

**On two Antarctic species of *Oswaldella* Stechow, 1919:
O. shetlandica Stepan'yants, 1979 and *O. elongata* spec. nov.
(Cnidaria Hydrozoa)
(Notes on Antarctic hydroids, II)**

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Two species of the antarctic hydroid genus *Oswaldella* Stechow, 1919, are considered. The first, described by Stepan'yants (1979) as a subspecies, *O. billardi shetlandica*, has been raised to specific level and will henceforth be indicated as *Oswaldella shetlandica* Stepan'yants, 1979. A second species is described as *Oswaldella elongata* spec. nov. Both species are differentiated against the remaining known species of *Oswaldella*; new records are added and the geographical distribution is discussed.

Resumen: Se considera la posición sistemática de dos especies del género *Oswaldella* Stechow, 1919. Una de ellas, descrita por Stepan'yants (1979) como una subespecie de *Oswaldella billardi* Briggs, 1938, es elevada al nivel específico y pasa a denominarse *Oswaldella shetlandica* Stepan'yants, 1979. La segunda especie se describe como *Oswaldella elongata* spec. nov. Se remarcan las diferencias de estas dos especies con las restantes especies del género y se presentan los datos existentes sobre la autoecología de ambas especies.

Introduction

During the Spanish Antarctic Expedition "Antártida 8611", carried out by the "Instituto Español de Oceanografía" in the austral summer of 1986-87, antarctic hydroids were collected. In two provisional papers on this material (Peña Cantero, 1991; Peña Cantero & García Carrascosa, 1994) two species of *Oswaldella* Stechow, 1919, identified to the generic level, were described and figured. The study of a large additional antarctic material, mainly collected by German Antarctic Expeditions with R.V. "Polarstern" and the examination of a schizoholotype of *Oswaldella billardi shetlandica* Stepan'yants, 1979, have enabled us to determine the exact taxonomic position of these two species. The first has now been identified as *Oswaldella billardi shetlandica* Stepan'yants, 1979, described by Stepan'yants as a subspecies of *Oswaldella billardi* Briggs, 1938. The study of the large "Polarstern" material of *O. billardi* and a comparison of this material with *O. billardi shetlandica* resulted in the discovery of such important differences that it appears necessary to consider Stepan'yants's subspecies as a distinct species of *Oswaldella* with the name *Oswaldella shetlandica*

Stepan'yants, 1979. The second species of *Oswaldella* collected by the Spanish Antarctic Expedition could not be identified with any of the known species of this genus and is described below as *Oswaldella elongata* spec. nov.

Description of the species

Oswaldella shetlandica Stepan'yants, 1979 (fig. 1)

Oswaldella billardi; Blanco & De Redolatti, 1977: 1-8, pl. 1 figs 1-2, pl. 2 figs 3-6, pl. 3 figs 7-8, pl. 4 figs 9-10.

Oswaldella billardi p.p. Blanco, 1984: 45-46, pl. 41 fig. 95.

Oswaldella billardi shetlandica p.p. Stepan'yants, 1979: 114, pl. 21 fig. 3; pl. 25 fig. 7.

Oswaldella sp.2 Peña Cantero, 1991: 182-186, pl. 34 figs a-j, pl. 58 figs a-f, pl. 68 fig. c; Peña Cantero & García Carrascosa, 1994: 126, figs 8i-l.

Material examined.— Spanish Antarctic Expedition:

Stn ANT 470, 61°50.90'S 58°36.00'W, near King George Island, South Shetlands, 150-154 m, 24.i.1987: one colony with several stems up to 105 mm, with gonothecae (RMNH Coel. no. 27281, two slides no. 3131).

Stn ANT 476, 61°54.30'S 58°59.70'W, near King George Island, South Shetlands, 198-215 m, 25.i.1987: single stem 90 mm high, with gonothecae.

Stn ANT 553, 61°47.40'S 58°21.90'W, near King George Island, South Shetlands, 178-216 m, 04.ii.1987: two colonies with several stems, 85 and 110 mm high, with gonothecae.

