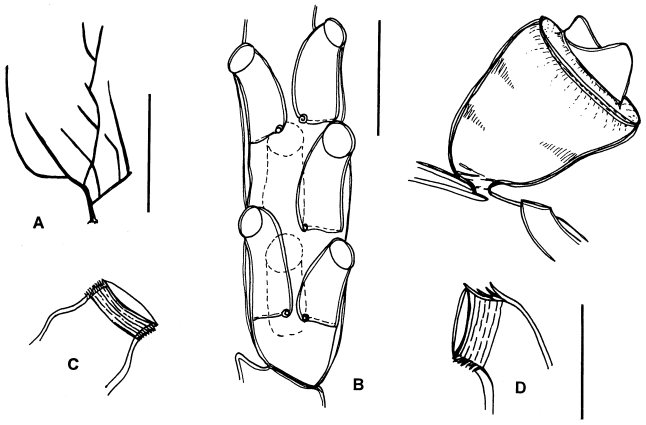
Dictyocladium affine.—Vanhöffen, 1910: 331, figures 44a–c.

Thuiaria affinis.—Stepanjants, 1979: 95, pl. 18 figs 1A, B, pl. 24 figs D–F.

Selaginopsis vanhoeffeni.—Peña Cantero and García Carrascosa, 1994: 121, figs 3j–n.

Material examined. Stn 44, NMV F91322, several sparingly fertile branch fragments, specimen alcohol-preserved. Stn 122, TM K2781, specimen alcohol-preserved, NMV F91347, malinol mounted microslide from infertile colony detached from substrate

Description. Colony stiff and woody, stem 2 mm thick at base, detached from hydrorhiza. Stem sparsely branched in one



Figures 19A–E. *Staurotheca affinis* stn 44. A, part of colony. B, branch internode. C, D, replicated hydrothecal margins. E, female gonotheca. Scale bar: A, 50 mm; B, E, 1 mm; C, D, 0.5 mm.

plane, primary branches rather geniculate, pointing upwards, straight or curved, a few second order branches present. Stem and lower branches fascicled, tubes consisting of a sheath of more or less concentric layers of perisarc surrounding stem; sheath thick proximally, layers becoming fewer but lumpy along branches, completely enclosing branches but branches visible through transparent outer perisarc. Hydrocladia (branches) long, straight, internodes variable in length, 1–10 groups of hydrothecae on internode, nodes oblique to transverse, deeply constricted.

Hydrothecae flask-shaped, immersed in internode, walls not in contact, typically 3 but sometimes 4 (on older hydrocladia) arranged in a verticil around internode, base of each slightly upwardly displaced with respect to others; a proximal athecate section of internode below basal-most hydrotheca. Adcauline hydrothecal wall straight to weakly convexly curved proximally, curvature more convex in distal third, abcauline wall almost straight to faintly concave with outward flexure below marginal rim; base of hydrotheca flat to weakly concave, a thick knot of perisarc at base of adcauline wall. Margin of hydrotheca circular, a tilted slightly upwards, edentulate, not everted, protruding just clear of internode, rim often ragged and produced into a short collar by numerous fine replications; operculum a thin, low dome.

Female gonothecae given off branch above a hydrotheca; pedicel short, wide, slightly bent, merging into gonotheca; body of gonotheca heart-shaped, widening from base to rounded shoulder, walls smooth to faintly undulated, distal end a platform with central wide orifice surrounded by a low collar and a pair of wing-shaped lobes, side of collar slightly outwardly turned and facing adcaudally. Perisarc very thick. No male gonothecae found.

Colour. Colony uniformly dark brown

Measurements (μm)	
Branch (hydrocladium)	
length of internode	1360–6000
width at node	320–400
length of infrathecal internode	360–840
width across hydrothecal pair, margin to margin	840–1100
Hydrotheca	
length (diagonal) across adcauline wall	900–1000
length of abcauline wall	780–1000
maximum width	312–384
width across floor	344–400
diameter at margin	280–336
Gonotheca	
length, base (excluding pedicel) to shoulder	1360–1460
width across shoulder	1360–1420
length of pedicel	140–200
width of pedicel at base	200–300
height of apertural collar	360–480
diameter of collar	700–900

Distribution. Circumantarctic (Peña Cantero et al., 1997).

