



## **Three new records of hydroids (Cnidaria: Hydrozoa) from southern Chile**

Authors: Galea, Horia R., Schories, Dirk, and Holtheuer, Jorge

Source: *Revue suisse de Zoologie*, 126(2) : 235-247

Published By: Muséum d'histoire naturelle, Genève

URL: <https://doi.org/10.5281/zenodo.3463457>

---

BioOne Complete ([complete.BioOne.org](https://complete.BioOne.org)) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at [www.bioone.org/terms-of-use](https://www.bioone.org/terms-of-use).

Usage of BioOne Complete content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

---

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

## Three new records of hydroids (Cnidaria: Hydrozoa) from southern Chile

Horia R. Galea<sup>1,\*</sup>, Dirk Schories<sup>2,3</sup> & Jorge Holtheuer<sup>4,5</sup>

<sup>1</sup> Hydrozoan Research Laboratory, 405 Chemin Les Gatiers, F-83170 Tourves, France

<sup>2</sup> Instituto de Ciencias Marinas y Limnológicas, Universidad Austral de Chile, Valdivia, Chile

<sup>3</sup> Forschungszentrum Jülich, Godesberger Allee 105, D-53175 Bonn, Germany

<sup>4</sup> Asesorías Ambientales y Buceo Profesional, Empresa KOJH, Punta Arenas, Chile

<sup>5</sup> Wildlife Conservation Society (WCS), Balmaceda 586, Punta Arenas, Chile

\* Corresponding author: horia.galea@gmail.com

**Abstract:** Three new records of hydroids from the Chilean side of the Strait of Magellan are dealt with herein: *Symplectoscyphus marionensis* Millard, 1971 is redescribed, the occurrence of *Sertularella implexa* (Allman, 1888) in Chile is confirmed, and the new species *Egmundella magellanica* sp. nov. is described.

**Keywords:** Taxonomy - Chilean Patagonia - fjords - Southeast Pacific.

### INTRODUCTION

During the last two decades, the hydrozoan fauna of Chile received increasing attention, with a series of taxonomic studies having been published on the group (Galea, 2007; Galea & Schories, 2012; Galea *et al.*, 2007, 2009, 2014). An inventory of the invertebrate fauna of the country continues.

Influenced by waters of the Strait of Magellan, the Almirantazgo Sound is a deep and narrow inlet of the sea, about 80 km long, oriented NW to SE, and ending in Caleta María and Jackson Bay. On its southern coast lie three large bays (*viz.* Brookes, Ainsworth and Parry) connected to the Cordillera Darwin, the southernmost tip of the Andes. Several field trips and expeditions have been undertaken in recent years in southern Patagonia, but none of them focused on Parry Bay. The Wildlife Conservation Society, Punta Arenas, Chile, organized in February 2018 a survey to study the abundance and distribution of the commercial scallops *Zygochlamys patagonica* and *Chlamys vitrea*, and their associated fauna at Parry Bay. Both scallops are only fished by the native population. Sampling started in the Strait of Magellan and then along the Almirantazgo Sound, down to Parry Bay (Fig. 1). Among other animal groups sampled, three hydroid species, representing new records for Chile, are discussed herein.

### MATERIAL AND METHODS

Sampling was done, using SCUBA, by two of us (DS and JH). The collected specimens were fixed in 10% formalin in seawater, and observations were done on preserved material using the methods described in Galea (2007). The study material is deposited in collections of the Muséum d'histoire naturelle de Genève, Switzerland, whose catalogue numbers are indicated by MHNG-INVE- followed by 6-digit numbers.

### TAXONOMY AND RESULTS

**Order Leptothecata Cornelius, 1992**  
**Family Symplectoscyphidae Maronna *et al.*, 2016**  
**Genus *Symplectoscyphus***  
**Marktanner-Turneretscher, 1890**

***Symplectoscyphus marionensis* Millard, 1971**  
 Figs 2-3; Table 1

*Symplectoscyphus marionensis* Millard, 1971: 405, fig. 7. – Blanco, 1980: 200, figs 6-13. – Blanco, 1984: 261, figs 1, 2. – Branch & Williams, 1993: 13, unnumbered fig. – Blanco, 1994a: 154. – Blanco, 1994b: 204.

**Material examined:** MHNG-INVE-129717; Chile, Región de Magallanes y de Antártica Chilena, Strait of Magellan, Stn. 1, WGS84: -53.82408 -71.06608,

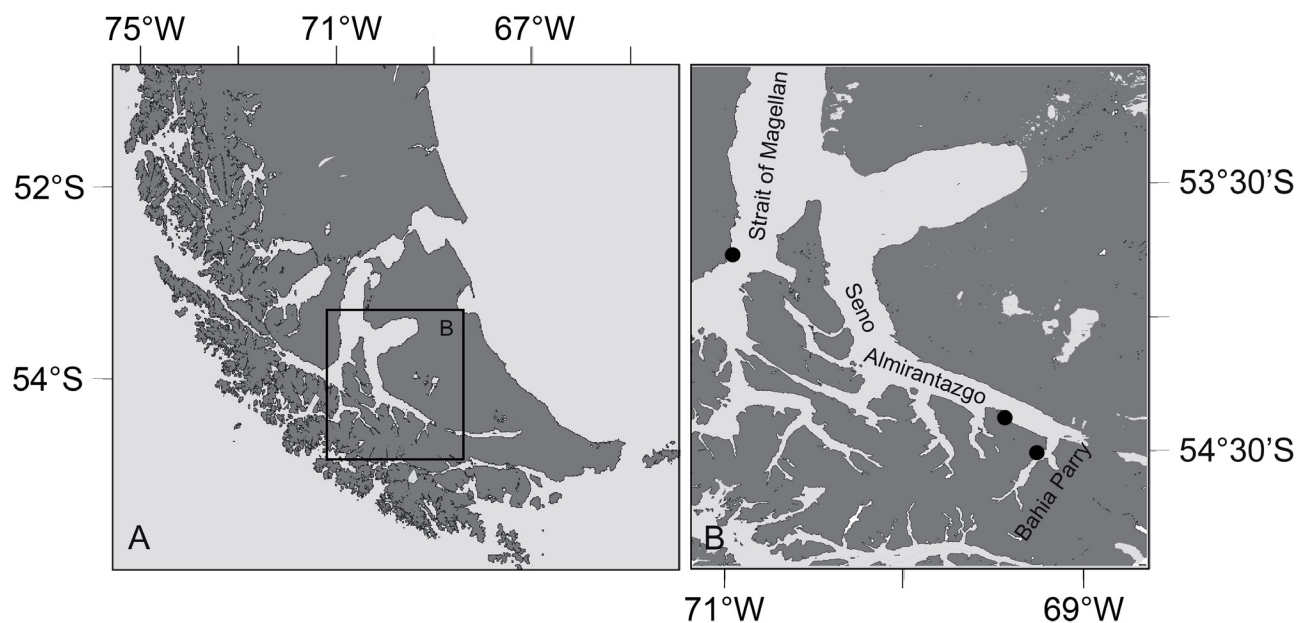


Fig. 1. Map of southern Chile and detail of the study area with the sampling stations.

5-10 m, coll. Schories & Holtheuer, 01.02.2018; fertile colony on crab carapace.

**Description:** Colony composed of numerous erect (though unable to support themselves when out of liquid), simple, monosiphonic, up to 2.5 cm high, stems arising from tubular, irregularly-branched hydrorhiza creeping on surface of a crab carapace; perisarc rather thick, striated obliquely, and straw-colored to transparent. Stems with a number of spiral twists (1 to 4 observed) just above their origin from the stolon, then divided into regular internodes by means of deep, oblique constrictions of the perisarc slanting in alternate directions; perisarc thick, with smooth surface, brownish at nodes and straw-colored to transparent elsewhere. Internodes short, slightly geniculate, swollen proximally, then gradually yet distinctly expanding so as to accommodate laterally a hydrotheca, just below the distal node. Side branches pinnately-arranged along the stem and with similar structure, generally given off singly, every 4 stem hydrothecae, by means of short, swollen apophyses borne immediately below the hydrothecal bases. Not rarely, apophyses arise more irregularly, every 1 to 9 hydrothecae, depending on the development of the colony. Branches are generally alternate along the stem. Apophyses are given off on one side of the hydrothecae, not laterally so as to form a coplanar structure; thus, the resulting colony is three-dimensional, displaying decidedly a frontal and a dorsal side, the majority of branches being shifted on anteriorly, forming a wide angle between the two rows. Occasionally, apophyses are also, here and there, given off posteriorly, but this does not alter maintenance of the pinnate structure of the colony. In addition, couples of

