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Species of *Oswaldella* Stechow, 1919 (Cnidaria: Hydrozoa: Kirchenpaueriidae) from US Antarctic expeditions, with the description of three new species

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Seventeen species of the genus *Oswaldella* Stechow have been studied, three of which are new to science (*Oswaldella frigida* sp. nov., *O. medeae* sp. nov. and *O. monomammillata* sp. nov.). The material studied was collected by several US Antarctic expeditions. Each species is described and figured, the systematic position amongst allied species is discussed and available data concerning autecology and geographical distribution are given. The remaining eight known species of the genus are also considered, regarding synonymy, autecology and geographical distribution. Finally, a general survey of the bathymetrical and biogeographical distribution of the known species of *Oswaldella* is given.

Keywords: Hydroids, systematics, ecology, biogeography, Antarctic Ocean.

Introduction

The present paper deals with the species of *Oswaldella* Stechow, 1919 present in the huge Antarctic hydroid collection gathered by several US Antarctic expeditions under the United States Antarctic Research Program (USARP). The expeditions were carried out with the research vessels *Eltanin*, *Hero*, *Islas Orcadas* and *Pr Siedlecki*, though some samples come from collections at coastal stations (e.g. Wilkes Station).

The genus *Oswaldella* constitutes one of the most diversified genera of Antarctic benthic hydroids. Previous to the inspection of the present material, a total number of 20 species was known. The study of the present collection has provided a total of 17 species, five of which are considered new to science, raising the number of known species to 25. Of the five new species, *O. crassa* Peña Cantero and Vervoort, 1998 and *O. curiosa* Peña Cantero and Vervoort, 1998 were described in a previous paper (cf. Peña Cantero and Vervoort, 1998), whereas the remaining three species

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(*O. frigida* sp. nov., *O. medeae* sp. nov. and *O. monomammillata* sp. nov.) are here described and figured. All the species found in the USARP collection are described and figured, with the exception of the two species characterized by Peña Cantero and Vervoort (1998).

Material and methods

Most of the material is preserved in the collections of the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (USNM). A representative collection is in the National Museum of Natural History, Leiden, The Netherlands (RMNH); some additional material of certain species has been deposited in the Museo Nacional de Ciencias Naturales of Madrid, Spain (MNCN). The collection numbers of that material are also found in the text.

Station list

0000X, Wilkes Station, 3 December 1961, 66°21′13″–66°21′16″S, 110°28′04″–110°28′14″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 238 m.
Oswaldella billardi Briggs, 1938.

000AG, Wilkes Station, 11 December 1961, 66°17′42″–66°17′52″S, 110°32′03″–110°32′42″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 101 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

000AH, Wilkes Station, 11 December 1961, 66°15′56″–66°15′57″S, 110°31′09″–110°31′47″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 55–91 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

000AM, Wilkes Station, 13 December 1961, 66°21′54″–66°22′01″S, 110°29′50″–110°30′02″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 293–329 m.
Oswaldella billardi Briggs, 1938.

000AZ, Wilkes Station, 12 February 1961, 66°16′38″–66°16′20″S, 110°30′48″–110°31′24″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 128–146 m.
Oswaldella sp. 2.

000DW, Wilkes Station, 3 December 1961, 66°22′19″–66°22′26″S, 110°36′01″–110°36′10″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 18–21 m.
Oswaldella sp. 2.

001/011, *Glacier*, 12 February 1968, 74°00′S, 54°56′W (east of Cape Wheeler, Antarctic Peninsula), 438 m.
Oswaldella delicata Peña Cantero, Svoboda and Vervoort, 1997; *Oswaldella erratum* Peña Cantero and Vervoort, 1997.

002/002, *Glacier*, 25 February 1969, 75°31′S, 30°08′W (off McDonald Ice Rumples, Caird Coast, Weddell Sea), 412 m.
Oswaldella billardi Briggs, 1938.

002/009, *Glacier*, 3 March 1969, 77°54.2′S, 45°13.3′W (off Berkner Islands, Ronne Ice Shelf, Weddell Sea), 252 m.
Oswaldella encarnae Peña Cantero, Svoboda and Vervoort, 1997.

00DAF, Wilkes Station, 9 December 1961, 66°20′15″–66°22′14″S, 110°26′00″–110°26′28″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 91 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

00DAQ, Wilkes Station, 16 December 1961, 66°15′47″–66°15′58″S, 110°29′56″–110°29′55″E (north of Wilkes Station, off Budd Coast, Wilkes Land), 36–91 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

11/958, *Eltanin*, 5 February 1964, 52°56′S, 75°00′W (Strait of Magellan, west of mouth of strait, South Pacific Ocean), 90 m.
Oswaldella herwigi El Beshbeeshy, 1991.

12/1001, *Eltanin*, 15 March 1964, 62°39′S, 54°46′W (NE of Joinville Island, Antarctic Peninsula), 234 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

12/1002, *Eltanin*, 15 March 1964, 62°40′S, 54°45′–54°44′W (off Elephant Island, South Shetland Islands), 265 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997; *Oswaldella monomammillata* sp. nov.

12/1003, *Eltanin*, 15 March 1964, 62°41′S, 54°43′W (NE of Joinville Island, Antarctic Peninsula), 210–220 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997; *Oswaldella medeae* sp. nov.; *Oswaldella stepanjantsae* El Beshbeeshy, 1991.

27/1896, *Eltanin*, 18 January 1967, 76°10′S, 168°17′E (Franklin Island, Victoria Land, Ross Sea), 70–81 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

27/1924, *Eltanin*, 27 January 1967, 75°10′–75°11′S, 176°13′–176°07′W (Pennell Bank, Victoria Land, Ross Sea), 728–732 m.
Oswaldella bifurca (Hartlaub, 1904).

27/1951, *Eltanin*, 5 February 1967, 67°00′–67°02′S, 163°33′E (Buckle Island, Balleny Islands, Victoria Land), 1442–1444 m.
Oswaldella bifurca (Hartlaub, 1904).

32/1995, *Eltanin*, 10 January 1968, 72°03′–72°04′S, 172°38′–172°06′E (Moubray Bay, east of Cape Hallett, Victoria Land, Ross Sea), 342–360 m.
Oswaldella bifurca (Hartlaub, 1904).

32/1996, *Eltanin*, 10 January 1968, 72°05′S, 172°08′–172°09′E (Moubray Bay, east of Cape Hallett, Victoria Land, Ross Sea), 344–351 m.
Oswaldella bifurca (Hartlaub, 1904); *Oswaldella blanconae* El Beshbeeshy, 1991.

32/2018, *Eltanin*, 14 January 1968, 74°01′–73°59′S, 178°53′–179°04′E (Pennell Bank, Victoria Land, Ross Sea), 256–258 m.
Oswaldella medeae sp. nov.

32/2021, *Eltanin*, 15 January 1968, 73°49′–73°50′S, 178°13′–178°14′W (Pennell Bank, Victoria Land, Ross Sea), 495–503 m.
Oswaldella bifurca (Hartlaub, 1904); *Oswaldella medeae* sp. nov.

32/2068, *Eltanin*, 27 January 1968, 78°24′S, 169°00′–168°59′W (NW of Roosevelt Island, Marie Byrd Land, Ross Sea), 562–564 m.
?*Oswaldella delicata* Peña Cantero, Svoboda and Vervoort, 1997.

32/2080, *Eltanin*, 31 January 1968, 75°50′–75°52′S, 173°08′W (Ross Sea, centre of sea), 468–474 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

32/2082, *Eltanin*, 31 January 1968, 75°50′–75°51′S, 173°08′W (Ross Sea, centre of sea), 595–600 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

32/2095, *Eltanin*, 3 February 1968, 76°04′–76°05′S, 164°46′–164°51′W (Ross Sea, center of sea), 513–550 m.
Oswaldella bifurca (Hartlaub, 1904).

32/2121, *Eltanin*, 12 February 1968, 72°27′–72°26′S, 177°04′–177°12′E (Cape Adare, Victoria Land, Ross Sea), 1883–1890 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

32/2125, *Eltanin*, 13 February 1968, 71°22′S, 170°43′–170°39′E (Cape Adare, Victoria Land, Ross Sea), 160–164 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

32/2128, *Eltanin*, 13 February 1968, 71°12′S, 171°24′E (Pennell Bank, Victoria Land, Ross Sea), 1610 m.
Oswaldella medeae sp. nov.

575/061, *Islas Orcadas*, 30 May 1975, 56°42.3′S, 27°00.4′W (Visokoi Island, South Sandwich Islands, Scotia Sea), 93–121 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

6/339, *Eltanin*, 3 December 1962, 53°′05′–53°08′S, 59°31′–59°24′W (west of Beauchene Island, Falkland Islands, South Atlantic Ocean), 512–586 m.
Oswaldella herwigi El Beshbeeshy, 1991.

6/340, *Eltanin*, 3 December 1962, 53°08′–53°07′S, 59°23′–59°21′W (west of Beauchene Island, Falkland Islands, South Atlantic Ocean), 567–578 m.
Oswaldella herwigi El Beshbeeshy, 1991.

6/342, *Eltanin*, 3 December 1962, 53°41′–53°52′S, 59°09′–59°08′W (Falkland Islands, South Atlantic Ocean), 44 m.
Oswaldella herwigi El Beshbeeshy, 1991.

6/415, *Eltanin*, 2 January 1963, 62°42′–62°41′S, 56°10′–56°12′W (north of d'Urville Island, Bransfield Strait, Antarctic Peninsula), 406–465 m.
Oswaldella vervoorti Peña Cantero and García Carrascosa, 1998.

6/416, *Eltanin*, 2 January 1963, 62°40′–62°39′S, 56°13′W (north of d'Urville Island, Bransfield Strait, Antarctic Peninsula), 494–507 m.
Oswaldella sp. 1.

6/418, *Eltanin*, 2 January 1963, 62°39′–62°40′S, 56°10′–56°08′W (north of d'Urville Island, Bransfield Strait, Antarctic Peninsula), 311–426 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

6/426, *Eltanin*, 5 January 1963, 62°27′–62°34′S, 57°58′–57°49′W (Penguin Island, Bransfield Strait, Antarctic Peninsula), 809–1116 m.
Oswaldella sp. 1.

6/428, *Eltanin*, 5 January 1963, 62°41′–62°39′S, 57°51′–57°46′W (Penguin Island, Bransfield Strait, Antarctic Peninsula), 662–1120 m.
Oswaldella crassa Peña Cantero and Vervoort, 1998; *Oswaldella curiosa* Peña Cantero and Vervoort, 1998; *Oswaldella* sp. 1.

6/445, *Eltanin*, 12 January 1963, 62°02′–62°00′S, 59°05′–59°08′W (NE of Livingston Island, South Shetland Islands), 101 m.
Oswaldella shetlandica Stepan'yants, 1979; *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998; *Oswaldella* sp. 1.

691/002-B, *Hero*, 1 February 1969, 64°50′S, 63°47′W (Palmer Archipelago, Antarctic Peninsula), 73–128 m.
Oswaldella vervoorti Peña Cantero and García Carrascosa, 1998.

691/003, *Hero*, 1 February 1969, 64°15′56″S, 63°58′20″W (Palmer Archipelago, Antarctic Peninsula), 73–101 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

691/020, *Hero*, 8 February 1969, 65°35′–65°37′S, 67°19′–67°24′W (west of Renaud Island, Biscoe Islands, Antarctic Peninsula), 161 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

691/023, *Hero*, 9 February 1969, 64°12.1′–64°11.3′S, 62°39.6′–62°40′W (Brabant Island, Palmer Archipelago, Antarctic Peninsula), 93–95 m.
Oswaldella incognita Peña Cantero, Svoboda and Vervoort, 1997; *Oswaldella shetlandica* Stepan'yants, 1979; *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998; *Oswaldella* sp. 1.

691/23, *Hero*, 9 February 1969, 64°12.1′–64°11.3′S, 62°39.6′–62°40′W (Dallmann Bay, Brabant Island, Palmer Archipelago, Antarctic Peninsula), 93–95 m.
Oswaldella shetlandica Stepan'yants, 1979.

691/24, *Hero*, 10 February 1966, 64°09′–64°10′S, 62°60′–62°41′W (Dallmann Bay, Brabant Island, Palmer Archipelago, Antarctic Peninsula), 93–99 m.
Oswaldella shetlandica Stepan'yants, 1979; *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998; *Oswaldella* sp. 1.

691/26, *Hero*, 10 February 1969, 63°26′–63°25′S, 62°15′–62°14′W (south of Low Island, Antarctic Peninsula), 119–124 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991; *Oswaldella frigida* sp. nov.

691/27, *Hero*, 10 February 1969, 63°24′S, 62°14′–62°12′W (south of Low Island, Antarctic Peninsula), 91–95 m.
Oswaldella incognita Peña Cantero, Svoboda and Vervoort, 1997; *Oswaldella shetlandica* Stepan'yants, 1979.

7/484, *Eltanin,* 16 February 1963, 58°44′–58°54′S, 44°36′–44°31′W (north of South Orkney Islands, Scotia Sea), 952 m.
Oswaldella incognita Peña Cantero, Svoboda and Vervoort, 1997; *Oswaldella shetlandica* Stepan'yants, 1979; *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998.

702/464, *Hero*, 28 March 1970, 62°58.4′S, 60°50.1′W (Deception Island, South Shetland Islands), 110–137 m.
Oswaldella grandis Peña Cantero, Svoboda and Vervoort, 1997.

702/465, *Hero*, 28 March 1970, 62°56.9′S, 60°50.1′W (Deception Island, South Shetland Islands), 154 m.
Oswaldella grandis Peña Cantero, Svoboda and Vervoort, 1997.

702/511, *Hero*, 18 March 1970, 64°46.8′S, 63°29.3′W (Port Lockroy, Wiencke Island, Palmer Archipelago, Antarctic Peninsula), 283–311 m.

Oswaldella erratum Peña Cantero and Vervoort, 1997.

721/1062, *Hero*, 19 December 1971, 62°19.0′S, 59°11.4′W (Nelson Island, South Shetland Islands), 44 m.
Oswaldella vervoorti Peña Cantero and García Carrascosa, 1998.

721/1063, *Hero*, 19 December 1971, 62°19.0′S, 59°11.4′W (Nelson Island, South Shetland Islands), 44 m.
Oswaldella frigida sp. nov.; *Oswaldella shetlandica* Stepan'yants, 1979; *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998.

721/1070, *Hero*, 28 January 1972, 64°47.7′S, 64°07.4′W (Anvers Island, Palmer Archipelago, Antarctic Peninsula), 100 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

721/704, *Hero*, 21 December 1971, 62°17.5′–62°17.9′S, 58°34.6′W (King George Island, South Shetland Islands), 55–78 m.
Oswaldella shetlandica Stepan'yants, 1979; *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998.

721/765, *Hero*, 3 January 1972, 64°47.3′S, 64°07.4′–64°06.3′W (Arthur Harbor, Anvers Island, Antarctic Peninsula), 55 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

721/776, *Hero*, 8 January 1972, 62°56.1′–62°56.7′S, 60°49.0′–60°49.6′W (Deception Island, South Shetland Islands), 109 m.
Oswaldella grandis Peña Cantero, Svoboda and Vervoort, 1997; *Oswaldella incognita* Peña Cantero, Svoboda and Vervoort, 1997.

721/801, *Hero*, 14 January 1972, 62°43′S, 61°02.5′W (Livingston Island, South Shetland Islands), 73 m.
Oswaldella incognita Peña Cantero, Svoboda and Vervoort, 1997; *Oswaldella shetlandica* Stepan'yants, 1979.

721/816, *Hero*, 16 January 1972, 62°20.5′–62°20.7′S, 58°45.4′–58°47.2′W (Nelson Island, South Shetland Islands), 50 m.
Oswaldella shetlandica Stepan'yants, 1979; *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998.

731/1756, *Hero*, 17 February 1973, 64°47′25″–64°47′02″S, 64°07.30′–64°06.13′W (Arthur Harbor, Anvers Island, Palmer Archipelago, Antarctic Peninsula), 91 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

731/1944, *Hero*, 11 March 1973, 64°46′28″–64°45′51″S, 63°26.5′–63°24.6′W (Anvers Island, Palmer Archipelago, Antarctic Peninsula), 100–150 m.
Oswaldella shetlandica Stepan'yants, 1979.

767, 10 February 1974, 66°53′S, 163°19′E (off south end of Buckle Island, Balleny Islands, Ross Sea), 55–146 m.
Oswaldella stepanjantsae El Beshbeeshy, 1991.

824/013-1, *Hero*, 19 March 1982, 65°14.00′S, 64°12.00′W (Penola Strait, Argentine Islands, Antarctic Peninsula), 310–360 m.
Oswaldella shetlandica Stepan'yants, 1979.

824/030-1, *Hero*, 25 March 1982, 64°14.10′–64°14.20′S, 62°32.30′–62°34.90′W (Minot Point, Brabant Island, Palmer Archipelago, Antarctic Peninsula), 90–135 m.
Oswaldella shetlandica Stepan'yants, 1979.

824/040-1, *Hero*, 29 March 1982, 64°48.42′S, 64°07.00′W (Anvers Island, Palmer Archipelago, Antarctic Peninsula), 75–110 m.
Oswaldella shetlandica Stepan'yants, 1979.

824/041-1, *Hero*, 29 March 1982, 64°48.42′S, 64°07.00′W (Anvers Island, Palmer Archipelago, Antarctic Peninsula), 88–112 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997.

833/018-1, *Hero*, 1 April 1983, 62°41.50′S, 56°01.75′W (off Elephant Island, South Shetland Islands), 210–240 m.
Oswaldella erratum Peña Cantero and Vervoort, 1997; *Oswaldella stepanjantsae* El Beshbeeshy, 1991.

833/022-4, *Hero*, 4 April 1983, 63°18.05′S, 61°53.05′W (Low Island, Antarctic Peninsula), 228–264 m.
Oswaldella shetlandica Stepan'yants, 1979.

SOSC-L26, 23 February 1972, 64°47′S, 64°06′W (Palmer Archipelago, Antarctic Peninsula).
Oswaldella erratum Peña Cantero and Vervoort, 1997.

SOSC-L42, 1972, 64°47′S, 64°06′W (Palmer Archipelago, Antarctic Peninsula).
Oswaldella vervoorti Peña Cantero and García Carrascosa, 1998.

SOSC-L46, 11 January 1973, 63°17′S, 62°09′W (Palmer Archipelago, Antarctic Peninsula).
Oswaldella shetlandica Stepan'yants, 1979.

Results and discussion

Oswaldella Stechow, 1919

Oswaldella Stechow, 1919: 853; type, by original designation: *Schizotricha bifurca*, Hartlaub, 1904.

Diagnosis (taken from Peña Cantero *et al*., 1997). Feather-like, colonial hydroids with branched or unbranched stem, divided into internodes or undivided, mono- or polysiphonic and with two longitudinal rows of apophyses, alternately arranged in one plane and supporting hydrocladia. Apophyses with varied number of nematophores on upper surface near axil with hydrocaulus, emerging through a raised, perforated part of the periderm ('mamelon') and/or through simple holes in the perisarc. Stem without nematophores or nematothecae. Hydrocladia typically branched. Degree of branching varied, fourth-order hydrocladia having been recorded. Hydrocladia homomerously divided into internodes (with the exception of *Oswaldella herwigi* El Beshbeeshy, 1991) bearing one hydrotheca and two nematophores each: one mesial superior nematophore and another mesial inferior. First nematophore placed behind free adcauline hydrothecal wall; second situated below hydrotheca at a more or less distinct elevation of internode. Mesial inferior nematophore with or without rudimentary, scale-shaped nematotheca. Hydrothecae cup-shaped to tubular. Colonies dioecious, with sexual dimorphism. Gonothecae inserting on hydrocladia below hydrotheca next to mesial inferior nematophore. Cnidome composed of microbasic mastigophores, typically in two size classes.

List of species described in or now referred to Oswaldella
Oswaldella antarctica (Jäderholm, 1904) (= *Schizotricha antarctica* Jäderholm, 1904)
Oswaldella bifurca (Hartlaub, 1904) (= *Schizotricha bifurca* Hartlaub, 1904)

Oswaldella billardi Briggs, 1938
Oswaldella blanconae El Beshbeeshy, 1991
Oswaldella crassa Peña Cantero and Vervoort, 1998
Oswaldella curiosa Peña Cantero and Vervoort, 1998
Oswaldella delicata Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella elongata Peña Cantero, García Carrascosa and Vervoort, 1995
Oswaldella encarnae Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella erratum Peña Cantero and Vervoort, 1997
Oswaldella frigida sp. nov.
Oswaldella garciacarrascosai Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella gracilis Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella grandis Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella herwigi El Beshbeeshy, 1991
Oswaldella incognita Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella medeae sp. nov.
Oswaldella monomammillata sp. nov.
Oswaldella obscura Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella rigida Peña Cantero, Svoboda and Vervoort, 1997
Oswaldella shetlandica Stepan'yants, 1979
Oswaldella stepanjantsae El Beshbeeshy, 1991
Oswaldella terranovae Peña Cantero and Vervoort, 1996
Oswaldella tottoni Peña Cantero and Vervoort, 1996
Oswaldella vervoorti Peña Cantero and García Carrascosa, 1998

Description of the species

Oswaldella antarctica (Jäderholm, 1904)

Schizotricha antarctica p.p. Jäderholm, 1904: 12; 1905: 35, pl. 14 figures 6–8.
Not *Schizotricha antarctica*: Vanhöffen, 1910: 336, figure 48 (= *Oswaldella rigida* Peña Cantero, Svoboda and Vervoort, 1997).
Oswaldella antarctica: Stechow, 1919: 853; 1920: 40(32); Peña Cantero and Vervoort, 1995: 330–333, figure 1; 1998: 36; Peña Cantero *et al*., 1997: 344; Peña Cantero and García Carrascosa, 1998: 178; 1999: 214; Peña Cantero and Marques, 1999: 85.
?*Polyplumaria antarctica*: Jäderholm, 1926: 6.
Not *Polyplumaria antarctica*: Billard, 1914: 28–31, figure 17 (= *Oswaldella erratum* Peña Cantero and Vervoort, 1997).
Not *Oswaldella antarctica*: Totton, 1930: 209–210, figure 51 (= *Oswaldella terranovae* Peña Cantero and Vervoort, 1996); Blanco, 1984: 41, pl. 38 figures 86–88 (= *Oswaldella blanconae* El Beshbeeshy, 1991); Broch, 1948: 13–16, figure 4a; Stepan'yants, 1979: 112, pl. 21 figure 5a, b (= *Oswaldella stepanjantsae* El Beshbeeshy, 1991); Naumov and Stepan'yants, 1972: 52, figure 14a, b (= partly *Oswaldella stepanjantsae* El Beshbeeshy, 1991, partly another species of *Oswaldella*); Peña Cantero, 1991: 168, pls 31, 56, pl. 68 figure a; Peña Cantero and García Carrascosa, 1994: 125–126, figure 8a–c; 1995: 96–101, figures 43A–E, 44A–F, 64E (= *Oswaldella incognita* Peña Cantero, Svoboda and Vervoort, 1997).

Remarks. *Oswaldella antarctica* is well characterized by the monosiphonic and unbranched stems, divided into internodes, the presence of two axillary nematophores and one 'mamelon' on the cauline apophyses, the much branched hydrocladia, the presence of a much reduced nematotheca on the hydrocladial internodes and the shape of the hydrotheca which is situated on the middle of the hydrocladial internode (table 1).

Table 1. Major features of the known species of *Oswaldella* Stechow, 1919.