Remarks. The stiff woody colony of the most intact specimen matches previous descriptions of *Staurotheca vanhoeffeni*. Dimensions of the two undamaged female gonothecae from stn 44 fit those given by Vanhöffen (1910). Stepanjants (1979) and Peña Cantero et al., (1997) described and figured male gonothecae: none are present in the Macquarie Island material. None of these authors mention the distinct knot of perisarc at the base of the adcauline hydrothecal wall. The fascicular tubes envelop the proximal part of the stem in contorted, more or less concentric layers of thickened, tough perisarc.

Symplectoscyphus paulensis Stechow

Figures 20A–D

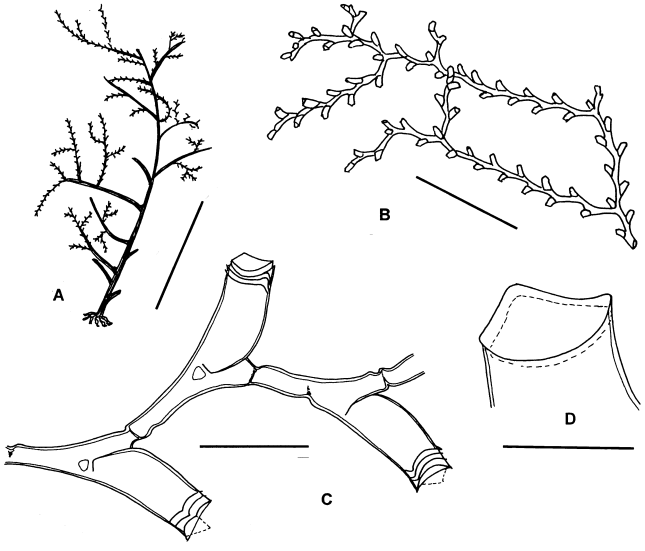
Symplectoscyphus paulensis Stechow, 1923a: 8.—Stechow, 1923b: 172.—Stechow, 1925: 467, fig. 28.—Millard, 1967: 183, figs 4G, H.—Vervoort, 1972b: 180, figs 60b, 61.—Millard, 1975: 317, figs 102A–C.—Millard, 1977b: 107.—Millard, 1978: 199.—Stepan-jants, 1979: 71, pl. 17 fig. 2.—Hirohito, 1983: 51, fig. 24.—Vervoort, 1993: 263, figs 63a–d, 65a.—Blanco, 1994: 154.—Bouillon et al., 1995: 74.

Material examined. Stn 120, TM K2790, NMV F91329, specimens alcohol-preserved; NMV F91348, malinol-mounted microslide, three complete infertile colonies, the tallest 100 mm high and fragments of others, possibly branches shed from these colonies. Colonies heavily overgrown by *Calamphora quadrispinosa*.

Description. Colonies irregularly and profusely branched more or less in one plane. Hydrorhiza a tuft of stolons detached from substrate. Stem of tallest colony 3 mm wide above hydrorhiza, heavily fascicled, stolons growing upwards to become polysiphonic tubes of stem. Branches (hydrocladia) to 30 mm long, slender, polysiphonic tubes often extending a short distance along branch. Branches thereafter monosiphonic (hydrocladia), branched subdichotomously several times at c. 120°, a hydrotheca in each dichotomy.

Hydrocladial internodes long, cylindrical, widening a little below hydrotheca, perisarc smooth, sometimes undulated, internode widening distally; nodes distinct, oblique to almost transverse, marked by a narrowing of perisarc, frequently a tumescence above or below node; a node on each side of hydrotheca in dichotomy.