— XIII Soviet Antarctic Expedition:

King George Island, South Shetlands, 50-55 m, single stem 30 mm high; no gonothecae (schizoholotype, RMHH Coel. no. 27283, two slides no. 3133).

Description.— Colonies composed of rooted bundles of stems, maximal height 110 mm. Hydrocauli frequently branched basally and forming stems of lower order. Axis with some accessory tubules, running up basal fourth of stem and occasionally giving rise to other stems.

Hydrocauli broken up into internodes of varied length bearing apophyses alternately arranged in two longitudinal series placed in one plane. Normally there is one apophysis to each internode, but a larger number - up to four - may occasionally be found. In the colony from Stn ANT 476 there are two apophyses to each internode though internodes with a single apophysis occur occasionally. Each apophysis has four nematophores; two are raised nematophores ("mamelons") on the upper part of the apophysis, the remaining two are circular holes in the perisarc and occur in the axil between apophysis and axis (fig. 1b).

Hydrocladia springing from the apophyses and not separated by a node; first internode hydrothecate and ramified, giving rise to two hydrocladia of the second order. Each of these secondary hydrocladia may have as many as four tertiary hydrocladia, one on each of the first four internodes of the secondary hydrocladium. Tertiary hydrocladia developing in space between secondary hydrocladia; hydrocladia of fourth order have also been observed (fig. 1a). Normally branching occurs in first (thecate) internode of the hydrocladia; occasionally there is a thecate internode without branch between the forked internodes. The arrangement of hydrothecae on

hydrocladia of second and lower order is more or less hemispherical: those of the second order face each other, those of lower order are turned upwards. When the degree of ramification is high the axis is almost hidden by the hydrocladia. Hydrocladia divided into homonomous internodes; last internode of each hydrocladium normally ending in a blunt point (fig. 1c, d, f). Each internode with one hydrotheca and two nematophores: one mesial superior and one mesial inferior, both represented by simple circular holes in the perisarc without any indication of a nematotheca. Mesial superior nematophore behind free part of adcauline hydrothecal border; mesial inferior on a strongly elevated part of the internode. Wall of internode opposite insertion of hydrotheca with a slight step.

Hydrotheca placed in middle of internode, with thick perisarc. Abcauline wall convex, particularly the distal portion, which curves strongly towards the axis and brings the kidney shaped hydrothecal aperture in a position facing the internode. Adcauline wall highly concave, almost completely adnate with only a fraction of that wall free distally (fig. 1e, g, h).

Ramified hydrocladial internodes with hydrotheca in axil formed by the two prongs; there is a mesial superior nematophore on each of the prongs behind the adcauline hydrothecal wall, shaped as in the other internodes. There is a mesial inferior nematophore in all forked internodes with the exception of the first forked internode of each hydrocladium.

Gonothecae springing from the internodes directly under inferior nematophore. They are pear-shaped, narrowing basally but without distinct peduncle; maximal diameter at their distal end. Top of gonotheca flattened and there with a circular opening surrounded by a low ledge (fig. 1a, i). Gonothecae in the colonies from Stn ANT 476 are cone-shaped and have a truncated distal portion; these gonothecae are probably young.

Measurements (in μm , with mean and standard deviation).

	ANT 470	schizoholotype (XIII SAE)
Hydrothecae		
length abcauline wall	201.5-286 (241.7 \pm 30.8)	195-266.5 (240.5 \pm 31.1)
length free part of adcauline wall	13-26 (21.1 \pm 4.6)	19.5
diameter of rim (lateral view)	117-195 (142.6 \pm 22.1)	123.5-149.5 (134.1 \pm 10.4)
diameter of rim (frontal view)	201.5-234 (219.1 \pm 10.6)	195-266.5 (226.7 \pm 23.7)
Internode		
length	606.8-1000 (698.2 \pm 111.3)	541.2-820 (653.7 \pm 90.5)
diameter under hydrothecae	123.5-273 (170 \pm 49.1)	117-247 (171.8 \pm 49)
diameter under nematophore	136.5-214.5 (164 \pm 23.8)	136.5-208 (170.9 \pm 25.6)
Diameter of the hydrocaulus	328-1000	
Nematocysts (microbasic mastigophore)	14.7-16.8 \times 4.6-5.6 (15.5 \pm 0.6 \times 5 \pm 0.3)	
Gonothecae		
length	1213.6-1476 (1279.2 \pm 103.2)	1000
maximal diameter	590.4-688.8 (650.5 \pm 36.9)	410
aperture diameter	360.8-459.2 (431.9 \pm 36.9)	328

