The benthic hydroid fauna of the Chafarinas Islands (Alborán Sea, western Mediterranean)

A.L. Peña Cantero & A.M. García Carrascosa

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The benthic hydroid fauna of the Chafarinas Islands (Western Mediterranean), collected during a survey in the summer of 1991, has been studied. A total of 86 species, 20 athecate hydroids and 66 thecate hydroids, has been recorded. For every species, the synonymy, a survey of the material studied and data concerning ecology and distribution are included. The majority of the species has been figured and the most important have been (re)described.

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Introduction

Although the Mediterranean hydroid fauna is relatively well known this knowledge mainly concerns the north coasts of the western basin and the Adriatic; in those areas most of the hydroid studies have been conducted. The hydroid fauna of the eastern basin and the North African coasts is badly known; in the former local studies have been done only in Syria (Billard, 1931a), Egypt (Billard, 1936; El Beshbeeshy, 1993; 1994a, 1994b; 1995a; 1995b), Israel (Picard, 1958b; Vervoort, 1993), Greece (Yamada, 1965; Marinopoulos, 1979; Morri & Bianchi, 1999) and off the Turkish coasts (Marinopoulos, 1979). From the North African coasts there is, besides the papers by Billard (1936) and El Beshbeeshy (1993; 1994a, 1994b; 1995a; 1995b) mentioned above, only the study by Picard (1955) from off Castiglione (Algeria).

As far as the Alborán Sea is concerned, there are no studies of the littoral hydroid fauna of the North African coasts, with the exception of that from Castiglione by Picard (1955). The northern coasts of the Alborán Sea are not much better known, since there are only records from local samplings in the Spanish littoral by García-Carrascosa (1981). Templado et al. (1986) gave a list of species from off Seco de los Olivos (Almería), and Alborán Island, collected between 60 and 300 m depth. Ramil & Vervoort (1992) published a study on the deep-water hydroid fauna of the Ibero-Moroccan Gulf, the Strait of Gibraltar and that part of the Alborán Sea closest to the Strait of Gibraltar, all material being collected between 115 and 2100 m depth. In addition there are reports from the Strait of Gibraltar and nearby Mediterranean areas by Medel & Vervoort (1995) and Medel et al. (1991, 1998).

The present study focuses on the littoral of the Alborán Sea, the Chafarinas Islands providing a typically littoral habitat, and supplements those by Ramil & Vervoort (1992) on deep-water hydroids.

The study of the fauna and flora of the Chafarinas Islands has a distinct biogeographical importance. Due to their location in the Alborán Sea, an area directly exposed to the influence of Atlantic water entering the Mediterranean through the Strait of Gibraltar, the study of their biodiversity could help to define more accurately the distribution of typically Atlantic species, present in the Mediterranean only in the area of the Alborán Sea, and of truly Mediterranean species, that in this area are under the influence of Atlantic surface water. The present study of the hydroid fauna of the Chafarinas is part of a larger project aiming at a study of the whole benthos of that area.

In this paper we present an inventory of the species of hydroids (Cnidaria, Hydrozoa) found in the Chafarinas area, with their synonymy, a survey of the material studied and data concerning their ecology and distribution. Nearly all species have been figured and the more important have been (re)described.

Material and Methods

The archipelago of Chafarinas is situated near the North African coast in the eastern basin of the Alborán Sea (western Mediterranean) at two miles from Ras el Ma (Morocco) (fig. 1). It is composed of three small, volcanic islands (Congreso, Isabel II and Rey Francisco), off the wide beach of Ras el Ma, in the coastal alluvial plain a few kilometres west of the mouth of the Ouad-Moulouya river. The Moulouya river plays a crucial role in the marine environment of the Archipelago.

The perimeter of the area under study was 500 m off the coastline of the islands; the greatest depth (70 m) was reached in the north-western part. In the southern part the sedimentary shelf is situated at 15 m depth; in the northern part it is deeper, reaching 30-35 m depth.

Sampling on hard bottoms

For each island a number of perpendicular transects (fig. 2) were selected, according to hydrodynamical and geomorphological characteristics. In each transect samples were collected by scuba-diving, supplemented by snorkeling and littoral sampling at the shallowest levels. In every transect topographical features and bio-

logical communities were studied previous to the sampling of standard surfaces of 25 x 25 cm in every community. Each sample was accompanied by a label with information on depth, inclination, orientation, community, etc. The samples were afterwards anaesthetized with $MgCl_2$ and sorted in the larger zoological groups for future study in the laboratory.

Hard bottom samples were coded with "CONG", "ISA" and "REY", according with the island from where they come (i.e. CONGRESO, ISABEL II and REY FRANCISCO) and a number. Extra samples, obtained by snorkeling and littoral sampling at specific localities, were coded adding the letter "P".

Sampling on soft bottoms

For soft bottoms a dredging plan was developed covering a reticulum of 200 x 200 m squares (fig. 2). For positioning the dredging stations a Global Positioning System (GPS) was employed. Dredging were carried out with a Holme's bilateral-anchor grab. Some additional trawling samples were obtained with a "chalut à perche", used to collect the vagile fauna.

Station list

For soft bottom samples sample code, depth and date are given; for hard bottoms the transect number and the locality are also provided.

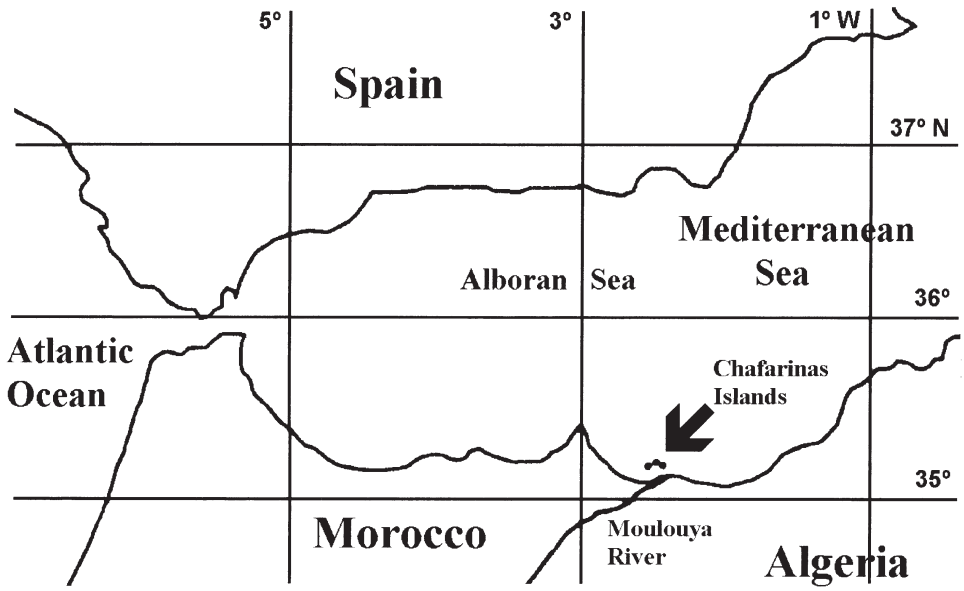

Fig. 1. Location of the Chafarinas Islands in western Mediterranean.

Soft bottom stations:

A-7, 57 m, 23.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Nemertesia ramosa* (Lamarck, 1816), *Clytia paulensis* (Vanhöffen, 1910).

A-10, 41 m, 14.vii.1991: *Clytia paulensis* (Vanhöffen, 1910).

A-11, 46 m, 24.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Aglaophenia octodonta* (Heller, 1868), *Clytia* spec.

A-12, 41 m, 11.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Salacia desmoides* (Torrey, 1902).

A-14, 40 m, 13.vii.1991: *Bougainvillia muscus* (Allman, 1863).

B-6, 52 m, 22.vii.1991: *Bougainvillia muscus* (Allman, 1863).

B-8, 47 m, 22.vii.1991: *Eudendrium ramosum* (Linnaeus, 1758), *Zanclea costata* Gegenbaur, 1856, *Aglaophenia kirchenpaueri* (Heller, 1868), *Nemertesia ramosa* (Lamarck, 1816), *Clytia gracilis* (M. Sars, 1850), *Laomedea pseudodichotoma* Vervoort, 1959.

B-10, 41 m, 24.vii.1991: *Bougainvillia muscus* (Lamarck, 1816), *Salacia desmoides* (Torrey, 1902).

B-11, 42 m, 21.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium glomeratum* Picard, 1951b, *E. ramosum* (Linnaeus, 1758), *Modeeria rotunda* (Quoy & Gaimard, 1827), *Filellum* spec.2, *Halecium lankesteri* (Bourne, 1890), *Mitrocomium* spec., *Antennella ansini* spec. nov., *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

B-13, 38 m, 24.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium glomeratum* Picard, 1951b, *E. ramosum* (Linnaeus, 1758), *Lovenella clausa* (Loven, 1836), *Nemertesia ramosa* (Lamarck, 1816).

B-15, 35 m, 22.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Ectopleura wrighti* Petersen, 1979, *Clytia gracilis* (M. Sars, 1850), *Clytia paulensis* (Vanhöffen, 1910).

C-3, 45 m, 17.vii.1991: *Eudendrium glomeratum* Picard, 1951b, *Nemertesia ramosa* (Lamarck, 1816), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850).

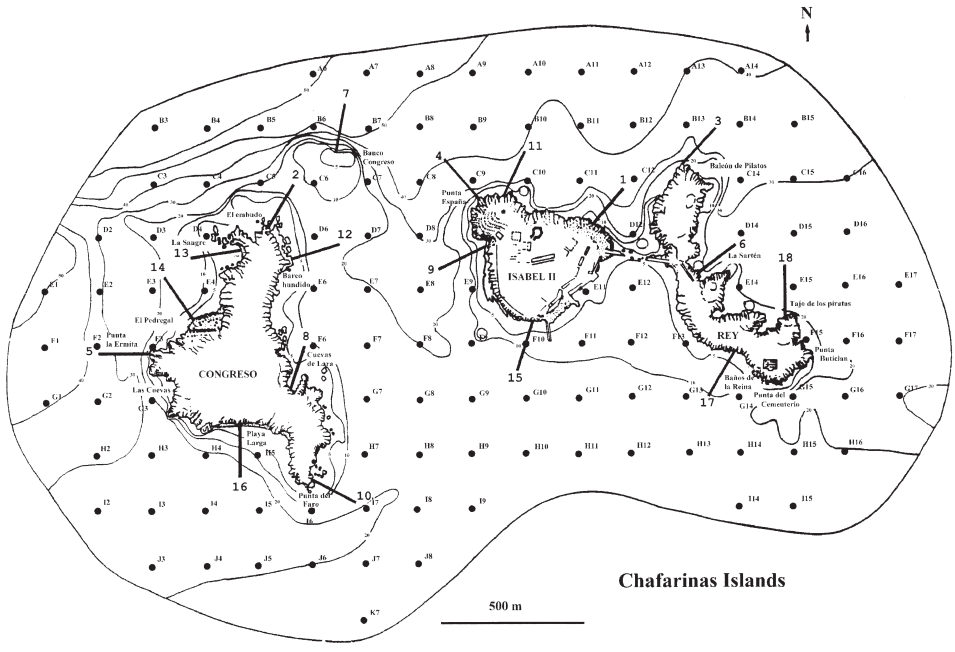

Fig. 2. Location of soft bottoms stations and hard bottom transects.

C-4, 34 m, 23.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium glomeratum* Picard, 1951b, *E. ramosum* (Linnaeus, 1758), *Zanclea costata* Gegenbaur, 1856, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Mitrocomium* spec., *Antennella ansini* spec. nov., *Nemertesia ramosa* (Lamarck, 1816), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Clytia* spec., *Laomedea* spec. 1.

C-8, 39 m, 18.vii.1991: *Zanclea costata* Gegenbaur, 1856, *Aglaophenia acacia* Allman, 1883, *Nemertesia ramosa* (Lamarck, 1816), *Sertularella polyzonias* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850).

C-8(bis), 40 m, 01.viii.1991: *Eudendrium ramosum* (Linnaeus, 1758), *Filellum* spec. 2, *Halecium lankesteri* (Bourne, 1890), *H. petrosum* Stechow, 1919, *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767).

C-9, 40 m, 04.viii.1991: *Eudendrium ramosum* (Linnaeus, 1758).

C-10, 39 m, 07.viii.1991: *Salacia desmoides* (Torrey, 1902).

C-12, 31 m, 07.viii.1991: *Nemertesia ramosa* (Lamarck, 1816), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758).

C-16, 29 m, 27.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Clytia paulensis* (Vanhöffen, 1910).

D-2, 41 m, 23.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *E. ramosum* (Linnaeus, 1758), *Zanclea costata* Gegenbaur, 1856, *Filellum* spec. 1, *Filellum* spec. 2, *Aglaophenia acacia* Allman, 1883, *Nemertesia perrieri* (Billard, 1901), *N. ramosa* (Lamarck, 1816), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910), *Clytia* spec., *Laomedea* spec.1.

D-3, 24 m, 23.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium glomeratum* Picard, 1951b, *Filellum* spec.1, *Halecium lankesteri* (Bourne, 1890), *H. petrosum* Stechow, 1919, *Antennella secundaria* (Gmelin, 1791), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758), *Clytia hemisphaerica* (Linnaeus, 1767).

D-8, 30 m, 03.viii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Opercularella* spec., *Filellum* spec. 1, *Nemertesia ramosa* (Lamarck, 1816), *Sertularella polyzonias* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850).

D-15, 27 m, 22.vii.1991: *Clytia hemisphaerica* (Linnaeus, 1767).

E-2, 40 m, 19.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Egmundella amirantensis* Millard & Bouillon, 1973, *Modeeria rotunda* (Quoy & Gaimard, 1827), *Filellum* spec. 1, *Filellum* spec. 2, *Halecium sibogae marocanum* Billard, 1934, *Nemertesia ramosa* (Lamarck, 1816), *Sertularella ellisii ornata* Broch, 1933, *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

E-3, 25 m, 13.vii.1991: *Sertularella polyzonias* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *Obelia dichotoma* (Linnaeus, 1758).

E-7, 19 m, 18.vii.1991: *Nemertesia ramosa* (Lamarck, 1816), *Campanularia hincksii* Alder, 1856.

E-l6, 25 m, 21.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

F-2, 40 m, 01.viii.1991: *Eudendrium ramosum* (Linnaeus, 1758), *Halecium lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *Clytia paulensis* (Vanhöffen, 1910), *Laomedea* spec. 1.

F-8, 18 m, 14.vii.1991: *Egmundella amirantensis* Millard & Bouillon, 1973, *Halecium sibogae marocanum* Billard, 1934, *Nemertesia ramosa* (Lamarck, 1816), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910).

F-9, 17 m, 05.viii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910).

F-10, 10 m, 05.viii.1991: *Sertularella polyzonias* (Linnaeus, 1758), *Clytia hemisphaerica* (Linnaeus, 1767).

F-12, 8 m, 05.viii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Egmundella amirantensis* Millard & Bouillon, 1973, *Halecium lankesteri* (Bourne, 1890), *Clytia hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910).

F-16, 22 m, 31.vii.1991: *Bougainvillia muscus* (Allman, 1863).

F-17, 21 m, 22.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Hydractinia carnea* (M. Sars, 1846), *Halecium delicatulum* Coughtrey, 1876, *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia perpusilla* Stechow, 1919, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

G-2, 38 m, 08.viii.1991: *Salacia desmoides* (Torrey, 1902), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *Clytia paulensis* (Vanhöffen, 1910).

G-8, 17 m, 21.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Hydractinia carnea* (M. Sars, 1846), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758), *Sertularia perpusilla* Stechow, 1919, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910).

G-9, 18 m, 21.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Lovenella clausa* (Loven, 1836), *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910).

G-10, 15 m, 11.vii.1991: *Sertularia perpusilla* Stechow, 1919, *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910).

G-14, 20 m, 26.vii.1991: *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910).

G-15, 21 m, 02.viii.1991: *Lovenella clausa* (Lovén, 1836), *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910).

G-16, 22 m, 21.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Sertularella polyzonias* (Linnaeus, 1758), *Sertularia perpusilla* Stechow, 1919, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758)

G-17, 20 m, 31.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium glomeratum* Picard, 1951, *E. ramosum* (Linnaeus, 1758), *Egmundella amirantensis* Millard & Bouillon, 1973, *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

H-10, 15 m, 27.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910), *Laomedea pseudodichotoma* Vervoort, 1959.

H-12, 14 m, 20.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910).

H-13, 16 m, 20.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Halecium sibogae marocanum* Billard, 1934, *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia paulensis* (Vanhöffen, 1910).

H-15, 20 m, 20.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Sertularella polyzonias* (Linnaeus, 1758), *Clytia hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

H-16, 20 m, 12.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium ramosum* (Linnaeus, 1758), *Lovenella clausa* (Lovén, 1836), *Clytia hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

I-3, 26 m, 12.vii.1991: *Filellum* spec. 1, *Campanularia hincksii* Alder, 1856.

I-5, 23 m, 15.vii.1991: *Sertularia distans* Lamouroux, 1816.

I-7, 20 m, 15.vii.1991: *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910).

I-8, 17 m, 01.viii.1991: *Eudendrium glomeratum* Picard, 1951, *Hydractinia carnea* (M. Sars, 1846), *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

I-14, 16 m, 15.vii.1991: *Clytia paulensis* (Vanhöffen, 1910).

I-15, 17 m, 21.vii.1991: *Hydractinia carnea* (M. Sars, 1846), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

J-8, 15 m, 28.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Lovenella clausa* (Lovén, 1836), *Clytia paulensis* (Vanhöffen, 1910).

Baños de la Reina trawl, Rey Francisco Island: *Hydractinia hooperii* (Sigerfoos, 1899).

Agassiz trawl, nº 5, Congreso Island: *Hydractinia calderi* Bouillon, Medel & Peña Cantero, 1997.

Hard bottom stations:

CONGRESO BANK, 23.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium glomeratum* Picard, 1951, *E. racemosum* (Gmelin, 1791), *Egmundella amirantensis* Millard & Bouillon, 1973, *Filellum* spec.2, *Scandia gigas* (Pieper, 1884), *Halecium pusillum* (M. Sars, 1857), *H. tenellum* Hincks, 1861, *Halecium* spec., *Aglaophenia kirchenpaueri* (Heller, 1868), *A. lophocarpa* Allman, 1877, *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. ellisii ornata* Broch, 1933, *S. polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

CONG 1, Transect 10, Jetty (Embarcadero), 0.5 m, 12.vii.1991: *Eudendrium merulum* Watson, 1985, *Coryne muscoides* (Linnaeus, 1761), *Cladocoryne flocosa* Rotch, 1871, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Sertularella fusiformis* (Hincks, 1861), *S. mediterranea* Hartlaub, 1901, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Ventromma halecioides* (Alder, 1859), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. paulensis* (Vanhöffen, 1910).

CONG 2, Transect 10, Jetty, 1 m, 12.vii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Hydrodendron mirabile* (Hincks, 1866), *Aglaophenia picardi* Svoboda, 1979, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Ventromma halecioides* (Alder, 1859), *Monotheca obliqua* (Johnston, 1847), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Clytia gracilis* (M. Sars, 1850).

CONG 3, Transect 10, Jetty, 2 m, 12.vii.1991: *Coryne muscoides* (Linnaeus, 1761), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Monotheca obliqua* (Johnston, 1847).

CONG 4, Transect 10, Jetty, 2 m, 12.vii.1991: *Halecium lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890.

CONG 5, Transect 10, Jetty, 0 m, 11.vii.1991: *Coryne muscoides* (Linnaeus, 1761), *Halecium lankesteri* (Bourne, 1890), *Sertularella lagenoides* Stechow, 1919, *Obelia geniculata* (Linnaeus, 1758), *Orthopyxis crenata* (Hartlaub, 1901), *O. integra* (Macgillivray, 1842).

CONG 6, Transect 10, Jetty, 0 m, 11.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Sertularella lagenoides* Stechow, 1919.

CONG 7, Transect 13, La Sangre, 19 m, 14.vii.1991: *Eudendrium glomeratum* Picard, 1951, *Filellum* spec. 1, *Filellum* spec.2, *Hebella scandens* (Bale, 1888), *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Halecium* spec., *Aglaophenia kirchenpaueri* (Heller, 1868), *A. lophocarpa* Allman, 1877, *A. pluma* (Linnaeus, 1758), *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *A. secundaria* (Gmelin, 1791), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

CONG 8, Transect 13, La Sangre, 10 m, 14.vii.1991: *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia lophocarpa* Allman, 1877, *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Salacia desmoides* (Torrey, 1902), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *S. perpusilla* Stechow, 1919, *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900), *Obelia dichotoma* (Linnaeus, 1758).

CONG 12, Transect 16, Playa Larga, 0.5 m, 19.vii.1991: *Eudendrium simplex* Pieper, 1884, *Coryne muscoides* (Linnaeus, 1761), *Halecium lankesteri* (Bourne, 1890), *H. pusillum* (M. Sars, 1857), *Sertularella lagenoides* Stechow, 1919.

CONG 13, Transect 16, Playa Larga, 2 m, 19.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Campanularia volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

CONG 15, Transect 16, Playa Larga, 0.3 m, 19.vii.1991: *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Sertularella lagenoides* Stechow, 1919, *Clytia linearis* (Thornely, 1900).

CONG 16, Transect 16, Playa Larga, 8 m, 19.vii.1991: *Sertularella ellisii ornata* Broch, 1933.

CONG 17, Transect 16, Playa Larga, 2 m, 19.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Sertularella fusiformis* (Hincks, 1861).

CONG 18, Transect 16, Playa Larga, 4.5 m, 19.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Halecium* spec., *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910)

CONG 21, Transect 16, Playa Larga, 8 m, 19.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella secundaria* (Gmelin, 1791), *Halopteris diaphana* (Heller, 1868), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Campanularia volubilis* (Linnaeus, 1758), *Clytia paulensis* (Vanhöffen, 1910).

CONG 22, Transect 16, Playa Larga, 1 m, 19.vii.1991: *Eudendrium simplex* Pieper, 1884, *Coryne muscoides* (Linnaeus, 1761), *Halecium lankesteri* (Bourne, 1890), *H. pusillum* (M. Sars, 1856), *Hydrodendron mirabile* (Hincks, 1866), *Sertularella lagenoides* Stechow, 1919.

CONG 23, Transect 16, Playa Larga, 8 m, 19.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium petrosum* Stechow, 1919, *Campanularia volubilis* (Linnaeus, 1758), *Clytia hemisphaerica* (Linnaeus, 1767).

CONG 25, Transect 5, Punta La Ermita, 25 m, 21.vii.1991: *Eudendrium rameum* (Pallas, 1766), *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. petrosum* Stechow, 1919, *H. sibogae marocanum* Billard, 1934, *H. tenellum* Hincks, 1861, *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. ellisii ornata* Broch, 1933, *S. polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *Clytia* spec., *Obelia dichotoma* (Linnaeus, 1758).

CONG 26, Transect 5, Punta La Ermita, 18 m, 21.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Halecium* spec., *Aglaophenia acacia* Allman, 1883, *A. lophocarpa* Allman, 1877, *Antennella ansini* spec. nov., *Nemertesia ramosa* (Lamarck, 1816), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia* spec.

CONG 27, Transect 5, Punta La Ermita, 13 m, 21.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *A. secundaria* (Gmelin, 1791), *Sertularia distans* Lamouroux, 1816, *Campanularia volubilis* (Linnaeus, 1758).

CONG 28, Transect 5, Punta La Ermita, 9 m, 21.vii.1991: *Eudendrium merulum* Watson, 1985, *Filellum* spec. 2, *Halecium delicatulum* Coughtrey, 1876, *Halecium* spec., *Aglaophenia kirchenpaueri* (Heller, 1868), *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856.

CONG 30, Transect 8, Cuevas de Lara, 0.2 m, 23.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Sertularella fusiformis* (Hincks, 1861), *Sertularia distans* Lamouroux, 1816, *Campanularia volubilis* (Linnaeus, 1758).

CONG 31, Transect 8, Cuevas de Lara, 2 m, 23.vii.1991: *Halecium delicatulum* Coughtrey, 1876, *Aglaophenia picardi* Svoboda, 1979.

CONG 32, Transect 8, Cuevas de Lara, 7 m, 23.vii.1991: *Filellum* spec. 1, *Filellum* spec. 2, *Scandia gigas*

(Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Monotheca obliqua* (Johnston, 1847), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia volubilis* (Linnaeus, 1758), *Clytia paulensis* (Vanhöffen, 1910).

CONG 33, Transect 8, Cuevas de Lara, 9 m, 23.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Antennella ansini* spec. nov., *Salacia desmoides* (Torrey, 1902), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Clytia* spec.

CONG 35, Transect 8, Cuevas de Lara, 2 m, 23.vii.1991: *Turritopsis nutricula* McCrady, 1859, *Filellum* spec. 1, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium* spec., *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

CONG 37, Transect 8, Cuevas de Lara, 0 m, 23.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Sertularella lagenoides* Stechow, 1919.

CONG 39, Transect 8, Cuevas de Lara, 0.4 m, 23.vii.1991: *Filellum* spec. 2, *Halecium lankesteri* (Bourne, 1890), *Monotheca obliqua* (Johnston, 1847), *Campanularia volubilis* (Linnaeus, 1758).

CONG 41, Transect 8, Cuevas de Lara, 2.5 m, 23.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Monotheca obliqua* (Johnston, 1847).

CONG 42, Transect 8, Cuevas de Lara, 8 m, 23.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. petrosum* Stechow, 1919, *H. tenellum* Hincks, 1861, *Antennella ansini* spec. nov., *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836).

CONG 43', Transect 8, Cuevas de Lara, 0 m, 23.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Ventromma halecioides* (Alder, 1859).

CONG 43, Transect 2, North Point, 2 m, 25.vii.1991: *Filellum* spec. 2, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella lagenoides* Stechow, 1919, *Campanularia volubilis* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900)

CONG 44, Transect 2, North Point, 3 m, 25.vii.1991: *Filellum serratum* (Clarke, 1879), *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Aglaophenia kirchenpaueri* (Heller, 1868), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Salacia desmoides* (Torrey, 1902), *Sertularella fusiformis* (Hincks, 1861), *S. mediterranea* Hartlaub, 1901, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900).

CONG 45, Transect 2, North Point, 3 m, 25.vii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella fusiformis* (Hincks, 1861).

CONG 46, Transect 2, North Point, 5 m, 25.vii.1991: *Filellum* spec. 2, *Anthohebella parasitica* (Ciamician, 1880), *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Aglaophenia kirchenpaueri* (Heller, 1868), *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Monotheca obliqua* (Johnston, 1847), *Dynamena disticha* (Bosc, 1802), *Sertularella lagenoides* Stechow, 1919, *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758), *Orthopyxis integra* (Macgillivray, 1842).

CONG 47, Transect 2, North Point, 2.5 m, 25.vii.1991: *Halecium delicatulum* Coughtrey, 1876, *H. pusillum* (M. Sars, 1857), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Ventromma halecioides* (Alder, 1859)

CONG 53, Transect 12, Barco hundido, 18 m, 04.viii.1991: *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia picardi* Svoboda, 1979, *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856.

CONG 54, Transect 12, Barco hundido, 17 m, 04.viii.1991: *Eudendrium glomeratum* Picard, 1951, *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Egmundella amirantensis* Millard & Bouillon, 1973, *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Antennella ansini* spec. nov., *A. secundaria* (Gmelin, 1791), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. ellisii ornata* Broch, 1933, *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

CONG 55, Transect 12, Barco hundido, 16 m, 04.viii.1991: *Eudendrium merulum* Watson, 1985, *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Antennella ansini* spec. nov., *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856.

CONG 56, Transect 12, Barco hundido, 15 m, 04.viii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia picardi* Svoboda, 1979, *Sertularella ellisii ornata* Broch, 1933, *Clytia linearis* (Thornely, 1900), *Clytia* spec.

CONG 57, Transect 12, Barco hundido, 10.5 m, 04.viii.1991: *Filellum disaggregatum* Peña Cantero, García Carrascosa & Vervoort, 1998, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Dynamena disticha* (Bosc, 1802), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

CONG 58, Transect 12, Barco hundido, 9 m, 04.viii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Clytia hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900).

CONG 59, Transect 12, Barco hundido, 9 m, 04.viii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Hydranthea margarica* (Hincks, 1863), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900).

CONG 60, Transect 12, Barco hundido, 8.5 m, 04.viii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Antennella ansini* spec. nov., *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816.

CONG 61, Transect 12, Barco hundido, 4 m, 04.viii.1991: *Eudendrium merulum* Watson, 1985, *Filellum* spec. 1, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella fusiformis* (Hincks, 1861), *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758), *Clytia paulensis* (Vanhöffen, 1910).

CONG 62, Transect 12, Barco hundido, 5 m, 04.viii.1991: *Eudendrium capillare* Alder, 1856, *Filellum disaggregatum* Peña Cantero, García Carrascosa & Vervoort, 1998, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium* spec., *Dynamena disticha* (Bosc, 1802).

CONG 63, Transect 12, Barco hundido, 2 m, 04.viii.1991: *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *H. pusillum* (M. Sars, 1857), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Sertularella lagenoides* Stechow, 1919, *Clytia hemisphaerica* (Linnaeus, 1767).

CONG 64, Transect 12, Barco hundido, 1 m, 04.viii.1991: *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Hydrodendron mirabile* (Hincks, 1866), *Ventromma halecioides* (Alder, 1859), *Clytia gracilis* (M. Sars, 1850).

CONG 66, Transect 13, La Sangre, 0 m, 04.viii.1991: *Eudendrium* spec., *Coryne muscoides* (Linnaeus, 1761), *Scandia gigas* (Pieper, 1884), *Halecium pusillum* (M. Sars, 1857), *Aglaophenia acacia* Allman, 1883, *Sertularella lagenoides* Stechow, 1919.

CONG 67, Transect 13, La Sangre, 0 m, 04.viii.1991: *Eudendrium* spec., *Scandia gigas* (Pieper, 1884), *Ventromma halecioides* (Alder, 1859), *Clytia gracilis* (M. Sars, 1850).

CONG 69, Transect 13, La Sangre, 2.5 m, 04.viii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Hydrodendron mirabile* (Hincks, 1866), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Campanularia volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

CONG 70, Transect 13, La Sangre, 4.5 m, 04.viii.1991: *Filellum* spec. 1, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia kirchenpaueri* (Heller, 1868), *A. picardi* Svoboda, 1979, *Antennella ansini* spec. nov., *Monotheca obliqua* (Johnston, 1847), *Salacia desmoides* (Torrey, 1902), *Sertularella mediterranea* Hartlaub, 1901, *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856.

CONG 71, Transect 13, La Sangre, 5 m, 04.viii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Antennella ansini* spec. nov., *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758).

CONG 72, Transect 13, La Sangre, 7 m, 04.viii.1991: *Filellum* spec. 1, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Monotheca obliqua* (Johnston, 1847), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Campanularia volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

CONG 73, Transect 13, La Sangre, 10 m, 04.viii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Aglaophenia kirchenpaueri* (Heller, 1868), *Dynamena disticha* (Bosc, 1802), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. mediterranea* Hartlaub, 1901, *Sertularia distans* Lamouroux, 1816, *Campanularia volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

CONG 74, Transect 13, La Sangre, 11 m, 04.viii.1991: *Filellum serratum* (Clarke, 1879), *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium pusillum* (M. Sars, 1857), *H. tenellum* Hincks, 1861, *Halecium* spec., *Aglaophenia kirchenpaueri* (Heller, 1868), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Monotheca obliqua* (Johnston, 1847), *Salacia desmoides* (Torrey, 1902), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *S. perpusilla* Stechow, 1919, *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *Orthopyxis asymmetrica* Stechow, 1919.

CONG 75, Transect 13, La Sangre, 12 m, 04.viii.1991: *Hydractinia inermis* (Allman, 1872), *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Aglaophenia picardi* Svoboda, 1979, *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Monotheca obliqua* (Johnston, 1847), *Salacia desmoides* (Torrey, 1902), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *S. perpusilla* Stechow, 1919.

CONG 76, Transect 13, La Sangre, 13 m, 04.viii.1991: *Filellum* spec. 1, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Salacia desmoides* (Torrey, 1902), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

CONG 77, Transect 14, El Pedregal, 21 m, 06.viii.1991: *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Aglaophenia picardi* Svoboda, 1979, *Antennella ansini* spec. nov., *Monotheca obliqua* (Johnston, 1847), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Clytia hemisphaerica* (Linnaeus, 1767), *Clytia* spec.

CONG 78, Transect 14, El Pedregal, 18 m, 06.viii.1991: *Eudendrium* spec., *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. petrosum* Stechow, 1919, *Antennella ansini* spec. nov., *A. secundaria* (Gmelin, 1791), *Sertularella polyzonias* (Linnaeus, 1758).

CONG 79, Transect 14, El Pedregal, 17 m, 06.viii.1991: *Eudendrium merulum* Watson, 1985, *Filellum* spec. 2, *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Synthecium evansii* (Ellis & Solander, 1786), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910)

CONG 80, Transect 14, El Pedregal, 15 m, 06.viii.1991: *Turritopsis nutricula* McCrady, 1859, *Eudendrium merulum* Watson, 1985, *Ectopleura wrighti* Petersen, 1979, *Cladocoryne flocosa* Rotch, 1871, *Filellum* spec. 1, *Filellum* spec. 2, *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Clytia* spec.

CONG 81, Transect 14, El Pedregal, 8 m, 06.viii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Aglaophenia picardi* Svoboda, 1979, *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Nemertesia ramosa* (Lamarck, 1816), *Dynamena disticha* (Bosc, 1802), *Orthopyxis crenata* (Hartlaub, 1901).

CONG 82, Transect 14, El Pedregal, 5 m, 06.viii.1991: *Filellum serratum* (Clarke, 1879), *Filellum* spec. 1, *Anthohebella parasitica* (Ciamician, 1880), *Scandia gigas* (Pieper, 1884), *Halecium delicatulum*

Coughtrey, 1876, *H. pusillum* (M. Sars, 1857), *Aglaophenia kirchenpaueri* (Heller, 1868), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Sertularella lagenoides* Stechow, 1919, *Campanularia volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

CONG 83, Transect 14, El Pedregal, 5 m, 06.viii.1991: *Eudendrium capillare* Alder, 1856, *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Aglaophenia kirchenpaueri* (Heller, 1868), *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Monotheca obliqua* (Johnston, 1847), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Sertularia distans* Lamouroux, 1816, *Campanularia volubilis* (Linnaeus, 1758).

ISA 1, Transect 1, North of the dike, 24 m, 13.vii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Antennella secundaria* (Gmelin, 1791), *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Sertularella polyzonias* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

ISA 2, Transect 1, North of the dike, 16 m, 13.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia lophocarpa* Allman, 1877, *Antennella ansini* spec. nov., *Halopteris liechtensternii* (Marktanner Turneretscher, 1890).

ISA 3, Transect 1, North of the dike, 12 m, 13.vii.1991: *Filellum* spec. 2, *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia octodonta* (Heller, 1868), *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Plumularia setacea* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Clytia linearis* (Thornely, 1900).

ISA 4, Transect 1, North of the dike, 10 m, 13.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Aglaophenia kirchenpaueri* (Heller, 1868), *Halopteris diaphana* (Heller, 1868), *Sertularella polyzonias* (Linnaeus, 1758), *Obelia dichotoma* (Linnaeus, 1758).

ISA 5, Transect 4, Punta España, 35 m, 18.vii.1991: *Eudendrium ramosum* (Linnaeus, 1758), *Ectopleura wrighti* Petersen, 1979, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium tenellum* Hincks, 1861, *Halecium* spec., *Aglaophenia elongata* Meneghini, 1845, *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella secundaria* (Gmelin, 1791), *Plumularia setacea* (Linnaeus, 1758), *Sertularella polyzonias* (Linnaeus, 1758), *Sertularia perpusilla* Stechow, 1919, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Clytia* spec., *Obelia dichotoma* (Linnaeus, 1758).

ISA 6, Transect 4, Punta España, 28 m, 18.vii.1991: *Halecium lankesteri* (Bourne, 1890), *H. sibogae marocanum* Billard, 1934, *H. tenellum* Hincks, 1861, *Antennella secundaria* (Gmelin, 1791), *Sertularella ellisii ornata* Broch, 1933, *Clytia* spec.

ISA 7, Transect 4, Punta España, 15 m, 18.vii.1991: *Filellum* spec. 1, *Halecium lankesteri* (Bourne, 1890), *Aglaophenia lophocarpa* Allman, 1877, *Antennella ansini* spec. nov., *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Salacia desmoides* (Torrey, 1902), *Campanularia volubilis* (Linnaeus, 1758).

ISA 9, Transect 4, Punta España, 12 m, 25.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Halecium* spec., *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910).

ISA 10, Transect 4, Punta España, 10 m, 25.vii.1991: *Filellum serratum* (Clarke, 1879), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia lophocarpa* Allman, 1877, *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

ISA 12, Trasect 9, Below the powder magazine, 5 m, 26.vii.1991: *Eudendrium merulum* Watson, 1985, *E. racemosum* (Gmelin, 1791), *Anthohebella parasitica* (Ciamician, 1880), *Halecium delicatulum* Coughtrey, 1876, *Aglaophenia kirchenpaueri* (Heller, 1868), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Sertularella mediterranea* Hartlaub, 1901, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

ISA 13, Trasect 9, Below the powder magazine, 0 m, 26.vii.1991: *Coryne muscoides* (Linnaeus, 1761), *Halecium lankesteri* (Bourne, 1890), *H. pusillum* (M. Sars, 1857), *Aglaophenia octodonta* (Heller, 1868), *Ventromma halecioides* (Alder, 1859), *Sertularella lagenoides* Stechow, 1919.

ISA 14, Trasect 9, Below the powder magazine, 0.3 m, 26.vii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia octodonta* (Heller, 1868), *Ventromma halecioides* (Alder, 1859), *Sertularella lagenoides* Stechow, 1919, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900).

ISA 15, Trasect 9, Below the powder magazine, 5 m, 26.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Sertularia distans* Lamouroux, 1816, *Clytia linearis* (Thornely, 1900).

ISA 16, Trasect 9, Below the powder magazine, 7 m, 26.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Antennella secundaria* (Gmelin, 1791), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856.

ISA 17, Trasect 9, Below the powder magazine, 3 m, 26.vii.1991: *Filellum* spec. 2, *Anthohebella parasitica* (Ciamician, 1880), *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia kirchenpaueri* (Heller, 1868), *A. picardi* Svoboda, 1979, *Antennella ansini* spec. nov., *Sertularella fusiformis* (Hincks, 1861), *Campanularia hincksii* Alder, 1856, *Clytia paulensis* (Vanhöffen, 1910).

ISA 18, Trasect 9, Below the powder magazine, 20 m, 27.vii.1991: *Eudendrium capillare* Alder, 1856, *E. racemosum* (Gmelin, 1791), *E. ramosum* (Linnaeus, 1758), *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia acacia* Allman, 1883, *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910).

ISA 19, Trasect 9, Below the powder magazine, 20 m, 27.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Halecium* spec., *Aglaophenia pluma* (Linnaeus, 1758), *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Sertularella polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758), *Clytia hemisphaerica* (Linnaeus, 1767).

ISA 21, Trasect 9, Below the powder magazine, 19 m, 27.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium tenellum* Hincks, 1861, *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *Clytia* spec.

ISA 22, Trasect 9, Below the powder magazine, 15 m, 27.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia lophocarpa* Allman, 1877, *Antennella ansini* spec. nov., *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Sertularella ellisii ornata* Broch, 1933, *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *Laomedea pseudodichotoma* Vervoort, 1959.

ISA 23, Trasect 9, Below the powder magazine, 18 m, 27.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. sibogae marocanum* Billard, 1934, *H. tenellum* Hincks, 1861, *Halecium* spec., *Antennella secundaria* (Gmelin, 1791).

ISA 24, Trasect 9, Below the powder magazine, l0 m, 27.vii.1991: *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

ISA 25, Transect 11, Below the lighthouse, 10 m, 02.viii.1991: *Filellum* spec. 2, *Halecium tenellum* Hincks, 1861, *Halecium* spec., *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

ISA 26, Transect 11, Below the lighthouse, 34 m 02.viii.1991: *Eudendrium capillare* Alder, 1856, *E. glomeratum* Picard, 1951, *E. moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Egmundella amirantensis* Millard & Bouillon, 1973, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Antennella secundaria* (Gmelin, 1791), *Halopteris diaphana* (Heller, 1868), *Sertularella fusiformis* (Hincks, 1861), *S. polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *Clytia* spec., *Obelia dichotoma* (Linnaeus, 1758).

ISA 27, Transect 11, Below the lighthouse, 25 m, 02.viii.1991: *Filellum* spec. 1, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Egmundella amirantensis* Millard & Bouillon, 1973, *Halecium delicatulum*

Coughtrey, 1876, *H. tenellum* Hincks, 1861, *Mitrocomium* spec., *Antennella ansini* spec. nov., *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Clytia* spec., *Obelia dichotoma* (Linnaeus, 1758).

ISA 28, Transect 11, Below the lighthouse, 29 m, 02.viii.1991: *Filellum* spec. 2, *Halecium tenellum* Hincks, 1861, *Mitrocomium* spec., *Sertularella polyzonias* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900), *Clytia* spec., *Obelia dichotoma* (Linnaeus, 1758).

ISA 29, Transect 11, Below the lighthouse, 6 m, 02.viii.1991: *Filellum* spec. 2, *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia kirchenpaueri* (Heller, 1868), *Antennella ansini* spec. nov., *A. secundaria* (Gmelin, 1791), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella lagenoides* Stechow, 1919, *S. mediterranea* Hartlaub, 1901, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910).

ISA 30, Transect 11, Below the lighthouse, 15 m, 02.viii.1991: *Eudendrium merulum* Watson, 1985, *Filellum* spec. 2, *Halecium lankesteri* (Bourne, 1890), *Aglaophenia octodonta* (Heller, 1868), *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella mediterranea* Hartlaub, 1901, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

ISA 32, Transect 11, Below the lighthouse, 25 m, 02.viii.1991: *Aglaophenia acacia* Allman, 1883.

PCONG 1, Playa Larga, 1 m, 19.vii.1991: *Clava multicornis* (Forskål, 1775), *Egmundella amirantensis* Millard & Bouillon, 1973, *Sertularella mediterranea* Hartlaub, 1901, *Clytia linearis* (Thornely, 1900).

PCONG 2, Cuevas de Lara, 3 m, 23.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Antennella ansini* spec. nov., *Monotheca obliqua* (Johnston, 1847), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Clytia paulensis* (Vanhöffen, 1910).

PCONG 3, Playa Larga, 2 m, 19.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Halecium delicatulum* Coughtrey, 1876, *Clytia linearis* (Thornely, 1900).

PCONG 4, Cuevas de Lara, 3 m, 23.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Filellum* spec. 2, *Halecium delicatulum* Coughtrey, 1876.

PCONG 5, Cuevas de Lara, 3 m, 23.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Filellum* spec. 2, *Anthohebella parasitica* (Ciamician, 1880), *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Halopteris diaphana* (Heller, 1868), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. fusiformis* (Hincks, 1861), *Sertularia distans* Lamouroux, 1816.

PCONG 6, Playa Larga, 2 m, 19.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Halecium* spec., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Campanularia volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

PCONG 7, 0.5 m, 12.vii.1991: *Anthohebella parasitica* (Ciamician, 1880), *Scandia gigas* (Pieper, 1884), *Aglaophenia picardi* Svoboda, 1979, *Ventromma halecioides* (Alder, 1859), *Monotheca obliqua* (Johnston, 1847), *Sertularella fusiformis* (Hincks, 1861).

PISA 1, Behind the pier, 2.5 m, 22.vii.1991: *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Clytia linearis* (Thornely, 1900).

PISA 2, Behind the pier, 3 m, 26.vii.1991: *Eudendrium racemosum* (Gmelin, 1791).

PISA 3, Behind the pier, 3 m, 26.vii.1991: *Eudendrium glomeratum* Picard, 1951, *Filellum* spec. 2, *Halecium delicatulum* Coughtrey, 1876, *Aglaophenia kirchenpaueri* (Heller, 1868), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

PISA 4, Behind the pier, 1 m, 22.vii.1991: *Eudendrium racemosum* (Gmelin, 1791).

PISA 5, Behind the pier, 2 m, 19.vii.1991: *Aglaophenia tubiformis* Marktanner Turneretscher, 1890.

PISA 6, Behind the pier, 2.7 m, 22.vii.1991: *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Clytia linearis* (Thornely, 1900).

PISA 7, Pier, 2 m, 24.vii.1991: *Eudendrium racemosum* (Gmelin, 1791).

PISA 8, Behind the pier, 1 m, 22.vii.1991: *Eudendrium racemosum* (Gmelin, 1791).

PISA 9, Pier, 1 m, 24.vii.1991: *Hydrodendron mirabile* (Hincks, 1866), *Clytia linearis* (Thornely, 1900), *Laomedea* spec. 2.

PISA 10, Pier, 1 m, 24.vii.1991: *Clytia linearis* (Thornely, 1900).

PISA 11, Behind the pier, 2.3 m, 19.vii.1991: *Anthohebella parasitica* (Ciamician, 1880), *Scandia gigas* (Pieper, 1884), *Aglaophenia kirchenpaueri* (Heller, 1868), *A. picardi* Svoboda, 1979, *Sertularella fusiformis* (Hincks, 1861).

PISA 12, Behind the pier, 2 m, 26.vii.1991: *Eudendrium capillare* Alder, 1856, *Halecium lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Ventromma halecioides* (Alder, 1859), *Clytia gracilis* (M. Sars, 1850).

PISA 13, Behind the pier, 2 m, 26.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Dynamena disticha* (Bosc, 1802), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856.

PISA 14, Behind the pier, 3.3 m, 22.vii.1991: *Turritopsis nutricula* McCrady, 1859, *Eudendrium capillare* Alder, 1856, *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Antennella ansini* spec. nov., *Plumularia setacea* (Linnaeus, 1758), *Sertularella mediterranea* Hartlaub, 1901, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910).

PISA 15, Pier, 1 m, 15.vii.1991: *Turritopsis nutricula* McCrady, 1859, *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Aglaophenia octodonta* (Heller, 1868), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *Laomedea* spec. 2.

PISA 16, Pier, 2 m: *Aglaophenia tubiformis* Marktanner Turneretscher, 1890.

PISA 17, Pier, 1 m, 15.vii.1991: *Filellum* spec. 2, *Halecium lankesteri* (Bourne, 1890), *Hydrodendron mirabile* (Hincks, 1866), *Aglaophenia octodonta* (Heller, 1868), *A. tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *C. volubilis* (Linnaeus, 1758).

PISA 18, Punta de España, 30 m, 19.vii.1991: *Eudendrium glomeratum* Picard, 1951b, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium tenellum* Hincks, 1861, *Aglaophenia acacia* Allman, 1883, *Antennella secundaria* (Gmelin, 1791), *Nemertesia ramosa* (Lamarck, 1816), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *Clytia* spec.

PISA 19, Behind the pier, 2 m, 26.vii.1991: *Eudendrium glomeratum* Picard, 1951, *Filellum* spec. 2, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Halecium* spec., *Dynamena disticha* (Bosc, 1802), *Sertularella lagenoides* Stechow, 1919, *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856.

PISA 20, Pier, 2 m, 15.vii.1991: *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Antennella ansini* spec. nov.

PISA 21, Behind the pier, 2 m, 26.vii.1991: *Eudendrium capillare* Alder, 1856, *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *H. lankesteri* (Bourne, 1890), *Ventromma halecioides* (Alder, 1859), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

PISA 22, Pier, 2 m, 24.vii.1991: *Filellum* spec. 2, *Aglaophenia octodonta* (Heller, 1868), *Sertularella lagenoides* Stechow, 1919, *Sertularia distans* Lamouroux, 1816, *Campanularia volubilis* (Linnaeus, 1758), *Clytia linearis* (Thornely, 1900).

PISA 23, Pier, 3 m, 24.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Filellum* spec. 2, *Halecium lankesteri* (Bourne, 1890), *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910).

PISA 24, Pier, 2 m, 24.vii.1991: *Filellum* spec. 2, *Halecium pusillum* (M. Sars, 1857), *Aglaophenia picardi* Svoboda, 1979, *Halopteris diaphana* (Heller, 1868), *Monotheca obliqua* (Johnston, 1847), *Dynamena disticha* (Bosc, 1802), *Campanularia volubilis* (Linnaeus, 1758).

PISA 25, Pier, 1 m, 15.vii.1991: *Clytia linearis* (Thornely, 1900).

PISA 26, Pier, 1.5 m, 15.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Halecium delicatulum* Coughtrey, 1876, *Antennella ansini* spec. nov.

PISA 27, Pier, 1 m, 15.vii.1991: *Filellum* spec. 2, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

PISA 28, Pier, 3 m, 15.vii.1991: *Eudendrium racemosum* (Gmelin, 1791).

PREY 1, Balcón de Pilatos, 13 m: *Aglaophenia lophocarpa* Allman, 1877, *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

REY 4, Transect 3, North Point, 27 m, 17.vii.1991: *Bougainvillia muscus* (Allman, 1863), *Eudendrium glomeratum* Picard, 1951b, *Filellum* spec. 2, *Halecium petrosum* Stechow, 1919, *H. tenellum* Hincks, 1861, *Aglaophenia lophocarpa* Allman, 1877, *Antennella secundaria* (Gmelin, 1791), *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Sertularella ellisii ornata* Broch, 1933, *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *C. paulensis* (Vanhöffen, 1910), *Obelia dichotoma* (Linnaeus, 1758).

REY 5, Transect 3, North Point, 20 m, 17.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. tenellum* Hincks, 1861, *Aglaophenia lophocarpa* Allman, 1877, *A. pluma* (Linnaeus, 1758), *Antennella ansini* spec. nov., *Halopteris diaphana* (Heller, 1868), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *S. polyzonias* (Linnaeus, 1758), *Sertularia distans* Lamouroux, 1816, *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *Clytia* spec., *Obelia bidentata* Clarke, 1875, *O. dichotoma* (Linnaeus, 1758).

REY 6, Transect 3, North Point, 10 m, 17.vii.1991: *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia lophocarpa* Allman, 1877, *A. pluma* (Linnaeus, 1758), *Antennella ansini* spec. nov., *A. secundaria* (Gmelin, 1791), *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

REY 7, Transect 6, La Sartén, 27 m, 22.vii.1991: *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia acacia* Allman, 1883, *A. lophocarpa* Allman, 1877, *Antennella secundaria* (Gmelin, 1791), *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Kirchenpaueria pinnata* (Linnaeus, 1758).

REY 8, Transect 6, La Sartén, 25 m, 22.vii.1991: *Eudendrium glomeratum* Picard, 1951, *E. ramosum* (Linnaeus, 1758), *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Antennella secundaria* (Gmelin, 1791), *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. hemisphaerica* (Linnaeus, 1767), *C. linearis* (Thornely, 1900), *Obelia dichotoma* (Linnaeus, 1758).

REY 9, Transect 6, La Sartén, 22 m, 22.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Halecium* spec., *Aglaophenia acacia* Allman, 1883, *A. lophocarpa* Allman, 1877, *Antennella ansini* spec. nov., *A. secundaria* (Gmelin, 1791), *Halopteris liechtensternii* (Marktanner Turneretscher, 1890).

REY 10, Transect 6, La Sartén, 16 m, 22.vii.1991: *Scandia gigas* (Pieper, 1884), *Antennella ansini* spec. nov., *Halopteris liechtensternii* (Marktanner Turneretscher, 1890), *Clytia linearis* (Thornely, 1900), *Obelia dichotoma* (Linnaeus, 1758).

REY 11, Transect 6, La Sartén, 6 m, 22.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Sertularella polyzonias* (Linnaeus, 1758), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900), *Orthopyxis integra* (Macgillivray, 1842).

REY 13, Transect 18, Tajo de los Piratas, 0 m, 25.vii.1991: *Scandia gigas* (Pieper, 1884), *Aglaophenia octodonta* (Heller, 1868), *Sertularella lagenoides* Stechow, 1919.

REY 14, Transect 18, Tajo de los Piratas, 0 m, 25.vii.1991: *Halecium pusillum* (M. Sars, 1857), *Aglaophenia octodonta* (Heller, 1868), *Sertularella lagenoides* Stechow, 1919.

REY 17, Transect 18, Tajo de los Piratas, 2-6 m, 25.vii.1991: *Eudendrium racemosum* (Gmelin, 1791), *Filellum* spec. 1, *Scandia gigas* (Pieper, 1884), *Halecium* spec., *Aglaophenia kirchenpaueri* (Heller, 1868), *A. picardi* Svoboda, 1979, *A. pluma* (Linnaeus, 1758), *Antennella ansini* spec. nov., *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Campanularia hincksii* Alder, 1856, *Clytia linearis* (Thornely, 1900).

REY 19, South of the dike, 2 m, 28.vii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia picardi* Svoboda, 1979, *A. tubiformis* Marktanner Turneretscher, 1890.

REY 20, Transect 17, Baños de la Reina, 3 m, 06.viii.1991: *Filellum* spec. 2, *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Campanularia hincksii* Alder, 1856, *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900).

REY 22, Transect 17, Baños de la Reina, 0 m, 06.viii.1991: *Turritopsis nutricula* McCrady, 1859, *Eudendrium moulouyensis* Marques, Peña Cantero & Vervoort, 2000, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Hydrodendron mirabile* (Hincks, 1866), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Clytia gracilis* (M. Sars, 1850), *C. linearis* (Thornely, 1900).

REY 23, Transect 17, Baños de la Reina, 0 m, 06.viii.1991: *Scandia gigas* (Pieper, 1884), *Halecium pusillum* (M. Sars, 1857), *Hydrodendron mirabile* (Hincks, 1866), *Ventromma halecioides* (Alder, 1859), *Sertularella fusiformis* (Hincks, 1861), *Campanularia volubilis* (Linnaeus, 1758).

REY 24, Transect 17, Baños de la Reina, 0 m, 06.viii.1991: *Coryne muscoides* (Linnaeus, 1761), *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *H. pusillum* (M. Sars, 1857), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Dynamena disticha* (Bosc, 1802), *Sertularella fusiformis* (Hincks, 1861), *Campanularia volubilis* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850).

REY 25, Transect 17, Baños de la Reina, 0 m, 06.viii.1991: *Eudendrium* spec., *Scandia gigas* (Pieper, 1884), *Ventromma halecioides* (Alder, 1859), *Sertularella fusiformis* (Hincks, 1861).

REY 27, Transect 17, Baños de la Reina, 1.5 m, 08.viii.1991: *Turritopsis nutricula* McCrady, 1859, *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Sertularella fusiformis* (Hincks, 1861), *Campanularia hincksii* Alder, 1856.

REY 28, Transect 17, Baños de la Reina, 2 m, 08.viii.1991: *Scandia gigas* (Pieper, 1884), *Halecium lankesteri* (Bourne, 1890), *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, *Kirchenpaueria pinnata* (Linnaeus, 1758), *Clytia gracilis* (M. Sars, 1850).

REY 29, Transect 17, Baños de la Reina, 1 m, 08.viii.1991: *Scandia gigas* (Pieper, 1884), *Halecium delicatulum* Coughtrey, 1876, *Halecium lankesteri* (Bourne, 1890).

REY 33, Transect 17, Baños de la Reina, 4 m, 08.viii.1991: *Scandia gigas* (Pieper, 1884), *Aglaophenia picardi* Svoboda, 1979, *Monotheca obliqua* (Johnston, 1847), *Sertularella fusiformis* (Hincks, 1861), *Sertularia perpusilla* Stechow, 1919.

Taxonomic account

Family Bougainvilliidae Allman, 1876

Genus *Bougainvillia* Lesson, 1836

Bougainvillia muscus (Allman, 1863)
(fig. 3a-c)

Perigonimus muscus Allman, 1863: 12.

Perigonimus ramosus Allman, 1863: 12.

Bougainvillia ramosa; Allman, 1872: 311, pl. 9 figs 5-7; Stechow, 1919: 27; Broch, 1933: 11; Leloup, 1934: 5; Picard, 1958a: 190; Patriti, 1970: 15, fig. 7; Boero, 1981a: 182; Morri, 1981a: 50-52, figs 15a-c; Isasi, 1985: 42-43, figs 1b-e; Boero & Fresi, 1986: 140; Gili, 1986: 108-109, fig. 4.3b; Ramil, 1988: 93-96; Gili et al., 1989: 70-71; Cornelius et al., 1990: 124, fig. 4.8; Altuna, 1994: 54-55; Medel & López González, 1996: 193; Morri & Bianchi, 1999: 285.

Bougainvillea ramosa; Motz-Kossowska, 1905: 76-77.

Bougainvillea fruticosa; Motz-Kossowska, 1905: 77.

Bougainvillia ramosa f. *typica*; Teissier, 1965: 13.

Bougainvillia ramosa f. *muscus*; Teissier, 1965: 13.

Bougainvillia ramosa f. *Typica*; Fey, 1970: 391.

Bougainvillia muscus; Calder, 1988: 24-28, figs 19-20; Boero & Bouillon, 1993: 258.

Material.— A-7, 57 m, a few stems on *Amathia* spec., no polyps (RMNH-Coel. 29290).— A-11, 46 m, one colony with a few stems on gorgonian, no polyps.— A-12, a few polysiphonic stems on *Turritella communis*, with gonophores (RMNH-Coel. 29291).— A-14, 40 m, stem fragment, no polyps.— B-6, 52 m, three stem fragments, no polyps.— B-10, 41 m, a stem fragment without polyps.— B-11, 42 m, a few tiny stems on mollusc eggs, with gonophores.— B-13, 38 m, several stems on *Dentalium inaequiconstatum* and *Ostraea* spec., with gonophores (RMNH-Coel. 29292).— B-15, 35 m, numerous stems on *Aporrhais pespelecani*, with gonophores.— CONGRESO BANK, colonies on *Eudendrium racemosum* and *Sertularella polyzonias*.— C-4, 34 m, two stems with a single polyp.— C-16, 29 m, stem fragment, no polyps.— D-3, 24 m, two stems on *Gracilaria* spec., no polyps.— D-8, 30 m, numerous polysiphonic stems, no polyps (RMNH-Coel. 29293).— E-2, 40 m, a few stem fragments.— E-16, 25 m, a few stems on polychaete tubes.— F-9, 17 m, stem fragment, no polyps.— F-12, 8 m, stem fragment, no polyps.— F-16, 22 m, a few stems on mollusc eggs, no polyps (RMNH-Coel. 29294).— F-17, 21 m, numerous stems on molluscs eggs and *Chaetomorpha* spec., with gonophores (RMNH-Coel. 29295).— G-8, 17 m, a few stem fragments, no polyps (RMNH-Coel. 29296).— G-9, 18 m, numerous stems on *Aporrhais pespelecani* (RMNH-Coel. 29297).— G-16, 22 m, numerous colonies with polysiphonic stems on molluscs eggs and *Gracilaria* spec., with gonophores (RMNH-Coel. 29298).— G-17, 20 m, several stems on mollusc eggs (RMNH-Coel. 29299).— H-10, 15 m, numerous stems without polyps and a small stem with polyps and gonophores on bivalve shells (RMNH-Coel. 29300).— H-12, 14 m, numerous colonies, no polyps (RMNH-Coel 29301).— H-13, 16 m, numerous stems (RMNH-Coel. 29302).— H-15, 20 m, several stem fragments, no polyps.— H-16, 20 m, numerous stems, no polyps (RMNH-Coel. 29303).— J-8, 15 m, colony with two small stems on *Amathia* spec., no polyps.— REY 4, 27 m, numerous stems on pebbles and *Sertularella polyzonias*, with gonophores (RMNH-Coel. 29304).

Remarks.— The present material consists of colonies composed of either small monosiphonic stems or large polysiphonic hydrocauli up to 70 mm high. Cnidome: microbasic euryteles (5.5-6.4 x 2.4-2.8 μm) and desmonemes (3.2-4 x 2-2.4 μm).

Ecology.— *Bougainvillia muscus* is an eurybathic species, found in the Mediterranean from the tidal level (Boero & Fresi, 1986) to 100 m depth (Morri, 1981a); our material comes from 8 to 57 m depth. Outside the Mediterranean it has been found in deeper waters, e.g., 1193 m depth (Gili et al., 1989).

Bougainvillia muscus has been found epibiontic on seaweeds (Broch, 1933; Boero & Fresi, 1986; Morri & Bianchi, 1999), hydrozoans (Stechow, 1919; Teissier, 1965; Boero & Fresi, 1986; Calder, 1988; Gili et al., 1989), sponges (Calder, 1988; Altuna, 1994), mollusc shells (Teissier, 1965; Boero & Fresi, 1986; Calder, 1988) and polychaete tubes (Boero & Fresi, 1986), as well as epilithic (Isasi, 1985; Calder, 1988) and on non-living substrata, such as mooring lines (Calder, 1988) and recovered instruments (Morri & Bianchi, 1999). We found it growing on a wide range of substrata, but mainly epibiontic on other invertebrates such as hydrozoans, anthozoans, bryozoans, polychaete tubes and shells of gastropods, bivalves and scaphopods. It was also observed on algae (*Gracilaria* and *Chaetomorpha*) and both on biotic (mollusc eggs) and abiotic (gravel) substrata. *Bougainvillia muscus* is used in turn as substratum by other species of hydroids (*Eudendrium ramosum*, *Campanularia hincksii*, *Clytia gracilis*, *C. paulensis*, *Obelia dichotoma* and *Sertularella polyzonias*).