Hydrothecae alternate, distant, given off almost in one plane just below node at an angle of c. 80° to internodal axis, almost cylindrical, narrowing very slightly to margin, walls smooth, adcauline wall gently convex, adnate adcauline wall short,



Figures 20A–D. *Symplectoscyphus paulensis*, stn 120. A, colony. B, distal monosiphonic branches. C, part of distal branch. D, rim of hydrotheca showing obtuse cusps. Scale bar: A, 50 mm; B, 10 mm; C, 1 mm; D, 0.5 mm.

becoming free opposite or just below node, free wall convex to almost straight, but less curved than adnate part, at least twice length of adnate part; abcauline wall slightly concave, curving smoothly outward, contiguous with internode. Hydrotheca widest at junction of adnate and free adcauline wall, narrowing a little to margin, floor narrow, flat, a minor thickening of perisarc at base of adcauline wall, a triangular foramen and thinning of perisarc in internode beneath floor.

Margin with 3 low, equidistant cusps separated by broad, rather shallow embayments; margin often with numerous fine replications, operculum of 3 triangular valves. Perisarc of hydrotheca thin, slightly thicker at marginal replications, operculum thin.

Hydranth with c. 24 tentacles, a strand of tissue attaching hydranth to hydrotheca about one-third distance up adcauline wall.

Colour. Pale yellow-brown.

Measurements (μm)

Hydrocladium	
length of internode	1000–1440
diameter at node	120–176
Hydrotheca	
length of free adcauline wall	792–840
length of adnate adcauline wall	328–392
length of abcauline wall	880–960
width at floor	184–280
width at margin	400–480

Distribution. A moderately deep-water species from 680 m in the southern Indian Ocean (Stechow, 1923b), 440 m in the south-west Indian Ocean, 347 m off Mozambique (Millard, 1967), 424–428 m on Vema Seamount (Vervoort, 1972a) and 399–500 m in Antarctica (Stepanjants, 1979).

Remarks. Although flexuous, the apical branches are rather brittle and easily broken. The hydrothecae are mostly arranged in one plane, but on some hydrocladia there is a tendency to face frontally. The small, thin marginal replications are slightly everted and are probably remnants of opercular attachments. The hydrothecae in the branch dichotomies do not differ in size or shape from those on the internodes.

The colonies are so heavily overgrown by *Calamphora quadrispinosa* that it is difficult to distinguish the stolons of that species from the polysiphonic tubes of *S. paulensis*. The syntype of *S. paulensis* is strongly polysiphonic (Vervoort, 1993) while monosiphonic hydrocladia of *S. paulensis* are similar to *S. bathyalis* Vervoort, 1972. *S. bathyalis* was rejected because of its weakly expanding hydrothecae.

The present specimens are the largest colonies of *S. paulensis* ever recorded. Previous records are of small polysiphonic colonies or monosiphonic fragments.

Symplectoscyphus tuba Totton

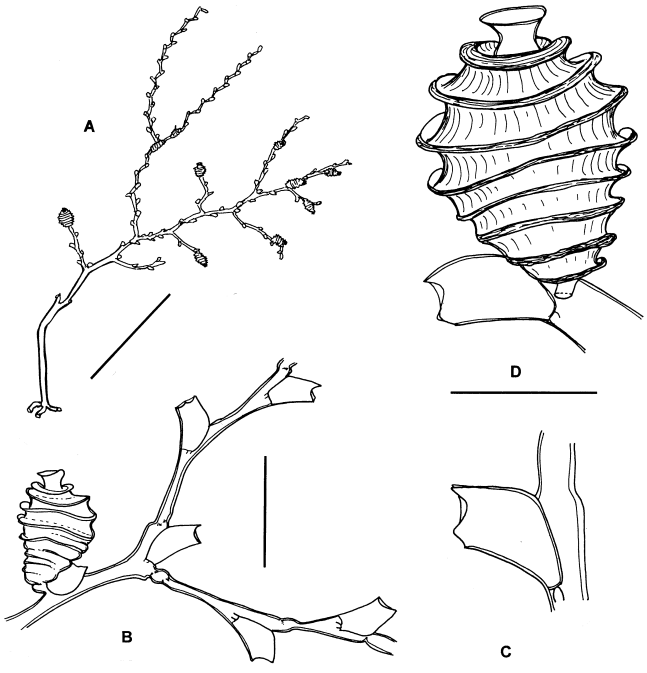
Figures 21A–D

Symplectoscyphus tuba Totton, 1930: 186, figs 37a, b.—Ralph, 1961: 816, figs 18f, g.—Leloup, 1974: 42, fig. 41.—Vervoort, 1993: 272, figs 67a–d.

