Atlantic Thyroscyphidae and Sertulariidae (Hydrozoa, Cnidaria) collected during the CANCAP and Mauritania-II expeditions of the National Museum of Natural History, Leiden, The Netherlands

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Key words: Cnidaria; Hydrozoa; Leptolida; Sertulariidae; north-eastern Atlantic; geographical distribution.
Twenty-three species, subspecies or varieties of hydroids of the families Thyroscyphidae and Sertulariidae (Leptolida, Hydrozoa, Cnidaria) are described and figured, originating from north-eastern Atlantic localities visited during the CANCAP and Mauritania-II Expeditions of the Rijksmuseum van Natuurlijke Historie (now Nationaal Natuurhistorisch Museum) in the years 1976-1988 and covering waters around Azores, Canary Islands, Madeira, Cape Verde Islands and the Atlantic off Morocco and Mauritania. Besides notes on the variability of the various species in the large material available, vertical and horizontal distributions are discussed. Observations on the considerable material of *Sertularella ellisii* (Deshayes & Milne-Edwards, 1836) indicate that this species cannot be separated from *Sertularella fusiformis* (Hincks, 1861); both species are consequently merged under the oldest available name: *Sertularella ellisii* (Milne Edwards & Haime, 1836). Also included are the European records of *Sertularella gaudichaudi* Auct., not to be confused with *Sertularella gaudichaudi* (Lamouroux, 1824) from the Falkland Islands. *Sertularella unituba* Calder, 1991, is recorded from many localities in the Cape Verde Islands region; these records represent the first from the eastern Atlantic.

Contents

Introduction

The leptolid material on which the present study is based, was collected in the years 1976-1986 during the CANCAP expeditions of the Rijksmuseum van Natuurlijke Historie, now Nationaal Museum van Natuurlijke Historie (National Museum of Natural History), Leiden, The Netherlands, to the Canarian-Cape Verdean region of the eastern North Atlantic and during a subsequent cruise off Mauritania (Mauritania-II expedition, 1988). For documentation concerning the CANCAP cruises we refer to Van der Land (1987); a list of the relevant stations of the Mauritania-II expedition is presented here.

The leptolid material, collected with a variety of collecting gear, was roughly sorted on board ship and preserved in ethanol 80% or formalin 6% in sea water; it was processed in the laboratory, involving final sorting, storage (in ethanol 80%) and preparation of slides. To obtain suitable slides a standard method was used, which involved staining in a diluted solution of haemalum Mayer (Merck) (c. 5 minutes), upgrading in a series of ethanol-water mixtures, ending in 96% ethanol, removal of the remaining water in a saturated solution of phenol in xylene, a short rinse in pure xylene and embedding in Malinol (Chroma, Köngen, Germany). The material is now

stored in the collections of the National Museum of Natural History; the registration numbers (RMNH-Coel....) as well as the slide numbers are listed in the paragraphs dealing with the material studied.

List of the stations

CANCAP Stations:

Stn 1.K16, SE coast of Madeira, Ponta de São Lourenço, W of Prainha, 32°44'N- 16°44'W, rocky shore with tide pools, shore collecting, 29.ii, 01.iii & 03.iii.1976: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 1.V37, SE of Madeira, 32°41'N-16°47'W, 80 m, shrimp trap, 9/10.iii.1976: *Sertularella polyzonias* (Linnaeus, 1758)

Stn 1.072, E of Madeira, 32°41'N-16°35'W, 80 m, Van Veen grab, 14.iii.1976: *Sertularella polyzonias* (Linnaeus, 1758)

Stn 1.093, S of Madeira, 32°38'N-16°50'W, 98-105 m, triangular dredge, 16.iii.1976: *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularella polyzonias* (Linnaeus, 1758)

Stn 1.094, S of Madeira, 32°39'N-16°49'W, 125-150 m, triangular dredge, 16.iii.1976: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 1.097, S of Madeira, 32°38'N-16°49'W, 193-196 m, rectangular dredge, 16.iii.1976: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 1.114, S of Madeira, 32°38'N-16°48'W, 280-320 m, rectangular dredge, 17.iii.1976: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 1.118, Morocco, off Cape Dra, 28°22' N-11°47'W, 48 m, beam trawl, 23.iii.1976: *Amphisbetia operculata* (Linnaeus, 1758); *Diphasia margareta* (Hassall, 1841); *Hydrallmania falcata* (Linnaeus, 1758); *Sertularella* spec.

Stn 1.145, Morocco, off Cap Blanc du Nord, 33°14' N-08°49'W, 100 m, triangular dredge, 28.iii.1976: *Diphasia pinastrum* (Cuvier, 1830)

Stn 2.047, Canary Islands, SE of Fuerteventura, Punta de Gran Tarajal, 28°11'N-14°02'W, 100-125 m, Agassiz trawl, 27.viii.1977: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 2.049, Canary Islands, SE of Fuerteventura, Punta de Gran Tarajal, 28°12'N-13°53'W, 70 m, Agassiz trawl, 27.viii.1977: *Sertularella cylindritheca* (Allman, 1888); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 2.106, Canary Islands, S of Hierro, off Punta de la Restinga, 27°35'N-17°59'W, 600-1000 m, rectangular dredge, 03.ix.1977: *Sertularella gayi robusta* Allman, 1873

Stn 2.114, Canary Islands, SW of Hierro, off Punta de Orchilla, 27°41'N-18°09'W, 340-480 m, Van Veen grab, 04.ix.1977: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 2.119, Canary Islands, SW of Hierro, off Punta de Orchilla, 27°42'N-18°09'W, 350 m, rectangular dredge, 05.ix.1977: *Salacia desmoides* (Torrey, 1902); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 2.120, Canary Islands, SW of Hierro, off Punta de Orchilla, 27°42'N-18°08'W, 350-400 m, rectangular dredge, 05.ix.1977: *Diphasia pinastrum* (Cuvier, 1830); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 2.141, Canary Islands, SW of Hierro, off Punta de Orchilla, 27°41'N-18°09'W, 480-540 m, rectangular dredge, 09.ix.1977: *Sertularella gayi robusta* Allman, 1873

Stn 2.D04, Canary Islands, S coast of Fuerteventura, near Punta del Morro Jable, 28°04'N-14°20'W, 10-15 m, Scuba diving, 30.viii.1977: *Dynamena disticha* (Bosc, 1802)

Stn 2.D08, Canary Islands, SW coast of Hierro, off Faro de Orchilla, 27°42'N-18°08'W, 5-25 m, Scuba diving, 05/09.ix.1977: *Sertularia turbinata* (Lamouroux, 1816)

Stn 3.010, Madeira Archipelago, S of Porto Santo, 33°00'N-16°21'W, 410-630 m, triangular dredge, 14.x.1978: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 3.060, SE of Madeira, 32°42'N-16°44'W, 70-100m, rectangular dredge, 20.x.1978: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 3.129, off Mauritania, 18°56'N-16°27'W, 32 m, Agassiz trawl, 29.x.1978: *Sertularia marginata* (Kirchenpauer, 1864)

Stn 3.164, off Mauritania, 19°24'N-16°52'W, 0-1 m, hand collecting, 31.x.1978: *Dynamena disticha* (Bosc,

1802); *Sertularia marginata* (Kirchenpauer, 1864)

Stn 3.182, off Mauritania, 20°21'N-17°02'W, 12 m, Agassiz trawl, 01.xi.1978: *Dynamena disticha* (Bosc, 1802); *Sertularia marginata* (Kirchenpauer, 1864)

Stn AZO.01, Azores, Santa Maria, S coast, Baia da Praia, 36°57'N-25°06'W, rocky flat with tide pools, shore collecting, 13.ix.1979: *Sertularella mediterranea* Hartlaub, 1901

Stn AZO.06, Azores, Santa Maria, SE coast, Ponta do Castelo, whaling station, 36°56'N-25°01'W, rocky flat with tide pools and boulders, shore collecting, 15.ix.1979: *Sertularella mediterranea* Hartlaub, 1901

Stn AZO.17, Azores, São Miguel, S coast, E of Praia do Pópulo, in front of church, 37°45'N-25°36'W, rocky flat with large tide pools, with few loose stones and boulders, shore collecting and snorkelling, 24.ix.1979: *Sertularella mediterranea* Hartlaub, 1901

Stn AZO.36, Azores, Pico, N coast, Cais de Pico, 38°31'N-28°19'W, shore collecting and snorkelling, 16.x.1979: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 4.003, Canary Islands, S of Lanzarote, 28°50'N-13°48'W, 21-24 m, triangular dredge, 14.5.1980: *Dynamena disticha* (Bosc, 1802)

Stn 4.004, Canary Islands, S of Lanzarote, 28°50'N-13°48'W, 26-37 m, triangular dredge, 14.v.1980: *Dynamena disticha* (Bosc, 1802); *Salacia desmoides* (Torrey, 1902); *Sertularella ellisii ellisii* (Deshayes & Milne- Edwards, 1836); *Sertularella polyzonias* (Linnaeus, 1758); *Sertularia distans* Lamouroux, 1816

Stn 4.007, Canary Islands, S of Lanzarote, 28°50'N-13°50'W, 25-36 m, triangular dredge, 14.v.1980: *Dynamena disticha* (Bosc, 1802); *Sertularella polyzonias* (Linnaeus, 1758); *Sertularia distans* Lamouroux, 1816

Stn 4.012, Canary Islands, S of Lanzarote, 28°51'N-13°51'W, 34-46 m, triangular dredge, 14.v.1980: *Dynamena disticha* (Bosc, 1802)

Stn 4.015, Canary Islands, S of Lanzarote, 28°51'N-13°52'W, 35-70 m, triangular dredge, 14.v.1980: *Sertularia distans* Lamouroux, 1816

Stn 4.021, Canary Islands, S of Lanzarote, 28°50'N-13°48'W, 24-34 m, Van Veen grab, 15.v.1980: *Salacia desmoides* (Torrey, 1902); *Sertularella polyzonias* (Linnaeus, 1758); *Sertularia distans* Lamouroux, 1816

Stn 4.023, Canary Islands, S of Lanzarote, 28°49'N-13°49'W, 38-40 m, triangular dredge, 15.v.1980: *Sertularella polyzonias* (Linnaues, 1758), dentate form; *Sertularia distans* Lamouroux, 1816

Stn 4.039, Canary Islands, S of Lanzarote, 28°48'N-13°47'W, 70-50 m, rectangular dredge, 16.v.1980: *Sertularella polyzonias* (Linnaeus, 1758), dentate form; *Sertularia distans* Lamouroux, 1816

Stn 4.040, Canary Islands, S of Lanzarote, 28°48'N-13°46'W, 45-70 m, rectangular dredge, 16.v.1980: *Dynamena disticha* (Bosc, 1802); *Sertularia distans* Lamouroux, 1816

Stn 4.059, Canary Islands, SE of Lanzarote, 28°48'N-13°45'W, 420-475 m, Agassiz trawl, 19.v.1980: *Sertularella gayi robusta* Allman, 1873

Stn 4.074, Canary Islands, SE of Lanzarote, 28°55'N-13°33'W, 85-110 m, Agassiz trawl, 20.v.1980: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 4.098, Canary Islands, E. of Lanzarote, 29°08'N-13°26'W, 50-70 m, Agassiz trawl, 22.v.1980: *Dynamena disticha* (Bosc, 1802)

Stn 4.115, Canary Islands, S of Palma, 28°27'N-17°51'W, 300 m, Van Veen grab, 28.v.1980: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 4.140, Canary Islands, SW of Palma, 28°39'N-17°58'W, 50 m, Hamon grab, 02.vi.1980: *Sertularella polyzonias* (Linnaeus, 1758)

Stn 4.143, Canary Islands, SW of Palma, 28°38'N-17°58'W, 110-86 m, rectangular dredge, 02.vi.1980: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 4.144, Canary Islands, SW of Palma, 28°38'N-17°59'W, 200-140 m, rectangular dredge, 02.vi.1980: *Sertularella* cf. *polyzonias* (Linnaeus, 1758); *Sertularella* spec.

Stn 4.150, Canary Islands, SW of Palma, 28°39'N-17°58'W, 90-50 m, Agassiz trawl, 03.vi.1980: *Sertularella polyzonias* (Linnaeus, 1758)

Stn 4.151, Canary Islands, SW of Palma, 28°39'N-17°58'W, 150-50 m, Agassiz trawl, 03.vi.1980: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 4.152, Canary Islands, SW of Palma, 28°38'N-17°59'W, 200 m, Agassiz trawl, 03.vi.1980: *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularella polyzonias* (Linnaeus, 1758)

Stn 4.153, Canary Islands, SW of Palma, 28°38'N-17°59'W, 200 m, Agassiz trawl, 03.vi.1980: *Dynamena*

disticha (Bosc, 1802); *Sertularella cylindritheca* (Allman, 1888); *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularella polyzonias* (Linnaeus, 1758), dentate form

Stn 4.158, Canary Islands, SW of Palma, 28°39'N-17°59'W, 350-250 m, rectangular dredge, 04.vi.1980: *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularella polyzonias* (Linnaeus, 1758)

Stn 4.163, Canary Islands, SW of Palma, 28°38'N-17°58'W, 450-375 m, rectangular dredge, 05.vi.1980: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 4.K12, Canary Islands, SE coast of Lanzarote, Arrecife, 28°57'N-13°33'W, rocky shore, tide pools, shallow sandy bay, 0-2 m, 21.v.1980: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836); *Sertularia distans* Lamouroux, 1816

Stn 4.V08, Selvagens archipelago, S of Selvagen Grande, 30°07'N-15°53'W, 260 m, various traps, 26/27.v.1980: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.008, Azores, S of São Miguel, 37°42'N-25°30'W, 75 m, Van Veen grab, 26.v.1981: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.018, Azores, E of Formigas, 37°16'N-24°45'W, 43-45 m, Van Veen grab, 27.v.1981: *Dynamena disticha* (Bosc, 1802); *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 5.044, Azores, S of Santa Marta, 36°55'N-25°08'W, 60-150 m, rectangular dredge, 29.v.1981: *Diphasia margareta* (Hassall, 1841); *Sertularia distans* Lamouroux, 1816

Stn 5.053, Azores, S of São Miguel, 37°42'N-25°27'W, 110 m, Van Veen grab, 31.v.1981: *Sertularella polyzonias* (Linnaeus, 1758)

Stn 5.056, Azores, S of São Miguel, 37°41'N-25°26'W, 180 m, Van Veen grab, 31.v.1981: *Diphasia pinastrum* (Cuvier, 1830); *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 5.066, Azores, S of São Miguel, 37°41'N-25°27'W, 95-120 m, rectangular dredge, 31.v.1981: *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836)

Stn 5.075, Azores, S of São Miguel, 37°41'N-25°24'W, 196 m, Van Veen grab, 31.v.1981: *Diphasia pinastrum* (Cuvier, 1830); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.077, Azores, E of Faial, 38°31'N-28°36'W, 56-64 m, Van Veen grab, 01.vi.1981: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.085, Azores, E of Faial, 38°31'N-28°35'W, 150-170 m, Agassiz trawl, 01.vi.1981: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 5.088, Azores, E of Faial, 38°31'N-28°36'W, 50-60 m, rectangular dredge, 01.vi.1981: *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularia distans* Lamouroux, 1816

Stn 5.089, Azores, E of Faial, 38°32'N-28°36'W, 50-70 m, rectangular dredge, 01.vi.1981: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.096, Azores, W of Pico, 38°34'N28°32'W, 52 m, Van Veen grab, 02.vi.1981: *Sertularella polyzonias* (Linnaeus, 1758)

Stn 5.100, Azores, W of Pico, 38°34'N-28°32'W, 55 m, triangular dredge, 02.vi.1981: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularia distans* Lamouroux, 1816

Stn 5.112, Azores, W of Pico, 38°32'N-28°34'W, 85 m, Van Veen grab, 03.vi.1981: *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularia distans* Lamouroux, 1816

Stn 5.132, Azores, W of Pico, 38°36'N-28°32'W, 168 m, Van Veen grab, 06.vi.1981: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.141, Azores, W of Pico, 38°35'N-28°33'W, 82-87 m, Agassiz trawl, 07.vi.1981: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.142, Azores, W of Pico, 38°35'N-28°33'W, 108-118 m, rectangular dredge, 07.vi.1981: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.153, Azores, E of Flores, 39°26'N-31°06'W, 150-168 m, rectangular dredge, 09.vi.1981: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn 5.165, Azores, N of Flores, 39°33'N-31°10'W, 115 m, rectangular dredge, 10.vi.1981: *Sertularella polyzonias* (Linnaeus, 1758)

Stn 5.D02, Azores, Ilhéus Formigas, 37°16'N-24°47'W, 0-15 m, Scuba diving, 27.v.1981: *Sertularia distans* Lamouroux, 1816; *Sertularia marginata* (Kirchenpauer, 1864)

Stn 5.D03, Azores, E coast of Santa Maria, Baia de São Lourenço, 37°59'N- 25°03'W, 0-15 m, Scuba diving, 28.v.1981: *Salacia desmoides* (Torrey, 1902); *Sertularella ellisii ellisii* (Deshayes & Milne-

Edwards, 1836); *Sertularia distans* Lamouroux, 1816; *Sertularia marginata* (Kirchenpauer, 1864)

Stn 5.D05, Azores, S coast of São Miguel, Ilhéu da Vila, 37°42'N-25°27'W, 0-15 m, Scuba diving, 31.v.1981: *Salacia desmoides* (Torrey, 1902); *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836); *Sertularella mediterranea* Hartlaub, 1901

Stn 6.007, Cape Verde Islands, S of São Tiago, 14°54'N-23°30'W, 70-88 m, Van Veen grab, 05.vi.1982: *Salacia desmoides* (Torrey, 1902)

Stn 6.014, Cape Verde Islands, S of São Tiago, 14°54'N-23°29'W, 18 m, Van Veen grab, 05.vi.1982: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 6.032, Cape Verde Islands, SW of Brava, 14°49'N-24°45'W, 375 m, rectangular dredge, 08.vi.1982: *Sertularella gayi robusta* Allman, 1876

Stn 6.034, Cape Verde Islands, SW of Brava, 14°49'N-24°45'W, 470-520 m, rectangular dredge, 08.vi.1982: *Diphasia attenuata robusta* Billard, 1924

Stn 6.038, Cape Verde Islands, W of Fogo, 14°55'N-24°31'W, 29 m, rectangular dredge, 09.vi.1982: *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836)

Stn 6.039, Cape Verde Islands, W of Fogo, 14°55'N-24°31'W, 30 m, rectangular dredge, 09.vi.1982: *Sertularia turbinata* (Lamouroux, 1816)

Stn 6.054, Cape Verde Islands, W of São Tiago, 14°54'N-23°30'W, 29-33 m, Van Veen grab, 11.vi.1982: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 6.058, Cape Verde Islands, SE of Boa Vista, 15°58'N-22°46'W, 34 m, Agassiz trawl, 12.06.1982: *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 6.062, Cape Verde Islands, SE of Boa Vista, 15°55'N-22°46'W, 82-98 m, Agassiz trawl, 12.06.1982: *Diphasia margareta* (Hassall, 1841)

Stn 6.067, Cape Verde Islands, SW of Boa Vista, 15°55'N-23°00'W, 58-62 m, Agassiz trawl, 13.vi.1982: *Dynamena dalmasi* (Versluys, 1899); *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836); *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularia distans* Lamouroux, 1816

Stn 6.069, Cape Verde Islands, SW of Boa Vista, 15°53'N-23°00'W, 76-90 m, Agassiz trawl, 13.vi.1982: *Diphasia delagei* Billard, 1912; *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821); *Sertularella unituba* Calder, 1991; *Sertularia distans* Lamouroux, 1816

Stn 6.070, Cape Verde Islands, SW of Boa Vista, 15°56'N-23°05'W, 107 m, Van Veen grab, 13.vi.1982: *Diphasia margareta* (Hassall, 1841)

Stn 6.071, Cape Verde Islands, SW of Boa Vista, 15°55'N-23°06'W, 110 m, rectangular dredge, 13.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella unituba* Calder, 1991

Stn 6.072, Cape Verde Islands, SW of Boa Vista, 15°43'N-23°06'W, 110 m, rectangular dredge, 13.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella unituba* Calder, 1991

Stn 6.074, Cape Verde Islands, SW of Boa Vista, 15°55'N-23°04'W, 91 m, rectangular dredge, 13.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella unituba* Calder, 1991

Stn 6.075, Cape Verde Islands, SW of Boa Vista, 15°55'N-23°04'W, 90 m, rectangular dredge, 13.vi.1982: *Diphasia margareta* (Hassall, 1841)

Stn 6.076, Cape Verde Islands, SW of Boa Vista, 15°55'N-23°05'W, 92 m, Agassiz trawl, 13.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella ellisii ornata* Broch, 1933; *Sertularella unituba* Calder, 1991

Stn 6.078, Cape Verde Islands, SW of Boa Vista, 15°55'N-23°06'W, 185-190 m, Agassiz trawl, 13.vi.1982: *Sertularella unituba* Calder, 1991

Stn 6.080, Cape Verde Islands, SW of Boa Vista, 15°57'N-23°08'W, 220-250 m, Agassiz trawl, 13.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi robusta* Allman, 1873; *Sertularella unituba* Calder, 1991

Stn 6.088, Cape Verde Islands, S of São Nicolau, 16°34'N-24°23'W, 460-540 m, rectangular dredge, 14.vi.1982: *Sertularella gayi robusta* Allman, 1873

Stn 6.104, Cape Verde Islands, SSW of Santa Luzia, 16°43'N-24°46'W, 110-150 m, rectangular dredge, 16.vi.1982: *Diphasia margareta* (Hassall, 1841)

Stn 6.106, Cape Verde Islands, SSW of Santa Luzia, 16°43'N-24°47'W, 150-300 m, rectangular dredge, 16.vi.1982: *Diphasia margareta* (Hassall, 1841)

Stn 6.108, Cape Verde Islands, SW of Santa Luzia, 16°44'N-24°46'W, 55-65 m, rectangular dredge, 16.vi.1982: *Sertularia distans* Lamouroux, 1816

Stn 6.109, Cape Verde Islands, S of Santa Luzia, 16°44'N-24°46'W, 55-80 m, Agassiz trawl, 16.vi.1982: *Dynamena dalmasi* (Versluys, 1899); *Sertularia distans* Lamouroux, 1816

Stn 6.113, Cape Verde Islands, SW of Santo Antão, 16°57'N-25°20'W, 220 m, Van Veen grab, 17.vi.1982: *Sertularella gayi robusta* Allman, 1873

Stn 6.116, Cape Verde Islands, SW of Santo Antão, 16°58'N-25°20'W, 312 m, Van Veen grab, 17.vi.1982: *Sertularia distans* Lamouroux, 1816

Stn 6.131, Cape Verde Islands, S of São Vicente, 16°47'N-25°02'W, 30-43 m, Agassiz trawl, 19.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 6.133, Cape Verde Islands, S of São Vicente, 16°47'N-25°02'W, 50-60 m, Agassiz trawl, 19.vi.1982: *Sertularella ellisii ellisii* (Deshayes & Milne- Edwards, 1836)

Stn 6.135, Cape Verde Islands, S of São Vicente, 16°46'N-25°03'W, 110-150 m, rectangular dredge, 19.vi.1982: *Sertularella unituba* Calder, 1991

Stn 6.137, Cape Verde Islands, S of São Vicente, 16°46'N-25°03'W, 75-90 m, Agassiz trawl, 19.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella ellisii* (Deshayes & Milne-Edwards, 1836); *Sertularella ellisii ornata* Broch, 1933

Stn 6.146, Cape Verde Islands, SW of São Vicente, 16°48'N-25°06'W, 75 m, Agassiz trawl, 20.vi.1982: *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836)

Stn 6.148, Cape Verde Islands, SW of São Vicente, 16°47'N-25°06'W, 100-200 m, Agassiz trawl, 20.vi.1982: *Diphasia margareta* (Hassall, 1841); *Sertularella unituba* Calder, 1991

Stn 6.161, Cape Verde Islands, NW of São Vicente, 16°54'N-25°02'W, 35-40 m, Agassiz trawl, 21.vi.1982: *Sertularia turbinata* (Lamouroux, 1816)

Stn 6.170, Cape Verde Islands, NW of São Vicente, 16°54'N-25°01'W, 30-37 m, Agassiz trawl, 22.vi.1982: *Sertularella ellisii ornata* Broch, 1933; *Sertularia turbinata* (Lamouroux, 1816)

Stn 6.174, Cape Verde Islands, NW of São Vicente, 16°55'N-25°02'W, 75 m, Agassiz trawl, 22.vi.1982: *Sertularella unituba* Calder, 1991

Stn 6.176, Cape Verde Islands, NW of São Vicente, 16°54'N-25°02'W, 54-62 m, Agassiz trawl, 22.06.1982: *Sertularia distans* Lamouroux, 1816

Stn 6.D01, Cape Verde Islands, S coast of São Tiago, SE of Porto Praia, 14°55'N-23°30'W, 0-15 m, Scuba diving, 04&05.vi.1982: *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836)

Stn 6.D02, Cape Verde Islands, W coast of São Tiago, Baia de Santa Clara, 15°01'N-23°44'W, 0-20 m, Scuba diving, 06&07.vi.1982: *Cnidoscyphus marginatus* (Allman, 1877); *Dynamena crisioides* Lamouroux, 1824; *Dynamena disticha* (Bosc, 1802); *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836)

Stn 6.D06, Cape Verde Islands, SW coast of São Nicolau, Baia do Tarrafal, 16°35'N-24°22'W, 0-15 m, Scuba diving, 10.vi.1982: *Sertularia turbinata* (Lamouroux, 1816)

Stn 6.D10, Cape Verde Islands, S coast of São Vicente, 16°48'N-25°01'W, 0-15 m, Scuba diving, 19.vi.1982: *Sertularella ellisii ellisii* (Deshayes & Milne- Edwards, 1836); *Sertularia marginata* (Kirchenpauer, 1864)

Stn 7.044, Cape Verde Islands, SW of Maio, Ponta Inglez/Ponta Preta, 15°07'N- 23°14'W, 45 m, rectangular dredge, 25.viii.1986: *Sertularella* spec.

Stn 7.058, Cape Verde Islands, SW of Maio, Ponta Inglez/Ponta Preta, 15°07'N- 23°14'W, 69 m, rectangular dredge, 26.viii.1986: *Diphasia delagei* Billard, 1912; *Diphasia margareta* (Hassall, 1841); *Sertularella unituba* Calder, 1991; *Sertularia distans Lamouroux*, 1816

Stn 7.059, Cape Verde Islands, SW of Maio, Ponta Inglez/Ponta Preta, 15°07'N- 23°14'W, 61 m, rectangular dredge, 26.viii.1986: *Diphasia margareta* (Hassall, 1841); *Salacia desmoides* (Torrey, 1902); *Sertularella unituba* Calder, 1991; *Sertularia distans* Lamouroux, 1816

Stn 7.081, Cape Verde Islands, W of Boa Vista, W of Ilhéu de Sal Rei, 16°11'N- 23°00'W, 70 m, Agassiz trawl, 28.viii.1986: *Sertularella unituba* Calder, 1991

Stn 7.119, Cape Verde Islands, S of Razo, 16°36'N-24°36'W, 140-160 m, van Veen grab, 01.ix.1986: *Diphasia margareta* (Hassall, 1841)

Stn 7.122, Cape Verde Islands, S of Razo, 16°36'N-24°35'W, 100 m, rectangular dredge, 01.ix.1986: *Diphasia margareta* (Hassall, 1841)

Stn 7.126, Cape Verde Islands, S of Razo, 16°36'N-24°36'W, 208-930 m, rectangular dredge, 01.ix.1986: *Diphasia margareta* (Hassall, 1841); *Sertularella unituba* Calder, 1991

Stn 7.140, Cape Verde Islands, S of Razo, 16°35'N-24°36'W, 1200 m, rectangular dredge, 04.ix.1986: *Sertularella unituba* Calder, 1991

Stn 7.149, Cape Verde Islands, S of Branco, 16°38'N-24°43'W, 100 m, rectangular dredge, 05.ix.1986: *Diphasia margareta* (Hassall, 1841)

Stn 7.156, Cape Verde Islands, SW of Branco, 16°40'N-24°43'W, 90-110 m, rectangular dredge, 05.ix.1986: *Diphasia margareta* (Hassall, 1841)

Stn 7.179, Cape Verde Islands, W. of São Vicente, Canal de São Vicente, 16°58'N-25°03'W, 280-330 m, Agassiz trawl, 08.ix.1986: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821)

MAURITANIA-II Expedition:

Stn MAU.009, Mauritania, Passe du Lévrier, E of Cap Blanc, 20°48'N-17°02'W, 17 m, Agassiz trawl, 07.vi.1988: *Amphisbetia operculata* (Linnaeus, 1758)

Stn MAU.010, Mauritania, Passe du Lévrier, E of Cap Blanc, 20°49'N-17°01'W, 17 m, Agassiz trawl, 07.vi.1988: *Amphisbetia operculata* (Linnaeus, 1758)

Stn MAU.022, off Mauritania, 18°50'N-16°28'W, 60-66 m, Agassiz trawl, 08.vi.1988: *Sertularia marginata* (Kirchenpauer, 1864)

Stn MAU.027, off Mauritania, 18°50'N-16°18'W, 16 m, Agassiz trawl, 09.vi.1988: *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836)

Stn MAU.033, RV "Tyro", off Mauritania, 18°47'N-16°34'W, 114 m, Van Veen grab, 09.vi.1988: *Sertularella cylindritheca* (Allman, 1888); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn MAU.039, off Mauritania, 18°48'N-16°43'W, 260-280 m, Agassiz trawl, 10.vi.1988: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn MAU.040, off Mauritania, 18°51'N-16°53'W, 500 m, Agassiz trawl, 10.vi.1988: *Diphasia margareta* (Hassall, 1841); *Sertularella gayi gayi* (Lamouroux, 1821); *Symplectoscyphus bathyalis* Vervoort, 1972

Stn MAU.041, off Mauritania, 18°51'N-16°56'W, 800-840 m, Agassiz trawl, 10.vi.1988: *Diphasia margareta* (Hassall, 1841); *Symplectoscyphus bathyalis* Vervoort, 1972

Stn MAU.042, off Mauritania, 19°03'N-16°58'W, 820-990 m, Agassiz trawl, 10.vi.1988: *Diphasia margareta* (Hassall, 1841)

Stn MAU.048, off Mauritania, 19°04'N-16°25'W, 24 m, Agassiz trawl, 11.vi.1988: *Diphasia margareta* (Hassall, 1841)

Stn MAU.063, Mauritania, off Banc d'Arguin, 20°00'N-17°09'W, 20 m, Van Veen grab, 13.vi.1988: *Amphisbetia operculata* (Linnaeus, 1758)

Stn MAU.072, Mauritania, off Banc d'Arguin, 20°00'N-17°24'W, 48-52 m, Agassiz trawl, 13.vi.1988: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn MAU.073, Mauritania, off Banc d'Arguin, 20°03'N-17°09'W, 19 m, Agassiz trawl, 13.vi.1988: *Amphisbetia operculata* (Linnaeus, 1758)

Stn MAU.080, Mauritania, off Banc d'Arguin, 20°02'N-17°26'W, 60-70 m, Agassiz trawl, 14.vi.1988: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn MAU.082, Mauritania, off Banc d'Arguin, 19°59'N-17°30'W, 100 m, Agassiz trawl, 14.vi.1988: *Sertularella gayi gayi* (Lamouroux, 1821)

Stn MAU.090, Mauritania, off Banc d'Arguin, 19°35'N-16°51'W, 38 m, Agassiz trawl, 15.06.1988: *Amphisbetia operculata* (Linnaeus, 1758)

Stn MAU.112, Mauritania, off Banc d'Arguin, 20°31'N-17°10'W, 29 m, Agassiz trawl, 18.vi.1988: *Amphisbetia operculata* (Linnaeus, 1758)

Stn MAU.117, Mauritania, off Banc d'Arguin, 20°24'N-17°19'W, 35-40 m, Agassiz trawl, 18.vi.1988: *Amphisbetia operculata* (Linnaeus, 1758); *Sertularella gayi gayi* (Lamouroux, 1821)

Stn MAU.130, Mauritania, off Banc d'Arguin, 20°25'N-17°40'W, 95-100 m, Agassiz trawl, 20.vi.1988: *Sertularella gayi gayi* (Lamouroux, 1821)

Station unknown:

Sertularella gayi gayi (Lamouroux, 1821)

Taxonomic review

Thyroscyphidae Stechow, 1920

Genus *Cnidoscyphus* Splettstösser, 1929

Cnidoscyphus marginatus (Allman, 1877)

Obelia marginata Allman, 1877: 9-10, pl. 6 figs 1-2.
Obelia (Lytoscyphus) marginata; Ritchie, 1909a: 260.
Lytoscyphus marginata; Ritchie, 1909a: 263.
Lytoscyphus marginatus; Billard, 1910: 8; Stechow, 1923d: 148; Leloup, 1935: 31; Redier, 1963: 21, fig. 2; Rees & Thursfield, 1965: 113.
Campanularia marginata; Nutting, 1915: 44, pl. 6 figs 5-7; Fraser, 1943: 88; 1944; 124-126, pl. 22 fig. 97; 1947: 5; Vannucci-Mendes, 1949: 228, pl. 1 figs 7-10; Vannucci, 1950: 84; 1951a: 82; 1951b: 106, 107, 108, 112, 113; Deevey, 1954: 270; Leloup, 1960: 226; Penner, 1962: 178; Mayal, 1973: 58, figs 40-46; 1983: 9, figs 15-17 [not *Campanularia marginata* Bale, 1884: 54, pl. 1 fig. 2 = *Thyroscyphus marginatus* (Bale, 1884) = *Thyroscyphus balei* Calder, 1983].
Leptoscyphus marginatus; Jäderholm, 1920: 3.
Cnidoscyphus marginatus; Splettstösser, 1929: 88-95, 125, figs 83-88, map. 2; Leloup, 1937a: 101, 117; Buchanan, 1957: 364, fig. 13; Vervoort, 1959: 248, fig. 20; Van Gemerden-Hoogeveen, 1965: 14; Vervoort, 1968: 31, 102, fig. 14; Cornelius, 1975: 280; Wedler, 1975: 332 et seq.; Calder, 1976: 169; Calder & Hester, 1978: 91; Colin, 1978: 142; Flores González, 1983: 120, photo 26; Bandel & Wedler, 1987: 35; Mergner, 1987: 187; Calder, 1993: 68 et seq.; Vervoort, 1993a: 104.
Thyroscyphus marginatus; Calder, 1983: 16-17, fig. 8; Harris, 1990: 229, fig. 11.5c-e; Cairns et al., 1991: 25; Calder, 1991a: 79-81, figs 41, 42.
Thyroscyphus marginata; Bouillon, Massin & Kresevic, 1995: 75 (sic).
Campanularia insignis Allman, 1888: 19-20, pl. 9 figs 1-2; Congdon, 1907: 468- 470, figs 10-11; Stechow, 1922 : 146; Rees & Thursfield, 1965: 195; Redier, 1971a: 509; Smaldon, Heppell & Watt, 1976: 17 [not *Campanularia insignis* Fewkes, 1881: 129-130 = *Campanularia macroscypha* Allman, 1877].
Lytoscyphus insignis; Ritchie, 1909a: 262.

Material.— **Cape Verde Islands**: Stn 6.D02: c. 15 colonies 25-50 mm high and some fragments; majority of colonies detached, some attached to substratum (calcareous algae, barnacles). One of colonies with male gonotheca. *Dynamena disticha* (Bosc, 1802) on some of stems. (RMNH-Coel. 26870, slide 1969).

Remarks.— We have nothing to add to the accurate description of this species by Calder (1991: 79-81, figs 41-42). A single (male) gonotheca was observed. The hydrothecae have well preserved hydranths, indicating live colonies when collected. Colonies heavily overgrown by filamentous algae and quite dirty.

Distribution.— This species is well distributed in superficial to moderately deep waters of the tropical Atlantic, being recorded from both western and eastern sides [Bermuda: Allman, 1888, Congdon, 1907, Ritchie, 1909a (all as *Campanularia insignis*); Jäderholm, 1920 (as *Leptoscyphus marginatus*); Bennitt, 1922, Fraser, 1944 (both as *Campanularia marginata*); Calder, 1986, 1991; western Atlantic: Calder, 1983; Florida, Venezuela, West Indies: Leloup, 1935, 1937a, Van Gemerden-Hogeveen, 1965; Brazilian coast off Pernambuco: Mayal, 1973, 1983 (as *Campanularia marginata*); West Africa: Vervoort, 1959, Redier, 1971a (as *Campanularia insignis*)]. The present records appear to be the first from the littoral (0-20 m) of the Cape Verde region.

Sertulariidae Lamouroux, 1812

Genus *Amphisbetia* L. Agassiz, 1862

Amphisbetia operculata (Linnaeus, 1758)

Sertularia operculata Linnaeus, 1758: 808; Hincks, 1868: 263-264, pl. 54; Vervoort, 1942: 298; 1946a: 319-320; 1946b: 249-251, fig. 109; 1949: 153; Hamond, 1957: 296, 318.

Odontotheca operculata; Levinsen, 1913: 5, figs 8-10; Broch, 1914: 36; Stechow, 1919: 102.