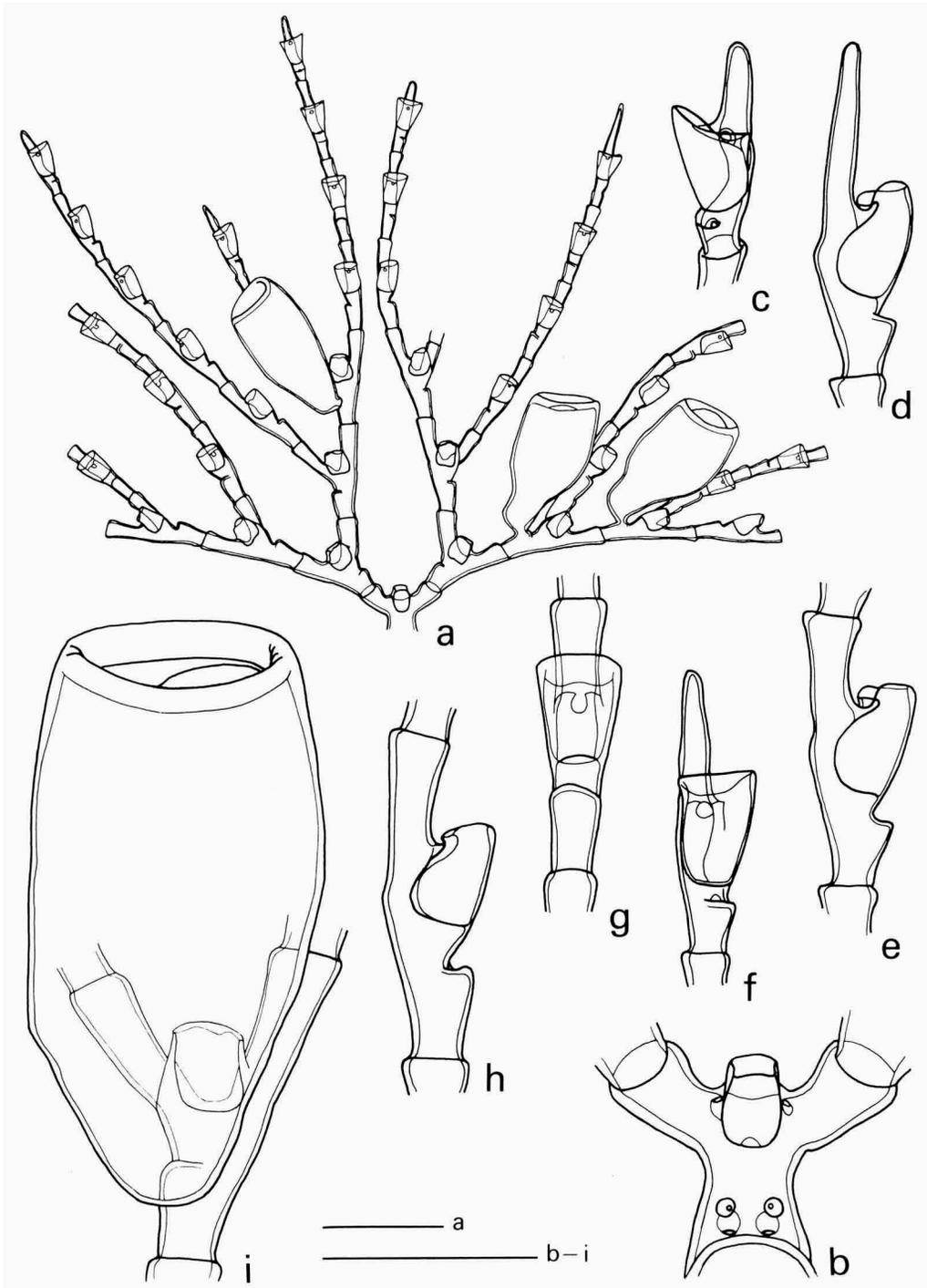


Fig. 1. *Oswaldella shetlandica* Stepan'yants, 1979, from Stn ANT 470. a, branch composed of hydrocladia up to fourth order and with gonothecae, showing disposition of hydrothecae; b, first hydrocladial internode, showing nematophores; c, d, f, terminal hydrocladial internodes showing blunt point; e, g, h, typical hydrocladial internodes; i, forked internode with gonotheca. Scale bars: a, 1 mm; b-i, 500 μ m.

Remarks.— Our material agrees completely with the material assigned to *Oswaldella billardi* Briggs, 1938, by Blanco & De Redolatti, 1977; the colony structure, hydrothecal and gonothecal morphology are identical. Blanco & De Redolatti also point out the absence of a mesial inferior nematotheca and indicate the presence, in the cauline apophyses, of a forked "mamelon" on the upper part and of another nematophore as a simple perisarcal hole in the axil with the stem. They probably did not refer to the second axillary nematophore in their description because of difficulties in observation. Blanco & De Redolatti also noticed the pointed terminal internodes.

Stepan'yants (1979) described a subspecies of *Oswaldella billardi* as *O. billardi shetlandica*. Our material shows great similarity with that subspecies in the general structure of the colony, number and disposition of the hydrocladia and general morphology of the hydrothecae. Both species are bristly, with a large number of upward directed hydrocladia, of which the last internodes are pointed and with a slight step in the internodal wall opposite the inserting of the hydrotheca, those hydrothecae having a strongly convex abcauline wall. However, Stepan'yants mentions the presence of a rudimentary mesial inferior nematotheca, definitely lacking in our material and in that described by Blanco & De Redolatti (1977). On the other hand, Stepan'yants does not refer to the number and disposition of nematophores on the cauline apophyses.