Sertularella tuba.—Stepanjants, 1979: 76, pl. 1 fig. 4.

Material examined. Stn 94, NMV F91323, specimen alcohol-preserved, NMV F 91349 malinol mounted microslide, fragments of colony detached from substrate. Stn 119, TM K2793, small fertile colony on primnoid gorgonian stem, specimen alcohol-preserved. Stn 120, TM K2794 many broken stems, longest intact stem 40 mm long, specimen alcohol-preserved. Stn 122, TM K2782, small infertile colony on *Eudendrium*, specimen alcohol-preserved.

Description. Hydrorhiza composed of sparse stolonal tubes. Stems monosiphonic, of same diameter as stolons,



Figures 21A–D. *Symplectoscyphus tuba* stn 120. A, single stem from colony. B, branch with axillar hydrotheca. C, hydrotheca. D, gonotheca. Scale bar: A, 10 mm; B, 1 mm; C, D, 0.5 mm.

lower stem rather lax, almost straight proximally, narrowing a little distally. Stems branched alternately, branches widely spaced, usually simple but sometimes rebranched once or twice.

Primary branches up to 12 mm long, directed upward at an acute angle to stem; secondary branching (hydrocladia) if present, pseudodichotomous, forking from below a hydrotheca. Lower branch internodes sub-sympodial, this structure becoming more pronounced distally along hydrocladia. Some hydrocladia terminating in tendrils that rejoin other hydrocladia to form a loose meshwork. Internodes variable in length, slender, widening distally to accommodate hydrotheca, perisarc smooth, node a weak oblique constriction in perisarc sloping away from hydrotheca.

Hydrothecae alternate, distal on internode, short, contracting from base to margin, but sometimes almost tubular; directed upwards at an angle of 35–45° to internodal axis, abcauline wall straight to weakly concave, smoothly contiguous with internode, adcauline wall convex, adnate adcauline wall slightly longer than free wall, almost straight, wall becoming free at node, curvature greater than adnate wall, imparting a distinct angularity to wall. Floor of hydrotheca narrow, flat, a small subcircular foramen in perisarc below. Margin with 3 cusps, adcauline the longest, slightly everted, with 2 abcauline laterals, these less pronounced, rounded; some hydrothecal margins slightly thickened, many replicated. Hydranths with c. 12–16 short tentacles, not well preserved.

Gonothecae abundant, arising on a very short, bent pedicel inserted close beneath hydrothecae on stem and hydrocladia; gonotheca adpressed to hydrocladium, facing distally, ovoid with 8–10 deep, upturned flanges, proximal 2 or 3 shallowest, distalmost flange a collar surrounding orifice; gonothecal wall between flanges deeply concave and strongly vertically striated. Orifice central, wide, trumpet-shaped, upright. Remains of gonophores present in many gonotheca but sex indeterminate.

Colour. Colony colourless, transparent; gonophores may have been pink in life.

Measurements (μm)

Stem	
diameter	?
Internode length	780–1260
diameter at node	88–120
Hydrotheca	
length of abcauline wall	416–440
length of adnate adcauline wall	296–360
length of free adcauline wall including replications	248–312
width across margin (lateral view)	192–216
width across floor	96–120
Gonotheca	
total length including pedicel	1120–1200
maximum diameter including flanges	760–800
diameter of orifice	240–280
length of tube	160–192
length of pedicel	80–112

Distribution. Northern New Zealand, 183 m (Totton, 1930); Antarctica, 145–410 m (Stepanjants, 1979); Chile, 30–60 m (Leloup, 1974); New Caledonia, 650–680 m (Vervoort, 1993).

