European Journal of Taxonomy 218: 1–52
http://dx.doi.org/10.5852/ejt.2016.218
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ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
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Monograph

urn:lsid:zoobank.org:pub:A4D7AA38-D18F-4604-A5E0-D965637BD9F8

Notes on some sertulariid hydroids (Cnidaria: Hydrozoa) from the tropical western Pacific, with descriptions of nine new species

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Abstract. Forty-three species of sertulariid hydroids (Cnidaria: Hydrozoa: Sertulariidae), collected from the tropical western Pacific (Taiwan, Philippines, New Caledonia, French Polynesia, Vanuatu, Fiji, Tonga, Solomon Islands) during various expeditions of the French Tropical Deep-Sea Benthos program, are discussed. Of these, nine are new to science: *Gonaxia nova* sp. nov., *G. plumularioides* sp. nov., *Sertularella folliformis* sp. nov., *Se. plicata* sp. nov., *Se. pseudocatena* sp. nov., *Se. splendida* sp. nov., *Se. tronconica* sp. nov., *Se. tubulosa* sp. nov., and *Symplectoscyphus paucicatillus* sp. nov. The subspecies *Symplectoscyphus johnstoni* (Gray, 1843) *tropicus* Vervoort, 1993 is raised to species but, in order to avoid the secondary homonymy with *Sy. tropicus* (Hartlaub, 1901), the replacement name, *Sy. fasciculatus* nom. nov., is introduced. The male and female gonothecae of *Diphasia cristata* Billard, 1920, the male gonothecae of *Gonaxia elegans* Vervoort, 1993, as well as the female gonothecae of *Salacia macer* Vervoort & Watson, 2003, are described for the first time. Additional notes on the morphology of several other species are provided. All taxa are illustrated, in most cases using figures drawn at the same scale, so as to highlight the differences between related species.

Key words. Deep water, new species, thecate hydroids, Sertulariidae.

Galea H.R. 2016. Notes on some sertulariid hydroids (Cnidaria: Hydrozoa) from the tropical western Pacific, with descriptions of nine new species. *European Journal of Taxonomy* 218: 1–52. http://dx.doi.org/10.5852/ejt.2016.218

Introduction

The present report is a continuation of an earlier study dealing with some new sertulariid and syntheciid hydroids (Galea 2015a), and completes a series of previous reports dealing with members of the families Sertulariidae Lamouroux, 1812 (Vervoort 1993), Halopteriddidae Millard, 1962 (Ansín Agís *et al*. 2009), Lafoeidae Hincks, 1868 (specifically, the genus *Acryptolaria* Norman, 1875) (Peña Cantero & Vervoort 2010), and Kirchenpaueriidae Stechow, 1921 (Ansín Agís *et al*. 2014) from the tropical western Pacific, obtained during numerous expeditions undertaken conjointly by the Institut de Recherche pour le Développement (IRD, formerly ORSTOM) and the Muséum national d'Histoire naturelle (MNHN) of Paris (Bouchet *et al*. 2008).

The sertulariid hydroids dealt with herein belong to the following ten genera: *Caminothujaria* von Campenhausen, 1896, *Diphasia* L. Agassiz, 1862, *Dynamena* Lamouroux, 1812, *Geminella* Billard, 1925b, *Gonaxia* Vervoort, 1993, *Idiellana* Cotton & Godfrey, 1942, *Salacia* Lamouroux, 1816,

Sertularella Gray, 1848, *Sertularia* Linnaeus, 1758 and *Symplectoscyphus* Marktanner-Turneretscher, 1890. Although most species have already been dealt with by Vervoort (1993), additional notes on them are provided, along with new data on the morphology of other taxa, including descriptions of nine new hydroids.

Material and methods

The methods of study were described in detail by Galea (2007, 2008). The list of stations is given in Table 1. Station numbers, as indicated in the text, are preceded by a two-letter prefix referring to the sampling gear used to secure the material, either a Charcot dredge (CC), a beam trawl (CP), a rocky-bottom dredge (DR) or a Warrén dredge (DW). The material is deposited in the collections of MNHN.

The species dealt with herein are listed according to their morphological similarities, notably the shape of their hydrothecae. Most figures, representing portions of colonies, hydro- and gonothecae, are drawn to the same scale and grouped onto the same plates, so as to facilitate comparisons between related species.

Results

Phylum Cnidaria Verrill, 1865
Class Hydrozoa Owen, 1843
Subclass Hydroidolina Collins & Marques, 2004
Order Leptothecata Cornelius, 1992
Family Sertulariidae Lamouroux, 1812

Genus ***Caminothujaria*** von Campenhausen, 1896

Caminothujaria molukkana von Campenhausen, 1896
Fig. 1A–B

Caminothujaria molukkana von Campenhausen, 1896: 103.

Caminothujaria molukkana – Schuchert 2015: 338, fig. 12.

Material examined

MUSORSTOM 3: Stn. DR117, numerous sterile fragments from an originally large colony (size undeterminable) (MNHN-IK-2012-16500); Stn. CP121, a 2.3 cm high, sterile colony (MNHN-IK-2012-16501); Stn. DR126, an originally 11.5 cm high colony, now broken into two parts, one gonotheca (MNHN-IK-2012-16502).

MUSORSTOM 8: Stn. CP1001, several stems and fragments up to 5.3 cm high, all sterile (MNHN-IK-2012-16503); Stn. DW1021, numerous sterile stems and fragments, 3–10.5 cm high, all sterile (MNHN-IK-2012-16504); Stn. CP1104, an originally large but sterile colony, now fragmented, largest fragment ca 8 cm high (MNHN-IK-2012-16505).

BORDAU 2: Stn. CP1582, ca 4 cm high, fertile colony composed of three stems (MNHN-IK-2012-16506).

SALOMON 1: Stn. DW1756, three sterile stems 2.5–5 cm high (MNHN-IK-2012-16507); Stn. DW1767, a ca 12 cm high, sterile colony (MNHN-IK-2012-16508).

Remarks

A list of synonyms is provided by Schuchert (2015) and, for a redescription, see Hirohito (1995).

Table 1. List of stations.

Campaign	Station	Date	Depth (m)	Latitude	Longitude
MUSORSTOM 3	DR117	3 Jun. 1985	92–97	12°31′ S	120°39′ E
	CP121	3 Jun. 1985	73–84	12°08′ S	121°17′ E
	DR126	4 Jun. 1985	266	11°49′ S	121°22′ E
	CP134	5 Jun. 1985	92–95	12°01′ S	121°57′ E
BIOCAL	CP34	29 Aug. 1985	710	23°11.88′ S	167°11.30′ E
	DW37	30 Aug. 1985	350	22°59.99′ S	167°15.65′ E
	DW38	30 Aug. 1985	360	22°59.74′ S	167°15.31′ E
	DW66	3 Sep. 1985	505–515	24°55.43′ S	168°21.67′ E
	CP69	3 Sep. 1985	1220–1225	23°51.38′ S	167°58.68′ E
	DW46	30 Aug. 1985	570–610	22°53.05′ S	167°17.08′ E
MUSORSTOM 4	CC174	17 Sep. 1985	385	19°00.30′ S	163°18.50′ E
	DW205	27 Sep. 1985	160	22°38.50′ S	167°06.80′ E
	DW221	29 Sep. 1985	535–560	22°58.60′ S	167°36.80′ E
MUSORSTOM 6	DW423	16 Feb. 1989	280	20°25.85′ S	166°40.50′ E
SMIB 4	DW40	7 Mar. 1989	260	24°46.20′ S	168°08.70′ E
	DW48	8 Mar. 1989	245	24°46.20′ S	168°08.70′ E
	DW55	9 Mar. 1989	260	23°21.40′ S	168°04.50′ E
	DW57	9 Mar. 1989	210	23°21.00′ S	168°21.00′ S
VOLSMAR	DW39	8 Jun. 1989	305	22°20.50′ S	168°43.50′ E
SMIB 6	DW127	4 Mar. 1990	205–215	19°06′ S	163°22′ E
BATHUS 2	DW716	10 May 1993	290–308	22°40′ S	167°12′ E
	CP737	13 May 1993	357–400	23°03.42′ S	166°59.97′ E
BATHUS 3	CP804	27 Nov. 1993	244–278	23°41.40′ S	168°00.42′ E
	CP806	27 Nov. 1993	308–312	23°42.31′ S	168°00.52′ E
	DW809	27 Nov. 1993	650–730	23°39.39′ S	167°58.94′ E
	DW810	27 Nov. 1993	850–900	23°40.45′ S	167°58.83′ E
	CP813	28 Nov. 1993	410–415	23°45.23′ S	168°16.57′ E
	CP814	28 Nov. 1993	444–530	23°47.60′ S	168°17.10′ E
	CP821	29 Nov. 1993	864–880	23°19.16′ S	167°58.63′ E
	CP823	29 Nov. 1993	980–1000	23°22.76′ S	167°51.60′ E
	DW829	29 Nov. 1993	386–390	23°21.37′ S	168°01.84′ E
	DW830	29 Nov. 1993	361–365	23°19.75′ S	168°01.45′ E
BATHUS 4	DW902	4 Aug. 1994	341–351	19°00.84′ S	163°14.83′ E
	CP906	4 Aug. 1994	339–350	19°01.07′ S	163°14.51′ E
	DW914	5 Aug. 1994	600–616	18°48.79′ S	163°15.23′ E
	DW923	6 Aug. 1994	502–470	18°51.51′ S	163°24.17′ E
MUSORSTOM 8	CP1001	25 Sep. 1994	150–250	18°48.97′ S	168°59.83′ E
	DW1019	28 Sep. 1994	397–430	17°38.25′ S	168°33.91′ E
	DW1021	28 Sep. 1994	124–130	17°42.75′ S	168°37.00′ E
	CP1083	5 Oct. 1994	397–439	15°51.91′ S	167°19.82′ E
	CP1084	5 Oct. 1994	207–280	15°50.29′ S	167°17.88′ E
	CP1104	7 Oct. 1994	125–129	15°03.83′ S	167°06.96′ E
	CP1131	11 Oct. 1994	140–175	15°38.41′ S	167°03.52′ E
MUSORSTOM 9	DW1204	28 Aug. 1997	60–62	9°52.6′ S	139°03.2′ W
	CP1265	3 Sep. 1997	90–92	9°20.4′ S	140°07.3′ W
BORDAU 1	CP1447	4 Mar. 1999	420–513	16°45.23′ S	179°59.13′ E
	CP1448	4 Mar. 1999	410–500	16°45.04′ S	179°58.97′ E
LITHIST	DW13	12 Aug. 1999	400	23°45′ S	168°17′ E
BORDAU 2	DW1513	1 Jun. 2000	190–221	21°19′ S	175°01′ W
	CP1582	13 Jun. 2000	79–82	18°41′ S	174°03′ W
	DW1595	16 Jun. 2000	523–806	19°03′ S	174°19′ W
TAIWAN 1	DW1	27 Jul. 2000	98	23°38.1′ N	119°50.9′ E
NORFOLK 1	DW1659	20 Jun. 2001	467–449	23°38′ S	167°42′ E
	DW1666	20 Jun. 2001	469–860	23°42′ S	167°43′ E
	DW1667	21 Jun. 2001	237–250	23°41′ S	168°01′ E
	DW1699	24 Jun. 2001	581–600	24°40′ S	168°39′ E
	DW1704	25 Jun. 2001	420–400	23°47′ S	168°17′ E
	DW1712	26 Jun. 2001	180–250	23°22′ S	168°03′ E
	CP1719	26 Jun. 2001	391–407	23°21′ S	168°02′ E
	DW1722	26 Jun. 2011	540	23°16′ S	168°01′ E
TAIWAN 2	DW118	31 Jul. 2001	128–136	24°56.3′ N	122°01.5′ E
SALOMON 1	DW1741	23 Sep. 2001	557–655	11°29′ S	159°57′ E
	DW1756	26 Sep. 2001	497–511	08°52′ S	159°50′ E
	DW1767	28 Sep. 2001	98–200	08°19′ S	160°40′ E
	DW1854	7 Oct. 2001	229–260	09°46′ S	160°53′ E

Geographical distribution

The known area of distribution ranges from Indonesia and Tuvalu in the south, through Japan in the north, and encompasses the Philippines and the South China Sea (Schuchert 2015).

Genus ***Diphasia*** L. Agassiz, 1862

Diphasia cristata Billard, 1920
Fig. 1C–J

Diphasia cristata Billard, 1920: 147, fig. 1f.

Diphasia cristata – Billard 1925b: 218, fig. 57, pl. 3 fig. 32. — Hirohito 1983: 38, fig. 15; 1995: 161, fig. 51a–c.

Material examined

SMIB 4: Stn. DW57, several sterile stems and fragments, up to 2.5 cm high (MNHN-IK-2012-16509).

SMIB 6: Stn. DW127, a female colony composed of several stems up to 4 cm high, epizoic on *Gonaxia* sp. (MNHN-IK-2012-16510).

MUSORSTOM 8: Stn. DW1021, small female colony composed of a few stems, up to 2 cm high, epizoic on *Caminothujana molukkana* (MNHN-IK-2012-16511).

BORDAU 1: Stn. CP1447, small female colony composed of several stems up to 2.4 cm high (MNHN-IK-2012-16512); Stn. CP1448, dense, fertile colony (or colonies?), up to 4 cm high, on dead antipatharian (MNHN-IK-2012-16513).

BORDAU 2: Stn. DW1513, male and female colonies with stems up to 1.5 cm high, on antipatharian and aglaopheniid hydroid (MNHN-IK-2012-16514).

Remarks

This species is immediately recognizable through the presence of five prominent, longitudinal, perisarcal crests running over the whole body of hydrothecae, as well as of an additional one found on the dorsal side of the internodes. For the most recent description, see Hirohito (1995). It should be noted that the oblique node demarcating the junction between the basal, ahydrothecate part and the main, distal, hydrothecate part of the stems and side branches is not always present in the material examined here.

The gonothecae of this species, hitherto unknown, are described from the present material. Male and female gonothecae present, each sex borne on different stems, but, due to their high density and the numerous branches and anastomoses of the stolon, it is impossible to determine if it is a single colony or whether several colonies are represented. The male gonothecae (Fig. 1I–J) are 1505–1580 µm long, ovoid (480–530 µm wide in middle), and provided with numerous upturned spines (width including the spines 1000–1170 µm). The aperture occurs on the apex of a short neck region and is surrounded by a few, short spines. The female gonothecae (Fig. 1F–H) are comparatively larger (2985–3160 µm long), have a rhomboidal cross-section (940–1010 µm wide), forming four crests at each angle; each one is provided with a succession of moderately long, upturned spines (width of gonotheca including the spines ca 1300 µm). A central, piriform chamber is attached to the walls of the gonotheca through four perisarcal connections, whose position alternates with that of the crests. The aperture is situated apically, and is small and quadrangular.

Geographical distribution

Previously known from the Philippines (Billard 1920, 1925b) and Japan (Hirohito 1983, 1995). The present material originates from New Caledonia, Vanuatu, Fiji, and Tonga.

Diphasia orientalis Billard, 1920
Fig. 1K

Diphasia orientalis Billard, 1920: 146, fig. 1d.

Diphasia orientalis – Billard 1925b: 212, figs 52–53. **—** Gibbons & Ryland 1989: 407, fig. 26.

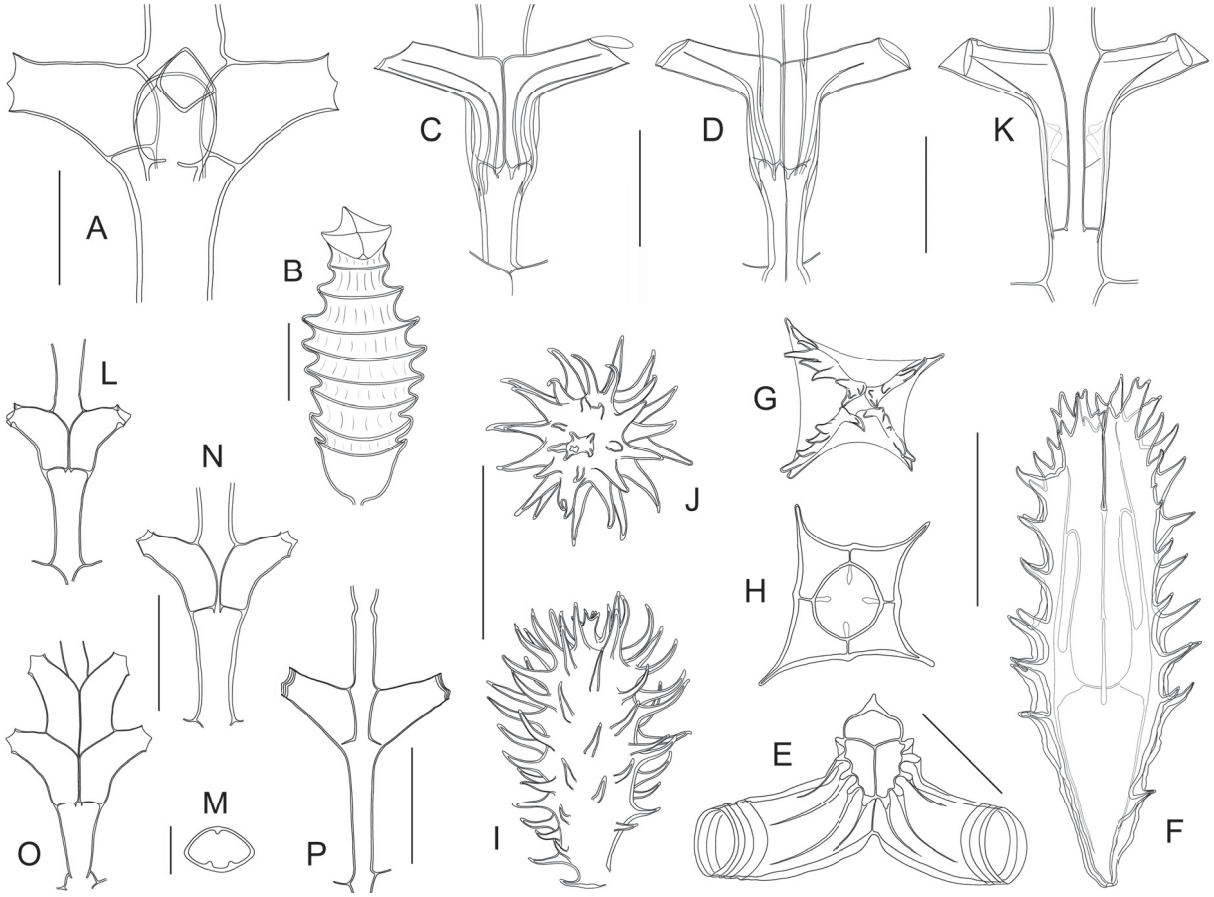


Fig. 1. — A–B. *Caminothujaria molukkana* von Campenhausen, 1896 (BORDAU 2, Stn. CP1582). **A**. Fragment of internode with verticil of hydrothecae. **B**. Gonotheca. **— C–J**. *Diphasia cristata* Billard, 1920 (BORDAU 1, Stn. CP1448). **C**. Pair of hydrothecae, frontal view. **D**. Same, dorsal view. **E**. Cross section through basal part of hydrothecal pair, showing perisarcal crests. **F**. Female gonotheca. **G**. Same, apical view. **H**. Same, cross section. **I**. Male gonotheca. **J**. Same, apical view. **— K**. *Diphasia orientalis* Billard, 1920 (MUSORSTOM 3, Stn. DR117), internode with pair of hydrothecae. **— L–O**. *Dynamena heterodonta* (Jarvis, 1922) (MUSORSTOM 9). **L**. Pair of hydrothecae in material from Stn. DW1204. **M**. Same sample, hydrothecal aperture, showing internal, submarginal cusps. **N–O**. Isolated (N) or stacked (O) pairs of hydrothecae in material from Stn. CP1265. **— P**. *Geminella ceramensis* Billard, 1925a (MUSORSTOM 8, Stn. CP1084), internode with pair of hydrothecae. Scale bars: A–D, K–L, N–P = 500 µm; E = 400 µm; F–J = 1 mm; M = 100 µm.