branches may be rarely given off from both sides of a hydrotheca, forming pairs flanking that theca. Aberrant origins for the side branches are to be found from within some incompletely-formed stem hydrothecae. Main branches rebranch again, forming up to 5th order branches. In all cases, the lower-order branches are significantly shifted with respect to their preceding counterparts, since the apertures of their hydrothecae are situated in a plane forming an almost right angle with that of the hydrothecae belonging to the immediately higher-order branch: while the stem hydrothecae are shifted on to the anterior side of the colony, those of the 1st order branches face upwards, and so on. First internode of a side branch slightly longer than the subsequent ones, with a couple of proximal twists of the perisarc; ordinary internodes of comparable length to those of the stem. Occasionally, clinging organs are given off from tips of both stem and branches, below the hydrothecae; multilobate, flattened laterally, with thick perisarc, gradually becoming thinner towards tips. Hydrothecae alternate, in two parallel rows, generally forming a right angle, occasionally more or less pronounced; tubular, 36-45% adnate to the corresponding internode, gently curving upwards and outwards; free adaxial and abaxial walls slightly convex, with smooth perisarc, comparatively thinner on the former; a perisarc plug at junction between the adnate adaxial wall and the base, occasionally with large, rounded fenestra immediately below or slightly overlapping the base; aperture distinctly thickened, provided with 3 conspicuous, pointed triangular cusps with rounded tips, one adaxial and two latero-abaxial, separated by deep, rounded embayments;

adaxial cusp distinctly produced and comparatively less developed than its lateral counterparts; no internal, submarginal cusps; renovations occasional, occurring generally singly. Gonothecae borne on both stems and side branches, predominant on the latter; arising singly, immediately below the hydrothecal bases, on one side of the theca, to which one of their basal walls is apposed, being thus flattened there; sex not determinable in the present material; elongated-oval, tapering below into an indistinct pedicel, above transversely wrinkled, with 6 to 8 complete annular ridges, not forming a spiral, and gradually fading away proximally; distally a rounded, slightly depressed plateau on the top of which is inserted a short, terminal tube, imperceptibly constricted in middle, occasionally somewhat flared at aperture. Cnidome: small and large, banana-shaped microbasic mastigophores, none seen discharged.

**Dimensions:** See Table 1.

**Remarks:** The characteristic, unilateral branching pattern met with in *S. marionensis* results in colonies

whose appearance (Fig. 2) resembles that of *S. allmani* Hartlaub, 1901, described by Galea *et al.* (2017). This feature was not particularly emphasized by Millard (1971) in her original account, although it is evident from her fig. 7D. The mode of branching and the shape of its gonotheca (her figs 7C and 7B, respectively) leave little doubt that we are dealing with the same species.

A redescription of *S. marionensis*, based on material from Staten Island, Argentina, was given by Blanco (1980), who was able to compare her specimens to the holotype. In her account, the unilateral position of hydrothecae and branches, as well as the thickening of the hydrothecal rim, are clearly emphasized.

The size of the colonies reaches as much as 5 cm (Blanco, 1980) or 6 cm (Millard, 1971) high. Millard (1971) observed terminal stolonization in her material, while clinging organs occur in ours.

A number of additional nominal species of *Symplectoscyphus* occur along the coasts of South America, namely: *S. affinis* (Hartlaub, 1901) (Hartlaub, 1905), *S. bathyalis* Vervoort, 1972 (original account),

Table 1. Measurements of *Symplectoscyphus marionensis* Millard, 1971, in  $\mu\text{m}$ .

	Present study	Millard (1971) holotype	Blanco (1980)
<b>Stolon</b>			
- diameter	205-250	-	180-380
<b>Internodes</b>			
- 1st internode, length	780-890	-	-
- ordinary internode, length	465-680	630-800	400-580
- diameter at node	120-210	-	160-290
- apophysis for branch, length	145-205	-	-
<b>Hydrothecae</b>			
- abaxial length	340-370	330-620	410-470
- free adaxial length	315-390	360-480	290-350
- adnate adaxial length	190-260	220-340	190-270
- free adaxial/adnate adaxial wall ratio	1.18-1.95	-	-
- adnate part/ adaxial wall ratio	0.36-0.45	0.34-0.49	-
- base width	160-180	-	-
- maximum width	240-280	-	280-310
- diameter at aperture	230-270	270-300	250-270
<b>Gonotheca</b>			
- total length	1325-1730	1260-2230	1580-1930 (♀)
- maximum width	550-720	500-930	640-880 (♀)
- tube length	105-130	-	110-150 (♀)
- tube width in middle	100-125	-	-
- tube diameter at aperture	115-135	-	210-240 (♀)
<b>Cnidome</b>			
- small mastigophores (length $\times$ width)	(5.9-6.2) $\times$ (1.8-1.9)	-	-
- large mastigophores (length $\times$ width)	(8.9-9.9) $\times$ (2.5-2.7)	-	-

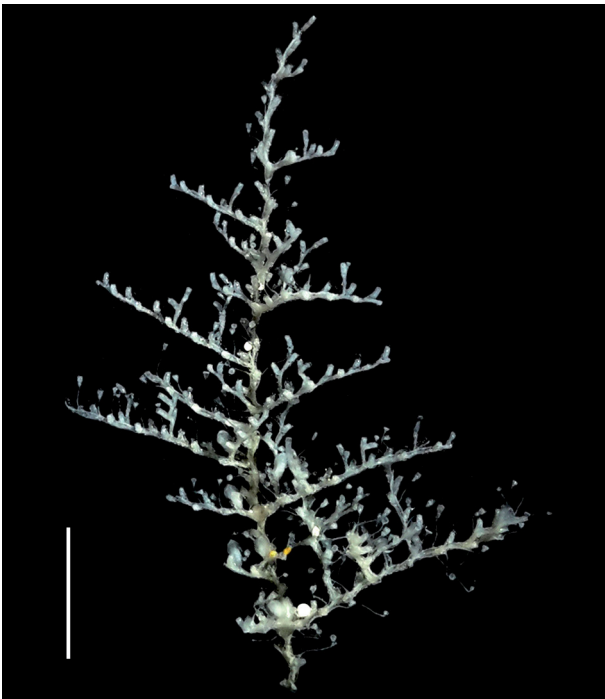
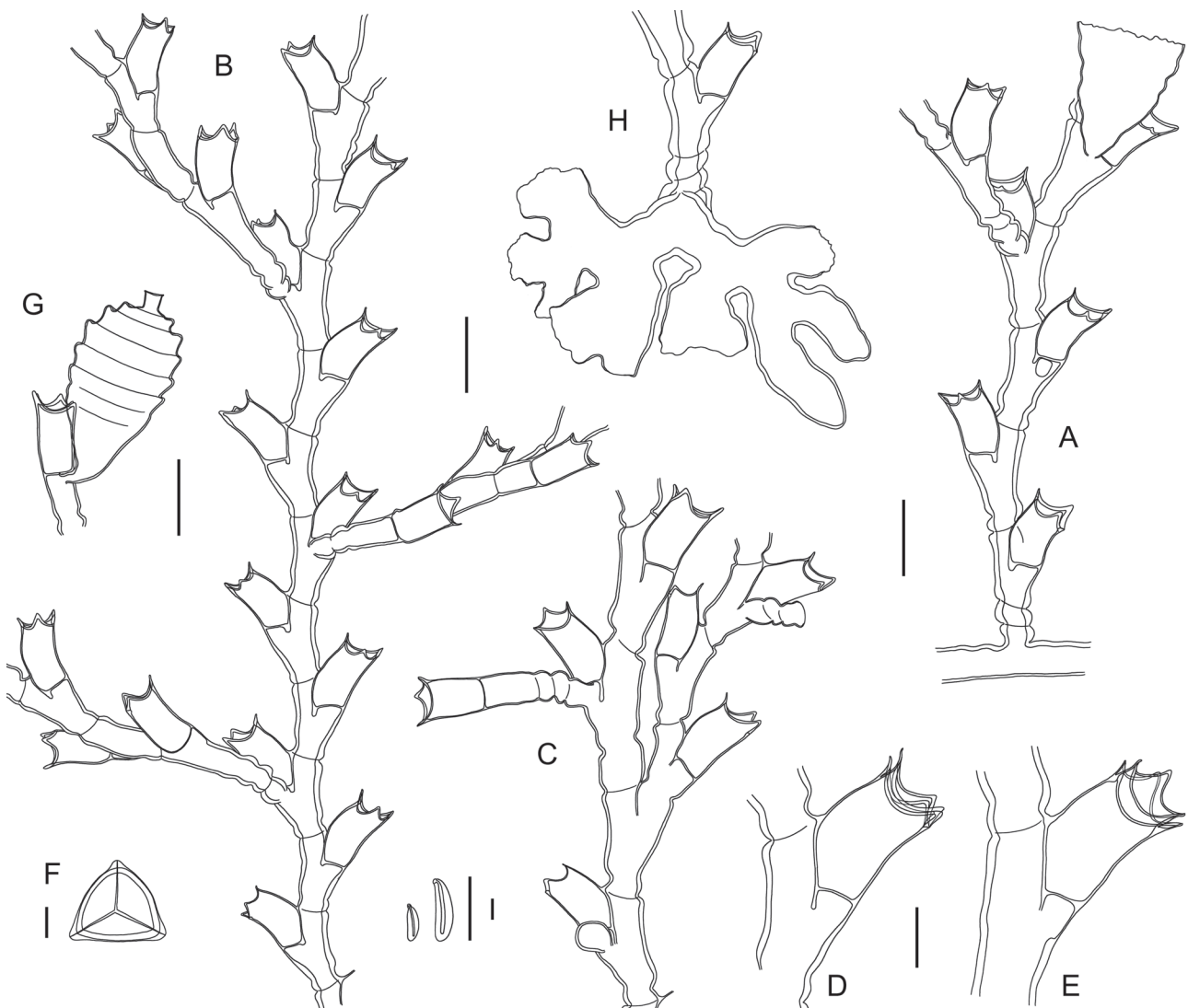


