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On a collection of hydroids (Cnidaria, Hydrozoa, Hydroidolina) from the west coast of Sweden, with a checklist of species from the region

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Abstract

An account is given of 48 species identified in a small collection of hydroids from the west coast of Sweden. Assigned to 39 genera and 18 families, most are well-known from boreal waters of the North Atlantic Ocean. *Campanulina panicula* G.O. Sars, 1874 is referred to *Racemoramus*, a new genus of leptothecates distinguished in part by having monopodial growth, rigid and non-segmented hydrocauli, and grape-like clusters of hydrothecae that arise at irregular intervals from the stem. The name *Sertularia dumosa* (now *Lafoea dumosa*) is taken to have been made available by Fleming (1820), not Fleming (1828). As such, it is not threatened by a virtually unused subjective synonym (*Lafoea cornuta* Lamouroux, 1821). *Aselomaris michaeli* Berrill, 1948 and *Rhizorhagium navis* Millard, 1959 are regarded as synonyms and combined under the binomen *Pachycordyle michaeli* (Berrill, 1948). Confusion in the literature over the identity of *Sertularia tenera* G.O. Sars, 1874 is addressed, and distinctive characters of the species are discussed. A species often misidentified as *S. tenera* is assigned to *Sertularia spitzbergensis* (Jäderholm, 1909); the name *spitzbergensis* is elevated in rank from subspecific to specific, and assigned priority over its simultaneous synonym *siberica* Jäderholm, 1909 under the First Reviser Principle. Gonothecae of *Clytia gigantea* (Hincks, 1866) (type locality: Lamlash Bay, UK) are reported for the first time in material from Europe. Although much like *Clytia hemisphaerica*, this species is retained as valid due to its remarkably robust colony form, elongate and gradually tapered hydrothecae, and linguiform rather than wavy or pointed marginal cusps. *Eudendrium album* Nutting, 1896, *Pachycordyle michaeli* (Berrill, 1948), and the hydroid stage of *Halitholus cirratus* Hartlaub, 1913 are reported for the first time from the study area. A checklist of hydroids from the study area is included.

Key words: Anthoathecata, Kattegat, Kosterhavet, Leptothecata, marine invertebrates, northwest Europe, Skagerrak, taxonomy, zoological nomenclature

Introduction

Reports of hydroids from the west coast of Sweden appear in works as early as those of Linnaeus (1761, 1767) and Forsskål (1775). Following them, Lovén (1836, 1858) and Lindström (1856b) provided information on certain species in the area. Later still, Segerstedt (1889) and Jäderholm (1909) published the first comprehensive accounts of these cnidarians in Swedish waters. The monograph by Jäderholm, based on materials at the Naturhistoriska Riksmuseet in Stockholm, is the most thorough study ever published on hydroids of the country. Details on expeditions from which those collections came are given in Théel (1905). Another large collection of marine macroinvertebrates was obtained at stations from the Norway border to the southern Kattegat between 1921 and 1938 under the direction of L.A. Jägerskiöld. The hydroids, identified by A.E. Jäderholm and P.L. Kramp, are at the Göteborgs Naturhistoriska Museum. Species were listed, with station data, in Jägerskiöld (1971). Later, Rees & Rowe (1969) provided information on hydroids collected from *Lophelia* reefs in the study area.

Other contributions to knowledge of hydroids from western Sweden exist in various faunal surveys (Lönnberg 1898, 1899b, 1902, 1903; Michanek 1967; Lundin *et al*. 2007, 2009), in accounts of one or two species (Lönnberg 1899a; Kramp 1935a, 1941; Hult 1941; Westblad 1947), and in the classic studies on Gullmarfjord biocoenoses by Gislén (1930). Species from western Sweden are also mentioned in certain works dealing largely with hydroids from other areas (Winther 1880a; Fenchel 1905; Kramp 1935b; Edwards 1965, 1973a; Cornelius 1975b, 1979, 1982, 1990, 1995a, b, 1998; Cornelius & Ryland 1990; Marques *et al*. 2000; and Schuchert 2004, 2007, 2008b, 2010). Finally, studies on nematocysts and isozymes of campanulariid hydroids obtained in Swedish waters were undertaken by Östman (1979a, b, 1982a, b, 1983, 1987, 1999) and Östman *et al*. (1987, 1995). Meanwhile, hydroids from nearby Danish waters were documented by Kramp (1935b), those of the Oslofjord in southern Norway by Christiansen (1972), and those of the Baltic Sea by authors including Lindström (1856a), Stechow (1927), Broch (1928), Thiel (1970), and Schönborn *et al*. (1993).

This study provides an account of a small collection of hydroids obtained during the Workshop on Marine Macrofauna held at the Lovén Centre for Marine Sciences, Tjärnö, western Sweden, 05–17 September 2010.

Material and methods

Sampling was undertaken in and near Kosterhavet National Park, established in 2009 as the first national marine park in Sweden. Subtidal samples were collected from R/V *Nereus* using a biological dredge and a Warén dredge. Bathymetric data presented herein reflect water depths at the beginning and end of dredge tows, so that "140–100 m" indicates that sampling was commenced at a depth of 140 m and ended at 100 m. Manual collecting was carried out in shallower waters from substrates around docks and on rocky and sedimentary shores. Other specimens were provided by Bernard Picton (from SCUBA dives), John Taylor and Emily Glover (species found on mollusc shells), and Dennis Gordon (*Cordylophora caspia* from a brackish water environment at Krokstrand). Voucher material has been deposited in collections of the Invertebrate Zoology Section, Department of Natural History, at the Royal Ontario Museum (ROM), Toronto, Ontario, Canada, with additional material at the Göteborgs Naturhistoriska Museum, Göteborg, Sweden.

The classification system used herein has been adapted largely from Cornelius (1995a, b), Schuchert (2004, 2005, 2006, 2007, 2008a, b, 2009, 2010), and Calder (2010). Synonymy lists include original accounts of all species, together with citations of works providing primary records of species from the west coast of Sweden. All included records have been traced and verified from original sources. Only those illustrations based on material of a given species from western Sweden were included in synonymy citations.

Nematocysts were examined in formalin-preserved material, as described elsewhere (Calder 1988), using a Zeiss Axioscop light microscope.

A checklist at the end of this work incorporates records of hydroids from the Swedish west coast, taken to include the region from the border between Sweden and Norway on the north (c. 59°05'N, 11°13'E) to and including Swedish waters of the Öresund on the south (c. 55°23'N, 12°49'E). Only reports clearly founded on original records were included; general distribution records based (or apparently based) largely or entirely on other literature reports were excluded. Data on many of the species are available online at the Species Gateway of ArtDatabanken, the Swedish Species Information Centre: http://www.artportalen.se/marin (last accessed 6 March 2011). The website "Cold-Water Coral Research in Sweden" (http://stroembergiensis.se/specList_phyl_web.htm, last acessed 22 November 2011) lists eighteen species of hydroids from *Lophelia* reefs on the west coast of Sweden. No attempt was made here to compile a comprehensive list of records of hydromedusae from the region; species known from the study area only as the medusa stage, including *Bougainvillia principis* (Steenstrup, in Lütken, 1850), *Amphinema dinema* (Péron & Lesueur, 1810), *Amphinema rugosum* (Mayer, 1900), *Rathkea octopunctata* (M. Sars, 1835), *Hybocodon prolifer* L. Agassiz, 1860, *Cladonema radiatum* Dujardin, 1843, *Coryne eximia* Allman, 1859, *Stauridiosarsia ophiogaster* (Haeckel, 1879), *Proboscidactyla stellata* (Forbes, 1846), *Laodicea undulata* (Forbes & Goodsir, 1853), *Staurostoma mertensii* (Brandt, 1834), *Melicertum octocostatum* (M. Sars, 1835), *Cosmetira pilosella* (Forbes, 1848), *Mitrocomella polydiademata* (Romanes, 1876), *Tiaropsis multicirrata* (M. Sars, 1835), *Eucheilota maculata* Hartlaub, 1894, and *Aequorea vitrina* Gosse, 1853, have been excluded.

Systematic account

PHYLUM CNIDARIA Verrill, 1865

SUBPHYLUM MEDUSOZOA Petersen, 1979

CLASS HYDROZOA Owen, 1843

SUBCLASS HYDROIDOLINA Collins, 2000

ORDER ANTHOATHECATA Cornelius, 1992a

SUBORDER FILIFERA Kühn, 1913

Family Eudendriidae L. Agassiz, 1862

Eudendrium album Nutting, 1896

Figs. 1, 2

Eudendrium album Nutting, 1896: 146.

Type locality. UK: Plymouth, Millbay Channel, on stones in shallow water (Nutting 1896: 146).

Museum material. Kosterhavet, 58°53.030'N, 11°05.567'E, 140–100 m, 10.ix.2010, biological dredge, R/V *Nereus*, one straggly colony with pedicels up to c. 10 mm high, without gonophores, ROMIZ B3919.—Kosterhavet, 58°53.367'N, 11°04.240'E, 90 m, 15.ix.2010, biological dredge, R/V *Nereus*, one sparingly branched colony, up to 8 mm high, on a polychaete tube, without gonophores, ROMIZ B3934.

Remarks. Schuchert (2008b) included 19 species, excluding the problematic *Myrionema multicornis* (Allman, 1876), in his review of eudendriids from Europe. These were differentiated largely on the basis of nematocyst complement. Two small species of the genus *Eudendrium* Ehrenberg, 1834 were distinguished from others in having macrobasic euryteles scattered over the hydranth body. Thread coils of these nematocysts are oblique to the capsule axis in *Eudendrium album* Nutting, 1896 and parallel in *E. simplex* Pieper, 1884. The two also differ in gonophore type, with those of *E. album* being gonochoristic and those of *E. simplex* being hermaphroditic. *Eudendrium simplex* is known only from the Mediterranean, where it occurs on the sea grass *Posidonia*, while *Eudendrium album* is a typically boreal species extending northwards to Scandinavia and Iceland (Schuchert 2008b).

Eudendrium album is reported here for the first time from the west coast of Sweden. The identification is based largely on its cnidome, comprising small heterotrichous microbasic euryteles and macrobasic euryteles (Figs. 2a–c). These are much as described in Schuchert's (2008b) account of the species. *Eudendrium capillare* Alder, 1856, reported from the study area (Segerstedt 1889; Jäderholm 1909; Kramp 1935b; Jägerskiöld 1971), from Denmark (Kramp 1935b), and from the Oslofjord (Christiansen 1972), is similar but lacks macrobasic euryteles.

For discussion of *Myrionema multicornis*, see Schuchert (2008b). Although reported from the Kattegat by Allman (1876), that location is unlikely to have been its place of origin.

Reported distribution. West coast of Sweden.—New record.

Elsewhere.—North Atlantic: from Norway to Galicia, Spain, and the Mediterranean Sea in Europe (Schuchert 2008b), and from the Gulf of St. Lawrence to Florida in North America (Calder 2004).

Eudendrium arbuscula Wright, 1859

Figs. 3, 4

Eudendrium arbuscula Wright, 1859: 113, pl. 9, figs. 5, 6.—Segerstedt, 1889: 9, 24.—Rees & Rowe, 1969: 11.—Jägerskiöld, 1971: 62.—Marques *et al*., 2000: 81, fig. 15 [the specific name *arbuscula* Wright, 1859 conserved and placed on the Official List of Specific Names in Zoology, Opinion 1956 (ICZN 2000)].

Eudendrium wrighti.—Jäderholm, 1909: 51 [incorrect subsequent spelling] [*Eudendrium wrightii* Hartlaub, 1905 placed on the Official Index of Rejected and Invalid Names in Zoology, Opinion 1956 (ICZN 2000)].

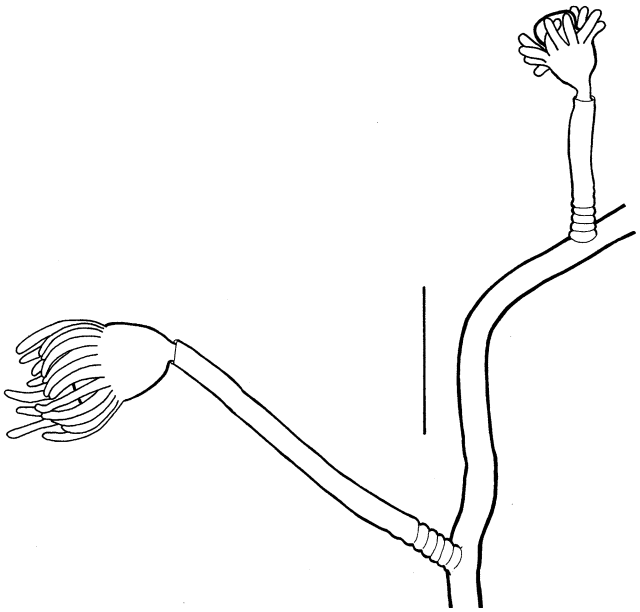

FIGURE 1. *Eudendrium album*: part of colony with hydrocaulus with two hydranths, ROMIZ B3934. Scale equals 0.5 mm.

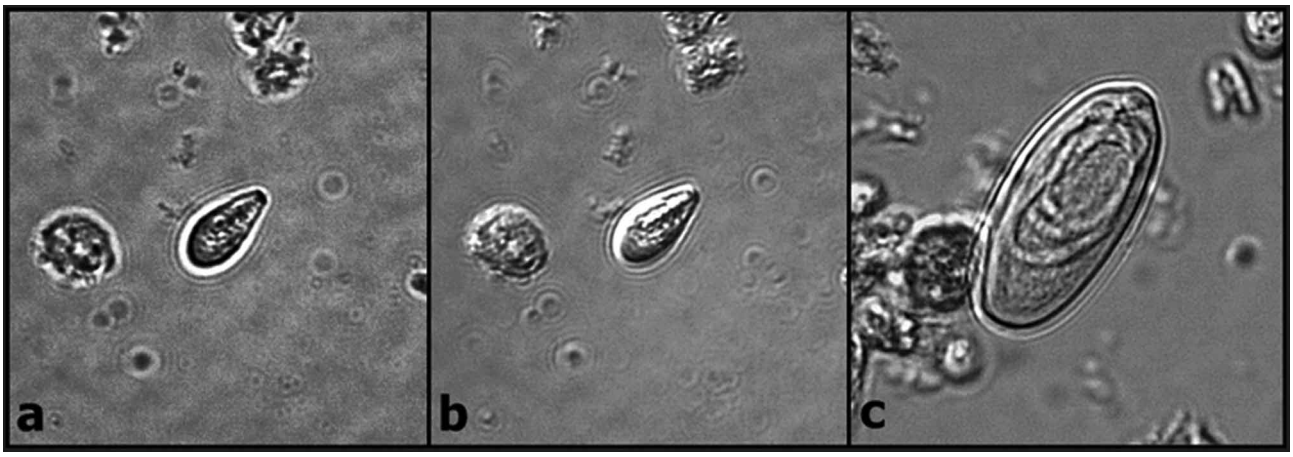

FIGURE 2. *Eudendrium album*, nematocysts, ROMIZ B3934: a, microbasic eurytele; b, microbasic eurytele; c, macrobasic eurytele.

Type locality. UK: Scotland, Firth of Forth, Queensferry (Wright 1859: 113).

Museum material. Kosterhavet, 58°53.585'N, 11°06.239'E, 14–10 m, 06.ix.2010, biological dredge, R/V *Nereus*, four colony fragments, up to 3.1 cm high, without gonophores, ROMIZ B3880.

Remarks. Colonies examined here were quite small and lacked gonophores, but they corresponded with *Eudendrium arbuscula* Wright, 1859 as described by Schuchert (2008b). The largest colony had a polysiphonic stem basally that lacked a bark-like covering as in the similar *E. annulatum* Norman, 1864; hydranths were small and bore a basal band of large microbasic euryteles having a straight shaft.

The specific name *arbuscula* Wright, 1859, as published in the binomen *Eudendrium arbuscula*, was conserved and placed on the Official List of Specific Names in Zoology (ICZN Opinion 1956). It had been threatened by a senior secondary homonym, *arbuscula* (d'Orbigny, 1846), as published in the binomen *Tubularia arbuscula*, a name placed in the same Opinion on the Official Index of Rejected and Invalid Specific Names in Zoology. Also placed on the Official Index in that Opinion was the name *E. wrightii* Hartlaub, 1905, a replacement name for *E. arbuscula* Wright. As noted by a number of authors (e.g., Marques & Vervoort 1999; Schuchert 2008b), the specific name is a noun in apposition and correctly spelled as "*arbuscula*," not "*arbusculum*."

Eudendrium arbuscula, a relatively shallow water species, has been reported several times from the west coast of Sweden (see Checklist), from Denmark (Kramp 1935b; Schuchert 2008b), and from the Oslofjord, Norway (Christiansen 1972).

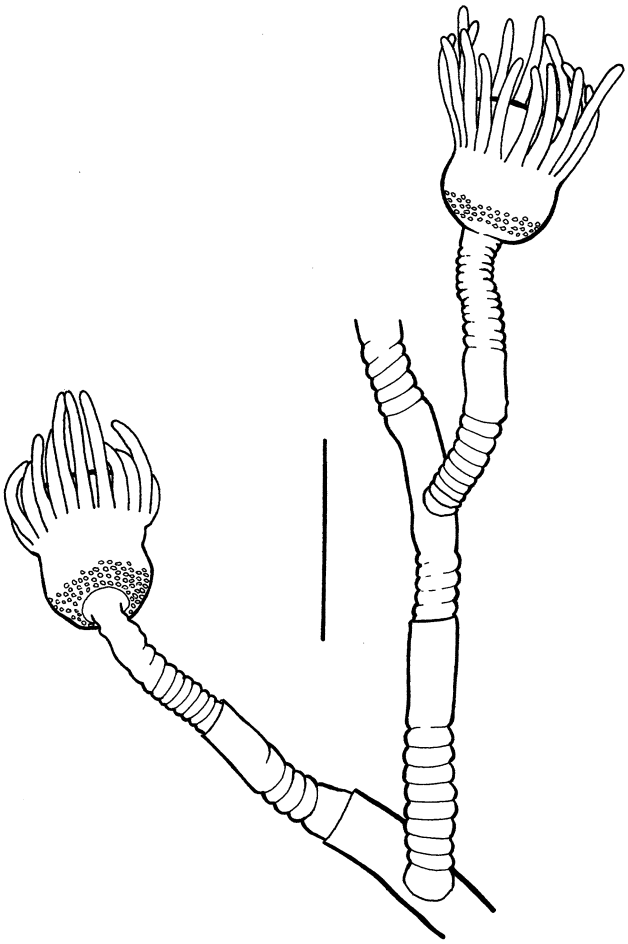

FIGURE 3. *Eudendrium arbuscula*: part of colony with hydrocaulus and two hydranths, ROMIZ B3880. Scale equals 0.5 mm.

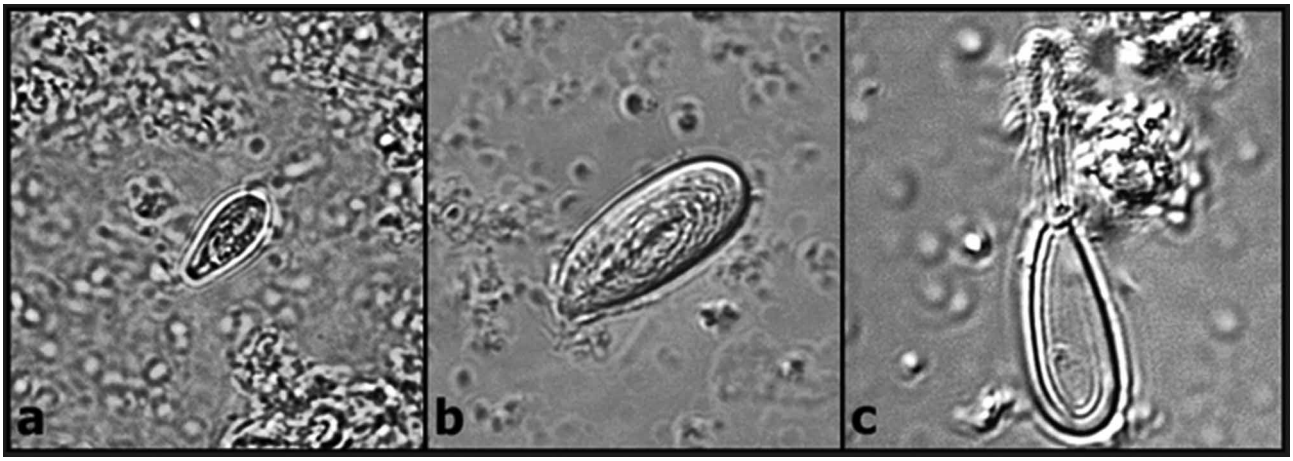

FIGURE 4. *Eudendrium arbuscula*, nematocysts, ROMIZ B3880: a, small microbasic eurytele; b, large microbasic eurytele (undischarged); c, large microbasic eurytele (discharged).

Reported distribution. West coast of Sweden.—Bohuslän (Marques *et al*. 2000) to Malösund (Jäderholm 1909, as *E. wrighti*).

Elsewhere.—North Atlantic: Norway to Brittany (Schuchert 2008b); northern Canada (Calder 1972).

Family Cordylophoridae von Lendenfeld, 1885

***Cordylophora caspia* (Pallas, 1771)**
Fig. 5

Tubularia caspia Pallas, 1771: 479.
?*Cordylophora caspia*.—Jägerskiöld, 1971: 61.

Type locality. Caspian Sea (Pallas 1771: 479).

Museum material. Krokstrand, 59°00'49"N, 11°27'30"E, 1 m, 08.ix.2010, collected manually, on submerged wood, one colony, 1.2 cm high, with two hydranths, without gonophores, coll. Dennis P. Gordon, ROMIZ B3904.

Remarks. *Cordylophora caspia* (Pallas, 1771) is one of the few species of hydroids that thrives in the upper reaches and headwaters of estuaries, and it also extends into fresh waters. It was found during this study in a brackish water environment at Krokstrand, in a fjord NE of Strömstad. The only previous record of this brackish and fresh-water species from western Sweden is that by Jägerskiöld (1971: 61) from a station in the middle Kattegat. Although the identification was made by a reliable hydrozoan specialist (P.L. Kramp), the report needs verification given the salinity at the area (19.79 ‰ surface; 34.05 ‰ bottom). Although infrequent in western Sweden, *C. caspia* is widespread in the Baltic Sea (e.g. Lindstrom 1856a: 72, as *C. lacustris*; Stechow 1927: 305, as *C. lacustris*; Broch 1928: 48, 55; Thiel 1970: 479; Schönborn *et al.* 1992: 215). It has also been reported from several brackish water areas in Denmark (Kramp 1935b). Species of *Cordylophora* von Lendenfeld, 1885 are familiar as invasives, and crypsis is also well-known to exist in the genus. Recent accounts of this species include those of Schuchert (2004), Folino-Rorem *et al*. (2009), and Calder (2010).

Reported distribution. West coast of Sweden.—Middle Kattegat (?) (Jägerskiöld 1971).

Elsewhere.—Worldwide (Schuchert 2004; Calder 2010).

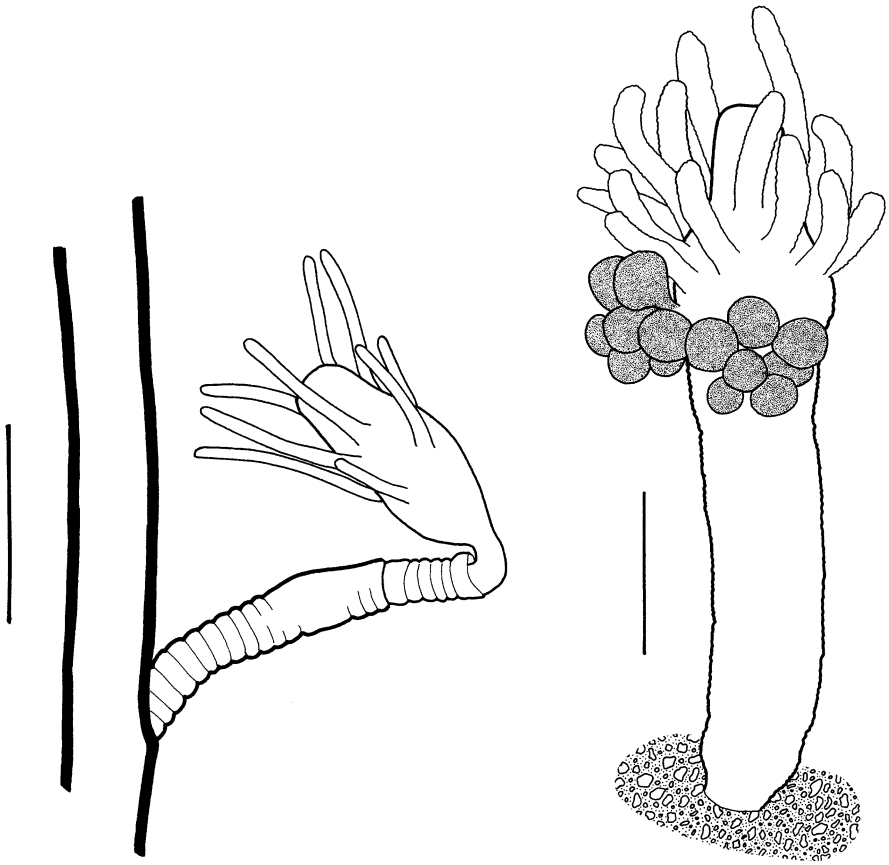

FIGURE 5. *Cordylophora caspia*: part of colony with hydrocaulus and hydranth, ROMIZ B3904. Scale equals 0.5 mm.
FIGURE 6. *Clava multicornis*: hydranth with gonophores, ROMIZ B3892. Scale equals 0.5 mm.

Family Hydractiniidae L. Agassiz, 1862

***Clava multicornis* (Forsskål, 1775)**
Fig. 6

Hydra multicornis Forsskål, 1775: 131.
Clava sqvamata.—Segerstedt, 1889: 6 [incorrect subsequent spelling].
Clava squamata.—Segerstedt, 1889: 23.—Lönnberg, 1898: 51.—Jäderholm, 1909: 44, pl. 1, figs. 11, 12.—Gislén, 1930: 320.—Kramp, 1935b: 65.—Jägerskiöld, 1971: 61.
Clava glomerata Lönnberg, 1899a: 45, unnumbered fig.; 1899b: 17.

Type locality. " In freto Öresund…" (Forsskål 1775: 131).

Museum material. Tjärnö, floating dock at Sven Lovén Centre for Marine Sciences, 58°52'33.68"N, 11°08'43.65"E, <1 m, 07.ix.2010, collected manually, on floating *Ascophyllum nodosum*, one colony, with gonophores, ROMIZ B3892.—Saltö naturreservat, outer ledge, 58°52'40"N, 11°06'53"E, <1 m, 11.ix.2010, collected manually, on attached *Ascophyllum nodosum*, one colony, with gonophores, ROMIZ B3926.

Remarks. Colonies of *Clava multicornis* (Forsskål, 1775) were promptly found in the study area on fucoid algae at and just below the surface of the water. The species is also known to occur intertidally, avoiding desiccation by clumping into a jelly-like mass (Edwards & Harvey 1975). When present on fucoids, colonies are often found in axils of its algal substrate, and abundances are reportedly greater in wave-sheltered than in wave-exposed areas (Rossi *et al*. 2000). The biology of this shallow-water hydroid has recently been reviewed by Schuchert (2008a). Earlier, Edwards & Harvey (1975) presented evidence from laboratory and field experiments that a diffuse colony form sometimes identified as *Clava squamata* (Müller, 1776) is conspecific. So too are *C. leptostyla* L. Agassiz, 1862 from the western North Atlantic and *C. glomerata* Lönnberg, 1899 from the Swedish west coast (Edwards & Harvey 1975). Other synonyms are listed in Schuchert (2008a).

Clava multicornis is well-known in southwestern Scandinavia (Jäderholm 1909; Kramp 1935b), although its occurrence in the Oslofjord has been found to vary considerably from year to year (Christiansen 1972). Colonies become dormant in the region during winter, but new hydranths are regenerated from stolons in spring (Kramp 1935b).

Reported distribution. West coast of Sweden.—Bohuslän to Öresund (Jäderholm 1909: 44, as *C. squamata*).

Elsewhere.—Boreal waters of the North Atlantic: from the Barents and White seas to Portugal in Europe (Naumov 1960; Schuchert 2008a), and from southern Labrador to Long Island, New York, in North America (Fraser 1944, as *Clava leptostyla*).

***Hydractinia echinata* (Fleming, 1828)**
Fig. 7

Alcyonium echinatum Fleming, 1828: 517.
Hydractinia echinata.—Segerstedt, 1889: 7, 23.—Lönnberg, 1898: 51; 1903: 60.—Jäderholm, 1909: 48, pl. 2, figs. 6–9.—Kramp, 1935b: 74.—Rees & Rowe, 1969: 8.—Jägerskiöld, 1971: 62.
not *Hydractinia echinata*.—Lovén, 1858: 305, pl. 4, figs. 1–15 [= *Podocoryna carnea* M. Sars, 1846].

Type locality. British Isles, but without specific location data (Fleming 1828: 517–518).

Museum material. Kosterhavet, 58°53.030'N, 11°05.567'E, 100–140 m, 10.ix.2010, biological dredge, R/V *Nereus*, one colony, on gastropod shell occupied by pagurid crab, with gonophores and spiral zooids, ROMIZ B3920.

Remarks. A well-known species in northwestern Europe, *Hydractinia echinata* (Fleming, 1828) is common on gastropod shells inhabited by pagurid crabs. A recent review of the species is given by Schuchert (2008a).

Hydractinia echinata is widespread and abundant in southwestern Scandinavia (Kramp 1935b; Jägerskiöld 1971; Christiansen 1972).

Reported distribution. West coast of Sweden.—From the Svinesund at the Norway border (Jägerskiöld 1971) to the Öresund (Lönnberg 1898).

Elsewhere.—Mistakenly recorded over a wide geographic area, including the Mediterranean Sea and eastern North America. Its primary distribution appears to be in shallow boreal waters of northwest Europe (Schuchert 2008a).

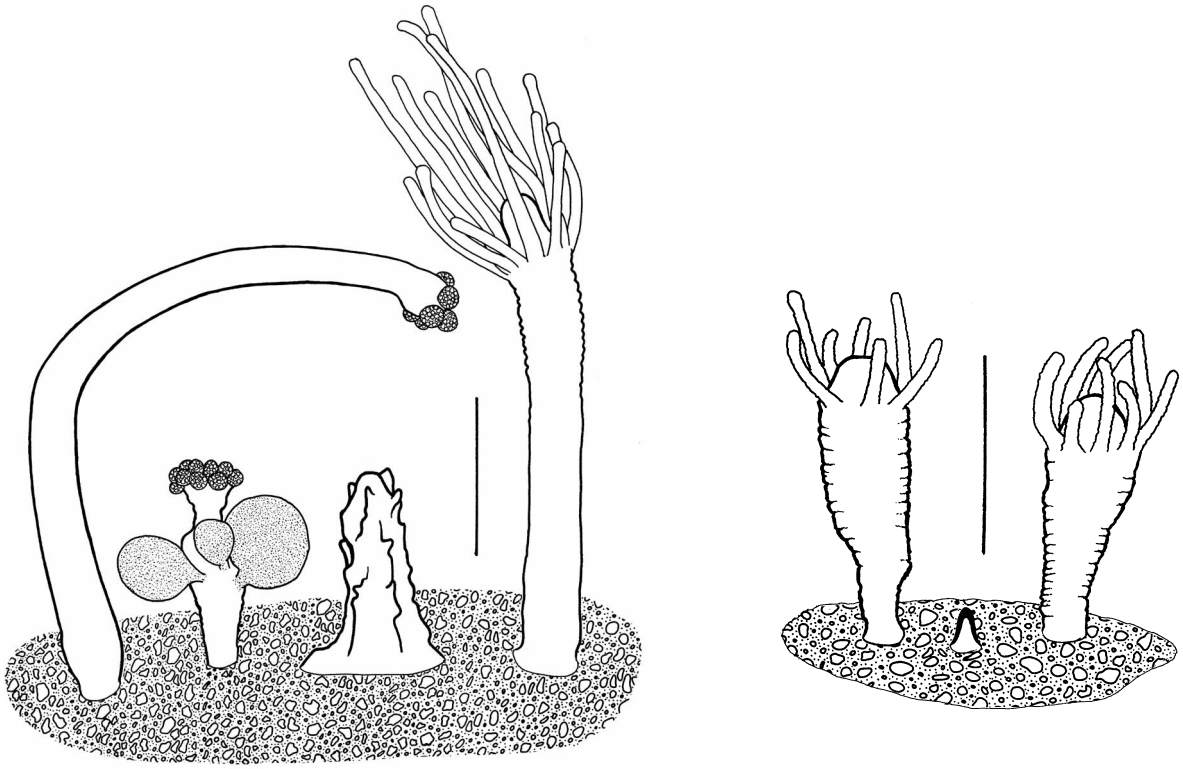

FIGURE 7. *Hydractinia echinata*: part of colony with spiral zooid, gonozooid, spine, and gastrozooid (left to right), ROMIZ B3920. Scale equals 0.5 mm.

FIGURE 8. *Podocoryna carnea*: part of colony with two small gastrozooids and a spine, ROMIZ B3935. Scale equals 0.5 mm.

***Podocoryna carnea* M. Sars, 1846**

Fig. 8

Podocoryna carnea M. Sars, 1846: 4, pl. 1, figs. 7–18 [not pl. 2, figs. 5–11 = *Podocoryna sarsii* Steenstrup, in Lütken, 1850].
Hydractinia echinata.—Lovén, 1858: 305, pl. 4, figs. 1–15 [not *Hydractinia echinata* (Fleming, 1828)].
Podocoryne carnea.—Segerstedt, 1889: 6, 23.—Lönnberg, 1898: 51; 1899b: 17.—Jäderholm, 1909: 50, pl. 3, figs.1–3.—Rees & Rowe, 1969: 8 [incorrect subsequent spelling of *Podocoryna* M. Sars, 1846].
Podocoryne inermis.—Lönnberg, 1903: 60 [incorrect subsequent spelling of *Podocoryna* M. Sars, 1846].
Hydractinia carnea.—Jägerskiöld, 1971: 62.

Type locality. Norway: Floröe and Manger (M. Sars 1846: 4).

Museum material. Tjärnö tidal flat, 58°52’26”N, 11°08’46”E, <1 m, 09.ix.2010, collected manually, one small colony, on shell of prosobranch gastropod, without gonophores, coll. John Taylor and Emily Glover, ROMIZ B3935.

Remarks. The biology and distribution of *Podocoryna carnea* M. Sars, 1846 have been reviewed by Edwards (1972) and Schuchert (2008a). Reports of this species outside northwestern Europe are now considered erroneous.

Classification of Hydractiniidae at the generic level remains unsettled. For reasons given elsewhere (Calder 2010), *Podocoryna* M. Sars, 1846, sometimes included in the synonymy of *Hydractinia* Van Beneden, 1844a, is recognized here as a distinct genus pending further study.

The hydroid *Podocoryna carnea* is common in waters of Denmark (Kramp 1935b, as *Hydractinia carnea*), the west coast of Sweden (Jägerskiöld 1971: 62, as *H. carnea*), and the Oslofjord, Norway (Christiansen 1972). Colonies become dormant or largely dormant in the region during winter (Kramp 1935b; Christiansen 1972).

Reported distribution. West coast of Sweden.—From Koster area (Jägerskiöld 1971) to the Öresund (Lönnberg 1898).

Elsewhere.—Northern Europe, from Norway to the British Isles (Schuchert 2008a).