We had the good fortune to obtain part of the type lot of *Oswaldella billardi shetlandica* for examination. This material originates from the same area as ours and it is in complete agreement. We have inspected a 30 mm high single stem, truncated basally and with a stolon running along the first 11 mm of the axis. The stem is divided into short internodes, separated by strong perisarcal constrictions; there is one apophysis per internode. Apophyses alternately arranged in two longitudinal series in one plane, pointing upwards under an angle of c. 45°. Apophyses each with four nematophores: two as simple circular holes in the perisarc of the axil and two "mamelons" situated on the upper part. The apophyses support the primary hydrocladia of which the first internode is bifurcated, giving rise to two secondary hydrocladia, making an angle of c. 90°. Each of these secondary hydrocladia may have as many as four tertiary hydrocladia, one on each of the first four internodes of the secondary hydrocladium and situated in the place formed by the secondary hydrocladia. The two more internal tertiary hydrocladia may give rise to one or two hydrocladia of the fourth order, here too the quaternaries are found on the first two internodes of the tertiaries. Arrangement of hydrothecae on hydrocladia of second and lower order more or less hemispherical, with those of second order facing each other and those of lower order turned upwards. Terminal internode of all hydrocladia normally bluntly pointed. Hydrothecae with strongly convex abcauline wall and with the aperture facing the internode. Each hydrothecate internode, with the exception of the first of the primary hydrocladium, with two nematophores as simple perisarcal holes: one mesial superior behind a free distal section of the adcauline hydrothecal wall, and a mesial inferior on an elevated part of the internode under the hydrotheca. The gonothecae resemble those described above (except those from ANT Stn 476 that are considered young) but are slightly smaller.