In the Mediterranean fertile colonies were found in April (Broch, 1933), May (Boero & Fresi, 1986), June (Morri & Bianchi, 1999), July (Broch, 1933), August (Motz-Kossowska, 1905), September (Morri & Bianchi, 1999) and November (Broch, 1933). We found fertile colonies in July, but always below the depth at which the summer thermocline is formed. In the nearby north-eastern Atlantic it was found with gonophores in May (Teissier, 1965; Ramil, 1988), June (Teissier, 1965; Fey, 1970), July (Teissier, 1965; Fey, 1970; Isasi, 1985), August (Teissier, 1965; Altuna, 1994) and Sep-

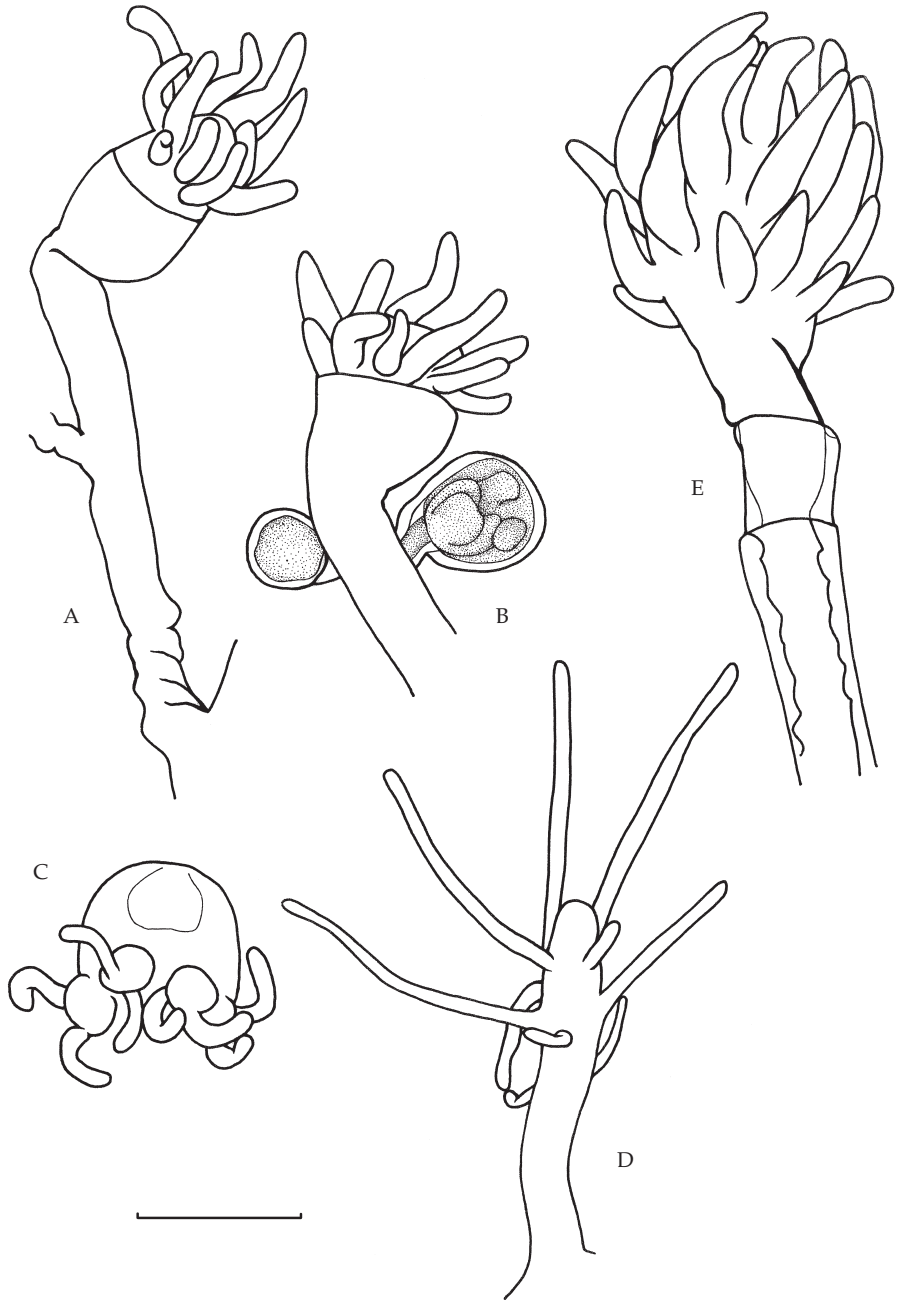

Fig. 3. A-C, *Bougainvillia muscus* (Allman, 1863). A, polyp; B, polyp with medusa buds; C, medusa. D, *Clava multicornis* (Forskål, 1775), polyp. E, *Turritopsis nutricula* McCrady, 1857, polyp. Scale bar: 250 μm.

tember (Teissier, 1965). At temperate latitudes it seems to be fertile throughout the year, with the exception of wintertime.

Distribution.— *Bougainvillia muscus* was considered a cosmopolitan species by Picard (1958a) and Morri (1981a). However, it seems to have a more restricted distribution, being considered circumtropical by Boero & Bouillon (1993) and circumglobal in tropical, subtropical and temperate waters by Altuna (1994).

In the eastern Atlantic it has been recorded from the Norwegian (Bonnevie, 1899) and Swedish coasts (Jäderholm, 1909) southwards to the coasts of South Africa (Millard, 1975).

In the Mediterranean it has been reported from the Adriatic (Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Motz-Kossowska, 1905) and the French (Motz-Kossowska, 1905; Leloup, 1934), Italian (Stechow, 1919; Morri, 1981a; Boero & Fresi, 1986) and Spanish coasts (Gili, 1986).

Family Clavidae McCrady, 1859

Genus *Clava* Gmelin, 1791

Clava multicornis (Forskål, 1775)

(fig. 3d)

Hydra multicornis Forskål, 1775: 131, pl. 26 figs B, b.
Clava multicornis; Hincks, 1868: 2, pl. 1 figs 1,1a; Leloup, 1934: 3; Picard, 1955: 184; 1958a: 189; Naumov, 1969: 195-196, fig. 65; Calder, 1972: 226; Boero, 1981a: 182, 184; Gili, 1986: 98-99, figs 4.2a, 4.55e; Roca, 1986: 78, fig. 20; Boero & Fresi, 1986: 139; Ramil, 1988: 72-75; Cornelius et al., 1990: 118-120, fig. 4.6; Boero & Bouillon, 1993: 258; Altuna, 1994: 58-60; Medel & López González, 1996: 193.
Clava multicornis f. *genuina*; Teissier, 1965: 11.
Clava multicornis f. *squamata*; Teissier, 1965: 11.
Clava multicornis f. *Squamata*; Fey, 1970: 390.

Material.— PCONG1, several colonies on *Acrosorium uncinatum* and bryozoans (RMNH-Coel. 29305).

Ecology.— *Clava multicornis* has been found in the Mediterranean from the tidal level (Boero & Fresi, 1986) to 25 m depth (Gili, 1986); our material was collected at 1 m depth. It has been found epibiontic on algae (Teissier, 1965; Naumov, 1969; Boero & Fresi, 1986; Gili, 1986; Roca, 1986; Ramil, 1988; Cornelius et al., 1990; Altuna, 1994), leaves of *Posidonia oceanica* (Boero, 1981a; Gili, 1986), bryozoans (Boero & Fresi, 1986; Altuna, 1994), cirripedes (Altuna, 1994), bivalves (Teissier, 1965; Altuna, 1994) and gastropods (Fey, 1970; Ramil, 1988), as well as epilithic (Cornelius et al., 1990). We found it on algae and bryozoans.

In the Mediterranean fertile colonies were found in June and July (Gili, 1986). In the north-eastern Atlantic Edwards & Harvey (1975) pointed out that it is fertile from spring to autumn, while Teissier (1965) recorded fertility throughout the year.

Distribution.— Picard (1958a) and Altuna (1994) considered it a North Atlantic species, but Boero & Bouillon (1993) assigned to it a boreal distribution. In the Mediterranean *Clava multicornis* has been reported from the Balearic Islands (Roca, 1986) and from off the Algerian (Picard, 1955), French (Leloup, 1934), Italian (Boero, 1981a; Boero & Fresi, 1986) and Spanish coasts (Gili, 1986).

Genus *Turritopsis* McCrady, 1857

Turritopsis nutricula McCrady, 1857
(fig. 3e)

Oceania (*Turritopsis*) *nutricula* McCrady, 1857: 55, pls 4-7; 1859: 105, 127-129, pl. 8 fig. 1.
Cordylophora Dohrni Motz-Kossowska, 1905: 63.
Turritopsis nutricula; Stechow, 1919: 12-13; Fraser, 1946: 37, 104; Russell, 1953: 115, figs 54-56, pl. 5 figs 1-5, pl. 29 figs 1-3; Teissier, 1965: 12; Vervoort, 1968: 5; Calder, 1971: 30-31, pl. 2 fig. a, pl. 6 fig. i; 1988: 8-10, figs 5-6; Millard & Bouillon, 1973: 30, fig. 4c; 1974: 15; Millard, 1975: 76, fig. 24f-g; Boero & Fresi, 1986: 140; Hirohito, 1988: 71-72, fig. 23c-d; Ramil & Vervoort, 1992: 17; Park, 1993: 264; Boero & Bouillon, 1993: 259; Medel & López González, 1996: 194; Migotto, 1996: 11-13, fig. 3a-c.
Turritopsis dohrni; Stechow, 1923b: 53; Leloup, 1934: 3.
Oceania nutricula; Picard, 1958a: 189.

Material.— CONG 35, one polyp.— CONG 80, two stem fragments with several polyps.— PISA 14, several stems on *Sertularella mediterranea* (RMNH-Coel. 29306).— PISA 15, a few stems on *Turbicellepora* spec.— REY 22, one colony with four stems; three with a single polyp and another with two on *Halopteris* spec. (RMNH-Coel. 29307).— REY 27, several stems with one or two polyps on *Cystoseira spinosa* and polychaetes (RMNH-Coel. 29308).

Ecology.— *Turritopsis nutricula* is an eurybathic species that, in the Mediterranean, has been found from around the tidal level (Boero & Fresi, 1986) to 200 m depth (Stechow, 1923b); our material comes from 0 to 15 m. Outside the Mediterranean it has been reported from 0 (Calder, 1988) to 508 m (Ramil & Vervoort, 1992).

Turritopsis nutricula occurred epibiontic on algae (Stechow, 1919; Boero & Fresi, 1986; Migotto, 1996), sponges (Calder, 1971, 1988), polychaete tubes (Calder, 1971), mollusc shells (Teissier, 1965; Calder, 1971; Migotto, 1996), anthozoans (Stechow, 1923b) and cirripedes (Boero & Fresi, 1986; Calder, 1971; Migotto, 1996), as well as epilithic on pebbles (Teissier, 1965) and rocks (Migotto, 1996). At the Chafarinas it was always found epibiontic, either on algae or on other invertebrates (bryozoans, hydrozoans and polychaete tubes).

In the Mediterranean fertile colonies were found in July and August (Boero & Fresi, 1986); in the north-eastern Atlantic gonophores were found in August (Teissier, 1965).

Distribution.— Boero & Bouillon (1993) considered the distribution of *Turritopsis nutricula* circumtropical; Ramil & Vervoort (1992) ascribe it an almost cosmopolitan pattern, though mainly restricted to temperate, subtropical and tropical waters. In the Mediterranean it has been reported from the Alboran Sea (Ramil & Vervoort, 1992), the Balearic Islands (Motz-Kossowska, 1905) and from off the French (Leloup, 1934) and Italian coasts (Stechow, 1923b; Boero & Fresi, 1986).

Family Eudendriidae L. Agassiz, 1862

Genus *Eudendrium* Ehrenberg, 1834

Remarks.— The taxonomy of species of *Eudendrium* is difficult and was in a confusing state until the middle of last century, as most species were only known from gross morphology. Picard (1952a) proposed the use of the nematocysts as a taxonomical tool in this genus. Only few authors (Millard, 1975; Watson, 1985; 1987; Marques, 1993; 1995;

1996; Schuchert, 1996) included detailed descriptions of the cnidome in their studies and even fewer did so for Mediterranean material (Bavestrello & Piraino, 1991; Marinopoulos, 1992). Mediterranean species of *Eudendrium* have recently been reviewed by Marques et al. (2000); they considered all records without details of the cnidome as being useless. The genus is in need of a comprehensive revision and until this has been accomplished, we prefer not to include information from outside the Mediterranean, with a few exceptions (e.g., *E. glomeratum*, *E. racemosum*), and to include only those Mediterranean records that Marques et al. (2000) considered reliable.

Eudendrium capillare Alder, 1856
(fig. 4a-b)

Eudendrium capillare Alder, 1856: 355, pl. 12 figs 9-12; Picard, 1955: 183, 195; Boero & Fresi, 1986: 141; Medel & López González, 1996: 194; Marques et al., 2000: 201-202.

Material.— CONG 62, one stem with two polyps.— CONG 83, a few stems with one or two polyps on *Codium vermilara*.— ISA 18, several colonies on *Cystoseira spinosa* and *Aglaophenia acacia*, with gonophores (RMNH-Coel. 29309).— ISA 26.— PISA 12, a few stems with one or two polyps, on rock (RMNH-Coel. 29310).— PISA 14, several stems with a single polyp, on *Sertularella mediterranea* (RMNH-Coel. 29311).— PISA 21, a single stem with one polyp.

Description.— Colonies composed of delicate, monosiphonic and branched stems up to 20 mm high. Perisarc of stem smooth, but sometimes with groups of irregularly arranged rings. Branches alternately arranged, approximately in one plane, and forming with stem an angle >45°. Branches well developed, with 3-4 basal rings, giving rise to several polyp-bearing pedicels. Polyp reddish and with a whorl of c. 26 tentacles around the hypostome. Cnidome: nugget-shaped (5.5-7.9 x 2.3-3.2 μm) and cylindrical (5.1-5.9 x 1.6-2.3 μm) microbasic euryteles.

Only female gonophores present, usually in a late developmental state (neither spadix nor polyp visible). However, a few gonophores with unbranched spadix were observed.

Ecology.— In the Mediterranean *Eudendrium capillare* has been reported from the tidal level (Boero & Fresi, 1986) to 7 m depth (Marques et al., 2000); our material was collected from 2 to 34 m depth.

Eudendrium capillare has been found epibiontic on algae (Boero & Fresi, 1986), sponges (Marques et al., 2000), cirripedes (Boero & Fresi, 1986; Marques et al., 2000), mollusc shells (Boero & Fresi, 1986; Marques et al., 2000), bryozoans (Boero & Fresi, 1986), ascidians (Marques et al., 2000), as well as on bio-concretions (Boero & Fresi, 1986) and also epilithic (Boero & Fresi, 1986). In our material *E. capillare* occurs on a wide variety of substrata: epibiontic on algae and hydrozoans and on non-living substrata, both biotic (remains of organisms) and abiotic (rocks and pebbles).

In the Mediterranean fertile colonies of *Eudendrium capillare* have been found in September and October (Boero & Fresi, 1986) and from April to December (Marques et al., 2000).

Distribution.— *Eudendrium capillare* is considered a North Atlantic (Picard, 1958a) or cosmopolitan species (Boero & Bouillon, 1993). Marques et al. (2000) considered it a likely cosmopolitan species. However, though it has been recorded worldwide, most of

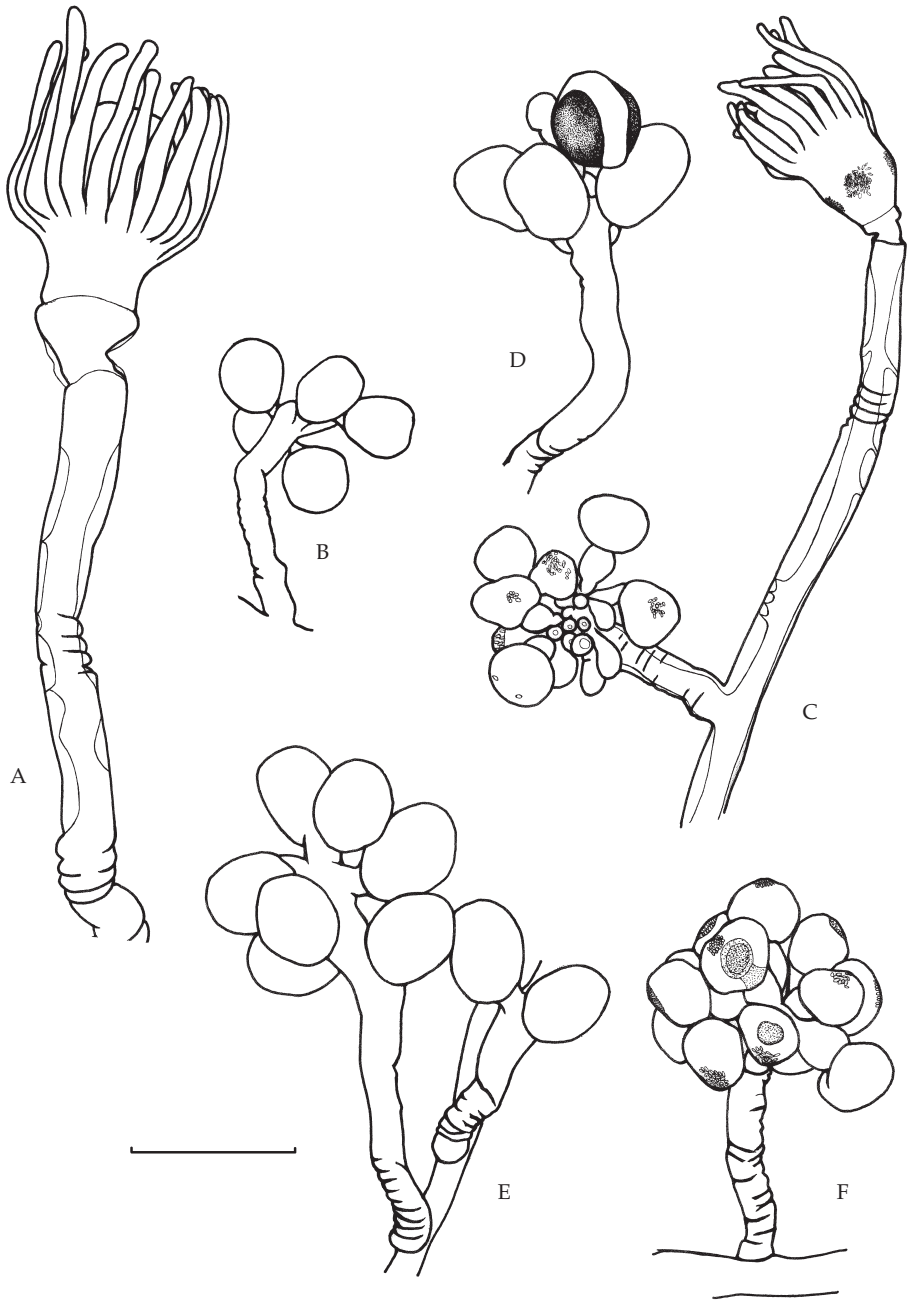

Fig. 4. A, B, *Eudendrium capillare* Alder, 1856. A, polyp; B, female gonophores. C-F, *Eudendrium glomeratum* Picard, 1951. C, polyp and male gonophores; D, E, female gonophores; F, male gonophores. Scale bar: 250 μm (A), 500 μm (B-F).

the records did not consider the cnidome; consequently they should be considered doubtful until nematocyst studies have established its actual geographical distribution.

In the Mediterranean it is definitely known from the Algerian (Picard, 1955), French (Marques et al., 2000) and Italian coasts (Boero & Fresi, 1986; Marques et al., 2000).

Eudendrium glomeratum Picard, 1952a
(fig. 4c-f)

Eudendrium ramosum; Motz-Kossowska, 1905: 52-54, 59, pl. 3 fig. 16; Picard, 1951b: 277.
Eudendrium indopacificum Stechow, 1923b: 59.
Eudendrium glomeratum Picard, 1952a: 338-339, 349; 1955: 183, 194, 196, 198; 1958a: 189; Rossi, 1961: 73-74; Teissier, 1965: 14; Fey, 1970: 392; Rossi, 1971: 18, fig. 6f; Marinopoulos, 1979: 120; 1981: 176; 1992: 59; Boero, 1981a: 182, 185; Watson, 1985: 213, figs 89-94; Boero & Fresi, 1986: 141; Boero et al., 1986: 92, figs 1a-c; Boero & Cornelius, 1987: 244; Roca, 1986: 99-102, fig. 24; Arillo et al., 1989: 289-299; Bavestrello & Arillo, 1992: 45-47; Bavestrello & Cerrano, 1992: 59; Bavestrello et al., 1994: 125-130, fig. 2; Boero & Bouillon, 1993: 259; Altuna, 1994: 68-69; Medel & López González, 1996: 194; Morri & Bianchi, 1999: 285; Marques et al., 2000: 205.

Material.— B-11, 42 m, several stems on *Sertularella polyzonias*, gorgonians and bryozoans, with gonophores (RMNH-Coel. 29312).— B-13, 38 m, several stems with a few polyps, on tube of benthic organism (RMNH-Coel. 29313).— CONGRESO BANK, a single stem, no polyps (RMNH-Coel. 29314).— CONG 7, 19 m, one fragment stem with four polyps.— CONG 54, 16.8 m, numerous stems on *Sertularella polyzonias*, *Eunicella* spec. and *Myriapora truncata*.— C-3, 45 m, two stems on stones, with gonophores.— C-4, 34 m, several stems on stones and remains of bryozoans and mollusc shells (RMNH-Coel. 29315).— D-3, 24 m, three stems on stones, no polyps.— G-17, 20 m, numerous stems on remains of *Posidonia* rhizomes and mollusc eggs, with gonophores (RMNH-Coel. 29316).— ISA 26, 34 m, on *Cellaria salicornoides*, *Pentapora* spec. and anthozoans.— I-8, 17 m, a few stems on *Gracilaria* spec. and mollusc eggs, no polyps (RMNH-Coel. 29317).— PISA 3, 3 m, two stems with one and two polyps on bio-concretions and *Plocamium cartilagineum*.— PISA 18, 30 m, numerous stems on *Haplopoma* spec. (RMNH-Coel. 29318).— PISA 19, 2 m, stem with a single polyp.— REY 4, 27 m, three stems, with gonophores.— REY 8, 25 m, numerous stems on gorgonians, with gonophores (RMNH-Coel. 29319).

Description.— Colonies up to 70 mm high, bushy with either mono- or polysiphonic stems and with stolonal or rhizoidal hydrorhiza, this depending upon the state of development. In polysiphonic colonies both main stem and secondary tubes giving rise to branches. Perisarc of stem smooth; occasionally with a few rings. Perisarc of branch smooth, but with a few proximal rings. Usually lateral branches alternately arranged in one plane and making an angle larger than 45° with the stem. Polyps with a whorl of 15-26 tentacles surrounding the hypostome. Cnidome: microbasic euryteles (6-7 x 3-3.6 μm), mainly present in tentacles, and macrobasic euryteles (20-33 x 8-15 μm), grouped on hydranth body and in distal part of male gonophores.

Male and female gonophores present. Female gonophores arising from atrophied polyps with a few tentacles, an unbranched spadix and 4-6 ova. Male gonophores two-chambered and borne on completely reduced polyps.

Ecology.— *Eudendrium glomeratum* seems to be a littoral and shelf species that, in the Mediterranean, has been found from the tidal level to 200 m depth (Marinopoulos, 1981); our material was collected from 2 to 45 m. In the nearby north-eastern Atlantic it has been recorded from 5 (Fey, 1970) to 80 m depth (Teissier, 1965). It has been reported epibiontic on algae (Rossi, 1961; Morri & Bianchi, 1999), *Posidonia oceanica*

rhizomes (Boero, 1981a), bryozoans and polychaete tubes (Altuna, 1994), as well as on bio-concretions (Rossi, 1961; Boero & Fresi, 1986; Altuna, 1994; Marques et al., 2000) and epilithic on gravel and pebbles (Teissier, 1965) and rocks (Altuna, 1994). At the Chafarinas *E. glomeratum* was usually found epibiontic on other invertebrates such as bryozoans, anthozoans and hydrozoans as well as on non-living substrata, both biotic (remains of organisms, mollusc eggs, bio-concretions) and abiotic (pebbles). Only occasionally it was found on algae. *Eudendrium glomeratum* may be used in turn as substratum by other hydroids; in our material, we found colonies of *Egmundella amirantensis*, *Modeeria rotunda*, *Filellum serratum*, *Campanularia hincksii*, *Clytia gracilis*, *C. hemisphaerica*, *C. paulensis*, *Clytia* spec., *Halecium petrosum*, *H. tenellum*, *Antennella secundaria* and *Sertularella polyzonias*.

In the Mediterranean fertile colonies of *E. glomeratum* have been found in January (Marinopoulos, 1981; Boero & Fresi, 1986), February and March (Boero & Fresi, 1986), end of August-beginning of September (Picard, 1952a), September-October (Marques et al., 2000), October (Picard, 1951b; Roca, 1986; Boero & Fresi, 1986) and November and December (Rossi, 1961; Boero & Fresi, 1986). We found it with gonophores in July. It thus seems to be fertile throughout the year. Outside the Mediterranean colonies with gonophores have been found in June (Fey, 1970; Altuna, 1994), July, August and September (Fey, 1970) and October (Fey, 1970; Altuna, 1994).

Distribution.— Though Picard (1958a) considered *Eudendrium glomeratum* endemic for the Mediterranean, it has a much wider geographical distribution, as is shown by Australian (Watson, 1985) and Brazilian (Marques, 1993) records. At present, it is considered a circumtropical species (Marques et al., 2000). In the eastern Atlantic it has been reported off Great Britain (Boero & Cornelius, 1987), W and NW of the French coast (Teissier, 1965; Fey, 1970) and off the Spanish Basque coast (Altuna, 1994).

In the Mediterranean it has been recorded from the Adriatic (Marques et al., 2000), Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986) and off the Algerian (Picard, 1955), French (Motz-Kossowska, 1905; Picard, 1951b, 1952a; Marinopoulos, 1981; Marques et al., 2000), Israeli (Marinopoulos, 1979; 1992; Marques et al., 2000), Italian (Rossi, 1961; Boero, 1981a; Boero & Fresi, 1986; Marques et al., 2000) and Turkish coasts (Marinopoulos, 1979, 1992).

Eudendrium merulum Watson, 1985
(fig. 5a-b)

Eudendrium merulum Watson, 1985: 200-202, figs 53-58; Bavestrello & Piraino, 1991: 200-203, figs 2-4; Marques et al., 2000: 203.

Material.— CONG 1, 0.5 m, numerous stems on *Salmacina* spec. and *Peyssonnelia coriacea*, with gonophores (RMNH-Coel. 29320).— CONG 28, 9 m, a few stems on sponges (RMNH-Coel. 29321).— CONG 55, 15.5 m, one stem with a single polyp on *Padina pavonia*.— CONG 61, 4 m, a few stems with a single polyp, on *Peyssonnelia rubra* (RMNH-Coel. 29322).— CONG 79, 17 m.— CONG 80, 15 m, two small colonies on bio-concretion of *Astroides calycularis*.— ISA 12, 5 m, one stem on *Plocamium cartilagineum* (RMNH-Coel. 29323).— ISA 30, 15 m, a few stems on bryozoans.

Description.— Colonies weakly developed, consisting of scarcely branched, monosiphonic stems, up to 20 mm high and with up to ten polyps per stem. Perisarc of stem smooth, with the exception of a series of strongly marked basal rings and

quite wide groups of rings irregularly arranged along the stem. Branches and pedicels weakly ringed at their base. Branches little developed, with one or two polyps. Hydranth with a whorl of 13-18 tentacles around the hypostome and a distinct furrow at the basal part. Cnidome: small microbasic euryteles (6.3-7.1 x 2.4-3.2 μm), mainly present on the tentacles, and large microbasic euryteles (22-35.5 x 12-19 μm) grouped in two narrow circlets, one on the hypostome and another on the hydranth body above the basal furrow.

Only two-chambered, male gonophores present, arising in large numbers from completely reduced polyps and with large microbasic euryteles at the distal part of the spermatic chambers.

Remarks.— *Eudendrium merulum* was originally described from Australian waters (Watson, 1985); since it has also been reported from the Mediterranean by Bavestrello & Piraino (1991) and Marques et al. (2000). Although our material has no female gonophores, the structure of the colony, the shape of male gonophores and the type and arrangement of the nematocysts are in full agreement with the characteristics of this species; the complementary microbasic euryteles, however, are larger than those reported by Marques et al. (2000).

Ecology.— In the Mediterranean *Eudendrium merulum* has been reported from 1 (Marques et al., 2000) to 10 m depth (Bavestrello & Piraino, 1991); our material comes from 0.5 to 17 m. Watson (1985) collected this species at 2-6 m depth in Australian waters. Bavestrello & Piraino (1991) found it growing epilithic and epibiontic on cirripedes. At the Chafarinas it was observed on a wide variety of substrata, though with a slight preference for epilithic occurrence (> 50% of the records). It was also found on bryozoans, sponges and polychaete tubes, as well as on bio-concretions. *Eudendrium merulum* was also used as substratum by other hydroid species (*Filellum* spec., *Halecium delicatulum* and *Clytia* spec.).

In the Mediterranean, Bavestrello & Piraino (1991) found colonies of *E. merulum* throughout the year, though fertile female colonies were only collected in July. Marques et al. (2000) found it fertile in January and from June to August. The single colony with gonophores in our material was also found in July. In Australian waters, Watson (1985) found fertile material in March and June.

Distribution.— *Eudendrium merulum* was originally described from Australian waters (Watson, 1985), but has subsequently been found in the Mediterranean. Bavestrello & Piraino (1991) reported it from the Ligurian Sea, the Gulf of Naples and off northern Sicily; Marques et al. (2000) from the Adriatic and off the Italian and Turkish coasts. The scarcity of records obscures its actual distribution, though its presence in Australian and Mediterranean waters points towards an Indo-Pacific distribution.

Eudendrium moulouyensis Marques, Peña Cantero & Vervoort, 2000

Eudendrium moulouyensis Marques, Peña Cantero & Vervoort, 2000: 200-201, fig. 1.

Material.— CONG 8, 10 m, numerous stems on *Cystoseira spinosa* (RMNH-Coel. 29324).— CONG 53, 17.5 m.— CONG 54, 16.8 m, several stems on *Myriapora truncata* and *Eunicella* spec. (RMNH-Coel. 29325).— CONG 63, 2 m, two stems on *Corallina elongata*.— CONG 64, 1 m, a few stems on *Cladostephus verticillatus*.— CONG 83, 5 m, a single polyp.— ISA 26, 34 m, a single stem.— PISA 15, 1 m, a few stems on *Rhodymenia* spec. (RMNH-Coel. 29326).— REY 6, 10 m, several stems on *Cystoseira* spec. (RMNH-Coel. 29327).— REY 22, 0 m, several stems on *Sargassum vulgare* (RMNH-Coel. 29328).

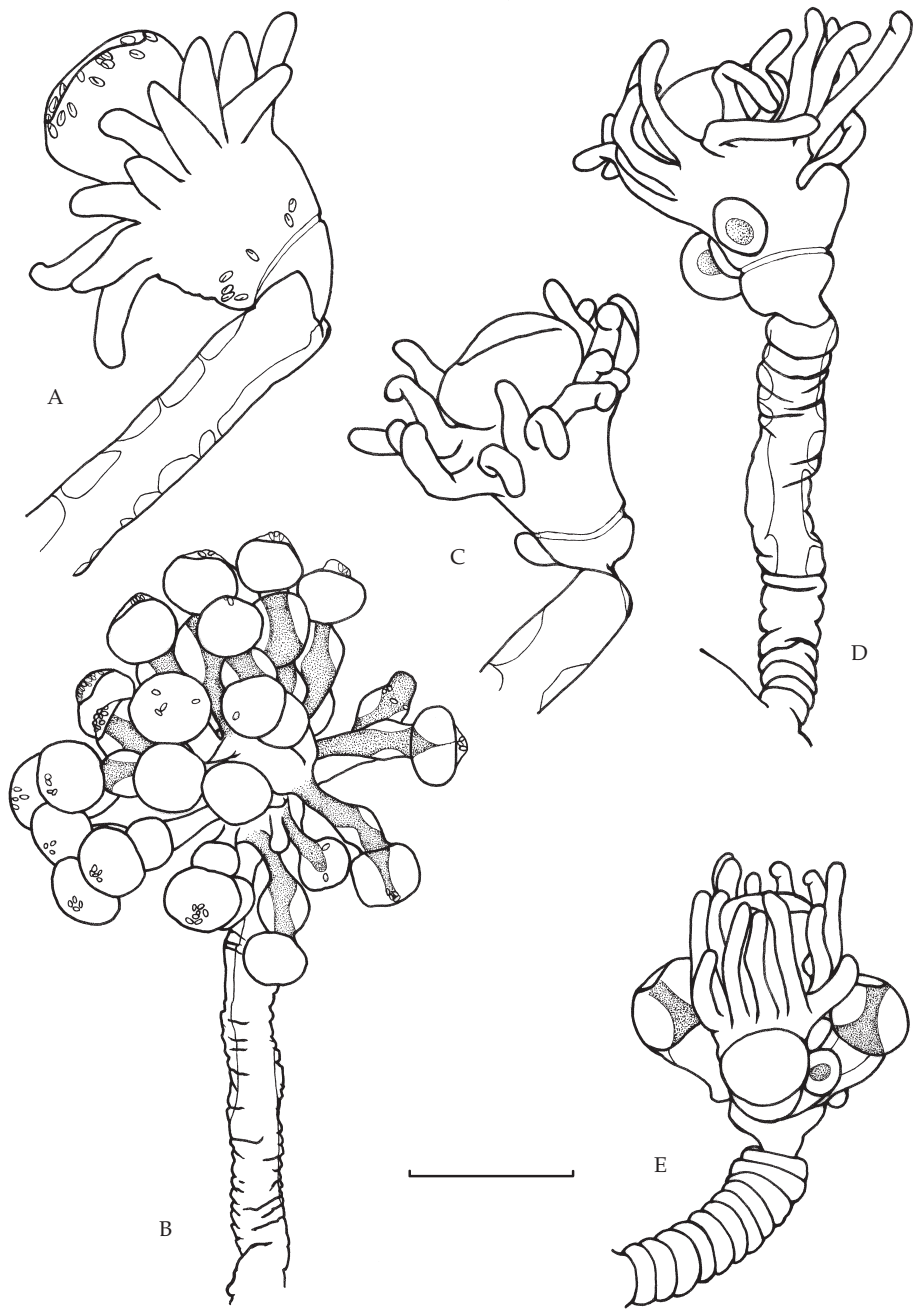

Fig. 5. A, B, *Eudendrium merulum* Watson, 1985. A, polyp showing nematocyst arrangement; B, male gonophores. C-E, *Eudendrium simplex* Pieper, 1884, polyps with male gonophores in different stages of development. Scale bar: 250 μm (A, C-E), 500 μm (B).

Remarks.— Marques et al. (2000) provided a full description and figures of this species; they also listed the known ecological data. The reasons for considering *E. moulouyensis* a new species were also discussed there.

Eudendrium racemosum (Gmelin, 1791)
(fig. 6)

Sertolara racemosa Cavolini, 1785: 160, pl. 6 figs 1-7, 14-15.
Sertularia racemosa Gmelin, 1791: 3854.
Eudendrium racemosum; Ehrenberg, 1834: 296; Stechow, 1919: 32; 1923b: 83; Broch, 1933: 13; Picard, 1951c: 260; 1952a: 349; 1955: 183; 1958a: 189; Rossi, 1961: 74; Yamada, 1965: 361; Millard & Bouillon, 1973: 33; Marinopoulos, 1979: 120; 1981: 176; Morri, 1981a: 59-61, figs 18a-e; Gili, 1986: 102-103, figs 4.6b, 4.54e; Roca, 1986: 102-107, fig. 25; Boero & Fresi, 1986: 141; Boero & Bouillon, 1993: 259; Medel & López González, 1996: 194; Morri & Bianchi, 1999: 285; Marques et al., 2000: 207-209.

Material.— CONGRESO BANK, on rock and bivalves.— CONG 18, 4.5 m, a single stem, with gonophores.— D-2, 41 m, a single polyp on *Nemertesia*.— ISA 4, 10 m, numerous stems on rocks, with gonophores (RMNH-Coel. 29329).— ISA 12, 5 m, numerous stems on rocks and *Celleporina* spec. (RMNH-Coel. 29330), with gonophores.— ISA 18, 20 m, a few stems on incrusting calcareous algae.— PCONG 2, 3 m, numerous stems on rocks (RMNH-Coel. 29331).— PCONG 3, 2 m, numerous stems on rocks, with gonophores (RMNH-Coel. 29332).— PCONG 4, 3 m, numerous stems on rocks, with gonophores (RMNH-Coel. 29333).— PCONG 5, 3 m, numerous stems on rocks, with gonophores (RMNH-Coel. 29334).— PCONG 6, 2 m, numerous stems on rocks, with gonophores (RMNH-Coel. 29335).— PISA 2, 3 m, two stems on rocks, with gonophores.— PISA 4, 1 m, numerous stems on rocks, with gonophores (RMNH-Coel. 29336).— PISA 7, 2 m, a single stem on rock, with gonophores.— PISA 8, 1 m, numerous stems on rocks (RMNH-Coel. 29337).— PISA 23, 3 m, numerous stems on rocks, with gonophores.— PISA 26, 1.5 m, a single stem on rock, with gonophores.— PISA 28, 3 m, one stem on rock, with gonophores.— REY 17, 2 m, three stems on rocks, with gonophores.

Description.— Colonies bushy, with monosiphonic stems, up to 100 mm high; sometimes with secondary tubes at the basal part. Perisarc of stems brown, basally ringed. Stems irregularly branched in several planes, branches well developed; basalmost branches may give rise to lower-order branches. However, branch development diminishing towards apex where branches with a single polyp are present. Both stems and branches with irregularly arranged series of rings, however, there is always a series of rings at the base of branches and pedicels. Polyps white, with a whorl of 27-30 tentacles around the hypostome and often with a cnidophore. Cnidome: microbasic euryteles (7.9 x 2.8 μm), mainly arranged on tentacles, and isorhizas (9.5 x 3.2 μm), present on cnidophore and in a circlet on proximal part of the polyp.

Male and female gonophores present. Female gonophores reddish, arising from polyps with a reduced number of tentacles, and with bifurcated spadix, disappearing later (all developmental stages may be observed on the same polyp: ripe eggs, without spadix, are found proximally). Number of eggs 7-17 per polyp. Male gonophores, with three or four chambers, arising from completely reduced polyps; up to 17 per polyp being present.

Ecology.— *Eudendrium racemosum* is a littoral and shelf species, found from the tidal zone (Broch, 1933) to 125 m depth (Marinopoulos, 1981); our material comes from 1 to 41 m depth. It has been found mainly on firm substrata, but also epibiontic on algae (Rossi, 1961; Boero & Fresi, 1986; Marques et al., 2000), incrusting calcareous

Fig. 6. *Eudendrium racemosum* (Gmelin, 1791). A, polyp with cnidophore; B-C, female gonophores; D, male gonophores. Scale bar: 500 μm.

algae (Morri & Bianchi, 1999), on hydrozoans and gorgonians (Boero & Fresi, 1986), mollusc shells (Marques et al., 2000), cirripedes and on bio-concretions (Boero & Fresi, 1986; Marques et al., 2000). We found it mainly epilithic (> 84% of records), but also epibiontic on algae, bryozoans and bivalve shells. *Eudendrium racemosum* is used in turn as substratum by numerous species of hydroids; we found it associated with *Bougainvillia muscus*, *Anthohebella parasitica*, *Filellum* spec., *Scandia gigas*, *Halecium delicatulum*, *H. lankesteri*, *H. pusillum*, *Halecium* spec., *Campanularia hincksii*, *C. volubilis*, *Clytia linearis*, *C. paulensis*, *Dynamena cornicina*, *Sertularella fusiformis*, *S. ellisii ornata*, *S. polyzonias*, *Sertularia distans*, *Antennella ansini* spec. nov., *Halopteris diaphana*, *Kirchenpaueria pinnata*, *Monotheca obliqua*, *Aglaophenia tubiformis* and *A. kirchenpaueri*.

In the Mediterranean, *E. racemosum* has been found with gonophores in June (Gili, 1986; Boero & Fresi, 1986), July (Broch, 1933; Boero & Fresi, 1986), August and September (Boero & Fresi, 1986) and October (Stechow, 1919; Boero & Fresi, 1986). Marques et al. (2000) found fertile colonies from March to December. At the Chafarinas colonies with gonophores were collected in July.

Distribution.— Picard (1958a) considered *Eudendrium racemosum* a Mediterranean species spreading in the nearby north-eastern Atlantic. However, there are records beyond that area, such as the Seychelles (Millard & Bouillon, 1973). It probably has an Indo-Pacific distribution (Boero & Bouillon, 1993; Marques et al., 2000).

In the Mediterranean it has been found in the Adriatic (Broch, 1933; Marques et al., 2000), the Aegean Sea (Morri & Bianchi, 1999), at Sardinia and Corsica (Marques et al., 2000), the Balearic Islands (Roca, 1986; Gili, 1986; Marques et al., 2000) and off the Algerian (Picard, 1955), French (Stechow, 1919; Picard, 1951c, 1952a; Marques et al., 2000), Greek (Yamada, 1965), Israeli (Marques et al., 2000), Italian (Stechow, 1923b; Rossi, 1961; Morri, 1981a; Boero & Fresi, 1986; Marques et al., 2000), Spanish (Gili, 1986) and Turkish coasts (Marinopoulos, 1979; Marques et al., 2000).

Eudendrium rameum (Pallas, 1766)
(fig. 7d-e)

Tubularia ramea Pallas, 1766: 83.
Eudendrium rameum; Johnston, 1847: 45; Medel & López González, 1996: 194; Marques et al., 2000: 204-205.

Material.— CONG 25, several stems on *Sargassum* spec., *Ellisella paraplexauroides* and *Sertella beaniana* (RMNH-Coel. 29338).

Description.— Colonies composed of bushy, strongly polysiphonic stems up to 100 mm high and rhizoidal hydrorhiza. Branching frequent; branches mainly arising from proximal part of stem. Stem and main branches with short branches bearing one to several polyps on pedicels. Perisarc smooth, except at base of branches and pedicels and a few series of irregularly arranged rings along stem and branches. Polyp with a whorl of c. 20 tentacles around the hypostome. Cnidome: small microbasic euryteles (7.5 x 3.2 μm), mainly distributed on tentacles, and large microbasic euryteles (18-19.3 x 9.5-10.6 μm), densely distributed over the polyp body, even the hypostome, and the stem coenosarc. In undischarged, large nematocysts the shaft reaches two-thirds of the capsule length.

Gonophores were not found.

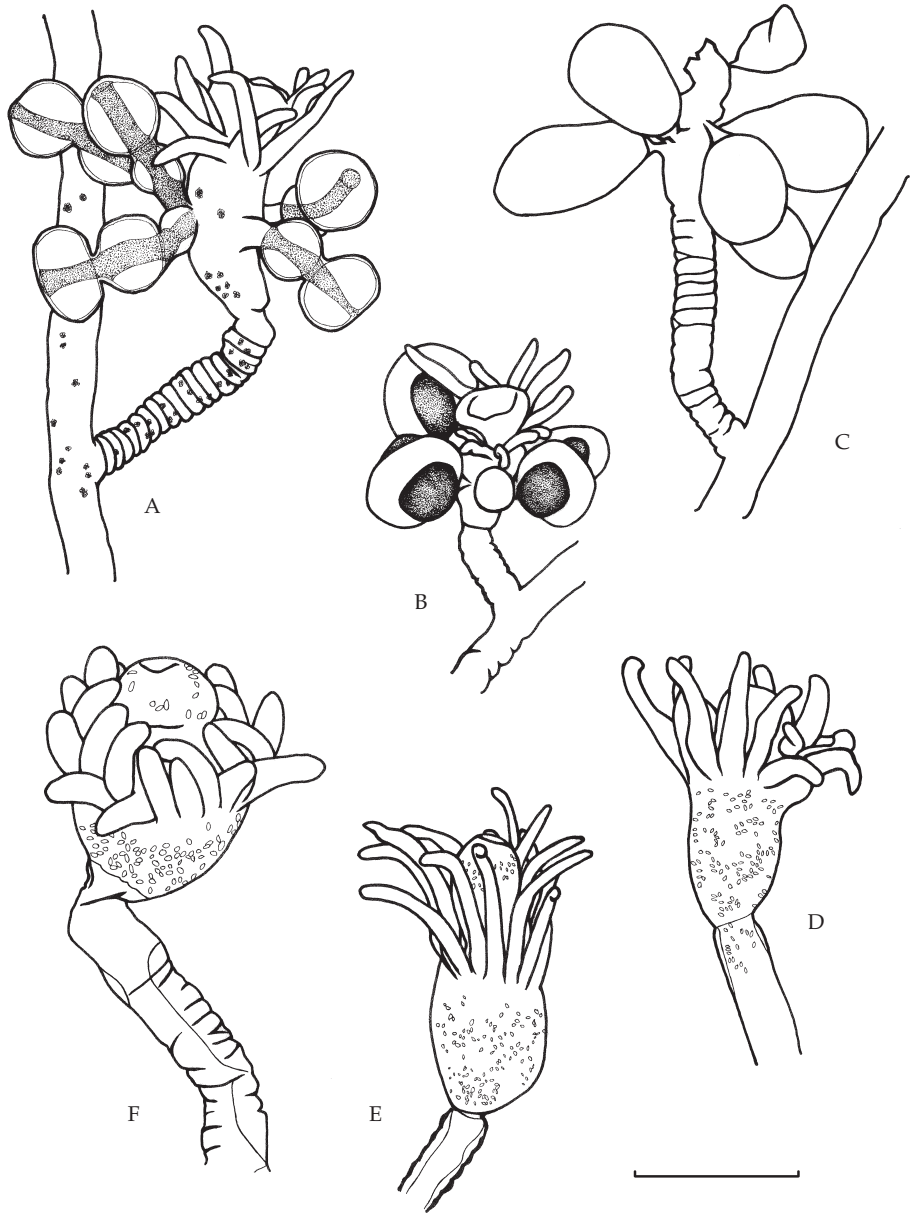

Fig. 7. A-C, *Eudendrium ramosum* (Linnaeus, 1758). A, polyp with male gonophores; B-C, female gonophores. D, E, *Eudendrium rameum* (Pallas, 1766), polyps showing nematocyst arrangement. F, *Eudendrium* spec., polyp showing nematocyst arrangement. Scale bar: 250 μm (F), 500 μm (A-E).

Remarks.— See Marques et al. (2000).

Ecology.— In the Mediterranean, Marques et al. (2000) found *Eudendrium rameum* from 10 to 20 m; our material was collected at 25 m depth.

At the Chafarinas it occurred epibiontic on algae, bryozoans and anthozoans. It is used in turn as substratum by numerous species of hydroids (*Scandia gigas*, *Halecium lankesteri*, *H. tenellum*, *H. sibogae marocanum*, *H. petrosum*, *Campanularia hincksii*, *Obelia dichotoma* and *Sertularella ellisii ornata*).

Distribution.— *Eudendrium rameum* is said to have a North Atlantic (Picard, 1958a), almost cosmopolitan (Cornelius et al., 1990) or boreal (Boero & Bouillon, 1993) distribution. Actually its distribution is uncertain, since most of the records concerning this species do not consider the cnidome. Marques et al. (2000) considered as reliable the records by Pallas (1766) from the Atlantic, and by Millard (1977) from the Indian Ocean. In the Mediterranean, Marques et al. (2000) reported it from off the Italian coast.

Eudendrium ramosum (Linnaeus, 1758)
(fig. 7a-c)

Tubularia ramosa Linnaeus, 1758: 804.
Eudendrium ramosum; Medel & López González, 1996: 194; Marques et al., 2000: 204 (synonymy).

Material.— B-8, 47 m, a few stems on *Sertella beaniana* and *Barbatia barbata*, without polyps (RMNH-Coel. 29339).— B-11, 42 m, a few stems on *Sertularella polyzonias*, gorgonians and bryozoans (RMNH-Coel. 29340).— B-13, 38 m, on tube of benthic organism.— B-15, 35 m, single stem on *Aporrhais pespelecani*.— C-4, 34 m, on stones and bio-detritic remains.— C-8 (bis), 40 m, numerous stems on *Barbatia barbata*, *Arca noae* and remains of bryozoans (RMNH-Coel. 29341).— C-9, 40 m, remains of stems on bryozoans and molluscs, without polyps.— D-2, 41 m.— D-8, 30 m, numerous stems on bio-detritic remains and polychaetes, with gonophores (RMNH-Coel. 29342).— E-2, 40 m, numerous stems on stones, *Nemertesia ramosa*, bryozoans and bivalves, with gonophores (RMNH-Coel. 29343).— E-16, 25 m, several stems with gonophores (RMNH-Coel. 29344).— F-2, 40 m, several stems on stones and bivalves, without polyps (RMNH-Coel. 29345).— F-9, 17 m, a single stem on *Amathia* spec., with gonophores.— F-12, 8 m, numerous stems on *Gracilaria* spec., *Cardium* spec. and *Amathia* spec., with gonophores (RMNH-Coel. 29346).— F-17, 21 m, a single stem on *Bougainvillia muscus*.— G-8, 17 m, a few stems on *Cystoseira zosteroides*, *Gracilaria* spec., remains of *Posidonia oceanica* leaves and bryozoans, with gonophores.— G-16, 22 m, numerous stems on *Gracilaria* spec., with gonophores.— G-17, 20 m, on mollusc eggs and remains of *Posidonia oceanica* rhizomes (RMNH-Coel. 29347).— H-10, 15 m, numerous stems on mollusc eggs and *Bougainvillia muscus*, without polyps (RMNH-Coel. 29348).— H-12, 14 m, numerous stems with gonophores (RMNH-Coel. 29349).— H-16, 20 m, several stems on *Amathia* spec. and polychaetes (RMNH-Coel. 29350).— ISA 5, 35 m, a few stems on pebbles and gorgonians, with gonophores.— ISA 18, 20 m.— REY 8, 25 m.

Description.— Colonies with scarcely branched, monosiphonic stems, sometimes with a few secondary tubes proximally. Colour of perisarc light horny to dark brown. Main branches long, originating at basal part of stem, forming an angle of 30-45° with stem, and directed upwards in more or less parallel direction. Perisarc smooth, with exception of a series of strongly marked rings at the base of branches and an occasional series of irregularly arranged rings along stem and branches; pedicels may be completely ringed. Polyp with a whorl of c. 22 tentacles around the hypostome. Cnidome: small microbasic euryteles (6.3 x 3.2 μm), mainly distributed on tentacles, and large

microbasic euryteles (12-16 x 5.5-5.8 μm), irregularly arranged on polyp body, including the hypostome where they form an indistinct circlet.

Male and female gonophores present, arising from normal polyps. Up to five, two-chambered male gonophores per polyp and up to six female gonophores, with unbranched spadix, per polyp.

Remarks.— See Marques et al. (2000). Our material is in general agreement with that described by those authors, with the exception of the smaller size of the large microbasic euryteles.

Ecology.— Marques et al. (2000) reported *Eudendrium ramosum* from 3 to 4 m depth in the Mediterranean; our material was collected from 8 to 47 m. Marques et al. (2000) found it on rocks and oysters; we observed it on a wide variety of substrata, mainly epibiontic on bryozoans, hydrozoans, shells of gastropods and bivalves, anthozoans, polychaete tubes and algae (*Cystoseira zosteroides* and *Gracilaria* spec.). It was also found on non-living substrata, both biotic (mollusc eggs and remains of organisms) and abiotic (pebbles). *Eudendrium ramosum* is frequently used as substratum by other species of hydroids; we found colonies of *Modeeria rotunda*, *Filellum* spec., *Halecium delicatulum*, *H. petrosum*, *Campanularia hincksii*, *Clytia gracilis*, *C. hemisphaerica*, *C. linearis*, *C. paulensis*, *Clytia* spec. and *Sertularella polyzonias*.

In the Mediterranean Marques et al. (2000) observed gonophores in September. At the Chafarinas we found fertile colonies in July and August.

Distribution.— *Eudendrium ramosum* has been considered a cosmopolitan species (Picard, 1958a; Boero & Bouillon, 1993). However, those records in which the cnidome was not considered should be re-inspected before establishing its actual distribution. Marques et al. (2000) stated that it appears to have a cosmopolitan distribution, but that most records are doubtful. They recorded it in the Mediterranean from the Adriatic and the Italian coasts.

Eudendrium simplex Pieper, 1884
(fig. 5c-e)

Eudendrium simplex Pieper, 1884: 150; Motz-Kossowskae, 1905: 56-57; Marques et al., 2000: 205-206.
Eudendrium motzkossowskae Picard, 1952a: 339, 349; 1952b: 222; 1958a: 189; Boero, 1981a: 182, 184-186, 188, fig. 4; Boero & Fresi, 1986: 147; Medel & López González, 1996: 194.

Material.— CONG 12, several colonies with gonophores, on *Cystoseira tamariscifolia* (RMNH-Coel. 29351).— CONG 22, one stem with a single polyp, on same substrate.

Description.— Weakly developed colonies, composed of stems usually bearing a single distal polyp (occasionally with two polyps). Perisarc of stem either completely ringed or smooth with a series of proximal rings. Polyps with a distinct furrow basally and with a crown of c. 21 tentacles around the hypostome. Cnidome: small microbasic euryteles (6.3 x 2.4 μm) and large macrobasic euryteles (14-17.4 x 6-8.7 μm) arranged in two whorls, one just above the basal furrow and another on the hypostome.

Only two-chambered male gonophores present, arising from normal, unreduced polyps above the basal furrow (up to eight gonophores per polyp).

Remarks.— Unfortunately no female gonophores were found, the identification therefore is slightly doubtful. However, the present material agrees with the

description of male *E. simplex* given by Marques et al. (2000).

Ecology.— *Eudendrium simplex* has been reported from the tidal level (Boero & Fresi, 1986) to 30 m depth (Boero, 1981a); our material comes from 0.5 to 1 m depth. It has frequently been found on *Posidonia oceanica* (Motz-Kossowska, 1905; Boero, 1981a; Boero & Fresi, 1986; Marques et al., 2000). In our material it always occurs epibiontic on the alga *Cystoseira tamariscifolia*.

Gonophores of *Eudendrium simplex* have been found end of August-beginning of September (Picard, 1952a), during the summer (Boero & Fresi, 1986) and in November (Marques et al., 2000). Our only fertile colony was collected in July.

Distribution.— Marques et al. (2000) considered *E. simplex* a species probably endemic to the Mediterranean. It is known from the Adriatic (Pieper, 1884; Marques et al., 2000) and from off the French (Motz-Kossowska, 1905; Picard, 1952a) and Italian coasts (Boero, 1981a; Boero & Fresi, 1986; Marques et al., 2000).

Eudendrium spec.
(fig. 7f)

Material.— CONG 66, several stems on *Corallina elongata*.— CONG 67, numerous colonies on *Corallina elongata* (RMNH-Coel. 29352).— CONG 78, some stems on pebbles and incrusting calcareous algae growing on pebbles.— REY 25, several colonies on *Corallina elongata* (RMNH-Coel. 29353).

Description.— Colonies composed of a stolonal hydrorhiza creeping on the substratum from which arise stems provided with a single distal polyp (occasionally two). Perisarc either smooth, with a series of basal rings, or completely ringed. Polyp with a whorl of c. 22 tentacles around the hypostome and with a slight furrow at the basal part of the body. Cnidome: microbasic euryteles, but in two size groups; the smallest (7.1 x 3.2 μm) mainly present in the tentacles, the largest (12-19.7 x 6-10.3 μm) densely distributed on hypostome and hydranth body, though absent below the basal furrow. The large microbasic euryteles have a thin shaft of one half to two-thirds the capsule length.

Gonophores were not observed.

Remarks.— *Eudendrium* spec. is near *Eudendrium rameum* (Pallas, 1766) in the size of the nematocysts. They differ in structure of the colony and the distribution of the nematocysts. In *E. rameum* the colonies are bushy and strongly polysiphonic; the large microbasic euryteles are present on the whole polyp and in the coenosarc of the pedicel close to the hydranth.

Ecology.— The colonies of *Eudendrium* spec. were collected in the tidal zone to 18 m depth. It grows mainly epibiontic on algae, especially on *Corallina elongata*, though also on pebbles.

Family Hydractiniidae L. Agassiz, 1862
Genus *Hydractinia* van Beneden, 1841

Hydractinia calderi Bouillon, Medel & Peña Cantero, 1997

Hydractinia calderi Bouillon, Medel & Peña Cantero, 1997: 477-478, figs 1-2, 3a-b.

Material.— Agassiz trawl, nº 5, colony on *Astraea rugosa*.

Remarks.— Bouillon et al. (1997) gave a full description and figures of the present material, as well as the reasons for establishing the new species.

Hydractinia carnea (M. Sars, 1846)
(fig. 8a-b)

Podocoryne carnea M. Sars, 1846: 4, pl. 1 figs 7-18; Hincks, 1868: 29, pl. 5 figs a-e, e'; Allman, 1872: 349, pl. 16 figs 1-9; Marktanner-Turneretscher, 1890: 202; Picard, 1958a: 190; Patriti, 1970: 17, fig. 11; Edwards, 1972: 122, figs 7a-b, 8a-d; Isasi, 1985: 43, fig. 1f; Gili, 1986: 112-113, fig. 4.7c; García Carrascosa et al., 1987: 365; Cornelius et al., 1990: 125, fig. 4.6; Boero & Bouillon, 1993: 259; Altuna, 1994: 70-71; Medel & López González, 1996: 194.
Podocoryne inermis Allman, 1876: 255, pl. 10 figs 4-5.
Hydractinia carnea; Motz-Kossowska, 1905: 85; Da Cunha, 1944: 17; Naumov, 1969: 219, figs 51C, c, 87.
Hydractinia carnea var. *inermis*; Motz-Kossowska, 1905: 85.
Hydractinia carnea var. *mediterranea*; Neppi, 1917: 39.
Podocoryna carnea; Stechow, 1923b: 67; Leloup, 1934: 4.
Podocoryna inermis; Leloup, 1934: 4.

Material.— F-17, 21 m, two colonies on *Hinia reticulata*, with gonophores (RMNH-Coel. 29354).— G-8, 17 m, one colony on *Hinia reticulata*.— I-8, 17 m, one colony on *Aporrhais pespelecani*.— I-15, 17 m, three colonies on *Murex brandaris*, *Hinia reticulata* and *Cassidaria* spec. (RMNH-Coel. 29355).

Remarks.— The medusa buds are in an early developmental stage; the structure of the medusa is unrecognizable making it impossible to be certain of the identification. Polyps with nematocysts arranged in small patches over the whole body. Cnidome: microbasic euryteles (7.1-9.5 x 2.4-3.2 μm) and desmonemes (4-4.7 x 2.4-2.8 μm).

Ecology.— *Hydractinia carnea* is a littoral species that, in the Mediterranean, has been found from the tidal level to 50 m depth (Gili, 1986); our material comes from 17 to 21 m. Outside the Mediterranean it has been collected from the tidal level down to 70 m depth (Naumov, 1969). It has been reported epibiontic on gastropod shells, either with the living animal or inhabited by pagurids or sipuculids (Stechow, 1923b; Leloup, 1934; Naumov, 1969; Isasi, 1985; Gili, 1986; García Carrascosa et al., 1987; Ramil, 1988; Cornelius et al., 1990; Altuna, 1994; etc.), hydrozoans (García Carrascosa et al., 1987), cirripedes, bivalve shells and large decapods (Edwards, 1972; Cornelius et al., 1990) and even epilithic (Edwards, 1972; Gili, 1986; Cornelius et al., 1990). In our material, we always found it on gastropod shells (*Hinia reticulata*, *Murex brandaris*, *Aporrhais pespelecani* and *Cassidaria* spec.).

In the Mediterranean it has been found fertile in June (Gili, 1986) and September (Motz-Kossowska, 1905). At the Chafarinas colonies with gonophores were collected in July. Outside the Mediterranean Ramil (1988), amongst others, found fertile colonies in April, May, August, October and November.

Distribution.— The geographical distribution of *Hydractinia carnea* is uncertain. It had been considered a North Atlantic (Picard, 1958a) or a cosmopolitan (Boero & Bouillon, 1993) species. However, many records are uncertain because the medusa development has not been checked.

In the north-eastern Atlantic it has been recorded all along the European coast (Edwards, 1972) and off the Moroccan coast (Patriti, 1970). In the Mediterranean it is known from off the Italian (Marktanner-Turneretscher, 1890; Stechow, 1923b), French

(Motz-Kossowska, 1905; Leloup, 1934) and Spanish coasts (Gili, 1986; García Carrascosa et al., 1987).

Hydractinia hooperii (Sigerfoos, 1899)
(fig. 8c-e)

Stylactis hooperii Sigerfoos, 1899: 801.
Stylactis hooperi; Moreira et al., 1979: 679; Wedler & Larson, 1986: 92-94, fig. 10Ba-c.
Stylactis hooperi var. *minor* Wedler & Larson, 1986: 94, fig. 10C.
Stylactaria arge; Calder, 1988: 33-35, figs 23-24.
Stylactaria hooperii; Namikawa, 1991: 809; Migotto, 1996: 14-15.
Hydractinia hooperii; Bouillon, Medel & Peña Cantero, 1997: 478.

Material.— Baños de la Reina trawl, colony on gastropod shell, with gonophores.

Description.— Stolonal, polymorphic colony growing on a gastropod shell. Smooth, cone-shaped spines present. Gastrozooid long and thin, with 11-16 tentacles set in a whorl around the hypostome. Gonozooids with only six to eight tentacles and four gonophores (two well developed and two much smaller). Cnidome: microbasic euryteles (7.1-7.9 x 2.4-3.2 μm) and desmonemes (5.5-6.3 x 2.8-3.2 μm).