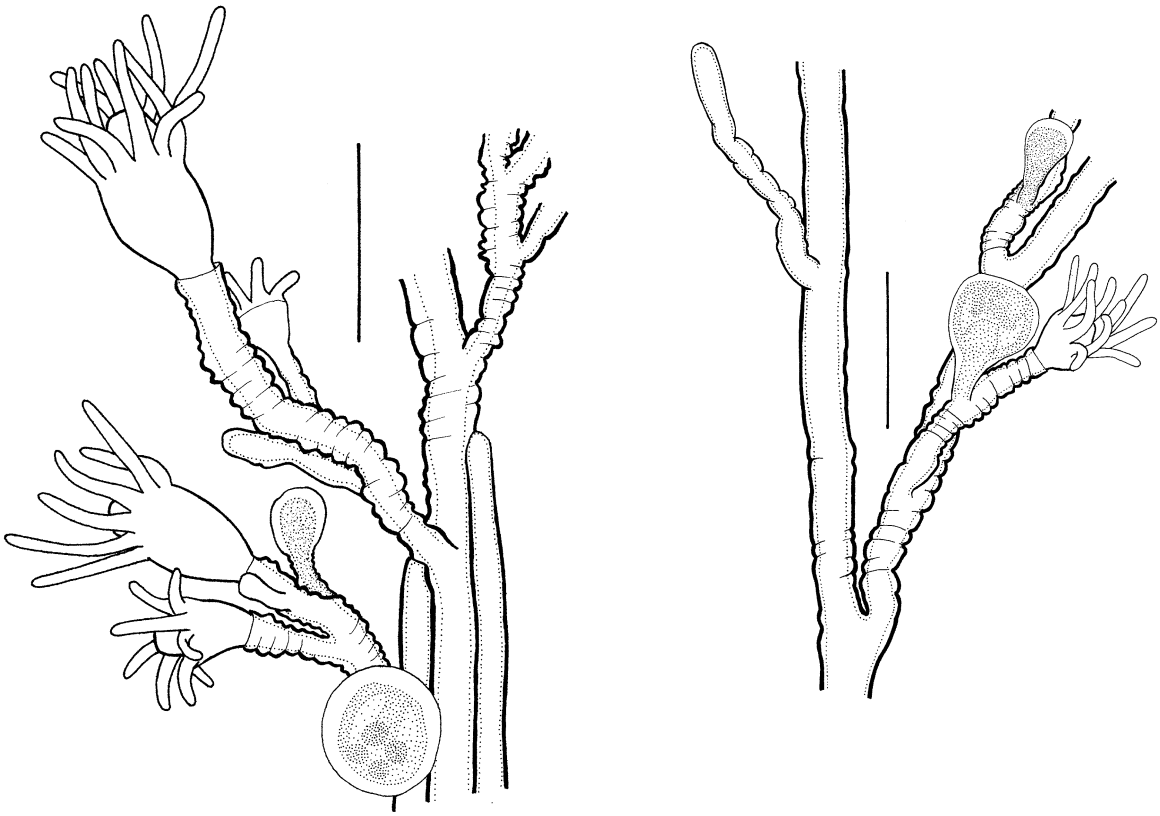

FIGURE 9. *Bougainvillia muscus*: part of colony with polysiphonic hydrocaulus, four hydranths, and two medusa buds, ROMIZ B3925. Scale equals 0.5 mm.

FIGURE 10. *Bougainvillia muscus*: part of colony with monosiphonic hydrocaulus, one hydranth and two medusa buds, ROMIZ B3893. Scale equals 0.5 mm.

Family Bougainvilliidae Lütken, 1850

Bougainvillia muscus (Allman, 1863)

Figs. 9, 10

Eudendrium ramosum.—Van Beneden, 1844b: 56, pl. 4, figs. 1–13 [not *Eudendrium ramosum* (Linnaeus, 1758)].
Perigonymus muscus Allman, 1863: 12 [incorrect subsequent spelling of *Perigonimus* M. Sars, 1846].
Bougainvillia muscus.—Segerstedt, 1889: 10, 24.
Bougainvillia ramosa.—Segerstedt, 1889: 10, 24.—Jäderholm, 1909: 47, pl. 3, fig. 4.—Rees & Rowe, 1969: 9.—Jägerskiöld, 1971: 61.
Bougainvillea ramosa.—Gislén, 1930: 315 [incorrect subsequent spelling of *Bougainvillia* Lesson, 1830].
Bougainvillia van benedeni.—Jäderholm, 1909: 46, pl. 3, fig. 5 [incorrect subsequent spelling of *B. benedenii* Bonnevie, 1898].

Type locality. UK: England, Devon, Torquay (Torbay) (Allman 1863: 12).

Museum material. Tjärnö, floating dock at Sven Lovén Centre for Marine Sciences, 58°52’33.68”N, 11°08’43.65”E, <1 m, 07.ix.2010, collected manually, along edge of dock near surface, two colonies, up to 5.3 cm high, with medusa buds, ROMIZ B3893.—Saltö naturreservat, outer ledge, 58°52’40”N, 11°06’53”E, <1 m, 11.ix.2010, collected manually, on attached red algae, one colony, up to 2 cm high, with numerous gonophores, ROMIZ B3925.

Remarks. Colonies of *Bougainvillia muscus* (Allman, 1863) in collections from the two sites above were distinctly different in the form of their trophosomes. Those from Saltö naturreservat, an exposed location with distinct water movement, were short, compact, and polysiphonic (Fig. 9). Such colonies resembled Jäderholm’s (1909) description of *B. van benedeni* (= *B. benedenii* Bonnevie, 1898). Those from sheltered, quiet waters on the floating

dock at Tjärnö were tall, slender, and monosiphonic or mostly so (Fig. 10). They resembled Jäderholm's (1909) account of *B. ramosa* (Van Beneden, 1844b). Nevertheless, hydroids from both locations fall within the limits of *B. muscus* as defined in a detailed recent account of the species by Schuchert (2007).

Illustrations of specimens from Bohuslän were provided by Jäderholm (1909, as both *B. ramosa* and *B. vanbenedeni*). The species has also been reported, as *B. ramosa*, from Denmark (Kramp 1935b) and the Oslofjord, Norway (Christiansen 1972).

Reported distribution. West coast of Sweden.—Säcken area (Jägerskiöld 1971) to southern Kattegat (Segerstedt 1889).

Elsewhere.—Thought to be essentially circumglobal (Calder 2010); in the North Atlantic from Norway to the Cape Verde Islands in the east, and from southern New England and Bermuda in the west (Mayer 1910, as *Bougainvillia autumnalis* Hartlaub, 1897; Calder 1988; Schuchert 2007).

Pachycordyle michaeli (Berrill, 1948)

Fig. 11

Aselomaris michaeli Berrill, 1948: 289, figs. 1–4.

Type locality. USA: Maine, Boothbay Harbor (Berrill 1948: 289).

Museum material. Tjärnö, floating dock at Sven Lovén Centre for Marine Sciences, 58°52'33.68"N, 11°08'43.65"E, <1 m, 07.ix.2010, collected manually, along edge of dock just below surface of water, two colonies, up to 0.5 cm high, with gonophores, ROMIZ B3891.

Remarks. Schuchert (2007) suspected that *Pachycordyle navis* (Millard, 1959), originally described from South Africa and subsequently discovered in northern Europe, was conspecific with *P. michaeli* (Berrill, 1948) from boreal waters along the east coast of the United States. There appear to be no noteworthy morphological differences between the two, and they are united here under the senior synonym. *Clavopsella quadranularia* Thiel, 1962 from the Kiel Canal in the Baltic Sea had earlier been included as a synonym of of *P. navis* by Millard (1975). *Cordylophora inkermanica* Marfenin, 1983 from the Black Sea was added to the the synonymy of *P. navis* by Schuchert (2004). Overviews of the taxonomy of this shallow-water species have been given by Schuchert (2004, 2007).

Berrill (1948) described *Aselomaris michaeli* from material found throughout the Boothbay Harbor region, Maine, USA. Spawning in the species appeared to be induced by light. Planulae were planktonic for about one day before settling to the bottom. By one day after settling, each planula metamorphosed into a hydranth with tentacles and with a bipolar stolon. Additional details of growth and form in this hydroid were described in a subsequent paper (Berrill 1949).

Pachycordyle michaeli is known from brackish water environments in Europe, tolerating salinities down to about 8 ‰ (Schuchert 2004). Likewise, the species was observed in brackish waters (c. 17–24 ‰) of the York River estuary, Virginia, on the east coast of North America (Calder 1971). Dense colonies were found there just beneath the surface of the water on floating objects. Hydroids were active from mid-October through early June at water temperatures ranging from 3.5° C to 20° C, and gonophores were observed from mid-November through early June. The species remained dormant during summer and early autumn. In the Baltic Sea, fertile colonies were observed by Thiel (1962) in spring, and again from late summer to autumn. Gonophores were present on colonies at Tjärnö during early September 2010, at water temperatures of about 17–18° C.

In addition to its occurrence in western Sweden, *P. michaeli* is known from the Isefjord, Denmark (Schuchert 2004, as *P. navis*).

Reported distribution. West coast of Sweden.—New record.

Elsewhere.—North Atlantic from Denmark and the Baltic Sea to southern England in Europe, and from Maine to Virginia in North America (Berrill 1948, as *Aselomaris michaeli*; Calder 1971, as *A. michaeli*; Schuchert 2004, as *Pachycordyle navis*); South Africa (Millard 1959, *as Rhizorhagium navis*); Black Sea (Marfenin 1983, as *Cordylophora inkermanica*).

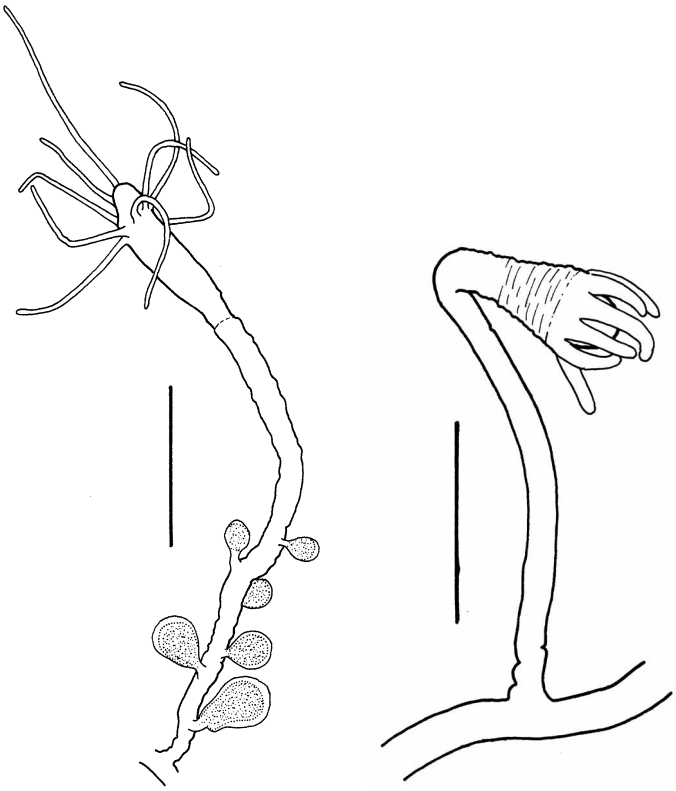

FIGURE 11. *Pachycordyle michaeli*: part of colony with hydrocaulus, hydranth, and gonophores, ROMIZ B3891. Scale equals 1.0 mm.
FIGURE 12. *Rhizorhagium roseum*: part of colony with stolon, hydrocaulus, and hydranth, ROMIZ B3909. Scale equals 0.5 mm.

Rhizorhagium roseum M. Sars, in G.O. Sars, 1874
Fig. 12

Rhizorhagium roseum M. Sars, in G.O. Sars, 1874: 129.—Rees & Rowe, 1969: 10.
Perigonimus roseus.—Lönnberg, 1902: 173.—Jäderholm, 1909: 46, pl. 3, fig. 7.—Jägerskiöld, 1971: 64.

Type locality. Norway: Mangerfjord, Bognestrømmen, 20 fm (37 m) (Rees 1956b: 114).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, two colonies, up to 5 mm high, on stems of *Tubularia indivisa* and *Lafoea gracillima*, without gonophores, ROMIZ B3909.

Remarks. Gonophores were lacking in studied material, but the trophosome of *Rhizorhagium roseum* M. Sars, in G.O. Sars, 1874, with its stolonal habit, long hydrocaulus, thin pseudohydrotheca, single tentacular whorl, and nipple-shaped hypostome, as well as its reddish to pinkish hydranths that bend over when disturbed, is distinctive among hydroids in the biogeographic region. A detailed account of this small species, from boreal and subarctic waters on both sides of the Atlantic Ocean, has recently been given by Schuchert (2007).

Rees (1956b) examined type material of *Rhizorhagium roseum* and concluded from the original label that it was from "Bongnestrømmen" (Bognestrømmen) in the Mangerfjord, Norway. In addition to its occurrence on the west coast of Sweden (e.g., Jäderholm 1909, as *Perigonimus roseus*), *R. roseum* has been reported from the Oslofjord, Norway (Christiansen 1972).

Reported distribution. West coast of Sweden.—Kosterfjord to Gullmarfjord (Rees & Rowe 1969).

Elsewhere.—North Atlantic from the Barents and White seas to western Scotland in Europe (Schuchert 2007), and from northern Foxe Basin in the Canadian Arctic to Buzzard's Bay, Massachusetts, in eastern North America (Calder 2004); eastern North Pacific from Alaska to southern Vancouver Island (Fraser 1944, as *Garveia groenlandica*; Brinckmann-Voss 1996).

Family Pandeidae Haeckel, 1879

***Halitholus cirratus* Hartlaub, 1913**
Fig. 13

Halitholus cirratus Hartlaub, 1913: 274, figs. 225–233 (medusa), 234 (hydroid).

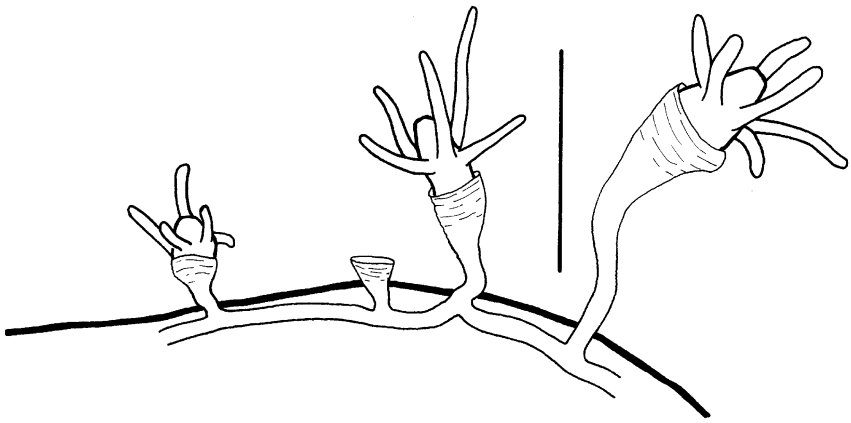

FIGURE 13. *Halitholus cirratus*: part of colony with three hydranths, ROMIZ B3918. Scale equals 0.5 mm.

Type locality. Northeast Atlantic; type material from several locations (Svalbard, Barents Sea, Baltic Sea, North Sea) (Schuchert 2007: 342).

Museum material. Kosterhavet, 58°52.424'N, 11°06.178'E, 160–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, three colonies, on *Yoldiella philippiana*, up to 0.5 mm high, without gonophores, ROMIZ B3918.

Remarks. These specimens corresponded with descriptions of *Halitholus cirratus* Hartlaub, 1913 by Hartlaub (1913), Kramp (1935b), and Schuchert (2007) in their tiny size, distinctly tapering pedicels, opaque and grit-covered perisarc, limited numbers of tentacles (usually about six), and substrate (a species growing on shells of the bivalve genus *Yoldiella*). Kramp (1935b) also noted that medusae of the species are exceedingly common in the Baltic and Belt seas and the Kattegat, suggesting that hydroids must also be common in these waters. The identification is nevertheless considered provisional because of insufficient knowledge of its medusa stage.

Perigonimus yoldiaearcticae Birula, 1897 is similar and sometimes considered conspecific with *H. cirratus* (e.g. Naumov 1960; Schönborn *et al*. 1993). Schuchert (2001a) provisionally assigned that species to the genus *Halitholus* Hartlaub, 1913, but kept *H. yoldiaearcticae* as distinct because of a lack of information about its life cycle. More recently, Schuchert (2007, 2011) has continued to question whether the two are conspecific. If they prove identical, the name *H. yoldiaearcticae* has priority. Birula (1897) established the specific name as *yoldiaearcticae*, now corrected under the code (Art. 32.5.2.3) to *yoldiaearcticae*. In terms of distribution, both *H. cirratus* and *H. yoldiaearcticae* are generally reported from high latitudes, including northern seas of the Russian Federation, Spitzbergen, and Greenland (Schuchert 2001a, 2007; Voronkov *et al*. 2010). Medusae of *Halitholus cirratus* extend southwards to the North and Baltic seas (Schuchert 2007) as well as the Kattegat (Kramp 1935b).

Hydroids identified as *Halitholus cirratus* have been reported from the Baltic Sea (Kramp 1935b) but not from western Sweden or the Oslofjord (Rees & Rowe 1969; Jägerskiöld 1971; Christiansen 1972).

Reported distribution. West coast of Sweden.—Hydroid not previously recorded.

Elsewhere.—In the North Atlantic, the medusa stage has been reported from northern seas of the Russian Federation to the Baltic and North seas in the east, and from western Greenland and the Canadian Arctic to Newfoundland (Kramp 1961; Shih *et al*. 1971) in the west.

Leuckartiara octona (Fleming, 1823)

Fig. 14

Geryonia octona Fleming, 1823: 298 [medusa stage].
Perigonimus repens.—Segerstedt, 1889: 9, 24.—Lönnberg, 1903: 60.—Jäderholm, 1909: 45, pl. 1, figs. 15, 16.—Jägerskiöld, 1971: 64.
Leuckartiara octona.—Rees & Rowe, 1969: 10.

Type locality. UK: Scotland, Aberdeen Bay (Fleming 1823: 298).

Museum material. Väderöarna, 58°34.931'N, 11°04.931'E, 121–50 m, 13.ix.2010, biological dredge, R/V *Nereus*, on rugose squat lobster (*Munida rugosa*), six branched colony fragments, up to 6 mm high, with gonophores, ROMIZ B3931.

Remarks. An historical account and detailed description of the hydroid of *Leuckartiara octona* (Fleming, 1823), long known in part as *Perigonimus repens* (Wright, 1858), was given by Rees (1938). In a revision of the genus *Perigonimus* M. Sars, 1846, Rees (1956a) included eight nominal species, and provisionally a ninth (*Perigonimus abyssi* G.O. Sars, 1874), in the synonymy of *L. octona*. The identity and lengthy synonymy of the medusa stage of *L. octona* had been clarified earlier by Hartlaub (1913). Current knowledge on taxonomy, nomenclature, life cycle, and seasonality of this species has been summarized by Schuchert (2007). He followed Edwards (1965) in recognizing *L. abyssi*, similar to *L. octona* but even more like *Neoturris pileata* (Forsskål, 1775), as valid pending more information on its life cycle. The three, with similar hydroids, are sympatric in southwestern Scandinavia.

The hydroid of *L. octona* is epizoic on a variety of substrates, including crustaceans, molluscs (bivalves, gastropods, scaphopods, chitons), ascidians, other hydroids, the polychaete *Aphrodite*, and even a species of fish (*Agonus cataphractus*), as well as stones (Stechow 1929; Leloup 1934; Kramp 1935b; Rees 1938; Russell 1953; Latham 1963; Rees & Rowe 1969; Christiansen 1972; Schuchert 2007). Colonies vary in morphology and size, and in occurrence of gonophores, depending upon factors including food, substrate, and even location on a given substrate such as upper and lower surfaces of gastropod shells (Rees 1938; Millard 1975). Hydroids examined here, growing on the exoskeleton of *Munida rugosa*, were mostly erect and branched, with medusa buds arising from stems and pedicels.

Jägerskiöld (1971) reported hydroids of this boreal species at 95 stations along the west coast of Sweden, and it was also frequent in samples from the Oslofjord (Christiansen 1972). In Denmark it is common off the west coast of Jutland, in the Skagerrak, and in the northeastern Kattegat, but rare in the southern Kattegat (Kramp 1935b). Colonies with gonophores were observed from May to October in the Oslofjord (Christiansen 1972). Young medusae appear during May or June in Danish waters, and the species is abundant there in autumn (Kramp 1926). Medusae of *L. octona* are quite long-lived and can be carried considerable distances offshore (Kramp 1926; Russell 1953).

Citations of Fleming's (1823) original account of this species are often given in error, even in a number of major monographic works (e.g., Russell 1953; Kramp 1961). His paper was published in the *Edinburgh Philosophical Journal* (not the *Edinburgh New Philosophical Journal*), and the brief description appears on page 298, not 299.

Reported distribution. West coast of Sweden.—From near the border with Norway (Jägerskiöld 1971) to the Öresund (Segerstedt 1889).

Elsewhere.—North Atlantic from northern Norway to the Mediterranean Sea in the east, and from Labrador to Rhode Island in the west (Schuchert 2007). It is generally thought to be circumglobal in temperate and tropical neritic waters.

Neoturris pileata (Forsskål, 1775)

Figs. 15, 16

Medusa pileata Forsskål, 1775: 110 [medusa stage].
Neoturris pileata.—Edwards, 1965: 461.—Rees & Rowe, 1969: 10.—Schuchert, 2007: 336.

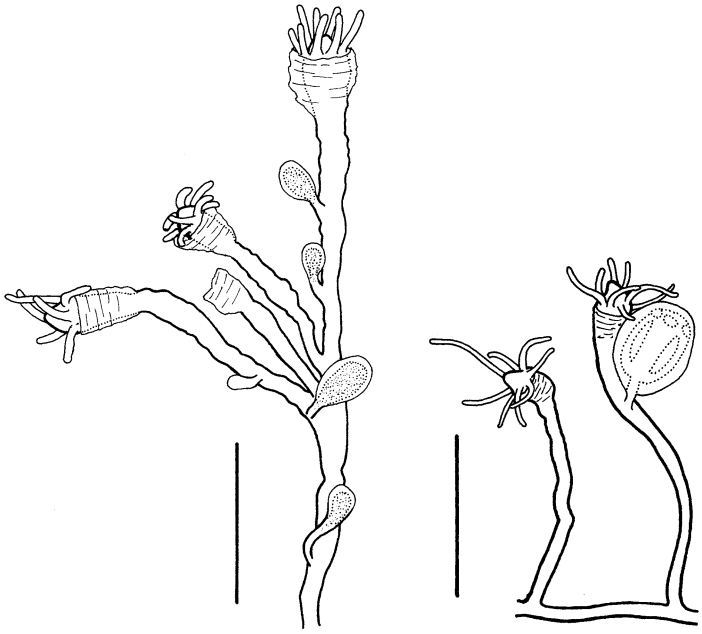

FIGURE 14. *Leuckartiara octona*: part of colony with hydrocaulus, hydranths, and gonophores, ROMIZ B3931. Scale equals 1.0 mm.
FIGURE 15. *Neoturris pileata*: part of colony with two hydranths and a medusa bud, ROMIZ B3932. Scale equals 1.0 mm.

Type locality. Mediterranean Sea (Forsskål 1775: 110).

Museum material. Kosterhavet, 58°49.446'N, 10°57.718'E, 45–48 m, 07.ix.2010, biological dredge, R/V *Nereus*, two colonies, on two specimens of *Nucula sulcata*, up to 1.5 mm high, without gonophores, ROMIZ B3895.–Kosterhavet, 58°56.608'N, 11°05.314'E, 70 m, 15.ix.2010, biological dredge, R/V *Nereus*, one colony, up to 2 mm high, on *Nucula sulcata*, with medusa buds, ROMIZ B3932.

Remarks. Edwards (1965) linked a hydroid found on bivalves of the genus *Nucula* in the Clyde Sea Area, Scotland, to the medusa *Neoturris pileata* (Forsskål, 1775). Descriptions and illustrations were given of this hydroid, and of various stages in the development of its medusa. Hydroids examined here corresponded with his account of *N. pileata*. Rees & Rowe (1969) also reported hydroids of *N. pileata* on *Nucula sulcata* off the Swedish west coast, and obtained young medusae from material collected at Väderöarna. The same specimens, collected late September and early October 1964, were examined and briefly discussed by Edwards (1965: 461). Medusae appear during winter and last until late summer in the North Sea, but may be found in the Skagerrak and Kattegat until October (Edwards 1965).

The hydroid of *N. pileata* closely resembles that of *Perigonimus abyssi* G.O. Sars, 1874 (=*Leuckartiara abyssi*) from western Norway, but Edwards (1965) maintained both as valid because of a lack of knowledge about the adult medusa of the latter. Schuchert (2007) kept them distinct for the same reason. Moreover, Schuchert showed that *N. pileata* has been found only on shells of the bivalve *Nucula*, and especially on *N. sulcata*, while *L. abyssi* has been found on the scaphopod *Dentalium dentale* as well as the bivalves *Nucula* and *Nuculana*. It had earlier been speculated that *P. abyssi* might be the hydroid stage of *N. pileata* or a species *of Leuckartiara* Hartlaub, 1913 (Rees 1938: 22; Russell 1953: 188). While similar to *Leuckartiara octona* (Fleming, 1823), hydroids of *N. pileata* tend to be shorter and less branched, and their newly-liberated medusae have four unequally developed perradial tentacles instead of just two (Edwards 1965; Schuchert 2007).

In contrast to the hydroid of *L. octona*, which occurs on a variety of substrates, *N. pileata* appears to be substrate-specific on species of *Nucula*, small bivalves inhabiting bottoms of fine mud. Colonies, adapted to life buried in mud, occur mainly on anterior and ventral surfaces of the shells (Edwards 1965; Schuchert 2007).

The cnidome of *Neoturris pileata* includes desmonemes and heterotrichous microbasic euryteles (Fig. 16).

Reported distribution. West coast of Sweden.—Kosterfjord (Rees & Rowe 1969) to Gullmarfjord (Schuchert 2007).

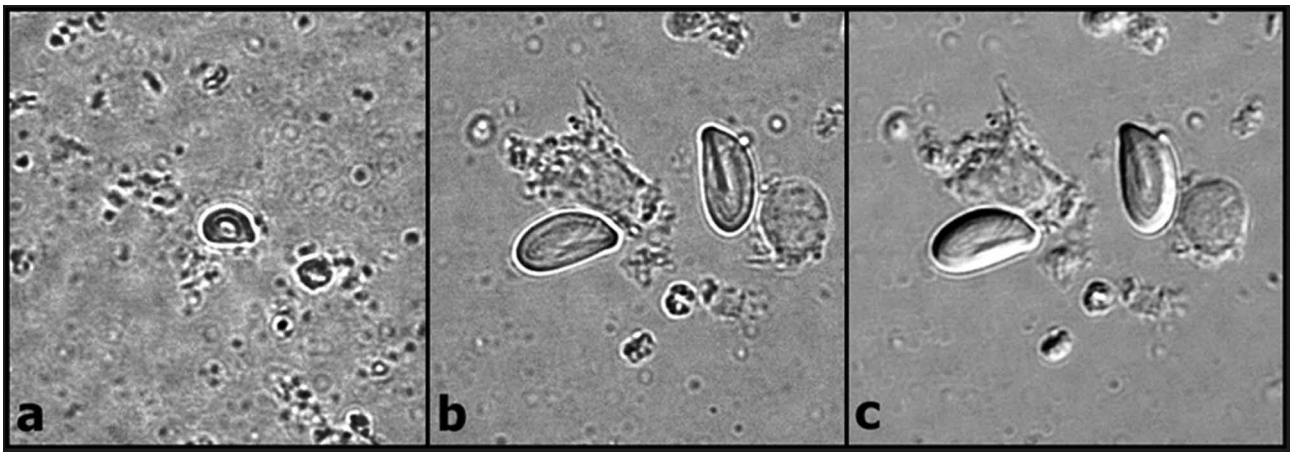

FIGURE 16. *Neoturris pileata*, nematocysts, ROMIZ B3932: a, desmoneme; b, two heterotrichous microbasic euryteles; c, two heterotrichous microbasic euryteles.

Elsewhere.—North Atlantic from Norway to western Sweden and Scotland (Schuchert 2007). The medusa stage is known from Norway (to 64°N) and Iceland southwards to north Africa, including the Mediterranean Sea (Edwards 1965), but not from North America (Cairns *et al*. 2002). The westernmost report of the medusa is from the central North Atlantic (49°49'N, 30°22'W) over the Mid-Atlantic Ridge (Kramp 1947: 62).

SUBORDER CAPITATA Kühn, 1913

Family Tubulariidae Fleming, 1828

Ectopleura larynx (Ellis & Solander, 1786)

Fig. 17

Tubularia larynx Ellis & Solander, 1786: 31.—Segerstedt, 1889: 11, 24.—Lönnberg, 1903: 60.—Fenchel, 1905: 552.—Jäderholm, 1909: 43, pl. 2, figs. 1–3.—Gislén, 1930: 350.—Rees & Rowe, 1969: 7.—Jägerskiöld, 1971: 64.—Östman *et al*., 1995: 166, figs. 2–6, 8.—Jonsson *et al*., 2004: 166.
Tubularia coronata.—Lönnberg, 1898: 51.

Type locality. British Isles (Schuchert 2010: 356, after Ellis 1755).

Museum material. Kosterhavet, 58°52.536'N, 11°06.229'E, 6–30 m, 07.ix.2010, SCUBA, four hydrocauli, two with hydranths, up to 2.5 cm high, with gonophores, coll. B.E. Picton, ROMIZ B3901.

Remarks. A thorough taxonomic review of *Ectopleura larynx* (Ellis & Solander, 1786) was recently undertaken by Schuchert (2010), and little need be added here to his detailed account. The widely used and familiar generic name *Ectopleura* L. Agassiz, 1862, to which the species is assigned, is threatened by at least three senior synonyms (Calder 2010). Current usage is maintained here.

Ectopleura larynx, typically a shallow-water species, is common in southwestern Scandinavia (Kramp 1935b; Rees & Rowe 1969; Christiansen 1972). Kramp noted that splendid colonies inhabit the northern end of the Lillebælt, an area having strong water currents. In the Oslofjord Christiansen found *E. larynx* throughout the year, although colonies died back in December and January. Hydroids with gonophores were present there from June to October. This species is a dominant fouling organism and a pest in the Norwegian salmon aquaculture industry (Guenther *et al*. 2009, 2010).

Reported distribution. West coast of Sweden.—Koster area (Jägerskiöld 1971, as *Tubularia larynx*) to Öresund (Lönnberg 1898, as *T. larynx*).

Elsewhere.—North Atlantic from the northwestern seas of the Russian Federation (Schuchert 2001a) to the Iberian Peninsula (Schuchert 2010) in the east, and from Newfoundland to Long Island Sound (Calder 1975) in the west; also reported from cool waters of the Pacific Ocean (Petersen 1990).

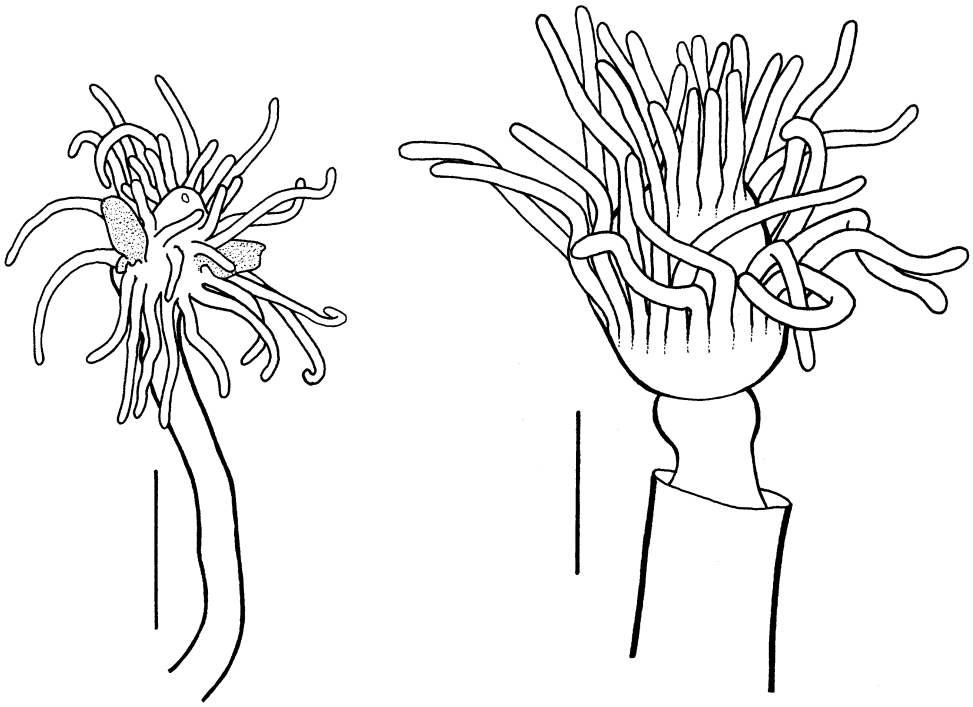

FIGURE 17. *Ectopleura larynx*: small hydranth with gonophores, ROMIZ B3901. Scale equals 1.0 mm.
FIGURE 18. *Tubularia indivisa*: small hydranth, ROMIZ B3908. Scale equals 1.0 mm.

Tubularia indivisa Linnaeus, 1758

Fig. 18

Tubularia indivisa Linnaeus, 1758: 803.—Segerstedt, 1889: 11, 24.—Lönnberg, 1902: 173; 1903: 59.—Jäderholm, 1909: 42, pl. 2, figs. 4–5.—Gislén, 1930: 350.—Rees & Rowe, 1969: 7.—Jägerskiöld, 1971: 64.—Jonsson *et al*., 2004: 166.—Schuchert, 2010: 343, fig. 2A.

Type locality. "Habitat in Oceano Europæo" (Linnaeus 1758: 803).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, two stems with hydranths, up to 9.5 cm high, one with incipient gonophores, ROMIZ B3908.

Remarks. Details on taxonomy, nomenclature, distribution, and general biology of *Tubularia indivisa* Linnaeus, 1758 are provided in a recent monograph by Schuchert (2010). He noted that the identity of *Tubularia divisa* Osburn, 1893 is unclear, but that the name is perhaps a spelling mistake. In briefly describing the species, Osburn (1893) associated it with accounts in *Seaside Studies* (E.C. Agassiz & A. Agassiz 1865) of *Tubularia couthouyi* L. Agassiz, 1862 and in *The Riverside Natural History* (Clarke 1888) of *Parypha crocea* L. Agassiz, 1862 (=*Ectopleura crocea*), together with a plate of *Tubularia indivisa*. The name is taken here to be an incorrect subsequent spelling of *T. indivisa* and, as such, not an available name (ICZN Art. 33.3). The status of *T. couthouyi* remains unresolved, with Fraser (1944) maintaining it as valid, Petersen (1990) regarding it conspecific with *T. indivisa*, and Schuchert (2010) considering it questionably so.

Tubularia indivisa is relatively common in southwestern Scandinavia, particularly at depths of about 10–100 m (Kramp 1935b; Rees & Rowe 1969; Jägerskiöld 1971; Christiansen 1972). Christiansen found fertile colonies from February to May in the Oslofjord.

Reported distribution. West coast of Sweden.—From the border with Norway (Jägerskiöld 1971) to the Öresund (Segerstedt 1889).

Elsewhere.—North Atlantic from northern seas of the Russian Federation to Ghana (Schuchert 2010) in the east, and from west Greenland (Schuchert 2001a) and the Gulf of St. Lawrence to Block Island Sound (Fraser 1944) in the west. This species has also been reported in the boreal North Pacific Ocean from the Bering Sea to northern Japan in the west, and from Alaska to Washington state in the east (Petersen 1990).

ORDER LEPTOTHECATA Cornelius, 1992a

SUBORDER CONICA Broch, 1910

Family Tiarannidae Russell, 1940

Modeeria rotunda (Quoy & Gaimard, 1827)

Fig. 19

Dianaea rotunda Quoy & Gaimard, 1827: 181, pl. 6A, figs. 1, 2 [medusa stage].
Calycella fastigiata.—Segerstedt, 1889: 14, 25.
Stegopoma fastigiatum.—Jäderholm, 1909: 78, pl. 8, fig. 1.—Rees & Rowe, 1969: 13.—Jägerskiöld, 1971: 64.
Modeeria rotunda.—Edwards, 1973a: 577, figs. 3a–c.