	Polysiphony	Branched stem	Divided stem	Angle between cauline apophyses and stem	Mesial inferior nematotheca	Number of axillary nematophores	Number of mamelons	Maximal order of hydrocladia	Hydrotheca	Hydrothecal aperture	Node between apophyses and hydrocladia	Position of hydrotheca on internode
O. antarctica (Jäderholm, 1904)	No	No	Yes	45°	Yes	2	1	4th	High	Even	Yes	On the middle
O. bifurca (Hartlaub, 1904)	No	No†	Yes	70°	No	1–2	0	4th	Low	Frontally depressed	No†	Basal half
O. billardi Briggs, 1938	No	No	Yes	45°	Yes	2	0	2nd	High	Adcaudally directed	Yes	Distal half
O. blanconae El Beshbeeshy, 1991	No	No	Yes	45°	No	1	1	2nd	Low	Even	Yes	Basal half
O. crassa Peña Cantero and Vervoort, 1998	?	?	No	45°	No	2	1	3rd	High	Adcaudally directed	No	On the middle
O. curiosa Peña Cantero and Vervoort, 1998	No	?	Yes	45°	No	1	0	3rd	High	Abcaudally directed	No	On the middle
O. delicata Peña Cantero *et al.*, 1997	No	No	Yes	45°	Yes	1	0	2nd	High	Even	Yes	On the middle
O. elongata Peña Cantero *et al.*, 1995	No	No	Yes	45°	No	2	2	2nd	High	Even	Yes	On the middle

Table 1. (*Continued*).

	Polysiphony	Branched stem	Divided stem	Angle between cauline apophyses and stem	Mesial inferior nematotheca	Number of axillary nematophores	Number of mamelons	Maximal order of hydrocladia	Hydrotheca	Hydrothecal aperture	Node between apophyses and hydrocladia	Position of hydrotheca on internode
O. encarnae Peña Cantero *et al.*, 1997	No	No	Yes	45°	Yes	2	0	1st	Low	Even/ Abcaudally directed	Yes	On the middle
O. erratum Peña Cantero and Vervoort, 1997	Yes†	No	No†	70°	Yes	2	0	4th	High	Adcaudally directed	No†	On the middle
O. frigida sp. nov.	No	No	Yes	45°	No	2	1–2	2nd	Low	Frontally depressed	Yes	On the middle/Basal half
O. garciacarrascosai Peña Cantero *et al.*, 1997	No	No	Yes	45°	No	2	1	2nd	High	Even	Yes	On the middle
O. gracilis Peña Cantero *et al.*, 1997	No	No	Yes	45°	No	1	0	1st	Low	Laterally depressed	Yes	On the middle
O. grandis Peña Cantero *et al.*, 1997	Yes	No	Yes†	45°	Yes	2	2	3rd	Low	Even	Yes†	Distal half
O. herwigi El Beshbeeshy, 1991	No	Yes†	Yes	45°	Yes	1	1	2nd	Low	Even/ Abcaudally directed	Yes	Distal half
O. incognita Peña Cantero *et al.*, 1997	No	No	Yes	45°	Yes	2	0	2nd	High	Even	No	On the middle

Table 1. (*Continued*).

	Polysiphony	Branched stem	Divided stem	Angle between cauline apophyses and stem	Mesial inferior nematotheca	Number of axillary nematophores	Number of mamelons	Maximal order of hydrocladia	Hydrotheca	Hydrothecal aperture	Node between apophyses and hydrocladia	Position of hydrotheca on internode
O. medeae sp. nov.	No	No	Yes	45°	Yes	2	1–2	2nd	Low	Even/ Abcaudally directed	Yes	Distal half/On the middle
O. monomammillata sp. nov.	No	No	Yes	45°	Yes	1	1	2nd	High	Even	Yes	On the middle
O. obscura Peña Cantero *et al.*, 1997	Yes	Yes	Yes†	45°	Yes	2	1	2nd	High	Even	Yes	On the middle
O. rigida Peña Cantero *et al.*, 1997	No	Yes	Yes†	70–90°	Yes	2	0	3rd	High	Adcauline elevation	No	On the middle
O. shetlandica Stepan'yants, 1979	Yes	No	Yes	45°	No	2	2	4th	High	Adcaudally directed	No	On the middle
O. stepanjantsae El Beshbeeshy, 1991	Yes	Yes	Yes	45°	Yes	6–2	2–0	4rd	High	Even	Yes	On the middle
O. terranovae Peña Cantero and Vervoort, 1996	No	Yes	Yes	45°	Yes	2	2	3rd	High	Even	Yes	On the middle
O. tottoni Peña Cantero and Vervoort, 1996	No	No	Yes†	45°	Yes	2	0	2nd	Low	Even	Yes	Distal half
O. vervoorti Peña Cantero and Vervoort, 1998	No	No	Yes	45°	Yes	2	1	3rd	Low	Even	Yes	Distal half

†Indicates that the situation may occasionally be contrary.

Ecology and distribution. *Oswaldella antarctica* is known from off Seymour Island (Graham Land), where it was collected at 150 m depth (Jäderholm, 1904; Peña Cantero and Vervoort, 1995).

Oswaldella bifurca (Hartlaub, 1904)
(figure 1)

Schizotricha bifurca Hartlaub, 1904: 16, pl. 3 figures 4–8.
Oswaldella bifurca: Stechow, 1919: 852; 1920: 40 (32); Peña Cantero *et al*., 1997: 345–349, figures 1, 13A; Peña Cantero and García Carrascosa, 1998: 179; 1999: 214; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and Marques, 1999: 85.
Not *Oswaldella bifurca*: Naumov and Stepan'yants, 1962: 98; Stepan'yants, 1979: 112, pl. 21 figure 4; Blanco, 1984: 43, pl. 39 figures 89, 90, pl. 40 figures 91–93, pl. 41 figure 94.
Not *Oswaldella bifurca*: Totton, 1930: 208, figure 50 (= *Oswaldella tottoni* Peña Cantero and Vervoort, 1996).
Not *Oswaldella bifurca*: Peña Cantero, 1991: 175–179, pl. 32; Peña Cantero and García Carrascosa, 1994: 125–126, figure 8d–f; 1995: 101–104, figure 45A–E (= *Oswaldella grandis* Peña Cantero, Svoboda and Vervoort, 1997).
Not *Oswaldella bifurca*: Millard, 1977: 40, figure 12a–c (=?*Ventromma* sp.).

Material examined. *27/1924*, one stem *ca* 40 mm high (USNM 1003297); *27/1951*, one fragmented stem (largest fragment *ca* 20 mm long) (USNM 1003298); *32/1995*, several stem fragments up to 20 mm long, with gonothecae (USNM 1003299; RMNH-Coel. 30201); *32/1996*, three stem fragments up to 17 mm long (USNM 1003300); *32/2021*, two stem fragments up to 5 mm long in bad condition (USNM 1003301); *32/2095*, numerous stems up to 60 mm high, with gonothecae (USNM 1003302; RMNH-Coel. 30202; MNCN 2.03/230); *32/2128*, three fragments and stems up to 42 mm high (USNM 1003303).

Description. Colonies composed of monosiphonic, unbranched (occasionally branched) stems up to 60 mm high. Stem divided into internodes with one or two apophyses per internode, slightly geniculate. Apophyses alternately arranged in one plane, forming two longitudinal series, slightly directed upwards, forming an angle of *ca* 70–80°. Cauline apophyses usually provided with one, sometimes two (27/1924, 32/2095, 32/1996 in part), axillary nematophores, but deprived of 'mamelons' (figure 1A–C). Cauline apophyses supporting hydrocladia (figure 1A), usually without node in between (present in 27/1924). Hydrocladia up to fourth order present. Hydrocladial branching symmetrical (figure 1A): first hydrocladial internode bifurcated, with two prongs of equal development (figure 1B, C), and giving rise to two secondary hydrocladia, each one with some third-order hydrocladia. These, occasionally, forming fourth-order hydrocladia. Hydrocladia basally following angle of cauline apophyses, but distally curving strongly upwards.

Hydrocladia homomerously divided into hydrothecate internodes, provided with one hydrotheca and two nematophores (figure 1D–J): one mesial superior nematophore emerging through a perisarc hole situated at the end of adcauline hydrothecal wall and one mesial inferior nematophore emerging through a perisarc hole in a strongly marked elevation of internode (angle between long axis of hydrocladial internode and steep wall of infrathecal elevation usually *ca* 90°, though sometimes less). Without mesial inferior nematotheca. Top of distal hydrocladial internodes pointed (figure 1D, E, H).

Hydrotheca low, placed on basal half or third of hydrocladial internode, adcauline wall fully adnate (figure 1D–J). Rim either even, and then hydrothecal aperture

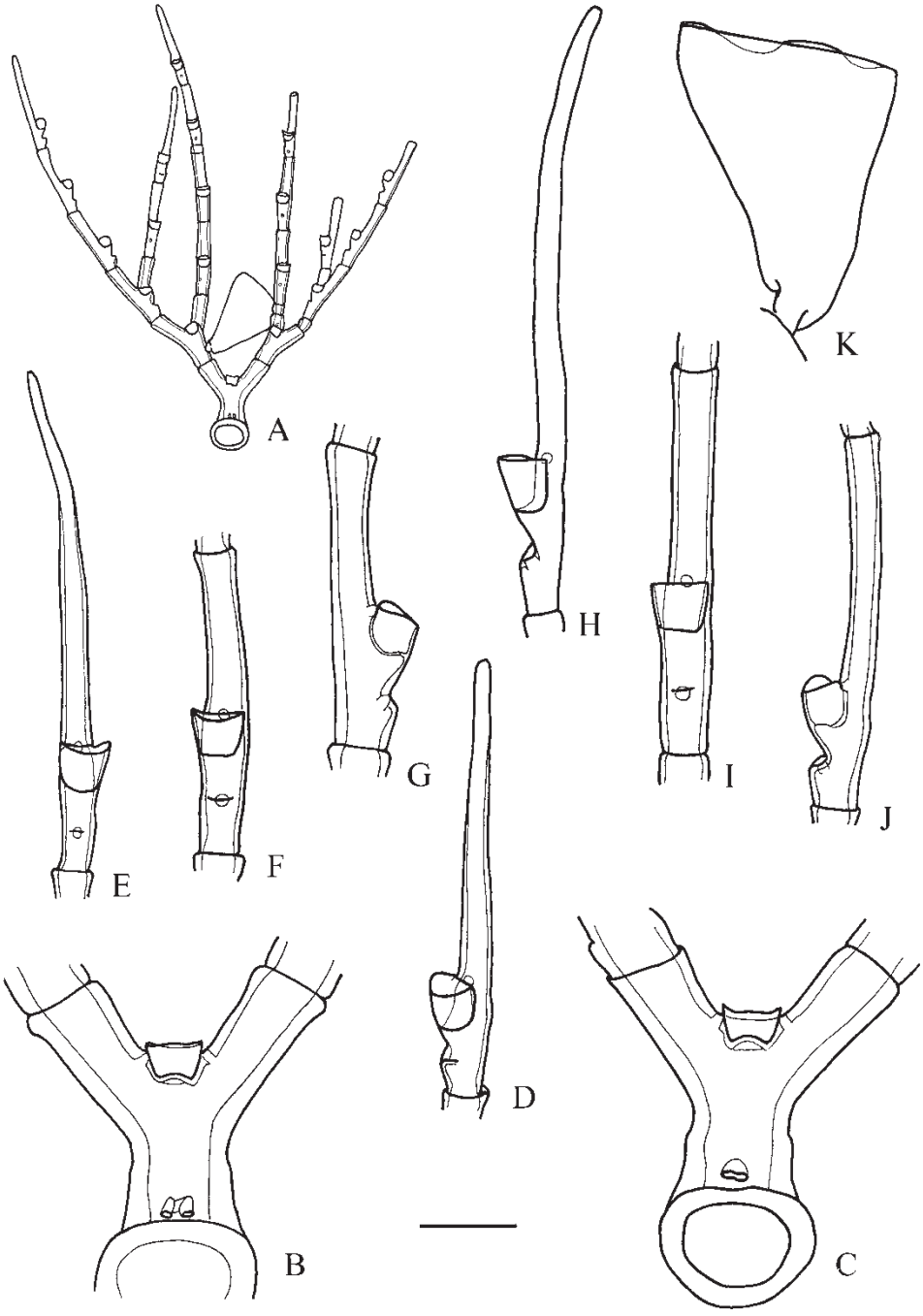


FIG. 1. *Oswaldella bifurca* (Hartlaub, 1904). (A) Hydrocladial branching and disposition of hydrothecae; (B, C) first hydrocladial internodes and cauline apophyses showing axillary holes; (D–J) hydrocladial internodes showing hydrothecae and both mesial superior and mesial inferior nematophores; (K) immature gonotheca (A–C, E, G, J–K, Stn 32/2095; D, F, Stn 32/1995; H, I, Stn 27/1951). Scale bar: 1 mm (A), 250 μm (B–K).

circular, or uneven with frontally depressed hydrothecal aperture due to presence of two slightly raised lateral lobes.

Immature gonothecae present, inserting close to mesial inferior nematophore. Gonotheca cone-shaped, distally truncated (figure 1K).

Remarks. Number of axillary nematophores on the cauline apophyses variable; even on the same stem we have observed apophyses bearing two and apophyses with a single axillary nematophore. There is a tendency, therefore, for the fusion of the two holes into one (figure 1B, C).

Ecology and distribution. *Oswaldella bifurca* is a deep-water species, having been found from 450 to 640 m depth (Peña Cantero *et al.*, 1997); our material comes from 342 to 1610 m depth. It has been found with gonothecae in November (Hartlaub, 1904) and February (Peña Cantero *et al.*, 1997); our colonies with immature gonothecae were found in January and February. It is used as a substratum by other hydroids (*Eudendrium* sp., *Filellum* sp.).

Hitherto *Oswaldella bifurca* was only known from West Antarctica, being recorded at 70°20′S–83°23′W, in the Bellingshausen Sea (Hartlaub, 1904), and off the south coast of the Weddell Sea (Peña Cantero *et al.*, 1997). Our material, however, comes from East Antarctica, where it was found at the central basin of the Ross Sea and off Victoria Land [Pennell Bank, east of Cape Hallett, off Cape Adare and off Buckle Island (Balleny Islands)].

Oswaldella billardi Briggs, 1938
(figure 2)

Oswaldella billardi Briggs, 1938: 40, figure 3, pl. 15 figure 1; Naumov and Stepan'yants, 1962: 98–99; 1972: 53–54, figure 14c; Stepan'yants, 1972: 74; Peña Cantero and Vervoort, 1997: 269–273, figure 1; 1998: 36; Peña Cantero and García Carrascosa, 1999: 214; Peña Cantero and Marques, 1999: 85.

Oswaldella billardi billardi Stepan'yants, 1979: 113, pl. 21 figure 3a, b.

Not *Oswaldella billardi*: Blanco, 1984: 45–46, pl. 41 figure 95, pl. 42 figures 96–97 (= *Oswaldella shetlandica* Stepan'yants, 1979 p.p.; *Oswaldella erratum* Peña Cantero and Vervoort, 1997 p.p.); Blanco and De Redolatti, 1977: 1–8, pls 1–4 (= *Oswaldella shetlandica* Stepan'yants, 1979); Broch, 1948: 13–16, figure 4b; Peña Cantero *et al.*, 1997: 349–353, figures 2, 13b (= *Oswaldella erratum* Peña Cantero and Vervoort, 1997).

Not *Oswaldella billardi shetlandica* Stepan'yants, 1979 (= *Oswaldella shetlandica* Stepan'yants, 1979 p.p.; *Oswaldella erratum* Peña Cantero and Vervoort, 1997 p.p.).

Material examined. *0000X*, two stems up to 75 mm high, with immature gonothecae (USNM 1003304; RMNH-Coel. 30203); *000AM*, several fragments up to 35 mm long (USNM 1003305; RMNH-Coel. 30204); *002/002*, two stems up to 90 mm high (USNM 1003306; RMNH-Coel. 30205).

Description. Colonies consisting of monosiphonic and unbranched stems up to 90 mm high, occasionally with some stolonal tubes. Hydrocaulus provided with apophyses alternately arranged in one plane and in two longitudinal rows. Cauline apophyses directed upwards, forming an angle of *ca* 45°, or slightly larger, with long axis of stem, provided with two nematophores, each one emerging through an axillary perisarc hole (figure 2B). Stems divided into internodes or with occasional internodes. Cauline apophyses supporting hydrocladia; secondary hydrocladia may be present (figure 2A). Cauline apophyses and hydrocladia separated by distinct node.

Hydrocladia homomerously divided into hydrothecate internodes provided with one hydrotheca and two nematophores (figure 2C–H): one mesial superior, emerging

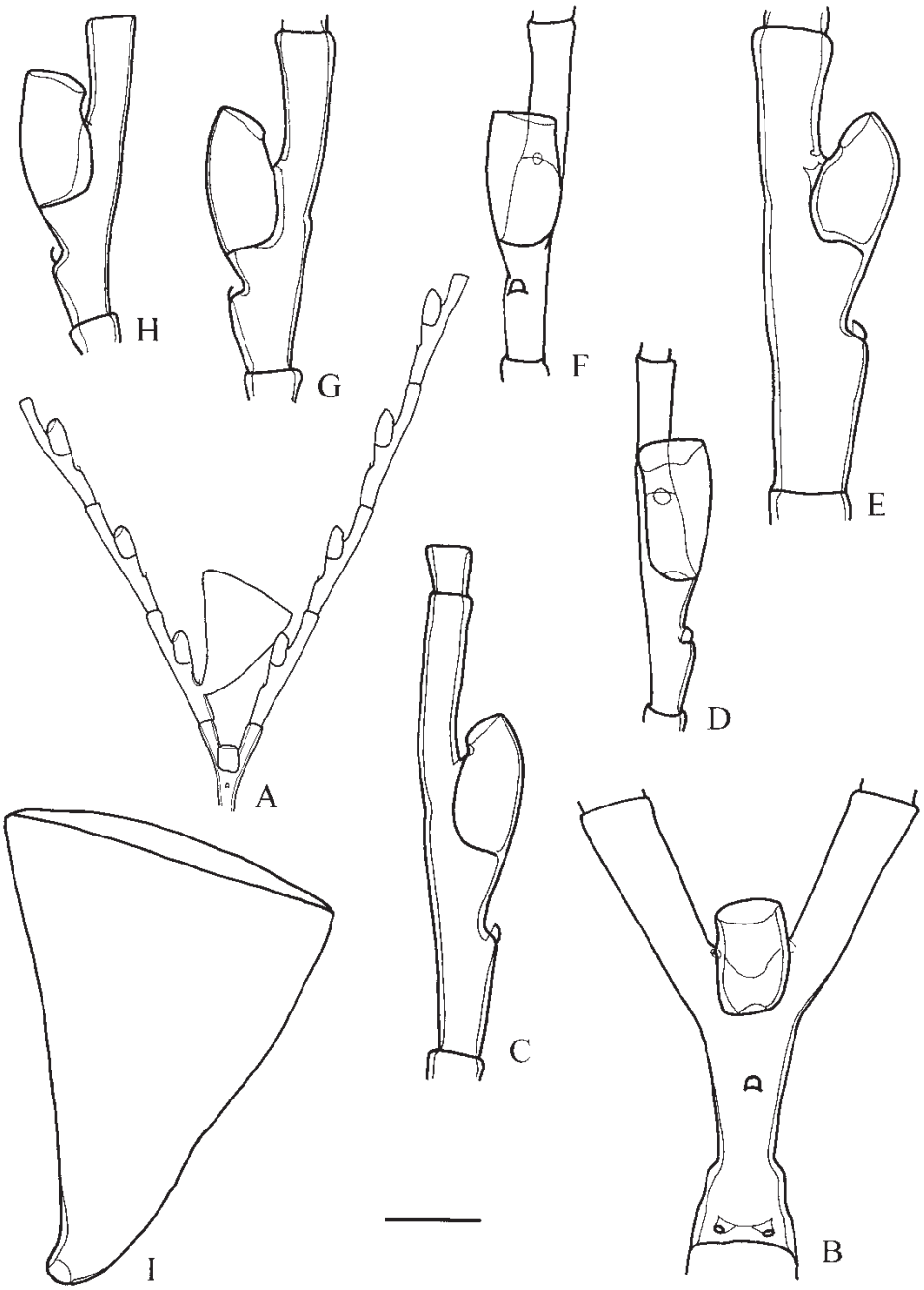


FIG. 2. *Oswaldella billardi* Briggs, 1938. (A) Branched hydrocladium and arrangement of hydrothecae and gonotheca; (B) cauline apophysis and first hydrocladial internode with axillary nematophores; (C–H) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca; (I) immature gonotheca (A–E, I, Stn 0000X; F, H, Stn 002/002; G, Stn 000AM). Scale bar: 1 mm (A), 250 μm (B–I).

through a simple perisarc hole situated behind free adcauline hydrothecal wall, and one mesial inferior nematophore emerging through a hole situated on an elevation of internode and provided with a scale-shaped nematotheca. Top of distal hydrocladial internodes truncated.

Hydrotheca elongate, usually situated slightly above middle of internode (figure 2C–H), sometimes slightly below that point; free part of adcauline wall considerable. Hydrothecal aperture circular or kidney-shaped and strongly tilted adcaudally. Abcauline wall of hydrotheca convex.

Immature gonothecae present, originating just below mesial inferior nematophore, cone-shaped; greatest diameter at truncated top (figure 2I).

Ecology and distribution. *Oswaldella billardi* is a shelf species (Peña Cantero and Vervoort, 1997). It has been recorded from 7 (Stepan'yants, 1972) to 206 m depth (Naumov and Stepan'yants, 1962) on bottoms of small rocks with red algae (Briggs, 1938), sand and boulders (Naumov and Stepan'yants, 1972) and rocks, pebbles, sand and mud (Stepan'yants, 1979). Our material was collected from 238 to 412 m depth. It has been found with gonothecae in January (Briggs, 1938; Stepan'yants, 1979) and in November (Stepan'yants, 1979); our material with immature gonothecae was collected in December.

Oswaldella billardi until now was considered endemic to East Antarctica (Peña Cantero and Vervoort, 1997), where it had been found in the Davis Sea (Briggs, 1938; Stepan'yants, 1972), off Queen Mary Coast and Enderby Land (Naumov and Stepan'yants, 1962) and off Adélie Coast (Naumov and Stepan'yants, 1972). We also found it in East Antarctica, in the region of Wilkes Land, in particular north of Wilkes Station (Budd Coast). However, part of our material was collected off McDonald Ice Rumples, on the east coast of the Weddell Sea, so its distribution may better be considered circum-Antarctic.

Oswaldella blanconae El Beshbeeshy, 1991
(figure 3)

Oswaldella blanconae El Beshbeeshy, 1991: 263, 265; Peña Cantero *et al*., 1997: 344; Peña Cantero and García Carrascosa, 1998: 179; 1999: 214; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and Marques, 1999: 85.
Oswaldella antarctica: Blanco, 1984: 41, pl. 38 figures 86–88.

Material examined. *32/1996*, one stem *ca* 8 mm high (USNM 1003307).

Description. Stem monosiphonic, unbranched (figure 3A), provided with apophyses alternately arranged in two longitudinal rows. Stem divided into internodes each with one apophysis, internodes arranged in zigzag fashion; stem internodes with bifurcation at origin of cauline apophysis. Angle between long axis of cauline internode and apophyses wider than 45°; angle between cauline apophyses and succeeding cauline internode *ca* 90° (figure 3A). Cauline apophyses provided with two nematophores: one emerging through a hole in perisarc of axil (figure 3B) and another nematophore emerging through a 'mamelon' situated laterally on dorsal side of apophysis (figure 3C). Distinct node present between cauline apophyses and hydrocladia (figure 3C). Hydrocladia undivided or bifurcated (figure 3A); up to secondary hydrocladia present; arrangement always symmetrical. Hydrocladia homomerous; all internodes hydrothecate; distal internodes apically truncated.