Material examined

MUSORSTOM 3: Stn. DR117, two infertile, unbranched stems, 9 and 12 mm high, detached from substrate (MNHN-IK-2012-16515); Stn. CP121, two infertile, unbranched stems, 13 and 22 mm high, detached from substrate (MNHN-IK-2012-16516).

Remarks

For a thorough description of this species, see Billard (1925b).

Geographical distribution

Indonesia (Billard 1925b), Fiji (Gibbons & Ryland 1989), Philippines (present report).

Genus ***Dynamena*** Lamouroux, 1812

Dynamena heterodonta (Jarvis, 1922)
Fig. 1L–O

Pasythea heterodonta Jarvis, 1922: 344, pl. 24, figs 11–12.

Dynamena heterodonta – Billard 1925b: 198, fig. 44. — Redier 1966: 86. — Vervoort & Vasseur 1977: 36, figs 16–17.
Sertularia gracilis – Billard 1905: 334 (not *Sertularia gracilis* Hassall, 1848: 2223).

non Dynamena quadridentata f. *heterodonta* – Vannucci 1951a: 83; 1951b: 108, 112, 114 [= *D. quadridentata* (Ellis & Solander, 1786)].

Material examined

MUSORSTOM 9: Stn. DW1204, small colony composed of four infertile stems, 6–12 cm high, detached from substrate (MNHN-IK-2012-16517); Stn. DW1265, sterile colony with stems up to 2.6 cm high, epizoic on *Synthecium* sp. (MNHN-IK-2012-16518).

Remarks

The sterile, unbranched stems, divided here and there by oblique nodes, each of which comprises a varied number of isolated hydrothecal pairs, occasionally forming apically stacked groups of two, the lack of evidence of an abcauline caecum in retracted hydranths, the two-cusped hydrothecae with a pleated adcauline flap and a semicircular abcauline flap, and the inconstant presence of internal, submarginal cusps in the hydrothecae suggest that they belong, with little doubt, to Jarvis' (1922) species.

Vervoort & Vasseur (1977) provided a reexamination of the type material, as well as a discussion regarding its differences with *D. quadridentata* (Ellis & Solander, 1786).

Geographical distribution

St. Brandon (Cargados Carajos) (Jarvis 1922), Indonesia (Billard 1925b), New Caledonia (Redier 1966), French Polynesia [Billard (1905), as *Sertularia gracilis* Hassall, 1848; Vervoort & Vasseur (1977); present study].

Genus ***Geminella*** Billard, 1925b

Geminella ceramensis **(**Billard, 1925a)
Fig. 1P

Sertularella ceramensis Billard, 1925a: 649.

Geminella ceramensis – Schuchert 2003: 174, fig. 31.

Material examined

MUSORSTOM 8: Stn. CP1084, small, sterile colony, less than 1 cm high, with tangled stems fixed on calcareous substrate (MNHN-IK-2012-16519); Stn. CP1131, two sterile stems 0.5 cm high, detached from substrate (MNHN-IK-2012-16520).

Remarks

For a redescription of this distinctive species, see Schuchert (2003), who also provided a synonymy.

Geographical distribution

Indonesia, Philippines, New Caledonia (Schuchert 2003), and Vanuatu (present study).

Genus ***Gonaxia*** Vervoort, 1993

Gonaxia amphorifera Vervoort, 1993
Figs 2A, 3A–B

Gonaxia amphorifera Vervoort, 1993: 117, figs 3f, 4, 5, 6a–b, 8a.

Material examined

SMIB 6: Stn. DW127, two colonies, one unbranched and 4.5 cm high, the other forked twice and 9 cm high, both bear male gonothecae (MNHN-IK-2012-16521).

Remarks

The difficulty of distinguishing *G. amphorifera* from *G. ampullacea* Vervoort, 1993 without their female gonothecae is notorious. Since the present material bears only male gonothecae, attention was focused on the hydrothecal features, in an attempt to separate them specifically. Although Vervoort (1993) emphasized several distinguishing characters, the distinction was still laborious and, eventually, two features proved useful. It was found that in the present species the free, distal part of the hydrocladial hydrothecae was constantly set at about 90° with the axis of the cladia, regardless the position of the thecae (Fig. 2A) while, in the following species, that angle varied considerably (Fig. 2B) between the proximal hydrothecae (where it was of 80–90°) and the distalmost ones (usually reaching 45°). The size of the hydrothecae was comparatively smaller in the present material (Fig. 3A) than in that assigned to *G. ampullacea* Vervoort, 1993 (Fig. 3C). I believe that the lack of a distinct inflation of the hydrothecae invoked by Vervoort is misleading.

Some hydrothecae exhibit incipient lateral diverticuli (Fig. 3A). Their structure is discussed under *G.* aff. *similis* Vervoort, 1993.

Geographical distribution

New Caledonia (Vervoort 1993; present study).

Gonaxia ampullacea Vervoort, 1993
Figs 2B, 3C–D

Gonaxia ampullacea Vervoort, 1993: 121, figs 6c, 7a–c, 9.

Material examined

BATHUS 4: DW914, a 3.5 cm high colony with unbranched stem, bearing male gonothecae (MNHN-IK-2012-16522).

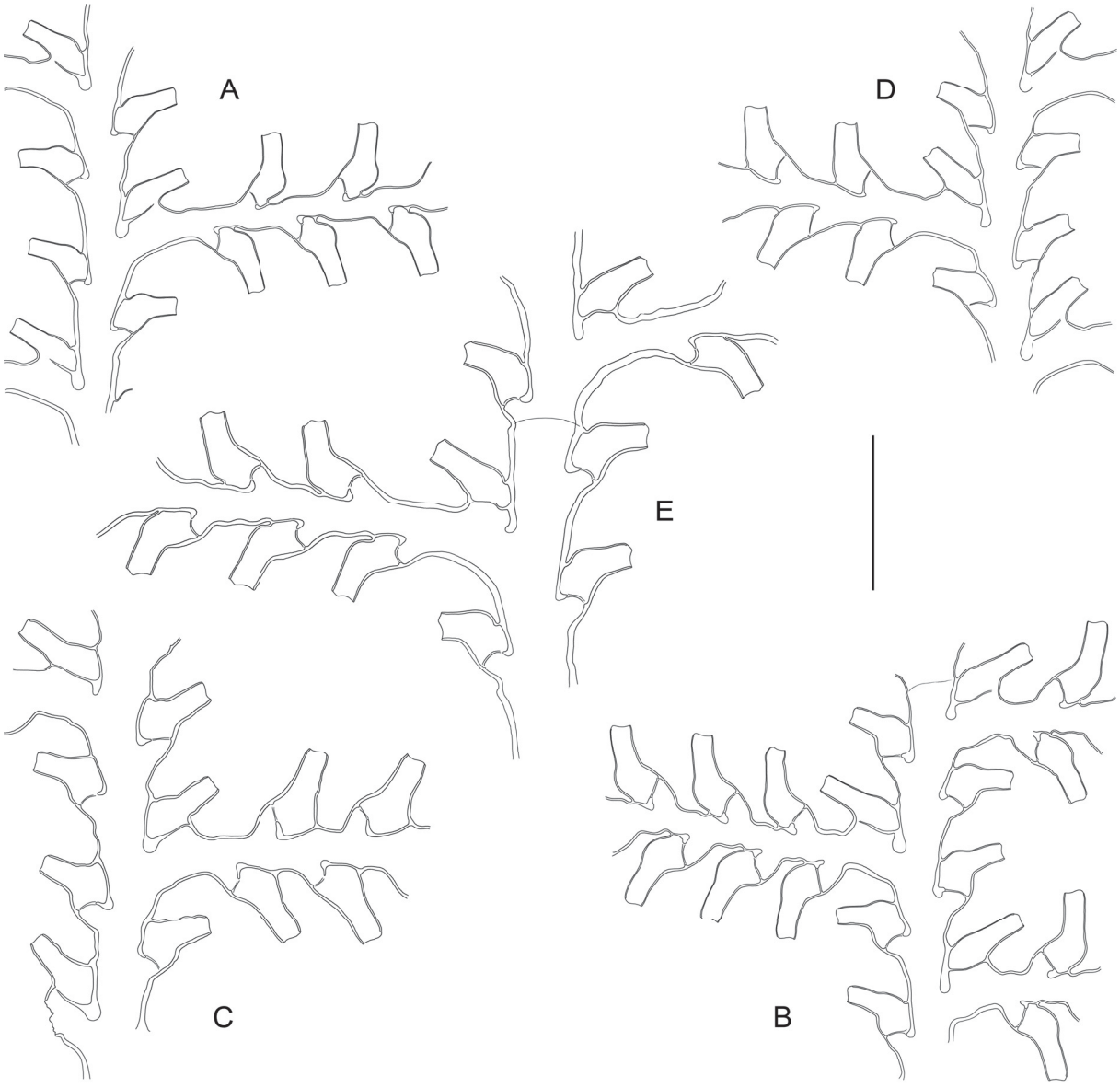


Fig. 2. — A. *Gonaxia amphorifera* Vervoort, 1993 (SMIB 6, Stn. DW127), portion of stem with cladium. **— B**. *Gonaxia ampullacea* Vervoort, 1993 (BATHUS 4, Stn. DW914), portion of stem with cladia. **— C**. *Gonaxia compacta* Vervoort, 1993 (BATHUS 4, Stn. DW923), portion of stem with cladium. **— D**. *Gonaxia intermedia* Vervoort, 1993 (BATHUS 4, Stn. CP906), portion of stem with cladium. **— E**. *Gonaxia sinuosa* Vervoort, 1993 (SMIB 4, Stn. DW40), portion of stem with cladia. Scale bar: A–E = 1 mm.

Remarks

As stated above, the larger size and the more acute angle formed by the free part of the hydrocladial hydrothecae with the axis of cladia were used to assign this material to *G. ampullacea*. As in *G. amphorifera*, some hydrothecae exhibit incipient lateral diverticuli (Fig. 3C).

Geographical distribution

New Caledonia (Vervoort 1993; present study).

Gonaxia compacta Vervoort, 1993
Figs 2C, 3E–F

Gonaxia compacta Vervoort, 1993: 135, figs 8c, 14a–b, 15a.

Material examined

BATHUS 4: Stn. DW923, a single, 6 cm high colony bearing an abortive gonotheca, as well as a row of incipient gonothecae, highly obscured by the accessory tubes of the stem (MNHN-IK-2012-16523).

Remarks

As already stated by Vervoort (1993), the hydrothecae of this species bear an obvious resemblance to those of *G. amphorifera*, *G. ampullacea*, and *G. sinuosa*, but it could be readily distinguished from them on the account of the absence of a pit formed by the free adaxial wall with the internode (Fig. 3E). Only an abortive gonotheca, arising from within the first hydrotheca of a cladium (Fig. 3F), was found. Several successive, elongate masses among the accessory tubes of the stem suggest the imminent formation of normal gonothecae.

Geographical distribution

New Caledonia (Vervoort 1993; present study).

Gonaxia intermedia Vervoort, 1993
Figs 2D, 3G–K

Gonaxia intermedia Vervoort, 1993: 157, figs 23e, 24d, 25a–c, 26a.

Material examined

BATHUS 4: Stn. DW902, several colonies and fragments, up to 9.5 cm high, mostly fertile, bearing male gonothecae (MNHN-IK-2012-16524); Stn. CP906, a total of twelve fertile colonies (10 male and 2 female), 4–6 cm high (MNHN-IK-2012-16525).

Remarks

In some colonies, the length of cladia reaches as much as 2.8 cm, and each may bear up to 116 hydrothecae. Aberrant secondary cladia, as those occurring in specimens from Stn. DW902, are given off from either within some cladial hydrothecae (Fig. 3J), or from short, auxiliary cladial tubes running parallel to the proximal parts of the axes of cladia.

Both male and female colonies are present in the material in hand. As stated by Vervoort (1993), the gonothecae of this species resemble those of *G. amphorifera* and *G. ampullacea* through their general shape and nearly fully adnate condition. They seem to originate from below the axillar hydrothecae. The distal part of a gonotheca overlaps the proximal part of the following one, though their bodies never fuse with each other. Their apertures (50–65 μm wide in males, and 250–290 μm wide in females)

are mounted on raised cones situated near the distal ends of their bodies. In the male colonies, the gonothecae are so obscured by the numerous auxiliary tubes running parallel to the stem, that only the tips of their neck regions protrude from the strongly fascicled mass which composes the stems. In one male specimen (from Stn. CP906) with otherwise normal gonothecae, an elongate, abortive gonotheca, with two distal apertures, is given off from the lumen of a cladial hydrotheca The occurrence of such

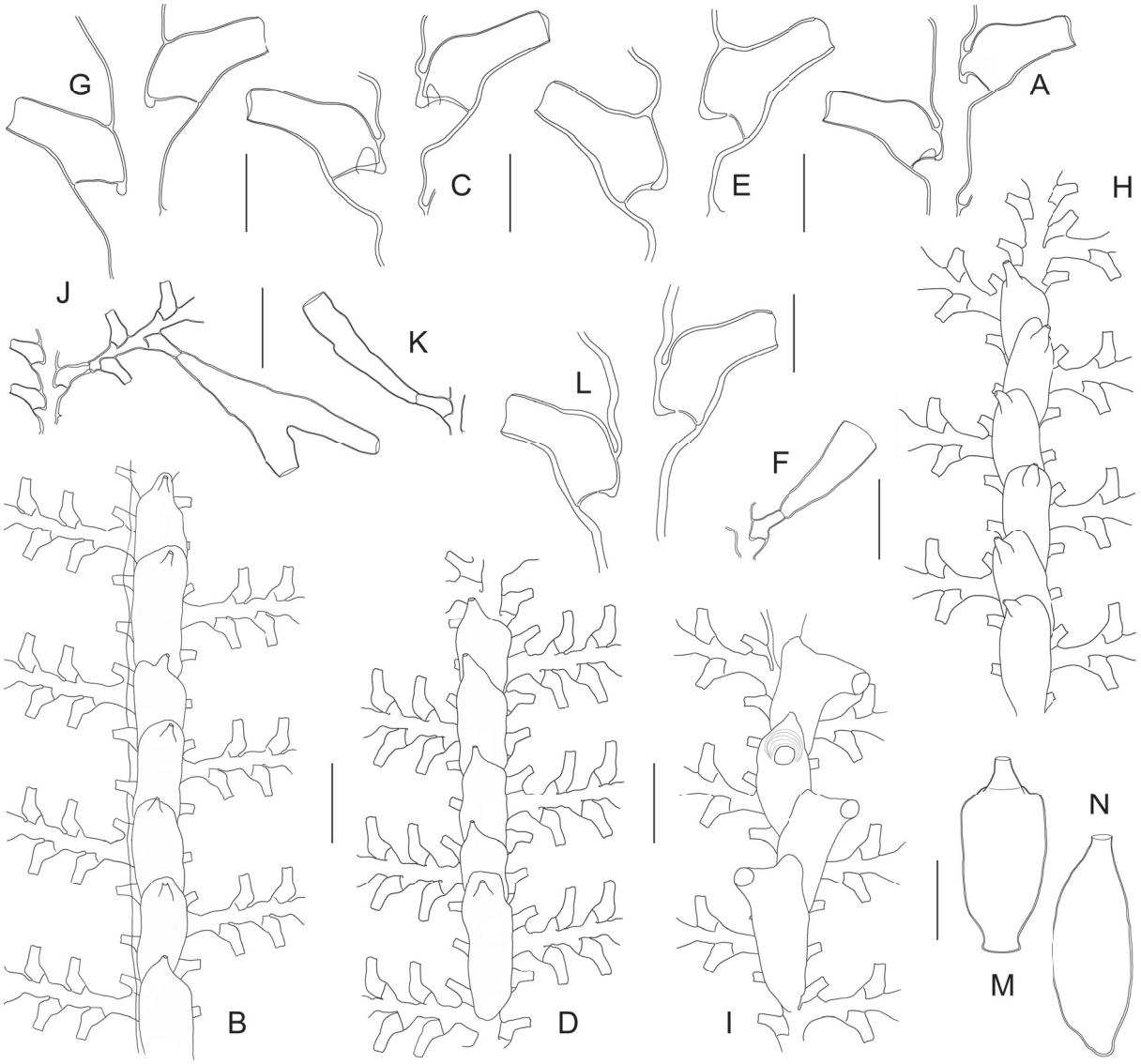


Fig. 3. — A–B. *Gonaxia amphorifera* Vervoort, 1993 (SMIB6, Stn. DW127). **A**. Two successive cladial internodes with their hydrothecae. **B**. Portion of stem with male gonothecae. **— C–D**. *Gonaxia ampullacea* Vervoort, 1993 (BATHUS 4, Stn. DW914). **C**. Two successive cladial internodes with their hydrothecae. **D**. Portion of stem with male gonothecae. **— E–F**. *Gonaxia compacta* Vervoort, 1993 (BATHUS 4, Stn. DW923). **E**. Two successive cladial internodes with their hydrothecae. **F**. Abortive gonotheca (of undetermined sex) originating from within a hydrotheca. **— G–K**. *Gonaxia intermedia* Vervoort, 1993 (BATHUS 4). **G**. Two successive cladial internodes with their hydrothecae (Stn. CP906). **H**. Portion of stem with male gonothecae (Stn. CP906). **I**. Portion of stem with female gonothecae (Stn. CP906). **J–K**. Abortive gonothecae arising from hydrothecal lumina (Stn. DW902). **— L–N**. *Gonaxia sinuosa* Vervoort, 1993 (SMIB 4, DW40). **L**. Two successive cladial internodes with their hydrothecae. **M–N**. Two female gonothecae. Scale bars: A, C, E, G, L = 300 µm; B, D, F, H–K, M–N = 1 mm.

gonothecae is considerable in the material from Stn. DW902, and specimens with one (Fig. 3K), two (Fig. 3J), or exceptionally three apertures could be seen. These so called abortive gonothecae may prove fully functional, as they are provided with apertures. However, their lumina are empty in the specimens in hand, and this assumption could not be checked at this stage.

Geographical distribution

New Caledonia (Vervoort 1993; present study).

Gonaxia sinuosa Vervoort, 1993
Figs 2E, 3L–N

Gonaxia sinuosa Vervoort, 1993: 179, figs 31c–e, 35b, 37a–b, 38a.

Material examined

SMIB 4: Stn. DW40, an originally 8 cm high colony with simple stem, now broken into two parts, bearing male gonothecae (MNHN-IK-2012-16526); Stn. DW48, an originally 5.5 cm high, sterile colony with simple stem, now broken into two unequal parts (MNHN-IK-2012-16527).

BATHUS 2: Stn. DW716, six colonies and fragments, 2.3–9.1 cm high, with simple or branched stems, two of which are sterile, two others bear male gonothecae, and the remaining two carry female gonothecae (MNHN-IK-2012-16528).