Type locality. Strait of Gibraltar (Quoy & Gaimard 1827: 182).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, two stolonal colonies, one on stem of *Tubularia indivisa* and another on stem of a campanulariid, without gonophores, ROMIZ B3915.

Remarks. Edwards (1973a) formally linked the hydroid of *Stegopoma fastigiatum* (Alder, 1860) and the medusa of *Modeeria rotunda* (Quoy & Gaimard, 1827), based in part on material studied by W.J. Rees from the Kosterfjord, Sweden. An extensive synonymy of the species, now widely known by the senior synonym *M. rotunda*, was included. Edwards also included observations on distribution and ecology. Additional information has been provided by Cornelius (1995a), among others, and an updated synonymy was given by Vervoort (2006).

The hydroids *Modeeria rotunda* and *Stegopoma plicatile* (M. Sars, 1863) were observed together at the same station during this study, raising the possibility that colonies thought to be the former might simply be stolonal colonies of the latter. That likelihood was ruled out because all parts of colonies of *M. rotunda* were stolonal with long pedicels, while the basal-most segments of hydrocauli of *S. plicatile*, even in early stages of development, were short and polysiphonic. Rees & Rowe (1969) also found both species at the same station (Säcken Reef) on the same day (23.ix.1964) and on the same substrate (*Tubularia indivisa* Linnaeus, 1758) in the Kosterfjord, so the two species are known to occur together. Kramp (1935b) distinguished *M. rotunda* from *S. plicatile* in being stolonal with long pedicels (at least 1/5 as long as the hydrothecae) instead of erect with short pedicels.

This species is known from the Oslofjord (Christiansen 1972) and from scattered locations along the west coast of Sweden (see Checklist), but it has yet to be reported from Denmark (Kramp 1935b).

Reported distribution. West coast of Sweden.—From the border with Norway to middle Kattegat (Jägerskiöld 1971: 64, as *Stegopoma fastigiatum*).

Elsewhere.—North Atlantic from the northern seas of the Russian Federation (Stepanjants 1989) to the tropics (Cornelius 1995a) in the east, and from Greenland (Schuchert 2001a) to south of the Dry Tortugas (Fraser 1944) in the west. This species has also been reported in the South Atlantic, in the Pacific and Indian oceans, and in Arctic and Antarctic regions (Ramil & Vervoort 1992).

Stegopoma plicatile (M. Sars, 1863)

Fig. 20

Lafoea plicatilis M. Sars, 1863: 31.
Stegopoma plicatile.—Kramp, 1935b: 131.—Rees & Rowe, 1969: 14.—Jägerskiöld, 1971: 64.—Cornelius, 1995a: 115, fig. 25B, 117, figs. 25C–F.

Type locality. Norway: "…ved Manger, Bejan, Tromsø og Vadsø…" (M. Sars 1863: 32).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, one colony, up to 2.3 cm high, on stem of tubularioid hydroid, without gonophores, ROMIZ B3913.

Remarks. Schuchert (2000) demonstrated that a free medusa occurs in the life cycle of *Stegopoma plicatile* (M. Sars, 1863), as in the related *Modeeria rotunda* (Quoy & Gaimard, 1827), and assigned the species to family Tiarannidae Russell, 1940. Stepanjants (1989) assigned this species to the genus *Modeeria* Forbes, 1848, as *M. plicatile*,

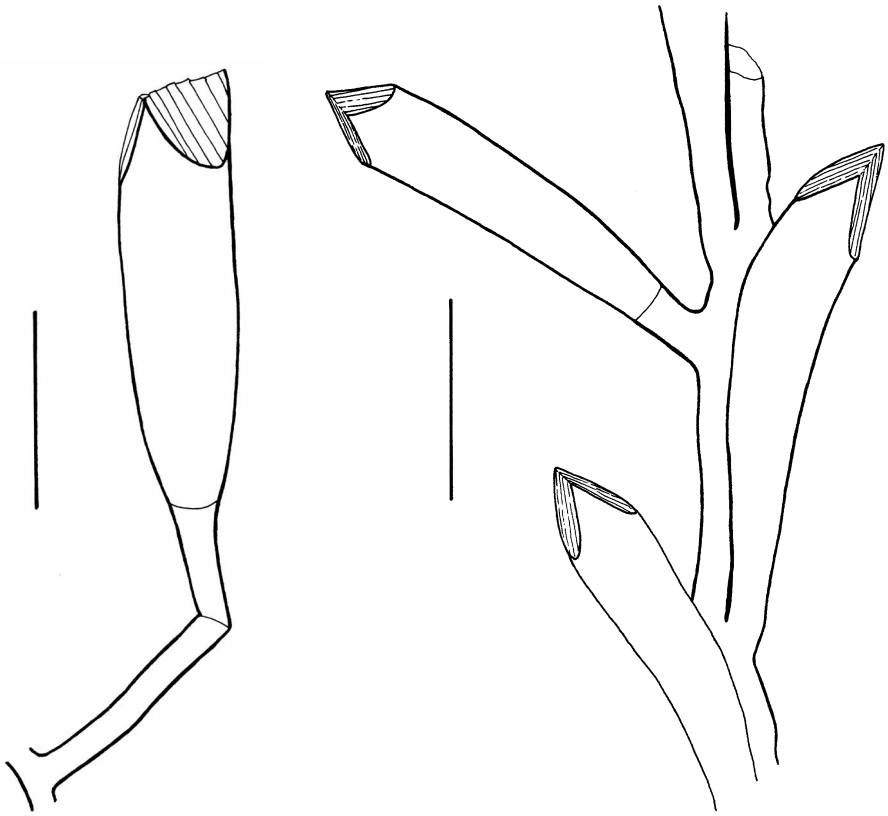

FIGURE 19. *Modeeria rotunda*: part of stolonal colony, with one hydrotheca, ROMIZ B3915. Scale equals 0.5 mm.
FIGURE 20. *Stegopoma plicatile*: part of branch with three hydrothecae, ROMIZ B3913. Scale equals 0.5 mm.

while Schuchert suggested it might be the hydroid of *Chromatonema rotunda* (intending it for *C. rubrum* Fewkes, 1882). Other contemporary taxonomic accounts of this hydroid include those of Vervoort (1972), Edwards (1973a), Cornelius (1995a), and Schuchert (2001a).

Molecular studies by Peña Cantero *et al*. (2010) indicate a close relationship between *S. plicatile* (family Tiarannidae) and *Anthohebella parasitica* (Ciamician, 1880) (family Hebellidae Fraser, 1912). The link between Tiarannidae (superfamily Laodiceoidea L. Agassiz, 1862), generally considered an "operculate" taxon, and Hebellidae (usually assigned to superfamily Lafoeoidea A. Agassiz, 1865), traditionally classified amongst "non-operculate" families, had been noted earlier from the morphology of their medusa stages (Migotto & Andrade 2000; Bouillon *et al*. 2006). Indeed, a relationship between laodiceoids and supposed lafoeoids had been proposed in the nineteenth century by A. Agassiz (1865), who linked a laodiceid medusa to a hydroid he supposed to be a lafoeid, but the discovery had long been discounted (see Calder, 1991: 31, 32).

In southwestern Scandinavia, Christiansen (1972) reported finding *Stegopoma plicatile* throughout the year in the Oslofjord, with most records at depths below 100 m. It extends southwards along the west coast of Sweden to the Kosterfjord and Gullmarfjord (Rees & Rowe 1969; Jägerskiöld 1971). In Denmark, it is known only from deep waters of the Skagerrak off Hirtshals and Skagen (Kramp 1935b).

Gonophores of *S. plicatile* were observed during January in the Oslofjord by Christiansen (1972). Existence of gonophores has not been recorded in reports of the species from Sweden and Denmark.

Reported distribution. West coast of Sweden.—From Säcken Reef (Rees & Rowe 1969) to the Gullmarfjord (Kramp 1935b; Rees & Rowe 1969; Cornelius 1995a).

Elsewhere.—North Atlantic from Svalbard (Ronowicz 2007) and northern seas of the Russian Federation (Stepanjants 1989, as *Modeeria plicatile*) to the west coast of Sweden (Rees & Rowe 1969; Cornelius 1995a; Schuchert 2001a) in the east, and from Baffin Island (Calder 1970) and Greenland (Schuchert 2001a) to slope waters off northern Florida (Henry *et al*. 2008) in the west. This species has also been reported from the eastern and western Pacific, and from the Antarctic (Vervoort 1972; Schuchert 2001a).

Family Lovenellidae Russell, 1953

***Lovenella producta* (G.O. Sars, 1874)**
Fig. 21

Calycella producta G.O. Sars, 1874: 118, pl. 5, figs. 6–8.
Lovenella producta.—Segerstedt, 1889: 12, 25.—Lönnberg, 1898: 52; 1903: 60.—Jäderholm, 1909: 79, pl. 8, fig. 2.—Kramp, 1935b: 140.—Jägerskiöld, 1971: 63.—Cornelius, 1995a: 168.

Type locality. Norway: Bodø and Lofoten Islands (G.O. Sars 1874: 118).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, two stolonal colonies, on stem of *Tubularia indivisa*, without gonophores, ROMIZ B3914.

Remarks. This species has been variously assigned to the genera *Calycella* Hincks, in Allman, 1864 (e.g., G.O. Sars 1874), *Campanulina* Van Beneden, 1847 (e.g., Bonnevie 1899), *Lovenella* Hincks, 1868 (e.g., Cornelius 1995a), and *Opercularella* Hincks, 1868 (e.g., Vervoort 1966). It also bears some resemblance to *Egmundella* Stechow, 1921b in having pedicellate hydrothecae with a cone-shaped operculum, with a diaphragm basally, and with nematophores. However, unlike in *E. gracilis* Stechow, 1921b, type species of that genus, its operculum is separated from the hydrothecal wall by a crease. Overall, its hydrothecae most closely resemble those of *Lovenella* as defined by its type species *L. clausa* (Lovén, 1836), and the binomen *Lovenella producta* (G.O. Sars, 1874), adopted by most recent authors (Cornelius 1995a), is also kept here. The generic identity of *L. producta* is likely to remain uncertain until more is known about its gonophores and life cycle.

Although gonophore type in *Lovenella producta* has yet to be determined, gonothecae were briefly described by Storm (1882) and translated in Bonnevie (1899) ("...on the stolon, smooth, circular, somewhat compressed at the sides, with a short aperture"). Vervoort (1985) described a sac-shaped structure arising from the hydrorhiza that he thought might be a gonotheca in material from the Bay of Biscay, although there is some doubt about the identification of his material (Cornelius 1995a). He found no distinct crease separating hydrothecal rim from operculum, as in material described and illustrated by G.O. Sars (1874), Jäderholm (1909), Kramp (1935b), Cornelius (1995a), and Schuchert (2001a), and no nematophores were noted on the hydrorhiza.

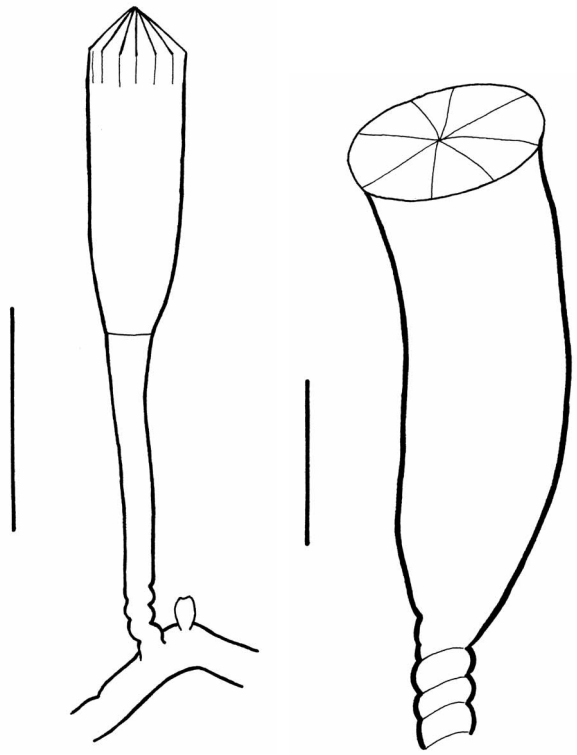

FIGURE 21. *Lovenella producta*: part of colony with stolon, hydrocaulus, hydrotheca, and nematotheca, ROMIZ B3914. Scale equals 0.5 mm.
FIGURE 22. *Calycella syringa*: young hydrotheca, ROMIZ B3899. Scale equals 0.1 mm.

Lovenella producta is a small and easily overlooked species, reported only occasionally even from its known centre of distribution in western Scandinavia. Besides records from the west coast of Norway (G.O. Sars 1874; Storm 1882; Bonnevie 1899; Cornelius 1995a; Mortensen & Fosså 2006), Christiansen (1972) collected it on four occasions in the Oslofjord, and Kramp (1935b) reported it from a location northwest of Hanstholm in Denmark. Scattered records of it exist from western Sweden (see Checklist). It is reportedly common on the Brattholmen Reef, Bergen, Norway (Cornelius 1995a).

Reported distribution. West coast of Sweden.—From the Säcken area (Jägerskiöld 1971) to the Öresund (Lönnberg 1898; Kramp 1935b).

Elsewhere.—North Atlantic from the Lofoten Islands (G.O. Sars 1874) and Iceland (Schuchert 2000) to the Öresund (Cornelius 1995a) and southwestern Ireland (Watson & Barnes 2004) in the east, and from Jones Sound in northern Canada (Broch 1910) to the New England coast north of Cape Cod (Fraser 1944) in the west. Also reported from the Pacific coast of North America (Fraser 1937).

Family Calycellidae Kramp, 1915

Calycella syringa (Linnaeus, 1767)

Fig. 22

Sertularia syringa Linnaeus, 1767: 1311.
Calycella syringa.—Segerstedt, 1889: 15, 25.—Jäderholm, 1909: 80, pl. 8, fig. 3.—Rees & Rowe, 1969: 14.
Calicella syringa.—Jägerskiöld, 1971: 61 [incorrect subsequent spelling of *Calycella* Hincks, in Allman, 1864].

Type locality. Linnaeus (1767: 1311) based his account of this species on material described and illustrated by Ellis (1755: 25, 26), but gave its provenance simply as "Habitat in Oceano." Although Ellis mentioned no specific locale for the species, his work was based on "zoophytes" of Great Britain and Ireland. The type locality can thus be restricted to the British Isles.

Museum material. Kosterhavet, 58°52.536'N, 11°06.229'E, 6–30 m, 07.ix.2010, SCUBA, a few hydrothecae, some with hydranths, on *Hydrallmania falcata*, without gonothecae, coll. B.E. Picton, ROMIZ B3899.

Remarks. *Calycella syringa* (Linnaeus, 1767) is abundant and widely distributed from Arctic regions to cool-temperate environments of both Atlantic and Pacific oceans, and it is common in southern Scandinavia (Jäderholm 1909; Kramp 1935b, as *Calicella syringa*; Jägerskiöld 1971, as *Calicella syringa*; Christiansen 1972). Confusion over its nomenclature, and especially the spelling of the generic name, was clarified by Cornelius (1978). Information on the biology of this hydroid, encountered frequently in relatively shallow boreal waters, has been summarized in Cornelius (1995a).

Reported distribution. West coast of Sweden.—From the Säcken area to middle Kattegat (Jägerskiöld 1971: 61, as *Calicella syringa*).

Elsewhere.—Widespread. In the northern hemisphere, it ranges from northern seas of the Russian Federation (Linko 1912, as *Campanulina syringa*; Naumov 1960, as *Calicella syringa*) to Portugal (da Cunha 1944) and the western Mediterranean (Bouillon *et al*. 2004) in the eastern North Atlantic; from Barrow Strait, Arctic Canada (Calder 1970), to Long Island Sound (Fraser 1944) in the western North Atlantic; from far eastern seas of the Russian Federation (Naumov 1960) to Japan (Hirohito 1995) in the western North Pacific; from Alaska (Fraser 1937) to California (Fraser 1948) in the eastern North Pacific.

Family Phialellidae Russell, 1953

Opercularella lacerata (Johnston, 1847)

Fig. 23

Campanularia lacerata Johnston, 1847: 111, pl. 28, fig. 3.
Opercularella lacerata.—Segerstedt, 1889: 14, 25.—Lönnberg, 1898: 52.—Jäderholm, 1909: 81, pl. 7, fig. 13.
Campanulina lacerata.—Jägerskiöld, 1971: 61.

Type locality. UK: Berwick Bay; St. Andrews (Johnston 1847: 111).

Museum material. Tjärnö, floating dock at Sven Lovén Centre for Marine Sciences, 58°52'33.68"N, 11°08'43.65"E, <1 m, 07.ix.2010, collected manually, on a fucoid alga, one colony, up to 3.5 mm high, without gonophores, ROMIZ B3890.

Remarks. *Opercularella lacerata* (Johnston, 1847) is frequent on floating docks just beneath the surface of the water on both sides of the boreal North Atlantic (personal observations), and it was found in that environment at Tjärnö. It is a euryhaline species, extending deep into the Baltic Sea (Cornelius 1995a).

The boreal *Opercularella pumila* Clark, 1875 is somewhat similar, but its colonies are at least partly stolonal. Erect colonies of that species are more compact than those of *O. lacerata* and seldom have more than a half-dozen hydranths and hydrothecae per stem. Although gonophores are fixed sporosacs in both, gonothecae of *O. lacerata* are oval to subcylindrical while those of *O. pumila* are fusiform with a tapered neck (Clark 1875; Calder 1971). Also similar is *Phialella quadrata* (Forbes, 1848), but it differs from *O. lacerata* in having a medusa stage rather than fixed sporosacs. Schuchert (2001b) noted that trophosomes of *O. lacerata* can be distinguished from *P. quadrata* in having: (1) larger hydrothecae (0.3–0.5 mm vs. 0.25 mm), and (2) pedicels that are usually shorter (with five rings or less) instead of as long or longer (with more than five rings) than the hydrothecae. Other characters useful in distinguishing the two were presented by Cornelius (1995a: 176). The hydroid of *Phialella quadrata* has not yet been reported from southwestern Scandinavia; the report by Cornelius (1995a) that Kramp (1935b) and Rees & Rowe (1969) had recorded it from Denmark and Sweden is in error. It was included by Kramp (as *Campanulina minuta* Stechow, 1923) as a species that might be expected to occur in Danish waters, but its known distribution was stated to be the Orkney Islands and possibly Kiel. Rees & Rowe made no mention of *P. quadrata* in their report.

In southwestern Scandinavia, colonies of *O. lacerata* were found throughout the year in the Oslofjord by Christiansen (1972), although gonophores were observed only during May and June. It is common on the Danish coast (Kramp 1935b) and is likely much more abundant and ubiquitous in waters of western Sweden than records presently indicate. Information on the biology of the species was summarized by Cornelius (1995a).

Reported distribution. West coast of Sweden.—Tjärnö (this study) to Kungsbackafjorden (Jägerskiöld 1971).

Elsewhere.—North Atlantic from Svalbard (Ronowicz 2007) and the White Sea to the Mediterranean (Cornelius 1995a) in the east, and from Greenland (Schuchert 2001a) and Foxe Basin in the Canadian north (Calder 1970) to Long Island Sound (Fraser 1944) in the west.

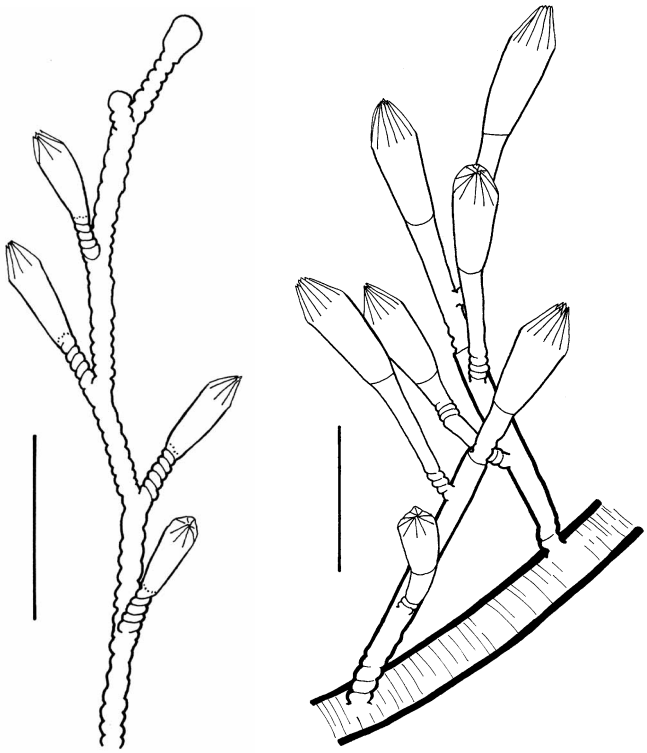

FIGURE 23. *Opercularella lacerata*: part of hydrocaulus with hydrothecae, ROMIZ B3890. Scale equals 0.5 mm.
FIGURE 24. *Racemoramus panicula*: part of hydrocaulus with two branches and hydrothecae, ROMIZ B3916. Scale equals 0.5 mm.

***Racemoramus*, gen. nov.**

Diagnosis. Colonies erect; growth monopodial with terminal hydranths encased in hydrothecae. Hydrocaulus monosiphonic, usually unbranched, straight or nearly so, relatively rigid, not divided into internodes; gradually tapering from proximal to distal end; annulations, if present, only at origin from slender hydrorhiza. Hydrothecae pedicellate, quite fragile, arising from hydrocaulus singly or in comparatively short monopodial and grape-like clusters ("panicles") at irregular intervals and often in different planes, directed obliquely upwards; radially symmetrical, deep cone-shaped, tapering into pedicel; diaphragm present basally; desmocytes small, forming a ring just above diaphragm; margin with conical operculum consisting of a folded continuation of the hydrothecal wall, opercular facets distinct, enclosing hydrothecal cavity when closed, not clearly demarcated from hydrothecal rim. Hydrothecal pedicels of varied length, with a few annulations basally. Nematophores absent.

Gonophores possibly free medusae; gonothecae very elongate, club-shaped, sometimes slightly curved or twisted, arising from hydrocaulus or from hydrothecal pedicels; aperture terminal, pedicel short, annulated.

Type species. *Campanulina panicula* G.O. Sars, 1874, designated herein.

Etymology. From Latin *racemus* (a cluster) and *ramus* (branch) in reference to branches with grape-like clusters of hydrothecae in the species. The gender of the name is masculine.

Remarks. Although the name *Racemoramus*, gen. nov., is masculine, the specific name of its type species, *panicula* G.O. Sars, 1874, as published in the binomen *Campanulina panicula*, is taken to be a noun in apposition and its suffix does not change.

The monopodial growth form of *Racemoramus panicula* (G.O. Sars, 1874) is unusual among leptothecate hydroids, and especially so amongst so-called "campanulinids," as noted previously (Kramp 1941; Cornelius 1995a). Its distinctive colony form distinguishes *Racemoramus* from these and all other genera of the suborder Campanulinida Hincks, 1868.

The difference in colony form is taken as sufficiently significant taxonomically to warrant establishment of a new genus. While superficially similar to *Plicatotheca* Calder & Vervoort, 1986, its colonies are fundamentally very different in being racemose instead of sympodial. While hydrothecae of the two are similar, the operculum does not fully enclose the hydrothecal cavity in *Plicatotheca* and its opercular facets are linguiform instead of pointed. Desmocytes forming a ring immediately above the diaphragm are large in *Plicatotheca*, but small and inconspicuous in *Racemoramus*.

Included in *Racemoramus* here are *Campanulina panicula*, *C. denticulata* Clarke, 1907, and *C. indivisa* Fraser, 1948. These three have generally been considered conspecific in recent work, although their combined geographic and bathymetric ranges are extremely wide, as discussed below. On zoogeographic grounds I prefer to maintain *C. denticulata* from the Pacific and Indian oceans as distinct from the Atlantic *C. panicula.* However, *Racemoramus indivisus*, comb. nov., from bathyal waters off California (Fraser 1948) is here considered conspecific with *R. denticulatus*, comb. nov., originally described from abyssal bottoms off Peru (Clarke 1907). Vervoort (1966) was the first to consider them as synonyms.

Calder *et al*. (2009) assigned Fraser's (1948) *Campanulina indivisa* to the genus *Plicatotheca* Calder & Vervoort, 1986, but that is incorrect because its colonies are racemose rather than sympodial.

Neither the life cycle of *R. panicula*, type species of the genus, nor that of *R. denticulatus* (including *R. indivisus*) is known. It remains to be established whether a medusa stage exists in species of the genus, and if so whether it is referable to a known medusa genus. Kramp (1941) observed gonothecae in material from the Trondheimfjord, and Christiansen (1972) reported finding them in material from Nygrunn in the Oslofjord, but neither was able to establish whether gonophores were fixed sporosacs or free medusae. Vervoort (1966) found only empty gonothecae in *Opercularella denticulata* from the Indian Ocean, but thought it likely that a medusa was produced in the species. Rees & Rowe (1969) found fertile material from Sweden with what appeared to be a developing medusa.

The familial affinities of *Racemoramus* remain obscure because of a lack of information on its life cycle. Its unique colony form and hydrothecal morphology exclude it from Campanulinidae Hincks, 1868, as defined by the type genus *Campanulina* Van Beneden, 1847. It is provisionally assigned here to Phialellidae Russell, 1953 based on the resemblance of its hydrothecae, including presence of a diaphragm, to those of phialellid genera including *Phialella* Browne, 1902, *Opercularella* Hincks, 1868, and *Plicatotheca*.

***Racemoramus panicula* (G.O. Sars, 1874), comb. nov.**
Fig. 24

Campanulina panicula G.O. Sars, 1874: 121, pl. 5, figs. 9–13.—Kramp, 1941: 4, fig. 5.—Rees & Rowe 1969: 17.—Jägerskiöld, 1971: 61.—Cornelius, 1995a: 192, fig. 43D.

Type locality. Norway: Oslofjord, 50–60 fm (91–110 m) (G.O. Sars 1874: 121).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, two colonies or colony fragments, each with many hydrocauli, up to 3.8 cm high, on polychaete tubes and ascidians, without gonophores, ROMIZ B3916.

Remarks. Kramp (1941) provided a thorough description of *Opercularella panicula* (G.O. Sars, 1874) based on specimens from Norway and Sweden, and remarked on its similarity to *Campanulina denticulata* Clarke, 1907 from deep waters of the eastern tropical Pacific (Clarke 1907) and Sagami Bay, Japan (Stechow 1913). Leloup (1974) discounted seeming differences between the two as ecologically induced and regarded them as conspecific. Vervoort (1966) referred *Campanulina indivisa* Fraser, 1948, from bathyal depths off California, to the synonymy of *O. denticulata*.

Subsequent authors have mostly agreed that these are all synonyms. Nevertheless, their combined range is so extensive that it raises doubts whether a single species is represented. In addition to records in the eastern Atlantic (e.g., Cornelius 1995a, as *Campanulina panicula*), similar hydroids have been reported from deep waters in the western Pacific (Stechow 1913: as *Campanulina denticulata*; Hirohito 1995: as *Opercularella panicula*; Schuchert 2003: as *Campanulina panicula*), the eastern Pacific (Clarke 1907: as *Campanulina denticulata*; Fraser 1948: as *Campanulina* (?) *indivisa*; Leloup 1974: as *Opercularella panicula*), and the Indian Ocean (Vervoort 1966: as ? *Opercularella denticulata*). Schuchert (2003) reported that materials from Indonesia were indistinguishable from those examined earlier from Iceland (Schuchert 2001a), supporting the hypothesis that a single species is represented. Its bathymetric range is also reported as being astoundingly wide, from 20–30 m (this study) to 5200 m (Stechow 1913, as *Campanulina denticulata*). As noted above, I prefer on zoogeographic grounds to keep the Atlantic *R. panicula* distinct from the Indo-Pacific *R. denticulata*.

This hydroid seems to be quite frequent in the Oslofjord, its type locality, having been collected at 12 stations there by Christiansen (1972). Records of *R. panicula* from Swedish waters are all from the Skagerrak (see Checklist). It was not recorded in Danish waters by Kramp (1935b). Of five figures of the species in the paper by Kramp (1941), only one (Fig. 5) was based on material from Sweden.

Reported distribution. West coast of Sweden.—Säcken Reef (Rees & Rowe 1969, as *Campanulina panicula*) to Skagerrak off Grebbestad (Kramp 1941, as *Campanulina panicula*).

Elsewhere.—Northeast Atlantic from Trondheimfjord, Norway (Storm 1882, as *Campanulina panicula*), and Iceland (Schuchert 2000, 2001a, as *Campanulina panicula*), to Morocco and southern Africa (Ramil & Iglesias 1988, as *Opercularella panicula*; Cornelius 1995a, as *Campanulina panicula*).

Family Incertae Sedis

***Cuspidella grandis* Hincks, 1868**
Fig. 25

Cuspidella grandis Hincks, 1868: 210, pl. 40, fig. 4.—Lönnberg, 1898: 53.—Kramp, 1935b: 134.—Jägerskiöld, 1971: 61.

Type locality. British Isles: Connemara (Ireland), Shetland (Scotland) (Hincks 1868: 210).

Museum material. Kosterhavet, 58°53.030'N, 11°05.567'E, 140–100 m, 10.ix.2010, biological dredge, R/V *Nereus*, two colony fragments, about 1.5 mm high, on *Ascidia mentula*, without gonophores, ROMIZ B3921.

Remarks. These specimens correspond with descriptions and illustrations of *Cuspidella grandis* Hincks, 1868, originally described from the British Isles. Hincks distinguished the species from *C. humilis* Hincks, 1866 in its larger size and in the relative slenderness of its hydrothecae in relation to height. Some hydrothecae examined here were even more elongate than those portrayed by Hincks. Taxonomic affinities of this morphotype remain uncertain because medusae assigned to several different genera and families are known to have *Cuspidella*-like hydroids

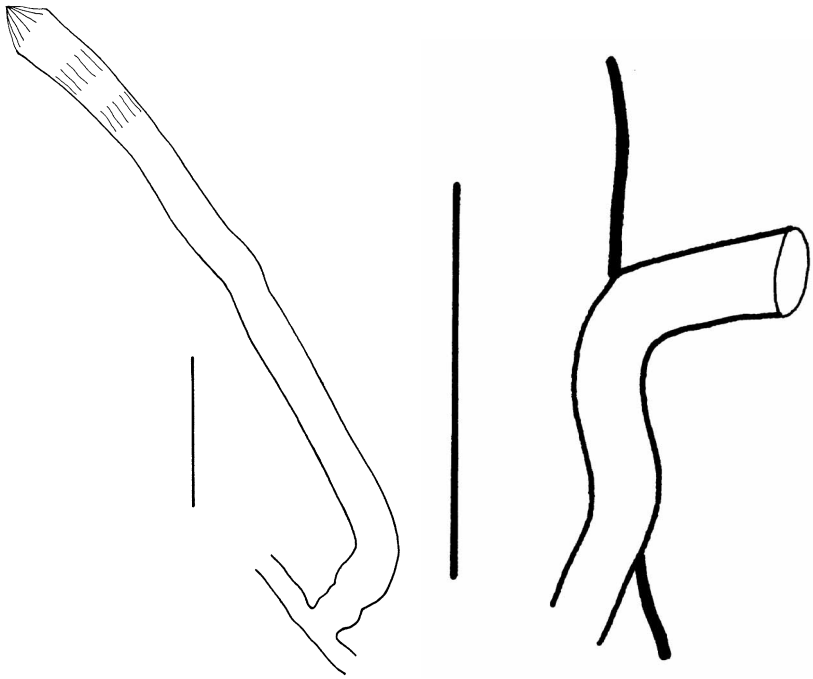

FIGURE 25. *Cuspidella grandis*: one hydrotheca with renovated margins, ROMIZ B3921. Scale equals 0.5 mm.
FIGURE 26. *Filellum serpens*: part of stolon with one hydrotheca, ROMIZ B3905. Scale equals 0.5 mm.

(e.g., Brinckmann 1965; Calder 1970; Cornelius 1995a; Bouillon *et al*. 2006). Medusae raised from a hydroid resembling *C. grandis* by Rees (1941) were identified by him as *Cosmetira pilosella* (Forbes, 1848), but he was reluctant to formally combine the two (Cornelius 1995a). Hydroids reared from medusae of *Mitrocomella polydiademata* (Romanes, 1876) by Edwards (1973b) likewise resemble *C. grandis*. Medusae of both *C. pilosella* and *M. polydiademata* occur in the Skagerrak and Kattegat (Cornelius 1995a). Given continuing uncertainty surrounding the identity of hydroids examined here, they are simply assigned to *C. grandis*.

Hydroids of this morphotype have been reported from a number of locations across southwestern Scandinavia (e.g., Kramp 1935b; Jägerskiöld 1971; Christiansen 1972, as *Cosmetira pilosella*).

Reported distribution. West coast of Sweden.—From Säcken area (Jägerskiöld 1971) to Öresund (Lönnberg 1898).

Elsewhere.—North Atlantic from northern seas of the Russian Federation to the Bay of Biscay (Christiansen 1972, as *Cosmetira pilosella*) in the east, and from Hudson Bay and Labrador to the Gulf of St. Lawrence (Fraser 1944) in the west.

Family Lafoeidae A. Agassiz, 1865

Filellum serpens (Hassall, 1848)

Fig. 26

Campanularia serpens Hassall, 1848: 2223 [the specific name *serpens* Hassall, 1848 conserved and placed on Official List of Specific Names in Zoology, Opinion 1485 (ICZN 1988)].

Filellum serpens.—Segerstedt, 1889: 15, 25.—Lönnberg, 1898: 53.—Jäderholm, 1909: 76, pl. 7, fig. 11.—Kramp, 1935b: 125.—Jägerskiöld, 1971: 62.—Cornelius, 1975b: 379; 1995a: 255, figs. 58A–C.

Type locality. Ireland: Dublin (Cornelius 1975b: 379).

Museum material. Kosterhavet, 58°53.039'N, 11°05.602'E, 160 m, 09.ix.2010, biological dredge, R/V *Nereus*, three colonies, two on *Tubularia indivisa* stems and one on *Abietiniaria abietina*, without gonophores, ROMIZ B3905.

Remarks. The genus *Filellum* Hincks, 1868 and species assigned to it, including *F. serpens* (Hassall, 1848), were reviewed and revised by Peña Cantero *et al*. (1998) and Marques *et al*. (2011). Threats to nomenclatural stability of both generic and specific names of *F. serpens* by lesser known senior synonyms were removed under a ruling (Opinion 1485) by the ICZN (1988).

Ten species were recognized as valid in *Filellum* worldwide by Marques *et al*. (2011). Trophosomes in these hydroids are stolonal and simple, comprising sessile and tubular hydrothecae, and identification of species can be difficult or impossible in the absence of gonophores. Gonothecae are aggregated to form a coppinia, the form of which can be diagnostic.

Filellum serpens, type species of the genus by monotypy, is common in southwestern Scandinavia (Kramp 1935b; Jägerskiöld 1971; Christiansen 1972). It is a boreal, eurybathic species, often found growing on other hydroids and especially on sertulariids (Cornelius 1995a; Peña Cantero *et al*. 1998; Marques *et al*. 2011). Christiansen (1972: 297) also observed it on "...algae, stones, shells, dead *Lophelia*, calcareous polychaete tubes and tests of the foraminifer *Rhabdammina*."

Reported distribution. West coast of Sweden.—From near the border with Norway (Jägerskiöld 1971) to the Öresund (Lönnberg 1898; Kramp 1935b).

Elsewhere.—North Atlantic from Spitzbergen and northern seas of the Russian Federation (Calder 1970) to the Mediterranean Sea (Peña Cantero *et al*. 1998) in the east, and from northern Foxe Basin in the Canadian Arctic to Buzzard's Bay, Massachusetts (Calder 2004) in the west. Although reports suggest that the species is virtually cosmopolitan, many records are suspect in the absence of coppinia (Marques *et al*. 2011). It is likely restricted largely to boreal regions.