Amphisbetia operculata; Stechow, 1921a: 258; 1923d: 200; Billard, 1927b: 340; Leloup, 1933: 9, 24; Teissier, 1933a: 121, fig. 2A, a; Philbert, 1935d: 32; Leloup, 1937a: 105, 116; Purchon, 1938: 327; Da Cunha, 1944: 9, 50, fig. 26; Leloup, 1947: 28, fig. 20: Da Cunha, 1950: 122, 125, 137: Teissier, 1950b: 21; Leloup, 1952: 174-175, fig. 101; Day & Morgans, 1956: 301; Millard, 1957: 221; 1958: 183; Leloup, 1960: 232; Cabioch, 1961: 20, 30; Millard, 1961: 204; Ralph, 1961: 775, fig. 8i-k; Millard, 1964: 25; Redier, 1964b: 135; Rees & Thursfield, 1965: 141; Teissier, 1965: 25, 37; Ralph, 1966: 159; Redier, 1966a: 46; 1967: 391; Cabioch, 1968: 556, 655; Millard, 1968: 254, 266; Fey, 1970: 401; Patriti, 1970: 44, fig. 59; Vervoort, 1972: 98-99; Castric-Fey, 1973: 214; Hiscock, 1974: 25; Leloup, 1974: 25; Millard, 1975: 251, fig. 83A-E; Watson, 1975: 167; Cabioch, Gentil, Glaçon & Retière, 1977: 124; Chas Brinquez & Rodriguez Babio, 1977: 29, fig. 14A- C; Evans, 1978: 88; Cornelius, 1979: 254-256, fig. 6; Stepan'yants, 1980: 116; García Corrales, Aguirre Inchaurbe & González Mora, 1980: 6, fig. 1; Castric & Michel, 1982: 27, fig., fig. 85; Altuna, Romero, Sanz, Torres- Gomez-de-Cadiz & Ibañez, 1983: 134; Urgorri & Besteiro, 1983: 17; Aguirrezabalaga et al., 1984: 91; Isasi Urdangarin, 1985: 74, fig. 18A-B; Gili, 1986; 117-118, fig. 4.14A; Isasi & Saiz, 1986: 70; Parapar Vegas, 1986: 37-44, pls 3-4; Boero & Bouillon, 1987: 242, fig. 21.7B; Stapels & Watson, 1987: 218; Vervoort, 1987: 86; Boero & Bouillon, 1989: 39, pl. 1 fig. vi; Gili, Vervoort & Pagès, 1989: 97-98, fig. 23A; Altuna & García Carrascosa, 1990: 54 et seq., fig.; Cornelius & Ryland, 1990: 142, fig. 4.16; Cornelius, 1992b: 82 et seq.; Dawson, 1992: 19; Boero & Bouillon, 1993: 264; García Alvarez et al., 1993: 271; Jones, 1993: 108 et seq.; Altuna Prados, 1994: 54; Genzano, 1994: 3-8; Watson, 1994: 67; Álvarez- Claudio & Anadón, 1995: 239; Bouillon, Massin & Kresevic, 1995: 63; Cornelius, 1995b: 30-32, fig. 4; Cornelius, Manuel & Ryland, 1995: 99, fig. 4.13.

Amphisbetia (Sertularia) operculata; Teissier & Teissier, 1930: 669; Philbert, 1935c: 27; Boero, 1984: 97.

Dynamena operculata; Coulon, 1931: 55; Naumov, 1960: 330-331, fig. 220, pl. 7 fig. 1; Naumov & Stepan'yants, 1962: 89; Belousov, 1975: 655, fig. 1 no. 84.

Material.— **Atlantic coast Morocco and Mauritania**: Stn MAU.009: numerous detached colonies with gonothecae, mixed with various epibionts (RMNH-Coel. 27808); Stn MAU.010: detached, strongly branched colony 170 mm high; gonothecae present (RMNH-Coel. 26874, slide 1973); Stn MAU.063: detached, branched colony 135 mm high, with gonothecae (RMNH-Coel. 26875, slide 1974); Stn MAU.073: numerous colonies up to 190 mm high, with abundant gonothecae and many epibionts. Various distinct hydrocauli form a large, confused mass of stems and ramifications, together a huge complex. None of the stems is polysiphonic; each hydrocaulus rises from a distinct hydrorhiza. There are no fusions between the various branches (RMNH-Coel. 26865, slide 1964); Stn MAU.090: detached colony 125 mm high, with gonothecae (RMNH-Coel. 26876, slide 1975); Stn MAU.112: detached colony 90 mm high, with gonothecae (RMNH-Coel. 26877, slide 1976); Stn MAU.117: several 40 mm high colonies on shield of Polyplacophora; no gonothecae (RMNH-Coel. 26878, slide 1977); Stn MAU.118: single detached fragment c. 5 mm long; no gonothecae.

Remarks.— We have nothing to add to the known descriptions of this species (e.g., Cornelius, 1979: 254-256, fig. 6; 1995b: 30-32, fig. 4), the present material showing no aberrant features.

Distribution.— *Amphisbetia operculata* (Linnaeus, 1758) is a species of almost cos-

mopolitan distribution, though avoiding pure Arctic and Antarctic conditions and usually restricted to coastal waters (Cornelius, 1995b). It occurs along the whole of the African Atlantic coast and appears to be abundantly represented in sublittoral waters off the coast of Mauritania, where huge colonies were collected. It is absent from catches done around the Azores, the Canaries, Madeira and in the Cape Verde area, though recorded from the Azores by Cornelius, 1992b. The Mauritania specimens are with well preserved polyps, indicating that live colonies were obtained and, by the wealth of gonothecae, in active reproduction.

Genus *Diphasia* L. Agassiz, 1862

Diphasia attenuata robusta Billard, 1924
(fig. 1)

Diphasia attenuata; Billard, 1906: 195-197, fig. 13.
Diphasia attenuata var. *robusta* Billard, 1924: 62-64; Patriti, 1970: 44, fig. 58; Ramil & Vervoort, 1992: 198-200, fig. 51a, b.

Material.— **Cape Verde Islands**: Stn 6.034: single hydrocladium 21 mm long; no gonothecae (RMNH-Coel. 26866, slides 1965 and 2022).

Remarks.— The hydrocladium consists of 11 pairs of hydrothecae separated by long internodes; the nodes are scarcely visible (fig. 1). The hydrothecae are strictly opposite and large, with a considerable part of the adcauline wall free: basally they are narrower than at the distal end. The hydrothecal aperture is large and completely directed upwards. The adcauline sinus at the hydrothecal aperture is considerable; the free part of the hydrotheca is dorsoventrally compressed. All undamaged hydrothecae have a fully retracted hydranth; no caecum was observed.

Discussion.— The fragment mentioned above agrees with *Diphasia attenuata* var. *robusta* Billard, 1924, as described by Ramil & Vervoort (1992: 198-200, fig. 51a-b). The hydrothecae are large; the abcauline hydrothecal wall is thickened. The present specimen as well as the material described by Ramil & Vervoort, 1992 (l.c.), in the arrangement of the hydrocladia and the difference in diameter between axis and hydrocladia presents characters that bring it close to the various forms of *Diphasia margareta* (Hassall, 1841) found in our material. The CANCAP material differs from that described by

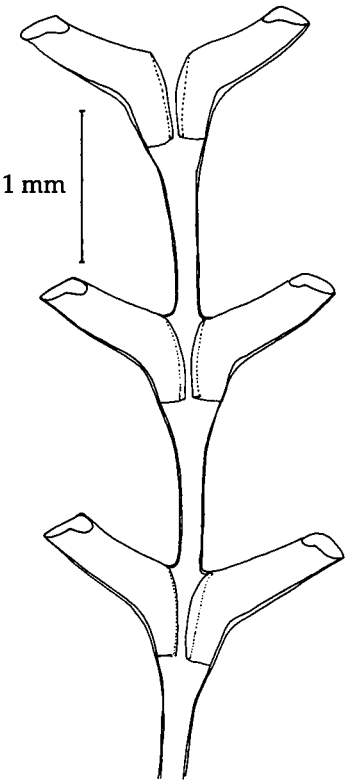


Fig. 1. *Diphasia attenuata* var. *robusta* Billard, 1924, from CANCAP Stn 6.034 (slide 1965); part of hydrocladium with three pairs of hydrothecae.

Ramil & Vervoort by the greater length of the internodes and the strictly opposite arrangement of the hydrothecae.

Distribution.— The geographical distribution of this subspecies is discussed by Ramil & Vervoort (1992: 199) and is confined to the eastern subtropical Atlantic (off North Africa between the coast NE of Rabat and Cape Bojador) and the Atlantic side of the Strait of Gibraltar. The range is now extended to the Cape Verde Islands: the present specimen undoubtedly originates from a living colony. Previous records set the depth limits of this species between 470 and 890 m; the present records are from 470-520 m.

Diphasia delagei Billard, 1912
(fig. 2)

Diphasia delagei Billard, 1912: 466-467, figs 3-4; Prenant & Teissier, 1924: 25; Billard, 1931b: 246-247; Teissier, 1950b: 19; 1965: 22; Cabioch, 1968: 548, 686; Cabioch, Gentil, Glaçon & Retière, 1977: 121; Cornelius, 1979: 259-260, fig. 10; Ramil & Vervoort, 1992: 201-202, fig. 56a; Bouillon, Massin & Kresevic, 1995: 64; Cornelius, 1995b: 41-43, fig. 7.

Nigella delagei; Stechow, 1921a: 257.

Material.— **Cape Verde Islands**: Stn 6.069: one colony on *Diphasia margareta* (RMNH-Coel. 26859, slide 1958); Stn 7.058: numerous colonies up to 23 mm high on several axes of *Streptocaulus pulcherrimus* Allman, 1883. Gonothecae present (RMNH-Coel. 26861, slide 1960).

Description.— Colonies consisting of stolons creeping on axes of *Diphasia margareta* (Hassall, 1841) and *Streptocaulus pulcherrimus* Allman, 1883, from which rise many 3-23 mm high unbranched hydrocauli (hydrocladia), opposite, sub-opposite and alternately arranged, pointing left and right. The general aspect of the colony is deceptive, because it resembles a hydrocaulus with pinnately arranged ramifications: in reality the stolon runs along the dorsal aspect of the axis of the host. Each hydrocaulus (hydrocladium) is composed of a primary athecate internode, separated from the following internode by means of an oblique node, and thecate internodes that are not separated by nodes.

Hydrothecae arranged in opposite pairs; adcauline hydrothecal walls of a pair not touching on frontal or dorsal aspect of internode. Shape of hydrotheca

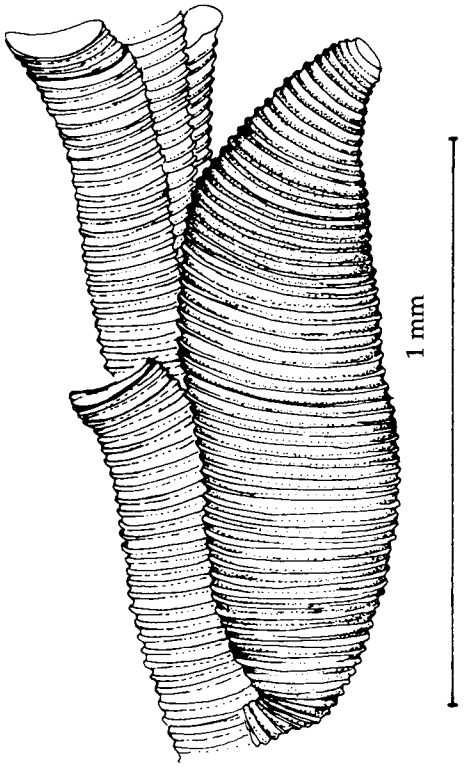


Fig. 2. *Diphasia delagei* Billard, 1912, from CANCAP Stn 7.058 (slide 1960); hydrothecae and gonotheca in lateral aspect.

tubular, elongated, with distal portion curving outward. Adcauline wall almost completely adnate with internode; plane of hydrothecal aperture parallel to internodal length axis. Hydrothecal rim with large though shallow adcauline sinus into which the circular opercular plate is attached. Abcauline part of hydrothecal border with thin perisarc which occasionally may give the impression of an abcauline sinus. Hydrothecae totally and finely ringed transversally; rings well marked and running distally till close under hydrothecal rim. Rings, though considerably less marked, are also visible on dorsal and frontal aspect of the internode.

Gonothecae springing from the internode directly under a pair of hydrothecae; they are large, sack-shaped and are disposed parallel to the axis, a major part of its dorsal wall being in direct contact with the wall of the internode. Distally the gonotheca narrows and has a fairly small circular aperture. The narrow part of the gonotheca curves frontally, the plane of the gonothecal aperture being parallel to the internodal length axis. As the hydrotheca the gonotheca is densely transversally ribbed (fig. 2). All gonothecae observed are male being almost completely filled by a mass of developing spermatocytes.

Remarks.— Unlike the Atlantic BALGIM material described by Ramil & Vervoort (1992: 201-202, fig. 56a) all CANCAP colonies belong to the type with closely approximated hydrothecal pairs; the distal part of a pair overlapping the base of the succeeding pair. The free distal portion of the hydrotheca is of reduced length; the number of renovations is none to one or two. Gonothecae appear to be quite rare in this species, though probably restricted to a short reproductive period. They are exclusively mentioned by Cornelius (1979: 259, fig. 10b) and described to be found in September in empty condition. The Stn 7.058 lot has numerous gonothecae and all inspected have developing male gonophores; they were taken in August.

Distribution.— This species was originally thought to be restricted to the English Channel and the Roscoff area (Cornelius, 1979: 260); its presence near the Cape Verde Islands has now also been established and judging from the abundance at Stn 7.058 it can not possibly be rare there. By its mode of growth along the axis of sertulariids and aglaopheniids it easily escapes detection. In the Cape Verde area it was found at almost the same depth (69-90 m) as the material recorded by Cornelius (1979): 60-90 m. The actual depth distribution of the species is between 39 m (Medel, 1996) and 1250 m (Ramil & Vervoort, 1992)

Diphasia margareta (Hassall, 1841)
(figs 3-4)

Sertularia Margareta Hassall, 1841b: 284, pl. 6 figs 3-4; Johnston, 1847: 72- 73, fig. 13.

Diphasia margareta; Evans, 1978: 91; Cornelius, 1979: 263-265, fig. 11; García Corrales, Aguirre Inchaurbe & González Mora, 1980: 9, fig. 2; Parapar Vegas, 1986: 45-51, pls 5-6; Templado et al.: 1986; Aquirrezabalaga et al., 1988: 11; Gili, Vervoort & Pagès, 1989: 99-100, fig. 24; Altuna & García Carrascosa, 1990: 54 et seq., fig.; Izquierdo, García-Corrales, Bacallado & Vervoort, 1990: 32-33, fig. 2; Crowell, 1991: 66: 72; Ramil & Vervoort, 1992: 201-211, figs 52a-c, 53a-g, 54a-e, 55a-c, 56c-e, 57a, 58a-d; Boero & Bouillon, 1993: 264; Altuna Prados, 1994: 54; Alvarez-Claudio & Anadón, 1995: 239; Bouillon, Massin & Kresevic, 1995: 64.

Diphasia pinaster; Hincks, 1868: 252-253, pl. 50 fig. 1; Ritchie, 1910-1911: 162; Bedot, 1911: 222; Billard, 1912: 461; Crawshay, 1912: 328; Massy, 1912: 216; Broch, 1913: 11; Levinsen, 1913: pl. 4 figs 26-27;

Robson, 1914: 102; Billard, 1924: 67; Prenant & Teissier, 1924: 25; Billard, 1927b: 341; 1931b: 246; Nobre, 1931: 15; Marine Biological Association, 1931: 74; Philbert, 1934: 1-6, pl. 1; Kramp, 1935: 182, fig. 76B; Perrier, 1936: 28; Moore, 1937: 44; Jones, 1939: 20; Leloup, 1940: 16; Kramp, 1943: 45; Fraser, 1944: 245-246, pl. 51 fig. 230; Kramp, 1947: 15; Teissier, 1950: 19; Williams, 1954: 49; Marine Biological Association, 1957: 47; Vervoort, 1959: 255, figs 23-24; Cabioch, 1961: 19, 36; Bruce, Colman & Jones, 1963: 53; Cabioch, 1965: 57; Rees & Thursfield, 1965: 121; Teissier, 1965: 22; Rees & White, 1966: 277; Cabioch, 1968: 548, 685; Fey, 1970: 398; Patriti, 1970: 42, fig. 55; Christiansen, 1972: 299; Edwards, 1973: 587; Cabioch, Gentil, Glaçon & Retière, 1977: 118; Cornelius, 1995b: 50-52, fig. 10; Cornelius, Manuel & Ryland, 1995: 99, fig. 4.15.

Diphasia (Eudiphasia) pinaster; Kudelin, 1914: 374-377, fig. 119C.

Nigellastrum pinaster; Stechow, 1922: 147; 1923d: 161; Kramp, 1938: 69; Da Cunha, 1940: 108; Vervoort, 1942: 290; Da Cunha, 1944: 9, 56, figs 30-31; 1950: 125.

Diphasia elegans G.O. Sars, 1874: 145-146, pl. 3 figs 23-26; Berezina, 1948: 61; Burdon-Jones & Tambs-Lycke, 1968: 7.

Diphasia (Eudiphasia) elegans; Kudelin, 1914: 380-381.

Nigellastrum elegans; Stechow, 1922: 147; 1923d: 161.

Abietinaria elegans; Stepan'yants, 1985a: 135, 140-143, fig. 3; Antsulevich, 1989: 26.

Diphasia pectinata; Vervoort, 1959: 255-256, figs 23-24.

Material.— **Azores area**: Stn 5.044: three colonies with male gonothecae 125-150 mm high and a fragment; one of colonies attached to colony of Bryozoa, remainder detached. Hydrocladial hydrothecae subopposite. Male gonothecae with four cusps at the distal part of the lateral margin, surrounding centrally placed, tube-shaped aperture. Occasionally cusps on female gonotheca bifurcate (RMNH-Coel. 26844, slides 1943, 1980); Stn 5.100: c. 30 colonies 50-125 mm high, basally anchored in sediment and some fragments. Both male and female gonothecae present, the latter of considerable size (RMNH-Coel. 26885, 3 slides 1985); Stn 5.153: five detached colonies 75-210 mm high. Hydrocauli basally of considerable diameter (1.5 mm), robust. Hydrocladial hydrothecae subopposite. One of colonies with male gonothecae (RNNH Coel. 26889, slides 1989).

Atlantic coast of Morocco and Mauritania: Stn 1.118: two detached colonies 145 mm high, both branched and with male gonothecae. With epizootic *Halecium* spec., *Plumularia setacea* (Linnaeus, 1758) and *Obelia dichotoma* (Linnaeus, 1758) (RMNH-Coel. 26879, 3 slides 1978); Stn MAU.039: several long and slender colonies up to 200 mm high and some fragments. Hydrothecae lengthened; thickening of perisarc at abcauline hydrothecal wall in some hydrothecae scarcely visible, thus resembling *D. attenuata*. Slender male gonothecae present. Also three detached colonies up to 140 mm high with identical characteristics (RMNH-Coel. 26909, two slides 2018); Stn MAU.040: various colonies, detached or attached to worm tubes, up to 55 mm long, partly with male gonothecae (RMNH-Coel. 27790); Stn MAU.041: two colonies and two fragments, up to 52 mm high. One of colonies attached to shell. No gonothecae (RMNH-Coel. 26910, slide 2019); Stn MAU.042: single detached colony, less robust than usually met with. Hydrothecae lengthened, with conspicuous free part of adcauline wall; internodes also long and slender. Axis ramified to form two secondary hydrocauli. Male gonothecae present; compared to those previously observed these are lengthened (RMNH- Coel. 26911, 2 slides 2020); Stn MAU.048: three detached colonies 120 mm high; no gonothecae. Perisarc at curvature of abcauline hydrothecal wall distinctly thickened (RMNH-Coel. 26912, slide 2021).

Canary Islands and Selvagens Archipelago: Stn 4.074: 50 mm high colony with dark brown periderm; no gonothecae. Hydrothecae with much developed swelling of abcauline perisarc; Stn 4.143: three colonies up to 120 mm high with abundant female gonothecae and some stems of *Sertularella gayi gayi* (Lamouroux, 1821) (RMNH-Coel. 27108, 2 slides 2478).

Cape Verde Islands: Stn 6.062: seven colonies 46-145 mm high, some attached to *Streptocaulus pulcherrimus* Allman, 1883, others detached. Adcauline wall hydrotheca adnate for greater part. Male and

female gonothecae present. Stems with hydrothecae of *Modeeria rotunda* (Quoy & Gaimard, 1827) (RMNH-Coel. 26891, 3 slides 1991); Stn 6.069: nine detached colonies and several attached to stones 55-110 mm high. Some colonies with female gonothecae. Predominantly hydrocladial hydrotheca with short free part of adcauline hydrothecal wall. Colour of axes and hydrocladia brownish, much more so than colonies from other stations (RMNH-Coel. 26893, 2 slides 1994); Stn 6.070: three complete colonies and some fragments, all detached, 50-100 mm high. No gonothecae (RMNH-Coel. 26894, slide 1995); Stn 6.071: 22 colonies, some old and without hydrocladia, 50-170 mm high, partly rooting in sediment, partly attached to colonies of Bryozoa. Hydrothecae with major part of adcauline wall adnate, free part usually short, flexure at abcauline wall distinct. Female and male gonothecae abundantly present, majority of female gonothecae without cusp at the end of the four (indistinct) ribs, occasionally a single spine is present. Male gonothecae with broad apical cone surrounded by four flattened cusps of same height (RMNH-Coel. 26895, 2 slides 1996); Stn 6.072: ten colonies 50-130 mm high attached to small stones from sediment and to axis of *Streptocaulus pulcherrimus* Allman, 1883. Female gonothecae present; only apical row of spines present, spines sometimes poorly developed, with *Clytia paulensis* (Vanhöffen, 1910) (RMNH-Coel. 26896, slide 1997); Stn 6.074: c. 30 erect, robust, monosiphonic hydrocauli 50-160 mm high with many female gonothecae on which *Clytia paulensis* (Vanhöffen, 1910) (fig. 3). In addition five colonies 15 mm high developing on axis of *Streptocaulus pulcherrimus* Allman, 1883. Hydrothecae of characteristic shape. No gonothecae. (RMNH-Coel. 26856, slides 1955 and 1999); Stn 6.075: c. 20 colonies 33-135 mm high, basally attached to sediment by means of stolonal fibres (hydrorhiza). Some colonies with male gonothecae with broad, flattened apical spines surrounding cone-shaped aperture (RMNH-Coel. 26897, slide 2000); Stn 6.076: single detached colony 127 mm high with female gonothecae; on stem *Campanularia hincksii* Alder, 1856. Gonothecae with single much reduced spine at end of each longitudinal carina (RMNH-Coel. 26898, slide 2001). In addition many colonies on calcareous red algae up to 150 mm high with numerous gonothecae of both sexes (RMNH-Coel. 27812); Stn 6.080: two developing colonies 12 and 17 mm high; no gonothecae. All in slide (RMNH-Coel. 27054, slide 2422); Stn 6.104: 13 colonies of which eight attached to sediment by means of stolonal fibres while five are attached to larger and older colonies, height 30-145 mm. (For description see below). Female gonothecae present, having one spine at the end of each longitudinal carina (RMNH-Coel. 26899, 2 slides 2002); Stn 6.106: one colony 76 mm high, detached; two colonies 20-30 mm high developing on axis of *Streptocaulus* cf. *pulcherrimus* Allman, 1883. Male gonothecae present on larger colony (RMNH-Coel. 26900, slides 2003 and 2004); Stn 6.131: single detached colony 70 mm high, no gonothecae. Hydrothecae with short free part of adcauline hydrothecal wall (RMNH-Coel. 26854, slide 1953); Stn 6.137: two colonies 6 and 11 mm high on *Streptocaulus* cf. *pulcherrimus* Allman, 1883; no gonothecae (RMNH-Coel. 26901, slide 2006); Stn 6.148: mutilated colonies 60 mm high, basally attached to sediment by means of stolonal fibres; two of colonies with remnants of hydrocladia. No gonothecae. In addition eight developing colonies 5-20 mm high on *Nemertesia* sp. and *Streptocaulus* cf. *pulcherrimus* sp., no gonothecae (RMNH-Coel. 26902, slide 2008); Stn 7.058: 13 colonies and some fragments up to 200 mm high; no gonothecae (RMNH-Coel. 26903, slide 2011); Stn 7.059: several colonies, some attached to axis of *Streptocaulus pulcherrimus* Allman, 1883, others detached, up to 225 mm high. Some colonies, probably as the result of damage, with hydrocladia only in highest parts. Female gonothecae present and bearing one or two cusps on each rib (RMNH-Coel. 26904, slide 2012); Stn 7.119: various detached stems c. 100 mm high; hydrothecae large, strongly curved, with abcauline perisarc strongly developed. Male and female gonothecae present; male ones smaller than usual, female with strong spines (RMNH-Coel. 27811); Stn 7.122: six detached colonies 35-70 mm high, some with male gonothecae. About half adcauline hydrothecal wall adnate, though varied along length of colony (RMNH-Coel. 26905, slide 2014); Stn 7.126: single detached fragment. Hydrothecae lengthened and slender, as are also the hydrocladial internodes. Thickening of perisarc at point of flexure of abcauline hydrothecal wall present but not so strong (see fig 4) (RMNH- Coel. 26906, slide 2015); Stn 7.149: six colonies attached to sediment and three smaller colonies taken from axis of *Nemertesia* sp., up to 120 mm high. Hydrothecae elongated, c. half adcauline hydrothecal wall free. Male gonothecae present (RMNH-Coel. 26907, slide 2016); Stn 7.156: various colonies on axis of *Nemertesia* sp. and several detached colonies 20-165 mm high. Some male gonothecae present. In addition three colonies 42-55 mm high on *Nemertesia* spec.; no gonothecae

(RMNH-Coel. 26908, slide 2017); Stn 7.179: single 70 mm high colony, without gonothecae, on old hydrocaulus of unidentifiable hydroid (RMNH-Coel. 27794).

Description (of the material from Stn 6.104).— Hydrocaulus erect, robust, monosiphonic, 50-160 mm high, attached to small stones of sediment by means of stolonal

Fig. 3. *Diphasia margareta* (Hassall, 1841), from CANCAP Stn 6.074; a, female gonotheca (slide 1955); b, part of axis with subopposite hydrothecae (slide 1999).

fibres, basally with a short athecate region with some transverse nodes. Rest of axis composed of thecate internodes separated by scarcely visible transverse nodes; each internode having one pair of opposite hydrothecae along the sides, not occupying the frontal or dorsal surface of the axis. Axial diameter superior to that of hydrocladia. Hydrocladia inserting on axial internodes, generally pinnately arranged but nearly opposite in the apical part. Hydrocladia composed of thecate internodes, a pair of opposite hydrothecae being found on each hydrocladial internode. Hydrotheca tubular, at half their length rather sharply curving outwards; abcauline hydrothecal wall internally with perisarcal thickening in area of curvature. Adcauline wall of hydrotheca adnate for greater part, only small portion free; this free part forms an almost perpendicular angle with the hydrocladial length axis in many hydrocladial internodes, though that angle appears to be variable. Hydrothecal aperture directed upwards, with a large adcauline sinus into which the circular opercular flap is attached. Axial hydrothecae smaller and narrower, almost straight and scarcely curved at the middle of the abcauline wall. Thickening at middle of adcauline wall present, though less developed than in hydrocladial hydrothecae (fig. 3b). Free portion of adcauline hydrothecal wall in comparison to adnate part shorter than in hydrocladial hydrotheca, making an angle of 45° with axial length axis.

Female gonothecae occur on hydrocladia, attached to internodes under hydrothecae, large, pyriform, in cross section more or less quadrangular, with the four externally produced, longitudinal ribs bearing one subterminal spine each, and a longitudinal furrow between each of those ribs. The marsupium inside the gonotheca communicates with the exterior by means of two opposite, circular holes in the sides of the gonotheca.

Male gonothecae, from other stations, are cylindrical structures, smaller than the female ones, narrowing towards their base and quadrangular in cross section some distance under the tip. Each of the four angles is produced into a spine of varied development. The gonothecal aperture is at the end of a conical structure surrounded by those spines.

Some of the older hydrocauli basally with developing colonies of the same species that use the axis as a substrate.

Remarks.— The considerable variability in hydrothecal and gonothecal development of this species has been described and figured at length by Ramil & Vervoort (1992: 201-210, figs 52-55, 56c-e, 57a, 58) and is to a certain extent reflected by the present material. Upon comparison of the CANCAP specimens with those described by

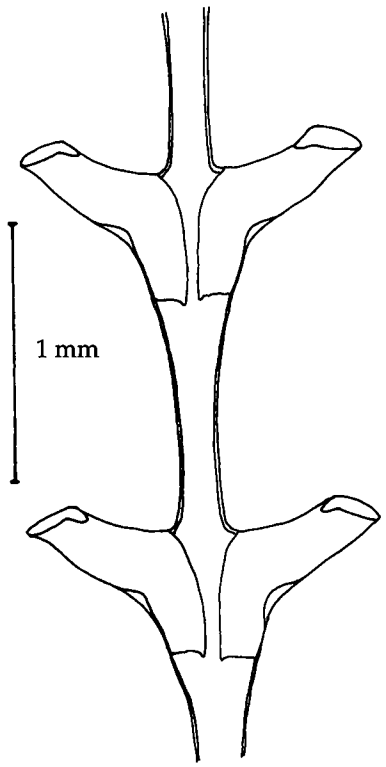


Fig. 4. *Diphasia margareta* (Hassall, 1851), from CANCAP Stn 7.126 (slide 2015); part of hydrocladium.

Vervoort & Ramil it appears that the majority of it belongs the form described as type 1, with the exception of those from Stn 1.118 (belonging to type 2) and those from Stn 7.126, MAU.039, MAU.041, MAU.042 and MAU.048, belonging to type 4 (cf. fig. 4). Nearly all the material referred to type 4 is from deeper water localities, with the exception of that from Stn MAU.048, but this material, in the development of the abcauline hydrothecal wall approaches type 1. It should be remarked that the distinction between the varieties indicated as types 1 to 4 is not sharp (neither it was in the CANCAP material described by Ramil & Vervoort); intermediary colonies do occur and the development of hydro- and gonothecae that is used to define those varieties varies considerably even along axis and hydrocladia of a single colony.

Distribution.— *Diphasia margareta* is widely distributed in temperate and subtropical north-eastern Atlantic waters, including the Mediterranean, ranging from the Norwegian coast to Guinea Bissau (Ramil & Vervoort, 1992); the present records fit nicely into that pattern. The species is quite common in moderately deep water (24-990 m) around the Cape Verde Islands and off the Mauritanian coast. The depth distribution extends to at least 1318 m (Ramil & Vervoort, 1992).

Diphasia pinastrum (Cuvier, 1830)

Sertularia Pinaster Ellis & Solander, 1786: 55-56, pl. 6 fig. b. [Not *Sertularia pinaster* Lepechin, 1783 = *Selaginopsis pinaster* (Lepechin, 1783); not *Diphasia pinaster* Hincks, 1868: 252-253, pl. 50 fig. 1 = *Diphasia margareta* (Hassall, 1841b)]

Sertularia pinastrum Cuvier, 1830: 301.

Diphasia pinastrum; Cornelius, 1979: 267-269, fig. 13; Ramil & Vervoort, 1992: 210-213, fig. 57b-e; Bouillon, Massin & Kresevic, 1995: 65.

Sertularia alata Hincks, 1855: 127-128, pl. 12.

Diphasia alata; Hincks, 1868: 258, pl. 48 fig. 2; Ritchie, 1910-1911: 162; Bedot, 1911: 222; Crawshay, 1912: 328; Billard, 1923: 16; Prenant & Teissier, 1924: 25; Billard, 1927b: 341; 1931b: 247; 1931d: 676; Marine Biological Association, 1931: 74; Kramp, 1935: 183, fig. 76a; Perrier, 1936: 28; Kramp, 1938: 69; Leloup, 1940: 16; Le Danois, 1948: 118, 175, 236; Teissier, 1950b: 18; Marine Biological Association, 1957: 46-47; Cabioch, 1965: 55; Rees & Thursfield, 1965: 119; Teissier, 1965: 21; Rees & White, 1966: 277; Cabioch, 1968: 655; Patriti, 1970: 43, fig. 56; Edwards, 1973: 586; Cabioch, Gentil, Glaçon & Retière, 1977: 118; Cornelius & Ryland, 1990: 142, fig. 4.14; Cornelius, 1995b: 35-37, fig. 5.

Diphasia (Eudiphasia) alata; Kudelin, 1914: 377-378, fig. 135

Nigellastrum alatum; Stechow, 1922: 147; 1923d: 160; Vervoort, 1942: 291.

Material.— **Azores area**: Stn 5.056: one complete colony 65 mm high and several large fragments 65-115 mm high of what undoubtedly have been large colonies. Axes strongly polysiphonic over greater part of their lengths; hydrorhiza composed of large number of stolonal tubes in basal part of axes. Male gonothecae with developing spermatocytes present (RMNH-Coel. 26845, slide 1944); Stn 5.075: three detached colonies 160-175 mm high, basally strongly polysiphonic; one of colonies branched. Male gonothecae present (RMNH-Coel. 26914, slide 2025).

Atlantic coast of Morocco and Mauritania: Stn 1.145: four young colonies 20-25 mm high and some fragments, apparently removed from stems of other hydroids (RMNH-Coel. 27109).

Canary Islands and Selvagens Archipelago: Stn 2.120: one complete colony and several developing on axes of *Plumularia* spec., 3-35 mm high. No gonothecae (RMNH-Coel. 26913, slide 2023).

Remarks.— For a description of this species we refer to Ramil & Vervoort (1992:

210-213, fig. 57b-e). The young colonies, that usually develop on the axes of plumularian hydroids, have the same characteristic hydrothecae as the adult colonies, but here they are placed alternately along the primary axis. The shape of the gonothecae is slightly varied, mainly because of variability in height of the four blunt cusps surrounding the slightly raised gonothecal aperture; there seem to be no external differences between male and female gonothecae. The gonothecae observed in the CANCAP material have here been considered male because of the presence of a large globular mass of developing spermatocytes, not completely filling the gonothecal space. Female gonothecae observed in the BALGIM material described by Ramil & Vervoort (1992) usually contain several (developing) eggs.

Distribution.— The geographical distribution of this species in the north-eastern Atlantic seems to be more restricted than that of *Diphasia margareta* (Hassall, 1841), being recorded from Bergen on the Norwegian coast southward till the Cape Spartel region, Morocco; it also includes the Mediterranean (Ramil & Vervoort, 1992). The present records extend the distribution to the Azores and the Canary Islands. Depth range 160-400 m.

Genus *Dynamena* Lamouroux 1812

Dynamena crisioides Lamouroux, 1824

Dynamena crisioides Lamouroux, 1824: 613, pl. 90 figs 11-12; Lamouroux in: Lamouroux, Bory de St. Vincent & Deslongchamps, 1824: 291; Billard, 1925a: 651; 1925b: 181, figs 36, 37a-e, pl. 7 fig. 21; 1926: 97; Fox, 1926: 103; Briggs & Gardner, 1931: 190; Stephenson, Stephenson, Tandy & Spender, 1931: 44, 54, 59, 71; Leloup, 1932: 159; Billard, 1933: 14; Dollfus, 1933: 128; Leloup, 1935: 41, fig. 24; Blackburn, 1937: 172, fig. 3; Leloup, 1937a: 107, 117; 1937b: 5, 36; Vervoort, 1941: 209; Blackburn, 1942: 112; Fraser, 1944: 296-298, pl. 62 fig. 282; Picard, 1951a: 112; Buchanan, 1956: 279; Day & Morgans, 1956: 301; Endean, Kenny & Stephenson, 1956: 102; Buchanan, 1957: 366; Millard, 1958: 183; Stephenson, Endean & Bennett, 1958: 267; Yamada, 1958: 51, 56, fig. 2; Pennycuik, 1959: 192; Vervoort, 1959: 260, fig. 27a-b; Yamada, 1959: 56; Leloup, 1960: 228; Hertlein, 1963: 230; Millard, 1964: 31; Mammen, 1965: 51, figs 84-85; Plante, 1965: 248, 259, 289, 307; Rees & Thursfield, 1965: 125; Van Gemerden-Hoogeveen, 1965: 21, fig. 6; Vasseur, 1965: 52, 70; Redier, 1966b: 85; 1967: 392; Vervoort, 1967: 38, fig. 10; 1968: 38, 103, fig. 18; Hirohito, 1969: 19; Fishelson, 1971: 122; Day, 1974: 85; Hirohito, 1974: 15; Jaubert & Vasseur, 1974: 137; Millard & Bouillon, 1974: 7, 32, fig. 6D; Rho & Chang, 1974: 141; Vasseur, 1974: 158; Cooke, 1975: 96, pl. 4 fig. 1; Millard, 1975: 263, fig. 87A-F; Wedler, 1975: 333 et seq.; Cooke, 1977: 93, fig. 20; Hirohito, 1977: 20-21, fig. 5; Rho, 1977: 271, 422, pl. 65 no. 85, pl. 86 no. 85; Vasseur, 1977: 97, 98; Vervoort & Vasseur, 1977: 35; Millard, 1978: 191 et seq.; 1980: 131; Florez González, 1983: 120; McCain, 1984: 99; Gravier-Bonnet, 1985: 155; Calder, 1986: 137, fig. 39; Venugopalan & Wagh, 1986: 276; Bandel & Wedler, 1987: 42; Mergner, 1987: 187; Rees & Vervoort, 1987: 103; Yamada & Kubota, 1987: 39; Gibbons & Ryland, 1989: 410-411, fig. 28; Park, 1990: 80; Cairns et al., 1991: 25; Calder, 1991a: 89-92, figs 47-48 [full synonymy]; 1991b: 223; 1991c: 2068 et seq.; 1991d: 2993-2999; Tang, 1991: 26; De Oliveira Pires, Barreira e Castro, Migotto & Marques, 1992: 6; Reyes & Campos, 1992: 108 et seq.; Park, 1992: 289; Calder, 1993: 68 et seq.; Vervoort: 1993a: 193; Bouillon, Massin & Kresevic, 1995: 65; Hirohito, 1995: 170-172, fig. 55a-b; Park, 1995: 14.