Remarks.— The present material was identified as *H. hooperii* by Bouillon et al. (1997). Although Calder (1988) considered *H. hooperii* conspecific with *H. arge* (Clarke, 1882), later authors (cf. Namikawa, 1991; Migotto, 1996; Bouillon et al., 1997) have kept the two species separate.

Ecology.— *Hydractinia hooperii* has been found from the tidal level (Migotto, 1996) down to 10 m depth (Wedler & Larson, 1986). It was frequently found on *Cerithium* shells (Wedler & Larson, 1986; Migotto, 1996; Bouillon et al., 1997), but also on gastropod shells inhabited by hermit crabs (Wedler & Larson, 1986), and on cirripedes (Migotto, 1996). We found it growing on a gastropod shell.

Migotto (1996) observed gonophores from February to April, June, and from October to November in Brazil; Wedler & Larson (1986), in Puerto Rico, found those in May and November. Our fertile material was collected in July/August.

Distribution.— Hitherto only known from the western Atlantic: off Long Islands, USA (Sigerfoos, 1899), Bermuda (Calder, 1988), Puerto Rico (Wedler & Larson, 1986) and Brazil (Moreira et al., 1979; Migotto, 1996). The present material constitutes the first record of the species from the Mediterranean and, consequently, from the eastern Atlantic. *Hydractinia hooperii* may have a tropical-temperate amphi-Atlantic distribution.

Hydractinia inermis (Allman, 1872)
(fig. 8f)

Stylactis inermis Allman, 1872: 305, text-fig. 79; Stechow, 1919: 23-24; Boero, 1981a: 182, 184-186, 188, fig. 3; Boero & Fresi, 1986: 140; García Rubies, 1987: 146, 149.
Stylactaria inermis; Stechow, 1921: 250; Boero & Bouillon, 1993: 259; Medel & López González, 1996: 194.
Stylactella inermis; Stechow, 1923b: 63-64.

Material.— CONG 75, 12 m, several colonies on *Posidonia oceanica* (RMNH-Coel. 29356).

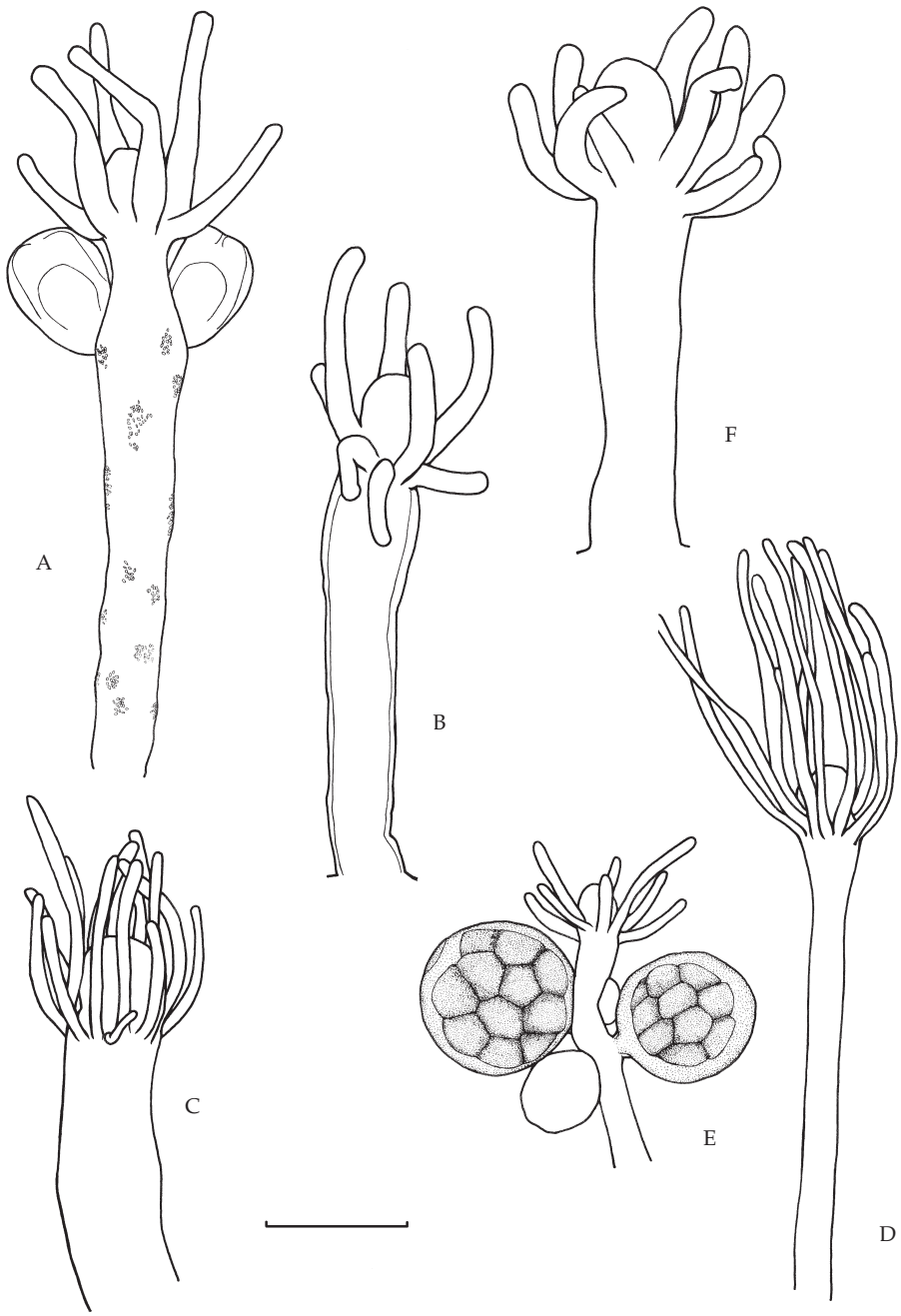

Fig. 8. A, B, *Hydractinia carnea* (M. Sars, 1846). A, gonozooid with medusa buds; B, gastrozooid. C-E, *Hydractinia hooperii* (Sigerfoos, 1899). C-D, gastrozooids; E, gonozooid with gonophores. F, *Hydractinia inermis* (Allman, 1872), polyp. Scale bar: 250 μm (A-B, F), 500 μm (C-E).

Remarks.— The stolons may anastomose to form an open network; the polyps have c. 12 tentacles in two closely approximated whorls. Cnidome: microbasic euryteles (7.1-7.9 x 2.4-2.8 μm) and desmonemes (5.5 x 4 μm).

Ecology.— *Hydractinia inermis* (Allman, 1872) is a littoral species, having been found from the tidal level (Stechow, 1919) down to 75 m depth (Stechow, 1923b); our material was collected at 15 m. It has been found epibiontic on algae (Stechow, 1919; Boero & Fresi, 1986), leaves of *Posidonia oceanica* (Stechow, 1919; Boero, 1981a), hydrozoans (Stechow, 1919, 1923b; Boero & Fresi, 1986), sponges and cirripedes (Boero & Fresi, 1986). In our material the colonies grow on the basal part of inner leaves of *Posidonia oceanica*.

Fertile colonies were collected in February (Gili, 1986), April (Stechow, 1919; Boero & Fresi, 1986) and May (Boero & Fresi, 1986).

Distribution.— Endemic to the Mediterranean (Boero & Bouillon, 1993). It has been recorded off the Italian (Stechow, 1919; 1923b; Boero, 1981a; Boero & Fresi, 1986), French (Stechow, 1919) and Spanish coasts (Gili, 1986; García Rubies, 1987).

Family Tubulariidae Allman, 1864

Genus *Ectopleura* Agassiz, 1862

Ectopleura wrighti Petersen, 1979
(fig. 9a-b)

Acharadria larynx Wright, 1863: 788, pl. 17 figs 7-8; Stechow, 1923b: 48; Picard, 1951c: 260; 1958a: 189.
Vorticlava larynx; Motz-kossowska, 1905: 51.
Ectopleura larynx; Brinckmann-Voss, 1970: 25-27, figs 26-28; Boero, 1981a: 182 et seq.; Boero & Fresi, 1986: 138.
Ectopleura wrighti; Petersen, 1990: 164-165, figs 21a-b; Boero & Bouillon, 1993: 261.

Material.— B-15, 35 m, a single stem on *Amathia* spec.— CONG 80, 15 m, two stems on *Peyssonnelia rubra* (RMNH-Coel. 29357).— ISA 5, 35 m, two stems (RMNH-Coel. 29358).

Description.— The present material consists of colonies composed of a few stems, up to 19 mm high, with a single distal polyp. The perisarc is smooth and reaches the basal part of the polyp. The hydranth is provided with an aboral whorl of 10-14 filiform tentacles and an oral one of 4-6 capitate tentacles.

Remarks.— Brinkmann-Voss (1970) pointed out that the descriptions of *Acharadria larynx* given by Wright (1863), Allman (1872) and Stechow (1923b) are ambiguous, being impossible to establish the true identity. She also stated that her specimens from Naples appear to be identical with those described by Allman (1872), Motz-Kossowska (1905) and Stechow (1923b).

Petersen (1990) indicated that the material described by Wright (1863), based on a specimen from Ilfracombre (Devon), could be a young specimen of *Ectopleura larynx* (Ellis & Solander, 1786). He also remarked that it is doubtful whether or not this material is conspecific with that described by Allman (1872) and that since Allman's record the species has not been found again in the British Islands. Petersen also points out that, whereas the medusa is known from the Mediterranean, it has never been found in British waters. He considered *E. wrighti* a Mediterranean species, different from the

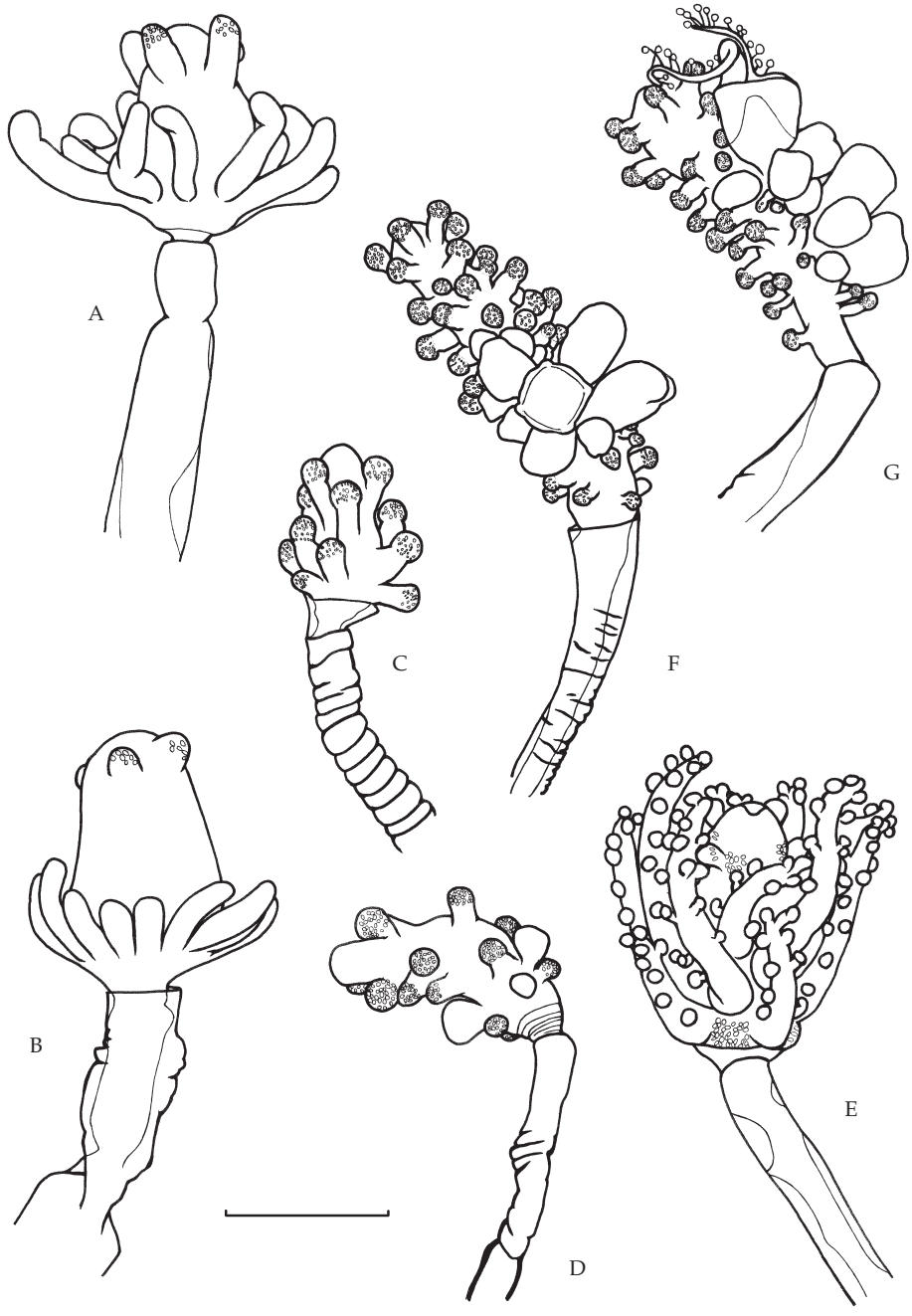

Fig. 9. A, B, *Ectopleura wrighti* Petersen, 1979, polyps. C, D, *Coryne muscoides* (Linnaeus, 1761), C, polyp; D, polyp with incipient gonophores. E, *Cladocoryne flocosa* Rotch, 1871, polyp showing sets of nematocyst. F, G, *Zanclea costata* Gegenbaur, 1856, polyps with medusa buds. Scale bar: 250 μm (A-B), 500 μm (C-G).

species described by Wright (1863) and Allman (1872) as *Acharadria larynx*.

Ecology.— *Ectopleura wrighti* is a littoral species, having been found almost from the tidal level (Boero & Fresi, 1986) to 40 m depth (Brinckmann-Voss, 1970); our material comes from 15 to 35 m. It has been found epibiontic on algae (Boero & Fresi, 1986), *Posidonia oceanica* (Brinckmann-Voss, 1970; Boero, 1981a), hydrozoans and cirripedes (Boero & Fresi, 1986), and echinoderms (Brinckmann-Voss, 1970), on bio-concretions (Boero & Fresi, 1986) and epilithic (Brinckmann-Voss, 1970). Our material was found on the alga *Peyssonnelia rubra* and the bryozoan *Amathia* spec.

Brinckmann-Voss (1970) observed buds throughout the year and medusae ready to hatch in June. Boero & Fresi (1986) found fertile colonies in June and Stechow (1923b) in September.

Distribution.— Though Picard (1958a) considered it a North Atlantic species, *Ectopleura wrighti* seems to be endemic to the Mediterranean (Boero & Bouillon, 1993). It has been reported from the Adriatic (Franzen & Hündgen, 1986) and from off the French (Picard, 1951c) and Italian coasts (Stechow, 1923b; Brinckmann-Voss, 1970; Boero & Fresi, 1986).

Family Corynidae Johnston, 1836

Genus *Coryne* Gaertner, 1774

Coryne muscoides (Linnaeus, 1761)

(fig. 9c-d)

Tubularia muscoides Linnaeus, 1761: 539.

Coryne pusilla var. *muscoides* Johnston, 1847: 42, pl. 6 figs 4-7.

Coryne vaginata Hincks, 1861: 295; 1968: 41, pl. 8 figs 1, 1a; Motz-Kossowska, 1905: 46; Da Cunha, 1944: 11, fig. 1; Patriti, 1970: 17, fig. 12.

Coryne muscoides; Stechow, 1919: 4; 1923b: 42; Leloup, 1934: 2; Picard, 1952a: 349; 1955: 184; 1958a: 189; Teissier, 1965: 7; Fey, 1970: 389; Brinkmann-Voss, 1970: 49-51, figs 54-56; Chas & Rodriguez, 1977: 19, figs 1a-b; Gili, 1986: 93, fig. 4.1e; Roca, 1986: 68-71, fig. 18; Boero & Fresi, 1986: 138; Ramil, 1988: 69-71; Cornelius et al., 1990: 118, fig. 4.4; Boero & Bouillon, 1993: 260; Altuna, 1994: 78-79; Medel & López González, 1996: 195.

Material.— CONG 1, 0.5 m, a few polyps on *Peyssonnelia coriacea*.— CONG 3, 2 m, several stems on *Halopteris scoparia* (RMNH-Coel. 29359).— CONG 5, 0 m, a few stems on *Cystoseira tamariscifolia*.— CONG 12, 0.5 m, several stems on *Cystoseira tamariscifolia*, with gonophores (RMNH-Coel. 29360).— CONG 22, 1 m, several stems on *Cystoseira tamariscifolia* and *Corallina elongata* (RMNH-Coel. 29361).— CONG 66, 0 m, a few stems on *Corallina elongata*.— ISA 13, 0 m, numerous stems on *Cystoseira tamariscifolia* (RMNH-Coel. 29362).— REY 24, 0 m, a few stems on *Pterocladia capillacea*.

Remarks.— The present material consists of colonies with either stems provided with a single distal polyp, or up to 22 mm high, branched stems with up to 16 polyps, depending on habitat.

Ecology.— *Coryne muscoides* has been reported in the Mediterranean from the tidal level (Boero & Fresi, 1986) down to 15 m depth (Gili, 1986). Our material was collected at 0-2 m. In the north-eastern Atlantic it occurs from 0 to 15 m depth (Fey, 1970). It has usually been found epibiontic on algae (Motz-Kossowska, 1905; Stechow, 1919; Da Cunha, 1944; Teissier, 1965; Fey, 1970; Boero & Fresi, 1986; Gili, 1986; Ramil, 1988;

Altuna, 1994), but also on leaves of *Posidonia oceanica* (Gili, 1986), cirripedes (Boero & Fresi, 1986), sponges, ascidians and bivalves (Ramil, 1988) and epilithic (Ramil, 1988; Altuna, 1994). We always found it on algae, especially on *Cystoseira tamariscifolia* and *Corallina elongata*.

In the Mediterranean *Coryne muscoides* has been found with gonophores in February (Boero & Fresi, 1986), April (Picard, 1955), May (Brinckmann-Voss, 1970; Roca, 1986), June (Motz-Kossowska, 1905), July (Motz-Kossowska, 1905; Boero & Fresi, 1986), August (Motz-Kossowska, 1905), September (Motz-Kossowska, 1905; Boero & Fresi, 1986), October (Motz-Kossowska, 1905; Stechow, 1919; Gili, 1986) and December (Stechow, 1919). At the Chafarinas fertile colonies were collected in July. It seems to be fertile throughout the year. In the nearby north-eastern Atlantic it has been found fertile in May (Fey, 1970; Ramil, 1988), from June to August (Teissier, 1965), September and December (Altuna, 1994).

Distribution.— Boero & Bouillon (1993) credit *Coryne muscoides* a Mediterranean-Atlantic distribution, but Altuna (1994) pointed out that its distribution is Lusitanian-Mediterranean, slightly spreading into the Celtic and Caledonian provinces. In the eastern Atlantic it has been found from off the British Islands (Cornelius et al., 1990) to the Moroccan coasts (Patriti, 1970).

In the Mediterranean it has been reported from the Balearic Islands (Roca, 1986) and from off the Algerian (Picard, 1955), French (Motz-Kossowska, 1905; Stechow, 1919; Picard, 1952a), Italian (Stechow, 1923b; Brinkmann-Voss, 1970; Boero & Fresi, 1986) and Spanish coasts (Gili, 1986).

Family Cladocorynidae Allman, 1872

Genus *Cladocoryne* Rotch, 1871

Cladocoryne flocosa Rotch, 1871

(fig. 9e)

Cladocoryne flocosa: Allman, 1872: 380, figs 82a-b; Marktanner-Turneretscher, 1890: 202; Motz-Kossowska, 1905: 47; Leloup, 1934: 2; Da Cunha, 1944: 13; Picard, 1951c: 260; 1958a: 188; 1958b: 1; Rossi, 1950: 198-199; 1961: 73; Teissier, 1965: 9; Brinckmann-Voss, 1970: 69-71, figs 80-82; Millard & Bouillon, 1974: 11, figs 1d-e; Millard, 1975: 65, figs 21a-b; Boero, 1981a: 182, 184; Isasi, 1985: 41, fig. 1a; Roca, 1986: 73-77, fig. 19; Boero & Fresi, 1986: 139; Piraino & Morri, 1989: 50; Boero & Bouillon, 1993: 261; Altuna, 1994: 102-103; Medel & López González, 1996: 196; Migotto, 1996: 17-18, fig. 4a-b; Morri & Bianchi, 1999: 285.

Material.— CONG 1, 0.5 m, several stems on *Peyssonnelia coriacea* and *Salmacina* spec.— CONG 80, 15 m, several colonies composed of numerous stems (RMNH-Coel. 29363).

Remarks.— The present material consists of colonies with stems up to 10 mm long and with four polyps.

Ecology.— *Cladocoryne flocosa* is a littoral species that, in the Mediterranean, has been found from the tidal level (Boero & Fresi, 1986) to 30 m depth (Brinckmann-Voss, 1970); our material comes from 0.5 to 15 m. Outside the Mediterranean it was collected from the tidal level (Altuna, 1994) to 20 m depth (Da Cunha, 1944).

Cladocoryne flocosa has frequently been found epibiontic on algae (Motz-Kossows-

ka, 1905; Da Cunha, 1944; Rossi, 1961; Brinckmann-Voss, 1970; Isasi, 1985; Roca, 1986; Boero & Fresi, 1986; Altuna, 1994; Morri & Bianchi, 1999; Migotto, 1996), but also on rhizomes (Boero, 1981a; Piraino & Morri, 1989) and basal leaves of *Posidonia oceanica* (Brinckmann-Voss, 1970), as well as on cirripedes (Boero & Fresi, 1986), decapods (Migotto, 1996), sponges (Motz-Kossowska, 1905), hydrozoans (Motz-Kossowska, 1905; Teissier, 1965; Millard & Bouillon, 1974; Boero & Fresi, 1986; Migotto, 1996), polychaete tubes (Altuna, 1994) and even epilithic (Gili, 1986; Migotto, 1996). In our material it was observed on algae and tubes of polychaetes.

In the Mediterranean fertile colonies were found from April to May (Brinckmann-Voss, 1970) and in July (Boero & Fresi, 1986).

Distribution.— *Cladocoryne flocosa* has been considered a cosmopolitan (Picard, 1958a) or circumtropical species (Boero & Bouillon, 1993). Its distribution pattern, however, seems to be circumglobal, being absent in colder regions. In the eastern Atlantic it has been recorded from off the British Islands (Allman, 1872) to the Portuguese coasts (Da Cunha, 1944).

In the Mediterranean it is known from the Adriatic (Marktanner-Turnerestcher, 1890), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986), Sicily (Piraino & Morri, 1989), and from off the French (Motz-Kossowska, 1905; Picard, 1951c), Israeli (Picard, 1958b), Italian (Rossi, 1950; 1961; Brinckmann-Voss, 1970; Boero, 1981a; Boero & Fresi, 1986) and Spanish coasts (Motz-Kossowska, 1905; Gili, 1986).

Family Zancleidae Russell, 1953

Genus *Zanclea* Gegenbaur, 1856

Zanclea costata Gegenbaur, 1856

(fig. 9f-g)

Zanclea costata Gegenbaur, 1856: 229, pl. 8 figs 4-7; Cerrano et al., 1997: 177-180, figs 1-3; Medel & López González, 1996: 196; Gravili et al., 1996: 103-104, fig. 3; Boero et al., 2000: 97-98, fig. 3.

Zanclea costata var. *neapolitana*; Brückner, 1914: 460, figs 7-24, pl. 8 figs 3-14; Brinckmann-Voss, 1970: 72-73, text-figs 83-84, pl. 4 fig. 1.

Material.— B-8, 47 m, colony on *Cardium* spec. (RMNH-Coel. 29364).— C-4, 34 m, fertile colony on *Cardium* spec.— C-8, 39 m, colony on *Venus ovata*.— D-2, 41 m, colony on *Venus ovata* (RMNH-Coel. 29365).

Description.— Stolonal colonies with stems bearing a single distal polyp. Perisarc thick, widening distally and reaching the base of the polyp. Hydranth with numerous capitate tentacles irregularly arranged over the whole body.

Gonophores arising on the hydranth body amongst the tentacles and shedding medusae provided with two marginal tentacles with cnidophores.

Remarks.— See Gravili et al. (1996), Cerrano et al. (1997) and Boero et al. (2000) for a detailed description and discussion. According to the last authors, *Z. costata* is the only known Mediterranean species of *Zanclea* living on mollusc shells.

Ecology.— *Zanclea costata* lives epibiontic on bivalve shells (Brückner, 1914; Brinckmann-Voss, 1970; Gravili et al., 1996; Cerrano et al., 1997; Boero et al., 2000). Our material occurs on bivalve shells (*Cardium* spec. and *Venus ovata*); it was collected from 34 to 47 m depth.

In the Mediterranean *Zanclea costata* has been found with gonophores in June (Brinckmann-Voss, 1970). At the Chafarinas fertile colonies were collected in July.

Distribution.— According to Boero et al. (2000) *Zanclea costata* is a Mediterranean species; records from outside that area need confirmation on the basis of the hydroid cnidome.

In the Mediterranean *Zanclea costata* is known from off the Italian (Brücker, 1914; Brinkmann-Voss, 1970; Cerrano et al., 1997) and Ionian coasts of Apulia (Boero et al., 2000).

Family Campanulinidae Hincks, 1868

Genus *Egmundella* Stechow, 1921

Egmundella amirantensis Millard & Bouillon, 1973 (fig. 10a-d)

Egmundella amirantensis Millard & Bouillon, 1973: 40-42, fig. 5A-D; Millard, 1975: 133, fig. 43G; García Corrales et al., 1979: 27-28, fig. 14; Roca, 1986: 9; Ramil & Vervoort, 1992: 22-23, fig. 2a-d.
Lafoeina amirantensis; Calder, 1991: 10, fig. 3; Calder & Vervoort, 1998: 15-16, fig. 5a-c.

Material.— CONGRESO BANK, several colonies on *Clytia hemisphaerica*, *Sertularella polyzonias* and algae (RMNH-Coel. 29366).— CONG 54, 16.8 m, several colonies on *Campanularia hincksii*, *Eudendrium glomeratum* and cirripedes (RMNH-Coel. 29367).— E-2, 40 m, a few colonies on *Sertularella ellisii ornata* (RMNH-Coel. 29368).— F-8, 18 m, colony on *Halecium sibogae marocanum*.— F-12, 8 m, colony on *Amathia* spec.— G-17, 20 m, a few hydrothecae on *Polysiphonia* cf. *denudata*.— ISA 26, 34 m, a few hydrothecae.— ISA 27, 25 m, several colonies on *Obelia dichotoma*, *Clytia linearis* and *Cornularia* spec.— PCONG 1, 1 m, several hydrothecae on *Acrosorium uncinatum* (RMNH-Coel. 29369).

Description.— Stolonal colonies of small size, composed of hydrorhizal stolons creeping on substrate and giving rise to small hydrothecae. Hydrotheca fusiform, either shortly pedicellate or without pedicel, but narrowed proximally. Operculum consisting of numerous triangular valves closing as a roof; there is no separation between opercular valves and hydrotheca. Proximal part of hydrothecal interior with a ring of desmocytes for polyp attachment; some hydrothecae proximally with a distinct circular diaphragm. Small, tubiform nematothecae arising from hydrorhizal stolons. Some nematothecae with thick proximal perisarc and a distal chamber containing the nematocysts.

Gonothecae were not found.

Remarks.— Calder (1991) referred this species to the genus *Lafoeina* M. Sars, 1874, considering that the hydrothecae lack pedicel and diaphragm, both features characterizing *Lafoeina*, but not *Egmundella* which has hydrothecae with pedicel and diaphragm. However, in the material from the Chafarinas, though most of the hydrothecae were not pedicellate, there were also hydrothecae with a distinct pedicel. Also many of the hydrothecae observed had a well marked diaphragm. Consequently we retain this species in the genus *Egmundella* Stechow, 1921

Ecology.— *Egmundella amirantensis* is an eurybathic species, having been found from 1 (Calder, 1991) to 1062 m depth (Calder & Vervoort, 1998). Our material comes from 1 to 40 m. It is a typically epibiontic species, having been frequently reported on hydroids (Millard & Bouillon, 1973; García Corrales et al., 1979; Roca,

1986; Calder, 1991; Ramil & Vervoort, 1992; Calder & Vervoort, 1998), but also on bryozoans (Calder, 1991) and algae (Millard & Bouillon, 1973; Roca, 1986). In our material it was found exclusively on other organisms, preferably living epibiontic on hydroids (> 57% of the records), but also on bryozoans, anthozoans, cirripedes and algae.

Millard & Bouillon (1973) found fertile colonies in summer.

Distribution.— Although Boero & Bouillon (1993) considered *Egmundella amirantensis* an Indo-Pacific species, its presence in Bermuda (Calder, 1991) points to a much wider, probably temperate circumtropical distribution.

It has been reported from the Seychelles (Millard & Bouillon, 1973), Mozambique (Millard, 1975), Bermudas (Calder, 1991), Mid-Atlantic Ridge (Calder & Vervoort, 1998), Cape Spartel and Casablanca, in Morocco (Ramil & Vervoort, 1992) and the north of Spain (García Corrales et al., 1979).

In the Mediterranean it is known from the Balearic Islands (Roca, 1986) and from off the Spanish coasts (García Corrales et al, 1979).

Genus *Opercularella* Hincks, 1868

Opercularella spec.
(fig. 10e)

?*Opercularella* sp. Ramil, 1988: 157-159, pl. 9 figs a-b.

Material.— D-8, 30 m, single hydrotheca on bivalve shell.

Description.— Stolonal hydrorhiza giving rise to a single hydrotheca on a long, completely wavy pedicel. Hydrotheca fusiform, with circular diaphragm delimiting a small basal chamber. Operculum composed of eight large, triangular valves, indistinctly separated from the hydrotheca and closing as a roof, though not converging completely at distal end.

Remarks.— The scarcity of material available prevents us from referring it to any known species. It is close to *Opercularella* spec. described by Ramil (1988) in size and shape of the hydrotheca and in habitat.

Family Lovenellidae Russell, 1953
Genus *Lovenella* Hincks, 1868

Lovenella clausa (Lovén, 1836)
(fig. 10f)

Campanularia clausa Lovén, 1836: 262.
Lovenella clausa; Hincks, 1868: 177, fig. 19, pl. 32 fig. 2; Jäderholm, 1909: 79; Fraser, 1912: 364, fig. 26a-d; Broch, 1928: 119: Da Cunha, 1944: 44, fig. 22; Marine Biological Association, 1957: 44; Patriti, 1970: 32, fig. 38; Ramil, 1988: 146, pl. 6; Cornelius et al., 1990: 134, fig. 4.12; Álvarez Claudio, 1993: 119-121, fig. 20; Medel & López González, 1996: 198.
?*Lovenella clausa*; Gili, 1986: 131, fig. 4.13f-g.
Not *Lovenella clausa*; García Corrales et al., 1979: 30, fig. 6.

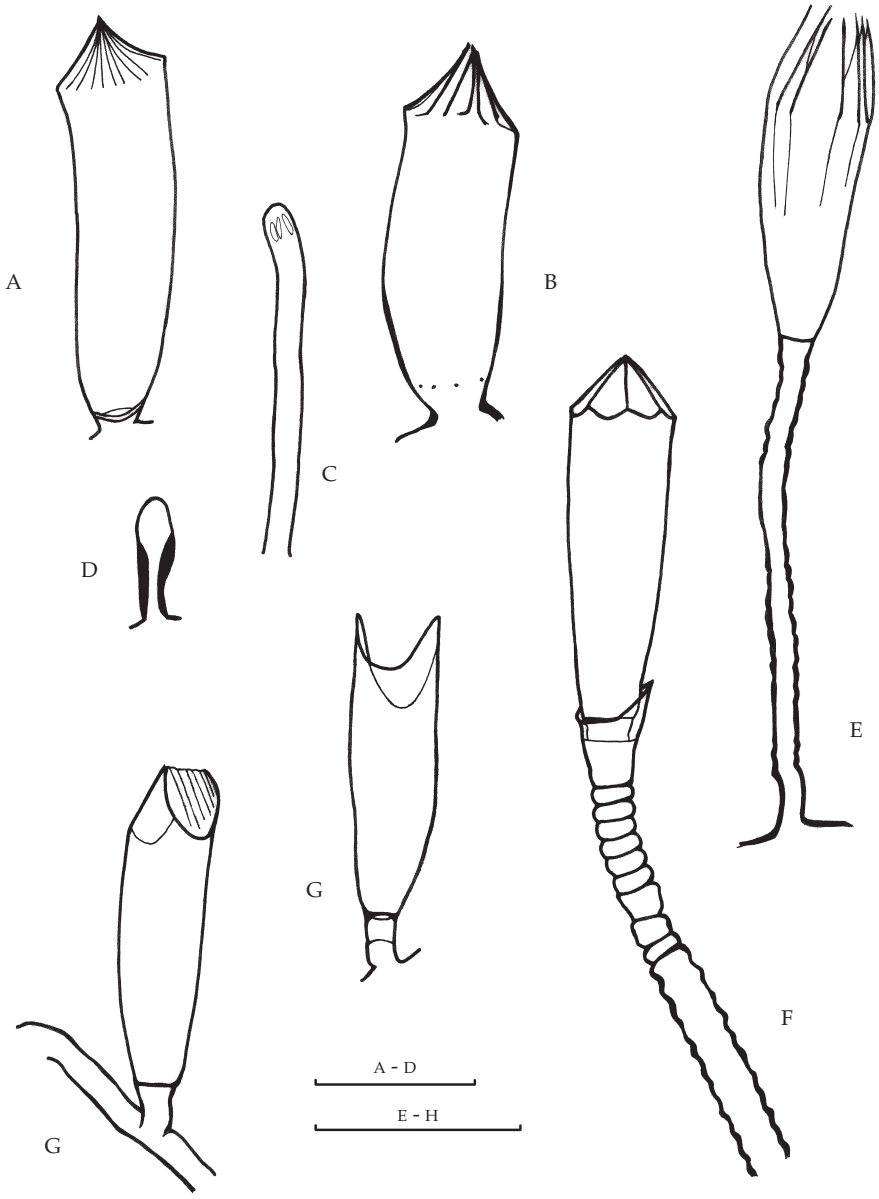

Fig. 10. A-D, *Egmundella amirantensis* Millard & Bouillon, 1973. A-B, hydrothecae; C-D, nematothecae. E, *Opercularella* spec., hydrotheca. F, *Lovenella clausa* (Lovén, 1836), hydrotheca. G, H, *Modeeria rotunda* (Quoy & Gaimard, 1827), hydrothecae. Scale bar: 100 μm (A-D), 250 μm (E), 500 μm (F-H).

Material.— B-13, 38 m, colony on *Turritella communis*; G-9, 18 m, colony on *Aporrhais pespelecani* (RMNH-Coel. 29370).— G-15, 21 m, colony on *Cancellaria cancellata*.— H-16, 20 m, colony on bivalve shell.— J-8, 15 m, hydrotheca on *Amathia* spec. (RMNH-Coel. 29371).

Description.— Colonies composed of hydrorhizal stolons creeping on substrate and giving rise to unbranched stems provided with a single hydrotheca at their distal end. Perisarc of stem completely wavy, forming a series of rings under the hydrothecae. Hydrotheca tubiform, with circular diaphragm delimiting a small basal chamber of c. 100 μm length. Hydrotheca slightly widening distally; maximum diameter at aperture c. 250 μm. Operculum composed of eight triangular valves closing to form a roof, distinctly separated from hydrotheca and resting in circular embayments of the hydrothecal rim. Frequently new hydrothecae arise from the diaphragm of older hydrothecae and remain inside that older hydrotheca. Length from hydrothecal diaphragm to distal end of opercular valves c. 875 μm.

No gonothecae.

Remarks.— *Lovenella clausa* has been reported twice from the Mediterranean. García Corrales et al. (1979) assigned to this species material from Altea (Spain), differing considerably from Lovén's species. The colonies are much smaller in all dimensions and the hydrothecae have a different shape, thinning sharply proximally and with an opercular apparatus completely different from that present in *L. clausa*, as the opercular plates are a continuation of the hydrothecal wall, lacking any jointing. The differences are large enough to consider the material studied by García Corrales et al. (1979) as not belonging to *L. clausa*.

The material of the second record (Gili, 1986) also has important size differences, being much smaller than Lovén's species. In Gili's material the hydrothecae have a length of 280-330 μm and a diameter at aperture of 95-120 μm; Patriti's (1970) material, for example, is c. 846 μm and c. 230 μm, respectively. The gonothecae found by Gili (1986) are c. 450 μm long, whereas those figured by Cornelius et al. (1990) have a length of c. 2300 μm. The distinct differences in hydrothecal and gonothecal size make Gili's record doubtful, and we have not considered it in our further discussion.

Ecology.— *Lovenella clausa* is a littoral and shelf species found from the tidal level (Cornelius et al., 1990) to 161 m depth (Álvarez Claudio, 1993). Our material was collected from 15 to 21 m depth.

The species has frequently been found on molluscs (Da Cunha, 1944; Ramil, 1988; Cornelius et al., 1990; Álvarez Claudio, 1993) and *Turritella* shells inhabited by the sipunculid *Phascolion strombi* (Ramil, 1988; Teissier, 1965) or by polychaetes (Álvarez Claudio, 1993), but it has also been reported on algae (Lovén, 1836; Cornelius et al., 1990) and shell fragments (Ramil, 1988).

Da Cunha (1944) and Ramil (1988) reported colonies with gonothecae in April and Álvarez Claudio (1993) in June.

Distribution.— *Lovenella clausa* was considered a Mediterranean-Atlantic species by Boero & Bouillon (1993). However, the records from the Mediterranean are dubious, so that its distribution could be restricted to the north-eastern Atlantic, extending over the Celtic, Caledonian, Lusitanian and Mauritanian provinces, penetrating the Mediterranean only in the Alboran Sea area. It is known from off the Baltic coast of Sweden (Lovén, 1836) to Agadir, in Morocco (Patriti, 1970), having also been reported

from the North Sea (Hartlaub, 1899, in Jäderholm, 1909), off the British Islands (Hincks, 1868; Cornelius et al., 1990), north-west coast of France (Teissier, 1965), north and north-west coast of Spain (Álvarez Claudio, 1993; Ramil, 1988) and Portugal (Da Cunha, 1944).

Family Tiarannidae Russell, 1940

Genus *Modeeria* Forbes, 1848

Modeeria rotunda (Quoy & Gaimard, 1827)
(fig. 10g-h)

Dianea rotunda Quoy & Gaimard, 1827: 181, pl. 6a figs 1-2 (medusa).
Campanularia fastigiata Alder, 1860: 73-74, pl. 5 fig. 1 (polyp).
Stegopoma fastigiatum; Stechow, 1919: 72; Picard, 1951c: 261; 1958a: 191; Vervoort, 1959: 234, fig. 10; Naumov, 1969: 341, fig. 206; Patriti, 1970: 31, fig. 37; Stepan'yants, 1979: 44, pl. 8 fig. 1a-b; Marinopoulos, 1981: 176.
Stegopoma fastigata; Fraser, 1946: 69-70, 250-251; Roca, 1986: 295-298, fig. 52.
Modeeria rotunda; Millard, 1975: 137, fig. 45a; 1977: 106; García Carrascosa, 1981: 99-102, pl. 1 fig. g, pl. 30 fig. b; Gili et al., 1989: 74, fig. 3c; Cornelius et al., 1990: 127, fig. 4.12; Ramil & Vervoort, 1992: 29-32, fig. 4a-b; Boero & Bouillon, 1993: 262; Álvarez Claudio, 1993: 105-107, fig. 17; Altuna, 1994: 127-128; Medel & López González, 1996: 197.

Material.— B-11, 42 m, single hydrotheca on *Eudendrium glomeratum* (RMNH-Coel. 29372).— E-2, 40 m, three hydrothecae on *Eudendrium ramosum*.

Description.— Small stolonal colonies. Filiform hydrorhiza giving rise to small hydrothecae on a short pedicel. Hydrotheca tubiform, with circular diaphragm. Hydrothecal rim uneven, with two large cusps. Operculum composed of two semi-circular valves, attached in two embayments of the rim and closing as a roof. Each valve with longitudinal grooves.

Gonothecae not found.

Ecology.— *Modeeria rotunda* is an eurybathic species that, in the Mediterranean, has been found from 0.5 (García Carrascosa, 1981) to 700 m depth (Rossi, 1958); our material comes from 40 to 42 m. Outside the Mediterranean it has been reported from 30 (Cornelius et al., 1990) to 1193 m depth (Gili et al., 1989). It has mainly been found epibiontic on hydrozoans (Stechow, 1919; Rossi, 1958; Vervoort, 1959; García Carrascosa, 1981; Roca, 1986; Gili et al., 1989; Ramil & Vervoort, 1992; Álvarez Claudio, 1993; Altuna, 1994), but also on ascidians (De Haro, 1965), anthozoans (Álvarez Claudio, 1993) and bio-concretions (García Carrascosa, 1981).

Vervoort (1959) found fertile colonies in April, Ramil & Vervoort (1992) in June and Álvarez Claudio (1993) in May and June.

Distribution.— *Modeeria rotunda* is widely considered a cosmopolitan species (Vervoort, 1959; Boero & Bouillon, 1993), also present in Arctic (Naumov, 1969) and sub-Antarctic (Stepan'yants, 1979) waters. In the nearby eastern Atlantic it has been reported from off the Cape Verde Islands (Stechow, 1925b), Morocco (Billard, 1906; Patriti, 1970; Ramil & Vervoort, 1992), Gibraltar Strait, Gulf of Cádiz and Cape San Vicente (Ramil & Vervoort, 1992), north of Spain (Álvarez Claudio, 1993; Altuna, 1994) and around the British Isles (Cornelius et al., 1990).

In the Mediterranean it is known from the Adriatic (Broch, 1912), the Balearic Islands (Roca, 1986) and from off the French (Picard, 1951c; Marinopoulos, 1981), Italian (Rossi, 1958) and Spanish coasts (García Carrascosa, 1981).

Family Lafoeidae Hincks, 1868

Genus *Filellum* Hincks, 1868

Filellum disaggregatum Peña Cantero, García Carrascosa & Vervoort, 1998

Filellum disaggregatum Peña Cantero, García Carrascosa & Vervoort, 1998: 308-311, figs 3-4.

Material.— CONG 57, 10.5 m, several colonies with numerous hydrothecae on *Cystoseira spinosa*, *Rhodymenia* spec. and *Acrosorium uncinatum*, with coppiniae (RMNH-Coel. 29373).— CONG 62, 5 m, a few hydrothecae on *Cystoseira spinosa*, with coppinia.

Remarks.— Peña Cantero et al. (1998) have fully described and figured *F. disaggregatum*, also presenting ecological details and distribution. These authors also gave arguments to consider this a new species and remarked that only fertile colonies of species of *Filellum* can be properly identified. The distinction between *F. disaggregatum* and *F. serpens* (Hassall, 1848) is impossible without the coppinia, so that previous records of infertile material of Hassall's species are doubtful.

Filellum serratum (Clarke, 1879)

Lafoëa serrata Clarke, 1879: 242, pl. 4 fig. 25; Ritchie, 1911: 818-820.
Filellum serratum; Millard, 1975: 178, fig. 59a-c; Boero & Bouillon, 1993: 263; Álvarez Claudio, 1993: 144-147, fig. 24, pl. 8 figs a-f; Hirohito, 1995: 110, fig. 31; Peña Cantero et al., 1998: 304-308, figs 1-2.

Material.— CONG 44, 3 m, numerous hydrothecae on *Flabellia petiolata*, *Halopteris filicina*, *Peyssonnelia rubra*, *Boscia anglicum*, *Plocamium coccineum*, *Sertularella ellisii*, *Salacia desmoides, Aglaophenia kirchenpaueri*, bio-concretions of *Astroides calycularis*, *Clavularia* spec., serpulids and *Scrupocellaria maderensis*, with coppiniae (RMNH-Coel. 29374).— CONG 74, 11 m, numerous hydrothecae on *Halopteris scoparia* and *Rhodymenia* spec., with coppiniae.— CONG 82, 5 m, numerous hydrothecae on *Corallina elongata*, *Rhodymenia ardissonei* and bio-concretions of *Astroides calycularis*, with coppiniae.— ISA 10, 10 m, numerous hydrothecae on *Cystoseira spinosa*, *Halopteris filicina* and *Sertularella ellisii*, with coppiniae (RMNH-Coel. 29375).

Remarks.— The material here identified as *Filellum serratum* was previously described and figured by Peña Cantero et al. (1998), who also presented a review of ecology and distribution of Clarke's species. The present material represents the first record of fertile colonies of *F. serratum* in the Mediterranean, confirming its presence in that sea. Peña Cantero et al. (1998) found important differences in the structure of the coppinia in the fertile material described by Ritchie (1911), Hirohito (1995) and ourselves, and that found by Millard (1975) and Álvarez Claudio (1993), indicating that *F. serratum* may be a complex of more than one species. Consequently, for proper identification of this species fertile material is a necessity.

Filellum spec. 1

Material.— CONG 7, 19 m, several hydrothecae on *Cystoseira spinosa* and *Acrosorium uncinatum*.— CONG 8, 10 m, several hydrothecae on *Cystoseira spinosa* and *Sargassum* spec. (RMNH-Coel. 29376).— CONG 18, 4.5 m, a few hydrothecae on *Corallina elongata*.— CONG 26, 18 m, a few hydrothecae on incrusting calcareous algae, *Cystoseira spinosa*, *Scrupocellaria* spec. and polychaete tubes (RMNH-Coel. 29377).— CONG 27, 13 m, several hydrothecae on *Corallina elongata*.— CONG 32, 7 m, a few hydrothecae on *Rhodymenia* spec.— CONG 33, 9 m, two hydrothecae on *Peyssonnelia rubra*.— CONG 35, 2 m, several hydrothecae on *Halopteris filicina*, *Peyssonnelia rubra* and *Plocamium cartilagineum* (RMNH-Coel. 29378, slide).— CONG 42, 8 m, a few hydrothecae on *Griffithsia* spec. and *Rhodymenia* spec. (RMNH-Coel. 29379).— CONG 53, 17.5 m, a few hydrothecae on *Cystoseira spinosa*.— CONG 54, 16.8 m, a few hydrothecae on *Sphaerococcus coronopifolius*, *Rhodophyllis divaricata*, *Sertularella ellisii* and bryozoans (RMNH-Coel. 29380).— CONG 55, 15.5 m, several hydrothecae on *Eudendrium merulum*.— CONG 56, 15 m, a few hydrothecae on *Sargassum* spec.— CONG 61, 4 m, numerous hydrothecae on *Peyssonnelia rubra* and *Lithophyllum expansum* (RMNH-Coel. 29382).— CONG 70, 4.5 m, a few hydrothecae on *Acrosorium uncinatum*, *Sargassum* spec. and *Jania* spec. (RMNH-Coel. 29383).— CONG 71, 5 m, a few hydrothecae on *Cystoseira spinosa*.— CONG 72, 7 m, a few hydrothecae on *Rhodymenia* spec.— CONG 73, 10 m, numerous hydrothecae on *Cystoseira spinosa*, *Halopteris filicina* and *Acrosorium uncinatum* (RMNH-Coel. 29384).— CONG 74, 11 m, a few hydrothecae on *Sargassum* spec.— CONG 75, 12 m, a few hydrothecae on *Acrosorium uncinatum* and rhizomes of *Posidonia oceanica*.— CONG 76, 13 m, numerous hydrothecae on *Halopteris filicina*, *Acrosorium uncinatum* and *Cystoseira spinosa* (RMNH-Coel. 29385).— CONG 80, 15 m, a few hydrothecae on *Erythroglossum sandrianum*, *Lithophyllum expansum*, bio-concretion of *Astroides calycularis*, *Cornularia* spec., bryozoans and polychaete tubes (RMNH-Coel. 29386).— CONG 82, 5 m, numerous hydrothecae on *Flabellia petiolata* (RMNH-Coel. 29387).— D-3, 24 m, a few hydrothecae on *Flabellia petiolata*.— D-8, 30 m, several hydrothecae on polychaete tubes.— E-2, 40 m, a few hydrothecae on *Eudendrium ramosum*.— ISA 2, 16 m, numerous hydrothecae on *Cystoseira spinosa* and *Acrosorium uncinatum* (RMNH-Coel. 29388).— ISA 7, 15 m, a few hydrothecae on *Cystoseira spinosa* (RMNH-Coel. 29389).— ISA 9, 12 m, a few hydrothecae on *Flabellia petiolata*, *Peyssonnelia coriacea*, *Acrosorium uncinatum* and bio-concretion of *Astroides calycularis* (RMNH-Coel. 29390).— ISA 16, 7 m, a few hydrothecae on *Peyssonnelia bornetii*.— ISA 18, 20 m, a few hydrothecae on *Cystoseira spinosa*.— ISA 22, 15 m, a few hydrothecae on *Cystoseira spinosa* and bryozoans (RMNH-Coel. 29391).— ISA 23, 18.2 m, a few hydrothecae on *Halopteris filicina*.— ISA 27, 25 m, a few hydrothecae.— I-3, 26 m, a few hydrothecae on algae remains.— REY 5, 20 m, numerous hydrothecae on *Cystoseira spinosa* and *Aglaophenia pluma* (RMNH-Coel. 29392).— REY 6, 10 m, a few hydrothecae on *Halopteris scoparia*, *Rhodymenia ardissonei* and *Aglaophenia pluma* (RMNH-Coel. 29393).— REY 7, 27 m, several hydrothecae on *Cystoseira spinosa* and *Sargassum* spec. (RMNH-Coel. 29394).— REY 8, 25 m, a few hydrothecae on *Cystoseira spinosa* and *Dictyota dichotoma* (RMNH-Coel. 29395).— REY 17, 2 m, a few hydrothecae on *Peyssonnelia coriacea* and *Myriapora truncata* (RMNH-Coel. 29396).

Remarks.— In *Filellum* spec. 1 we have included all infertile material with hydrothecae resembling those of *F. disaggregatum* and *F. serpens*. As stated above, only colonies with a coppinia can be confidently identified.

Ecology.— The material brought to *Filellum* spec. 1 was collected from 2 to 40 m depth, mainly growing epibiontic on other organisms, preferably on algae (> 76% of the occasions), such as the sciaphilic or hemiphotophilic algae *Cystoseira spinosa*, *Halopteris filicina*, *Acrosorium uncinatum*, *Flabellia petiolata*, *Peyssonnelia coriacea*, *P. rubra*, etc. It was also found on rhizomes of *Posidonia oceanica*, hydrozoans, bryozoans, anthozoans and polychaete tubes, as well as on non-living, biotic substrata (bio-concretions and remains of organism).

Filellum spec. 2

Material.— B-11, 42 m, a few hydrothecae on *Eudendrium glomeratum* and *Eudendrium ramosum* (RMNH-Coel. 29397).— CONGRESO BANK, several hydrothecae on *Cystoseira spinosa* (RMNH-Coel. 29398).— CONG 1, 0.5 m, numerous hydrothecae on *Peyssonnelia coriacea* and *Cryptonemia lomation* (RMNH-Coel. 29399).— CONG 2, 1 m, a few hydrothecae on *Corallina elongata* (RMNH-Coel. 29400).— CONG 7, 19 m, a few hydrothecae on *Cystoseira spinosa*, *Halopteris filicina* and *Acrosorium uncinatum*; CONG 25, 25 m, a few hydrothecae.— CONG 28, 9 m, a few hydrothecae on *Flabellia petiolata*, *Aglaophenia kirchenpaueri*, *Sertularella ellisii* and *Salmacina* spec. (RMNH-Coel. 29401).— CONG 32, 7 m, a few hydrothecae on *Halopteris scoparia*.— CONG 35, 2 m, a few hydrothecae; CONG 39, 0.4 m, five hydrothecae on *Griffithsia* spec.— CONG 43, 0 m, a few hydrothecae on *Corallina elongata* (RMNH-Coel. 29402).— CONG 45, 3 m, a few hydrothecae on *Sargassum* spec.— CONG 46, 5 m, a few hydrothecae on *Flabellia petiolata*, *Corallina elongata*, bio-concretions of *Astroides calycularis* and *Halecium* spec. (RMNH-Coel. 29403).— CONG 59, 9 m, several hydrothecae on *Peyssonnelia rubra*, *Halopteris filicina* and *Sertularella ellisii* (RMNH-Coel. 29404).— CONG 60, 8.5 m, a few hydrothecae on *Flabellia petiolata*, *Corallina* spec., *Acrosorium uncinatum* and *Rhodymenia* spec. (RMNH-Coel. 29405).— CONG 61, 4 m, numerous hydrothecae on *Halopteris filicina*, *Peyssonnelia rubra*, *Flabellia petiolata* and *Rhodymenia* spec. (RMNH-Coel. 29406).— CONG 62, 5 m, a few hydrothecae on *Corallina elongata*.— CONG 63, 2 m, a few hydrothecae on *Corallina elongata* and bio-concretions (RMNH-Coel. 29407).— CONG 70, 4.5 m, a few hydrothecae.— CONG 72, 7 m, numerous hydrothecae on *Halopteris scoparia* (RMNH-Coel. 29408).— CONG 76, 13 m, numerous hydrothecae on *Cystoseira spinosa*.— CONG 79, 17 m, numerous hydrothecae on *Sertularella ellisii* and *Cellaria salicornoides* (RMNH-Coel. 29409).— CONG 80, 15 m, a few hydrothecae on *Scrupocellaria* spec.— CONG 81, 8 m, a few hydrothecae on *Corallina elongata* and *Flabellia petiolata* (RMNH-Coel. 29410).— CONG 83, 5 m, a few hydrothecae on *Acrosorium uncinatum*, *Jania longifurca*, *Halopteris filicina* and *Corallina elongata* (RMNH-Coel. 29411).— C-8 (bis), 40 m, a few hydrothecae on *Eudendrium ramosum*.— D-2, 41 m, a few hydrothecae on *Nemertesia perrieri* and *Nemertesia ramosa*.— E-2, 40 m, a few hydrothecae on *Nemertesia ramosa*.— ISA 1, 24 m, numerous hydrothecae on *Cystoseira spinosa* (RMNH-Coel. 29412).— ISA 3, 12 m, a few hydrothecae on *Cystoseira spinosa* and *Corallina* spec. (RMNH-Coel. 29413).— ISA 5, 35 m, numerous hydrothecae on *Eudendrium ramosum*, *Antennella secundaria, Aglaophenia elongata*, *Eudendrium* spec. and *Ellisella paraplexauroides* (RMNH-Coel. 29381, slide).— ISA 14, 0.3 m, a few hydrothecae on incrusting calcareous algae, *Corallina elongata* and cirripedes.— ISA 17, 3 m, a few hydrothecae on *Corallina elongata*, *Acrosorium uncinatum*, *Aglaophenia kirchenpaueri* and *Sertularella ellisii* (RMNH-Coel. 29414).— ISA 24, 10 m, a few hydrothecae on *Halopteris scoparia*, *Peyssonnelia* spec. and *Cystoseira spinosa* (RMNH-Coel. 29415).— ISA 25, 10 m, a few hydrothecae on *Peyssonnelia rubra* and *Myriapora truncata*.— ISA 26, 34 m, numerous hydrothecae on *Obelia dichotoma* and *Cellaria salicornoides* (RMNH-Coel. 29416).— ISA 27, 25 m, numerous hydrothecae on *Cornularia* spec., *Cellaria salicornoides*, *Celleporina* spec. and serpulids.— ISA 28, 29 m, a few hydrothecae on *Eudendrium* spec., *Clytia linearis* and *Scrupocellaria* spec.— ISA 29, 6 m, numerous hydrothecae on *Halopteris filicina*, *Peyssonnelia* spec. and bio-concretions of *Astroides calycularis* (RMNH-Coel. 29417).— ISA 30, 15 m, several hydrothecae on *Halopteris filicina* and *Peyssonnelia coriacea* (RMNH-Coel. 29418).— PCONG 2, 3 m, a few hydrothecae on *Acrosorium uncinatum*, *Flabellia petiolata*, *Halopteris filicina* and *Eudendrium racemosum* (RMNH-Coel. 29419).— PCONG 4, 3 m, a few hydrothecae on *Eudendrium racemosum*.— PCONG 5, 3 m, a few hydrothecae on *Rhodymenia ardissonei*.— PCONG 6, 2 m, a few hydrothecae on *Plocamium cartilagineum*, *Eudendrium racemosum* and *Dynamena cornicina* (RMNH-Coel. 29420).— PISA 3, 3 m, a few hydrothecae on *Plocamium cartilagineum*.— PISA 17, 1 m, several hydrothecae on bio-concretions of *Astroides calycularis* and polychaete tubes.— PISA 18, 30 m, a few hydrothecae on *Aglaophenia acacia*, *Clytia* spec. and *Eudendrium* spec.— PISA 19, 2 m, numerous hydrothecae on *Amphiroa cryptarthodia*, *Rhodymenia ardissonei* and bio-concretions of *Astroides calycularis* (RMNH-Coel. 29421).— PISA 22, 2 m, a few hydrothecae on *Corallina elongata* and *Sertularella ellisii*.— PISA 23, 3 m, a few hydrothecae on *Halopteris filicina* and *Eudendrium racemosum*.— PISA 24, 2 m, a few hydrothecae on *Plocamium cartilagineum* and *Aglaophenia picardi*.— PISA 27, 1 m, several hydrothecae on *Peyssonnelia coriacea* (RMNH-Coel. 29422); REY 4, 27 m, a few hydrothecae on *Eudendrium glomeratum*, *Cellaria salicornoides* and other bryozoans.— REY 20, 3 m, a few hydrothecae on *Corallina elongata*.

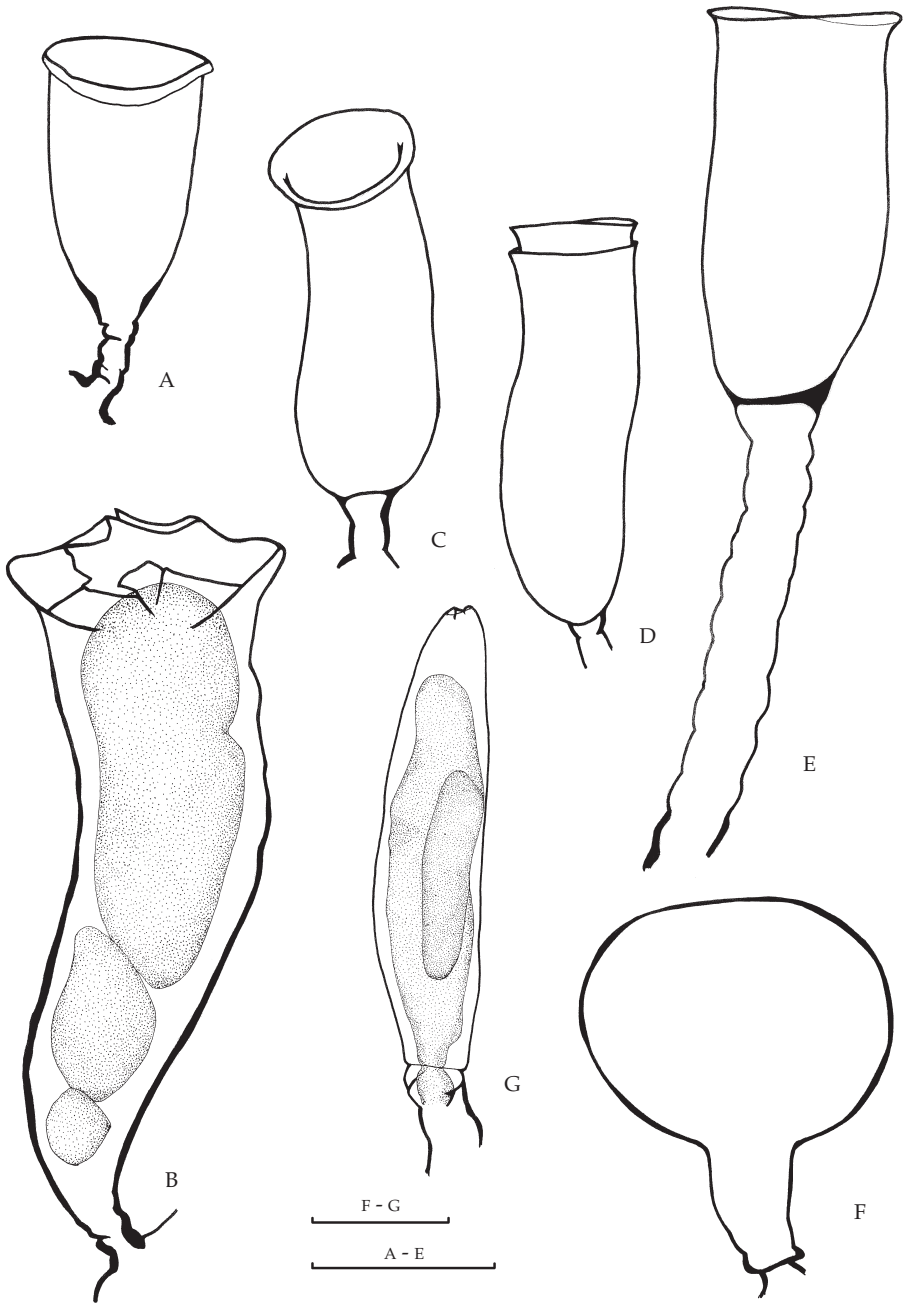

Fig. 11. A, B, *Anthohebella parasitica* (Ciamician, 1880). A, hydrotheca; B, gonotheca. C, D, *Hebella scandens* (Bale, 1888), hydrothecae. E-G, *Scandia gigas* (Pieper, 1884). E, hydrotheca; F, female gonotheca; G, male gonotheca. Scale bar: 250 μm (C-G), 500 μm (A-B).