We have also been able to inspect some additional material referred to the subspecies *shetlandica* by Stepan'yants (1979), originating from the South Orkney's, depth 176 m and collected by the "Akademik Knipovitch I". Though only a 5 mm

high fragment, this has been sufficient to make a detailed study of its structure and to become convinced that it is quite different from the Russian material described above. In fact it clearly belongs to the nominal subspecies *Oswaldella billardi billardi* Briggs, 1938. The stem is not divided into internodes, the cauline apophyses, alternately arranged in two longitudinal series in one plane, have only two nematophores, shaped as circular holes in the axillary periderm of the apophyses. There is a distinct mesial inferior nematotheca; the abcauline wall of the hydrotheca is strongly convex and the hydrothecal aperture faces the internode. In all these details this South Orkney material agrees with the plentiful material of *Oswaldella billardi* in the "Polarstern" collection (data not yet published).

The fact that Stepan'yants's material of *Oswaldella billardi shetlandica* is composite explains the fact that in her description of that subspecies she refers to the presence of a rudimentary mesial inferior nematotheca, an important characteristic differentiating *O. billardi shetlandica*, where it is absent, from the nominal subspecies *O. billardi billardi*, where it is present.

Though *Oswaldella billardi billardi* and *O. billardi shetlandica* are similar in hydrothecal morphology - strongly convex abcauline wall and aperture facing the internode - both are differing in a number of important differences:

1. The axis is not broken up into internodes in *O. billardi billardi* but divided into internodes in *O. billardi shetlandica*.

2. The cauline apophyses are directed upwards at an angle of 70-80° in the first and have only two circular, axillary nematophores; in the second the apophyses point upwards under an angle of c. 45° and have four nematophores, viz. two circular axillary nematophores and two "mamelons" on the upper part.

3. The (reduced) mesial inferior nematotheca in *O. billardi billardi* and the total absence of a mesial inferior nematotheca in *O. billardi shetlandica*, though a circular nematophore does occur in the same position. We feel justified to raise *Oswaldella billardi shetlandica* to specific level and hence refer to it as *Oswaldella shetlandica* Stepan'yants, 1979.

Oswaldella shetlandica shows more significant differences with the remaining species of the genus. *O. antarctica* (Jäderholm, 1904) differs by the presence of a rudimentary mesial inferior nematotheca, by hydrothecal morphology - straight abcauline wall and circular aperture -, by the degree of hydrocladial ramification - normally two hydrocladia of the second order only - and by number and disposition of the nematophores, viz. two circular nematophores in the axil of the apophysis and one "mamelon" (Peña Cantero & Vervoort, 1995).

Oswaldella bifurca (Hartlaub, 1904) differs in hydrothecal morphology - smaller and cup-shaped -, by hydrocladial structure and degree of ramification - quite occasionally hydrocladia of the third order can be observed -, and by the disposition of the axillary nematophores on the cauline apophyses, viz. a single circular hole and no "mamelon".

Oswaldella herwigi El Beshbeeshy, 1991, though sharing with *O. shetlandica* the lack of a mesial inferior nematotheca, differs by size, shape and place of the hydrothecae - smaller, cup-shaped with circular rim and placed on distal third of internode -, by hydrocladial structure and degree of ramification - hydrocladia with athecate internodes alternating with thecate internodes and exclusively hydrocladia of second

order are present, originating in the thecate internodes -, and by number and disposition of the nematophores on the cauline apophyses, viz. only two, one axillary as a circular hole and one "mamelon" always at the same place of the dorsal part of the apophysis.

Oswaldella blanconae El Beshbeeshy, 1991, also lacks the mesial inferior nematotheca, but differs in size, shape and place of the hydrothecae - smaller and with straight abcauline wall, placed on the basal third of the internode -, by the degree of ramification of the hydrocladia - usually not forked and only quite occasionally ramified once -, and by the number and place of the nematophores in the cauline apophyses, viz. a single "mamelon" on one side of the apophysis (according to the descriptions).

Oswaldella stepanjantsae El Beshbeeshy, 1991 (= *O. stepanjantsi*, incorrect original spelling) differs by the presence of a mesial inferior nematotheca, by hydrothecal morphology - straight abcauline wall and circular rim -, by hydrocladial structure, - viz. several short, athecate internodes at the base of each hydrocladium -, and by the presence, at the apophysis, of four axillary nematophores as simple, perisarcular holes and two "mamelons" (unpublished data).