Dynamena crisioides crisioides; Schmidt, 1972a: 36, 41, 42, 43, 44; Millard & Bouillon, 1973: 68.

Dynamena crisioides f. *typica*; Vannucci Mendes, 1946: 447, pl. 3 figs 24-25; 1949: 243; Vannucci, 1951b: 110, 111, 112, 115, 117; 1954: 115.

Dynamena (Thuiaria) crisioides; Kalk, 1958: 230.

Thuiaria (Dynamena) crisioides; Morris & Mogelberg, 1973: 25.

Thuiaria crisioides; Fraser, 1943: 93; 1944: 296-298, pl. 62 fig. 282; 1947: 12; 1948: 250; Deevey, 1954: 270.
(?)*Salacia crisioides*; Stechow, 1922: 150.
Salacia (?) *crisioides*; Stechow, 1923d: 213.
Dynamena tubuliformis Marktanner-Turneretscher, 1890: 238-239, pl. 4 fig. 10; Stechow, 1923a: 12; 1923d: 163; 1926: 101; Hummelinck, 1933: 305; Yamada, 1955: 2, pl. 1 figs 1-2.
Sertularia tubuliformis; Broch, 1914: 34; Jäderholm, 1917: 14; 1920: 5; 1923: 4; Rodgers & Oleröd, 1988: 301.
Thuiaria tubuliformis; Briggs, 1918: 34, 38; Warren, 1919: 113, figs 4-5, pl. 12 figs 4-5; Jarvis, 1922: 342; Hargitt, 1927: 508, pl. 1 figs 4-5; Ling, 1938: 360, figs 19-20; Mayal, 1981c: 229, 230; 1981d: 230; Zhang Liangxing, Huang Zongguo, Li Chuanyan & Zheng Chengxing, 1984: 548.
Thuiaria interrupta Allman, 1885: 145, pl. 16 figs 8-10.
Thuiaria palans Thornely, 1904: 119, pl. 3 figs 5, 5a.
Synthecium maldivense Borradaile, 1905: 841, pl. 69 fig. 5a-d.
Sertularia humilis Congdon, 1907: 479, figs 29-32.
Sertularella serrata Billard, 1919: 22 fig. 3c.
Sertularia aestuaria Stechow, 1919: 157.

Material.— **Cape Verde Islands**: Stn 6.D02: detached fragment or small colony 20 mm high; no gonothecae (RMNH-Coel. 26864, slide 1963).

Description.— Axis brown, yellowish in upper parts; hydrocladia yellow. Axis divided into internodes, each with basal hydrotheca, alternately on left and right sides; the alternating hydrocladia insert on a small apophysis basally of each axial hydrotheca. Remaining part of each internode with one or two pairs of subopposite hydrothecae. Hydrocladia basally have an athecate internode, separated from apophysis by a transverse node; rest of hydrocladium composed of thecate internodes with 2 or 3 pairs of subopposite or opposite hydrothecae each. In each internode there is a gradual diminution in size of the hydrothecae from proximal to distal part. Adcauline wall of hydrocladial hydrothecae almost completely adnate; this wall slightly convex in its superior part, while the abcauline wall is concave. Adcauline walls of each pair of hydrothecae not touching, neither on frontal side nor on back. No gonothecae are present.

Remarks.— The hydrothecal operculum in species of *Dynamena* is usually considered to be two-flapped: a comparatively small abcauline flap and a larger adcauline flap, occasionally with a deep median cleft. The present specimen is particularly well preserved, though covered by epibiotic algae, and the structure of the operculum is clearly visible. The cleft in the adcauline opercular flap appears to be of considerable depth, the two partitions virtually acting as separate valves that are curved adcaudally to make room for the passage of the hydranth. The adcauline flap is pushed downward but usually retains its flat surface. The (well preserved) hydranths show no trace of a caecum.

Distribution.— *Dynamena crisioides* is circumglobally distributed in tropical and subtropical waters (Vervoort, 1941, 1959; Millard, 1975; Calder, 1991a); it has previously been recorded from a number of localities off the African west coast (Vervoort, 1959). The present locality, though further north, fits into the distributional pattern of this species in the Atlantic; it occurred between 0 and 20 m depth.

Dynamena dalmasi (Versluys, 1899) (figs 5, 6a-b)

Thuiaria sertularioides Allman, 1877: 28, pl. 16 figs 11-12 [not *Dynamena sertularioides* Lamouroux, 1816: 178 = *Synthecium sertularioides* (Lamouroux, 1816)].
Sertularia sertularioides; Nutting, 1904: 57.
Tridentata sertularioides; Stechow, 1922; 150; 1923d: 205.
Desmoscyphus dalmasi Versluys, 1899: 38, figs 6-8; Van Soest, 1976: 85.
Sertularia dalmasi; Fraser, 1944: 280-281, pl. 60 fig. 267a-e; 1947: 10; 1948: 247; Deevey, 1954: 270; Vervoort, 1959: 279, fig. 38; Rees & Thursfield, 1965: 146; Rho, 1967: 355-356, fig. 19A-C, pl. 1 fig. 8; Vervoort, 1968: 106; Rho & Chang, 1972: 104; Defenbaugh & Hopkins, 1973: 104-105, pl. 14 fig. 51; Morris & Mogelberg, 1973: 27; Defenbaugh, 1974: 118; Rho & Chang, 1974: 144; Rho, 1977: 263, 419, pl. 80 fig. 75; Park, 1992: 291.
Tridentata dalmasi; Stechow, 1922: 149.
Dynamena dalmasi; Cairns et al., 1991: 26; Calder, 1991a: 92-93, fig. 49; 1993: 68 et seq.; Bouillon, Massin & Kresevic, 1995: 65.
Sertularia rathbuni Nutting, 1904: 57, pl. 3 figs 4-9; Hentschell, 1922: 4; Leloup, 1935: 50, fig. 30.
Tridentata rathbuni; Stechow, 1922: 150.
Dynamena mayeri; Vervoort, 1959: 261-263, fig. 28 [not *Sertularia mayeri* Nutting, 1904: 58, pl. 5 figs 1-4 = *Dynamena disticha* (Bosc, 1802)].

Material.— **Cape Verde Islands**: Stn 6.067: up to 40 mm high colonies on stem and leafs of foliaceous algae and old hydroid stems; gonothecae present (RMNH-Coel. 26860, slide 1959, fig. 5; slide 2463, with *Sertularia distans* Lamouroux, 1816, fig. 6a-b); Stn 6.109: numerous detached colonies and some attached to stone up to 47 mm high. Ramification in agreement with that described for the species. Gonothecae are present (RMNH-Coel. 26915, two slides 2027). In addition four colonies 4-14 mm on bivalve shell; no gonothecae (RMNH-Coel. 27094, slide 2466).

Description.— Hydrocauli straight, often of considerable length and branched, giving rise to hydrocladia perpendicular to length axis of hydrocaulus (fig. 5a), thus creating the impression that the hydrocaulus is a stolon from which the colonies originate, the hydrocladia forming the axis of such colonies. This impression is strengthened by the fact that the hydrocaulus is often parallel to the substrate and has apical stolons. Hydrocaulus divided

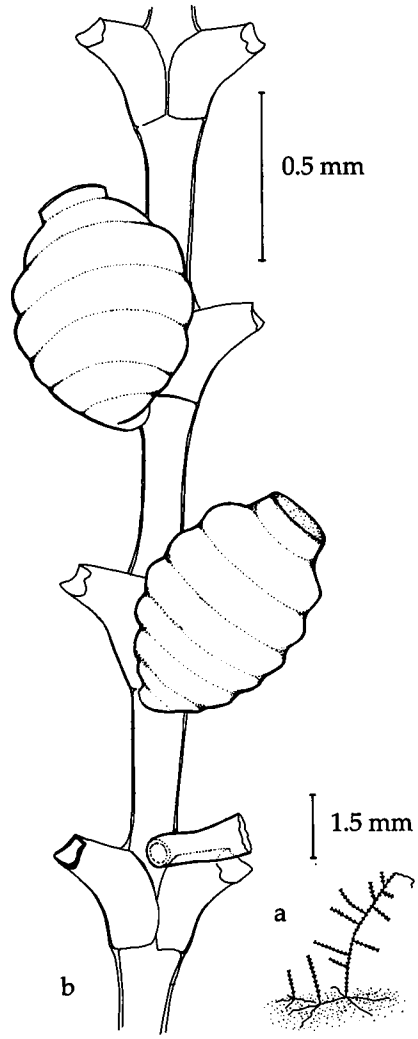


Fig. 5. *Dynamena dalmasi* (Versluys, 1899), from CANCAP Stn 6.067 (slide 1959); a, colonies arising from stolon; b, part of stem with pairs of hydrothecae and gonothecae.

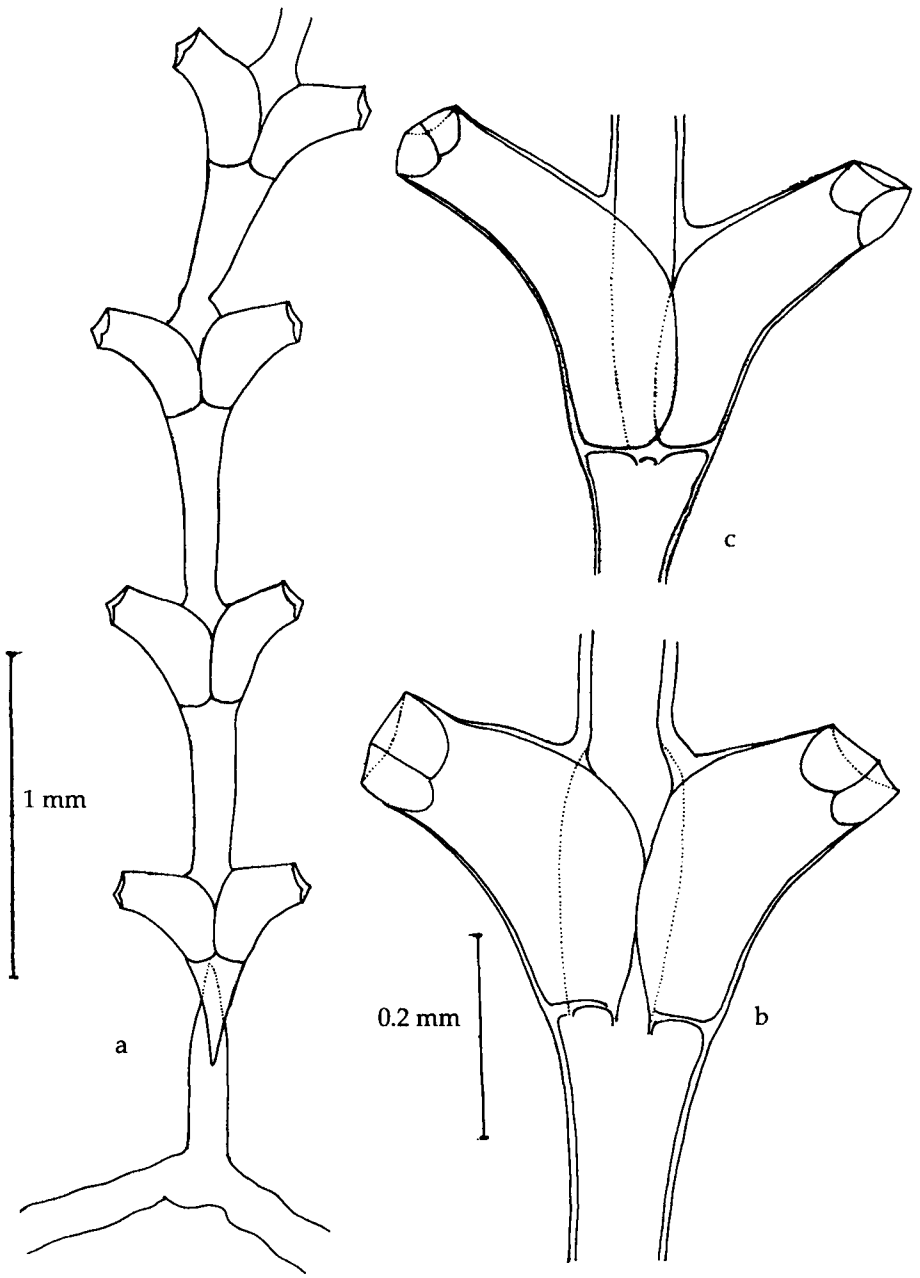


Fig. 6a-b. *Dynamena dalmasi* (Versluys, 1899), from CANCAP Stn 6.067 (slide 2463); a, stem arising from stolon, showing basal part with oblique hindge-joint; b, pair of hydrothecae from basal portion of stem; c, *Sertularia distans* Lamouroux, 1816, from CANCAP Stn 4.k12, pair of hydrothecae in frontal view (slide 2459); a, scale 1 mm; b-c, scale 0.2 mm.

into internodes; first internode athecate and separated from the remaining (thecate) internodes by an oblique node (fig. 6a). Hydrocladia leaving axial internodes at various levels, pointing backwards, forward or laterally. First internode of hydrocladium occasionally with oblique node. Thecate internodes long, pair of hydrotheca at extreme distal part. Hydrothecae tubular, curved and short (fig. 6a-b). Adcauline hydrothecal wall adnate for c. two-thirds of its length. Marginal cusps small. Lumen of hydrothecae gradually widening from base onwards; basal portion not widened and swollen as in *Sertularia turbinata*. Hydrothecal rim slightly thickened, renovations of hydrothecal border quite common, but of much reduced length. Development of intrathecal cusps varied: some colonies without any internal cusps, in other one to three intrathecal cusps may be observed in the more basally placed pairs of hydrothecae, diminishing in size distally and completely absent from the distal hydrothecal pairs. Hydrothecae with intrathecal cusps have one (usually best developed) on the adcauline side and two smaller on the abcauline side, placed laterally under the marginal cusps; those abcauline intrathecal cusps may be completely absent. Structure of the opercular apparatus as in *Dynamena crisioides* Lamouroux, 1824; there is a fairly small, stiff abcauline plate and a bigger adcauline plate with a deep median cleft; the two halves acting as separate valves and curving upward with extrusion of the hydranths. Hydranths well preserved in some colonies, without trace of a caecum in retracted condition.

Gonothecae (so far unknown) present, small, globular, transversally ribbed to undulated at apical half, with short, wide apical neck with circular aperture. They insert by means of a short pedicel at the base of a pair of hydrothecae of the basal region of hydrocaulus or hydrocladia (fig. 5b). No athecate internodes have been observed amongst the thecate internodes as occurs in *Sertularia distans*.

Remarks.— The CANCAP specimens agree with previous descriptions of Atlantic specimens by Vervoort (1959, as *Dynamena mayeri*) and Calder (1991a). The gonothecae, that are not rare in the CANCAP material, were not previously described.

Distribution.— The geographical range of this species includes tropical and subtropical parts of both the Pacific and Atlantic; its distribution, consequently, being almost circumglobal. Western Atlantic records are given by Allman (1877), Versluys (1899), Fraser (1944) and Calder (1991a). Eastern Atlantic localities are listed by Vervoort (1959, both as *Dynamena mayeri* and *Sertularia dalmasi*). Eastern Pacific records are given by Fraser (1948), and from the western Pacific it is recorded by Park & Rho (1986). The present records are both from the Cape Verde area and fit into the picture given above; the depth distribution there is between 55 and 80 m.

Dynamena disticha (Bosc, 1802)
(fig. 7)

Sertularia disticha Bosc, 1802: 101, pl. 29 fig. 2.

Dynamena disticha; Stechow, 1923d: 164; Picard, 1951a: 111; 1951c: 261; 1952b: 220; 1958a: 193; Tortonese, 1958: 182; Rossi, 1961: 83; Marinopoulos, 1979: 120; Morri, 1979: 306; 1980: 9; Boero, 1981a: 182; 1981b: 197; Gili i Sardà, 1982: 73, fig. 34A; Gili & Romero, 1983: 36 et seq.; Boero, 1985: 136; Boero & Fresi, 1986: 146; Calder, 1986: 137, pl. 39; García Rubies, 1987: 146, 148; Roca, 1987: 211; Calder, 1990: 446, 448; Cairns et al., 1991: 26; Calder, 1991a: 93-96, fig. 50; 1991b: 223; 1991c: 2068 et seq.; Cornelius, 1992a: 257; 1992b: 99; Calder, 1993: 68 et seq.; Bouillon, Massin & Kresevic, 1995: 66.

Tridentata disticha; Stechow, 1922: 149; 1923d: 204.

Dynamena disticha f. *cornicina*; Picard, 1958b: 2.

Dynamena cornicina McCrady, 1859: 204-205; Billard, 1925b: 188, fig. 40, pl. 7 fig. 23; 1926: 97; 1931a: 392, fig. 1 no. 2; Leloup, 1932: 159; Billard, 1933: 14, fig. 5; Broch, 1933: 86, fig. 36; Dollfus, 1933: 128; Leloup, 1934a: 12, 13; 1935a: 39, figs 22-23; 1935b: 2, 4; Billard, 1936: 7; Fraser, 1937: 161, pl. 37 fig. 193; Leloup, 1937a: 106, 116, 117, fig. 9; 1937b: 5, 36; Blackburn, 1938: 319; Leloup, 1938a: 15, fig. 10; 1938b: 6; 1940: 17; Vervoort, 1941: 206; Blackburn, 1942: 113; Da Cunha, 1944: 9, 53, fig. 28; Fraser, 1944: 279-280, pl. 60 fig. 266; Vannucci Mendez, 1946: 562, pl. 4 figs 33-34; Vervoort, 1946a: 307; Vannucci Mendes, 1949: 242; Da Cunha, 1950: 125; Vannucci, 1950: 87; 1951b: 107, 108, 110, 111, 112, 115, 117; Dawydoff, 1952: 55; Buchanan, 1957: 365; Pennycuik, 1959: 192; Yamada, 1959: 58; Leloup, 1960: 228; Millard, 1964: 29, fig. 9; Van Gemerden-Hoogeveen, 1965: 25; Rees & Thursfield, 1965: 125; Vervoort, 1967: 40-42, fig. 11; 1968: 103; Hirohito, 1969: 18; Gravier, 1970: 116; Patriti, 1970: 41, fig. 54 bis; Calder, 1971: 70, pl. 5c; Fishelsohn, 1971: 122; Redier, 1971b: 144; Schmidt, 1972a: 36, 41, 42, 43, 45; Por & Ferber, 1972: 150; Schmidt, 1973: 284; Millard & Bouillon, 1974: 7; Cooke, 1975: 94, pl. 3 figs 3-4; Millard, 1975: 261-263, fig. 86A-E; Wedler, 1975: 332 et seq.; Calder, 1976: 169; Cooke, 1977: 95, fig. 21; Mergner & Wedler, 1977: 16, pl. 4 fig. 27a-b, pl. 7 fig. 49; Calder & Hester, 1978: 91; Millard, 1978: 191 et seq.; García Corrales et al., 1980: 12, fig. 3; Ljubenkov, 1980: 49; García-Carrascosa, 1981: 227-230, pl. 19 figs a-e, pl. 35 fig. a; Butler et al., 1983: 42; Calder, 1983: 9-11, figs 1-2; Masunari, 1983: 80-82; McCain, 1984: 99; Flores González, 1983: 120, photo 27; Austin, 1985: 60; Gili & García-Rubies, 1985: 46, figs 4C, 6C; Gili, 1986: 118-119, fig. 4.21D, E; Bandel & Wedler, 1987: 42; García-Carrascosa et al., 1987: 371; Mergner, 1987: 187; Llobet, Gili & Barangé, 1988: 40, fig. 4B; Gibbons & Ryland, 1989: 407-410, fig. 27; Gili, Murillo & Ros, 1989: 23; Gili, Vervoort & Pagès, 1989: 100, fig. 25A; Altuna & García Carrascosa, 1990: 54 et seq., fig.; Izquierdo et al., 1990: 34-36, fig. 3; Calder, 1991a: 93- 96, fig. 50; Medel Soteras et al., 1991: 507-510, fig. 2; Cornelius, 1992a: 257; 1992b: 82 et seq.; De Oliveira Pires et al., 1992: 6; Genzano, 1992: 144, figs 5-6; Genzano & Zamponi, 1992: 50-52, fig. 21; Park, 1992: 289; Vervoort, 1993a: 108; 1993b: 554; Boero & Bouillon, 1993: 264; Coll & Moreno, 1993: 319; Hirohito, 1995: 167-170, fig. 54a-g; Calder, 1995: 543 et seq.; Peña Cantero, 1995: 355-360, pl. 43 figs a-d.

Sertularia cornicina; Fraser, 1911: 72; 1912: 374, fig. 38; Sumner et al., 1913: 572; Fraser, 1915: 308; 1918: 333, 359; 1921: 174, fig. 90; Bennitt, 1922: 250; Jarvis, 1922: 338; Fraser, 1937: 161, pl. 37 fig. 193; 1938a: 9, 54; 1938b: 110; 1938c: 135; 1940: 41; 1943: 92; 1944: 279-280, pl. 60 fig. 266; Hewatt, 1946: 197; Fraser, 1947: 10; 1948: 247; Deevey, 1950: 334, 346; 1954: 270; Stepan'yants, 1972: 325; Mayal, 1973: 33, figs 16-19; Morris & Mogelberg, 1973: 23, fig. 36a-d.

Tridentata cornicina; Stechow, 1922: 149; 1923d: 204.

Sertularia exigua Allman, 1877: 24, pl. 16 figs 7, 8; Fraser, 1936: 50, pl. 1 fig. 4; 1938a: 9, 54; 1938c: 135; 1939: 160 et seq.; 1944: 281-282, pl. 60 fig. 268; 1947: 10; 1948: 248; Deevey, 1954: 270; Yamada, 1959: 70; Vervoort, 1968: 106; Morris & Mogelberg, 1973: 23, fig. 37a-b; Brusca, 1973: 48; Cornelius, 1979: 284; Butler et al., 1983: 42.

Tridentata exigua; Stechow, 1922: 149; 1923d: 204.

Dynamena exigua; Ljubenkov, 1980: 49.

Sertularia distans Allman, 1877: 25, pl. 16 figs 9, 10 [not *Sertularia distans* Lamouroux, 1816].

Sertularia complexa Clarke, 1879: 245, pl. 4 figs 26-28.

Tridentata complexa; Stechow, 1922: 149; 1923d: 204.

Dynamena bilat(t)eralis Brooks, 1882: 136, 142.

Sertularia mayeri Nutting, 1904: 58, pl. 5 figs 1-4; Hentschel, 1922: 4, 8; Leloup, 1935a: 49; Fraser, 1938a: 9, 55; Burkenroad, 1939: 23; Fraser, 1939: 160 et seq.; 1943: 93; 1944: 285-286, pl. 61 fig. 272; 1948: 249; Deevey, 1954: 270; Defenbaugh, 1972: 388; Defenbaugh & Hopkins, 1973: 106-107, pl. 14 fig. 53; Morris & Mogelberg, 1973: 24, fig. 41a-c; Defenbaugh, 1974: 118; Butler et al., 1983: 42.

Tridentata mayeri; Stechow, 1922: 149; 1923d: 205.

Dynamena mayeri; Rees & Thursfield, 1965: 126; Van Gemerden-Hoogeveen, 1965: 30; Redier, 1965: 378; Vervoort, 1968: 103.

Sertularia pourtalesi Nutting, 1904: 59, pl. 5 fig. 5.

Disertasia cavolini Neppi, 1917: 50-53, pl. 5 figs 16-25.

Dynamena cavolinii; Riedl, 1959: 647, pl. 10 fig. 4; Micalef & Evans, 1968: 2; Riedl, 1970: 150, pl. 41; Marano & Vaccarella, 1973: 46; Gili & Castelló, 1985: 16, fig. 6H-I; Kapler, 1979: 185, fig. 12, colour-plate; Gili i Sardà, 1982: 74, fig. 34B; Gili, 1986: 119-120, fig. 4.25C; Gili, Murillo & Ros, 1989: 23.

Sertularia densa Stechow, 1919: 93, fig. J[1]

Dynamena densa; Stechow, 1923d: 164.

Dynamena disticha f. *densa*; Picard, 1952a: 349; 1958b: 2.

Material.— **Azores area**: Stn 5.018: small colony 5 mm high; no gonothecae. Pairs of hydrothecae closely approximated, without intermediate part of internode being visible (RMNH-Coel. 26923, slide 2035).

Atlantic coast Morocco and Mauritania: Stn 3.164: several colonies up to 8 mm high on algae and phanerogams. Internodes short, so much so that pairs of hydrothecae occasionally appear to be imbricate. Agrees with *Dynamena cornicina* as described by Millard, 1975 (RMNH-Coel. 26917, slide 2029); Stn 3.182: numerous colonies up to 25 mm high on algae. Many gonothecae in various stages of development (RMNH-Coel. no. 27789).

Canary Islands and Selvagens Archipelago: Stn 2.D04: large number of colonies 3-15 mm high on *Zostera* spec. Internodes long; hydrothecae lengthened; no gonothecae (RMNH-Coel. 26916, slide 2028); Stn 4.003: twenty-eight colonies and some fragments 4-22 mm high on shells of Prosobranchia; no gonothecae. Agrees with the description of the unbranched form (RMNH-Coel. 26918, slide 2030); Stn 4.004: numerous colonies 4-20 mm high on polychaete tubes; no gonothecae (RMNH-Coel. 26919, slide 2031); Stn 4.007: many colonies 5-20 mm high on polychaete tubes. No gonothecae (RMNH-Coel. 26920, slide 2032); Stn 4.012: many stems and various fragments 5-28 mm high on polychaete tube. No gonothecae (RMNH-Coel. 26834, slide 1933); Stn 4.040: several colonies up to 30 mm high on shells of lamellibranchs; no gonothecae (RMNH-Coel. 26921, 2 slides 2033); Stn 4.098: several colonies 3-11 mm high on algae; no gonothecae (RMNH-Coel. 26922, slide 2034); Stn 4.153: c. 15 mm long fragment mixed with *Sertularella* spp. (RMNH-Coel. 26959, slide 2072).

Cape Verde Islands: Stn 6.D02: small, unbranched colonies up to 10 mm high on axis of *Cnidoscyphus marginatus* (Allman, 1877) (RMNH-Coel. 26873, slide 1972).

Remarks.— This species has been accurately described by Calder (1991a) and by Medel Soteras et al. (1991); it need not be redescribed in detail here.

The material consists of unbranched stems of varied length (8-25 mm) rising from a stolon reptant in many instances on algae. The stems are broken up into internodes, the nodes are oblique and in many cases quite indistinct. The basal internode springs directly from the stolon and is separated from the first thecate internode by an oblique hinge-joint. Occasionally there is an intermediate athecate internode with proximal and distal hinge-joints. The length of the internodes and the development of the pair of (frontal) hydrothecae is greatly varied, both along the length of one axis as well as amongst the material from the various stations.

The material from Mauritania (Stn 3.164) is characterized by quite short internodes all along the c. 8 mm high stems; the adnate part of the hydrothecal pair is fairly short and moderately swollen, the apical part turns sharply outwards (fig. 7a). This is the only fertile material; the gonothecae in shape correspond with Calder's (1991a) description but occur on the lower internodes, not on the stolon. The transverse ridges occur over the whole length of the gonotheca and usually are not restricted to the

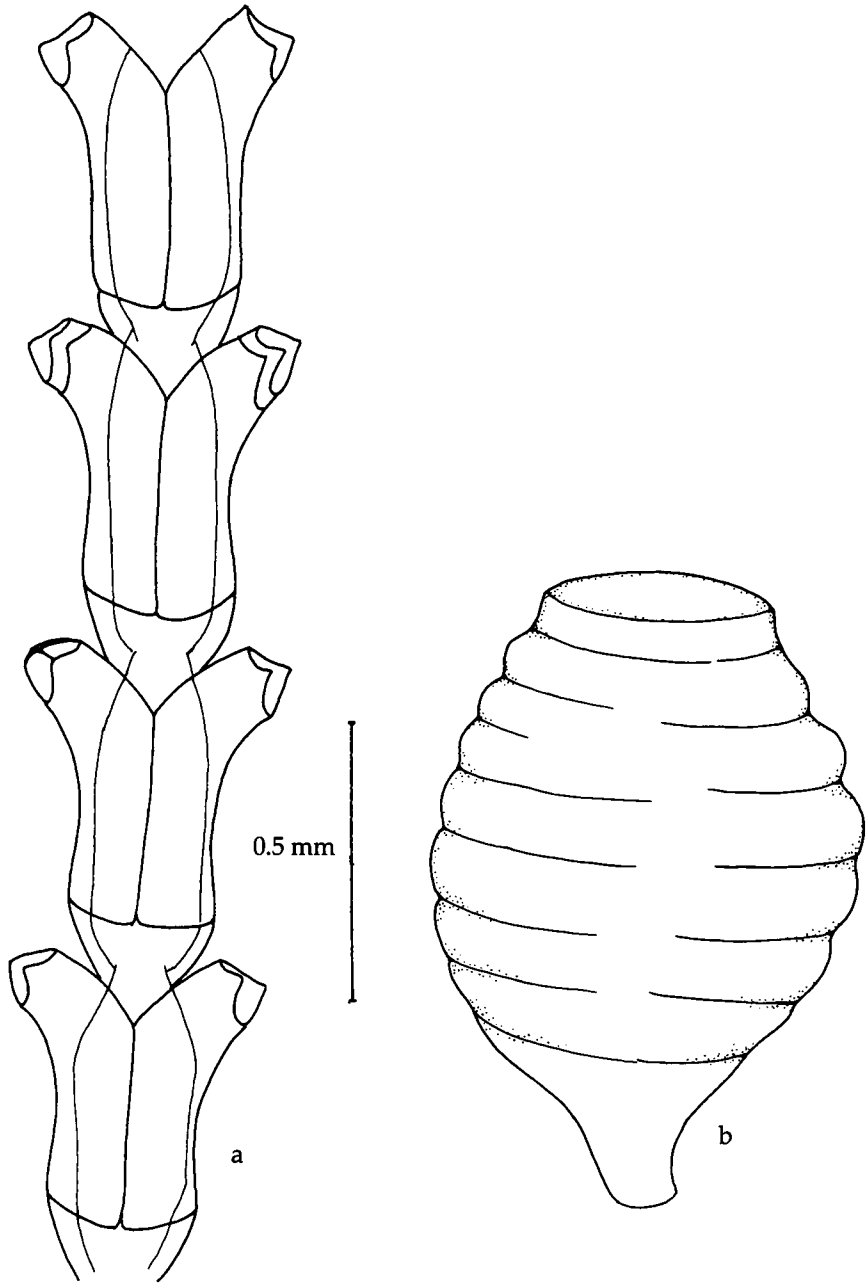


Fig. 7. *Dynamena disticha* (Bosc, 1802), from CANCAP Stn 3.182 (slide 4022); a, fragment of stem; b, gonotheca.

apical half (fig. 7b); they are rounded in cross section; there are a number of perisarcal elevations (cusps?) on the inside of the gonothecal rim. The colonies in the material of Medel et al. also carried gonothecae on the proximal stem internodes, the transverse ridges occurring all over the gonothecal surface.

The majority of the remaining colonies (as far as well developed) has remarkably slender internodes with long, slender hydrothecae, the free apical portions of which curve outwards smoothly. None of this material is fertile. No intrathecal cusps have been observed.

Distribution.— This species is of circumglobal distribution in shallow waters of subtropical and tropical seas, including the Mediterranean (Calder, 1991a; Medel Soteras et al., 1991; Vervoort, 1993a-b). It was recently recorded from the Azores by Cornelius (1992b, as *Dynamena cornicina*) and is recorded from the Canary Islands by Izquierda et al. (1992). The present records fit into the picture outlined above and are from between 0 and 70 m depth.

Genus *Hydrallmania* Hincks, 1868

Hydrallmania falcata (Linnaeus, 1758)

Sertularia falcata Linnaeus, 1758: 810; Pallas, 1766: 144-146.

Plumularia falcata; Lamarck, 1816: 174; Bailly, 1865: 252; Ulyanin, 1872: 105; Alexander, 1932: 40.

Hydrallmania falcata; Hincks, 1868: 273-275, pl. 58; Verrill, 1879: 18; Lameere, 1894: 20; Fauvel, 1895: v, lxvii; Whiteaves, 1901: 27; Wood, 1901: 18, 21; Shidlovskii, 1902: 223; Morey, 1909: 216; Bedot, 1911: 222; Ritchie, 1910-1911: 221; Billard, 1912: 461; Broch, 1912b: 16; Crawshay, 1912: 329; Linko, 1912: 90-99, fig. 13; Massy, 1912: 216; Stechow, 1912: 357; Fraser, 1913: 174; Levinsen, 1913: pl. 5 fig. 7; Meek & Storrow, 1913: 66, 70; Reitzenstein, 1913: 1 et seq.; Robson, 1913b: 76-83; Sumner et al., 1913: 573; Dons, 1914: 51; Kudelin, 1914: 473-478; Robson, 1914: 103; Waddington, 1914: 217; Deryugin, 1915: 311; Fraser, 1915: 308; Hartlaub & Scheuring, 1916: 82; Pratt, 1916: 108, fig. 179; Billard, 1917: 209; Broch, 1918: 135-138, fig. 73; Fraser, 1918: 333, 357; Jäderholm, 1919b: 10; Renouf, 1920: 115; Fraser, 1921: 171, fig. 83; Horsman, 1922: 263; Scheuring, 1922: 160, 176; Van Benthem Jutting, 1922: lxxxvi; Elmhurst, 1923: 21; Prenant & Teissier, 1924: 25; Teissier, 1924: 70-75, figs 1-9; Fraser, 1926: 213; Billard, 1927b: 340; Fraser, 1927: 326; Stechow, 1927: 312; Broch, 1928a: 68, fig. 63; Broch, 1928b: 121, fig. 21; Mathisen, 1928: 6, 24, 37; Pax, 1928: 12, fig. 5b; Vonck, 1930: 93, fig. 9; Billard, 1931b: 247; Coulon, 1931: 54; Marine Biological Association, 1931: 75; Préfontaine, 1931: 77; Fraser, 1932: 51; Kramp, 1932: 46, 49, tab. 1; Robertson, 1932: 130; Leloup, 1933: 9, 25; Kramp, 1934: 70; Leloup, 1934b: 2; Alexander et al., 1935: 50; Kramp, 1935: 193, figs 79C, 80B; Philbert, 1935c: 27; 1935d: 33; Hummelinck, 1936: 49; Perrier, 1936: 28; Moore, 1937: 46; Ushakov, 1937: 21; Kramp, 1938: 54, 62, 69, 71, 78, 79, fig. 5; Purchon, 1938: 327; Thiel, 1938: 1 et seq., figs 8, 12-15, 18; Leloup, 1940: 18; Bassindale, 1941: 150; Kramp, 1942: 32-33; Vervoort, 1942: 295; Kramp, 1943: 37; Morley, 1943: 76; Fraser, 1944: 250-252, pl. 53 fig. 236; Vervoort, 1946b: 255, figs 111-113; Leloup, 1947: 30, fig. 22; Berezina, 1948: 60, pl. 16 fig. 11; Purchon, 1948: 289, 293, 300; Vervoort, 1949: 155; Caspers, 1950: 133; Kramp, 1950: 506, fig. 15; Picard, 1950: 192; Teissier, 1950b: 21; McMillan, 1951: 73; Mistakidis, 1951: 45; Leloup, 1952: 171-172, fig. 99; Lewis, 1953: 533; Naumov, 1953; fig. 3a; Hummelinck, 1954: 161; Newell, 1954: 330; Williams, 1954: 49; Knight-Jones & Jones, 1956: 28; Spaul, 1956: 18; Ancelin, 1957: 453, 457; Bassindale & Barrett, 1957: 246; Hamond, 1957: 296, 317; Marine Biological Association, 1957: 48; Purchon, 1957: 221; Pérès & Picard, 1958: 109; Bousfield & Leim, 1959: 14; Leloup, 1960: 223; Naumov, 1960: 402-403, fig. 294; Cabioch, 1961: 19, 26, 30; Millard, 1961: 206; Préfontaine & Brunel, 1962: 245; Brotskaya et al., 1963: 174; Bruce et al., 1963: 54; Taege, 1963: 252, fig. 2; Pérès & Picard, 1964: 115; Redier, 1964b: 146; Cabioch, 1965: 57; Rees & Thursfield, 1965: 145; Teissier, 1965: 26; Crothers, 1966: 13; Redier,

1966a: 44; Davis, 1967: 18; Redier, 1967: 394; Richards & Riley, 1967: 130; Cabioch, 1969: 565, 489, 655; Rees & Rowe, 1969: 20; Robins, 1969: 333; Fey, 1970: 401; Füller, 1970: 16, fig. 16/4; Hiscock, 1970: 30; Thiel, 1970: 489; Huxtable, 1971: 65, fig; Jägerskiöld, 1971: 63; Christiansen, 1972: 302; Houvenaghel-Crèvecoeur, 1972: 2813-2815, pl. 2; Stepan'yants, 1972: 325; Von Salvini-Plawen, 1972: 393; Castric-Fey, 1973: 214; Edwards, 1973: 586; Voigt, 1973: 27, pl. 4 figs 5-9; Hiscock, 1974: 25; Laverack & Blacker, 1974: 22; Belousov, 1975: 655, fig. 1 no. 51; Calder, 1975: 305, fig. 5B; Millard, 1975: 269; Olafsson, 1975: 10, 23, fig. 22; Logan, 1976: 29; Withers & Thorp, 1976: 597, 603; Boyden et al., 1977: 488; Manea, 1977: 45, fig. 4; Evans, 1978: 95; Bromley, 1979: 520; Cornelius, 1979: 273, figs 15-16; Prud'homme van Reine, 1981: 139, fig. 3; Wolff & Dankert, 1981: 27; Castric & Michel, 1982: 28, fig. 85, fig.; Headstrom, 1984: 84, fig.; Stepan'yants, 1985a: 136; 1985b: 85, 87; Vervoort, 1985: 291; Marfenin, 1987: fig. 11; Cornelius, 1988: 76; Malyutin & Marfenin, 1988: 99; 1989: 71; Marfenin & Khomenko, 1989: 82; Stepan'yants, 1989: 414 et seq.; Cornelius & Ryland, 1990: 146, fig. 4.18; Davoult & Richard, 1990: 194; Oosterbaan, 1990: 116; Schultze et al., 1990: 42; Cairns et al., 1991: 26; Castric-Fey & Chassé, 1991: 523; Cornelius, 1992a: 255; Ramil & Vervoort, 1992: 216-217, fig. 60c-d; Harms, 1993: 15; Schönborn et al., 1993: 247, pl. 14 fig. 5; Vervoort, 1993a: 186-187, fig. 2e, tab. 26; Bouillon et al., 1995: 67; Cornelius, 1995b: 60-62, fig. 13; Cornelius et al., 1995: 102, fig. 4.15.