Remarks.— The material referred here to *Filellum* spec. 2 consists of infertile colonies with hydrothecae distinctly resembling those of *F. serratum*. However, the absence of coppiniae prevents us from including it in Clarke's species.

Ecology.— *Filellum* spec. 2 was collected from the tidal level to 42 m depth, growing almost exclusively epibiontic on other organisms, mainly seaweeds and hydrozoans, but also on bryozoans, anthozoans, polychaete tubes and cirripedes, as well as on bio-concretions.

Family Hebellidae Fraser, 1912

Genus *Anthohebella* Boero, Bouillon & Kubota, 1997

Anthohebella parasitica (Ciamician, 1880)

(fig. 11a-b)

Lafoea parasitica Ciamician, 1880: 673, pl. 39 figs 1-4.

Hebella parasitica; Marktanner-Turneretscher, 1890: 213; Stechow, 1919: 76; Leloup, 1934: 8; 1937: 4; Da Cunha, 1941: 1, figs 1-2; 1944: 42, fig. 20; Rossi, 1950: 217, fig. 12b; Picard, 1952a: 347; Vervoort & Vasseur, 1977: 12, fig. 3; García Corrales et al., 1979: 16, fig. 6; Marinopoulos, 1979: 120; Boero, 1980: 133, figs 1-7; 1981b: 109, fig. 1; Isasi, 1985: 54-55, figs 8a-b; García Carrascosa, 1981: 148-151, pl. 5 figs e-h; Gili, 1986: 172, fig. 4.27a, d; Izquierdo et al., 1986a: 85-86, fig. 3; Roca, 1986: 179-182, fig. 37; Boero & Fresi, 1986: 143; Park, 1993: 264; Boero & Bouillon, 1993: 263; Vervoort, 1993: 544; Altuna, 1994: 147-151, pl. 20, figs a-c; Medel & López González, 1996: 198.

Hebella furax; García Corrales et al., 1979: 14, fig. 5.

Anthohebella parasitica; Boero et al., 1997: 24-25, fig. 13.

Material.— CONG 46, 5 m, a few hydrothecae on *Aglaophenia kirchenpaueri*, with gonothecae.— CONG 82, 5 m, a few hydrothecae on *Aglaophenia kirchenpaueri*, with gonothecae.— ISA 12, 5 m, several hydrothecae on *Aglaophenia kirchenpaueri*, with gonothecae (RMNH-Coel. 29423).— ISA 17, 3 m, several hydrothecae on *Aglaophenia kirchenpaueri* and *Aglaophenia picardi*, with gonothecae (RMNH-Coel. 29424).— PCONG 5, 3 m, single hydrotheca on *Eudendrium racemosum*, with gonothecae.— PCONG 7, 0.5 m, a few hydrothecae on *Aglaophenia picardi*, with gonothecae.— PISA 11, 2.3 m, several hydrothecae on *Aglaophenia kirchenpaueri*, with gonothecae (RMNH-Coel. 29425).

Ecology.— *Anthohebella parasitica* is a littoral species that, in the Mediterranean, has been found from the tidal level (Stechow, 1919; García Carrascosa, 1981; Boero & Fresi, 1986) to 30 m depth (Stechow, 1919); our material was collected from 0.5 to 5 m. Outside the Mediterranean, it has been reported from the tidal level to 20-25 m depth (Altuna, 1994). It is an epibiontic species, having been reported almost exclusively on other hydroids, mainly species of *Aglaophenia* and *Sertularella* (Stechow, 1919; Leloup, 1934; Boero, 1980; García Carrascosa, 1981; Roca, 1986; Boero & Fresi, 1986; Gili, 1986; Vervoort, 1993; Altuna, 1994; etc.), but also on bryozoans and algae (Altuna, 1994). In our material it was exclusively found epibiontic on hydroids, mainly on *Aglaophenia kirchenpaueri* and *A. picardi*, but also on *Eudendrium racemosum*.

Boero & Fresi (1986) collected the species throughout the year in the Mediterranean and found fertile colonies in June and September. At the Chafarinas colonies with gonothecae were collected in July and August. Outside the Mediterranean Isasi (1985) found gonothecae in August and Altuna (1994), who found this species throughout the year (with the exception of February), reported fertile colonies exclusively from July. At temperate latitudes *A. parasitica* therefore seems to be fertile in summer.

Distribution.— *Anthohebella parasitica* seems to have a warm-temperate circumtropical distribution (Altuna, 1994). It has been reported from the Red Sea (Mergner & Wedler, 1977), the Pacific (Vervoort & Vasseur, 1977), Japan (Stechow, 1923a; Leloup, 1938), Korea (Park, 1993) and the China Sea (Leloup, 1937). In the north-eastern Atlantic it has been recorded from off the French (Billard, 1926), Portuguese (Da Cunha, 1944) and Spanish coasts (Isasi, 1985; Altuna, 1994).

In the Mediterranean it is known from the Adriatic (Marktanner-Turneretscher, 1890), the Balearic Islands (Roca, 1986) and from off the French (Picard, 1952a), Israeli (Vervoort, 1993), Italian (Rossi, 1950; Boero, 1980, 1981b; Boero & Fresi, 1986), Spanish (García Corrales et al., 1979; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Genus *Hebella* Allman, 1888

Hebella scandens (Bale, 1888)
(fig. 11c-d)

Lafoea calcarata A. Agassiz, 1865: 124, 125, 126, 132, figs 190-193.
Lafoea scandens Bale, 1888: 758, pl. 13 figs 16-19.
Hebella cylindrata Marktanner-Turneretscher, 1890: 214, pl. 3 fig. 15; Vervoort, 1959: 241, figs 15a-d; De Haro, 1965: 109, fig. 3.
Hebella scandens; Marktanner-Turneretscher, 1890: 214, pl. 3 fig. 16; Picard, 1958b: 1; Rossi, 1971: 36, fig. 1; Millard & Bouillon, 1973: 59; Millard, 1975: 182, figs 60f-g; García Carrascosa, 1981: 151, pl. 5 figs i-j; Isasi, 1985: 54, fig. 7; Gili, 1986: 172, figs 4.13b-c, h; Templado et al., 1986: 98; Boero & Bouillon, 1993: 263; Vervoort, 1993: 544-545; Altuna, 1994: 151-158, pl. 21 figs a-d, pl. 22 figs a-e; Migotto, 1996: 26-27, fig. 6a-b; Boero et al., 1997: 8-11.
Hebella contorta Marktanner-Turneretscher, 1890: 215, pl. 3 figs 17a-b.
Hebellopsis scandens; Hadzi, 1916: 27; Calder, 1991: 43-45, fig. 27; Medel & López González, 1996: 198.
Hebella calcarata; Fraser, 1944: 205, pl. 39 fig. 183; 1946: 57; Picard, 1951c: 261.
Hebella scandens var. *michaelseni*; Vervoort, 1959: 238, fig. 13.
Hebella scandens var. *contorta*; Vervoort, 1959: 239, fig. 14; 1968: 25, fig. 10; Vervoort & Vasseur, 1977: 13, figs 4, 12a.
Hebella urceolata Millard, 1964: 12, fig. 2a; 1979: 139; García Corrales et al., 1979: 17, fig. 7.
Hebella scandens contorta; Park, 1993; 264.

Material.— CONG 7, 19 m, a few colonies on *Cystoseira spinosa*, *Aglaophenia kirchenpaueri* and *Sertularia distans* (RMNH-Coel. 29426).

Ecology.— *Hebella scandens* is a littoral and shelf species; in the Mediterranean it has been found from the tidal level (García Carrascosa, 1981) to 120 m depth (Templado et al., 1986); our material was collected at 19 m. Outside the Mediterranean it has been reported from the tidal level to 164 m depth (Millard, 1975). It seems to be a strictly epibiontic species, having been found mainly on hydrozoans, especially Sertulariidae (Rossi, 1961; García Carrascosa, 1981; Gili, 1986; Roca, 1986; Vervoort, 1993; Altuna, 1994; etc.), but also on algae (Isasi, 1985; Gili, 1986; Altuna, 1994), sponges (Isasi, 1985) and bryozoans (García Carrascosa, 1981). In our material, it was found on *Cystoseira spinosa*, *Aglaophenia kirchenpaueri* and *Sertularia distans*.

We did not find references of fertile material from the Mediterranean. Outside that area colonies with gonothecae were found in April (Millard, 1957), July (Altuna, 1994),

August (Isasi, 1985), September (Millard, 1957), December (Vervoort, 1959), from January to February, April and from August to October (Migotto, 1996). Millard & Bouillon (1973) found gonothecae in the summer.

Distribution.— Although considered a cosmopolitan species (Picard, 1958a; Millard, 1975; Boero & Bouillon, 1993), *Hebella scandens* seems to have a circumglobal distribution (Calder, 1991), restricted to tropical, sub-tropical and temperate waters (Vervoort, 1993). In the eastern Atlantic it has been reported from off the north coast of Spain (García Corrales et al., 1979; Isasi, 1985; Altuna, 1994) to South Africa (Millard, 1975).

In the Mediterranean it is known from the Adriatic (Marktanner-Turneretscher, 1890), the Alboran Sea (Templado et al., 1986), the Balearic Islands (Gili, 1986; Roca, 1986), and from off the French (Picard, 1951c), Israeli (Picard, 1958b; Vervoort, 1993), Italian (Rossi, 1961), Spanish (De Haro, 1965; García Corrales et al., 1979; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Genus *Scandia* Fraser, 1912

Scandia gigas (Pieper, 1884) (fig. 11e-g)

Lafoea gigas Pieper, 1884: 165.
Hebella gigas; Stechow, 1919: 76; Leloup, 1934: 8.
Hebellopsis gigas; Broch, 1933: 61-62, figs 22a-e.
? *Hebella pocillum*; Fraser, 1937: 114, pl. 24 fig. 130a-b; 1944: 207, pl. 39 fig. 186; 1946: 57.
Scandia pocillum; Picard, 1952a: 349; 1955: 187; Rossi, 1961: 81, fig. 2; 1971: 36, fig. 14f-g; Marinopoulos, 1979: 120; García Corrales et al., 1979: 23, fig. 10a-f; García Carrascosa, 1981: 155, pl. 6 figs c-h; Gili, 1982: 72, fig. 33; Isasi, 1985: 55, fig. 8c-d.
Lafoea pocillum; Patriti, 1970: 27, fig. 27.
Scandia michael-sarsi; García Corrales et al., 1979: 20, figs 9a-f.
Scandia gigas; Boero, 1981a: 182, 184-185, 190, fig. 6; Boero & Fresi, 1986: 143; Gili, 1986: 171-172, fig. 4.27b-c; Altuna, 1994: 158-161, pl. 23 figs a-e; Medel & López González, 1996: 196.
Scandia parvula; Roca, 1986: 190-197, fig. 39.
Not *Lafoea pocillum* Hincks, 1868: 204, pl. 40 fig. 2 [= *Lafoea dumosa* (Fleming, 1820)]; Naumov, 1969: 295, fig. 46a, 161.

Material.— CONGRESO BANK, a few stems on *Rhodymenia ardissonei*, *Cystoseira spinosa* and *Eudendrium racemosum* (RMNH-Coel. 29427).— CONG 1, 0.5 m, numerous stems on *Peyssonnelia coriacea*, *Flabellia petiolata*, *Valonia utricularis*, *Corallina elongata*, *Plocamium cartilagineum* and bio-concretion of *Astroides calycularis* (RMNH-Coel. 29428).— CONG 2, 1 m, numerous stems on rock, *Peyssonnelia squamaria*, *Corallina elongata*, *Flabellia petiolata*, *Valonia utricularis* and bio-concretion of *Astroides calycularis* (RMNH-Coel. 29429).— CONG 6, 0 m, a few stems on *Hypnea musciformis*, *Cystoseira stricta* and *Corallina elongata* (RMNH-Coel. 29430).— CONG 7, 19 m, a few stems on *Cystoseira spinosa*.— CONG 8, 10 m, a few stems on *Cystoseira spinosa*, *Acrosorium uncinatum*, *Pentapora* spec. and sponges (RMNH-Coel. 29431).— CONG 13, 2 m, a few stems on *Cladostephus verticillatus* and *Halopteris scoparia*.— CONG 17, 2 m, a few stems on *Codium bursa* and incrusting calcareous algae.— CONG 18, 4.5 m, numerous stems on *Flabellia petiolata*, *Halopteris filicina*, *Corallina elongata*, *Acrosorium uncinatum*, *Cladostephus verticillatus* and *Cystoseira* spec., with gonothecae (RMNH-Coel. 29432).— CONG 21, 8 m, several stems on *Halopteris scoparia*, with gonothecae (RMNH-Coel. 29430).— CONG 23, 8 m, a few stems on *Halopteris scoparia*, *Plocamium cartilagineum* and *Acrosorium* spec., with gonothecae (RMNH-Coel. 29433).— CONG 25, 25 m, numerous stems on *Sertularella* spec. and *Eudendrium rameum*, with gonothecae (RMNH-Coel. 29434).— CONG 26, 18 m, numerous stems on *Cystoseira spinosa*, *Peyssonnelia bornetii*,

Halopteris filicina, incrusting calcareous algae, *Dictyota* spec. and *Adeonella* spec., with gonothecae (RMNH-Coel 29435).— CONG 27, 13 m, numerous stems on *Padina pavonia*, *Corallina elongata*, *Sargassum* spec. and *Flabellia petiolata* (RMNH-Coel 29436).— CONG 30, 0.2 m, a few stems on *Corallina elongata* and *Gigartina teedii*.— CONG 32, 7 m, a few stems on *Halopteris scoparia*, *Flabellia petiolata*, incrusting calcareous algae, *Zanardinia prototypus*, sponges and polychaete tubes, with gonothecae (RMNH-Coel 29437).— CONG 33, 9 m, five stems on rock and *Flabellia petiolata*.— CONG 35, 2 m, a few stems on *Flabellia petiolata*, *Sargassum* spec. and *Cystoseira* spec. (RMNH-Coel 29438); CONG 37, 0 m, a few stems on *Corallina elongata*.— CONG 41, 2.5 m, a few stems on *Halopteris scoparia* and *Corallina granifera*.— CONG 42, 8 m, a few stems on *Peyssonnelia rubra* and *Flabellia petiolata*.— CONG 43', 0 m, a few stems on *Corallina elongata*, *Hypnea musciformis* and *Valonia utricularis* (RMNH-Coel 29439).— CONG 44, 3 m, several stems on *Flabellia petiolata*, *Zonaria tournefortii*, *Peyssonnelia rubra*, *Plocamium coccineum*, *Halopteris filicina*, *Salacia desmoides* and *Aglaophenia kirchenpaueri*, with gonothecae (RMNH-Coel 29440).— CONG 45, 3 m, a few stems on *Sargassum* spec., *Rhodymenia ardissonei*, *Corallina elongata*, *Jania* spec. and incrusting calcareous algae (RMNH-Coel 29441).— CONG 46, 5 m, several stems on *Corallina elongata*, bio-concretion of *Astroides calycularis* and cirripedes (RMNH-Coel 29442).— CONG 53, 17.5 m, numerous stems on *Peyssonnelia rubra*, *Halopteris filicina*, *Lithophyllum expansum*, *Dictyota dichotoma* var. *intricata*, *Cystoseira spinosa* and sponges (RMNH-Coel 29443).— CONG 54, 16.8 m, a few stems on *Cladostephus verticillatus*, *Peyssonnelia* spec., *Flabellia petiolata*, *Cystoseira spinosa*, *Rhodophyllis divaricata*, *Sertularella ellisii* and polychaetes (RMNH-Coel 29444).— CONG 55, 15.5 m, a few stems on *Padina pavonia* and *Sphaerococcus coronopifolius*.— CONG 56, 15 m, a few stems on *Padina pavonia*.— CONG 57, 10.5 m, numerous stems on *Cystoseira spinosa*, *Peyssonnelia rubra*, *Padina pavonia*, *Rhodymenia* spec. and sponges (RMNH-Coel 29445).— CONG 58, 9 m, a few stems on rock, *Padina pavonia* and incrusting calcareous algae.— CONG 59, 9 m, numerous stems on *Peyssonnelia rubra* and *Halopteris filicina* (RMNH-Coel 29446).— CONG 60, 8.5 m, a few stems on *Acrosorium uncinatum*, *Flabellia petiolata*, *Corallina* spec. and bivalves (RMNH-Coel 29447).— CONG 61, 4 m, numerous stems on *Lithophyllum expansum*, *Peyssonnelia rubra* and *Flabellia petiolata* (RMNH-Coel 29448).— CONG 62, 5 m, several stems on *Sargassum* spec., *Corallina elongata*, *Corallina granifera*, *Halopteris scoparia*, *Cystoseira spinosa* and *Jania* spec. (RMNH-Coel 29449).— CONG 63, 2 m, several stems on *Corallina elongata*, *Sargassum* spec. and *Halopteris scoparia*.— CONG 64, 1 m, a few stems on *Cladostephus verticillatus*.— CONG 66, 0 m, a few stems on *Corallina elongata*, with gonothecae.— CONG 67, 0 m, a few stems on *Corallina elongata*.— CONG 69, 2.5 m, a few stems on *Halopteris filicina* and incrusting calcareous algae.— CONG 70, 4.5 m, a few stems on *Peyssonnelia rubra*, *Acrosorium uncinatum*, *Griffithsia* spec., *Halopteris filicina* and sponges (RMNH-Coel 29450).— CONG 71, 5 m, numerous stems on *Halopteris scoparia*, *Sargassum* spec., *Cystoseira spinosa* and *Gigartina teedii* (RMNH-Coel 29451).— CONG 72, 7 m, a few stems on *Halopteris scoparia* and *Padina pavonia*.— CONG 73, 10 m, a few stems on *Cystoseira spinosa*.— CONG 74, 11 m, several stems on *Sphaerococcus coronopifolius*, *Cystoseira spinosa*, *Halopteris scoparia*, *Sargassum* spec., leaves and rhizomes of *Posidonia oceanica*, *Salacia desmoides* and *Amathia* spec. (RMNH-Coel 29452).— CONG 75, 12 m, a few stems on *Halopteris filicina*, rhizomes of *Posidonia oceanica*, *Sertularella ellisii* and *Pentapora* spec. (RMNH-Coel 29453).— CONG 76, 13 m, numerous stems on *Halopteris filicina*, *Acrosorium uncinatum*, *Cystoseira spinosa*, *Sertularia distans* and *Salmacina* spec., with gonothecae (RMNH-Coel 29454).— CONG 77, 20.5 m, numerous stems on *Aglaozonia chilosa*, *Cladophora lehmanniana*, *Cystoseira spinosa*, incrusting calcareous algae and *Halopteris filicina* (RMNH-Coel 29455).— CONG 78, 18 m, a few stems on *Pinna nobilis*.— CONG 81, 8 m, numerous stems on *Lithophyllum expansum*, *Sargassum* spec., *Corallina elongata*, *Flabellia petiolata*, *Halopteris scoparia*, sponges and *Sertularella* spec. (RMNH-Coel 29456).— CONG 82, 5 m, a few stems on *Corallina elongata*.— CONG 83, 5 m, a single stem on *Corallina elongata*; C-4, 34 m, two stems on algal remains.— ISA 1, 24 m, several stems on *Peyssonnelia rubra*, *Halopteris filicina*, *Cystoseira spinosa*, incrusting calcareous algae, *Eudendrium* spec. and *Scrupocellaria* spec. (RMNH-Coel 29457).— ISA 2, 16 m, a few stems on *Cystoseira spinosa* and *Dictyota dichotoma*.— ISA 5, 35 m, two stems on *Pentapora fascialis*.— ISA 9, 12 m, a few stems on *Acrosorium uncinatum*, *Flabellia petiolata* and bryozoans (RMNH-Coel 29458).— ISA 14, 0.3 m, a few stems.— ISA 15, 5 m, a few stems on *Flabellia petiolata*, *Sargassum* spec., *Cystoseira spinosa*, *Corallina elongata* and *Halopteris* spec. (RMNH-Coel 29459).— ISA 16, 7 m, numerous stems on *Peyssonnelia bornetii*, *Flabellia petiolata*, *Corallina elongata*, *Halopteris* spec., bio-concretion of *Astroides calycularis* and *Diaperoecia* spec. (RMNH-Coel 29460).— ISA 17, 3 m, two stems on

Caberea boryi.— ISA 18, 20 m, a few stems on *Cystoseira spinosa*.— ISA 19, 20 m, a few stems on *Aglaophenia pluma*.— ISA 21, 19.2 m, numerous stems on rock, cirripedes, polychaete tubes and bryozoans (RMNH-Coel 29461).— ISA 22, 15 m, numerous stems on *Cystoseira spinosa*, *Halopteris filicina* and ascidians, with gonothecae (RMNH-Coel 29462).— ISA 23, 18.2 m, a few stems on *Cystoseira spinosa* and *Flabellia petiolata*.— ISA 24, 10 m, a few stems on *Cystoseira spinosa*, *Halopteris scoparia* and *Flabellia petiolata* (RMNH-Coel 29463).— ISA 26, 34 m, a few stems on *Eudendrium* spec., *Cellaria salicornoides*, *Schizomavella* spec., *Scrupocellaria* spec. and polychaete tubes (RMNH-Coel 29464).— ISA 27, 25 m, a few stems on *Celleporina* spec.— PCONG 2, 3 m, a few stems on *Halopteris filicina* and *Eudendrium racemosum* (RMNH-Coel 29465).— PCONG 5, 3 m, a few stems on *Corallina elongata*.— PCONG 6, 2 m, a few stems on *Plocamium cartilagineum* and *Eudendrium racemosum* (RMNH-Coel 29466).— PCONG 7, 0.5 m, a few stems on *Acrosorium uncinatum*.— PISA 11, 2.3 m, a few stems on *Aglaophenia kirchenpaueri*.— PISA 13, 2 m, a few stems on *Acrosorium uncinatum* and *Amphiroa rigida*.— PISA 18, 30 m, a few stems on incrusting calcareous algae and *Eudendrium* spec.— PISA 19, 2 m, a few stems on *Acrosorium uncinatum* and *Amphiroa cryptarthodia* (RMNH-Coel 29467).— PISA 21, 2 m, a few stems on *Valonia utricularis* and incrusting calcareous algae.— REY 5, 20 m, numerous stems on *Cystoseira spinosa* and *Mesophyllum lichenoides*, with gonothecae (RMNH-Coel 29468).— REY 6, 10 m, a few stems on *Cystoseira spinosa*, *Rhodymenia ardissonei* and *Aglaophenia pluma* (RMNH-Coel 29469).— REY 7, 27 m, a few stems on *Cystoseira spinosa* and sponges.— REY 8, 25 m, numerous stems on *Dictyota dichotoma*, *Eudendrium* spec. and gorgonians (RMNH-Coel 29470).— REY 9, 22 m, two stems on incrusting calcareous algae.— REY 10, 16 m, a few stems on *Peyssonnelia rubra* and sponges.— REY 11, 6 m, a few stems on *Halopteris scoparia*, *Rhodymenia* spec. and *Corallina granifera* (RMNH-Coel 29471).— REY 13, 0 m, a few stems on *Corallina elongata*.— REY 17, 2 m, a few stems on *Myriapora truncata*.— REY 19, 2 m, six stems on *Sargassum* spec.— REY 22, 0 m, a few stems on *Sargassum vulgare*, *Padina pavonia* and *Hypnea musciformis*.— REY 23, 0 m, numerous stems on *Valonia utricularis*, *Corallina elongata*, *Rhodymenia* spec. and bio-concretion of *Astroides calycularis* (RMNH-Coel 29472).— REY 24, 0 m, a few stems on *Pterocladia capillacea* and *Corallina elongata*.— REY 25, 0 m, a few stems on *Corallina elongata*, *Codium bursa* and *Pterocladia capillacea* (RMNH-Coel 29473).— REY 27, 1.5 m, a few stems on *Cystoseira spinosa*, *Flabellia petiolata* and *Corallina granifera* (RMNH-Coel 29474).— REY 28, 2 m, a few stems on pebbles and *Halopteris* spec.— REY 29, 1 m, a few stems on *Cladostephus verticillatus*, *Sargassum* spec. and *Cystoseira spinosa*.— REY 33, 4 m, numerous stems on *Peyssonnelia rubra*, *Acrosorium uncinatum*, leaves and scales of *Posidonia oceanica*, sponges and gastropods (RMNH-Coel 29475).

Description.— Colonies of varied appearance: from stolonal colonies with filiform hydrorhiza giving rise to hydrantophores with a single hydrotheca to colonies with branched hydrantophores bearing up to five hydrothecae. Hydrantophores of varied length, perisarc smooth or spirally twisted. Secondary hydrantophores irregularly arising from primaries without any form of apophyses. Hydrotheca bell-shaped, with basal, circular diaphragm and a ring of refringent desmocytes above it. Diameter of hydrotheca slightly narrowing proximally. Hydrothecal aperture circular; rim even, though slightly everted. Some hydrothecae with up to three short renovations of the hydrothecal rim.

Gonothecae arising directly from hydrorhizal stolons and shortly pedicellate. Female gonotheca pumpkin-shaped; male gonotheca fusiform. No gonothecal aperture observed.

Remarks.— Cornelius (1975b) examined the type of *Lafoea pocillum* Hincks, 1868, considering it conspecific with *Lafoea dumosa* (Fleming, 1820). However, Boero (1981a), taking into account Cornelius's (1975b) paper, indicated that the Mediterranean material of *Lafoea pocillum* should be assigned to *Scandia gigas* (Pieper, 1884).

Roca (1986) did not follow Cornelius's (1975b) views, indicating that what Cornelius (1975b) figured and assigned as the holotype of *L. pocillum* was quite different

from the original description and figures by Hincks (1868). Following Naumov (1969) in this respect, Roca (1986) considered *Campanularia parvula* Hinck, 1853 (= *Lafoea parvula* Hincks, 1868) conspecific with *Lafoea pocillum* Hincks, 1868, indicating that the proper name for all that material should be *Scandia parvula* (Hincks, 1853). Later authors (cf. Gili, 1986; Boero & Fresi, 1986) have followed Cornelius (1975b) and Boero (1981a). Altuna (1994) did the same, though he considered the form assigned to *Lafoea pocillum* by Naumov (1969) conspecific with *Scandia gigas*; Cornelius (1975b) considered it to belong to *Lafoea dumosa*. However, Naumov's (1969) description of *L. pocillum* shows that in his material the gonothecae were placed in a coppinia, clearly indicating that Naumov's material does not belong to *Scandia gigas*, which has isolated gonothecae with distinct sexual dimorphism.

The species described as *Hebella pocillum* by Fraser (1937; 1944) is indicated by Cornelius (1975b) as being unidentifiable; both Fraser's description and his figures are ambiguous and prevent us from identifying his material as *Scandia gigas*. Several studies in the western Atlantic (cf. Calder, 1970, 1975), carried out inside the area of distribution given by Fraser (1946) for *H. pocillum*, did not reveal the presence of *Scandia gigas* (Pieper, 1884) so that the presence of this species in the western Atlantic could not be confirmed. It seems best to consider Fraser's (1937, 1944) records of *Hebella pocillum* (Hincks, 1868) as highly dubious.

Ecology.— *Scandia gigas* is a littoral and shelf species that has been found from the tidal level to 89 m depth in the Mediterranean (Roca, 1986); our material comes from 0 to 35 m. Outside the Mediterranean it has been reported from the tidal zone (Altuna, 1994) to 122 m depth (Fraser, 1944, but see remarks above). It has frequently been found epibiontic on algae (Stechow, 1923b; Rossi, 1961; García Corrales et al., 1979; García Carrascosa, 1981; Isasi, 1985; Gili, 1986; Boero & Fresi, 1986; Roca, 1986), rhizomes and leaves of *Posidonia oceanica* (Boero, 1981a; Roca, 1986), hydrozoans (Stechow, 1919; Boero & Fresi, 1986), bryozoans and sponges (Boero & Fresi, 1986) and epilithic (Gili, 1986). In our material, *Scandia gigas* was found on a wide range of substrata, but with a clear preference for algae (> 74% of the records), the more important being *Cystoseira spinosa*, *Corallina elongata*, *Flabellia petiolata*, *Halopteris scoparia*, *Halopteris filicina*, *Peyssonnelia rubra* and *Acrosorium uncinatum*. Additionally it was found epibiontic on leaves and rhizomes of *Posidonia oceanica*, sponges, hydrozoans, anthozoans, bryozoans, polychaete tubes, bivalve and gastropod shells, cirripedes and ascidians, as well as on non-living substrata, both biotic (bio-concretions, remains of organisms) and abiotic (pebbles and rock).

In the Mediterranean fertile colonies of *Scandia gigas* have been found in April (Gili, 1986), July (Broch, 1933) and August-September (Boero & Fresi, 1986). At the Chafarinas we found colonies with gonothecae in July and August. It thus seems to be fertile in summer.

Distribution.— *Scandia gigas* is ascribed a boreal (Boero & Bouillon, 1993) or cold-temperate circumboreal (Altuna, 1994) distribution. However, it is a species with only few records outside the Mediterranean. It is certainly present in Atlantic waters off the north coast of Spain (Isasi, 1985; Altuna, 1994) and off Morocco (Patriti, 1970), whereas the remaining Atlantic European records are doubtful. It has also been reported in the eastern Pacific from the Bering Sea to California (Fraser, 1946) and in the western Atlantic from Hudson Bay to Martha's Vineyard (Fraser, 1946). As stated above, Fras-

er's records are doubtful and should they prove incorrect, the distribution of *S. gigas* could be restricted to the Mediterranean and the Lusitanian and Mauritanian Atlantic provinces.

In the Mediterranean it is known from the Adriatic (Broch, 1933), the Balearic Islands (Roca, 1986), and from off the Algerian (Picard, 1955), French (Stechow, 1919; Picard, 1952a), Italian (Rossi, 1961; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Corrales et al., 1979; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Family Haleciidae Hincks, 1868

Genus *Halecium* Oken, 1815

Halecium delicatulum Coughtrey, 1876
(fig. 12a-b)

Halecium delicatulum Coughtrey, 1876a: 26, pl. 3 figs 4-5; 1876b: 299; Ralph, 1958: 334-338, figs 11e, h-n, 12a-p; Patriti, 1970: 23-24, fig. 20; Vervoort, 1972: 27, figs 4-5; Leloup, 1974: 10; Millard, 1975: 145, fig. 47f-l; García Carrascosa, 1981: 130-134, pl. 4 figs a-f; Roca, 1986: 126-131, fig. 29; Ramil, 1988: 166-171; Ramil & Vervoort, 1992: 82-85, fig. 20a-c; Park, 1993: 265; Altuna, 1994: 168-174, pl. 26 figs a-c, pl. 27 figs a-d; Medel & López González, 1996: 199; Migotto, 1996: 30-31, fig. 6d-e; Medel et al., 1998: 31-33, fig. 1; Medel & Vervoort, 2000: 12-13.

Halecium gracile Bale, 1888: 759, pl. 14 figs 1-3; Motz Kossowska, 1911: 335-336, figs 7-8.

Halecium parvulum Bale, 1888: 760, pl. 14 figs 4-5; Marktanner-Turneretscher, 1890: 218, pl. 3 fig. 22; Vervoort, 1959: 227-229, fig. 7.

Halecium mediterraneum; Stechow, 1919: 34-35; 1923b: 91; Broch, 1933: 18, fig. 5; Picard, 1951c: 260; 1952a: 349; 1955: 187; 1958a: 192; Marinopoulos, 1979: 120; Boero, 1981a: 182, 184-185; Gili, 1986: 138-139, fig. 4.11b; Boero & Fresi, 1986: 142; Boero & Bouillon, 1993: 263; Morri & Bianchi, 1999: 286.

Halecium tenellum; García Corrales et al., 1978: 9, figs 1-2.

Material.— CONG 1, 0.5 m, numerous colonies with plenty of stems on *Flabellia petiolata*, *Peyssonnelia coriacea*, *Corallina elongata*, *Cryptonemia lomation* and *Eudendrium merulum*, with gonothecae (RMNH-Coel. 29476).— CONG 2, 1 m, numerous colonies on *Corallina elongata*, *Flabellia petiolata*, *Peyssonnelia squamaria*, *Halopteris* spec., *Cryptonemia lomation* and bryozoans (RMNH-Coel. 29477).— CONG 8, 10 m, a few stems on *Acrosorium uncinatum* and sponges (RMNH-Coel. 29478).— CONG 13, 2 m, colony with eight stems on *Cladostephus verticillatus*.— CONG 18, 4.5 m, two colonies with a few stems, on *Halopteris filicina* and *Cystoseira* spec. (RMNH-Coel. 29479).— CONG 21, 8 m, colony with two stems on *Halopteris scoparia*.— CONG 26, 18 m, several stems on *Cystoseira spinosa* (RMNH-Coel. 29480).— CONG 28, 9 m, a few stems on *Aglaophenia kirchenpaueri*.— CONG 31, 2 m, three stems on pebbles.— CONG 44; 3 m, a few stems.— CONG 46, 5 m, a few stems on *Peyssonnelia coriacea* (RMNH-Coel. 29481).— CONG 47, 2.5 m, two stems on *Cladostephus verticillatus*.— CONG 54, 16.8 m, four stems on *Sertularella ellisii*, *Eunicella* spec. and cirripedes.— CONG 57, 10.5 m, two stems on *Peyssonnelia rubra* and *Padina pavonia*.— CONG 60, 8.5 m, a few stems on *Corallina* spec.— CONG 61, 4 m, several colonies on *Flabellia petiolata*, *Peyssonnelia rubra* and *Halopteris filicina* (RMNH-Coel. 29482); CONG 63, 2 m, a few stems on *Corallina elongata*, incrusting calcareous algae, *Corallina granifera* and *Sargassum* spec. (RMNH-Coel. 29483).— CONG 64, 1 m, single colony with three stems on *Cladostephus verticillatus*.— CONG 72, 7 m, single stem on *Halopteris scoparia*.— CONG 75, 12 m, single colony with a few stems on *Posidonia oceanica*.— CONG 77, 20.5 m, single colony with two stems on *Halopteris filicina*.— CONG 82, 5 m, several colonies on *Corallina elongata* (RMNH-Coel. 29484).— CONG 83, 5 m, a few colonies on *Acrosorium uncinatum* and *Codium vermilara* (RMNH-Coel. 29485).— F-17, 21 m, two colonies on *Eudendrium ramosum* (RMNH-Coel. 29486).— ISA 2, 16 m, a few stems.— ISA 9, 12 m, a

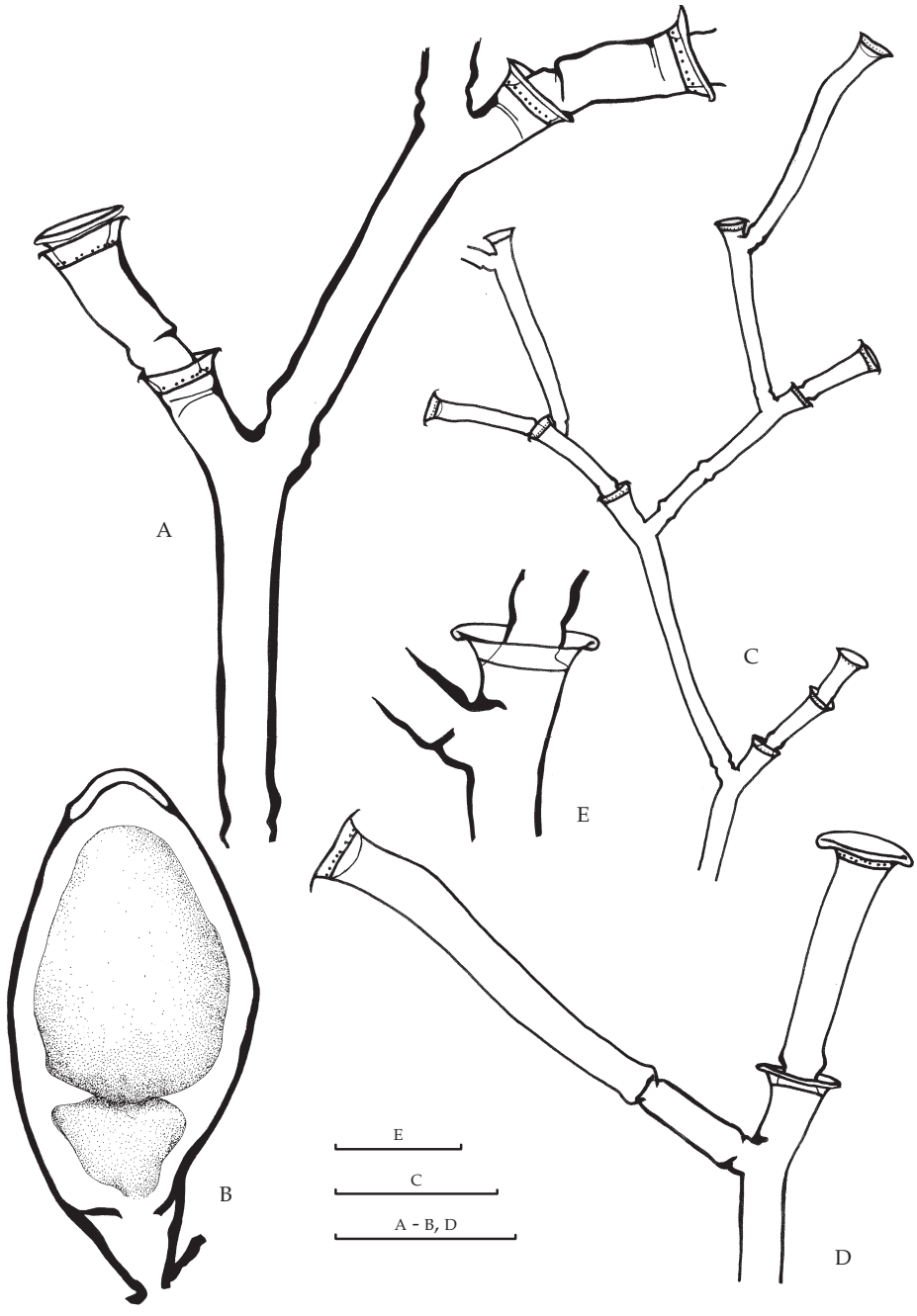

Fig. 12. A, B, *Halecium delicatulum* Coughtrey, 1876. A, stem fragment with hydrothecae; B, gonotheca. C-E, *Halecium tenellum* Hincks, 1861. C, stem fragment showing internode arrangement; D, E, hydrothecae. Scale bar: 100 mm (E), 250 μm (A-B, D), 500 μm (C).

few stems on bryozoans.— ISA 10, 10 m, a few stems.— ISA 12, 5 m, numerous stems on *Plocamium cartilagineum*, *Acrosorium uncinatum*, *Bryopsis* spec., *Halopteris filicina* and *Scrupocellaria* spec., with gonothecae (RMNH-Coel. 29487).— ISA 27, 25 m, several stems on *Celleporina* spec.— PCONG 2, 3 m, two colonies each of single stem on *Rhodymenia ardissonei* and *Eudendrium racemosum*.— PCONG 3, 2 m, remains of stems on *Acrosorium uncinatum*.— PCONG 4, 3 m, single colony with two small stems on *Eudendrium racemosum*.— PCONG 5, 3 m, several colonies on *Corallina elongata*, *Haraldia lenormandii* and *Eudendrium racemosum* (RMNH-Coel. 29488).— PCONG 6, 2 m, a few colonies on *Eudendrium racemosum* and *Sertularella ellisii* (RMNH-Coel. 29489).— PISA 3, 3 m, numerous colonies on *Plocamium cartilagineum*, *Dynamena cornicina*, bryozoans and cirripedes, with gonothecae (RMNH-Coel. 29490).— PISA 13, 2 m, numerous stems on *Amphiroa rigida*, with gonothecae (RMNH-Coel. 29491).— PISA 14, 3.3 m, numerous stems on *Sertularella mediterranea* (RMNH-Coel. 29492).— PISA 19, 2 m, several stems on *Amphiroa cryptarthodia* (RMNH-Coel. 29493).— PISA 21, 2 m, a few stems on *Halopteris filicina*, with gonothecae.— PISA 26, 1.5 m, a few stems on *Eudendrium racemosum* and polychaete tubes (RMNH-Coel. 29494).— REY 29, 1 m, a few stems on *Halopteris scoparia* and *Jania* spec. (RMNH-Coel. 29495).

Remarks.— The present material consists of colonies with monosiphonic stems up to 20 mm high. The hydrotheca is 20-36 μm high and the diameter at the aperture is 120-160 μm. The gonotheca is 572 μm high and 272 μm and 208 μm wide in frontal and lateral view, respectively.

Ecology.— *Halecium delicatulum* is an eurybathic species that, in the Mediterranean, has been found from slightly below the tidal level (Boero & Fresi, 1986; Gili, 1986) down to 145 m depth (Ramil & Vervoort, 1992); our material was found from 0.5 to 25 m. Outside the Mediterranean, it has been reported much deeper, from the tidal level (Millard, 1975; Altuna, 1994) to 2035 m depth (Ramil & Vervoort, 1992).

It has been found epilithic (Roca, 1986; Altuna, 1994; Migotto, 1996) and epibiontic on numerous organisms: algae (Stechow, 1919, 1923b; Broch, 1933; García Carrascosa, 1981; Roca, 1986; Gili, 1986; Boero & Fresi, 1986; Altuna, 1994; Morri & Bianchi, 1999; etc.), leaves and rhizomes of *Posidonia oceanica* (Stechow, 1919; García Carrascosa, 1981; Boero, 1981a; Roca, 1986), hydrozoans (Stechow, 1919, 1923b; Vervoort, 1959; Boero & Fresi, 1986; Roca, 1986; Ramil, 1988; Ramil & Vervoort, 1992; Medel et al., 1998; Medel & Vervoort, 2000), bryozoans (Stechow, 1919; Boero & Fresi, 1986; Altuna, 1994; Migotto, 1996; Medel et al., 1998; Medel & Vervoort, 2000), polychaete tubes (García Carrascosa, 1981), ascidians (García Carrascosa, 1981; Medel et al., 1998), sponges (García Carrascosa, 1981; Boero & Fresi, 1986; Altuna, 1994; Migotto, 1996), cirripedes (Boero & Fresi, 1986), anthozoans and mollusc shells (Boero & Fresi, 1986; Migotto, 1996). In our material it was mainly found epibiontic, preferably on algae (> 66% of the records), but also on rhizomes of *Posidonia oceanica*, hydrozoans, bryozoans, cirripedes, anthozoans, polychaete tubes and sponges; occasionally it was found epilithic on pebbles.

In the Mediterranean, fertile colonies were found in April (Stechow, 1919, 1923b; Gili, 1986), May (Roca, 1986), July, August and September (Boero & Fresi, 1986) and November (Broch, 1933); our fertile material was collected in July. Outside the Mediterranean, Altuna (1994), for example, found it fertile from April to September. At temperate latitudes, it seems to be fertile throughout the year with the exception of the winter.

Distribution.— Rees & Vervoort (1987) credit *Halecium delicatulum* with a circumglobal distribution in tropical and subtropical waters, though with extensions outside that area. However, its presence in Antarctic and sub-Antarctic waters (Stepan'yants, 1979) and, probably also Arctic waters (Leloup, 1960) points to a cos-

mopolitan distribution, as was already pointed out by Millard (1975).

In the eastern Atlantic it has been recorded from the Bay of Biscay (Altuna, 1994) to South Africa (Millard, 1975), being also known from off Galicia (Ramil, 1988), the western part of the Strait of Gibraltar (Ramil & Vervoort, 1992), Strait of Gibraltar (Medel et al., 1998), Azores (Medel & Vervoort, 2000), Morocco (Patriti, 1970; Ramil & Vervoort, 1992), Mauritania and the Cape Verde Islands (Medel & Vervoort, 2000), and off the African tropical coasts (Vervoort, 1959).

In the Mediterranean it has been reported from the Adriatic (Broch, 1933), the Balearic Islands (Roca, 1986; Gili, 1986), and off the Algerian (Picard, 1955), Italian (Stechow, 1923b; Boero, 1981a; Boero & Fresi, 1986), French (Stechow, 1919; Picard, 1951c, 1952a), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Halecium lankesteri (Bourne, 1890)
(fig. 13a-c)

Haloikema lankesteri Bourne, 1890: 395, pl. 26.

Halecium lankesteri; Bedot, 1911: 213-217, pl. 11 figs 1-5; Broch, 1933: 16-17, figs 3a-d, figs 4e-f; Vervoort, 1949: 145; Picard, 1955: 188; Marinopoulos, 1979: 120; Roca, 1986: 141, fig. 32; Medel & López González, 1996: 199.

Halecium robustum; Broch, 1912: 14, fig. 1; Babic, 1913a: 470-473, figs 4-6; Bedot, 1914: 82, pl. 5 fig. 6; Teissier, 1965: 21; Fey, 1970: 397.

Halecium lankesteri p.p. Isasi, 1985: 47, fig. 4a-f; Altuna, 1994: 179-184, pl. 29 figs a-e.

Halecium pusillum p.p. García Corrales et al., 1978: 14-16, fig. 4.

Halecium nanum; Medel & Vervoort, 2000: 18-21, fig. 4

Not *Halecium lankesteri*; Vervoort, 1959: 221, figs 3, 4a-c, 5; Millard, 1975: 153, figs 50b-e; Cornelius, 1975b: 153, figs 50b-e; García Corrales et al., 1978: 13, figs 3a-i; Gili et al., 1989: 80, fig. 9; Cornelius et al., 1990: 137, fig. 4.14; El Beshbeeshy, 1994a: 126-129, fig. 1a-c.

Material.— B-11, 42 m, on *Sertularella polyzonias*.— C-4, 34 m, on stones and remnants of bryozoans.— C-8 (bis), 40 m, single colony on *Arca noae*.— CONG 1, 0.5 m, a few colonies on *Peyssonnelia coriacea* and *Flabellia petiolata* (RMNH-Coel. 29496).— CONG 2, 1 m, a few stems on *Corallina elongata* and *Acrosorium uncinatum* (RMNH-Coel. 29497).— CONG 3, 2 m, numerous stems on *Halopteris scoparia*, with gonothecae (RMNH-Coel. 29498).— CONG 4, 2 m, a few stems on *Corallina granifera* and incrusting calcareous algae (RMNH-Coel. 29499).— CONG 5, 0 m, several stems on *Cystoseira tamariscifolia* (RMNH-Coel. 29500).— CONG 6, 0 m, single colony on *Hypnea musciformis*.— CONG 7, 19 m, numerous stems on *Cystoseira spinosa*, *Acrosorium uncinatum*, *Aglaophenia kirchenpaueri*, *Halecium* spec. and *Salmacina* spec. (RMNH-Coel. 29501).— CONG 8, 10 m, several colonies on *Padina pavonia*, *Cystoseira spinosa* and *Colpomenia peregrina*.— CONG 12, 0.5 m, a few stems on *Cystoseira tamariscifolia* (RMNH-Coel. 29502).— CONG 13, 2 m, several colonies on *Cladostephus verticillatus*.— CONG 15, 0.3 m, a few stems on *Cystoseira tamariscifolia* (RMNH-Coel. 29503).— CONG 17, 2 m, a few stems on *Codium bursa*.— CONG 22, 1 m, numerous colonies on *Hypnea musciformis*, *Cystoseira tamariscifolia*, *Corallina elongata* and *Colpomenia peregrina* (RMNH-Coel. 29504).— CONG 23, 8 m, a few stems on *Halopteris scoparia* (RMNH-Coel. 29505).— CONG 25, 25 m, a few stems on *Eudendrium rameum*.— CONG 26, 18 m, a few stems on incrusting calcareous algae and *Peyssonnelia bornetii* (RMNH-Coel. 29506).— CONG 27, 13 m, a few colonies on *Flabellia petiolata*, *Sargassum* spec. and *Corallina elongata* (RMNH-Coel. 29507).— CONG 30, 0.2 m, numerous colonies on *Hypnea musciformis*, *Corallina elongata*, *Gigartina teedii* and *Halopteris scoparia* (RMNH-Coel. 29508).— CONG 32, 7 m, a few colonies on *Flabellia petiolata*, *Cystoseira spinosa* and incrusting calcareous algae (RMNH-Coel. 29509).— CONG 37, 0 m, single stem on *Corallina elongata*.— CONG 39, 0.4 m, a few stems on *Halopteris* spec., *Corallina elongata* and *Acrosorium uncinatum* (RMNH-Coel. 29510).— CONG 41, 2.5 m, one colony on *Halopteris scoparia*.— CONG 42, 8

m, a few stems on incrusting calcareous algae.— CONG 43', 0 m, two colonies on *Valonia utricularis* and *Corallina elongata*.— CONG 44, 3 m, a few colonies on *Flabellia petiolata*, *Peyssonnelia rubra* and *Sertularella ellisii* (RMNH-Coel. 29511).— CONG 45, 3 m, a few colonies on *Sargassum* spec., *Padina pavonia* and *Colpomenia peregrina* (RMNH-Coel. 29512).— CONG 46, 5 m, a few colonies on *Corallina elongata* and *Acrosorium uncinatum*.— CONG 53, 17.5 m, four stems on *Lithophyllum expansum*.— CONG 56, 15 m, a single colony on hydrozoan hydrorhiza.— CONG 57, 10.5 m, numerous colonies on *Cystoseira spinosa*, *Peyssonnelia rubra*, *Rhodymenia* spec., sponges and *Caberea boryi* (RMNH-Coel. 29513).— CONG 58, 9 m, two colonies on *Padina pavonia* and incrusting calcareous algae.— CONG 60, 8.5 m, numerous stems on *Halopteris scoparia*, with gonothecae (RMNH-Coel. 29514).— CONG 61, 4 m, single colony on *Peyssonnelia rubra*.— CONG 63, 2 m, several colonies on *Corallina elongata*, *Cladostephus verticillatus*, *Sargassum* spec. and *Corallina granifera* (RMNH-Coel. 29515); CONG 64, 1 m, several colonies on *Cladostephus verticillatus*, *Sargassum* spec. and *Corallina elongata* (RMNH-Coel. 29516).— CONG 69, 2.5 m, a few colonies on *Padina pavonia*, *Cladostephus verticillatus* and *Halopteris filicina* (RMNH-Coel. 29517).— CONG 70, 4.5 m, single colony on *Halopteris filicina*.— CONG 72, 7 m, numerous colonies on *Halopteris scoparia* and *Padina pavonia* (RMNH-Coel. 29518).— CONG 76, 13 m, single colony on *Cystoseira spinosa*.— CONG 77, 20.5 m, several colonies on *Corallina elongata*, *Cladophora lehmanniana*, *Boergeseniella fruticulosa*, *Halopteris filicina* and *Aglaozonia chilosa* (RMNH-Coel. 30009).— CONG 78, 18 m, single colony on pebbles.— CONG 83, 5 m, single colony on *Codium bursa*.— D-3, 24 m, on *Halecium petrosum*.— F-2, 40 m, single colony on remains of algae.— F-12, 8 m, numerous colonies on *Gracilaria* spec., *Polysiphonia* cf. *denudata*, *Cardium* spec. and *Amathia* spec. (RMNH-Coel. 29519).— ISA 1, 24 m, numerous colonies on pebbles, *Peyssonnelia rubra* and *Halopteris filicina* (RMNH-Coel. 29529).— ISA 2, 16 m, numerous colonies on *Cystoseira spinosa*, *Acrosorium uncinatum* and *Dictyota linearis*, with gonothecae (RMNH-Coel. 29521).— ISA 3, 12 m, several colonies on *Cystoseira spinosa*, *Sargassum* spec. and *Dictyota dichotoma* (RMNH-Coel. 29522).— ISA 6, 28 m, several colonies on pebbles.— ISA 7, 15 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29523).— ISA 9, 12 m, two stems on *Halopteris filicina*.— ISA 10, 10 m, two stems.— ISA 13, 0 m, a few stems on *Cystoseira spinosa*.— ISA 14, 0.3 m, several colonies on *Cystoseira* spec. and *Laurencia* spec. (RMNH-Coel. 29524).— ISA 15, 5 m, a single colony on *Corallina elongata*.— ISA 17, 3 m, several stems on *Corallina elongata* (RMNH-Coel. 29525).— ISA 18, 20 m, a few stems on *Cystoseira spinosa*.— ISA 19, 20 m, a few stems.— ISA 22, 15 m, numerous colonies on *Flabellia petiolata*, *Cystoseira spinosa* and *Halopteris filicina* (RMNH-Coel. 29526).— ISA 23, 18.2 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29527).— ISA 24, 10 m, two stems on *Cystoseira spinosa* and *Acrosorium uncinatum*.— ISA 26, 34 m, single stem on *Valkeria* spec.— ISA 29, 6 m, a single colony on *Halopteris filicina*.— ISA 30, 15 m, a few stems on *Peyssonnelia coriacea* and *Halopteris filicina* (RMNH-Coel. 29528).— PCONG 5, 3 m, a single colony on *Eudendrium racemosum*.— PCONG 6, 2 m, two colonies.— PISA 12, 2 m, a few colonies on rocks and incrusting calcareous algae.— PISA 14, 3.3 m, a single colony on *Sertularella mediterranea*.— PISA 17, 1 m, single stem on *Valonia utricularis*.— PISA 21, 2 m, a few colonies on *Rhodophyllis divaricata*, *Halopteris filicina* and *Valonia utricularis* (RMNH-Coel. 29529).— PISA 23, 3 m, several colonies on *Corallina granifera* and *Corallina elongata* (RMNH-Coel. 29530).— REY 5, 20 m, numerous stems on *Cystoseira spinosa* and *Aglaophenia pluma* (RMNH-Coel. 29531).— REY 6, 10 m, numerous colonies on *Cystoseira spinosa*, *Rhodymenia ardissonei*, *Aglaophenia pluma* and bryozoans (RMNH-Coel. 29532).— REY 7, 27 m, several colonies on *Cystoseira spinosa*, incrusting calcareous algae, *Gigartina* spec. and gorgonians (RMNH-Coel. 29533).— REY 8, 25 m, several stems on *Cystoseira spinosa* (RMNH-Coel. 29534).— REY 9, 22 m, numerous colonies on *Cystoseira spinosa* (RMNH-Coel. 29535).— REY 11, 6 m, numerous colonies on *Halopteris scoparia* and *Rhodymenia* spec.— REY 19, 2 m, a single colony on *Cladostephus verticillatus*.— REY 22, 0 m, several colonies on *Sargassum vulgare* (RMNH-Coel. 29536).— REY 24, 0 m, a few stems on *Pterocladia capillacea*.— REY 27, 1.5 m, two colonies on *Cystoseira spinosa*.— REY 28, 2 m, a few colonies on *Halopteris scoparia* and pebbles (RMNH-Coel. 29537).— REY 29, 1 m, two stems on *Cystoseira spinosa* and *Halopteris scoparia*.

Description.— Colonies with stolonal hydrorhiza giving rise, through short apophyses, to monosiphonic stems up to 8 mm high. Stem divided into hydrothecate internodes provided with rings marked by strong perisarc constrictions. Rings in turn with slight

constriction halfway giving the appearance of double rings; hydrothecate internodes usually with 1-2 double rings. Annulation disappearing toward distal part of internode where the hydrotheca is placed. Following internode resting on a short apophysis arising just behind hydrotheca; hydrothecal rim at level of the distal node. Internodes arranged in a straight line, with strongly curved apophyses, or in a zig-zag pattern.

Hydrotheca short, dish-shaped. Hydrothecal diameter increasing towards the circular aperture. Hydrothecal rim not everted, but forming a slight fold inwards. Hydrotheca provided with a ring of desmocytes just above hydrothecal diaphragm and with a minor abcauline thickening of perisarc. Occasionally shortly pedicellate secondary hydrothecae are present, originating from a short apophysis, usually followed by a double ring.

Branching occasional; only a few stems branched. Branches inserted on short apophyses originating below a hydrotheca. Occasionally branch on opposite side present, forming a trichotomy (CONG 60).

In all the material the coenosarc is richly provided with symbiotic zooxanthellae.

Only female gonothecae present. Gonothecae arising from primary hydrothecae. Gonotheca pear-shaped (684 μm long and 424 μm maximal diameter), provided with an adcauline bulge bearing two apertures from each of which a defensive polyp protrudes. Gonophore provided with two ova. Both gonophores and defensive polyps provided with zooxanthellae.

Remarks.— In some stems there is a reduction of the annulation towards the distal part, with only indistinctly marked double rings. However, the typical annulation is present basally. In other stems the first hydrothecate internode lacks rings, these being present in all the following internodes. These variation are found in stems from the same colony, for example in the material from ISA 2.

In our opinion two distinctly different species have been confused under the name of *Halecium lankesteri*. The first species, corresponding with the original description by Bourne (1890) of *Haloikema lankesteri* and to which also our material belongs, is characterized by a series of peculiar rings in the typical hydrothecate internodes. Those rings have a marked constriction halfway and seem to be double. Another feature, not mentioned by Bourne, but visible in his figures, is the presence of endosymbiotic zooxanthellae, giving to the coenosarc a brownish or greenish colour. Bedot (1911), who published a precise description of the species, pointed out that the brown coloration of the polyps was due to "petites granulations répandues à profusion dans tout le corps et dans les tentacules". Picard (1955) also remarked that the endoderm of this species enclosed plenty of zooxanthellae. All our material clearly belongs to this species and is provided with zooxanthellae.

The second species, with a much wider geographical distribution, and including the material assigned to *H. lankesteri* by Vervoort (1959), Millard (1975), Gili et al. (1989), etc., is characterized by having smooth hydrothecate internodes and by the absence of endosymbiontic zooxanthellae. Here also belongs the material studied by Cornelius (1975b) and Cornelius et al. (1990), though they included Bourne's species in their description and synonymy.

There are also differences in the shape of the female gonothecae. Those figured by Cornelius (1975b) or Vervoort (1959), belonging to colonies with smooth internodes, are kidney-shaped and provided with a tubular aperture at the central part of the con-

cave side. In Bourne's species the female gonothecae are ovoid, with convex walls and only a small opening halfway the adcauline wall, where the apertures for the defensive polyps are situated.

The differences between the two types of colonies lead to the conclusion that they belong to two different species: *Halecium lankesteri* Bourne, 1890 and a second species that still needs to be named.

Ecology.— *Halecium lankesteri* is a littoral species, having been found from 4 (Broch, 1933) to 75 m depth (Stechow, 1923b); our material was collected from the tidal level down to 40 m depth. The lowest level of its bathymetrical distribution could be conditioned by the light requirements of the endosymbiotic zooxanthellae. It has always been recorded epibiontic on algae, especially on *Cystoseira* spp. (Broch, 1912, 1933; Babic, 1913a; Stechow, 1919, 1923b; Bedot, 1911, 1914; Picard, 1955; Roca, 1986; Altuna, 1994). At the Chafarinas, however, we found it on a wide variety of substrata, though with a clear preference for epibiontic life on algae, on which *H. lankesteri* was found in c. 80% of the records; particularly on *Cystoseira spinosa* and *Corallina elongata*. At the remaining occasions it was observed on hydrozoans, bryozoans, bivalves, polychaetes, sponges and anthozoans, as well as on non-living substrata, both biotic and abiotic (pebbles and rocks).

In the Mediterranean fertile colonies of *Halecium lankesteri* were found in August and September (Babic, 1913a) and November (Broch, 1933). Our fertile colonies were collected in July and August. Outside the Mediterranean it has been reported with gonothecae in June and July (Bedot, 1914).

Distribution.— *Halecium lankesteri* seems to be restricted to the Lusitanian, Mauritanian and Mediterranean provinces. In eastern Atlantic it has been reported off the south-west coast of Great Britain (Bourne, 1890), north-west of France (Bedot, 1911; 1914; Vervoort, 1949), off the Spanish Basque coast (Isasi, 1985; Altuna, 1994) and at the Canary Islands (Medel & Vervoort, 2000).

In the Mediterranean, reliable records are from the Adriatic (Broch, 1912, 1933; Babic, 1913a), the Balearic Islands (Roca, 1986), and off the Algerian (Picard, 1955), French (Stechow, 1919), Italian (Stechow, 1923b) and Turkish coasts (Marinopoulos, 1979).

Halecium petrosum Stechow, 1919
(fig. 14a-c)

Halecium robustum; Motz Kossowska, 1911: 346-347, fig. 14.
Halecium petrosum Stechow, 1919: 36; 1923b: 91; Leloup, 1934: 7; Riedl, 1959: 630; Picard, 1951c: 260; 1955: 187; 1958a: 192; Rossi, 1961: 77; García Carrascosa, 1981: 124-127, pl. 5 figs a-d; Boero, 1981a: 182; Coma et al., 1992: 161-169, fig. 1a; Boero & Bouillon, 1993: 263; Medel & López González, 1996: 199.

Material.— CONG 23, 8 m, single stem (RMNH-Coel. 29538).— CONG 25, 25 m, a few stems on *Jania* spec. and *Eudendrium rameum* (RMNH-Coel. 29539).— CONG 42, 8 m, single stem.— CONG 78, 18 m, single stem.— C-8 (bis), 40 m, single colony on *Eudendrium ramosum*.— D-3, 24 m, on anthozoans.— REY 4, 27 m, several stems on *Eudendrium glomeratum*, *Cellaria salicornoides* and *Myriapora truncata* (RMNH-Coel. 29540).