Ecology and distribution.— *Oswaldella shetlandica* is a shelf species recorded from 30 m (Stepan'yants, 1979) to 100 m (Blanco & De Redolatti, 1977), mainly on rocky surfaces (Stepan'yants, 1979). The material collected by the Spanish Antarctic Expedition originates from 150 to 216 m depth, on stony bottom. Fertile colonies were found in January and February.

Oswaldella shetlandica has been recorded only from King George Island in the region of the South Shetland's (Stepan'yants, 1979 and present material) and from Low Island, in the immediate vicinity of the South Shetlands (Blanco & De Redolatti, 1977).

Oswaldella elongata spec. nov.
(fig. 2)

Oswaldella sp.1 Peña Cantero, 1991: 179-182, pl. 33 figs a-e, pl. 57 figs a-f, pl. 68 fig. b; Peña Cantero & García Carrascosa, 1994: 126, figs 8g-h.

Material examined.— Spanish Antarctic Expedition:

Stn ANT 161, 54°53.80' -54°54.60'S, 34°49.60' -34°47.70'W, near Clerke Rocks, 150-250 m, 14.xii.1986, one colony up to 210 mm high; no gonothecae.

Stn ANT 182, 54°33.60'S 35°48.20'W, South Georgia, 86-176 m, 18.xii.1986, one colony composed of four stems up to 65 mm high, without gonothecae and attached to a hydrocoral (holotype in the collection of Facultad de Biología, Universidad de Valencia, Coel. n° 3/ANT 182; schizoholotype RMNH Coel. n° 27282, two slides n° 3132).

Description (of the holotype).— Colony composed of four pinnate, unbranched stems up to 65 mm high and with stolonial hydrorhiza. Axes broken up into internodes of unequal length, the shortest in the basal portion, the longest in the distal half. Internodes provided with apophyses that are alternately arranged in two longitudinal series in a single plane; they are directed upwards under an angle of c. 45°. Number of apophyses per internode varying between one and fifteen. Each apophysis with four nematophores of which two are "mamelons", placed one at each side of the upper part of the apophyses, the remaining two are no more than circular holes in the axillary periderm (fig. 2b, c).

Hydrocladia well separated from the internodes; the first internode is thecate and bifurcated, resulting in the presence of a pair of hydrocladia of the second order. There are no further ramifications (fig. 2a). Hydrotheca on the first, bifurcated internode placed in axil between both prongs; three nematophores are present: one mesial inferior on a slightly raised part of the internode under the hydrotheca and two mesial superior, one on each prong and placed behind the free ledge of the hydrothecal adcauline wall. Remaining internodes homomerous and each with one hydrotheca and two nematophores: one mesial superior shaped as a circular hole in the perisarc behind the free part of the adcauline hydrothecal wall, and the second mesial inferior, also shaped as a circular perisarc hole but placed on top of a considerably raised part of the internode under the hydrotheca; no nematotheca is present. Hydrothecae of secondary hydrocladia facing each other; they are large and deep, with straight or slightly convex abcauline wall. Hydrothecal rim even and almost circular, slightly tilted in the direction of the internode. Adcauline wall almost fully adnate, with minor free part (fig. 2d-h).

Measurements (in μm , with mean and standard deviation).

Hydrothecae		
length abcauline wall	344.5-442	(399 \pm 19.6)
length free part of adcauline wall	13-32.5	(20.2 \pm 7.2)
diameter at rim	123.5-162.5	(147.6 \pm 10.6)
Internode		
length	836.4-1016.8	(933.8 \pm 57)
diameter under hydrothecae	156-240.5	(205.1 \pm 25.7)
diameter under nematophore	143-221	(181 \pm 21.5)
Diameter of hydrocaulus	312-394	
Length of apophyses	293-325	
Nematocysts (microbasic mastigophores)	14-16.8 \times 5.6-6	15.6 \pm 0.7 \times 5.6 \pm 0.1

Remarks.— The colony from Stn ANT 161 seems to have a branched axis, but closer inspection reveals a different pattern. From several places on the primary axis, at spots normally occupied by cauline apophyses, stolonial structures develop, running for some distance along that axis and bearing hydrocauli, creating the appearance of ramification.