Lafoea dumosa (Fleming, 1820)

Fig. 27

Sertularia dumosa Fleming, 1820: 84.
Lafoea dumosa.—Segerstedt, 1889: 15, 26.—Jäderholm, 1909: 71, pl. 7, fig. 5.—Gislén, 1930: 332.—Rees & Rowe, 1969: 14.—Jägerskiöld, 1971: 63.—Cornelius, 1975b: 386.

Type locality. UK: Scotland, Arbroath (Cornelius 1975b: 386).

Museum material. Kosterhavet, 58°52.424'N, 11°06.178'E, 85 m, 06.ix.2010, Warén dredge, R/V *Nereus*, three colony fragments, up to 2 cm high, without gonothecae, ROMIZ B3888.

Remarks. The concept of *Lafoea dumosa* (Fleming, 1820) adopted here is restricted in scope to the morphotype defined in traditional accounts of the species (e.g., Jäderholm 1909; Broch 1918; Stechow 1925; Totton 1930; Kramp 1935b; Fraser 1944; Vervoort 1946; Calder 1970). As such it does not include *L. fruticosa* (M. Sars, 1850) and *L. gracillima* (Alder, 1856) as synonyms. Additional discussion of the matter is given below in remarks under *L. gracillima*. While synonymy of the three nominal species is possible or even likely, it seems best to keep them separate pending further evidence. Recent molecular and life cycle studies have shown taxonomic lumping in the latter half of the twentieth century to have often been excessive, and a conservative approach seems warranted in addressing this possible species complex. Indeed, preliminary molecular work by Moura *et al*. (2008) suggests existence of cryptic species in *L. dumosa*.

Fleming (1820) used the name *Sertularia dumosa* in conjunction with a hydroid that he briefly compared and contrasted with *Sertularia verticillata* Linnaeus, 1758 (now *Rhizocaulus verticillatus*). According to Fleming, it differed from the species described and illustrated by Ellis (1755: 23, No. 20, pl. 13, figs.a, A) as the "horse-tail coralline" (*R. verticillatus*) in having "...irregularly disposed, and nearly sessile cups." Cornelius (1995a: 261) considered the name as established in Fleming's early work a nomen nudum, implicitly regarding the four-line account insufficient as a description or definition under the International Code of Zoological Nomenclature (ICZN 1999). While the description was intentionally preliminary, and a somewhat fuller one was provided later (Fleming 1828, as *Campanularia dumosa*), some currently accepted names of hydroids are based on less information (e.g., see discussion of *Hydractinia sodalis* Stimpson, 1858 in Calder 2010: 34). The account by Fleming (1820) satisfies the requirements of Art. 12.1 of the code, in my opinion, and the specific name *dumosa* is taken here as available from that date. Threats to nomenclatural stability are also thereby avoided. Had the name *L. dumosa* not been made available until 1828, that well-known binomen would be a junior subjective synonym of the virtually unused and lesser known *L. cornuta* Lamouroux, 1821.

Lafoea dumosa appears to be the most common and widespread species of the genus in southwestern Scandinavia (Kramp 1935b; Rees & Rowe 1969; Jägerskiöld 1971; Christiansen 1972).

Reported distribution. West coast of Sweden.—From Säcken Reef to southern Kattegat (Rees & Rowe 1969; Jägerskiöld 1971).

Elsewhere.— North Atlantic from northern Greenland to the Cape Verde Islands (Schuchert 2001a; Vervoort 2006) in the east, and from Ungava Bay to the Caribbean Sea (Vervoort 1968; Calder 1970) in the west. Reportedly circumglobal.

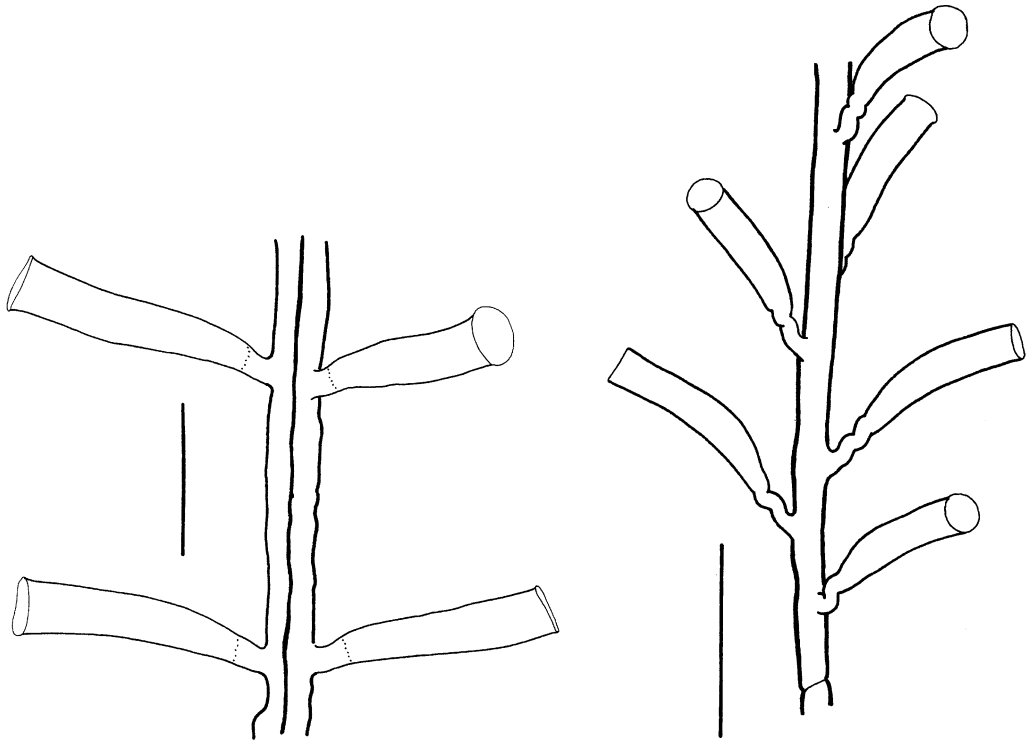

FIGURE 27. *Lafoea dumosa*: part of branch with hydrothecae, ROMIZ B3888. Scale equals 0.5 mm.
FIGURE 28. *Lafoea gracillima*: part of branch with hydrothecae, ROMIZ B3912. Scale equals 0.5 mm.

Lafoea gracillima (Alder, 1856)

Fig. 28

Campanularia gracillima Alder, 1856: 361, pl. 14, figs. 5, 6.
Lafoea fruticosa.—Segerstedt, 1889: 15, 26 [not *Campanularia fruticosa* M. Sars, 1850].
Lafoea gracillima.—Jäderholm, 1909: 74, pl. 7, figs. 6, 7.—Rees & Rowe, 1969: 15.—Jägerskiöld, 1971: 63.

Type locality. UK: England, Northumberland coast (Alder 1856: 361; Cornelius & Garfath 1980: 281).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 30–20 m, 09.ix.2010, biological dredge, R/V *Nereus*, one colony, up to 3.8 cm high, on stems of *Tubularia indivisa*, without gonophores, ROMIZ B3912.

Remarks. There has been longstanding debate whether *Lafoea gracillima* (Alder, 1856) is conspecific with *L. fruticosa* (M. Sars, 1850). Cornelius (1975b) reviewed the evidence, concluded that they were identical, and referred both to the synonymy of *L. dumosa* (Fleming, 1820). His concept of the species has been widely adopted in recent major taxonomic accounts of this hydrozoan (e.g. Rees & Vervoort 1987; Cornelius 1995a; Hirohito 1995; Schuchert 2001a, 2003; Watson 2003; Bouillon *et al*. 2006; Vervoort 2006).While acknowledging the high degree of variation apparent in these hydroids, and the overlap in morphotypes that may occur, evidence from molecular work is needed to resolve their relationships. Moura *et al*. (2008) suggested from preliminary molecular analyses that *L. dumosa* could be a species complex, and Schuchert (2001a) discovered some nematocyst differences in materials assigned to the species. For now, as with Cairns *et al*. (2002: 56), I prefer to maintain *L. gracillima* as valid.

Lafoea gracillima, or the typical form corresponding to it, is common in southwestern Scandinavia (Kramp 1935b; Rees & Rowe 1969; Jägerskiöld 1971; Christiansen 1972).

Reported distribution. West coast of Sweden.—Säcken Reef to Gullmarfjord (Rees & Rowe 1969).

Elsewhere.—North Atlantic from Spitzbergen to Madeira (Christiansen 1972) in the east, and from Greenland and the Canadian Arctic to Nantucket Sound (Calder 1970, 2004) in the west.

Family Haleciidae Hincks, 1868

Halecium articulosum Clark, 1875

Fig. 29

Halecium articulosum Clark, 1875: 63, pl. 10, fig. 6.—Jäderholm, 1909: 58, pl. 5, fig. 7.
Halecium sessile.—Segerstedt, 1889: 16, 26.—Cornelius, 1975b: 406 [not *Halecium sessile* Norman, 1867].
Halecium articulosus.—Jägerskiöld, 1971: 62 [incorrect subsequent spelling].

Type locality. USA: New England coast, several locations between Eastport, Maine, and Long Island Sound (Clark 1875: 63).

Museum material. Kosterhavet, 58°52.424'N, 11°06.178'E, 35–11 m, 06.ix.2010, biological dredge, R/V *Nereus*, one colony, 10.5 cm high, without gonophores, ROMIZ B3887.

Remarks. *Halecium articulosum* Clark, 1875 resembles *H. halecinum* (Linnaeus, 1758) in general colony form. It differs in having branches given off in several planes instead of one, and its branches tend to be more curved. Female gonothecae are kidney-shaped to mitten-shaped with a lateral aperture, instead of being oblong with a terminal aperture. Hydrothecae are strictly sessile. Secondary hydrothecae, when present, also appear sessile because they arise directly from the diaphragm of the hydrothecae beneath them rather than being pedicellate.

Confusion exists in the literature about the identity and synonymy of this species. Cornelius (1975b) examined type material of *H. articulosum* from Casco Bay, Maine, USA, and concluded that it was conspecific with *H. sessile* Norman, 1867, originally described from Scotland. Later, he regarded them as questionably conspecific (Cornelius 1995a). Still later, when describing their hydranths (Cornelius 1998), he treated them as distinct species. Kramp (1935b) distinguished *H. articulosum* from *H. sessile* in having (1) adjacent hydrothecae at an angle of about 90° rather than being in the same plane, (2) internodes about twice as long as wide, instead of greater, (3) stems that are thick and strongly branched instead of thin and sparsely branched. Hydroids illustrated as *H. sessile* in Cornelius (1995a) correspond with Kramp's (1935b: 144, 149, fig. 62C) account and illustration of *H. articulosum*. Earlier, Jäderholm (1909) had concluded that Swedish hydroids of the kind examined here were identical with *H. articulosum* and not *H. sessile*.

The identity of *Halecium filiforme* Alder, 1862, a nominal species originally based on a mix of at least two species and representing a possible threat to *H. articulosum* or *H. sessile*, was resolved by Cornelius (1975a). A lectotype was chosen that links it to *Halecium muricatum* (Ellis & Solander, 1786).

Halecium plumosum Hincks, 1868 bears some resemblance to *H. articulosum*, but the original account is scarcely sufficient for identification. Unfortunately, material studied by Hincks (1868) was also sterile. Cornelius (1975a: 409) concluded that this hydroid resembled "...specimens referable to *H. sessile* sensu Norman..." The similarity between *H. plumosum* and *H. sessile* was noted again more recently (Cornelius 1998). *Halecium plumosum* is regarded here as a nomen dubium, although it was maintained as valid by Schuchert (2011). Material from the Oslofjord identified as *H. plumosum* by Bonnevie (1899) was examined by Christiansen (1972). He considered the identity of the specimen doubtful but close to *H. sessile*.

Halecium articulosum is much less abundant than *H. halecinum* in European waters, and records of it in southern Scandinavia are limited (Kramp 1935b, 1938; Christiansen 1972; Checklist herein). Kramp and Christiansen, and Jäderholm (1909) earlier, noted that it had been confounded with other species and was likely more widely distributed on the boreal coast of Europe than indicated in the literature.

Reported distribution. West coast of Sweden.—Koster to middle Kattegat (Jägerskiöld 1971).

Elsewhere.—North Atlantic from Iceland to Belgium (Christiansen 1972) in the east, and from the Grand Banks of Newfoundland to Long Island Sound (Fraser 1944) in the west.

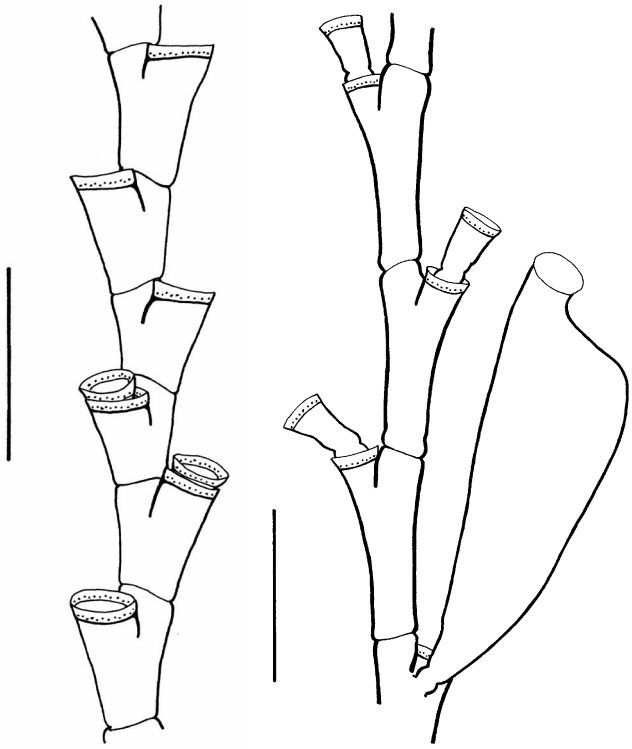

FIGURE 29. *Halecium articulosum*: part of branch with hydrothecae, ROMIZ B3887. Scale equals 0.5 mm.
FIGURE 30. *Halecium halecinum*: part of branch with hydrothecae and female gonotheca, ROMIZ B3897. Scale equals 0.5 mm.

Halecium halecinum (Linnaeus, 1758)

Fig. 30

Sertularia halecina Linnaeus, 1758: 809 [the specific name *halecina* Linnaeus, 1758 conserved and placed on Official List of Specific Names in Zoology, Opinion 1220 (ICZN 1982)].
Halecium halecinum.—Segerstedt, 1889: 15, 26.—Jäderholm, 1909: 57, pl. 4, figs. 13, 14.—Rees & Rowe, 1969: 12.—Jäger-skiöld, 1971: 62.
Halecium cf. *halecinum*.—Gislén, 1930: 329.

Type locality. England: Kent, Whitstable (Cornelius 1975b: 394).

Museum material. Kosterhavet, 58°52.567'N, 11°06.313'E, 6–30 m, 07.ix.2010, SCUBA, three colonies with fragments, up to 7 cm high, two colonies with female gonophores and one with male gonophores, coll. B.E. Picton, ROMIZ B3897.

Remarks. *Halecium halecinum* (Linnaeus, 1758) is one of the most distinctive species of the genus in the typical shape of its trophosome. With a regularly pinnate colony form and moderately short, relatively straight branches, it resembles a herring skeleton. As noted by Cornelius (1995a), this hydroid was aptly called the "herring-bone coralline" by Ellis (1755).

Schuchert (2005) noted that there are variations from this well-known form of the species. Identifications are best made from examination of female gonothecae, if present, which are oblong and have an aperture at the end of a terminal, asymmetrically placed collar. In the sympatric *H. beanii* (Johnston, 1838) and *H. sessile* Norman, 1867, and in the circumpolar *H. scutum* (Clark, 1877), such gonothecae are mitten-shaped, with the aperture occurring laterally. Several other characters distinguishing *H. halecinum* from *H. beanii* were noted by Medel & Vervoort (2000): (1) hydrocladia usually arise from the front or back of hydrothecae instead of laterally, (2) the first internode of a hydrocladium is usually thecate rather than athecate, (3) secondary hydrophores are longer.

Characters of hydranths of *H. halecinum* have been studied by Cornelius (1998), and by Gravier-Bonnet (2007), who described a new type of hydranth in the species termed an "extensible polyp." Such polyps were capa-

ble of great extension and contraction, and were thought to have defensive, excretory, and possibly sensory functions. They were scattered irregularly over the colony.

Contemporary taxonomic accounts of *H. halecinum* include those of Cornelius (1975a, 1995b), Medel *et al.* (1998), Medel & Vervoort (2000), and Schuchert (2005). An extensive synonymy was listed by Medel & Vervoort (2000), together with detailed distribution records of the species worldwide.

According to Rees & Rowe (1969), this is the most abundant species of the genus *Halecium* Oken, 1815 on the west coast of Sweden. Records by Jägerskiöld (1971) support that conclusion (see Checklist). It is also the most common species of *Halecium* in waters around Denmark (Kramp 1935b), and it occurs up the Oslofjord of Norway as far as Steilene (Christiansen 1972).

Reported distribution. West coast of Sweden.—From Säcken to southern Kattegat, 9–200 m (Jägerskiöld 1971).

Elsewhere.—Atlantic Ocean from Spitzbergen and northern seas of the Russian Federation to South Africa in the east (Cornelius 1995a), and from the Strait of Belle Isle to Chesapeake Bay (Calder 2004) in the west, with questionable records from the Caribbean Sea and Gulf of Mexico (Flórez González 1983; Bandel & Wedler 1987; Reyes & Campos 1992; Calder & Cairns 2009). It has also been reported from the western and eastern Pacific, and from the Indian Ocean (Medel & Vervoort 2000).

Halecium textum Kramp, 1911

Fig. 31

Halecium textum Kramp, 1911: 368, pl. 21, figs. 5, 6.
Halecium tenellum.—Segerstedt, 1889: 16, 26.—Jäderholm, 1909: 55, pl. 4, fig. 12 [not *Halecium tenellum* Hincks, 1861].
Halecium undulatum.—Hamond, 1957: 304.—Cornelius, 1995a: 300; 1998: 91 [Not *Halecium undulatum* Billard, 1922].

Type locality. Greenland: Maroussia, 160 –180 m (Kramp 1911: 369).

Museum material. Kosterhavet, 58°53.039'N, 11°05.602'E, 160 m, 09.ix.2010, biological dredge, R/V *Nereus*, two colony fragments, up to 1 cm high, with one on *Sertularella polyzonias*, without gonophores, ROMIZ B3906.

Remarks. Schuchert (2001a) concluded that several reports of *H. undulatum* Billard, 1922, including at least some of those in Calder (1970), Hamond (1957), and Cornelius (1995a), were based on the little-known *H. textum* Kramp, 1911. Differences between the two species appear minor, the only distinguishing character of note appearing to be the presence of a pseudodiaphragm in *H. textum* and its absence in *H. undulatum*. After examining the sterile type material of *H. undulatum*, Schuchert noted that it could not properly be identified but nevertheless treated it as a questionable synonym of *H. textum*. Schuchert (2005) continued to regard them as possible synonyms, although both are currently recognized as valid in the World Hydrozoa Database (Schuchert 2011). Cornelius (1975b) believed that *H. undulatum* was based on small colonies of *H. labrosum* Alder, 1859, but later maintained it as distinct (Cornelius 1995a, 1998). He noted that the publication date of Billard's (1922) original account of *H. undulatum*, although given as 1921, appeared in 1922 (Cornelius 1995b: 343). Material from Sweden, examined here, corresponds morphologically with accounts of *H. textum* by Schuchert (2001a, 2005), including presence of a pseudodiaphragm.

Halecium textum has also been mistaken for *H. tenellum* Hincks, 1861, as in Jäderholm's (1909) records from the west coast of Sweden (Schuchert 2001a). Jäderholm's material included hydroids identified as *H. tenellum* by Segerstedt (1889). According to Schuchert, *H. textum* can be distinguished from *H. tenellum* in having: (1) larger and more profuse colonies that sometimes form tangled masses, (2) perisarc that is strongly annulated over frequent stretches of the colony, (3) frequent polytomies, with two or more side branches arising beneath a hydrotheca, (4) a pseudodiaphragm, (5) short hydrophores.

Another small species of the genus *Halecium* Oken, 1815 in cold North Atlantic waters having a similar colony form and flared rim is *Halecium minutum* Broch, 1903. It is distinguished from *H. textum* in having unusually deep hydrothecae for the genus, and its pseudodiaphragm, when present, is distal to the insertion of a branch (Schuchert 2001a). Moreover, gonothecae of *H. minutum* arise from the hydrorhiza, have the shape of an empty coin purse, and have distal spines. Those of *H. textum* occur on the branches, are oblong in shape, and lack distal spines.

Reported distribution. West coast of Sweden.—Kosterhavet (this study) to Gullmarfjord (Cornelius 1995a). Elsewhere.—North Atlantic from Iceland, Faroes, and Svalbard questionably to British Isles in the east (Schuchert 2005; Ronowicz 2007; Ronowicz *et al*. 2008), and from Greenland and Frobisher Bay at least to Northumberland Strait (Calder 2004, as *H. undulatum*) in the west. Schuchert (2005) included Fraser's (1944) records of *H. tenellum* in the synonymy of *H. textum*. If so, records extend to New England, with highly questionable reports from further south.

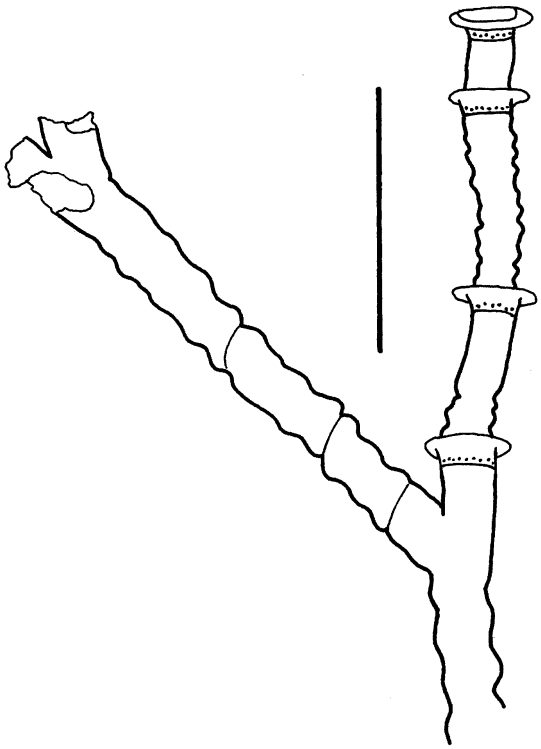

FIGURE 31. *Halecium textum*: part of colony with hydrothecae, ROMIZ B3906. Scale equals 0.5 mm.

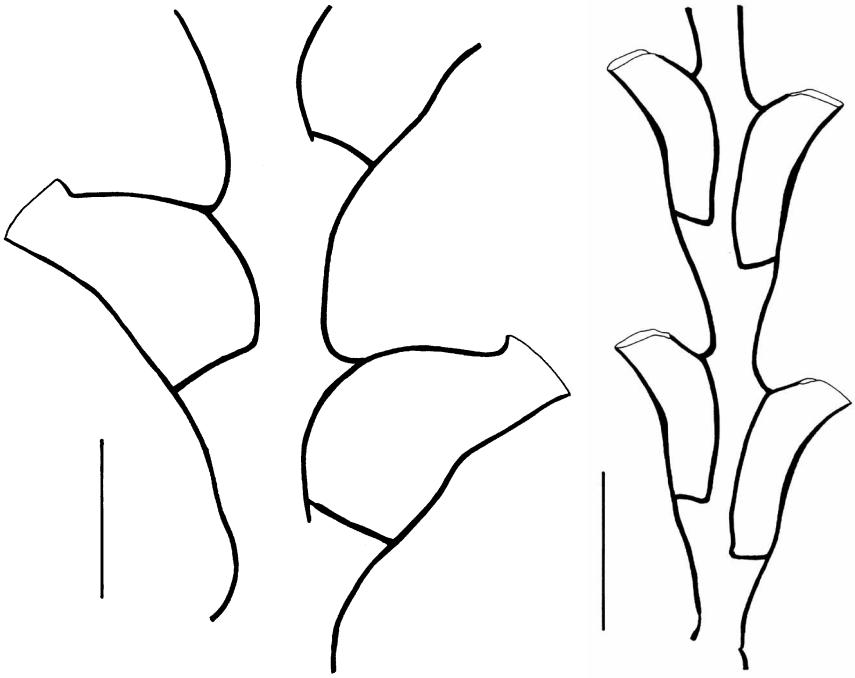

FIGURE 32. *Abietinaria abietina*: part of branch with alternate to subalternate hydrothecae, ROMIZ B3882. Scale equals 0.5 mm.

FIGURE 33. *Diphasia fallax*: part of branch with two subopposite pairs of hydrothecae, ROMIZ B3911. Scale equals 0.5 mm.

Family Sertulariidae Lamouroux, 1812

***Abietinaria abietina* (Linnaeus, 1758)**
Fig. 32

Sertularia abietina Linnaeus, 1758: 808.—Winther, 1880a: 250.—Segerstedt, 1889: 18, 27.—Lönnberg, 1898: 53.
Diphasia abietina.—Jäderholm, 1909: 85, pl. 8, fig. 14.
Abietinaria abietina.—Rees & Rowe, 1969: 19.—Jägerskiöld, 1971: 61.

Type locality. UK: England, south coast (Cornelius 1979: 251).

Museum material. Kosterhavet, 58°53.039'N, 11°05.602'E, 160–30 m, 06.ix.2010, biological dredge, R/V *Nereus*, two colonies, to 7.5 cm high, without gonophores, ROMIZ B3882.

Remarks. *Abietinaria abietina* (Linnaeus, 1758) is a large and conspicuous hydroid that is widespread in the study area. Jägerskiöld (1971) reported it from 33 stations covering much of the west coast of Sweden, while Rees & Rowe (1969) noted that it is common on rocky habitats. It is also found in Denmark (Kramp 1935b) and in the Oslofjord, Norway (Christiansen 1972). *Abietinaria filicula* (Ellis & Solander 1786), reportedly rare in the study area (Rees & Rowe 1969) and not nearly as well known overall (Cornelius 1979: 254), is morphologically similar but much less robust. Other characters distinguishing it from *A. abietina*, according to Cornelius (1995b), are the more pronounced adcauline notch on the hydrotheca beneath the aperture and the pear-shaped instead of elongate-ovate gonothecae. These two have now been recognized as distinct at the molecular level (Moura *et al*. 2011). The reported depth range of *A. abietina* in Swedish waters is 10–200 m (see Checklist).

Cornelius (1979, 1995b) provided accounts of the biology of both *A. abietina* and *A. filicula*.

Reported distribution. West coast of Sweden.—From the Koster area to the Öresund (Jäderholm 1909).

Elsewhere.—In the northern hemisphere from polar waters to Portugal and Madeira in Europe (da Cunha 1944; Cornelius 1995b), to Nantucket Sound on the east coast of the United States (Calder 2004), to California on the west coast of the United States (Fraser 1948), and to Kamchatka in Asia (Yamada 1959). Also reported from the Magellan region in the southern hemisphere (Peña Cantero & García Carrascosa 1999).

***Diphasia fallax* (Johnston, 1847)**
Fig. 33

Sertularia fallax Johnston, 1847: 73, pl. 11, figs. 2, 5, 6.
Diphasia fallax.—Segerstedt, 1889: 17, 26.—Jäderholm, 1909: 83, pl. 8, figs. 7, 8.—Rees & Rowe, 1969: 18.—Jägerskiöld, 1971: 61.

Type locality. UK: NE coast of Britain, between Scarborough and Aberdeen (Cornelius 1979: 260).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, five fragments of colonies, up to 2 cm high, on *Nemertesia rugosa* and unattached, without gonophores, ROMIZ B3911.

Remarks. Of the various species of *Diphasia* L. Agassiz, 1862 occurring in waters of southern Scandinavia, *D. fallax* (Johnston, 1847) appears to be the most common (Jäderholm 1909; Kramp 1935b; Jägerskiöld 1971; Christiansen 1972). It is readily distinguished by having smooth-walled and gradually outward-curved hydrothecae that are adnate to stem and branches for about 2/3 of their length. Details on the taxonomy of this boreal, amphi-Atlantic species have been given by Cornelius (1979; 1995b).

Reported distribution. West coast of Sweden.—From the border with Norway to the middle Kattegat (Jägerskiöld 1971).

Elsewhere.—North Atlantic from the Barents and White seas, and Spitzbergen, to northern Britain (Cornelius 1995b) in the east, and from Northumberland Strait to Block Island Sound (Calder 2004) in the west. A record of the species from bathyal waters off Charleston, South Carolina, by Fraser (1944) needs confirmation.

***Dynamena pumila* (Linnaeus, 1758)**
Fig. 34

Sertularia pumila Linnaeus, 1758: 807.—Lindström, 1856b: 365, pl. 13, A, figs. 1–23.—Segerstedt, 1889: 18, 27.—Lönnberg, 1898: 53; 1899b: 17; 1903: 60.—Jäderholm, 1909: 96, pl. 11, figs. 1–3.
Sertularia (*Dynamena*) *pumila*.—Gislén, 1930: 346.
Dynamena pumila.—Jägerskiöld, 1971: 62.—Cornelius, 1979: 271.

Type locality. England: Sussex, Rottingdean (Cornelius 1979: 271).

Museum material. Kosterhavet, 58°49.953'N, 11°02.072'E, 26 m, 07.ix.2010, biological dredge, R/V *Nereus*, one colony, to 7 mm high, without gonophores, ROMIZ B3903.

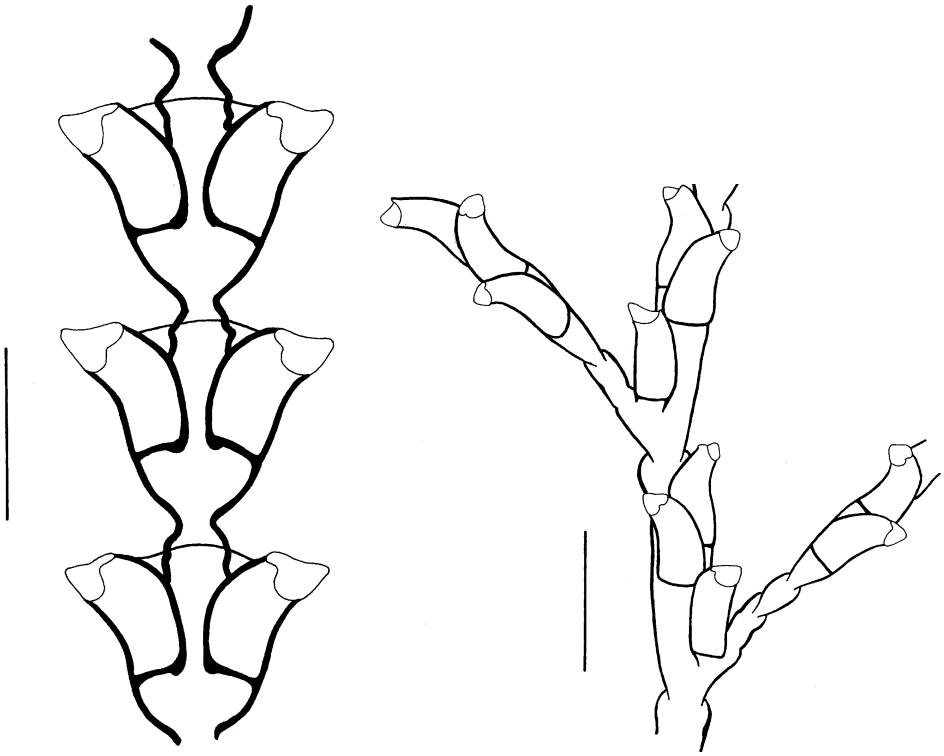

FIGURE 34. *Dynamena pumila*: part of hydrocaulus with three opposite pairs of hydrothecae, ROMIZ B3903. Scale equals 0.5 mm.
FIGURE 35. *Hydrallmania falcata*: part of hydrocaulus with two branches and hydrothecae, ROMIZ B3900. Scale equals 0.5 mm.

Remarks. Taxonomic reviews of *Dynamena pumila* (Linnaeus, 1758) have been given in works including those of Cornelius (1979, 1995b), and need not be repeated here.

This well-known boreal and largely intertidal species is abundant on fucoid algae (especially *Ascophyllum nodosum* and *Fucus* spp.) and underlying rocky substrates on shores of northwestern Europe and northeastern North America. Hydroids of *D. pumila* are well-adapted to environmental stresses of life in the intertidal zone, and they occur in both wave-sheltered and wave-exposed areas (Rossi *et al*. 2000). The location of colonies on algal substrates varies depending on exposure, with those from sheltered areas occurring on mid- to upper parts of thalli and those from more exposed areas occupying areas towards the base (Cornelius 1979). On very high-energy shores, Cornelius noted that colonies may be restricted to crevices and to the undersides of overhangs. On very sheltered shores, they tend to occur in areas of maximum tidal flow. He also reported that hydrothecae of specimens from an exposed site had thicker perisarc and were notably smaller than those from an exposed site. Annulations on the stem facilitate bending, and basal articulating joints allow flexing of up to 180° in either direction (Hughes 1992). These skeletal structures facilitate feeding and minimize the risk of breakage or complete dislodging of the colony from its substrate under high-energy conditions. The ability of the stem to flex and bend also allows the colony to lie against the substrate during exposure at low tides, reducing the risk of desiccation.

At the northern limits of its range, *D. pumila* survives an extended period of the year as dormant tissue in stems and stolons. Colonies that I observed in southern Labrador during early summer (late June and early July, 2000) were just beginning growth. Further south in the Bay of Fundy region, eastern Canada, the species declines significantly in abundance during winter but nevertheless remains active all year (Henry 2001).

Intertidal colonies of *Dynamena pumila* were frequently observed in the study area during the workshop at Tjärnö in late summer 2010 on both attached and detached fucoids. Material listed above (ROMIZ B3903) was found in deeper waters but occurred on a detached algal thallus. At water temperatures of about 17º C, these hydroids were active but frequently overgrown by algae and diatoms. The species is common as well in Danish waters (Kramp 1935b) and in the Oslofjord, Norway (Christiansen 1972).

Reported distribution. West coast of Sweden.—Koster area to the Öresund (Jäderholm 1909, as *Sertularia pumila*).

Elsewhere.—Boreal waters of the North Atlantic from the Barents and White seas to Portugal in Europe (da Cunha 1944; Naumov 1960; Cornelius 1995b), and from southern Labrador to New Jersey in North America (Fraser 1944, as *Sertularia pumila*).

Hydrallmania falcata (Linnaeus, 1758)

Fig. 35

Sertularia falcata Linnaeus, 1758: 810.
Hydrallmania falcata.—Winther, 1880a: 251.—Jäderholm, 1909: 104, pl. 11, fig. 17.—Rees & Rowe, 1969: 20.—Jägerskiöld, 1971: 63.
Hydrallmannia falcata.—Segerstedt, 1889: 19, 27 [incorrect subsequent spelling of *Hydrallmania* Hincks, 1868].

Type locality. England: north Kent, coastal waters (Cornelius 1979: 273).

Museum material. Kosterhavet, 58°52.536'N, 11°06.229'E, 6–30 m, 07.ix.2010, SCUBA, one old and quite heavily fouled colony with some new growth, 8 cm high, without gonothecae, coll. B.E. Picton, ROMIZ B3900.

Remarks. *Hydrallmania falcata* (Linnaeus, 1758) is common in the boreal zone on both European and American coasts of the North Atlantic Ocean, and it is frequent in waters of southern Scandinavia (Kramp 1935b; Jägerskiöld 1971; Christiansen 1972). Its abundance is reflected by the large number of references (>180) with information about the species in the synonymy list of Medel & Vervoort (1998). At one time this hydroid constituted part of the "white weed" fishery in Europe, together with *Sertularia argentea* Linnaeus, 1758 and *S. cupressina* Linnaeus, 1758 (e.g., Hancock *et al*. 1956; Berghahn & Offermann 1999; Wagler *et al*. 2009). Dryed hydroid colonies were dyed and used for decorative purposes, but the market collapsed due to lack of demand.