Description.— Colonies composed of monosiphonic stems up to 14 mm high inserted on hydrorhizal apophyses. Stems starting with an athecate internode fol-

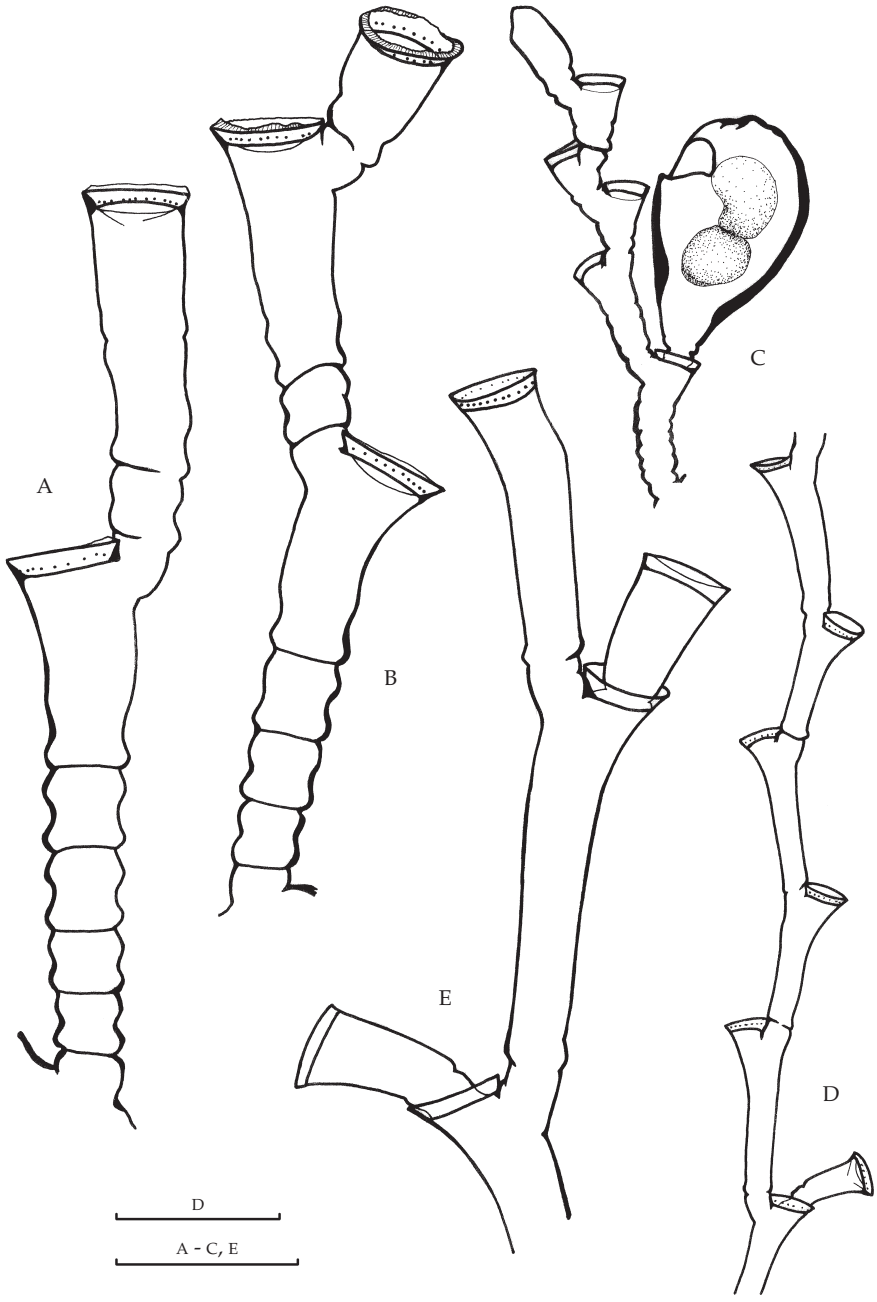

Fig. 13. A-C, *Halecium lankesteri* (Bourne, 1890). A, B, stems with hydrothecae; C, stem with female gonotheca. D, E, *Halecium* spec. D, stem fragment; E, hydrothecae. Scale bar: 250 μm (A-B, E), 500 μm (C-D).

lowed by a succession of thecate internodes arranged in zigzag fashion and delimited by alternately arranged oblique nodes. Internode strongly abcaudally directed at distal end and with a distal hydrotheca. Succeeding internode originating below hydrotheca, on adcauline side of internode, and directed upwards and outwards.

Hydrotheca low, 32-48 μm high. Hydrothecal rim situated at the level of the distal node. Hydrotheca widening distally (180-212 μm diameter at aperture). Abcauline hydrothecal wall straight; adcauline hydrothecal wall completely free and slightly adcaudally directed. Hydrotheca provided with a ring of desmocytes situated slightly above hydrothecal diaphragm.

Free part of internode between hydrotheca and apophysis supporting succeeding internode short; that free part with a perisarc thickening at adcauline side.

Secondary hydrothecae present, situated on pedicels arising from diaphragm of primary hydrotheca. Pedicels inserting on a more or less distinctly marked intermediate, athecate internode resting on a short proximal segment.

Branches arising from apophyses formed below hydrothecae, on abcauline side of internode. Each branch composed of a short, athecate internode and a series of normal thecate internodes. Occasionally branches originating from pedicel supporting second-order hydrothecae.

No gonothecae.

Ecology.— *Halecium petrosum* seems to be a littoral and shelf species, though being absent from the shallowest infra-littoral. It has been reported from 5 (Rossi, 1961) to 200 m depth (García Carrascosa, 1981); our material was collected from 8 to 40 m depth. It has mainly been found epibiontic on algae (Leloup, 1934; Rossi, 1961; Coma et al., 1992), but also on rhizomes of *Posidonia oceanica*, hydrozoans and anthozoans (García Carrascosa, 1981), on bio-concretions (Riedl, 1959) and on rocks (Motz-Kossowska, 1911). In our material it was typically found epibiontic, usually on hydrozoans, bryozoans and anthozoans and occasionally on algae. *Halecium petrosum* is used in turn as substratum by other hydroids (for instance by *H. lankesteri*).

Fertile colonies of *Halecium petrosum* were reported from August (Motz-Kossowska, 1911), September (Coma et al., 1992) and October (Coma et al., 1992; Stechow, 1923b).

Distribution.— *Halecium petrosum* was considered a Mediterranean species, spreading in the eastern Atlantic, by Picard (1958a) and a Mediterranean-Atlantic species by Boero & Bouillon (1993). However, we did not trace records of the species outside Mediterranean waters. It is known from off the Algerian (Picard, 1955), Italian (Stechow, 1923b; Riedl, 1959; Rossi, 1961), French (Motz-Kossowska, 1911; Leloup, 1934; Picard, 1951c) and Spanish coast (Coma et al., 1992), so that it could very well be a Mediterranean endemic.

Halecium pusillum (M. Sars, 1856)
(fig. 14d-e)

Eudendrium pusillum M. Sars, 1857: 154, pl. 1 figs 14-16.

Halecium pusillum; Motz-Kossowska, 1911: 347-350, figs 15-16; Broch, 1912: 16-17, fig. 2; Babic, 1913a: 469-470, figs 1-3; Stechow, 1919: 33; Neppi, 1921: 15; Picard, 1951b: 277; 1951c: 260; 1952a: 349; 1958a: 192; Riedl, 1959: 630; Teissier, 1965: 21; Fey, 1970: 397; García Carrascosa, 1981: 127, pl. 3 figs a-d; Boero, 1981a: 190, fig. 7a-c; 1981b: 109, fig. 2a-b; Isasi, 1985: 50, fig. 5a-c; Roca, 1986: 136,

fig. 31; Gili, 1986: 141-142, fig. 4.10b; Boero & Fresi, 1986: 143; Ramil, 1988: 197-202, pl. 13; Coma et al., 1992: 161-169, figs 1b-d; Boero & Bouillon, 1993: 263; Altuna, 1994: 189-192, pl. 32 figs a-e; Medel & López González, 1996: 199; Medel et al., 1998: 37-38, fig. 4; Morri & Bianchi, 1999: 286.

Halecium annulatum; Stechow, 1919: 33.

Halecium Schneideri; Billard, 1927: 329.

Halecium pusillum p.p. García Corrales et al., 1978: 14, fig. 4.

Material.— CONGRESO BANK, a few stems on *Sargassum* spec.— CONG 12, 0.5 m, several colonies on *Cystoseira tamariscifolia*.— CONG 22, on *Valonia utricularis*.— CONG 47, 2.5 m, a few stems on *Halopteris scoparia*.— CONG 63, 2 m, a few stems on *Corallina elongata* (RMNH-Coel. 29541).— CONG 66, 0 m, single colony on *Corallina elongata* (RMNH-Coel. 29542).— CONG 74, 11 m, a few stems on leaves of *Posidonia oceanica*.— CONG 82, 5 m, a few colonies con *Corallina elongata*, *Halopteris filicina* and *Crisia* spec. (RMNH-Coel. 29543).— ISA 13, 0 m, several colonies on *Cystoseira tamariscifolia* (RMNH-Coel. 29544).— PISA 24, 2 m, single colony on algae.— REY 14, 0 m, a few stems on *Corallina elongata* (RMNH-Coel. 29545).— REY 23, 0 m, several colonies on *Corallina elongata* and *Peyssonnelia squamaria* (RMNH-Coel. 29546).— REY 24, 0 m, three colonies on *Pterocladia capillacea*.

Description.— Colonies composed of a stolonal hydrorhiza giving rise to tiny stems without any hydrorhizal apophysis. Stems composed of a few thecate internodes densely ringed over almost their entire length; typically only fraction of stem immediately under hydrotheca smooth. Stem internodes widening distally and provided with a distal hydrotheca. Succeeding internodes arising just below previous hydrotheca and curving upwards; there may be two internodes beside each other (CONG 82).

Hydrotheca low, strongly widening towards circular aperture. Rim of hydrothecal aperture even, slightly everted. Hydrotheca with a ring of desmocytes above diaphragm. Secondary hydrothecae present, arising directly from primaries.

Ecology.— *Halecium pusillum* seems to be a littoral species that, in the Mediterranean, has been found from the tidal level (García Carrascosa, 1981) down to 40 m depth (Rossi, 1961); our material comes from the tidal level to 11 m. Outside the Mediterranean it has a similar bathymetrical distribution, having been found from the tidal level (Ramil, 1988) to 30 m depth (Fey, 1970). It has usually been found epibiontic on a wide range of organisms: often on algae (Motz-Kossowska, 1911; Babic, 1913a; Stechow, 1919; García Carrascosa, 1981; Boero & Fresi, 1986; Altuna, 1994; Medel et al., 1998; Morri & Bianchi, 1999), and leaves and rhizomes of *Posidonia oceanica* (Stechow, 1919; Picard, 1951b; Boero, 1981a; Boero & Fresi, 1986), but also on *Cymodocea nodosa* (García Carrascosa, 1981) and *Zostera nana* (Picard, 1952b), bryozoans (Rossi, 1961; Boero & Fresi, 1986; Altuna, 1994), hydrozoans (Rossi, 1961; Boero & Fresi, 1986; Altuna, 1994; Medel et al., 1998), cirripedes (Altuna, 1994) and mollusc shells (Boero & Fresi, 1986). It has also been found on bio-concretions (Rossi, 1961; Boero & Fresi, 1986) and small pebbles (Altuna, 1994). At the Chafarinas *H. pusillum* has a purely epibiontic habit, growing mainly on algae (> 90% of the occasions), specially on *Corallina elongata* and *Cystoseira tamariscifolia*. The remaining records are from leaves of *Posidonia oceanica* and bryozoans.

In the Mediterranean fertile colonies of *H. pusillum* were found in February (Stechow, 1919; Coma et al., 1992), March (Gili, 1986; Coma et al., 1992), April (Boero & Fresi, 1986; Coma et al., 1992) and October (Boero & Fresi, 1986). Outside the Mediterranean Ramil (1988) found colonies with gonothecae in April. *Halecium pusillum* also

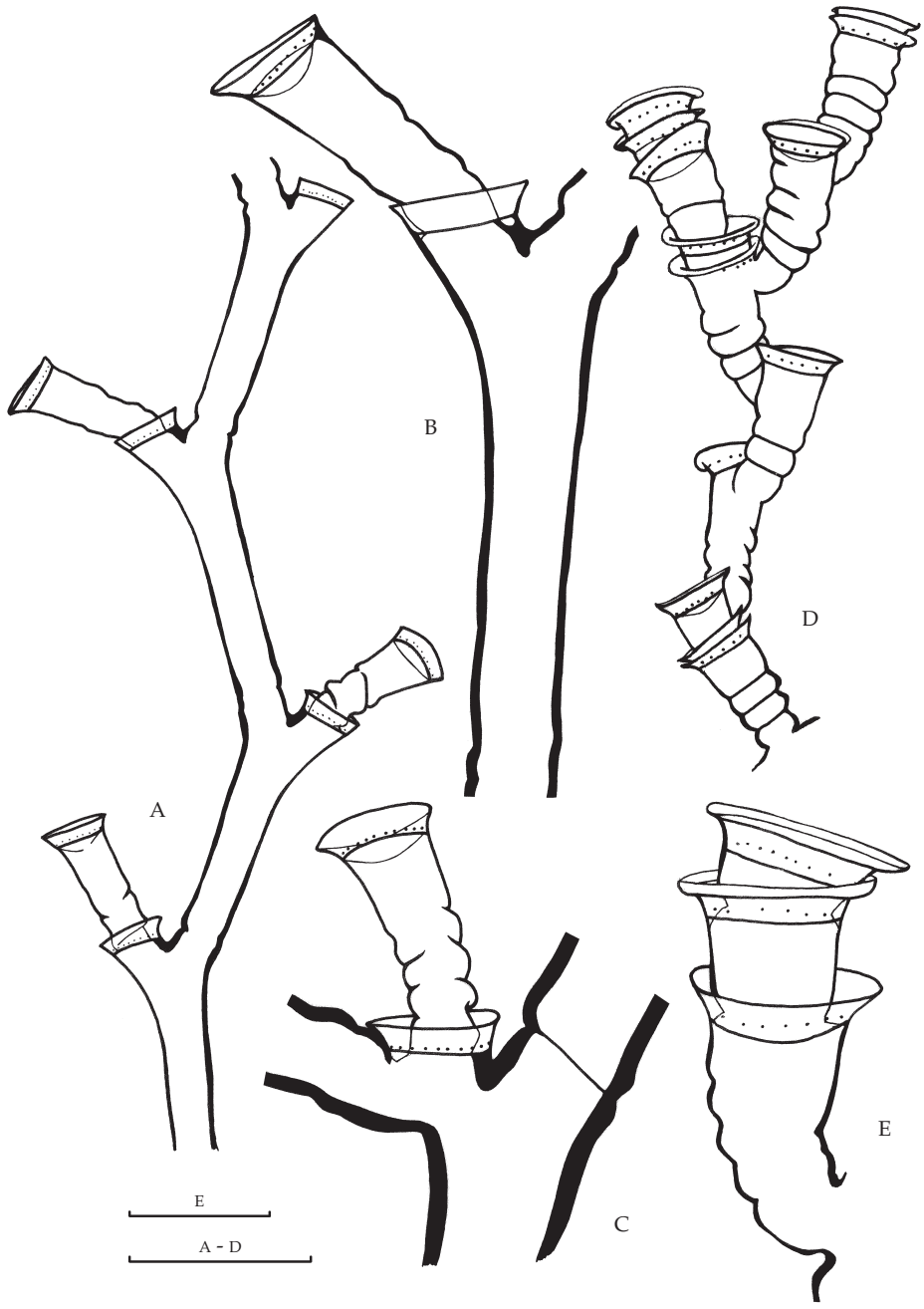

Fig. 14. A-C, *Halecium petrosum* Stechow, 1919. A, stem fragment; B, hydrothecae; C, hydrothecae and branching. D, E, *Halecium pusillum* (M. Sars, 1856). D, stem; E, hydrothecae. Scale bar: 100 μm (E), 250 μm (B-D), 500 μm (A).

forms vegetative shoots (frustules) for asexual reproduction, that have been observed in October and November (Boero & Fresi, 1986), April and August (Ramil, 1988) and throughout the year (Coma et al., 1992).

Distribution.— *Halecium pusillum* is considered to have a circumtropical (Picard, 1958a) or tropical-Atlantic (Boero & Bouillon, 1993) distribution. Although most of the records are from the Mediterranean and the nearby European Atlantic, there are also reports of its occurrence from Indochina (Leloup, 1937), the Atlantic coast of South America, French Guayana (Leloup, 1960) and Korea (Park, 1993). In the eastern Atlantic it is known from NW and W of France (Billard, 1926; Philbert, 1935; Teissier, 1965; Fey, 1970), N and NW of Spain (Isasi, 1985; Ramil, 1988; Altuna, 1994) and the Strait of Gibraltar (Medel et al., 1998).

In the Mediterranean it has been reported from the Adriatic (Broch, 1912, 1933; Babic, 1913a), the Balearic Islands (Roca, 1986) and the French (Motz-Kossowska, 1911; Stechow, 1919; Leloup, 1934; Picard, 1951b, c, 1952b), Italian (Rossi, 1961; Boero, 1981a, b; Boero & Fresi, 1986) and Spanish coasts (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986).

Halecium sibogae marocanum Billard, 1934
(fig. 15)

Halecium Sibogae marocanum Billard, 1934: 229, fig. 2; Van Praët, 1979: 880.
Halecium sibogae var. *marocanum*; Patriti, 1970: 25, fig. 23.
Halecium sibogae marocanum; Ramil & Vervoort, 1992: 86, fig. 21a-e, fig. 22a-b; Medel et al., 1998: 39-41, fig. 5; Ramil et al., 1998: 7-8, fig. 1; Medel & Vervoort, 2000: 21-23.

Material.— CONG 25, 25 m, several stems on *Eudendrium rameum* (RMNH-Coel. 29547).— E-2, 40 m, stem fragment with gonothecae.— F-8, 18 m, three stems on remnants of bivalve shells (RMNH-Coel. 29548).— H-13, 16 m, two stems on *Eudendrium* spec.— ISA 6, 28 m, two stems on pebbles.— ISA 23, 18 m, two stems on *Cystoseira spinosa* (RMNH-Coel. 29549).

Remarks.— The present material consists of colonies with monosiphonic stems up to 30 mm high. The hydrotheca is 60-84 μm high and the diameter at the aperture is 256-324 μm. The characteristic thickening inward, at the axil with the following internode, may be little marked or even absent, as in the material from E-2. Only female gonothecae were found in our material, bearing 10-12 ova.

Ecology.— *Halecium sibogae marocanum* has been found from 20 (Medel et al., 1998) to 756 m depth (Ramil et al., 1998). Our material comes from 16 to 40 m depth, below the depth at which the summer thermocline is formed.

Ramil & Vervoort (1992) found *H. sibogae marocanum* growing on hydrozoans and worm tubes, Medel et al. (1998) on rocks, and Medel & Vervoort (2000) on gorgonians. We found it epibiontic on algae, hydrozoans and on non-living substrata, both biotic (remains of organisms) and abiotic (pebbles). In turn, we observed it as substratum for other hydroid species (*Egmundella amirantensis*, *Clytia paulensis* and *Halecium tenellum*).

Fertile colonies of *Halecium sibogae marocanum* were found in June by Ramil & Vervoort (1992) and in March, June and August by Medel & Vervoort (2000). In our material the only colony with gonothecae was collected in July.

Distribution.— *Halecium sibogae marocanum* has been reported from off the Azores,

Canaries and Cape Verde Islands (Medel & Vervoort, 2000), Galice Bank (Ramil et al., 1998), Atlantic coast of Morocco (Billard, 1934; Ramil & Vervoort, 1992; Medel & Vervoort, 2000), Strait of Gibraltar (Ramil & Vervoort, 1992; Medel et al., 1998) and the Mediterranean coast of Morocco (Ramil & Vervoort, 1992). It seems, therefore, to have a Mauritanian and Lusitanian distribution, being also present in the Alboran Sea area of the Mediterranean.

Halecium tenellum Hincks, 1861
(fig. 12c-e)

Halecium tenellum Hincks, 1861: 252, pl. 6 figs 1-4; 1868: 226-227, pl. 45 fig. 1; Broch, 1912: 17-18, fig. 3; 1918: 46-50, fig. 20; 1933: 17; Stechow, 1919: 41, figs j-k; 1923b: 88; Da Cunha, 1944: 23; Vervoort, 1946b: 164-165, fig. 68; 1959: 229-331, fig. 8; 1966: 102, fig. 2; Picard, 1951c: 260; 1955: 187; 1958a: 192; Rossi, 1961: 76; Teissier, 1965: 21; Fey, 1970: 397; Patriti, 1970: 24, fig. 21; Millard, 1975: 156-175, fig. 50f-l; Boero, 1981a: 182, 184; Marinopoulos, 1981: 176; García Carrascosa, 1981: 121-124, pl. 2 figs f-j; Gili, 1986: 139-140, fig. 4.13a; Templado et al., 1986: 98; Roca, 1986: 131-136, fig. 30; Boero & Fresi, 1986: 143; Gili et al., 1989: 81, fig. 10a; Calder, 1991: 22-24, fig. 14; Ramil & Vervoort, 1992: 90-91, figs 21f-g; Park, 1993: 265; Boero & Bouillon, 1993: 263; Álvarez Claudio, 1993: 198-200, fig. 34; Altuna, 1994: 195-196; Migotto, 1996: 34-35, fig. 6h; Medel & López González, 1996: 199; Medel et al., 1998: 41-42, fig. 6; Ramil et al., 1998: 8; Medel & Vervoort, 2000: 23-25.

Not *Halecium tenellum*; García Corrales et al., 1978: 9, figs 1-2 (= *H. delicatulum* Coughtrey, 1876).

Material.— CONGRESO BANK, a few stems on *Plocamium cartilagineum*, *Aglaophenia kirchenpaueri* and *Sertularella polyzonias* (RMNH-Coel. 29550).— CONG 7, 19 m, several stems on *Cystoseira spinosa*, *Aglaophenia kirchenpaueri* and sponges (RMNH-Coel. 29551).— CONG 25, 25 m, several stems on *Eudendrium rameum* (RMNH-Coel. 29552).— CONG 26, 18 m, several stems on *Cystoseira spinosa*, *Peyssonnelia bornetii*, incrusting calcareous algae and anthozoans (RMNH-Coel. 29553).— CONG 27, 13 m, two stems on *Corallina elongata*.— CONG 42, 8 m, a few stems on *Peyssonnelia rubra*.— CONG 46, 5 m, a few stems on *Peyssonnelia coriacea* and *Eudendrium* spec.— CONG 74, 11 m, single colony on rhizomes of *Posidonia oceanica*.— CONG 76, 13 m, colony on *Cystoseira spinosa*.— F-2, 40 m, a few stems on *Halecium sibogae marocanum*.— ISA 5, 35 m, two stems on *Chartella papyrea*.— ISA 6, 28 m, four stems on pebbles.— ISA 9, 12 m, a few stems on *Flabellia petiolata*.— ISA 19, 20 m, numerous stems on *Aglaophenia pluma*, with gonothecae (RMNH-Coel. 29554).— ISA 21, 19.2 m, several colonies on rocks, polychaetes, bryozoans and cirripedes (RMNH-Coel. 29555).— ISA 23, 18.2 m, single stem on *Cystoseira spinosa*.— ISA 25, 10 m, several colonies on *Peyssonnelia rubra*, *Obelia dichotoma*, *Myriapora truncata* and sponges (RMNH-Coel. 29556).— ISA 26, 34 m, numerous colonies on *Obelia dichotoma*, *Eudendrium* spec., *Clavularia* spec., *Cellaria salicornoides*, *Scrupocellaria* spec., *Pentapora fascialis*, *Crisia* spec., *Caberea boryi* and *Turbicellepora* spec. (RMNH-Coel. 29558).— ISA 27, 25 m, numerous stems on *Cornularia* spec., *Cellaria salicornoides*, *Sertella beaniana* and *Celleporina* spec. (RMNH-Coel. 29559).— ISA 28, 29 m, a few stems on bryozoans.— PISA 14, 3.3 m, a few stems.— PISA 18, 30 m, numerous stems on bryozoans (RMNH-Coel. 29560).— REY 4, 27 m, several colonies on *Flabellia petiolata*, *Sertularella polyzonias*, *Eudendrium glomeratum*, *Obelia dichotoma*, *Cellaria salicornoides*, *Caberea boryi*, *Myriapora truncata*, *Adeonella calveti* and anthozoans, with gonothecae (RMNH-Coel. 29561).— REY 5, 20 m, a few stems on *Cystoseira spinosa* and seaweeds (RMNH-Coel. 29562).

Remarks.— The present material consists of colonies with monosiphonic stems up to 8 mm high. The hydrotheca is 20-36 μm high and its diameter at the rim is 112-148 μm.

Poorly developed colonies of *Halecium tenellum* may be confused with those of *H. delicatulum* when in the latter the pseudo-diaphragm is absent. However, both species are easily distinguishable because *H. tenellum* has much more delicate colonies with

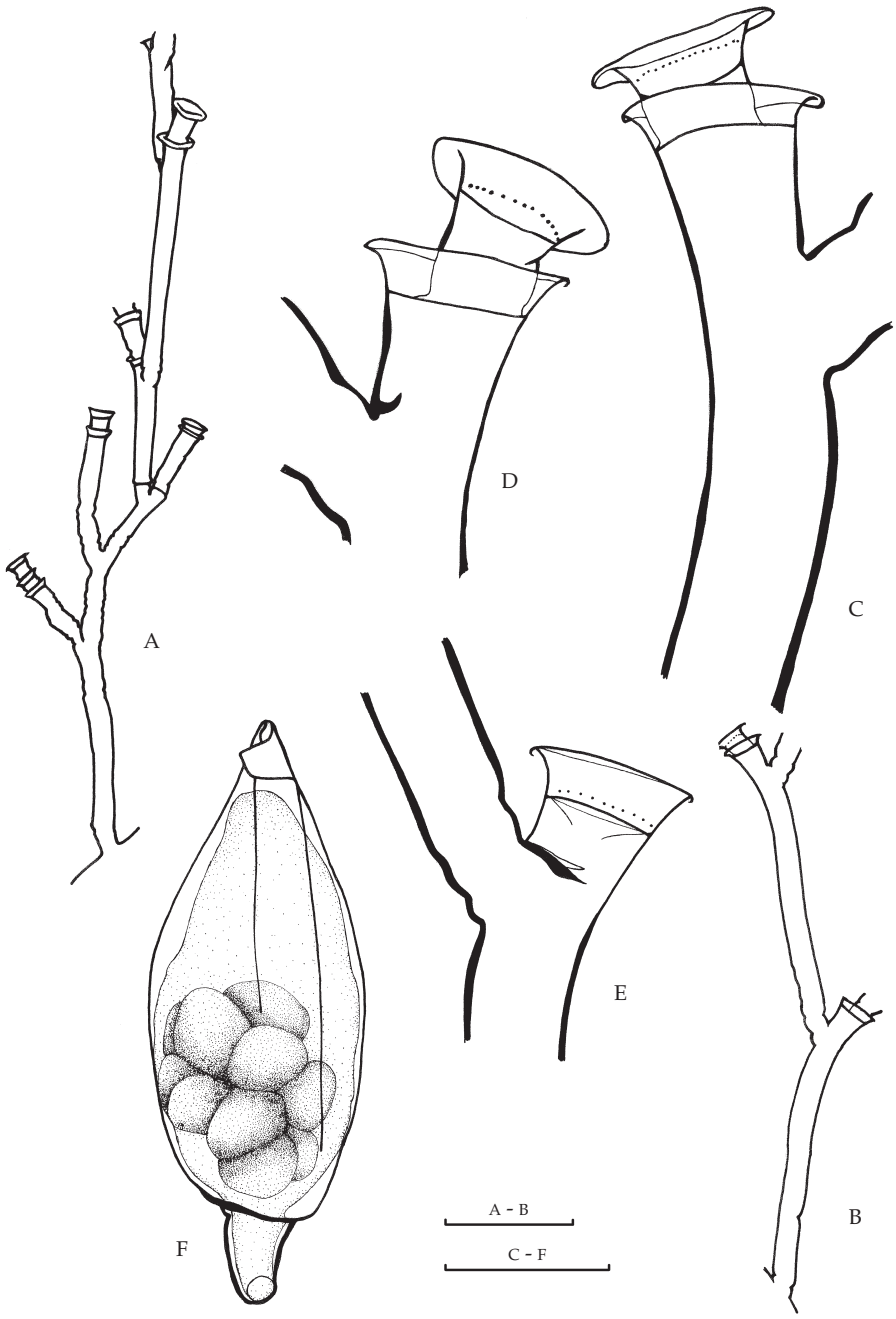

Fig. 15. *Halecium sibogae marocanum* Billard, 1934. A, B, stems; C-E, hydrothecae; F, female gonotheca. Scale bar: 250 μm (C-E), 500 μm (F), 1 mm (A-B).

long and thin internodes, strongly arranged in zigzag fashion. Moreover in *H. tenellum* the internodes present a slight perisarc thickening inwards, at the axil with the following internode.

Ecology.— *Halecium tenellum* is an eurybathic species that, in the Mediterranean, has been found from 0.5 (Boero & Fresi, 1986) to 200 m depth (Marinopoulos, 1979); our material comes from 3.3 to 40 m. Outside the Mediterranean it was reported from the tidal level (Migotto, 1996) to 1200 m depth (Medel & Vervoort, 2000). It has frequently been found epibiontic on hydrozoans (Broch, 1912, 1933; Stechow, 1919; Da Cunha, 1944; Rossi, 1961; García Carrascosa, 1981; Boero & Fresi, 1986; Gili, 1986; Gili et al., 1989; Ramil & Vervoort, 1992; Altuna, 1994; Ramil et al., 1998; etc.), bryozoans (Motz-Kossowska, 1911; Boero & Fresi, 1986; Ramil & Vervoort, 1992; Altuna, 1994; Migotto, 1996) and algae (Da Cunha, 1944; Rossi, 1961; Boero & Fresi, 1986; Roca, 1986; Migotto, 1996). Occasionally, it has been also collected on polychaete tubes (Medel & Vervoort, 2000), anthozoans (Gili, 1986; Migotto, 1996) and sponges (Gili, 1986; Medel & Vervoort, 2000). At the Chafarinas we found it on a wide range of substrata, though preferably growing epibiontic on other organisms, especially on bryozoans, hydrozoans, anthozoans, sponges, cirripedes and polychaete tubes, in which it was found in more than 71% of the occasions. The remaining records are mainly from hemiphotophilic or sciaphilic algae (*Cystoseira spinosa*, *Flabellia petiolata*, *Peyssonnelia* spp.) and, occasionally, from rhizomes of *Posidonia oceanica*, and epilithic on rocks and pebbles. In turn, we found it as substratum for other hydroids (for instance *Clytia paulensis* and *Clytia* spec.).

In the Mediterranean, *H. tenellum* was collected with gonothecae in April (Picard, 1955; Gili, 1986), in May in the Strait of Gibraltar (Medel et al., 1998). Outside the Mediterranean Vervoort (1959) found fertile colonies in January, April and December, Altuna (1994) in October and Medel & Vervoort (2000) in June.

Distribution.— *Halecium tenellum* is widely considered a cosmopolitan species (Picard, 1958a; Boero & Bouillon, 1993), being also present in Artic (Broch, 1918) and Antarctic waters (Stepan'yants, 1979).

In the nearby eastern Atlantic it has been reported from off the NW and W coasts of France (Teissier, 1965; Fey, 1970), N of Spain (Álvarez Claudio, 1993), Gorrige, Seine and Ampère banks (Ramil et al., 1998), coasts of Portugal (Da Cunha, 1944), Azores (Medel & Vervoort, 2000), western part of the Strait of Gibraltar (Ramil & Vervoort, 1992), Strait of Gibraltar (Medel et al., 1998), Morocco (Patriti, 1970; Ramil & Vervoort, 1992) and Cape Verde Islands (Medel & Vervoort, 2000).

In the Mediterranean *H. tenellum* is known from the Adriatic (Broch, 1933), the Balearic Islands (Roca, 1986), the Alboran Sea (Templado et al., 1986; Ramil & Vervoort, 1992) and from off the Algerian (Picard, 1955), French (Motz Kossowska, 1911; Stechow, 1919; Picard, 1951c; Marinopoulos, 1981), Italian (Rossi, 1961; Boero, 1981a; Boero & Fresi, 1986) and Spanish coasts (García Carrascosa, 1981; Gili, 1986).

Halecium spec.
(fig. 13d-e)

Material.— CONGRESO BANK, a few stems.— CONG 1, 0.5 m, a few stems on *Peyssonnelia coriacea* (RMNH-Coel. 30010).— CONG 7, 19 m, a few stems on *Cystoseira spinosa*, *Halopteris filicina*, *Aglaophe-*

nia spec. and sponges (RMNH-Coel. 29563).— CONG 8, 10 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29564).— CONG 15, 0.3 m, two stems on *Cystoseira tamariscifolia*.— CONG 17, 2 m, single colony on *Codium bursa*.— CONG 18, 4.5 m, single colony on *Corallina elongata*.— CONG 26, 18 m, a few stems on *Cystoseira spinosa* and *Adeonella* spec. (RMNH-Coel. 29565).— CONG 28, 9 m, numerous stems on *Aglaophenia kirchenpaueri*, *Pentapora ottomulleriana* and cirripedes (RMNH-Coel. 29566).— CONG 35, 2 m, three colonies (RMNH-Coel. 29567).— CONG 57, 10.5 m, a few stems on *Cystoseira spinosa*, *Peyssonnelia rubra* and *Acrosorium uncinatum* (RMNH-Coel. 29568).— CONG 58, 9 m, two colonies on *Padina pavonia* and incrusting calcareous algae (RMNH-Coel. 29569).— CONG 60, 8.5 m, a few stems on *Halopteris scoparia* and bivalves (RMNH-Coel. 29570).— CONG 62, 5 m, two colonies on *Sargassum* spec. and *Halopteris scoparia*.— CONG 74, 11 m, single colony on *Halopteris scoparia*.— ISA 2, 16 m, a few stems.— ISA 3, 12 m, several colonies on *Cystoseira spinosa*, *Sargassum* spec. and *Dictyota dichotoma* (RMNH-Coel. 29571).— ISA 5, 35 m, several stems on *Chartella papyrea*.— ISA 9, 12 m, a few colonies on *Halopteris filicina* and bryozoans (RMNH-Coel. 29572).— ISA 10, 10 m, several stems on *Sargassum* spec. and *Cystoseira spinosa* (RMNH-Coel. 29573).— ISA 17, 3 m, several stems on *Aglaophenia kirchenpaueri*.— ISA 19, 20 m, a few stems on *Aglaophenia pluma*, with gonothecae.— ISA 22, 15 m, a single colony on *Cystoseira spinosa*.— ISA 23, 18.2 m, a single stem on *Polysiphonia* spec.— ISA 25, 10 m, a few stems on *Halopteris filicina* (RMNH-Coel. 29574).— ISA 29, 6 m, two stems.— PCONG 5, 3 m, several colonies on *Haraldia lenormandii*, *Rhodymenia ardissonei* and *Eudendrium racemosum* (RMNH-Coel. 29575).— PCONG 6, 2 m, several stems on *Haraldia lenormandii* and *Eudendrium racemosum* (RMNH-Coel. 29576).— PISA 19, 2 m, several stems on *Amphiroa cryptarthodia*.— REY 6, 10 m, numerous stems on *Cystoseira spinosa*, *Halopteris scoparia* and *Rhodymenia ardissonei* (RMNH-Coel. 29577).— REY 7, 27 m, a few stems on *Cystoseira spinosa* and bryozoans.— REY 9, 22 m, several stems on pebbles and incrusting calcareous algae.— REY 17, 2 m, a single stem.

Description.— Colonies with a stolonal hydrorhiza giving rise to monosiphonic stems up to 13 mm high. Stem inserting on hydrorhizal apophysis and divided into thecate internodes (456-760 μm long and 96-136 μm wide) delimited by straight or oblique nodes. Stem frequently with a basal intermediate athecate internode (up to 416 μm length).

Stem internodes with one distal hydrotheca and usually a slight thickening at the basal part. Just below hydrotheca, stem internode forming an apophysis supporting the succeeding internode. Apophyses more or less upwardly directed, adcauline hydrothecal wall may thus be more or less adnate to the internode. Usually secondary hydrotheca present; sometimes hydrothecae of higher order (up to fourth order) present; occasionally only primary hydrothecae developed. Hydrothecae always placed below distal node, alternately arranged in one plane, low, 20-32 μm high, with straight walls widening towards circular aperture (116-156 μm diameter). Hydrothecal rim smooth, though a delicate, inwardly directed fold may be present.

Branching occasional, though branching of fourth order observed, arising from apophyses originating below first, second or higher-order hydrothecae. In the material from CONG 28, provided with numerous higher-order hydrothecae, there are plenty of branches.

Remarks.— The coenosarc of colonies from CONG 18, CONG 25, CONG 26, CONG 58, CONG 62, CONG 74, ISA 22, REY 7 and REY 9 has endosymbiotic zooxanthellae. In the material from CONG 28 long, vegetative stolons (up to 600 μm) were observed at the distal part of the stem.

Due to the absence of gonothecae and the scarcity of distinguishing features in the species of *Halecium*, it was not possible to assign this material to any of the known species.

Ecology.— *Halecium* spec. was found from 0.3 to 35 m depth, mainly epibiontic on algae (>68% of the occasions), but also on hydrozoans and bryozoans and, occasionally on cirripedes, sponges and bivalves. A few times it was also found on non-living susbtratum (pebbles).

Genus *Hydranthea* Hincks, 1868

Hydranthea margarica (Hincks, 1863)
(fig. 16a)

Atractylis margarica Hincks, 1863: 45.
Hydranthea margarica Hincks, 1868: 100, pl. 19 fig. 1; Huvé, 1954: 178-182, pl. 3 figs 7-9, pl. 4 figs 10-14, pl. 5 figs 15-16, pl. 6 figs 17-22; Picard, 1958a: 192; Millard & Bouillon, 1973: 45, fig. 6a; García Carrascosa, 1981: 115-118, pl. 3 figs e-g; Gili, 1986: 133-134, fig. 4.9a; Boero & Fresi, 1986: 143; Cornelius et al., 1990: 140, fig. 4.15; Boero & Bouillon, 1993: 263; Medel & López González, 1996: 200.
Halecium margaricum; Motz-Kossowska, 1911: 327-328, fig. 1.
Halecium Billardii Motz-Kossowska, 1911: 328-331, figs 2-4.
Halecium Billardii var. *exigum* Motz-Kossowska, 1911: 331, fig. 4.
Halecium billardi; Picard, 1951c: 260.
?*Hydranthea* cf. *margarica*; Altuna, 1994: 196-199, pl. 34.

Material.— CONG 59, 9 m, several colonies on *Myriapora truncata* (RMNH-Coel. 29578).

Description.— Colonies composed of a stolonal hydrorhiza giving rise to short pedicels, slightly narrowing basally, bearing a distal hydrotheca. Hydrotheca low, widening towards aperture. Hydrothecal aperture circular; rim even. Polyps large, with a whorl of filiform tentacles around the hypostome, basally connected by an intertentacular membrane. There are aggregations of large nematocysts at the tentacular base.

No gonothecae.

Ecology.— *Hydranthea margarica* appears to be a littoral species, though absent from the shallowest level. In the Mediterranean it has been found from 10 (García Carrascosa, 1981) to 20 m depth (Boero & Fresi, 1986); our material was collected at 9 m. Outside the Mediterranean Millard & Bouillon (1973), for instance, found it from 6 to 15 m. It has mainly been found epibiontic on bryozoans (Hincks, 1868; Motz-Kossowska, 1911; Altuna, 1994) and hydrozoans (Motz-Kossowska, 1911; Huvé, 1954; García Carrascosa, 1981; Cornelius et al., 1990; Altuna, 1994), but also on algae (Gili, 1986; Cornelius et al., 1990) and on non-living substrata, both biotic (mollusc shells) and abiotic (pebbles and rocks) (Teissier, 1965; Cornelius et al., 1990). We found it on *Myriapora truncata*.

In the Mediterranean fertile colonies of *Hydranthea margarica* have been found in August (Boero & Fresi, 1986) and October (Motz-Kossowska, 1911). Outside the Mediterranean gonothecae have been observed in August (Teissier, 1965).

Distribution.— As *Hydranthea margarica* is an inconspicuous species its exact geographical distribution is difficult to determine as it has certainly been frequently overlooked. Its area of distribution may thus be much wider than that reflected by the present data. Picard (1958a) considered it a North Atlantic species, whereas Boero & Bouillon (1993) assigned to it a boreal distribution. Its presence at the Seychelles (Millard & Bouillon, 1973) points to a wider distribution. In eastern Atlantic it has been reported from the

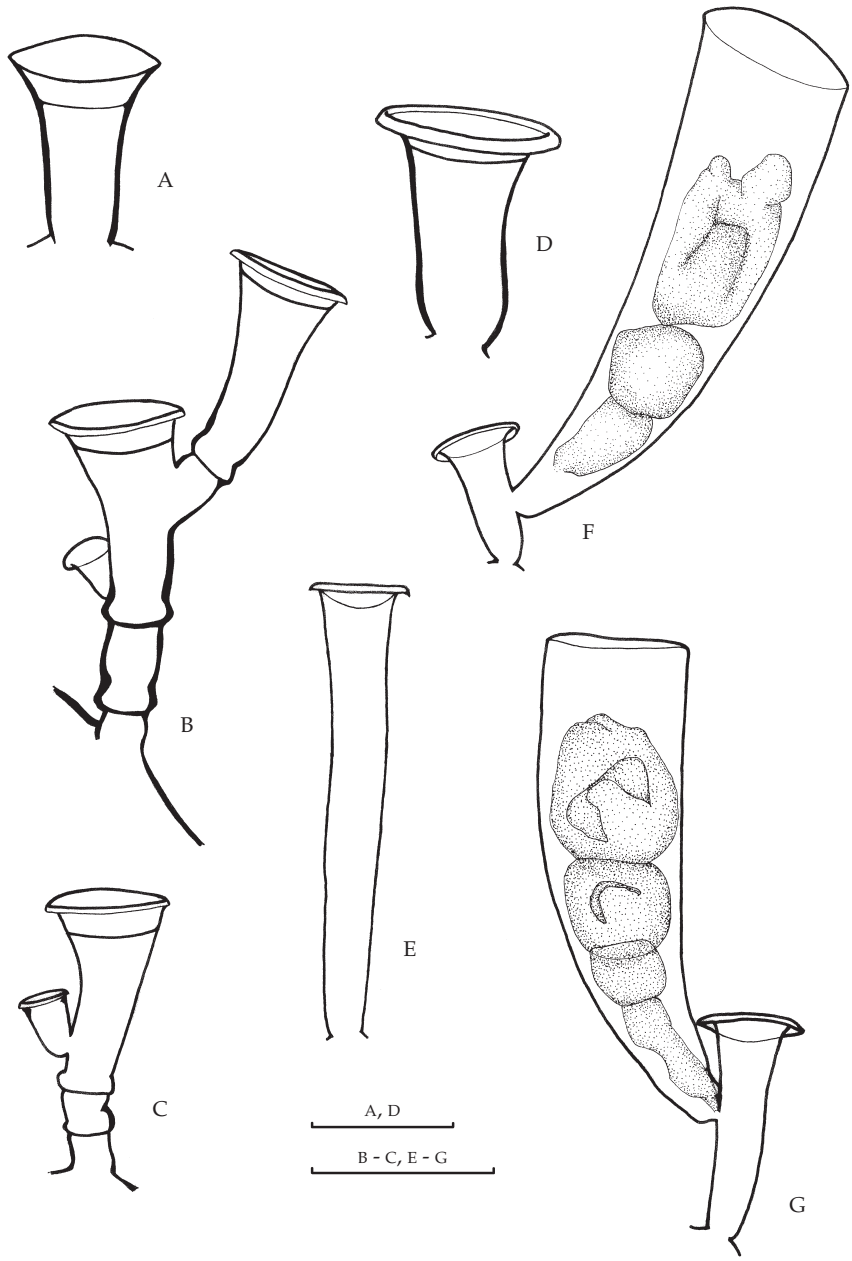

Fig. 16. A, *Hydranthea margarica* (Hincks, 1863), hydrotheca. B, C, *Hydrodendron mirabile* (Hincks, 1866), stems with hydrothecae and nematothecae. D-G, *Mitrocomium* spec. D-E, hydrothecae; F-G, hydrothecae and gonothecae. Scale bar: 100 μm (A, D), 250 μm (B-C, E-G).

Shetland Islands (Cornelius et al., 1990) to the Spanish Basque coasts (Altuna, 1994).

In the Mediterranean, *H. margarica* is known from off the French (Motz-Kossowska, 1911; Picard, 1951c; Huvé, 1954), Italian (Boero & Fresi, 1986) and Spanish coasts (García Carrascosa, 1981; Gili, 1986).

Genus *Hydrodendron* Hincks, 1874

Hydrodendron mirabile (Hincks, 1866)
(fig. 16b-c)

Ophiodes mirabilis Hincks, 1866b: 422, pl. 14 figs 1-5; 1868: 231, pl. 45 figs 2, 2', 2a-d; Motz-Kossowska, 1911: 334; Bedot, 1914: 82; Teissier, 1965: 20.
Ophiodes caciniforme Ritchie, 1907: 500, pl. 23 figs 11-12, pl. 24 fig. 1, pl. 25 fig. 5.
Ophiodes caciniformis; Babic, 1913a: 473, fig. 7.
Ophiodissa mirabilis; Stechow, 1919: 42; Picard, 1951c: 260; 1958a: 192; Cornelius, 1975b: 414, figs 14a-b; Isasi, 1985: 51, figs 5d-f; Boero & Fresi, 1986: 143; Ramil, 1988: 204-208, pl. 14; Boero & Bouillon, 1993: 263; Medel & López González, 1996: 200.
Ophiodissa caciniformis; Stechow, 1919: 42; Vervoort, 1959: 218-221, figs 1a-b, 2; García Corrales et al., 1978: 16-18, fig. 5; Boero & Bouillon, 1993: 263.
Hydrodendron caciniformis; Millard, 1957: 186, figs 3a-c; 1975: 158, figs 51a-f; Ralph, 1958: 342, figs 13b-c, 14a; Park, 1993: 265.
Hydrodendron mirabilis; Boero, 1981a: 182; Gili, 1986: 132-133, fig. 4.9b.
Hydrodendron caciniforme; Rees & Vervoort, 1987: 20.
Hydrodendron mirabile; Rees & Vervoort, 1987: 20; Gili et al., 1989: 81-82, fig. 10b; Altuna, 1994: 199-203, pl. 35, pl. 36 figs a-f; Medel et al., 1998: 43-45, fig. 7; Medel & Vervoort, 2000: 26-28.

Material.— CONG 2, 1 m, single colony on incrusting calcareous algae (RMNH-Coel. 29579).— CONG 22, 1 m, two stems on *Ulva rigida* (RMNH-Coel. 29580, slide).— CONG 64, 1 m, single colony on *Sargassum* spec. (RMNH-Coel. 29581).— CONG 69, 2.5 m, one stem on *Halopteris filicina*.— PISA 9, 1 m, several stems on incrusting calcareous algae.— PISA 17, 1 m, a single stem.— REY 22, 0 m, single colony on *Sargassum vulgare*.— REY 23, 0 m, a few stems on *Rhodymenia* spec. (RMNH-Coel. 29582).

Description.— Scarcely developed colonies composed of a stolonal hydrorhiza giving rise, through short apophyses, to tiny stems with up to five polyps. Stems composed of a series of thecate internodes separated by transverse nodes and proximally provided with a like-ring swelling. Frequently with intermediate athecate internodes following hydrorhizal apophyses or cauline thecate internodes.

Stem internodes with distal hydrotheca. Successive internodes inserting on apophyses formed on previous internode below hydrotheca. Occasionally internodes with two almost opposite successive internodes.

Hydrotheca high; diameter increasing towards aperture. Hydrothecal aperture circular; rim even, but frequently everted. Ring of desmocytes present. Sometimes secondary hydrotheca arising, almost without pedicel, from diaphragm of primary hydrotheca.

Stem provided with irregularly arranged, one-chambered, bell-shaped nematothecae, usually one per thecate internode.

No gonothecae.

Remarks.— Cornelius (1975b), after examination of both the neotype of *Ophiodes mirabilis* Hincks, 1866b and the paralectotype of *Ophiodes caciniformis* Ritchie, 1907,

concluded that both are conspecific; the latter being based on larger colonies than those originally referred to Hincks's species.

Ecology.— *Hydrodendron mirabile* is a littoral species that, in the Mediterranean, has been found from 0.5 (Boero & Fresi, 1986) to 40 m depth (García Corrales et al., 1978); our material comes from the tidal level to 2.5 m. Outside the Mediterranean it has been reported from the tidal level (Ramil, 1988) to 65 m (Vervoort, 1959). It has frequently been found epibiontic on algae (Motz-Kossowska, 1911; Babic, 1913a; Bedot, 1914; Stechow, 1919; Teissier, 1965; Isasi, 1985; Boero & Fresi, 1986; Gili, 1986; Ramil, 1988; Altuna, 1994), but also on *Posidonia oceanica* (Motz-Kossowska, 1911), hydrozoans (Vervoort, 1959; Ramil, 1988; Altuna, 1994), sponges (Ramil, 1988; Altuna, 1994; Medel & Vervoort, 2000), cirripedes (Boero & Fresi, 1986), bryozoans (Ramil, 1988; Altuna, 1994) and bivalve shells (Isasi, 1985); it has also been recorded growing on rocks (Medel et al., 1998). At the Chafarinas it was always found epibiontic on algae.

In the Mediterranean material gonothecae were observed in July (Motz-Kossowska, 1911).

Distribution.— Although considered a North Atlantic species by Picard (1958a), *Hydrodendron mirabile* seems to have a wider distribution, since it has been recorded from off the tropical Atlantic coasts of America (Leloup, 1935), from New Zealand (Ralph, 1958), Korea (Park, 1993) and the Indian Ocean coasts of South Africa (Millard, 1975). The absence of records from the Pacific coasts of America points towards an Indo- Westpacific distribution that is restricted to tropical and temperate waters. In the eastern Atlantic it has been reported from Great Britain (Cornelius, 1975b) to the South African coasts (Millard, 1975).

In the Mediterranean it has been recorded from the Adriatic (Babic, 1913a) and the French (Motz-Kossowska, 1911; Stechow, 1919; Picard, 1951c), Italian (Boero & Fresi, 1986) and Spanish coasts (García Corrales et al., 1978; Gili, 1986).

Genus *Mitrocomium* Haeckel, 1879

Mitrocomium spec.
(fig. 16d-g)

Material.— B-11, 42 m, a few hydrothecae on *Sertularella polyzonias* (RMNH-Coel. 29583).— C-4, 34 m, on stones and bivalve shells.— ISA 27, 25 m, a few hydrothecae on *Clytia linearis*, with gonothecae (RMNH-Coel. 29584).— ISA 28, 29 m, several colonies on *Cellaria salicornoides* and *Valkeria* spec.

Description.— Scarcely developed colonies provided with thick stolonal hydrorhiza giving rise to short pedicels bearing a distal hydrotheca. Sometimes with secondary hydrotheca inserted on a short pedicel arising from diaphragm of primary hydrotheca. Hydrothecal diameter increasing distally. Hydrothecal aperture circular; rim even, but strongly everted. Ring of desmocytes present. Polyp large, provided with large nematocysts distributed throughout its body.

Gonothecae arising from hydrothecal pedicel. Gonotheca horn-shaped, without pedicel.

Remarks.— Our material is in agreement, both in colonial structure and cnidome, with Boero's (1981a) description of *Campalecium medusiferum* Torrey, 1902.

However, this author doubted whether or not his material and Torrey's species were conspecific, because of the lack of medusae in the latter.

To *Campalecium medusiferum* Torrey, 1902 had been referred material that was originally described as *Halecium Torreyi* Motz-Kossowska, 1911 and *Haleciella microtheca* Hadzi, 1914, both species having a more or less similar structure. It is presently accepted that several species are involved, only identifiable by studying the medusae. Thus, Brinckmann-Voss (1959) found medusae belonging to *Mitrocomium cirratum*, in colonies assigned to *Haleciella microtheca*, and differing from those obtained by Boero (1981a) from the material identified as *Campalecium medusiferum*.

Calder (1991) restored the genus name *Mitrocomium* to include the haleciids releasing medusae and assigned to *M. cirratum* his material from the Bermudas, but he also indicated the necessity to study its life-cycle to confirm the systematic position.

These facts and the absence of medusae in our material, prevent us from referring it to any of the known species of *Mitrocomium*.

Ecology.— *Mitrocomium* spec. was collected from 25 to 42 m depth, growing on bryozoans and hydrozoans, as well as on non-living substrata, both biotic (organisms remains) and abiotic (pebbles). Fertile colonies were found in August.

Family Aglaopheniidae Broch, 1918

Genus *Aglaophenia* Linnaeus, 1758

Aglaophenia acacia Allman, 1883
(fig. 17a)

Aglaophenia acacia Allman, 1883: 38, pl. 12 figs 1-4; Marktanner- Turneretscher, 1890: 270, pl. 7 fig. 1; Pictet & Bedot, 1900: 44, pl. 10 figs 4-7; Kühn, 1909: 254, figs Ub, V; Blanco, 1967: 288-292, pl. 6 figs 4-8; Svoboda, 1979: 79-82, figs 12d, 13d, 14b, 15d(1-5), 16d; Gili, 1986: 144-145, fig. 4.35A-C; Roca, 1986: 407-410, fig. 69; Svoboda & Cornelius, 1991: 14-16, figs 1, 17a-b, 20a-b, 21a-b; Boero & Bouillon, 1993: 546; Vervoort, 1993: 546; El Beshbeeshy, 1995b: 398-400, fig. 1a-b; Medel & López González, 1996: 200; Ansín Agís, 1998: 69-74, figs 1a-c, 2a-d.

Aglaophenia elongata p.p. Picard, 1955: 190.

Aglaophenia elongata; Van Gemerden Hoogeveen, 1965: 79-80, fig. 44; García Carrascosa, 1981: 302-305, pl. 29 fig. g, pl. 44 figs d-e.

Material.— CONG 26, 18 m, one stem fragment.— CONG 66, 0 m, two stem fragments (RMNH-Coel. 29585).— C-8, 39 m, two stems on bivalve-shell remains (RMNH-Coel. 29586).— D-2, 41 m, several stem fragments, with corbulae (RMNH-Coel. 29587).— ISA 18, 20 m, numerous stems on rocks, with corbulae.— ISA 32, 25 m, numerous stems, with corbulae.— PISA 18, 30 m, numerous stems on *Eudendrium glomeratum*, with corbulae (RMNH-Coel. 29588).— REY 7, 27 m, four stems with corbulae (RMNH-Coel. 29589).— REY 9, 22 m, single stem on incrusting calcareous algae spreading on pebbles.

Remarks.— The present material consists of stems up to 150 mm high with trifold branching. The hydrotheca is 352-412 μm high and 184-212 μm wide at the rim. The length/diameter ratio is 1.86-2.17. The lateral nematothecae overreach the rim of hydrotheca. The internal communication between hydrotheca and mesial inferior nematothecae is usually closed, even in the youngest parts of the stems. Corbulae originate from a modified hydrocladium and are provided with 10 ribs.

In the material from D-2 and REY 7 the main branches arise from a normal

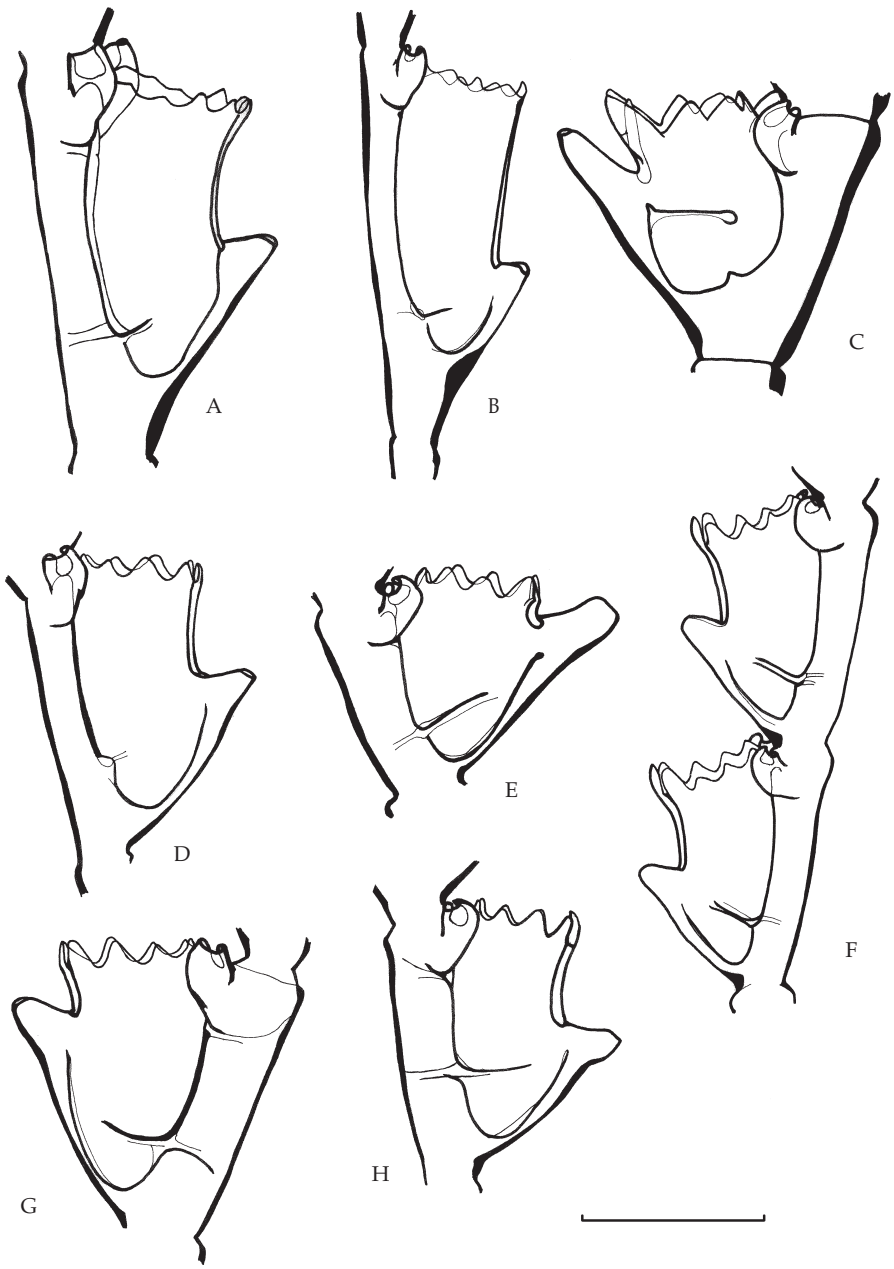

Fig. 17. A, *Aglaophenia acacia* Allman, 1883, hydrotheca. B, *Aglaophenia elongata* (Meneghini, 1845), hydrotheca. C, *Aglaophenia kirchenpaueri* (Heller, 1868), hydrotheca. D, *Aglaophenia lophocarpa* Allman, 1877, hydrotheca. E, *Aglaophenia octodonta* (Heller, 1868), hydrotheca. F, *Aglaophenia picardi* Svoboda, 1979, hydrothecae. G, *Aglaophenia pluma* (Linnaeus, 1758), hydrotheca. H, *Aglaophenia tubiformis* Marktanner Turneretscher, 1890, hydrotheca. Scale bar: 250 μm.

cauline internode bearing one hydrocladium situated below the branch, but with opposite orientation.

García Carrascosa (1981) assigned to *Aglaophenia elongata* material that clearly belongs to *A. acacia*, since it has the characteristic features of Allman's species, such as trifold branching, hydrothecae at the base of the branches and long corbulae.

Blanco (1967) identified as *Aglaophenia acacia* material from off the Argentina coasts that agrees with Allman's species. Svoboda (1979), and Svoboda & Cornelius (1991), did not recognize that record and excluded the South American coast from the geographical distribution of *A. acacia*.

Picard (1955) reported *Aglaophenia elongata* from Castiglione (Algeria). Nevertheless, he indicated that in his material, including both branched and unbranched stems, the passage between hydrotheca and mesial nematotheca was frequently closed; this, according to Svoboda (1979) and Svoboda & Cornelius (1991), is characteristic of *A. acacia* and *A. lophocarpa*. Since Picard did not mention which colonies, branched or unbranched, have that communication closed, Svoboda (1979) referred to *A. elongata* the material with branched stems and to *A. lophocarpa* that with unbranched stems. However, we believe that the material with branched stems rather belongs to *A. acacia*, as Picard indicated that the communication between hydrotheca and mesial nematotheca is frequently closed, which may refer to all of his branched colonies. We doubt whether the colonies with unbranched stems belong to young, still unbranched colonies of *A. acacia*, or to *A. lophocarpa*. Picard himself considered those colonies identical with *A. lophocarpa* which he considered conspecific with *A. elongata*.

Ecology.— In the Mediterranean, *Aglaophenia acacia* has been found from 34 to 46 m depth (Picard, 1955). According to Svoboda & Cornelius (1991) it is found below 40 m depth; our material comes from 18 to 41 m. Outside the Mediterranean, it has been reported from 9 (Svoboda, 1979) to 822 m depth (Allman, 1883). It seems to be a species of deeper waters which, in the Mediterranean, is found under the depth at which the summer thermocline is formed. It has been reported growing on hard substrata (Roca, 1986; Svoboda and Cornelius, 1991), but also epibiontic on algae, bryozoans and polychaete tubes (García Carrascosa, 1981). In our material it was found on rocks, shell fragments, incrusting calcareous algae and hydrozoans. *Aglaophenia acacia* is used as substratum by other species of hydroids: we observed colonies of *Eudendrium capillare*, *Filellum* spec., *Clytia gracilis*, *C. paulensis* and *Clytia* spec.