Hydrocladial internodes provided with one hydrotheca and two nematophores (figure 3B, D–G): one mesial superior emerging through a perisarc hole situated behind free portion of adcauline hydrothecal wall and one mesial inferior, deprived

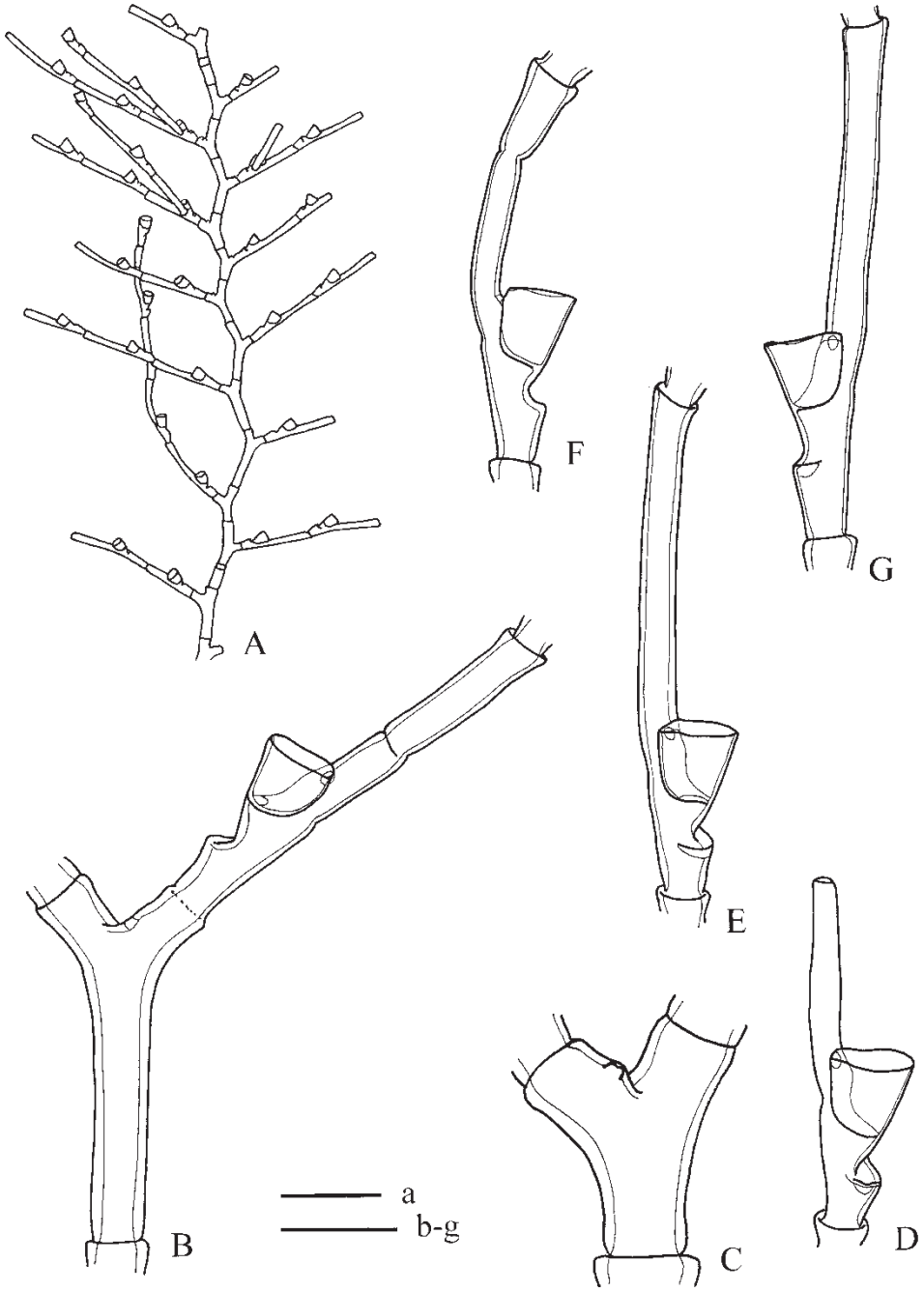


FIG. 3. *Oswaldella blanconae* El Beshbeeshy, 1991. (A) Stem showing zigzag arrangement of cauline internodes, and hydrocladial and hydrothecal disposition; (B) cauline internode and apophysis with axillary nematophore and first hydrocladial internode; (C) cauline internode and cauline apophysis showing 'mamelon'; (D–G) hydrocladial internodes with hydrotheca and mesial superior and mesial inferior nematophores (all drawings, Stn 32/1996). Scale bars: 1 mm (A), 200 μm (B, D–G), 150 μm (C).

of nematotheca, emerging through a perisarc hole situated on a strongly marked elevation of internode (angle between long axis of hydrocladial internode and steep slope of infrathecal elevation almost 90°).

Hydrothecae placed on basal half or basal third of hydrocladial internodes (figure 3), shallow; aperture circular and either perpendicular to longitudinal axis of internode or slightly tilted downwards; rim even. Adcauline wall of hydrotheca with conspicuous free portion, abcauline wall straight, running smoothly into wall of internode; angle with long axis of internode *ca* 45°.

Gonothecae absent.

Remarks. *Oswaldella blanconae* is a rare species, hitherto only recorded by Blanco (1984). It is a distinctive species, characterized by hydrotheca placed on basal half or third of the internode, the absence of mesial inferior nematothecae (although a nematophore is present), the shape of the hydrotheca, the presence of one 'mamelon' besides the axillary nematophore on the cauline apophyses, and the arrangement of cauline internodes.

Ecology and distribution. *Oswaldella blanconae* appears to have a circum-Antarctic distribution. The only previous record was from off Low Island, in West Antarctica, at a depth of 90–100 m (Blanco, 1984). Our material comes from east of Cape Hallett (Victoria Land), in the Ross Sea region, where was collected between 344 and 351 m depth.

Oswaldella crassa Peña Cantero and Vervoort, 1998

Oswaldella crassa Peña Cantero and Vervoort, 1998: 33–35, figure 1; Peña Cantero and García Carrascosa, 1998: 178; 1999: 214; Peña Cantero and Marques, 1999: 85.

Material examined. *6/428*, Three stem fragments up to 35 mm long.

Remarks. The material of this species was previously described and figured by Peña Cantero and Vervoort (1998). *Oswaldella crassa* is characterized by the absence of nematotheca in the hydrocladial internodes, the presence of two axillary nematophores and one 'mamelon' on the cauline apophyses, the shape of the hydrotheca, situated on the middle of the hydrocladial internodes, the strong development of the perisarc, the absence of node between cauline apophyses and hydrocladia, and the absence of internodes in the stem (cf. table 1).

Ecology and distribution. *Oswaldella crassa* is known only from the Bransfield Strait area, where it was collected at depths from 662 to 1120 m in January (Peña Cantero and Vervoort, 1998).

Oswaldella curiosa Peña Cantero and Vervoort, 1998

Oswaldella curiosa Peña Cantero and Vervoort, 1998: 35–39, figure 2; Peña Cantero and García Carrascosa, 1999: 214; Peña Cantero and Marques, 1999: 85.

Material examined. *6/428*, three stems up to 35 mm high.

Remarks. The material of this species was previously described and figured by Peña Cantero and Vervoort (1998). *Oswaldella curiosa* is well characterized, especially by the shape of the hydrotheca, since it is the only known species of the genus with a completely abcaudally directed hydrothecal aperture. It is also characterized by the absence of mesial inferior nematothecae in the hydrocladial internodes, the

absence of a node between cauline apophyses and hydrocladia, and by the presence of a single axillary nematophore in the cauline apophyses (cf. table 1).

Ecology and distribution. *Oswaldella curiosa* is known only from the Bransfield Strait area, where it was collected at depths between 662 and 1120 m in January (Peña Cantero and Vervoort, 1998).

Oswaldella delicata Peña Cantero, Svoboda and Vervoort, 1997 (figure 4)

Oswaldella delicata Peña Cantero *et al*., 1997: 353–355, figures 3, 13C; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1999: 214; Peña Cantero and Marques, 1999: 85.

?*Oswaldella* sp. 1 Peña Cantero and Vervoort, 1995: 334–336, figure 2.

Material examined. *001/011*, two stems up to 60 mm high (USNM 1003308; RMNH-Coel. 30206); ?*32/2068*, two stems up to 24 mm high (USNM 1003309; RMNH-Coel. 30207).

Description. Colonies composed of monosiphonic and unbranched stems up to 60 mm high. Hydrocaulus provided with apophyses alternately arranged in one plane, forming two longitudinal rows; apophyses upwardly directed, forming an angle of *ca* 45° with long axis of stem (figure 4A). Hydrocaulus divided into internodes; usually one apophysis per internode. Cauline apophyses provided with a single axillary nematophore, emerging through a simple perisarc hole (figure 4B, C). Apophyses supporting unbranched hydrocladia separated by a distinct node (figure 4A, B).

Hydrocladia homomerously divided into hydrothecate internodes provided with one hydrotheca and two nematophores (figure 4B, D–H): one mesial superior, emerging through a perisarc hole situated behind free adcauline hydrothecal wall, and one mesial inferior springing from a perisarc hole in a slight elevation of internode and provided with a scale-shaped nematotheca. Distal hydrocladial internodes apically truncated.

Hydrotheca elongate, placed on middle of hydrocladial internode (figure 4B, D–H); distinct part of its adcauline wall free. Abcauline hydrothecal wall straight, though convex basally. Hydrothecal aperture circular, more or less perpendicular to long axis of internode; rim even.

Gonothecae present in the material from Stn 32/2068 (figure 4I), inserting on infrathecal elevation of hydrocladial internode, fusiform, provided with an almost circular, subterminal aperture; basal third with node or diaphragm.

Remarks. The material from Stn 32/2068 differs from *O. delicata* studied so far by the absence of internodes in the stems, the presence of an inconspicuous node between the cauline apophyses and the hydrocladia (figure 4B), and the shape of the gonothecae (figure 4I). The difference in gonothecal structure may be due to sexual dimorphism. In the original description of *O. delicata* only one type of gonotheca was found; sexual dimorphism is known to exist in species of *Oswaldella*.

Ecology and distribution. *Oswaldella delicata* was known only from 430 to 440 m depth off the south coast of the Weddell Sea, occurring on muddy bottom; colonies with gonothecae were collected in February (Peña Cantero *et al.*, 1997). Our material was collected at 438 m depth, east of Cape Wheeler, off the south-west coast of the Weddell Sea.

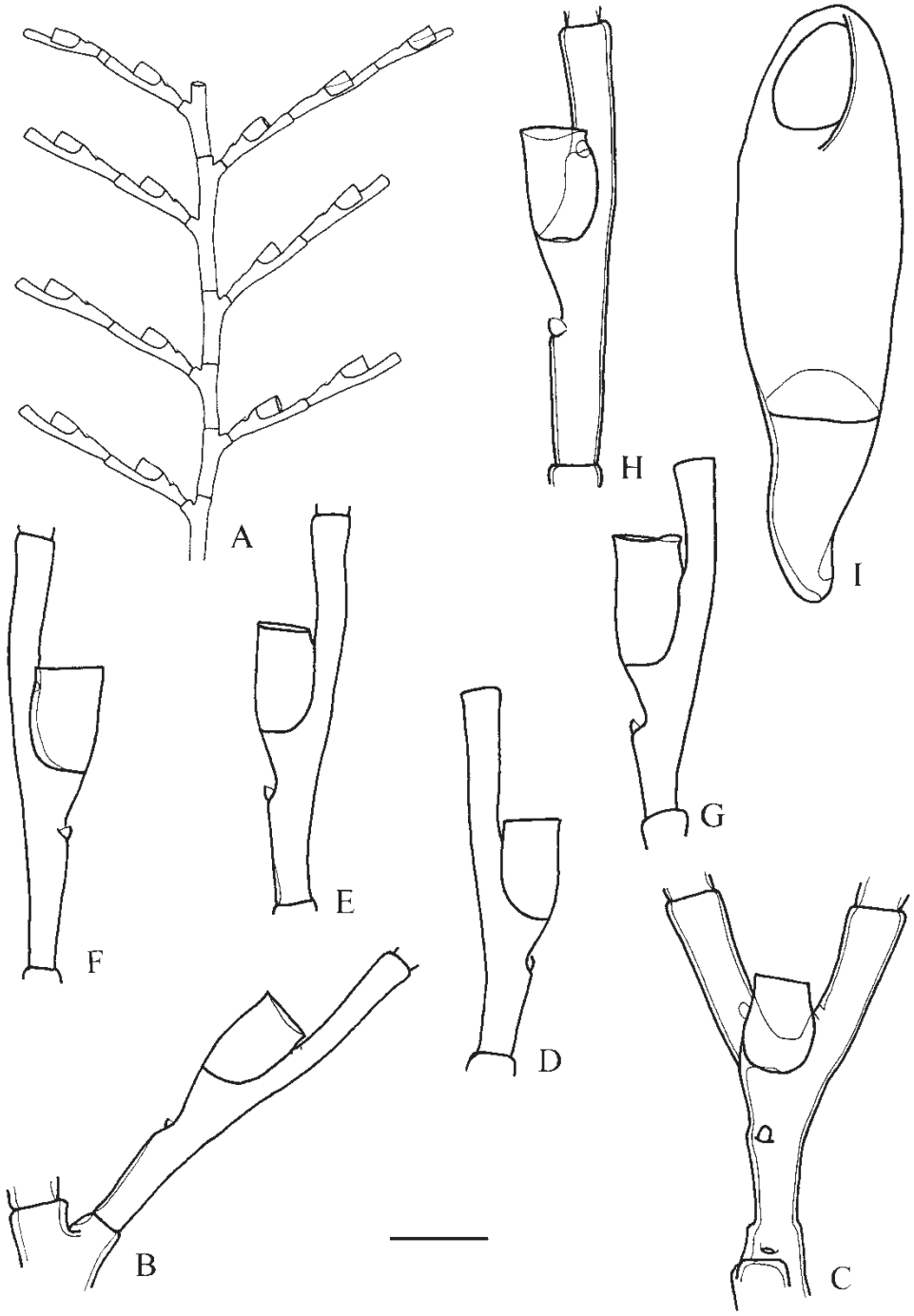


FIG. 4. *Oswaldella delicata* Peña Cantero, Svoboda and Vervoort, 1997. (A) Fragment of stem showing hydrocladial and hydrothecal arrangement; (B, C) cauline apophyses showing axillary nematophore and first hydrocladial internode (in C with branching); (D–H) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca; (I) gonotheca (A, B, D–F, Stn 001/011; C, G–I, Stn 32/2068). Scale bar: 1 mm (A), 250 μm (B–H).

Oswaldella elongata Peña Cantero, García Carrascosa and Vervoort, 1995

Oswaldella elongata Peña Cantero *et al.*, 1995: 347–350, figure 2; 1997: 344; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1999: 212 *et seq.*; Peña Cantero and Marques, 1999: 85.

Oswaldella sp.1 Peña Cantero, 1991: 179–182, pl. 33 figures a–e, pl. 57 figures a–f, pl. 68 figure b; Peña Cantero and García Carrascosa, 1994: 126, figure 8g, h; 1995: 104–107, figures 46A–F, 47A–F, 64F.

Remarks. *Oswaldella elongata* is an uncommon species, well characterized by the long hydrothecae, the absence of mesial inferior nematothecae in the hydrocladial internodes, the presence of two axillary nematophores and two 'mamelons' in the cauline apophyses and the presence of only secondary hydrocladia (cf. table 1).

Ecology and distribution. *Oswaldella elongata* is known only from off Clerke Rocks and South Georgia, where it was found between 86 and 250 m depth, growing on hydrocorals (Peña Cantero *et al.*, 1995).

Oswaldella encarnae Peña Cantero, Svoboda and Vervoort, 1997
(figure 5)

Oswaldella encarnae Peña Cantero *et al.*, 1997: 356–358, figures 4, 13D; Peña Cantero and García Carrascosa, 1998: 179; 1999: 214; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and Marques, 1999: 85.

Material examined. *002/009*, three fragments and stems up to 48 mm high (USNM 1003310; RMNH-Coel. 30208).

Description. Monosiphonic and unbranched stems up to 48 mm high. Hydrocaulus provided with cauline apophyses directed upwards and forming an angle of *ca* 45° with long axis of stem (figure 5A). This stem divided into internodes with one or two apophyses per internode. Cauline apophyses provided with two axillary nematophores, emerging through simple perisarc holes (figure 5B, C); without 'mamelons'. Each apophysis supporting an unbranched hydrocladium (figure 5A–C), separated by a distinct node (figure 5B, C); top of distal hydrocladial internodes truncated.

Hydrocladia homomerously divided into internodes each provided with one hydrotheca and two nematophores (figure 5B–G): one infrathecal mesial nematophore with a scale-shaped nematotheca and situated on a slight elevation of internode, and one mesial superior nematophore, emerging through a perisarc hole placed behind free adcauline hydrothecal wall.

Hydrothecae usually placed on distal half of internodes (figure 5); sometimes in the middle (usually in basalmost internodes). Hydrotheca shallow, with part of the adcauline hydrothecal wall free. Abcauline wall straight, running smoothly into wall of internode under an angle of *ca* 30° with internodal long axis. Aperture circular, slightly tilted downwards; rim even.

Gonothecae absent.

Ecology and distribution. *Oswaldella encarnae* appears to be a shelf species, having been found from depths of 400 to 440 m on muddy bottoms (Peña Cantero *et al.*, 1997); our material was found at a depth of 252 m. Peña Cantero *et al.* (1997) recorded gonothecae from February.

Presently *Oswaldella encarnae* can best be considered endemic to the Weddell Sea, in West Antarctica, as it has been reported off the south and east coasts of the Weddell Sea (Peña Cantero *et al.*, 1997). We record it here from north off Berkner Island, off the south coast of the Weddell Sea.

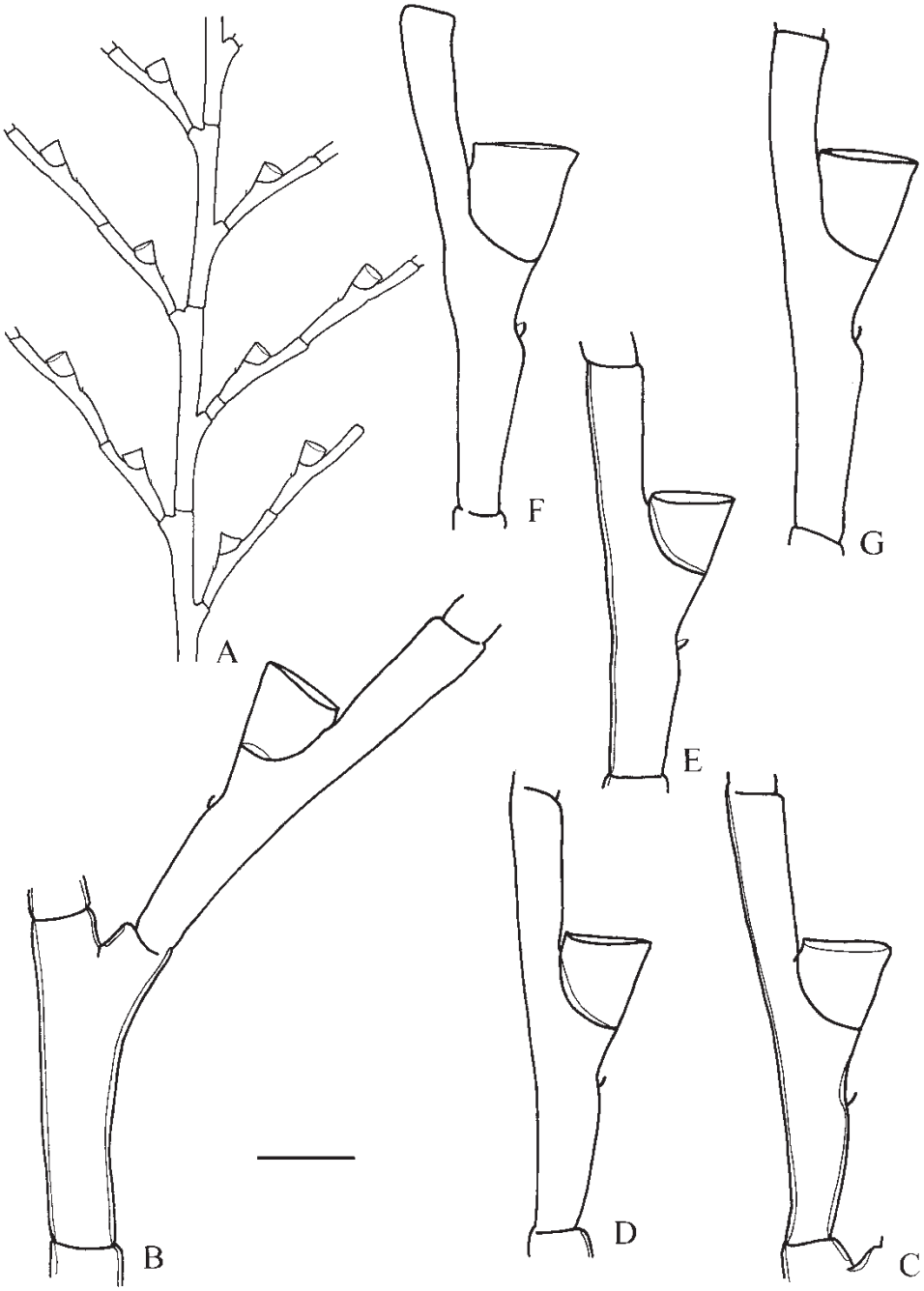


FIG. 5. *Oswaldella encarnae* Peña Cantero, Svoboda and Vervoort, 1997. (A) Fragment of stem showing hydrocladial and hydrothecal arrangement; (B) cauline internode and apophysis with axillary nematophore and first hydrocladial internode; (C) cauline apophysis with axillary nematophore and first hydrocladial internode; (D–G) hydrocladial internodes showing hydrotheca, mesial superior nematophore and mesial inferior nematotheca (all drawings, Stn 002/009). Scale bar: 1 mm (A), 250 μm (B–G).

Oswaldella erratum Peña Cantero and Vervoort, 1997
(figures 6, 7)

Oswaldella erratum Peña Cantero and Vervoort, 1997: 273–276; 1998: 36; Peña Cantero and García Carrascosa, 1999: 214; Peña Cantero and Marques, 1999: 85.
Oswaldella billardi: Broch, 1948: 13–16, figure 4b; Peña Cantero *et al*., 1997: 349–353, figures 2, 13b.
Oswaldella billardi shetlandica p.p. Stepan'yants, 1979: 114, pl. 21 figure 3b, c (only a part belongs to *Oswaldella shetlandica* Stepan'yants, 1979).
Oswaldella billardi p.p. Blanco, 1984: 45–46, pl. 42 figures 96, 97 (partly *Oswaldella shetlandica* Stepan'yants, 1979).
Polyplumaria antarctica: Billard, 1914: 28–31, figure 17.

Material examined. ?*001/011*, one stem *ca* 70 mm high (USNM 1003311); *12/1001*, one stem *ca* 10 mm high (USNM 1003312); *12/1002*, one fragmented stem (largest fragment *ca* 55 mm long) (USNM 1003313); *12/1003*, numerous stems up to 65 mm high, with gonothecae (USNM 1003314; RMNH-Coel. 30209; MNCN 2.03/231); *575/061*, three stem fragments up to 35 mm long (USNM 1003315); *691/003*, one stem fragment *ca* 55 mm long, with gonothecae (USNM 1003316); *691/020*, one stem *ca* 62 mm high (USNM 1003317); *702/511*, one distally broken stem *ca* 30 mm high (USNM 1003318); ?*721/1070*, two stems up to 80 mm high, with gonothecae (USNM 1003319; RMNH-Coel. 30210); *721/765*, three stems up to 65 mm high, with gonothecae (USNM 1003320; RMNH-Coel. 30211; MNCN 2.03/232); *731/1756*, one fragment *ca* 23 mm long (USNM 1003321); *824/041-1*, one stem *ca* 23 mm high (USNM 1003322); *833/018-1*, one stem *ca* 130 mm high (USNM 1003323); *SOSC-L26*, two stems up to 30 mm high (USNM 1003324).

Description. Colonies consisting of monosiphonic and unbranched stems up to 130 mm high. Stems typically robust, with strongly developed perisarc (figure 6A–E). Hydrocaulus provided with apophyses alternately arranged in one plane, forming two longitudinal rows. Cauline apophyses directed upwards, forming an angle of *ca* 70° with long axis of stem, provided with two nematophores, each emerging through an axillary perisarc hole (figures 6B, 7B). Stems with occasional nodes or completely without. Cauline apophyses supporting hydrocladia (figures 6A, 7A); up to third-order hydrocladia present (figure 6A). Node between cauline apophyses and hydrocladia absent (figure 6B), indistinct or present in smallest stems with little developed perisarc (figure 7B).