Fig. 2. *Symplectoscyphus marionensis* Millard, 1971. Macro-photograph of a preserved fertile stem highly invested by a colony of *Campanularia lennoxensis* Jäderholm, 1903. Scale bar: 0.5 cm.

Fig. 3. *Symplectoscyphus marionensis* Millard, 1971. (A) Basal part of a colony. (B) Portion of stem with proximal part of three consecutive side branches arising through apophyses below the stem hydrothecae. (C) Aberrant origin of a branch from within a hydrotheca. (D) Hydrothecae from proximal part of a stem, (E) from a branch, and (F) aperture with its closing apparatus in frontal view. (G) Gonotheca and its relative position to the corresponding hydrotheca, seen laterally. (H) Clinging organ borne on middle portion of a branch. (I) Cnidome. Scale bars: 10  $\mu$ m (I), 100  $\mu$ m (F), 200  $\mu$ m (D, E), 500  $\mu$ m (A-C, G, H).



*S. chubuticus* El Beshbeeshy, 2011 (original account), *S. filiformis* (Allman, 1888) (Galea, 2007; Galea & Schories, 2012), *S. flexilis* (Hartlaub, 1901) (Galea & Schories, 2012; Galea *et al.*, 2014), *S. interruptus* (Pfeffer, 1889) (Galea & Schories, 2012), *S. leloupi* El Beshbeeshy, 2011 (original account; Galea *et al.*, 2009), *S. magellanicus* (Marktanner-Turneretscher, 1890) (Galea, 2007; Galea & Schories, 2012), *S. milneanus* (d'Orbigny, 1842) (Galea *et al.*, 2009), *S. modestus* (Hartlaub, 1901) (Hartlaub, 1905), *S. paraglacialis* El Beshbeeshy, 2011 (original account; Galea & Schories, 2012), *S. patagonicus* Galea & Schories, 2012 (original account), *S. salvadorensis* El Beshbeeshy, 2011 (original account), *S. semper* Galea & Schories, 2014 (Galea *et al.*, 2014), *S. singularis* El Beshbeeshy, 2011 (original account), *S. subarticulatus* (Coughtrey, 1875) (Galea *et al.*, 2014), *S. unilateralis* (Lamouroux, 1824) (Galea *et al.*, 2014), *S. valdesicus* El Beshbeeshy, 2011 (original account), and *S. vervoorti* El Beshbeeshy, 2011 (original account).

*Symplectoscyphus affinis* was regarded as a junior synonym of *S. magellanicus* by Vervoort (1972). So were *S. modestus* and *S. interruptus* by Galea & Schories (2012). These statements, however, require a reexamination of the types to be confirmed.

Among the nominal species listed above, *S. marionensis* is distinctive through its unilateral arrangement of both hydrothecae and side branches, a condition only encountered in the stems of the otherwise rarely branched *S. unilateralis*. However, their respective gonothecae are morphologically different, and the trophosome of the latter is comparatively smaller in all proportions.

It should be also noted that side branches of *S. marionensis* are not given laterally, but from insertion points in front or the rear side of its hydrothecae, just below their bases, and consequently do not lie in one plane with the stem (Fig. 3B). A similar branching pattern, with no true axillar hydrothecae, is also met with in some other congeners, e.g. *S. flexilis* (fig. 6C in Galea & Schories, 2012; fig. 4E<sup>1</sup> in Galea *et al.*, 2014) and *S. paraglacialis* (fig. 6L in Galea & Schories, 2012).

**Distribution:** South-African sub-Antarctic islands – Marion Island [Prince Edwards islands, (Millard, 1971)]. Argentina – Isla de los Estados (Blanco, 1980, 1984, 1994b). Chile – Región de Magallanes y Antártica Chilena [Strait of Magellan (present study)].

#### Family Sertularellidae Maronna *et al.*, 2016

##### Genus *Sertularella* Gray, 1848

##### *Sertularella implexa* (Allman, 1888)

Figs 4-5; Table 2

*Sertularia implexa* p.p. Allman, 1888: 54, pl. 26 figs 1, 1a. – Hartlaub, 1901: 90. – Bedot, 1916: 223. – Galea *et al.*, 2017: 282, figs 12B, 13A-D.

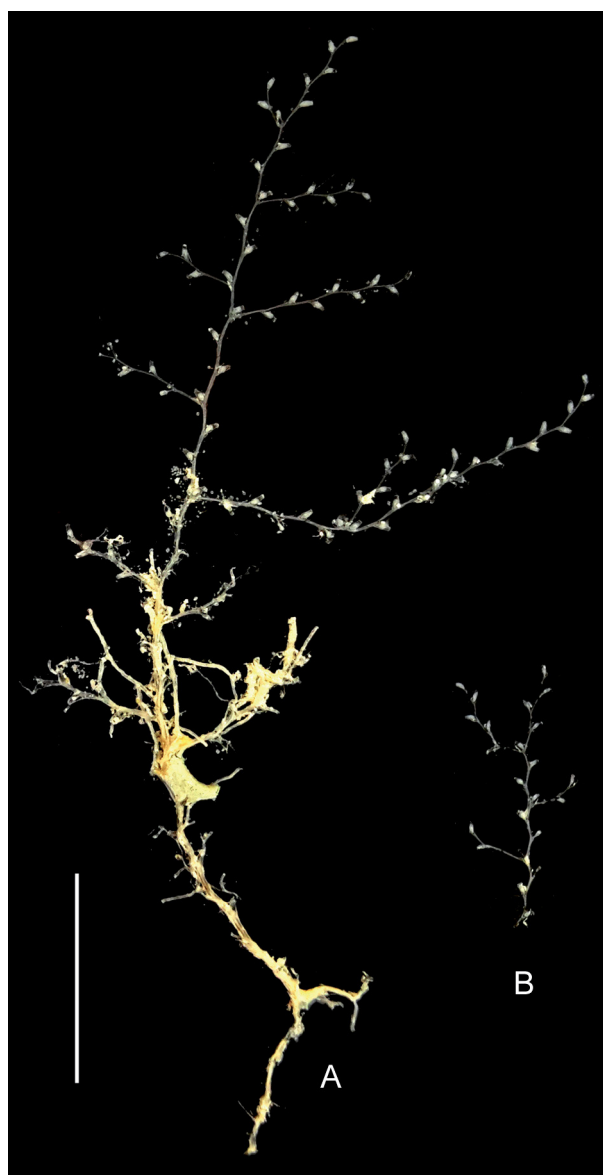


Fig. 4. *Sertularella implexa* (Allman, 1888). Preserved specimens from (A) MHNG-INVE-129724 and (B) MHNG-INVE-129727. Scale bar: 1 cm.

non *Sertularella implexa*. – Galea & Schories, 2012a: 40, pl. 3 fig. 4F-J (= *Sertularella recta* Galea & Schories, 2017).