In the Mediterranean fertile colonies of *Aglaophenia acacia* were found in February, April and June (Picard, 1955), July (Gili, 1986; Svoboda, 1979) and December (Roca, 1986). We found colonies with corbulae in July and August. Outside Mediterranean waters it has been reported with corbulae in March (Ansín Agís, 1998), May (Svoboda & Cornelius, 1991; Ansín Agís, 1998), June (Ansín Agís, 1998), July (Allman, 1883) and August (Svoboda & Cornelius, 1991).

Distribution.— *Aglaophenia acacia* is presently credited with an amphi-Atlantic distribution, spreading in tropical, subtropical and temperate waters. In the eastern Atlantic it has been reported from off Great Britain, Ireland and NW of France (Svoboda & Cornelius, 1991), N of Spain (Svoboda, 1979), Morocco (Ansín Agís, 1998), the Azores (Allman, 1883; Ansín Agís, 1998) and the Canary Islands (Svoboda, 1979). In

western Atlantic it is known from off North Carolina (Fraser, 1944), Tortugas, Florida (Svoboda, 1979) and the Argentine coasts (Blanco, 1967).

In the Mediterranean it has been found off the Balearic Islands (Roca, 1986) and off the Algerian (Picard, 1955), Egyptian (El Beshbeeshy, 1995b), Italian (Svoboda, 1979; Svoboda & Cornelius, 1991), Israeli (Svoboda & Cornelius, 1991; Vervoort, 1993), Spanish (García Carrascosa, 1981; Gili, 1986) and Tunisian coasts (Svoboda, 1979).

Aglaophenia elongata Meneghini, 1845
(fig. 17b)

Aglaophenia elongata Meneghini, 1845: 192, pl. 13; Marktanner Turneretscher, 1890: 262, pl. 7 figs 8, 12; Svoboda, 1979: 74, figs 12c, 13c, 15c, 16c; Gili, 1986: 146, figs 4.34e-g, 4.57d; Svoboda & Cornelius, 1991: 16, fig. 2; Vervoort, 1993: 546; Medel & López González, 1996: 200; Morri & Bianchi, 1999: 286.
Plumularia elongata; Heller, 1868: 39, pl. 32 fig. 2.
Aglaophenia microdonta Pieper, 1884: 217.
Aglaophenia elongata p.p. Broch, 1933: 56, fig. 18f.
Not *Aglaophenia elongata*; Graeffe, 1884: 23; Broch, 1912: 34, fig. 10; Stechow, 1923b: 252; Picard, 1955: 190; García Carrascosa, 1981: 302, pl. 29 fig. g, pl. 44 figs d-e.

Material.— ISA 5, 35 m, several stem fragments (RMNH-Coel. 29590).

Remarks.— The present material consists of branched stems with branches originating from normal, hydrocladiate stem internodes. Branches arising from a cauline apophysis, composed of two prosegments followed by a normal series of hydrocladiate internodes. The hydrotheca is 364 μm high and 156 μm in diameter at the aperture. The lateral nematothecae reach the hydrothecal rim.

Ecology.— *Aglaophenia elongata* has been found from 10 to 74 m depth (Svoboda & Cornelius, 1991); our material was collected at 35 m. It seems to be a shelf species, having its highest bathymetrical level under the depth at which the summer thermocline is formed. It has been observed on mollusc shells, remains of Bryozoa, calcareous red algae and *Cystoseira* spec. (Svoboda & Cornelius, 1991), bio-concretions (Boero & Fresi, 1986), rhizomes of *Posidonia oceanica* (Gili, 1986), algae (Morri & Bianchi, 1999) and epilithic on rocks and stones in muddy bottoms (Gili, 1986; Boero & Fresi, 1986). We found it as host for epibiontic colonies of *Filellum serratum*.

Svoboda & Cornelius (1991) found fertile colonies of *Aglaophenia elongata* from June to November, Gili (1986) in April, and Vervoort (1993) in February, April, June and December. It thus seems to be fertile throughout the year.

Distribution.— Boero & Bouillon (1993) considered *Aglaophenia elongata* an Atlantic-Mediterranean species. However, Vervoort (1993), pointed out that it seems to be a Mediterranean endemic, since, according to Svoboda & Cornelius (1991), reliable records are only those from the Tyrrhenian, Ligurian and Adriatic seas, as well as those from the Israeli coast. Svoboda & Cornelius (1991) also reported it from Elba (Italy), Haifa (Israel) and the Catalonian coasts (Spain); Vervoort (1993) from the Israeli coasts; Gili (1986) from the Catalonian coasts and the Balearic Islands, and Morri & Bianchi (1999) from the Aegean sea. The remaining records appear to be erroneous.

Aglaophenia kirchenpaueri (Heller, 1868) (fig. 17c)

Sertularia pluma p.p. Linnaeus, 1758: 811.
Plumularia kirchenpaueri Heller, 1868: 40, 82, pl. 2 fig. 4.
Aglaophenia kirchenpaueri; Marktanner Turneretscher, 1890: 263, pl. 7 figs 9, 22; Da Cunha, 1950: 124, 131, fig. 3; Picard, 1955: 189; Patriti, 1970: 49, fig. 68; Rossi, 1961: 78-79; 1971: 29, fig. 11f-h; Svoboda, 1979: 87-90, figs 12g, 13g, 14c, 15g, 16g, pl. 5 fig. f; García Carrascosa, 1981: 309-312, pl. 28 figs d-e, pl. 44 figs a-c; Gili, 1986: 143-144, figs 4.33A-B, 4.54c; Roca, 1986: 415-419, fig. 71; Templado et al., 1986: 98; Izquierdo et al., 1986b: 62-63, fig. 11; Cornelius et al., 1990: 156, fig. 4.24; Svoboda & Cornelius, 1991: 20-22, figs 4.17c-d, 20d, 21c-d; Ramil & Vervoort, 1992: 93, fig. 23a; Altuna, 1994: 209-210; Medel & López González, 1996: 200; Ansín Agís, 1998: 79-85, fig. 3a-f.
Aglaophenia septifera Broch, 1912: 6-7, fig. 8; Stechow, 1919: 148; Picard, 1952a: 349; Riedl, 1959: 665.
Thecocarpus phyteuma García Corrales et al. 1978: 66, fig. 32.

Material.— B-8, 47 m, one detached (?) stem.— CONGRESO BANK, numerous stems on rocks, *Eudendrium racemosum*, *Aglaophenia kirchenpaueri* and *Rhodymenia ardissonei*, with corbulae.— CONG 7, 19 m, numerous stems on rock and *Cystoseira spinosa*, with corbulae (RMNH -Coel. 29591).— CONG 28, 9 m, numerous stems on *Salmacina* spec. and *Pentapora ottomulleriana*, with corbulae.— CONG 44, 3 m, c. 20 stems on *Zonaria tournefortii* and *Astroides calycularis*, with corbulae (RMNH -Coel. 29592).— CONG 46, 5 m, numerous stems on rocks, *Corallina elongata*, *Aglaophenia kirchenpaueri*, sponges, bio-concretions of *Corallina elongata* (RMNH -Coel. 29593).— CONG 70, 4.5 m, three stems on rocks and *Halopteris filicina* (RMNH -Coel. 29594).— CONG 73, 10 m, four stems on *Cystoseira spinosa* (RMNH -Coel. 29595).— CONG 74, 11 m, two stems on *Sphaerococcus coronopifolius*.— CONG 82, 5 m, several stems on rocks, sponges and *Corallina elongata* (RMNH -Coel. 29596).— CONG 83, 5 m, three stems on *Corallina elongata*; ISA 4, 10 m, several stems on rocks and *Halopteris* spec., with corbulae; ISA 12, 5 m, several stems on rocks and *Scrupocellaria* spec.— ISA 17, 3 m, numerous stems on rocks, bio-concretions of *Astroides calycularis* and *Arca* spec., with corbulae.— ISA 29, 6 m, three stems on cirripedes and bio-concretion of *Astroides calycularis*.— PISA 11, 2.3 m, numerous stems on rocks, with corbulae (RMNH -Coel. 29597).— PISA 3, 3 m, four stems on *Plocamium cartilagineum* (RMNH-Coel. 30011).— REY 17, 2 m, five stems on rocks and *Celleporina* spec., with corbulae (RMNH - Coel. 30011).

Remarks.— The present material consists of unbranched stems up to 130 mm high. The corbulae are short and provided with 5-8 pairs of ribs.

Ecology.— *Aglaophenia kirchenpaueri* is a littoral and shelf species that, in the Mediterranean, has been found from almost the tidal level (Gili, 1986; Boero & Fresi, 1986) to 120 m depth (Templado et al., 1986). Ramil & Vervoort (1992) however, reported a single hydrocladium at 373 m depth. Our material comes from 2 to 19 m depth.

Aglaophenia kirchenpaueri is able to develop on a wide range of substrata, though it seems to have a preference for hard substrata. Thus, it has been frequently reported epilithic on rocks (Isasi, 1985; Gili, 1986; Svoboda & Cornelius, 1991; Altuna, 1994) and bio-concretions (Rossi, 1961; García Carrascosa, 1981; Boero & Fresi, 1986), but also epibiontic on algae, mainly those with large thallus as for instance *Cystoseira* spp. (Rossi, 1961; Svoboda & Cornelius, 1991; Altuna, 1994), rhizomes of *Posidonia oceanica* (García Carrascosa, 1981; Boero, 1981a) and invertebrates (Stechow, 1919; Isasi, 1985; Boero & Fresi, 1986; Svoboda & Cornelius, 1991). We observed it epibiontic on algae, sponges, hydrozoans, bryozoans, polychaete tubes, cirripedes and bivalve shells, on bio-concretions and epilithic on rocks. *Aglaophenia kirchenpaueri* is in turn used as substratum by other hydroid species (cf. Isasi, 1985; Altuna, 1994; Ansín Agís, 1998). In

our material we found colonies of thirteen different hydroid species (*Filellum serratum*, *Anthohebella parasitica*, *Hebella scandens*, *Scandia gigas*, *Halecium delicatulum*, *H. lankesteri*, *H. tenellum*, *Halecium* spec., *Campanularia hincksii*, *C. volubilis*, *Clytia linearis*, *Sertularia distans* and *Antennella ansini* spec. nov.). Moreover, it was the only species with auto-epibiosis.

In the Mediterranean, fertile colonies of *A. kirchenpaueri* were found in February (Picard, 1955; Boero & Fresi, 1986), April (Picard, 1955; Gili, 1986), May (Rossi, 1961; Gili, 1986), August (Picard, 1952a; Roca, 1986), September (Picard, 1952a; Boero & Fresi, 1986) and November (Rossi, 1971; Boero & Fresi, 1986). Svoboda & Cornelius (1991) observed corbulae from June to November. We found fertile colonies in July. According to the available data it seems to be fertile throughout the year. In the nearby Atlantic it was found with corbulae in May (Ansín Agís, 1998), July and August (Isasi, 1985; Da Cunha, 1950) and September and October (Ansín Agís, 1998).

Distribution.— Boero & Bouillon (1993) ascribe to *A. kirchenpaueri* a Mediterranean-Atlantic distribution. It is widely distributed in the Mediterranean, whereas it is restricted to the Mauritanian, Lusitanian and Caledonian provinces in the eastern Atlantic, where it has been reported from Galway, on the west coast of Ireland (Svoboda & Cornelius, 1991) to the Cape Verde Islands (Svoboda, 1979).

In the Mediterranean it has been reported from the Alboran Sea (Templado et al., 1986), the Balearic Islands (Gili, 1986; Roca, 1986) and from off the Algerian (Picard, 1955), French (Stechow, 1919; Picard, 1952a), Italian (Stechow, 1923b; Rossi, 1961; Svoboda, 1979; Svoboda & Cornelius, 1991) and Spanish coasts (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986; Svoboda, 1979; Svoboda & Cornelius, 1991).

Aglaophenia lophocarpa Allman, 1877
(fig. 17d)

Aglaophenia lophocarpa Allman, 1877: 41, pl. 24 figs 1-4; Stechow, 1923b: 250; Svoboda, 1979: 82, figs 12b,e, 13e, 15e(1-3); Gili et al., 1989: 92-94, fig. 20A; Svoboda & Cornelius, 1991: 22-23, fig. 5; El Beshbeeshy, 1995a: 313-315; 1995b: 400-401, fig. 1c; Medel & López González, 1996: 200; Ramil et al., 1998: 9-10; Ansín Agís, 1998: 101-109, figs 5a-g, 6a-g, 7a-f, 8a-f.
Aglaophenia apocarpa Allman, 1877: 41, pl. 24 figs 5-9; Bedot, 1921: 43, pl. 6 figs 45-47.
?*Aglaophenia elongata* p.p. Picard, 1955: 190.
Aglaophenia elongata p.p. Gili, 1986: 146, figs 4.34e-g.
?*Aglaophenia* cf. *lophocarpa* Ramil & Vervoort, 1992: 93-94, fig. 23b-c.

Material.— CONGRESO BANK, on *Cystoseira spinosa*.— CONG 7, 19 m, numerous stems on *Cystoseira spinosa* (RMNH-Coel. 29599).— CONG 8, 10 m, a few stems on *Cystoseira spinosa* and *Cladostephus verticillatus* (RMNH-Coel. 29600).— CONG 26, 18 m, two stems on *Cystoseira spinosa*.— ISA 2, 16 m, a few stems on *Cystoseira spinosa*.— ISA 7, 15 m, on *Cystoseira spinosa*.— ISA 10, 10 m, one stem on *Cystoseira spinosa*.— ISA 22, 15 m, four stems on *Cystoseira spinosa* (RMNH-Coel. 29601).— PREY 1, 13 m, numerous stems on *Cystoseira spinosa* (RMNH-Coel. 29557).— REY 4, 27 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29602).— REY 5, 20 m, numerous stems on *Cystoseira spinosa* and *Cladostephus verticillatus* (RMNH-Coel. 30012).— REY 6, 10 m.— REY 7, 27 m, several stems on *Cystoseira spinosa* (RMNH-Coel. 29603).— REY 9, 22 m, numerous stems on *Cystoseira spinosa* (RMNH-Coel. 29604).

Remarks.— The present material consists of unbranched stems up to 40 mm high. The hydrotheca is 328-388 μm high and 172-200 μm in diameter at the rim. The

length/diameter ratio is 1.80-2.06. The lateral nematothecae reach or slightly overpass the rim of the hydrotheca.

In the smallest stems there is a basal, unsegmented part, followed by one prosegment and up to three hydrothecate internodes prior to the normal series of hydrocladiate internodes (ISA 2, ISA 7, REY 4, REY 7, CONG 8 and CONGRESO BANK). In the remaining stems there are no cauline hydrothecae.

Ecology.— *Aglaophenia lophocarpa* is an eurybathic species that, in the Mediterranean, has been found from 5 to 50 m depth (Svoboda & Cornelius, 1991); our material comes from 10 to 27 m. Outside the Mediterranean it has been reported from the tidal level to 1800 m depth (Ansín Agís, 1998). Svoboda & Cornelius (1991) observed it on hard substrata, such as rocks and coralline algae and Ansín Agís (1998) on *Sertularella* spec. In contrast, we only found it epibiontic on algae, mainly on *Cystoseira spinosa*. Ansín Agís (1998) also found it as a substratum for other species of hydroids.

Svoboda & Cornelius (1991) reported fertile colonies in the Mediterranean from April to September. In the nearby eastern Atlantic, Ansín Agís (1998) found corbulae in March, May, June, September and October.

Distribution.— Boero & Bouillon (1993) assigned to *Aglaophenia lophocarpa* a tropical-Atlantic distribution, whereas Svoboda & Cornelius (1991) pointed out that its distribution is uncertain because of past confusion with *Aglaophenia acacia*. Nevertheless, an amphi-Atlantic distribution seems reasonable, since it has been reported in the western Atlantic from the Caribbean Sea (Allman, 1877), and in the eastern Atlantic from off the Azores (Svoboda, 1979; Ansín Agís, 1998), Josephine Bank (Ramil et al., 1998), Madeira, Selvagens Archipelago, the Canary Islands, Mauritania and the Cape Verde Islands (Ansín Agís, 1998), off Guinea-Bissau (Gili et al., 1989) and the Mediterranean, particularly from off the Egyptian (El Beshbeeshy, 1995a; 1995b), French (Svoboda, 1979), Italian (Svoboda, 1979; Svoboda & Cornelius, 1991), Spanish (Svoboda & Cornelius, 1991) and, probably, Algerian coasts (Picard, 1955).

Aglaophenia octodonta (Heller, 1868)
(fig. 17e)

Plumularia octodonta Heller, 1868: 40, pl. 2 fig. 3.
Aglaophenia helleri plus var. Marktanner Turneretscher, 1890: 271, pl. 7 figs 3, 13-16; Stechow, 1919: 144.
Aglaophenia filicula; Kühn, 1909: 452, fig. Ua, pl. 21 figs 64-69, pl. 22 figs 40-74.
Aglaophenia adriatica Babic, 1911: 541, figs 1-2.
Aglaophenia pluma var. *helleri*; Bedot, 1919: 265.
Aglaophenia octodonta; Stechow, 1923b: 247-248; Picard, 1952a: 344; 1955: 191; Rossi, 1961: 78; Svoboda, 1979: 65, figs 12a, 13a, 15a, 16a, pl. 5c; Roca, 1986: 419-425, fig. 72; Gili, 1986: 148-149, fig. 4.33c-e; Svoboda & Cornelius, 1991: 23-25, fig. 6; Medel & López González, 1996: 200; Ansín Agís, 1998: 119-125, figs 9a-h, 10a-c; Morri & Bianchi, 1999: 286.
Aglaophenia pluma f. *helleri*; Broch, 1933: 50, fig. 18c; Da Cunha, 1944: 37, fig. 16b.
Aglaophenia pluma f. *octodonta*; Riedl, 1959: 662.
Aglaophenia tubulifera; García Carrascosa, 1981: 305-309, pl. 28 figs a-c, pl. 43 figs a-b.

Material.— A-11, 46 m, one stem 10 mm high, without polyps (detached ?).— ISA 3, 12 m.— ISA 13, 0 m, numerous stems on *Cystoseira tamariscifolia*, *Mytilus* spec. and *Turbicellepora* spec., with corbulae (RMNH-Coel. 29605).— ISA 14, 0.3 m, two stems on *Laurencia* spec.— ISA 30, 15 m, four stems on

Halopteris filicina.— PISA 15, 1 m, numerous stems on rocks and *Amathia* spec. (RMNH-Coel. 29606).— PISA 17, 1 m, a few stems on *Peyssonnelia coriacea*.— PISA 22, 2 m, numerous stems on rocks, *Cladophora lehmanniana*, *Corallina elongata*, *Pterocladia capillacea*, cirripedes and bivalves (RMNH-Coel. 29607).— REY 13, 0 m, several stems on *Corallina elongata* (RMNH-Coel. 29608).— REY 14, 0 m, four stems on *Corallina elongata* and *Valonia utricularis* (RMNH-Coel. 29609).

Remarks.— The present material consists of unbranched stems up to 25 mm high. The hydrotheca is 228-284 μm high and 164-204 μm in diameter at the rim. The length/diameter ratio is 1.23-1.55. The lateral nematothecae usually do not reach the rim of the hydrotheca.

Ecology.— *Aglaophenia octodonta* seems to be a littoral species, having been found from the tidal level (Boero & Fresi, 1986) to 30 m depth (Stechow, 1919); our material comes from the tidal level to 15 m depth. Outside the Mediterranean Ansín Agís (1998) reported it from the tidal level to 45 m depth. At the Chafarinas *A. octodonta* was mainly found epibiontic on algae (especially on *Corallina elongata*), but also on bryozoans, cirripedes and bivalves and epilithic. In the literature it has been reported from those substrata, but also from bio-concretions of *Vermetus* spec. (García Carrascosa, 1981), sponges (Boero & Fresi, 1986; Ramil, 1988; Svoboda & Cornelius, 1991; Ansín Agís, 1998), colonial ascidians (Ramil, 1988) and scales of the rhizome of *Posidonia oceanica* (Svoboda & Cornelius, 1991). García Carrascosa (1981) pointed out that *A. octodonta* has a preference for hard substrata, such as bio-concretions, molluscs shells and rocks. *Aglaophenia octodonta* may be used in turn as substratum by other hydroid species (cf. Roca, 1986; Ansín Agís, 1998); we observed colonies of *Clytia linearis*, *C. gracilis* and *Campanularia hincksii*.

In the Mediterranean *A. octodonta* seems to be fertile throughout the year: Svoboda & Cornelius (1991) found colonies with corbulae all the year round, with a maximum in February-March; Boero & Fresi (1986) between March and November; Roca (1986) between April and June; Stechow (1919) in March-April; Picard (1952a) in August-September; and Gili (1986) in May. Our fertile colonies were collected in July. Outside the Mediterranean Ramil (1988) found colonies with corbulae in March, April, June, September and October, Altuna (1994) in March, May and June and Ansín Agís (1998) in March, May-June, September and November.

Distribution.— Boero & Bouillon (1993) credit *Aglaophenia octodonta* with a Mediterranean-Atlantic distribution, being present in the Mediterranean and the nearby north-eastern Atlantic (Svoboda & Cornelius, 1991). Outside the Mediterranean it has been reported from off Morocco (Svoboda & Cornelius, 1991), Mauritania, the Canary Islands, Madeira and the Azores (Ansín Agís, 1998), Portugal (Da Cunha, 1944; Svoboda & Cornelius, 1991), north coast of Spain (Ramil, 1988; Altuna, 1994) and north-west coast of France (Teissier, 1965).

In the Mediterranean it has been recorded from the Adriatic (Broch, 1933; Riedl, 1959; Svoboda, 1979; Svoboda & Cornelius, 1991), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986) and from off the Algerian (Picard, 1955), French (Stechow, 1919; Picard, 1952a), Italian (Rossi, 1971; Boero, 1981a; Boero & Fresi, 1986; Svoboda & Cornelius, 1991), Maltese (Svoboda & Cornelius, 1991), Spanish (García Carrascosa, 1981; Gili, 1986; Svoboda & Cornelius, 1991) and Turkish coasts (Svoboda & Cornelius, 1991).

Aglaophenia picardi Svoboda, 1979
(fig. 17f)

? *Aglaophenia* sp. Picard, 1955: 190.
Aglaophenia pluma f. *typica*; Riedl, 1959: 660.
Aglaophenia pluma var. *teissieri* Svoboda, 1970: 676.
Aglaophenia picardi Svoboda 1979: 70, figs 12b, 13b, 15b, 16b; Boero, 1981a: 182, 185; Isasi, 1985: 95, fig. 30; Svoboda & Cornelius, 1991: 29-30, fig. 11; Ramil & Vervoort, 1992: 95-97, fig. 23d; Boero & Bouillon, 1993: 263; Vervoort, 1993: 458; Altuna, 1994: 215-218, pl. 39 figs a-e; Medel & López González, 1996: 200; Ansín Agís, 1998: 139-142, fig. 12a-d; Morri & Bianchi, 1999: 287.

Material.— CONG 2, 1 m, numerous stems on rocks, *Flabellia petiolata*, *Corallina elongata*, *Peyssonnelia squamaria* and sponges (RMNH-Coel. 29610).— CONG 31, 2 m, two stems on pebbles (RMNH-Coel. 29611).— CONG 53, 17.5 m, single stem on *Cystoseira spinosa* (RMNH-Coel. 29612).— CONG 56, 15 m, single stem on *Acrosorium uncinatum*.— CONG 70, 4.5 m, two stems on rocks.— CONG 75, 12 m, single stem on *Acrosorium uncinatum*.— CONG 77, 20.5 m, one stem.— CONG 81, 8 m.— ISA 17, 3 m, four stems on rocks.— PCONG 7, 0.5 m, numerous stems on *Peyssonnelia squamaria*, incrusting calcareous algae and sponges, with corbulae (RMNH-Coel. 29613).— PISA 11, 2.3 m, two stems on rocks (RMNH-Coel. 29614).— PISA 24, 2 m, several colonies on rocks, incrusting calcareous algae and bryozoans (RMNH-Coel. 29615).— REY 17, 2 m.— REY 19, 2 m, two stems on pebbles.— REY 33, 4 m, a few stems on scales of *Posidonia oceanica* (RMNH-Coel. 29616).

Remarks.— The present material consists of unbranched stems without prosegment up to 40 mm high. The hydrotheca is 248-320 μm high and 140-160 μm in diameter at the rim. The length/diameter ratio is 1.58-2.17. The lateral nematothecae reach the rim of the hydrotheca.

Ecology.— *Aglaophenia picardi* seems to be a littoral species, having been found from the tidal level down to 45 m depth (Svoboda & Cornelius, 1991); our material was collected from 0.5 to 21 m. However, Ramil & Vervoort (1992) reported a 5 mm stem fragment, in bad condition, at 580 m depth in the Strait of Gibraltar.

Aglaophenia picardi has been reported epibiontic on algae (Boero & Fresi, 1986; Svoboda & Cornelius, 1991; Altuna, 1994; Morri & Bianchi, 1999), rhizomes of *Posidonia oceanica* (Boero, 1981a; Svoboda & Cornelius, 1991), cirripedes (Boero & Fresi, 1986; Svoboda & Cornelius, 1991; Altuna, 1994), molluscs (Isasi, 1985; Svoboda & Cornelius, 1991), sponges (Boero & Fresi, 1986; Svoboda & Cornelius, 1991; Vervoort, 1993; Altuna, 1994) and bryozoans and polychaete tubes (Altuna, 1994), as well as epilithic on rocks (Svoboda & Cornelius, 1991). We found it epibiontic on algae, scales of *Posidonia oceanica*, bryozoans and sponges and epilithic on rocks and pebbles. *Aglaophenia picardi* is in turn used as substratum by other hydroid species (cf. Vervoort, 1993); we observed colonies of *Filellum* spec., *Anthohebella parasitica*, *Halopteris diaphana*, *Monotheca obliqua* and *Campanularia volubilis*.

In the Mediterranean *Aglaophenia picardi* seems to be fertile throughout the year. Svoboda & Cornelius (1991) found fertile colonies from April to November and Boero & Fresi (1986) from September to March. In our material fertile colonies were collected in July. Outside the Mediterranean Isasi (1985) reported fertile colonies in July and Altuna (1994), who studied material throughout the year, found colonies with corbulae in May, June, September, October and November, being absent from December to April, so that the fertile period seems to be throughout the year with the exception of winter.

Distribution.— Boero & Bouillon (1993) considered *Aglaophenia picardi* to be endemic to the Mediterranean. However, it is also present in the nearby north-eastern Atlantic, being distributed in the Mauritanian and Lusitanian provinces. Outside the Mediterranean, it has been reported from the Cape Verde Islands (Svoboda, 1979), the Canary Islands (Svoboda & Cornelius, 1991; Ansín Agís, 1998), Madeira (Ansín Agís, 1998) and the Spanish Basque coast (Isasi, 1985; Altuna, 1994).

In the Mediterranean, it is known from the Aegean Sea (Morri & Bianchi, 1999) and off the Israeli (Svoboda & Cornelius, 1991; Vervoort, 1993), Italian (Boero, 1981a; Svoboda & Cornelius, 1991), Maltese and Yugoslavian coasts (Svoboda & Cornelius, 1991), as well as the Turkish coasts of the Black Sea (Svoboda & Cornelius, 1991).

Aglaophenia pluma (Linnaeus, 1758)
(fig. 17g)

Sertularia pluma Linnaeus, 1758: 811.

Plumularia cristata Lamarck, 1816: 125; Johnston, 1838: 143-145, pl. 19 figs 1-3, pl. 20 fig. 1; 1847: 92-94, pl. 23 figs 1-3.

Aglaophenia cristata; McCrady, 1857: 202-203.

Plumularia pluma var. *dichotoma*; M. Sars, 1857: 164.

Aglaophenia pluma p.p. Hincks, 1868: 286-288, fig. 37, pl. 63 fig. 1; Vervoort, 1946b: 190, figs 80-81.

Aglaophenia dichotoma p.p. Kirchenpauer, 1872: 13, 25, 30, pls 1-3 fig 7; Broch, 1912: 6, fig. 6; Stechow, 1919: 144.

Aglaophenia pluma; Svoboda, 1979: 98-103, figs 15j(1-4); Isasi, 1985: 97, fig. 31; Ramil, 1988: 455-460; Svoboda & Cornelius, 1991: 30-34, figs 10f, 12, 13a-g, 19a-b, 24a-b; Altuna, 1994: 218-220; Medel & López González, 1996: 200; Ansín Agís, 1998: 145-153, fig. 13a-i.

Material.— CONG 7, 19 m, numerous stems on *Cystoseira spinosa*, with corbulae (RMNH-Coel. 29617).— ISA 19, 20 m, numerous stems on *Ellisella paraplexauroides*, with corbulae (RMNH-Coel. 29618).— REY 5, 20 m, numerous stems on rocks, *Cystoseira spinosa* and *Cladostephus verticillatus*, with corbulae.— REY 6, 10 m, numerous stems on *Cystoseira spinosa*, with corbulae; REY 17, 2 m, a few stems on rocks and *Schizobrachiella sanguinea*.

Remarks.— The present material consists of dichotomously branched stems several centimetres high. The branches originate from a bifid, hydrocladiate, cauline internode, and consist of a continuation of the previous sequence of cauline, hydrocladiate internodes. The hydrotheca is 308-344 μm high and 180-192 μm in diameter at the rim. The length/diameter ratio is 1.7-1.8. The lateral nematothecae reach the hydrothecal rim.

The existing confusion between *Aglaophenia pluma* and other species, such as *A. tubiformis* or *A. octodonta* renders the data previous to Svoboda's (1979) study useless.

Ecology.— *Aglaophenia pluma* is a littoral species, having been found from 0.5 to 20 m depth (Svoboda & Cornelius, 1991); our material comes from 2 to 20 m. Outside the Mediterranean Ansín Agís (1998) reported it from the tidal level to 70 m depth. According to Svoboda & Cornelius (1991) it has frequently been found epibiontic on *Halidrys siliquosa* in the Atlantic, but also occurs on *Sargassum* spp. and stipes of *Laminaria* spp., as well as on rocks and gravel. Ansín Agís (1998) found it on rocks, algae, *Zostera* spec. and cirripedes and Altuna (1994) pointed out that it has a certain preference for *Cystoseira* spp. We found it mainly epibiontic on algae (especially on *Cystoseira spinosa*), but also on anthozoans and bryozoans and even epilithic. *Aglaophenia*

pluma is used in turn as substratum by other hydroid species (cf. Ansín Agís, 1998); we observed colonies of *Filellum* spec., *Scandia gigas*, *Halecium lankesteri*, *H. tenellum*, *Halecium* spec., *Kirchenpaueria pinnata*, *Dynamena disticha*, *Sertularia distans*, *Campanularia hincksii*, *C. volubilis* and *Clytia linearis*.

We did not find records of fertile colonies from the Mediterranean. Outside that area Svoboda (1979) found colonies with corbulae off Great Britain and NW of France between May and October; Teissier (1965), off Roscoff, between April and September, though Svoboda & Cornelius (1991) indicated that part of those data may relate to *A. tubiformis*, also present in that area. Ramil (1988) found fertile colonies in April, July, September and November, Altuna (1994) between April and August, and in October and Ansín Agís (1998) in May and June and from August to October. At the Chafarinas colonies with corbulae were collected in July. It seems to be fertile throughout the year, except in winter, though according to Svoboda & Cornelius (1991) there are only few winter records that support that conclusion.

Distribution.— Boero & Bouillon (1993) ascribe to *Aglaophenia pluma* a cosmopolitan distribution. Reliable records, however, are only known from the north-eastern Atlantic and the Mediterranean (Svoboda & Cornelius, 1991). In the Atlantic its northern limit is situated at Great Britain, where it seems to be present around the Irish coasts and from the south of England to the west coast of Scotland, reaching perhaps as far as the Shetland Islands. In the eastern Atlantic its limit seems to be situated at the northern coast of France (Svoboda & Cornelius, 1991). It has also been reported from the north-western coasts of France (Teissier, 1965; Svoboda & Cornelius, 1991), northern coast of Spain (García Corrales et al., 1978; Isasi, 1985; Ramil, 1988; Svoboda & Cornelius, 1991), Portugal (Svoboda & Cornelius, 1991), the Azores, Madeira, Selvagens Archipelago and the Canary Islands (Ansín Agís, 1998), and Morocco (Patriti, 1970; Svoboda & Cornelius, 1991).

In the Mediterranean it has been reported from off Málaga and Almería in Spain (Svoboda & Cornelius, 1991) and Sette, in France (Stechow, 1919; Svoboda & Cornelius, 1991). There probably are more records, particularly from the Spanish coast. García Carrascosa (1981) recorded *Aglaophenia pluma* and *A. dichotoma* from several localities at the Spanish Mediterranean coast and, though confusion with *A. tubiformis* seems likely, *A. pluma* was probably present in his material. Gili (1986) recorded *A. pluma* from the Catalonian coast of Spain, but inclusion of *A. tubiformis* seems likely since the author himself indicated the presence of symbiotic zooxanthellae. Finally, Roca (1986) recorded *A. pluma* from the Balearic Islands, but she did not consider the presence of zooxanthellae a reliable character; in her material both *A. pluma* and *A. tubiformis* may have been present.

Aglaophenia tubiformis Marktanner Turneretscher, 1890
(fig. 17h)

Plumularia pluma var. *dichotoma* p.p. M. Sars, 1857: 164.
Plumularia cristata; Heller, 1868: 39, pl. 2 fig. 1.
Aglaophenia pluma; Graeffe, 1884: 23; Marktanner Turneretscher, 1890: 269-270, pl. 7 figs 1-2, 18.
Aglaophenia tubiformis plus var. Marktanner Turneretscher, 1890: 269-270, pl. 7 figs 4-6, 17.
Aglaophenia tubiformis; Schneider, 1897: 487; Neppi, 1920: 11; 1922: 82; Svoboda, 1979: 90, figs 12h, 13h, 14d, 15h, 16h, pl. 5(a-b), 6, 8, 9a(1-2); Boero, 1981a: 182; Ramil, 1988: 461-466; Svoboda & Cor-

nelius, 1991: 34-36, figs 14, 25a; Boero & Bouillon, 1993: 263; Vervoort, 1993: 548-549; Medel & López González, 1996: 200; Ramil et al., 1998: 10; Morri & Bianchi, 1999: 287.
Aglaophenia elongata p.p. Broch, 1912: 32, fig. 9, 34, fig. 10.
Aglaophenia pluma p.p. Broch, 1912: 32, fig. 9, 34, fig.10; Gili, 1986: 147-148, figs 4.35d-f, 4.57e.
Aglaophenia nanella Stechow, 1919: 147.
Aglaophenia pluma var. *dichotoma*; Neppi, 1920: 10-11, pl. 1 figs 7-9.
Aglaophenia tubulifera; Stechow, 1923b: 249.
Aglaophenia pluma f. *typica*; Broch, 1933: 44, fig. 18b.
Aglaophenia dichotoma f. *gracilis*; Broch, 1933: 55.
Aglaophenia elongata; Broch, 1933: 56

Material.— CONGRESO BANK, numerous stems on *Cystoseira tamariscifolia*, *Sargassum* spec. and *Eudendrium racemosum*, with corbulae (RMNH-Coel. 29619).— CONG 3, 2 m, a few stems on *Halopteris scoparia* (RMNH-Coel. 29620).— CONG 4, 2 m, two stems on *Sargassum* spec.— CONG 7, 19 m, a few stems on *Cystoseira spinosa*.— CONG 13, 2 m, three stems on *Cladostephus verticillatus*.— CONG 15, 0.3 m, numerous stems on *Cystoseira tamariscifolia* (RMNH-Coel. 29621).— CONG 17, 2 m, three stems on *Codium bursa* (RMNH-Coel. 30014).— CONG 18, 4.5 m, several stems on *Cystoseira* spec., with corbulae (RMNH-Coel. 29622).— CONG 21, 8 m, single stem on *Halopteris scoparia*.— CONG 27, 13 m, two stems on *Cladostephus verticillatus*.— CONG 32, 7 m, a single stem on *Halopteris scoparia*.— CONG 35, 2 m, four stems on *Sargassum* spec. (RMNH-Coel. 29623).— CONG 45, 3 m, three stems on *Halopteris scoparia* (RMNH-Coel. 29624).— CONG 46, 5 m, two stems on *Corallina elongata*.— CONG 47, 0 m, a few stems on *Cladostephus verticillatus*.— CONG 57, 10.5 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29625).— CONG 58, 9 m, five stems on *Padina pavonia* (RMNH-Coel. 29626).— CONG 63, 2 m, single stem on *Cladostephus verticillatus*.— CONG 69, 2.5 m, two stems on *Padina pavonia*.— CONG 75, 12 m, single stem on leaves of *Posidonia oceanica*.— CONG 76, 13 m, seven stems on *Cystoseira spinosa* (RMNH-Coel. 29627).— CONG 81, 8 m, three stems on *Corallina elongata*.— CONG 83, 5 m, several stems on *Codium vermilara* and *Halopteris filicina* (RMNH-Coel. 29628).— ISA 3, 12 m, four stems on *Sargassum* spec.— ISA 5, 35 m, two stems.— ISA 9, 12 m, a single stem.— ISA 10, 10 m, single stem.— PISA 1, 2.5 m, numerous stems on rocks and incrusting calcareous algae, with corbulae (RMNH-Coel. 29629).— PISA 5, 2 m, numerous stems on rocks and *Padina pavonia* (RMNH-Coel. 29630).— PISA 6, 2.7 m, numerous stems on incrusting calcareous algae (RMNH-Coel. 30013).— PISA 12, 2 m, numerous stems on rocks and incrusting calcareous algae (RMNH-Coel. 29631).— PISA 16, 2 m, numerous stems on *Padina pavonia*, with corbulae (RMNH-Coel. 29632).— PISA 17, 1 m, numerous stems on *Peyssonnelia coriacea* and bio-concretion of *Astroides calycularis*, with corbulae (RMNH-Coel. 29633).— PISA 20, 2 m, numerous stems on *Cystoseira* spec. and sponges, with corbulae (RMNH-Coel. 29634).— REY 11, 6 m, three stems on *Halopteris scoparia* (RMNH-Coel. 29635).— REY 19, 2 m, several stems on *Cladostephus verticillatus* (RMNH-Coel. 29636).— REY 20, 3 m, single stem.— REY 22, 0 m, single stem on *Sargassum vulgare*.— REY 24, 0 m, two stems on *Pterocladia capillacea*.— REY 28, 2 m, single stem on *Halopteris* spec.

Remarks.— The present material consists of unbranched stems up to 70 mm high. The hydrotheca is 284-360 μm high and 152-184 mm in diameter at the rim. The lateral nematothecae reach the rim of the hydrotheca. In all the material considered to be this species the coenosarc has many endosymbiotic zooxanthellae.

In small stems we have observed up to five cauline hydrothecae following the prosegment. In the material from CONG 57 it is possible to follow the regression sequence of those cauline hydrothecae.

In the material from PISA 20 there are branched stems. The branches originates from normal cauline internodes, but are deprived of a hydrocladium. The branches consist of complete cormoids with a short proximal part, 1-2 prosegments and the normal series of hydrocladiate internodes.

Ecology.— *Aglaophenia tubiformis* is a littoral species, with its lowest bathymetrical limit conditioned by the light requirements of its symbiotic zooxanthellae. It has been recorded from the tidal level down to 40 m depth, or even deeper in the transparent waters of the middle Adriatic and near Greece (Svoboda & Cornelius, 1991). Our material originates from the tidal level to 35 m depth. Outside the Mediterranean Ramil et al. (1998) reported it form 54 to 62 m depth. Svoboda & Cornelius (1991) indicated that in the Adriatic, *A. tubiformis* is preferably found epibiontic on *Cystoseira* spec. and *Sargassum* spec., whereas in the western Mediterranean it is very often found on rocks. Vervoort (1993) and Morri & Bianchi (1999) also found it on algae, but Boero & Fresi (1986) observed it growing on rocks, bio-concretions, algae, sponges, bryozoans and cirripedes. Outside the Mediterranean Svoboda & Cornelius (1991) found it frequently on *Halidrys* spec. in Galicia and Britain and on *Cystoseira* spec. off the Moroccan coast. Ramil (1988) found it on rocks and algae. In our material it occurs preferably epibiontic on seaweeds (>82% of the occasions). Occasionally, it was also observed epibiontic on leaves of *Posidonia oceanica*, sponges and hydrozoans, on bio-concretions and epilithic. *Aglaophenia tubiformis* in turn is used as substratum by other species of hydroids (*Antennella ansini* spec. nov. and *Clytia paulensis*).

In the Mediterranean *A. tubiformis* has been found with corbulae from February to October (Svoboda, 1979), from February to May and in September (Boero & Fresi, 1986) and in March (Vervoort, 1993). Our fertile material was collected in July. It is probably fertile during most of the year, with the exception of winter. Outside the Mediterranean Ramil (1988) reported corbulae from April to September and Ramil et al. (1998) in October.

Distribution.— According to Svoboda & Cornelius (1991) *Aglaophenia tubiformis* is present in the Mediterranean, with the exception of the Black Sea, and the nearby eastern Atlantic, being known from Morocco to Brittany. Consequently it is present in the Mediterranean, Mauritanian and Lusitanian provinces. In the eastern Atlantic it has been reported from off the north-western coast of France (Svoboda & Cornelius, 1991), north-western coast of Spain (Ramil, 1988; Svoboda & Cornelius, 1991), the coasts of Portugal and Morocco (Svoboda & Cornelius, 1991), and from Gorringe Bank (Ramil et al., 1998).

In the Mediterranean Svoboda & Cornelius (1991) reported it from off the Greek, Italian, Maltese, Spanish and Bosnian coasts. It is also known from the Israeli coasts (Svoboda & Cornelius, 1991; Vervoort, 1993) and the Aegean Sea (Morri & Bianchi, 1999). Spanish localities are specified by García Carrascosa (1981), Gili (1986) and Roca (1986).

Family Halopteridae Millard, 1962

Genus *Antennella* Allman, 1877

Antennella ansini spec. nov.
(fig. 18a-d)

?*Halopteris glutinosa*; García Corrales et al., 1978: 40, fig. 17; Izquierdo et al., 1986b: 50, fig. 1.
Antennella siliquosa p.p. García Carrascosa, 1981: 255-258, pl. 23 figs a-e, pl. 40 figs a-b.
Antennella campanulaformis; Ansín Agís, 1998: 313-317, figs 44a-g, 45a-d.

Material.— B-11, 42 m, a few stems on *Sertularella polyzonias*.— CONGRESO BANK, a few stems on *Cystoseira spinosa*, with gonothecae.— CONG 7, 19 m, numerous stems on *Cystoseira spinosa*, *Halopteris*

filicina, *Aglaozonia chilosa*, *Acrosorium uncinatum* and sponges, with gonothecae (RMNH-Coel. 29637).— CONG 8, 10 m, numerous stems on *Halopteris scoparia*, *Cystoseira spinosa*, *Padina pavonia*, *Cladostephus verticillatus*, *Sargassum* spec. and *Dictyota dichotoma* var. *intricata*, with gonothecae (holotype, RMNH-Coel. 29638).— CONG 26, 18 m, a few stems on *Cystoseira spinosa*, *Halopteris filicina* and *Amphiroa cryptarthodia*, with gonothecae (RMNH-Coel. 29639).— CONG 27, 13 m, numerous stems on *Cladostephus verticillatus*, *Sargassum* spec., *Halopteris filicina* and *Corallina elongata*, with gonothecae (RMNH-Coel. 29640).— CONG 28, 9 m, several stems on *Halopteris filicina*, *Plocamium cartilagineum*, *Aglaophenia kirchenpaueri* and bryozoans, with gonothecae (RMNH-Coel. 29641).— CONG 33, 9 m, a few stems on *Halopteris filicina*, *Peyssonnelia rubra*, *Flabellia petiolata* and *Acrosorium uncinatum*.— CONG 35, 2 m, a few stems on *Halopteris filicina* and *Acrosorium* spec. (RMNH-Coel. 29642).— CONG 42, 8 m, a few stems on *Flabellia petiolata*, *Acrosorium uncinatum*, *Griffithsia* spec. and polychaetes, with gonothecae (RMNH-Coel. 29643).— CONG 45, 3 m, a few stems on *Padina pavonia*.— CONG 46, 5 m, a few stems on *Flabellia petiolata*, *Corallina elongata*, *Acrosorium uncinatum* and *Salmacina* spec., with gonothecae (RMNH-Coel. 29644).— CONG 53, 17.5 m, numerous stems on *Cystoseira spinosa*, *Halopteris filicina*, *Dictyota dichotoma* var. *intricata*, *Rhodophyllis divaricata* and incrusting calcareous algae, with gonothecae (RMNH-Coel. 29645).— CONG 54, 16.8 m, a few stems on *Halopteris filicina* and *Acrosorium uncinatum* (RMNH-Coel. 29646).— CONG 55, 15.5 m, numerous stems on *Sphaerococcus coronopifolius*, *Padina pavonia* and *Caberea boryi*.— CONG 57, 10.5 m, numerous stems on *Cystoseira spinosa*, *Padina pavonia*, *Halopteris* spec., *Acrosorium uncinatum* and sponges (RMNH-Coel. 29647).— CONG 60, 8.5 m, two stems on *Acrosorium uncinatum*.— CONG 61, 4 m, a few stems on *Peyssonnelia rubra*.— CONG 69, 2.5 m, seven stems on *Padina pavonia*.— CONG 70, 4.5 m, numerous stems on rock, *Halopteris filicina*, *Codium vermilara*, *Peyssonnelia rubra*, *Sargassum* spec., *Acrosorium uncinatum*, *Caberea boryi*, *Salmacina* spec. and sponges, with gonothecae (RMNH-Coel. 29648).— CONG 71, 5 m, a few stems on pebbles and *Halopteris scoparia*.— CONG 72, 7 m, two stems on *Halopteris scoparia*.— CONG 74, 11 m, a few stems on *Halopteris scoparia*.— CONG 75, 12 m, a few stems on *Acrosorium uncinatum* and *Pentapora* spec. (RMNH-Coel. 29649).— CONG 76, 13 m, a few stems on *Cystoseira spinosa*, *Acrosorium uncinatum* and *Dictyota* spec. (RMNH-Coel. 29650).— CONG 77, 20.5 m, four stems on algae.— CONG 78, 18 m, two stems.— CONG 81, 8 m, a few stems on *Corallina elongata* and *Sargassum* spec.— CONG 82, 5 m, several stems on *Flabellia petiolata*, *Halopteris filicina*, *Acrosorium uncinatum* and bio-concretion of *Astroides calycularis* (RMNH-Coel. 29651).— CONG 83, 5 m, numerous stems on *Amphiroa rigida*, *Halopteris filicina*, *Acrosorium uncinatum*, *Corallina elongata* and *Codium vermilara* (RMNH-Coel. 29652).— C-4, 34 m, a single stem on remains of bivalves.— ISA 2, 16 m, numerous stems on *Cystoseira spinosa*, *Dictyota linearis*, *Acrosorium uncinatum* and *Serpula vermicularis*, with gonothecae (RMNH-Coel. 29653).— ISA 3, 12 m, three stems on *Cystoseira spinosa*.— ISA 7, 15 m, on *Cystoseira spinosa* and *Padina pavonia*.— ISA 10, 10 m, a single stem on *Sargassum* spec.— ISA 12, 5 m, numerous stems on *Plocamium cartilagineum*, *Acrosorium uncinatum*, *Halopteris filicina*, *Aglaophenia kirchenpaueri*, *Celleporina* spec., *Schizobrachiella* spec. and sponges, with gonothecae (RMNH-Coel. 29654).— ISA 17, 3 m, a few stems on *Corallina elongata*.— ISA 22, 15 m, a few stems on *Cystoseira spinosa* and *Halopteris filicina*, with gonothecae.— ISA 24, 10 m, a few stems on *Cystoseira spinosa* and *Halopteris scoparia* (RMNH-Coel. 29655).— ISA 25, 10 m, a few stems on *Peyssonnelia rubra*, *Caberea boryi* and bryozoans.— ISA 27, 25 m, a few stems.— ISA 29, 6 m, a few stems.— ISA 30, 15 m, numerous stems on *Halopteris filicina*, *Plocamium cartilagineum*, *Pentapora fascialis* and *Serpula vermicularis*, with gonothecae (RMNH-Coel. 29656).— PCONG 2, 3 m, five stems on *Rhodymenia ardissonei* and *Acrosorium uncinatum*.— PISA 3, 3 m, numerous stems on *Plocamium cartilagineum* and cirripedes, with gonothecae (RMNH-Coel. 29657).— PISA 14, 3.3 m, several stems on *Sertularella mediterranea* (RMNH-Coel. 29658).— PISA 17, 1 m, numerous stems on *Peyssonnelia coriacea*, *Valonia utricularis*, *Cladophora lehmanniana* and *Aglaophenia octodonta*, with gonothecae (RMNH-Coel. 29659).— PISA 20, 2 m, numerous stems on *Cystoseira* spec., *Valonia utricularis* and *Aglaophenia tubiformis*, with gonothecae (RMNH-Coel. 29660).— PISA 23, 3 m, numerous stems on *Corallina granifera*, *Rhodophyllis divaricata*, *Halopteris filicina*, *Plocamium cartilagineum*, *Corallina elongata*, *Cladophora lehmanniana*, *Eudendrium racemosum*, *Halopteris diaphana* and *Caberea boryi*, with gonothecae (RMNH-Coel. 29661).— PISA 26, 1.5 m, a few stems on *Bryopsis adriatica* and *Eudendrium racemosum*.— REY 5, 20 m, four stems on *Cystoseira spinosa*.— REY 6, 10 m, a few stems on *Cystoseira spinosa* and *Halopteris scoparia* (RMNH-Coel.

29662).— REY 9, 22 m, a few stems on *Cystoseira spinosa*.— REY 10, 16 m, numerous stems on *Halopteris filicina* and *Dictyota dichotoma*, with gonothecae (RMNH-Coel. 29663).— REY 17, 2 m, a few stems on *Peyssonnelia coriacea*, *Eudendrium racemosum*, *Schizobrachiella sanguinea* and *Pentapora fascialis* (RMNH-Coel. 29664). With the exception of the holotype (Cong 8) all this material represents paratypes.

Type-locality: Chafarinas Islands, Mediterranean Sea, Congreso Island, La Sangre, 10 m depth, on algae.

Description (based on all material).— Colonies with stolonal hydrorhiza giving rise to small unbranched stems inserting on short hydrorhizal apophyses. Proximal part of stem composed of one or several ahydrothecate internodes bearing up to three, approximately median nematothecae at different level. A short athecate internode may be present just above hydrorhizal apophysis. Those internodes separated by transverse nodes. Remaining stem composed of a series of alternately arranged hydrothecate and ahydrothecate internodes. Stems with up to 12 hydrothecae observed. Separation between basal part of hydrothecate internode and distal part of ahydrothecate internode by oblique nodes; that between distal part of hydrothecate internode and basal part of ahydrothecate internode by transverse nodes.

Hydrothecate internodes provided with one hydrotheca and three nematothecae: one mesial inferior and two lateral. Mesial inferior nematotheca short, without apophysis, not reaching basal part of hydrotheca; adcauline side of distal chamber deeply scooped. Lateral nematothecae resting on short apophyses originating just below separation between adcauline hydrothecal wall and internode. Lateral nematothecae short, usually reaching halfway free adcauline hydrothecal wall; pedicel short, distal part rounded with deeply scooped inner and outer walls. Distal node of hydrothecate internode situated at the level where adcauline hydrothecal wall becomes free.

Ahydrothecate internodes long, longer than hydrothecate ones; length variable and with a single distal nematotheca, shaped like mesial inferior nematothecae of hydrothecate internodes. All nematothecae two-chambered.

Hydrothecae abcaudally directed, cup-shaped, slightly widening at their aperture. Adcauline hydrothecal wall free for approximately half its length. Abcauline wall slightly convex, sometimes slightly concave at distal part. Free part of adcauline hydrothecal wall slightly concave. Hydrothecal aperture circular; rim slightly laterally depressed.

Gonothecae usually on basal hydrothecate internodes, inserted on short apophyses situated at the antero-lateral side of internode, between hydrothecal base and mesial inferior nematotheca. Up to two gonothecae per stem present. Male gonotheca fusiform, basally curved, provided with a short basal segment and one or two nematothecae. Gonothecal aperture circular and situated at distal, truncated part of gonotheca (ISA 12). In the material from PISA 17 and PISA 20 female gonothecae present. Gonothecae inserted on short apophyses and provided with a short basal segment. Gonotheca strongly flattened, being wide in frontal and thin in lateral view, carrying one or two nematothecae. Gonothecal aperture distinctly larger than that of male gonothecae.

Table 1. Measurements (in μm) of *Antennella ansini* spec. nov. and *A. campanulaformis* (Mulder & Trebilcock, 1909).

	Chafarinas Is. (*A. ansini* spec. nov.)	Ansín Agis (1998) (*A. campanulaformis*)	Schuchert (1997) (*A. campanulaformis*) Australia	Schuchert (1997) (*A. campanulaformis*) Seychelles	Watson (1973) (*A. campanulaformis*)
Hydrotheca					
Height	172-216	-	-	-	-
Length of abcauline wall	164-216	150-210	180-250	150-210	200-220
Lenght of free adcauline wall	112-128	110-125	170-200	90-120	210-250
Diameter at aperture	192-208	170-200	280	210-250	210-230
Length of lateral nematothecae	48-60	-	-	-	80-100
Length of ahydrothecate internodes	381-600	260-400	290-380	330-450	280-310
Length of hydrothecate internodes	310-320	280-360	330-450	380-390	390-450
Female gonothecae					
Length	356-616	600	600-700	-	640-660
Width	360-448	500-560	600-700	-	-
Male gonothecae					
Length	500-568	400-460	up to 300	-	220-270
Length of basal segment	60-80	70	-	-	-
Width	160-258	170-290	-	-	100-140

Remarks.— At first we were inclined to consider the present material as belonging to *Antennella siliquosa* (Hincks, 1877). Identical material, studied by Ansín Agís (1998) was identified by that author as *Antennella campanulaformis* (Mulder & Trebilcock, 1909). This, however, is a Pacific, or Indo-Pacific species, unlikely to occur in the Atlantic or Mediterranean. Examination of the available descriptions and figures convinced us that, though closely related, our material does not belong to Mulder & Trebilcock's species. As we have been unable to identify this material with any of the remaining species of *Antennella* we describe it here as a species new to science, *Antenella ansini* spec. nov. The reasons for doing that are the following:

Antennella campanulaformis is a Pacific or Indo-Pacific species, originally described from Australia. Our material is from the Mediterranean. All the reliable records of *A. campanulaformis* are from off Australia. The Indian Ocean record, from the Seychelles (cf. Millard & Bouillon, 1973 as *Halopteris diaphana*), was only tentatively considered by Schuchert (1997) as belonging to *A. campanulaformis*.

Antennella campanulaformis is a monoecious species, male and female gonothecae being present on the same stem. Our material is dioecious, having male and female gonothecae on different stems.

In *A. campanulaformis* the ahydrothecate internodes are short, distinctly shorter than the hydrothecate ones. In our material, however, the ahydrothecate internodes are long, usually much longer than hydrothecate internodes; sometimes of equal length, but never shorter.

In *A. campanulaformis* the female gonothecae are much larger than the male ones. In our material the male gonothecae are larger than female ones. Moreover, in our material the male gonothecae are also larger than those of *A. campanulaformis*, e.g. 220-270 μm (Watson, 1973) or up to 300 (Schuchert, 1997).

Antennella campanulaformis has larger hydrothecae (cf. Table 1) and longer lateral nematothecae.

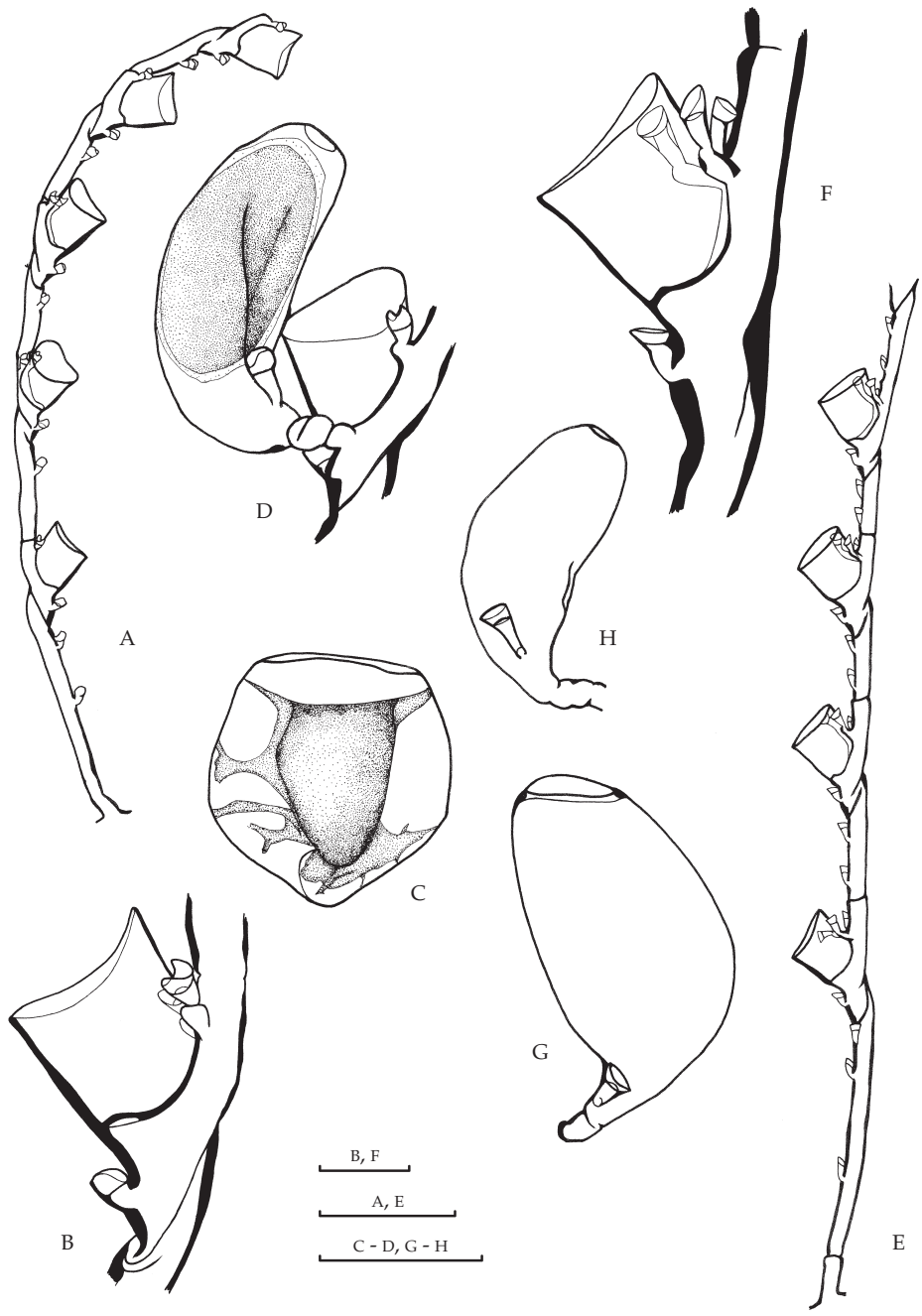

Fig. 18. A-D, *Antennella ansini* spec. nov. A, stem; B, hydrothecate internode showing hydrotheca and nematothecae; C, female gonotheca; D, male gonotheca. E-H, *Antennella secundaria* (Gmelin, 1791). E, stem; F, hydrothecate internode showing hydrotheca and nematothecae; G, female gonotheca; H, male gonotheca. Scale bar: 100 μm (B, F), 250 μm (C-D, G-H), 500 μm (A, E).

The material identified as *A. campanulaformis* by Ansín Agís (1998), in our opinion, belongs to *Antennella ansini* spec. nov., being similar in every detail. Ansín Agís did not mention whether his material was monoecious, as is characteristic of *A. campanulaformis*, though he described male and female gonothecae. We assume here that his material was dioecious; when dealing with *A. siliquosa* (Hincks, 1877) he stated that this material was monoecious (Ansín Agís, 1998: 336).

Ansín Agís (1998) considered the material studied by García Corrales et al. (1978) from off Asturias, northern coast of Spain, and by Izquierdo et al. (1986b) from the Canary Islands, both referred to *Halopteris glutinosa* (Lamouroux, 1816), as being close to *A. campanulaformis*. After examination of the descriptions and figures provided by these authors, we partly agree with Ansín Agís, but believe it is closer to *A. ansini* spec. nov. The absence of gonothecae, however, prevents confident identification.

Etymology.— The species is dedicated to Dr José Ansín Agís, University of Vigo, who drew attention on the uncertain identification of Atlantic representatives of *Antennella.*

Ecology.— *Antennella ansini* spec. nov. was collected from 5 to 25 m depth (Ansín Agís, 1998). We found it from 1 to 42 m depth.

In our material *Antennella ansini* spec. nov. was observed on a wide variety of substrata, though with a clear preference for epibiontic mode of life, since it was found on non-living substrata in less than 3% of the occasions. It has mainly been found epibiontic on algae (>74% of the records), especially on sciaphilic algae, such as *Acrosorium uncinatum*, *Halopteris filicina*, *Cystoseira spinosa* and so on. It was also observed on bryozoans, hydrozoans, sponges, polychaete tubes and, occasionally, cirripedes, bio-detritic remains, bio-concretions, pebbles and rocks. Ansín Agís (1998) found it on algae and ascidians.