Hydrocladia homomerously divided into hydrothecate internodes each with one hydrotheca and two nematophores (figures 6C–E, 7C–J): one mesial superior, emerging through a simple perisarc hole behind free adcauline hydrothecal wall, and one mesial inferior nematophore emerging through a hole on an elevation of internode and provided with a scale-shaped nematotheca. Top of distal hydrocladial internodes truncated.

Hydrotheca elongate, usually situated in middle of internode (figures 6, 7); sometimes, mainly in proximal part of hydrocladia, on distal half; part of adcauline wall of hydrotheca free. Aperture kidney-shaped and strongly tilted adcaudally. Abcauline wall of hydrotheca basally straight, strongly curving inwards distally.

Female gonothecae present, inserting just below mesial inferior nematophore, fusiform (figure 6A, F); aperture circular and subterminal. Gonotheca sometimes provided with node or diaphragm at basal fourth.

Remarks. *Oswaldella erratum* is allied to *O. billardi*, sharing many features (cf. table 1). They can be distinguished by the larger size of the hydrothecae in

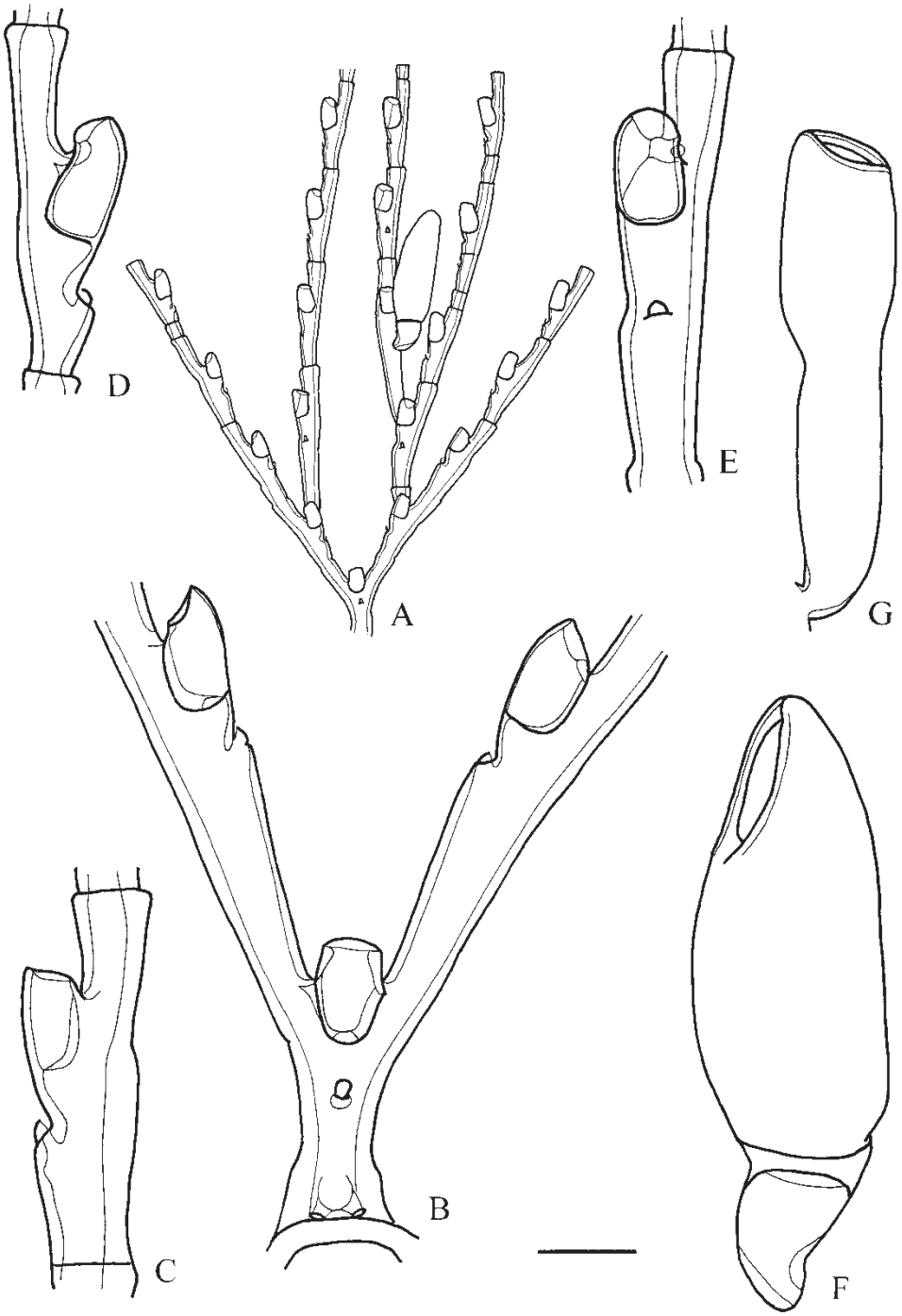


FIG. 6. *Oswaldella erratum* Peña Cantero and Vervoort, 1997. (A) Hydrocladial branching and disposition of hydrothecae and gonothecae; (B) cauline apophysis with axillary nematophores and branched hydrocladium; (C–E) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca; (F) female gonotheca; (G) male gonotheca (A, C–F, Stn 12/1003; B, Stn 691/20; G, Stn 721/765). Scale bar: 1 mm (A), 250 μm (B–G).

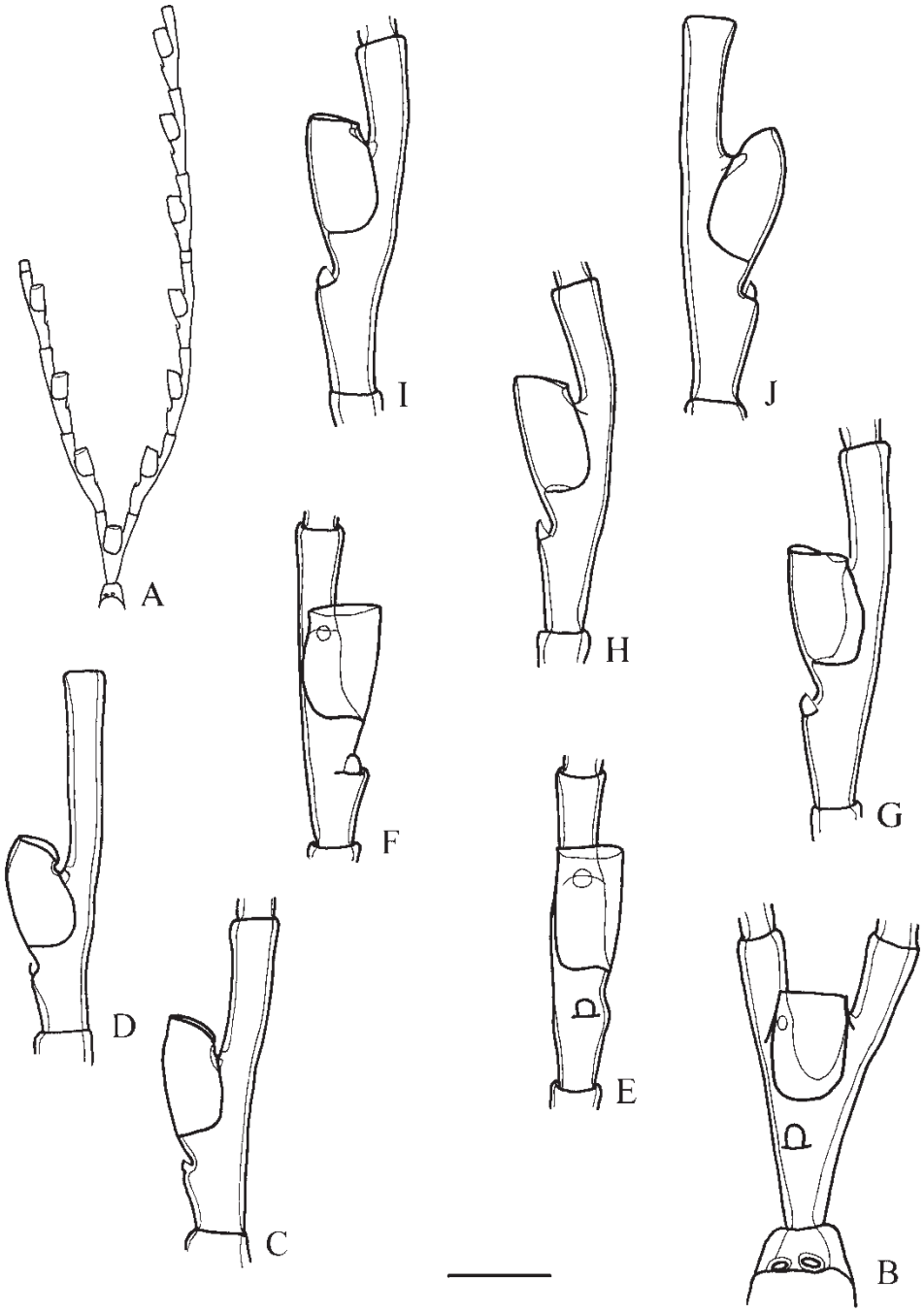


FIG. 7. *Oswaldella erratum* Peña Cantero and Vervoort, 1997. (A) Branched hydrocladium and arrangement of hydrothecae; (B) cauline apophysis with axillary nematophores and branched hydrocladium; (C–J) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca (A, B, E–I, Stn 575/61; C, Stn SOSC-L26; D, Stn 824/41-1; J, Stn 702/511). Scale bar: 1 mm (A), 250 μm (B–J).

O. billardi, in which the length of the abcauline hydrothecal wall may be 350 μm at the first hydrocladial internode and may reach 400 μm at the last. In *O. erratum* that length may be 240 μm at the first hydrocladial internode, reaching up to 360 μm in the last internodes. Moreover, in *O. billardi* the hydrocladia are always separated from the cauline apophyses by a distinct node, whereas in *O. erratum* that node is usually absent or little marked. In *O. erratum*, the stem is deprived of nodes or has only occasional internodes, whereas in *O. billardi* the stem usually presents internodes. In *O. billardi* only secondary hydrocladia are present, whereas in *O. erratum* there are typically up to third-order hydrocladia.

Ecology and distribution. *Oswaldella erratum* is a shelf species (Peña Cantero *et al.*, 1997), having been found at depths from 70 (Billard, 1914) to 696 m (Peña Cantero *et al.*, 1997) on bottoms of mud and sand (Broch, 1948), mud and pebbles (Billard, 1914), and on rocky and stony bottoms (Peña Cantero *et al.*, 1997). Our material comes from depths of 55 to 311 m and was found on gravel. It has been found with gonothecae in March (Peña Cantero *et al.*, 1997) and in November (Billard, 1914); we found fertile colonies in January, February and March.

Oswaldella erratum appears to be endemic to West Antarctica, where it has been recorded from Roosen Channel, Antarctic Peninsula (Billard, 1914), off Bouvet and Peter I Islands (Broch, 1948), the South Orkney Islands (Stepan'yants, 1979), Petermann Island (65°10′S, 64°10′W; Blanco, 1984) and off the east coast of the Weddell Sea (Peña Cantero *et al.*, 1997). Our material was collected from off Visokoi Island, in the South Sandwich Islands, and from the Antarctic Peninsula region: at the north-east of Joinville Island, west of Renaud Island (Biscoe Islands), off Wiencke and Anvers Islands (Palmer Archipelago) and off Elephant Island.

Oswaldella frigida sp. nov.
(figure 8; table 2)

Material examined. *691/26*, one stem *ca* 75 mm high (holotype, USNM 1003325); *721/1063*, three stem fragments up to 50 mm high (USNM 1003326; RMNH-Coel. 30212; MNCN 2.03/233).

Description. Colonies consisting of monosiphonic and unbranched stems up to 75 mm high. Hydrocaulus provided with apophyses alternately arranged in one plane and forming two longitudinal series. Cauline apophyses directed upwards, forming an angle of *ca* 45° with long axis of stem. Stem divided into internodes with usually one or two apophyses per internode although up to four apophyses have been observed. Cauline apophyses with three (figure 8C), occasionally four (figure 8B) nematophores: two axillary nematophores, each one emerging through a simple perisarc hole, and one more emerging through a 'mamelon'. Occasionally an extra nematophore is present, emerging through a second 'mamelon'. Cauline apophyses supporting hydrocladia with asymmetrical branching (figure 8A). First hydocladial internode bifurcated, giving rise to two unequally developed prongs, this process being repeated at the next internodes; ramifications all in one plane. Cauline apophyses and hydrocladia separated by a distinct node (figure 8A, B).

Hydrocladia homomerously divided into hydrothecate internodes, each provided with one hydrotheca and two nematophores (figure 8D–K): one mesial superior nematophore, emerging through a simple perisarc hole situated behind free adcauline hydrothecal wall, and one mesial inferior nematophore emerging through a hole

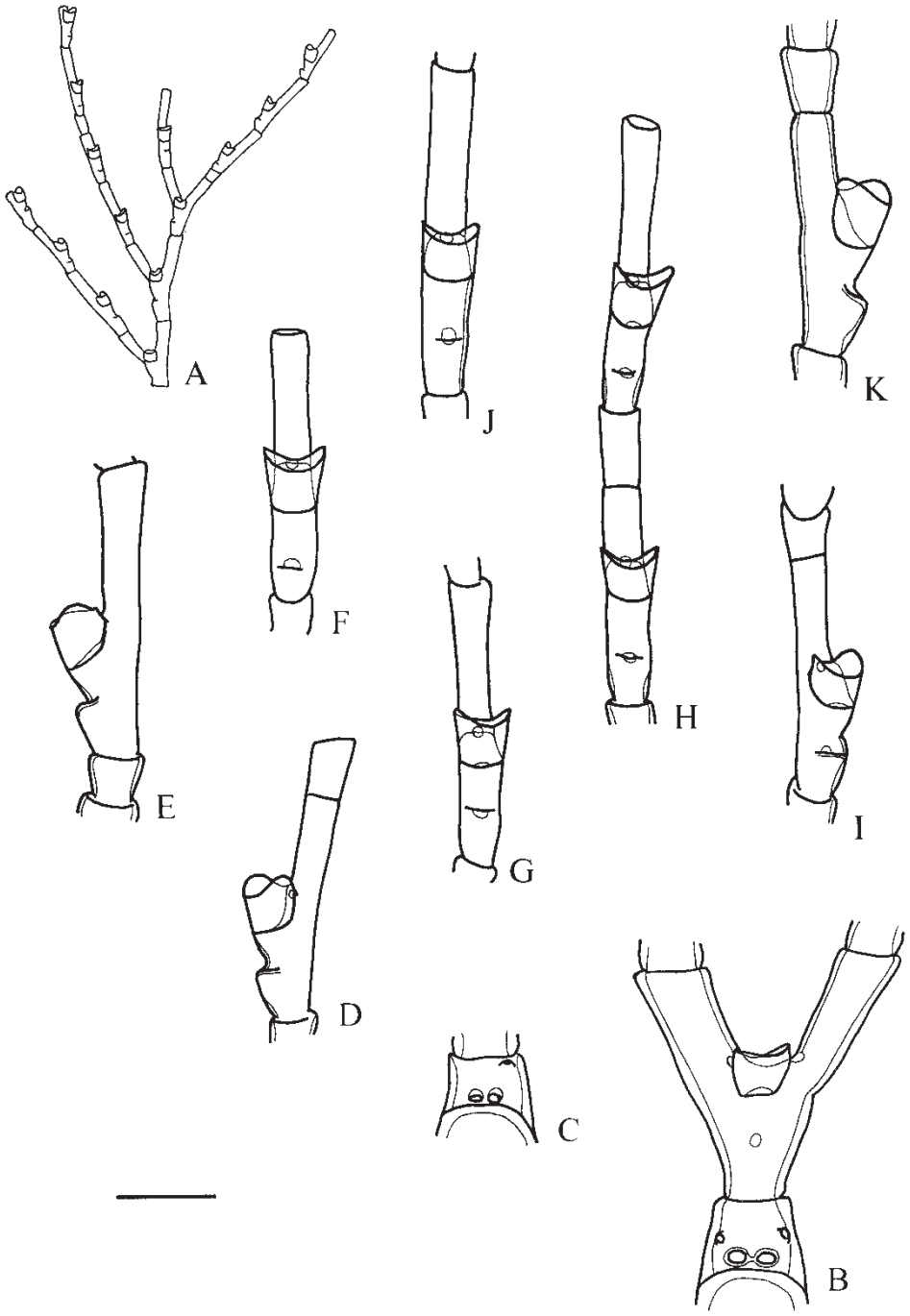


FIG. 8. *Oswaldella frigida* sp. nov. (A) Hydrocladial branching and arrangement of hydrothecae; (B) cauline apophysis with axillary nematophores and 'mamelons', as well as branched hydrocladium; (C) cauline apophysis with two axillary nematophores and a single 'mamelon'; (D–K) hydrocladial internodes with hydrotheca and both mesial superior and mesial inferior nematophores (A–E, G–I, Stn 691/26; F, J, K, Stn 721/1063). Scale bar: 1 mm (A), 250 μm (B–K).

Table 2. Measurements of *Oswaldella frigida* sp. nov. (in μm).

Hydrothecae	
Length of abcauline wall	80–120
Length of free part of adcauline wall	20–30
Diameter at rim	130–150
Internode	
Length	680–730
Diameter under hydrotheca	150–170

situated on a strong elevation of the internode and deprived of any kind of nematotheca. Top of distal hydrocladial internodes truncated.

Hydrotheca shallow, placed on proximal half of internode or in the middle (figure 8D–K). Hydrothecal aperture frontally depressed; rim uneven due to the presence of two strongly developed lateral lobes. Hydrotheca provided with a conspicuous free portion of its adcauline wall.

Gonothecae absent.

Remarks. *Oswaldella frigida* sp. nov. is allied to *O. bifurca* in general appearance, but differs in many respects (cf. table 1). In *O. bifurca* there is usually a single nematophore on the cauline apophyses emerging through a simple axillary perisarc hole (occasionally two), in *O. frigida* sp. nov. there are typically four nematophores on the cauline apophyses, two axillary nematophores emerging each from a perisarc hole and two more emerging each from a 'mamelon' (occasionally only a single 'mamelon'). Also, though in both species the hydrotheca is frontally depressed, in *O. frigida* sp. nov. that frontal depression is much better developed; in fact, in many hydrothecae of *O. bifurca* the rim is even. Moreover, whereas in *O. bifurca* the hydrotheca is adnate over the entire adcauline wall, that adcauline hydrothecal wall usually has a distinct free portion in *O. frigida* sp. nov. In *O. bifurca*, the top of the distal hydrocladial internodes is pointed, whereas in *O. frigida* sp. nov. that part is truncated. In *O. bifurca* the hydrocladial arrangement is usually symmetrical, but in *O. frigida* sp. nov. that disposition is asymmetrical. In *O. bifurca* the first hydrocladial internode is distinctly bifurcated, giving rise to two secondary prongs of equal development, while in *O. frigida* sp. nov. that first internode gives rise to two unequally developed prongs that could be seen as the first-order hydrocladium giving rise to several secondary hydrocladia. In *O. bifurca* the cauline apophyses form an angle of *ca* 70° with the long axis of the stem, whereas in *O. frigida* sp. nov. that angle is *ca* 45°. In *O. frigida* sp. nov. there is a distinct node separating cauline apophyses and hydrocladia; such a node is absent in *O. bifurca*, only in the youngest stems is it possible to find an indistinctly indicated node. In *O. bifurca* the stem is slightly geniculate, due to the arrangement and structure of the cauline apophyses, whereas in *O. frigida* sp. nov. the stem is straight. Finally, in *O. bifurca* the hydrocladia proximally follow the angle of *ca* 70° of the cauline apophyses, curving strongly upwards distally, whereas in *O. frigida* sp. nov. the hydrocladia completely follow the angle of *ca* 45° of the cauline apophyses.

Ecology and distribution. *Oswaldella frigida* sp. nov. has been collected from depths of 44 to 124 m off Low Island and off Nelson Island, in the South Shetland Islands.

Etymology. The specific name *frigida* refers to the frigid conditions under which this species lives.

Oswaldella garciacarrascosai Peña Cantero, Svoboda and Vervoort, 1997

Oswaldella garciacarrascosai Peña Cantero *et al*., 1997: 358–361, figures 5, 14A; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1998: 178; 1999: 214; Peña Cantero and Marques, 1999: 85.

Remarks. *Oswaldella garciacarrascosai* is well characterized by the absence of mesial inferior nematothecae in the hydrocladial internodes, the presence of two axillary nematophores and one 'mamelon' in the cauline apophyses, the shape of the hydrotheca, and the presence of only secondary hydrocladia (cf. table 1).

Ecology and distribution. *Oswaldella garciacarrascosai* was found from depths of 330 to 340 m on muddy bottoms off the south coast of the Weddell Sea. It was observed epibiotic on Bryozoa; fertile colonies were found in January and February (Peña Cantero *et al.*, 1997).

Oswaldella gracilis Peña Cantero, Svoboda and Vervoort, 1997

Oswaldella gracilis Peña Cantero *et al*., 1997: 361–363, figures 6, 14B; Peña Cantero and García Carracosa, 1998: 179; 1999: 214; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and Marques, 1999: 85.

Remarks. *Oswaldella gracilis* is an uncommon species, characterized mainly by the shape of the hydrotheca, which is low and laterally depressed, the absence of mesial inferior nematothecae in the hydrocladial internodes, the presence of a single axillary nematophore in the cauline apophyses, and the presence of only first-order hydrocladia (cf. table 1).

Ecology and distribution. *Oswaldella gracilis* is known from off the south coast of the Weddell Sea, where it was collected at a depth of 440 m (Peña Cantero *et al.*, 1997).

Oswaldella grandis Peña Cantero, Svoboda and Vervoort, 1997
(figure 9)

Oswaldella grandis Peña Cantero *et al*., 1997: 363–367, figures 7, 14C, D; Peña Cantero and García Carrascosa, 1998: 179; 1999: 212 *et seq*.; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and Marques, 1999: 85.

Oswaldella bifurca: Peña Cantero, 1991: 175, pl. 32; Peña Cantero and García Carrascosa, 1994: 125, figure 8d–f; 1995: 101–104, figure 45A–E.

?*Oswaldella bifurca*: Naumov and Stepan'yants, 1962: 98; Stepan'yants, 1979: 112, pl. 21 figure 4; Blanco, 1984: 43, pl. 39 figures 89, 90, pl. 40 figures 91–93, pl. 41 figure 94.

Material examined. *702/464*, one stem *ca* 145 mm high (USNM 1003327); *702/465*, two stems up to 500 mm high (USNM 1003328; RMNH-Coel. 30213); *721/776*, four stems up to 460 mm high, with gonothecae (USNM 1003329; RMNH-Coel. 30214; MNCN 2.03/234).