Reviews of the biology of *H. falcata* are given in Cornelius (1979, 1995b). Colony ontogeny of the species, with eventual development of spirally arranged branches having hydrothecae in a single densely-packed series on the upper surface, was described by Kosevich (2006).

An overview of species assigned to *Hydrallmania* Hincks, 1868 was given by Vervoort (1993), who reported *H. falcata* from deep waters (1665–1590 m) off New Caledonia in the western Pacific.

Reported distribution. West coast of Sweden.—Koster area to Öresund (Winther 1880a; Jägerskiöld 1971).
Elsewhere.—North Atlantic from Svalbard and the Kara Sea (Kramp 1938; Ramil & Vervoort 1992) to Morocco (Medel & Vervoort 1998) in the east, and from the Strait of Belle Isle to Long Island Sound (Calder 2004) in the west.

Sertularella polyzonias (Linnaeus, 1758)

Fig. 36

Sertularia polyzonias Linnaeus, 1758: 813.
Sertularella polyzonias.—Segerstedt, 1889: 16, 26.—Jäderholm, 1909: 100, pl. 11, fig. 12.—Rees & Rowe, 1969: 18.—Jägerskiöld, 1971: 64.—Cornelius, 1979: 288.

Type locality. England: Kent, north coast (Cornelius 1979: 288).

Museum material. Kosterhavet, 58°52.424'N, 11°06.178'E, 35–11 m, 06.ix.2010, biological dredge, R/V *Nereus*, several colonies and colony fragments, up to 2.3 cm high, on bryozoans and algae, without gonothecae, ROMIZ B3886.

Remarks. *Sertularella polyzonias* (Linnaeus, 1758) can be somewhat difficult to distinguish from *S. gayi* (Lamouroux, 1821), which also occurs in northwestern Europe. According to Ramil & Vervoort (1992) and Ramil *et al*. (1992), *S. polyzonias* differs from *S. gayi* in: (1) the form of the hydrocaulus, which is indistinct and monosiphonic instead of distinct and strongly polysiphonic; (2) the type of branching, which is irregular instead of regularly pinnate and in one plane; (3) the shape of the adcauline hydrothecal wall, which is smooth or minimally undulated instead of being more distinctly wavy; (4) the number of cusps flanking the aperture of the gonotheca, with four instead of two. Cornelius (1995b) noted that variations have been noted in these characters, but he retained both species as valid. In addition to morphology, molecular differences have been noted in specimens assigned to the two species (Moura *et al*. 2008, 2011).

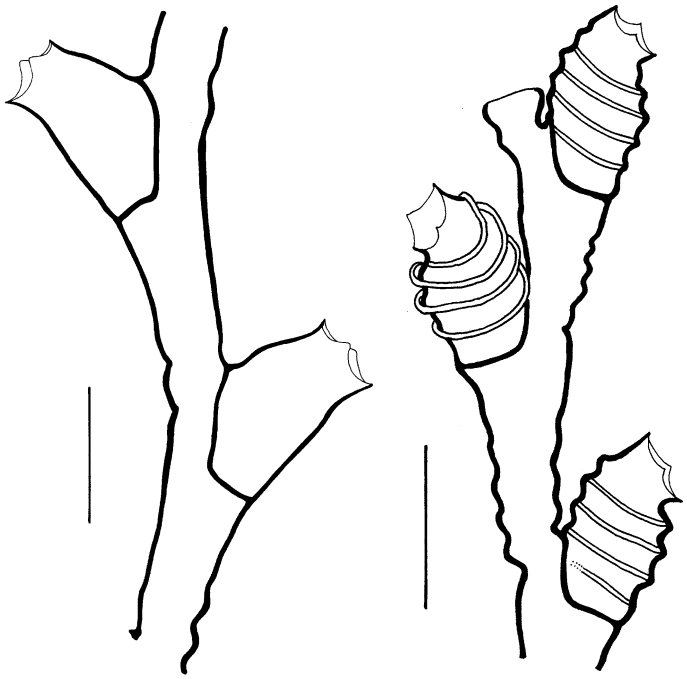

FIGURE 36. *Sertularella polyzonias*: part of branch with two hydrothecae, ROMIZ B3886. Scale equals 0.5 mm.
FIGURE 37. *Sertularella rugosa*: part of hydrocaulus with three hydrothecae, ROMIZ B3910. Scale equals 0.5 mm.

Also similar to *S. polyzonias* in the northeastern North Atlantic is *Sertularella ellisii* (Deshayes & Milne Edwards, 1836), a species differing from *S. polyzonias* in having three intrathecal cusps within its hydrothecae. These two have recently been shown to be genetically distinct (Moura *et al*. 2011). Ramil *et al*. (1992) and Medel & Vervoort (1998) noted that *S. ellisii* has sometimes been misidentified in European waters as *S. gaudichaudi* (Lamouroux, 1824), a species from the southwestern South Atlantic.

Sertularella polyzonias is abundant at shallow depths in western Sweden, but it becomes scarcer in deeper water (Rees & Rowe 1969). It is also present in Danish waters (Kramp 1935b) and in the Oslofjord, Norway (Christiansen 1972). An extensive synonymy of the species is given by Medel & Vervoort (1998).

Reported distribution. West coast of Sweden.—From Säcken Reef in the Kosterfjord to southern Kattegat (Rees & Rowe 1969; Jägerskiöld 1971).

Elsewhere.—Often described as "cosmopolitan." From Spitzbergen and the northern seas of the Russian Federation at least to Morocco in the eastern North Atlantic (Naumov 1960; Cornelius 1995b; Ramil & Vervoort 1992), and from Foxe Basin in the Canadian Arctic and west Greenland to Long Island Sound in the west (Broch 1918; Calder 2004); from the northeastern seas of the Russian Federation to Japan (Hirohito 1995) in the western North Pacific, and from Alaska to Washington state (Fraser 1937) in the east.

Sertularella rugosa (Linnaeus, 1758)

Fig. 37

Sertularia rugosa Linnaeus, 1758: 809.

Sertularella rugosa.—Segerstedt, 1889: 17, 26.—Lönnberg, 1903: 60.—Jäderholm, 1909: 101, pl. 11, fig. 14.—Gislén, 1930: 346.—Rees & Rowe, 1969: 18.—Jägerskiöld, 1971: 64.—Cornelius, 1979: 290.

Type locality. UK: England, Brighton (Cornelius 1979: 290).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, one colony, up to 6 mm high, on *Flustra* sp., without gonophores, ROMIZ B3910.

Remarks. Unlike many species of hydroids, the synonymy of *Sertularella rugosa* (Linnaeus, 1758) is uncomplicated (see Cornelius 1979). Some authors (e.g., Cornelius 1979, 1995b; Schuchert 2001a) have suggested that *Sertularella tenella* (Alder, 1856) may be identical with *S. rugosa* (Linnaeus, 1758), but the two seem quite distinct morphologically.

Rees & Rowe (1969) noted that *S. rugosa* is common on colonies of the bryozoan *Flustra* in western Sweden, and it was found on that substrate in the Kosterhavet during this study. Kramp (1935b) reported it to be common in shallow waters (0–35 m) along the Danish coast on substrates such as algae, other hydroids, the bryozoan *Flustra foliacea*, and the sponge *Halichondria panicea*. Christiansen (1972) found it on the same species of sponge in the Oslofjord. The association of this hydroid with *Flustra foliacea* was described in Stebbing (1971).

Reports of this boreal species from the tropical eastern Pacific and from Peru by Fraser (1938, 1948) seem questionable.

Reported distribution. West coast of Sweden.—Kosterfjord to southern Kattegat (Jägerskiöld 1971).
Elsewhere.—In the northern hemisphere from the Barents and White seas to western France (Linko 1912; Naumov 1960; Cornelius 1995b) in the eastern Atlantic, from Greenland and Labrador to Long Island Sound (Schuchert 2001a; Calder 2004) in the western Atlantic, from Alaska to California (Fraser 1948) in the eastern Pacific, and from the Bering Sea to Japan (Yamada 1959; Naumov 1960) in the western Pacific.

Sertularella tenella (Alder, 1856)

Fig. 38

Sertularia tenella Alder, 1856: 357, pl. 13, figs. 3–6.

Sertularella tenella.—Segerstedt, 1889: 17, 26.—Jäderholm, 1909: 102, pl. 11, fig. 15.—Kramp, 1935b: 178, fig. 73C.—Rees & Rowe, 1969: 19.—Jägerskiöld, 1971: 64.—Cornelius, 1979: 292; 1995b: 81, fig. 19A.

Type locality. UK: England, Northumberland (Cornelius & Garfath 1980: 285).

Museum material. Kosterhavet, 58°53.039'N, 11°05.602'E, 160–30 m, 06.ix.2010, biological dredge, R/V *Nereus*, three colonies, with one on a shell fragment, one on *Abietinaria abietina*, and one on a gastropod egg case, up to 1.2 cm high, without gonophores, ROMIZ B3881.

Remarks. Hydroids of *Sertularella tenella* Alder, 1856 somewhat resemble those of *S. rugosa* (Linnaeus, 1758) in being relatively small and in having annulated hydrothecae. Cornelius (1995b: 82) listed six characters useful in distinguishing *S. tenella* from its congener: (1) the aperture is perpendicular to the hydrothecal axis rather than being outward-inclined, (2) hydrothecae are widely separated vertically rather than being bunched together, (3) a notch is absent just below the rim on the abcauline wall of the hydrotheca, (4) hydrothecae are adnate for about ¼ rather than ¼–½ of their length, (5) the number of hydrothecal annulations is 5–6 rather than 3–4, and (6) its typical substrate is usually other hydroids rather than flustrid bryozoans.

Records indicate that *S. tenella* is common along the coast of western Sweden from the mid-Kattegat northwards (see Checklist). By contrast, it is reportedly infrequent in Danish waters (Kramp 1935b) and in the Oslofjord (Christiansen 1972).

Records of this typically boreal species from the Caribbean region (e.g., Fraser 1944) are almost certainly erroneous.

Reported distribution. West coast of Sweden.—From the border with Norway to mid-Kattegat (Jägerskiöld 1971).

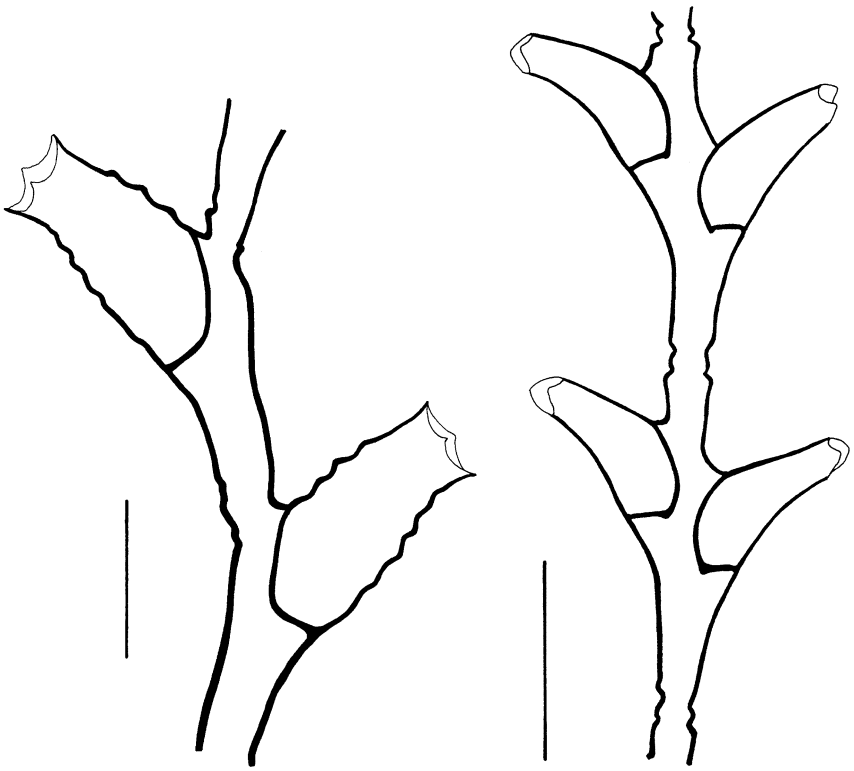

FIGURE 38. *Sertularella tenella*: part of hydrocaulus with two hydrothecae, ROMIZ B3881. Scale equals 0.5 mm.
FIGURE 39. *Sertularia tenera*: part of branch with two pairs of subopposite hydrothecae, ROMIZ B3927. Scale equals 0.5 mm.

Elsewhere.—In the North Atlantic from the Barents Sea and Svalbard to the Atlantic coast of France (Cornelius 1995b; Ronowicz 2007), and from Hudson Bay and Greenland to Cape Cod (Fraser 1944; Calder 1970). In the North Pacific from the Bering Sea southeastwards to California and southwestwards to Japan (Fraser 1937; Yamada 1959; Naumov 1960).

Sertularia tenera G.O. Sars, 1874

Fig. 39

Sertularia tenera G.O. Sars, 1874: 108, pl. 4, figs. 1–4.—Segerstedt, 1889: 18, 27.—Jägerskiöld, 1971: 64.
Thuiaria tenera.—Jäderholm, 1909: 93.
not *Sertularia tenera*.—Cornelius, 1979: 299, figs. 27a, b [=*Sertularia spitzbergensis* Jäderholm, 1909].

Type locality. Norway: Skudesnæs, in open ocean (G.O. Sars 1874: 109).

Museum material. Väderöarna, 58°35.005'N, 11°04.983'E, 121–50 m, 13.ix.2010, biological dredge, R/V *Nereus*, on a rock, 11 plumes, 3.7 cm high, with one developing gonotheca, ROMIZ B3927.

Remarks. *Sertularia tenera* G.O. Sars, 1874 was originally described from the open coast off southwestern Norway. Material from western Sweden, collected here, corresponded closely with the original account of the species. These small and fine hydroids were initially thought to be juveniles of either *Sertularia cupressina* Linnaeus, 1758 or *S. argentea* Linnaeus, 1758, or even *Hydrallmania falcata* (Linnaeus, 1758). However, presence of a developing gonotheca on one of the plumes provided evidence that these were fully developed colonies. Indeed, they corresponded with an account and illustration of *S. tenera* from Karlsö, northern Norway, by Jäderholm (1909). His material, of a similar size and slenderness, bore fully developed gonothecae. *Sertularia arctica* Allman, 1874b from Spitzbergen and *S. birulae* Schydlowsky, 1902, from the White Sea, appear very similar morphologically.

Hydroids of *S. tenera* observed here, and those described by authors including G.O. Sars (1874), Winther (1880b), Jäderholm (1909, as *Thuiaria tenera*), Ritchie (1911, as *T. tenera*), Kudelin (1914), and Kramp (1935b), differ significantly in morphology from many other accounts of the species. A distinctive morphotype identified as *Sertularia tenera* by Thompson (1887), Marktanner-Turneretscher (1895), Broch (1910, 1918), Calder (1970), Cornelius (1979), and Schuchert (2001a), as *Thuiaria arctica* forma *siberica* and *T. arctica* forma *spitzbergensis* by Jäderholm (1909), as *Sertularia tenera arctica* by Kudelin (1914), and as *Thuiaria tenera* by Fraser (1944), is regarded here as a different species. Unlike *S. tenera*, hydrothecae are almost strictly alternate rather than being subopposite, and their shape is relatively thick and close to triangular instead of decidedly slender and curved. Its hydrocladia are sometimes arranged in a spiral distally instead of being in one plane throughout, and its colonies tend to be larger and more robust. Finally, its gonothecae have longitudinal ridges and are polygonal in cross-section instead of being smooth and oval in cross section. This form appears to be more characteristically Arctic or subarctic in distribution than *S. tenera*.

This misidentified morphotype is not considered conspecific with *Sertularia arctica* Allman, 1874b, a species more like the true *S. tenera*. The oldest available names for it appear to be the simultaneous synonyms *Thuiaria arctica* forma *sibirica* and *T. arctica* forma *spitzbergensis* of Jäderholm (1909), with the names of the two forms being taken here as subspecific (International Code of Zoological Nomenclature, Art. 45.6.4). Acting as First Reviser, I assign priority to the name *spitzbergensis* over *siberica* for the species, the binomen being *Sertularia spitzbergensis* (Jäderholm, 1909). The name *spitzbergensis*, elevated in rank from subspecific to specific, was chosen because the species it represents is presently better known from the northern North Atlantic and adjacent Arctic than from the far-eastern seas of the Russian Federation, as implied by the other eligible name.

Other records of *S. tenera* are numerous (e.g., Hincks 1874b; Thompson 1887; Marktanner-Turneretscher 1890, 1895; Levinsen 1893a, b; Vanhöffen 1897; Bonnevie 1899; Nutting 1899, 1904; Sæmundsson 1902; Broch 1908; Hartlaub & Scheuring 1915; Jäderholm 1919; Kramp 1932a, b, 1938, 1942, 1943; Yamada 1950; Naumov 1960; Antsulevich 1987; Węsławski *et al*. 1997; Henry & Kenchington 2004; Henry *et al*. 2006: 68), but the identity of hydroids assigned to the species is uncertain in nearly all of these works. In some, hydroids differ from both *S. tenera* and *S. spitzbergensis*.

Given the confusion over the identity of *S. tenera*, its actual distribution is in considerable doubt. Based on records that appear sound, the currently known range of *S. tenera* is taken here to be from northern Scandinavia to northern Britain in the eastern North Atlantic.

Reported distribution. West coast of Sweden.—From Säcken area to near Anholt in the Kattegat, 23–85 m (Jägerskiöld 1971: 64).

Elsewhere.—North Atlantic: Norway (Jäderholm 1909) to Scotland (Ritchie 1911).

Tamarisca tamarisca (Linnaeus, 1758)

Fig. 40

Sertularia tamarisca Linnaeus, 1758: 808.
Diphasia tamarisca.—Segerstedt, 1889: 17, 26.
Sertularella tamarisca.—Jäderholm, 1909: 97, pl. 11, figs. 4–7.
Diphasia cf. *tamarisca*.—Gislén, 1930: 324.
Sertomma tamarisca.—Jägerskiöld, 1971: 64.

Type locality. Ireland: Dalkey Island (Cornelius 1979: 305).

Museum material. Kosterhavet, 58°53.367’N, 11°04.240’E, 90 m, 15.ix.2010, biological dredge, R/V *Nereus*, one colony, 6.7 cm high, without gonothecae, ROMIZ B3933.

Remarks. *Tamarisca tamarisca* (Linnaeus, 1758) is a large and distinctive hydroid with a relatively uncomplicated taxonomic history. The most troublesome nomenclatural question in the past was its generic assignment, but for the past half-century it has been referred to *Tamarisca* Kudelin, 1914. Originally founded as a subgenus of *Sertularella* Gray, 1848, *Tamarisca* was raised to generic rank by Naumov (1960) and has been recognized as such in subsequent works. *Sertomma* Stechow, 1919b is considered a synonym (Cornelius 1979). Details on its taxonomy are given by Cornelius (1979; 1995b).

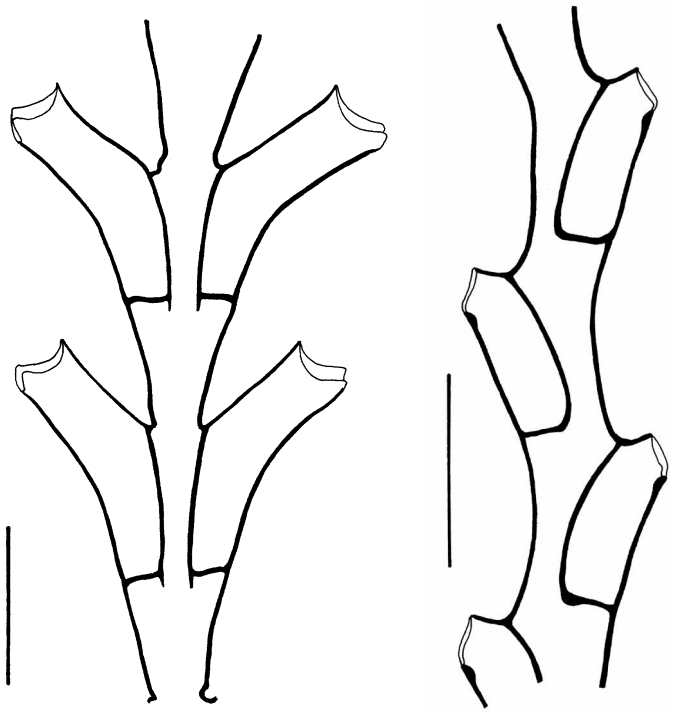

FIGURE 40. *Tamarisca tamarisca*: part of branch with two pairs of opposite hydrothecae, ROMIZ B3933. Scale equals 1.0 mm.

FIGURE 41. *Thuiaria articulata*: part of branch with alternate and deeply immersed hydrothecae, ROMIZ B3902. Scale equals 0.5 mm.

This species has been reported several times at locations in western Sweden (see Checklist). It was not found in the Oslofjord by Christiansen (1972), but Kramp (1935b) included records of *T. tamarisca* from the Skagerrak off Hanstholm and Hirtshals, Denmark, at depths of 57 and 225 m.

The centre of distribution of *Tamarisca tamarisca* is the eastern North Atlantic; records of it in the western North Atlantic are few (see Fraser 1944). The only specimen recorded in the catalog of the National Museum of Natural History, Smithsonian Institution (USNM 29443), is from Plymouth Sound, UK. No records of it were found in online searches of collections at the Museum of Comparative Zoology, Harvard University, and the Peabody Museum of Natural History, Yale University.

Reported distribution. West coast of Sweden.—Koster area to Gullmarfjord (Jäderholm 1909).

Elsewhere. North Atlantic from the Barents and White seas to the Bay of Biscay (Naumov 1960; Cornelius 1995b; Altuna 2007) in the east, and from west Greenland to Massachusetts Bay in the west (Fraser 1944, as *Diphasia tamarisca*; Schuchert 2001).

Thuiaria articulata **(Pallas, 1766)**

Fig. 41

Sertularia articulata Pallas, 1766: 137.
Salacia lonchitis.—Rees & Rowe, 1969: 20.
Thuiaria lonchitis.—Segerstedt, 1889: 19, 27.—Jäderholm, 1909: 89, pl. 9, fig. 3.—Kramp, 1935b: 197, fig. 81C.—Jägerskiöld, 1971: 64.

Type locality. UK: England, Lancashire, off Lytham (53°44’N, 02°58’W), based on a neotype (Cornelius 1979: 276).

Museum material. Kosterhavet, 58°52.536’N, 11°06.229’E, 6–30 m, 07.ix.2010, SCUBA, one colony, 7 cm high, without gonophores, coll. B.E. Picton, ROMIZ B3902.

Remarks. The troubled synonymy of *Thuiaria articulata* (Pallas, 1766) has been resolved to a considerable extent by Cornelius (1979, 1995b). Syntypes of *Sertularia lichenastrum* Linnaeus, 1758, sometimes considered its senior synonym, are much more like *Thuiaria alternitheca* Levinsen, 1893b than *T. articulata* (Cornelius 1979: Fig. 18a –c). Cornelius also concluded that *T. lonchitis* (Ellis & Solander, 1786), a name often applied to this species, is an objective synonym of *T. articulata*, both having been based on a species of hydroid described by Ellis (1755). Supposed differences in branching, whether alternate or opposite, are inconsequential because the arrangement can vary even within a given colony (Schuchert 2001a).

Thuiaria thuja (Linnaeus, 1758), present in southern Scandinavian waters and elsewhere in northwest Europe (Cornelius 1995b), differs in having branched hydrocladia that arise in a spiral around the stem. Hydrocladia of *T. articulata* are unbranched and pinnately arranged.

Two species somewhat resembling *T. articulata* occur at higher latitudes of the North Atlantic. Schuchert (2001a) employed a ratio of the length of the free part of the adcauline wall of the hydrotheca to the diameter of the hydrothecal orifice to distinguish *T. carica* Levinsen, 1893c. The ratio was consistently above 1 in *T. carica*, but mostly below 0.8 in *T. articulata*. In *T. laxa* Allman, 1874a, hydrocladia of older colonies are branched instead of simple, and hydrothecae are entirely or almost entirely immersed in the hydrocladia, instead of being partly free.
Thuiaria kolaensis Jäderholm, 1907, originally described from the Kola Peninsula, was included in the synonymy of *T. lonchitis* by Vervoort (1946). A detailed synonymy of *T. articulata* is given in Cornelius (1979). Meanwhile, however, molecular studies suggest there may be crypsis within this species (Moura *et al*. 2011).

Thuiaria articulata has been reported frequently in southern Scandinavia (e.g., Jäderholm 1909, as *T. lonchitis*; Kramp 1935b, as *T. lonchitis*; Rees & Rowe 1969, as *Salacia lonchitis*; Jägerskiöld 1971, as *T. lonchitis*; Christiansen 1972).

Reported distribution. West coast of Sweden.—From the border with Norway to near Anholt in the Kattegat (Jägerskiöld 1971, as *Thuiaria lonchitis*).

Elsewhere.—Circumpolar, from the Arctic Ocean to Britain and Brittany in the eastern Atlantic (Cornelius 1979, 1995b), to Nantucket, Massachusetts (Fraser 1944) in the western Atlantic, to the Queen Charlotte Islands in the eastern Pacific (Fraser 1937, as *Thuiaria lonchitis*) to Japan in the western Pacific (Yamada 1959).

Family Kirchenpaueriidae Stechow, 1921a

Kirchenpaueria pinnata (Linnaeus, 1758)

Fig. 42

Sertularia pinnata Linnaeus, 1758: 813.
Plumularia pinnata.—Winther, 1880a: 252.—Segerstedt, 1889: 20, 27.—Lönnberg, 1898: 53.—Jäderholm, 1909: 106, pl. 12, figs. 3, 4.
Plumularia (*Kirchenpaueria*) *pinnata*.—Gislén, 1930: 341.
Kirchenpaueria pinnata.—Michanek 1967: 456.—Rees & Rowe, 1969: 20.—Jägerskiöld, 1971: 63.

Type locality. "Habitat in Oceano" (Linnaeus 1758: 813).

Museum material. Kosterhavet, 58°52.567'N, 11°06.313'E, 6–30 m, 07.ix.2010, SCUBA, one colony, up to 10 cm high, with a few mostly smooth gonothecae (empty), coll. B.E. Picton, ROMIZ B3896.

Remarks. Descriptions and illustrations of *Kirchenpaueria pinnata* (Linnaeus, 1758) in contemporary works include those of Ramil & Vervoort (1992), Cornelius (1995b), Medel & Vervoort (1995), and Ramil *et al*. (1998). *Kirchenpaueria elegantula* (G.O. Sars 1874) from the Hardangerfjord, southwestern Norway, is considered conspecific or questionably conspecific (e.g., Bedot 1916; Kramp 1935b; Vervoort 1946; Christiansen 1972; Ramil & Vervoort 1992; Cornelius 1995b; Medel & Vervoort 1995; Ramil *et al*. 1998). Opinions differ whether *K. similis* (Hincks, 1861) from the Isle of Man, UK, should be included as a synonym, with some regarding it as identical (e.g., Bedot 1916; Kramp 1935b; Vervoort 1946; Ramil & Vervoort 1992; Medel & Vervoort 1995; Ramil *et al*. 1998; Schuchert 2011) and others as a valid species (e.g., Jäderholm 1909; Cornelius 1992b, 1995b). A number of characters have been used to distinguish *K. similis* from its congener, such as the presence of heteromeric instead of homomeric hydrocladia and existence of several hydrocladia per stem internode instead of a single one (Cornelius 1995b). However, Moura *et al*. (2008) reported virtually no variation in sequences of the mitochondrial 16S RNA gene in haplotypes of *K. pinnata* and *K. similis*, suggesting that the two are conspecific. Leclère *et al*. (2007) and Peña Cantero *et al*. (2010) drew the same conclusion, although molecular data in the three reports are all based on

the same single sample of somewhat atypical material of *K. similis* from the vicinity of Roscoff, France (Peter Schuchert, pers. comm., 22 November 2011). In any case, material examined here corresponded with accounts of the typical form of *K. pinnata*.

Gonothecae of *K. pinnata* are known to be highly varied in shape, with nearly smooth ones next to those with ribs or spines (e.g., Vervoort 1949). Millard (1975) and Medel & Vervoort (1995) noted that spinulation seems related to both age and sex, with younger gonothecae, and especially those of male colonies, appearing to be smoother.

The species is common in waters of southwestern Scandinavia (Kramp 1935b; Jägerskiöld 1971; Christiansen 1972).

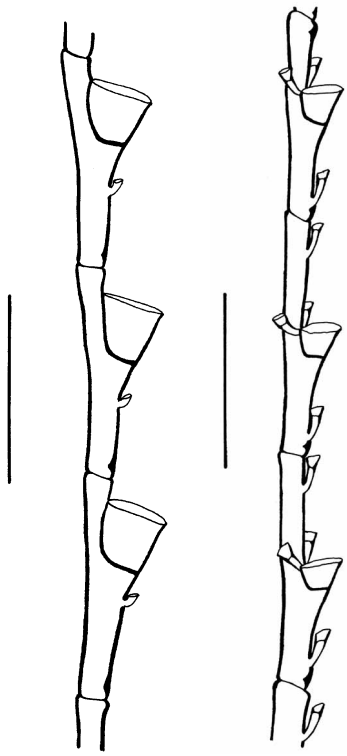

FIGURE 42. *Kirchenpaueria pinnata*: part of hydrocladium with hydrothecae and minute nematothecae, ROMIZ B3896. Scale equals 0.5 mm.
FIGURE 43. *Nemertesia ramosa*: part of hydrocladium with hydrothecae and nematothecae, ROMIZ B3884. Scale equals 0.5 mm.

Reported distribution. West coast of Sweden.—Sacken Reef (Rees & Rowe 1969) to Öresund (Winther 1880a).

Elsewhere.—Eastern North Atlantic from northern Norway (Christiansen 1972) at least to Morocco, including the Mediterranean Sea (Cornelius 1995b); also reported from the eastern South Atlantic (Vervoort 1959; Millard 1975).

Family Plumulariidae McCrady, 1859

Nemertesia ramosa Lamouroux, 1816

Fig. 43

Nemertesia ramosa Lamouroux, 1816: 164.—Jägerskiöld, 1971: 63.—Cornelius, 1995b: 156.
Antennularia ramosa.—Segerstedt, 1889: 20, 27.—Jäderholm, 1909: 105, pl. 12, fig. 2.
Antennularia (*Nemertesia*) *ramosa*.—Gislén, 1930: 310.

Type locality. "Océan Européen" (Lamouroux 1816: 164).

Museum material. Kosterhavet, 58°52.424'N, 11°06.178'E, 35–11 m, 06.ix.2010, biological dredge, R/V *Nereus*, on a pebble and unattached, several colony fragments, up to 7 cm high, with gonothecae, ROMIZ B3884.

Remarks. Three species of the genus *Nemertesia* Lamouroux, 1812, *N. antennina* (Linnaeus, 1758), *N. ramosa* Lamouroux, 1816, and *N. norvegica* (G.O. Sars, 1874), have been reported from southern Scandinavia. The first two are known from western Sweden (see Checklist) and are widespread in European waters. The only record of *N. norvegica* from the Skagerrak-Kattegat area is that of G.O. Sars (1874), who described it from Stormeberget in the Oslofjord (Christiansen 1972). The species has been observed infrequently and is poorly known. Cornelius (1995b: 146) noted the possibility that it might be referable to *Antennopsis* Allman, 1877, if that genus were to be recognized as valid.

Nemertesia ramosa, collected here from the Kosterhavet, is easily distinguished from *N. antennina* (Linnaeus 1758) in having homomeric (with all or mostly all hydrocladial internodes hydrothecate) rather than heteromeric (with hydrocladial internodes alternately hydrothecate and non-hydrothecate) hydrocladia. *Nemertesia norvegica* is similar, but its stems are non-canaliculate, apparently unbranched, and have four or fewer longitudinal rows of hydrocladia (Cornelius 1995b). In addition, gonothecae of *N. norvegica* are described by Cornelius as being in the form of a "crescent-shaped sausage" rather than "curved ovoid."

Although *Nemertesia ramosa* is known from southern Iceland (Schuchert 2001a), the Skagerrak presently appears to be its northern limit in continental Europe. In addition to its Atlantic distribution the species has been reported from the Indian Ocean, the Malay Archipelago, the South China Sea, and the western South Atlantic, but Ramil & Vervoort (1992) provided evidence that materal so identified from those areas was different. They concluded that *N. ramosa*, at least so far, is a "purely Atlantic" species, and discussed its synonymy. Other accounts of the taxonomy of the species are given in works such as those of Cornelius (1995b) and Calder & Vervoort (1998).

In waters of southwestern Scandinavia, *Nemertesia ramosa* has been reported from the west coast of Jutland in Denmark (Kramp 1935b), from the west coast of Sweden (Jäderholm 1909), and from the Oslofjord, Norway (Christiansen 1972).

Reported distribution. West coast of Sweden.—From the Säcken Reef area to Flatholmen (Jäderholm 1909; Jägerskiöld 1971).

Elsewhere.—Eastern Atlantic from southern Iceland and the Oslofjord, Norway, to South Africa (Christiansen 1972; Ramil & Vervoort 1992; Schuchert 2001a); Mid-Atlantic Ridge (Calder & Vervoort 1998).

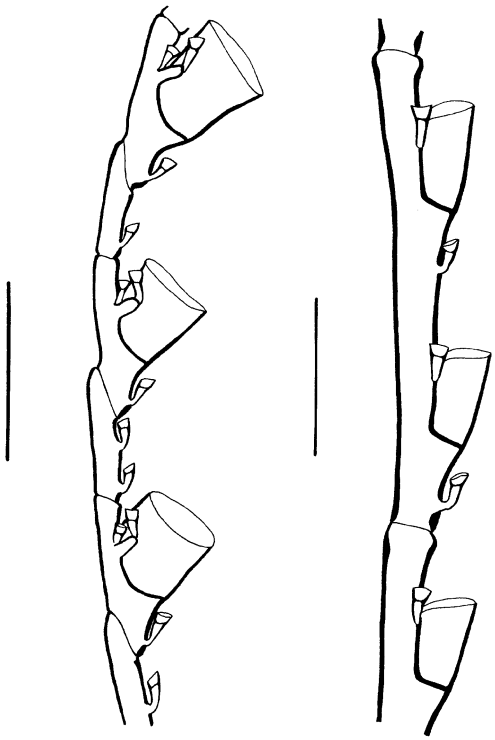

FIGURE 44. *Halopteris catharina*: part of hydrocladium with hydrothecae and nematothecae, ROMIZ B3929. Scale equals 0.5 mm.

FIGURE 45. *Schizotricha frutescens*: part of hydrocladium with hydrothecae and nematothecae, ROMIZ B3928. Scale equals 0.5 mm.

Family Halopteridídae Millard, 1962

***Halopteris catharina* (Johnston, 1833)**
Fig. 44

Plumularia catharina Johnston, 1833: 497, figs. 61–62.—Jäderholm, 1909: 107, pl. 12, fig. 7.
Plumularia catharinae.—Segerstedt, 1889: 21, 27 [incorrect subsequent spelling].
Halopteris catharina.—Rees & Rowe, 1969: 21.
Schizotricha catharina.—Jägerskiöld, 1971: 64.

Type locality. UK: England, Berwick; Scotland, Firth of Forth (Johnston 1833: 497).

Museum material. Väderöarna, 58°35.010'N, 11°04.864'E, 121–50 m, 13.ix.2010, biological dredge, R/V *Nereus*, on a bivalve, one small colony, 5 mm high, without gonophores, ROMIZ B3929.