*Sertularella picta*. – Vervoort, 1972: 113, figs 34, 35C [non *Sertularella picta* (Meyen, 1834) = *Sertularella gaudichaudi* (Lamouroux, 1824)].

non *Sertularella picta*. – Vervoort, 1972: 114, fig. 35A, B (= *Sertularella fuegonensis* El Beshbeeshy, 2011).

**Material examined:** MHNG-INVE-129724; Chile, Región de Magallanes y de Antártica Chilena, Bahía Parry, Stn. 3, WGS84: -54.64663 -69.38810, 10-20 m, coll. Schories & Holtheuer, 05.02.2018; five sterile colonies, 3.5-5.0 cm high. – MHNG-INVE-129727; Región de Magallanes y de Antártica Chilena, Bahía Parry, Stn. 3, WGS84: -54.64663 -69.38810, 10-20 m,

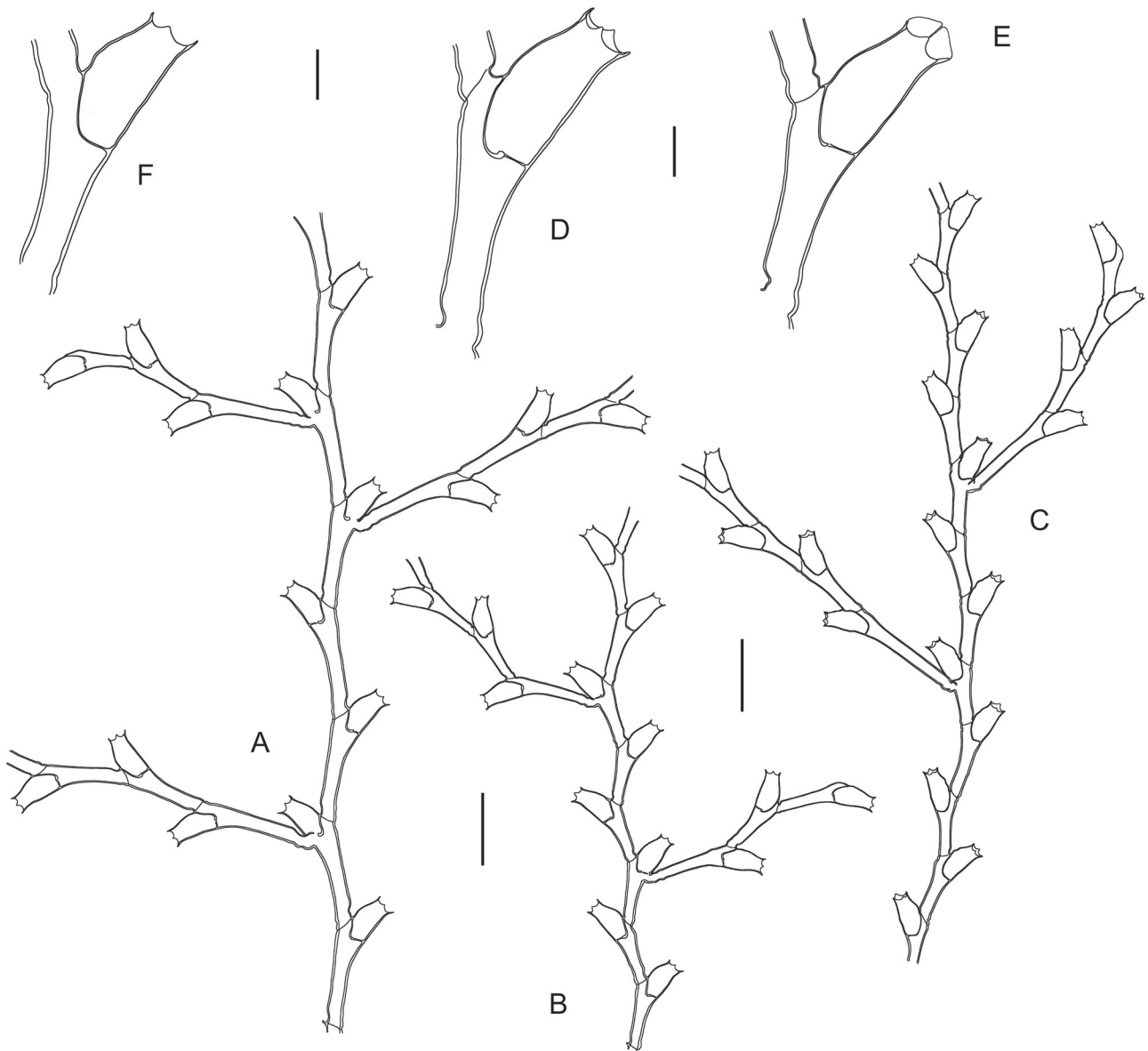


Fig. 5. *Sertularella implexa* (Allman, 1888). Fragments of colonies from (A) MHNG-INVE-129724 and (B) MHNG-INVE-129727. (C) Comparison with the holotype, NHML 1888.11.13.42 (Natural History Museum, London, United Kingdom), the latter reproduced from Galea *et al.* (2017). (D-F) Hydrothecae from the same sources, respectively. Scale bars: 200  $\mu$ m (D-F), 1 mm (A-C).

coll. Schories & Holtheuer, 05.02.2018; three sterile stems, 0.9-1.2 cm high. – MHNG-INVE-129721; Región de Magallanes y de Antártica Chilena, Bahía Parry, Stn. 2, WGS84: -54.66090 -69.37640, 20-30 m, coll. Schories & Holtheuer, 03.02.2018; two sterile stems, 1.7 and 2.3 cm high.

**Dimensions:** See Table 2.

**Remarks:** The colonies from sample MHNG-INVE-129721 are similar to those from sample MHNG-INVE-129727 (Fig. 5B) regarding their small size and the length of their internodes, compared to the larger, yet still monosiphonic colonies with longer internodes

present in sample MHNG-INVE-129724 (Fig. 5A). Despite these minor differences, all materials in hand show no specific differences with the type of *S. implexa* that was reexamined, redescribed and illustrated by Galea *et al.* (2017), and reproduced here in Fig. 5C. A comparison of their measurements is given in Table 2. Only branches of maximum 2nd order occur in the present material, with two consecutive branches being separated by 1-12 successive hydrothecae, the latter lying in one plane, and having the perisarc of their free adaxial wall smooth; their apertures may be renovated 1-3 times, and there are no internal, submarginal projections of the perisarc.

Table 2. Measurements of *Sertularella implexa* (Allman, 1888), in  $\mu\text{m}$ .

	Present study MHNG-INVE-129724	Present study MHNG-INVE-129727	Galea <i>et al.</i> (2017) holotype NHM 1888.11.13.42
<b>Internode</b>			
- ordinary internode, length	920-1530	845-995	690-1155
- 1st internode, length	1290-1740	1225-2185	1655-2010
- diameter at node	145-270	140-165	160-180
<b>Hydrotheca</b>			
- free adaxial length	410-440	410-445	360-440
- adnate adaxial length	300-325	235-255	255-290
- abaxial length	585-620	530-540	560-595
- base width	145-170	165-190	-
- maximum width	290-315	290-305	275-310
- diameter at aperture	240-260	220-245	195-235

As noted by these authors, the type material, as well as the present specimens, are sterile. Gonothecae are only known from the material likely incorrectly assigned by Vervoort (1972) to *S. picta* (Meyen, 1834), and believed to belong, with little doubt, to the present species (Galea *et al.*, 2017).

**Distribution:** Chile – Región de Magallanes y Antártica Chilena [off Isla Nueva (Vervoort, 1972, as *S. picta*), Bahía Parry (present study)]. Argentina – Provincia de Santa Cruz [off Deseado (Vervoort, 1972, as *S. picta*)]; Provincia de Tierra del Fuego, Antártida e Islas del Atlántico Sur [off Isla de los Estados (Vervoort, 1972, as *S. picta*)]. Between Cabo Virgenes and the Falkland Is. (Allman, 1888).

**Family Campanulinidae Hincks, 1868**  
**Genus *Egmundella* Stechow, 1921**

***Egmundella magellanica* sp. nov.**

Fig. 6; Table 3

**Type material:** MHNG-INVE-129725; Chile, Región de Magallanes y de Antártica Chilena, Bahía Parry, Stn. 3, WGS84: -54.64663 -69.38810, 10-20 m, coll. Schories & Holtheuer, 05.02.2018; profuse colony, epizoic on *Bougainvillia muscus* (Allman, 1863); gonothecae rare; at least one with intact gonophore.