BATHUS 3: Stn. CP804, eleven colonies and fragments, 1.5–4.9 cm high, all with simple stems, of which four are sterile, three bear male gonothecae, and the remaining four bear female gonothecae (MNHN-IK-2012-16529); Stn. DW829, two colonies with simple stems, 3.8 and 2.4 cm high, the latter devoid of its basal part, and bearing three incipient gonothecae (MNHN-IK-2012-16530).

Remarks

The shape of the hydrothecae (Fig. 3L), as well as the condition and morphology of the gonothecae (Fig. 3M–N) are characteristic. One stem from BATHUS 2, Stn. DW716 is fully fertile (male) and bears its gonothecae in two parallel rows, each one originating from below the base of an axillar hydrotheca. The female stems examined here bear a lesser number of gonothecae.

Geographical distribution

New Caledonia (Vervoort 1993; present study), Norfolk Ridge (Vervoort 1993).

Gonaxia crassicaulis Vervoort, 1993
Fig. 4A

Gonaxia crassicaulis Vervoort, 1993: 145, figs 18c–d, 19a–b.

Material examined

MUSORSTOM 4: Stn. DW205, a cladium, 2.5 cm long (MNHN-IK-2012-16531).

NORFOLK 1: Stn. DW1712, an infertile colony, 3.8 cm high (MNHN-IK-2012-16532).

Remarks

According to Vervoort (1993), *G. crassicaulis* is easily recognizable through the characteristic development of the perisarc, forming thick, internal, longitudinal ridges, connecting the adnate adaxial walls of the hydrothecae in each row (Fig. 4A).

Fig. 4. — A. *Gonaxia crassicaulis* Vervoort, 1993 (MUSORSTOM 4, Stn. DW205), portion of cladium. **— B–D**. *Gonaxia elegans* Vervoort, 1993 (BATHUS 3, Stn. DW809). **B**. Portion of stem and basal part of a cladium. **C**. Two consecutive internodes with their hydrothecae. **D**. Portion of stem with male gonothecae. **— E–F**. *Gonaxia* cf. *errans* Vervoort, 1993 (BATHUS 2, Stn. CP737). **E**. Distalmost portion of stem with basal parts of four hydrocladia. **F**. Two consecutive cladial internodes with their hydrothecae. **— G–J**. *Gonaxia plumularioides* sp. nov. (BIOCAL, Stn. CP34). **G**. Distalmost part of a stem, showing the structure of internodes. **H**. Two consecutive cladial internodes with their hydrothecae. **I**. Stem hydrotheca. **J**. Axillar hydrotheca. Scale bars: A–B, D–E, G = 1 mm; C, F, H–J = 300 μm.

Also characteristic is the presence of large, internal, semi-circular "thickenings" of the perisarc (Fig. 4A), arching over the basal foramina, when the hydrothecae are seen laterally. These structures, one situated in the "frontal" aspect of the hydrothecae, the other on their "dorsal" side, correspond in fact to the attachment points of the hydrothecal bases to the lateral walls of the thecae which, in this species, are raised above the level of the foramina. When the hydrothecae are seen facing their apertures, the hydrothecal bases appear U-shaped, the foramina being situated at the bottom of this concavity.

Geographical distribution

New Caledonia (present study), Norfolk Ridge (Vervoort 1993).

Gonaxia elegans Vervoort, 1993
Fig. 4B–D

Gonaxia elegans Vervoort, 1993: 153, figs 19c, 21b–c, 22.

Material examined

BATHUS 3: Stn. DW809, a 4.4 cm high colony devoid of hydrorhiza and bearing female gonothecae, as well as an originally 5.4 cm high colony (now broken into two parts) bearing male gonothecae and several broken cladia originating from both colonies (MNHN-IK-2012-16533).

Remarks

This species is immediately recognizable through the characteristic position and shape of its hydrothecae. The 5.4 cm high colony is evidently male when compared to the smaller one, which bears gonothecae possessing much wider apertures. Only the female gonothecae were described by Vervoort (1993) but, upon a careful inspection of the present material, it should be stated that they do not arise from the accessory tubes on the hydrocaulus, but from the main tube itself, as this is indisputably seen in the monosiphonic part of the stem. In addition, in this colony at least, nearly all accessory tubes are found on the "dorsal" aspect of the stem, while the row of gonothecae is situated on its "front".

The male gonothecae, observed here for the first time, are similar in shape to the female ones, and also arise from the main tube of the stem, but in both the frontal and dorsal aspects of the colony. They are given off closely and in a single row (Fig. 4D), are about half adnate, and their free parts are shifted alternately left and right; their bases are obscured by the numerous accessory tubes running up the stem. They are long (1.5–2 mm), tubular (480–520 μm wide), with small, circular apertures (100–120 μm wide) mounted on the summit of a conical, distal neck region.

Geographical distribution

New Caledonia (Vervoort 1993; present study), Norfolk Ridge (Vervoort 1993).

Gonaxia cf. ***errans*** Vervoort, 1993
Fig. 4E–F

Gonaxia errans Vervoort, 1993: 154, figs 23a–d, 24a–c.

Material examined

BATHUS 2: Stn. CP737, two stem fragments, 13 and 9 mm high, the former corresponding to the middle part of a colony, while the latter is likely the distalmost end of (another?) colony; both are sterile; several broken cladia are also present (MNHN-IK-2012-16534).

Remarks

The pattern of cladial arrangement on the stem in this scarce material seems to follow a rather peculiar sequence: each equivalent of internode (the nodes are inconspicuous) has a proximal apophysis with its associated axillar hydrotheca, two alternate hydrothecae above, as well as a second, distal apophysis (on the side opposite to the former) with its associated axillar hydrotheca; the same sequence is repeated on the following "internode" but, there, it is the opposite image of the preceding one. In the distalmost part of one of the available colony fragments, two successive cladia occur on the same side, and are separated on the opposite side by a single stem hydrotheca. According to Vervoort (1993), the cladial arrangement is varied, with "zero to three hydrothecae between two successive apophyses", which is apparently the case in the present material.

The shape of the hydrothecae also fits the original description of *G. errans*, though they are comparatively shorter in the material in hand (free adaxial side 335–365 µm, adnate adaxial side 280–300 µm, abaxial side 490–510 µm), but seem to have almost the same width (maximum width 205–220 µm, diameter at aperture 165–175 µm) as in Vervoort's samples. Consequently, the present material is provisionally assigned to *G. errans*.

Geographical distribution

New Caledonia (present study), Norfolk Ridge (Vervoort 1993).

Gonaxia plumularioides sp. nov.
urn:lsid:zoobank.org:act:6A07FF84-EAA6-4AE6-8755-B450B17A28EB
Fig. 4G–J; Table 2

Diagnosis

Gonaxia with slender, fascicled, branched or unbranched stems; cladia monosiphonic. Equivalents of internodes composed of a proximal hydrocladial apophysis and its associated axillary hydrotheca, two alternate hydrothecae above, and a second, distal hydrocladial apophysis and its associated hydrotheca. Hydrothecae tubular, slightly curved up- and outwards, comparatively slender and more immersed on stem than on cladia. Gonothecae unknown.

Etymology

From the Latin *plūma*, meaning feather, and the Greek *εἶδος*, meaning likeness, with reference to their plumose appearance, recalling the branching pattern displayed by some hydroids belonging to the superfamily Plumularioidea.

Material examined

Holotype

BIOCAL: Stn. CP34, a 2.8 cm high, distal fragment of a branch or a stem, itself branched twice, sterile (MNHN-IK-2012-16535).

Paratype

BIOCAL: Stn. CP34, a 7.7 cm high, unbranched colony devoid of its hydrorhiza, as well as a 1 cm high fragment corresponding to the distalmost part of a colony; both are sterile (MNHN-IK-2012-16536).

Description

Colonies attaining at least 8 cm high, composed of either simple or ramified stems of slender appearance, despite being fascicled; accessory tubes on both "frontal" and "dorsal" sides of stems; the latter uniformly grading to monosiphonic distally. Side branches, when present, arising only in

Table 2. Measurements (in µm) of hydrothecae of *Gonaxia plumularioides* sp. nov. and *G. nova* sp. nov.

	G. plumularioides sp. nov.			***G. nova*** sp. nov.		
	Caulinar hydrotheca	**Axillar hydrotheca**	**Cladial hydrotheca**	**Caulinar hydrotheca**	**Axillar hydrotheca**	**Cladial hydrotheca**
Free adaxial side	85–125	75–140	180–210	555–575	565–630	580–615
Adnate adaxial side	355–380	360–440	315–350	220–245	175–220	175–205
Abaxial side	315–345	195–245	395–440	600–630	505–575	620–665
Maximum width	110–125	125–145	195–205	260–270	270–290	250–260
Diameter at rim	80–90	80–95	160–170	160–165	150–185	165–175

"frontal" aspect of the stem or higher order branches; up to 2nd order branching observed. Division into internodes indistinct, but equivalents of internodes composed of the regular sequence: a first, basal apophysis (60–90 µm long) and its associated axillar hydrotheca, two additional, alternate hydrothecae above, and a second axillar apophysis with its associated hydrotheca. Following internode with same sequence, but its proximal apophysis on side opposite to the distal apophysis of preceding internode. Cladia leaving axis at 75–80° from upper part of stem or branches; two successive cladia on same side of stem are distant of 2200–2310 µm; strictly monosiphonic, alternate, up to 1 cm long, comprising a succession of up to 23 alternate hydrothecae. Division into internodes indistinct; equivalent of first cladial internode comparatively longer (580–705 µm) than subsequent ones (480–515 µm); internodes short, accommodating a single hydrotheca distally. Hydrothecae widely spaced on stem (570–740 µm), less so on cladia (470–530 µm); tubular, slightly curving up- and outwards, free part angled at 50° to the axis of internode; stem hydrothecae slightly shifted on frontally; the two rows of cladial hydrothecae coplanar; less than half adnate on cladia, but considerably immersed into the stem internodes; free adaxial side nearly straight, adnate counterpart curved, ending basally in perisarc peg; abaxial side convex, with inflexion point in middle; aperture with three low cusps separated by shallow embayments; opercular apparatus lost. Gonothecae unknown.

Remarks

The branching pattern of the stems of *G. plumularioides* sp. nov. resembles that seen in some plumularioid hydroids that build three-dimensional colonies (e.g., *Macrorhynchia philippina* Kirchenpauer, 1872, *M. allmani* (Nutting, 1900), *Plumularia spiralis* Billard, 1911, etc.), and is consequently different from that observed in its congeners (e.g., *G. amphorifera*, *G. sinuosa*, *G. nova* sp. nov., see description below), which generally build planar colonies.

The regular structure of the stem internodes is also peculiar, and is only occasionally observed in the material assigned herein to *G. errans*, a species known for its inconstant structure of the stem (Vervoort 1993).

The shape of the hydrocladial hydrothecae resembles that of other congeners: 1) *G. complexa* Vervoort, 1993, but in this species the hydrothecae have an exceedingly long part free from internode; 2) *G. elegans*, but its hydrothecae have a conspicuously straight axis instead of being convex (compare Fig. 4C and 4H); 3) *G. errans*, whose hydrothecae have, however, a much longer free part (compare Fig. 4F with Fig. 4H); 4) *G. intercalata* Vervoort & Watson, 2003, but its hydrothecae are huge compared to those of the new species; 5) *G. stricta* Vervoort, 1993, but here the hydrothecae have a much longer free part, and the cladial internodes are marked by internal, oblique perisarcal thickenings (Vervoort 1993); 6) *G. tasmanica* Watson & Vervoort, 2001, but its hydrothecae are comparatively larger.

Geographical distribution

New Caledonia.

Gonaxia nova sp. nov.
urn:lsid:zoobank.org:act:6C6AA611-2E5C-40B9-9502-31888388A7E9
Figs 5A–B, 6A–E; Table 2

Diagnosis

Gonaxia with either branched or unbranched, rigid, fascicled stems arising from disc-shaped hydrorhiza. Internodes slightly geniculate, comprising a latero-distal cladial apophysis with its associated hydrotheca, and two alternate hydrothecae below. Cladia alternate, composed of moderately long, geniculate internodes. Hydrothecae arranged at a wide angle to the stem; long, tubular, slightly arcuate, tumid proximally, distally tubular, adnate for ¼ their length. Gonothecae originating on both sides of the stem from below axillar hydrothecae; adnate for about half their length; erect portion tubular, ending in rather long neck region bearing the aperture distally.

Etymology

From the Latin *novus*, *-a*, *-um* (and the Grek *νέος*), meaning new, indicating that we are dealing with a new, undescribed species.

Material examined

Holotype

MUSORSTOM 8: Stn. CP1083, a 4.2 cm high, unbranched colony bearing male gonothecae (MNHN-IK-2012-16537).

Paratypes

MUSORSTOM 8: Stn. CP1083, eight colonies or fragments with branched or unbranched stems, of which four bear female gonothecae and range between 2.6 and 5.0 cm in height, while the remaining four bear male gonothecae and range between 2.8 and 3.9 cm in height (MNHN-IK-2012-16538).

Description

Colonies composed of branched or unbranched, thick, rigid, fascicled stems arising from rhizoid hydrorhiza firmly attached to substrate. Nodes inconspicuous, even in the monosiphonic parts, but equivalents of internodes 1580–2000 µm long, slightly geniculate, composed of a latero-distal hydrocladial apophysis with its associated hydrotheca, and two additional, alternate hydrothecae below. Hydrocladia strictly monosiphonic, arranged at approximately right angles to the stem; up to 1.2 cm long, nodes indistinct (60–70 µm wide); equivalents of internodes moderately long, geniculate, each carrying a hydrotheca distally; first internode comparatively longer (1020–1240 µm) than subsequent ones (590–760 µm); up to 20 hydrothecae per cladium. Hydrothecae long, tubular, facing outwards at nearly right angles to their corresponding internodes; slightly tumid basally, walls parallel distally; adnate for about ¼th their length; free adaxial side slightly convex proximally, then straight; abaxial wall with noticeable convexity in middle; aperture triangular in frontal view; margin with three conspicuous cusps (two latero-adaxial and one abaxial) separated by rather deep embayments; operculum composed of three triangular flaps forming a low roof. Gonothecae on both sides of the stem, originating from below axillar hydrothecae; about half adnate, strongly appressed proximally to the stem; distal half erect, tubular, ending in moderately long, tronconical collar, bearing the aperture distally (small in male, Fig. 6E; comparatively larger in female, Fig. 6D); perisarc of abaxial wall of fused part finely and densely striated (Fig. 6E–F); individual gonothecae either solitary (towards apex of stem) or fused together through auxiliary tubes given off from one or both ends of their adnate parts; in highly polysiphonic parts of stem, adnate parts of gonothecae obscured by apposition of auxiliary tubes; length of adnate part 1250–1340 µm (♂) and 1720–1970 µm (♀), and of free part 1540–1910 µm (♂) and 1640–1720 µm (♀); width of free part

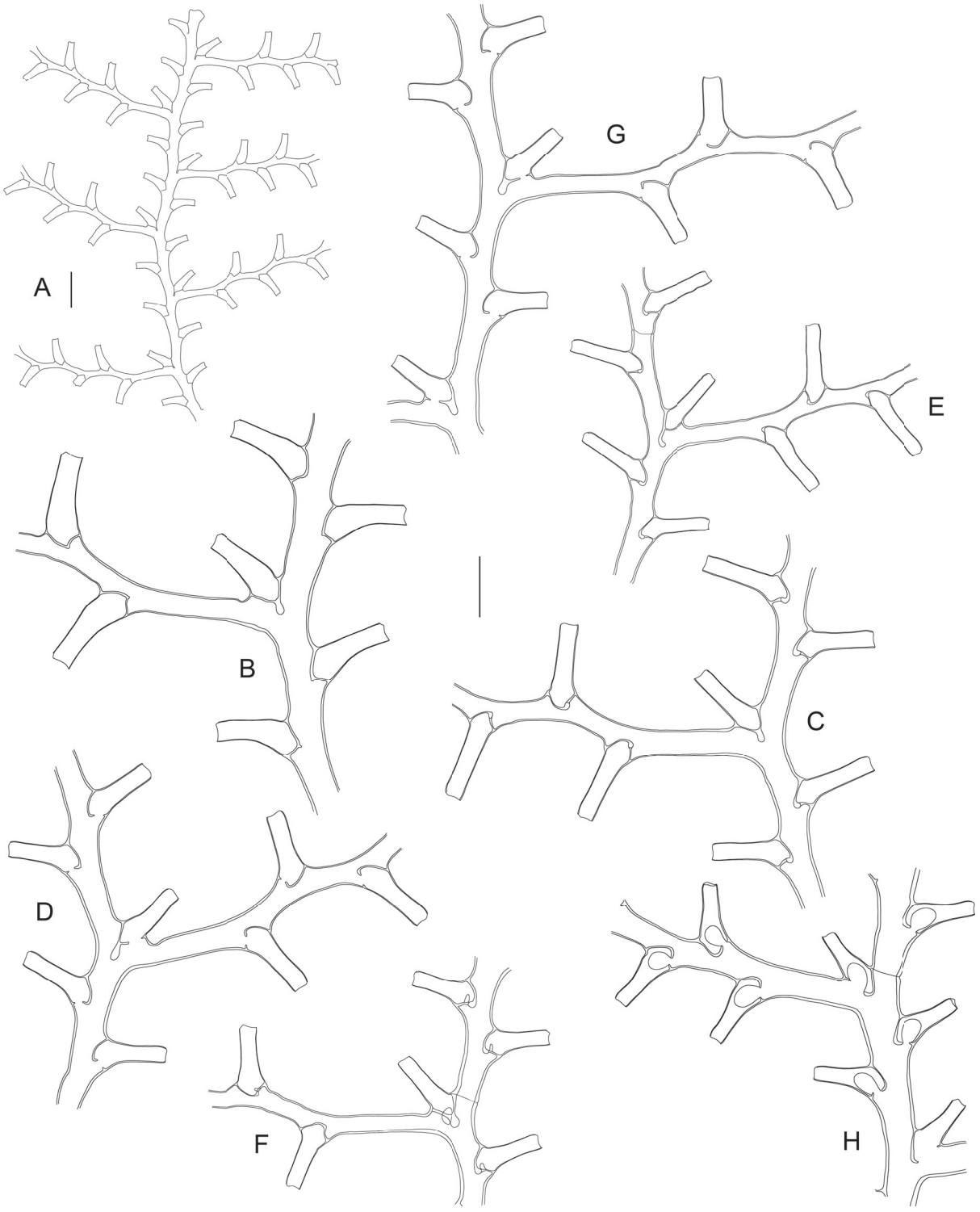
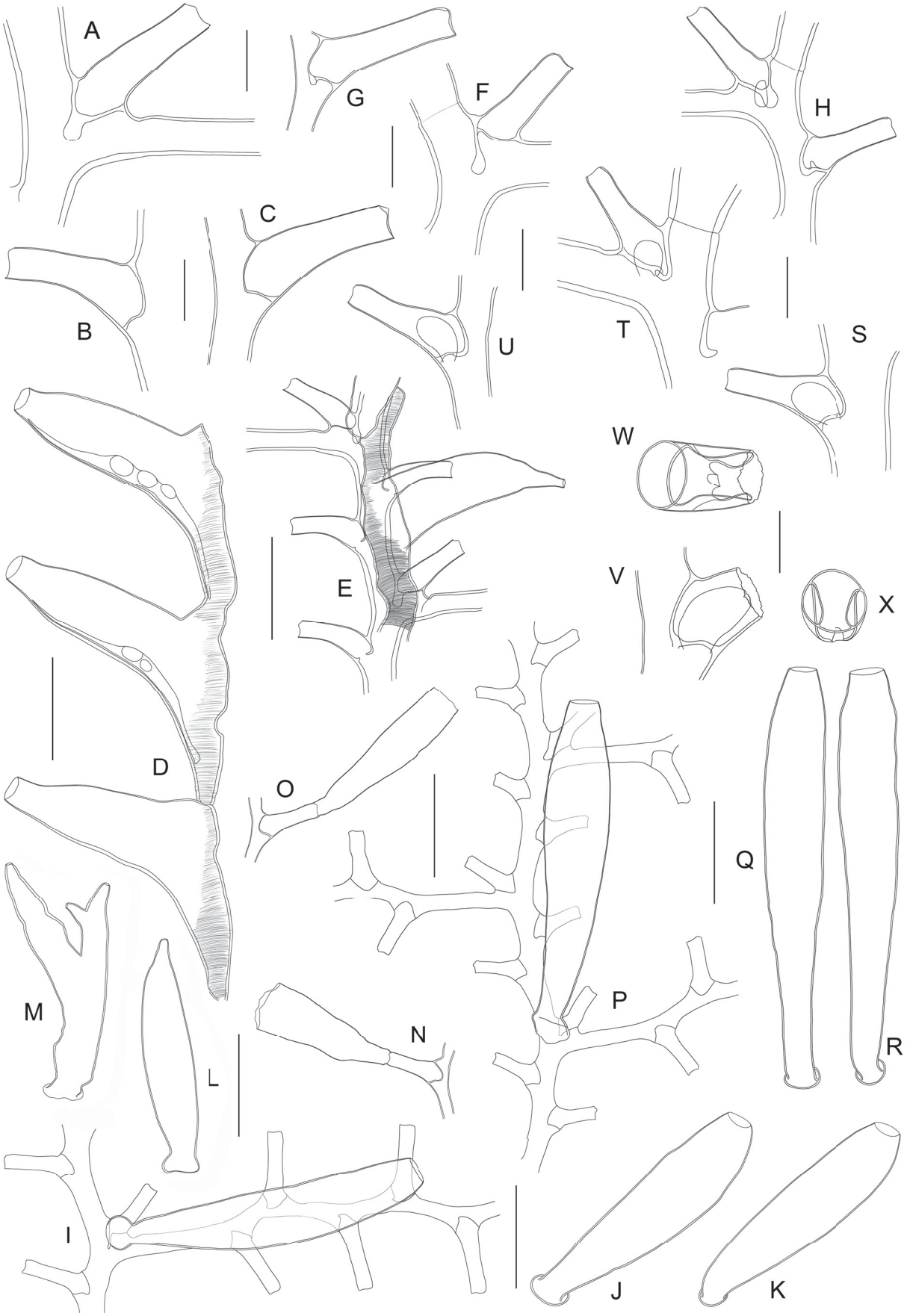