Remarks. Relatively recent taxonomic accounts of *Halopteris catharina* (Johnston, 1833) have been given by authors including Ramil & Vervoort (1992), Cornelius (1995b), and Schuchert (1997). Most records of the species have been from boreal and temperate waters of the eastern north Atlantic, and it appears to be relatively common at moderate depths along the west coast of Sweden (see Checklist). It is also known from Danish waters (Kramp 1935b, as *Schizotricha catharina*) and from the Oslofjord (Christiansen 1972, as *Antennella catharina*). The species can be distinguished from known congeners in having hydrocladia that are usually arranged in opposite pairs, and hydrothecae that are flanked by two pairs of lateral nematothecae. Female gonothecae of *H. catharina* resemble a flattened cylinder (Schuchert 1997).

Reports of *H. catharina* from pelagic *Sargassum* in the western North Atlantic were considered misidentifications of *H. diaphana* (Heller, 1868) earlier by me (Calder 1997). In turn, records of *H. diaphana* from that region have been referred to *H. alternata* (Nutting, 1900) by Schuchert (1997), who indicated that *H. diaphana* appears limited to the Mediterranean Sea and to Brazil.

Reported distribution. West coast of Sweden.—Säcken Reef area to southern Kattegat (Jägerskiöld 1971).
Elsewhere.—Atlantic Ocean from Trondheim, Norway, and Iceland to Namibia in the east (Jäderholm 1909; Ramil & Vervoort 1992), and from Georgia, USA, to the Straits of Magellan in the west (Vervoort 1972).

***Schizotricha frutescens* (Ellis & Solander, 1786)**
Fig. 45

Sertularia frutescens Ellis & Solander, 1786: 55, pl. 6, figs. a, A.
Plumularia frutescens.—Segerstedt, 1889: 21, 27.
Schizotrichia frutescens.—Jäderholm, 1909: 108, pl. 12, fig. 9 [incorrect subsequent spelling of *Schizotricha* Allman, 1883].
Schizotricha frutescens.—Kramp, 1935b: 160, fig. 65B, C.—Rees & Rowe, 1969: 21.—Jägerskiöld, 1971: 64.

Type locality. UK: England, North Yorkshire, Scarborough (Ellis & Solander 1786: 55).

Museum material. Väderöarna, 58°35.010'N, 11°04.864'E, 121–50 m, 13.ix.2010, biological dredge, R/V *Nereus*, one colony, 2.8 cm high, without gonophores, ROMIZ B3928.

Remarks. Although sometimes included in the genus *Polyplumaria* G.O. Sars, 1874 (e.g. Broch 1918; Christiansen 1972; Cornelius 1995b), Peña Cantero & Vervoort (1999) maintained that *Sertularia frutescens* Ellis & Solander, 1786 was referable instead to *Schizotricha* Allman, 1883. They also provided a detailed synonymy, description, and illustration of this hydroid. Other recent accounts of *S. frutescens* include those of Ramil & Vervoort (1992), Cornelius (1995b), and Schuchert (1997).

Schizotricha frutescens, widely distributed in warmer waters of the eastern North Atlantic including the Mediterranean Sea, has been reported over a depth range of about 20–1262 m (Christiansen 1972; Ramil & Vervoort 1992; Peña Cantero & Vervoort 1999). It has been reported a number of times previously from the west coast of Sweden (Segerstedt 1889; Jäderholm 1909; Kramp 1935b; Rees & Rowe 1969; Jägerskiöld 1971), as well as from Denmark (Kramp 1935b) and the nearby Oslofjord in Norway (Christiansen 1972). The colony examined here had live hydranths but was not in good condition, with broken hydrocladia.

Reported distribution. West coast of Sweden.—From the border with Norway to mid-way along the Kattegat coast.

Elsewhere.—Eastern Atlantic from Iceland and the Trondheim area, Norway, to Morocco; questionably also from South Africa and the Kerguelen Islands in the southern Indian Ocean (Millard 1975; Ramil & Vervoort 1992; Cornelius 1995b; Peña Cantero & Vervoort 1999).

SUBORDER PROBOSCOIDEA Broch, 1910

Family Campanulariidae Johnston, 1837

Subfamily Clytiinae Cockerell, 1911

Clytia gigantea (Hincks, 1866)

Figs. 46, 47

Campanularia gigantea Hincks, 1866: 297.—Jäderholm, 1909: 69, pl. 7, figs. 1–3.

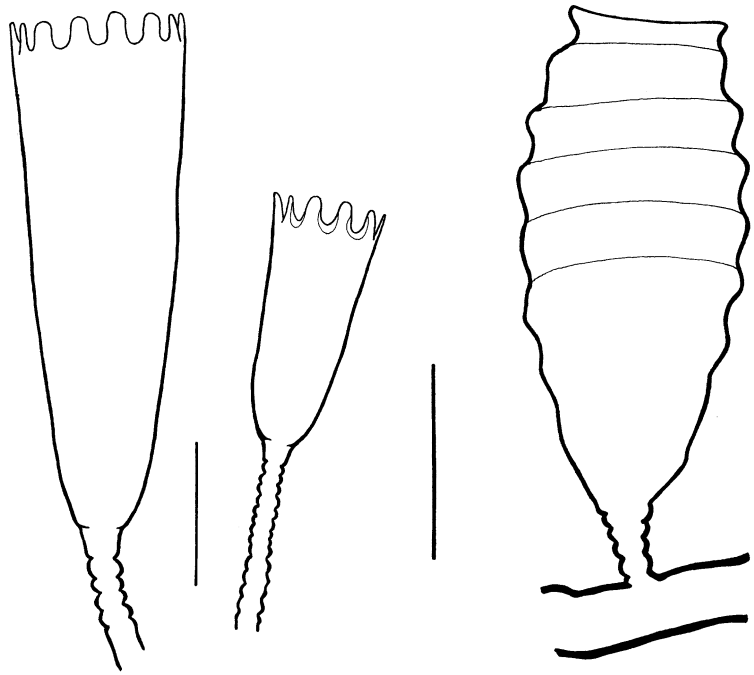

FIGURE 46. *Clytia gigantea*: two hydrothecae, ROMIZ B3917. Scale equals 0.5 mm.
FIGURE 47. *Clytia gigantea*: gonotheca, ROMIZ B3917. Scale equals 0.5 mm.

Type locality. UK: Scotland, Lamlash Bay (Hincks 1866: 297).

Museum material. Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, on tube of polychaete, one colony, up to 2.2 cm high, with gonothecae, ROMIZ B3917.

Remarks. This nominal species has sometimes been combined with *Clytia hemisphaerica* (Linnaeus, 1767). Cornelius (1982) considered them identical, and a number of recent authors, including me (Calder, 1991; Cairns *et al*. 2002), adopted that opinion. After examining the material above, however, *Clytia gigantea* (Hincks, 1866) is upheld as a valid species based on a combination of characters including its strikingly robust colony form, sparingly branched pedicels, and exceptionally large, elongate, gradually tapered hydrothecae. Moreover, hydrothecal cusps in C. *gigantea* are linguiform (Fig. 46) rather than wavy as in *C. hemisphaerica*. Specimens studied here were much like those reported earlier from Bohuslän by Jaderholm (1909: pl. 7, figs. 1–3). In reporting the species from the Oslofjord, Norway, Christiansen (1972) noted that some hydrothecae in his material reached 3 mm long. Ones exceeding 2 mm in length were observed on the hydroid colony reported herein from Kosterhavet.

Reports of *Clytia gigantea* from the Mediterranean, and from the Atlantic and Pacific coasts of North America (see below), need confirmation. The species, or a variant of it, has also been reported from Chile (Leloup 1974; Galea *et al*. 2009).

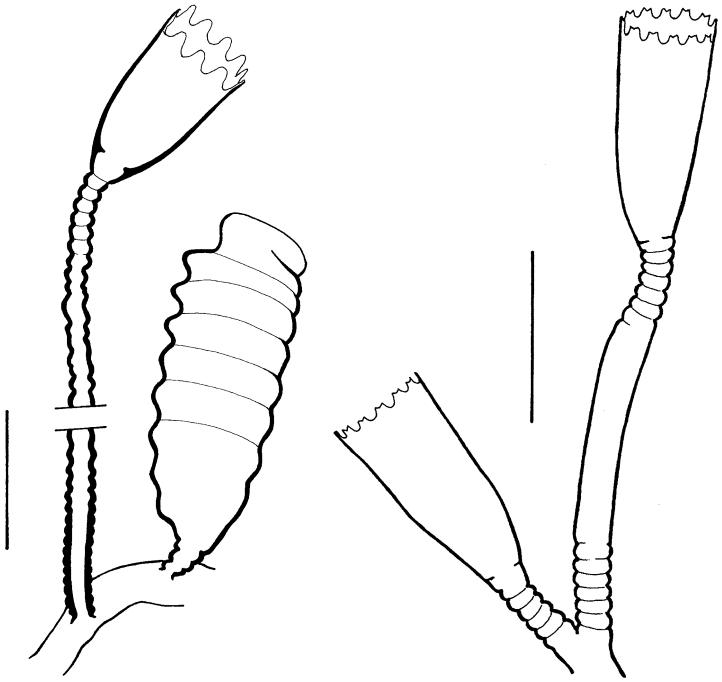

FIGURE 48. *Clytia hemisphaerica*: part of colony with hydrotheca and gonotheca, ROMIZ B3930. Scale equals 0.5 mm.
FIGURE 49. *Gonothyraea loveni*: part of colony with two hydrothecae, ROMIZ B3885. Scale equals 0.5 mm.

Gonophores of this species, examined here (Fig. 47), are previously unknown in Europe. Those of the variant form from Chile have been described and illustrated by Leloup (1974) and Galea *et al.* (2009).

Reported distribution. West coast of Sweden.—Bohuslän (Jäderholm 1909, as *Campanularia gigantea*). Elsewhere.—Boreal waters of the North Atlantic from Norway to Great Britain in Europe (Hincks 1868; Christiansen 1972), and from Newfoundland to Cape Cod in North America (Fraser 1944); questionable records exist from the Mediterranean (e.g., Pieper 1884; Babić 1904), the Queen Charlotte Islands in the northeast Pacific (Fraser 1937, as *Campanularia gigantea*), and Chile (Leloup 1974; Galea *et al*. 2009).

Clytia hemisphaerica (Linnaeus, 1767)

Fig. 48

Medusa hemisphaerica Linnaeus, 1767: 1098 [medusa stage].
Clytia johnstoni.—Segerstedt, 1889: 11, 25.—Jäderholm, 1909: 61, pl. 5, fig. 12.
Clytia hemisphaerica.—Rees & Rowe, 1969: 16.—Cornelius, 1982: 75, fig. 9k.—Östman, 1999: 17.
Campanularia johnstoni.—Jägerskiöld, 1971: 61.
Clytia hemisphaerica form (or forma) *johnstoni*.—Östman, 1979a: 5; 1979b: 127, figs. 1, 2, 4, 5; 1982a: 156; 1983: 6.

Type locality. "Habitat in Oceano Belgico" (Linnaeus 1767: 1098).

Museum material. Kosterhavet, 58°50.278'N, 11°02.680'E, 13 m, 07.ix.2010, biological dredge, R/V *Nereus*, on algae, one stolonal colony, without gonophores, ROMIZ B3894.—Kosterhavet, 58°53.093'N, 11°05.668'E, 20–30 m, 09.ix.2010, biological dredge, R/V *Nereus*, on algae, one stolonal colony, with gonophores, ROMIZ B3907.—Saltö naturreservat, outer ledge, 58°52'40"N, 11°06'53"E, <1 m, 11.ix.2010, collected manually, on red algae, two stolonal colonies, with gonophores, ROMIZ B3923.—Väderöarna, 58°34.931'N, 11°04.931'E, 121–50 m, 13.ix.2010, biological dredge, R/V *Nereus*, on antenna of a decapod crustacean, one colony, with a few branched pedicels, up to 9 mm high, with gonophores, ROMIZ B3930.

Remarks. A comprehensive taxonomic overview of *Clytia hemisphaerica* (Linnaeus, 1767) was given by Cornelius (1982), and additional details were provided by Calder (1991). The sympatric *C. gracilis* (M. Sars, 1850) is

similar, but its gonothecae have smooth rather than spirally ribbed walls. Nematocysts of the two species also differ (Östman 1979a). Östman added that colonies of *C. gracilis* are often branched, and hydrothecal cusps are sharp-pointed, whereas colonies of *C. hemsphaerica* are usually unbranched, and hydrothecal cusps are broad and symmetrical. Comments on *C. gigantea* (Hincks, 1866), sometimes included as a synonym, are given above. Although *C. hemisphaerica* is generally reported to be virtually cosmopolitan, Cornelius (1995b: 254) is probably correct that "nearly all" records of species of the taxonomically difficult genus *Clytia* Lamouroux, 1812 are suspect.

Clytia hemisphaerica has been reported numerous times along the west coast of Sweden (see Checklist). Hydroids of the species die back during winter in nearby waters of Denmark (Kramp 1935b: 100, as *Campanularia johnstoni* Alder, 1856) and the Oslofjord, Norway (Christiansen 1972: 293–294, as *Clytia johnstoni*).

Reported distribution. West coast of Sweden.—From the border with Norway to southern Kattegat (Jägerskiöld 1971).

Elsewhere.—North Atlantic from Svalbard and Finnmark to the Mediterranean Sea in Europe (Christiansen 1972; Cornelius 1982), and from Labrador to Florida in North America (Calder 2004). Reported to be circumglobal (Calder 1991).

Subfamily Obeliinae Haeckel, 1879

Gonothyraea loveni (Allman, 1859)

Fig. 49

Laomedea loveni Allman, 1859: 138.—Jägerskiöld, 1971: 63.
Campanularia geniculata.—Lovén, 1836: 281, pl. 6, figs. 1–10, pl. 7, figs. 11–18 [not *Obelia geniculata* (Linnaeus, 1758)].
Gonothyraea loveni.—Segerstedt, 1889: 13, 25.—Lönnberg, 1898: 52; 1899b: 17; 1903: 60.—Jäderholm, 1909: 64, pl. 6, fig. 2.—Östman, 1982a: 156; 1982b: 228; 1983: 6; 1999: 19.

Type locality. UK: Scotland, Firth of Forth, Cramond Island (Allman 1859: 137).

Museum material. Kosterhavet, 58°52.424'N, 11°06.178'E, 35–11 m, 06.ix.2010, biological dredge, R/V *Nereus*, on algae, three colony fragments, up to 9 mm high, without gonothecae, ROMIZ B3885.

Remarks. *Gonothyraea loveni* (Allman, 1859) and *G. hyalina* Hincks, 1866 have been regarded as distinct by some authors (e.g. Linko 1911; Broch 1918; Kramp 1935b; Hamond 1957; Christiansen 1972; Östman 1987, 1999) and as conspecific by others (e.g. Fraser 1944; Naumov 1960; Calder 1970; Cornelius 1982; Schuchert 2009). The two have been separated on differences in structure of the hydrothecal margin, with hydroids having notched cusps with vertical lines extending down from them being assigned to *G. hyalina* and those with slightly notched or unnotched cusps and no vertical lines to *G. loveni*. Athough likely conspecific, they are listed separately in the Checklist at the end of this work.The trophosome of *Laomedea neglecta* Alder, 1856 is similar, although hydrothecal cusps of this small species are more distinctly bimucronate.

Gonothyraea loveni is a decidedly eurytopic species. In estuaries of the American east coast, it was active at temperatures from 0–24.5° C (Calder 1971) and at salinities between 12–33‰ (Calder 1976). In the Gulf of Finland, it was observed at salinities as low as 5‰ by Alexander Antsulevich (Cornelius 1995b).

Isozymes and nematocysts have been investigated in Swedish populations of *G. loveni* by Östman (1982a, b, 1983, 1987, 1999). Other aspects of its biology are summarized by Cornelius (1982, 1995b).

Gonothyraea loveni is common in Danish waters (Kramp 1935b, as *Laomedea loveni*) and the Oslofjord, Norway (Christiansen 1972), as well as western Sweden (e.g., Jäderholm 1909). Cornelius (1995b) noted that the name of this species honours Sven Ludvig Lovén (1809–1895), the Swedish marine zoologist who first described and illustrated its unusual medusoids (Lovén 1836: pl. 7, as *Campanularia geniculata*).

Reported distribution. West coast of Sweden.—Kosterhavet to Öresund (Segerstedt 1889; this study).

Elsewhere.—From Svalbard and the north coast of the Russian Federation to the Mediterranean Sea and Morocco in the eastern North Atlantic (Cornelius 1982), and from Foxe Basin in the Canadian Arctic to South Carolina on North American shores (Calder 1970; 1990).

***Laomedea flexuosa* Alder, 1857**
Fig. 50

Laomedea flexuosa Alder, 1857: 122.—Östman, 1979a: 6; 1982a: 156; 1982b: 228; 1983: 6; 1999: 19 [the specific name *flexuosa* Alder, 1857 conserved and placed on Official List of Specific Names in Zoology, Opinion 1345 (ICZN 1985)].
Campanularia flexuosa.—Segerstedt, 1889: 14, 25.—Jäderholm, 1909: 68, pl. 6, fig. 15.
Campanularia (*Laomedea*) *flexuosa*.—Gislén, 1930: 316.

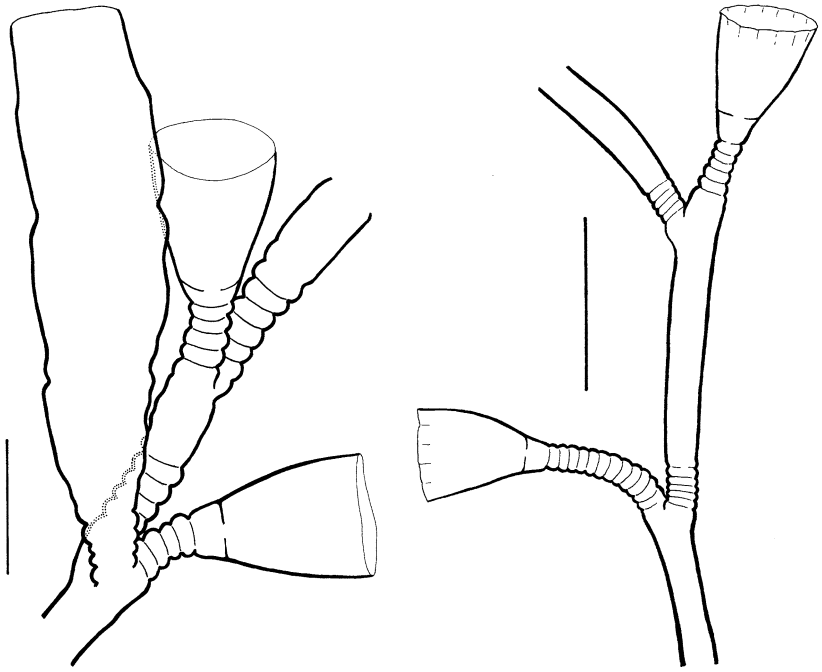

FIGURE 50. *Laomedea flexuosa*: part of colony with two hydrothecae and a female gonotheca, ROMIZ B3922. Scale equals 0.5 mm.
FIGURE 51. *Obelia dichotoma*: part of colony with two hydrothecae, ROMIZ B3898. Scale equals 0.5 mm.

Type locality. British Isles (Cornelius & Garfath 1980: 284).

Museum material. Saltö naturreservat, outer ledge, 58°52'40"N, 11°06'53"E, <1 m, 11.ix.2010, collected manually, on *Ascophyllum nodosum*, two colonies, up to 1.5 cm high, with female gonothecae, ROMIZ B3922.

Remarks. Together with *Dynamena pumila* (Linnaeus, 1758) and *Clava multicornis* (Forsskål, 1775), *Laomedea flexuosa* Alder, 1857 is common on boreal shores of both western Europe and eastern North America. While frequent intertidally on fucoids and other substrates, the species has occasionally been recorded as deep as 100 m (Cornelius 1995b). Records of *L. flexuosa* in western Sweden have predominantly been from very shallow waters, and it was not recorded at all in the extensive collections of Jägerskiöld (1971), most of which were obtained in deeper waters by dredging. In the nearby Oslofjord, southern Norway, it is common from the intertidal zone to a depth of about 3 m on algae and stones (Christiansen 1972). In Danish waters it is abundant where suitable substrates exist, and penetrates deep into the Baltic Sea (Kramp 1935b). The restricted vertical distribution of this hydroid in the White Sea was attributed by Marfenin & Belorustseva (2008) to intensive release of planula larvae during low tide, and to their subsequent rapid settlement as the water began to rise.

Notes on the biology of this species are given by Cornelius (1982, 1995b), and its cnidome has been characterized by Östman (1979a, 1982b, 1983, 1999). *Laomedea flexuosa* is the type species of the genus *Laomedea* Lamouroux, 1812, so designated under the plenary powers by the ICZN (1985) in Opinion 1345.

Reported distribution. West coast of Sweden.—Koster to Öresund (Segerstedt 1889).

Elsewhere.—In the North Atlantic from Svalbard and the north coast of the Russian Federation to the Mediterranean Sea, and southwards to west Africa in the east (Linko 1911, as *Campanularia flexuosa*; Cornelius 1982; Voronkov *et al*. 2010), and from the Gulf of St. Lawrence to Long Island Sound in the west (Fraser 1944, as *Campanularia flexuosa*). It has been reported as an invasive species in the Sea of Japan (e.g. Kashin *et al*. 2003). A record of this boreal hydroid from the Tortugas, Florida (Wallace 1909: 137, as *Campanularia flexuosa*), questioned by both Fraser (1944) and Vervoort (1968), is certainly based on a misidentification.

Obelia dichotoma (Linnaeus, 1758)

Figs. 51, 52

Sertularia dichotoma Linnaeus, 1758: 812.
Obelia dichotoma.—Segerstedt, 1889: 12, 25.—Lönnberg, 1898: 52; 1899b: 17.—Jäderholm, 1909: 63, pl. 5, fig. 15.—Rees & Rowe, 1969: 17.—Östman, 1982a: 156; 1982b: 228; 1983: 7.
Laomedea dichotoma.—Jägerskiöld, 1971: 63.—Östman, 1979a: 6; 1999: 19.
Obelia dichotoma form *dubia*.—Östman, 1983: 7; 1999: 19.
Obelia dichotoma form *plicata*.—Östman, 1983: 7; 1999: 19.

Type locality. UK: coast of SW England (Cornelius 1975a: 267).

Museum material. Kosterhavet, 58°52.567'N, 11°06.313'E, 6–30 m, 07.ix.2010, SCUBA, on algae and *Sertularella polyzonias*, one colony, up to 2.5 cm high, with gonothecae, coll. B.E. Picton, ROMIZ B3898.

Remarks. Linnaeus (1758) evidently based his account of *Sertularia dichotoma* (= *Obelia dichotoma*) on the earlier report of Ellis (1755), giving its provenance merely as "Habitat in Oceano." Cornelius (1975a) restricted the type locality of the species to southwest coast of England, where it was found by Ellis "...in great abundance."

Identification of material examined here was based on morphology and examination of the cnidome. In addition to A-type b-rhabdoids (microbasic b-mastigophores), exceedingly slender, elongate, and curved I_d-type isorhizas (Fig. 52c), and curved but somewhat thicker I_D-type isorhizas (Fig. 52b), as described in this species by Östman (1982b, 1987, 1999), were observed on hydranths of the specimens.

Details of the natural history of *O. dichotoma*, a well-known and widespread species, are given in Cornelius (1975, 1990, 1995). Although generally supposed to be virtually cosmopolitan, many identifications of the species remain doubtful. It was reported from Denmark by Kramp (1935b, as *Laomedea dichotoma*) but not from the Oslofjord, Norway, by Christiansen (1972).

Reported distribution. West coast of Sweden.—From northern Kosterfjord to the Öresund (Lönnberg 1898; Rees & Rowe 1969).

Elsewhere.—North Atlantic from the Barents Sea to the Mediterranean Sea in Europe, and from the Gulf of St. Lawrence to the Gulf of Mexico in North America (Broch 1910; Fraser 1944; Bouillon *et al*. 2004).

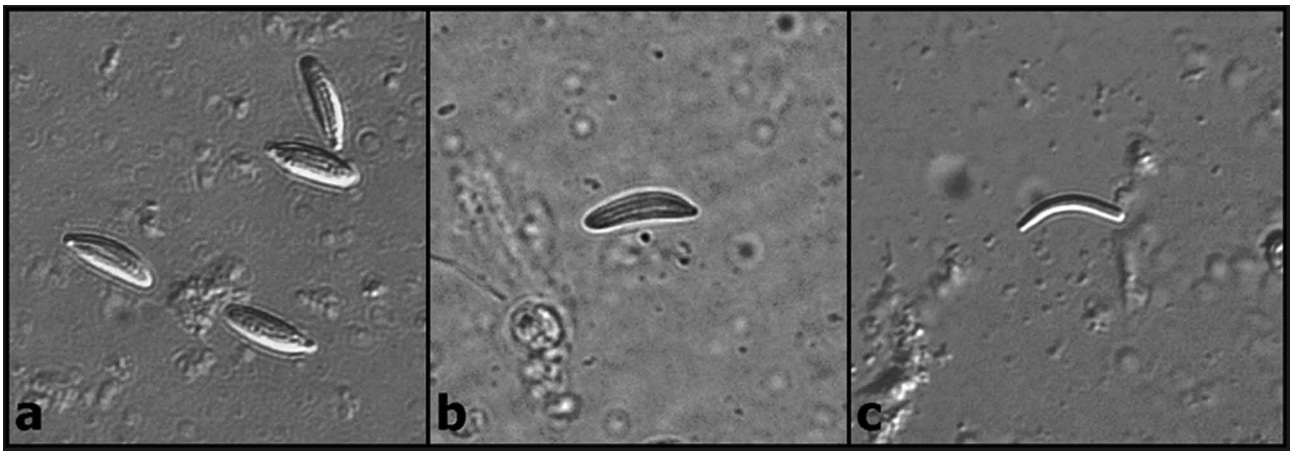

FIGURE 52. *Obelia dichotoma*, nematocysts, ROMIZ B3898: a, A-type b-rhabdoids (microbasic b-mastigophores); b, I_D-type isorhiza; c, I_d-type isorhiza.

Obelia geniculata (Linnaeus, 1758)

Fig. 53

Sertularia geniculata Linnaeus, 1758: 812; 1761: 541; 1767: 1312.
not *Campanularia geniculata*.—Lovén, 1836: 281, pl. 6, figs. 1–10, pl. 7, figs. 11–18 [= *Gonothyraea loveni* (Allman, 1859)].
Obelia geniculata.—Segerstedt, 1889: 12, 25.—Jäderholm, 1909: 62, pl. 6, fig. 1.—Östman, 1982a: 156; 1982b: 228; 1983: 6; 1999: 19.
Obelia (*Laomedea*) *geniculata*.—Gislén, 1930: 338.
Laomedea geniculata.—Jägerskiöld, 1971: 63.—Östman, 1979a: 6.

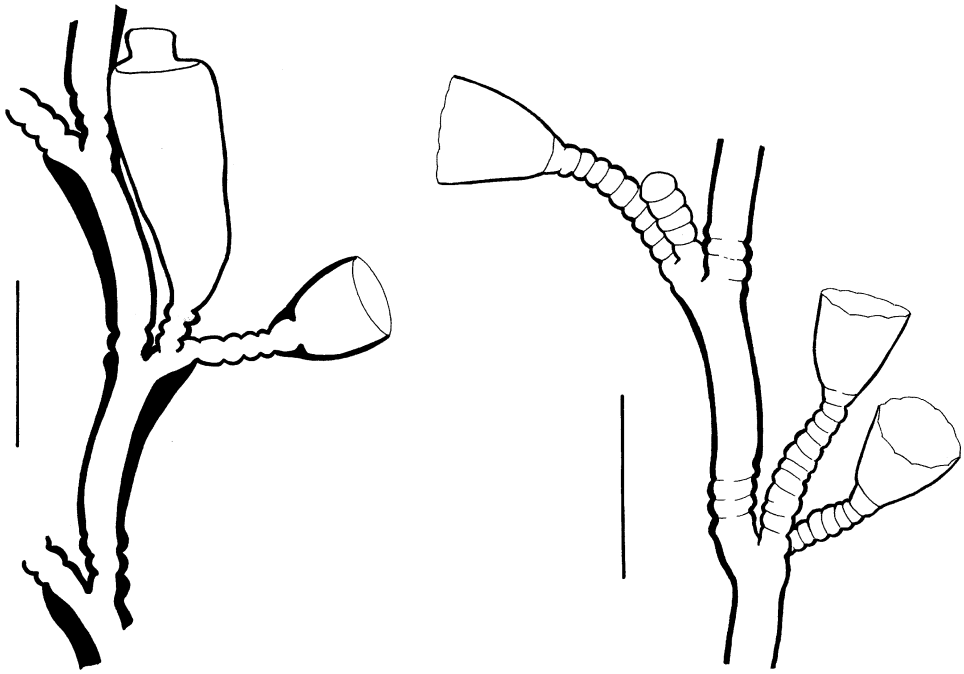

FIGURE 53. *Obelia geniculata*: part of colony with a hydrotheca and a gonotheca, ROMIZ B3924. Scale equals 0.5 mm.
FIGURE 54. *Obelia longissima*: part of colony with three hydrothecae, ROMIZ B3889. Scale equals 0.5 mm.

Type locality. UK: England, Kent, Dover (Cornelius 1975a: 273).

Museum material. Saltö naturreservat, outer ledge, 58°52'40"N, 11°06'53"E, <1 m, 11.ix.2010, collected manually, on attached red algae, one colony, up to 1.3 cm high, with gonothecae, ROMIZ B3924.

Remarks. One of the most familiar of all hydroids, *Obelia geniculata* (Linnaeus, 1758) has been recorded many times along the coast of western Sweden (see Checklist, p. 66). It is also one of the most common hydroids in Danish waters (Kramp 1935b, as *Laomedea geniculata*). However, in the nearby Oslofjord, southern Norway, it is not common anywhere and is apparently of irregular occurrence (Christiansen 1972). *Obelia geniculata* is the easiest of the local species of the genus to identify because of its asymmetrically thickened internodes, short hydrothecal pedicels, and thickened hydrothecae. The species also differs from others of the genus *Obelia* Péron & Lesueur, 1810 from Europe in acid phosphatase patterns (Östman 1982a) and cnidome (Östman 1982b, 1999).

Detailed accounts of the biology of *O. geniculata* have been given by Cornelius (1975a, 1990, 1995b). Reports indicate that this hydrozoan is virtually "cosmopolitan" in shallow waters, but recent evidence implies that cryptic species may exist (Govindarajan *et al*. 2005).

Reported distribution. West coast of Sweden.—From Koster to southern Kattegat (Jägerskiöld 1971: 63).

Elsewhere.—North Atlantic-Arctic: from the White Sea and Jan Mayen Island to the Mediterranean Sea in Europe, and from Hudson Bay to the Gulf of Mexico in North America (Linko 1911; Cornelius 1975a).

Obelia longissima (Pallas, 1766)

Figs. 54, 55

Sertularia longissima Pallas, 1766: 119.
Obelia flabellata.—Segerstedt, 1889: 12, 25.—Jäderholm, 1909: 62, pl. 5, fig. 16.
Obelia longissima.—Jäderholm, 1909: 63, pl. 5, fig. 14.—Östman, 1982a: 156; 1982b: 228; 1983: 7; 1999: 19.—Cornelius, 1990: 559.
Laomedea longissima.—Jägerskiöld, 1971: 63.—Östman, 1979a: 6.

Type locality. "Oceanus Europæus" (Pallas 1766: 120).

Museum material. Tjärnö, floating dock at Sven Lovén Centre for Marine Sciences, 58°52'33.68"N, 11°08'43.65"E, <1 m, 07.ix.2010, collected manually from dock, one colony, 9.5 cm high, without gonothecae, ROMIZ B3889.

Remarks. The validity of *Obelia longissima* (Pallas, 1766) was confirmed by Östman (1982a, b, 1987, 1999), who showed that it differed from *O. dichotoma* (Linnaeus, 1758) in cnidome and in acid phosphatase band patterns. According to Cornelius (1990, 1995), *O. longissima* can be distinguished from *O. dichotoma* in having: (1) long, monosiphonic, regularly branched stems that are often dark or even black in colour; (2) branches over a given part of the stem of essentially the same length; (3) hydrothecae round instead of polygonal in cross-section; (4) hydrothecal margin with shallow, wavy cusps rather than a series of lobes. Nevertheless, young, old, or damaged specimens can still be difficult to identify based on morphology alone. The colonies examined here, rather old, somewhat damaged, and overgrown with other hydroids, corresponded most closely to *O. longissima*. Examination of nematocysts from tissue of museum material (ROMIZ B3889) revealed the presence of F_1-type isorhizas (Fig. 55b, c), diagnostic of the species (Östman 1982b). A-type b-rhabdoids (microbasic b-mastigophores) were also present.

A comprehensive overview of this species was given by Cornelius (1990). It is frequent in Danish waters (Kramp 1935b, as *Laomedea longissima*) and in the Oslofjord, Norway (Christiansen 1972), as well as western Sweden (Jägerskiöld 1971).

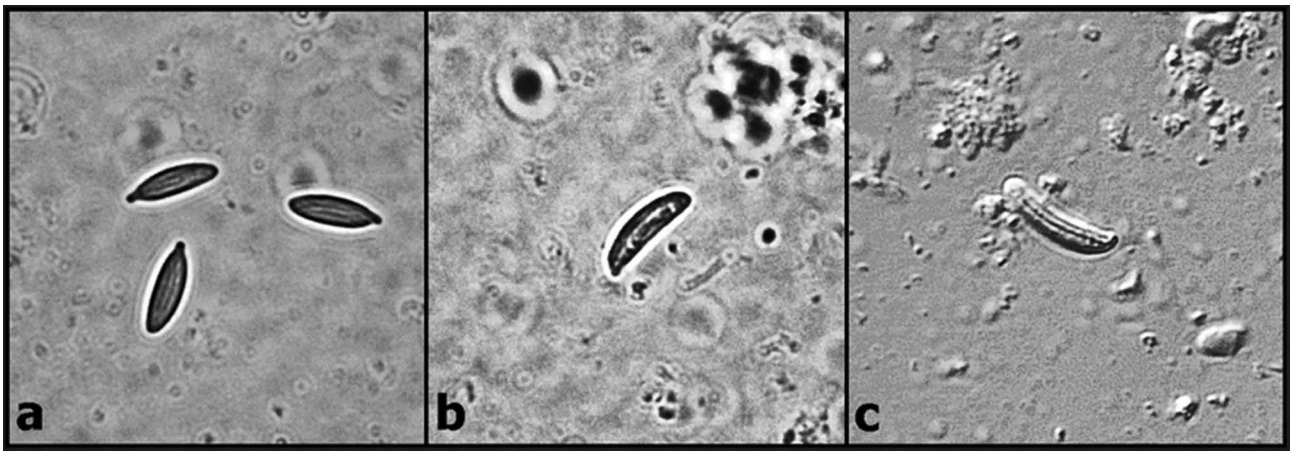

FIGURE 55. *Obelia longissima*, nematocysts, ROMIZ B3889: a, A-type b-rhabdoids (microbasic b-mastigophores); b, F_1-type isorhiza; c, F_1-type isorhiza.

Reported distribution. West coast of Sweden.—From Strömstad area to south of Falkenberg (Jägerskiöld 1971: 63).

Elsewhere.—North Atlantic-Arctic from polar waters to the Mediterranean Sea in Europe, and to South Carolina in North America (Schuchert 2001a; Bouillon *et al*. 2004; Calder 2004).

Checklist of hydroids reported from the west coast of Sweden

Note: records of species by Segerstedt (1889) herein are listed in the format "(Segerstedt 1889: x, [y])," where x is the page number in the text on which a given species is discussed, and y is the page number in a table in which the same species is recorded. Both pages are cited because records given on the two pages sometimes differ. For example, depths at which *Eudendrium annulatum* Norman, 1864 was collected (0–50 m) were given only in the table on page 24; that depth range correspondingly appears in brackets.