Description. Colonies consisting of polysiphonic and unbranched stems up to 500 mm high. Hydrocaulus divided into internodes, occasionally so in Stn 702/465, and provided with alternately arranged apophyses, forming two longitudinal rows in one plane. Cauline apophyses directed upwards, forming an angle of *ca* 45° with long axis of stem and provided with four nematophores (figure 9B): two axillary nematophores emerging through simple perisarc holes and two more emerging each through a 'mamelon', placed laterally on upper surface of apophysis. Cauline apophyses supporting branched hydrocladia; up to third-order hydrocladia observed (figure 9A). Hydrocladial arrangement symmetrical (figure 9A); first hydrocladial internode giving rise to two secondary hydrocladia that usually support two or more

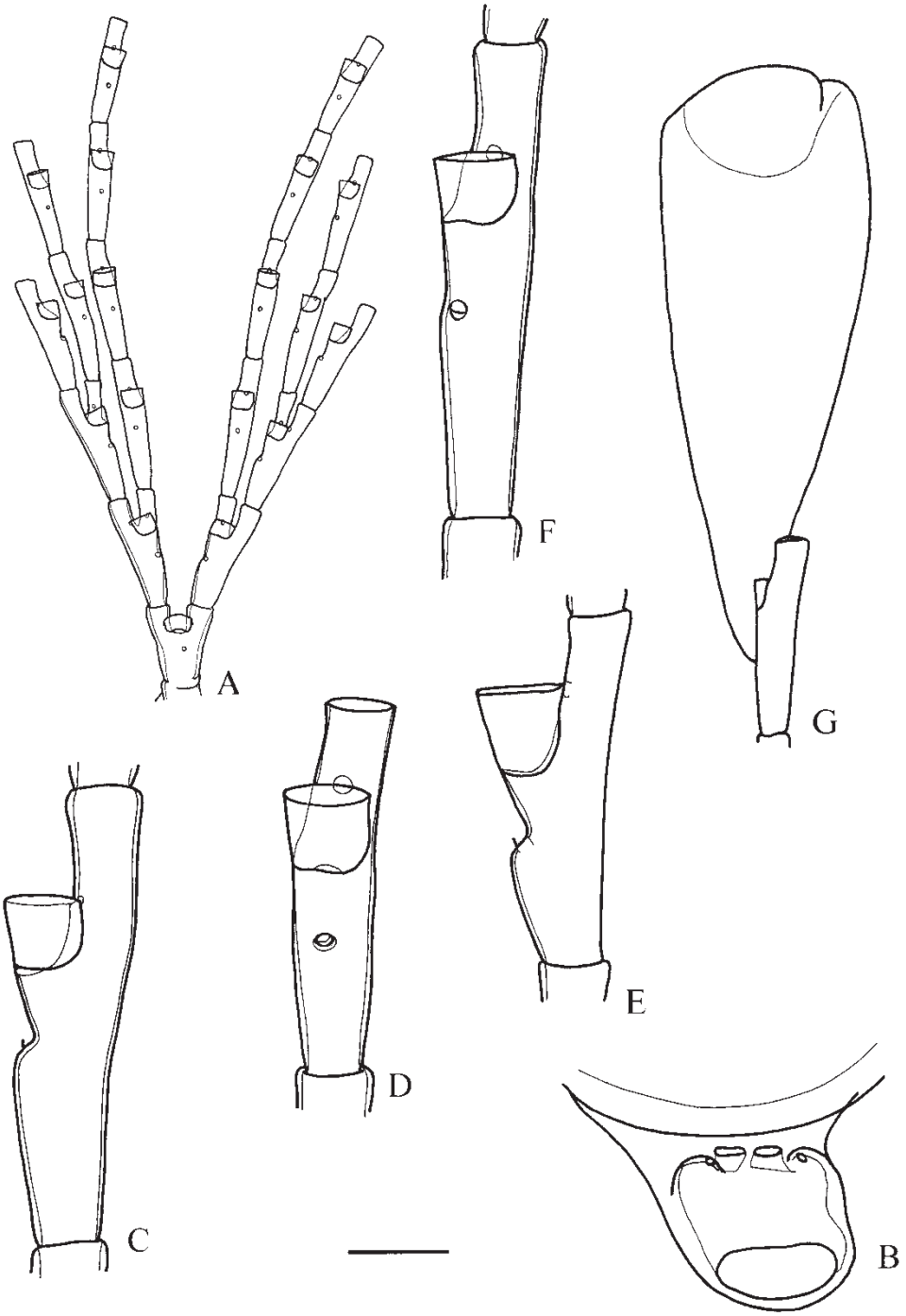


FIG. 9. *Oswaldella grandis* Peña Cantero, Svoboda and Vervoort, 1997. (A) Hydrocladial branching and arrangement of hydrothecae; (B) cauline apophysis with axillary nematophores and 'mamelons'; (C–F) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca; (G) gonotheca (A–F, Stn 702/464; G, Stn 721/776). Scale bar: 1 mm (A), 600 μm (G), 250 μm (B–F).

third-order hydrocladia. No distinct node between cauline apophyses and hydrocladia, although present in the material from Stn 702/465. Top of distal hydrocladial internodes truncated.

Hydrocladia homomerously divided into hydrothecate internodes, each provided with one hydrotheca and two nematophores (figure 9C–F): one mesial superior emerging through a perisarc hole situated behind free adcauline hydrothecal wall and one mesial inferior provided with a much-reduced nematotheca and emerging through a perisarc hole situated on a slight elevation of internode.

Hydrotheca shallow, situated on distal half of internode (figure 9C–F). Adcauline hydrothecal wall almost completely adnate; aperture circular and approximately perpendicular to long axis of internode; rim even. Abcauline hydrothecal wall straight; angle with internodal long axis very acute.

Female gonothecae present (figure 9G), inserting on infrathecal elevation of hydrocladial internodes, large, club-shaped and provided with a subterminal aperture.

Remarks. *Oswaldella grandis* is a well-characterized species, easily recognizable by the large, unbranched stems, the shape of the hydrotheca which is placed on the distal half of the hydrocladial internodes, the much-reduced nematotheca, the shape of the gonothecae and the presence of four nematophores on the cauline apophyses, two of which emerge through 'mamelons' (cf. table 1).

Ecology and distribution. *Oswaldella grandis* appears to be a shelf species, having been found at depths of 220 to 440 m on muddy bottoms and on bottoms with small stones (Peña Cantero *et al.*, 1997); our material comes from 109 to 154 m. It is used as a substratum by other hydroids (*Billardia* sp.) (Peña Cantero *et al.*, 1997). It has been collected with gonothecae in January and February (Peña Cantero *et al.*, 1997); our fertile material was found in January.

Oswaldella grandis seems to be endemic to West Antarctica (Peña Cantero and Vervoort, 1998). It is known from off Elephant Island (Peña Cantero and García Carrascosa, 1995) and off the south coast of the Weddell Sea (Peña Cantero *et al.*, 1997). Our material was collected off Deception Island, in the South Shetland Islands.

Oswaldella herwigi El Beshbeeshy, 1991
(figure 10)

Oswaldella herwigi El Beshbeeshy, 1991: 259–265, figure 66; Peña Cantero *et al.*, 1997: 344; Peña Cantero and García Carrascosa, 1998: 179; 1999: 214; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and Marques, 1999: 85.

Material examined. *11/958*, numerous stems up to 24 mm high (USNM 1003330; RMNH-Coel. 30215; MNCN 2.03/235); *6/339*, two stem fragments up to 20 mm long (USNM 1003331); *6/340*, several stems a few millimetres high (USNM 1003332); *6/342*, two incipient stems (USNM 1003333).

Description. Stem monosiphonic, either branched or unbranched. Hydrocauli provided with alternately arranged apophyses, forming two longitudinal series, sometimes arranged in two planes meeting at an obtuse angle (up to 90°) (figure 10B, C). Apophyses directed upwards at an angle of *ca* 45° with long axis of stem. Each apophysis provided with an axillary nematophore emerging through a simple perisarc hole and a second nematophore emerging through a 'mamelon' situated on one side

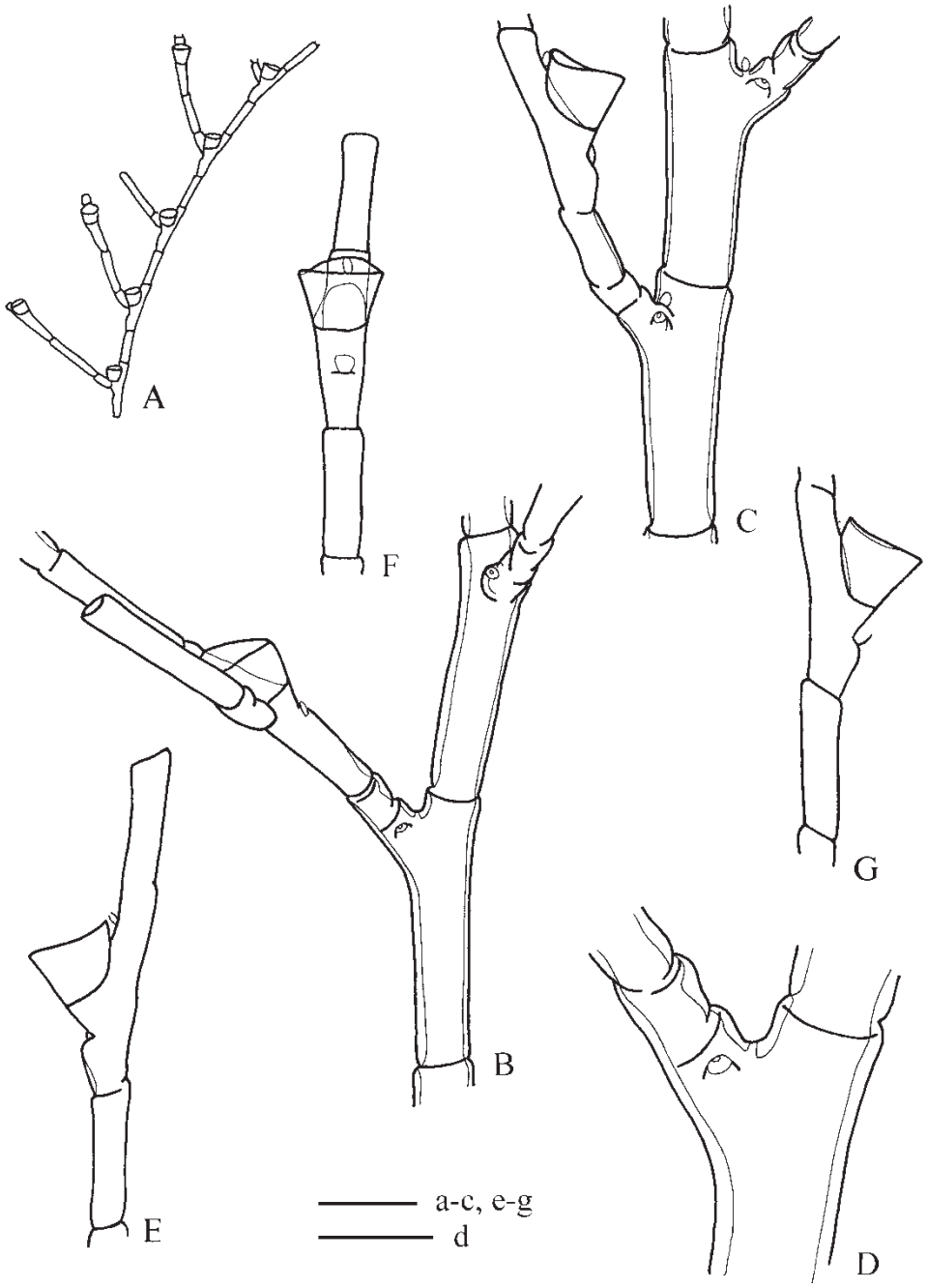


FIG. 10. *Oswaldella herwigi* El Beshbeeshy, 1991. (A) Hydrocladial branching and arrangement of hydrothecae; (B, C) cauline internodes and apophyses with axillary nematophore and 'mamelon' as well as first hydrocladial internodes; (D) detail of cauline apophysis with axillary nematophore and 'mamelon'; (E–G) athecate and thecate hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca (all drawings, Stn 11/958). Scale bars: 1 mm (A), 250 μm (B, C, E–G), 150 μm (D).

of the apophysis (figure 10B–D). Stem divided into internodes with one apophysis each.

Cauline apophyses supporting hydrocladia separated by a distinct node (figure 10B, C). Second-order hydrocladia present (figure 10A); in one stem with incipient third-order hydrocladia. Hydrocladial arrangement asymmetrical (figure 10A); first-order hydrocladia giving rise to several secondary hydrocladia. Top of distal hydrocladial internodes truncated.

Hydrocladia heteromerously segmented (figure 10), with alternately arranged athecate and hydrothecate internodes. Hydrothecate internodes with one hydrotheca and two nematophores (figure 10E–G): one mesial inferior emerging through a perisarc hole on a slight elevation of internode and provided with a scale-shaped nematotheca, and a mesial superior nematophore emerging through a perisarc hole situated behind the free adcauline hydrothecal wall.

Hydrothecae usually situated on distal half of hydrothecate internodes; sometimes in the middle (figure 10A, C, E, G). Hydrotheca shallow, rim circular and slightly laterally depressed, tilted downwards. Considerable part of adcauline wall of hydrotheca free; abcauline wall at an angle of *ca* 60° with internodal long axis.

Gonothecae absent.

Remarks. *Oswaldella herwigi* is the only species of the genus found outside Antarctic waters (cf. figure 19). It also has peculiarities in which it differs from the remaining species of *Oswaldella*. For example, the 'mamelon' present on the cauline apophyses of this species has a structure different from that of the other species, as it is provided with a conical distal structure (figure 10D) that is absent in the remaining species. Moreover, the naked nematophores, i.e. the mesial superior nematophore situated behind free adcauline hydrothecal wall and the axillary nematophore of the cauline apophyses appear to be sheathed (figure 10C, E–G). *Oswaldella herwigi* is also the only species with heteromerously divided hydrocladia, having alternating hydrothecate and athecate internodes.

In two stems from Stn 6/340 the cauline apophysis of the first stem internode has two axillary perisarc holes. In the second internode, those axillary holes are partly merged. In the remaining cauline apophyses there is a single axillary perisarc hole. This phenomenon is similar to that observed in other species of the genus (e.g. *O. bifurca*) and points to a certain inconsistency in the number of axillary nematophores.

Ecology and distribution. *Oswaldella herwigi* is endemic to the Patagonian region (El Beshbeeshy, 1991), having been collected at depths from 90 to 1000 m on the Patagonian shelf and slope (El Beshbeeshy, 1991). Our material comes from depths of 44 to 586 m off the Falkland Islands and the western mouth of the Strait of Magellan. We found it growing as an epibiont on hydroids (*Nemertesia* sp. and Aglaopheniidae).

Oswaldella incognita Peña Cantero, Svoboda and Vervoort, 1997
(figure 11)

Oswaldella incognita Peña Cantero *et al.*, 1997: 367–369, figure 8; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1999: 212 *et seq*.; Peña Cantero and Marques, 1999: 85.

Oswaldella antarctica: Peña Cantero, 1991: 168, pls 31, 56, pl. 68 figure a; Peña Cantero and García Carrascosa, 1994: 125, figure 8a–c; 1995: 96–101, figures 43A–E, 44A–F, 64E.

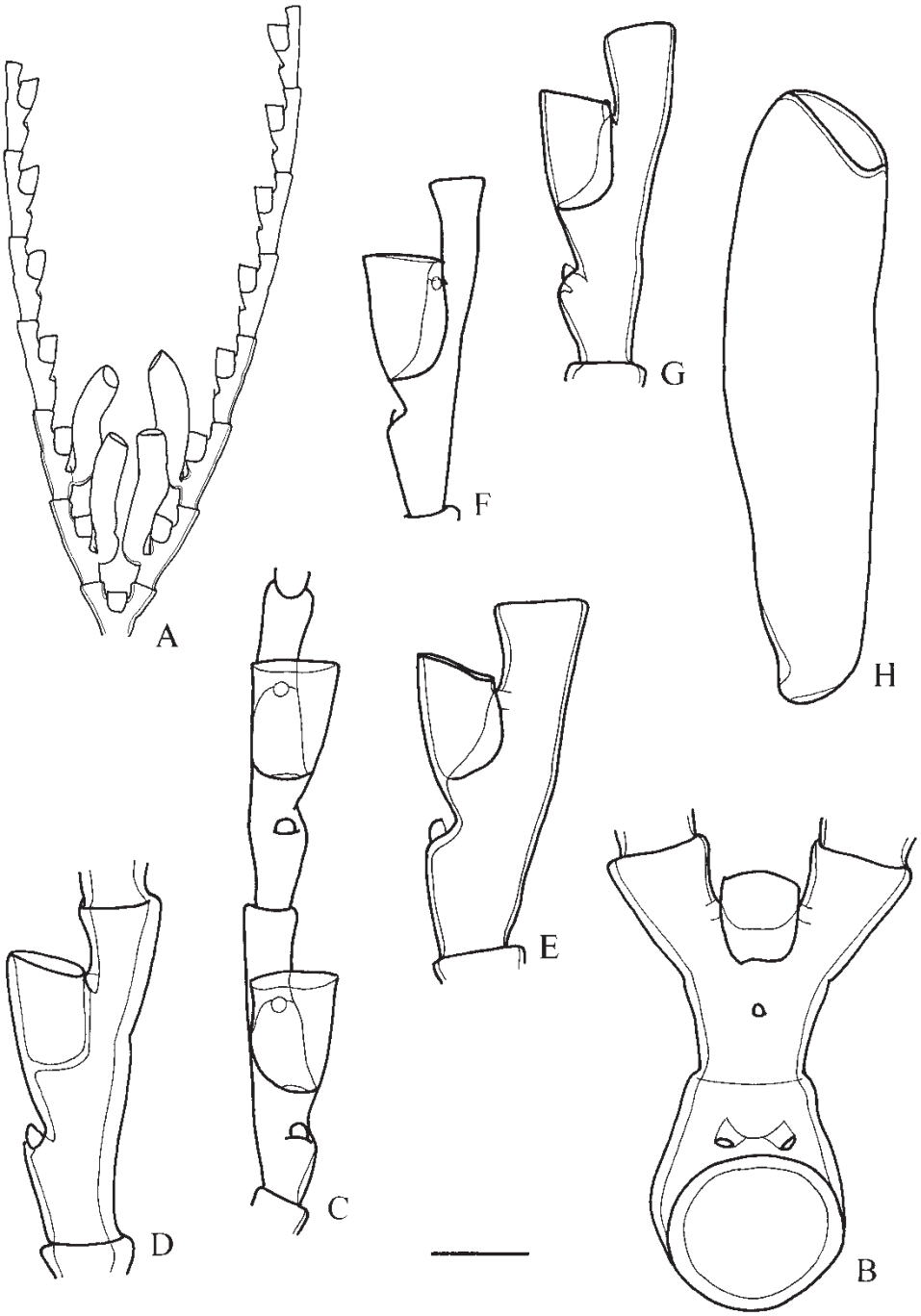


FIG. 11. *Oswaldella incognita* Peña Cantero, Svoboda and Vervoort, 1997. (A) Branched hydrocladium and arrangement of hydrothecae and gonothecae; (B) cauline apophysis with axillary nematophores and branched hydrocladium; (C–G) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca; (H) gonotheca (A–C, E–H, Stn 721/776; D, Stn 7/484). Scale bar: 1 mm (A), 250 μm (B–H).

Material examined. *691/023*, one stem *ca* 35 mm high, with a single hydrocladium (USNM 1003334); *691/27*, two stems and one stem fragment up to 80 mm high, with male gonothecae (USNM 1003335; RMNH-Coel. 30216; MNCN 2.03/236); *7/484*, two stems up to 60 mm high (USNM 1003336); *721/776*, one basally broken stem *ca* 60 mm high, with male gonothecae (USNM 1003337); *721/801*, one stem *ca* 48 mm high (USNM 1003338).

Description. Colonies composed of monosiphonic and unbranched stems (forked in the material from Stn 7/484), provided with apophyses alternately arranged in one plane and forming two longitudinal series. Apophyses directed upwards at an angle of *ca* 45°. Stem divided into internodes with one apophysis each. Cauline apophyses supporting hydrocladia; up to second-order hydrocladia present (figure 11A). Node separating cauline apophyses and hydrocladia inconspicuous (figure 11B). Cauline apophyses provided with two axillary nematophores, each emerging through an axillary perisarc hole (figure 11B); 'mamelons' absent. Top of distal hydrocladial internodes truncated.

Hydrocladia homomerously segmented; internodes each with one hydrotheca and two nematophores (figure 11C–G): one mesial inferior emerging through a perisarc hole on a slight elevation of the internode and provided with a scale-shaped nematotheca, and one mesial superior emerging through a perisarc hole situated behind the free adcauline hydrothecal wall.

Hydrothecae placed either in middle of hydrocladial internode or on its distal half (figure 11A, C–G). Hydrotheca elongate, with circular aperture slightly tilted adcaudally. Rim even; sometimes with a tiny adcauline elevation. Abcauline wall of hydrotheca slightly convex, or straight; angle with long axis of internode 30° or less. Free adcauline hydrothecal wall distinct.

Male gonothecae present, inserted at hydrothecal base on elevation of internode (figure 11A), fusiform, with a subterminal, oval aperture (figure 11A, H).

Remarks. *Oswaldella incognita* is a well-characterized species, easily recognizable by the unbranched stems divided into internodes, the presence of secondary hydrocladia only, the existence of two axillary nematophores on the cauline apophyses and the shape of the hydrotheca (cf. table 1).

Ecology and distribution. *Oswaldella incognita* has been found at depths from 234 (Peña Cantero and García Carrascosa, 1995) to 414 m (Peña Cantero *et al.*, 1997); our material comes from 73 to 952 m. Peña Cantero and García Carrascosa (1995) found fertile colonies in January; colonies with gonothecae in our material were collected in January and February.

The species was previously known only from off Elephant Island (Peña Cantero and García Carrascosa, 1995; Peña Cantero *et al.*, 1997). Our material comes from north of the South Orkney Islands, off Brabant Island (Palmer Archipelago), off Deception and Livingston Islands (South Shetland Islands) and off Low Island.

Oswaldella medeae sp. nov.
(figure 12; table 3)

Material examined. *12/1003*, four stem fragments up to 20 mm long (holotype, USNM 1003339; paratypes, RMNH-Coel. 30217 and MNCN 2.03/237); *32/2018*, one distally broken stem *ca* 9 mm high (USNM 1003340); *32/2021*, two stem fragments up to 7 mm long, each with a single hydrocladium (USNM 1003341).

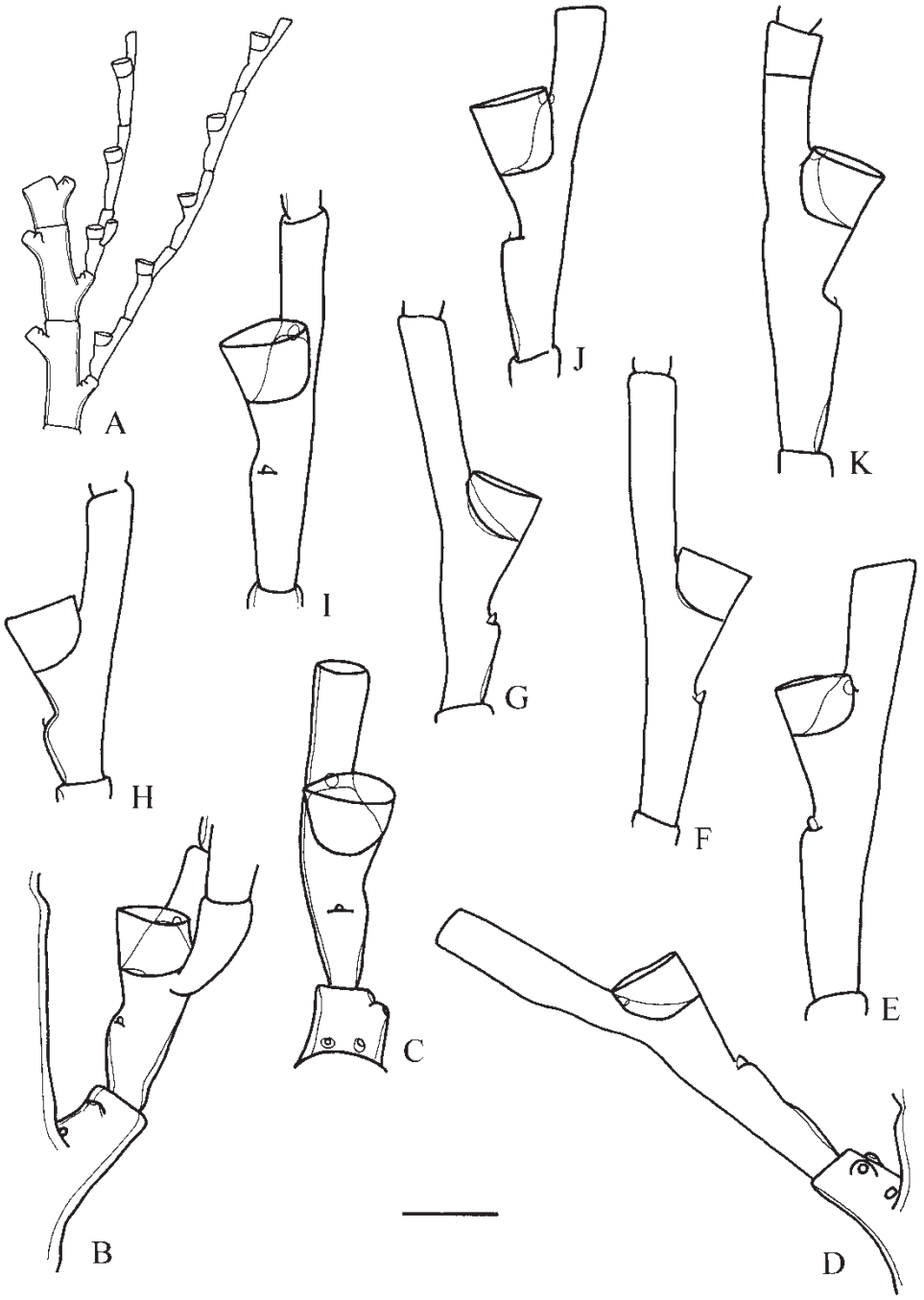


FIG. 12. *Oswaldella medeae* sp. nov. (A) Fragment of stem showing hydrocladial and hydrothecal arrangement; (B–D) cauline apophyses with axillary nematophores and 'mamelons', as well as first hydrocladial internode (in D with two 'mamelons'); (E–K) hydrocladial internodes showing hydrotheca, mesial superior nematophore and mesial inferior nematotheca (A–C, H–K, Stn 12/1003; D, F, G, Stn 32/2018; E, Stn 32/2021). Scale bar: 1 mm (A), 250 μm (B–K).