Fig. 5. — A–B. *Gonaxia nova* sp. nov. (MUSORSTOM 8, Stn. CP1083). **A**. Distalmost, monosiphonic part of a colony. **B**. Portion of stem with basal part of a cladium. **— C–G**. *Gonaxia scalariformis* Vervoort, 1993, portions of stems and basal parts of cladia from BIOCAL, Stn. DW46 (C = colony #1; D = colony #2; E = colony #3), Stn. DW66 (**F**), and NORFOLK 1, Stn. DW1699 (**G**), showing discrete differences in shape and size. **— H**. *Gonaxia* aff. *similis* Vervoort, 1993 (MUSORSTOM 6, Stn. DW423), portion of stem with cladium. Scale bars: A = 1 mm; B–H = 500 µm.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565–590 µm (♂) and 620–690 µm (♀); length of neck region 260–365 µm (♂) and 165–245 µ (♀); diameter at aperture 90–105 µm (♂) and 245–260 µm (♀).

Remarks

The hydrothecae of this species resemble those of several congeners: 1) *G. bulbifera* Vervoort, 1993, but this species has proportionally smaller hydro- and gonothecae (about two times smaller), its hydrothecal axes are straight instead of being curved, its caulinar apophyses are conspicuously inflated, and its cladial internodes are collinear instead of being slightly geniculate; 2) *G. elegans*, but in this species the hydrothecae are much more closely-set, and the cladial internodes are strictly collinear (compare Fig. 5B with Fig. 4B); 3) *G. perplexa* Vervoort, 1993, but in this species the hydrothecae are more approximated and have straight axes, and the gonothecae are nearly fully adnate, their bodies being likely fused to each other, and their apertures are characteristically shifted outward from the stem; 4–7) *G. complexa* Vervoort, 1993, *G. persimilis* Vervoort, 1993, *G. similis*, and *G. scalariformis*, but these species are immediately distinguished through their free gonothecae, originating perpendicularly to the stems; 8) *G. stricta* Vervoort, 1993, but in this species the hydrothecae have straight axes and they are more approximated on cladia.

Geographical distribution

Vanuatu.

Gonaxia scalariformis Vervoort, 1993
Figs 5C–G, 6F–R

Gonaxia scalariformis Vervoort, 1993: 173, figs 31b, 32, 33c–d, 35a.

Material examined

BIOCAL: Stn. DW46, three colonies (#1–3) slightly differing in the size of their hydrothecae: colony #1 is 3.5 cm high, devoid of its hydrorhiza, and bears two female gonothecae (MNHN-IK-2012-16539), colony #2 is 2.8 cm high, devoid of its hydrorhiza, and bears three female gonothecae (MNHN-IK-2012-16540), and colony #3 is 2.2 cm high and broken in two parts, the basal one exhibiting remnants of hydrorhiza; both parts bear five male gonothecae each (MNHN-IK-2012-16541); Stn. DW66, a 1.6 cm high colony devoid of both its hydrorhiza and apical part, with two abortive gonothecae (MNHN-IK-2012-16542); Stn. CP69, a 1.4 cm high colony devoid of its distalmost part, with a single female gonotheca (MNHN-IK-2012-16543).

NORFOLK 1: Stn. DW1699, a 1.7 cm high colony devoid of both its hydrorhiza and upper part, bearing two female gonothecae (MNHN-IK-2012-16544).

Fig. 6. (previous page) **— A–E**. *Gonaxia nova* sp. nov. (MUSORSTOM 8, Stn. CP1083). **A**. Axillar hydrotheca. **B**. Caulinar hydrotheca. **C**. Cladial hydrotheca. **D**. Female gonothecae, lateral view. **E**. Male gonotheca, slightly oblique view. **— F–R**. *Gonaxia scalariformis* Vervoort, 1993. **F**. Axillar hydrotheca (BIOCAL, Stn. DW46, colony #1). **G**. Cladial hydrotheca (BIOCAL, Stn. DW46, colony #1). **H**. Caulinar and axillar hydrothecae (BIOCAL, Stn. DW66). **I–M**. Normal gonothecae from BIOCAL, Stn. DW46 (I = colony #1; J–K = colony #2; L–M = colony #3). **N–O**. Abortive gonotheca from BIOCAL, Stn. DW66. **P–R**. Normal gonothecae from BIOCAL, Stn. CP69 (**P**) and NORFOLK 1, Stn. DW1699 (**Q–R**). **— S–X**. *Gonaxia* aff. *similis* Vervoort, 1993 (MUSORSTOM 6, Stn. DW423). **S**. Cauline hydrotheca. **T**. Axillar hydrotheca. **U**. Cladial hydrotheca. **V**. Lateral view of a hydrotheca, showing diverticulum. **W**. Same hydrotheca viewed from above, showing minute foramen for the passage of coenosarc, and lateral diverticuli. **X**. Same hydrotheca in apical view, showing lateral diverticuli and basal foramen. Scale bars: A–C, F–H, S–U = 300 µm; D–E, I–R = 1 mm; V–X = 200 µm.

Remarks

All available specimens have lightly fascicled stems basally, and none is ramified. Although the arrangement and general shape of the hydrothecae perfectly match the description of the holotype, noticeable variations in size could be observed. Thus, the colony #3 from sample BIOCAL, Stn. DW46 has the slenderest hydrothecae, while those from NORFOLK 1, Stn. DW1699 are the widest ones. In the sample from BIOCAL, Stn. DW66, incipient antero-dorsal diverticuli are seen in most hydrothecae (Fig. 5F). Gonothecae of both sexes are present in the available material. Although they conform to the original description, the male gonothecae in the colony #3 from BIOCAL, Stn. DW46 are arranged on both anterior and posterior sides of the stem, and some exhibit bifid (Fig. 6M) or trifid apices. The female gonothecae from BIOCAL, Stn. DW66 are likely abortive, as they originate from within the hydrothecae (Fig. 6N–O); in addition, they are not fully formed, as their distal ends are missing; their sex is indeterminate. The female gonothecae from NORFOLK 1, Stn. DW1699 (Fig. 6Q–R) are the longest with respect to those present in the other samples.

Geographical distribution

New Caledonia and Norfolk Ridge (Vervoort 1993; present study).

Gonaxia* aff. *similis Vervoort, 1993
Figs 5H, 6S–X

Gonaxia similis Vervoort, 1993: 174, figs 33e–f, 34, 36a, 39a.

Material examined

MUSORSTOM 6: Stn. DW423, a 2.7 cm high, sterile colony (MNHN-IK-2012-16545).

Remarks

The present specimen is likely part of the material in RMNH-Coel. 25839 (also from MUSORSTOM 6, Stn. DW423) studied by Vervoort (1993).

According to Vervoort, his material had gonothecae adnate to the stem (p. 174, fig. 34c), not arranged perpendicularly to it, as in the majority of samples assigned by him to *G. similis*. Consequently, the material in hand may belong to a separate species.

One hydrocladium in the present specimen is branched, and the secondary cladium is borne on a short, quadrangular apophysis originating from below the hydrothecal base of the first internode of a cladium.

Not mentioned by Vervoort in his sample RMNH-Coel. 25839 is the constant presence of well-developed antero-posterior diverticuli within the hydrothecae (Figs 5H, 6S–V). Such variably developed diverticuli also occur in other congeners discussed herein, *viz. G. amphorifera* (Fig. 3A), *G. ampullacea* (Fig. 3C), and *G. scalariformis* (Fig. 5F). In the present material, their development is considerable, and extends well on each lateral side of the hydrotheca. A frontal view of the free adaxial wall of the hydrotheca (Fig. 6W), and a frontal view of the aperture (Fig. 6X) show two empty lateral "pockets" which narrow considerably the hydrothecal lumen; the foramen for the passage of the hydranth within the hydrotheca is minute and horseshoe-shaped.

Geographical distribution

New Caledonia (Vervoort 1993; present study).

Genus ***Idiellana*** Cotton & Godfrey, 1942

Idiellana pristis (Lamouroux, 1816)
Fig. 7A

Idia pristis Lamouroux, 1816: 199, pl. 5, fig. 5.

Idiellana pristis – Schuchert 2003: 175, fig. 32.

Material examined

MUSORSTOM 3: Stn. CP121, sterile colony composed of two stems, 1.7 and 3.7 cm high (MNHN-IK-2012-16546); Stn. CP134, sterile colony composed of two stems, 1.5 and 2.7 cm high (MNHN-IK-2012-16547).

MUSORSTOM 8: Stn. DW1021, two sterile stems, 3.5 and 5 cm high (MNHN-IK-2012-16548); Stn. CP1131, several sterile stems, 1.5–8.5 cm high (MNHN-IK-2012-16549).

TAIWAN 1: Stn. DW1, four sterile stems, 0.7–1.4 cm high, on gravel (MNHN-IK-2012-16550).

Remarks

For the latest redescription and a list of synonyms, refer to Schuchert (2003).

Geographical distribution

Circumglobal in tropical and subtropical seas (Precker & Lawn 2010).

Genus ***Salacia*** Lamouroux, 1816

Salacia macer Vervoort & Watson, 2003
Fig. 7B–G

Salacia macer Vervoort & Watson, 2003: 154, figs 34g, 35a.

Material examined

BATHUS 3: Stn. DW809, single sterile stem, 2.4 cm high, partly damaged (several cladia missing) (MNHN-IK-2012-16551).

NORFOLK 1: Stn. DW1659, four stems 3–4.5 cm high, two of which bear female gonothecae (MNHN-IK-2012-16552).

Remarks

The slender habit of these colonies, their regularly-pinnate branching pattern and their division into internodes, each of which bears a single pair of strictly opposite hydrothecae, are diagnostic (Vervoort & Watson 2003). The gonothecae, not previously described, are present in this material, and are female. They are borne on either the stem or cladia, and are arranged perpendicularly from below one hydrotheca of a pair. Urn-shaped, smooth-walled, 3280–3565 µm long and 1110–1170 µm wide, tapering basally into a short pedicel; distally truncate, aperture circular, 590–615 µm wide, borne on a short, 565–575 µm wide neck region. Possibly up to 100 oocytes per gonotheca, though their number is difficult to ascertain.

Geographical distribution

Norfolk Ridge (Vervoort & Watson 2003; present study).

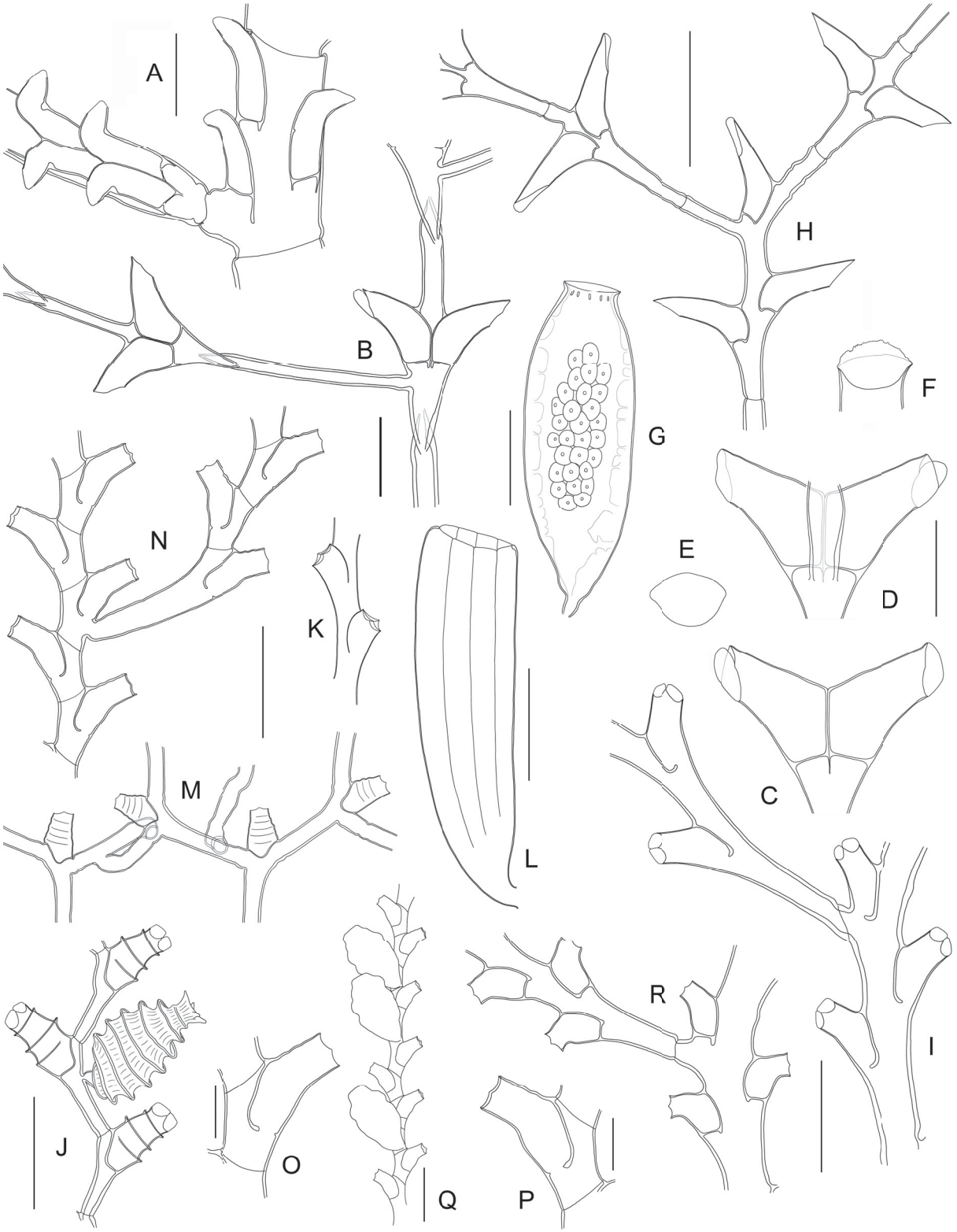


Fig. 7. (continued on next page) **— A**. *Idiellana pristis* (Lamouroux, 1816) (TAIWAN 1, Stn. DW1), stem internode and basal part of cladium. **— B–G**. *Salacia macer* Vervoort & Watson, 2003 (NORFOLK 1, Stn. DW1659). **B**. Stem internode and basal part of cladium. **C**. Hydrothecae, frontal view. **D**. Same, dorsal view. **E**. Hydrothecal aperture, frontal view. **F**. Hydrothecal aperture, oblique view, showing

Salacia sibogae Billard, 1924
Fig. 7H

Salacia sibogae Billard, 1924: 64, fig. 1b–c.

Salacia sibogae – Schuchert 2003: 177, fig. 34.

Material examined

MUSORSTOM 3: Stn. DR126, four small (0.4–1.1 cm high), sterile stems on axis of dead gorgonian (MNHN-IK-2012-16553).

Remarks

A recent redescription of this species and a list of synonyms are available in Schuchert (2003).

Geographical distribution

Previosuly known from Indonesia and Japan (Schuchert 2003). The present material originates from the Philippines.

Genus ***Sertularella*** Gray, 1848

Sertularella acutidentata Billard, 1919
Fig. 7I

Sertularella acutidentata Billard, 1919: 20, figs 1e, 2.

Sertularella acutidentata acutidentata – Vervoort & Watson 2003: 154, fig. 35b–e.

Material examined

TAIWAN 2: Stn. DW118, two infertile colonies, 7 and 8 cm high (MNHN-IK-2012-16554).

Remarks

For a redescription of this species, refer to Hirohito (1995). Its synonymy is given by Vervoort & Watson (2003).

Geographical distribution

Indonesia, Japan, Philippines, New Caledonia, and north of New Zealand (Vervoort & Watson 2003).

operculum. **G**. Female gonotheca. **— H**. *Salacia sibogae* Billard, 1924 (MUSORSTOM 3, Stn. DR126), portion of stem and basal part of cladium. **— I**. *Sertularella acutidentata* Billard, 1919 (TAIWAN 2, Stn. DW118), portion of stem with basal part of side branch. **— J**. *Sertularella areyi* Nutting, 1904 (BATHUS 3, Stn. CP813), portion of fertile stem. **— K–L**. *Sertularella diaphana* (Allman, 1885) (MUSORSTOM 8, Stn. CP1104). **K**. Two hydrothecae. **L**. Gonotheca. **— M**. *Sertularella mirabilis* Jäderholm, 1896 (TAIWAN 2, Stn. DW118), portion of colony. **— N–Q**. *Sertularella novaecaledoniae* Vervoort, 1993 (MUSORSTOM 4, Stn. DW221). **N**. Portion of stem and proximal part of a branch. **O–P**. Hydrothecae. **Q**. Portion of stem with gonothecae. **— R**. *Sertularella quadridens* (Bale, 1884) (MUSORSTOM 3, Stn. CP121), portion of stem and proximal part of a side branch. Scale bars: A–B = 500 µm; C–F = 400 µm; G–N, Q–R = 1 mm; O–P = 300 µm.