Remarks. Although the width of the hydrothecal margin and diameter of the gonotheca are somewhat greater than measurements given by Totton (1930), Ralph (1961a) and Vervoort (1993) for *Symplectoscyphus tuba* I have no doubt that the present material is referrable to that species. It is a rather delicate species, of which only small colonies or fragments of colonies have been previously reported. Its long, slender internodes, widely spaced hydrothecae and ovoid, deeply ridged gonothecae are characteristic.

Thyroscyphoides Naumov, 1955

Thyroscyphoides sympodialis sp. nov.

Figures 22A–D

Material examined. Stn 44, NMV F91330, holotype, specimen alcohol-preserved, NMV F91350, malinol-mounted microslide from holotype colony; 20 infertile stems on hydrorhiza of *Eudendrium*.

Description (of holotype). Hydrorhiza tubular, rather contorted, reptant on substrate. Stems simple, to 12 mm high, proximal part of stem of same diameter as stolon; basal-most part of stem with 2 to 4 broad, indefinite annulations, stem thereafter sympodial, sometimes a side branch given off from lower stem. Internodes long, smooth, tubular, becoming shorter along stem, widening distally to below hydrotheca; nodes usually with 1 or 2 deep, oblique constrictions almost parallel with adcauline wall of hydrotheca, a slight tumescence in perisarc above node, sometimes 1 or 2 additional constrictions along internode.

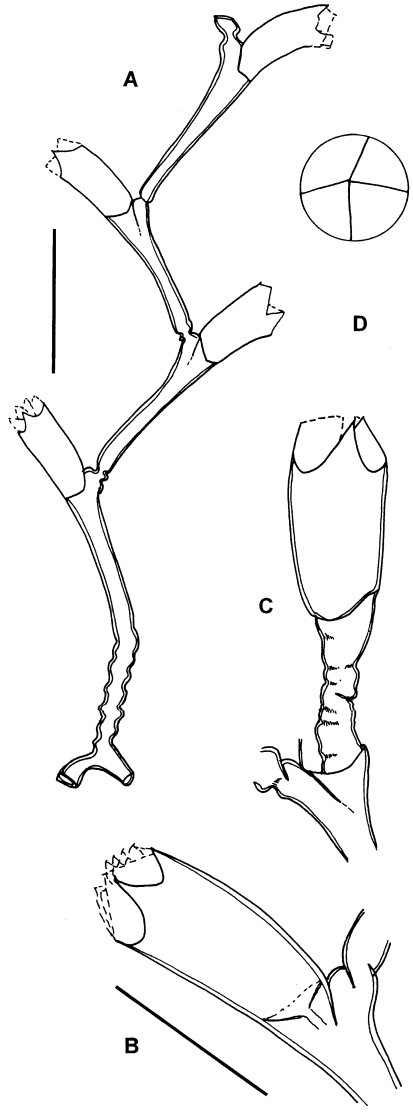
Hydrothecae alternate, arising just below node, body tubular, wide, most sessile but some pedicellate; in sessile hydrothecae abcauline wall smoothly contiguous with outward bend of internode, free adcauline wall smooth, weakly convex to almost straight, a short length of wall adnate to internode; floor of hydrotheca flat, saucer-shaped or funnel-shaped (depending upon angle of view), hydropore slightly offset, fairly wide, a row of desmocytes above marking place of attachment of hydranth. Pedicellate hydrothecae arising from floor of a broken hydrotheca; pedicels of variable length, smooth to corrugated with some internal thickenings; floor of hydrothecae rounded to sinusoidal. In both forms, hydrothecal margin almost circular (anterior view) with 4 sharply pointed triangular cusps separated by deep embayments; operculum of 4 thin pyramidal valves. Hydranth without diverticulum, but with a distinct annular fold; hydranth with c. 20 tentacles.