ORDER ANTHOATHECATA Cornelius, 1992a

Family Eudendriidae L. Agassiz, 1862

Eudendrium album Nutting, 1896.—Kosterhavet (58°53.030'N, 11°05.567'E), 140–100 m; (58°53.367'N, 11°04.240'E), 90 m (this study).

Eudendrium annulatum Norman, 1864.—Gullmarfjord, Blåbergsholmen; [0–50 m] (Segerstedt 1889: 8, [24]).—Kristineberg, 0–30 m; Gullmarfjord (Jäderholm 1909: 51).

Eudendrium arbuscula Wright, 1859.—Gullmarfjord; [30–50 m] (Segerstedt 1889: 9, [24]; material considered indeterminable by Jäderholm 1909).—Malösund (Jäderholm 1909: 51, as *E. wrighti*).—Kostersten (58°52’06”N, 11°04’09”E), 35 m; Svenningskär, Gullmarfjord (58°13’77”N, 11°24’89”E), 18–20 m (Rees & Rowe 1969: 11).—Kosterfjord (Jägerskiöld 1971: 62).—Bohuslän (Marques *et al*. 2000: 81).—Kosterhavet (58°53.585’N, 11°06.239’E), 14–10 m (this study).

Eudendrium capillare Alder, 1856.—Väderöarna; Gullmarfjord, c. 40 m; [30–100 m] (Segerstedt 1889: 8, [24]).—Gullmarfjord; Väderöarna; Kristineberg (Jäderholm 1909: 53).—Gullmarfjord, Väderöarna, 30–100 m (Kramp 1935b: 92).—At seven stations from eastern Skagerrak to middle Kattegat, 30.5–78 m (Jägerskiöld 1971: 62).

Eudendrium cnidoferum Stechow, 1919a.—Bohuslän (Jäderholm 1907: 373; 1909: 52; as *Eudendrium armatum* Jäderholm, 1907).—Bohuslän (Schuchert 2008b: 688). *Eudendrium armatum* Jäderholm, 1907 is an invalid junior primary homonym of *E. armatum* Tichomiroff, 1887, and the specific name has been replaced as above. *Eudendrium cnidoferum* is known only from the type material. That material, with few remaining hydranths, was found by Schuchert (2008b) to be much like *E. glomeratum* Picard, 1952. Although both species were retained as valid, Schuchert noted that examination of new material from Bohuslän was needed to resolve questions about the relationship of the two species. If proven conspecific, the lesser-known name *E. cnidoferum* has priority.

Eudendrium rameum (Pallas, 1766).—Koster; Kattegat (Jäderholm 1909: 50).—Säcken Reef, Kosterfjord (59°07’N, 11°07’02”E), 80–100 m; Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Väderöarna (58°33’03”N, 11°05’06”E), 10–20 m (Rees & Rowe 1969: 11).—Säcken area, 25–80 m (Jägerskiöld 1971: 62).—Northern Kosterfjord, 82-87 m (Jonsson *et al*. 2004).—Skagerrak, 530 m (Lundin *et al.* 2007).

Eudendrium ramosum (Linnaeus, 1758).—Skåne, Kullen, by S. Lovén; [intertidal] (Segerstedt 1889: 8, [24]).—Kosterfjord, 60–90 m (Kramp 1935b: 87).—Lilla Sneholm, Kosterfjord (58°53’02”N, 11°04’09”E), 10–20 m (Rees & Rowe 1969: 12).—Near Norwegian border, 60–90 m; Strömstad area, 25–30 m (Jägerskiöld 1971: 62).

Eudendrium sp.—At seven stations from eastern Skagerrak to southern Kattegat, 26–70(?) m (Jägerskiöld 1971: 62).

Family Cordylophoridae von Lendenfeld, 1885

Cordylophora caspia (Pallas, 1771).—Middle Kattegat, 40 m (Jägerskiöld 1971: 61) (questionable record).—Krokstrand (59°00’49”N, 11°27’30”E), 1 m (this study).

Family Hydractiniidae L. Agassiz, 1862

Clava multicornis (Forsskål, 1775).—Öresund (Sweden?) (Forsskål 1775: 131, as *Hydra multicornis*).—Bohuslän; [Koster—Gullmarfjord; Öresund; intertidal] (Segerstedt 1889: 6, as *Clava sqvamata;* [23], as *C. squamata*).—Öresund, 13–18 m (Lönnberg 1898: 51, as *C. squamata*).—Skåne, Öresund, 5–10 m (Lönnberg 1899a: 45, 1899b: 17, as *C. glomerata*).—Bohuslän; Gullmarfjord; Skarfsäter; Kristineberg; Väderöarna; Skåne, Sofiero, 13–18 m (Jäderholm 1909: 44, as *C. squamata*).—At three stations in the Gullmarfjord, 0.2–0.55 m (Gislén 1930: 320, as *Clava squamata*).—In Öresund, at least as far as Landskrone (Kramp 1935b: 65, as *Clava squamata*).—Gothenberg archipelago, 0–7 m (Jägerskiöld 1971: 61, as *Clava squamata*).— Tjärnö (58°52’33.68”N, 11°08’43.65”E), <1 m; Saltö naturreservat, outer ledge (58°52’40”N, 11°06’53”E,) <1 m (this study).

Hydractinia echinata (Fleming, 1828).—Gullmarfjord and archipelago, 10–50 m; [Gullmarfjord; Öresund; 10–50 m] (Segerstedt 1889: 7, [23]).—Öresund, 22–36 m (Lönnberg 1898: 51).—Kattegat (Lönnberg 1903: 60).—Gullmarfjord; Kristineberg; Halland, Laholmsbukten, 13 fm (24 m); Skåne, Väderöarna, 13.5 fm (25 m);

Skagerrak, Nidingarne, 22 fm (40 m) (Jäderholm 1909: 48).—Öresund, to just south of Helsingborg (Kramp 1935b: 74).—Vattenholmen, Kosterfjord (58°52'15"N, 11°05'04"E), 120 m; Flatholmen, Gullmarfjord (58°15'08"N, 11°23'08"E), 35 m; Lökarna, Gullmarfjord (58°13'52"N, 11°24'82"E), 35 m (Rees & Rowe 1969: 8).—At 92 stations from Svinesund to southern Kattegat, shore to 82 m (Jägerskiöld 1971: 62).—Kosterhavet (58°53.030'N, 11°05.567'E), 100–140 m (this study).

Hydractinia sp.—Gothenberg archipelago, 3–5 m (Jägerskiöld 1971: 62).

Podocoryna carnea M. Sars, 1846.—Bohuslän (Lovén 1858: 305, as *Hydractinia echinata*).—Gullmarfjord, [Gullmarfjord; Öresund; intertidal–50 m] (Segerstedt 1889: 6, [23], as *Podocoryne carnea*).—Öresund, 24–29 m (Lönnberg 1898: 51, 1899b: 17, as *Podocoryne carnea*).—Hallands Väderö, 5–6 m (Lönnberg 1903: 60, as *Podocoryne inermis*).—Gullmarfjord; Kristineberg (Jäderholm 1909: 50, as *Podocoryne carnea*).—Gäsö, Gullmarfjord (58°13'65"N, 11°24'82"E), 18–20 m (Rees & Rowe 1969: 8, as *Podocoryne carnea*).—At 82 stations from Koster area to southern Kattegat, 0.1–110 m (Jägerskiöld 1971: 62, as *Hydractinia carnea*).—Tjärnö tidal flat (58°52'26"N, 11°08 46"E), <1 m (this study).

Podocoryna sarsii Steenstrup, in Lütken, 1850.—Middle Kattegat, 33 m (Jägerskiöld 1971: 63, as *Hydractinia sarsi*).

Family Bougainvilliidae Lütken, 1850

Bimeria vestita Wright, 1859.—Öresund, 16 m (Lönnberg 1898: 51, as *Perigonimus vestitus*). The identification of this species was considered uncertain by Jäderholm (1909).

Bougainvillia muscoides (M. Sars, 1846).—Gullmarfjord, 30–100 m (Segerstedt 1889: 9, [24], as *Perigonimus muscoides*).—Gullmarfjord, 30–100 m; Kristineberg (Jäderholm 1909: 46, as *Perigonimus muscoides*).—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; Smörkullen, Gullmarfjord (58°23'94"N, 11°37'75"E), 50 m (Rees & Rowe 1969: 8).—Kosterfjord, 50–70 m; eastern Skagerrak, 42–70(?) m (Jägerskiöld 1971: 64, as *Perigonimus muscoides*).—Kosterfjord, Säcken Reef, 80–100 m (Schuchert 2007: 214).

Bougainvillia muscus (Allman, 1863).—Gullmarfjord, 50–100 m (Segerstedt 1889: 10, [24], as *Bougainvillia ramosa*); Gullmarfjord; Skåne, Kullen, by S. Lovén; [intertidal] (Segerstedt 1889: 10, [24], as *B. muscus*).—Bohuslän; Gullmarfjord; Kristineberg (Jäderholm 1909: 46, as *Bougainvillia van benedeni*); Bohuslän; Gullmarfjord; Kristineberg; Flatholmen; Väderöarna; Nidingarne, 35 fm (64 m) (Jäderholm 1909: 47, as *Bougainvillia ramosa*).—At 13 stations in the Gullmarfjord, 3–33.6 m (Gislén 1930: 315, as *Bougainvillea ramosa*).—Väderöarna (58°35'04"N, 11°04'08"E), 80 m; Lilla Sneholm, Kosterfjord (58°53'02"N, 11°04'09"E), 10–20 m; Svenningskär, Gullmarfjord (58°13'77"N, 11°24'89"E), 18–20 m (Rees & Rowe 1969: 9, as *B. ramosa*).—At 26 stations from Säcken area to middle Kattegat, 0.1–200 m (Jägerskiöld 1971: 61, as *Bougainvillia ramosa*).—Tjärnö (58°52'33.68"N, 11°08'43.65"E), <1 m; Saltö naturreservat (58°52'40"N, 11°06'53"E), <1 m (this study).

Bougainvillia sp.—SE Lilla Sneholm, Kosterfjord (58°53'03"N, 11°04'07"E), 40 m; Väderöarna (58°35'04"N, 11°04'08"E), 80 m; Svenningskär, Gullmarfjord (58°13'77"N, 11°24'89"E), 18–20 m; Smörkullen, Gullmarfjord (58°23'94"N, 11°37'75"E), 50 m (Rees & Rowe 1969: 9).

Bougainvillia pyramidata (Forbes & Goodsir, 1853).—Skär, Gullmarfjord, no coordinates, 80 m; Smörkullen, Gullmarfjord, no coordinates, 50 m (Rees & Rowe 1969: 8; Schuchert 2007: 217).

Dicoryne conferta (Alder, 1856).—Gullmarfjord; [30–50 m] (Segerstedt 1889: 10, [24]).—Öresund, 22–45 m (Lönnberg 1898: 51).—Skälderviken (Lönnberg 1903: 60).—Gullmarfjord; Kristineberg; Koön at Marstrand, 20–38 m; Öresund, W of Torekov, 14.5 fm (27 m); between Torekov and Arild, 14 fm (26 m) (Jäderholm 1909: 47).—Väderöarna (58°33'N, 11°05'06"E), 10–20 m; Ramsö, Kosterfjord (58°50'03"N, 11°05'06"E), 100 m (Rees & Rowe 1969: 9).—At 59 stations from Dynekilen to southern Kattegat, 7.5–101 m (Jägerskiöld

1971: 61).—Kosterfjord, Ramsö; Gullmarfjord, Gåsö, Ranna, 20–30 m; Kristineberg (Schuchert 2007: 243).

Pachycordyle michaeli (Berrill, 1948).—Tjärnö (58°52’33.68”N, 11°08’43.65”E), <1 m (this study).

Rhizorhagium roseum M. Sars, in G. O. Sars, 1874.—Flatholmen, c. 20 fm (37 m) (Lönnberg 1902: 173, as *Perigonimus roseus*).—Kristineberg; Flatholmen (Jäderholm 1909: 46, as *Perigonimus roseus*).—SE Sneholm, Kosterfjord (58°53’01”N, 11°07’09”E), 90–130 m; Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Smörkullen, Gullmarfjord (58°23’94”N, 11°37’75”E), 50 m; common on *Tubularia indivisa* (Rees & Rowe 1969: 10).—Eastern Skagerrak, 45–80 m; Grebbestad-Fjällbacka area, 18 m; Kungsbackafjorden, 25–26 m (Jägerskiöld 1971: 64, as *Perigonimus roseus*).—Kosterhavet (58°53.093’N, 11°05.668’E), 20–30 m (this study).

Family Pandeidae Haeckel, 1879

Halitholus cirratus Hartlaub, 1913.—Kosterhavet (58°52.424’N, 11°06.178’E), 160–30 m (this study).

Leuckartiara abyssi (G. O. Sars, 1874).—Koster islands area, c. 180 m (Segerstedt 1889: 10, [24], as *Perigonimus abyssi*).—Koster, 180 m (Jäderholm 1909: 45, as *Perigonimus abyssi*).—At 11 stations from Säcken to southern Kattegat, 14–209 m (Jägerskiöld 1971: 64, as *Perigonimus abyssi*).

Leuckartiara octona (Fleming, 1823).—Gullmarfjord and vicinity; [Gullmarfjord; Öresund; 30–100 m] (Segerstedt 1889: 9, [24], as *Perigonimus repens*).—W of Hallands Väderö, 24–26 m (Lönnberg 1903: 60, as *Perigonimus repens*).—Mouth of the Gullmarfjord; Kristineberg; Kosterfjord (Jäderholm 1909: 45, as *Perigonimus repens*).—Svenningskär, Gullmarfjord (58°13’77”N, 11°24’89”E), 18–20 m; Smörkullen, Gullmarfjord (58°23’94”N, 11°37’75”E), 50 m; on *Turritella* and *Nucula* (Rees & Rowe 1969: 10).—At 95 stations from near Norway border to southern Kattegat, 9–200 m (Jägerskiöld 1971: 64, as *Perigonimus repens*).—Väderöarna (58°34.931’N, 11°04.931’E), 121–50 m (this study).

Neoturris pileata (Forsskål, 1775).—SE Lilla Sneholm (58°53’02”N, 11°04’07”E), 40 m; Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), no depth data; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Ulvillarna, Kosterfjord (58°49’04”N, 11°05’E), 100 m; common on *Nucula sulcata* (Edwards 1965: 461; Rees & Rowe 1969: 10).—Kosterfjord, Ulvillarna, 100 m; Gullmarfjord, Gåsö, Ranna, 20–30 m (Schuchert 2007: 336).—Kosterhavet (58°49.446’N, 10°57.718’E), 45–48 m; (58°56.608’N, 11°05.314’E), 70 m (this study).

“*Perigonimus*” sp.—At 69 stations from near Norway border to southern Kattegat, 9.5–200 m (Jägerskiöld 1971: 63).

Family Oceaniidae Eschscholtz, 1829

Corydendrium dispar Kramp, 1935a.—Eastern Kattegat, SE of Fladen Lightship, 40 m; Kungsbackafjord, 26 m; Väderöarna (Kramp 1935a: 3; 1935b: 70).—Gothenberg archipelago, 54 m; Nidingen-Varberg area, 26 m; middle Kattegat, 40 m (Jägerskiöld 1971: 61).—Kungsbackafjord, 26 m (Schuchert 2004: 338).

Merona cornucopiae (Norman, 1864).—At five stations from northern Kattegat to southern Kattegat, 25–37 m (Jägerskiöld 1971: 63).

Family Corymorphidae Allman, 1872

Euphysa aurata Forbes, 1848.—Blåbergsholm (Hult 1941: 457, as *Corymorpha annulicornis*).

Corymorpha nutans M. Sars, 1835.—Glommen area, 19 m (Jägerskiöld 1971: 61).

Family Tubulariidae Fleming, 1828

Ectopleura larynx (Ellis & Solander, 1786).—Bohuslän; [Koster-Gullmarfjord; 0–100 m] (Segerstedt 1889: 11, [24], as *Tubularia larynx*).—Öresund, 21 m (Lönnberg 1898: 51, as *Tubularia coronata*).—Väderö Strait, 17–

20 m (Lönnberg 1903: 60, as *Tubularia larynx*).—Kristineberg (Fenchel 1905: 552, as *Tubularia larynx*).—Bohuslän; Gullmarfjord; Grötö, 20 fm (37 m); Blåbergsholmen; Skårbergen; Kristineberg; Väderöarna; Hakefjord; W of Koster, 3–8 fm (5–15 m); Skåne, Torekov, Höghalla Udde, 11 fm (20 m); Svartskärsgrundet, 14 fm (26 m) (Jäderholm 1909: 43, as *Tubularia larynx*).—At 14 stations in the Gullmarfjord, 1.2–24 m (Gislén 1930: 350, as *Tubularia larynx*).—Gullmarfjord, common on *Mytilus* at extreme low water (Rees & Rowe 1969: 7, as *Tubularia larynx*).—At nine stations from Koster area to southern Kattegat, 10–78 m (Jägerskiöld 1971: 64, as *Tubularia larynx*).—Blåbergsholmen and Flatholmen, near-surface; Stångholmen, 15 m (Östman *et al*. 1995: 166, as *Tubularia larynx*).—Northern Kosterfjord, 82-87 m (Jonsson *et al*. 2004, as *Tubularia larynx*).—Kosterhavet (58°52.536'N, 11°06.229'E), 6–30 m (this study).

Tubularia indivisa Linnaeus, 1758.—Outer Gullmarfjord; Väderöarna; Koster; [Koster-Gullmarfjord; Öresund; 30–180 m] (Segerstedt 1889: 11, [24]).—Flatholmen, c. 20 fm (37 m) (Lönnberg 1902: 173).—W of Hallands Väderö, 24–26 m (Lonnberg 1903: 59).—Gullmarfjord; Flatholmen; Kristineberg; Skårbergen; Väderöarna; Koster, 100 fm (183 m); Nidingarne, 35 fm (64 m) (Jäderholm 1909: 42).—Gullmarfjord: Flatholmen, 24 m; Mittskär, 31.8 m (Gislén 1930: 350).—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; Vattenholmen, Kosterfjord (58°52'06"N, 11°06'03"E), 80–120 m; Väderöarna (58°35'04"N, 11°04'08"E), 80 m; Ramsö, Kosterfjord (58°50'03"N, 11°05'06"E), 100 m (Rees & Rowe 1969: 7).—At 24 stations from near Norway border to southern Kattegat, 20–90 m (Jägerskiöld 1971: 64).—Northern Kosterfjord, 82-87 m (Jonsson *et al*. 2004).—Kosterfjord, 80–120 m (Schuchert 2010: 343).—Kosterhavet (58°53.093'N, 11°05.668'E), 20–30 m (this study).

Tubularia sp.—Eastern Skagerrak, 31 m; Gothenberg archipelago, 63 m; middle Kattegat, 42 m (Jägerskiöld 1971: 63).

Family Acaulidae Fraser, 1924

Acaulis primarius Stimpson, 1854.—Öresund, 24–25 m (Lönnberg 1898: 52).—Kattegat, between Hallands Väderö and Höghalla Udde, 17–18 m (Lönnberg 1903: 59).—Öresund, SW of Valgrund, 24–25 m (Jäderholm 1909: 40).

Family Boreohydridae Westblad, 1947

Boreohydra simplex Westblad, 1937.—Gullmarfjord (Hult 1941: 455; Westblad 1947: 1).

Family Corynidae Johnston, 1837

Coryne muscoides (Linnaeus, 1761).—Bohuslän (Linnaeus 1761: 539, as *Tubularia muscoides*).

Coryne pusilla Gaertner, in Pallas, 1774.—Gullmarfjord; Väderöarna; Koster; [intertidal–10 m] (Segerstedt 1889: 7, [23]).—Gullmarfjord; Blåbergsholmen (as *Coryne pusilla*); Kristineberg (as *C. vermicularis*) (Jäderholm 1909: 39).—Gullmarfjord, Smalsund, 0.2–0.35 m (Gislén 1930: 321).—Gothenberg archipelago, 63 m (Jägerskiöld 1971: 61). *Coryne vermicularis* Hincks, 1866 is conspecific (Schuchert 2001b: 779, 2010: 513).

Coryne vanbenedenii Hincks, 1868.—Gullmarfjord; [intertidal] (Segerstedt 1889: 7, [23]). This is a poorly-known species, liberating juvenile polyps from fixed gonophores (Schuchert 2001b, 2010). Segerstedt (1889) found it on *Fucus vesiculosus* and *Zostera marina*.

Coryne sp.—Middle Kattegat, 75–78 m (Jägerskiöld 1971: 61).

Sarsia lovenii (M. Sars, 1846).—West coast of Sweden (Lovén 1836: 275, as *Syncoryna ramosa*).—Bohuslän (without detailed locality data); Kristineberg (Jäderholm 1909: 40, as *Syncoryne loveni*).

Sarsia tubulosa (M. Sars, 1835).—"Bahusiae" (Lovén 1836: 275, as *Syncoryna sarsii*).—Bohuslän, near Orust, observed by S. Lovén; [Mässkär (Bohuslän), intertidal] (Segerstedt 1889: 7, [23], as *Syncoryne sarsii*).—Kristineberg (Lönnberg 1902: 173, as *Coryne sarsii*).—Kristineberg; Bohuslän, Måsö, by S. Lovén (Jäderholm

1909: 40, as *Syncoryne sarsi*).—Lökarna, Gullmarfjord (58°13’06”N, 11°24’09”E), 35 m (Rees & Rowe 1969: 7).—Archipelago between Kalvö and Grebbestad, 22–32 m (Jägerskiöld 1971: 61, as *Coryne sarsi*).—Kungsbackafjord, no depth (medusa?) (Jägerskiöld 1971: 64).

Stauridiosarsia producta (Wright, 1858).—Middle Kattegat, 75–78 m (Jägerskiöld 1971: 64, as *Stauridium productum*).

Stauridiosarsia spongicola (Anger, 1972). Near Kristineberg (58°14’42”N, 11°25’E), growing in the sponge *Halichondria panicea* (Anger 1972: 80, as *Dipurena spongicola*). Formerly in *Dipurena*; see Schuchert (2010) for generic assignment. An inadequately known species.

Family Protohydridae Allman, 1888

Protohydra leuckarti Greeff, 1869.—Bohuslän (Hansson 1998). The species has been reported from the Baltic coast of Sweden by Westblad (1930).

Family Zancleidae Russell, 1953

Zanclea implexa (Alder, 1856).—Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Smörkullen, Gullmarfjord (58°23’94”N, 11°37’75”E), 50 m; Lökarna, Gullmarfjord (58°13’52”N, 11°24’82”E), 35 m (Rees & Rowe 1969: 7: 7).—Kattegat, off Göteborg, 46–63 m (Schuchert 2010: 502). Reports from the area of *Zanclea costata* Gegenbaur, 1856, a species endemic to the Mediterranean, are misidentifications (see Schuchert 2010).

ORDER LEPTOTHECATA Cornelius, 1992a

Family Tiarannidae Russell, 1940

Modeeria rotunda (Quoy & Gaimard, 1827).—Kattegat, far from coast (Segerstedt 1889: 14, [25], as *Calycella fastigiata*).—Bohuslän; Väderöarna; Gullmarfjord (Jäderholm 1909: 78, as *Stegopoma fastigiatum*).—Säcken Reef, Kosterfjord (59°00’07”N, 11°07’02”E), 80–100 m; SE Sneholm (58°53’01”N, 11°07’09”E), 90–130 m (Rees & Rowe 1969: 13, as *Stegopoma fastigiatum*).—At five stations from near Norway border to middle Kattegat, 30–80 m (Jägerskiöld 1971: 64, as *Stegopoma fastigiatum*).—Kosterfjord [Skagerrak] (Edwards 1973a: 577 [583]).—Kosterhavet (58°53.093’N, 11°05.668’E), 20–30 m (this study).

Stegopoma plicatile (M. Sars, 1863).—Kosterfjord; Gullmarfjord (Kramp 1935b: 131).—Säcken Reef, Kosterfjord (59°07’N, 11°07’02”E), 80–100 m; Vattenholmen, Kosterfjord (58°52’N, 11°06’03”E), 120–80 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Smörkullen, Gullmarfjord (58°23’94”N, 11°37’75”E), 50 m (Rees & Rowe 1969: 14).—At four stations from Säcken and eastern Skagerrak, 60–545 m (Jägerskiöld 1971: 64).—Kosterfjord, 80–120 m; Gullmarfjord, 50 m (Cornelius 1995a: 115; 117).—Kosterhavet (58°53.093’N, 11°05.668’E), 20–30 m (this study).

Family Lovenellidae Russell, 1953

Lovenella clausa (Lovén, 1836).—Bohuslän (Lovén 1836: 262, as *Campanularia clausa*).—Koster, by S. Lovén; [intertidal to 10 m] (Segerstedt 1889: 12, [25]). The species was originally found on *Fucus* (Lovén 1836; Segerstedt 1889).

Lovenella producta (G. O. Sars, 1874).—Koster, c. 180 m (Segerstedt 1889: 12, [25]).—Öresund, 22–27 m (Lönnberg 1898: 52).—W of Hallands Väderö (Lönnberg 1903: 60).—Koster, c. 180 m (Jäderholm 1909: 79).—At four stations from Säcken to Nidingen-Varberg area, 55–200 m (Jägerskiöld 1971: 63).—Öresund, as far as Barsebäck (Kramp 1935b: 140; Cornelius 1995a: 168).—Kosterhavet, 58°53.093’N, 11°05.668’E, 20–30 m (this study).

Family Calycellidae Kramp, 1915

Calycella syringa (Linnaeus, 1767).—Gullmarfjord; Väderöarna, 50–100 m (Segerstedt 1889: 15, [25]).—Gullmarfjord; Väderöarna; Koster, 30 fm (55 m) (Jäderholm 1909: 80).—Väderöarna (58°35’04”N, 11°04’08”E),

80 m (Rees & Rowe 1969: 14).—At 16 stations from Säcken area to middle Kattegat, c. 14–200 m (Jägerskiöld 1971: 61, as *Calicella syringa*).—Kosterhavet (58°52.536'N, 11°06.229'E), 6–30 m (this study).

Family Phialellidae Russell, 1953

Opercularella lacerata (Johnston, 1847).—Gullmarfjord; [intertidal] (Segerstedt 1889: 14, [25]).—Öresund, 21–27 m (Lönnberg 1898: 52).—Gullmarfjord; Klubban (Jäderholm 1909: 81).—Kungsbackafjorden, 15 m (Jägerskiöld 1971: 61, as *Campanulina lacerata*).—Tjärnö (58°52'33.68"N, 11°08'43.65"E), <1 m (this study).

Racemoramus panicula (G. O. Sars, 1874).—Skagerrak, off Grebbestad (58°42'N, 11°02'E), 160–220 m (Kramp 1941: 4, as *Campanulina panicula*).—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; Vattenholmen, Kosterfjord (58°52'N, 11°06'03"E), 80–120 m; Tegelskär, Kosterfjord (58°52'N, 11°59'E), 100 m (Rees & Rowe 1969: 17, as *Campanulina panicula*).—Eastern Skagerrak, 152–200 m (Jägerskiöld 1971: 61, as *Campanulina panicula*).—Kosterfjord, 80–120 m (Cornelius 1995a: 191, as *Campanulina panicula*).—Kosterhavet (58°53.093'N, 11°05.668'E), 20–30 m (this study).

Opercularella pumila Clark, 1875.—Gullmar estuary, 40 m (Lundin *et al*. 2009: 34, as *Campanulina pumila*).

Family Incertae Sedis

Cuspidella humilis Hincks, 1866.—Bohuslän (Kramp 1935b: 134).—At six stations from Säcken area to middle Kattegat, 25–80 m (Jägerskiöld 1971: 61).

Cuspidella grandis Hincks, 1868.—Öresund, 21 m (Lönnberg 1898: 53).—Fladen; Lille Middelgrund, 33–40 m (Kramp 1935b: 134).—At six stations from Säcken area to middle Kattegat, 19–80 m (Jägerskiöld 1971: 61).—Kosterhavet (58°53.030'N, 11°05.567'E), 140–100 m (this study).

Cuspidella sp.—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; Väderöarna (58°35'04"N, 11°04'08"E), 80 m (Rees & Rowe 1969: 13).

Lafoeina tenuis M. Sars, in G.O. Sars, 1874.—Väderöarna; Kristineberg (Jäderholm 1909: 82).—Bohuslän (Kramp 1935b: 135).—Eastern Skagerrak, 152–200 m; middle Kattegat, 85 m (Jägerskiöld 1971: 63).

Family Eirenidae Haeckel, 1879

Eutima sp.—Väderöarna (58°35'04"N, 11°04'08"E), 100 m, a single polyp on stems of *Tubularia indivisa* (Rees & Rowe 1969: 13).

Family Lafoeidae A. Agassiz, 1862

Filellum expansum Levinsen, 1893.—Kristineberg (Jäderholm 1909: 77). This species is a folliculinid, not a hydroid.

Filellum serpens (Hassall, 1848).—Bohuslän; [Koster-Gullmarfjord; 30–180 m] (Segerstedt 1889: 15, [25]).—Öresund, 22 m (Lönnberg 1898: 53).—Gullmarfjord; Koster, 30–40 fm (55–73 m) (Jäderholm 1909: 76).—In Öresund, to about Landskrona (Kramp 1935b: 125).—At 45 stations from near Norway border to southern Kattegat, 19–545 m (Jägerskiöld 1971: 62).—Väderöarna; Gullmarfjord, Gåsö Ranna, 20–30 m (Cornelius 1975b: 379).—Gullmarfjord (Cornelius 1995a: 255).—Kosterhavet (58°53.039'N, 11°05.602'E), 160 m (this study).

Lafoea dumosa (Fleming, 1828).—Bohuslän, Gullmarfjord, 35–40 m; Koster, c. 180 m (Segerstedt 1889: 15, [26]).—Bohuslän; Gullmarfjord; Skårberget; Väderöarna; Kosterfjord, 11–110 fm (20–201 m); W of Koster; Skagerrak, Nidingarne, 19 fm (35 m) (Jäderholm 1909: 71, 72).—Gullmarfjord: Flatholmen, 24 m; Smörkullen, 27.6 m (Gislén 1930: 332).—SE Sneholm, Kosterfjord (58°53'01"N, 11°07'09"E), 130–90 m; Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; SE Lilla Sneholm (58°53'02"N, 11°04'07"E), no depth data; Vattenholmen, Kosterfjord (58°52'06"N, 11°06'03"E), 80–120 m; Ramsö, Kosterfjord (58°50'03"N,

11°05’06”E), 100 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Lilla Sneholm, Kosterfjord (58°53’02”N, 11°04’09”E), 10–20 m; Väderöarna (58°35’37”N, 11°04’08”E), c. 100 m; Svenningskär, Gullmarfjord (58°13’77”N, 11°24’89”E), 18–20 m; Gåsö, Gullmarfjord (58°13’65”N, 11°24’82”E), 35 m; Smörkullen, Gullmarfjord (58°23’94”N, 11°37’75”E), 50 m (Rees & Rowe 1969: 14).—At 45 stations from Säcken to southern Kattegat, 14–200 m (Jägerskiöld 1971: 63).—Kosterfjord (58°50’N, 11°00’E), 80–100 m; Väderöarna (58°05’N, 11°04’E), 80 m; Gullmarfjord, Löken, Gåsö Ranna, 25–30 m; Gullmarfjord, Gåsö, 20–30 m (Cornelius 1975b: 386).—Kosterhavet (58°52.424’N, 11°06.178’E), 85 m (this study).

Lafoea fruticosa (M. Sars, 1850).—Väderöarna, c. 100 m; Koster, c. 180 m (Segerstedt 1889: 15, [26]).—Just south of Falkenberg, 18 m (Kramp 1935b: 124).—At 4 stations from Grebbestad-Fjällbacka area to southern Kattegat, 18–43 m (Jägerskiöld 1971: 63).—Records by Segerstedt (1889) were included under *Lafoea gracillima* by Jäderholm (1909).

Lafoea fruticosa forma *pocillum*.—South of Falkenberg, 18 m (Jägerskiöld 1971: 63). *Lafoea pocillum* Hincks, 1868 was referred to the synonymy of *L. dumosa* by Cornelius (1975b, 1995a).

Lafoea gracillima (Alder, 1856).—Väderöarna and Koster, 100–180 m (Jäderholm 1909: 74).—Säcken Reef, Kosterfjord (59°07’N, 11°07’02”E), 80–100 m; Vattenholmen, Kosterfjord (58°52’15”N, 11°05’04”E), 120–80 m; Vattenholmen, Kosterfjord (58°52’15”N, 11°05’04”E), 120–80 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Smörkullen, Gullmarfjord (58°23’94”N, 11°37’75”E), 50 m (Rees & Rowe 1969: 15).—At seven stations from Säcken to Kosterfjord and eastern Skagerrak, 30–160 m (Jägerskiöld 1971: 63).—Kosterhavet (58°53.093’N, 11°05.668’E), 30–20 m (this study).

Family Haleciidae Hincks, 1868

Halecium articulosum Clark, 1875.—Gullmarfjord archipelago, 30–50 m (Segerstedt 1889: 16, [26], as *H. sessile*).—Bohuslän; Gullmarfjord, 30–50 m (Jäderholm 1909: 58).—At five stations from Koster to middle Kattegat, 20–70 m (Jägerskiöld 1971: 62, as *H. articulosus*).—Gullmarfjord, c. 30 m (Cornelius, 1975b: 406, as *H. sessile*).—Kosterhavet (58°52.424’N, 11°06.178’E), 35–11 m (this study).

Halecium beanii (Johnston, 1838).—Outer Gullmarfjord, 10–30 m; Väderöarna; [30–100 m] (Segerstedt 1889: 16, [26]).—Bohuslän; Gullmarfjord, Flatholmen; Väderöarna, 50–60 fm (91–110 m) (Jäderholm 1909: 60, as *H.beani*).—Säcken Reef, Kosterfjord (59°07’N, 11°07’02”E), 80–100 m; Kostersten (58°52’06”N, 11°04’09”E), 35 m (Rees & Rowe 1969: 12).—At 13 stations from Säcken to middle Kattegat, c. 8–80 m (Jägerskiöld 1971: 62, as *H. beani*).—Gullmarfjord (Cornelius 1975b: 406, on *Halecium sessile*).

Halecium curvicaule von Lorenz, 1886.—Near Anholt, 40–50 m (Jägerskiöld 1971: 62).

Halecium halecinum (Linnaeus, 1758).—Gullmarfjord; Väderöarna; Koster; [30–180 m] (Segerstedt 1889: 15, [26]).—Bohuslän; Gullmarfjord; Flatholmen; Kristineberg; Lindholmen; Gåsöfjord; Väderöarna; Koster; in Bohuslän at 30–180 m (Jäderholm 1909: 57).—Gullmarfjord, Skårberget, 55–60 m (Gislén 1930: 329, as *Halecium* cf. *halecinum*).—SE Lilla Sneholm, Kosterfjord (58°53’01”N, 11°07’09”E), 100–90 m; SE Lilla Sneholm, Kosterfjord (58°53’02”N, 11°04’07”E), 40 m; Flatholmen, Gullmarfjord (58°15’08”N, 11°23’08”E), 38 m; Väderöarna (58°35’37”N, 11°04’08”E), c. 100 m (Rees & Rowe 1969: 12).—At 22 stations from Säcken to southern Kattegat, 9–200 m (Jägerskiöld 1971: 62).—Kosterhavet (58°52.567’N, 11°06.313’E), 6–30 m (this study).

Halecium labrosum Alder, 1859.—Kosterfjord, 20 m (Kramp 1935b: 148). At four stations from Kosterfjord to Grebbestad-Fjällbacka area, 20–70(?) m (Jägerskiöld 1971: 62).—N Väderöarna (58°35’N, 11°04’E), 80 m (Cornelius 1975b: 396; 1995a: 283).