**Diagnosis:** Colony stolonial with simple, pedicellate hydrothecae, nematothecae and gonothecae arising from creeping, branching, anastomosing hydrorhiza. Hydrotheca almost tubular, tapering slightly below and merging gradually and imperceptibly with its pedicel; basally a thin diaphragm, distally a filmy, pleated operculum, not delimited basally by crease line. Nematothecae elongate. Gonothecae long, tubular,

smooth-walled, borne on pedicels of varied length, distally with pleated operculum. Gonophore a medusa.

**Etymology:** Named after its geographical area of occurrence, the Strait of Magellan.

**Description:** Colony stolonial, arising from branching, anastomosing hydrorhiza creeping on stem and branches of a hydroid host. Hydrothecae borne singly on top of pedicels of variable length; pedicels with a varied number (generally 2-4) of twists proximally, smooth or with scattered wrinkles elsewhere, though never below the hydrotheca; the latter almost tubular, gently tapering proximally and merging gradually and imperceptibly into its pedicel; separation marked by thin, though distinct, diaphragm; operculum consisting of the filmy, distal perisarc, forming contiguous triangular pleats (not distinct flaps) that meet centrally to form a pyramidal roof; no crease line between the hydrothecal wall and operculum. Hydranths with 22-24 filiform tentacles. Nematothecae scattered on hydrorhiza, pedicellate, with single, distal, ovoid chamber filled with a cluster of banana-shaped nematocysts; perisarc distinctly thickened on pedicel, comparatively thinner around the battery of nematocysts, leaving a small apical, circular aperture. Gonothecae arising from hydrorhiza, borne on either short, spirally-twisted or long, thin, centrally smooth pedicels; tubular, much longer and wider than the hydrothecae; perisarc smooth, except distally where it forms a pleated operculum around the distal aperture, similar to that of the hydrothecae. The gonophore, rather opaque in this fixed material, is most probably a medusa bud. Cnidome of the hydranth: small microbasic mastigophores; elongated-ovoid, unipolarly-curved haplonemes; long, thin, fusiform, gently curved heteronemes; long, fusiform, comparatively stouter heteronemes.



Table 3 (part). Morphological differences between the nominal species with *Campanulina*-like hydroids and stolonar nematocystae. Measurements in  $\mu\text{m}$ . C stands for *Cyclocanna* Bigelow, 1918, E for *Egmundella* Stechow, 1921, and O for *Oplorhiza* Allman, 1877.

Colony	<i>Egmundella magellanica</i> sp. nov.	<i>O. diaphragmata</i> Naumov, 1960	<i>E. fusciculata</i> Fraser, 1940	<i>E. gracilis</i> Stechow, 1921	<i>E. grandis</i> Fraser, 1941	<i>E. grimaldii</i> Leloup, 1940	<i>E. humilis</i> Fraser, 1936
- stem condition	Monosiphonic, simple	Monosiphonic, either simple or ramified	Polysiphonic, ramified	Monosiphonic, simple	Monosiphonic, simple	Monosiphonic, simple	Monosiphonic, simple
<b>Pedicle</b>							
- length	1000-7000	-	-	<sup>(1)</sup> 2000-4000 <sup>(2)</sup> 286-703	Ca. 3000	Ca. 300	<sup>(1)</sup> < 400
- diameter	65-80	-	-	50-60	-	100	-
<b>Hydrotheca</b>							
- length	520-805	500-600	-	<sup>(2)</sup> 354-400	700-800	600-950	<sup>(1)</sup> Ca. 400
- max. width	160-210	250-300	-	<sup>(2)</sup> 131-143	-	300-400	-
- diaphragm and width at this level	Present Width 100-135	Present	Not stated	<sup>(3)</sup> Present	Not stated	Present	<sup>(2)</sup> Present
<b>Gonotheca</b>							
- shape	Long, tubular, smooth-walled, borne on either short or exceedingly long pedicel; operculum pleated	Long, conical, borne on spirally-twisted pedicel. Identity not sure.	Not known	Not known	Not known	Not known	<sup>(2)</sup> Sessile, cylindrical, tapering abruptly below, wrinkled walls, operculum pleated
- height	2770-2845	-	-	-	-	-	<sup>(2)</sup> Ca. 700
- maximum width	430-490	-	-	-	-	-	<sup>(2)</sup> Ca. 300
<b>Nematocystae</b>							
- origin	Hydrothiza	Hydrothiza and hydrothecal pedicels	Accessory tubes and hydrothecal pedicels	Hydrothiza and hydrothecal pedicels	Hydrothiza and hydrothecal pedicels	Hydrothiza	<sup>(1)</sup> Hydrothiza
- shape	Elongated	Elongated	Globular	Elongated	Spherical	Elongated	Globular
- length	80-120	100-110	-	<sup>(1)</sup> Ca. 100 <sup>(2)</sup> 88-96	-	-	-
- max. width	30-35	50-60	-	<sup>(1)</sup> Ca. 40 <sup>(2)</sup> 43-45	-	30-40	-
<b>Distribution</b>	Southern Chile	Sea of Okhotsk (Russian Federation)	Off Martha's Vineyard (Massachusetts, USA)	<sup>(1)</sup> Vancouver (British Columbia, Canada) <sup>(2)</sup> Southern Chile	Off mouth of Chesapeake Bay (Virginia, USA)	Off Island of Newfoundland and Labrador, Canada	Sagami Bay (Japan)
<b>Reference(s)</b>	Present study	Naumov (1969)	Fraser (1940)	<sup>(1)</sup> Stechow (1921) <sup>(2)</sup> Galea (2007) <sup>(3)</sup> Present study	Fraser (1941)	Leloup (1940)	<sup>(1)</sup> Fraser (1936) <sup>(2)</sup> Hirohito (1995)

Table 3 (continued). Morphological differences between the nominal species with *Campanulina*-like hydroids and stolonial nematothecae. Measurements in  $\mu\text{m}$ . C stands for *Cyclocanna* Bigelow, 1918, E for *Egmondella* Stechow, 1921, and O for *Oplorhiza* Allman, 1877.

Colony	<i>E. modesta</i> Millard & Bouillon, 1975	<i>O. parvula</i> Allman, 1877	<i>E. polynema</i> Fraser, 1948	<i>C. producta</i> (G.O. Sars, 1874)	<i>E. sibogae</i> Billard, 1940	<i>E. superba</i> Stechow, 1921	<i>E. valdiviae</i> Stechow, 1925
- stem condition	Monosiphonic, simple	Monosiphonic, simple	Monosiphonic, either simple or ramified	Monosiphonic, simple	Monosiphonic, simple	Monosiphonic, simple	Monosiphonic, simple
<b>Pedicle</b>							
- length	140-710	Ca. 200	< 3600 (simple), < 4500 (ramified)	3000-6000	80-825	(1) < 6000 (2) Ca. 8000	(1) 900-1000 (2) Ca. 675
- diameter	30-50	-	-	80-90	-	(1) Ca. 80	(1) Ca. 35
<b>Hydrotheca</b>							
- length	200-330	-	Ca. 1000	500-800	495-695	(1) Ca. 800 (2) Ca. 540	(2) Ca. 235
- max. width	80-110	-	Ca. 250	280-320	100-130	(1) Ca. 250 (2) Ca. 280	(1) Ca. 140 (2) Ca. 150
- diaphragm and width at this level	Present	Present	Present	Present	Reportedly absent	Reportedly absent	Not detectable
<b>Gonotheca</b>							
- shape	Not known	Not known	Sessile, long, tubular, striated longitudinally, operculum pleated	Fan-shaped, strongly flattened, borne on short pedicel; operculum slit-like	Long, tubular, smooth-walled, either sessile or borne on short pedicel, operculum pleated	Not known	Not known
- height	-	-	Ca. 1800	1500-4400	1190-1290	-	-
- maximum width	-	-	Ca. 250	1700-4600	220-315	-	-
<b>Nematothecae</b>							
- origin	Hydrorhiza	Hydrorhiza	Hydrothecal pedicels	Hydrorhiza	Hydrorhiza	Hydrorhiza	Hydrorhiza
- shape	Globular	Elongated	Elongated	Slightly elongated	Elongated	Elongated	Elongated
- length	40-50	-	-	60-100	-	(1,2) Ca. 110	(1) Ca. 45 (2) Ca. 50
- max. width	20-40	-	-	-	-	-	(1) Ca. 20 (2) Ca. 22
<b>Distribution</b>	Mahé Island (Republic of Seychelles)	Marquesas Keys (Florida, USA)	Cedros Island (Baja California, Mexico)	N Atlantic to high Arctic	Between New Guinea and Seram; Sumbawa (Indonesia)	St. Thomas (US Virgin Islands)	W Sumatra (Indonesia)
<b>Reference(s)</b>	Millard & Bouillon (1975)	Allman (1877)	Fraser (1948)	Schuchert (2016)	Billard (1940)	(1) Stechow (1923) (2) Vervoort (1966)	(1) Stechow (1925) (2) Vervoort (1966)