Sertularia stipulata Linnaeus, 1758: 813.

Material.— **Atlantic coast Morocco and Mauritania**: Stn 1.118: single colony 200 mm high, with gonothecae (RMNH-Coel. 26835, slide 1934).

Remarks.— Colony composed of a regularly bifurcated stem, one of the branches continuing as axis, the other forming a primary hydrocladium with pinnately arranged secondary hydrocladia; the various primary hydrocladia are helicoidally arranged. There are no tertiary hydrocladia. Gonothecae present and found on primary and secondary hydrocladia, but usually on the latter. Gonotheca more or less cylindrical, with a short pedicel, some indistinct longitudinal carinae and a circular distal aperture.

Distribution.— This species is widely distributed in the northern Atlantic, occurring both on the eastern and western sides, occasionally in great numbers. It does not penetrate into the Baltic proper, being recorded from Little and Great Belt (Kramp, 1935), from Kiel Bight (Thiel, 1970) and Fehmarnbelt (Schönborn et al., 1993). In the eastern Atlantic it has so far been recorded as far south as the entrance to the Strait of Gibraltar (Ramil & Vervoort, 1992); the present record brings it as far south as the Atlantic waters off Morocco, depth 48 m. The species also occurs in deep Pacific waters (Vervoort, 1993a) and may have a wider distribution in North Pacific waters. For a discussion of the various species in the genus *Hydrallmania* Hincks, 1868, we refer to Vervoort (1993a: 185-188). The depth distribution of this species extends from 10 to 521 m (Ramil & Vervoort, 1992); it may occasionally occur much deeper (cf. Vervoort, 1993a).

Genus *Salacia* Lamouroux, 1816

Salacia desmoides (Torrey, 1902)

Sertularia desmoidis Torrey, 1902: 65-66, pl. 8 figs 70-72 (incorrect original spelling).

Sertularia desmoides; Fraser, 1911: 72 (justified emendation); Billard, 1924: 66; Fraser, 1938a: 9, 54; 1938b: 110; 1948: 247.

Salacia desmoides; Stechow, 1922: 150; 1923d: 213; Millard, 1967: 179, fig. 44A-C; 1975: 274, fig. 90A-C; 1978: 196 et seq.; Isazi & Siaz, 1986: 70; García-Carrascosa et al., 1987: 371; Altuna & García-Carrascosa, 1990: 54; Cairns et al., 1991: 26; Medel Soteras et al., 1991: 510-512, figs 1-3.

Dynamena dubia Billard, 1922b: 344-348, fig. 1.

Dymella dubia; Stechow, 1923d: 167-168; Leloup, 1940: 16; Rees & White, 1966: 277.

Salacia dubia; Rees & White, 1966: 277; Fey, 1970: 398; Aguirrezabalaga et al., 1987: 112-114, fig. 7; Altuna & García-Carrascosa, 1990: 54, 80, fig.; Izquierdo et al., 1990: 31-32, fig. 1; Castric-Fey & Chassé, 1991: 523; Boero & Bouillon, 1993: 264; Altuna Prados, 1994a: 54, fig. 4A-B; Bouillon et al., 1995: 68. Peña Cantero, 1995: 361-366, pl. 44 figs a-c.

Sertularia dubia; Patriti, 1970: 10, fig. 25.

Salacia cantabrica García Corrales et al., 1980: 17-20, fig. 5.

Material.— **Azores area**: Stn 5.018: bunch of stems c. 10 mm high on Bryozoa, no gonothecae (RMNH-Coel. 27107, slide 2480); Stn 5.D03: c. 15 stems 5-15 mm high on tubes of sabellids. Poorly developed and without gonothecae. With *Sertularia distans* (Lamouroux, 1816), *Clytia hemisphaerica* (Linnaeus, 1758), and *Clytia paulensis* (Vanhöffen, 1910) (RMNH-Coel. 26926, slide 2038); Stn 5.D05: six colonies c. 13 mm high between *Sertularella mediterranea* Hartlaub, 1901 and *S. ellisii ellisii* (Deshayes & Milne-Edwards, 1836). No gonothecae (RMNH-Coel. 26927, slide 2039).

Canary Islands and Selvagens Archipelago: Stn 2.119: several colonies 5-35 mm high on fishing line. Some gonothecae present (RMNH-Coel. 26924, slide 2036); Stn 4.004: various colonies 8-35 mm high on algae. Colonies with tendency towards alternate, more or less dichotomous branching. Apical stolons present. No gonothecae (RMNH-Coel. 26925, slide 2037); Stn 4.021: many stems and fragments up to 75 mm high on polychaete tubes, shell fragments and algae. Strongly branched dichotomously. Many colonies have the top part of the axis forming stolons supporting new stems. No gonothecae present (RMNH-Coel. 26833, slide 1932).

Cape Verde Islands: Stn 6.007: several branched stems on a stone, up to 30 mm high. No gonothecae (RMNH-Coel. 26928, slide 2040); Stn 7.059: several up to 25 mm high hydrocauli attached to old hydroid stems; no gonothecae (RMNH-Coel. 27798).

Remarks.— The colonies usually are composed of unbranched or irregularly branched, up to 25 mm high stems; branching sometimes more or less pinnate or with a tendency towards dichotomy. Branches inserting on axis just under pair of hydrothecae and, as axis, occasionally terminating in a tendril. Hydrothecae in pairs on front of internodes, contiguous for greater part of adcauline walls; free part gently curving outwards. Plane of aperture not parallel to length axis of axis or hydrocladium, but tilted in adcauline direction, circular or with scarcely indicated pair of teeth on lateral part of rim, shifted in adcauline direction. Opercular plate circular, attached at middle of abcauline part of hydrothecal rim, in lateral view with curved apical portion. Gonothecae, where present, inserting by means of short pedicel on internodes just under hydrotheca. Gonotheca barrel-shaped, with shallow circular grooves, gradually disappearing on distal part. Apically there is a short collar surrounding a wide, circular aperture.

There can in our opinion be no reasonable doubt that '*Sertularia desmoidis*' Torrey, 1902, and *Dynamena dubia* Billard, 1922b, are conspecific. We do not follow Cornelius (1995b) in considering the latter a doubtful synonym of *Tridentata distans* (Lamouroux, 1816) (= *Sertularia distans* Lamouroux, 1816).

Distribution.— The species is widely distributed in the tropical and subtropical

Pacific and Atlantic. It has previously been recorded from the Atlantic coasts of France and Spain (Billard, 1922, as *Dynamena dubia*; Fey, 1970, as *Salacia dubia*; Altuna Prados, 1994, as *Salacia dubia*), from the Atlantic off Morocco (Patriti, 1970, as *Sertularia dubia*) and from South African waters, including the Indian Ocean coastal waters (Millard, 1975). The species also occurs in the Mediterranean (Peña Cantero, 1995). From the Canary Islands the species has been reported by Izquierdo et al., 1990 (as *Salacia dubia*). The present records fit in the general picture of the distribution of this species; the depth records range from 0 to 350 m.

Genus *Sertularella* Gray, 1848

Sertularella cylindritheca (Allman, 1888)

Sertularia cylindritheca Allman, 1888: 59-60, pl. 29 figs 1, 1a.
Sertularella cylindritheca; Nutting, 1904: 87, pl. 19 fig. 4; Broch, 1913: 11; Billard, 1931d: 676, fig. 2; Fraser, 1943: 92; 1944: 259, pl. 54 fig. 244, pl. 55 fig. 244; Vannucci, 1951b: 107, 113, 114; Vervoort, 1959, 266-269, figs 30-31; Leloup, 1960: 229; Vervoort, 1968: 43, 104, fig. 30; Patriti, 1970: 39, fig. 51; Vervoort, 1972: 126, fig. 39a; Edwards, 1973: 587; Cornelius, 1979: 306; Stepan'yants, 1979: 90, pl. 14 fig. 5A-B; García Corrales et al., 1980: 26, fig. 8; Aguirrezabalaga et al., 1986: 139; Templado et al., 1986: 98; Gili et al., 1989: 100-101, fig. 25B; Altuna & García-Carrascosa, 1990: 54 et seq., fig.; Izquierdo et al., 1990: 36-37, fig. 5; Medel Soteras et al., 1991: 517-519, fig. 6; Ramil & Vervoort, 1992: 217-219, fig. 60a; Boero & Bouillon, 1993: 264; Vervoort, 1993a: 190; Altuna Prados, 1994a: 54, fig. 5; Bouillon et al., 1995: 69; Cornelius, 1995b: 112.
Sertularelloides cylindritheca: Picard, 1958a: 192.
Sertularelloides mercatoris Leloup, 1937a: 101-103, fig. 6.
Cnidoscyphus macrotheca Kramp, 1947: 10-14, figs 6-9.
Sertularella catena; Mayal, 1973: 39, figs 24-25; 1981b: 228; 1981c: 229, 230; 1981d: 231.

Material.— **Atlantic coast of Morocco and Mauritania**: Stn MAU.033: two colonies 54 and 58 mm high attached to small stones, smaller made up in slide. No gonothecae (RMNH-Coel. 26929, slide 2041).

Canary Islands and Selvagens Archipelago: Stn 2.049: seven colonies maximally 70 x 40 mm, without gonotheca, with *Hebella scandens* (Bale, 1884) [RMNH-Coel. 26868, slides 1967 (1) and 2042 (2)]; Stn 4.153: twelve mm high fragment, hydrothecae damaged (RMNH-Coel. 26960, slide 2071).

Remarks.— The material from the Canary Islands is best developed, with many (retracted) hydranths inside the hydrothecae. The two colonies from Mauritania are heavily covered by epizootic Foraminifera; living hydranths apparently only occurred in the higher parts of hydrocladia and stem. Shape of colony and hydrothecae is as described by Vervoort (1959), Izquierdo et al. (1990) and Medel Soteras et al. (1991).

The square hydrothecae, the large hydranths and their mode of attachment inside the hydrotheca set this species apart from the majority of species in the genus *Sertularella*; its isolated position might merit the resurrection of the genus *Sertularelloides* Leloup, 1937a, of which the type, *Sertularelloides mercatoris* Leloup, 1937a, is clearly conspecific with *Sertularella cylindritheca* (Allman, 1888).

Distribution.— The species is well distributed in subtropical and tropical waters of the Atlantic, occurring along both eastern and western coasts as well in the Canary Islands, where it has previously been reported by Izquierdo et al. (1990). In that area

depth records varied between 9 m (Vervoort, 1968) and 290 m (Ramil & Vervoort, 1992). It had not previously been recorded from Mauritanian coastal waters, though its occurrence there is not surprising. In the CANCAP material depth ranges between 7 and 200 m.

Sertularella ellisii ellisii (Deshayes & Milne-Edwards, 1836) (figs 8a, b, d-f, 9a-c)

Corallina minus ramosa alterna vice denticulata Ellis, 1755: 19-20, pl. 2 figs b, B (part).

Sertularia Ellisii Deshayes & Milne-Edwards, 1836: 142.

Sertularella ellisi; Stechow, 1923d: 193, fig. D'b; Picard, 1950: 193; 1956: 258 et seq., fig. 2a; 1958a: 192; Tortonese, 1958: 183, 188; Costa, 1960: 33, 47; Rossi, 1961: 81, fig. 1; Cabioch, 1965: 56; Luther & Fiedler, 1965: 237, pl. 37; Cabioch, 1968: 556, 704; Bellan-Santini, 1970: 340; Clausade, 1970: 717; Bouillon & Levi, 1971: 221; Lipken & Safiel, 1971: 11; Rossi, 1971: 34, fig. 13A-C, E; Castric-Fey, 1973: 213; Saldanha, 1974: 325; Chimenz Gusso & Rivosecchi Taramelli, 1976: 113, 117; Relini & Romairone, 1976: 239; Cabioch et al., 1977: 123; Cuadras & Pereira, 1977: 303; Marinopoulos, 1979: 120; Camp & Ros, 1980: 201; Morri, 1980: 8; García-Carrascosa, 1981: 216-218, pl. 15 figs a-i; Morri, 1981: 89; Morri & Martini, 1981: 308 et seq.; Gili & Romero, 1983: 36 et seq.; Gili & Ros, 1985: 329 et seq.; Gili, 1986: 127-128, figs 4.23A-C, 4.54a; Gili et al., 1989: 23; Ramil et al., 1992: 503-507, figs 6-7; Vervoort, 1993a: 190; 1993b: 555; Altuna Prados, 1994: 54; Bouillon et al., 1995: 69.

Sertularella polyzonias forma *ellisi*; Leloup, 1934a: 13, 14.

Sertularella ellisi forma *ellisi*; Picard, 1956: 264, fig. 3d, e; Teissier, 1965: 23; Fey, 1970: 399; Castric-Fey, 1973: 213; Castric & Michel, 1982: 86, fig.; Peña Cantero, 1995: 367-374, pl. 45 figs a-f.

Sertularella gaudichaudi p.p. Cornelius, 1979: 282-284, fig. 20; Boero & Bouillon, 1993: 264; Cornelius, 1995b: 68-70, fig. 15; Cornelius et al., 1995: 102, fig. 4.16.

Sertularella gaudichaudi; García Corrales et al., 1980: 30-33, fig. 10; García-Carrascosa, 1981: 216, pl. 15 figs a-i; Altuna et al., 1984: 134; Gili, 1986: 127-128, figs 4.22A-C, 4.57A; Isasi & Saiz, 1986: 70.

Sertularella gaudichaudi f. *ellisi*; Boero, 1985: 136; García-Carrascosa et al., 1987: 370, fig. 1E-H.

Sertularella gr. *ellisi*; Castric & Michel, 1982: 86, fig.

Sertularella ellisi forma *fusiformis*; Teissier, 1965: 23; Fey, 1970: 399; Castric-Fey, 1973: 213; Castric & Michel, 1982: 86, fig.

Sertularella fusiformis Hincks, 1861: 253, pl. 6 figs 7-8; Ritchie, 1910-1911: 220; Fraser, 1911: 69; Broch, 1918: 105-106; Fraser, 1918: 333, 358; Stechow, 1919: 84, fig. B'; Fraser, 1921: 172, fig. 86; 1922: 5; Stechow, 1923d: 180, figs W, X; Stechow, 1926: 102, 104; Fraser, 1931: 479, 481; Leloup, 1934a: 13, 14; Billard, 1936: 5, figs 1-3; Fraser, 1937: 153, pl. 39 fig. 181; Moore, 1937: 45; Bruce, 1938: 19; Fraser, 1938a: 9, 52; Eales, 1939: 41; Fraser, 1939: 160 et seq.; Leloup, 1940: 17; Bassindale, 1941: 150; Kramp, 1943: 45; Fraser, 1944: 261, pl. 56 fig. 247; 1948: 244; Da Cunha, 1950: 122, 125, 135, fig. 5; Picard, 1950: 194; 1951b: 278; 1951c: 261; 1952a: 347, 349; 1955: 192; Millard, 1957: 213, figs 10C, 11E; Riedl, 1959: 649; Eales, 1961: 37; Millard, 1964: 42; Rees & Thursfield, 1965: 134; Eales, 1967: 37; Robins, 1969: 333; Calder, 1970: 1541; Day et al., 1970: 14; Millard, 1975: 289, fig. 93E-G; Boyden et al., 1977: 488; Millard, 1978: 197 et seq.; García Corrales et al., 1980: 29, fig. 9; Gili, 1986: 128-129, fig. 4.24A-C; Isasi & Saiz, 1986: 70; Parapar Vegas, 1986: 100-106, pls 18-19; Altuna & García Carrascosa, 1990: 54 et seq., fig; Ramil et al., 1992: 507-511, figs 8-10; Boero & Bouillon, 1993: 264; Vervoort, 1993a: 190; 1993b: 555; Altuna Prados, 1994: 54; Bouillon et al., 1995: 69; Peña Cantero, 1995: 376-382, pl. 46 figs a-e.

Sertularella fusiformis forma *typica* Broch, 1933: 69, figs 27-28; Picard, 1955: 192.

Sertularella africana Stechow, 1919: 83-84.

Material.— **Azores area:** Stn AZO.36: numerous colonies 5-20 mm high on tubes of sabellid polychaetes; gonothecae present (RMNH-Coel. 26849, slide 1948). Seems to have the characters of *S. ellisii ellisii*

because of hydrothecal shape and development of axis; usually three intrathecal cusps present (fig. 8f). Some colonies with curved abcauline hydrothecal wall reminding of *S. mediterranea*. In addition (RMNH-Coel. 26850, slide 1949) 15 colonies on stone, up to 12 mm high. Hydrothecae small, with three intrathecal cusps (and occasionally two small laterals). Nodes of axis with some indistinct rings. Remnants of gonothecae present. There is variability in the shape and position of the hydrothecae: the plane of the aperture being perpendicular to the hydrothecal length axis to slightly tilted downward. Angle between adcauline hydrothecal wall and internode varied to some extent; hydrothecae in some stems turned obliquely in frontal direction. Some of hydrothecal walls slightly undulated; Stn 5.018: many colonies up to 15 mm high on algae, some branched, with gonothecae (RMNH- Coel. 27106, two slides 2479). Hydrothecae curved outward, rim wide; internodes ringed, conforms to *S. fusiformis* Auct.; Stn 5.056: six colonies 3-13 mm high (RMNH-Coel. 26931, slide 2044). Apical portion of hydrotheca curved, as a result aperture tilted downwards; 3 large intrathecal cusps present. No gonothecae; Stn 5.066: eleven colonies 3-30 mm high and three fragments; gonothecae present (RMNH-Coel. 26840, slide 1939). Small form, with three small intrathecal cusps, hydrotheca with distal part narrowing, lengthened and strongly curved, placing aperture parallel to hydrocladial length axis (fig. 8e). Hydrothecal renovations present. Hydrocladial internodes more or less lengthened. Gonothecae placed along length of axis, swollen, with distinct ribs, neck distinct, apex with 2 well developed, opposite cusps; third cusp thinner and smaller, occasionally present. Axis occasionally branched; Stn 5.085: knot of hydrocauli adhering to what appears to be old hydroid stems, up to 30 mm high (RMNH-Coel. 26841, slide 1940). Colonies slender; hydrothecae of the shape normally met with in *S. ellisii ellisii*, with three small intratheçal cusps and slightly outward curved hydrothecae. Gonothecae abundantly present, with distinct neck and generally with three apical cusps; walls strongly undulated; Stn 5.089: various colonies 4-30 mm high on old axis of *Aglaophenia* sp. (RMNH-Coel. 26871, slide 1970). Hydrothecae with curved to strongly curved apical portion and aperture occasionally renovated, tilted downwards and with three intrathecal cusps. Gonothecae with two or three well developed apical cusps. Some colonies irregularly branched; hydrocladia long; Stn 5.D03: several colonies and eight developing colonies on tubes of sabellid polychaetes 2-15 mm high; no gonothecae (RMNH-Coel. 26838, slide 1937, fig. 8b). Hydrotheca with three internal cusps, only occasionally with two small laterals. Associated with algae. Hydrothecal walls smooth; apical portion straight; Stn 5.D05: several colonies up to 17 mm high, partly on sponge (RMNH-Coel. 26843, slide 1942 and Coel. 26932, two slides 2045). Up to five intrathecal cusps present, best developed in distal parts of colonies; two laterals small. No gonothecae. Mixed with *Sertularella mediterranea* Hartlaub, 1901, and sometimes difficult to separate. Resembles *Sertularella fusiformis* Auct. by geniculation of axis. Strongly covered by epiphytes and epizooids.

Atlantic coast of Morocco and Mauritania: Stn MAU.027: small, 5-10 mm high colonies on old axis of gorgonid; no gonothecae. Hydrothecae smooth, basally swollen, narrowing towards rim, with three internal cusps (RMNH-Coel. 26943, slide 2056).

Madeira area: Stn 1.K16: seven small and two developing colonies 1-7 mm high; no gonothecae (RMNH-Coel. 26848, slide 1947). Hydrothecae with three to five intrathecal cusps, usual number is four, smaller abcauline fifth may occasionally be present (fig. 9a).

Canary Islands and Selvagens Archipelago: Stn 4.004: c. 11 well developed stems and many developing colonies on algae, 2-23 mm high (RMNH-Coel. 26837, slide 1936). Resembles material described by Medel et al. (1991) as *Sertularella* spec.: hydrothecae with three to five internal cusps, all fairly robust and strongly developed (fig. 8d). Hydrothecae differ from those of *Sertularella* spec. as described by Medel et al. by the contracted, outward curved distal part of the hydrotheca resulting from strong contraction of abcauline hydrothecal wall some distance from rim; as a result hydrothecal rim occasionally tilted in adcauline direction. No gonothecae; Stn 4.K12: two detached fragments 5 and 9 mm long; no gonothecae (RMNH-Coel. 26930, slide 2043). Intrathecal teeth vary between three

(large) and five (three large and two small). Axis moderately geniculate; hydrothecae smooth to moderately undulated.

Cape Verde Islands: Stn 6.014: several colonies up to 23 mm high on stone (RMNH-Coel. 26933, two slides 2046). Hydrothecae short, with three intrathecal cusps. Plane of hydrothecal aperture tilted downwards. No gonothecae. In addition several colonies 12 mm high on stone, no gonothecae. Hydrothecae swollen basally; neck and aperture narrow; three or five intrathecal cusps present, the two additional cusps, when present, small. Some hydrothecae with indistinct undulation at abcauline wall. Plane of hydrothecal aperture perpendicular to length axis. Also several detached colonies 13 mm high; no gonothecae. Hydrothecae bottle-shaped, plane of hydrothecal aperture perpendicular to hydrothecal length axis. Hydrothecal wall with some transverse undulations running from adcauline towards abcauline wall. Three well developed intrathecal cusps present; Stn 6.038: several colonies 8-28 mm high, detached from substratum (RMNH-Coel. 26853, slide 1952). This material has a tendency towards pinnate ramification, with a main axis from which originate the hydrocladia on both sides, though irregularly and in the same plane. Hydrothecae small and elongated, with aperture parallel to length axis of hydrocladium. Three intrathecal cusps and occasionally two small, additional, lateral cusps. No gonothecae; Stn 6.054: various colonies up to 13 mm high on stone (RMNH-Coel. 26934, 2 slides 2047). Internodes short; hydrothecae with c. one-third of adcauline hydrothecal wall adnate. Abcauline wall, and also often adcauline wall, with two or three shallow undulations, but not always so. Apical portion of hydrotheca narrowed; hydrothecal aperture small, with three intrathecal cusps. No gonothecae. Resembling *Sertularella fusiformis* Auct.; Stn 6.058: various colonies 5-48 mm high on stones (RMNH-Coel. 26858, slide 1957). Colonies much branched and fairly high. Hydrothecae placed on short internodes, resembling those of *S. gayi gayi* but curved outward, with distinct neck and three intrathecal cusps (fig. 9c). Gonothecae ringed over entire length, with four prominent distal cusps. (Axes with tubes of cemented sand grains, probably of polychaetes); Stn 6.067: several colonies 15-25 mm high; single gonotheca present (RMNH-Coel. 26935, 3 slides 2048). Hydrothecae with three internal cusps. In addition specimens (two colonies and various fragments) 10-15 mm high (RMNH-Coel. 26872, slide 1971), similar to those from Stn 6.137, with three intrathecal cusps; occasionally also two smaller laterals (fig. 9b). No gonothecae. In addition five hydrocauli on foliaceous algae (along edge of thallus), each with one ramification and a gonotheca in basal part. Gonotheca globular, with well marked ribs, especially in distal half; apex with four cusps, only occasionally with three. Hydrothecal aperture not exactly perpendicular to hydrothecal length axis, but slightly tilted downwards. Aperture narrowed, as far as could be discerned with 3 or 4 internal cusps. Also various colonies up to 25 mm high on algae. Axis slightly branched; hydrothecae fairly large, with narrowed aperture and three intrathecal cusps. A gonotheca is found in the basal part of some of colonies. Also three colonies up to 17 mm high on stone. Hydrothecae of characteristic shape, with 3 intrathecal cusps. Gonothecae globular with four apical cusps maximally. Another sample consists of many colonies up to 30 mm high on algae and stones, with gonothecae. Internodes short; hydrothecae short, with three intrathecal cusps. Gonothecae abundantly present, globular, almost spherical, with four apical cusps. Some of this material with *Hebella scandens* Bale, 1888 (living, with hydranths!), some heavily infested by other epibionts. Hydrothecae occasionally with renovations and slightly undulated walls; Stn 6.131: three stems c. 20 mm high from same stolon, with a single gonotheca (RMNH-Coel. 26937, slide 2050). Hydrothecal aperture with three intrathecal cusps, slightly tilted ventrally; Stn 6.133: small, detached stem with three hydrocladia (RMNH-Coel. 26938, slide 2051). Apical portion of hydrotheca curved; aperture directed laterally. There are three intrathecal teeth. No gonothecae are present; Stn 6.137: several colonies 3-14 mm high on Bryozoa (RMNH-Coel. 26939, slide 2052). Hydrothecae from base to top of colony gradually narrowing; plane of hydrothecal aperture slightly tilted downwards; 3 intrathecal cusps present. No gonothecae; Stn 6.146: c. 16 colonies on Bryozoa; no gonothecae (RMNH-Coel. 26940, slide 2053). Internodes long; plane of hydrothecal aperture not always perpendicular to hydrothecal length axis. Three intrathecal cusps; occasionally two small extra cups present. Hydrothecal aperture occasionally renovated. With some hydrothecae of *Modeeria rotunda* (Quoy & Gaimard, 1827); Stn 6.D01: several stems c. 15 mm high on small stones, with single gonotheca. Intrathecal

cusps present (RMNH Coel. 27806); Stn 6.D02: four small colonies 3-7 mm high (RMNH-Coel. 26942, slide 2055). Apical part hydrothecae slightly curved outward and with three intrathecal cusps. No gonothecae; Stn 6.D10: eight colonies 6-15 mm high, without gonothecae (RMNH-Coel. 26832, slide 1931). Hydrothecae as in *Sertularella fusiformis* (sensu Ramil, et al., 1992) and *S. ornata* (sensu Medel et al., 1991), with three intrathecal cusps, but without undulations. Hydrothecae short and swollen; abcauline wall in many cases strongly contracted distally. Without exception the hydrothecae are in the same plane; there are no rings at the short axial or hydrocladial nodes that are in straight line, no geniculation (fig. 8a).

Remarks.— The material studied and commented upon above, shows a great variability. If only the extreme forms are being considered it is possible to distinguish the following forms:

1. *Sertularella fusiformis* Auct. Colonies small, up to 20 mm high. Hydrothecae with symmetrical walls, swollen in basal half and narrowed in distal half, which gives the lateral aspect of ad- and abcauline walls a distinguished S-shape and the whole hydrotheca the aspect of a bottle, as described by Hincks (1861: 253, pl. 6 figs 7, 8) in his description of *Sertularia fusiformis*; plane of aperture more or less perpendicular to hydrothecal length axis. The internodes may have several weak annulations and may be shaped as a truncated cone, increasing significantly in diameter from their base onwards and this in such a way that internode and hydrotheca are spindle-shaped (shaped like an amphora), as is also expressed by Hincks (1861, *l.c.*; 1868: 243, pl. 47 fig. 4). There are three or five intrathecal cusps. See figs 8d, 9a. The variability in the above described structure is considerable.

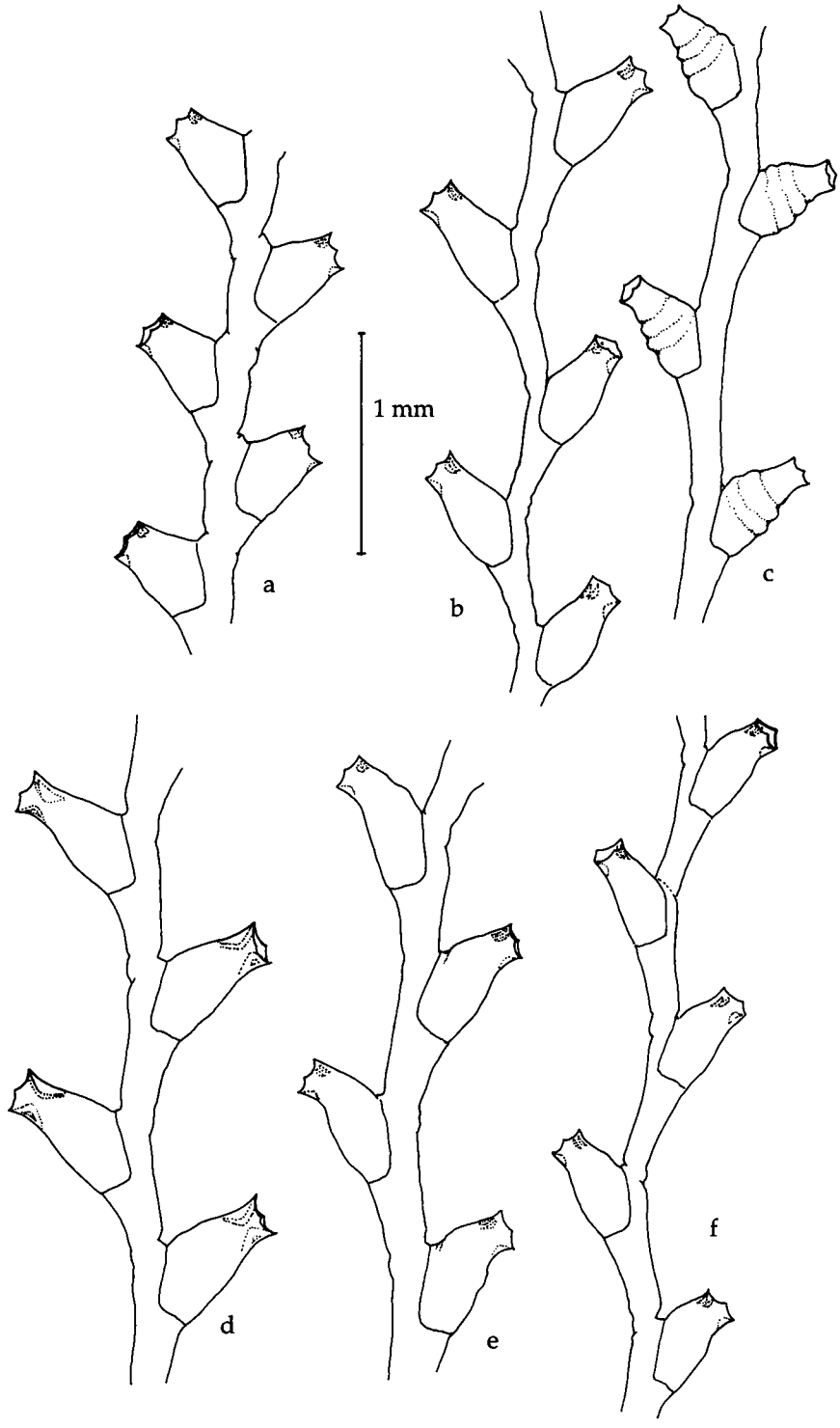
2. Colonies that conform with the current concept of *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836), see Ramil et al., 1992. Colonies larger than in the preceding forms, reaching 30 mm high. Shape of hydrotheca varied. Plane of aperture more or less perpendicular to hydrothecal length axis, though occasionally tilted in ad- or abcauline direction. Hydrothecal walls more or less straight, without the pronounced S-shape mentioned above under 1, which makes those hydrothecae more tubular. There are 3 or 5 intrathecal cusps. See figs 8b, 9b.

3. Colonies that reach a considerable size, up to 48 mm. They are more branched than the two morphs described above. Hydrothecae comparatively short, with swollen base and narrowed neck. Distal third of hydrotheca distinctly tilted in adcauline direction. There are 3 intrathecal cusps. Internodes thick. See figs 8e, 9c.

4. Small, up to 19 mm high colonies. Hydrothecae with more or less symmetrical walls; plane of aperture more or less perpendicular to hydrothecal length axis. Basal portion of hydrotheca considerably swollen; neck wide and elongated. There are three or four transverse undulations, running from adcauline to abcauline wall, where they are best visible. Internodes large and straight.

Besides these extreme forms there are many other colonies with intermediate characters, varied even in the same colony. The internodes are variable in number of undulations, in diameter, in length and in inclination, being either zig-zag or in a

Fig. 8a-b, d-f, *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1834), part of hydrocauli from various CANCAP stations; a, Stn 6.D10 (slide 1931); b, Stn 5.D03 (slide 1937); d, Stn 4.004 (slide 1936); e, Stn 5.066 (slide 1939); f, Stn Azo 036 (slide 1948). 8c, *Sertularella ellisii ornata* Broch, 1933, part of hydrocladium from CANCAP Stn 6.137 (slide 1951).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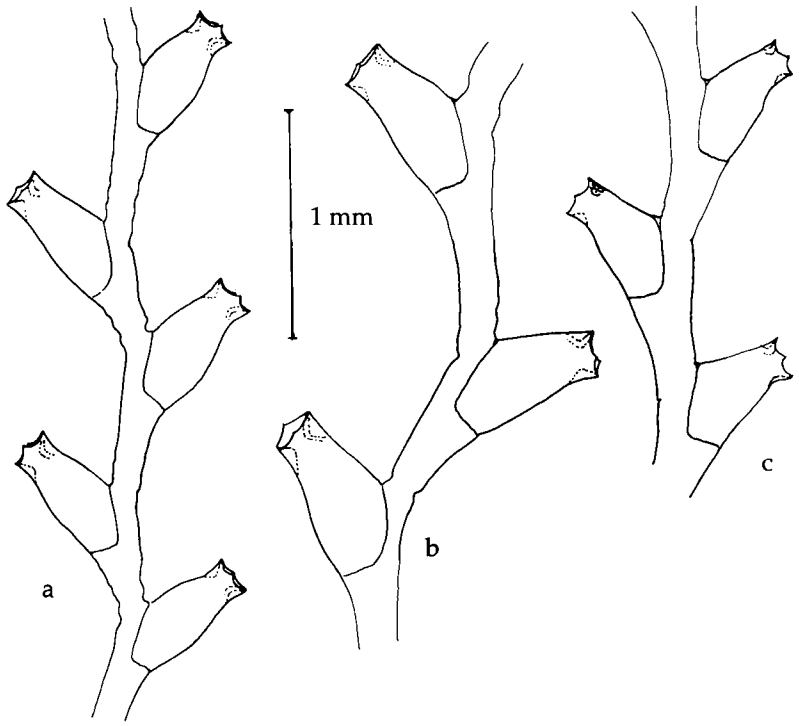

Fig. 9. *Sertularella ellisi ellisii* (Deshayes & Milne Edwards, 1834), part of hydrocladium from various CANCAP stations; a, Stn 1.K16 (slide 1947); b, Stn 6.067 (slide 1971); c, Stn 6.058 (slide 1957).

straight line. Hydrothecae are variable in the angle their length axis makes with that of the internode, in the mode of convexity and/or concavity of their walls (expressing the degree of swelling in the basal portion and contraction, if present, of the 'neck') and in the angle between the plane of the aperture and hydrothecal length axis.

The characters that have been used to try separating *Sertularella fusiformis* and *Sertularella ellisii ellisii* in our CANCAP material do not appear to be concise and can not be used, in our opinion, to separate this material into two distinct groups or species. Even considering the four forms defined above it is difficult or even impossible to define characters that could be used to separate two species.

The type locality of *Sertularia ellisii ellisii* is probably the Isle of Sheppey, N coast of Kent, England (cf. Cornelius, 1979: 288-289; Ramil, Parapar & Vervoort, 1992: 506-507). Boero & Bouillon (1993: 264) perpetuate the use of two incorrect specific names for Mediterranean sertularellids, viz. *Sertularella gaudichaudi* (Lamouroux, 1824) and *Sertularella picta* (Meyen, 1834). *S. gaudichaudi* is a large sertularellid with strongly polysiphonic stem and four-cusped, slightly thickened hydrothecal rim without internal cusps; it belongs to the Falkland Island fauna. *S. picta* is a rather well known and well characterized, repeatedly redescribed Antarctic sertularellid. Both species do not belong to the Mediterranean fauna. Boero & Bouillon probably use those names to indicate *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836) and *Sertularella*

mediterranea Hartlaub, 1901, respectively. Usage of the trivial names *Sertularella gaudichaudi* and *Sertularella picta* for elements of the Mediterranean or NE Atlantic fauna can only lead towards further confusion of the already quite complicated sertularellid nomenclature. Cornelius (1995b: 68-70, fig. 15) refers to material that in our opinion should be referred to *Sertularella ellisii ellisii* as *Sertularella 'gaudichaudi'* (Lamouroux, 1824).

Millard (1958) indicates that *Sertularella fusiformis* is a variable species that can only with certainty be distinguished by the presence of 4 intrathecal cusps that alternate with the marginal cusps. Rossi (1961) failed to observe this disposition of the intrathecal cusps in her Mediterranean material, nor have we seen it in our Atlantic specimens. Hincks (1861), in the original description of his material, does not refer to intrathecal cusps, but they may have been overlooked. We have been able to study some of Millard's South African material in slides of the Natural History Museum (British Museum (Natural History)), London. It is in accordance with Millard's description and in the presence of alternating intrathecal cusps quite different from the material of the *Sertularella ellisii* complex described above. It may well represent an undescribed species.