Sertularella areyi Nutting, 1904
Fig. 7J

Sertularella areyi Nutting, 1904: 83, pl. 17, fig. 6.

Sertularella areyi – Vervoort & Watson 2003: 156, fig. 35f–l.

Material examined

MUSORSTOM 4: Stn. CC174, several stems, up to 1.4 cm high, all but one sterile (MNHN-IK-2012-16555).

BATHUS 3: Stn. CP813, fertile colonies with stems up to 1.4 cm high on two fragments of gorgonian (MNHN-IK-2012-16556); Stn. CP814, two infertile colonies with stems up to 1.5 cm high, one on dead gorgonian, the other on sponge (MNHN-IK-2012-16557).

LITHIST: Stn. DW13, small colony composed of a few sterile stems, up to 1.2 cm high, growing on *Acryptolaria* sp. (MNHN-IK-2012-16558).

BORDAU 2: Stn. DW1513, small colony composed of several sterile, up to 5 mm high, stems growing on *G. ceramensis* (MNHN-IK-2012-16559).

NORFOLK 1: Stn. DW1704, small colony composed of a restricted number of stems, some fertile and up to 1 cm high, epizoic on *Zygophylax* sp., *Sertularella helenae* Vervoort, 1993, and tube of coronate medusa (MNHN-IK-2012-16560).

Remarks

This very distinctive species needs no additional comments on morphology. Its synonymy, as well as a redescription, are provided by Vervoort & Watson (2003).

Geographical distribution

Tropical and subtropical parts of the Atlantic and Indo-Pacific (Vervoort & Watson 2003).

Sertularella diaphana (Allman, 1885)
Fig. 7K–L

Thuiaria diaphana Allman, 1885: 145, pl. 18, figs 1–3.

Sertularella diaphana – Vervoort & Watson 2003: 159, fig. 36g–h.

Material examined

MUSORSTOM 8: Stn. CP1104, colony composed of several fertile (male gonothecae) stems, up to 6 cm high, epizoic on stem of aglaopheniid hydroid (MNHN-IK-2012-16561).

Remarks

For lists of synonyms and descriptions, see Calder (1991), Vervoort (1933) and Galea (2010).

Geographical distribution

Circumglobal in tropical and subtropical seas (Vervoort & Watson 2003).

Sertularella mirabilis Jäderholm, 1896
Fig. 7M

Sertularella mirabilis Jäderholm, 1896: 9, pl. 2, fig. 1.

Sertularella mirabilis – Schuchert 2015: 339, fig. 13.

Material examined

TAIWAN 2: Stn. DW118, a 3.2 cm high, sterile colony (MNHN-IK-2012-16562).

Remarks

Hirohito (1995) provided a thorough description of this peculiar species. Its synonymy is given by Schuchert (2015).

Geographical distribution

From the South China Sea to Korea and Japan (Schuchert 2015).

Sertularella novaecaledoniae Vervoort, 1993
Fig. 7N–Q

Sertularella novaecaledoniae Vervoort, 1993: 225, figs 50, 51aA, 52a.

Material examined

MUSORSTOM 4: Stn. DW221, a 4 cm high, fertile colony (MNHN-IK-2012-16563).

Remarks

The present material, represented by a colony with flabellate appearance, with fascicled stem and side branches divided into very short internodes, each carrying a tubular hydrotheca adnate for about half its length, conforms to the description of the type given by Vervoort (1993). The gonothecae have undulated walls, and their apical part is flattened (Fig. 7Q).

Geographical distribution

New Caledonia (present study), Norfolk Ridge (Vervoort 1993).

Sertularella quadridens (Bale, 1884)
Fig. 7R

Thuiaria quadridens Bale, 1884: 119, pl. 7, figs 5–6.

Sertularella quadridens – Schuchert 2003: 185, fig. 41.

Material examined

MUSORSTOM 3: Stn. DR117, a 18 mm high, sterile colony (MNHN-IK-2012-16564); Stn. CP121, a complete colony, 3 cm high, as well as four fragments, 1.4–3.2 cm high, all sterile (MNHN-IK-2012-16565).

Remarks

For a list of synonyms and a recent redescription, see Schuchert (2003).

Geographical distribution

Widely distributed throughout the tropical Indo-Pacific (Precker & Lawn 2010).

Sertularella folliformis sp. nov.
urn:lsid:zoobank.org:act:7A654AE7-6B4E-465C-9F5A-1D48528466E5
Fig. 8A–G; Table 3

Diagnosis

Sertularella species with flabellate colonies; branching irregular; stem and branches strongly polysiphonic basally, grading to monosiphonic distally; internodes short, slightly geniculate to collinear; hydrothecae exceedingly long, tubular, curved downwards, with 8–10 broad, complete annuli and four internal, submarginal cusps. Gonothecae large, elongated-ovoid, distally truncate.

Etymology

From the Latin words *follis*, meaning bellows, and *fōrma*, meaning shape, with reference to the plicate condition of the hydrothecal wall, recalling the bellows of an accordion.

Material examined

Holotype

BATHUS 3: Stn. DW809, a 4.5 × 4.5 cm sterile colony and four smaller fragments, three of which bear one gonotheca, and the fourth two gonothecae (MNHN-IK-2012-16566).

Paratype

BATHUS 3: Stn. DW809, a few colonies and fragments, largest one 7.5 × 3.5 cm, all sterile (MNHN-IK-2012-16567).

Description

Colonies flabellate, attaining 7.5 cm high, arising from rhizoid stolons firmly attached to substrate. Branching irregular, with up to 3rd order branches arranged roughly in one plane. Stems and side branches polysiphonic, main stem reaching as much as 2 mm wide basally. Both stem and branches divided into internodes by slightly-marked nodes slanting in alternate directions. Internodes short, slightly geniculate to collinear, each carrying a hydrotheca in its distal half. Side branches originate laterally below the bases of stem hydrothecae; first internode comparatively longer than subsequent ones. Hydrothecae exceedingly long, tubular, slightly curved downward, adnate for ¼th or less their length, tapering imperceptibly towards aperture, walls provided with 8–10 broad, complete annuli; margin occasionally renovated; rim provided with four short cusps separated by shallow embayments; four submarginal, intrathecal projections of perisarc, two latero-adaxial and two latero-abaxial. Gonotheca originating from axil of hydrotheca, in front and/or backside of colony; elongated-ovoid, tapering abruptly below, distally truncate, wall smooth to slightly undulate.

Remarks

The hydrothecal shape is diagnostic in this species. There are few congeners which approach this condition, viz. *S. catena* (Allman, 1888) and *S. pseudocatena* sp. nov. (Fig. 9J), but both have much shorter hydrothecae, and their transverse ribs do not extend over the abaxial wall. Three other species, namely *S. helenae* Vervoort, 1993 (Fig. 8H), *S. paucicostata* Vervoort, 1993 (Fig. 8I), and *S. pseudocostata* Vervoort, 1993, exhibit comparatively more prominent hydrothecal ridges. The eastern Pacific *S. exilis* Fraser, 1938 has isodiametric hydrothecae "regularly curved upward and then outward" (Fraser 1938), but their surface is reportedly smooth. In addition, it is "an especially diminutive species"

Table 3. Measurements (in µm) of *Sertularella folliformis* sp. nov. and *S. plicata* sp. nov.

	S. folliformis sp. nov.	***S. plicata*** sp. nov.
Internodes		
- length (in general)	680–865	660–890
- length (1st cladial internode)	1360–2405	1365–1450
- diameter at node	325–400	125–145
Hydrotheca		
- free adaxial side	1025–1235	365–440
- adnate adaxial side	375–415	190–225
- abcauline side	1170–1295	450–495
- maximum width	320–345	255–275
- diameter at rim	290–305	170–180
Gonotheca		
- length	2245–2345	–
- maximum width	780–850	–
- apical width	445–455	–

(Calder *et al*. 2009). *Sertularella whitei* Rees & Vervoort, 1987 also has exceedingly long, outwardly-curved hydrothecae, but their surface is entirely smooth (Rees & Vervoort 1987).

Geographical distribution

New Caledonia.

Sertularella helenae Vervoort, 1993
Fig. 8H

Sertularella helenae Vervoort, 1993: 218, fig. 47b–e.

Material examined

BIOCAL: Stn. DW37, several sterile stems, up to 2.6 cm high, and smaller fragments (MNHN-IK-2012-16568); Stn. DW38, single, sterile colony 3 cm high and 4.7 cm wide (MNHN-IK-2012-16569).

BATHUS 3: Stn. CP804, a 2.5 cm high and 3.8 cm wide, sterile colony (MNHN-IK-2012-16570); Stn. CP821, a 3.4 cm high, sterile colony (MNHN-IK-2012-16571); Stn. DW830, four sterile colony fragments, 0.7–1.5 cm high (MNHN-IK-2012-16572).

NORFOLK 1: Stn. CP1719, a 4.2 cm high, sterile colony (MNHN-IK-2012-16573).

SALOMON 1: Stn. DW1741, two sterile colonies, 2.2 and 2.6 cm high (MNHN-IK-2012-16574).

Remarks

This very distinctive species needs no additional comments on morphology. For a thorough description, see Vervoort (1993). The gonothecae still remain to be discovered.

Geographical distribution

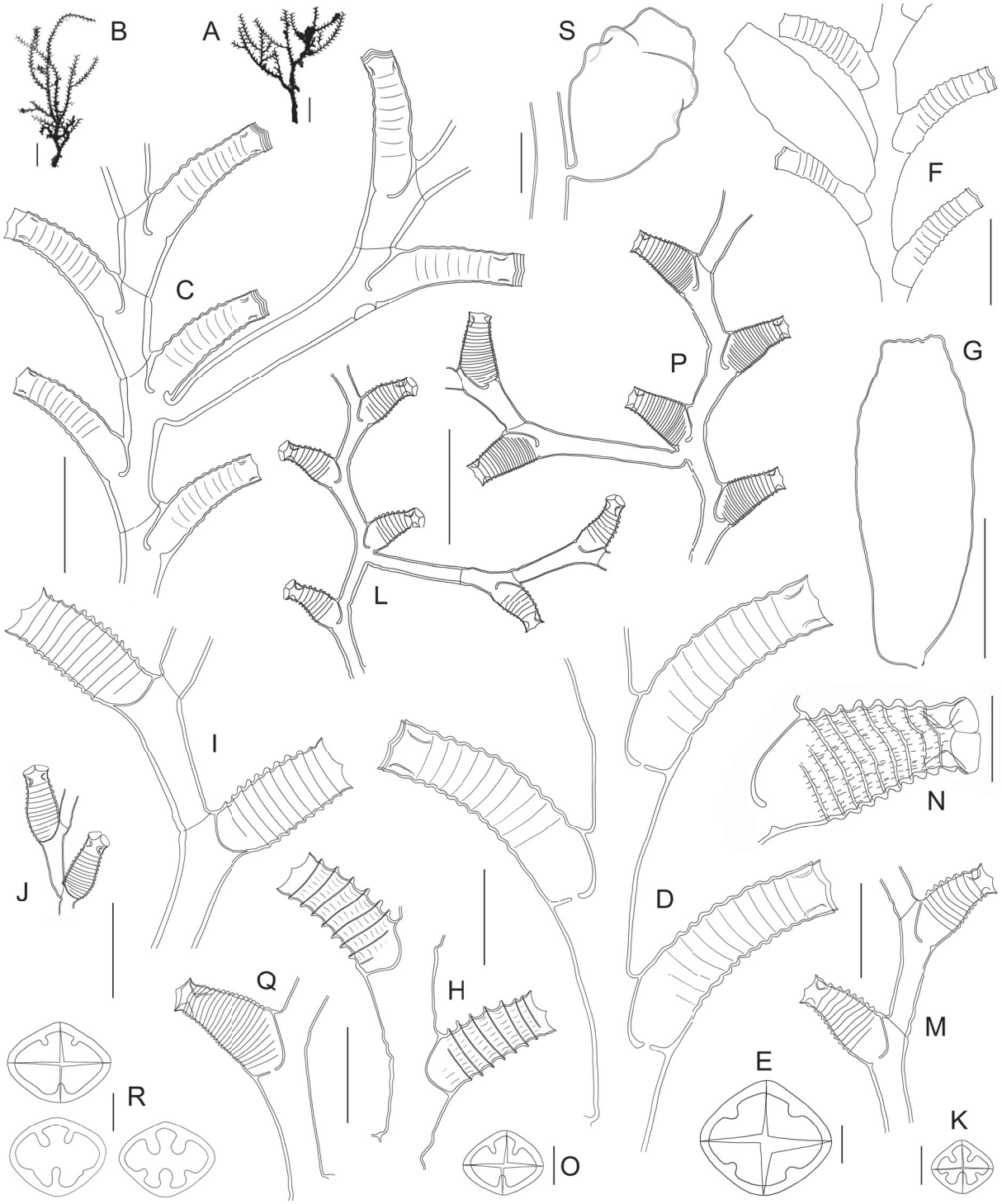
New Caledonia (Vervoort 1993; present study), Norfolk Ridge and Solomon Islands (present study).

Sertularella paucicostata Vervoort, 1993
Fig. 8I

Sertularella paucicostata Vervoort, 1993: 227, figs 51b–f, j.

Material examined

MUSORSTOM 3: Stn. DW809, several infertile stems, some branched, up to 1.3 cm high, epizoic on *Sertularella folliformis* sp. nov. (MNHN-IK-2012-16575).



Remarks

Surprisingly, Vervoort (1993) compared his new species with *Sertularella costata* Leloup, 1940, which is a much smaller and delicate hydroid (compare Fig. 8I and 8J), as illustrated by specimens of this species from the Andaman Sea, Thailand belonging to my private collection.

Sertularella costata is a rather poorly known species, with a few records around the world. Hirohito (1995) provided succinct measurements of the hydrothecae, while Calder *et al*. (2003) gave the first description and measurements of the gonotheca. The dimensions of the hydrothecae in the Thailand material are as follows: abcauline side 315–360 µm, free adcauline side 265–280 µm, adnate adcauline side 100–110 µm, maximum width 155–170 µm, diameter at aperture 130–140 µm. The external wall is provided with 10–13 transverse ridges, and three internal, submarginal cusps are present within the hydrothecae (Fig. 8K). Through the size of its hydrothecae, the material from Thailand comes close to the Japanese specimens examined by Hirohito and, through the number of external ridges, it approaches that of the Galapagos specimens, which is apparently 10–11 (Calder *et al*. 2003: fig. 14). In contrast, about 20 ridges ornament the hydrothecal walls in material from Japan (Leloup 1940; Hirohito 1995).

In my opinion, *S. paucicostata* most closely resembles both *S. helenae* and *S. pseudocostata* Vervoort, 1993. However, unlike *S. paucicostata*, *S. helenae* forms fascicled colonies with shorter internodes, and its hydrothecae are smaller (compare Fig. 8I and 8H) and provided with numerous perpendicular creases between the transverse ridges. According to Vervoort (1993), the hydrothecae of *S. pseudocostata* are comparatively larger and their outer wall has frilled ribs.

Geographical distribution

New Caledonia, Norfolk Ridge (Vervoort 1993), and the Philippines (present study).

Sertularella plicata sp. nov.
urn:lsid:zoobank.org:act:5CBEB7F6-12F7-403C-AC8D-58AE01B11AC7
Fig. 8L–O; Table 3

Diagnosis

Small *Sertularella* with monosiphonic stems; side branches given off irregularly in one plane. Internodes moderately long and geniculate. Hydrothecae piriform, with 8–10 conspicuous, transverse ribs; aperture on short, narrow neck facing outwards; 3 or 5 internal, submarginal, lamellar cusps. Gonothecae unknown.

Fig. 8. (previous page) **— A–G**. *Sertularella folliformis* sp. nov. (BATHUS 3, Stn. DW809). **A**. Holotype. **B**. Paratype. **C**. Portion of stem with proximal part of a side branch. **D**. Successive internodes with their hydrothecae. **E**. Hydrothecal aperture, frontal view, showing internal cusps. **F**. Portion of stem with gonotheca, showing insertion site. **G**. Gonotheca. **— H**. *Sertularella helenae* Vervoort, 1993 (SALOMON A, Stn. DW1714), two successive internodes with their hydrothecae. **— I**. *Sertularella paucicostata* Vervoort, 1993 (BATHUS 3, Stn. DW809), two consecutive internodes with their hydrothecae, and comparison with *Sertularella costata* Leloup, 1940 (J–K). **— L–O**. *Sertularella plicata* sp. nov. (MUSORSTOM 3, Stn. CP121). **L**. Portion of stem and proximal part of a side branch. **M**. Two consecutive internodes with their hydrothecae. **N**. More detailed view of the hydrotheca, to show its wrinkled surface. **O**. Hydrothecal aperture in frontal view, showing internal cusps. **— P–S**. *Sertularella* aff. *sinensis* Jäderholm, 1896. **P**. Portion of stem (BATHUS 3, Stn. DW829). **Q**. Hydrotheca (BORDAU 2, Stn. DW1595). **R**. Frontal view of three hydrothecal apertures, to show variation in the number of internal cusps. **S**. Gonotheca (BORDAU 2, Stn. DW1595). Scale bars: A–B = 1 cm; C, F–G, L, P = 1 mm; D, H–J, M, Q, S = 500 µm; E, K, O, R = 100 µm; N = 200 µm.

Etymology

From the Latin *plĭco*, *-ātum*, *-āre* (and the Greek *πλέχω*), meaning "pleat, pleated, to pleat", to characterize the appearance of the external surface of the hydrothecal wall.

Material examined

Holotype

MUSORSTOM 3: Stn. CP121, colony composed of several sterile stems up to 1 cm high, epizoic on dead gorgonian (MNHN-IK-2012-16576).

Description

Colony composed of up to 1 cm high, monosiphonic stems arising from creeping, branching hydrorhiza. Basal parts of stems of varied length and ahydrothecate, perisarc smooth; above, stems divided into regular, moderately long, geniculate internodes, by means of slightly oblique nodes slanting in alternate directions; each internode with one, distal hydrotheca. Side branches arising irregularly from below the bases of stem hydrothecae and in the same plane as the stem; from one to several hydrothecae between two successive side branches; up to second order branching observed; structure identical to that of stem, except for the first internode, which is comparatively longer than following ones; distal-most, tendril-like internodes occasionally anastomose with each other or with neighboring stems. Hydrothecae swollen basally, then narrowing gradually distally to a short neck region projecting the aperture slightly outwards; adaxial side less than ⅓ adnate; walls with 8–10 conspicuous transverse ridges encircling the theca; numerous creases, perpendicular to the ridges, give the hydrotheca a wrinkled appearance; aperture rhomboidal, rim with four blunt cusps separated by shallow embayments; opercular apparatus composed of four triangular valves forming a low roof; 3 or 5 internal, submarginal, lamellar cusps (two latero-adaxial and one adaxial and, in some hydrothecae, two additional, latero-adaxial ones). Gonothecae not observed.