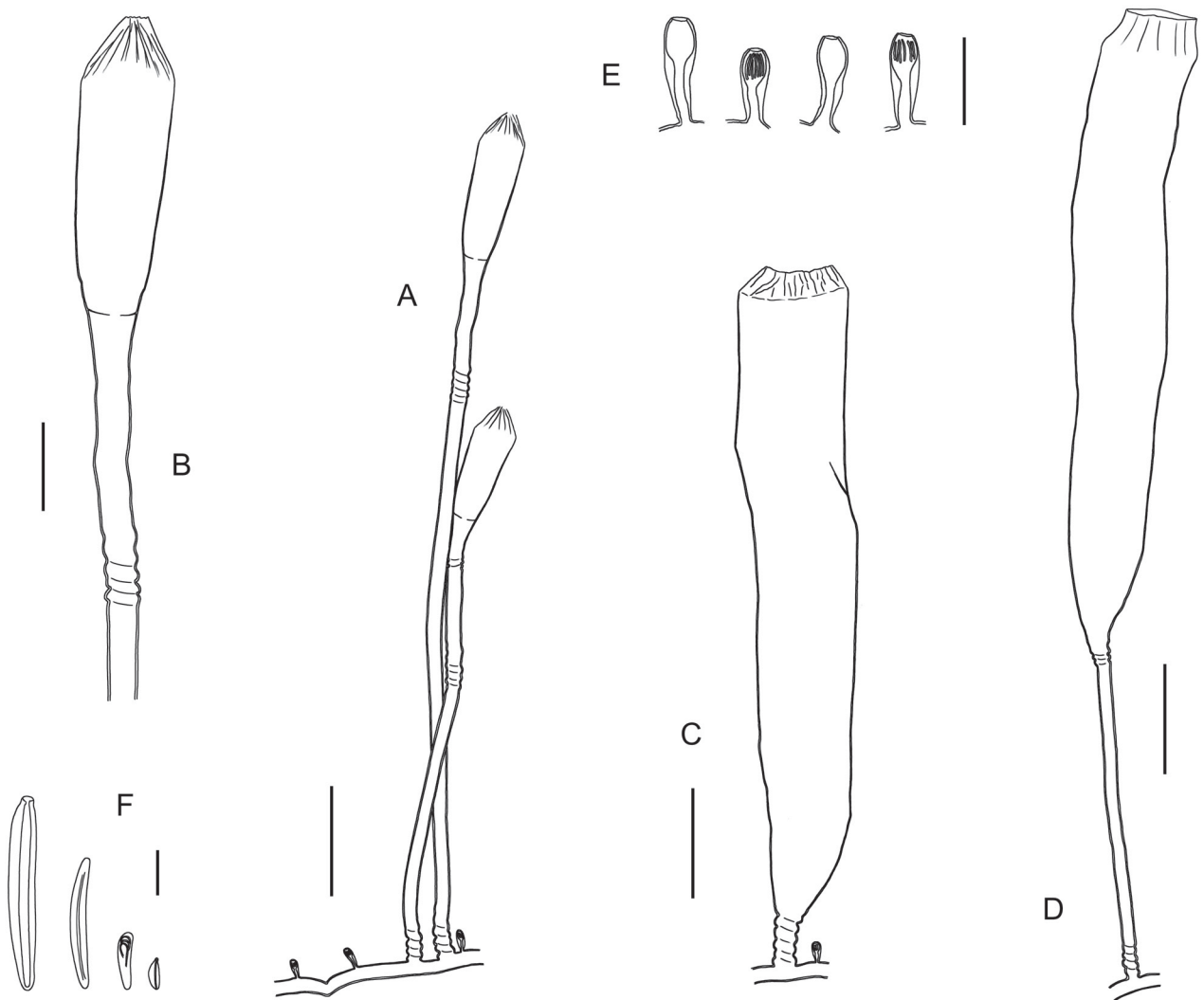


Fig. 6. *Egmundella magellanica* sp. nov. (A) Portion of hydrorhiza with two erect shoots and nematothecae. (B) Detail of a hydrotheca. (C) Gonothecae on short and (D) long pedicels. (E) Stolonal nematothecae, to show variation in shape and size. (F) Cnidome of the hydranth. Scale bars: 10  $\mu\text{m}$  (F), 100  $\mu\text{m}$  (E), 200  $\mu\text{m}$  (B), 500  $\mu\text{m}$  (A, C, D).

**Dimensions:** See Table 3 for measurements of the tropho- and gonosome, and a comparison with its congeners. Cnidome: microbasic mastigophores (7.2–7.4)  $\times$  (2.0–2.3)  $\mu\text{m}$ , haplonemes (11.6–15.7)  $\times$  (2.6–3.7)  $\mu\text{m}$ , small heteronemes ca. 27.9  $\times$  3.8  $\mu\text{m}$ , large heteronemes (39.8–43.0)  $\times$  (5.6–6.2)  $\mu\text{m}$ .

**Remarks:** The current distinction between *Oplorhiza* Allman, 1877 and *Egmundella* Stechow, 1921 mainly relies in the shape of their hydrothecae, supposedly ovoid in the former, and funnel-shaped in the latter (Bouillon *et al.*, 2006). This opinion follows Stechow (1921), who regarded *Egmundella* as not possessing ovoid hydrothecae, the latter showing an imperceptible transition with the hydrocaulus, marked by the presence of a reduced diaphragm. No modern redescription of *O. parvula* Allman, 1877, the type species of *Oplorhiza*, is available to date, in order to check this statement,

given that illustrations of many hydroid species by Allman proved partly inaccurate (*e.g.* Billard, 1910).

However, hydrothecae of *O. parvula* were originally described as “tubular” and “provided with a floor” (Allman, 1877), thus not essentially differing from those of *Egmundella*. Their supposedly ovoid shape is, in our opinion, not a reliable character supporting a generic separation. However, since hydroids belonging to these genera are not yet related to existing medusae, it is likely useless to consider assigning them a definitive taxonomic status. As most records of hydroids with *Campanulina*-like hydrothecae and stolonal nematothecae were assigned to *Egmundella*, this genus is retained to accommodate the hydroid described herein.

Ten nominal species have been assigned so far to *Egmundella*, two others to *Oplorhiza*, and one to *Cyclocanna* Bigelow, 1918 (Table 3). Although the

trophosomes of most appear morphologically uniform, differences in the condition of the stem, the size of the hydrothecae and the shape and position of the nematothecae, could be noted. Gonothecae have been rarely observed in a few species but, when known, they provide reliable characters for a specific separation. In one instance, it has been demonstrated that *Cyclocanna welshi* Bigelow, 1918 is the medusa stage of the hydroid *Egmundella producta* (G.O. Sars, 1874), providing a new nomenclatural combination for this animal, as *Cyclocanna producta* (G.O. Sars, 1874) (Schuchert *et al.*, 2017).

In *Egmundella gracilis* Stechow, 1921, type species of the genus, the hydrothecal wall does not form a crease line at junction with the operculum [“Das Operculum bildet mit der Thekenwand keinen besonders scharfen Rand” (Stechow, 1921)], and this statement is also stressed in the diagnosis of the genus. Although not expressly indicated, but obvious from Stechow’s (1923) fig. Q, the operculum results from a modification of the distal hydrothecal wall, the latter being filmy and pleated there, so as to form a pyramidal roof. In addition, the nematothecae were described as short pedicellate, spherical, monothalamic and immovable [“kurzgestielte, kugelige, einkammerige, unbewegliche Nematophoren mit dicker Peridermwand und einem dicken Bündel sehr großer, langer Nesselkapseln” (Stechow, 1921)].

Although the nematothecae of *O. parvula* are reportedly said to be pedicellate [“in the form of tubular receptacles with an orifice in the summit” (Allman, 1877: 14)], it is not clear whether its hydrothecae possess a pleated operculum. Indeed, the latter is said “cut into thin collapsible segments” (Allman, 1877: 14), and is depicted as such [Allman’s (1877) pl. 7 fig. 2].