Table 3. Measurements of *Oswaldella medeae* sp. nov. (in μm).

Hydrothecae	
Length of abcauline wall	120–200
Length of free part of adcauline wall	30–50
Diameter at rim	180–230
Nematothecae	
Length	20–30
Internode	
Length	750–1150
Diameter under hydrotheca	180–230

Description. Colonies apparently with monosiphonic and unbranched stems, but present material fragmentary, largest fragment up to 20 mm long. Hydrocaulus with apophyses alternately arranged in one plane, forming two longitudinal series (figure 12A). Cauline apophyses directed upwards, at an angle of *ca* 45° with long axis of stem and provided with three (figure 12B, C) or four (figure 12D) nematophores: two axillary nematophores, each emerging through a simple perisarc hole, and one or two nematophores emerging through a strongly developed 'mamelon', situated laterally on upper part of apophysis. Hydrocaulus divided into internodes with one or two apophyses per internode (figure 12A). Cauline apophyses supporting hydrocladia (figure 12A–D) from which they are separated by distinct node; secondary hydrocladia present (figure 12B).

Hydrocladia homomerously segmented; hydrothecate internodes with one hydrotheca and two nematophores (figure 12C–K): one mesial superior emerging through a simple perisarc hole just behind free adcauline hydrothecal wall and another mesial inferior nematophore, emerging through a perisarc hole on a strong elevation of the internode and provided with a small, scale-shaped nematotheca. Top of distal hydrocladial internodes truncated.

Hydrotheca shallow, situated in middle of hydrocladial internode or on its distal half (figure 12). Hydrothecal aperture circular and distinctly tilted downwards. Adcauline wall of hydrotheca with considerable free part. Abcauline wall straight, angle with long axis of internode *ca* 45°.

Gonothecae absent.

Remarks. *Oswaldella medeae* sp. nov. is well characterized by the shape of the hydrotheca, with a strong downward tilt, and by the presence of one or two 'mamelons' on the cauline apophyses, besides two axillary nematophores (cf. table 1).

Oswaldella medeae sp. nov. is allied to *O. grandis* by the presence of two axillary nematophores and two 'mamelons', as well as by the general shape of the hydrotheca which is also shallow (cf. table 1). They are clearly different as in *O. grandis* the hydrotheca is almost fully adnate to the hydrocladial internode, the abcauline wall is very steep and the hydrothecal aperture is perpendicular to the long axis of the internode. They also differ in the general structure of the colony, since *O. grandis* is a much more robust species, with stems reaching 500 mm height. On the other hand, the cauline apophyses are relatively shorter and in close contact with the stem. Also, the hydrocladia are much more branched, having several third-order hydrocladia. Finally, in *O. grandis* the mesial inferior nematotheca is much more reduced.

By the occasional presence of one 'mamelon' besides the two axillary nematophores *O. medeae* sp. nov. is allied to *O. antarctica*, *O. crassa*, *O. garciacarrascosai*, *O. obscura* and *O. vervoorti* (cf. table 1). However, *O. medeae* sp. nov. clearly differs

from those species. *Oswaldella antarctica*, *O. crassa*, *O. garciacarrascosai* and *O. obscura* have elongate hydrothecae, whereas in *O. medeae* sp. nov. these are shallow. In this character *O. medeae* sp. nov. is also close to *O. vervoorti*, though in this species the hydrotheca is larger and always situated on the distal half of internode, the hydrothecal aperture is approximately perpendicular to the long axis of the internode, and the mesial inferior nematotheca is larger. In *O. vervoorti* hydrocladia up to fourth-order are present, whereas in *O. medeae* sp. nov. only secondary hydrocladia have been observed.

The presence of a shallow hydrotheca with a strong downward tilt of the rim brings *O. medeae* sp. nov. near to *O. herwigi* (cf. table 1), but in this species, together with one 'mamelon', there is a single axillary nematophore on the cauline apophyses. Moreover, the asymmetrical structure of the hydrocladia is completely different and hydroids of that species have alternately arranged hydrothecate and athecate internodes.

Oswaldella encarnae also has hydrothecae in which the rim is slightly tilted downwards (cf. table 1), but in this species the hydrothecae are distinctly larger, the hydrocladia are unbranched and there are only axillary nematophores on the cauline apophyses, with 'mamelons' being absent.

Ecology and distribution. *Oswaldella medeae* sp. nov. appears to have a circum-Antarctic distribution. It was collected at depths between 210 and 503 m at Pennell Bank (Victoria Land), in the Ross Sea region, and at the north-east of Joinville Island (Antarctic Peninsula).

Etymology. The specific name *medeae* is a dedication to Medea Peña Sancho, daughter of the first author.

Oswaldella monomammillata sp. nov.
(figure 13; table 4)

Material examined. *12/1002*, one stem fragment *ca* 15 mm long (holotype, USNM 1003342).

Description. Colonies composed apparently of monosiphonic and unbranched stems (figure 13A). Hydrocaulus provided with apophyses alternately arranged in one plane, forming two longitudinal rows. Cauline apophyses directed upwards, forming an angle of *ca* 45° with long axis of stem and provided with two nematophores (figure 13B–D): one axillary emerging through a simple perisarc hole and another emerging through a 'mamelon', placed laterally on upper surface of apophysis. Stem divided into internodes; one apophysis per internode. Cauline apophyses supporting hydrocladia (figure 13A–C); up to secondary hydrocladia present. A distinct node separates cauline apophysis and hydrocladium.

Hydrocladia homomerously divided into internodes each provided with one hydrotheca and two nematophores (figure 13E, F): one mesial superior emerging through a simple perisarc hole situated just behind free adcauline hydrothecal wall, and one mesial inferior emerging through a hole situated on a sharp elevation of the internode and provided with a much-reduced nematotheca. Top of distal hydrocladial internodes truncated.

Hydrotheca elongate, placed nearly in the middle of internode (figure 13E, F). Hydrothecal aperture circular, rim even and more or less perpendicular to long axis of internode. Adcauline hydrothecal wall with a distinct free part. Abcauline wall

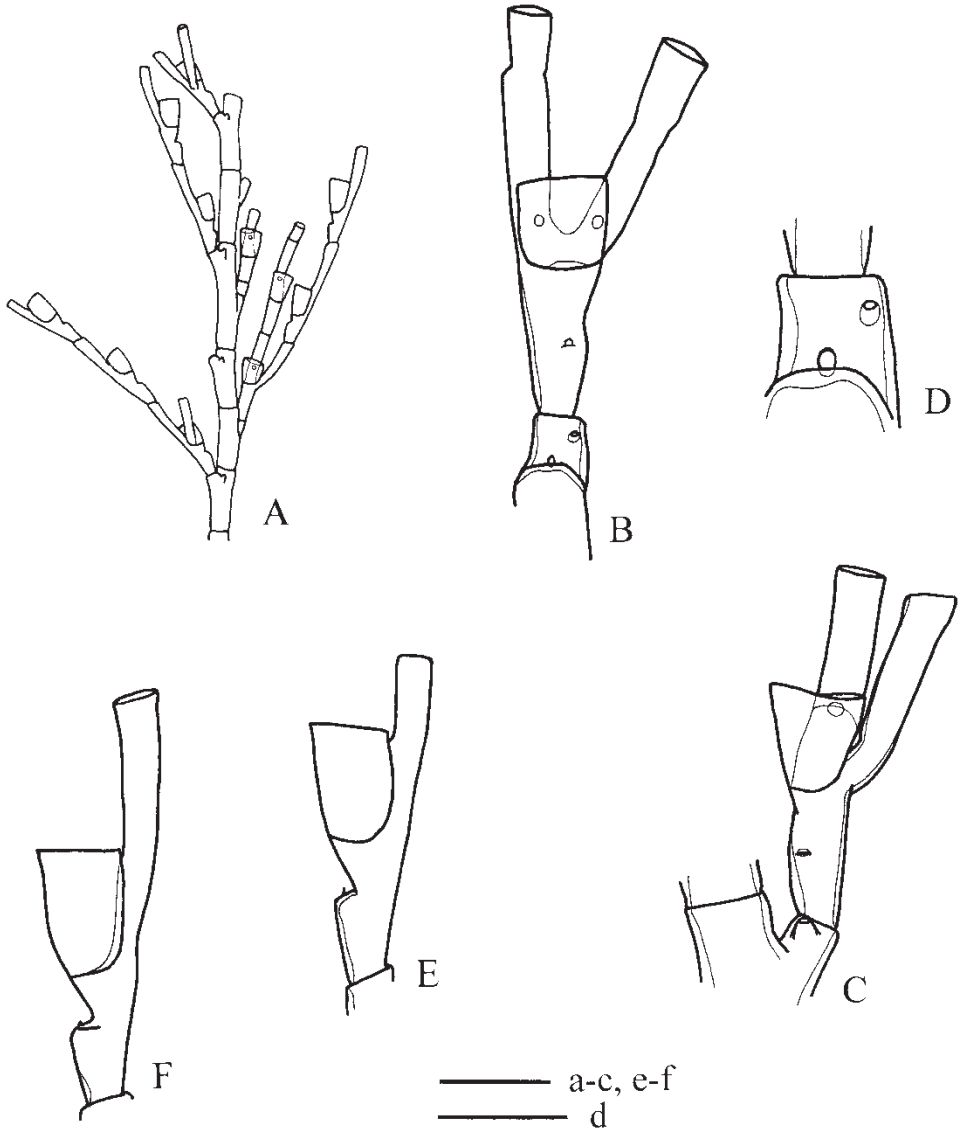


FIG. 13. *Oswaldella monomammillata* sp. nov. (A) Fragment of stem showing hydrocladial and hydrothecal arrangement; (B, C) cauline apophyses with axillary nematophore and 'mamelon', as well as first hydrocladial internode with branched hydrocladia; (D) detail of cauline apophysis with axillary nematophore and 'mamelon'; (E, F) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca (all drawings, Stn 12/1002). Scale bars: 1 mm (A), 250 μm (B, C, E, F), 150 μm (D).

approximately straight, but sometimes convex basally and with a slight distal concavity.

Gonothecae absent.

Remarks. In spite of the scarcity of material, *O. monomammillata* sp. nov. is a well-characterized species, clearly distinguishable from the remaining species of the genus (cf. table 1).

Table 4. Measurements of *Oswaldella monomammillata* sp. nov. (in μm).

Hydrothecae	
Length of abcauline wall	200–300
Length of free part of adcauline wall	*ca* 30
Diameter at rim	170–200
Nematothecae	
Length	*ca* 20
Internode	
Length	740–930
Diameter under hydrotheca	150–175

Oswaldella monomammillata sp. nov. is allied to *O. garciacarrascosai* in general aspect of the colony and in shape of the hydrothecae (cf. table 1). Differences concern the number of nematophores on the cauline apophyses, since in *O. garciacarrascosai* there are two axillary nematophores and one 'mamelon', whereas in *O. monomammillata* sp. nov. there is a single axillary nematophore besides the 'mamelon'. They also differ because in *O. garciacarrascosai* there is no nematotheca at the mesial inferior nematophore of the hydrocladial internodes, whereas in *O. monomammillata* sp. nov. there is a much-reduced nematotheca. The hydrothecae in *O. garciacarrascosai* are also slightly larger; Peña Cantero *et al.* (1997) reported a length of the abcauline hydrothecal wall of 228–312 μm, whereas in *O. monomammillata* sp. nov. that length is 240–280 μm.

In the shape of the hydrotheca *O. monomammillata* sp. nov. also resembles *O. delicata*, but these species differ in the number of nematophores present on the cauline apophyses (cf. table 1); in *O. delicata* there is a single axillary nematophore emerging through a perisarc hole, whereas in *O. monomammillata* sp. nov. there is also a 'mamelon'. They also differ in the development of the mesial inferior nematotheca, since in *O. delicata* there is a conspicuous scale-shaped nematotheca, whereas in *O. monomammillata* sp. nov. that nematotheca is much less developed, being rather inconspicuous. Moreover, in *O. monomammillata* sp. nov. the hydrocladia are bifurcated but in *O. delicata* usually unbranched.

Ecology and distribution. *Oswaldella monomammillata* sp. nov. was collected at 265 m depth off Elephant Island.

Etymology. The specific name *monomammillata* refers to the presence of a single 'mamelon' at the cauline apophysis.

Oswaldella obscura Peña Cantero, Svoboda and Vervoort, 1997

Oswaldella obscura Peña Cantero *et al*., 1997: 370–373, figures 9, 15A, B; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1998: 178; 1999: 214; Peña Cantero and Marques, 1999: 85.

Remarks. *Oswaldella obscura* is characterized by the polysiphonic and branched stems, the presence of mesial inferior nematothecae in the hydrocladial internodes, the presence of two axillary nematophores and one 'mamelon' in the cauline apophyses and the presence of only secondary hydrocladia (cf. table 1).

Ecology and distribution. *Oswaldella obscura* has been found on muddy bottoms at depths between 260 and 830 m, along the south and east coasts of the Weddell Sea. Fertile colonies were found in January and February. It is used as a substratum by other hydroids (Peña Cantero *et al.*, 1997).

Oswaldella rigida Peña Cantero, Svoboda and Vervoort, 1997

Oswaldella rigida Peña Cantero *et al*., 1997: 373–376, figures 10, 15C; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1999: 214; Peña Cantero and Marques, 1999: 85.

Schizotricha antarctica: Vanhöffen, 1910: 336, figure 48.

Remarks. *Oswaldella rigida* is well characterized by the branched stems, the angle of 70–90° formed between the cauline apophyses and the stem, the absence of a node between the cauline apophyses and the hydrocladia, the shape of the hydrotheca, provided with an adcauline elevation, and the presence of two axillary nematophores on the cauline apophyses (cf. table 1).

Ecology and distribution. *Oswaldella rigida* is a shelf species, having been found at depths from 80 to 830 m on muddy and rocky bottoms (Peña Cantero *et al.*, 1997).

Oswaldella rigida appears to have a circum-Antarctic distribution (Peña Cantero *et al.*, 1997). It is known from the Davis Sea (Vanhöffen, 1910) in East Antarctica, and at the east coast of the Weddell Sea (Peña Cantero *et al.*, 1997) in West Antarctica.

Oswaldella shetlandica Stepan'yants, 1979
(figure 14)

Oswaldella billardi: Blanco and De Redolatti, 1977: 1–8, pls 1–4.

Oswaldella billardi shetlandica p.p. Stepan'yants, 1979: 114, pl. 21 figure 3V, G, pl. 25 figure 7.

Oswaldella billardi p.p.: Blanco, 1984: 45–46, pl. 41 figure 95.

Oswaldella sp. 2 Peña Cantero, 1991: 182–186, pl. 34 figures a–j, pl. 58 figures a–f, pl. 68 figure c; Peña Cantero and García Carrascosa, 1994: 126, figures 8i–l; 1995: 107–111, figures 48A–J, 49A–F, 64G.

Oswaldella shetlandica Peña Cantero *et al*., 1995: 342–347, figure 1; 1997: 344; Peña Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1999: 212 *et seq*.; Peña Cantero and Marques, 1999: 85.

Material examined. *6/445*, one stem *ca* 11 mm high (USNM 1003343); *691/023*, one stem *ca* 45 mm high in bad condition (USNM 1003344); *691/23*, numerous broken stems without hydrocladia; only one stem *ca* 45 mm high with hydrocladia and with a single gonotheca (USNM 1003345); *691/24,* two stems up to 40 mm high (USNM 1003346); *691/27*, several stems up to 90 mm high, with gonothecae (USNM 1003347; RMNH-Coel. 30218; MNCN 2.03/238); *7/484*, one stem *ca* 42 mm high (USNM 1003348); *721/1063*, two stem fragments up to 28 mm long, with gonothecae (USNM 1003349; RMNH-Coel. 30219); *721/704*, one colony with several stems up to 170 mm high (USNM 1003350; RMNH-Coel. 30220; MNCN 2.03/239); *721/801*, one distal stem fragment *ca* 30 mm long (USNM 1003351); *721/816*, numerous stems up to 170 mm high, with gonothecae (USNM 1003352; RMNH-Coel. 30221; MNCN 2.03/240); *731/1944*, three stems up to 25 mm high (USNM 1003353); *824/013-1*, three fragments or stems up to 50 mm high (USNM 1003354); *824/030-1*, eight stems up to 85 mm high, with gonothecae (USNM 1003355; RMNH-Coel. 30222); *824/040-1*, one stem fragment *ca* 4 mm long, with a single gonotheca (USNM 1003356); *833/022-4*, numerous stems up to 110 mm high, with male gonothecae (USNM 1003357; RMNH-Coel. 30223; MNCN 2.03/241); *SOSC-L46*, one distally truncated stem *ca* 18 mm high, with gonothecae (USNM 1003358).

Description. Stems polysiphonic and unbranched, divided into internodes. Sometimes colonies apparently with branched stems, but actually such 'secondary' stems originate from stolons ascending on 'main' stems. Hydrocaulus provided with

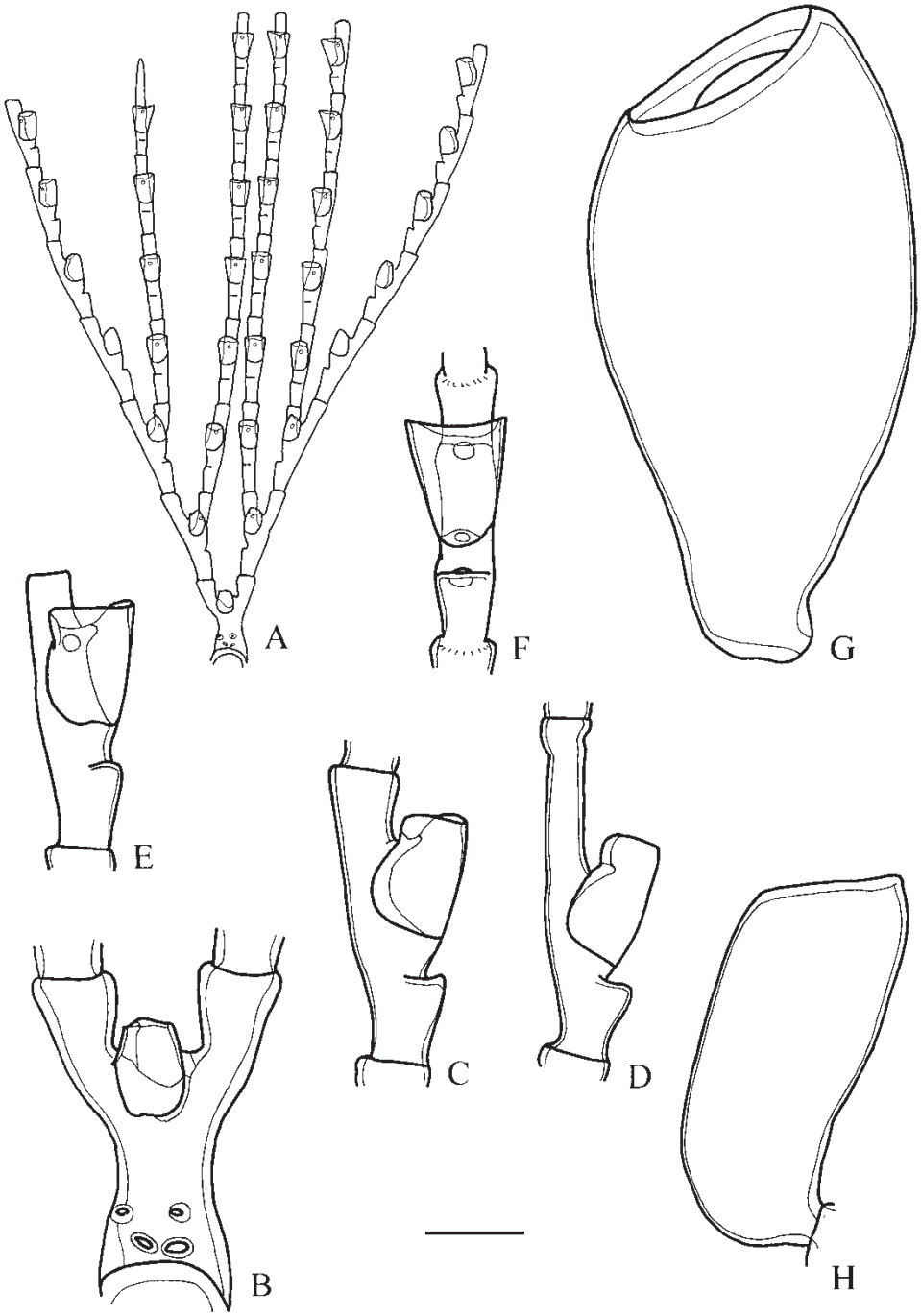


FIG. 14. *Oswaldella shetlandica* Stepan'yants, 1979. (A) Hydrocladial branching and disposition of hydrothecae; (B) cauline apophysis with axillary nematophores and 'mamelons', as well as branched hydrocladium; (C–F) hydrocladial internodes with hydrotheca and both mesial superior and mesial inferior nematophores; (G) female gonotheca; (H) male gonotheca (A, B, Stn 7/484; C–G, Stn 721/816; H, Stn 833/22-4). Scale bar: 1 mm (A), 250 μm (B–H).

alternately arranged cauline apophyses, forming two longitudinal series; usually one or two, sometimes three, apophyses per internode. Cauline apophyses forming an angle of *ca* 45° with long axis of cauline internodes, provided with four nematophores (figure 14B): two emerging through axillary perisarc holes and two additional nematophores each emerging through a 'mamelon'; occasionally a single 'mamelon' present. Cauline apophyses supporting much-branched hydrocladia (figure 14A); up to fourth-order hydrocladia observed, hydrocladial arrangement symmetrical. No node between cauline apophysis and hydrocladium (figure 14A, B). Top of distal hydrocladial internodes pointed; occasionally truncated.

Hydrocladia homomerously segmented, all internodes hydrothecate and provided with one hydrotheca and two nematophores (figure 14C–F): one mesial inferior emerging through a simple perisarc hole situated at dorsal surface of strong elevation of internode (without remnants of nematothecae) and one mesial superior nematophore, emerging through a perisarc hole situated behind free adcauline hydrothecal wall.