Remarks

Hydrothecae with such deep, transverse ridges are present in a number of congeners, but several distinctive features allow their separation from the new species: 1) *S. areyi* Nutting, 1904, but its hydrothecae are provided with only 2–3 transverse ridges (Fig. 7J); 2) *S. costata* Leloup, 1940 is a much smaller hydroid (compare Fig. 8J and 8M); 3) *S. crenulata* Nutting, 1905 possesses a considerable number of closely-set, transverse ridges, and its hydrothecae are tronconical (Vervoort 1993); 4–6) *S. helenae* Vervoort, 1993 (Fig. 8H), *S. paucicostata* Vervoort, 1993 (Fig. 8I) and *S. pseudocostata* Vervoort, 1993, but their hydrothecae are larger and more tubular; 7) *S. fraseri* Galea, 2010 is a more delicate hydroid and its hydrothecae are provided with fewer ridges; 8) *S. quadrata* Nutting, 1895 has densely-striated, exceedingly long and tubular hydrothecae, with characteristically squared cross-section (Nutting 1904); 9) the hydrothecae of *S. sinensis* Jäderholm, 1896 are only half adnate, and the number of ridges they carry reaches as many as 15 in the northern hemisphere (Naumov 1969); 10) *S. striata* Stechow, 1923, but in this species the internodes are comparatively shorter, almost collinear, and the hydrothecae are less fusiform and only about half adnate (Millard 1964).

Geographical distribution

Philippines.

Sertularella aff. ***sinensis*** Jäderholm, 1896
Fig. 8P–S; Table 4

Sertularella sinensis Jäderholm, 1896: 11, pl. 2, figs 2–3.

Sertularella sinensis – Vervoort & Watson 2003: 177, fig. 41d–h.

Table 4. Measurements (in μm) of *Sertularella sinensis* Jäderholm, 1896 from various sources.

	Present study	Naumov (1969)	Vervoort (1993) (CHALCAL 2, Stn. DW80)	Vervoort & Watson (2003)	
				(NZOI Stn. K825, slide 2270)	(NMNZ BS437, slide 2977)
Internode					
- length	655–865	–	–	–	–
- diameter at node	180–215	–	–	–	–
Hydrotheca					
- free adaxial side	480–540	230–270	250–310	345–390	395–425
- adnate adaxial side	315–335	250–270	265–310	345–375	280–360
- abcauline side	555–590	350–370	295–355	425–460	420–430
- maximum width	335–360	–	250–275	310–330	280–295
- diameter at aperture	205–220	150–170	170–185	145–165	195–215
- number of ridges	19–21	11–15	10–12	16–20	ca 18

Material examined

BATHUS 3: Stn. DW829, a sterile, polysiphonic, flabellate colony 3 cm high and 3.8 cm wide, broken off from its 2.3 cm long basal part (MNHN-IK-2012-16577).

BORDAU 2: Stn. DW1595, a single fertile stem, 6.7 cm high, polysiphonic basally, with only two side branches left, one of which is incomplete (MNHN-IK-2012-16578).

Remarks

The specimen from BORDAU 2 comprises a tall, erect, straight stem with only two side branches left, while numerous lateral apophyses indicate the presence of pre-existent branches. The upper part of the specimen from BATHUS 3 is flabellate, and this structure most probably arose upon the breakage of the apical part of the initial stem and the subsequent profuse development of several distal side branches, which divided up to four times. Though of different appearance, both specimens bear hydrothecae of the same shape and size, and are believed to be conspecific.

The identification of the present material is provisional, owing to multiple discrepancies exhibited by the specimens from a wide geographical area assigned to *S. sinensis* by various authors. Among the points of difference, the following ones are noteworthy: 1) the habit of the colonies is apparently strictly monosiphonic in the material from the northern hemisphere (Hirohito 1995), and polysiphonic in that from the southern one (Vervoort 1993; Vervoort & Watson 2003; present study); 2) the shape of the hydrothecae illustrated in the literature varies from decidedly compressed longitudinally in their free part (Jäderholm 1896; Rho & Chang 1974; Hirohito 1995) to "normally" shaped (Vervoort & Watson 2003); 3) the number of transverse ridges accounts from 6–8 (Hirohito 1983) to 11–15 (Naumov 1969), and to as many as 19–21 (present material); 4) the dimensions of the hydrothecae exhibit a wide range of variation, as exemplified in Table 4; 5) the number of transverse ridges at the surface of the gonothecal wall varies from 5–6 (Vervoort & Watson 2003), to ca 8 (Hirohito 1995), and to ca 14 (Jäderholm 1896: pl. 2, fig. 3); 6) the number of apical projections of the gonotheca reported, for instance, is either 4 (Jäderholm 1896; Hirohito 1995) or 8 (Vervoort & Watson 2003); 7) small gonothecae (750–800 × 550–700 μm) were reported by Hirohito (1995), while comparatively larger ones (1720–1935 × 1230–1280 μm) occurred in the material studied by Vervoort & Watson (2003).

The available data suggest that we are possibly dealing with at least two sibling species: the northern hemisphere form is apparently monosiphonic in habit, the free parts of their hydrothecae are

characteristically compressed longitudinally, the number of annulations they carry is low (not exceeding 15), and their gonothecae are small and provided with 4 apical projections; conversely, the specimens from the southern hemisphere are represented by colonies with fascicled stems and branches, the hydrothecae are "normally" shaped, the number of annulations they carry may reach as many as 21, their gonothecae are comparatively larger, and their apices are provided with 8 projections.

In addition, the present material comes closer to that from New Zealand (Vervoort & Watson 2003), judging by the size and number of ribs of the hydrothecae, than to the New Caledonian one (Vervoort 1993), which have smaller hydrothecae, with a lesser number of transverse ridges (see Table 4).

The gonotheca depicted in Fig. 8S is likely immature, owing to its apparently incomplete rings and flattened apical part, and originates from an auxiliary tube running up the main stem of the colony from BORDAU 2, similarly to some gonothecae examined by Vervoort &Watson (2003).

Geographical distribution

Sertularella sinensis sensu stricto occurs from China (Jäderholm 1896) to the Sea of Okhotsk (Naumov 1969). Additional material, possibly not conspecific, was recorded from New Caledonia (Vervoort 1993; present study), Tonga (present study), and New Zealand (Vervoort & Watson 2003).

Sertularella cf. ***anguina*** Vervoort, 1993
Fig. 9A; Table 5

Sertularella anguina Vervoort, 1993: 198, figs 40b–d, 41a–b.

Material examined

NORFOLK 1: Stn. DW1722, a sterile, unbranched stem, 3 cm high (MNHN-IK-2012-16579).

Remarks

This lightly fascicled stem (only basally), divided into moderately long, slender, geniculate internodes, each carrying distally an exceedingly long, slender hydrotheca with tapering walls and five internal, submarginal cusps (two latero-adaxial, one abaxial, and two latero-abaxial), fits the diagnosis of *S. anguina* given by Vervoort (1993). This author gave no precise information on the exact number of internal projections of the perisarc, but assumed that four may have been present in his material, possibly two latero-adaxial and two latero-abaxial. The fifth, strictly abaxial cusp observed in the present material is only visible when the hydrothecal apertures are seen frontally, but not laterally. Although the measurements between the material in hand and the holotype appear similar (Table 5), certain differences (as the width of the hydrotheca) may be attributed to the fact that the former was measured in water, while the latter is a microslide preparation that suffered a certain degree of shrinkage.

Geographical distribution

New Caledonia (Vervoort 1993) and Norfolk ridge (present study).

Sertularella cf. ***bipectinata*** Vervoort, 1993
Fig. 9B–C; Table 5

Sertularella bipectinata Vervoort, 1993: 207, figs 43c–e, 44.

Material examined

BATHUS 3: Stn. DW809: a 2.2 cm high, sterile, lightly fascicled (a couple of accessory tubes) stem, provided with two short side branches (MNHN-IK-2012-16580).

Table 5. Measurements (in µm) of *Sertularella* cf. *anguina* Vervoort, 1993, *S.* cf. *bipectinata* Vervoort, 1993, and *S. leiocarpoides* Vervoort, 1993, and comparisons with their respective holotypes (second column for each species).

	S. cf. ***anguina*** Vervoort, 1993		***S.*** cf. ***bipectinata*** Vervoort, 1993		***S. leiocarpoides*** Vervoort, 1993	
	Present study: NORFOLK 1, Stn. DW1722	Vervoort (1993): MUSORSTOM 6, Stn. CP464	Present study: BATHUS 3, Stn. DW809	Vervoort (1993): BIOCAL, Stn. DW36	Present study: BATHUS 3, Stn. DW829	Vervoort (1993): MUSORSTOM 4, Stn. DW212
Internode						
- length	830–1200	755–850	1050–1110	1150–1260	755–1025	870–1040
- diam. at node	255–310	175–205	325–355	435–455	300–340	280–305
Hydrotheca						
- free adax. side	840–900	760–845	1110–1170	1000–1065	680–765	695–735
- adn. adax. wall	305–340	235–245	380–390	450–520	395–430	410–435
- abaxial wall	925–1010	890–935	1245–1285	1195–1300	900–950	870–910
- max. width	300–315	235–245	375–390	410–435	395–420	390–410
- diameter at rim	210–245	150–170	260–270	260–265	300–310	280–305
Gonotheca						
- length	–	–	–	–	ca 2955	3100–3255
- max. width	–	–	–	–	ca 1055	1000–1020
- apical width	–	–	–	–	ca 425	–

Remarks

The present material, although similar to that assigned above to *S.* aff. *anguina* Vervoort, 1993, differs from it through its comparatively thicker internodes, a more reduced ratio of internode length/hydrothecal depth, and the comparatively larger size of its hydrothecae (Table 5). These features, in combination with the presence of three internal, submarginal cusps (two latero-adaxial and one abaxial), also reported by Vervoort (1993), suggest that it may belong to *S. bipectinata*, and this identification should be regarded as provisional in the absence of fertile material.

Geographical distribution

New Caledonia (present study), Norfolk Ridge (Vervoort 1993).

Sertularella leiocarpoides Vervoort, 1993

Figs 9D–G, 10A; Table 5

Sertularella leiocarpoides Vervoort, 1993: 223, fig. 49.

Material examined

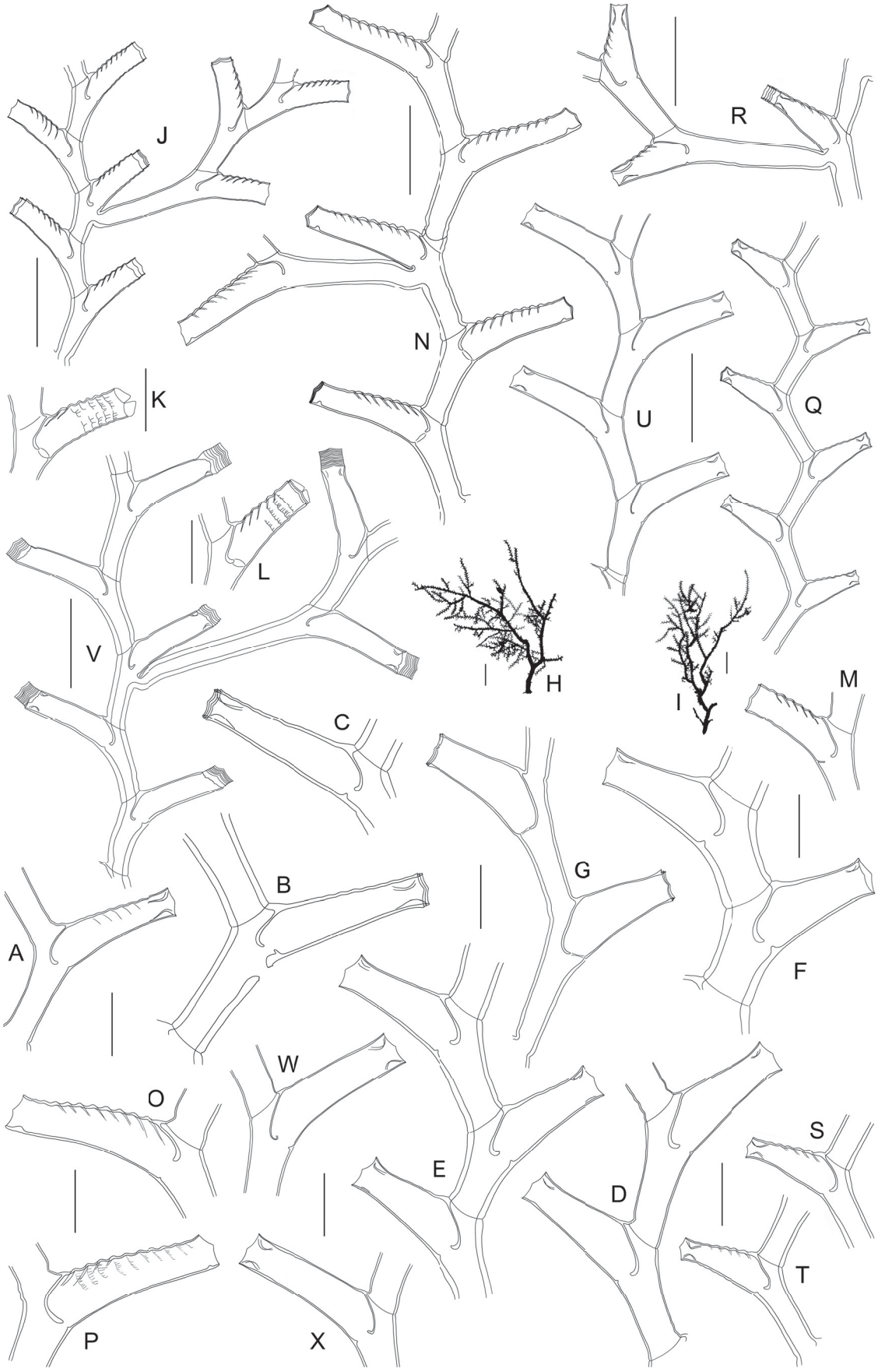
BATHUS 2: Stn. CP737, a 5 cm high, sterile colony devoid of hydrorhiza (MNHN-IK-2012-16581).

BATHUS 3: Stn. DW829, a 3.5 cm high colony fragment bearing one gonotheca (MNHN-IK-2012-16582); Stn. DW830, a 5 cm high and 7.5 cm wide sterile colony (MNHN-IK-2012-16583).

SALOMON 1: Stn. DW1741, a 2 cm high, sterile colony (MNHN-IK-2012-16584).

Remarks

The four available specimens were compared to a colony of *Sertularella leiocarpa* (Allman, 1888) from Inaccessible Island (see Galea 2015b). Portions of three of them are illustrated altogether with *S.*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leiocarpa, so as to show their specific differences (compare Fig. 5D–F and 5G). As already noted by Vervoort (1993), the internodes are thick, short and geniculate in *S. leiocarpoides*, and comparatively more slender, longer, and less geniculate in *S. leiocarpa*. In addition, the hydrothecae of Vervoort's species have the adaxial cusps characteristically upturned, and there are generally also two inconspicuous latero-adaxial, internal, submarginal projections of the perisarc and, occasionally, a third one, on the abaxial side.

Geographical distribution

New Caledonia (Vervoort 1993; present study), Solomon Islands (present study).

Sertularella pseudocatena sp. nov.
urn:lsid:zoobank.org:act:3395EF3F-3DFF-489B-AB25-B4E2A58F8F7C
Figs 9H–M, 10B–C; Table 6

Sertularella catena – Vervoort 1993: 210, fig. 45a–c [not *Sertularella catena* (Allman, 1888)].

Diagnosis

Flabellate colonies with highly polysiphonic stems and branches; branching irregular, given off roughly in one plane; internodes rather short; hydrothecae long, tubular, almost straight; free adaxial wall with 5–7 transverse ridges extending almost to abaxial wall; gonotheca sac-shaped, with 1–3 broad, transverse ridges and 2–5 inconspicuous apical projections.

Etymology

The specific epithet results from the word-forming element *pseudo-* (derived from the Ancient Greek *ψευδής*, pseudês), meaning false, in appearance only, or resembling, and *catena*, the name of a species created by Allman (1888), suggesting that the new species superficially resembles *S. catena*.

Material examined

Holotype
BATHUS 3: Stn. DW809, single flabellate colony ca 6.5 × 6.5 cm, as well as three fragments from it, two of which bearing one gonotheca, while the third one carries two gonothecae (MNHN-IK-2012-16585).

Paratype
BATHUS 3: Stn. DW809, several colonies up to 8.5 cm high, as well as numerous smaller fragments (MNHN-IK-2012-16586).

Fig. 9. (previous page) **— A**. *Sertularella* cf. *anguina* Vervoort, 1993 (NORFOLK 1, Stn. DW1722), hydrotheca. **— B–C**. *Sertularella* cf. *bipectinata* Vervoort, 1993 (BATHUS 3, DW809), two hydrothecae. **— D–F**. *Sertularella leiocarpoides* Vervoort, 1993, three hydrothecae (D = BATHUS 2, Stn. CP737; E = BATHUS 3, Stn. DW829; F = Stn. DW829), and comparison with *Sertularella leiocarpa* (Allman, 1888) (G) from Inaccessible Island. **— H–M**. *Sertularella pseudocatena* sp. nov. (BATHUS 3, Stn. DW809). **H**. Holotype. **I**. Paratype. **J**. Portion of stem with side branch. **K–M**. Three hydrothecae. **— N–P**. *Sertularella splendida* sp. nov. (BATHUS 3, Stn. DW809). **N**. Portion of stem and proximal part of a side branch. **O–P**. Two hydrothecae. **— Q–T**. *Sertularella tronconica* sp. nov. **Q**. Portion of side branch (NORFOLK 1, Stn. DW1704). **R**. Portion of stem and proximal part of a side branch (BATHUS 3, Stn. DW809). **S–T**. Two hydrothecae (NORFOLK 1, Stn. DW1704). **— U–X**. *Sertularella tubulosa* sp. nov. (BATHUS 3, Stn. DW810). **U**. Distal portion of stem. **V**. Portion of stem and proximal part of side branch. **W–X**. Two hydrothecae. Scale bars: A–G, K–M, O–P, S–T, W–X = 500 µm; J, N, Q–R, U–V = 1 mm; H–I = 1 cm.

Table 6. Measurements (in µm) of four new species of *Sertularella* discussed herein.

	S. pseudocatena sp. nov. (BATHUS 3, Stn. DW809)	***S. splendida*** sp. nov. (BATHUS 3, Stn. DW809)	***S. tronconica*** sp. nov.		***S. tubulosa*** sp. nov. (BATHUS 3, Stn. DW810)
			(NORFOLK 1, Stn. DW1704)	(BATHUS 3, Stn. DW809)	
Internodes					
- length (in general)	495–680	965–1260	660–825	620–890	825–990
- length (1st cladial internode)	1135–1395	ca 1730	–	1260–1630	ca 2240
- diameter at node	225–290	335–365	220–240	195–245	275–315
Hydrotheca					
- free adaxial side	560–635	1050–1170	565–605	445–480	900–1050
- adnate adaxial side	295–330	325–410	300–315	290–355	350–420
- abcauline side	705–740	1170–1320	660–690	585–660	1125–1170
- maximum width	270–290	400–410	295–310	265–300	315–350
- diameter at rim	240–255	280–300	170–185	150–160	275–290
Gonotheca					
- length	1235–1445	–	ca 2135	–	–
- maximum width	615–765	–	ca 925	–	–
- apical width	345–395	–	–	–	–

Description

Colonies flabellate, up to 8.5 cm high, of rigid appearance, though rather brittle upon manipulation, as demonstrated by the highly fragmented condition of the present material. Stolon rhizoid, firmly attached to substrate. Stems strongly fascicled, attaining up to 3 mm wide basally; irregularly ramified (up to 5th order branches, but possibly more in living specimens), branches roughly coplanar. Perisarc moderately thick, straw colored. Basal parts of side branches also polysiphonic, thinning out to monosiphonic distally. Main tube of both stems and side branches divided into rather short internodes by means of oblique nodes slanting in alternate directions; internodes distinctly geniculate, each carrying a hydrotheca distally. Side branches arising laterally from below the bases of hydrothecae; first internode longer than subsequent ones. Hydrothecae alternate, long, tubular, given off at about 25° with axis of internode; free adaxial side with 5–7 conspicuous wrinkles reaching abaxial wall, which appears undulated; wrinkles backward-oriented at site of origin on adaxial wall (Fig. 9L–M), becoming transverse towards abaxial wall (Fig. 9K); base of hydrotheca with an incomplete septum, leaving a large foramen for the passage of hydranth; margin generally renovated several times, provided with four short cusps separated by shallow embayments; aperture quadrangular in frontal view; no internal, submarginal projections of perisarc. Coenosarc poorly preserved, tentacle number could not be ascertained. Gonothecae (only 4 seen) arising from an internode on side opposite hydrotheca, midway between base of theca and proximal node; thick-walled, with 2–3 transverse "ribs", aperture on well-formed neck, enclosed by filmy perisarc; 2–5 blunt, inconspicuous projections around aperture; body tapering below into indistinct pedicel; sex could not be ascertained.