Available descriptions of a few nominal species, assigned to either *Egmundella* or *Oplorhiza*, suggest that they may possess hydrothecal opercula composed of multiple, distinct flaps, with or without a basal crease line. It is not clear whether this is a normal condition, or these flaps result from the tearing of the filmy, distal, thecal perisarc. For example, the operculum of *Egmundella grimaldii* Leloup, 1940 is reportedly said to be composed of many pointed, deciduous flaps [“Opercule formé de nombreuses dents pointues, caduques, prolongeant directement l’hydrothèque” (Leloup, 1940: 7)], while that of *Egmundella modesta* Millard & Bouillon, 1975 possesses “triangular segments clearly demarcated from thecal wall” (Millard & Bouillon, 1975: 5); in a previous description of their species, Millard & Bouillon (1973: 43, as ? *Lovenella* sp.) report the following: “Margin indented to take the opercular segments which are sharply demarcated from it”. The operculum of *Oplorhiza diaphragmata* Naumov, 1960 consists of “10-14 narrow triangular plates sometimes folded into a many-sided pyramid over the hydrotheca mouth. No sharp boundary between hydrotheca mouth and operculum” (Naumov, 1969: 337). Reexamination of fresh specimens of these

species is therefore necessary to document the exact condition of their hydrothecal opercula.

Besides *E. magellanica* sp. nov., two other congeners occur in the eastern Pacific, namely *E. gracilis* and *Egmundella polynema* Fraser, 1948. The former, originally found in the Vancouver area (Stechow, 1921), was subsequently recorded from southern Chile (Galea, 2007). It is a species with comparatively smaller hydrothecae (Table 3), characterized by the occurrence of the nematothecae not only on the hydrotheca, but also in small groups a short distance below the thecal bases. The presence of dense clusters of nematothecae on the hydrothecal pedicels of *E. polynema*, as well as its longitudinally striated gonothecae, make it distinct from the new species described herein.

Two hydroids have been described from the western Pacific, viz. *O. diaphragmata* and *Egmundella humilis* Fraser, 1936. The former apparently displays a hydrothecal operculum with a different structure (see above), and its putative gonothecae are long and conical (Naumov, 1969). The latter is a comparatively smaller species than *E. magellanica* sp. nov. (see Table 3), and its gonothecae are sessile and provided with wrinkled walls (Hirohito, 1995).

Although *C. producta* occurs on both sides of the North Atlantic [notably its medusa, see Schuchert (2016)], five other hydroids were recorded exclusively from the western Atlantic: *Egmundella grimaldii* Leloup, 1940, *Egmundella fasciculata* Fraser, 1940, and *Egmundella grandis* Fraser, 1941 occur in cold to temperate areas, while *O. parvula* and *Egmundella superba* Stechow, 1921 are tropical (see original accounts). The morphology and taxonomic position of *C. producta* were discussed by Schuchert (2016) and Schuchert *et al.* (2017), respectively. *Egmundella grimaldii* and *E. superba* have larger hydrothecae than *E. magellanica* sp. nov. (see Table 3), *E. fasciculata* builds polysiphonic colonies (Fraser, 1940), *E. grandis* has nematothecae on both the stolon and hydrothecal pedicels (Fraser, 1941), and *O. parvula* has twisted pedicels immediately below the hydrothecal bases (Allman, 1877), a condition never met with neither in the new species, nor in some of its congeners [e.g. *E. modesta*, see Millard & Bouillon (1975)].

Finally, three additional species occur in the Indian Ocean, viz. *E. modesta*, *Egmundella valdiviae* Stechow, 1925, and *Egmundella sibogae* Billard, 1940. As noted above, the closing apparatus of *E. modesta* may be different from that met with in *E. magellanica* sp. nov., its hydrothecae are comparatively shorter (see Table 3), and its nematothecae are spherical and sessile (Millard & Bouillon, 1975). Although similar in shape, the gonothecae of *E. sibogae* are of smaller proportions (see Table 3), and this species is kept separate mainly on biogeographical grounds. Similarly, based on its geographical origin, the new species is considered as distinct from *E. valdiviae* occurring off West Sumatra.

Linking hydroids and medusae under a unified classification and nomenclature can be challenging. However, even though the life cycle of the present hydroid remains to be studied, it has been decided to create a new species for it, mainly because its morphology is different from that of its two other congeners from the eastern Pacific, *E. gracilis* and *E. polynema*. In addition, based on biogeographical grounds, it is assumed that the tropical *O. parvula*, *E. superba*, *E. modesta*, *E. valdiviae*, and *E. sibogae*, the northwestern Atlantic *E. grimaldii*, *E. fasciculata* and *E. grandis*, as well as the northwestern Pacific *O. diaphragmata* and *E. humilis* could reasonably be excluded from the comparison, besides a series of morphological differences displayed by some of them (Table 3). Moreover, Patagonian medusae are poorly known, and the dispersive stage of *E. magellanica* sp. nov. may well be undescribed.

Sampling new material of hydroids and medusae for molecular studies is required to allow sequence comparisons for matching their life cycles (e.g. Schuchert *et al.*, 2017).

**Distribution:** Chile – Región de Magallanes y Antártica Chilena [Bahía Parry (present study)].

#### ACKNOWLEDGEMENTS

DS and JH are grateful to the scientific divers Mateo Caceres and Hans Bartsch for participation and assistance in the field expeditions. Sampling and sorting the material onboard were inconceivable without the help of Belen Guarda and her team. The field work was supported by the Wildlife Conservation Society. Sincere thanks are due to Drs Dale Calder (Royal Ontario Museum, Toronto, Canada) and Peter Schuchert (MHNG, Switzerland) for their thorough reading of the manuscript and their helpful suggestions.

#### REFERENCES

- Allman G.J. 1863. Notes on the Hydrozoa. I. On the structure of *Corymorpha nutans*. II. Diagnoses of new species of Tubularidae obtained, during the autumn of 1862, on the coasts of Shetland and Devonshire. *Annals and Magazine of Natural History* 3(11)(61): 1-12.
- Allman G.J. 1877. Report on the Hydrozoa collected during the exploration of the Gulf Stream by L. F. de Pourtalès, Assistant United States Coast Survey. *Memoirs of the Museum of Comparative Zoölogy at Harvard College* 5(2): 1-66.
- Allman G.J. 1888. Report on the Hydrozoa dredged by H.M.S. *Challenger* during the years 1873-76. Part II. – The Tubularinae, Corymorphinae, Campanularinae, Sertularinae and Thalamophora. *Report on the Scientific Results of the Voyage of H.M.S. Challenger during the year 1873-76, Zoology* 23(70): 1-90.
- Bedot M. 1916. Matériaux pour servir à l'Histoire des Hydroïdes. 5<sup>e</sup> période (1881-1890). *Revue suisse de Zoologie* 24(1): 1-394.
- Bigelow H.B. 1918. Some medusae and siphonophorae from the western Atlantic. *Bulletin of the Museum of Comparative Zoölogy* 62(8): 363-442.
- Billard A. 1910. Révision d'une partie de la collection des hydroïdes du British Museum. *Annales des Sciences Naturelles, Zoologie* (9)11: 1-67.
- Billard A. 1940. Note sur une espèce nouvelle d'hydroïde: *Egmundella sibogae* (Campanulinidae). *Bulletin de la Société Zoologique de France* 65: 135-137.
- Blanco O.M. 1980. Acerca de dos especies del género *Symplectoscyphus* Stechow, 1924. *Neotrópica* 26(76): 197-203.
- Blanco O.M. 1984. *Symplectoscyphus marionensis* Millard, 1971 (Hydrozoa Thecata) y sus epizoicos. *Revista del Museo de La Plata* 13(146): 261-267.
- Blanco O. 1994a. Claves de familias y géneros para facilitar el reconocimiento de los Hydrozoa (Leptolina) Athecata, Thecata y Limnomedusae Argentinos (generación polipoide exclusivamente). *Revista del Museo de La Plata (Zoología)* 14 (160): 147-179.
- Blanco O. 1994b. Enumeración sistemática y distribución geográfica preliminar de los Hydrozoa de la República Argentina. Suborden Athecata (Gymnoblastea, Anthomedusae), Thecata (Calyptoblastea, Leptomedusae) y Limnomedusae. *Revista del Museo La Plata (Zoología)* 14(161): 181-216.
- Bouillon J., Gravili C., Pagès F., Gili J.M., Boero F. 2006. An introduction to Hydrozoa. *Mémoires du Muséum national d'Histoire naturelle, Paris* 194: 1-591.
- Branch M.L., Williams G.C. 1993. The Hydrozoa, Octocorallia and Scleractinia of subantarctic Marion and Prince Edwards Islands: illustrated keys to the species and results of the 1982-1989 University of Cape Town surveys. *South African Journal of Antarctic Research* 23(1-2): 3-24.
- Cornelius P.F.S. 1992. The Azores hydroid fauna and its origin, with discussion of rafting and medusa suppression. *Arquipélago* 10: 75-99.
- Coughtrey M. 1875. Notes on the New Zealand Hydrozoa. *Transactions of the Royal Society of New Zealand* 7: 281-293.
- D'Orbigny A. 1842 & 1847. Zoophytes. In: Bertrand P. (ed). Voyage dans l'Amérique Méridionale (Le Brésil, La République Orientale de l'Uruguay, La République Argentine, La Patagonie, La République du Chili, La République de Bolivie, La République du Pérou), exécuté pendant les années 1826, 1827, 1828, 1829, 1830, 1831, 1832 et 1833. Tome V, 4<sup>e</sup> Partie. *M. le Ministre de l'Instruction Publique, Paris*, 28 pp.
- El Beshbeeshy M. 2011. Thekate Hydrozoa vom Patagonischen Schelf (Cnidaria, Hydrozoa, Thecata). G. Jarms (ed.). *Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg* 46: 19-233.
- Fraser C.M. 1936. Some Japanese hydroids, mostly new. II. *Transactions of the Royal Society of Canada*, series 3, section V, 30: 49-54.
- Fraser C.M. 1940. Some hydroids from the California coast, collected in 1939. *Transactions of the Royal Society of Canada* series 3, section 5, 34: 39-44.
- Fraser C.M. 1941. New species of hydroids, mostly from the Atlantic Ocean, in the United States National Museum. *Proceedings of the United States National Museum* 91: 77-89.
- Fraser C.M. 1948. Hydroids of the Allan Hancock Pacific