Perisarc of lower stems comparatively thick, thinning apically along internodes, hydrothecal margin and operculum extremely thin and fragile.

Colour. Transparent, colourless

Measurements (μm)

Stem internode	
length	1000–1640
diameter at node	80–96
Hydrotheca	
length of adnate adcauline wall	168–200
length of free adcauline wall	480–584
length of abcauline wall (to marginal embayment)	336–520
width at margin	248–296
height of marginal cusps	120–184
width of floor	120–136



Figures 22A–D. *Thyroscyphoides sympodialis* sp. nov., stn 44. A, single stem from colony. B, sessile hydrotheca, C, pedicellate hydrotheca. D, anterior view of hydrothecal operculum. Scale bar: A, 1 mm; B, C, D, 0.5 mm.

Distribution. This is the second record of the genus. *T. biformis* is known from deep water in the northern Pacific Kurile Islands (Naumov, 1955).

Etymology. Refers to the strongly sympodial habit.

Remarks. The colonies are almost flaccid out of fluid and the thin, almost transparent perisarc of the hydrothecal margin and operculae are so crushed that few remain intact.

Sessile and pedicellate hydrothecae on the same stem and a hydranth lacking a diverticulum places the species in *Thyroscyphoides* Naumov, 1955. The only other known species of the genus, *T. biformis* Naumov, 1955, differs from *T. sympodialis* in its alternate hydrothecae and its strongly sympodial habit.

Aglaopheniidae L. Agassiz, 1862

Gymnangium Hincks, 1874

Gymnangium japonicum Watson and Vervoort

Figures 23A, B

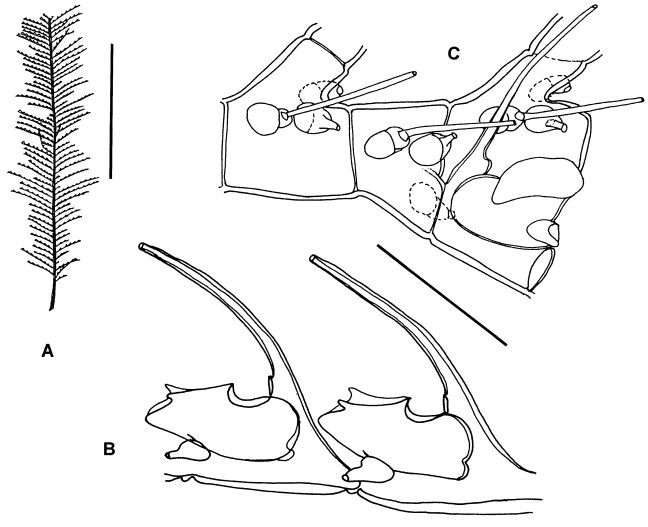
Gymnangium japonicum Watson and Vervoort, 2001: 182, figs 15a–g.

Halicetta sp.—Hirohito, 1995: 293, figs 103e–g, pl. 13 fig. D.

Material examined. Stn 122, TM K2789, specimen alcohol-preserved, NMV F91351, malinol-mounted microslide from same colony; broken infertile stem 50 mm long, detached from substrate.

Distribution. Originally recorded (as *Halicetta* sp.) from a depth of 250 m from Japan (Hirohito, 1995), from 750–900 m south-east of Tasmania (Watson and Vervoort, 2001).

Remarks. The material conforms exactly with the description and dimensions of *Gymnangium japonicum* Watson and Vervoort, 2001 reported from deep water seamounts south-east of Tasmania. The stem is golden brown, hydrocladia yellowish-green.



Figures 23A–C. *Gymnangium japonicum*, stn 122. A, colony. B, hydrocladial hydrothecae. C, cauline internodes with tubular nematocysts (after Watson and Vervoort 2001). A, 20 mm; B, C, 0.5 mm.