Remarks

Vervoort (1993) assigned his infertile material from New Caledonia to *S. catena* (Allman, 1888), a species known only from the Caribbean region, on the account of morphological similarities in the "structure and shape of the hydrothecae". Unfortunately, Vervoort did not provide any updated illustrations of Allman's holotype to facilitate a comparison with the New Caledonian specimens.

However, though of nearly similar size, the appearance of the holotype of *S. catena*, illustrated by Allman (1888: pl. 27, fig. 2), differs radically from the silhouettes of the colonies from New Caledonia (Fig. 9H–I), in having a definite main stem and a comparatively more sparing branching pattern. In

addition, unlike the strictly tubular hydrothecae observed in the material in hand (Fig. 9J–M), those of *S. catena* appear "subcylindrical" (especially on the adaxial side) and "narrowed slightly at each end" (Nutting 1904: pl. 15, fig. 3); this is also evident from Allman's illustration (1888: pl. 27, fig. 2a).

The present material bears several gonothecae and, consequently, allows a much more reliable distinction from Allman's species to be made. Unlike the transversely ribbed gonothecae observed here, those of *S. catena* are reportedly "elongate ovate, destitute of annulation, with a small terminal, bicuspate orifice" (Allman 1888). Upon a reexamination of the type, Nutting (1904) added the following: "Gonangia […] large, terete in form, orifice terminal, small, armed with two shallow processes or teeth" (Nutting 1904). Although their surface was originally illustrated as totally smooth (Allman 1888: pl. 28, fig. 2a), Nutting (1904) added that "There is apparently a series of very shallow rugosities or annulations on the distal portion of the gonangia" (illustrated in his pl. 15, fig. 3). This is corroborated by Vervoort's observation, which confirms the existence "at the apical third" of the gonotheca of "two indistinct furrows", though he states that "there is no funnel and no distinct opening".

In addition, the length of the gonothecae in the present material encompasses that of a whole internode with its associated hydrotheca, measured from the proximal node to the hydrothecal aperture. In contrast, the gonothecae of *S. catena* are comparatively bigger: in Allman's figure (1888: pl. 28, fig. 2a), the gonotheca is illustrated being as long as three successive internodes, while in Nutting's figure (1904: pl. 15, fig. 3) is encompasses the length of 2.5 internodes.

Taken together, the appearance of the colonies, with their profuse branching pattern, the perfectly tubular and slightly curved hydrothecae marked with conspicuous furrows at their surface, as well as the comparatively smaller and transversely ribbed gonotheca, suggest that we are dealing with a species distinct from *S. catena*. Additional, geographical considerations support this view.

Geographical distribution

New Caledonia (Vervoort 1993; present study).

Sertularella splendida sp. nov.
urn:lsid:zoobank.org:act:900C4D1A-64A7-402E-B695-3BF396F18579
Fig. 9N–P; Table 6

Diagnosis

Sertularella with lightly fascicled, irregularly and sparsely branched stems; internodes moderately long, geniculate; hydrothecae exceedingly long, gradually narrowing slightly from base to aperture, adnate for ¼ or less, free adaxial side with 7–9 transverse ridges, an intrathecal cusp abaxially. Gonothecae unknown.

Etymology

From the Latin adjective *splendĭdo*, *-a*, *-um (splendeo)*, originally meaning brilliant, dazzling, or glowing, but subsequently retained as "splendid" or "magnificent" in modern usage, to denote the beautiful appearance displayed by this species.

Material examined

Holotype

BATHUS 3: Stn. DW809, a 23 mm high, sterile stem fragment devoid of its basal part, but carrying a short, distally broken side branch; an accessory tube on the stem (MNHN-IK-2012-16587).

Paratypes

BATHUS 3: Stn. DW809, four sterile stems or fragments, 7–14 mm high; side branches occur in two specimens; accessory tubes also present in two specimens (MNHN-IK-2012-16588).

Description

Colonies up to 23 mm high, arising from rhizoid stolon firmly attached to substrate; stems either lightly fascicled basally (with 1–2 auxiliary tubes) or monosiphonic; basal part of varied length, ahydrothecate, with smooth, thick perisarc; above, stem divided into regular internodes by means of slightly oblique nodes sloping in alternate directions; internodes geniculate, moderately long, widening gradually towards distal end, where they bear a hydrotheca. Side branches, when present, originating from below a stem hydrotheca, either laterally, or slightly in front of colony; first internode longer than subsequent ones, constricted basally at insertion on stem; remainder of side branch with same structure as stem. Hydrothecae alternate on stem and branches, originating at an angle of 50–60° with the internode; exceedingly long, slightly curving downward proximally and upward distally, tapering gradually, though rather imperceptibly, towards aperture; adaxial wall ¼ to ⅕ adnate to internode; free part with 7–9 prominent grooves; abaxial wall slightly sigmoid; basal foramen wide; distal end of hydrotheca slightly upturned; margin with four short, triangular cusps separated by shallow embayments; aperture quadrate in frontal view; an intrathecal cusp abaxially. Gonothecae absent.

Remarks

A careful search of the relevant literature reveals no other *Sertularella* species which approaches the present hydroid in the morphology of its hydrothecae.

Geographical distribution

New Caledonia.

Sertularella tronconica sp. nov.

urn:lsid:zoobank.org:act:CC79A536-B897-4CA4-9C85-DB835908E5BE

Figs 9Q–T, 10D; Table 6

Diagnosis

Sertularella with lightly fascicled, irregularly and sparsely branched stems; colonies coplanar; internodes moderately long, geniculate; hydrothecae tronconical, adnate for ⅓ their length; adaxial wall with 4–5 transverse ridges; 5 prominent intrathecal, submarginal cusps; gonotheca large, transversely ridged adaxially.

Eymology

From the Latin words, *truncāre*, meaning to truncate, and *cōnus* (also *χωνος* in Greek), meaning cone, to characterize the shape of the hydrotheca.

Material examined

Holotype

NORFOLK 1: Stn. DW1704, single, unbranched colony, 2 cm high, devoid of its hydrorhiza, but bearing a basal accessory tube running up the stem; a female gonotheca present (several large oocytes still noticeable inside) (MNHN-IK-2012-16589).

Paratypes

BATHUS 3: Stn. DW809, several sterile stems and fragments, up to 1.4 cm high, some branched and some with lightly fascicled stems (MNHN-IK-2012-16590).

Description

Colonies up to 2 cm high, arising from creeping (young colonies) to rhizoid (adult colonies) hydrorhiza, firmly attached to substrate. Basal part of stem of varied length, ahydrothecate, bearing a reduced number of accessory tubes; perisarc thick and smooth. Remainder of stem divided into regular internodes by means of oblique constrictions of the perisarc slanting in alternate directions. Internodes moderately long, width increasing imperceptibly towards distal ends, so as to accommodate the basal part of a hydrotheca. Branching scarce and irregular, in one plane, with up to 2nd order branches observed; side branches originating laterally from below the base of a stem hydrotheca; first internode comparatively longer than subsequent ones, constricted basally at insertion on stem; remainder of side branches with similar structure as the stem. Hydrothecae arranged alternately at an angle of 35–40° with the internode; moderately long, tronconical, widening slightly below aperture; adaxial wall adnate for about ⅓ its length; free part with 4–5 transverse, though incomplete, ridges, not reaching abaxial side, running parallel to adnate side of adaxial wall; abaxial wall nearly straight; margin occasionally renovated; aperture quadrate in frontal view, bearing 4 short cusps separated by shallow embayments; five prominent, submarginal, intrathecal cusps: two latero-adaxial, two latero-abaxial, and one abaxial. Gonothecae originating from the internode, on side opposite hydrotheca, midway between its base and proximal node; large, transversely ribbed; a short, distal neck; aperture large, surrounded by 3–4 almost imperceptible, blunt cusps; a few large oocytes noticeable by transparency.

Remarks

Several species possess hydrothecae that resemble, more or less, the shape of those of *S. tronconica* sp. nov., but the latter may be reliably distinguished from its congeners as follows: 1–2) in both *S. anguina* and *S. bipectinata* the length/width ratio of the hydrotheca is comparatively higher (Vervoort 1993); 3) the hydrothecae of *S. inconstans* Billard, 1919 are adnate for a greater extent of their adaxial wall (Rees & Vervoort 1987), and the transverse ridges, which encircle the bodies of proximal hydrothecae, gradually fade off towards the distal end of the colony, and are eventually represented by indistinct undulations of the perisarc on the adaxial side (Billard 1925b); in addition, the internodes are only slightly geniculate and do not reach the degree of geniculation encountered in *S. tronconica* sp. nov.; 4) *S. keiensis* Billard, 1925b, but in this species the hydrothecae are slightly smaller and adnate for a longer extent, their surface varies from wrinkled (Billard 1925b) to smooth (Leloup 1937), and there are four lamellar, internal, submarginal cusps (two latero-adaxial and two latero-abaxial); 5) *S. leiocarpoides*, but this species has comparatively larger, smooth-walled hydrothecae (compare Fig. 9S–T with 9D–F); 6) although very similar morphologically, the hydrothecae of *S. natalensis* Millard, 1968 have a length/width ratio of ca 2.1–2.3 (calculated from Millard 1968, 1975), while those of *S. tronconica* sp. nov.are comparatively more slender, with a ratio of ca 2.4–2.9; in addition, the ridges are common in younger hydrothecae and may totally disappear in the older ones (Millard 1968); moreover, its gonothecae appear more fusiform, only their distal end is wrinkled, and the aperture is surrounded by 3–4 projections of perisarc (Millard 1975); 7) unlike in the present species, the length/width ratio of the hydrotheca in *S. undulitheca* Vervoort, 1959 is lower, between 2.1 and 2.3 (calculated from Vervoort 1959), its internodes are comparatively shorter and slightly geniculate, and both the hydro- and gonothecae are wrinkled throughout.

Geographical distribution

New Caledonia and Norfolk Ridge.

Sertularella tubulosa sp. nov.
urn:lsid:zoobank.org:act:8D56454C-7B2C-451C-BFB2-9C42603F3005
Fig. 9U–X; Table 6

Diagnosis

Sertularella with lightly polysiphonic, irregularly and sparsely ramified stems; internodes moderately long, geniculate; hydrothecae exceedingly long, tubular, isodiametric throughout, walls entirely smooth; four small marginal cusps, and four submarginal, intrathecal projections of perisarc. Gonothecae unknown.

Etymology

The specific name is derived from the Latin *tŭbŭlus*, *-i*, meaning tube, and describes the shape of the hydrotheca.

Material examined

Holotype

BATHUS 3: Stn. DW810, single, sterile, branched stem, 2.6 cm high, lightly fascicled basally, but devoid of hydrorhiza (MNHN-IK-2012-16591).

Description

The colony, devoid of hydrorhiza, is composed of a single stem, 2.6 cm high, giving rise to a side branch towards its middle. Perisarc thick basally, thinning out gradually towards tip of colony. Basal part of stem ahydrothecate, overgrown by a few accessory tubes; upper and longest part divided into regular internodes by oblique constrictions of the perisarc slanting in alternate directions. Internodes moderately long, geniculate, widening distally so as to accommodate a hydrotheca. The single side branch originates laterally from below a stem hydrotheca; first internode comparatively longer than subsequent ones; the latter with same structure as the stem. Hydrothecae angled at 40–45° with the stem; long, tubular, isodiametric throughout, adnate for about ¼ their length; free adaxial wall nearly straight and smooth; abaxial wall basally convex, becoming rapidly straight for most of its length; basal foramen wide; aperture squared in frontal view, with four inconspicuous marginal cusps separated by shallow embayments; four intrathecal, submarginal cusps: two latero-adaxial and two latero-abaxial; margin often renovated in damaged hydrothecae. Gonothecae unknown.

Remarks

The characteristic tubular shape of the hydrothecae of this species is diagnostic. Tubular, smooth-walled hydrothecae are only encountered in a few congeners that can be distinguished from the new species on the following accounts: 1) the hydrothecae of *S. billardi* Vervoort, 1993 have a comparatively lower length/width ratio of the hydrothecae (Vervoort 1993); 2) *S. exilis* Fraser, 1938 has typically curved hydrothecae (Fraser 1938), and the species is minute (Calder *et al*. 2009); 3) *S. vervoorti* El Beshbeeshy, 2011 possesses huge hydrothecae, whose length/width ratio is lower than in *S. tubulosa* sp. nov. (El Beshbeeshy 2011); 4) in *S. whitei* the hydrothecae originate at a more acute angle with the axis of internode, are smaller, curve slightly outwards, and the stem internodes are longer and more slender than in the present species (Rees & Vervoort 1987).

Geographical distribution

New Caledonia.

Genus ***Sertularia*** Linnaeus, 1758

Sertularia tongensis (Stechow, 1919)
Fig. 10E

Sertularella tongensis Stechow, 1919: 89, fig. f[1]–g[1].

Sertularia tongensis – Galea 2010: 18, fig. 5h–m (synonymy); 2015b: 10, fig. 3s.

Material examined

MUSORSTOM 9: Stn. CP1265, small colony composed of a few sterile, unbranched stems, up to 1 cm high (MNHN-IK-2012-16592).

Remarks

As stated by Galea (2010, 2015b), this species is immediately recognizable, even in sterile condition, through its alternate hydrothecae whose apertures are closed by two opercular flaps pleated along a median line.

Geographical distribution

Likely circumglobal in temperate to tropical seas (Galea 2015b). The present record is from the Marquesas.

Genus ***Symplectoscyphus*** Marktanner-Turneretscher, 1890

Symplectoscyphus effusus Vervoort, 1993
Fig. 10F–H; Table 7

Symplectoscyphus effusus Vervoort, 1993: 253, figs 59, 60a–e.

Material examined

NORFOLK 1: Stn. DW1712, small colony composed of several stems up to 11 mm high, mostly fertile (female), on worm tube covered by sand grains (MNHN-IK-2012-16593).

Remarks

The long, tubular, upwardly-curved hydrothecae, and the transversely ribbed gonothecae with frilled margin, characteristically curving downwards, are diagnostic (Vervoort 1993). In addition, the comparative measurements of this material and of the holotype (see Table 7) leave no doubt about their conspecificity. The gonothecae in the specimen examined have 4–5 prominent ribs, and these are definitely transversely and not spirally arranged, as stated by Vervoort. Two large oocytes or planulae occur in each gonotheca.

Geographical distribution

New Caledonia (Vervoort 1993), Norfolk Ridge (present material).

Symplectoscyphus fasciculatus nom. nov.
Fig. 10I–L

Symplectoscyphus johnstoni tropicus Vervoort, 1993: 259, figs 61, 62a–d [not *S. johnstoni* (Gray, 1843)].

non Symplectoscyphus johnstoni tropicus – Vervoort & Watson 2003: 217, fig. 51f–l.

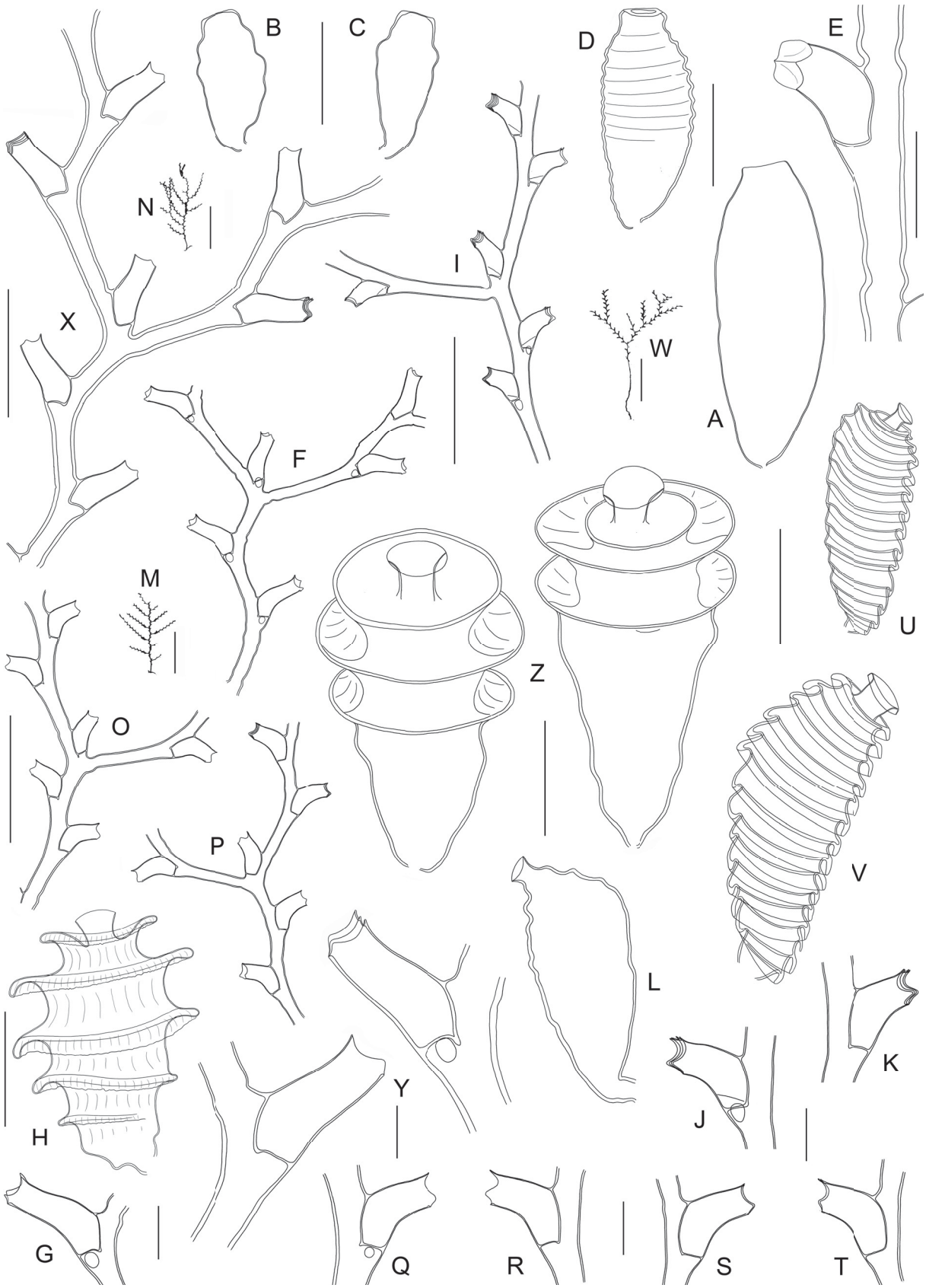
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Table 7. Measurements (in µm) of S*ymplectoscyphus effusus* Vervoort, 1993 and *S. paucicatillus* sp. nov.