Distribution.— *Sertularella ellisii ellisii* is a characteristic subspecies of the littoral zone and of shallow waters of the boreal and subtropical Atlantic, predominantly the eastern side and the Mediterranean, but occurring also along the Atlantic coasts of North America. There are also records from the northern Pacific Ocean (Fraser, 1937, as *Sertularella fusiformis*). Owing to its great variability and subsequent confusion with related species the exact extent of its distribution in the Atlantic is uncertain. Depth records of the present material lie between 0 and 180 m depth.

Sertularella ellisii ornata Broch, 1933
(fig. 8c)

Sertularella fusiformis forma *ornata* Broch, 1933: 741, fig. 30.
Sertularella fusiformis var. *ornata*; Picard, 1950: 194; 1955: 192. Vervoort, 1993a: 190.
Sertularella ellisi forma *ornata*; García-Carrascosa, 1981: 219-221, pl. 16 figs a-i.
Sertularella ellisi var. *ornata*; Picard, 1956: 265, fig. 3f.
Sertularella gaudichaudi f. *ornata*; Boero & Fresi, 1986: 146; García- Carrascosa et al., 1987: 370, fig. 1I-J.
Sertularella ornata; Medel Soteras et al., 1991: 526-528, fig. 10.

Material.— **Cape Verde Islands**: Stn 6.076: two small colonies 5 and 7 mm high; hydrothecae with distinct transverse ribs from adcauline to abcauline hydrothecal walls (RMNH-Coel. 26936, slide 2049); Stn 6.137: six fragments 3-13 mm high, slightly branched, from *Cladocarpus* sp. (RMNH-Coel. 26852, 2 slides 1951). Axes fine, with long internodes. Hydrothecae basally swollen, circular in cross section in the basal part; hydrothecal neck and aperture narrowed; 3-5 intrathecal cusps. There are 3-4 transverse ribs running from adcauline towards abcauline wall of hydrotheca. On internodes and stems *Filellum serratum* (Clarke, 1879); Stn 6.170: several colonies up to 19 mm high on axis of *Streptocaulus* spec. (RMNH- Coel. 26941, 2 slides 2054). Hydrothecae with one-third of adcauline wall adnate and 2 or 3 ribs (undulations) running from adcauline towards abcauline hydrothecal wall; three to five intrathecal cusps present. Hydrothecae apically strongly narrowed to form a well developed neck; hydrothecal aperture perpendicular to hydrothecal length axis. No gonothecae.

Remarks.— We have recorded as *Sertularella ellisii ornata* the material with strong-

ly ribbed and apically contracted hydrothecae (fig. 8c), though an inspection of the large material recorded above as *Sertularella ellisii ellisii* shows that in these characters too variability is considerable. We doubt the taxonomic validity of this subspecies but like to draw attention to the fact that the nominate subspecies and *S. ellisii ornata* were found growing together, only the latter producing gonothecae (Medel et al., 1991).

Distribution.— Previously this subspecies has mainly been recorded from the Mediterranean (Broch, 1993; Picard, 1956; Rossi, 1961; García Carrascosa et al., 1987; Medel et al., 1991). The present records from the Cape Verde area confirm the presence of this subspecies in the subtropical Atlantic. The known depth range extends from 0 m (Broch, 1933) to 120 m (García Carrasoca, 1981).

Sertularella gayi gayi (Lamouroux, 1821)
(figs 10-11)

Sertularia Gayi Lamouroux, 1821: 12, pl. 6 figs 8-9.

Sertularella gayi (or *Gayi*); Hincks, 1868: 237-239, fig. 29, pl. 46 fig. 2; Hartlaub, 1901: 61-62, fig. 9; Ritchie, 1910-1911: 220; Billard, 1912: 464; Crawshey, 1912: 327; Massy, 1912: 216; Stechow, 1912: 359; Grieg, 1913: 147; Sumner et al., 1913: 573; Robson, 1914: 101; Bale, 1915: 283; Fraser, 1915: 308; Broch, 1918: 102-104; Stechow, 1919: 89; Pawsey et al., 1920: 10; Horsman, 1922: 264; Jäderholm, 1922: 7; Elmhurst, 1923: 21; Stechow, 1923d: 112, 113; Teissier, 1923a: 355; Hargitt, 1924: 495, pl. 5 fig. 21; Pawsey & Davis, 1924: 14; Prenant & Teissier, 1924: 25; Billard, 1927b: 339; Dons, 1927: 2; Broch, 1928a: 67; Billard, 1931b: 246; Billard, 1931d: 675; Nobre, 1931: 15; Payne, 1931: 743; Marine Biological Association, 1931: 75; Kramp, 1935: 176, fig. 73B; Philbert, 1935c: 27; 1935d: 31; Perrier, 1936: 26; Leloup, 1937b: 5, 37, fig. 24; Moore, 1937: 45; Kramp, 1938: 42, 62, 68, 72, 77; Da Cunha, 1940: 108, 116; Leloup, 1940: 17; Bassindale, 1941: 150; Fraser, 1943: 92; Kramp, 1943: 45; Da Cunha, 1944: 8, 46, fig. 23; Dons, 1944: 74; Fraser, 1944: 262-263, pl. 56 fig. 248; Kramp, 1947: 14; Leloup, 1947: 34, fig. 23; Le Danois, 1948: 118, 175, 237; Vervoort, 1949: 151; Da Cunha, 1950: 122, 125, 135; Deevey, 1950: 334, 346; Picard, 1950: 194; Teissier, 1950b: 20; Picard, 1951b: 278; 1951c: 261; Dawydoff, 1952: 55; Leloup, 1952: 166-168, fig. 96; Rees, 1952: 7; Deevey, 1954: 270; Forster, 1955: 198; Knight-Jones & Jones, 1956: 29; Picard, 1956: 261, fig. 2d, 4a; Buchanan, 1957: 366; Hamond, 1957: 320; Marine Biological Association, 1957: 47; Picard, 1958a: 193; Vervoort, 1959: 273, figs 33b-c, 34b; Burdon-Jones & Tambs-Lyche, 1960: 7; Cabioch, 1961: 27, 36; Millard, 1961: 204; Naumov & Stepan'yants, 1962: 86; Redier, 1962b: 35; Bruce, Colman & Jones, 1963: 53; Cabioch, 1965: 56; Redier, 1965: 373; Rees & Thursfield, 1965: 134; Teissier, 1965: 24; Crothers, 1966: 13; Monniot, 1966: 827 et seq.; Rees & White, 1966: 277; Vervoort, 1966: 127, fig. 30; Cabioch, 1968: 489, 565, 655; Vervoort, 1968: 104; Hirohito, 1969: 21, fig. 15; Rees & Rowe, 1969: 18; Robins, 1969: 333; Clausade, 1970: 727; Fey, 1970: 400; Patriti, 1970: 37, fig. 48; Bouillon & Levi, 1971: 221; Guille, 1971: 279; Jägerskiöld, 1971: 64; Christiansen, 1972: 301; Stepan'yants, 1972: 325; Vervoort, 1972: 116, fig. 36a-b; Castric-Fey, 1973: 213; Defenbaugh & Hopkins, 1973: 103, pl. 13 fig. 48; Edwards, 1973: 586; Hiscock, 1974: 24; Saldanha, 1974: 325; Millard, 1975: 305; Cabioch et al., 1977: 120; Evans, 1978: 98; Cornelius, 1979: 284, fig. 21; García Corrales et al., 1980: 33, fig. 11; García-Carrascosa, 1981: 225-227, pl. 18 figs a-e, pl. 34 fig. b; Marinopoulos, 1981: 176; Castric & Michel, 1982: 28, fig. 86, fig.; Hirohito, 1983: 44; Urgorri & Besteiro, 1983: 17; Aguirrezabalaga et al., 1984: 87; Gili, 1986: 123-124, fig. 4.23D-E; Parapar Vegas, 1986: 79-88, pls 12-13; Templado et al., 1986: 98; García-Carrascosa, Escarti & Silvestre, 1987: 370-371; Gili, Murillo & Ros, 1989: 23; Gili, Vervoort & Pagès, 1989: 102-103, fig. 27; Vietti & Boero, 1989: 220; Altuna & García Carrascosa, 1990: 54 et seq., fig.; Cornelius & Ryland, 1990: 146, fig. 4.19; Izquierdo et al., 1990: 39, fig. 6; Park, 1990: 80; Cairns et al., 1991: 26; Castric-Fey & Chassé, 1991: 523; Medel Soteras et al., 1991: 524-526, fig. 9; Cornelius, 1992b: 82 et seq.; Jensen & Frederiksen, 1992: 64; Ramilet al., 1992: 496-500, figs 1a, 2, 3; Boero & Bouillon, 1993: 264; Vervoort, 1993a: 190; Altuna Prados, 1994: 54; Bouillon et al., 1995:

69; Cornelius, 1995b: 71-73, fig. 16; Hirohito, 1995: 192-194, fig. 63a-b; Klitgaard, 1995: 17 et seq.; Park, 1995: 14.

Sertularella gayi gayi; Blanco, 1982: 157-159, figs 6-9; Ramil & Vervoort, 1992: 219-222, fig. 61a-e.

Sertularella gayi forma *gayi*; Ralph, 1961: 833-834, fig. 24d-f.

Sertularella gayi var. *gayi*; Stepan'yants, 1979: 87, pl. 16 fig. 4A-B.

Material.— **Azores area**: Stn 5.008: numerous colonies up to 160 mm high on small stones; no gonothecae (RMNH-Coel. 27044, two slides 2410). Hydrothecae with free part adcauline wall usually shorter than adnate part; this free part smooth to carrying one distinct and some indistinct undulation, petering out towards abcauline wall. Branching irregular; Stn 5.075: nine large colonies 50-200 mm high on stones and various fragments; no gonothecae (RMNH-Coel. 27045, two slides 2411). Largest colonies basally with axis of c. 6 mm diameter. As the material described from Stn 5.008. Some of axes with *Filellum serpens* (Hassall, 1848); Stn 5.077: ten colonies 30-75 mm high, with irregularly branched axis; one axis trifurcate (RMNH-Coel. 27046, slide 2412). Hydrocladia long, some as long as 40 mm. In some of the hydrothecae the indistinct ribs extend almost to the abcauline wall. No gonothecae present; Stn 5.088: numerous colonies 25-100 mm high, 3 developing colonies (attached to Ascidia and Bryozoa) and various fragments; no gonothecae (RMNH-Coel. 27047, two slides 2413, see also slide 2461). Colonies irregularly built; hydrocladia up to 35 mm long, some branched. Hydrothecae with free part adcauline hydrothecal wall shorter or as long as adnate part, with undulations varying between scarcely indicated to well marked, always petering out towards abcauline side; Stn 5.089: three colonies 80-130 mm high and a fragment (RMNH-Coel. 27033, slide 2394). Structure of colony as usually met with in this species; hydrothecal ribs little marked. No gonothecae. On stem *Filellum serpens* (Hassall, 1848), in large numbers, and some hydrothecae of *Clytia paulensis* (Vanhöffen, 1910); Stn 5.100: three colonies 45-105 mm high and 2 fragments, opaque, without gonothecae. (RMNH-Coel. 26888, 4 slides [1988 (1, with *Sertularia distans* Lamouroux, 1816) and 2414 (3)]. Ramification pinnate and dense; hydrocladia long, up to 55 mm. Hydrothecae smooth to undulated on free adcauline side; Stn 5.112: two colonies 30 and 70 mm high; no gonothecae (RMNH-Coel. 27049, slide 2415). Resembling *S. polyzonias* in irregular branching. Axis bifurcated, each part branched several times, with alternate hydrocladia, some of which attain great length (c. 50 mm) and are directed upwards; colonies as a result irregularly built, scarcely pinnate, polysiphonic with exception of distal parts. Hydrothecae with free part adcauline wall shorter to as long as adnate part, smooth and curved to almost straight with distinct undulation, petering out towards abcauline side. Colour yellowish. Axis with *Hebella scandens* (Bale, 1888); Stn 5.132: single colony 65 mm high; hydrothecae smooth. No gonothecae; Stn 5.141: two colonies 15 and 30 mm high attached to stone; no gonothecae (RMNH-Coel. 27050, slide 2416). Hydrothecae with free part adcauline wall of varied length (shorter than to 1.5 times as long as adnate part) with ribs that are scarcely indicated to quite distinct; Stn 5.142: single 60 mm high colony in two pieces, composed of polysiphonic main axis and pinnately arranged hydrocladia, 10-15 mm long (RMNH-Coel. 27056, slide 2424). Hydrothecae with distinct 'axil', free part adcauline hydrothecal wall smooth to distinctly undulated, furrows petering out towards abcauline wall. No gonothecae. With *Antennella* spec. In addition a detached fragment 25 mm long; no gonothecae; Stn 5.153: five well developed colonies 110-130 mm high and several developing colonies, without gonothecae, on gorgonids. Hydrothecae short and without ribs.

Atlantic coast Morocco and Mauritania: Stn MAU.033: detached colonies 32 mm high; no gonothecae (RMNH-Coel. 27072, all in slide 2441); Stn MAU.039: several colonies and fragments up to 65 mm high. Some colonies attached to worm-tubes, others detached (RMNH-Coel. 27073, three slides 2442). Axis with few pinnately arranged, widely spaced hydrocladia, that may develop secondary hydrocladia. Hydrothecae large, with indistinct ribs though free part adcauline wall usually distinctly undulated. No gonothecae; Stn MAU.040: four colonies up to 60 mm high, partly on worm tubes, partly detached; without gonothecae. Axis polysiphonic; branching regular and in one plane. Hydrothecae almost smooth (RMNH-Coel. 27791); Stn MAU.072: numerous colonies up to 90 mm high (RMNH-Coel. 27074, three slides 2443). Hydrothecae occasionally with poorly developed ribs. No gonothecae.

Partly invested by a sponge; Stn MAU.080: several colonies up to 90 mm, some detached, others on worm-tubes (RMNH-Coel. 27075, slide 2444). Axis not strongly polysiphonic; hydrocladia long and branched, thus forming secondary hydrocladia. Hydrothecae short, ribs visible but not strongly marked; Stn MAU.082: single colony 140 mm high attached to worm tube (RMNH-Coel. 27076, two slides 2445). Axis forked, thus forming secondary ramifications. Hydrothecae short and basally swollen; no ribs. No gonothecae; Stn MAU.117: numerous colonies up to 70 mm high (RMNH-Coel. 27077, two slides 2446). Stems forming a dense mass rising from hydrorhizal matting, detached from substratum. Hydrothecae without ribs. No gonothecae; Stn MAU.130: two colonies up to 30 mm high on worm tubes; no gonothecae. Axis monosiphonic; hydrothecae with low ribs on adcauline wall (RMNH-Coel. 27810).

Madeira area: Stn 1.093: several yellowish colonies with a tendency towards pinnate ramification and with gonothecae (RMNH-Coel. 26961, 2 slides 2075). Hydrothecae with short free part adcauline wall, much shorter than adnate part, with only basal undulation or weakly undulated and only basally distinct; axis monosiphonic with beginning of polysiphony. Gonothecae slender ovoid, ribbed, ribs becoming more pronounced in distal portion; two apical lips around aperture; Stn 1.094: ten colonies 45-160 mm with gonothecae (RMNH- Coel. 26962, 2 slides 2076). Hydrothecae and gonothecae as in material from Stn 1.093; stem polysiphonic. Some of hydrocladia end in stolons and are occasionally fused. With *Clytia paulensis* (Vanhöffen, 1910); Stn 1.097: twelve colonies 13-100 mm high on shells, axis of gorgonids and sponges; some with gonothecae (RMNH-Coel. 26963, 3 slides 2077). Free part adcauline wall hydrotheca longer than in previously described specimens, weakly to distinctly ribbed. Gonothecae as usual. With *Filellum serratum* (Clarke, 1879), *Clytia paulensis* (Vanhöffen, 1910) and *Campanularia hincksii* Alder, 1856 (single hydrotheca); Stn 1.114: single fragment 27 mm high; no gonothecae (made up in slide; RMNH-Coel. 26964, 2 slides 2078). Axis monosiphonic; hydrothecae with strongly ribbed free part adcauline hydrothecal wall, particularly in basal portion of colony; Stn 3.010: two colonies c. 70 x 35 mm, with gonothecae. Hydrothecae with indistinct ribs; perisarc thin; Stn 3.060: three colonies, various fragments and developing colonies 15-190 mm high, on rock fragments and Bryozoa; with gonothecae (RMNH-Coel. 27032, 2 slides 2393). Corresponds with the form described by Medel et al, 1992, i.e., hydrothecae smooth or nearly so, occasionally with indication of a rib at base of free part adcauline wall. Gonothecae elongate, distinct ribs on distal half; two broad 'lips' at orifice.

Canary Islands and Selvagens Archipelago: Stn 2.047: twelve colonies 50-175 mm high on rock fragments, shells and gorgonids (RMNH-Coel. 26965, 2 slides 2079). Stem with lamellibranchs of considerable size. Hydrothecal adcauline wall smooth, with undulation near axil with internode, stems strongly polysiphonic. Hydrocladia and branches usually pinnate, hydrocladia subopposite; occasionally branch on frontal or dorsal aspect of colony; Stn 2.049: single colony 45 x 45 mm and 3 fragments, no gonothecae (RMNH-Coel. 26966, slide 2080). Colony pinnate; hydrocladia subopposite, hydrothecae smooth, only single undulation at base of free part adcauline wall; Stn 2.114: two colonies 45 and 55 mm high, without gonothecae (RMNH-Coel. 26846, slide 2083). Base polysiphonic. Hydrothecae ribbed, with large free adcauline wall. Ribs well marked at adcauline side of hydrothecal wall but gradually disappearing abcaudally. Internodes long, hydrocladia short, with 6 hydrothecae maximally; Stn 2.119: many colonies in different stages of development on a rope, 3-115 mm high [RMNH-Coel. 26839, slides 1938 (1) and 1945 (1)]. Larger colonies with gonothecae of which the two lips are not so prominent (fig. 10b). Two types of hydrothecae are met with in this material, of which one is swollen and short, the other more elongated and slender, placed at internodes of identical shape (fig. 10a). Hydrothecal ribs distinct. The larger type of hydrothecae recalls that also met with in *S. gayi robusta*. On some of colonies hydrothecae of *Modeeria rotunda* (Quoy & Gaimard, 1827); Stn 2.120: two developing colonies, 20 x 15 mm and 2 fragments, colour brown (RMNH-Coel. 26968, 2 slides 2084). Adcauline wall hydrothecae distinctly undulated. No gonothecae; Stn 4.074: two colonies c. 100 mm high, with dark, strongly polysiphonic axis; no gonothecae (RMNH-Coel. 27809); Stn 4.115: single colony 70 mm high; no gonothecae (RMNH-Coel. 27035, slide 2396). Hydrothecae with distinct

ribs, best visible on adcauline side; *Modeeria rotunda* (Quoy & Gaimard, 1827) epizootic on axis and some of hydrocladia; Stn 4.143: eight colonies 15-50 mm high, distinctly pinnate, hydrocladia up to 35 mm long, no gonothecae (RMNH Coel 27037, slides 2400 and 2478). Hydrothecae smooth with deep, rounded axil as material described by Medel et al (1992). In addition some young, up to 10 mm high colonies on *Diphasia margareta* (Hassall, 1841); Stn 4.151: two colonies 47 and 63 mm high; no gonothecae (RMNH-Coel. 27036, two slides 2397). Agree with colonies described by Medel et al. (1992): smooth hydrothecae with deep, rounded axil. Also fragment of *Halecium* cf. *beanii* (Johnston, 1838) (slide 2399) and small colony of *Clytia gracilis* (M. Sars, 1850) (slide 2398); Stn 4.152: single colony 75 mm high on rope and in addition numerous colonies on shells and axes of Antipatharia, 20-100 mm high (RMNH-Coel. 27038, two slides 2401). No gonothecae, ribs of hydrotheca scarcely visible. On axes *Filellum serratum* (Clarke, 1875). Hydrothecae vary from the smooth form described and figured by Medel et al. (1992) to a form with a single rib or undulation best visible on adcauline side near axil. Also some detached fragments; Stn 4.153: up to 90 mm high colonies on axis of antipatharian (with *S. polyzonias*) [RMNH-Coel. 27039, slides 2402 (2) and 2403 (2)]. Young colony of *Aglaophenia tubulifera* on one of hydrothecae; those are of the same shape as those of Stn 4.152. Also *Garveia* (?) sp. and *Filellum serratum* (Clarke, 1875) on axes. No gonothecae; Stn 4.158: numerous colonies up to 40 x 40 mm; no gonothecae (RMNH-Coel. 26831, slide 1930 and RMNH-Coel. 27040, four slides 2405). Free part adcauline wall longer than adnate part, with well marked transverse ribs, petering out towards abcauline hydrothecal wall (fig. 11). Mixed with colonies with smooth hydrothecae. With *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Campanularia hincksii* Alder, 1856; Stn 4.163: two detached colonies 30 and 40 mm high; no gonothecae (RMNH-Coel. 27041, slide 2406). Hydrothecal wall ribbed; considerable part adcauline hydrothecal wall free, agrees with specimens from Stn 4.158; Stn 4.V08: eleven detached colonies 17-100 mm high and many fragments; gonothecae absent (RMNH-Coel. 27042, two slides 2407). Hydrothecae large, free part adcauline wall longer than adnate part, generally smooth but some hydrothecae with beginning undulation at adcauline wall starting near axil. Many epizooids, e.g. *Antennela secundaria* (Gmelin, 1791)(in slides 2407 and separately in slide 2408); Canary Islands Expedition 1980, station unknown (RMNH-Coel. 27078, slide 2447): three adult and 2 developing colonies 4-25 mm high on shells; no gonothecae. Hydrothecal ribs little prominent.

Cape Verde Islands: Stn 6.067: fragmented colony c. 26 mm high; no gonothecae (RMNH-Coel. 27043, two slides 2409). In addition 40 mm high colony on small stone. Axis basally polysiphonic, hydrocladia more or less in same plane, but not regularly pinnate. Hydrothecae with shallow ribs and with distinct and narrow neck; Stn 6.069: two fragments of old colonies with much renovated hydrothecae; no gonothecae. Covered with many epibionts (Haleciidae, Lafoeidae and Campanulariidae); Stn 7.179: single colony c. 80 mm high and several fragments; gonothecae present (RMNH-Coel. 27793). With *Hebella* spec. Hydrothecae smooth or with some little marked undulations of the adcauline wall; gonothecae with four low cusps.

Remarks.— We have little to add to the description of Atlantic representatives of this species by Ramil & Vervoort (1992: 219-222, fig. 61a-e) and Ramil et al. (1992); the characters distinguishing the nominate subspecies from *Sertularella gayi robusta* Allman, 1873, have been outlined by Ramil & Vervoort (1992). In contradistinction to *Sertularella polyzonias* (Linnaeus, 1758) hydrothecae with internal cusps have not been observed in this species, nor did we experience much difficulty in distinguishing well developed material of both species.

Distribution.— *Sertularella gayi gayi* has a wide distribution in the Atlantic Ocean, mainly in deeper parts of the boreal, temperate and subtropical areas, though penetrating far north (Spitzbergen, Leloup, 1940). The southward distribution in the Atlantic is not clear: South African records according to Millard (1975) are doubtful. The distribution of this species in the CANCAP area is wide. From the Azores it has

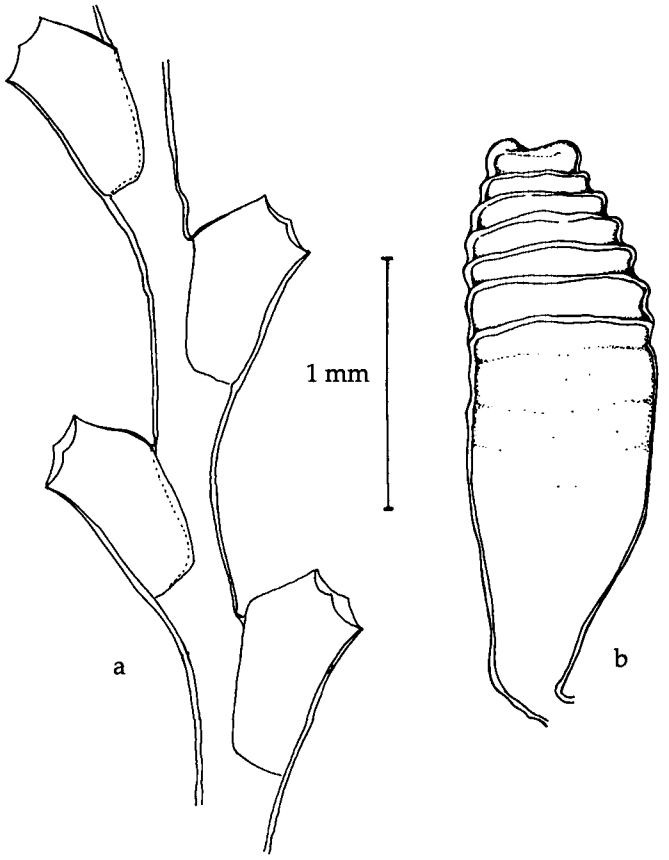

Fig. 10. *Sertularella gayi gayi* (Lamouroux, 1821), from CANCAP Stn 2.119 (slide 1938); a, part of hydrocladium; b, gonotheca.

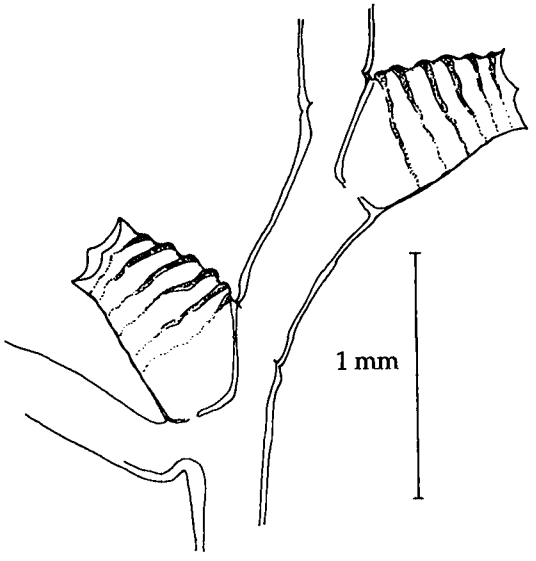

Fig. 11. *Sertularella gayi gayi* (Lamouroux, 1821), from CANCAP Stn 4.158 (slide 1930), part of stem with axillary and axial hydrotheca.

previously been recorded by Rees & White (1966) and Cornelius (1992), from the Canary Islands by Izquiero et al. (1990), from off the coast of Morocco by Patriti (1970), from Mauritania by Billard (1906) and from the Cape Verde region by Rees & Thursfield (1965). The present localities underline its considerable distribution in the area studied.

The known depth distribution of this species extends from 10 m (Medel et al., 1991) to at least 1200 m (Ramil & Vervoort, 1992). The present records are from between 70 and 630 m.

Sertularella gayi robusta Allman, 1873
(fig. 12)

Sertularella Gayi var. *robusta* Allman, 1873: 186; 1874: 474, pl. 66 figs 3, 3a; 1877: 22-23, pl. 15 figs 3-5; Billard, 1906: 185, fig. 9B; Vervoort, 1993a: 190.

Sertularella gayi robusta; Vervoort, 1972: 118-120, fig. 36c, d; Ramil & Vervoort, 1992: 223-225, figs 60b, 62a-c.

Sertularella Gayi var. *elongata* Billard, 1906: 185-186, fig. 9C.

Material.— **Canary Islands and Selvagens Archipelago**: Stn 2.106: single colony c. 140 mm high, spread 50 mm, on coral fragment; gonothecae borne on hydrocladia along whole length of colony (RMNH-Coel. 26967, 2 slides 2081). In addition 7 smaller colonies 4-83 mm high of which 5 detached and 2 on coral fragments; gonothecae present on 2 colonies. Hydrothecae swollen, free part adcauline wall c. 1.5 times longer than fused part, with distinct transverse ribs over whole breadth of hydrotheca. Gonothecae strongly ribbed, particularly on distal part, with three blunt apical cusps; Stn 2.141: single colony 114 mm high attached to coral fragment, with gonothecae (RMNH-Coel. 26969, slide 2085). Hydrothecae inflated, ribs distinct on adcauline side and weakly visible on abcauline side (fig. 12b). With many hydrothecae of *Modeeria rotunda* (Quoy & Gaimard, 1827); Stn 4.059: two stem fragments 20-25 mm and four branches 13-20 mm; no gonothecae (RMNH- Coel. 27034, two slides 27034). Internodes long and hydrothecae large; ribs on hydrotheca present but little marked.

Cape Verde Islands: Stn 6.032: single 16 mm long fragment (RMNH-Coel. 27057, all in slide 2425). Hydrothecae large and strongly annulated [up to 8 ribs running transversely from ad- to abcauline hydrothecal wall (fig. 12a, compare also Ramil & Vervoort, 1992, fig. 62c)]. No gonothecae; Stn 6.080: four fragments 10-15 mm high (RMNH-Coel. 27052, slide 2420). Hydrothecae of the two types described by Ramil & Vervoort (1992), some densely covered by *Filellum serratum* (Clarke, 1875). In addition several 15-20 mm high, developing colonies; Stn 6.088: single, forked axis without gonothecae (RMNH-Coel. 27062, slide 2431). Hydrothecae large, no intrathecal cusps, large part of adcauline hydrothecal wall free. Hydrothecae with shallow transverse undulations running from adcauline to abcauline hydrothecal wall. No hydrothecal neck, aperture wide. Likely to be a juvenile colony of this species; Stn 6.113; two hydrocauli attached to gorgonids and a detached colony 75-170 mm high (RMNH- Coel. 27064, slide 2433). Axis occasionally with branching. Hydrothecae large, with indistinct ribs. Gonothecae present. Colonies completely invested by *Filellum serratum* (Clarke, 1879) and *Hebella* spec.

Remarks.— For a full description of this subspecies we refer to Ramil & Vervoort (1992: 223-225, figs 60b, 62a-c); there is a considerable difference between the young and full-grown colonies in the shape of the hydrothecae.

Distribution.— The geographical distribution of this Atlantic subspecies is discussed in detail by Ramil & Vervoort (1992) and includes localities from off the coast

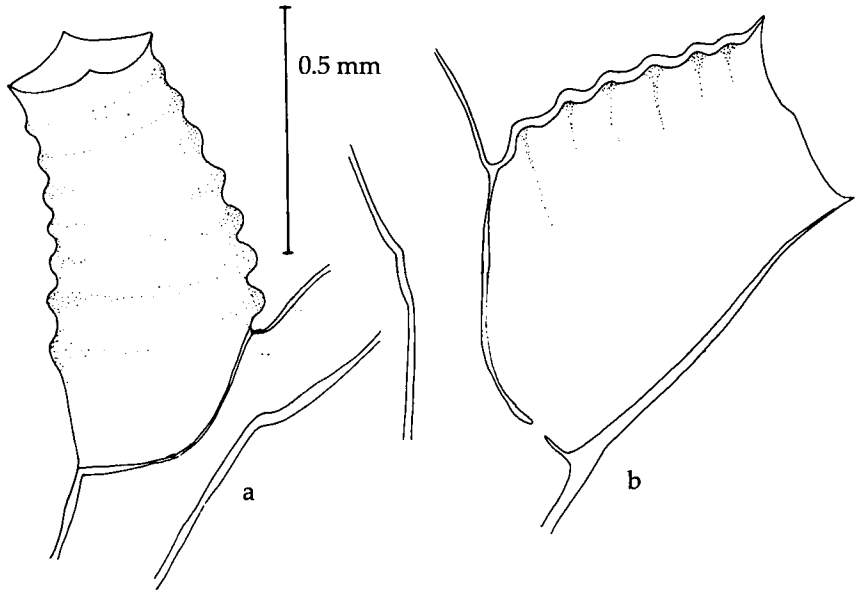

Fig. 12. *Sertularella gayi robusta* Allman, 1873, hydrothecae; a, from CANCAP Stn 6.032 (slide 2425); b, from CANCAP Stn 2.141 (slide 2085).

of Morocco and from south of Madeira (Billard, 1906). The present localities extend the distribution in the CANCAP area to the Canary Islands, Selvagens Archipelago and the Cape Verde region. Previous records are all from deep water (550-890 m); the present are from between 220 and 1000 m.

Sertularella mediterranea Hartlaub, 1901

Sertularella mediterranea Hartlaub, 1901: 86-87, pl. 5 figs 10, 11, 15, 16; Kudelin, 1914: 507-508, fig. 174; Neppi, 1917: 48, fig. 10; Warren, 1919: 120, fig. 7; Neppi, 1921: 22, figs 7-8; Billard, 1922a: 107, figs 3-4; 1923: 16; Stechow, 1923d: 189, 192, fig. C^1, D^1a; Billard, 1927b: 338; 1931a: 390; 1931d: 675; Broch, 1933: 76, fig. 31; Philbert, 1935a: 88; 1935c: 18, 27; 1935d: 31; Eyre & Stephensen, 1938: 39; Da Cunha, 1944: 858, fig. 25; Vervoort, 1946a: 312; 1949: 150, fig. 5; Da Cunha, 1950: 122, 125, 135; Picard, 1950: 193; Teissier, 1950: 19; Dieuzeide & Goëau-Brissonnière, 1951: 22; Bassindale & Barrett, 1957: 246; Hamond, 1957: 296, 316, fig. 24; Millard, 1957: 215, figs 10E, 11B; 1958: 190; Riedl, 1959: 649; Vervoort, 1959: 272, figs 33a, 34a; Teissier, 1965: 23; Vasseur, 1965: 70; Yamada, 1965: 362; Crothers, 1966: 13; Millard, 1966: 492; Baker, 1967: 40; Millard, 1967: 180; Berrisford, 1969: 394; Day et al., 1970: 14; Fey, 1970: 399; Schmidt, 1972a: 37, 43, fig. 2a, pl. 1B; 1972b: 1; Castric-Fey, 1973: 213; Schmidt, 1973: 286; Vasseur, 1974: 158; Mergner & Wedler, 1977: 20, pl. 3 fig. 2a-b; García-Carrascosa, 1981: 213-215, pl. 14 figs d-f, pl. 35 fig. d; Gili, 1986: 124-125, figs 4.24D-E, 4.56e; Mergner, 1987: 187; Gili et al., 1989: 23; Medel Soteras et al., 1991: 528-531, fig. 11; Ramil et al., 1992: 511-518, figs 11-14; Vervoort, 1993a: 191; Altuna Prados, 1994: 54; Bouillon et al., 1995: 69: Peña Cantero, 1995: 387-390, pl. 48 figs a-g.

Sertularella mediterranea mediterranea; Millard, 1964: 45; 1975, 294, fig. 96B-C; 1978: 197 et seq.; Altuna et al., 1984: 134.

Sertularella mediterranea f. *mediterranea*; Castric & Michel, 1982: 86, fig.

Sertularia mediterranea; Parenzan, 1956: 625, 627.

Sertularella polyzonias mediterranea; Da Cunha, 1940: 108, 116; Rossi, 1950: 209-211, fig. 8.
Sertularella polyzonias f. *mediterranea*; Leloup, 1934a: 13, 14; 1937a: 104, 116, fig. 7; 1937b: 5, 39, fig. 26; 1940: 18.
Sertularella polyzonias var. *mediterranea*; Rossi, 1950: 18, fig. 8; Dawydoff, 1952: 55.
Sertularella gaudichaudi; Billard, 1912: 464; Altuna et al., 1984: 134.
Sertularella gaudichaudi p.p. Cornelius, 1979: 282-284, fig. 20.
Sertularella gaudichaudi f. *mediterranea*; Boero & Fresi, 1986: 146; Aguirrezabalaga et al., 1987: 114-116, figs 4-5; García-Carrascosa et al., 1987: 370, fig. 1C-D.
Sertularella ellisi f. *mediterranea*; Picard, 1956: 264, fig. 3b; Patriti, 1970: 38, fig. 49.
Sertularella picta; García-Corrales et al., 1980: 37-40, fig. 12; Isazi & Saiz, 1986: 70.
Sertularella sp. Aguirrezabalaga et al., 1987: 116, fig. 6.

Material.— **Azores area**: Stn AZO.01: fair number of short, unbranched axes 2-18 mm high on tubes of sabellid polychaete (RMNH-Coel. 26944, slide 2058). Shape of axis characteristic for this species; abcauline marginal cusp of hydrotheca little developed, three intrathecal cusps. Some of hydrocauli with gonothecae; Stn AZO.06: several detached stems 6-12 mm high; no gonothecae (RMNH-Coel. 26945, slide 2059). Material agrees with that from AZO.17 described more fully; Stn AZO.17: several detached stems 5 - 20 mm high (RMNH-Coel. 26847, slide 1946). In basal parts of colonies hydrothecae similar to those of *Sertularella ellisii ellisii* (Deshayes & Milne-Edwards, 1836), in more distal parts abcauline marginal cusp enlarged. Number of intrathecal cusps 3 or 4. Some gonothecae with well developed neck, 4 distinct cusps and swelling usually in upper third. Colonies heavily invested by sediment; Stn 5.D05: several colonies c. 15 mm high, with gonothecae (RMNH-Coel. 26842, slide 1941). Three intrathecal cusps present.

Remarks.— This species is extensively described, discussed and figured by Ramil et al. (1992); the CANCAP material is in accordance with the notes presented there.

Distribution.— The species is widely distributed in the Mediterranean and has also been found in the eastern Atlantic, where it seems to be of fairly sporadic occurrence and ranges from the vicinity of Spitzbergen southward till the coasts of South Africa (details in Ramil et al., 1992). From the area now studied it has previously been found off Morocco (Patriti, 1970), off Mauritania (Billard, 1906) and the Azores (Leloup, 1940).