In our material fertile colonies of *Antennella ansini* spec. nov. were collected in July and August; Ansín Agís (1998) reported gonothecae in May.

Distribution.— *Antennella ansini* spec. nov. is known from off Madeira and the Canary Islands (Ansín Agís, 1998) in the eastern Atlantic, and from off the Chafarinas (present material) and the Spanish Mediterranean coasts (García Carrascosa, 1981).

Antennella secundaria (Gmelin, 1791)
(fig. 18e-h)

Sertularia secundaria Gmelin, 1791: 3856.

Plumularia secundaria; Marktanner Turneretscher, 1890: 252, pl. 6 fig. 1; Pictet & Bedot, 1900: 27-28, pl. 6 fig. 7.

Antennella secundaria; Stechow, 1907: 199; Fey, 1970: 402; Millard, 1975: 332-334, fig. 10f-l; Boero, 1981a: 182, 184, 192; García Carrascosa, 1981: 250-254, pl. 23 figs f-k, pl. 40 figs c-e; Templado et al., 1986: 98; Roca, 1986: 379, fig. 65; Ramil, 1988: 391-396; Ramil & Vervoort, 1992: 143-145, fig. 37a-d; Álvarez Claudio, 1993: 239-242, fig. 41; El Beshbeeshy, 1995a: 313-315; 1995b: 405-406, fig. 1d; Medel & López González, 1996: 201; Ramil et al., 1998: 31; Ansín Agís, 1998: 323-331, fig. 46a-e; Morri & Bianchi, 1999: 287.

Antenella secundaria; Bedot, 1914: 82-83, pl. 5 fig. 1,7-8; Stechow, 1923a: 17; Patriti, 1970: 57, fig. 81a-b.

Polyplumaria secundaria; Picard, 1952a: 349; 1955: 189; Marinopoulos, 1979: 120.

Halopteris catharina; García Corrales et al., 1978: 47, fig. 20; Gili, 1986: 158-159, figs 4.30a, 4.56f; Izquierdo et al., 1986b: 52-53, fig. 3.

Material.— CONG 7, 19 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29665).— CONG 21, 8 m, three stems on *Sargassum* spec.— CONG 27, 13 m, two stems on *Sargassum* spec. and *Corallina elongata*.— CONG 54, 16.8 m, a few stems on *Halopteris filicina*.— CONG 78, 18 m, four stem on *Acrosorium uncinatum*.— D-3, 24 m, several stems on *Flabellia petiolata* (RMNH-Coel. 29666).— ISA 1, 24 m, numerous stems on *Halopteris filicina* and *Cystoseira spinosa*, with gonothecae (RMNH-Coel. 29667).— ISA 5, 35 m, numerous stems on *Dictyota dichotoma*, *Ellisella paraplexauroides*, cirripedes and *Eudendrium* spec., with gonothecae (RMNH-Coel. 29668).— ISA 6, 28 m, two stems on pebbles.— ISA 16, 7 m, four stems on *Peyssonnelia bornetii* and bio-concretion of *Astroides calycularis*.— ISA 23, 18.2 m, two stems on *Cystoseira spinosa*.— ISA 26, 34 m, a few stems on *Clavularia* spec. and *Schizomavella* spec. (RMNH-Coel. 29669).— ISA 29, on *Scrupocellaria* spec. and bio-concretions of *Astroides calycularis*.— PISA 18, 30 m, numerous stems on incrusting calcareous algae, *Eudendrium* spec., *Microporella* spec. and other bryozoans, with gonothecae (RMNH-Coel. 29670).— REY 4, 27 m, a few stems on *Antithamnion algeriense* and *Eudendrium glomeratum*, with gonothecae (RMNH-Coel. 29671).— REY 6, 10 m, a single stem with gonothecae.— REY 7, 27 m, numerous stems on *Cystoseira spinosa* and *Rhodophyllis divaricata*, with gonothecae (RMNH-Coel. 29672).— REY 8, 25 m, a few stems on *Cystoseira spinosa*, serpulids and sponges (RMNH-Coel. 29673).— REY 9, 22 m, a few stems on rocks, *Cystoseira spinosa* and *Halopteris filicina*, with gonothecae (RMNH-Coel. 29674).

Remarks.— The present material consists of unbranched stems with up to 14 hydrothecae. In the material from ISA 1 and ISA 5 two stems were provided with one lateral branch with four and two hydrothecae, respectively. We have observed up to 11 gonothecae per stem, usually one per internode, but two gonothecae per internode were also present.

Ecology.— *Antennella secundaria* is an eurybathic species that, in the Mediterranean, has been reported from almost the tidal level (Broch, 1933; García Carrascosa, 1981) to 550 m depth (Ramil & Vervoort, 1992); our material comes from 7 to 35 m. Outside the Mediterranean Ansín Agís (1998) reported it from 15 to 1000 m depth. It has been recorded from a wide range of substrata, including leaves and rhizomes of *Posidonia oceanica* (Stechow, 1919; García Carrascosa, 1981; Boero, 1981a; Roca, 1986), algae (Morri & Bianchi, 1999), sponges (Ansín Agís, 1998), hydroids (Ramil et al., 1998; Ansín Agís, 1998), polychaete tubes (Álvarez Claudio, 1993) and biodetritic remains (Teissier, 1965; Ramil, 1988). In our material it was frequently observed epibiontic on algae, particularly on *Cystoseira spinosa*, but also on bryozoans, hydrozoans, anthozoans, sponges, cirripedes, polychaete tubes and on bio-concretions, pebbles and rocks. Although it seems to prefer algae in the photophilic littoral rock zone, its indifference to substrata warrants its presence in any substratum in the sciaphilic littoral rock zone or in deeper habitats without algal development. *Antennella secundaria* may in turn be used as substratum by other species of hydroids (cf. Ansín Agís, 1998); we observed colonies of *Filellum serratum*.

In the Mediterranean *Antennella secundaria* has been observed with gonothecae in March (Gili, 1986), April (Picard, 1955), June (Ramil & Vervoort, 1992; Morri & Bianchi, 1999), August (Morri & Bianchi, 1999), and from August to October (Boero & Fresi, 1986). Our fertile material was collected in July. It is probably fertile throughout the year, with the exception of winter. In the eastern North Atlantic colonies with gonothecae were found in February, April and May (Álvarez Claudio, 1993), June (Ramil & Vervoort, 1992; Álvarez Claudio, 1993), July (Teissier, 1965; Álvarez Claudio, 1993), August (Teissier, 1965; Ramil, 1988), October (Ramil, 1988) and between April and October (Altuna, 1994).

Distribution.— *Antennella secundaria* is considered a cosmopolitan species by some authors (e.g., Millard, 1975; Boero & Bouillon, 1993, Gili et al., 1989). However, it is absent from the polar seas and uncommon or absent in the high latitudes of the three oceans (García Carrascosa, 1981), consequently it should be considered a circumglobal species from tropical, subtropical and temperate waters (Altuna, 1994). In the nearby eastern Atlantic it has been recorded from off the Cape Verde Islands, Mauritania, Selvagens Archipelago (Ansín Agís, 1998), the Canary Islands (Izquierdo et al., 1986b; Ansín Agís, 1998), off the Moroccan coasts (Billard, 1906; Patriti, 1970), Bay of Cádiz (Billard, 1906), Strait of Gibraltar (Ramil & Vervoort, 1992), Madeira and the Azores (Ansín Agís, 1998), northern coasts of Spain (Ramil, 1988; Álvarez Claudio, 1993; Altuna, 1994), coasts of north-western France (Bedot, 1911; Teissier, 1965) and from Gorringe and Ampère Banks (Ramil et al., 1998).

In the Mediterranean it has been reported from the Adriatic (Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986; Gili, 1986), Strait of Gibraltar (Ramil & Vervoort, 1992), Alboran Sea (Templado et al., 1986; Ramil & Vervoort, 1992) and from off the Algerian (Picard, 1955), Egyptian (El Beshbeeshy, 1995a; 1995b), French (Stechow, 1919; Picard, 1952a), Italian (Stechow, 1923b; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Genus *Halopteris* Allman, 1877

Halopteris diaphana (Heller 1868)
(fig. 19a-d)

Anisocalix diaphanus Heller, 1868: 42, pl. 2 fig. 5.
Plumularia alternata Nutting, 1900: 62, pl. 4 figs 1-2.
Plumularia diaphana; Bedot, 1914: 89, pl. 5 figs 14-16; Stechow, 1919: 114; Fraser, 1944: 342, pl. 73 figs 331a-d; 1946: 91; Fey, 1970: 403.
Thecocaulus diaphanus; Stechow, 1923b: 224; Gili, 1982: 82, fig. 39; 1986: 159, fig. 4.28c-d.
Antennella diaphana f. *typica*; Broch, 1933: 24.
Antenella diaphana; Leloup, 1934: 15.
Polyplumaria diaphana; Picard, 1951c: 261.
Antennella diaphana diaphana; Van Gemerden Hoogeveen, 1965: 49, figs 23-28; Leloup, 1974: 47, fig. 42.
Halopteris diaphana diaphana; Vervoort, 1968: 58, figs 27a-c; García Corrales et al., 1978: 42, fig. 18a-c; Isasi, 1985: 85, fig. 24a-c.
Halopteris diaphana; Vervoort, 1968: 108; García Carrascosa, 1981: 259, pl. 24 figs c-f, pl. 37 figs a-c; Boero, 1981a: 182, 184; Izquierdo et al., 1986b: 51, fig. 2; Roca, 1986: 392, fig. 67; 1990: 50; Altuna, 1994: 244-248; Migotto, 1996: 45-48, fig. 9d-e; Medel & López González, 1996: 202; Ansín Agís, 1998: 375-381, fig. 52a; Morri & Bianchi, 1999: 287.

Material.— CONG 8, 10 m, two stems on *Cystoseira spinosa*.— CONG 21, 8 m, single stem on *Halopteris scoparia*.— CONG 28, 9 m, one stem fragment.— CONG 53, 17.5 m, two stems on *Peyssonnelia rubra*.— CONG 57, 10.5 m, four stems on *Peyssonnelia rubra*, *Cystoseira spinosa* and sponges (RMNH-Coel. 29675).— CONG 69, 2.5 m, nine stems on *Padina pavonia* (RMNH-Coel. 29676).— ISA 4, 10 m, numerous stems on *Peyssonnelia* spec., with gonothecae (RMNH-Coel. 29677).— ISA 26, 34 m, a few stems on *Pentapora* spec. and *Turbicellepora* spec.— ISA 30, 15 m, several stems on *Halopteris filicina* and *Celleporina caminata* (RMNH-Coel. 29678).— PCONG 5, 3 m, a few stems on *Corallina elongata* and *Haraldia lenormandii* (RMNH-Coel. 29679).— PISA 23, 3 m, three stems on *Eudendrium*

racemosum.— PISA 24, 2 m, a few stems on incrusting calcareous algae, *Aglaophenia picardi* and bryozoans (RMNH-Coel. 29680).— REY 5, 20 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29681).

Remarks.— The present material consists of colonies with monosiphonic stems up to 10 mm high.

Ecology.— In the Mediterranean *Halopteris diaphana* has been found from 2 (García Carrascosa, 1981; Morri & Bianchi, 1999) to 75 m depth (Stechow, 1923b). Our material occurs from 2 to 34 m. Outside the Mediterranean it has been usually reported from the tidal level (Altuna, 1994) to 60 m depth (Teissier, 1965), though there are records up to 2557 m (Fraser, 1946).

From our material *Halopteris diaphana* emerges as a typically epibiontic species. It was mainly found on algae (>60% of the records), especially hemiphotophilic or sciaphilic algae such as *Cystoseira spinosa* or *Peyssonnelia rubra*. It was also found on bryozoans, hydrozoans and sponges. According to the literature this species also develops on bivalve shells (García Carrascosa, 1981; Isasi, 1985; Altuna, 1994), cirripedes (Isasi, 1985; Altuna, 1994), rhizomes and leaves of *Posidonia oceanica* (García Carrascosa, 1981; Boero, 1981a), algae (Morri & Bianchi, 1999; Migotto, 1996) and even epilithic (García Carrascosa, 1981; Gili, 1986; Altuna, 1994; Migotto, 1996). In our material it was found in turn as substratum for colonies of *Antennella ansini* spec. nov.

In the Mediterranean fertile colonies were found in April (Gili, 1986), June (Boero & Fresi, 1986) and August (Morri & Bianchi, 1999). At the Chafarinas colonies with gonothecae were collected in July. Outside the Mediterranean, in the nearby Atlantic, it has been found with gonothecae in June (Fey, 1970; Altuna, 1994) and July (Fey, 1970; Isasi, 1985). *Halopteris diaphana* consequently seems to be fertile the whole summer.

Distribution.— *Halopteris diaphana* is currently considered a circumtropical species (Vervoort, 1968; Boero & Bouillon, 1993; Altuna, 1994). In the eastern Atlantic it has been reported from the north-western coasts of France (Bedot, 1914; Teissier, 1965) to the Canary Islands (Izquierdo et al., 1986b; Ansín Agís, 1998).

In the Mediterranean it is known from the Adriatic (Heller, 1868; Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986), and off the French (Stechow, 1919), Italian (Stechow, 1923b; Boero, 1981a), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Halopteris liechtensternii (Marktanner Turneretscher, 1890) (fig. 19e-h)

Plumularia liechtensternii Marktanner Turneretscher, 1890: 257, fig. 2-2a; Motz Kossowska, 1908: 55, figs 1-3.

Heterotheca liechtensterni; Stechow, 1923b: 233.

?*Antennella diaphana* f. *typica* p.p. Broch, 1933: 24 (only fertile material from Prizidnice).

Polyplumaria liechtensterni; Picard, 1955: 188; Rossi, 1961: 78.

Thecocaulus diaphanus; Riedl, 1959: 654, pl. 11 fig. 7; Gili, 1982: 81, fig. 39 [not *Halopteris diaphana* (Heller, 1868)].

Halopteris sp. Roca, 1986: 398-403, fig. 68.

Halopteris liechtensterni; Boero & Bouillon, 1993: 264; Medel & Vervoort, 1995: 39, fig. 16.

Halopteris liechtensternii; Medel & López González, 1996: 202; Schuchert, 1997: 73-76, fig. 24.

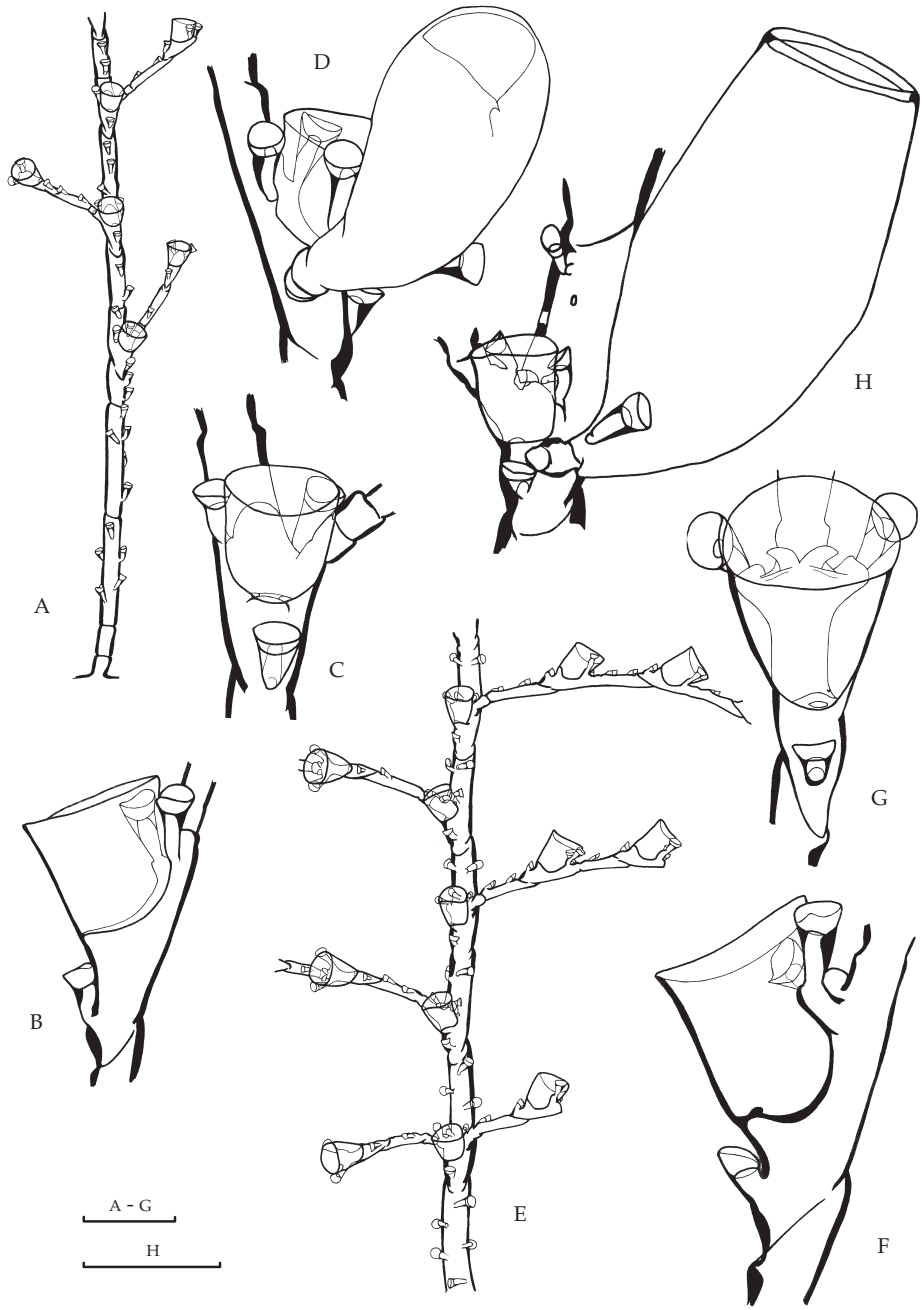

Fig. 19. A-D, *Halopteris diaphana* (Heller, 1868). A, stem; B, hydrocladial hydrothecate internode showing hydrotheca and nematothecae; C, cauline hydrothecate internode showing hydrocladial apophysis; D, gonotheca. E-H, *Halopteris liechtensternii* (Marktanner Turneretscher, 1890). E, stem fragment; F-G, hydrothecate internodes showing hydrotheca and nematothecae; H, gonotheca. Scale bar: 100 μm (B-D, F-G), 250 μm (H), 500 μm (A, E).

Material.— ISA 1, 24 m, a few stems on *Halopteris filicina* (RMNH-Coel. 29682).— ISA 2, 16 m, single stem on *Cystoseira* spec.— ISA 3, 12 m, single, basally broken stem.— ISA 7, 15 m.— ISA 19, 20 m, a few stems (RMNH-Coel. 29683).— ISA 22, 15 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29684).— PREY 1, 13 m, two stems on *Cystoseira spinosa*.— REY 4, 27 m, single stem.— REY 7, 27 m, three stems on *Cystoseira spinosa* (RMNH-Coel. 29685).— REY 8, 25 m, three stems on serpulids (RMNH-Coel. 29686).— REY 9, 22 m, three stems on *Cystoseira spinosa* (RMNH-Coel. 29687).— REY 10, 16 m, three stems on sponges, with gonothecae.

Description.— Colony composed of a stolonal hydrorhiza, without nematothecae, giving rise to monosiphonic stems up to 21 mm high. Hydrocauli inserting on short hydrorhizal apophyses and with up to three basal, ahydrothecate internodes bearing up to 11 nematothecae. Rest of stem consisting of a series of homomerous, hydrothecate internodes each provided with one hydrotheca, situated on basal half of internode, and seven or eight two-chambered nematothecae: one mesial inferior nematotheca, one pair of lateral nematothecae situated on short apophyses and reaching the hydrothecal rim, one pair situated behind the hydrotheca in axil between hydrotheca and internode and, finally, two or three nematothecae above the hydrotheca and arranged at different levels.

Hydrocladia alternately arranged. Hydrocladium arising from a short cauline apophysis, composed of a short basal athecate internode and a series of alternating ahydrothecate and hydrothecate internodes. The former are provided with two, occasionally one, nematothecae at different levels. Hydrothecate internodes with one hydrotheca and five nematothecae, with identical disposition as that of the main stem.

Hydrotheca cup-shaped and directed outwards. Adcauline hydrothecal wall free for approximately half its length. Both abcauline wall (length 184-200 μm) and free part of adcauline wall straight. Hydrothecal aperture circular, 184-200 μm in diamater; rim even.

Nematothecae two-chambered; upper chamber with one more or less developed emargination on the adcauline side.

Gonothecae inserted on internode between basal part of hydrotheca and mesial inferior nematotheca; provided with a short basal segment. Gonotheca ovoid, though distal end truncated and with a wide, circular aperture. Gonothecae provided with two basal nematothecae.

Remarks.— The presence of alternately arranged hydrothecate and ahydrothecate internodes on the main stem is occasional and occurs in the distal part of some of the largest stems (REY 7, PREY 1).

In one colony from ISA 19 opposite hydrocladia were observed. In the presence of hydrocladia, the lateral nematotheca on the side of the hydrocladium shifts towards the hydrocladium-bearing apophysis. In such cases the hydrocladium seems to develop from a nematotheca-bearing apophysis; the (lateral) nematotheca has no proper apophysis. The apophysis supporting the hydrocladium in such cases seems to develop from the apophysis of the lateral nematotheca of the cauline hydrotheca; this development is visible in some of the colonies.

Ecology.— *Halopteris liechtensternii* has been found from the tidal level (Motz-Kossowska, 1908) to 40 m depth (Rossi, 1961). Our material comes from 12 to 27 m depth. We found it mainly epibiontic on algae (> 71% of the records), especially on hemiphotophilic and sciaphilic algae such as *Cystoseira spinosa* and *Halopteris filicina*. The remain-

ing records are from sponges and polychaete tubes. According to the literature it also occurs epibiontic on algae (Rossi, 1961; Roca, 1986; Medel & Vervoort, 1995), hydroids (Rossi, 1961), cirripedes (Roca, 1986; Medel & Vervoort, 1995), anthozoans and polychaete tubes and on bio-concretions (Roca, 1986) and epilithic (Medel & Vervoort, 1995).

Halopteris liechtensternii has been found with gonothecae in May (Roca, 1986), June (Roca, 1986; Schuchert, 1997), July (Roca, 1986; Medel & Vervoort, 1995) and August (Roca, 1986). At the Chafarinas Islands fertile colonies were collected in July.

Distribution.— *Halopteris liechtensternii* is an endemic of the Mediterranean (Boero & Bouillon, 1993; Schuchert, 1997). It is known from the Adriatic (Marktanner Turneretscher, 1890), Strait of Gibraltar (Medel & Vervoort, 1995), the Balearic Islands (Roca, 1986), Corsica (Schuchert, 1997) and from off the French (Motz-Kossowska, 1908; Schuchert, 1997), Greek (Schuchert, 1997), Italian (Rossi, 1961), Moroccan (Patriti, 1970) and Spanish coasts (Schuchert, 1997; Medel & Vervoort, 1995).

Family Kirchenpaueriidae Millard, 1962

Genus *Kirchenpaueria* Jickeli, 1883

Kirchenpaueria pinnata (Linnaeus, 1758)
(fig. 20a-c)

Sertularia pinnata Linnaeus, 1758: 813.
Plumularia pinnata; Hincks, 1868: 295-296, pl. 65 fig. 1.
Plumularia echinulata; Hincks, 1868: 302-303, pl. 65 fig. 2.
Plumularia similis; Hincks, 1868: 303-304, pl. 65 fig. 3.
Plumularia elegantula G.O. Sars, 1874: 103-104, pl. 3 figs 9-14.
Plumularia helleri; Marktanner Turneretscher, 1890: 251, pl. 6 fig. 3.
Kirchenpaueria pinnata; Bedot, 1916: 645; Broch, 1918: 54; 1933: 27; Stechow, 1919: 107, figs p-s; 1923b: 215; Da Cunha, 1944: 24, figs 6-9; Millard, 1975: 372-375, figs 119a-d; García Corrales et al., 1978: 49, fig. 2; García Carrascosa, 1981: 236-238; Gili, 1986: 154-155, fig. 4.29; Izquierdo et al., 1986b: 53-54, fig. 4; Roca, 1986: 352-359, fig. 61; Roca & Moreno, 1987: 46-48, fig. 2; Ramil, 1988: 397-407; Ramil & Vervoort, 1992: 158-161, fig. 41a-c; Boero & Bouillon, 1993: 264; Álvarez Claudio, 1993: 259-262, text-fig. 44, pl. 25; Altuna, 1994: 249-253, pl. 45 figs a-c; El Beshbeeshy, 1995a: 313-315; 1995b: 406-408, fig. 2c-d; Medel & López González, 1996: 202; Ramil et al., 1998: 33-35, figs 20-21; Ansín Agís, 1998: 419-426, fig. 57a-e; Morri & Bianchi, 1999: 287.
Kirchenpaueria pinnata f. *echinulata*; Stechow, 1919: 107, figs p1-s1; Teissier, 1965: 26; García Carrascosa, 1981: 239-241, pl. 21 figs a-d, pl. 36 figs b-c.
Kirchenpaueria pinnata f. *typica*; Stechow, 1919: 107; Teissier, 1965: 26; García Carrascosa, 1981: 238-239, pl. 22 figs d-e.
Kirchenpaueria pinnata f. *similis*; Stechow, 1919: 110; Teissier, 1965: 27; García Carrascosa, 1981: 241-242, pl. 21 figs e-f.
Kirchenpaueria pinnata echinulata; Billard, 1926: 342; Da Cunha, 1944: 24, figs 7-8.
Kirchenpaueria pinnata articulata; Billard, 1926: 343; Da Cunha, 1944: 26.
Kirchenpaueria pinnata similis; Billard, 1926: 343; Da Cunha, 1944: 26, fig. 9.
Diplocyathus minutus Leloup, 1930: 1, figs 1-5.
Kirchenpaueria pinnata f. *elegantula*; Broch, 1933: 27; Vervoort, 1959: 289-290.
Kirchenpaueria pinnata var. *echinulata*; Philbert, 1935: 34.
Kirchenpaueria echinulata; Picard, 1952a: 341, fig. 1a; 1955: 188; Rossi, 1961: 77; Boero, 1981a: 182; Gili, 1986: 155, fig. 4.28a-b; Boero & Bouillon, 1993: 264.
Kirchenpaueria pinnata var. *elegantula*; Patriti, 1970: 55, figs 77a-c.
Ventromma halecioides; Chas & Rodriguez, 1977: 31, figs 17a-c.

Kirchenpaueria pinnata f. *minuta*; García Carrascosa, 1981: 243, pl. 21 fig. 6, pl. 36 fig. a.
Kirchenpaueria pinnata typica; Gili, 1982: 82, fig. 40.
Kirchenpaueria similis; Roca & Moreno, 1987: 46-48, fig. 2.

Material.— CONG 1, 0.5 m, a few stems on *Flabellia petiolata*, *Peyssonnelia coriacea* and *Salmacina* spec. (RMNH-Coel. 29688).— CONG 2, 1 m, a few stems on *Peyssonnelia squamaria* (RMNH-Coel. 29689).— CONG 7, 19 m, ten stems on *Cystoseira spinosa* (RMNH-Coel. 29690).— CONG 8, 10 m, eight stems on *Cystoseira spinosa* and *Acrosorium uncinatum*.— CONG 13, 2 m, four stems on *Cladostephus verticillatus*.— CONG 18, 4.5 m, a few stems on *Halopteris filicina*, *Corallina elongata* and *Corallina granifera* (RMNH-Coel. 29691).— CONG 21, 8 m, single stem.— CONG 28, 9 m, numerous stems on *Sertularella ellisi*, *Salmacina* spec., sponges and bryozoans (RMNH-Coel. 29692).— CONG 43, 2 m, several stems on *Corallina elongata*, *Boergeseniella fruticulosa* and *Rhodymenia* spec. (RMNH-Coel. 29693).— CONG 44, 3 m, two stems on *Clavularia* spec. and *Scrupocellaria maderensis*.— CONG 45, 3 m, a few stems on *Sargassum* spec. and *Padina pavonia* (RMNH-Coel. 29694).— CONG 58, 9 m, four stems on *Padina pavonia*.— CONG 61, 4 m, two stems on *Lithophyllum expansum*.— CONG 72, 7 m, single stem on *Sargassum* spec.— CONG 74, 11 m, several stems on *Cystoseira spinosa* and *Sargassum* spec. (RMNH-Coel. 29695).— CONG 76, 13 m, three stems on *Cystoseira spinosa* and sponges.— CONG 82, 5 m, several stems on *Flabellia petiolata*, *Corallina elongata*, *Rhodymenia ardissonei*, *Acrosorium uncinatum* and *Salmacina* spec. (RMNH-Coel. 29696).— CONG 83, 5 m, eight stems on *Halopteris filicina* and *Acrosorium uncinatum* (RMNH-Coel. 29697).— ISA 12, 5 m, a few stems on *Plocamium cartilagineum*.— ISA 24, 10 m, single stem on polychaete tubes.— ISA 25, 10 m, a few stems on *Myriapora truncata* and *Scrupocellaria* spec. (RMNH-Coel. 29698).— ISA 29, 6 m, a few stems on *Scrupocellaria scruposa* and bio-concretions of *Astroides calycularis* (RMNH-Coel. 29699).— ISA 30, 15 m, a few stems on *Peyssonnelia coriacea* and *Halopteris filicina* (RMNH-Coel. 29700).— PCONG 6, 2 m, single stem on *Eudendrium racemosum*.— PISA 3, 3 m, three stems on bio-concretion.— PISA 17, 1 m, a few stems on *Peyssonnelia coriacea* (RMNH-Coel. 29701).— PISA 27, 1 m, three stems on *Valonia utricularis*.— REY 5, 20 m, numerous stems on *Cystoseira spinosa* and *Aglaophenia pluma* (RMNH-Coel. 29702).— REY 6, 10 m, five stems on *Cystoseira spinosa* and *Salmacina* spec.— REY 7, 27 m, four stems.— REY 17, 2 m, a few stems on *Halopteris* sp. (RMNH-Coel. 29703).— REY 24, 0 m, two stems on *Pterocladia capillacea*.— REY 28, 2 m, numerous stems on pebbles (RMNH-Coel. 29704).

Remarks.— The present material consists of colonies with monosiphonic stems up to 15 mm high.

The large morphological variability present in *K. pinnata* resulted in the description of various species and subspecies, that at present are considered to represent a single species with a wide intraspecific variability: *Kirchenpaueria pinnata* (Linnaeus, 1758) (Ramil & Vervoort, 1992).

In the present material variability is particularly observed in the structure of the hydrocladia, even within the same colony. The hydrocladia may be monomerously segmented, being exclusively composed of thecate internodes, or be heteromerous and composed of thecate and athecate internodes in varied succession.

Ecology.— *Kirchenpaueria pinnata* is an eurybathic species that, in the Mediterranean, has been found from the tidal level (García Carrascosa, 1981) to 145 m depth (Ramil & Vervoort, 1992); our material comes from the tidal level to 27 m. Outside the Mediterranean it has been reported from the tidal level (Ansín Agís, 1998) down to 765 m depth (Ramil et al., 1998). It develops on a wide range of substrata. In our material it was mainly found epibiontic on algae (> 67% of the records), but also on bryozoans, polychaete tubes, hydrozoans, sponges, bio-concretions and occasionally on anthozoans and epilithic on pebbles. Our data concur with those in the literature, where it has also been reported from rhizomes and leaves of *Posidonia oceanica* (García Carrascosa, 1981; Boero, 1981a).

In the Mediterranean fertile colonies of *Kirchenpaueria pinnata* have been found in January and March (Stechow, 1923b), April (Stechow, 1919; Gili, 1986), May (Gili, 1986), June (Ramil & Vervoort, 1992), July (Gili, 1986), October (Stechow, 1919, 1923b; Roca, 1986) and December (Roca, 1986). It thus seems to be fertile throughout the year. Outside the Mediterranean there are records of gonothecae in January and March (Chas & Rodriguez, 1977; Altuna, 1994), April (Ramil, 1988; Álvarez Claudio, 1993; Altuna, 1994), June and July (Altuna, 1994), August (Ramil, 1988), September (Altuna, 1994) and November (Ramil, 1988). Teissier (1965) found colonies with gonothecae from March to November.

Distribution.— *Kirchenpaueria pinnata* is restricted to the Mediterranean and the eastern Atlantic. It has been reported from off Iceland (Broch, 1918) to South Africa (Millard, 1975), where it reaches the Indian coasts of Natal (Millard, 1975). There are, however, a few isolated records from the Pacific: off the Japanese coasts (Hirohito, 1983), New Guinea (Bouillon, 1984) and off the North American coasts (Fraser, 1911).

In the nearby eastern Atlantic it has been reported from the Canary Islands (Izquierdo et al., 1986b; Ansín Agís, 1998), Galice and Gorringe Banks (Ramil et al., 1998), Madeira (Ansín Agís, 1998) and from off the Moroccan (Patriti, 1970), Portuguese (Da Cunha, 1944), Spanish (Ramil, 1988; Altuna, 1994; etc.) and French coasts (Teissier, 1965).

In the Mediterranean it has been recorded from the Adriatic (Carus, 1884; Marktanner Turneretscher, 1890; Broch, 1912, 1933; Babic, 1913b; Stechow, 1919), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986), the Alboran Sea (Ramil & Vervoort, 1992), and from off the Algerian (Picard, 1955), Egyptian (El Beshbeeshy, 1995a; 1995b), French (Stechow, 1919; Leloup, 1930; 1934; Picard, 1952a), Israeli (Picard, 1958b), Italian (Marktanner Turneretscher, 1890; Stechow, 1919, 1923b; Rossi, 1961; Boero & Fresi, 1986), Spanish (García Carrascosa, 1981; Gili, 1986), Syrian (Billard, 1931a) and Turkish coasts (Marinopoulos, 1979).

Genus *Ventromma* Stechow, 1923b

Ventromma halecioides (Alder, 1859)
(fig. 20d-e)

Plumularia halecioides Alder, 1859: 353, pl. 12 figs 1-5; Stechow, 1919: 117; Fraser, 1937: 188, pl. 43 figs 227a-d; 1948: 91-92; Naumov, 1960: 505, fig. 356.

Ventromma halecioides; Stechow, 1923b: 220; Picard, 1952a: 349; García Corrales et al., 1978: 51-53, fig. 23; Morri, 1981a: 88-90, text-fig. 30, pl. 2 fig. 4; Boero, 1981a: 182, 184; Isasi, 1985: 89-90, fig. 27; Roca, 1986: 370, fig. 63; Gili, 1986: 153, fig. 4.29b; Boero & Fresi, 1986: 146; Ramil, 1988: 408-412; Cornelius et al., 1990: 154, fig. 4.23; Boero & Bouillon, 1993: 264; Vervoort, 1993: 550-551; Altuna, 1994: 253-255; Medel & López González, 1996: 202; Migotto, 1996: 51-53, fig. 10a-c.

Ventroma halecioides; Da Cunha, 1944: 26.

Plumularia irregularis Millard, 1958: 210-212, fig. 13a-c.

Kirchenpaueria irregularis; Millard, 1975: 370-372, fig. 118d-g

Ventromna halecioides; García Carrascosa, 1981: 246, pl. 22 figs a-c.

Kirchenpaueria halecioides; Ansín Agís, 1998: 409-415, fig. 56a-d.

Not *Ventromma halecioides*; Chas & Rodriguez, 1977: 31, figs 17a-c.

Material.— CONG 1, 0.5 m, numerous stems on *Peyssonnelia coriacea*, *Flabellia petiolata* and sponges (RMNH-Coel. 29705).— CONG 2, 1 m, three stems on *Corallina elongata* and bio-concretions.— CONG

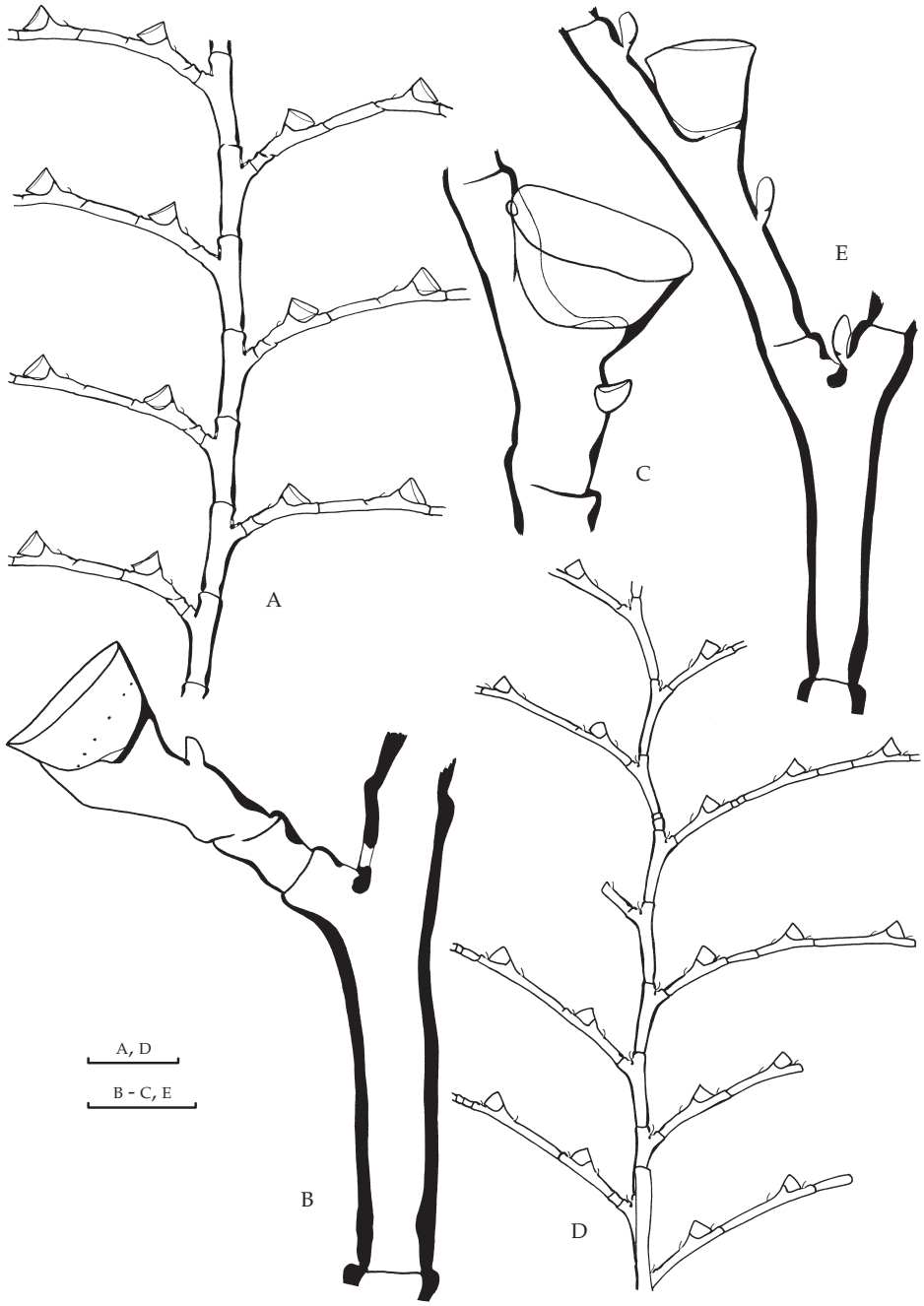

Fig. 20. A-C, *Kirchenpaueria pinnata* (Linnaeus, 1758). A, stem; B, cauline internode and hydrocladium; C, hydrothecate internode showing hydrotheca, nematotheca and opening of mesial superior nematophore. D, E, *Ventromma halecioides* (Alder, 1859). D, stem; E, stem internode and hydrocladium, showing hydrotheca and nematothecae. Scale bar: 100 μm (B-C, E), 500 μm (A, D).

43', 0 m, two stems on *Corallina elongata* and *Hypnea musciformis*.— CONG 47, 2.5 m, a single stem on pebbles.— CONG 64, 1 m, several stems on *Sargassum* spec. (RMNH-Coel. 29706).— CONG 67, 0 m, numerous stems on *Corallina elongata*, *Valonia utricularis* and *Laurencia* spec. (RMNH-Coel. 29707).— ISA 13, 0 m, numerous stems on *Cystoseira tamariscifolia*, *Mytilus* spec. and cirripedes (RMNH-Coel. 29708).— ISA 14, 0.3 m, numerous stems on incrusting calcareous algae, *Valonia utricularis*, *Corallina elongata*, *Laurencia* sp, *Ceramium ciliatum*, *Cystoseira* spec. and *Vermetus* spec. (RMNH-Coel. 29709).— PCONG 7, 0.5 m, three stems on incrusting calcareous algae.— PISA 12, 2 m, numerous stems on rock and incrusting calcareous algae, with gonothecae (RMNH-Coel. 29710).— PISA 21, 2 m, a single stem on *Rhodophyllis divaricata*.— REY 23, 0 m, a few stems on *Valonia utricularis* and *Rhodymenia* spec. (RMNH-Coel. 29711).— REY 25, 0 m, seven stems on *Pterocladia capillacea* and *Codium bursa*.

Remarks.— The present material consists of colonies with monosiphonic or polysiphonic stems up to 22 mm high. In the material from CONG 47, CONG 64, CONG 67, ISA 13 and ISA 14 there are colonies with tiny stems, with the cauline internodes indistinctly arranged in zigzag fashion and with hydrocladia composed of a single hydrotheca; the mesial superior nematothecae being absent. Such colonies can be confused with those of *Kirchenpaueria pinnata* also presenting a single hydrotheca per hydrocladium. They may be distinguished, however, by the shape of the nematothecae, because there are nematothecae on the cauline internodes, and because the hydrothecae are smaller in *V. halecioides*.

Ecology.— *Ventromma halecioides* is a littoral species that, in the Mediterranean, has been reported from the tidal level (Boero & Fresi, 1986) to 50 m depth (Morri, 1981a); our material comes from zero to 2.5 m. Outside the Mediterranean it follows a similar bathymetrical pattern, having been found from the tidal level (Ramil, 1988) to 40 m depth (Ansín Agís, 1998). It grows on a wide range of substrata. In our material, however, it shows a clear preference for epibiontic life on algae (>75% of the records), though it was occasionally found on sponges, bivalves, cirripedes and on non-living substrata both biotic (bio-concretions) and abiotic (rocks and pebbles). The available data from the literature agree with the wide variety of substrata used, including seagrasses such as *Zostera nana* (Stechow, 1923b; Picard, 1952b). *Ventromma halecioides* may in turn be used as substratum by other hydroids, such as *Obelia dichotoma*, *Clytia hemisphaerica*, *C. paulensis*, *Halecium lankesteri* and *Campalecium medusiferum* (Isasi, 1985).

In the Mediterranean *V. halecioides* has been found with gonothecae in June (Gili, 1986; Vervoort, 1993) and July (Gili, 1986); according to Morri (1981a) the reproduction preferentially occurs between spring and autumn. Outside the Mediterranean there are references from June (Ansín Agís, 1998) and July (Isasi, 1985; Altuna, 1994). The scarcity of data prevent us from establishing its exact reproductive period; in the Mediterranean it is fertile throughout the year, with the exception of winter.

Distribution.— *Ventromma halecioides* was considered a cosmopolitan species by Boero & Bouillon (1993). As it is absent from polar waters it can better be conceived as a circum tropical/temperate species. Vervoort (1993) indicated that it is widely distributed in tropical, subtropical and temperate waters of the Atlantic and Pacific oceans. According to García Carrascosa (1981) the wide distribution of *V. halecioides* is probably influenced by its great tolerance to ecological factors, as salinity and temperature, its presence in harbours and regular occurrence as fouling organism. In the eastern Atlantic it has been reported from off Great Britain (Cornelius et al., 1990) to the coasts of Senegal (Picard, 1951a) and the Cape Verde Islands (Ritchie, 1907).

In the Mediterranean it is known from the Adriatic (Riedl, 1970), the Balearic Islands (Roca, 1986) and off the French (Stechow, 1919; Leloup, 1934; Picard, 1952a), Israeli (Vervoort, 1993), Italian (Marktanner Turneretscher, 1890; Stechow, 1923b; Morri, 1981a; Boero, 1981a; Boero & Fresi, 1986) and Spanish coasts (García Carrascosa, 1981; Gili, 1986). It has also been recorded from the Black Sea (Naumov, 1969) and the Suez Canal (Billard, 1926).

Family Plumulariidae L. Agassiz, 1862

Genus *Monotheca* Nutting, 1900

Monotheca obliqua (Johnston, 1847)
(fig. 21a-b)

Laomedea obliqua Johnston, 1847: 106, pl. 28 fig. 1.
Plumularia obliqua; Hincks, 1861: 258; Bale, 1884: 138, pl. 12 fig. 1; Marktanner Turneretscher, 1890: 254; Broch, 1933: 32, figs 10a-e; Leloup, 1934: 15; Da Cunha, 1944: 30, fig. 11; 1950: 128; Watson, 1973: 189; Millard & Bouillon, 1974: 9, 34, figs 8a-d; Millard, 1975: 396, figs 125a-b; García Corrales et al., 1978: 56, fig. 25a-d; Boero, 1981a: 192, figs 13a-d; Boero & Fresi, 1986: 145; Isasi, 1985: 89, fig. 26; Gili, 1986: 164-165, fig. 4.31a; Roca, 1986: 329, fig. 58; Boero & Bouillon, 1993: 264; Medel & López González, 1996: 202; Morri & Bianchi, 1999: 287.
Plumularia obliqua var. *robusta*; Bale, 1884: 139, pl. 12 figs 2-3.
Monotheca obliqua; Stechow, 1919: 113; 1923b: 224; Picard, 1951b: 278; 1955: 188; García Carrascosa, 1981: 266, pl. 25 figs a-f, pl. 37 figs d-f; Ramil, 1988: 416; Cornelius et al., 1990: 152, fig. 4.22; Park, 1992: 294; 1993: 273; Altuna, 1994: 255-257.
Monotheca posidoniae Picard, 1952a: 341, fig. 2b; 1955: 188.
Plumularia obliqua typica; Gili, 1982: 86, fig. 43.
Plumularia obliqua posidoniae; Gili, 1982: 87, fig. 44; 1986: 165, figs 4.31b, 4.55c.
Not *Monotheca oblica*; Patriti, 1970: 58, figs 83a-b (= *M. pulchella*).

Material.— CONG 2, 1 m, numerous stems on *Peyssonnelia squamaria*, *Corallina elongata*, *Halopteris* spec., *Flabellia petiolata* and *Cryptonemia lomation* (RMNH-Coel. 29712).— CONG 3, 2 m, two stems on *Halopteris scoparia*.— CONG 32, 7 m, a few stems on *Halopteris scoparia*.— CONG 39, 0.4 m, five stems on *Halopteris* spec. (RMNH-Coel. 29713).— CONG 41, 2.5 m, a few stems on *Halopteris scoparia*.— CONG 46, 5 m, a few stems on *Flabellia petiolata*.— CONG 70, 4.5 m, several stems on *Griffithsia* spec. (RMNH-Coel. 29714).— CONG 72, 7 m, single stem on *Posidonia oceanica* leaf.— CONG 74, 11 m, numerous stems on *Posidonia oceanica* leaves.— CONG 75, 12 m, numerous stems on *Posidonia oceanica* leaves (RMNH-Coel. 29715).— CONG 77, 20.5 m, eight stems on *Halopteris filicina* (RMNH-Coel. 29716).— CONG 83, 5 m, numerous stems on *Sphaerococcus coronopifolius*, *Jania longifurca* and *Amphiroa rigida* (RMNH-Coel. 29717).— PCONG 2, 3 m, several stems on *Acrosorium uncinatum* and *Eudendrium racemosum* (RMNH-Coel. 29718).— PCONG 7, 0.5 m, four stems on *Peyssonnelia squamaria*.— PISA 24, 2 m, numerous stems on *Plocamium cartilagineum*, incrusting calcareous algae and *Aglaophenia picardi*, with gonothecae (RMNH-Coel. 29719).— REY 33, 4 m, numerous stems on *Posidonia oceanica* leaves.

Remarks.— The present material consists of colonies with stems provided with up to 15 hydrothecae. Although the material from *Posidonia oceanica* has the same colonial structure as that from other substrata, it presents some differences. The perisarc thickening is much more developed. The abcauline hydrothecal wall is strongly convex, as a result the kidney-shaped hydrothecal aperture is strongly adcaudally directed. The shape of the hydrothecal aperture is due to a large perisarc thickening at the distal part of the adcauline hydrothecal wall. The hydrotheca,

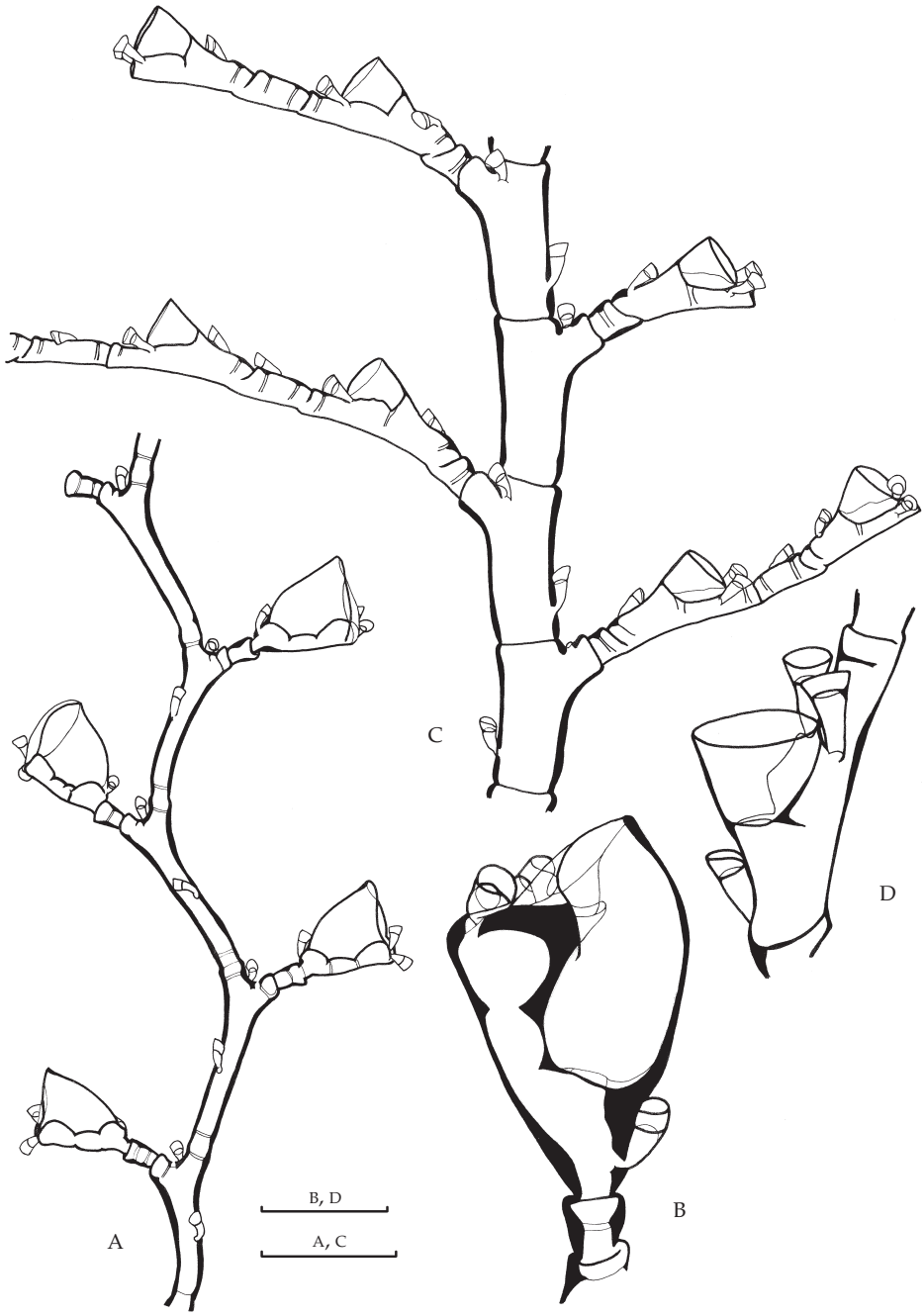

Fig. 21. A, B, *Monotheca obliqua* (Johnston, 1847). A, stem; B, hydrothecate internode showing hydrotheca and nematothecae. C, D, *Plumularia setacea* (Linnaeus, 1758). C, stem fragment; D, hydrothecate internode showing hydrotheca and nematothecae. Scale bar: 100 μm (B, D), 250 μm (A, C).

moreover, is wider at the base than at the aperture, and the antechamber of the aperture is more developed. Also, the nematophore present at the axil of the cauline apophyses seems to have a mesial location.

Millard & Bouillon (1974), Boero (1981a) and Roca (1986) considered *Monotheca obliqua* and *M. posidoniae* Picard, 1952a conspecific. Boero (1981), on the other hand, indicated that the colonies of *M. obliqua* from *Posidonia oceanica*, have a considerable morphological variability and that the strong perisarc thickening of the hydrothecate internodes decreases with increasing depth. In our material, however, that strong perisarc thickening was present in all the colonies from *Posidonia*, even those from 12 m depth. Though we could no study deeper material, there is no evidence of the decrease in perisarc thickness with depth in our material.

Ecology.— In the Mediterranean *Monotheca obliqua* has been found from the tidal level (García Carrascosa, 1981; Boero & Fresi, 1986) to 70 m depth (Roca, 1986); our material comes from 0.4 to 20 m. Its lowest bathymetrical level seems to be related to the distribution of its main substratum, the seagrass *Posidonia oceanica*. Outside the Mediterranean, it has been reported from the tidal level (Ramil, 1988) to 28 m depth (Fey, 1970).

In our material it was always found epibiontic on other organisms, mainly on algae (>92% of the records) and *Posidonia oceanica* leaves. The remaining records are from hydrozoans (*Eudendrium racemosum* and *Aglaophenia picardi*). The available data from the literature also point to a preference for epibiontic life, as it has been reported from *P. oceanica*, algae and hydroids, but also from bryozoans (Picard, 1955; García Carrascosa, 1981) and cirripedes (Boero & Fresi, 1986), though Gili (1986) also found it on rocks.

In the Mediterranean *Monotheca obliqua* has been found with gonothecae in February (Gili, 1986), May (Roca, 1986), June (Rossi, 1950; Roca, 1986), August (Picard, 1951; Gili, 1986), September (Picard, 1951) and October (Boero & Fresi, 1986). It therefore seems to be fertile throughout the year, with the probable exception of winter. In the north-eastern Atlantic, however, it seems to be fertile only in summer, having been found with gonothecae in September (Altuna, 1994) and August (Fey, 1970).

Distribution.— Boero & Bouillon (1993) gave *Monotheca obliqua* a circumtropical distribution. However, though it has been reported from off South Africa (Millard, 1975), Mozambique (Millard & Bouillon, 1974), Japan (Stechow & Uchida, 1931), Korea (Park, 1992; 1993) and Australia and Tasmania (Bale, 1884; Watson, 1973), there are no records from the eastern Pacific and the western Atlantic. Accordingly it could better be considered a species with wide distribution in the Indo-West Pacific and the eastern Atlantic. In the north-eastern Atlantic it has been reported off the south-west coast of England (Hincks, 1868; Cornelius et al., 1990), north-west coast of France (Billard, 1923; 1926; Marktanner Turneretscher, 1890; Philbert, 1935; Fey, 1969), Spain (Isasi, 1985; Ramil, 1988; Altuna, 1994) and Portugal (Da Cunha, 1944; 1950).

In the Mediterranean it is known from the Adriatic (Marktanner Turneretscher, 1890; Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986) and off the Algerian (Picard, 1955), Egyptian (Billard, 1936), French (Stechow, 1919; Leloup, 1934; Picard, 1951b, 1952a), Italian (Stechow, 1923b; Boero, 1981a; Boero & Fresi, 1986), Spanish (De Haro, 1965; García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Genus *Nemertesia* Lamouroux, 1812

Nemertesia perrieri (Billard, 1901)
(fig. 22a-c)

Antennularia Perrieri Billard, 1901: 73-74; 1904a: 217; 1906: 211-212, fig. 15c; Arévalo & Carretero, 1906: 82; Rioja & Martín, 1906: 278; Stechow, 1909: 81-82.

Antennularia dendritica Stechow, 1907: 195-196.

?*Antennularia Perrieri* var. *irregularis*; Stechow, 1909: 83.

Nemertesia perrieri; Bedot, 1917: 45; 1921: 35; Billard, 1923: 17; 1927: 343; Da Cunha, 1940: 113; 1944: 33, fig. 15a; 1950: 129; Vervoort, 1946a: 327; 1959: 292-293, fig. 46a; Patriti, 1970: 46, fig. 62; Saldanha, 1974: 325; Álvarez Claudio, 1993: 273, text-fig. 46a-c, pl. 28 figs a-c; Álvarez Claudio & Anadón, 1995: 239; Ansín Agís, 1998: 497-504, figs 69a-f, 70a-f.

Nemertesia irregularis; Ramil & Vervoort, 1992: 170-173, fig. 48a; Álvarez Claudio, 1996: 17; Medel & Vervoort, 1995: 52, figs 22a-c, 23c.

Not *Nemertesia perrieri*; Vervoort, 1966: 183, fig. 40; Roca, 1986: 315-319, fig. 56 [= *Nemertesia antennina* (Linnaeus, 1758)].

Material.— D-2, 41 m, several stems (RMNH-Coel. 29720).

Description.— Colonies with rhizoidal hydrorhiza giving rise to monosiphonic and unbranched stems up to 80 mm high. Stem divided into short and wide hydrocladiate internodes delimited by perisarc constrictions. Number of hydrocladia per internode and arrangement variable. Proximal part of best developed stems with up to three hydrocladia per internode, arranged in a verticil alternating with previous and succeeding verticils. Following stem internodes with two hydrocladia arranged in decussate pairs. Finally, at distal end, a single hydrocladium per internode, arranged alternately, is observed.

Hydrocladia inserted on long cauline apophyses originating at distal part of internodes. Apophyses provided with a nematophore, emerging through a "mamelon" on upper surface near axil with stem, and four nematothecae: two on upper surface above "mamelon" and one more on each side of apophysis close to cauline internode. Apophyses followed by a series of alternating ahydrothecate and hydrothecate internodes. First ahydrothecate internode shorter and provided with a single nematotheca and two thin perisarc rings situated before and after the nematotheca. Distal part of ahydrothecate internode separated from proximal part of hydrothecate internode by an oblique node; distal part of hydrothecate internode separated from proximal part of ahydrothecate internodes by a transverse node.

Hydrothecate internodes with one hydrotheca and three nematothecae: one mesial inferior nematotheca and two lateral, flanking the hydrothecal aperture. Mesial inferior nematotheca on a slight proximal swelling of the internode. Nematothecae two-chambered and mobile. Hydrotheca halfway the internode, small, cup-shaped and fully adnate to internode with its adcauline wall. Abcauline hydrothecal wall straight. Hydrothecal aperture circular and abcaudally directed.

Ahydrothecate internodes approximately as long as hydrothecate ones; with two mesial nematothecae at different level. Sometimes two ahydrothecate internodes, each provided with a single nematotheca, between two hydrothecate internodes.

Hydrothecate internodes with a perisarc ring below the mesial inferior nematothe-

ca and another less well marked at the distal end. Ahydrothecate internodes also with two slight perisarc rings, one at the proximal part, below the inferior nematotheca, and another at the distal part, above the superior nematotheca. All rings much more marked on dorsal side of the internodes.

No gonothecae.

Ecology.— *Nemertesia perrieri* is a littoral and shelf species, having been found from 5 to 291 m depth (Medel & Vervoort, 1995). Medel & Vervoort (1995) found *N. perrieri* on bottoms of mixed sand and mud and on concretions of polychaete tubes. It is used as substratum by other species of hydroids (cf. Álvarez Claudio, 1993; Ansín Agís, 1998). It has been found with gonothecae in February (Álvarez Claudio, 1993), March (Ansín Agís, 1998), April (Medel & Vervoort, 1995), May (Ansín Agís, 1998), July (Medel & Vervoort, 1995) and August (Billard, 1901).

Distribution.— *Nemertesia perrieri* has mainly been found in the north-eastern Atlantic: Bay of Biscay (Billard, 1923, 1927), north of Spain (Arévalo & Carretero, 1906; Rioja & Martín, 1906; Álvarez Claudio, 1993; Álvarez Claudio & Anadón, 1995), Portugal (Da Cunha, 1940, 1944, 1950; Saldanha, 1974), Gulf of Cádiz (Billard, 1906), the Canary Islands (Billard, 1901, 1904a, 1906; Ansín Agís, 1998) and off Morocco (Patriti, 1970; Ramil & Vervoort, 1992; Ansín Agís, 1998), Mauritania (Vervoort, 1946a; Ansín Agís, 1998) and Senegal (Vervoort, 1959). There are also records from off Japan (Stechow, 1907, 1909).

In the Mediterranean it was previously only known from the Strait of Gibraltar and off the Granada and Málaga coasts in Spain (Medel & Vervoort, 1995).

Nemertesia ramosa (Lamarck, 1816)
(fig. 22d-f)

Antennularia ramosa Lamarck, 1816: 123; Hincks, 1868: 282-283, pl. 62; Billard, 1904a: 221-227, figs 86bis, 87-88.

Antennularia variabilis Broch, 1903: 10-11, pl. 4 figs 22-25.

Antennularia ramosa var. *plumularioides* Billard, 1906: 215-216.