	S. effusus Vervoort, 1993		***S. paucicatillus*** sp. nov. (present study: BATHUS 4, Stn. DW923)
	Present study: NORFOLK 1, Stn. DW1712	Vervoort (1993): CHALCAL 2, Stn. DW08	
Internodes			
- length (in general)	415–745	405–690	455–875
- diameter at node	95–105	65–90	155–230
Hydrotheca			
- free adaxial side	305–340	215–235	405–470
- adnate adaxial side	150–160	115–170	215–245
- abcauline side	325–340	295–320	465–530
- maximum width	135–150	105–120	230–250
- diameter at rim	130–135	135–140	185–195
Gonotheca			
- length	ca 1175	ca 1110	1240–1480
- maximum width	ca 835	ca 645	865–890
- tube length	–	ca 120	165–180
- tube diameter	–	–	ca 155
- diameter at aperture	ca 175	ca 110	260–270

non Symplectoscyphus tropicus (Hartlaub, 1901).

Diagnosis

Symplectoscyphus species of flaccid appearance; stems and side branches fascicled basally, geniculate at origin of branches; branching pseudodichotomous; internodes composed of two alternate hydrothecae and a lateral apophysis with its associated hydrotheca; all hydrothecae tubular, curved outwards; gonothecae sac-shaped, nearly fully adnate, perisarc undulated, aperture round, on top of short funnel.

Etymology

From the Latin *fascis*, meaning fascicled, to characterize the polysiphonic habit of the colonies.

Fig. 10. (previous page) **— A**. *Sertularella leiocarpoides* Vervoort, 1993 (BATHUS 3, Stn. DW829), gonotheca. **— B–C**. *Sertularella pseudocatena* sp. nov. (BATHUS 3, Stn. DW809), two gonothecae. **— D**. *Sertularella tronconica* sp. nov. (NORFOLK 1, Stn. DW1704), gonotheca. **— E**. *Sertularia tongensis* (Stechow, 1919) (MUSORSTOM 9, Stn. CP1265), internode with hydrotheca. **— F–H**. *Symplectoscyphus effusus* Vervoort, 1993 (NORFOLK 1, Stn. DW1712). **F**. Portion of colony. **G**. Hydrotheca. **H**. Gonotheca. **— I–L**. *Symplectoscyphus fasciculatus* nom. nov. (MUSORSTOM 4, Stn. CC174). **I**. Portion of colony. **J–K**. Two hydrothecae. **L**. Male gonotheca. **— M–V**. *Symplectoscyphus ralphae* Vervoort, 1993 (NORFOLK 1, Stn. DW1712). **M–N**. Samples #1 and #2, repectively. **O–P**. Portions from samples #1 and #2, respectively. **Q–T**. Hydrothecae from samples #1 (Q–R) and #2 (S–T). **U–V**. Gonothecae from samples #1 and #2, respectively. **— W–Z**. *Symplectoscyphus paucicatillus* sp. nov. (BATHUS 4, Stn. DW923). **W**. Paratype, colony silhouette. **X**. Portion of colony. **Y**. Two hydrothecae. **Z**. Two gonothecae. Scale bars: A–D, F, I, O–P, X = 1 mm; E = 300 µm; G, J–K, Q–T, Y = 200 µm; H, L, U–V, Z = 500 µm; M–N, W = 1 cm.

Material examined

Holotype

MUSORSTOM 4: Stn. CP153, "several well developed, flabellate colonies 30×50 mm, stems basally polysiphonic; many appressed gonothecae […]. One large colony 30×40 mm is holotype (MNHN-Hy. 1117)" (Vervoort 1993).

Additional material

MUSORTSOM 4: Stn. CC174, a 4.5 cm high, fertile (male) colony.

Description

Flaccid, flabellate, up to 4 cm high and 5 cm wide colonies arising from branched, rhizoid stolon. Stems strongly fascicled basally, thinning out gradually to monosiphonic distally; flexuous, usually regularly and alternately branched; occasionally with "irregular" branches resulting from considerable development of secondary stems from branches growing as long as the main stem itself, and resulting in multiple tangled stems, whose distalmost branches form multiple anastomoses between them and with neighboring stems. Division into internodes indistinct, even in monosiphonic parts, but equivalents of internodes long, geniculate, comprising a basal apophysis and its associated axillar hydrotheca, as well as two alternate hydrothecae above. Apophyses alternate. Side branches straight (until they rebranch again in pseudodichotomous manner), nodes indistinct, but each equivalent of internode bearing hydrothecae arranged alternately. Hydrothecae tubular, curving away from internode, adnate for nearly half their length. Free adaxial wall straight to slightly convex; abaxial wall straight basally, curving suddenly in its distal third. Hydrothecal aperture nearly parallel to longitudinal axis of internode; margin with three pointed cusps separated by rather deep embayments; adaxial cusp recurved; renovations common and numerous. No conspicuous submarginal, intrathecal cusps, except for an occasional abaxial thickening. Gonothecae given off from below hydrothecal bases, fitting tightly and neatly against internodes. Male and female similar in shape; sac-shaped, wall undulated and never ribbed; undulations more pronounced distally, fading off basally; aperture distal, borne on outwardly-projecting, trumpet-shaped terminal tube.

Remarks

The description provided above combines Vervoort's (1993) account with personal observations of the material in hand. The latter apparently belongs to a "large tangled tuft of c. 30 mm high colonies on wormtubes" previously examined by Vervoort.

Owing to the fasciculate habit of its stems and the gonothecae with undulated walls, the large material studied by Vervoort was assigned to a new subspecies, *tropicus*, of *Symplectoscyphus johnstoni* (Gray, 1843). In doing so, Vervoort distinguished it from its congeners with monosiphonic stems and transversely-ribbed gonothecae, *viz*. *S. johnstoni johnstoni* (Gray, 1843) and *S. johnstoni subtropicus* Ralph, 1961, the latter being additionally characterized by the presence of three submarginal, intrathecal cusps.

As stated by Ralph (1961), *S. johnstoni* is a species with strictly monosiphonic stems, and its gonothecae are provided with "8 to14 evenly spaced transverse ridges". Consequently, the subspecies *tropicus* could be confidently raised to species. However, when doing so, it becomes an invalid junior homonym of *S. tropicus* (Hartlaub, 1901). To avoid this situation, the junior homonym is replaced here with the binomen *S. fasciculatus* nom. nov., whose holotype remains the same for both the original and the new name of the single biological species (ICZN Art. 72.7). The measurements of *S. fasciculatus* nom. nov. are given by Vervoort (1993: 260, table 51).

A restricted number of species belonging to this highly speciose genus are polysiphonic in habit: six congeners from the Antarctic [*S. bellinghauseni* Peña Cantero, 2012 (Peña Cantero 2012);

S. cumberlandicus (Jäderholm, 1905) (Peña Cantero *et al*. 2002); *S. frondosus* Peña Cantero, 2010 (Peña Cantero 2010); *S. hesperides* Peña Cantero, 2012 (Peña Cantero 2012); *S. liouvillei* (Billard, 1914) (Peña Cantero *et al*. 2002); *S. sofiae* Peña Cantero *et al*., 2002 (Peña Cantero *et al*. 2002)], ten from the subantarctic [*S. adpressus* (Ritchie, 1911) (Ritchie 1911); *S. amoenus* Vervoort & Watson, 2003 (Vervoort & Watson 2003); *S. arboriformis* (Marktanner-Turneretscher, 1890) (Millard 1975); *S. columnarius* (Briggs, 1914) (Ralph 1961); *S. divaricatus* (Busk, 1852) (Ralph 1961); *S. magellanicus* (Marktanner-Turneretscher, 1890) (Galea & Schories 2012); *S. patagonicus* Galea & Schories, 2012 (Galea & Schories 2012); *S. paulensis* Stechow, 1923 (Watson 2003); *S. procerus* (Trebilcock, 1928) (Ralph 1961); *S. subarticulatus* (Coughtrey, 1875) (Millard 1977)], and two from the tropics, both assigned to *S. tropicus* Hartlaub, 1901 [*sensu* Clarke 1894 (as *Sertularella variabilis*) and *sensu* Billard 1925b].

Ecologically, *S. fasciculatus* nom. nov. occurs in a biogeographical area radically different from that of the majority of species listed above. Its gonothecae are different from those of the following species, which exhibit transverse ridges: *S. aggreggatus* (Jäderholm, 1917) (Peña Cantero *et al*. 2002), *S. arboriformis* (Millard 1975), *S. columnarius* (Ralph 1961), *S. cumberlandicus* (Jäderholm 1905), *S. magellanicus* (Galea & Schories 2012), *S. patagonicus* (Galea *et al*. 2014), *S. procerus* (Ralph 1961), *S. sofiae* (Peña Cantero *et al*. 2002), and *S. subarticulatus* (Ralph 1961). The gonothecae of *S. frondosus* (Peña Cantero 2010) and *S. liouvillei* (Peña Cantero *et al*. 2002) are exceedingly long and tubular, while those of *S. amoenus* (Vervoort & Watson 2003) and *S. paulensis* (Peña Cantero 2012) are ovoid and have smooth to slightly undulated walls, yet they are not adherent to their corresponding internodes, and their distal tubes are not eccentrically placed. The habit and shape of the gonothecae of *S. fasciculatus* nom. nov. come closest to those of *S. adpressus*. However, the latter is a more robust species, with pinnate appearance, and its hydrothecae are subopposite and highly immersed into their internodes (Ritchie 1911). Although not completely formed in the specimens of *S. bellinghauseni* studied by Peña Cantero (2012), the gonothecae seem "to be characterized by the presence of rings". Similarly, the gonothecae of *S. hesperides* were incipient and apparently smooth (Peña Cantero 2012), but this species is distinguished through its hydrothecae that are adnate for one-third or less their adaxial length. Finally, the gonothecae of *S. divaricatus* are unknown yet, but this species possesses rather highly immersed hydrothecae (Ralph 1961).

Geographical distribution

New Caledonia (Vervoort 1993).

Symplectoscyphus ralphae Vervoort, 1993
Fig. 10M–V

Symplectoscyphus ralphae Vervoort, 1993: 270, figs 65e–f, 66a–c.

Material examined

NORFOLK 1: Stn. DW1712, two fertile colonies, ca 18 mm high, both detached from substrate (sample A) (MNHN-IK-2012-16594); two colonies, 10 and 20 mm high, the largest bearing two gonothecae (sample B), on bryozoan (MNHN-IK-2012-16595).

Remarks

The trophosomes of both samples are indistinguishable morphologically (compare Figs 10M and 10N; 10O and 10P; 10Q–R and 10S–T), but the gonothecae they bear are different. Those in sample A are smaller, provided with 12–14 transverse ridges and a narrow, trumpet-shaped distal tube (Fig. 10U), while those in sample B are comparatively larger, exhibit about 15 ridges, and their distal tube is much wider and has an everted rim (Fig. 10V). Although the gonothecal content in sample A could not be

confidently ascertained, it may prove to be male; that in sample B contains two large ovoid bodies (either oocytes or developing planulas), and is consequently assigned to the female sex.

Vervoort (1993) did not compare his new species with its congeners, and the present identifications are mainly based on the shape of the gonotheca. However, other symplectoscyphid hydroids belonging to the present collection, but not included in this study, exhibit indistinguishable trophosomes, but their gonothecae are of different sizes and bear a varied number of transverse ridges. Consequently, it is felt that the discrimination of species belonging to certain morphologically related groups of *Symplectoscyphus* is not possible in the absence of molecular studies, owing to the absence of reliable morphological characters.

Geographical distribution

New Caledonia (Vervoort 1993), Norfolk Ridge (present study).

Symplectoscyphus paucicatillus sp. nov.
urn:lsid:zoobank.org:act:B00A7B9A-265C-48D9-BDDB-71DB49EA7DE7
Fig. 10W–Z; Table 7

Diagnosis

Symplectoscyphus with monosiphonic stems; branching pseudodichotomous, occurring at irregular intervals; internodes moderately long, slender, geniculate; hydrothecae long, tubular, sigmoid in shape; gonothecae transversely ribbed distally, undulated basally, with trumpet-shaped apical tube.

Etymology

From the Latin words *pauci*, *-ōrum*, meaning a few, and *cātillus*, *-i*, meaning small dish(es), making reference to the shape of the gonotheca, which resembles several stacked dishes.

Material examined

Holotype

BATHUS 4: Stn. DW923, ca 2.8 cm high colony, bearing 3 fully formed and one incipient gonotheca (MNHN-IK-2012-16596).

Paratypes

BATHUS 4: Stn. DW923, two sterile colonies 2 and 3 cm high (MNHN-IK-2012-16597).

Description

Colonies up to 3 cm high arising from creeping, branching hydrorhiza. Stems monosiphonic throughout, composed of a long (up to 1.4 cm), lower, ahydrothecate part, and an upper and longest part bearing hydrothecae. Perisarc rather thick and straw colored, thinning out gradually towards tips of colonies; basally a little tortuous, rapidly becoming straight and smooth. Hydrothecate part divided into rather poorly indicated internodes by means of oblique constrictions of the perisarc slanting in alternate directions; each internode moderately long, slender, distinctly geniculate, bearing a hydrotheca distally. Branching pattern pseudodichotomous; side branches arising at irregular intervals from slightly below a hydrotheca, the latter becoming axillar (Fig. 10X); structure identical to that of stem; first internode not significantly longer compared to subsequent ones; up to 2nd order side branches, and all in roughly one plane, giving the colony a flabellate appearance. Hydrothecae originating at very acute angles with the axis of corresponding internode; long, tubular, slightly sigmoid (facing outward basally and upwards distally); adaxial wall adnate for about ⅓ its length; aperture with three pointed, triangular cusps separated by moderately deep embayments; adaxial cusp produced adaxially; opercular apparatus

usually lost; renovation of margin common. Gonothecae borne on both the main stem and side branches, arising usually from below the hydrothecal bases, occasionally from the axil formed by free adaxial wall with next internode; body elongated ovoid, provided distally with 2–3 broad, conspicuous, transverse ribs, and undulated basally, where it tapers to an indistinct pedicel; apical part a flattened plateau from the center of which arises a short trumpet-shaped tube; sex of gonothecae apparently female, judging from the remains of soft tissues (presence of a spherical body, likely an oocyte).

Remarks

The hydrothecae of this species resemble those of other congeners, but there are points of difference which allow their specific separation, as follows: 1) *S. amoenus* Vervoort &Watson, 2003 is a species with fascicled stems, its hydrothecae are deeper (755–920 µm, compared to 590–625 in the present material), and its gonothecae have undulated walls (Vervoort & Watson 2003); 2) *S. amphoriferus* (Allman, 1877) has comparatively slender hydrothecae (judging from the size of their apertures), and its gonothecae are pear-shaped, with "eleven raised transverse ridges and a slender terminal neck" (Millard 1977); 3) *S. effusus* Vervoort , 1993, but this is a comparatively smaller species (compare Fig. 10G and 10Y); 4) *S. macrocarpus* (Billard, 1918), has more slender [according to the size of their apertures (see Billard 1925b; Schuchert 2003)] and shorter hydrothecae (420–470 µm); in addition, its gonothecae (of both sexes) are characteristically amphora-shaped (Billard 1925b); 5) *S. pedunculatus* (Billard, 1919) has longer, more slender, and less adnate hydrothecae (Billard 1925b; Vervoort 1993).

Geographical distribution

New Caledonia.

Discussion

Large collections of hydroids originating from the tropical western Pacific were obtained during various expeditions of the French Tropical Deep-Sea Benthos program. Their study, entrusted to various experts, yielded a number of reports dealing with several families of thecate hydroids (see Introduction).

The present work, focusing on hydroids of the family Sertulariidae Lamouroux, 1812, is a continuation of the large account published by Vervoort (1993) and the recent study by Galea (2015), who introduced three new genera, *viz*. *Gonaxia*, and *Caledoniana* and *Solenoscyphus*, respectively.

In addition to the genera *Abietinaria* Kirchenpauer, 1884, *Caminothujaria* von Campenhausen, 1896, *Dictyocladium* Allman, 1888, *Dynamena* Lamouroux, 1812, *Geminella* Billard, 1925b, *Hydrallmania* Hincks, 1968, *Idiellana* Cotton & Godfrey, 1942, *Sertularella* Gray, 1848, and *Symplectoscyphus* Marktanner-Turneretscher, 1890 dealt with by Vervoort, members of three other genera, *viz*. *Diphasia* L. Agassiz, 1862, *Salacia* Lamouroux, 1816, and *Sertularia* Linnaeus, 1758, are discussed herein.

Of the forty-three species, belonging to ten genera, dealt with in the present report, 9 are new to Science, and a subspecies is raised to full species level, accompanied by a name change. Of these, two new species of *Gonaxia*, added to the 21 congeners described earlier by Vervoort, raise their number to 23 within the study area. Six and two species are added to the widely distributed and speciose genera *Sertularella* and *Symplectoscyphus*, respectively. Additional hydroids, partly discussed earlier by Vervoort, also occur in the present collection, and additional notes on their morphology are provided. Finally, other hydroids, such as the poorly known *Diphasia cristata* Billard, 1920 and *Salacia macer* Vervoort & Watson, 2003, occurred as fertile colonies, allowing descriptions of their hitherto unknown gonothecae.

As already underlined by Vervoort for the family Sertulariidae, but also by Peña Cantero & Vervoort (2010) for the species of *Acryptolaria* Norman, 1875 (family Lafoeidae Hincks, 1868), the deep-water

species composition in the study area reveals a high degree of endemism. Regarding the sertulariid hydroids, this is especially true with respect to the genera *Caledoniana*, *Gonaxia*, *Sertularella and Solenoscyphus*. Among the main factors involved, the lack of a free-swimming dispersive stage (Peña Cantero & Vervoort 2010) limits the capabilities of an efficient dispersal, causing a marked reproductive isolation and, consequently, a high degree of speciation.

Although the hydroid fauna of the study area can be considered as relatively well investigated, it is likely that, with future sampling, new genera and species will be discovered.

Acknowledgements

Thanks are due to Philippe Bouchet and Pierre Lozouet, both of MNHN, for giving me access to the material described in this paper, and to Aude Andouche for curatorial assistance. The acknowledgements to cruises senior scientists, collectors, captains and crew in Bouchet *et al*. (2008) also apply here. I am grateful to Dr. Dale Calder (Royal Ontario Museum, Toronto, Canada) for his helpful advice on ICZN matters. Sincere thanks are due to Drs Peter Schuchert (MHNG, Switzerland) and Henry H.C. Choong (Fairbanks Museum & Planetarium, USA) for constructive comments on an earlier version of this report. This study was undertaken with no financial support.

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Manuscript received: 22 January 2016
Manuscript accepted: 21 March 2016
Published on: 2 August 2016
Topic editor: Rudy Jocqué
Desk editor: Kristiaan Hoedemakers

Printed versions of all papers are also deposited in the libraries of the institutes that are members of the *EJT* consortium: Muséum national d'Histoire naturelle, Paris, France; Botanic Garden Meise, Belgium; Royal Museum for Central Africa, Tervuren, Belgium; Natural History Museum, London, United Kingdom; Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Natural History Museum of Denmark, Copenhagen, Denmark; Naturalis Biodiversity Center, Leiden, the Netherlands.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: European Journal of Taxonomy

Jahr/Year: 2016

Band/Volume: 0218

Autor(en)/Author(s): Galea Horia R.

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