- Expeditions since March, 1938. *Allan Hancock Pacific Expeditions* 4(5): 179-343.
- Galea H.R. 2007. Hydroids and hydromedusae (Cnidaria: Hydrozoa) from the fjords region of southern Chile. *Zootaxa* 1597: 1-116.
- Galea H.R., Schories D. 2012. Some hydrozoans (Cnidaria) from Central Chile and the Strait of Magellan. *Zootaxa* 3296: 19-67.
- Galea H.R., Försterra G., Häussermann V. 2007. Additions to the hydroids (Cnidaria: Hydrozoa) from the fjords region of southern Chile. *Zootaxa* 1650: 55-68.
- Galea H.R., Häussermann V., Försterra G. 2009. New additions to the hydroids (Cnidaria: Hydrozoa) from the fjords region of southern Chile. *Zootaxa* 2019: 1-28.
- Galea H.R., Schories D., Försterra G., Häussermann V. 2014. New species and new records of hydroids (Cnidaria: Hydrozoa) from Chile. *Zootaxa* 3852(1): 1-50.
- Galea H.R., Schories D., Häussermann V., Försterra G. 2017. Taxonomic revision of the genus *Sertularella* (Cnidaria: Hydrozoa) from southern South America and the subantarctic, with descriptions of five new species. *Revue suisse de Zoologie* 124(2): 255-321.
- Gray J.E. 1848. List of the specimens of British animals in the collection of the British Museum. Part 1. Centroniae or radiated animals. *Trustees of the British Museum, London*, 173 pp.
- Hartlaub C. 1901. Revision der *Sertularella*-Arten. *Abhandlungen aus dem Gebiete der Naturwissenschaften, Hamburg* 16(2)(1): 1-143.
- Hartlaub C. 1905. Die Hydroiden der Magalhaensischen Region und chilenischen Küste. In: Fauna chilensis. *Zoologische Jahrbücher, Suppl.* 6(3): 497-714.
- Hincks T. 1868. A history of British hydroid zoophytes. *John van Voorst, London*, 338 pp.
- Hirohito, Emperor of Japan. 1995. The hydroids of Sagami Bay. II. Thecata. *Publications of the Biological Laboratory, Imperial Household, Tokyo*, VII + 244 pp (English text).
- Jäderholm E. 1903. Aussereuropäische Hydroiden im schwedischen Reichsmuseum. *Arkiv för Zoologi* 1: 259-312.
- Lamouroux J.V.F. 1824. Description des polypiers flexibles (pp. 603-643). In: Quoy J.R.C., Gaimard J.P. (eds). Voyage autour du monde, entrepris par ordre du Roi, sous le Ministère et conformément aux instructions de S. Exc. le Vicomte de Bouchage, Secrétaire d'Etat au Département de la Marine, exécuté sur les corvettes de S.M. l'Uranie et la Physicienne, pendant les années 1817, 1818, 1819 et 1820. Zoologie (2<sup>e</sup> partie). *Pillet Aîné, Paris*, 712 pp.
- Leloup E. 1940. Hydropolypes provenant des croisières du Prince Albert I<sup>er</sup> de Monaco. *Résultats des campagnes scientifiques accomplies sur son yacht par Albert I<sup>er</sup> Prince souverain de Monaco* 104: 1-39.
- Marktanner-Turneretscher G. 1890. Die Hydroiden des k. k. naturhistorischen Hofmuseums. *Annalen des k. k. Naturhistorischen Hofmuseums* 5: 195-286.
- Maronna M.M., Miranda T.P., Peña Cantero A.L., Barbeitos M.S., Marques A.C. 2016. Towards a phylogenetic classification of Leptothecata (Cnidaria, Hydrozoa). *Nature, Scientific Reports* 6, 18075. DOI: 10.1038/srep18075
- Meyen F.J.F. 1834. Über das Leuchten des Meeres und Beschreibung einiger Polypen und anderer niederer Thiere. In: Beiträge zur Zoologie, gesammelt auf einer Reise um die Erde. *Verhandlungen der Kaiserlichen Leopoldinisch-Carolinischen Akademie der Naturforscher* 16 (Suppl.): 125-216.
- Millard N.A.H. 1971. Hydrozoa (pp. 396-408). In: van Zinderen Bakker E.M., Winterbottom J.M., Dyer R.A. (eds). Marion and Prince Edwards Islands: report on the South African biological and geological expedition, 1965-1966. *A.A. Balkema, Cape Town*, XI+427 pp.
- Millard N.A.H., Bouillon J. 1973. Hydroids from the Seychelles (Coelenterata). *Annales du Muséum Royal de l'Afrique Centrale* 206: 1-105.
- Millard N.A.H., Bouillon J. 1975. Additional hydroids from the Seychelles. *Annals of the South African Museum* 69(1): 1-15.
- Naumov D.V. 1960. Gidroidi i gidromedusy morskikh, solonovotvodnykh i presnovodnykh basseinov SSSR. *Opredeleteli po faune SSSR, Izdavaemye Zoologicheskim Institutom Akademii Nauk SSSR* 70: 1-626.
- Naumov D.V. 1969. Hydroids and hydromedusae of the USSR. *Israel program for scientific translation, Jerusalem*, VI + 631 pp.
- Pfeffer G. 1889. Zur Fauna von Süd-Georgien. *Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten* 6(2): 37-55.
- Sars G.O. 1874. Bidrag til Kundskaben om Norges Hydroider. *Forhandlinger i Videnskabs-Selskabet i Kristiania* 1873: 91-150.
- Schuchert P. 2016. On the gonotheca of *Egmundella producta* (G.O. Sars, 1874) n. comb. (Cnidaria, Hydrozoa). *Revue suisse de Zoologie* 123(2): 219-225.
- Schuchert P., Hosia A., Leclère L. 2017. Identification of the polyp stage of three leptomedusa species using DNA barcoding. *Revue suisse de Zoologie* 124(1): 167-182.
- Stechow E. 1921. Über Hydroiden der Deutschen Tiefsee-Expedition, nebst Bemerkungen über einige andre Formen. *Zoologischer Anzeiger* 53: 223-236.
- Stechow E. 1923. Zur Kenntnis des Hydroidenfauna des Mittelmeeres, Amerikas und anderer Gebiete. II. Teil. *Zoologische Jahrbücher* 47(1): 29-270.
- Stechow E. 1925. Hydroiden der Deutschen Tiefsee-Expedition. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer „Valdivia“ 1898-1899* 27: 383-546.
- Vervoort W. 1972. Hydroids from the Theta, Vema and Yelcho cruises of the Lamont-Doherty geological observatory. *Zoologische Verhandelingen, Leiden* 120: 1-247.