In the CANCAP collection it is rare, being recorded exclusively from the Azores area, where it was collected at depths between 0 and 15 m. Though mainly living in the littoral zone it seems occasionally to penetrate deeper water: 240 m (Leloup, 1940).

Sertularella polyzonias (Linnaeus, 1758)
(fig. 13)

Sertularia polyzonias Linnaeus, 1758: 813.
Sertularella polyzonias; Hincks, 1868: 235-237, pl. 46 fig. 1; Ritchie, 1910-1911: 220 Bedot, 1911: 220; Fraser, 1911: 70; Billard, 1912: 461; Broch, 1912a: 45-46; Chichkoff, 1912: xxxi; Crawshay, 1912: 327; Linko, 1912: 122-126, fig. 18; Massy, 1912: 217; Stechow, 1912: 358; Kramp, 1913: 23; Müller-Calé, 1913: 102, pl. 10 figs 26-30; Müller-Calé & Krüger, 1913a: 42 et seq., figs 1-3; 1913b: 59 et seq., figs; Robson, 1913b: 80, 81; Sumner et al., 1913: 573; Fraser, 1913: 175; 1914a: 192, pl. 30 fig. 113; Kudelin, 1914: 494-501; Müller, 1914: 332-334; Robson, 1914: 101; Hadzi, 1915: 151, figs 26-28; Stechow, 1919: 89; Renouf, 1920: 115; Babić, 1921: 95; Buchner, 1921: 39; Fraser, 1921: 173, fig. 87; Neppi, 1921: 27; Fraser, 1922: 5; Horsman, 1922: 264; Scheuring, 1922: 160, 174; Jäderholm, 1922: 7; Stechow, 1923c: 110, 111; 1923d: 194, fig. D^1c; Teissier, 1923a: 354, 355; Bale, 1924: 242; Prenant & Teissier, 1924: 25; Fraser, 1926: 210, 213; Billard, 1927b: 338; Fraser, 1927: 326; Broch, 1928a: 68;

1928b: 120; Buchner, 1930: 73; Saint-Hilaire, 1930: 527 et seq.; Billard, 1931b: 246; Borcea, 1931: 695; Fraser, 1931: 479, 481; Marine Biological Association, 1931: 75; Nobre, 1931: 14; Payne, 1931: 743; Préfontaine, 1931: 77; Fraser, 1932: 52; Kramp, 1932: 12; Broch, 1933: 65, figs 24-25; Leloup, 1933: 8; Leloup, 1934a: 13; Fraser, 1935: 145; Kramp, 1935: 175, fig. 72a, 73a; Cart & Crichton, 1936: 284; Fraser, 1936: 126; Perrier, 1936: 26; Fraser, 1937: 156-157, pl. 35 fig. 187; Leloup, 1937b: 5, 39; Moore, 1937: 45; Nobre, 1937: 22; Eales, 1939: 41; Da Cunha, 1940: 108; Antipa, 1941: 217; Morley, 1943: 76; Da Cunha, 1944: 8, 47, fig. 24; Fraser, 1944: 268-270, pl. 58 fig. 258; Bacci, 1947: 30; Fenyuk, 1947: 4; Fowell, 1947: 262; Leloup, 1947: 31, fig. 23; Berezina, 1948: 63, pl. 17 fig. 2; Le Danois, 1948: 118, 175, 237; Kato, 1949: 215; Caspers, 1950: 133; Da Cunha, 1950: 122, 125, 135; Dieuzeide, 1950: 20; Picard, 1950b: 193; 1951c: 261; Teissier, 1950b: 19; Leloup, 1952: 168-169, fig. 97; Picard, 1952a: 347, 349; Rees, 1952: 7; Newell, 1954: 330; Williams, 1954: 49; Knight-Jones & Jones, 1956: 26; Picard, 1956: 263, figs 2c, 4c; Spaul, 1956: 18; Bassindale & Barrett, 1957: 245; Buchanan, 1957: 366; Hamond, 1957: 217, figs 10j, 11h; Marine Biological Association, 1957: 47-48; Millard, 1957: 296, 316; Naumov, 1957: 40; Valkanov, 1957: 17; Barrett & Yonge, 1958: 51, fig. 14c; Millard, 1958: 191; Naumov & Stepan'yants, 1958: 57-58; Picard, 1958a: 193; Costa, 1960: 33, 47; Kerneis, 1960: 163; Naumov, 1960: 337-338, figs 46K, 226; Eales, 1961: 37; Manea, 1961: 850; Ralph, 1961: 834, fig. 24h-i; Jacquotte, 1962: 165, 182; Naumov & Stepan'yants, 1962: 87; Préfontaine & Brunel, 1962; 245; Redier, 1962b: 35; Blanco, 1963: 178; Brotskaya et al., 1963: 174; Bruce et al., 1963: 53; Filatova & Barsonova, 1964: 19; Millard, 1964: 46; Redier, 1964b: 138; Cabioch, 1965: 56; Rees & Thursfield, 1965: 137; Teissier, 1965: 24; Monniot, 1966: 827 et seq.; Redier, 1966b: 83; Rees & White, 1966: 278; Baker, 1967: 40; Davis, 1967: 17; Eales, 1967: 37; Millard, 1967: 182; Redier, 1967: 396; Cabioch, 1968: 642; Manea, 1968: 283; Millard, 1968: 254, 271-272; Vidal, 1968: 189; Rees & Rowe, 1969: 18; Robins, 1969: 333; Brunel, 1970: 18; Calder, 1970: 1528, pl. 6 figs 3-5; Clausade, 1970: 727; Day et al., 1970: 15; Fey, 1970: 399, 400; Füller, 1970: 17; Hiscock, 1970: 30; Patriti, 1970: 39, fig. 50; Bouillon & Levi, 1971: 221; Guille, 1971: 279; Huxtable, 1971: 65, fig; Jägerskiöld, 1971: 64; Redier, 1971a: 511; 1971b: 143; 1971c: 72; Rossi, 1971: 34, fig. 13D; Christiansen, 1972: 300; Von Salvini-Plawen, 1972: 391; Castric-Fey, 1973: 213; Edwards, 1973: 586; Hiscock, 1974: 24; Laverack & Blacker, 1974: 23; Leloup, 1974: 32, fig. 26; Saldanha, 1974: 325; Belousov, 1975: 655, fig. 1 no. 47; Calder, 1975: 307, fig. 5c; Hughes, 1975: 291 et seq.; Millard, 1975: 300, fig. 98F-H; Olafsson, 1975: 23; Logan, 1976: 30; Withers & Thorp, 1976: 603; Boyden et al., 1977: 488; Chas Brinquez & Babio, 1977: 27, fig. 12A-C; Fiorini, 1977: 205, fig. 7b; Mergner & Wedler, 1977: 20, pl. 3 fig. 22; Evans, 1978: 99; Cornelius, 1979: 287, fig. 22; Marinopoulos, 1979: 120; Stepan'yants, 1979: 88; García Corrales et al., 1980: 41, fig. 13; Honegger, 1980: 67-73, figs 1-10; Stepan'yants, 1980: 116; Boero, 1981a: 182; 1981b: 197; García-Carrascosa, 1981: 222-224, pl. 17 figs a-l; Marinopoulos, 1981: 176; Castric & Michel, 1982: 28, fig. 86, fig.; Gili i Sarda, 1982: 77, fig. 37A; Urgorri & Besteiro, 1983: 25; Blanco, 1984: 37-39, figs 69-81 on pls 31-36; Austin, 1985: 61; Boero & Fresi, 1986: 146; Gili, 1986: 125-126, fig. 4.21A-B; Parapar Vegas, 1986: 89-99, pls 14-17; Templado et al., 1986: 98; Aguirrezabalaga et al., 1987: 114; García- Carrascosa et al., 1987: 370; Gili et al., 1987: 92; Llobet i Nadal, 1987: 175-176, fig. 55; Wacasey & Atkinson, 1987: 16 et seq.; Gili et al., 1989: 23; Altuna & García Carrascosa, 1990: 54 et seq., fig.; Cornelius & Ryland, 1990: 146, fig. 4.19; Izquierdo et al., 1990: 40, fig. 8; Cairns et al., 1991: 26; Castric-Fey & Chassé, 1991: 523; El Beshbeeshy, 1991: 179-181, fig. 45; Llobet et al., 1991: 153 et seq.; Marano et al., 1991: 8; Medel Soteras et al., 1991: 519-521, fig. 7; Cornelius, 1992a: 255; 1992b: 79 et seq.; Ramil & Vervoort, 1992: 225-227, fig. 63a-b; Ramil et al., 1992: 500-503, figs 1b, 4-5; Sommer, 1992: 210; Boero & Bouillon, 1993: 264; Harms, 1993: 16; Vervoort, 1993a: 191; Altuna Prados, 1994: 54; Park, 1994: 202, table 1; Álvarez-Claudio & Anadón, 1995: 240; Bouillon et al., 1995: 70; Cornelius, 1995b: 74-76, fig. 17; Cornelius et al., 1995: 102, fig. 4.16; Hirohito, 1995: 199-200, fig. 65d. Peña Cantero, 1995: 393-396, pl. 49 figs a-d.

Sertularella cf. *polyzonias*; Camp & Ros, 1980: 202.

Sertularella polyzonias polyzonias; Millard, 1978: 198.

Sertularella polyzonias f. *typica*; Broch, 1914: 34; 1918: 101-102; Mathisen, 1928: 6, 20, 37; Kramp, 1938: 42, 63, 68, 73, 80; 1942: 22; Vervoort, 1942: 292; 1946b: 224, fig. 96; Kramp, 1947: 4; Vervoort, 1949: 149; Leloup, 1960: 223.

Material.— **Azores area**: Stn 5.053: detached colonies 70-90 mm high, all with gonothecae (RMNH-Coel. 26959, slide 2072). Agrees with current concept of *S. polyzonias*, both in mode of colony development as well as in shape of hydrothecae. Some of hydrothecae renovated. One of gonothecae with acrocyst outside, composed of mass of eggs in gelatinous ball attached inside gonothecae by means of prolongation of this envelope, questionably retractile; Stn 5.096: three fragments 14-16 mm; no gonothecae (RMNH-Coel. 27055, all in slide 2423). Hydrothecae small, slightly swollen, free part adcauline wall with indistinct undulations; no intrathecal cusps; Stn 5.165: c. 25 mm high colony on fragment of echinoderm test; no gonothecae (all in slide) (RMNH-Coel. 26958, slide 2074). With the mode of ramification characteristic of this species. Living specimen but completely covered by epizooids (Foraminifera), which give it a curious appearance. Hydrothecae of the normal type, some with renovation.

Madeira area: Stn 1.V37: four colonies 30-70 mm high, of which 2 with gonothecae (RMNH- Coel. 26946, slide 2060). Some of (basal) hydrothecae with free part adcauline wall longer than adnate part and indistinctly undulated; gonothecae elongated ovoid, with undulated walls, short neck with four blunt cusps and a large mass of developing spermatocytes; Stn 1.072: single colony 37 mm high; with gonothecae (made up in slide) (RMNH-Coel. 26947, slide 2061). Only remnants of hydranths present. Hydrothecae with weakly undulated free part of adcauline wall, about as long as fused part. Gonothecae elongate ovoid, with short neck, bearing 4-5 blunt cusps; contents mediocre; Stn 1.093: two fragments almost without ramification, colourless, with gonothecae (RMNH-Coel. 26869, slide 1968). Hydrothecae occasionally renovated, with free part adcauline wall of varied length, smooth, convex or slightly undulated, polyps present. Gonothecae elongated ovoid, with undulations only in distal part, no neck and four blunt cusps.

Canary Islands and Selvagens Archipelago: Stn 4.004: 3 stems 10-23 mm high on algae; with gonothecae (RMNH-Coel. 26948, slide 2062). Hydrothecae with free part of varied length, smooth to weakly undulated. Gonothecae with distinct neck bearing 4-5 blunt cusps; Stn 4.007: seven stems 25-40 mm high on polychaete tubes, no gonothecae (RMNH-Coel. 26949, slide 2063). Colonies sparingly branched. Conforms to the normal form of this species, with free part adcauline hydrothecal wall much shorter than adnate part and convex or indistinctly undulated; Stn 4.021: twelve colonies 6-40 mm high; single damaged gonotheca (RMNH-Coel. 26950, slide 2064). Stolon attached to small stones. Hydrothecae of the usual shape; gonothecae elongated ovoid, apical portion undulated, distinct neck with four cusps. Living colonies, hydranths present; Stn 4.023: colonies and fragments 20-26 mm high, usually detached, some on shell agglomerates (RMNH-Coel. 26951, two slide 2065). With many gonothecae. As *S. polyzonias*, but hydrothecae occasionally heavily cusped internally; number of cusps usually two or three, occasionally five, quite long, running fairly deep inside hydrotheca (fig. 13c-d). Occasionally renovations observed, including also teeth and opercular plates. Gonothecae not much different from type normally observed in *S. polyzonias*, with slightly wider neck and three or four heavy, blunt cusps; Stn 4.039: c. 40 mm long fragment without gonothecae (all in slide) (RMNH-Coel. 26952, slide 2066). Hydrothecae with rests of hydranths, older ones heavily covered by epiphytes, those with internal cusps, usually two (ad- and abcaudally), rounded, occasionally lengthened, becoming heavier in basal hydrothecae; Stn 4.140: single colony 55 mm high, with gonothecae (all in slide) (RMNH-Coel. 26953, slide 2068). Fully the usual *S. polyzonias*, no trace of internal cusps, gonothecae with distinct neck and four rounded cusps. Periderm fairly thin; Stn 4.144: three fragments c. 20 mm high probably belong here. Hydrocauli erect, with short hydrocladia. No gonothecae (RMNH-Coel. 27799); Stn 4.150: c. 60 mm long fragment of axis with gonothecae (all in slide) (RMNH-Coel. 26954, slide 2068). Hydrothecae shaped as usual; older hydrothecae heavily covered by epizooids and epiphytes. Gonothecae elongated ovoid, no neck, with two to four cusps around aperture, some of which may be greatly thickened; Stn 4.152: colony composed of 6 branched stems 35-75 mm high attached to small stones; with gonothecae (RMNH-Coel. 26955, slide 2069). Colony heavily covered by epiphytes, only upper hydranths living. Hydrotheca big, no trace of internal cusps; free portion of adcauline wall of hydrotheca usually longer than adnate part. Gonothecae without neck, with four

low cusps around aperture; gonophore inside with many eggs arranged in two longitudinal strings. In addition three c. 30 mm high, detached stems with gonothecae (RMNH-Coel. 27795); Stn 4.153: many up to 30 mm high stems on old gorgonid axes, mixed with *Sertularella gayi* (Lamouroux, 1821); gonothecae present (RMNH-Coel. 26956, slides 2070 (2) and 2404 (4) and RMNH-Coel. 27110, three slides 2481, fig. 13a-b). Also up to 30 mm high fragmentary colonies on corals, without gonothecae. Some of colonies with sterile colonies of *Eudendrium* spec., developing *Antennella secundaria* (Gmelin, 1791) and *Aglaophenia tubulifera* (Hincks, 1861). Some of the hydrothecae in slides 2070 and 2404 have distinct intrathecal cusps and agree with the cusped form of *S. polyzonias* figured by Medel et al. (1991). Shape of hydrothecae varied, some with fairly narrow apical portion and distinct concavity of distal third of abcauline margin as a result of which distal portion of hydrotheca is curved outward. Opercular plates renovated many times. Gonothecae on largest colony elongated ovoid and empty, undulations petering out proximally; three acute terminal cusps; Stn 4.158: various fragments on axes of Gorgonacea, c. 35 mm high and with gonothecae (RMNH-Coel. 27796).

Remarks.— This widely distributed species has been described repeatedly; we like to refer to descriptions by Ramil & Vervoort (1992: 225-227, figs 63a- b) and Ramil

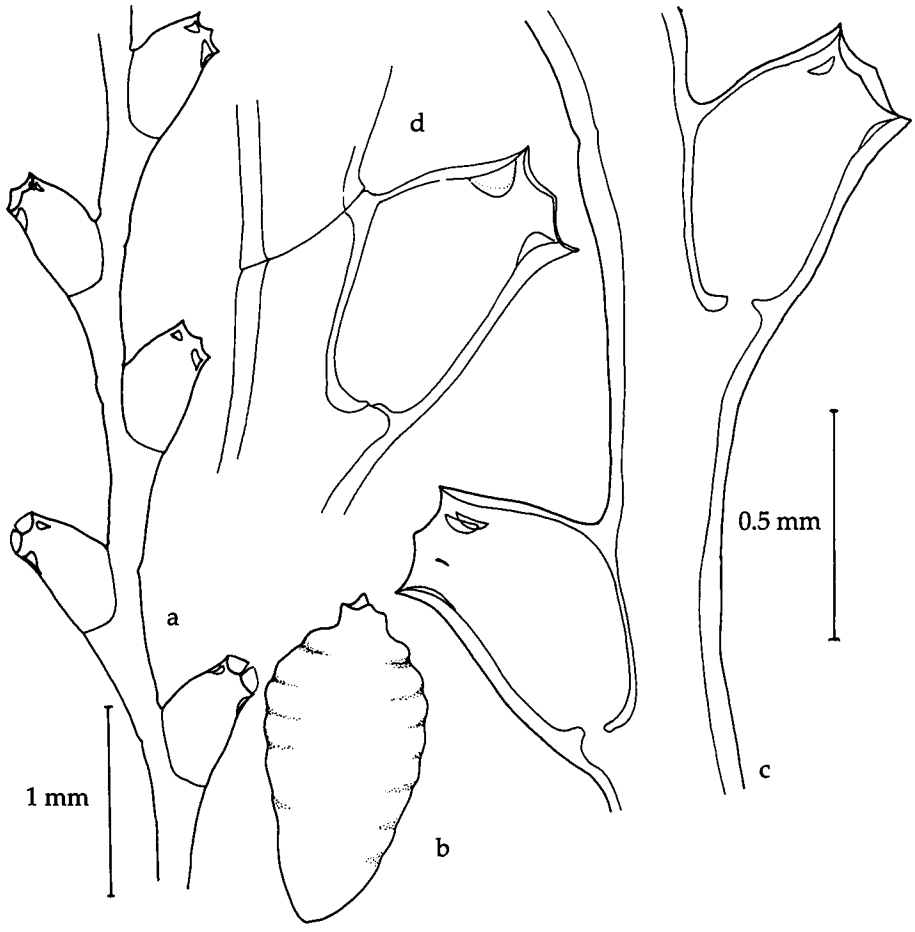

Fig. 13. *Sertularella polyzonias* (Linnaeus, 1758), specimens with intrathecal cusps; a-b, from CANCAP Stn 4.153 (slide 2481); c-d, from CANCAP Stn 4.021 (slide 2065); a-b, scale 1 mm; c-d, scale 0.5 mm.

et al. (1992: 500-503, figs 1b, 4-5) based on specimens from nearby areas with which our material generally agrees (for specimens with intrathecal cusps, see below).

We refrain from giving a scientific name to certain specimens in the above material showing quite haphazard occurrence of intrathecal teeth in otherwise 'normal' colonies. In all the material inspected the occurrence of intrathecal cusps is incidental, i.e. there are hydrotheca with and hydrothecae without intrathecal cusps. The degree of development and their number varied: usually there are three, rarely two or five. In some hydrothecae they are just indicated, in others they are distinctly visible, well developed and run comparatively deep down into the interior of the hydrotheca. As in the non-dentate colonies the development of the hydrothecal periderm is varied, being fairly thin (the usual condition) to quite thick (in exceptional cases). Colonies with such thick periderm can easily be confused with *Sertularella g. gayi* (Lamouroux, 1821), where intrathecal cusps apparently never occur. Well developed colonies of both species can usually be distinguished by their different appearance [see Ramil, Parapar & Vervoort, 1992, fig. 1a (*S. g. gayi*) and fig. 1b (*S. polyzonias*)]. Colonies with intrathecal cusps have previously been recorded by Naumov (1960: 337, localities not specified, probably Atlantic); Millard (1975: 299, localities not specified, Table Bay to Moçambique); García Corrales et al., (1981: 42, Mediterranean coast of Spain); Gili (1986: 126, Catalan coast of Spain and Majorca), and Medel, García & García Gómez (1991: 521, Strait of Gibraltar area).

Distribution.— *Sertularella polyzonias* is a cosmopolitan species, recorded from arctic regions, eastern and western Atlantic, the Mediterranean, and the Indian Ocean, occurring from shallow waters down to a depth of at least 454 m (Pictet & Bedot, 1900). Depth distribution of the CANCAP material is between 24 and 200 m.

Specimens of *Sertularella polyzonias* (Linnaeus, 1758) with intrathecal cusps were found at the stations 4.023, 4.039 and 4.153, all from the region of the Canary Islands and the Selvagens Archipelago; Atlantic specimens of dentate *S. polyzonias* so far have only been recorded by Naumov (1960, see above).

Sertularella unituba Calder, 1991
(figs 14-19)

Sertularia exigua Allman, 1888: 55 (= *Sertularia laxa* in the explanation of plate 26).
Sertularia laxa Allman, 1888, pl. 26 figs 2, 2a (= *Sertularia exigua* Allman, 1888); Pictet & Bedot, 1900: 22-23 [not *Sertularia laxa* Lamarck, 1816: 116 = *Thyroscyphus fruticosus* (Esper, 1793)].
Sertularella gayi unituba Calder, 1991a: 103-104, fig. 54; Vervoort, 1993a: 190.

Material.— **Cape Verde Islands**: Stn 6.069: seven detached colonies up to 105 mm high, some strongly polysiphonic (RMNH-Coel. 27058, three slides 2426, fig.14c). Ramification irregular, though in some with pinnate tendencies. Hydrothecae large, free part adcauline wall considerable, development of ribs on that part varied, sometimes scarcely present, in other hydrothecae considerable but petering out ventrally; many renovations (fig. 15c). Gonothecae with 3-4 apical cusps and with transversely ribbed distal half. Agrees with colonies from Stns 6.072 and 6.076, but here polysiphony and branching agree with *S. gayi robusta* and not *S. polyzonias*; polysiphonic occasionally considerable. Nearly all hydrothecae with considerable concavity of distal part abcauline wall and as a result outward curved distal portion, undistinguishable from type material of *Sertularia laxa* (= *S. exigua*), vide infra. With *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Filellum serpens* (Hassall, 1848); Stn 6.071: 15 colonies 35-110 mm high, of which 3 attached to concretions of stones and calcareous material, the rest

detached (RMNH-Coel. 27051, slides 2417 (3) and 2427 (2). Agrees with material from Stns 6.072 and 6.076 in showing similarity with *S. polyzonias*; colonies lax, some weakly polysiphonic basally. Some hydrothecae with indistinct undulation of free part adcauline wall (fig. 15b, d-e). Gonothecae elongated, ribbed on distal half, with 3-5 rounded to acute cusps around aperture. With some hydrothecae of *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Clytia paulensis* (Vanhöffen, 1910) (in slides 2427). One of slides 2427 indistinguishable from *Sertularia laxa* (= *S. exigua*); Stn 6.072: various colonies up to 95 mm high on bivalve shells, corals and calcareous polychaete tubes on shell of *Turrirella* spec. (RMNH-Coel. 26857, slides 1956 (1), 2418 (1) and 2419 (2); also some fragments. Colonies lightly polysiphonic basally, degree of polysiphony varied. Some colonies more or less pinnately built, others irregular. Hydrothecae with conspicuous free portion of adcauline wall. Ribs scarcely visible. Many gonothecae present of which a fair number with acrocyst. Gonotheca more or less transversely ribbed over whole surface, most strongly so in distal third. There are 3 or 4 apical cusps, that in some gonothecae are better developed than in others. With some hydrothecae of *Modeeria rotunda* (Quoy & Gaimard, 1827). Material in slide 2418 indistinguishable from *Sertularia laxa* (= *S. exigua*); Stn 6.074: seven colonies on stones 20-66 mm high, basally polysiphonic; ramification irregular (RMNH-Coel. 27059, slide 2428). Hydrothecae with concavity in apical third of abcauline wall, consequently apical portion narrowed and curved outward, as in the type material of *Sertularia laxa* (= *S. exigua*). Single gonotheca with 4 apical cusps present. Hydrocaulus totally covered by *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Filellum serpens* (Hassall, 1848); Stn 6.076: c. twelve colonies up to 60 mm high and with gonothecae, on bivalve shells and corals, agreeing with specimens from Stn 6.072 (RMNH-Coel. 27060, slide 2429). In pattern of ramification and gonothecal cusps much like *S. polyzonias*. Hydrothecae with considerable portion of adcauline hydrothecal wall free and with weakly indicated ribs on that side. Many gonothecae. Some of hydrothecae on slide 2429 with outwardly directed apical portion. With *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Filellum serpens* (Hassall, 1848); Stn 6.078: two colonies 30 and 35 mm high on stone (made up in slide) (RMNH-Coel. 27061, two slides 2430). Hydrothecae with free part adcauline hydrothecal wall of considerable length, in some hydrothecae with shallow undulations. Length of free part diminishes along length of colony; some hydrothecae with outward curved apical portion. Two ribbed gonothecae present with 4 small apical cusps. Hydrocladial internodes thin and lengthened. In addition three colonies 30-50 mm high on shells and stones. Gonothecae with three apical cusps. With many hydrothecae of *Modeeria rotunda* (Quoy & Gaimard, 1827); Stn 6.080: The first batch comprises four colonies 13-30 mm high, monosiphonic and irregularly branched. Hydrothecae with considerable part of adcauline wall free and weak undulations at that part of the hydrothecal wall. No gonothecae. In addition fragmented hydrocauli up to 45 mm high on shells of Prosobranchia, Scaphopoda and several developing colonies 4-24 mm high on *Dentalium*-shell. Hydrothecae large and slender, with scarcely visible annulations or ribs and the aperture narrow. Gonothecae are present, with four small and well separated distal cusps. Second batch 38-55 mm high, largely monosiphonic colonies and fragments. Some fragments have the hydrothecae elongate, annulation visible, broad. Internodes long and slender. Gonothecae with up to 5 cusps. Some colonies have the base of stem polysiphonic and the internodes short. Hydrothecae also short, ribs visible. Ramification of hydrocaulus irregular; gonothecae with 3 apical cusps (RMNH-Coel. 27053, three slides 2421 (one composite!) (fig. 15a) and RMNH-Coel. 26862, slide 1961, figs 14b, 16); Stn 6.135: two polysiphonic colonies 100 mm high; ramification more or less in one plane (RMNH-Coel. 27063, two slides 2432). Hydrothecae long and slender, with more pronounced neck than is usually observed in *S. unituba*; hydrothecal ribs indistinct. Gonothecae with 3 apical cusps. One of colonies with dense cover of *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Filellum serpens* (Hassall, 1848). Material mostly dead and heavily incrusted; Stn 6.148: five colonies 10-40 mm high on shell of *Xenophora* sp. (RMNH-Coel. 27065, slide 2434) Agrees with material from Stn 6.135; colonies young, without gonothecae. Ramification in one plane and tending to be pinnate. Adcauline hydrothecal wall with distinct undulations; Stn 6.174: three small colonies 30 mm high on shell of *Xenophora* sp. and some detached fragments (RMNH-Coel. 27066, slide 2435). Ramification irregular. Hydrothecae not so strongly elongated, small. Annulation of hydrothecal wall visible. No gonothecae; Stn 7.058: two colonies 40 and 50 mm high (RMNH-Coel. 27067, two slides 2436). Hydrocaulus polysiphonic at its base and irregularly branched. Gonothecae strongly ribbed in apical half, with 3 or 4 sharp apical cusps.

Hydrothecae elongate; ribs visible but not strongly marked; aperture narrow. Also smaller colony, 35 mm and some fragments. With *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Filellum serpens* (Hassall, 1848); Stn 7.059: several colonies up to 80 mm high on stones and shells and some fragments (RMNH-Coel. 27068, slide 2437). Largest colony detached. Ramification more or less pinnate but irregularly so; hydrothecae fairly large. Hydrothecae distinctly ribbed. Gonothecae with 2 or 3 apical cusps. With *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Filellum serpens* (Hassall, 1848); Stn 7.081: small, scarcely branched colonies up to 15 mm high on Bryozoa (RMNH-Coel. 27069, slide 2438). Hydrothecae resembling those of material from Stn 7.126. Axis monosiphonic; no gonothecae. Collected alive; some of hydranths in slide partly expanded. With *Modeeria rotunda* (Quoy & Gaimard, 1827) and *Filellum serpens* (Hassall, 1848); Stn 7.126: two detached colonies 25 and 70 mm high (RMNH-Coel. 27070, slide 2439). Base of stem polysiphonic; ramification pinnate. Hydrothecae elongate, slender, occasionally with well marked annulations. Gonothecae with 3 small, closely packed cusps. Slide of top 30 mm of larger colony; Stn 7.140: single detached, strongly polysiphonic and much branched colony 90 mm high (RMNH-Coel. 26863, slide 1962 and RMNH-Coel. 27071, two slides 2440). Hydrothecae large and slender, with only small part of adcauline hydrothecal wall adnate. Ribs visible at adcauline hydrothecal wall. Gonothecae large and slender, strongly ribbed, with 3 or 4 small apical cusps (fig. 14d).

Description.— Colonies usually with distinct, mono- or polysiphonic axis; colonies with monosiphonic or weakly polysiphonic axis lax, unable to support themselves outside fluid; polysiphonic colonies, with exception of branches, erect, stiff (fig. 14a, c). Branching irregular and in all directions, branches of second and third order usually present in well developed colonies. In young colonies the branching is more or less in one plane. Axis and branches divided into internodes separated by oblique nodes alternately sloping towards left or right sides. Each internode with apical hydrotheca; succeeding hydrothecae alternately turned left or right and in same plane.

Hydrotheca adnate for less than half length of adcauline wall; free part adcauline wall straight or nearly so, with scarcely noticeable to quite distinct undulations, in which case continuing downward on hydrothecal wall, usually petering out towards abcauline wall. There is no axillary pocket of the shape observed in *S. gayi gayi*. Basal third of abcauline wall of hydrotheca imperceptibly swollen, then continuing as well marked concavity that may be slightly thickened and curving outward again towards hydrothecal rim, giving hydrotheca a characteristic 'neck', enhanced by slightly everted condition of hydrothecal rim. Rim with four distinct cusps separated by rounded embayments; renovations are common. Intrathecal cusps occasionally observed, small, numbering three. Operculum four-flapped, the triangular plates are attached in the embayments between the marginal cusps. Many hydrothecae with opercular apparatus in undamaged condition; hydrothecae with renovated opercular apparatus common. Length of free portion of hydrotheca as well as diameter varied; some of hydrothecae with distinct 'neck' may be quite swollen, particularly after renovation of the hydrotheca as a result of damage (figs 14b, 15-16).

Gonothecae inserting on internode directly under hydrotheca, elongated ovoid, distal half with concentric transverse undulations or well developed ribs, usually disappearing on proximal half. Faint constriction present just under margin. There are two types of gonothecae, one with fairly wide opening, the other with a narrow opening; the difference probably being sexual. Aperture surrounded by three to five cusps of varied height; the number of two has also been observed but seems to be excep-

tional. Basal portion of gonotheca narrowed with quite short laterally curved pedicel (fig. 14d).

S. unituba	*S. gayi gayi*	*S. gayi robusta*
Colony: polysiphonic, ramification irregular, in same plane or not, second and third order of ramification present. Distinct axis formed by polysiphony.	Colony: polysiphonic, with ramifications more or less in one plane; first and second order of ramification present. Axis usually distinct.	Colony: strongly polysiphonic, ramification exceptionally regular, usually in more than one plane, with branches of first and second order. Main axis distinct.
Hydrotheca: less than half of adcauline wall adnate; abcauline wall with distinct concavity, starting at c. basal third, defining a distinct 'neck'; rim slightly everted and usually renovated. Lateral walls of hydrotheca distinctly ribbed to almost smooth. Hydrothecae not necessarily in one plane.	Hydrothecae: c. half adcauline wall adnate; concavity at abcauline side much less distinct, starting at distal third of wall. Free part adcauline wall may be slightly wrinkled but lateral hydrothecal wall usually smooth. Hydrotheca usually in one plane.	Hydrotheca: large, with less than half adcauline wall adnate; free part hydrotheca usually considerable, with minimal adcauline swelling. Annulation of hydrothecal wall distinct. Hydrothecae usually in one plane.
Gonotheca: distinctly ribbed in distal half to distal two-thirds; elongated ovoid, abundant. Neck wide to narrow, with 3 to 5 cusps.	Gonotheca: broadly ovoid, with shallow ribs on distal third, aperture with two 'lips'. Sparingly distributed over colony.	Gonotheca: as in *S. gayi gayi*, but larger, with 3 broad cusps; present in small numbers.

Variability.— The variability in the material referred to *Sertularella unituba* here is considerable. There is variation in shape of the colony and in shape of the hydro- and gonothecae.

The shape of the colony in well developed colonies is intermediate between the quite lax normal growth habit of *Sertularella polyzonias* and the more rigid, polysiphonic colony of *Sertularella gayi gayi*. In *S. unituba* well grown colonies are lax, particularly the monosiphonic colonies, with long and flexuous branches; a tendency towards a more pinnate growth type is occasionally observed.

In the hydrothecae the length of the free portion of the adcauline wall is practically always superior to that of the adnate part; it is straight to slightly convex, smooth to distinctly ribbed, the ribs invariably petering out towards the abcauline wall. The abcauline wall is usually convex in its basal two-thirds and concave in the distal third, combined with the (usually) slightly everted marginal cusps this gives the

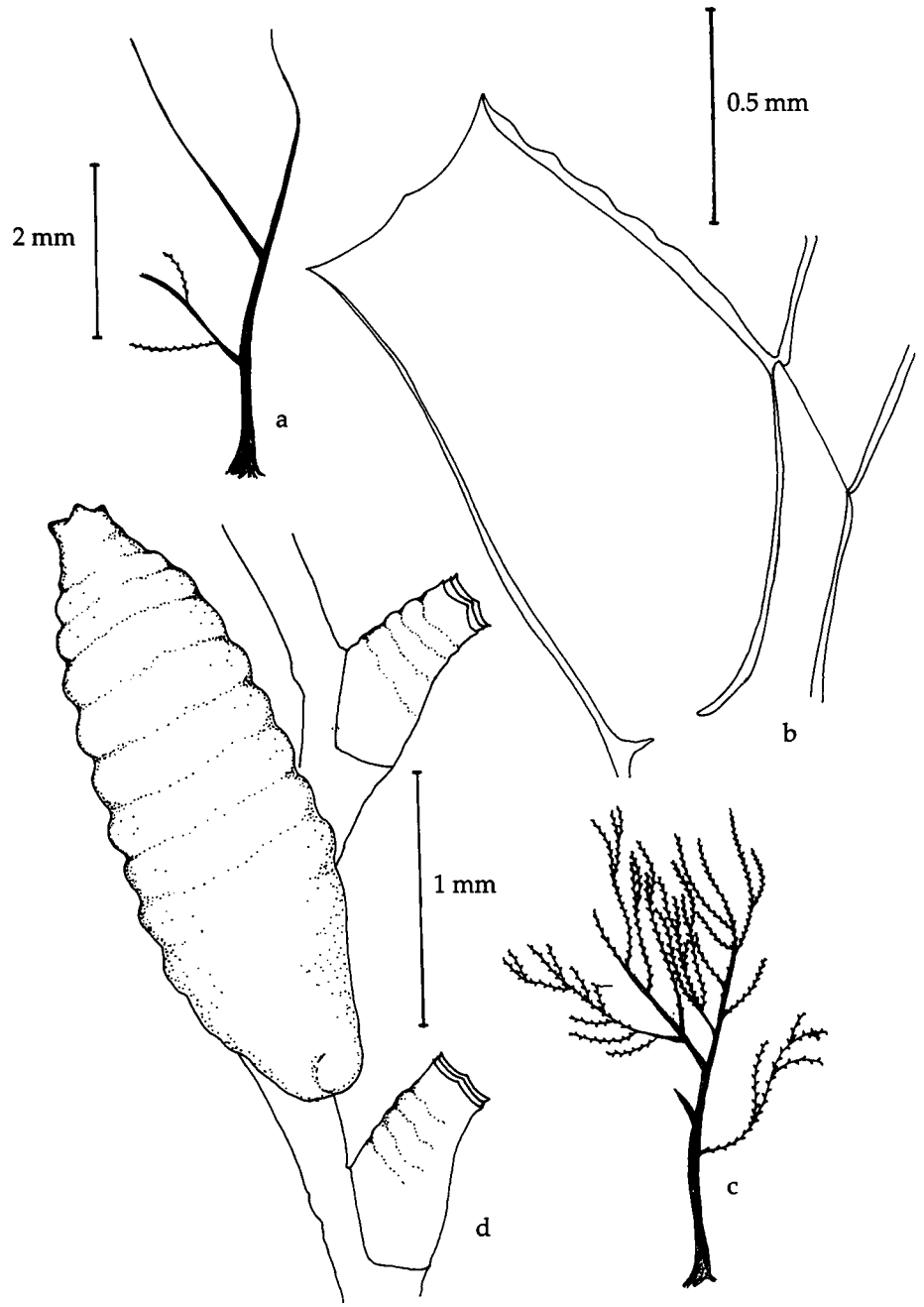

Fig. 14. *Sertularella unituba* Calder, 1991; a, whole colony from CANCAP Stn 6.080; b, hydrotheca from same station (slide 1961); c, whole colony from CANCAP Stn 6.069; d, part of hydrocladium with hydrothecae and a gonotheca; a, c, scale 2 mm; b, scale 0.5 mm; d, scale 1 mm.