Hydrotheca placed in middle of hydrocladial internode (figure 14C–F), elongate, part of adcauline wall free. Abcauline wall slightly convex; aperture kidney-shaped, slightly tilted adcaudally and strongly depressed at adcauline side.

Male and female gonothecae present, inserting on hydrocladial internodes directly under inferior nematophore. Both male and female gonothecae pear-shaped; gonothecal aperture circular, large and situated at distal oblique end. Female gonothecae (figure 14G) much larger than male ones (figure 14H).

Remarks. This is a common and well-characterized Antarctic species (cf. table 1). It is easily recognizable by the strong division of the stems into internodes, the abundant branching of the hydrocladia, the presence of two axillary nematophores and two 'mamelons' on the cauline apophyses, the absence of a mesial inferior nematotheca at the hydrocladial internodes and the shape of hydrothecae and gonothecae.

Ecology and distribution. *Oswaldella shetlandica* is a shelf species (Peña Cantero *et al.*, 1995), having been recorded at depths from 30 (Stepan'yants, 1979) to 216 m (Peña Cantero *et al.*, 1995); our material comes from 44 to 952 m. It has been found on rocky (Stepan'yants, 1979) and stony bottoms (Peña Cantero *et al.*, 1995). We have found it epibiotic on hydroids (*Billardia subrufa* and *Staurotheca* sp.). *Oswaldella shetlandica* has been collected with gonothecae in January and February (Peña Cantero *et al.*, 1995). In our material, fertile colonies were collected in January, February, March, April and December.

Oswaldella shetlandica appears to be endemic to West Antarctica, where it has been reported from off King George Island, in the South Shetland Islands (Stepan'yants, 1979; Peña Cantero *et al.*, 1995) and off Low Island (Blanco and De Redolatti, 1977). Our material comes from off King George, Livingston and Nelson Islands (South Shetland Islands), Anvers and Brabant Islands (Palmer Archipelago), Low Island, Argentine Island (Antarctic Peninsula) and from north of the South Orkney Islands.

Oswaldella stepanjantsae El Beshbeeshy, 1991
(figure 15)

Oswaldella stepanjanti El Beshbeeshy, 1991: 263, 265 (incorrect original spelling).
Oswaldella stepanjantsae Peña Cantero *et al.*, 1997: 344, 376–380, figures 11, 15D; Peña

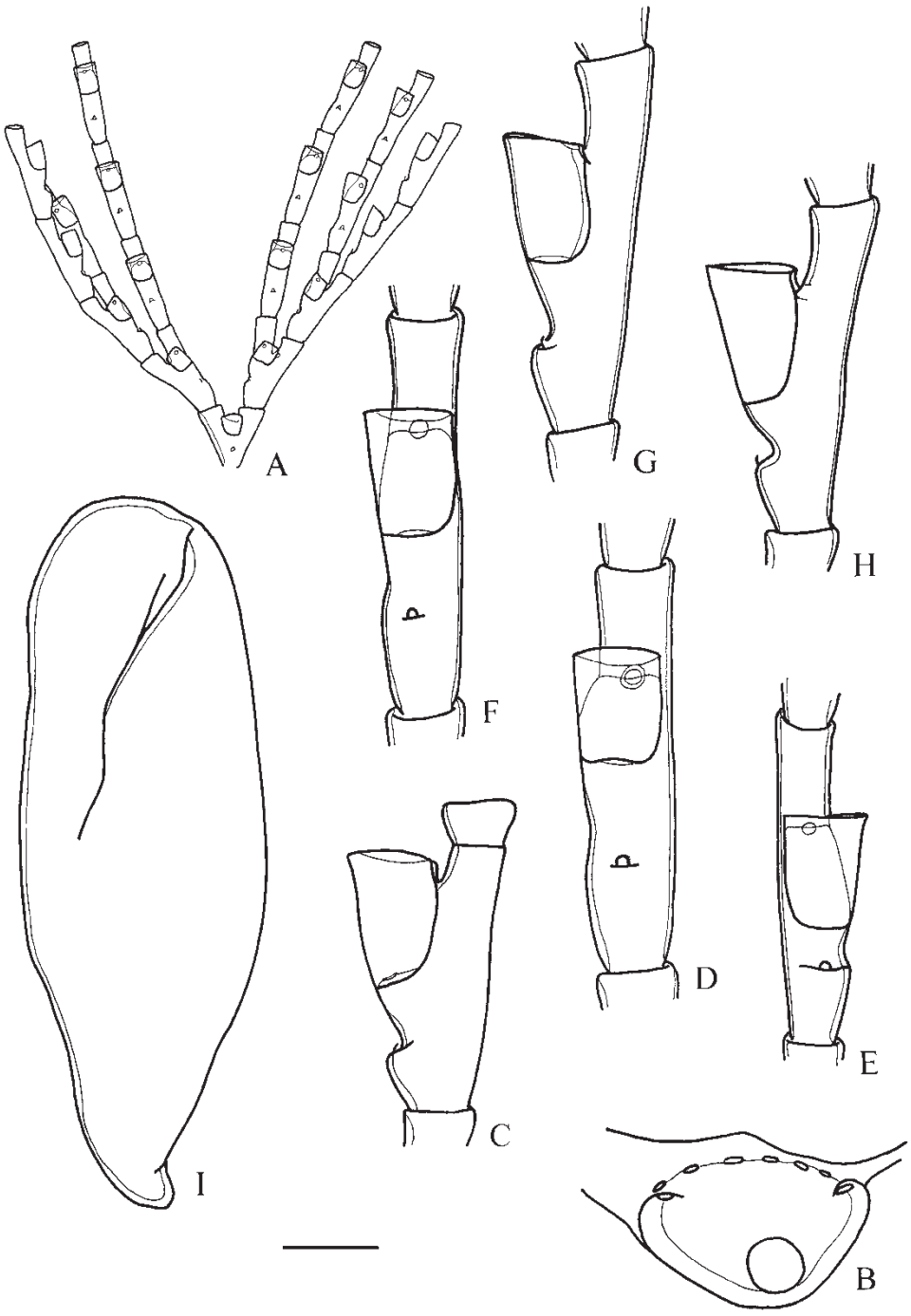


FIG. 15. *Oswaldella stepanjantsae* El Beshbeeshy, 1991. (A) Hydrocladial branching and disposition of hydrothecae; (B) cauline apophysis with axillary nematophores and 'mamelons'; (C–H) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca; (I) gonotheca (A–D, F–I, Stn 32/2125; E, Stn 32/2080). Scale bar: 1 mm (A), 250 μm (B–I).

Cantero and Vervoort, 1998: 36; Peña Cantero and García Carrascosa, 1999: 214; Peña Cantero and Marques, 1999: 85 (justified emendation).
Oswaldella antarctica: Broch, 1948: 13–16, figure 4a; Stepan'yants, 1979: 112, pl. 21 figure 5.
Oswaldella antarctica p.p.: Naumov and Stepan'yants, 1972: 52, figure 14a, b.

Material examined. *000AG*, one stem at least 210 mm high (USNM 1003359); *000AH*, one fragmented stem, at least 220 mm high, with gonothecae (USNM 1003360; RMNH-Coel. 30224); *00DAF*, several stems of at least 300 mm high (USNM 1003361; RMNH-Coel. 30225); *00DAQ*, four stems up to 320 mm high (USNM 1003362); *12/1003* several fragments up to 32 mm long (USNM 1003363); *27/1896*, numerous stem fragments up to 100 mm long, with immature gonothecae (USNM 1003364; RMNH-Coel. 30226; MNCN 2.03/242); *32/2080*, one fragmented stem (largest fragment *ca* 120 mm long) (USNM 1003365; RMNH-Coel. 30227); *32/2082*; three stem fragments up to 50 mm long (USNM 1003366); *32/2121*, numerous stem fragments up to 70 mm long, with gonothecae (USNM 1003367); *32/2125*, one fragmented stem (largest fragment up to 90 mm long), with gonothecae (USNM 1003368; RMNH-Coel. 30228; MNCN 2.03/243); *6/418*, several fragments up to 50 mm long, with gonothecae (USNM 1003369); *691/26*, numerous fragments up to 220 mm long (USNM 1003370; RMNH-Coel. 30229; MNCN 2.03/244); *767*, two stem fragments up to 60 mm long (USNM 1003371); *833/018-1*, one stem *ca* 500 mm high (USNM 1003372; RMNH-Coel. 30230; MNCN 2.03/245).

Description. Colonies consisting of polysiphonic and branched stems. Hydrocauli provided with apophyses alternately arranged in two longitudinal series, directed upwards, forming an angle of *ca* 45° with long axis of stem. Hydrocaulus divided into internodes with one apophysis each; nodes, situated just above apophyses, often incomplete, as a result many internodes apparently with two apophyses. Cauline apophyses typically provided with two dorsal nematophores (figure 15B), each one emerging through a 'mamelon' which may occasionally be absent (for instance in the material from Stn 6/418), and from two to six axillary nematophores (figure 15B) emerging through simple perisarc holes. Cauline apophyses supporting hydrocladia (figure 15A) from which they are separated by a distinct node, usually followed by a series of short, athecate internodes. Up to fourth-order hydrocladia present; hydrocladial arrangement symmetrical (figure 15A).

Hydrocladia homomerously segmented; all internodes hydrothecate with one hydrotheca in middle of internode and two nematophores (figure 15C–H): one mesial inferior emerging through a perisarc hole on slight elevation of internode and provided with a scale-shaped nematotheca, and another mesial superior nematophore emerging through a perisarc hole behind free portion of adcauline hydrothecal wall. Top of distal hydrocladial internodes truncated.

Hydrotheca elongate (figure 15C–H); rim circular and even, slightly tilted adcaudally. Adcauline wall of hydrotheca with distinct free portion; abcauline wall straight.

Gonothecae present, inserting on infrathecal elevation of hydrocladial internodes, fusiform, with subterminal aperture (figure 15I).

Remarks. *Oswaldella stepanjantsae* is well characterized by the general appearance of the colony, by the presence of two 'mamelons' and two to six axillary nematophores on the cauline apophyses (cf. table 1), and by the shape of hydrothecae and gonothecae.

Ecology and distribution. *Oswaldella stepanjantsae* has been found at depths between 50 and 600 m (Broch, 1948); our material comes from 36 to 1890 m. It

occurred on muddy, sandy and stony bottoms and on bottoms composed of mud and sand or small stones (Broch, 1948). It has been found with gonothecae in January and February (Peña Cantero *et al.*, 1997); our fertile material was collected in January, February and December. It is used as a substratum by other hydroids: Peña Cantero *et al.* (1997) found colonies of *Hydractinia* sp., *Halecium* sp. and we have observed colonies of *Abietinella* sp., *Billardia subrufa*, *Campanularia* sp., *Filellum* sp., *Hydractinia* sp., *Sertularella* sp. and *Symplectoscyphus* sp.

Oswaldella stepanjantsae is a circum-Antarctic species (Peña Cantero and Vervoort, 1998). It was known from off Elephant and Peter I Islands (Broch, 1948) and the eastern coast of the Weddell Sea (Peña Cantero *et al.*, 1997), in West Antarctica, and from off Adélie Land (cf. Peña Cantero *et al.*, 1997) in East Antarctica. Our material comes from the Wilkes Land region, the Ross Sea and the Antarctic Peninsula area. In Wilkes Land, it was found north of Wilkes Station (Budd Coast). In the Ross Sea, *O. stepanjantsae* was collected in the central basin, off Franklin Island, Cape Adare, and at the Balleny Islands. Finally, near the Antarctic Peninsula it was found north-east of Joinville Island, north of D'Urville Island and south of Low Island.

Oswaldella terranovae Peña Cantero and Vervoort, 1996

Oswaldella terranovae Peña Cantero and Vervoort, 1996: 136–138, figure 1; Peña Cantero *et al.*, 1997: 344; Peña Cantero and Vervoort, 1998: 37; Peña Cantero and García Carrascosa, 1999: 214; Peña Cantero and Marques, 1999: 85.
Oswaldella antarctica: Totton, 1930: 209–210, figure 51.

Remarks. *Oswaldella terranovae* is characterized by the branched stems, the presence of a much reduced mesial inferior nematotheca in the hydrocladial internodes, the shape of the hydrotheca, and the presence of two axillary nematophores and two 'mamelons' on the cauline apophyses (cf. table 1).

Ecology and distribution. *Oswaldella terranovae* is known only from off Cape Adare, Ross Sea, where it was found at depths of 82–92 m, on a bottom of pebbles (Peña Cantero and Vervoort, 1996).

Oswaldella tottoni Peña Cantero and Vervoort, 1996

Oswaldella tottoni Peña Cantero and Vervoort, 1996: 139–142, figure 2; Peña Cantero *et al.*, 1997: 380–383, figure 12; Peña Cantero and García Carrascosa, 1998: 179; 1999: 214; Peña Cantero and Vervoort, 1998: 37; Peña Cantero and Marques, 1999: 85.
Oswaldella bifurca: Totton, 1930: 208–209, figure 50.

Remarks. *Oswaldella tottoni* is well characterized by the shape of the hydrotheca, which is low and situated on the distal half of the hydrocladial internodes, the presence of two axillary nematophores on the cauline apophyses, and the presence of only secondary hydrocladia (cf. table 1).

Ecology and distribution. *Oswaldella tottoni* is a shelf species (Peña Cantero *et al.*, 1997), having been found at depths from 256 (Peña Cantero and Vervoort, 1996) to 400 m (Peña Cantero *et al.*, 1997) on muddy bottoms.

Oswaldella tottoni seems to have a circum-Antarctic distribution. It is known from McMurdo Sound, Ross Sea (Peña Cantero and Vervoort, 1996), in East Antarctica, and from the east coast of the Weddell Sea (Peña Cantero *et al.*, 1997), in West Antarctica.

Oswaldella vervoorti Peña Cantero and García Carrascosa, 1998
(figure 16)

Oswaldella vervoorti Peña Cantero and García Carrascosa, 1998: 175–179, figure 1; 1999: 214.
?*Oswaldella* spec. 2 Peña Cantero and Vervoort, 1995: 336–339, figure 3; Peña Cantero and Marques, 1999: 85.

Material examined. *6/415*, one stem *ca* 11 mm high (USNM 1003373); *6/445*, four stem fragments up to 33 mm long (USNM 1003374); *691/002-B*, numerous fragments and stems up to 20 mm high (USNM 1003375; RMNH-Coel. 30231; MNCN 2.03/246); *691/023*, two stem fragments up to 25 mm high, with one immature gonotheca (USNM 1003376); *691/24*, five stem fragments up to 45 mm long (USNM 1003377); *7/484*, two stem fragments up to 35 mm long (USNM 1003378); *721/1062*, one stem *ca* 46 mm high (USNM 1003379); *721/1063*, three stems up to 28 mm high (USNM 1003380; RMNH-Coel. 30232); *721/704*, four stems up to 30 mm high (USNM 1003381; RMNH-Coel. 30233); *721/816*, one stem *ca* 40 mm high (USNM 1003382); *SOSC-L42*, one stem *ca* 33 mm high, with immature gonothecae (USNM 1003383).

Description. Colonies composed of monosiphonic and unbranched stems up to 45 mm high. Stems with alternately arranged apophyses forming two longitudinal rows, directed upwards and forming an angle of *ca* 45° with long axis of hydrocaulus. Stems divided into internodes with one, occasionally two apophyses per internode, each provided with three nematophores (figure 16B): two axillary nematophores, each emerging from a simple perisarc hole, and another emerging through a 'mamelon' and occasionally absent. Cauline apophyses supporting hydrocladia from which they are separated by distinct node (figure 16B); up to third-order hydrocladia observed (figure 16A).

Hydrocladia homomerously divided into hydrothecate internodes with one hydrotheca and two nematophores (figure 16C–H): one mesial superior nematophore emerging from a perisarc hole situated behind free adcauline hydrothecal wall and one mesial inferior nematophore with a scale-shaped nematotheca and emerging through a perisarc hole situated on slight elevation of internode. Top of distal hydrocladial internodes truncated.

Hydrotheca shallow, situated on distal half of hydrocladial internode (figure 16C–H). Hydrothecal aperture perpendicular to long axis of internode, sometimes slightly tilted adcaudally; rim circular and even. Adcauline wall of hydrotheca with distinct free portion; abcauline wall straight, angle with internodal long axis *ca* 30°.

Immature gonothecae present, inserting on elevation of hydrocladial internode just under mesial inferior nematotheca. Gonotheca cone-shaped; maximum diameter at distal, truncated part (figure 16I).

Remarks. *Oswaldella vervoorti* is an easily recognizable species (cf. table 1), being characterized by the shape of the hydrotheca, the position of the hydrotheca on the distal half of the hydrocladial internodes, the much-branched hydrocladia and the presence of two axillary nematophores and one 'mamelon' on the cauline apophyses.

Ecology and distribution. *Oswaldella vervoorti* was previously known only from off Livingston Island, in the South Shetland Islands, where it was found at a depth of 46 m on muddy bottoms, epibiotic on ascidians (Peña Cantero and García Carrascosa, 1998). Our material comes from depths of 44 to 952 m. Immature gonothecae were found in February. We found it epibiotic on hydroids (*Schizotricha* sp.).

Oswaldella vervoorti appears to be endemic in West Antarctica. It had been reported from off Livingston Island, in the South Shetland Islands (Peña Cantero and García Carrascosa, 1998). Our material was collected north of the South Orkney Islands, north of d'Urville Island (Antarctic Peninsula), north-east of Livingston Island and off Nelson and King George Islands (South Shetland Islands) and off Brabant Island (Palmer Archipelago).

Oswaldella sp. 1
(figure 17)

Material examined. *6/416*, one stem broken into two fragments (35 and 20 mm long) (USNM 1003384); *6/426*, a few stems up to 70 mm high (USNM 1003385; RMNH-Coel. 30234); *6/428*, one stem *ca* 18 mm high (USNM 1003386); *6/445*, two fragments of one stem (USNM 1003387); *691/023*, three basally broken stems up to 25 mm high (USNM 1003388; RMNH-Coel. 30235); *691/24*, two stems up to 15 mm high (USNM 1003389).

Description. Colonies composed of monosiphonic and unbranched stems up to 70 mm high. Hydrocaulus with apophyses alternately arranged in one plane, forming two longitudinal rows and directed upwards, forming an angle of *ca* 45° with long axis of stem (figure 17A). Cauline apophyses provided with two axillary nematophores, each one emerging from a simple perisarc hole (figure 17B). Hydrocaulus divided into internodes (figure 17A); one to three apophyses per internode, each apophysis supporting an unbranched hydrocladium (figure 17A), though secondary hydrocladia are also present (figure 17B). A distinct node separating cauline apophyses and hydrocladia (figure 17A, B).

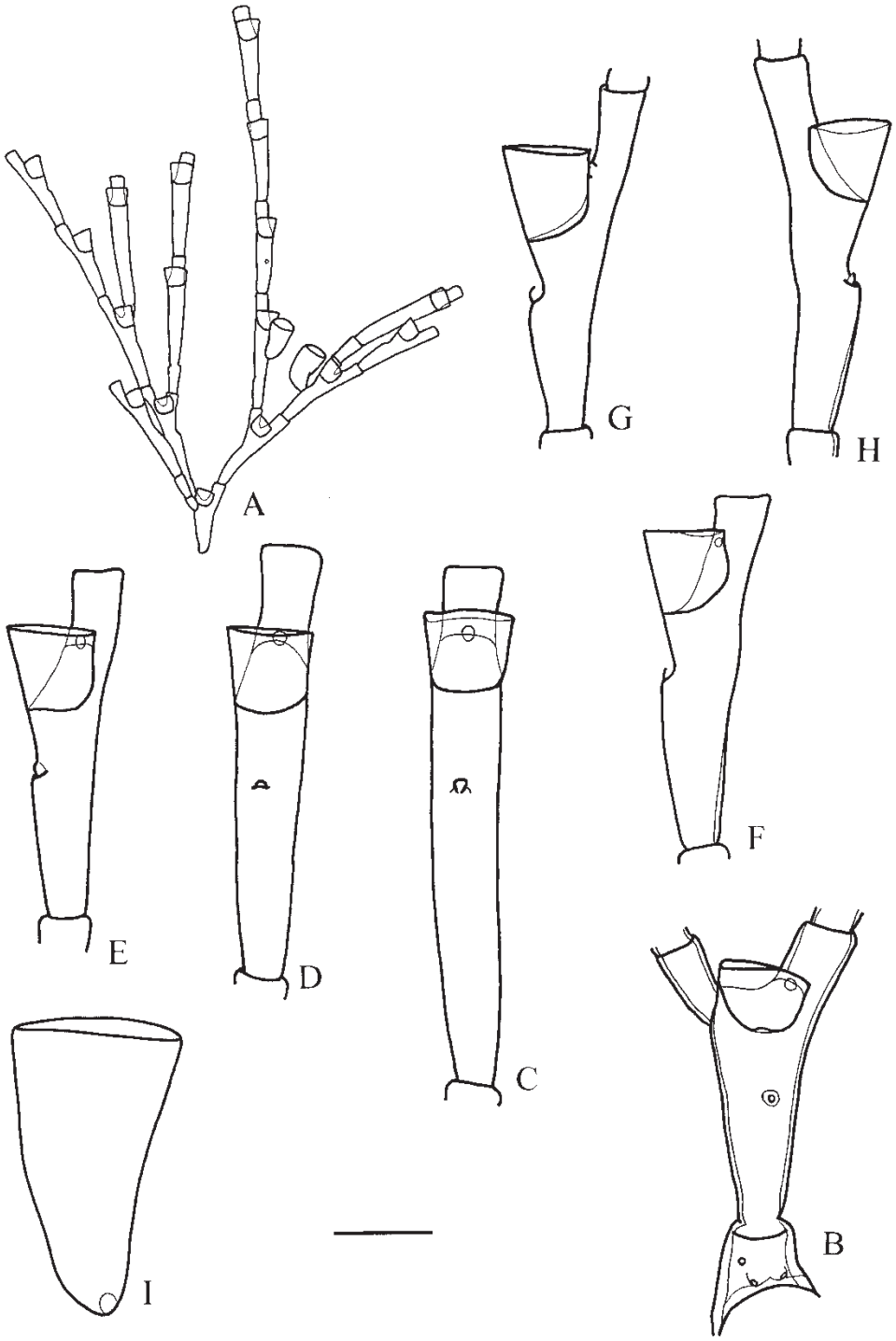
Hydrocladia homomerously divided into internodes, each with one hydrotheca and two nematophores (figure 17C–K): one mesial superior, emerging from a simple perisarc hole behind free adcauline hydrothecal wall, and one mesial inferior nematophore with a much-reduced, scale-shaped nematotheca emerging from a perisarc hole in an elevation of the internode. Top of distal hydrocladial internodes truncated.

Hydrotheca elongate, situated approximately in the middle of hydrocladial internode (figure 17C–K), provided with a long free part of its adcauline wall (up to half of its length). Abcauline hydrothecal wall straight, though slightly convex basally; sometimes with a slight concavity at distal end. Hydrothecal aperture with circular and even rim, approximately perpendicular to long axis of internode.

Gonothecae absent.

Remarks. *Oswaldella* sp. 1 is allied to *O. delicata* (cf. table 1), sharing with it the general appearance and structure of the colony. These two differ in the number of axillary nematophores; in *O. delicata* there is a single axillary nematophore, in *Oswaldella* sp. 1 there are two, each one emerging from a perisarc hole. They also differ in greater length of the free adcauline hydrothecal wall in *Oswaldella* sp. 1.