Halecium muricatum (Ellis & Solander, 1786).—Kristineberg; Gullmarfjord (Jäderholm 1909: 59).—Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; Väderöarna (58°33’N, 11°05’06”E), 10–20 m; Sven-

ningskär, Gullmarfjord (58°13’77”N, 11°24’89”E), 18–20 m (Rees & Rowe 1969: 12).—At five stations from eastern Skagerrak to southern Kattegat, 22–70(?) m (Jägerskiöld 1971: 62).—Gullmarfjord, 20–30 m; west coast of Sweden (?) (Linnaeus Collection) (Cornelius 1975b: 403).—West Sweden (Cornelius & Ryland 1990: 137).

Halecium sessile Norman, 1867.—Skagerrak (58°15’N, 10°50’E), 172 m (Jägerskiöld 1971: 62). Jäderholm (1909: 58) referred Segerstedt’s (1889) records of this species to *H. articulosum*.

Halecium tenellum Hincks, 1861.—Gullmarfjord, c. 50 m; Bohuslän, Grafvarne, by S. Lovén (Segerstedt 1889: 16, [26]).—Gullmarfjord, c. 50 m (Jäderholm 1909: 55).—Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Löken, Gullmarfjord (58°13’06”N, 11°24’09”E), 35 m (Rees & Rowe 1969: 13).—At seven stations from Koster area to southern Kattegat, 14–48 m (Jägerskiöld 1971: 62).—Kristineberg area (Cornelius 1995a: 296). Schuchert (2005) included Jäderholm’s (1909) record of this species in the synonymy of *Halecium textum* Kramp, 1911, and Jäderholm’s material included that of Segerstedt (1889). Certain other records of the species in Swedish waters may likewise prove to be referable to *H. textum*.

Halecium textum Kramp, 1911.—Gullmarfjord (Hamond 1957: 307, as *Halecium undulatum*).—Gullmarfjord (Cornelius 1995a: 300, as *H. undulatum*).—Gasö Ränna, 40 m (Cornelius 1998: 91, as *H. undulatum*).—Kosterhavet (58°53.039’N, 11°05.602’E), 160 m (this study). See records and comments above on *Halecium tenellum*.

Halecium sp.—Eastern Skagerrak, 170–200 m; Gothenberg archipelago, 63 m; middle Kattegat, 27 m (Jägerskiöld 1971: 62).

Family Sertulariidae Lamouroux, 1812

Abietinaria abietina (Linnaeus, 1758).—Öresund, Skåne, Kullen (Winther 1880a: 250, as *Sertularia abietina*).—Bohuslän, c. 40–180 m; [Koster-Gullmarfjord; Kullen; 30–180 m] (Segerstedt 1889: 18, [27], as *Sertularia abietina*).—Öresund, 36 m (Lonnberg 1898: 53, as *Sertularia abietina*).—Gullmarfjord; Kristineberg; Styrsö, 50–70 m; Väderöarna, 60 fm (110 m); Koster; S Koster, 25 fm (46 m); Öresund, Höghalla Udde; Nidingarne, 19 fm (35 m) (Jäderholm 1909: 85, as *Diphasia abietina*).—Lilla Sneholm (58°53’02”N, 11°04’07”E), 40 m; Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; Lilla Sneholm (58°53’02”N, 11°04’09”E), 10–20 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Skär, Gullmarfjord (58°18’79”N, 11°32’53”E), 80 m; Svenningskär, Gullmarfjord (58°13’77”N, 11°24’89”E), 18–20 m; Lökarna, Gåsö (58°13’06”N, 11°24’09”E), 35 m (Rees & Rowe 1969: 19).—At 33 stations from Koster area to southern Kattegat, 18–200 m (Jägerskiöld 1971: 61).—Kosterhavet (58°53.039’N, 11°05.602’E), 160–30 m (this study).

Abietinaria filicula (Ellis & Solander, 1786).—Gullmarfjord; Kristineberg (Jäderholm 1909: 87, as *Diphasia filicula*).—Bohuslän; eastern Kattegat, 26–33 m (Kramp 1935b: 185).—Lökarna (58°13’52”N, 11°24’82”E), 35 m; Svenningskär, Gullmarfjord (58°13’77”N, 11°24’89”E), 18–20 m (Rees & Rowe 1969: 20).—At four stations in the Kattegat, 26 –55 m (Jägerskiöld 1971: 61). Rare, according to Rees & Rowe (1969).

Diphasia attenuata (Hincks, 1866).—Gullmarfjord, c. 70 m (Segerstedt 1889: 18, [26]).

Diphasia fallax (Johnston, 1847).—Väderöarna; Gullmarfjord; [30–100 m] (Segerstedt 1889: 17, [26]).—Bohuslän; Gullmarfjord; Kristineberg; Skårbergen; Väderöarna, 60 fm (110 m) (Jäderholm 1909: 83).—Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m (Rees & Rowe 1969: 18).—At 10 stations from near Norway border to middle Kattegat, 29–127 m (Jägerskiöld 1971: 61).—Kosterhavet (58°53.093’N, 11°05.668’E), 20–30 m (this study).

Diphasia margareta (Hassall, 1841).—Bohuslän (Jäderholm 1909: 84, as *Diphasia pinaster*). See Cornelius (1995: 35, 50) for nomenclature.

Diphasia nigra (Pallas, 1766).—Koster, Tenholmen (Jägerskiöld 1971: 62, as *Dynamena pinnata*).

Diphasia rosacea (Linnaeus, 1758).—Gullmarfjord, c. 50 m (Segerstedt 1889: 18, [26]).—Gullmarfjord, 50–70 m; Kristineberg (Jäderholm 1909: 83).—Eastern Kattegat, 26 m (Kramp 1936b: 182).—Säcken, 80 m; middle Kattegat, 26 m (Jägerskiöld 1971: 62).

Dynamena pumila (Linnaeus, 1758).—Bohuslän archipelago (Lindström 1856b: 365, as *Sertularia pumila*).—Bohuslän; Skåne, Kullen, by G. Winther; [Koster-Gullmarfjord; Oresund; intertidal–50 m] (Segerstedt 1889: 18, [27], as *Sertularia pumila*).—Öresund, 10–16 m (Lönnberg 1898: 53, 1899b: 17, as *Sertularia pumila*).—Skälderviken (Lönnberg 1903: 60, as *Sertularia pumila*).—Bohuslän; Gullmarfjord; Kristineberg; Väderöarna; Sydkoster, 20–30 fm (37–55 m); W of Sydkoster, 2–6 fm (4–11 m); Koster, 2–3 fm (4–5 m); Koster Strait; Nord-Koster; Hallands Väderö; between Väderö and Höghalla Udde, 8–10 fm (15–18 m); Torekov; Öresund, NE of Hittarp (Jäderholm 1909: 96, as *Sertularia pumila*).—At 17 stations in the Gullmarfjord, 0.15–5 m (Gislén 1930: 346, as *Sertularia* (*Dynamena*) *pumila*).—At 22 stations from Säcken area to southern Kattegat, 0–200 m (Jägerskiöld 1971: 62).—Gullmarfjord, Gåsö Ranna (Cornelius 1979: 271).—Kosterhavet (58°49.953’N,11°02.072’E), 26 m (this study).

Hydrallmania falcata (Linnaeus, 1758).—Öresund, Skåne, Kullen, 8–16 fm (15–29 m) (Winther 1880a: 251).—Gullmarfjord, 30–50 m; Kattegat, far from coast; [Gullmarfjord; Kullen] (Segerstedt 1889: 19, [27], as *Hydrallmannia falcata*).—Bohuslän; Gullmarfjord, 30–50 m; Väderöarna; Laholmsbukten, 11 fm (20 m) (Jäderholm 1909: 104).—Gåsö, Gullmarfjord (58°13’65”N, 11°24’82”E), 35 m (Rees & Rowe 1969: 20).—At 32 stations from Koster area to southern Kattegat, 14–545 m (Jägerskiöld 1971: 63).—Kosterhavet (58°52.536’N, 11°06.229’E), 6–30 m (this study).

Selaginopsis fusca (Johnston, 1847).—Kattegat, far from coast (Segerstedt 1889: 19, [27], as *Sertularia fusca*).—Bohuslän (Jäderholm 1909: 95, as *Thuiaria fusca*).

Sertularella gayi (Lamouroux, 1821).—Väderöarna, 50–100 m (Segerstedt 1889: 16, [26]).—Bohuslän; Kristineberg; Väderöarna, 50–100 m; Koster, 100 fm (183 m) (Jäderholm 1909: 100).—Bohuslän, 50–200 m (Kramp 1935b: 176).—Säcken Reef, Kosterfjord (59°07’N, 11°07’02”E), 80–100 m (Rees & Rowe 1969: 18).—Singlefjord, 110–125 m; Säcken, 80 m; eastern Skagerrak, 170–200 m (Jägerskiöld 1971: 64).

Sertularella polyzonias (Linnaeus, 1758).—Bohuslän, 20–30 m; [Koster-Gullmarfjord; 10–50 m] (Segerstedt 1889: 16, [26]).—Bohuslän; Gullmarfjord; Kristineberg; Väderöarna, 10–30 fm (18–55 m); Koster, 15–20 fm (27–37 m) (Jäderholm 1909: 100).—Säcken Reef, Kosterfjord (59°07’N, 11°07’02”E), 80–100 m; Kostersten (58°52’06”N, 11°04’09”E), 35 m; Vattenholmen, Kosterfjord (58°52’15”N, 11°05’04”E), 120 m; Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m; SE Lilla Sneholm (58°53’02”N, 11°04’07”E), no depth data; Väderöarna (58°33’N, 11°05’06”E), 10–20 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Lilla Sneholm, Kosterfjord (58°53’02”N, 11°04’09”E), 10–20 m; Flatholmen, Gullmarfjord (58°15’08”N, 11°23’08”E), 35 m (Rees & Rowe 1969: 18).—At 25 stations from Koster area to southern Kattegat, 0–80 m (Jägerskiöld 1971: 64).—Kosterfjord, Vattenholmen, 80–120 m; Gullmarfjord, Gåsö Ranna, Löken, 25–30 m (Cornelius 1979: 288).—Kosterhavet (58°52.424’N, 11°06.178’E), 35–11 m (this study).

Sertularella rugosa (Linnaeus, 1758).—Bohuslän; [Koster-Gullmarfjord; 0–100 m] (Segerstedt 1889: 17, [26]).—Between Hallands Väderö and the mainland, 12–18 m (Lönnberg 1903: 60).—Bohuslän; Gullmarfjord; Blåbergsholmen; Väderöarna; Koster, 20 fm (37 m); between Väderö and Höghalla Udde, 8–10 fm (15–18 m) (Jäderholm 1909: 101).—Gullmarfjord, Mittskär, 29.1 m (Gislén 1930: 346).—SE Lilla Sneholm (58°53’02”N, 11°04’07”E), no depth data; Flatholmen, Gullmarfjord (58°15’08”N, 11°23’08”E), 35 m (Rees & Rowe 1969: 18).—At nine stations from Kosterfjord to southern Kattegat, 14–70(?) m (Jägerskiöld 1971: 64).—Kosterfjord, Sneholm, 40 m (Cornelius 1979: 290).—Kosterhavet (58°53.093’N, 11°05.668’E), 20–30 m (this study).

Sertularella tenella (Alder, 1856).—Gullmarfjord; Väderöarna; Koster, <50–180 m (Segerstedt 1889: 17, [26]).—Gullmarfjord, Flatholmen, Kristineberg; Väderöarna; Koster (Jäderholm 1909: 102).—Bohuslän, 30–180 m (Kramp 1935b: 178).—Vattenholmen, Kosterfjord (58°52'06"N, 11°06'03"E), 80–120 m; SE Lilla Sneholm (58°53'02"N, 11°04'07"E), no depth data; Väderöarna (58°35'04"N, 11°04'08"E), 80 m; Smörkullen, Gullmarfjord (58°23'94"N, 11°37'75"E), 50 m (Rees & Rowe 1969: 19).—At 19 stations from near Norway border to Glommen area, 19–80 m (Jägerskiöld 1971: 64).—Kosterfjord, SE of Lilla Sneholm, 40 m; Kosterfjord, Vattenholmen, 80-120 m; Väderöarna, 80 m; Gullmarfjord, Gåsö Ranna, 20-30 m; Gullmarfjord, Smörkullen, 50 m (Cornelius 1979: 292).—Kosterfjord, 80–120 m (Cornelius 1995b: 81).—Kosterhavet (58°53.039'N, 11°05.602'E), 160–30 m (this study).

Sertularia argentea Linnaeus, 1758.—Sweden (Linnaeus, 1761: 541, as *Sertularia echinata*).—Väderöarna (58°35'04"N, 11°04'08"E), 80 m (Rees & Rowe 1969: 20).—(Stn. 25). Apparently rare in Bohuslän (Rees & Rowe 1969).

Sertularia cupressina Linnaeus, 1758.—At six stations from eastern Skagerrak to southern Kattegat, 22–80 m (Jägerskiöld 1971: 64). Uncertainty remains whether *S. cupressina* and *S. argentea* are conspecific. Moura *et al*. (2011) concluded from molecular analyses that they were probably identical, but noted that confirmation was needed. When considered conspecific, the name *S. cupressina* has priority under the Principle of the First Reviser (see Cornelius 1979: 294).

Sertularia spitzbergensis (Jäderholm 1909).—Gullmarfjord, Gåsö Ranna, 20–30 m (Cornelius 1979: 300, figs. 27a, b, as *Sertularia tenera*).

Sertularia tenera G. O. Sars, 1874.—Outer Gullmarfjord, c. 50 m (Segerstedt 1889: 18, [27]).—Gullmarfjord, 50 m (Jäderholm 1909: 93, as *Thuiaria tenera*).—At 11 stations from Säcken area to vicinity of Anholt, 23–85 m (Jägerskiöld 1971: 64).—Väderöarna (58°35.005'N, 11°04.983'E), 121–50 m (this study).

Tamarisca tamarisca (Linnaeus, 1758).—Väderöarna, c. 100 m; outer Gullmarfjord, 40–50 m; Koster, 180 m (Segerstedt 1889: 17, [26], as *Diphasia tamarisca*).—Bohuslän; Gullmarfjord; Flatholmen, 15–40 fm (27–73 m); Kristineberg; Väderöarna, c. 100 m; Koster, 90 fm (165 m) (Jäderholm 1909: 97, as *Sertularella tamarisca*).—Gullmarfjord, Långholmen, 27.5 m (Gislén 1930: 324, as *Diphasia* cf. *tamarisca*).—Kosterfjord, 20 m and 30 m (Jägerskiöld 1971: 64, as *Sertomma tamarisca*).—Kosterhavet (58°53.367'N, 11°04.240'E), 90 m (this study).

Thuiaria articulata (Pallas, 1766).—Outer Gullmarfjord, 40–50 m (Segerstedt 1889: 19, [27], as *Thuiaria lonchitis*).—Gullmarfjord, 40–50 m; Flatholmen; Kristineberg (Jäderholm 1909: 89, as *Thuiaria lonchitis*).—Bohuslän, 20–50 m (Kramp 1935b: 197, as *Thuiaria lonchitis*).—Vattenholmen, Kosterfjord (58°52'06"N, 11°06'03"E), 80–120 m (Rees & Rowe 1969: 20, as *Salacia lonchitis*).—At 12 stations from near Norway border to Anholt area, 20–90 m (Jägerskiöld 1971: 64, as *Thuiaria lonchitis*).—Kosterhavet (58°52.536'N, 11°06.229'E), 6–30 m (this study).

Thuiaria thuja (Linnaeus, 1758).—Kattegat, far from coast (Segerstedt 1889: 19, [27], as *Thuiaria thuia*).—Bohuslän; Kattegat (Jäderholm 1909: 87, as *Thuiaria thuia*).

Family Kirchenpaueriidae Stechow, 1921a

Kirchenpaueria pinnata (Linnaeus, 1758).—Öresund, Skåne, Kullen, 8–15 fm (15–27 m) (Winther 1880a: 252, as *Plumularia pinnata*).—Bohuslän, 25–100 m; [Koster-Gullmarfjord; Kullen; 10–100 m] (Segerstedt 1889: 20, [27], as *Plumularia pinnata*).—Öresund, 29–36 m (Lönnberg 1898: 53, as *Plumularia pinnata*).—Bohuslän; Gullmarfjord; Kristineberg; Skår; Styrsö, 23 m; Väderöarna; Koster, 12–18 fm (22–33 m) (Jäderholm 1909: 106, as *Plumularia pinnata*).—At 23 stations in the Gullmarfjord, 5.4–33.6 m (Gislén 1930: 341, as *Plumularia* (*Kirchenpaueria*) *pinnata*).—West Hågarnskären, Gullmarfjord, 11 m (Michanek 1967: 456).—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; Skär, Gullmarfjord (58°18'79"N, 11°32'53"E), 80 m; Svenningskär, Gullmarfjord (58°13'77"N, 11°24'89"E), 18–20 m (Rees & Rowe 1969: 20).—At 47 stations

from Säcken to southern Kattegat, 9–80 m (Jägerskiöld 1971: 63).—Kosterhavet (58°52.567'N, 11°06.313'E), 6–30 m (this study).

Kirchenpaueria similis (Hincks, 1861).—Väderöarna (Jäderholm 1909: 107, as *Plumularia similis*). Usually considered conspecific with *Kirchenpaueria pinnata* (see text).

Family Plumulariidae McCrady, 1859

Nemertesia antennina (Linnaeus, 1758).—Bohuslän; outer Gullmarfjord, c. 40 m; [Gullmarfjord; Kattegat, far from coast] (Segerstedt 1889: 19, [27], as *Antennularia antennina*).—Bohuslän; Gullmarfjord (Jäderholm 1909: 105, as *Antennularia antennina*).— SE Lilla Sneholm (58°53'02"N, 11°04'07"E), 40 m; Gåsö, Gullmarfjord (58°15'08"N, 11°23'08"E), 35 m; Svenningskär, Gullmarfjord (58°13'77"N, 11°24'89"E), 18–20 m (Rees & Rowe 1969: 22).—Säcken, 80 m; middle Kattegat, 42 m (Jägerskiöld 1971: 63).—Swedish side of Skagerrak (Cornelius 1995b: 150).

Nemertesia ramosa Lamouroux, 1816.—Outer Gullmarfjord, 40–50 m (Segerstedt 1889: 20, [27], as *Antennularia ramosa*).—Gullmarfjord; Flatholmen; Kristineberg; Väderöarna (Jäderholm 1909: 105, as *Antennularia ramosa*).—Gullmarfjord, Flatholmen, 24 m (Gislén 1930: 310, as *Antennularia* (*Nemertesia*) *ramosa*).—At five stations from Säcken to Kosterfjord, 20–80 m (Jägerskiöld 1971: 63).—Swedish side of Skagerrak (Cornelius 1995b: 156).—Kosterhavet (58°52.424'N, 11°06.178'E), 35–11 m (this study).

Plumularia setacea (Linnaeus, 1758).—Bohuslän; outer Gullmarfjord, 30–50 m; Skåne, Kullen, by S. Lovén (Segerstedt 1889: 20, [27]).—Gullmarfjord; Flatholmen; near mouth of the Gullmarfjord; Väderöarna (Jäderholm 1909: 107).—Lille Middelgrund (Kramp 1935b: 161).—SE Lilla Sneholm, Kosterfjord (58°53'01"N, 11°07'09"E), 90–130 m (Rees & Rowe 1969: 22).—At five stations from Koster area to middle Kattegat, 29–70(?) m (Jägerskiöld 1971: 64).

Family Halopteridae Millard, 1962

Halopteris catharina (Johnston, 1833).—Väderöarna; outer Gullmarfjord and archipelago; [30–100 m] (Segerstedt 1889: 21, [27], as *Plumularia catharinae*).—Bohuslän; Nordbonden; Väderöarna (Jäderholm 1909: 107, as *Plumularia catharina*).—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; Väderöarna (58°35'04"N, 11°04'08"E), 80 m; Ulvillarna, Kosterfjord (58°49'04"N, 11°05'E), 100 m; Lilla Sneholm, Kosterfjord (58°53'02"N, 11°04'09"E), 10–20 m; Smörkullen, Gullmarfjord (58°23'94"N, 11°37'75"E), 50 m (Rees & Rowe 1969: 21).—At 16 stations from Säcken to southern Kattegat, 22–80 m (Jägerskiöld 1971: 64, as *Schizotricha catharina*).—Väderöarna (58°35.010'N, 11°04.864'E), 121–50 m (this study).

Polyplumaria gracillima (G. O. Sars, 1874).—Bohuslän (Segerstedt 1889: [27]).—Bohuslän (Jäderholm 1909: 108, as *Schizotrichia gracillima*).—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m (Rees & Rowe 1969: 22).—Säcken, 80 m (Jägerskiöld 1971: 64).

Schizotricha frutescens (Ellis & Solander, 1786).—Outer Gullmarfjord, c. 40 m (Segerstedt 1889: 21, [27], as *Plumularia frutescens*).—Gullmarfjord, 30–50 m; Väderöarna (Jäderholm 1909: 108, as *Schizotrichia frutescens*).—Bohuslän (Kramp 1935b: 160).—Vattenholmen, Kosterfjord (58°52'15"N, 11°05'04"E), 120 m (Rees & Rowe 1969: 21).—At nine stations from near Norway border to Anholt area, 9–80 m (Jägerskiöld 1971: 64).—Väderöarna (58°35.010'N, 11°04.864'E), 121–50 m (this study).

Family Aglaopheniidae Marktanner-Turneretscher, 1890

Cladocarpus integer (G. O. Sars, 1874).—Bohuslän, Kosterfjord, 80–90 m (Kramp 1935b: 169).—Säcken area, 80 m (Jägerskiöld 1971: 61).

Lytocarpia myriophyllum (Linnaeus, 1758).—Kattegat, far from coast (Segerstedt 1889: 21, [27], as *Aglaophaenia myriophyllum*).—Bohuslän (Jäderholm 1909: 110, as *Thecocarpus myriophyllum*).—Säcken, 80–90 m (Jägerskiöld 1971: 64, as *Thecocarpus myriophyllum*).—Kosterfjord (Cornelius 1995b: 217).

Aglaophenia pluma (Linnaeus, 1758).—A record of this species from the west coast of Sweden was attributed to Linnaeus (in Fauna Svecica) by Segerstedt (1889: 22). I was unable to verify that record in Linnaeus (1761), and *A. pluma* was not included in the monograph of Jäderholm (1909). Cornelius (1995b: 194) believed the northern limit of its range in the region was northern France.

Family Campanulariidae Johnston, 1837

Campanularia hincksii Alder, 1856.—Outer Gullmarfjord, c. 50 m (Segerstedt 1889: 13, [25]).—Gullmarfjord, c. 50 m (Jäderholm 1909: 67, as *Campanularia hincksi*).—Fladen, 27–40 m (Kramp 1935b: 102, as *Campanularia hincksi*).—Väderöarna (58°35'04"N, 11°04'08"E), 80 m; Smörkullen, Gullmarfjord (58°23'94"N, 11°37'75"E), 50 m (Rees & Rowe 1969: 16).—At 12 stations from Säcken area to southern Kattegat, 9.5–80 m (Jägerskiöld 1971: 61, as *Campanularia hincksi*).—Gullmarfjord (58°15'N, 11°28'E) (Östman 1983: 6).—Gullmarfjord (58°14'N, 11°28'E) (Östman 1999: 17).

Campanularia volubilis (Linnaeus, 1758).—Bohuslän, no specific locality data (Jäderholm 1909: 68).—Väderöarna (58°35'04"N, 11°04'04"E), 80 m (Rees & Rowe 1969: 16). Records of the species are few in Swedish waters (Rees & Rowe 1969).

Campanularia sp.—Säcken, 80 m (Jägerskiöld 1971: 61).

Orthopyxis integra (Macgillivray, 1842).—Gullmarfjord; [10–50 m] (Segerstedt 1889: 13, [25], as *Campanularia caliculata*).—Gullmarfjord, 10–50 m; Väderöarna (Jäderholm 1909: 65, as *Campanularia integra*).—Gothenberg archipelago, 9–27 m (Jägerskiöld 1971: 61, as *Campanularia integra*).—Gullmarfjord, Smedjan, 10–20 m (Östman 1979a: 5, as *Campanularia integra*).—Gullmarfjord (58°15'N, 11°28'E) (Östman 1983: 6, as *Campanularia integra*).—Swedish west coast (Östman 1999: 19).

Rhizocaulus verticillatus (Linnaeus, 1758).—Väderöarna; [50–100 m] (Segerstedt 1889: 14, [25], as *Campanularia verticillata*).—Bohuslän; Väderöarna, 50–100 m; Skagerrak, 320 fm (585 m) (Jaderholm 1909: 69, as *Campanularia verticillata*).

Clytia gigantea (Hincks, 1866).—Bohuslän (Jäderholm 1909: 69, as *Campanularia gigantea*).—Kosterhavet (58°53.093'N, 11°05.668'E), 20–30 m (this study).

Clytia gracilis (M. Sars, 1850).—Outer Gullmarfjord, c. 50 m; Koster, c. 180 m; Bohuslän, Grafvarne, by S. Lovén (Segerstedt 1889: 13, [25], as *Gonothyraea gracilis*).—Gullmarfjord; Kristineberg (Jäderholm 1909: 64, as *Gonothyraea gracilis*).—At 24 stations from near Norway border to Laholmsbukten, 1.7–125 m (Jägerskiöld 1971: 63, as *Laomedea gracilis*).—Gullmarfjord: Hågarnskär, Flatholmsrännan, 15–40 m (Östman 1979a: 6, 1979b: 127, as *Clytia hemisphaerica* form *gracilis*).—Gullmarfjord: Hågarnskär, 15–40 m (Östman 1982a: 156, as *Clytia hemisphaerica* form *gracilis*).—Gullmarfjord (58°15'N, 11°28'E) (Östman 1983: 6).—Gullmarfjord, 20–30 m (Cornelius 1995b: 247).—Swedish west coast (Östman 1999: 17).

Clytia hemisphaerica (Linnaeus, 1767).—Gullmarfjord; Väderöarna; Koster; Skåne, Kullen, by S. Lovén; [intertidal–50 m] (Segerstedt 1889: 11, [25], as *Clytia johnstoni*).—Bohuslän; Kristineberg; Gullmarfjord, Blåbergsholmen, 10 fm (18 m); Väderöarna (Jäderholm 1909: 61, as *Clytia johnstoni*).—Säcken Reef, Kosterfjord (59°07'N, 11°07'02"E), 80–100 m; SE Lilla Sneholm (58°53'02"N, 11°04'04"E), 40 m; Vattenholmen, Kosterfjord (58°52'06"N, 11°06'03"E), 80–120 m; Väderöarna (58°35'04"N, 11°04'08"E), 80 m; Ramsö, Kosterfjord (58°50'03"N, 11°05'06"E), 100 m; Kristineberg, Gullmarfjord (58°15'04"N, 11°27'03"E), no depth data (Rees & Rowe 1969: 16).—At 34 stations from near Norway border to southern Kattegat (Jägerskiöld 1971: 61, as *Campanularia johnstoni*).—Gullmarfjord: Blåbergsholmen, 1–4 m, and Smedjan, 10–20 m (Östman 1979a: 5, 1979b: 127, as *Clytia hemisphaerica* form *johnstoni*).—Gullmarfjord: Blåbergsholmen, Usholmen, Klubban Biological Station, and Smedjan, 1–20 m (Östman 1982a: 156, as *Clytia hemisphaerica* form *johnstoni*).—W Sweden, 20–30 m (Cornelius 1982: 75).—Gullmarfjord (58°15'N, 11°28'E) (Östman 1983: 6, as *Clytia hemisphaerica* forma *johnstoni*).—Swedish west coast (Östman 1999: 17).—Kosterhavet

(58°50.278’N, 11°02.680’E), 13 m; (58°53.093’N, 11°05.668’E), 20–30 m; Saltö naturreservat (58°52’40”N, 11°06’53”E), <1 m; Väderöarna (58°34.931’N, 11°04.931’E), 121–50 m (this study). *Campanularia johnstoni* Alder, 1856 is considered a synonym.

“*Eulaomedea*” sp.—Vattenholmen, Kosterfjord (58°52’06”N, 11°06’03”E), 80–120 m (Rees & Rowe 1969: 17).

Gonothyraea hyalina Hincks, 1866.—At seven stations from Koster area to south of Falkenberg, 18–80 m (Jägerskiöld 1971: 63, as *Laomedea hyalina*).

Gonothyraea loveni (Allman, 1859).—No specific location (Lovén 1836: 281, as *Campanularia geniculata*).—Bohuslän, Väderöarna, c. 100 m, by S. Lovén; [Väderöarna; Öresund] (Segerstedt 1889: 13, [25]).—Öresund, various locations, 5–16 m (Lönnberg 1898: 52, 1899b: 17).—Hallands Väderö (Lönnberg 1903: 60).—Islandsberg; Väderöarna, c. 100 m; Öresund, off Sofiero; Hallands Väderö (Jäderholm 1909: 64).—Northern Kattegat, 19 m; Varberg area, 31 m; middle Kattegat, 21 m (Jägerskiöld 1971: 63, as *Laomedea loveni*).—Gullmarfjord: Kockholmarna and Långgap, 0.2–0.5 m (Östman 1982a: 156).—Gullmarfjord: Långgap and harbour at Klubban Biological Station, 0.2–0.5 m (Östman 1982b: 228).—Gullmarfjord (58°15’N, 11°28’E) (Östman 1983: 6).—Swedish west coast (Östman 1999: 19).—Kosterhavet (58°52.424’N, 11°06.178’E), 35–11 m (this study).

Hartlaubella gelatinosa (Pallas, 1766).—Kristineberg (Jäderholm 1909: 70, as *Campanularia gelatinosa*).—At five stations in the Gullmarfjord, 11.7–24.6 m (Gislén 1930: 338, as *Obelia* (*Laomedea*) *gelatinosa*).

Laomedea exigua M. Sars, 1857.—Outside Hållö, Smögen, c. 100 m (Lundin *et al*. 2009).

Laomedea flexuosa Alder, 1857.—Bohuslän; [Koster-Gullmarfjord; Öresund; intertidal] (Segerstedt 1889: 14, [25], as *Campanularia flexuosa*).—Gullmarfjord; Kristineberg; Väderöarna; Koster; W of Koster, 20 fm (37 m); S of Kullen, 13 fm (24 m); Hallands Väderö (Jaderholm 1909: 68, as *Campanularia flexuosa*).—At four stations in the Gullmarfjord, 0.1–0.6 m (Gislén 1930: 316, as *Campanularia* (*Laomedea*) *flexuosa*).—Gullmarfjord, Blåbergsholmen, 0.2–0.5 m (Östman 1979a: 6).—Gullmarfjord: Blåbergsholmen, Långgap, Flatholmen, and Usholmen, 0.2–0.5 m (Östman 1982a: 156).—Gullmarfjord: Långgap and harbour at Klubban Biological Station, 0.2–0.5 m (Östman 1982b: 228).—Gullmarfjord (58°15’N, 11°28’E) (Östman 1983: 6).—Swedish west coast (Östman 1999: 19).—Saltö naturreservat (58°52’40”N, 11°06’53”E), <1 m (this study).

Laomedea neglecta Alder, 1856.—Outer Gullmarfjord; [intertidal] (Segerstedt 1889: 14, [25], as *Campanularia neglecta*).—Gullmarfjord; Kristineberg; Väderöarna (Jaderholm 1909: 69, as *Campanularia neglecta*).—Grebbestad-Fjällbacka area, 15 m; Nidingen-Varberg area, 27 m; Anholt area, 40–50 m (Jägerskiöld 1971: 63).—Gullmarfjord, Gäsö Ranna, 20–30 m (Cornelius 1982: 108).

Laomedea sp.—Anholt area, 19 m and 31–53 m (Jägerskiöld 1971: 63).

Obelia dichotoma (Linnaeus, 1758).—Gullmarfjord; [intertidal–50 m] (Segerstedt 1889: 12, [25]).—Öresund, 15–22 m (Lönnberg 1898: 52, 1899b: 17).—Bohuslän; Gullmarfjord; Väderöarna; Kosterfjord, 40 fm (73 m) (Jaderholm 1909: 63).—Säcken Reef, Kosterfjord (59°07’N, 11°07’02”E), 80–100 m; Vattenholmen, Kosterfjord (58°52’N, 11°06’03”E), 80–120 m; Väderöarna (58°35’04”N, 11°04’08”E), 80 m; Väderöarna (58°33’N, 11°05’06”E), 10–20 m; Ramsö, Kosterfjord (58°50’03”N, 11°05’06”E), 100 m; Gåsö, Gullmarfjord (58°13’65”N, 11°24’82”E), 35 m; Smörkullen, Gullmarfjord (58°23’94”N, 11°37’75”E), 50 m (Rees & Rowe 1969: 17).—At 25 stations from Säcken to southern Kattegat, 0–70 m (Jägerskiöld 1971: 63, as *Laomedea dichotoma*).—Gullmarfjord: Blåbergsholmen, Hågarnskär, Flatholmen, 2–4 m (Östman 1979a: 6, as *Laomedea dichotoma*).—Gullmarfjord: Blåbergsholmen, Hågarnskär, Flatholmen, and Långgap, 2–40 m (Östman 1982a: 156).—Gullmarfjord: Blåbergsholmen, Flatholmen, Byxeskär, and Hågarnskär, 2–40 m (Östman 1982b: 228).—Gullmarfjord (58°15’N, 11°28’E) (Östman 1983: 7, including *dubia* and *plicata* forms).—Swedish west coast (Östman 1999: 19, including *dubia* and *plicata* forms).—Kosterhavet (58°52.567’N,

11°06.313’E), 6–30 m (this study).

Obelia geniculata (Linnaeus, 1758).—Bohuslän (Linnaeus 1761: 541, 1767: 1312, as *Sertularia geniculata*).—Bohuslän; [Koster-Gullmarfjord; 0–10 m] (Segerstedt 1889: 12, [25]).—Bohuslän; Ramsö; Gullmarfjord; Skatholmen; Kristineberg; Väderöarna; Koster; Skåne, Höghalla Udde, 8 fm (15 m) (Jäderholm 1909: 62).—At seven stations in the Gullmarfjord, 1.0–13.2 m (Gislén 1930: 338, as *Obelia* (*Laomedea*) *geniculata*).—At 33 stations from Koster to southern Kattegat, 9–80 m (Jägerskiöld 1971: 63, as *Laomedea geniculata*).—Gullmarfjord, Blåbergsholmen, 0.5–4 m (Östman 1979a: 6, as *Laomedea geniculata*).—Gullmarfjord: Blåbergsholmen, Usholmen, Bonden, and at Klubban Biological Station, 0.5–4 m (Östman 1982a: 156).—Gullmarfjord: Blåbergsholmen, Långgap, and Flatholmen, 0.5–4 m (Östman 1982b: 228).—Gullmarfjord (58°15’N, 11°28’E) (Östman 1983: 6).—Swedish west coast (Östman 1999: 19).—Saltö naturreservat (58°52’40”N, 11°06’53”E), <1 m (this study).

Obelia longissima (Pallas, 1766).—Gullmarfjord; [10–30 m] (Segerstedt 1889: 12, [25], as *Obelia flabellata*).—Bohuslän, Gullmarfjord, 10–30 m (Jäderholm 1909: 62, as *Obelia flabellata*); Klubban; Kristineberg (Jäderholm 1909: 63).—At 15 stations from Strömstad area to south of Falkenberg, 12–100 m (Jägerskiöld 1971: 63, as *Laomedea longissima*).—Gullmarfjord, Blåbergsholmen, 0.2–4 m (Östman 1979a: 6, as *Laomedea longissima*).—Gullmarfjord: Blåbergsholmen, Usholmen, and Gula Skären, 0.2–25 m (Östman 1982a: 156).—Gullmarfjord: Blåbergsholmen, Långgap, Flatholmen, and Byxeskär, 0.5–15 m (Östman 1982b: 228).—Gullmarfjord (58°15’N, 11°28’E) (Östman 1983: 7).—Kristineberg (Cornelius 1990: 559).—Swedish west coast (Östman 1999: 19).—Tjärnö (58°52’33.68”N, 11°08’43.65”E), <1 m (this study).

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