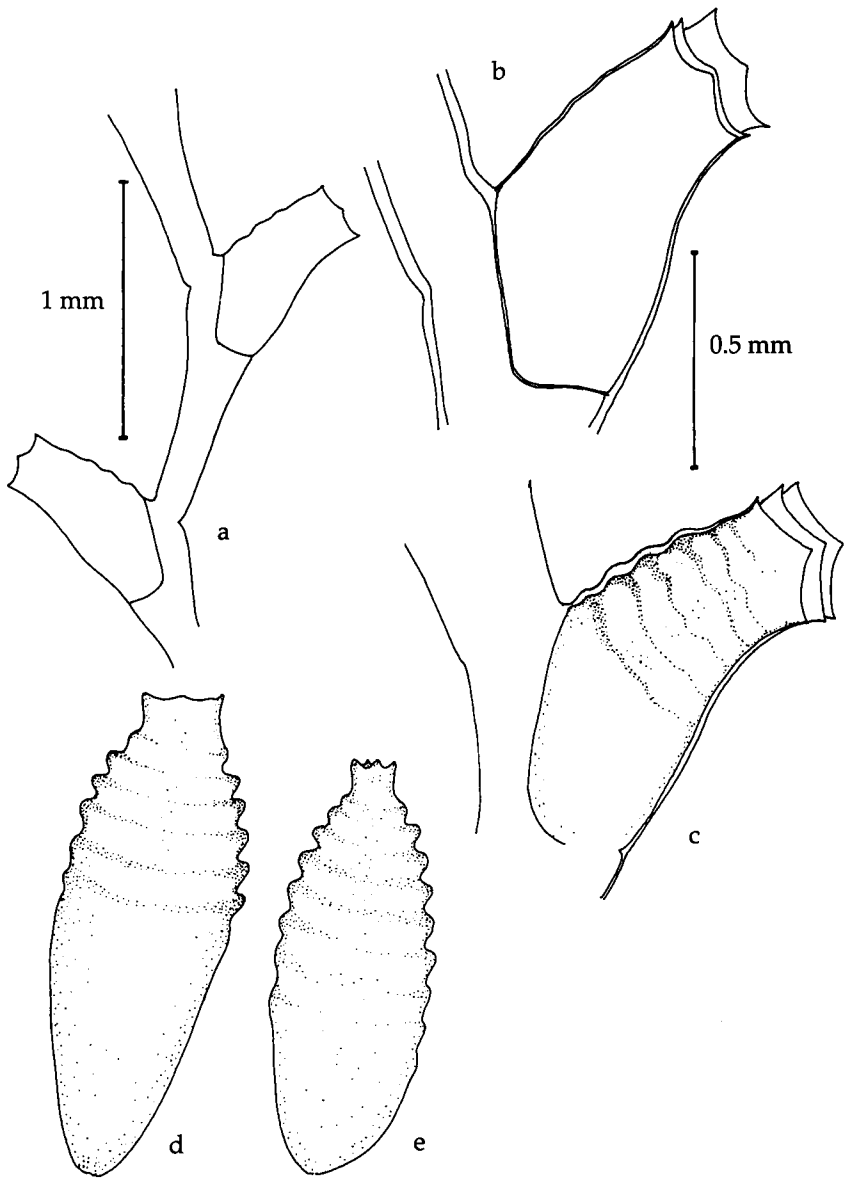

Fig. 15. *Sertularella unituba* Calder, 1991; a, part of hydrocladium from CANCAP Stn 6.080 (slide 2421); b, hydrotheca from CANCAP Stn 6.071 (slide 2427); c, hydrotheca from CANCAP Stn 6.069 (slide 2426); d-e, gonothecae from CANCAP Stn 6.071 (d, slide 2417; e, slide 2427); a, scale 1 mm; b-e, scale 0.5 mm.

hydrotheca an outwardly pointing 'neck'. The concave part of the abcauline wall may be slightly thickened and small internal cusps have occasionally been observed, three cusps being the maximum. Some colonies have all hydrothecae with distinct 'neck', in others the occurrence of a 'neck' is restricted to repaired or renovated hydrothecae.

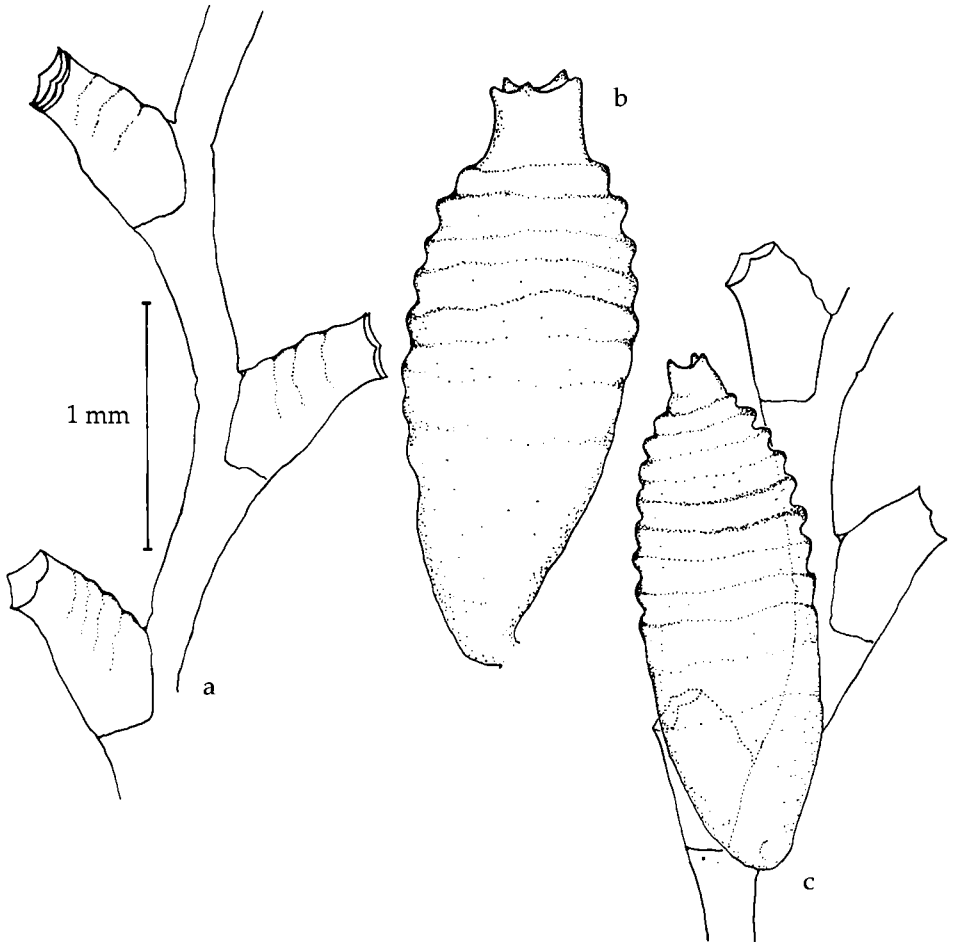

Fig. 16. *Sertularella unituba* Calder, 1991, from CANCAP Stn 6.080 (slide 1961); a, part of hydrocladium; b, gonotheca; c, part of hydrocladium with hydrothecae and a gonotheca; a-c, scale 1 mm.

Renovations of the hydrothecal margin are common, as is the renovation, several times, of the opercular apparatus.

The gonothecae, generally elongated ovoid, greatly vary in total length, as a result some colonies have slender, others fairly bulky gonothecae. The development of the undulations or ribs also varies, but smooth gonothecae have not been observed. The number of apical cusps varies between 3 and 5, with 2 teeth being exceptional. These are found either on a fairly wide neck or on a narrow neck and are obtuse or sharply pointed. Gonothecae with a wide neck have occasionally been observed to have an acrocyst and have been considered female; the males are supposed to have a narrow neck.

Some colonies were captured in living condition and have a (partly contracted) hydranth with a distinct abcauline caecum; many colonies were dead and are heavily covered by algae and/or epizooids.

Remarks.— We have been able to inspect the holotype and some additional material of *Sertularella gayi unituba* Calder, 1991, kindly placed at our disposal by Dr Dale Calder, Royal Ontario Museum, Toronto, Canada. The holotype is a c. 35 mm high colony (probably a branch or a top part, in two pieces), alcohol preserved, with one attached gonotheca (and a second gonotheca in a small vial), bearing the following labelling: *Sertularella gayi unituba* new subspecies, holotype, Cat. ROMIZ B249, Invertebrate Zoology. Bermuda, 2 km S.E. of Castle Rock, dredge, coarse sand and coral rubble, -50 to -80 m. 27 August 1979. Coll. J. Markham; Ident. D.R. Calder. Acc. # 1990- 076. This material is in good agreement with the above description of the CANCAP specimens (fig. 17). The axis is monosiphonic over its whole length and near the end has one side branch with axillary hydrotheca. Division into internodes is indistinct but visible from the perisarcal constrictions. The hydrothecae vary a great deal in exact shape but are all sac-shaped, widening basally and fused for slightly more than half the length of the adcauline hydrothecal wall; apical portion more or less curved away from the internode. Abcauline wall straight to concave or curved; free part adcauline wall straight to weakly convex. Apical part of hydrotheca with indistinctly marked ribs, gradually petering on the hydrothecal basal part, giving rise to more or less distinctly visible undulations of the free adcauline wall and the distal part of the abcauline wall; degree of undulation different in all hydrothecae of the holotype. The basal part of the fused adcauline wall curves fairly suddenly and may show a minor thickening at the point of curvature; the hole in the hydrothecal bottom is poorly visible. Hydrothecal rim distinctly four-cusped, the cusps being acute though not deep. Renovations of the hydrothecal rim are common; as many as four may occur. Operculum composed of four hyaline, triangular opercular flaps, present on majority of hydrothecae, but occasionally folded inwards. Perisarc thick on hydrothecal walls, thinning out near hydrothecal rim. There are no well preserved hydranths, though tissue rests are distinctly present. Of the two gonothecae inspected one is in good condition, ovoid, slightly compressed on one side because of pressure of internode, with a short, curved pedicel. Top part narrowed and slightly lengthened, with three blunt, low cusps. Gonothecal surface with six or seven rounded ribs, gradually becoming shallow towards basal third. Interior of gonotheca with knob-shaped mass of tissue; the sex of the gonothecae could not be determined.

Measurements of holotype (in μm)

Internode, length	1195 - 1520
idem, diameter at node	175 - 215
Hydrotheca, length free part adcau line wall*	430 - 435
idem, length fused part	475 - 520
idem, length abcauline wall*	520 - 650
idem, total depth*	695 - 775
idem, diameter at rim	260 - 280
Gonotheca, maximum diameter	800 - 825
idem, length	1520 - 1630
idem, diameter at rim	215 - 220

[* = including renovations]

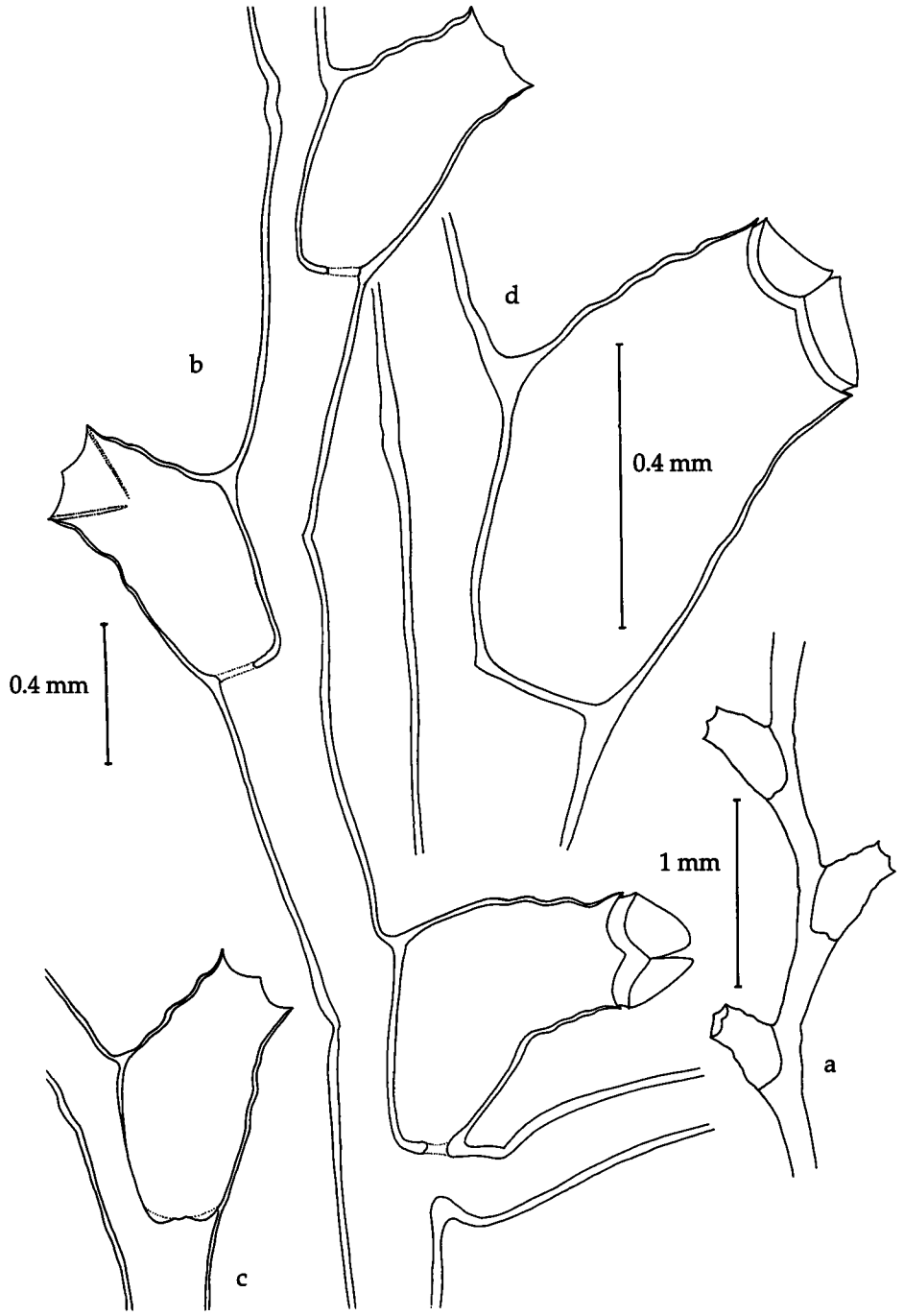

Fig. 17. *Sertularella unituba* Calder [holotype of *Sertularella gayi unituba* Calder, 1991 (ROMIZ B249)]; a, hydrocladium; b, part of stem; c-d, hydrocladial hydrothecae; a, scale 1 mm; b-c, scale 0.4 mm; d, scale 0.4 mm.

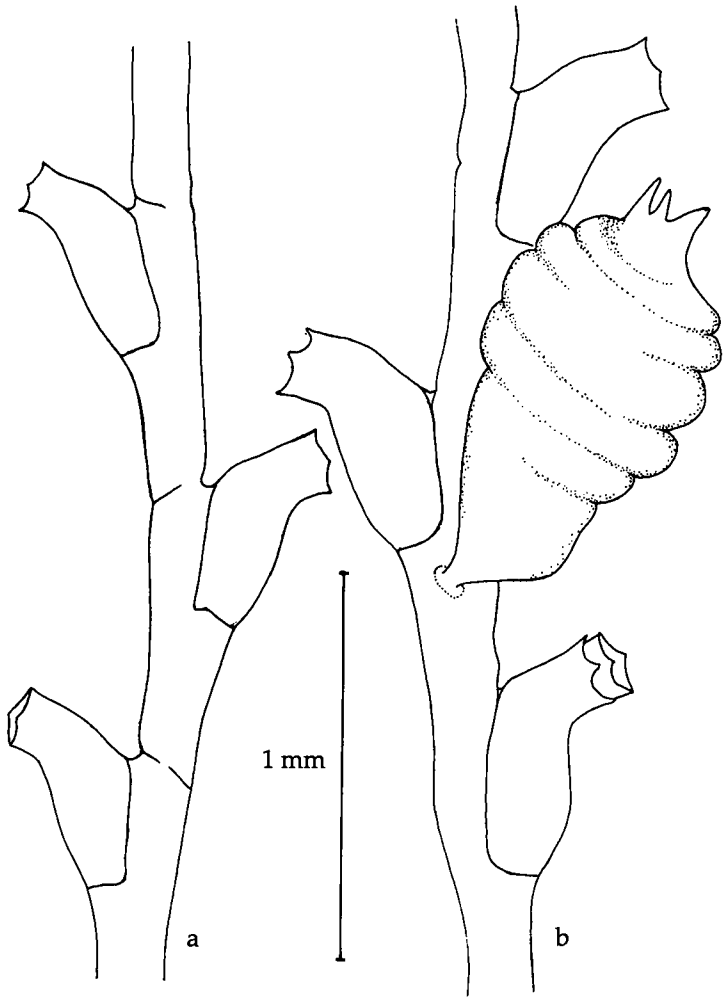

Fig. 18. *Sertularella unituba* Calder (holotype of *Sertularia exigua* = *S. laxa* Allman, 1888, BMNH 1888.11.13.100, Challenger Stn 75); a, part of hydrocladium from Allman's original (but remade) slide of material treated with KOH and stained with Ehrlich's haematoxylin; b, part of hydrocladium with hydrothecae and a gonotheca in slide made from alcohol preserved syntypes.

The additional material referred to above consists of a well developed colony 50 x 55 mm of which the main axis is polysiphonic at the base, and a number of colony fragments, all without gonothecae, from the Atlantic Ocean 2 km south of Castle Rock, Bermuda, on crab pot line, 274 m depth, 04.iv.1992, collected and identified by Dr D.R. Calder. This material is now in NNM under RMNH-Coel. 27138, two slides 2586). It agrees with the holotype and will not be described here.

The holotype of Allman's *Sertularia exigua* (= *Sertularia laxa* in the explanation of pl. 26 figs 2, 2a) turned up in the collections of the Natural History Museum [British Museum (Natural History)], London, and thanks to the help of Dr P.F.S. Cornelius and Ms Ann Morgan we have been able to inspect it. The label received with the type

material reads: "*Sertularia laxa* Allman, 1888.11.13.100, Challenger coll., Loc. Stn 75, near the Azores, 38°38'N, 28°28'30"W, 450 fms." and bears the following note: "Identity of this specimen was lost during 1939-45 war. Damp in caves caused label to blacken obliterating all writing. Specimen re-identified by E. W(hite) during March 1958". The type material consists of syntype colonies and a slide which is part of the syntype series.

The syntype material is composed of a fairly large number of colonies attached to two separate worm tubes by means of a creeping stolon; the majority being monosiphonic, some colonies are polysiphonic. There is a third batch of detached specimens of about the same height but quite irregularly ramified. All colonies richly bear (empty) gonothecae. Two detached fragments have been stained with Mayer's haemalum and mounted in Malinol (RMHN Coel. 27140, slide 2858).

The syntype slide is a restored slide with a mounted and stained specimen, the label indicates that as was previously treated in KOH and stained with Ehrlich's haematoxylin; it bears the same number. It contains a monosiphonic c. 25 mm long, curved colony springing from a fragment of stolon and with a ramification c. 10 mm downwards from the top; this branch has a secondary ramification (figs 18a, 19).

The syntype material on the slide is characterized by fairly strong contraction of the apical portion of the hydrothecae, at the same time this portion is decidedly curved outwards; this detail is also visible in Allman's illustration (1888, pl. 26 fig. 2a). A similar hydrothecal condition has repeatedly been observed in the CANCAP material, being usually restricted to a number of hydrothecae of a colony, though occasionally colonies where all hydrothecae have this condition are also met with. In the slide the internodes are only visible by, occasionally quite indistinct, contractions of the perisarc; the apical region of the hydrothecae, possibly as a result of the treatment with KOH, is thin; no opercular plates could be observed. Some of the hydrothecae appear to have renovated distal portions. No gonothecae are present in Allman's slide, though some occur in the additional slides of the type series.

Measurements (in μm):	Syntype slide NHM 88.11.13.100	slide made from syntype slide 2858
Internode, length	975 - 1300	975 - 1085
idem, diameter at node	185 - 215	130 - 175
Hydrotheca, length free part adcauline wall*	370 - 410	390 - 435
idem, length fused part	410 - 455	455 - 475
idem, length abcauline wall*	475 - 605	560 - 570
idem, total depth*	605 - 715	695 - 715
idem, diameter at rim	175 - 215	175 - 215
Gonotheca, maximum diameter		975 - 1040
idem, length		1520 - 1800
idem, diameter at rim		175 - 195
[* = including renovations]		

The newly made slide reveals that the colonies are quite dirty and are covered by many sedentary Foraminifera, that obscure the exact structure of the hydrothecae.

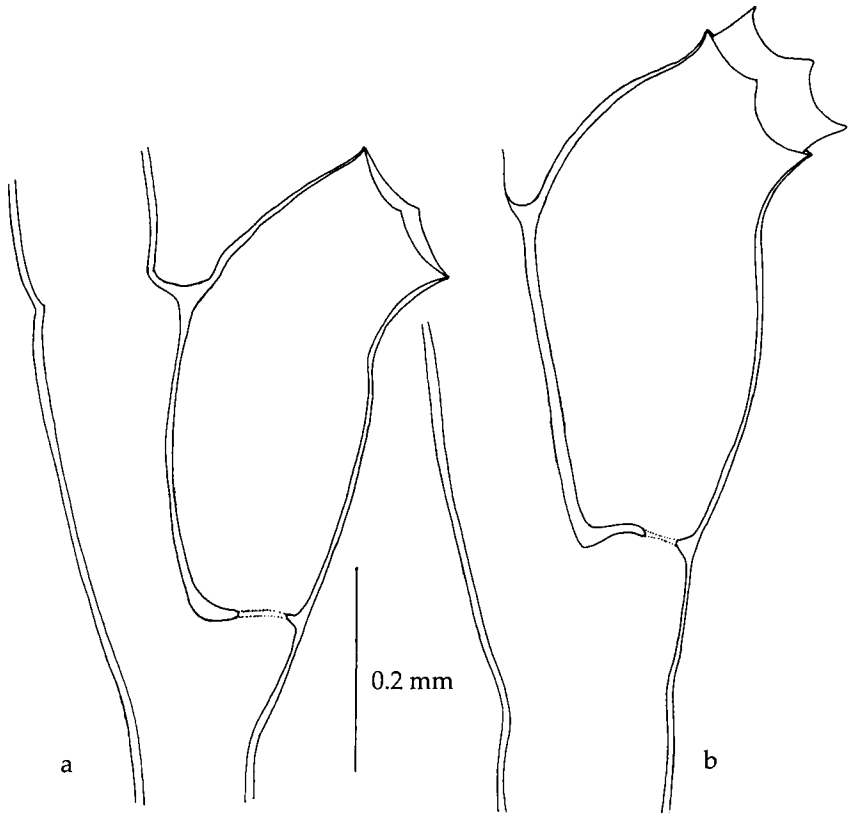

Fig. 19. *Sertularella unituba* Calder (holotype of *Sertularia exigua* = *S. laxa* Allman, 1888, BMNH 1888.11.13.100, Challenger Stn 75); a-b, hydrothecae in Almman's original (but remade) slide of material treated with KOH and stained with Ehrlich's haematoxylin.

This is probably the reason why Allman's slide was treated with KOH. The freshly made slide shows strongly deformed hydrothecae with a much contracted and in some instances twisted distal portion of the hydrothecae (fig. 18b). There are many renovations, though usually restricted to two or three for each hydrotheca. Some hydrothecae still have the triangular opercular plates. The gonothecae are smaller than those observed in the CANCAP material, probably because they are not quite full-grown. No living tissue has been observed.

Distribution.— Allman's material of *Sertularia exigua* (= *Sertularia laxa*) originates from the Azores region, 38°38.0'N-28°28'30"W, depth 450 fms (823 m). Calder's *Sertularella gayi unituba* was obtained at various localities in Bermudan waters, 50-80 m depth. All the present material is from the Cape Verde area, occurring at many localities at intermediate depths, 61-250 m, but probably going much deeper (930 m, Stn 7.126).

Sertularella spec.

Material.— **Madeira area**: Stn 1.118: single damaged fragment 12 mm long; no gonothecae (RMNH Coel. 27801).

Canary Islands and Selvagens Archipelago: Stn 4.144: small fragments, c. 5 mm high. Axis geniculate; hydrothecae with distinct neck; walls almost straight, less than half of adcauline wall adnate. Whole of wall of hydrotheca with transverse ribs; no intrathecal cusps. No gonothecae (RMNH-Coel. 27805).

Cape Verde Islands: Stn 7.044: several 15 mm high colonies on calcareous concretions; no gonothecae. Hydrothecae fairly strongly curved and with many renovations. No intrathecal cusps. Internodes in straight line; not geniculate (RMNH-Coel. 27802).

Remarks.— The condition of the above colonies does not permit specific identification.

Genus *Sertularia* Linnaeus, 1758

Sertularia distans Lamouroux, 1816
(Figs 6c, 20a-b)

Dynamena distans Lamouroux, 1816: 180, pl. 5 fig. 1a, B.

Sertularia distans; Broch, 1913: 11; Stechow, 1913a: 144; 1913b: 13, 147, fig. 125; Broch, 1914: 34; Jäderholm, 1916-1917: 14; Jäderholm, 1919a: 14, pl. 3 fig. 7; Stechow, 1919: 94, fig. K[1]; Stechow, 1923d: 203; Billard, 1925c: 197-202, fig. 1; Leloup, 1938: 17; Vervoort, 1946a: 318; Leloup, 1947: 30; Picard, 1950: 192; Rossi, 1950: 20, fig. 10a; Teissier, 1950b: 20; Picard, 1951a: 112; 1951b: 261; Dawydoff, 1952: 56; Picard, 1952a: 348, 349; 1952b: 220; Yamada, 1955; 3, pl. 1 fig. 3; Picard, 1958a: 193; Yamada, 1959: 69; Cabioch, 1961: 20, 26; Rees & Thursfield, 1965: 140, 200; Teissier, 1965: 25; Redier, 1966b: 84; Rees & White, 1966: 278; Cabioch, 1968: 556; Vervoort, 1968: 106; Robins, 1969: 333; Gravier, 1970: 116, figs 13B, 14A; Rossi, 1971: 34; Gravier-Bonnet, 1972: 4, 5; Mayal, 1973: 29, figs 10-15; Day, 1974: 86; Millard & Bouillon, 1974: 8; Millard, 1975: 306, fig. 99E-H; Millard & Bouillon, 1975: 2; Cabioch et al., 1977: 123; Evans, 1978: 85; Millard, 1978: 198; Cornelius, 1979: 296, fig. 26; García Corrales et al., 1980: 49, fig. 17; Rho & Park, 1980: 24, pl. 5 figs 8-9, pl. 6 figs 1-2; Boero, 1981a: 182; García-Carrascosa, 1981: 201-204, pl. 13 figs c-l, pl. 34 fig. a; Mayal, 1981d: 231; Altuna et al., 1983: 134; Calder, 1983: 12-15, fig. 5; Hirohito, 1983: 48-49; Mayal, 1983: 6, 7, figs 4-6.11; Bouillon, 1984: 106; McCain, 1984: 99; Gili, 1986: 120-121, fig. 4.26D; Isasi & Saiz, 1986: 70; Parapar Vegas, 1986: 137-146, pls 29-30; Aguirrezabalaga et al., 1987: 114; García-Carrascosa et al., 1987: 369; García Rubies, 1987: 148, 151; Llobel i Nadal, 1987: 172-173, fig. 54; Cornelius, 1988: 76; Altuna & García Carrascosa, 1990: 81, fig. 58; Calder, 1990: 446, 448; Cornelius & Ryland, 1990: 148, fig. 4.20; Izquierdo et al., 1990: 41-42, fig. 8; Medel Soteras et al., 1991: 512-514, fig. 4; Llobet et al., 1991: 153 et seq.; Ramil & Vervoort, 1992: 227-228, fig. 63c; Vervoort, 1993a: 193; Altuna Prados, 1994: 54; Hirohito, 1995: 207-209, fig. 68a-i; Peña Cantero, 1995: 399-404, pl. 50 figs a-e.

Sertularia distans distans; Day et al., 1970: 15.

Sertularia distans ? Buchanan, 1957: 350.

Sertularia distans var. *gracilis*; Billard, 1912: 465; Prenant & Teissier, 1924: 26; Billard, 1925b: 175, fig. 33; 1925c: 200; 1927b: 339; Teissier, 1930: 185; Billard, 1931d: 676; 1933; 21, fig. 4; Dollfuss, 1933: 127; Leloup, 1935: 47, figs 28-29; Philbert, 1935c: 27; 1935d: 32; Leloup, 1937a: 105, 117, fig. 8; 1940: 19; Vervoort, 1949: 154, fig. 4a-b; Millard, 1957: 221, fig. 12; 1958: 193; Yamada, 1959: 70; Mammen, 1965: 44, fig. 75; Rees & Thursfield, 1965: 146; Van Gemerden-Hoogeveen, 1965: 36; Baker, 1967: 40; Berrisford, 1969: 394; Schmidt, 1972a: 42; Rees & White, 1966: 278; Pennycuik, 1959: 197; Millard, 1964: 49; 1966: 492; 1968: 254, 272; 1975: 272; Cooke, 1977: 97, fig. 23.

Sertularia distans var. *gracilis* f. *peculiaris* Leloup, 1935: 47.
not *Sertularia distans* Lamouroux, 1816: 191.
not *Sertularia distans* Allman, 1877: 25, pl. 16 figs 9-10 [= *Dynamena disticha* (Bosc, 1802)].
Dynamena distans; Stechow, 1923b: 12; Teissier, 1950a: 4-5.
Tridentata distans; Hirohito, 1969: 23, fig. 16; Calder, 1991a: 105-107, fig. 55; 1991b: 223; 1991c: 2068 et seq.; Cornelius, 1992a: 255, 257; 1992b: 79 et seq.; 1995b: 108-111, fig. 27; Cornelius & Ryland, 1995: 104, fig. 4.17.
Sertularia lamourousii Deshayes & Milne-Edwards, 1836: 153.
Sertularia lamourouxi; Bedot, 1910: 371.
Tridentata lamourouxi; Stechow, 1922: 149.
Sertularia gracilis Hassall, 1848: 2223; Neppi, 1921: 8, fig. 2; Horsman, 1922: 260; Nobre, 1931: 16; Teissier, 1933a: 123, fig. 2B, b; 1933b: 124-128, 2 figs; Perrier, 1936: 27; Fraser, 1944: 282-283, pl. 61 fig. 270; Teissier, 1950a: 4-5; Pearse & Williams, 1951: 136; Hamond, 1957: 296, 317; Redier, 1964a: 641; Teissier, 1965: 25; Redier, 1967: 399.
Tridentata gracilis; Stechow, 1927: 312.
Dynamena gracilis p.p. Marktanner-Turneretscher, 1890: 240.
Sertularia stookeyi Nutting, 1904: 59, pl. 5 figs 6-7.
Tridentata stookeyi; Stechow, 1922: 149.
Sertularia heterodonta Ritchie, 1909b: 79, fig. 4a-d.
Tridentata heterodonta; Stechow, 1922: 149.

Material.— **Azores area**: Stn 5.044: small colonies up to 20 mm high on *Diphasia margareta*; one of colonies branched. No gonothecae. In addition scarcely branched stems 2-18 mm high on *Aglaophenia* spec. and *Nemertesia* spec., no gonothecae. Some colonies with stolons at distal end (RMNH-Coel. 27088, slide 2460); Stn 5.088: four small unbranched colonies up to 3-5 mm on *Sertularella gayi gayi* (Lamouroux, 1821); no gonothecae (RMNH-Coel. 27089, all in slide 2461). With *Hebella scandens* (Bale, 1888); Stn 5.100: detached fragment 8 mm long, in slide 1988 together with *Sertularella gayi gayi* (Lamouroux, 1821) and separate axis 11 mm high with two gonothecae (RMNH-Coel. 26999, two slides 1988); Stn 5.112: several small, unbranched colonies up to 8 mm high on *Sertularella gayi gayi* (Lamouroux, 1821); no gonothecae (RMNH-Coel. 27090, slide 2462); Stn 5.D02: two small stems c. 4 mm high on *Eudendrium* spec. No gonothecae (RMNH-Coel. 27800); Stn 5.D03: many small colonies 2-10 mm high on algae and tubes of polychaetes. No gonothecae. Also branched 25 mm high colonies with some gonothecae (RMNH-Coel. 26851, slide 1950).

Canary Islands and Selvagens Archipelago: Stn 4.004: two large fragments and many small colonies attached to algae 3-40 mm high, some stems ending in stolons; no gonothecae (RMHH Coel. 27081, two slides 2452). Fragments with alternate hydrothecae have been observed; Stn 4.007: several colonies 2-15 mm high, some branched, on algae and *Aglaophenia* spec. No gonothecae (RMHH Coel. 27082, slide 2454); Stn 4.015: branched, detached stem c. 27 mm high; no gonothecae (RMNH-Coel. 27804); Stn 4.021: detached and intertwined colonies and others attached to worm-tubes, all up to 45 mm high (RMNH-Coel. 27083, 2 slides 2455). Axes much branched, apical parts often with stolons. Gonothecae with acrocyst present; Stn 4.023: several colonies 4-20 mm high on calcareous algae; some gonothecae present (RMNH-Coel. 27084, slide 2456). In addition several branched stems 2-25 mm high on algae, empty gonothecae present; Stn 4.039: single detached, branched colony 28 mm long, well preserved hydranths present; no gonothecae (RMNH-Coel. 27085, all in slide 2457). With *Clytia paulensis* Vanhöffen, 1910; Stn 4.040: numerous colonies 35-40 mm high on calcareous algae (RMNH-Coel. 27086, slide 2458). Colonies branched; some with gonothecae. With *Obelia bidentata* Clark, 1875 and *Clytia linearis* (Thornely, 1899); Stn 4.K12: six well developed and several developing colonies, all unbranched 1-10 mm high; pairs of hydrothecae closely together (fig. 20a-b). No gonothecae (RMNH-Coel. 27087, slide 2459).

Cape Verde Islands: Stn 6.067: many colonies up to 15 mm high on foliaceous algae; colonies found

on 'leaf' as well as on stalk [RMNH-Coel. 27091, slide 2463 (fig. 6c), with *Dynamena dalmasi* (Versluys, 1899)]. Axes scarcely ramified. Hydrothecae short, marginal cusps small; no gonothecae. Hydrothecae slender and long, with the marginal cusps slightly developed. No gonothecae present; Stn 6.069: numerous colonies 20-30 mm high on calcarious algae and on a shell (RMNH-Coel. 27092, two slides 2464). In some colonies the hydrothecae have multiple renovations of the margin, resulting in a well sized tube. Some hydrothecal margins with abcauline cusp. Gonothecae present. With *Clytia paulensis* (Vanhöffen, 1910); Stn 6.108: several branched colonies up to 42 mm high on Bryozoa; no gonothecae

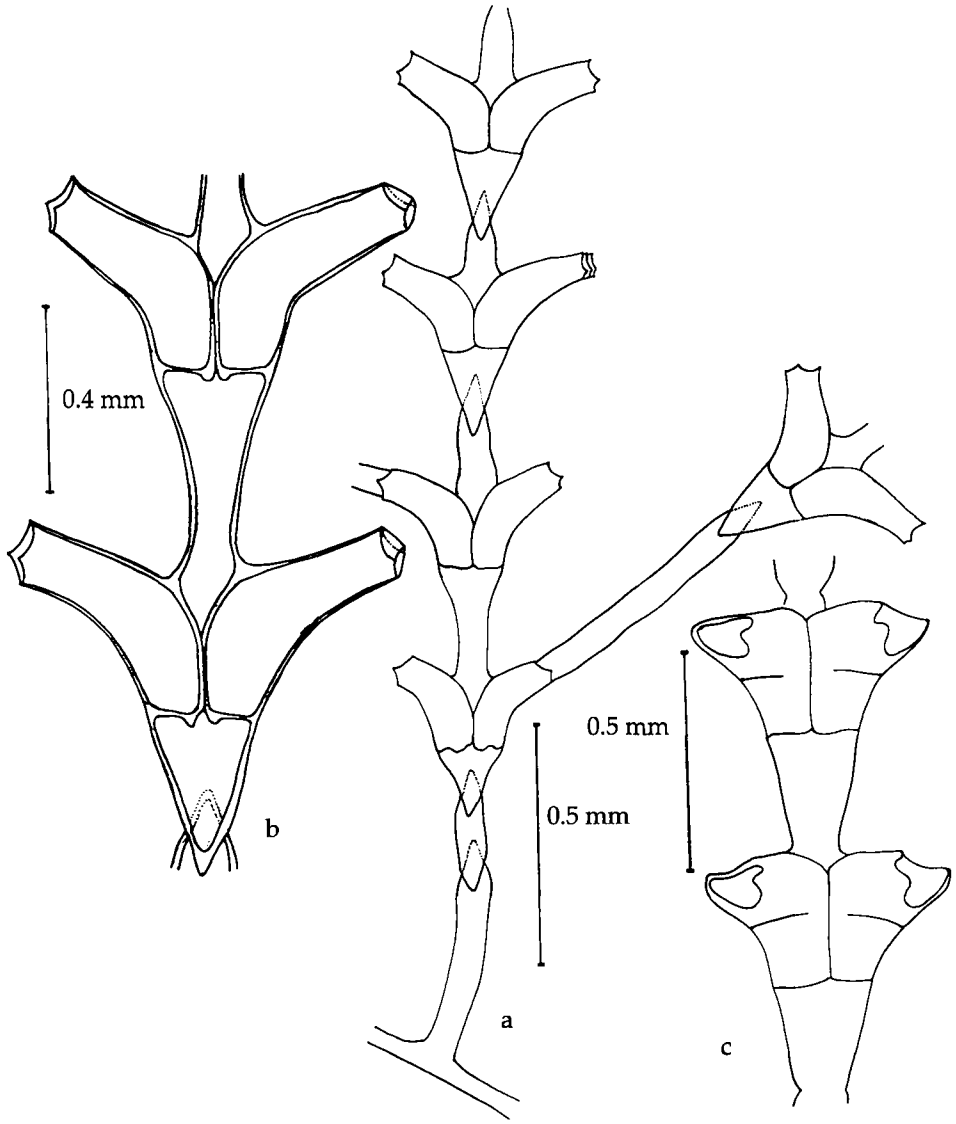

Fig. 20a-b. *Sertularia distans* Lamouroux, 1816, from CANCAP Stn 4.K12 (slide 2459); a, part of colony; b, two hydrocladial internodes in frontal aspect. 20c, *Sertularia marginata* (Kirchenpauer, 1864), two hydrocladial internodes in frontal aspect, CANCAP Stn 3.164 (slide 2471).