Oswaldella elongata shows distinct differences with the remaining species of *Oswaldella*. It approaches *O. billardi* Briggs, 1938, in hydrothecal morphology but in Briggs's species the abcauline wall is more convex and shorter than in *O. elongata*. On the other hand, while *O. billardi* has a small and rudimentary mesial inferior nematotheca, such a structure is absent from *O. elongata* where a nematophore shaped as a circular hole in the perisarc occurs at the same place. There are also differences in number and disposition of the nematophores on the cauline apophyses: *O. billardi* has only two axillary nematophores - circular holes in the perisarc -, in *O. elongata*, in addition to those two axillary nematophores there are two "mamelons".

Oswaldella elongata has in common with *O. shetlandica* Stepan'yants, 1979, the lack of the rudimentary mesial inferior nematotheca and the presence of four nematophores - two axillary and two "mamelons" - on the cauline apophyses. In *O. shetlan-*

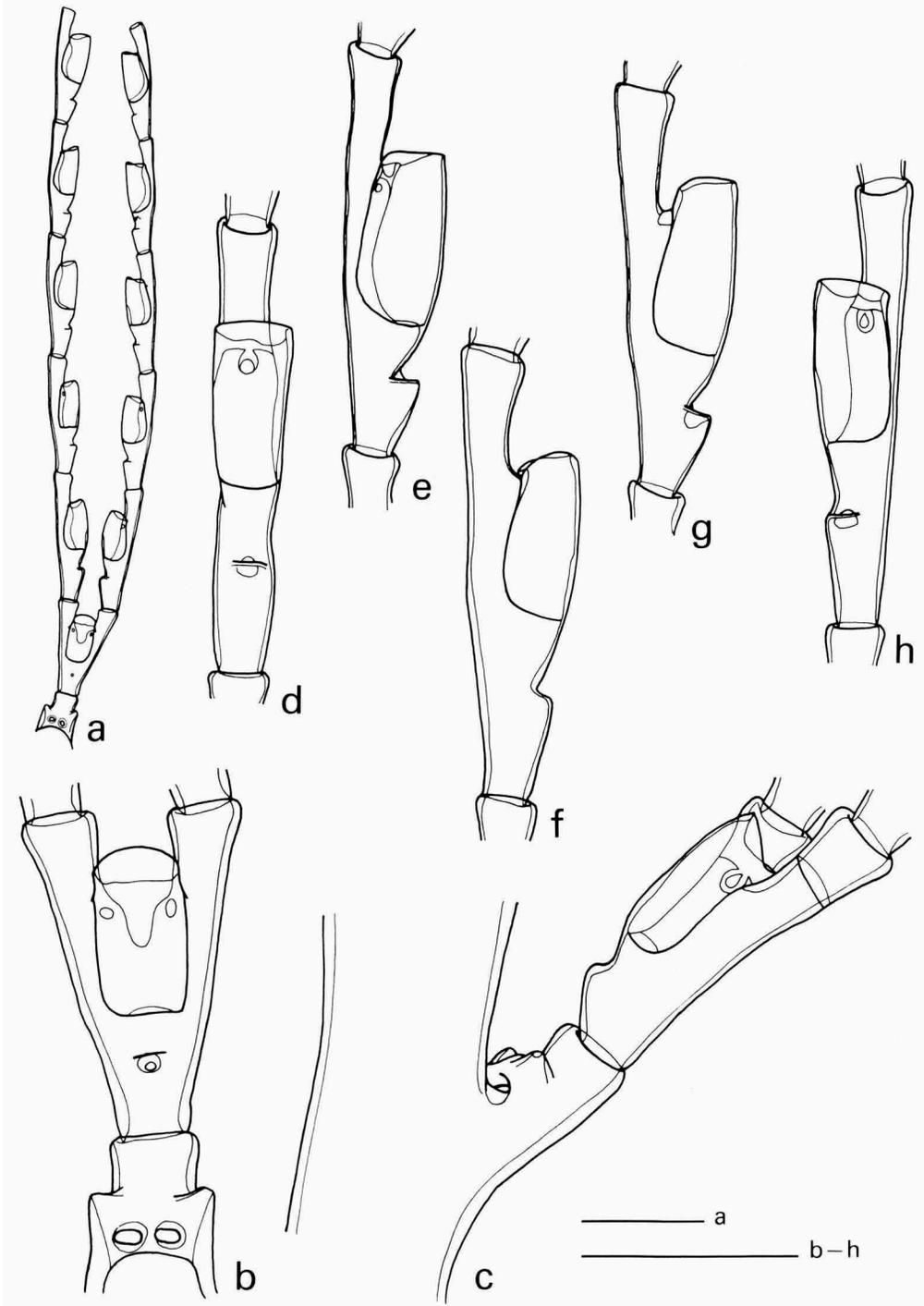


Fig. 2. *Oswaldella elongata* spec. nov., holotype from Stn ANT 182. a, branch showing hydrocladial ramification and disposition of hydrothecae; b, first hydrocladial internode with axillary hydrotheca and nematophores, frontal view; c, idem, lateral view; d-h, typical hydrothecal internodes with hydrotheca and mesial superior and mesial inferior nematophores. Scale bars: a, 1 mm; b-h, 500 μ m.

dica, however, the two "mamelons" of the axis are placed on the upper part of the apophysis; in *O. elongata* those two "mamelons" are situated one on each side of the upper part of the apophysis. Bigger differences occur in shape and size of the hydrothecae, that in *O. elongata* are large and slender; they have thin perisarc and the aperture is slightly tilted towards the internode. In *O. shetlandica* the hydrothecae are shorter and have thicker perisarc, with the abcauline wall more strongly convex and the hydrothecal aperture faces the internode. In addition there is differences in branching: in *O. elongata* the primary hydrocladia branch once, while in *O. shetlandica* branching is considerable, with hydrocladia of the fourth order being present, obscuring visibility of the axis.