Campanulariidae Johnston, 1837

Tulpa Stechow, 1921

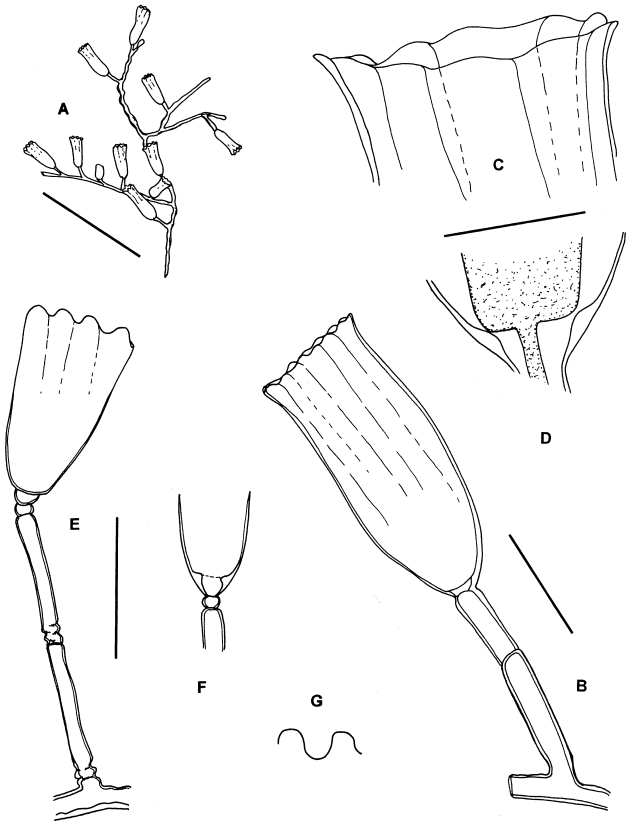
Tulpa diverticula Totton

Figures 24A–D

Tulpa diverticula Totton, 1930: 145, fig. 5.—Ralph, 1957: 844, fig. 7.—Millard, 1977a: 20, figs 5G–H.—Stepanjants, 1979: 35, pl. 6 fig 2.—Gravier-Bonnet, 1979: 33.—Bouillon et al., 1995: 86.

Campanularia diverticula Naumov and Stepanjants, 1962: 72.—Dawson, 1992: 13.

Material examined. Stn 44, TM K2786, specimen alcohol-preserved, infertile colony on *Eudendrium* and other hydroids. Stn 90, TM



Figures 24A–G. A–D, *Tulpa diverticula*, stn 94. A, stem from colony. B, hydrotheca, C, rim of hydrotheca, enlarged, D, base of hydrotheca, enlarged. E–G, *Campanularia hicksoni*, stn 44. E, hydrotheca. F, base of hydrotheca showing thickening and diaphragm. G, rounded marginal cusps. Scale bar: A, 10 mm; B, 1 mm; C, D, 0.5 mm; E, F, G, 0.5 mm.

K2788, specimen alcohol-preserved, sparse infertile colony on another hydroid. Stn 94, NMV F91326, specimen alcohol-preserved, NMV F91352 malinol-mounted microslide from same colony; infertile colony detached from substrate. Stn 119, TM K2787, specimen alcohol-preserved, sparse infertile colony on another hydroid. Stn 120, NMV F91327, sparse infertile colony, specimen alcohol-preserved.

Description. Colony stolonal, hydrorhiza tubular, perisarc smooth and thick with close, fine, vertical internal striae. Hydrothecal pedicels tubular, of variable length, given off more or less regularly, usually from same side of stolon; pedicel ending in a weak constriction below hydrotheca, sometimes 1 or 2 regeneration joints along length; perisarc thinner than on hydrorhiza.

Hydrotheca large, deeply cylindrical to weakly bell-shaped, base rounded with transverse diaphragm with central hydropore, wall thickened below diaphragm, thinning above. Hydrotheca gracefully everted below circular margin, rim with 12–14 shallow crenulations sometimes finely replicated, usually six to eight faint pleats extending partially or completely down into hydrotheca from embayments between crenulations. Hydranth large, with 20–24 tentacles.

Colour. Preserved specimens colourless.