FIG. 16. *Oswaldella vervoorti* Peña Cantero and García Carrascosa, 1998. (A) Hydrocladial branching and disposition of hydrothecae; (B) cauline apophysis with axillary nematophores and 'mamelon', as well as first hydrocladial internode with branched hydrocladium; (C–H) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca; (I) immature gonotheca (A–C, Stn 721/816; D, I, Stn 691/24; E, Stn 721/1062; F, Stn 7/484; G, Stn 721/1063; H, Stn 701/704). Scale bar: 1 mm (A), 250 μm (B–I).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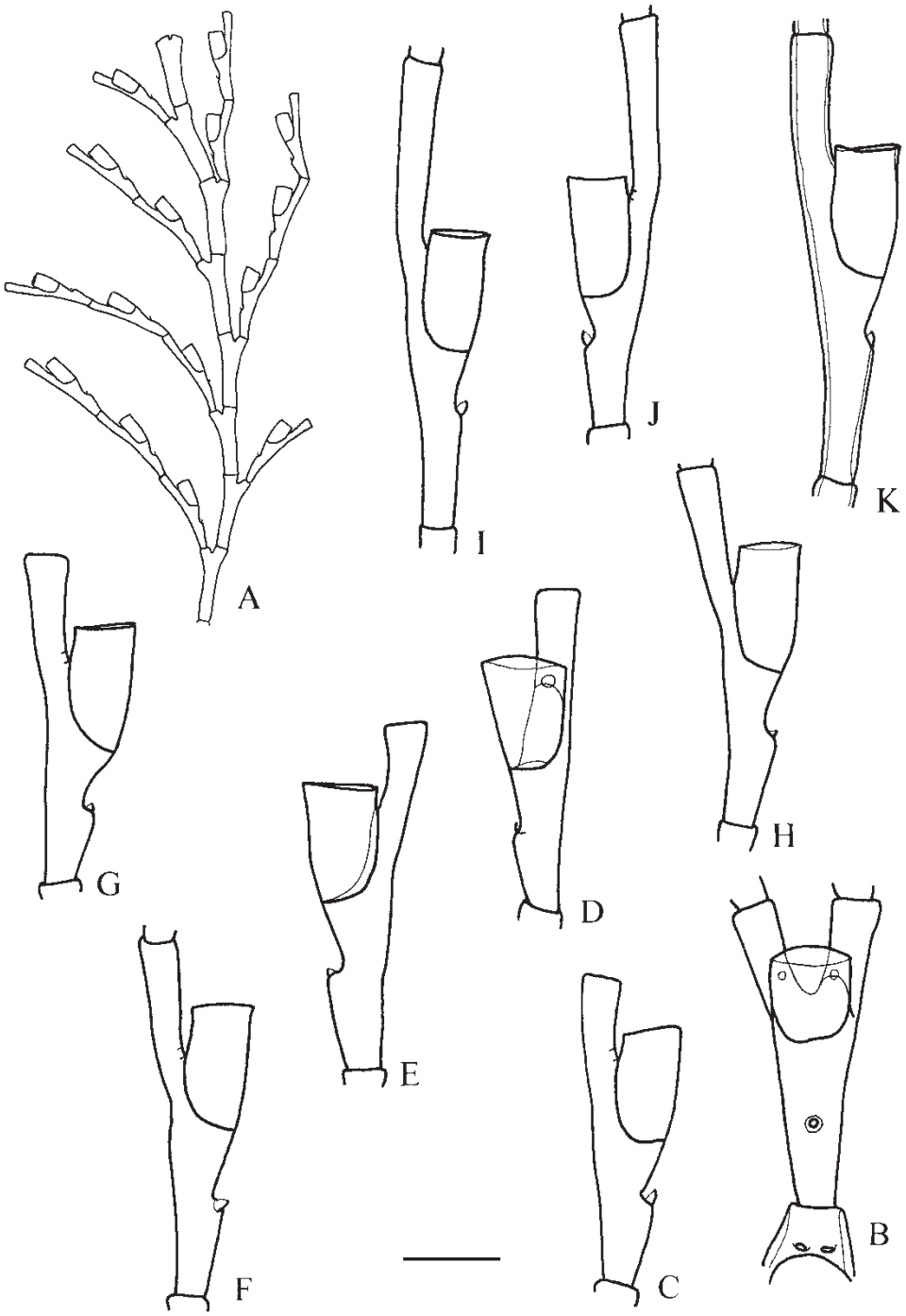


FIG. 17. *Oswaldella* sp. 1. (A) Fragment of stem showing hydrocladial and hydrothecal arrangement; (B) cauline apophysis with axillary nematophores and first hydrocladial internode with branched hydrocladium; (C–K) hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca (A, E–G, Stn 691/23; B–D, Stn 6/445; H, Stn 691/24; I, J, Stn 6/416; K, Stn 6/426). Scale bar: 1 mm (A), 250 μm (B–K).

Additional fertile material is necessary to define the systematic status of the present material.

Ecology and distribution. *Oswaldella* sp. 1 was found at depths from 93 to 507 m near the Antarctic Peninsula: off Brabant Island (Palmer Archipelago), north-east of Livingston Island (South Shetland Islands) and north of d'Urville Island and Penguin Island (Bransfield Strait).

Oswaldella sp. 2
(figure 18)

Material examined. *000AZ*, one stem *ca* 47 mm high, almost without hydrocladia (USNM 1003390); *000DW*, six stem fragments up to 100 mm long (USNM 1003391; RMNH-Coel. 30236).

Description. Stems unbranched and apparently monosiphonic. Stem provided with apophyses alternately arranged in one plane, forming two longitudinal series. Cauline apophyses directed upwards, forming an angle of *ca* 45° with longitudinal axis of stem and provided with two axillary nematophores (figure 18B), each one emerging from a simple perisarc hole. Stem divided into internodes, each with one apophysis supporting hydrocladia that are usually bifurcated and have two secondary hydrocladia (figure 18A); third-order hydrocladia are also present. Hydrocladial arrangement symmetrical (figure 18A). A distinct node separating cauline apophyses and hydrocladia (figure 18A, B).

Hydrocladia homomerously divided into hydrothecate internodes with one hydrotheca and two nematophores (figure 18C–G): one mesial superior emerging from a perisarc hole behind free adcauline hydrothecal wall, and one mesial inferior nematophore provided with a scale-shaped nematotheca, emerging from a perisarc hole in a slight elevation of internode. Top of distal hydrocladial internodes truncated.

Hydrotheca elongate, placed on distal half of internode (figure 18C–G). Hydrothecal aperture slightly tilted adcaudally, rim circular and even. Adcauline wall with a distinct free portion; abcauline wall almost straight, angle with long axis of internode very acute.

Gonothecae absent.

Remarks. *Oswaldella* sp. 2 is allied to *O. incognita* (cf. table 1), sharing the division of the stem into internodes, the presence of two axillary nematophores on the cauline apophyses and the general shape of the hydrothecae. There are, nevertheless, distinct differences, such as the longer hydrocladial internodes and shorter hydrothecae in *Oswaldella* sp. 2. Also, in *Oswaldella* sp. 2 the hydrothecae are placed on the distal half of the internodes, whereas in *O. incognita* they occur approximately in the middle. Finally, in *O. incognita* only secondary hydrocladia have been reported whereas in *Oswaldella* sp. 2 third-order hydrocladia have also been observed. These differences, along with the absence of gonothecae in the present material, prevent us from properly evaluating the systematic position of *Oswaldella* sp. 2.

Ecology and distribution. *Oswaldella* sp. 2 was found at depths from 18 to 146 m, north of Wilkes Station, at the Budd Coast (Wilkes Land).

Geographical and bathymetrical considerations

In figure 19 the geographical records of the 25 known species of *Oswaldella* are shown. Nearly all species are endemic to the Antarctic Region and are restricted to

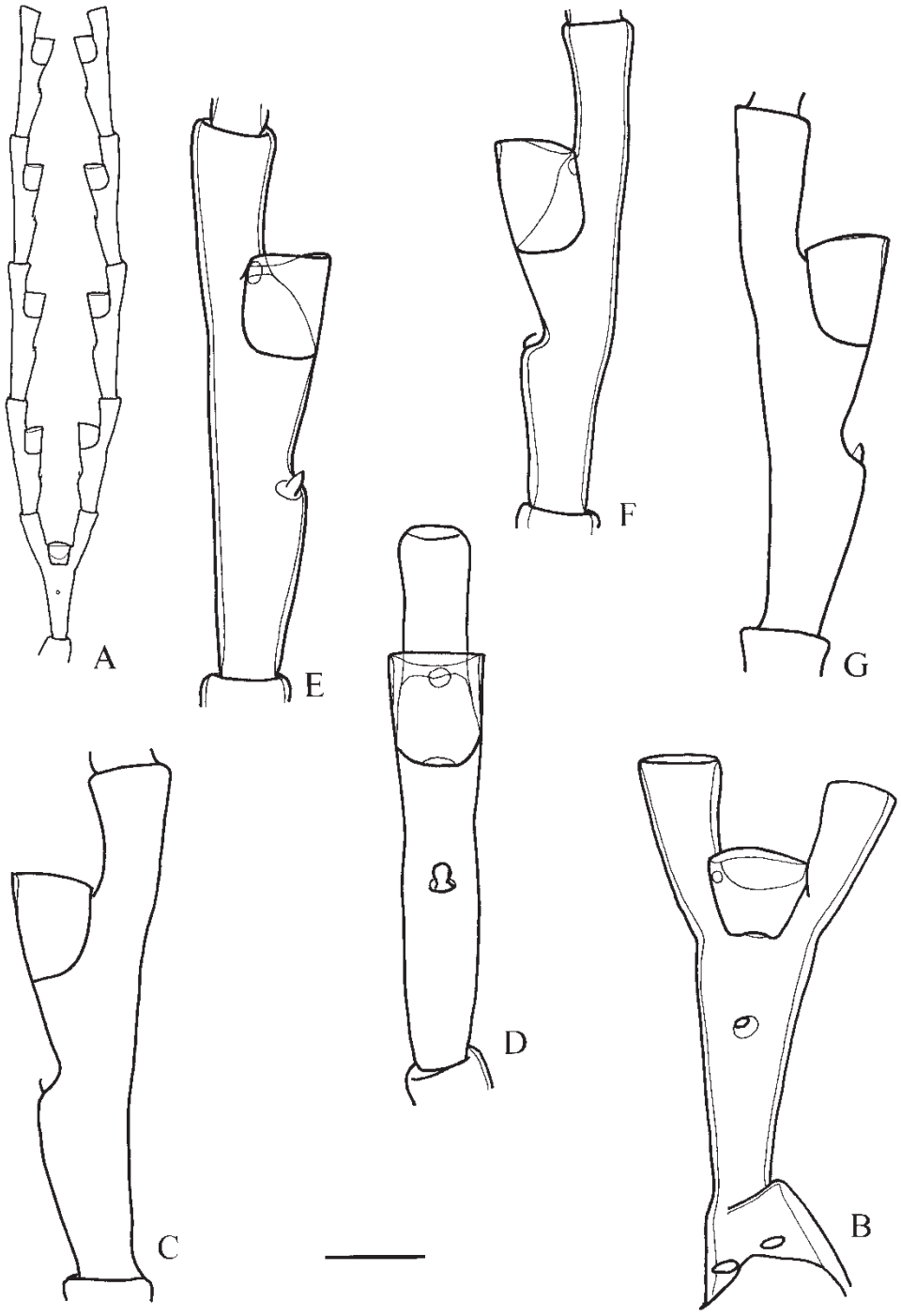


FIG. 18. *Oswaldella* sp. 2. (A) Hydrocladial branching and disposition of hydrothecae; (B) cauline apophysis with axillary nematophores and first hydrocladial internode with branched hydrocladium; (C–G) hydrocladial internodes showing hydrotheca, mesial superior nematophore and mesial inferior nematotheca (A–E, G, Stn 000DW; F, Stn 000AZ). Scale bar: 1 mm (A), 250 μm (B–G).

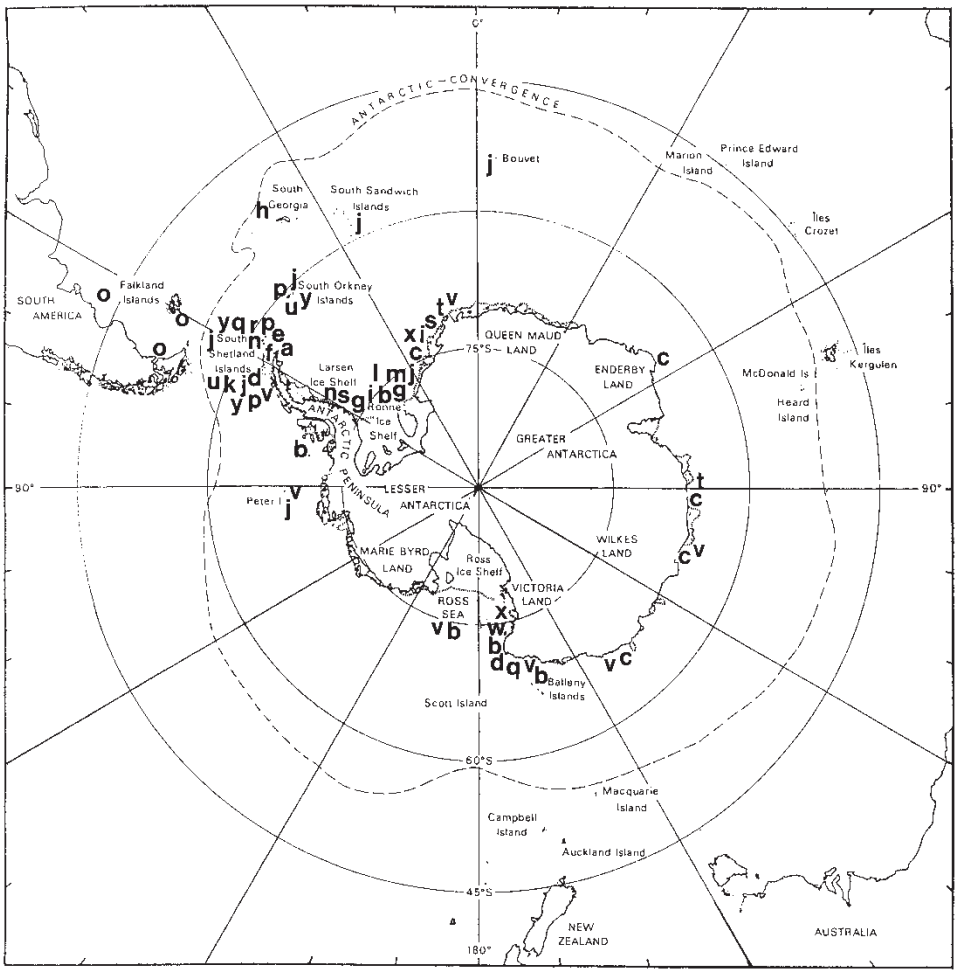


FIG. 19. Geographical distribution of the known Antarctic and sub-Antarctic species of *Oswaldella* Stechow, 1919. (a) *O. antarctica*; (b) *O. bifurca*; (c) *O. billardi*; (d) *O. blanconae*; (e) *O. crassa*; (f) *O. curiosa*; (g) *O. delicata*; (h) *O. elongata*; (i) *O. encarnae*; (j) *O. erratum*; (k) *O. frigida* sp. nov.; (l) *O. garciacarrascosai*; (m) *O. gracilis*; (n) *O. grandis*; (o) *O. herwigi*; (p) *O. incognita*; (q) *O. medeae* sp. nov.; (r) *O. monomammillata* sp. nov.; (s) *O. obscura*; (t) *O. rigida*; (u) *O. shetlandica*; (v) *O. stepanjantsae*; (w) *O. terranovae*; (x) *O. tottoni*; (y) *O. vervoorti*.

the Continental Antarctic Region (High Antarctica and Scotia Ridge). Only *Oswaldella herwigi*, with a Patagonian distribution, is found outside Antarctic waters, having been recorded from the Patagonian shelf and slope and from off the Falkland Islands.

Of the 24 Antarctic species, seven (*Oswaldella bifurca*, *O. billardi*, *O. blanconae*, *O. medeae* sp. nov., *O. rigida*, *O. stepanjantsae* and *O. tottoni*) are presently considered to have a circum-Antarctic distribution (i.e. present in both East and West Antarctica). *Oswaldella bifurca* has been found in the Bellingshausen Sea and off the south coast of the Weddell Sea, in West Antarctica, and in the Ross Sea and off

Victoria Land, in East Antarctica. *Oswaldella billardi* has mainly been found in East Antarctica (in the Davis Sea and off Queen Mary Coast, Enderby Land, Adélie Coast and Wilkes Land), but it has also been found at the east coast of the Weddell Sea, in West Antarctica. *Oswaldella blanconae* is known only from off Low Island, in West Antarctica, and from east of Cape Hallett (Victoria Land), in East Antarctica. *Oswaldella medeae* sp. nov. has been collected from the Pennell Bank (Victoria Land), in East Antarctica, and at the north-east of Joinville Island (Antarctic Peninsula), in West Antarctica. *Oswaldella rigida* has been reported both in the Davis Sea and in the Weddell Sea. *Oswaldella stepanjantsae* has been found in the Ross Sea and off Adélie Coast and Wilkes Land, in East Antarctica, and in the Weddell Sea and off Peter I, Elephant, Joinville, d'Urville and Low islands, in West Antarctica. Finally, *O. tottoni* has been reported from the Ross Sea, in East Antarctica, and the Weddell Sea, in West Antarctica.

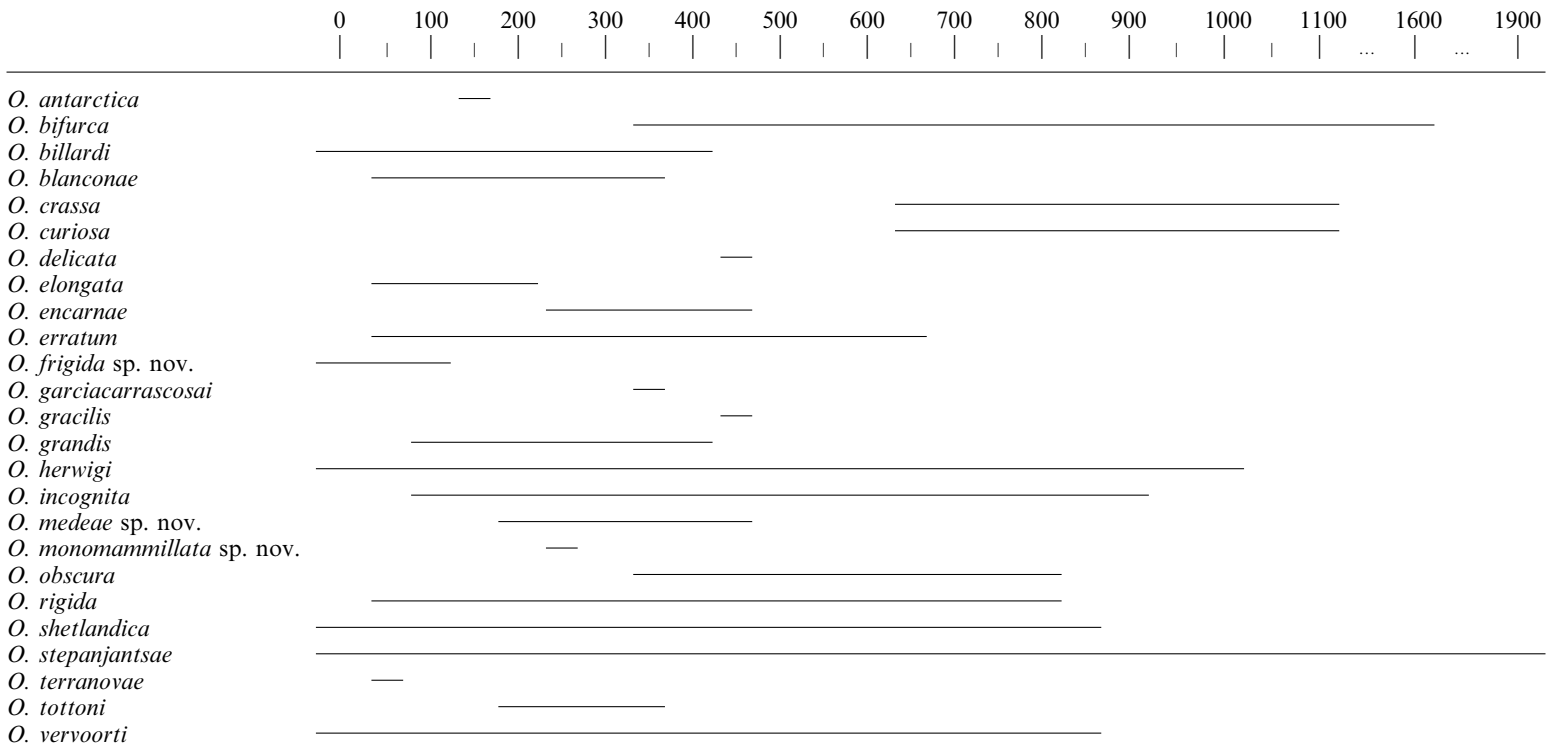
Of the remaining 17 species, only *O. terranovae* may be presently considered endemic to East Antarctica, being known only from the Ross Sea.

The remaining 16 species are endemic in West Antarctica. *Oswaldella erratum* has the widest distribution, being known from off the Antarctic Peninsula, Peter I, Elephant and Petermann islands, the South Orkney Islands, the South Sandwich Islands, the Weddell Sea, and even off Bouvet Island, at the limits of the Antarctic Region. *Oswaldella grandis* is known from both the Weddell Sea region and the Elephant/South Shetland Islands area. Five species (*Oswaldella delicata*, *O. encarnae*, *O. garciacarrascosai*, *O. gracilis* and *O. obscura*) are known only from the Weddell Sea. Nine species (*Oswaldella antarctica*, *O. crassa*, *O. curiosa*, *O. elongata*, *O. frigida* sp. nov., *O. incognita*, *O. monomammillata* sp. nov., *O. shetlandica* and *O. vervoorti*) have been found only in the area of the Antarctic Peninsula and Scotia Ridge islands: *O. antarctica* at Seymour Island; *O. crassa* and *O. curiosa* from Bransfield Strait; *O. frigida* sp. nov. at Low Island and Nelson Island; *O. incognita* off Palmer Archipelago, Low Island, the South Shetland Islands, Elephant Island and the South Orkney Islands; *O. monomammillata* sp. nov. off Elephant Island; *O. shetlandica* off Palmer Archipelago, Low Island, the South Shetland Islands and the South Orkney Islands; *O. vervoorti* off Palmer Archipelago, the South Shetland Islands, Antarctic Peninsula and the South Orkney Islands; finally, *O. elongata*, is known only from off South Georgia which is usually considered as a separate district of the Continental Antarctic Region.

As indicated by Peña Cantero and Vervoort (1998), *Oswaldella* is principally an Antarctic genus, with a single species (*O. herwigi*) found outside the Antarctic Region and having a Patagonian distribution. The present distribution suggests that *Oswaldella* is a genus originating from, or at least diversifying in, the Antarctic Region. Moreover, the distinct asymmetry between East and West Antarctica in the number of species (cf. figure 19) may also point to West Antarctica as the speciation centre for the genus.

Most of the Antarctic species of *Oswaldella* appear to be shelf species (cf. table 5). Though many have a wide bathymetrical range, their deepest records are either over or at the limit of the Antarctic continental shelf-break, which occurs much deeper than in other oceanic regions (at 800 m depth in the Ross Sea). Only *O. crassa* and *O. curiosa* seem to be bathyal species. *Oswaldella bifurca* is distributed in deep waters of the continental shelf and on bathyal bottoms. *Oswaldella incognita*, *O. shetlandica*, *O. stepanjantsae* and *O. vervoorti* may be considered eurybathic species; besides being widely distributed on the continental shelf, they are also widely spread on

Table 5. Bathymetrical distribution of the known species of *Oswaldella* Stechow, 1919 (in metres).



bathyal bottoms. The Patagonian species, *Oswaldella herwigi*, is also a eurybathic species, being present both along the continental shelf and on bathyal bottoms.

The geographical and bathymetrical distributions as outlined above are evidently provisional and likely to be changed in the future, since they are based on fairly scarce data; there are currently many Antarctic areas from which the benthic hydroid fauna is either poorly known or completely unknown (cf. figure 19).

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