With the remaining species of *Oswaldella* differences are even bigger. *Oswaldella bifurca* (Hartlaub, 1904) differs by shape and size of hydrothecae, those being cup-shaped and much smaller. The cauline apophyses have only one nematophore represented by a circular hole in the perisarc.

Oswaldella antarctica (Jäderholm, 1904) has a small and rudimentary mesial inferior nematotheca, while the hydrothecae are smaller and shorter; there are two nematophores on the apophyses shaped as circular holes and a "mamelon".

Oswaldella herwigi El Beshbeeshy, 1991, shares with *O. elongata* the absence of a mesial inferior nematotheca, but this species is quite different by size, shape and insertion of the hydrothecae, that are much smaller, cup-shaped and placed on the distal third of the internode. There is also a great difference in hydrocladial structure, *O. herwigi* being the only species of *Oswaldella* where thecate and atehcate internodes alternate in the hydrocladia; also there are several hydrocladia of the second order, originating in thecate internodes. On the apophyses there is an axillary nematophore shaped as a hole and one "mamelon" on the dorsal part, always in the same position.

Oswaldella blanconae El Beshbeeshy, 1991, also lacks the mesial inferior nematotheca, but differs by size, shape and disposition of the hydrothecae, that are smaller and insert on the basal third of the internode. Bifurcation of the primary hydrocladia has only occasionally been observed; only one "mamelon" situated at one side of the cauline apophyses has here been described.

Oswaldella stepanjantsae El Beshbeeshy, 1991, differs by the presence of a mesial inferior nematotheca, though greatly reduced. The hydrothecae are wider and smaller and have a straight abcauline wall slightly directed outward. The hydrocladia normally start with a few short, atehcate internodes; the secondary hydrocladia may give rise to hydrocladia of lower order. It also differs by the presence, at the apophysis, of four nematophores as simple perisarc holes and two "mamelons".

Ecology and distribution.— The material of *Oswaldella elongata* described here originates from off South Georgia and from Clerke Rocks off South Georgia, depth 86-250 m. The colony from Stn ANT 182 was growing on a hydrocoral.

Etymology.— The specific name *elongata* has been taken from the latin adjective "longus", meaning long and referring to the shape of the hydrothecae.

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