Measurements (μm)

Hydrorhiza	
diameter	280–380
Pedicel	
length	1900–4900
diameter	160–300
Hydrotheca	
diameter at diaphragm	220–340
length, diaphragm to margin	2320–2820
diameter of margin	820–1000

Distribution. North and South Islands of New Zealand (Ralph, 1957) and Antarctic (Stepanjants,1979).

Remarks. The straggling hydrorhiza readily detaches from the substrate. The thin hydrotheca is easily crushed along the pleat-lines during mounting. Many pedicels are segmented with up to five regenerations, apparently repair after breakage. The species is a very common epizooite on other hydroids in the collection.

Campanularia hicksoni Totton

Figures 24E–G

Campanularia hicksoni Totton, 1930: 148, figs 7a–e.—Briggs, 1938: 15.—Rees and Thursfield, 1965: 90, 195.—Blanco and Bellusci de Miralles, 1972, 145: 10, figs 6–19.—Naumov and Stepanjants, 1972: 34, 37.—Stepanjants, 1972: 67, fig. 12.—Stepanjants, 1979: 29, pl. 5 fig. 1.—Blanco, 1984: 18, pl. 13 figs 29–31.—El Beshbeeshy, 1991: 94, fig. 22a.—Blanco, 1994: 159.

Campaularia laevis Hickson and Gravely, 1907: 25, pl. 4 fig. 26.—Ritchie, 1913: 19, fig. 5.—Vanhöffen, 1910: 298, fig. 18 (not *Campaularia laevis* Hartlaub, 1905: 565, fig. P1).

Material examined. Stn 44, TM K2792, NMV F91331, infertile colonies on *Tulpa diverticula* and *Eudendrium*, specimens alcohol-preserved.

Description. Colonies comprising many pedicellate hydrothecae arising from hydrorhiza overrunning stems and hydrorhizae of other hydroids. Stolons tubular, sometimes contorted, perisarc thick. Pedicels simple, unbranched, variable in length, long, tubular, of same diameter as stolon; most pedicels with 3 or 4 obscure proximal annulations, pedicels thereafter smooth, sometimes with a few groups of undulations or joints marking site of regeneration. Pedicel ending in a slightly expanded distal shoulder, a flattened spherule between stem and basal chamber of hydrotheca.

Hydrotheca deeply campanulate, walls expanding smoothly from base to margin, basal chamber narrow, enclosed by outer walls, diaphragm marked by an annular thickening of wall; margin circular, crenulate, with 8–10 apically flattened cusps, embayments between U-shaped, an almost exact reverse image of cusps. Hydrothecal margins often with 2 or 3 widely separated regenerations. Hydranth with c. 16–18 tentacles.

Perisarc of stems fairly thick, thinning distally along hydrothecal body to margin.

Colour. Colonies transparent and colourless to white.

Measurements (μm)

Pedicel	
length	1200–3800
diameter	64–72
diameter of spherule	52–64

Hydrotheca	
depth of basal chamber	40–64
length, diaphragm to margin	640–664
diameter at margin	320–440
height of marginal cusp	40
width of marginal embayment	48–64

Distribution. Antarctic (Totton, 1930; Briggs, 1938; Stepanjants, 1979).

Remarks. Many hydrothecal margins are damaged and most of the undamaged ones fade in stained mounts The few faint pleats extending downwards from the margin in many hydrothecae may result from collapse in mountant.

Dimensions of the present specimens agree fairly well with those of the "short race" of *Campanularia hicksoni* recorded from a depth of 92 m from McMurdo Sound (Totton, 1930) but with the following minor differences: (i) the hydrothecae of the present specimens are a little more campanulate than shown in Totton's figure; (ii) overall length of the hydrotheca of the present specimens is at the lower range of Totton's specimens; and (iii) the marginal diameter of the present specimens falls between Totton's "short race" and those he considered normal for specimens from Cape Adare. Totton's specimens had a variable number of marginal crenulations (9–20); the number of crenulations on the present specimens are at the lower end of this range.

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