(RMNH-Coel. 27093, slide 2465); Stn 6.116: fragment composed of piece of stolon with two stems, height 5 and 8 mm. No gonothecae; hydrothecae renovated (RMNH-Coel. 27095, all in slide 2468); Stn 6.176: several small colonies up to 10 mm high on stone. No gonothecae (RMNH-Coel. 27096, slide 2469); Stn 7.058: single 25 mm high, branched colony; no gonothecae (RMNH-Coel. 27104, all in slide 2013); Stn 7.059: several detached fragments c. 35 mm high; no gonothecae (RMNH-Coel. 27797).

Discussion.— Our material (figs 6c, 20a-b) agrees with detailed descriptions by Cornelius (1979: 296-299, fig. 26); García Corrales et al., (1980: 49-52, fig. 17); Calder (1991: 105-107, fig. 55, as *Tridentata distans*), and Ramil & Vervoort (1992: 227-228, fig. 63c) and will not be redescribed here. We have not followed Calder in recognizing the genus *Tridentata* Stechow, 1920; for reasons see Vervoort & Vasseur, 1977.

Distribution.— This species is widely distributed in temperate and tropical parts of the Atlantic (including the Mediterranean), the Pacific and the Indian Ocean. The present records show the wide distribution the CANCAP area, but it is absent from the waters off Mauritania, from where it has been mentioned by Billard (1931). Previous records are from the Azores (Rees & White, 1966; Cornelius, 1992b), Madeira (Billard, 1906), and the Cape Verde region (Leloup, 1940). It occurs in subsurface waters down to a depth of at least 826 m (Ramil & Vervoort, 1992). The present records are mostly from superficial water layers but it has been found down to a depth of 314 m.

Sertularia marginata (Kirchenpauer, 1864)
(figs 20c-22)

Dynamena marginata Kirchenpauer, 1864: 13, fig. 8a-c.

Sertularia marginata; Bale, 1913: 125, pl. 12 fig. 9; Jäderholm, 1920: 5; Jarvis, 1922: 340; Totton, 1930: 204, fig. 48b; Billard, 1931a: 391, fig. 1 no. 1; Leloup, 1935: 49; Blackburn, 1938: 319; Leloup, 1939: 421, fig. 4; Blackburn, 1942: 114; Vannucci Mendes, 1946: 567, pl. 3 fig. 31a, pl. 4 figs 36-37; Vannucci, 1951b: 106, 109, 110, 111, 113, 116, 117; Buchanan, 1957: 367; Millard, 1957: 224, fig. 13; Picard, 1958a: 193; Ralph, 1961: 785, fig. 12d-g; Millard, 1964: 49; Pérèz & Picard, 1964: 21; Mammen, 1965: 45, fig. 77; Van Gemerden-Hoogeveen, 1965: 39, figs 13-17; Millard, 1966: 492; Rees & White, 1966: 278; Vervoort, 1966: 130, figs 33-34; Pérès, 1967: 460; Vervoort, 1968: 106; Berrisford, 1969: 394; Day, Field & Penrith, 1970: 15; Patriti, 1970: 40, fig. 52; Morris & Mogelberg, 1973: 24; Millard & Bouillon, 1974: 8, 33, fig. 6E; Millard, 1975: 311, fig. 99A-D; Calder, 1976: 169; Gordon & Ballantine, 1977: 100; Calder & Hester, 1978: 91; Millard, 1978: 198 et seq.; Marinopoulos, 1979: 120; García Corrales et al., 1980: 52, fig. 18; Calder, 1983: 15-16, figs 6-7; Flores González, 1983: 120, photo 31; Staples & Watson, 1987: 218; Altuna & García Carrascosa, 1990: 54 et seq., fig.; Izquierdo et al., 1990: 43-44, fig. 9; Medel Soteras et al., 1991: 514-516, fig. 5; Vervoort, 1993b: 556-557; Boero & Bouillon, 1993: 264; Watson, 1994: 67.

Sertularia marginata var. *typica* Vannucci, 1949: 248; 1951a: 84; 1954: 115.

Sertularia marginata var. *laxa* Vannucci, 1949: 248, pl. 3 fig. 46; 1950: 88; 1951a: 84; 1951b: 107, 108, 113, 116, 117.

Amphisbetia marginata; Stechow, 1921a: 258.

Tridentata marginata; Calder, 1991a: 107-109, figs 56-57; 1991b: 223; 1991c: 2068 et seq.; 1993: 68 et seq.; Calder, 1995: 543 et seq.

Sertularia flosculus Thompson, 1879: 104, pl. 17 figs 2, 2a.

Tridentata flosculus; Stechow, 1923d: 204.

Sertularia loculosa p.p. Bale, 1884: 91; Billard, 1908: 1357 [not *Sertularia loculosa* Busk, 1852).

Sertularia amplectens Allman, 1885: 141, pl. 16 figs 3-4; Fraser, 1944: 279, pl. 60 fig. 265; Morris & Mogelberg, 1973: 23, fig. 35a-b; Butler et al., 1983: 42.

Desmoscyphus pectinatus p.p. Allman, 1888: 71.

Desmoscyphus gracilis Allman, 1888: 71, pl. 34 figs 2, 2a-c.
Desmoscyphus inflatus Versluys, 1899: 42, figs 11-13; Van Soest, 1976: 84.
Sertularia inflata; Jäderholm, 1903: 286; Stechow, 1912: 361; Fraser, 1943: 93; 1944: 283-285, pl. 61 fig. 271; 1947: 11; 1948: 249; Deevey, 1950: 347; Hedgpeth, 1950: 73; Deevey, 1954: 272; Rees & Thursfield, 1965: 147; Van Gemerden-Hoogeveen, 1965: 45, figs 18-22; Vervoort, 1968: 48, 106, figs 23-24; Defenbaugh & Hopkins, 1973: 105-106, pl. 14 fig. 52; Mayal, 1973: 34, figs 20-23; Morris & Mogelberg, 1973: 24, fig. 40a-e; Wedler, 1975: 332 et seq.; Butler et al., 1983: 42; Venugopalan & Wagh, 1986: 276; Bandel & Wedler, 1987: 38; Britton & Morton, 1989: 344, fig. 3.5D; Russel & Hedgpeth, 1990: 233, fig. 10; Antsulevich, 1991: 35.
Tridentata inflata; Stechow, 1922: 149.
Sertularia versluysi Nutting, 1904: 53, pl. 1 figs 4-9; Fraser, 1912: 375, fig. 40; Sumner et al., 1913: 572; Bennitt, 1922: 251; Hentschel, 1922: 4, 8; Fraser, 1938a: 9, 55; 1939: 160 et seq.; Vervoort, 1959: 281, figs 39- 41; Brusca, 1973: 48.
not *Sertularia versluysi*; Billard, 1907: 275 [= *Sertularia turbinata* (Lamouroux, 1816)].
Sertularia challengeri p.p. Nutting, 1904: 54.
Sertularia pluma Hartlaub, 1905: 661 (nomen nudum).
Sertularia turbinata p.p. Billard, 1909: 322; 1910: 19 [not *Sertularia turbinata* (Lamouroux, 1816)].

Material.— **Azores area**: Stn 5.D02: two detached hydrocauli c. 15 mm high; axis branched, with thick perisarc, no gonothecae (RMNH-Coel. 27803); Stn 5.D03: five detached, well developed colonies 25-30 mm high, partly with gonothecae (RMNH-Coel. 26836, slide 1935 and RMNH-Coel. 27099, slide 2472). Internal cusp present in superior part of abcauline hydrothecal wall. In addition 12 detached colonies without gonothecae 17-35 mm high. With *Clytia gracilis* (M. Sars, 1850).

Atlantic coast Morocco and Mauritania: Stn 3.129: numerous colonies 13 mm high on leaves of *Zostera*, some with gonothecae (RMNH-Coel. 27097, two slides 2470). Distal part of axis with stolons of considerable length. Some of colonies branched; Stn 3.164: numerous colonies 5-27 mm high on *Zostera* leaves, with many gonothecae (RMNH-Coel. 27098, 2 slides 2471, figs 20c-22); Stn 3.182: several detached colonies up to 38 mm high without gonothecae; apical stolons present (RMNH-Coel. 27792); Stn MAU.022: several colonies 3-11 mm high on leaves of *Zostera* (RMNH-Coel. 27105, slide 2477). Some colonies pinnate, others erect; both types with gonothecae, even on smallest colonies. Gonothecae with apical cusps of varied length. Abcauline ridges in some hydrothecae thick.

Cape Verde Islands: Stn 6.D10: c. 20 detached colonies up to 16 mm high; no gonothecae (RMNH-Coel. 27103, slide 2476).

Description.— Erect colonies, up to 25 mm high, rising from stolon creeping on fixed substrate or algae; no internal septa in stolon. Adult colonies pinnate, with hydrocladia alternately arranged along axis (fig. 21); young colonies composed of unbranched axis. Axis (hydrocaulus) monosiphonic, initially straight, becoming geniculate in younger parts, divided into internodes; septa, except for lowest, principally indicated by peridermal constrictions, slightly oblique. Perisarc fairly heavy, particularly in lower part of axis. Basal axial internode fused with stolon, articulating by a distal hinge-joint with first hydrothecate internode of axis, which may also be carrying the first hydrocladium. Axial internodes short, provided with three hydrothecae and a proximal apophysis carrying the hydrocladium; basal hydrotheca axillary and fused with both apophysis and internode; remaining hydrothecae subopposite. Hydrocladia 8-12 mm long, directed outwards and slightly curved, angle with axis c. 60°, movable by means of a hinge-joint between first, athecate and second, hydrothecate internodes; the athecate internode is almost fused with the apophysis.

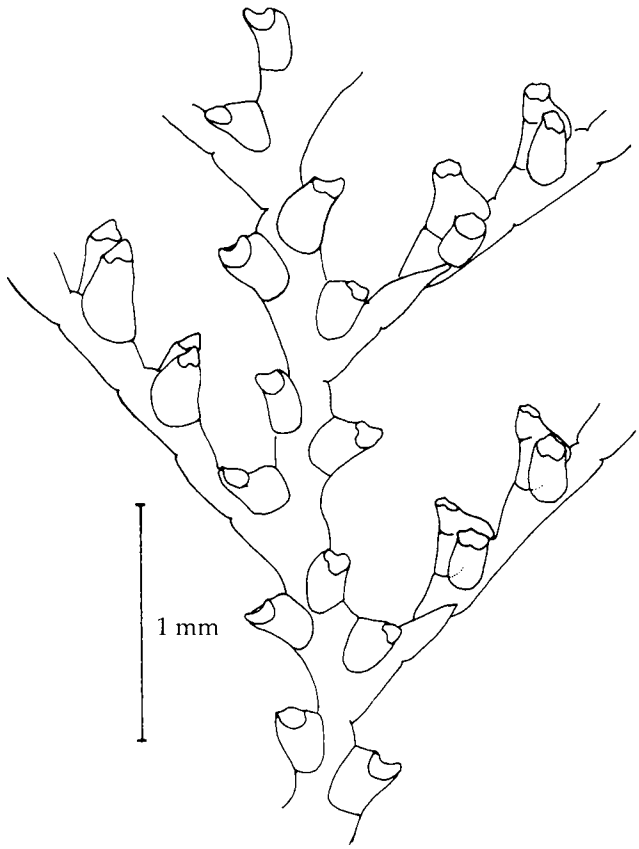

Fig. 21. *Sertularia marginata* (Kirchenpauer, 1864), from CANCAP Stn 3.164 (slide 2471); part of colony.

Thecate internodes of hydrocladium separated by transverse septa (with exception of the first thecate internode), fairly short, bearing a pair of strictly opposite hydrothecae. Hydrothecae facing outwards and obliquely upwards, completely adnate frontally (figs 20c, 22a) and separated by the width of the internode dorsally (fig. 22b), rather tumid and swollen, adnate to internode for c. two-thirds of their total length; their length axis forming an angle of c. 30° with internodal length axis. Seen from the front adnate part of adcauline wall straight; free portion convex and smooth. Abcauline wall smoothly concave, front and back of hydrotheca with curved line, originating from perisarcal elevation or ring inside hydrotheca, starting some distance below hydrothecal rim and initiated by a minor perisarcal peg projecting into interior of hydrotheca. Development of peg and rings varied. Hydrothecal rim with two distinct, rounded lateral cusps; in addition there is a small adcauline marginal cusp; hydrothecal rim distinctly thickened, without renovations. Opercular apparatus, as far as our observations on preserved material go, composed of two flaps: a large semicircular abcauline flap, stretched between the lateral cusps, and a smaller adcauline flap, folded in the middle and shaped like a tent. Hydranth with distinct abcauline caecum.

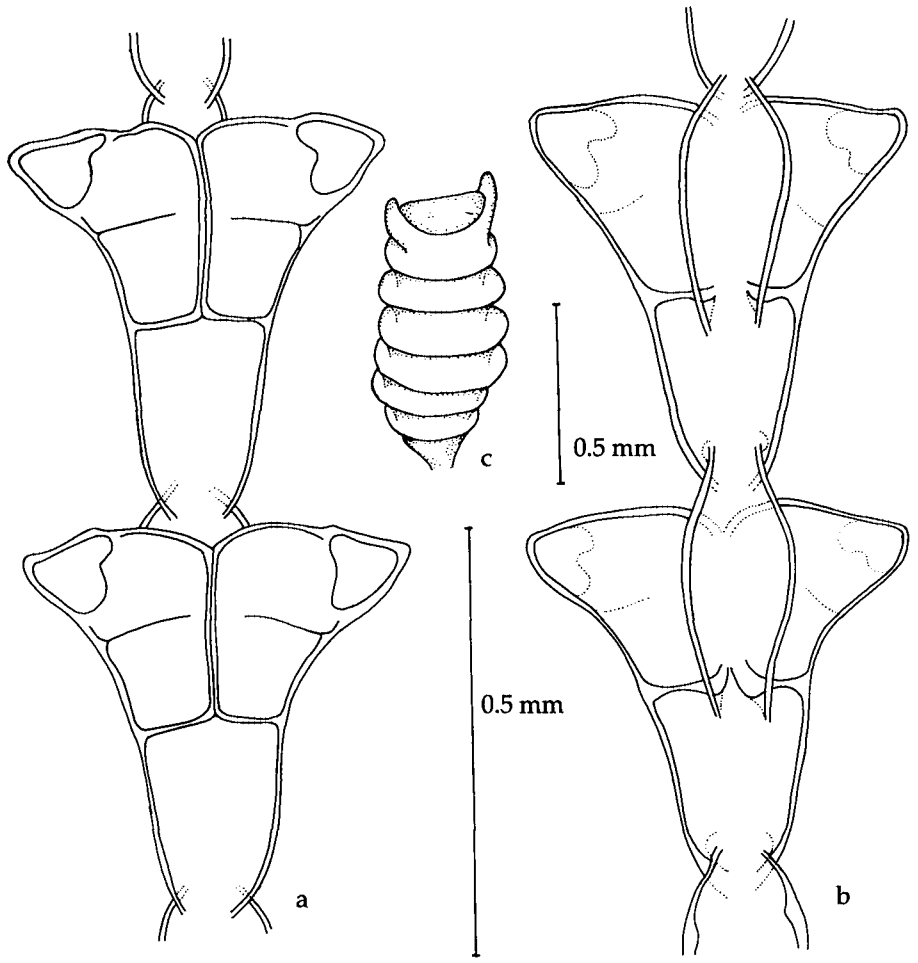

Fig. 22. *Sertularia marginata* (Kirchenpauer, 1864), from CANCAP Stn 3.164 (slide 2471); a, two hydrocladial internodes in frontal view; b, same internodes seen from backside; c, gonotheca.

Gonothecae large, drum-shaped, occasionally slightly compressed, with 6-8 circular ribs and two rounded lateral spines (fig. 22c), sometimes of considerable size, at the large, circular orifice, which is closed by a circular lid in the specimens studied. Gonothecae inserting on axial internodes directly under the non-axillary hydrothecae by means of a short pedicel and arranged in one row.

Distribution.— Circumglobal in tropical and subtropical seas: western Atlantic (Leloup, 1935; Calder, 1991); eastern Atlantic (García Corrales, Aguire Inchaurbe & González Mora, 1980); Indian Ocean (Millard & Bouillon, 1974), western Pacific (Ralph, 1961) and eastern Pacific (Fraser, 1948). The species was originally described from the alga *Sargassum* in the Pacific Ocean (Kirchenpauer, 1864). The present records confirm its presence in the eastern temperate and subtropical Atlantic, being recorded, though not in great numbers, from off Mauritania, from the Azores and

from the Cape Verde region, from the intertidal down to a depth of c. 35 m. The species was frequently observed on leaves of *Zostera* spec.

Sertularia turbinata (Lamouroux, 1816)
(fig. 23)

Dynamena turbinata Lamouroux, 1816: 180.

Sertularia turbinata; Deshayes & Milne-Edwards, 1836: 154; Bale, 1913: 124, pl. 12 fig. 6; Stechow, 1913a: 144; 1913b: 13, 145, figs 119-120; Broch, 1914: 34; Billard, 1925b: 177, fig. 34; 1927a: 512-513; 1931c: 248; Leloup, 1935: 50; 1937a: 106, 117; Fraser, 1944: 290-291, pl. 62, fig. 278; 1947: 11; Vannucci, 1949: 244; 1951b: 108, 109, 113, 117; Deevey, 1954: 270; Millard & Harrison, 1954: 176; Buchanan, 1957: 366; Millard, 1958: 197, fig. 8B; Pennycuik, 1959: 198; Vervoort, 1959: 275, fig. 35-36; Yamada, 1959: 7; Millard, 1964: 49; Mammen, 1965: 46, figs 78-81; Rees & Thursfield, 1965: 148; Van Gemerden-Hoogeveen, 1965: 38; Vervoort, 1968: 52, 107, fig. 25; Redier, 1971: 143; 1971a: 512; Defenbaugh & Hopkins, 1973: 107-108, pl. 14 fig. 54; Mayal, 1973: 26, figs 6-9; Millard & Bouillon, 1973: 76, fig. 9H; Morris & Mogelberg, 1973: 25, fig. 43; Millard & Bouillon, 1974: 8; Millard, 1975: 312, fig. 100B-C, E; Wedler, 1975: 333 et seq.; De Boyd Smith, 1977, fig. 161; Millard, 1978: 198; Mayal, 1981d: 230; Butler et al., 1983: 42; Flores González, 1983: 120, photo 32; Hirohito, 1983: 50, fig. 22; Mayal, 1983: 5-6, fig. 3; Calder, 1986: 139, pl. 39; Venugopalan & Wagh, 1986: 276; Mergner, 1987: 187; Roca, 1987: 212; Rees & Vervoort, 1987: 111-113, fig. 22; Gibbons & Ryland, 1989: 425, fig. 39; Izquierdo et al., 1990: 45, fig. 10; Boero & Bouillon, 1993: 264; Watson, 1994: 67; Hirohito, 1995: 218-219, fig. 73d-f.

Tridentata turbinata; Stechow, 1922: 149, 150; 1923a: 15; 1923d: 205; 1925: 232, fig. L; Calder, 1991a: 110-112, fig. 60; 1991b: 223; 1991c: 2068 et seq.; 1993: 68 et seq.; 1995: 543 et seq.

Tridentata (Sertularia) turbinata: Stechow, 1923d: 207.

not *Sertularia turbinata*; Ritchie, 1910b: 821; Bale, 1913: 124, pl. 12 fig. 6; Jäderholm, 1919: 14, pl. 3 fig. 8 [= *Sertularia loculosa* Busk, 1852].

not *Sertularia turbinata*; Jarvis, 1922: 341, pl. 24 fig. 8 [= ?*Dynamena* spec.].

not *Sertularia turbinata*; Vervoort & Vasseur, 1977: 60, figs 26-27; García Corrales et al., 1980: 57, fig. 19 [= *Sertularia tumida* Allman, 1877].

Sertularia loculosa; Bale, 1884: 91, pl. 4 figs 5-6, pl. 19 fig. 9; 1913: 121, pl. 12 figs 7-8. (not *Sertularia loculosa* Busk, 1852).

Desmoscyphus brevicyathus Versluys, 1899: 40, figs 9-10.

Sertularia brevicyathus; Nutting, 1904: 60, pl. 6 figs 1-2.

Tridentata brevicyathus; Stechow, 1922: 149.

Sertularia versluysi; Billard, 1907: 275 [not *Sertularia versluysi* Nutting, 1904 = *Sertularia marginata* (Kirchenpauer, 1864)].

Tridentata acuta Stechow, 1921b: 231.

Sertularia acuta; Millard, 1958: 192, fig. 8A, F.

Sertularia balei Briggs, 1922: 150.

Sertularia restricta Totton, 1930: 205.

Geminella ceramensis; Vannucci Mendes, 1946: 570.

Material.— **Canary Islands and Selvagens Archipelago**: Stn 2.D08: detached hydrocauli c. 10 mm high, without ramification and without gonothecae (RMNH-Coel. 27807).

Cape Verde Islands: Stn 6.039: single detached colony composed of 6 hydrocauli up to 12 mm high; no gonothecae (RMNH-Coel. 27100, all in slide 2473, fig. 23); Stn 6.161: several colonies 12 mm high on algae; no gonothecae (RMNH-Coel. 27101, slide 2474); Stn 6.170; several detached colonies 9-16 mm high; no gonothecae (RMNH- Coel. 27102, two slides 2475); Stn 6.D06: several colonies without gonothecae 3-15 mm high, some detached, some attached to algae (RMNH-Coel. 26855, slide 1954).

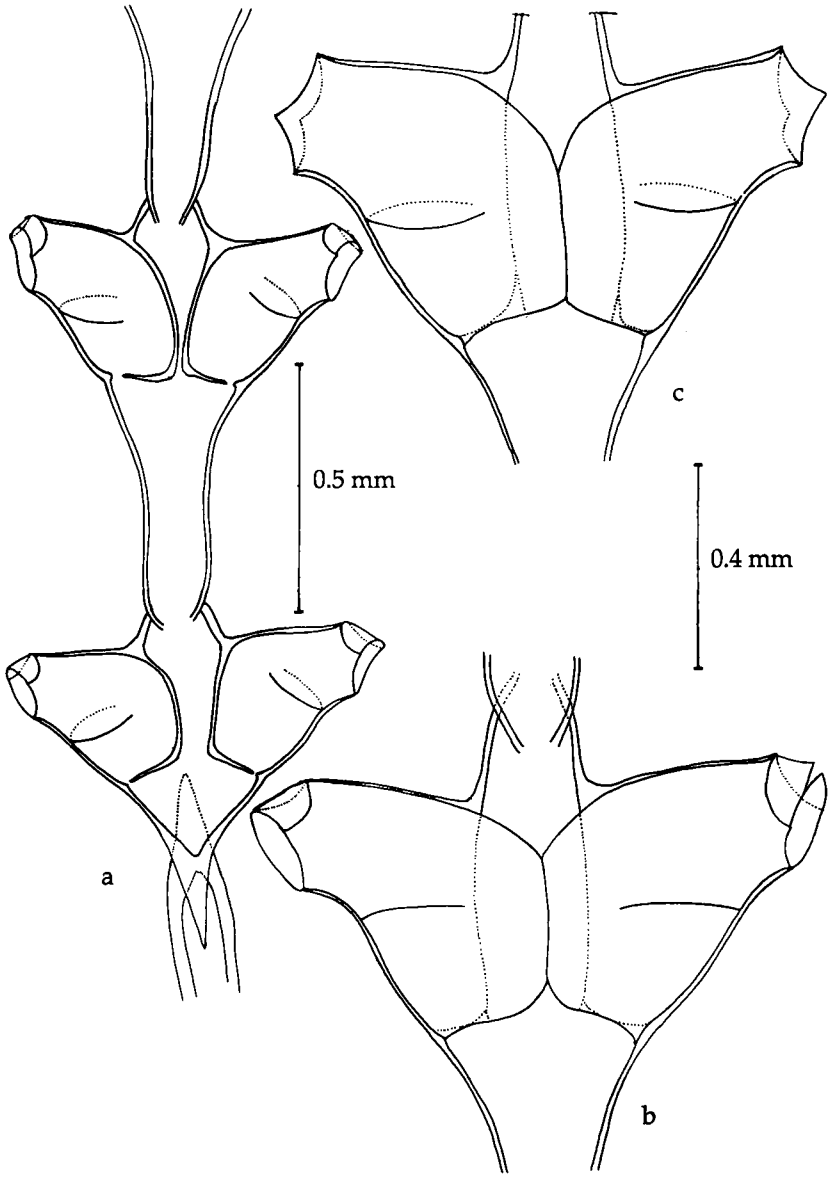

Fig. 23. *Sertularia turbinata* (Lamouroux, 1816), from CANCAP Stn 6.039 (slide 2473); a, basal part of stem, frontal aspect; b, pair of hydrothecae, frontal view; c, same pair seen from backside.

Description (of the material from Stn 6.D06).— Erect, c. 20 mm high, unbranched colonies rising from a creeping stolon; perisarc moderately developed, transparent. Basal part of axis composed of athecate internode rising direct from stolon and separated from rest of axis by an oblique hinge-joint in its distal part. Rest of axis composed of thecate internodes separated by slightly oblique nodes with exception of

first thecate internode which articulates with athecate basal internode. Each thecate internode with a pair of opposite hydrothecae in its distal half. Hydrothecae tubular, curving outwards; basal half swollen. Abcauline wall convex in basal two- thirds and concave in distal part, forming a curvature. Adcauline wall also convex in its basal half and there adnate to internode; free part straight and perpendicular to internodal length axis. At curvature of abcauline wall a fine transversal line of perisarc is visible. Adcauline walls of each pair of hydrothecae, with exception of basal pair, adnate on front of colony; adcauline walls separate on dorsal side of colony; length of adnate part increases along length of axis (cf. fig. 23a). Hydrothecal rim with three marginal cusps: one minute median adcauline and two large laterals. Operculum composed of two valves, a large abcauline flap and a smaller and curved adcauline flap. Horseshoe shaped thickening of perisarc visible in inside of hydrotheca, being very distinct on inside of abcauline wall and gradually disappearing adcaudally. No gonothecae have been found.

Remarks.— In the synonymy of this species we have largely followed Calder (1991a: 110-112) with the exception of his referral of this species to the genus *Tridentata* Stechow, 1920. The reasons for doing so have previously been outlined (Vervoort & Vasseur, 1977: 60) and we see no reason to change that opinion. Though we recognize the need for subdivision of the large genus *Sertularia* Linnaeus, 1758, we believe *Tridentata* Stechow to be ill-founded. We also believe the synonymization of that genus with *Geminella* Billard, 1925, to be incorrect (Vervoort, 1993a: 109).

Distribution.— Circumglobal in the warmer parts of Atlantic and Pacific; also in the Indian Ocean: western Atlantic (Vervoort, 1968; Calder, 1991a); eastern Atlantic (Vervoort, 1959); Indian Ocean (Rees & Vervoort, 1987); Indo-West-Pacific (Billard, 1925b). The present records are all from the Cape Verde Islands region in the subtropical part of the eastern Atlantic where the species was found intertidally and down to a depth of c. 40 m.

Genus *Symplectoscyphus* Marktanner-Turneretscher, 1890

Symplectoscyphus bathyalis Vervoort, 1972
(fig. 24a-b)

Symplectoscyphus bathyalis Vervoort, 1972: 174-180, figs 58-59, 60a; 1993a: 239, 242-245, figs 54f-h, 55a-b, d, tab. 45.
Sertularella bathyalis; Stepan'yants, 1979: 70, pl. 12 fig. 4.

Material.— **Atlantic coast of Morocco and Mauritania**: Stn MAU.040: several colonies up to 65 mm high and some fragments; colonies with many female gonothecae (fig. 24b). Basal parts of colonies polysiphonic; hydrocladia springing from axis along all its length; some branched (RMNH-Coel. 27788); Stn MAU.041: single colony 23 mm high, composed of hydrocaulus, basally with two tubes, top part monosiphonic (fig. 24a)(RMNH-Coel. 26867, slide 1966).

Description (of the material from MAU.041).— Internodes of axis long, each with a hydrothecae at its latero-distal extremity, alternately pointing left and right. Hydrocaulus slightly thicker than the hydrocladia, the latter springing alternately on left and right side of hydrocaulus; three axial hydrothecae between two succeeding

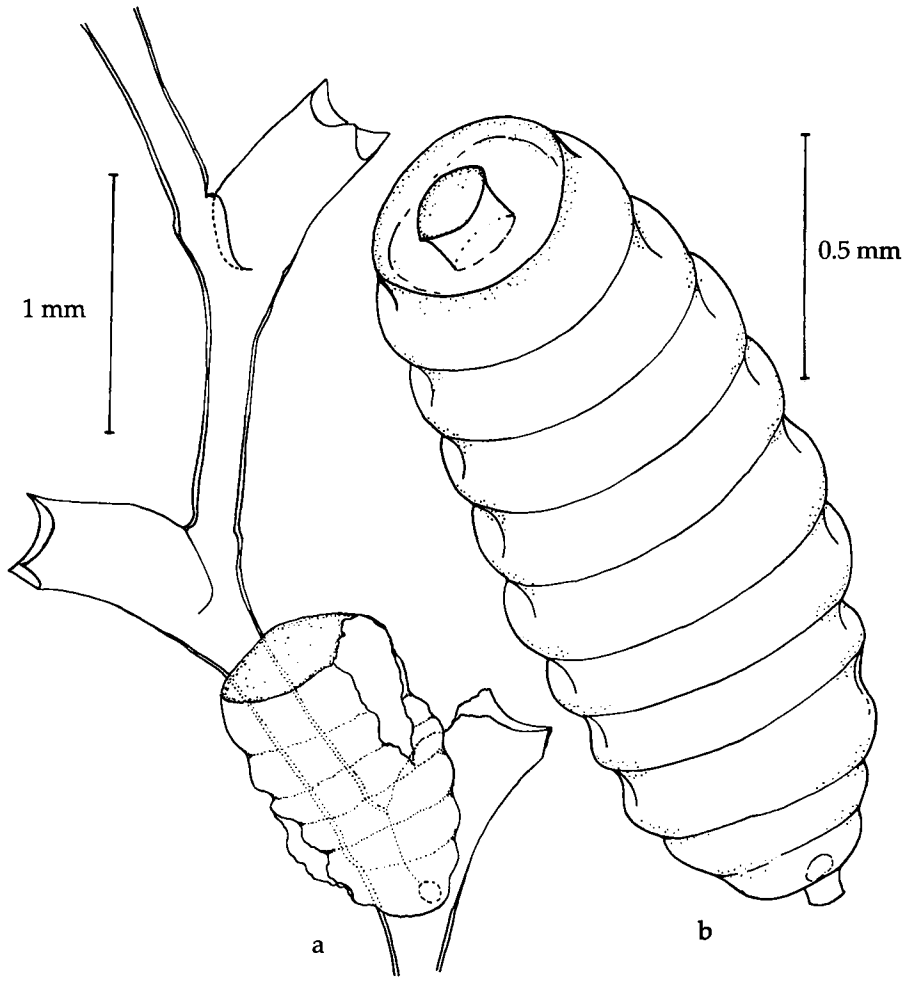

Fig. 24. *Symplectoscyphus bathyalis* Vervoort, 1972; a, part of stem with damaged male gonothecae from CANCAP Stn Mau 041 (slide 1966); b, mature female gonotheca from CANCAP Stn Mau 040 (slide 4021).

hydrocladia (on opposite sides). Hydrothecae of both axis and hydrocladia equal, being tubular, of almost equal diameter over their length, slightly curved, about one third of adcauline wall adnate, free part proximally convex. Hydrothecal rim with three cusps, one medio-dorsal and two latero-ventral (fig. 24a). Operculum composed of three more or less triangular flaps, each attached into an embayment between marginal cusps. Number of renovations reduced, two or three being occasionally present. There are two damaged male gonothecae; these are large, barrel-shaped and provided with broad, transverse ribs over whole length. Apical portion much damaged; structure of top of gonotheca indistinct (fig. 24a). They insert directly under hydrothecal diaphragm, leaving a deep, rounded cicatrice when shed.

The colonies from MAU.040 have abundant female gonothecae, springing from

internodes at the base of a hydrotheca. Surface of hydrotheca with well marked circular ribs over their whole length; apex with short, cylindrical funnel, widening apically (fig. 24b).

Measurements (in μm):	Bay of Biscay (Vervoort, 1972)	S.E. Pacific (Vervoort, 1972)	Norfolk ridge (Vervoort, 1993a)	Off Mauritania (slide 1966)
Internode, length	1215-2025	1150-1285	1195-1520	1300-1500
diameter at node	205-270	135-175	195-260	150-175
Hydrotheca, length abcauline wall*	610-675	725-745	900-930	825-870
length free part adcauline wall*	595-675	850-865	975-1,080	630-695
length adnate part adcauline wall	285-310	330-340	255-260	325-390
total depth*	745-760	875-945	1040-1080	870-890
maximal diameter	390-430	430-475	455-500	410-435
diameter at rim	350-375	440-450	500-540	370-410
Gonotheca, maximal diameter	1010-1150		870-935	
total length (incl. funnel)	1350-1480		1195-1305	
[*= including renovations]				

Distribution.— This species was originally described from deep water of the Bay of Biscay (Vervoort, 1972) and is also known to occur in deep water of the south-eastern Pacific (Vervoort, 1972) and at the north-western tip of the Norfolk Ridge (Vervoort, 1993a). The present record extends its distribution to deep water off the coast of Mauritania.

Zoogeographical remarks

The following zoogeographical remarks are tentative as only two leptolid families have so far been studied. A more complete account will be given later, when additional families have been studied.

The majority of the species found in the CANCAP area have a circumtropical distribution, being present in warmer water of the seas all around the world. To this group belong *Amphisbetia operculata* (L., 1758), *Dynamena crisioides* Lamouroux, 1824, *Dynamena dalmasi* (Versluys, 1899), *D. disticha* (Bosc, 1802), *Salacia desmoides* (Torrey, 1902), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816), *S. marginata* (Kirchenpauer, 1864) and *S. turbinata* (Lamouroux, 1816). The group second in importance is that formed by the species distributed mainly in the north-eastern Atlantic: *Diphasia attenuata robusta* (Billard, 1924), *D. delagei* Billard, 1912, *D. margareta* (Hassall, 1841), *D. pinastrum* (Cuvier, 1830), *Sertularella ellisii ornata* Broch, 1933, *S. gayi robusta* Allman, 1873 and *S. gayi gayi* (Lamouroux, 1821). Three species from the area studied are present on both sides of the Atlantic: *Cnidoscyphus marginatus* (Allman, 1877), *Sertularella cylindritheca* (Allman, 1888), and *S. unituba* Calder, 1991. One species, *Sertularella mediterranea* Hartlaub, 1901, is distributed along the eastern Atlantic coasts, and *Sertularella polyzonias* (Linnaeus, 1758), is considered cosmopolitan. *Hydrallmania falcata* (Linnaeus, 1758) is mainly North Atlantic and *Symplectoscyphus bathyalis* Vervoort, 1972, is a deep water species occurring bathyal in both Atlantic and Pacific.

It is remarkable that the two principal groups of species are those with a wide distribution, the other being restricted to the north-eastern Atlantic. Thyroscyphidae and Sertulariidae are families of Leptolida that do not release fully formed medusae, the majority producing fixed gonophores. Nevertheless, the capacity of dispersion shown by the species of each group is varied. All species of *Diphasia* found in the CANCAP area are restricted to the north-eastern Atlantic, while those of *Dynamena* belong to the circumtropical group. Cornelius (1992a) lists three species of the genus *Dynamena* as possible "rafters"; this, we think, could be the usual way of dispersion for more species in this genus. According to Sommer (1992), planula settlement within the group of Leptolida possessing a free medusa takes place later than that of species with fixed gonophores. Moreover, gonophores have lower capacity of dispersion than the medusae. All this suggests that many species with fixed gonophores may use others means of dispersal (propagules, gemmulae, hydrorhyza fragments, rafting, etc.).

The family Sertulariidae is well represented in the CANCAP area, with 23 species in all (including those that were recorded by previous authors (Rees & White, 1966; Patriti, 1970; Izquierdo et al, 1990; Cornelius, 1992b). *Diphasia margareta, S. ellisii ellisii* and *S. gayi gayi* were particularly abundant at the majority of stations studied. *Sertularella unituba* was abundant in the Cape Verde area. The Cape Verde Islands form the region where the greatest variety of species has been recorded, some of which are characteristic for tropical West Africa (*C. marginatus, D. dalmasi* and *D. crisioides*) and absent from the remaining stations studied. These differences could be due to the location of the Cape Verde Islands in a system of currents that forms a barrier for north-eastern Atlantic benthic species.

The Canary Islands are a second area with more variety of species, all of them (except *S. gayi robusta*) found also along the Iberian Peninsula (Medel & Lopez-González, 1996). Madeira has less variety of species which may be due to a shorter sampling period. Finally, all species recorded from the Azores, the more isolated area, were also found previously in the north- eastern Atlantic.

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