Nemertesia ramosa; Bedot, 1917: 46; Broch, 1918: 66-69, figs 32-33; 1933: 38; Vervoort, 1946b: 182-185, figs 76b, 77; Picard, 1951c: 261; 1955: 189; García Carrascosa, 1981: 274-277, pl. 26 figs g-i, pl. 39 fig. a-c; Gili, 1986: 162-163, figs 4.32c-d, 4.56d, 4.57i; Templado et al., 1986: 98; Cornelius et al., 1990: 154, fig. 4.22; Ramil & Vervoort, 1992: 173-176, fig. 44a-f; Boero & Bouillon, 1993: 264; Vervoort, 1993: 552-553; Ramil, 1994: 260-262, pl. 46 figs b,d-e; Álvarez Claudio, 1993: 278-281, text-fig. 47, pl. 28; Medel & López González, 1996: 202; Calder & Vervoort, 1998: 47-49, fig. 23a-c; Ramil et al., 1998: 36-37; Ansín Agís, 1998: 509-520, figs 71a-c, 72a-i.

Nemertesia ramosa var. *plumularioides*; Bedot, 1917: 46; Vervoort, 1959: 293-297, figs 46b, 47; Patriti, 1970: 45, fig. 61.

Not *Nemertesia ramosa*; Billard, 1913: 58-60, fig. 49; Leloup, 1937: 47, fig. 32; Vervoort, 1966: 136-140, fig. 41; Rees & Vervoort, 1987: 133-135, fig. 28a-b.

Not *Nemertesia ramosa*: Vervoort, 1972: 234-236, fig. 82; Blanco, 1976: 57-59, pl. 8 (= *Plumularia insignis* Allman, 1883).

Material.— A-7, 57 m, single stem.— B-8, 47 m, one stem fragment.— B-13, 38 m, two stem fragments (RMNH-Coel. 29721).— CONG 26, 18 m, one stem fragment.— CONG 81, 8 m, one stem fragment.— C-3, 45 m, a few stems on stones and biodetritic remains (RMNH-Coel. 29722).— C-4, 34 m, numerous stems on stones and mollusc-shells remnants (RMNH-Coel. 29723).— C-8, 39 m, numerous stems on bivalve and echinoid remains (RMNH-Coel. 29724).— C-12, 31 m, several stems on echinoid remnants

(RMNH-Coel. 29725).— D-2, 41 m, single stem.— D-8, 30 m, numerous stems on stones and bivalve remains (RMNH-Coel. 29726).— E-2, 40 m, numerous stems on bivalve remains (RMNH-Coel. 29727).— E-7, 19 m, a few stems.— F-8, 18 m, single stem.— PISA 18, 30 m, single stem with gonothecae.

Remarks.— In the monosiphonic, plume-shaped stems it is possible to observe the primary structure. In the material from E-7, for example, one stem is provided with two basal internodes without hydrocladia but with large openings in the perisarc from which hydrorhizal stolons emerge. The basalmost internode has four holes and lacks nematothecae. The following internode, provided with a nematotheca, has a single aperture, but the stolon emerging from that opening is bifurcated; one branch goes down, but the other grows up the stem.

Ecology.— In the Mediterranean *Nemertesia ramosa* has been found from 5 (Gili, 1986) to 508 m depth (Ramil & Vervoort, 1992); our specimens comes from 8 to 57 m. Outside the Mediterranean it has been reported from 8 (Fey, 1970) to 1182 m depth (Ramil & Vervoort, 1992).

In our material *Nemertesia ramosa* was always found growing on non-living substrata, both biotic (remains of organism) and abiotic (pebbles). In the literature it has been reported from the same type of substrata (e.g., Picard, 1951c; Gili, 1986; Ramil, 1988), but also from the carapace of Decapoda of the genus *Pisa* (Broch, 1933; Roca, 1986), anthozoans (Álvarez Claudio, 1993) or directly attached in mud (García Carrascosa, 1981) or to rocks (Roca, 1986; Ramil, 1988). *Nemertesia ramosa* is used as substratum by many other species of hydroids [see Roca (1986) and Álvarez Claudio (1993)].

In the Mediterranean fertile colonies of *Nemertesia ramosa* have been found in January (Roca, 1986), February (Stechow, 1919), July (Picard, 1955) and December (Roca, 1986). In our material fertile material was collected in July. It seems to be fertile throughout the year. Outside the Mediterranean, colonies with gonothecae were collected in January (Vervoort, 1959), February (Álvarez Claudio, 1993), March (Ansín Agís, 1998), April (Teissier, 1965; Álvarez Claudio, 1993), May (Álvarez Claudio, 1993), June (Ansín Agís, 1998), from May to September (Teissier, 1965; Fey, 1970) and from August to October (Ansín Agís, 1998).

Distribution.— *Nemertesia ramosa* is restricted to the eastern Atlantic. Although Boero & Bouillon (1993) ascribed it a tropical-Atlantic distribution, Ramil & Vervoort (1992) indicated that *N. ramosa* is widely distributed in the Mediterranean and eastern Atlantic, the records from outside those areas being erroneous. It has been reported from Iceland (Broch, 1918), Sweden (Jäderholm, 1909) and Norway (Marktanner Turneretscher, 1890) to South Africa, where it penetrates the Indian Ocean up to Mozambique (Millard, 1975).

In the nearby eastern Atlantic it has been reported from the Gulf of Cádiz (Billard, 1906), the Strait of Gibraltar (Ramil & Vervoort, 1992), Ampère Bank (Ramil et al., 1998), the Azores Islands, Madeira, Selvagens Archipelago, the Canary Islands (Ansín Agís, 1998), and from off the Spanish (Ramil, 1988; Álvarez Claudio, 1993; Altuna, 1994), Portuguese (Da Cunha, 1944, 1950), Moroccan (Patriti, 1970; Ramil & Vervoort, 1992; Ansín Agís, 1998) and Mauritanian coasts (Ansín Agís, 1998). It has been recently reported from the Mid-Atlantic Ridge (Calder & Vervoort, 1998).

In the Mediterranean it has been recorded from the Adriatic (Stechow, 1919; Broch, 1933), the Alboran Sea (Templado et al., 1986), the Balearic Islands (Roca, 1986),

and from off the Algerian (Picard, 1955), French (Stechow, 1919; Leloup, 1934; Picard, 1951c), Israeli (Vervoort, 1993), Italian (Neppi, 1920; Rees & Thursfield, 1965) and Spanish coasts (García Carrascosa, 1981; Gili, 1986).

Genus *Plumularia* Lamarck, 1816.

Plumularia setacea (Linneus, 1758)
(fig. 21c-d)

Sertularia setacea Linnaeus, 1758: 813.

Plumularia setacea; Hincks, 1868: 296-299, pl. 66 fig. 1; Broch, 1918: 55; Da Cunha, 1944: 30, fig. 12; Vervoort, 1946b: 175-178, figs 24f, 73; Picard, 1952a: 349; 1955: 188; Rossi, 1961: 77; 1971: 28, fig. 10g-h; Yamada, 1965: 362; Millard, 1968: 278-279, fig. 5f-h; 1975: 399-401, fig. 124e-k; Vervoort, 1968: 64-66, fig. 29; Patriti, 1970: 54, fig. 75; García Corrales et al., 1978: 53, figs 24a-c; García Carrascosa, 1981: 262-265, pl. 24 fig. a-b, pl. 36 fig. d; Boero, 1981a: 182; Isasi, 1985: 86, fig. 25; Gili, 1986: 163-164, fig. 4.30c; Roca, 1986: 341, fig. 60; Ramil, 1988: 435-442; Ramil & Vervoort, 1992: 191-193, fig. 47f-i; Boero & Bouillon, 1993: 264; Álvarez Claudio, 1993: 290-293, text-fig. 49, pl. 30; Altuna, 1994: 267-269; Medel & López González, 1996: 202; Ramil et al., 1998: 37-38; Ansín Agís, 1998: 565-577, fig. 80a-j; Morri & Bianchi, 1999: 287.

Plumularia setacea f. *typica*; Broch, 1918: 56.

Plumularia setacea f. *microtheca*; Broch, 1918: 56; 1933: 34-35.

Material.— ISA 3, 12 m, six stems on *Cystoseira spinosa* and *Dictyota dichotoma* (RMNH-Coel. 29728).— ISA 5, 35 m, single stem on *Dendrophyllia* spec.— PISA 14, 3.3 m, single stem on *Sertularella mediterranea*.

Ecology.— *Plumularia setacea* is an eurybathic species that in the Mediterranean has been found from the tidal level (Broch, 1933; García Carrascosa, 1981; Roca, 1986) to 395 m depth (Ramil & Vervoort, 1992); our material comes from 3.5 to 35 m depth. Outside the Mediterranean it has been reported from the tidal zone (Ramil, 1988; Altuna, 1993) to 604 m depth (Ramil & Vervoort, 1992). It occurs on a wide range of substrata, showing a certain preference for other hydroid species, especially *Aglaophenia* spp. (Stechow, 1919, 1923b; Rossi, 1950, 1961; Teissier, 1975; Hughes, 1975; Isasi, 1985; Boero & Fresi, 1986; Ramil, 1988; Ramil & Vervoort, 1992; Altuna, 1994), though it has been also found on algae (Riedl, 1959; García Carrascosa, 1981; Gili, 1986; Ansín Agís, 1998), leaves and rhizomes of *Posidonia oceanica* (García Carrascosa, 1981), mollusc shells (Chas & Rodriguez, 1977; García Carrascosa, 1981; Ansín Agís, 1998), bryozoans (Ramil, 1988; Altuna, 1994; Ansín Agís, 1998), sponges (Broch, 1933; Isasi, 1985; Ramil, 1988; Altuna, 1994; Ansín Agís, 1998), cirripedes (Broch, 1933; García Carrascosa, 1981; Ramil, 1988) and even on bio-concretions (Morri & Bianchi, 1999) and epilithic (Teissier, 1965; García Carrascosa, 1981; Isasi, 1985; Gili, 1986; Ramil, 1988). We found it epibiontic on algae, hydrozoans and anthozoans.

In the Mediterranean fertile colonies were found in March (Stechow, 1923b), May (Rossi, 1961), June (Picard, 1955; Morri & Bianchi, 1999), August and September (Picard, 1952a). In the nearby eastern Atlantic, Ramil (1988) found colonies with gonothecae in February, April, June and from August to November, Teissier (1965) from March to November, Altuna (1994) from April to October, and Ansín Agís (1998) in March, May-June and from August to November.

Fig. 22. A-C, *Nemertesia perrieri* (Billard, 1901). A, stem fragment with hydrocladia; B, cauline apophysis and first ahydrothecate internode, showing nematothecae and "mamelon"; C, ahydrothecate and hydrothecate internodes showing hydrotheca and nematothecae. D-F, *Nemertesia ramosa* (Lamarck, 1816). D, stem fragment with hydrocladia; E, cauline apophysis showing nematothecae and "mamelon"; F, hydrothecate internode showing hydrotheca and nematothecae. Scale bar: 100 μm (B-C, E-F), 500 μm (A, D).

Distribution.— Boero & Bouillon (1993) considered *Plumularia setacea* a cosmopolitan species. However, it is absent in polar waters, though in the warmer waters of the Atlantic and the Pacific it reaches the south coasts of Iceland (Broch, 1918) and the southern part of the Gulf of Alaska (Fraser, 1937, 1946), respectively. In eastern Atlantic it has been reported from Iceland (Broch, 1918), Sweden (Jäderholm, 1909) and Norway (Bonnevie, 1899), to South Africa (Millard, 1975).

In the Mediterranean it is known from the Adriatic (Broch, 1912, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986), and from off the Algerian (Picard, 1955), French (Stechow, 1919; Leloup, 1934; Picard, 1952a), Greek (Yamada, 1965), Italian (Stechow, 1923b; Rossi, 1961; Boero & Fresi, 1986), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Family Syntheciidae Marktanner Turneretscher, 1890
Genus *Synthecium* Allman, 1872

Synthecium evansii (Ellis & Solander, 1786)
(fig. 23a-b)

Sertularia evansii Ellis & Solander, 1786: 58, no. 35.
Dynamena tubulosa; Heller, 1868: 35, figs 5-6.
Synthecium evansii; Marktanner Turneretscher, 1890: 248; Broch, 1912: 47, fig. 15; Stechow, 1919: 82; 1923b: 150; Leloup, 1934: 11-12, figs 1-2; Picard, 1951b: 278; 1951c: 261; Rossi, 1961: 81; De Haro, 1965: 11, fig. 7; García Corrales et al., 1979: 33, fig. 18; Cornelius, 1979: 307; 1980: 7-8; Boero, 1981a: 182; Gili, 1982: 69, fig. 31; 1986: 166-167, figs 4.25d, 4.54d; Izquierdo et al., 1986a: 93, fig. 9; Boero & Fresi, 1986: 146; Roca, 1986: 440-444, fig. 75; Carcía Carrascosa et al., 1987: 371; Ramil & Vervoort, 1992: 230-232, fig. 65; Boero & Bouillon, 1993: 264; Medel & López González, 1996: 205.
Synthecium tubulosum; Picard, 1958a: 192; Marinopoulos, 1981: 176.

Material.— CONG 79, 17 m, stem fragment (RMNH-Coel. 29729).

Ecology.— *Synthecium evansii* is an eurybathic species; in the Mediterranean it has been found from 2 (Boero & Fresi, 1986) to 250 m depth (Marinopoulos, 1981); our material was collected at 17 m. Outside the Mediterranean Ramil & Vervoort (1992) found it up to 523 m depth. It grows on a wide range of substrata, such as sponges (Boero & Fresi, 1986; Roca, 1986), hydrozoans (Ramil & Vervoort, 1992), mollusc shells (Roca, 1986), on bio-concretions (Boero & Fresi, 1986), and even epilithic (Izquierdo et al., 1986a; Roca, 1986). It is used in turn as substratum by other hydroids (cf. Roca, 1986; Boero & Fresi, 1986).

In the Mediterranean fertile colonies of *S. evansii* have been collected in July and September (Gili, 1982; 1986) and October and November (Boero & Fresi, 1986).

Distribution.— *Synthecium evansii* was formerly considered an endemic of the Mediterranean (Picard, 1958a). Presently it is also known to occur outside that area, having been recorded from off the Canary Islands (Izquierdo et al., 1986a) and the Atlantic west of the Strait of Gibraltar (Ramil & Vervoort, 1992). *Synthecium evansii*, therefore, is distributed in the Mediterranean and Mauritanian provinces.

In the Mediterranean it is known from the Adriatic (Marktanner Turneretscher, 1890; Broch, 1912), off the Balearic Islands (Roca, 1986), the Columbretes Islands (Gar-

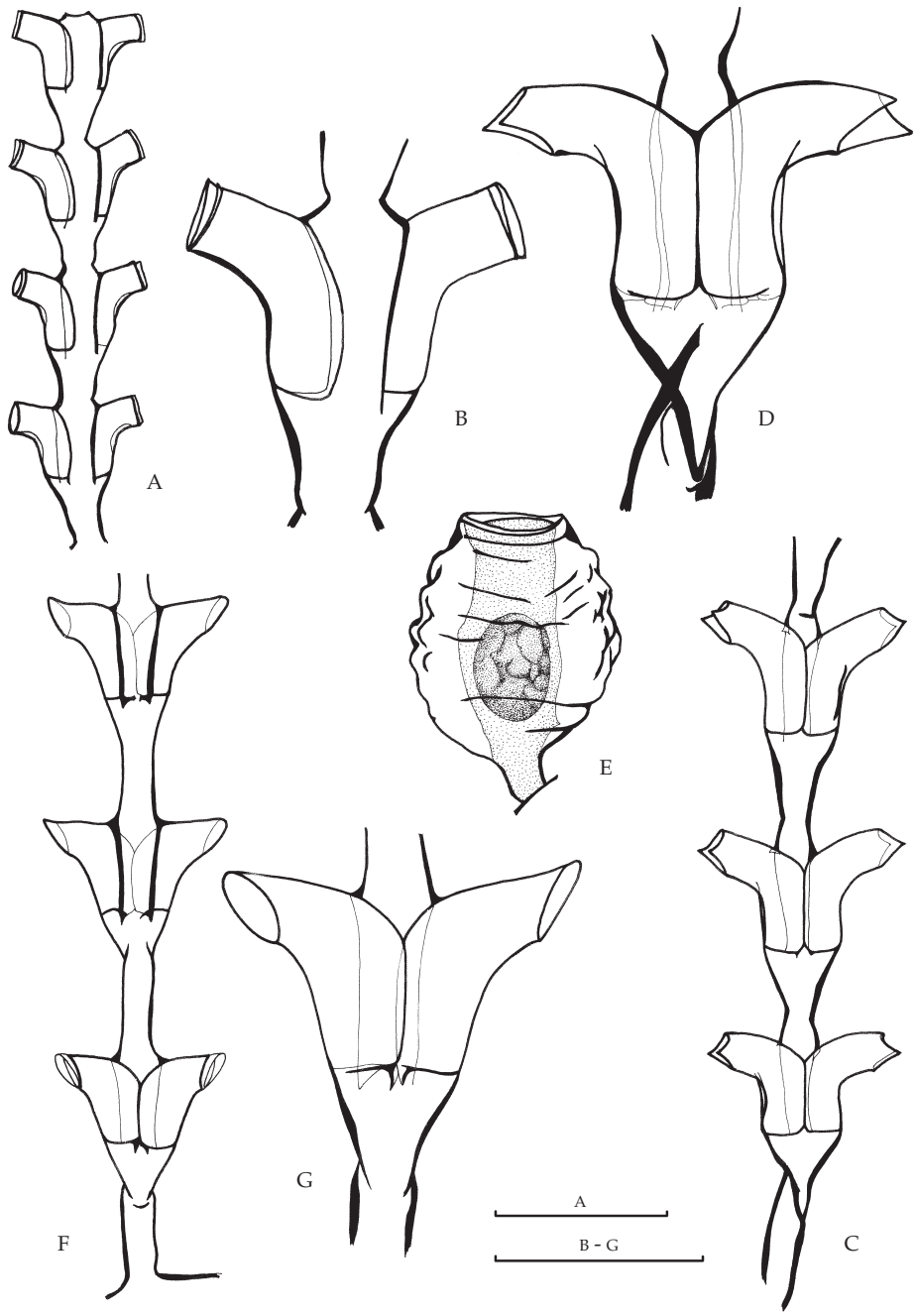

Fig. 23. A, B, *Synthecium evansii* (Ellis & Solander, 1786). A, stem showing hydrothecal arrangement; B, hydrothecae. C-E, *Dynamena disticha* (Bosc, 1802). C, stem showing hydrothecal arrangement; D, hydrothecae; E, gonotheca. F, G, *Salacia desmoides* (Torrey, 1902). F, stem showing hydrothecal arrangement; G, hydrothecae. Scale bar: 250 μm (D, G), 500 μm (B-C, E-F), 1 mm (A).

cía Carrascosa et al., 1987) and off the French (Stechow, 1919; Leloup, 1934; Picard, 1951b, c), Italian (Stechow, 1919, 1923b; Rossi, 1961; Boero & Fresi, 1986) and Spanish coasts (De Haro, 1965; García Corrales et al., 1979; Gili, 1986).

Family Sertulariidae Lamouroux, 1812

Genus *Dynamena* Lamouroux, 1812

Dynamena disticha (Bosc, 1802)

(fig. 23c-e)

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

Dynamena cornicina McCrady, 1859: 204; Da Cunha, 1944: 53, fig. 28; Vervoort, 1967: 40-42, fig. 11; Patriti, 1970: 41, fig. 54bis; Millard & Bouillon, 1973: 68; Millard, 1975: 261-263, fig. 86a-e; García Corrales et al., 1980: 12, fig. 3; García Carrascosa, 1981: 227, pl. 19 figs a-e, pl. 35 fig. a; Calder, 1983: 9-11, figs 1-2; Gili, 1986: 118-119, fig. 4.21d-e; Izquierdo et al., 1990: 34, fig. 3.

Sertularia densa Stechow, 1919: 93, fig. j.

Dynamena densa; Stechow, 1923b: 164.

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

Dynamena disticha; Picard, 1958b: 2; Rossi, 1961: 83-84; Roca, 1986: 461, fig. 78; Boero, 1981a: 182, 184; Calder, 1991: 93-96, fig. 50a-c; Medel et al., 1991: 507-510, fig. 2; Boero & Bouillon, 1993: 264; Vervoort, 1993: 554; El Beshbeeshy, 1994b: 146-148, fig. 1b; 1995a: 313-315; Medel & Vervoort, 1998: 25-29, fig. 7; Medel & López González, 1996: 204; Migotto, 1996: 62-64, fig. 12a-c.

Material.— CONG 2, 1 m, four stems interwoven with sponges.— CONG 8, 10 m, several stems on *Cystoseira spinosa* (RMNH-Coel. 29730).— CONG 28, 9 m, several colonies on *Flabellia petiolata* and *Salmacina* spec., with gonothecae (RMNH-Coel. 29731).— CONG 44, 3 m, a few stems on *Flabellia petiolata* and *Peyssonnelia rubra* (RMNH-Coel. 29732).— CONG 46, 5 m, two colonies on *Corallina elongata* and *Peyssonnelia coriacea*.— CONG 57, 10.5 m, six stems on *Padina pavonia*.— CONG 62, 5 m, five stems on *Cystoseira spinosa*.— CONG 72, 7 m, several stems on *Sargassum* spec. and *Cystoseira spinosa* (RMNH-Coel. 29733).— CONG 73, 10 m, two stems on *Acrosorium uncinatum*.— CONG 81, 8 m, single stem with two hydrothecae.— CONG 82, 5 m, four stems on *Flabellia petiolata*.— CONG 83, 5 m, four stems on *Codium vermilara*.— ISA 3, 12 m, one stem with three pairs of hydrothecae.— ISA 12, 5 m, numerous stems on *Plocamium cartilagineum*, *Caberea boryi* and cirripedes, with gonothecae (RMNH-Coel. 29734).— PCONG 2, 3 m, one stem on *Eudendrium racemosum*.— PCONG 6, 2 m, a few stems on *Haraldia lenormandii* and *Eudendrium racemosum* (RMNH-Coel. 29735).— PISA 3, 3 m, numerous stems on *Plocamium cartilagineum*, with gonothecae (RMNH-Coel. 29736).— PISA 13, 2 m, several stems on *Amphiroa rigida* and *Acrosorium uncinatum* (RMNH-Coel. 29737).— PISA 19, 2 m, numerous stems on *Amphiroa cryptarthodia* and *Acrosorium uncinatum*, with gonothecae (RMNH-Coel. 29738).— PISA 21, 2 m, numerous stems on *Rhodophyllis divaricata*, *Valonia utricularis* and *Balanus* spec., with gonothecae (RMNH-Coel. 29739).— PISA 24, 2 m, a few stems on *Plocamium cartilagineum*, with gonothecae.— REY 6, 10 m, numerous stems on *Cystoseira spinosa*, *Rhodymenia ardissonei* and *Aglaophenia pluma*, with gonothecae (RMNH-Coel. 29740).— REY 17, 2 m, three stems on *Peyssonnelia coriacea*.— REY 24, 0 m, several stems on *Pterocladia capillacea*, with gonothecae (RMNH-Coel. 29741).

Remarks.— The present material consists of colonies with stems having up to 18 pairs of hydrothecae. Up to five gonothecae occur per stem and, sometimes, two gonothecae per internode.

Ecology.— In the Mediterranean *Dynamena disticha* has been found from the tidal level (Roca, 1986) to 60 m depth (García Carrascosa, 1981). Our material was collected

from the tidal level to 12 m. Outside the Mediterranean it has been reported reaching considerable depths, e.g., 250 m depth (Gili et al., 1989).

Dynamena disticha has frequently been reported growing epibiontic on algae (Stechow, 1919, 1923b; Leloup, 1934; Rossi, 1961; García Carrascosa, 1981; Roca, 1986; Gili, 1986; Medel & Vervoort, 1998; etc.), but also on leaves and rhizomes of *Posidonia oceanica* (Picard, 1952b; García Carrascosa, 1981; Gili, 1986), hydroids (Migotto, 1996; Medel & Vervoort, 1998), polychaete tubes (Riedl, 1959; García Carrascosa, 1981; Medel & Vervoort, 1998), mollusc shells (Medel & Vervoort, 1998), bryozoans (García Carrascosa, 1981; Roca, 1986), sponges, cirripedes and holothurians (Migotto, 1996), or even epilithic (Gili, 1986). In our material, *D. disticha* was always found on other organisms, with a clear preference for the algae (c. 75% of the records), preferently sciaphilic or hemiphotophilic, such as *Acrosorium uncinatum*, *Flabellia petiolata*, *Peyssonnelia coriacea*, *Plocamium cartilagineum*, *Cystoseira spinosa*, etc. The remaining records are from sponges, hydrozoans, bryozoans, polychaete tubes and cirripedes. *Dynamena disticha* may be used in turn as substratum by other species of hydroids. Thus, Calder (1983) found colonies of *Hebella scandens*, and in our material we observed colonies of *Filellum* spec., *Halecium delicatulum* and *Sertularia distans*.

In the Mediterranean the species has been found with gonothecae in February (Gili, 1986), June (Gili, 1986; Roca, 1986), July (Boero & Fresi, 1986; Roca, 1986; Vervoort, 1993), August and September (Picard, 1952a; Boero & Fresi, 1986) and October and November (Boero & Fresi, 1986). Our material with gonothecae was collected in July and August. It seems to be fertile throughout the year.

Distribution.— Millard (1975) and Boero & Bouillon (1993) ascribe *Dynamena disticha* a cosmopolitan distribution; it is absent, however, from the polar regions. Vervoort (1993) thought its distribution was circumglobal, being widely scattered over tropical, subtropical and temperate waters. In eastern Atlantic it has been reported from the Gulf of Cádiz (Medel et al., 1990), the Azores (Medel & Vervoort, 1998), the Canary Islands (Izquierdo et al., 1990; Medel & Vervoort, 1998), the Cape Verde Islands (Medel & Vervoort, 1998), and the coasts of Portugal (Da Cunha, 1944), Morocco (Patriti, 1970), Mauritania (Medel & Vervoort, 1998), Senegal (Picard, 1951a), Guinea Bissau (Gili et al., 1989) and South Africa (Millard, 1975).

In the Mediterranean it is known from the Adriatic (Broch, 1933), off the Balearic Islands (Gili, 1986; Roca, 1986), Ceuta (Medel et al., 1990), and the Egyptian (Billard, 1936; El Beshbeeshy, 1994b; 1995a), French (Stechow, 1919; Picard, 1952a), Greek (Marinopoulos, 1979), Israeli (Picard, 1958b; Vervoort, 1993), Italian (Stechow, 1923b; Rossi, 1961; Boero, 1981a), Spanish (García Corrales et al., 1980; García Carrascosa, 1981; Gili, 1986), Syrian (Billard, 1931a) and Turkish coasts (Marinopoulos, 1979).

Genus *Salacia* Lamouroux, 1816

Salacia desmoides (Torrey, 1902)
(fig. 23f-g)

Sertularia desmoides Torrey, 1902: 6, pl. 8 figs 70-72; Fraser, 1937: 161-162, pl. 37 fig. 104.
Dynamena dubia Billard, 1922b: 344-348, fig. 1a-c.
Dymella dubia; Stechow, 1923b: 167.
Salacia dubia; Billard, 1924: 66; Fey, 1970: 398.

Salacia desmoides; Millard, 1975: 274, figs 90a-c; García Carrascosa, 1981: 231, pl. 20 figs a-e, pl. 35 figs b-c; Isasi, 1985: 81, figs 23a-d; Boero & Fresi, 1986: 146; Ramil, 1988: 338-342; Medel et al., 1991: 510-512, fig. 3; Boero & Bouillon, 1993: 264; Altuna, 1994: 280-284, pl. 51 figs a-e; Medel & López González, 1996: 204; Medel & Vervoort, 1998: 30-32.
Dynamena desmoidis; Picard, 1951c: 261; Boero, 1981a: 182 (incorrect sub-sequent spelling).
Sertularia dubia; Patriti, 1970: 40, figs 53a-d.
Salacia cantabrica García Corrales et al., 1980: 17, fig. 5.

Material.— A-12, 41 m, several stems.— B-10, 41 m, three stems.— CONG 8, 10 m, several stems on *Cystoseira spinosa* and *Acrosorium uncinatum* (RMNH-Coel. 29742).— CONG 33, 0 m, numerous stems on rocks, *Flabellia petiolata*, *Peyssonnelia rubra*, *Acrosorium uncinatum*, *Halopteris filicina* and *Chama gryphoides* (RMNH-Coel. 29743).— CONG 44, 3 m, numerous stems on *Flabellia petiolata* and *Peyssonnelia rubra* (RMNH-Coel. 29744).— CONG 70, 4.5 m, numerous stems on *Acrosorium uncinatum* (RMNH-Coel. 29745).— CONG 74, 11 m, numerous stems on *Sphaerococcus coronopifolius* and rhizomes of *Posidonia oceanica* (RMNH-Coel. 29746).— CONG 75, 12 m, several stems on *Acrosorium uncinatum*, rhizomes of *Posidonia oceanica* and *Pentapora* spec. (RMNH-Coel. 29747).— CONG 76, 13 m, a few stems on *Jania* spec.— C-10, 39 m, one stem fragment.— G-2, 38 m, two stems.— ISA 7, 15 m, a few stems on *Cystoseira spinosa*.

Remarks.— The present material consists of stems with up to 15 pairs of hydrothecae.

Ecology.— In the Mediterranean *Salacia desmoides* has been found from 4 (Boero & Fresi, 1986) to 22 m depth (García Carrascosa, 1981); our material comes from the tidal level to 41 m. Outside the Mediterranean it has been reported from the tidal level (Isasi, 1985; Ramil, 1988) to 350 m depth (Medel & Vervoort, 1998). It has been reported from a wide range of substrata, such as algae (García Carrascosa, 1981; Boero & Fresi, 1986; Medel & Vervoort, 1998), rhizomes of *Posidonia oceanica* (García Carrascosa, 1981; Gili, 1986), on *Cymodocea* (García Carrascosa, 1981), bryozoans (García Carrascosa, 1981; Medel & Vervoort, 1998), ascidians (García Carrascosa, 1981) and on hydrozoans, polychaete tubes, shell fragments, fishing lines and stones (Medel & Vervoort, 1998). In our material, we observed it primarily on algae and rhizomes of *Posidonia oceanica* (> 83% of the occasions), being mainly sciaphilic and hemiphotophilic algae, such as *Acrosorium uncinatum*, *Flabellia petiolata*, *Peyssonnelia rubra*, *Sphaerococcus coronopifolius*, *Cystoseira spinosa*, etc. Occasionally, it was also observed on bryozoans, bivalves and found epilithic. *Salacia desmoides* may in turn be used as substratum by other hydroids. Altuna (1994) observed epibiontic colonies of *Hebella scandens* and we found colonies of *Filellum serratum*, *Scandia gigas* and *Sertularia distans*.

In the Mediterranean fertile colonies of *Salacia desmoides* have been found in July (Boero & Fresi, 1986) and August and September (Picard, 1951c). Outside the Mediterranean colonies with gonothecae were reported in April (Billard, 1926), June and July (Altuna, 1994), August (Fey, 1970; Isasi, 1985; Ramil, 1988) and October (Fey, 1970). At temperate latitudes it seems to be fertile throughout the year, with the exception of winter.

Distribution.— Boero & Bouillon (1993) assigned to *Salacia desmoides* a Mediterranean-Atlantic distribution. However, it seems to have a much wider distribution, considered as Indo-Pacific by García Carrascosa (1981). This is supported by the absence of records from the western Atlantic. In the eastern Atlantic, it has been reported from off western France (Billard, 1926; Fey, 1970), Basque country (Isasi,

1985; Altuna, 1994), Galicia (Ramil, 1988), Azores (Leloup, 1940; Medel & Vervoort, 1998), Morocco (Patriti, 1970), the Canary Islands (Izquierdo et al., 1990; Medel & Vervoort, 1998), Mauritania (Billard, 1931b) and the Cape Verde Islands (Leloup, 1940; Medel & Vervoort, 1998).

There are few records of *Salacia desmoides* from the Mediterranean. It is known from off the French (Picard, 1951c), Italian (Boero & Fresi, 1986), Spanish (García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Genus *Sertularella* Gray, 1848

Remarks.— The taxonomy of species of *Sertularella* is complicated; this also concerns those from the Mediterranean. Picard (1956) published a critical revision of the Mediterranean species of *Sertularella*. Two species amongst those recorded and discussed here, *S. polyzonias* (Linnaeus, 1758) and *S. ellisii* (Deshayes & Milne-Edwards, 1836), were also studied by Picard (1956). He credited *S. ellisii* with a huge morphological variability, including a series of forms (f. *ellisii*, f. *lagenoides*, f. *mediterranea*, f. *ornata* and f. *spelea*) conditioned by environmental factors. Later, Cornelius (1979) sank *Sertularella ellisii*, *S. fusiformis* (Hincks, 1861) and *S. mediterranea* Hartlaub, 1901a in the synonymy of *S. gaudichaudi* (Lamouroux, 1824), described from the Falkland Islands. Recently Ramil et al. (1992), in a study of Galician species of *Sertularella*, discussed those species at length and rejected Cornelius's (1979) suggestions. García Corrales et al. (1980) were of the opinion that *S. gaudichaudi* sensu Cornelius (1979) included at least three species, *S. gaudichaudi*, *S. picta* (Meyen, 1834) and *S. fusiformis*. Ramil et al. (1992) identified the first two species as *S. ellisii* and *S. mediterranea*, respectively. They pointed out that *S. gaudichaudi* and *S. picta* are species from the southern hemisphere much different from the European species of *Sertularella*. In the present study we have basically followed the ideas of Ramil et al. (1992) but have added *Sertularella lagenoides* Stechow, 1919, that is here considered a valid species that may have been present in part of the material identified by Ramil et al. as *S. fusiformis*. Finally we like to point out that in our opinion all the species of the genus considered in this study are well characterized from a morphological and ecological point of view.

Sertularella ellisii ellisii (Deshayes & Milne Edwards, 1836) (fig. 24a-c)

Corallina minus ramosa alterna vice denticulata...p.p. Ellis, 1756: 19-20, pl. 2 figs b,B.
Sertularia Ellisii Deshayes & Milne Edwards, 1836: 142-143.
Sertularella ellisi; Stechow, 1923b: 193-194, fig. D[1]b; Morri, 1980: 8; 1981b: 89; García Carrascosa, 1981: 216, pl. 15 figs a-i; Morri & Martini, 1981: 308.
Sertularella fusiformis f. *glabra*; Broch, 1933: 69-73, figs 27-28.
Sertularella polyzonias var. *ellisi*; Leloup, 1934: 14.
Sertularella fusiformis f. *typica*; Picard, 1955: 192.
Sertularella ellisii f. *ellisii*; Picard, 1956: 264-265, figs 1a, 2a, 3d-e.
Sertularella ellisi p.p. Rossi, 1961: 81, fig. 1.
Sertularella ellisi f. *ellisi*; Teissier, 1965: 23.
Sertularella ellisi f. *Ellisi*; Fey, 1970: 399.
Sertularella gaudichaudi p.p. Cornelius, 1979: 282-284, fig. 20; Boero & Fresi, 1986: 146.
Sertularella gaudichaudi; García Corrales et al., 1980: 30-33, fig. 10; Morri, 1981a: 85, figs 29a-e, pl. 1 fig.

10; Boero, 1981a: 182, 184-185; Altuna et al., 1984: 134; Gili, 1986: 127-128, figs 4.22a-c, 4.57a; Templado et al., 1986: 98; Roca, 1986: 486, fig. 81.

Sertularella ellisii; Ramil, 1988: 343-347, pl. 19; Ramil et al., 1992: 503-507, figs 6-7; Vervoort, 1993: 555; Medel & López González, 1996: 204; Morri & Bianchi, 1999: 287.

Sertularella sp. Medel et al., 1991: 531, fig. 12.

Sertularella gr. *ellisii* p.p. Altuna, 1994: 287-297, pl. 53 figs a-e, pl. 54 figs a-c, pl. 55, figs a-c.

Sertularella ellisii ellisii; Medel & Vervoort, 1998: 33-39, figs 8a-b, d-f, 9a-c.

Material.— CONGRESO BANK, four stems.— CONG 7, 19 m, a few stems on *Heterosiphonia crispella* and *Aglaozonia chilosa* (RMNH-Coel. 29748).— CONG 8, 10 m, several stems on *Cystoseira spinosa* (RMNH-Coel. 29749).— CONG 25, 25 m, a few stems on sponges (RMNH-Coel. 29750).— CONG 26, 18 m, four stems on incrusting calcareous algae, *Peyssonnelia bornetii* and *Halopteris filicina*.— CONG 28, 9 m, five stems on *Flabellia petiolata* (RMNH-Coel. 29751).— CONG 32, 7 m, three stems on bio-concretions and *Halopteris scoparia*.— CONG 33, 9 m, two stems on *Halopteris filicina*.— CONG 42, 8 m, a stem fragment.— CONG 54, 16.8 m, numerous stems on *Rhodophyllis divaricata*, *Eunicella* spec. and *Turbicellepora* spec. (RMNH-Coel. 29752).— CONG 57, 10.5 m, three stems on *Cystoseira spinosa*.— CONG 59, 9 m, a few stems on *Peyssonnelia rubra* and *Halopteris filicina* (RMNH-Coel. 29753).— CONG 60, 8.5 m, single stem.— CONG 71, 5 m, two stems on *Halopteris scoparia*.— CONG 73, 10 m, a few stems.— CONG 74, 11 m, numerous stems on *Sphaerococcus coronopifolius* and rhizomes of *Posidonia oceanica* (RMNH-Coel. 29754).— CONG 75, 12 m, three stems on *Halopteris filicina* and *Pentapora* spec.— CONG 76, 13 m, eight stems on *Cystoseira spinosa* and sponges (RMNH-Coel. 29755).— CONG 77, 20.5 m, a single stem on *Halopteris filicina*.— CONG 79, 17 m, several stems on *Adeonella* spec., with gonothecae (RMNH-Coel. 29756).— C-12, 31 m, two stems on remnants of bryozoans.— D-2, 41 m, a mass of stems with gonothecae (RMNH-Coel. 29757).— D-3, 24 m, three stems.— F-2, 40 m, numerous stems on remnants of bryozoans and anthozoans (RMNH-Coel. 29758).— F-8, 18 m, numerous stems on *Cystoseira spinosa* and *Gracilaria* spec. (RMNH-Coel. 29759).— F-17, 21 m, on *Chaetomorpha* spec.— G-2, 38 m, numerous stems on *Cystoseira spinosa*, with gonothecae (RMNH-Coel. 29760).— G-8, 17 m, several stems on *Cystoseira zosteroides* and remnants of *Posidonia oceanica* scales (RMNH-Coel. 29761).— H-12, 14 m, two stem fragments.— ISA 9, 12 m, several stems on bryozoans (RMNH-Coel. 29762).— ISA 10, 10 m, a few stems on *Corallina elongata*, *Cystoseira spinosa* and gorgonians (RMNH-Coel. 29763).— ISA 16, 7 m, four stems on *Corallina elongata*.— ISA 24, 10 m, two stems on *Halopteris scoparia*.— PCONG 5, 3 m.— PISA 18, 30 m, a few stems (RMNH-Coel. 29764).— PREY 1, 13 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29765).— REY 5, 20 m, two stems on *Cystoseira spinosa*.— REY 6, 10 m, a few stems on *Halopteris scoparia* (RMNH-Coel. 29766).

Remarks.— The present material consists of colonies with monosiphonic stems up 30 mm high. The hydrothecal diameter increases from the base up to the point where the adcauline wall becomes free and then decreases towards the hydrothecal aperture. Consequently, the diameter at the hydrothecal aperture and its proximal part is similar, but approximately half of that found at the inflexion point of the adcauline wall. The hydrotheca is free for half or more of the adcauline wall. The free part of the adcauline hydrothecal wall is straight, but slightly concave just below the hydrothecal rim. The abcauline hydrothecal wall is straight. Sometimes the hydrotheca has a short distal neck. Hydrothecae with three or five intrathecal cusps. Three large cusps, two adcauline and one abcauline, are always present. Two more small cusps may be present, one on each side of the large abcauline cusp. A few hydrothecae have one short hydrothecal renovation. The ovoid gonotheca is c. 1800 μm long and c. 900 μm wide; it is provided with four blunt distal cusps.

Ecology.— *Sertularella ellisii ellisii* seems to be a littoral and shelf species that, in the Mediterranean, has been found from the tidal level (Broch, 1933) to 90 m depth (García Carrascosa, 1981). Our material was collected from 3 to 41 m. Outside the

Mediterranean, it has been reported from the tidal level (Isasi, 1985; Ramil et al., 1992) to 180 m depth (Medel & Vervoort, 1998).

Sertularella ellisii ellisii can be found on a wide range of substrata. In our material it showed a preference for algae and *Posidonia oceanica* (> 70% of the records). Concerning the former, these were mainly hemiphotophilic or sciaphilic algae, such as *Cystoseira spinosa*, *Halopteris filicina*, *Peyssonnelia bornetii*, *P. rubra*, *Sphaerococcus coronopifolius*, etc., whereas in *P. oceanica* it was found on the rhizomes. The remaining records are from bryozoans, anthozoans, sponges, bio-concretions and biodetritic remains. Moreover, it has been reported epibiontic on rhizomes of *Cymodocea nodosa* (García Carrascosa, 1981) and leaves of *P. oceanica* (Boero, 1981a; García Carrascosa, 1981), on polychaete tubes (Isasi, 1985; Medel & Vervoort, 1998), hydrozoans (Vervoort, 1993; Medel & Vervoort, 1998) and ascidians (Ramil, 1988), and even epilithic (Isasi, 1985; Gili, 1986; Ramil, 1988; Medel & Vervoort, 1998). In our material, it also served as support for other species of hydroids, such as *Filellum* spec., *Halecium delicatulum*, *H. lankesteri*, *Campanularia hincksii*, *Clytia gracilis*, *C. linearis* and *C. paulensis*.

In the Mediterranean it has been found with gonothecae in April (Picard, 1955; Gili, 1986), May (Medel et al., 1991) and November (Rossi, 1961). In our material, fertile colonies were collected in July and August. In the European Atlantic fertile colonies have been reported from July to November (Teissier, 1965), from June to August (Fey, 1970) and from February to May and in September (Ramil et al., 1992). It seems therefore to be fertile throughout the year, with the exception of winter.

Distribution.— *Sertularella ellisii ellisii* seems to be restricted to the Lusitanian, Mauritanian and Mediterranean provinces.

In the Atlantic it has been reported from off the north-western and west coasts of France (Teissier, 1965; Fey, 1970), Spain (Isasi, 1985; Ramil, 1988; Altuna, 1994), Mauritania, the Azores, and Canary and Cape Verde Islands (Medel & Vervoort, 1998).

In the Mediterranean it has been recorded from the Adriatic (Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986), and from off the Algerian (Picard, 1955), French (Picard, 1956), Israeli (Vervoort, 1993), Italian (Boero & Fresi, 1986), Spanish (García Corrales et al., 1980; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Sertularella ellisii ornata Broch, 1933
(fig. 24d)

Sertularella fusiformis f. *ornata* Broch, 1933: 74, fig. 29; Picard, 1955: 192.
Sertularella fusiformis var. *ornata*; Picard, 1955: 192.
Sertularella ellisii f. *ornata*; Picard, 1956: 265, fig. 3f.
Sertularella ellisi p.p. Rossi, 1961: 81; Gili, 1986: 126-127, fig. 4.23a-c, 4.54a.
Sertularella ellisii f. *spelea*; Riedl, 1966: 134.
Sertularella ellisi f. *ornata*; García Carrascosa, 1981: 219, pl. 16 figs a-h.
Sertularella gaudichaudi p.p. Boero & Fresi, 1986: 146.
Sertularella ornata; Medel et al., 1991: 526-528, fig. 10; Vervoort, 1993: 555-556; Morri & Bianchi, 1999: 287.
Sertularella ellisii ornata; Medel & Vervoort, 1998: 39-40, fig. 8c.

Material.— CONGRESO BANK, a few stems on seaweeds and *Eudendrium racemosum* (RMNH-Coel. 29767).— C-4, 34 m, one stem.— CONG 16, 8 m, numerous stems on *Lithophyllum expansum* (RMNH-

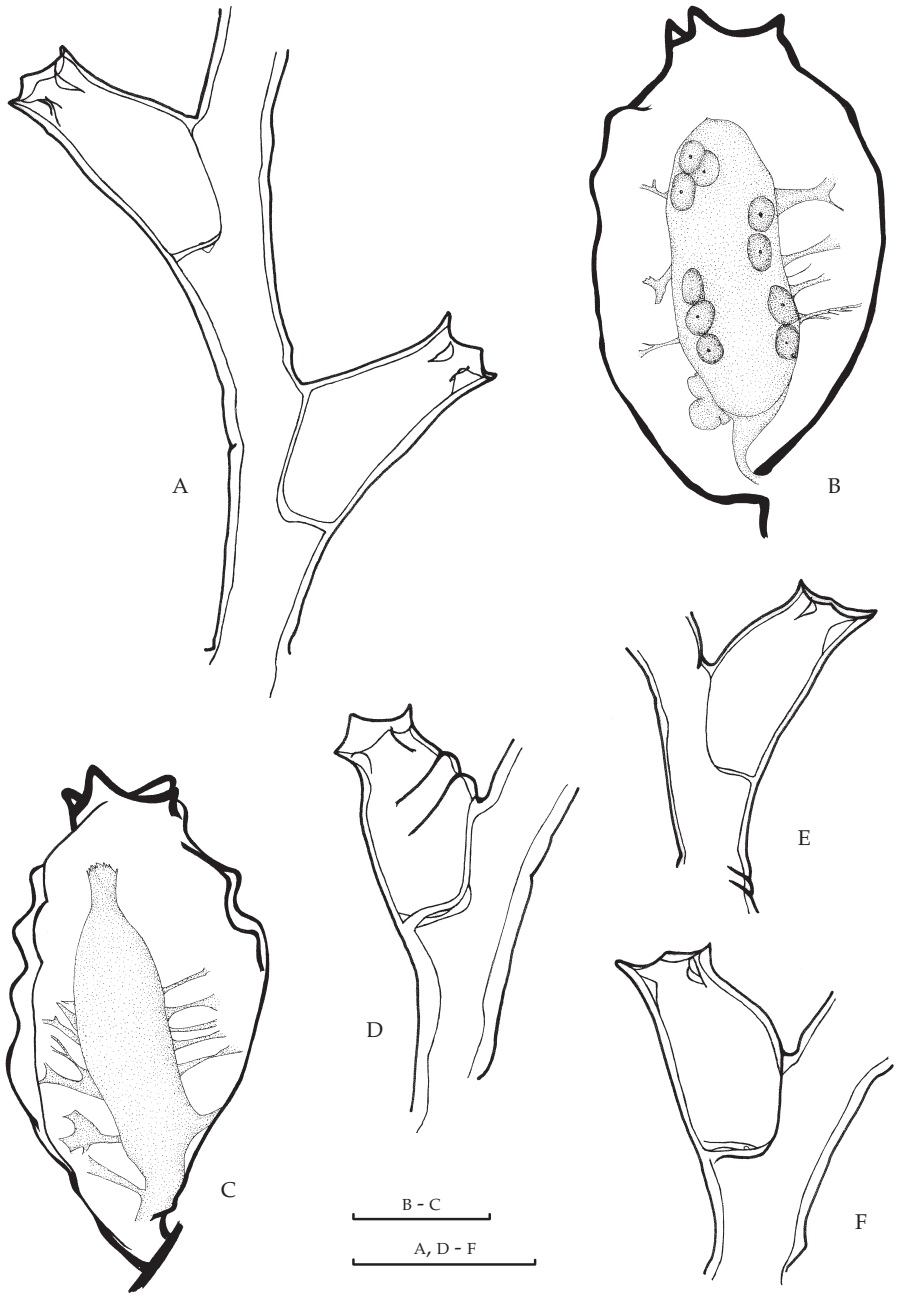

Fig. 24. A-C, *Sertularella ellisii ellisii* (Deshayes & Milne Edwards, 1836). A, hydrothecae; B, female gonotheca; C, male gonotheca. D, *Sertularella ellisii ornata* Broch, 1933, hydrotheca. E, F, *Sertularella mediterranea* Hartlaub, 1901, hydrothecae. Scale bar: 500 μm.

Coel. 29768).— CONG 25, 25 m, several stems on incrusting calcareous algae and *Eudendrium rameum* (RMNH-Coel. 29769).— CONG 54, 16.8 m, a few stems (RMNH-Coel. 29770).— CONG 56, 15 m, seven stems (RMNH-Coel. 29771).— E-2, 40 m, numerous stems on biodetritic remains (RMNH-Coel. 29772).— ISA 6, 28 m, one stem (one hydrotheca) on pebbles.— ISA 22, 15 m, one stem.— REY 4, 27 m, a few stem fragments in bad condition.

Remarks.— *Sertularella ellisii ornata* shares with *S. ellisii ellisii* the colonial structure. However it differs in the shape of the hydrothecae. *Sertularella ellisii ornata* has two strongly marked ribs, thinning laterally, on the free part of the adcauline hydrothecal wall; the hydrothecal diameter distinctly decreases at the distal part forming a kind of hydrothecal neck. There are three internal cusps, two adcauline and another abcauline; almost every hydrotheca has renovations of the hydrothecal aperture.

We have kept both subspecies of *S. ellisii* separate because of differences in shape of the hydrothecae and because the subspecies *ornata* seems to be well characterized from an ecological point of view, being always associated with sciaphylic habitats.

Medel et al. (1991) considered both forms as different species, i.e. *Sertularella ellisii* (Deshayes & Milne Edwards, 1836) and *Sertularella ornata* Broch, 1933; Medel & Vervoort (1998) distinguish them as subspecies. We have here distinguished two subspecies, waiting for a more comprehensive study to determine if we are dealing with one variable species or two different species.

Ecology.— *Sertularella ellisi ornata* is a littoral and shelf species that, in the Mediterranean, has been found from 4 (Broch, 1933) to 120 m depth (García Carrascosa, 1981); our material comes from 8 to 40 m. Outside the Mediterranean, Medel & Vervoort (1998) found it from 30 to 92 m depth.

It has been reported growing on rhizomes of *Posidonia oceanica* (Rossi, 1961; García Carrascosa, 1981), algae, incrusting calcareous algae, ascidians, bryozoans, anthozoans (García Carrascosa, 1981), hydrozoans (Medel & Vervoort, 1998), shells of *Pecten* spec. (Vervoort, 1993) and recovered instruments (Morri & Bianchi, 1999). In our material, it was observed epibiontic on algae (*Lithophyllum expansum* and other incrusting calcareous algae) and hydrozoans (*Eudendrium rameum* and *E. racemosum*), on biodetritic remains and on pebbles. It was used in turn as substratum by other hydroids (*Egmundella amirantensis* and *Clytia paulensis*).

Only a few records of fertile colonies are known. Medel et al., (1991) found gonothecae in May and Broch (1933) in June and November.

Distribution.— *Sertularella ellisii ornata* is a characteristic Mediterranean form, although Medel & Vervoort (1998) reported it also from off the Cape Verde Islands. In the Mediterranean it has been reported from the Adriatic (Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Strait of Gibraltar Strait (Medel et al., 1991) and off the Algerian (Picard, 1955), Israeli (Vervoort, 1993), Italian (Rossi, 1961; Boero & Fresi, 1986) and Spanish coasts (García Carrascosa, 1981; Gili, 1986).

Sertularella fusiformis (Hincks, 1861)
(fig. 25a-b)

Sertularia fusiformis Hincks, 1861: 253, pl. 6 figs 7-8.

Sertularella fusiformis; Hincks, 1868: 243, pl. 47 fig. 4; Stechow, 1919: 84-86, fig. B[1]; 1923: 180, figs W-X; García Corrales et al., 1980: 29-30, fig. 9; Gili, 1986: 128-129, fig. 4.24a-c; Isasi, 1985: 77-78, fig. 21;

Ramil, 1988: 349-352; Vervoort, 1993: 555.
Sertularella fusiformis p.p. Billard, 1936: 5-7, figs 1-2; Ramil et al., 1992: 507-511, figs 8-10.
Sertularella ellisi f. *fusiformis*; Teissier, 1965: 23; Fey, 1970: 399.
? *Sertularella fusiformis*; Millard, 1975: 289-290, fig. 93e-g.
Sertularella gaudichaudi p.p. Cornelius, 1979: 282, 284, fig. 20.

Material.— CONG 1, 0.5 m, numerous stems on *Peyssonnelia coriacea*, *Flabellia petiolata*, *Corallina elongata*, incrusting calcareous algae, *Cryptonemia lomation* and *Salmacina* spec.— CONG 2, 1 m, numerous stems on *Salmacina* spec., *Corallina elongata*, *Peyssonnelia squamaria*, incrusting calcareous algae, bio-concretions of *Astroides calycularis* (RMNH-Coel. 29773).— CONG 17, 2 m, two colonies on *Codium bursa*.— CONG 30, 0.2 m, several stems on *Corallina elongata* (RMNH-Coel. 29774).— CONG 44, 3 m, several stems on *Flabellia petiolata*, *Peyssonnelia rubra* and *Halopteris filicina* (RMNH-Coel. 29775).— CONG 45, 3 m, a few stems on *Jania* spec.— CONG 61, 4 m, a few colonies on *Peyssonnelia rubra* and *Flabellia petiolata* (RMNH-Coel. 29776).— CONG 72, 7 m, four colonies on rocks, *Cystoseira spinosa*, *Sargassum* spec. and *Rhodymenia* spec.— CONG 83, 5 m, four stems on *Amphiroa rigida* and bryozoans.— ISA 17, 3 m, a few stems on *Corallina elongata* and bio-concretions of *Astroides calycularis*.— ISA 26, 34 m, a few stems on *Schizomavella* spec.— PCONG 2, 3 m, two stems on *Acrosorium uncinatum* and *Eudendrium racemosum*.— PCONG 5, 3 m, several stems on *Corallina elongata*, *Rhodymenia ardissonei*, *Haraldia lenormandii*, *Champia parvula* and *Eudendrium racemosum* (RMNH-Coel. 29777).— PCONG 6, 2 m, four stems on *Eudendrium racemosum*.— PCONG 7, 0.5 m, several stems on *Peyssonnelia squamaria* (RMNH-Coel. 29778).— PISA 11, 2.3 m, four stems on rocks.— PISA 21, 2 m, single stem.— REY 17, 2 m, a few stems on *Rhodymenia ardissonei*, *Schizobrachiella sanguinea*, *Pentapora fascialis* and cirripedes (RMNH-Coel. 29779).— REY 23, 0 m, a few stems on *Cladophora lehmanniana*.— REY 24, 0 m, a few stems on *Pterocladia capillacea*, *Corallina elongata* and anthozoans (RMNH-Coel. 29780).— REY 25, 0 m, a few stems on *Corallina elongata* (RMNH-Coel. 29781).— REY 27, 1.5 m, a few stems on *Cystoseira spinosa* and *Flabellia petiolata* (RMNH-Coel. 29782).— REY 33, 4 m, numerous stems on scales of *Posidonia oceanica* (RMNH-Coel. 29783).

Description.— Colonies composed of a stolonal hydrorhiza giving rise to unbranched monosiphonic stems up to 10 mm high. Stems divided into internodes separated by oblique nodes sloping in alternate directions. Internodes arranged more or less in zigzag fashion, either long and thin or short and wide at the hydrothecal base.

Hydrothecae situated on distal part of internodes and alternately arranged in one plane, small, flask-shaped and free for more than half their adcauline wall. Abcauline wall convex, except distal fourth which is approximately straight. Adcauline wall similar to abcauline wall; hydrotheca being approximately symmetrical. Hydrothecal distal fourth forming a neck of varied length. Free part of adcauline hydrothecal wall provided with two more or less marked ribs that may also be absent. Hydrotheca with three large intrathecal cusps, two adcauline and one abcauline, just below the rim of the hydrothecal aperture.

The material from PCONG 5 has branches emerging from the hydrothecae.

Remarks.— Millard (1975) identified as *Sertularella fusiformis* material having important differences with Hincks's species in the shape of the hydrotheca and features of the intrathecal cusps. In Millard's material there are usually four small intrathecal cusps, alternating with the cusps of the hydrothecal aperture. We seriously doubt the identity of Millard's material.

According to Medel & Vervoort (1998) *S. fusiformis* is conspecific with *S. ellisii*. Those authors considered *S. ellisii* a variable species including forms resembling *S. fusifomis*; they did not find features distinguishing the two species. We believe that *S.*

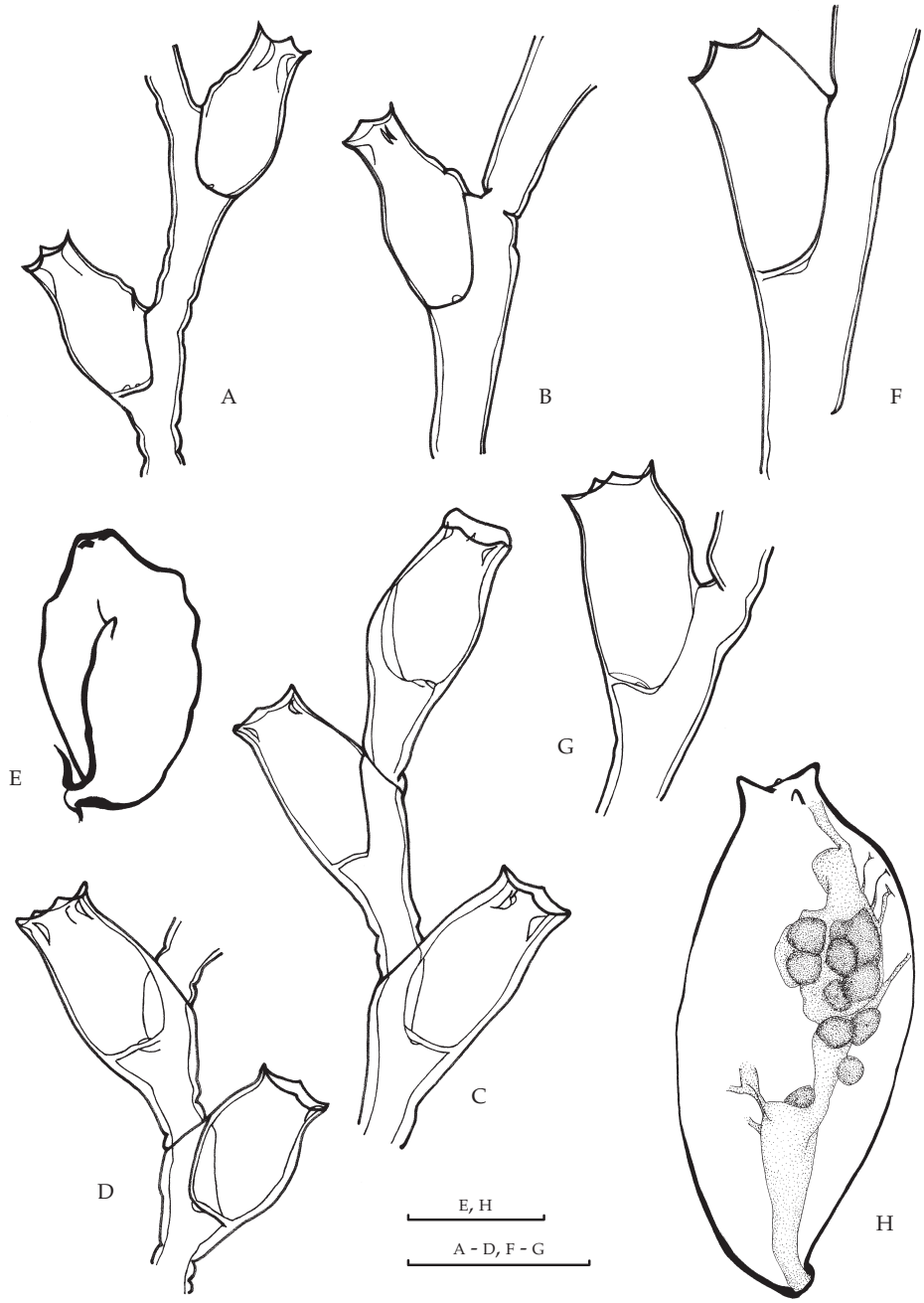

Fig. 25. A, B, *Sertularella fusiformis* (Hincks, 1861), hydrothecae. C-E, *Sertularella lagenoides* Stechow, 1919. C-D, hydrothecae; E, gonotheca. F-H, *Sertularella polyzonias* (Linnaeus, 1758). F-G, hydrothecae; H, gonotheca. Scale bar: 500 μm.

fusiformis may have been absent from the material studied by these authors, as in our material *S. fusiformis* and *S. ellisi* are distinctly separated.

Ecology.— *Sertularella fusiformis* is a littoral species. In the Mediterranean it has been found from the tidal level (Roca, 1986) to 20 m depth (Gili, 1986). Our material was collected from the tidal level to 7 m, though once it was found at 34 m depth. Outside the Mediterranean it is known from the tidal level (Hincks, 1868; Isasi, 1985; Ramil, 1988) to 68 m depth (Fraser, 1944).

Sertularella fusiformis has been reported epibiontic on algae (Stechow, 1919; Roca, 1986; Ramil et al., 1992; Vervoort, 1993) and rhizomes of *Posidonia oceanica* (Roca, 1986), as well as on other invertebrates (Gili, 1986; Ramil et al., 1992) and epilithic (Gili, 1986). At the Chafarinas *S. fusiformis* occurs on a wide range of substrata, though preferably on algae (> 68% of the records), mainly on sciaphilic and hemiphotophilic algae (*Flabellia petiolata*, *Peyssonnelia rubra*, *P. squamaria*, *Rhodymenia ardissonei*, *Cystoseira spinosa*, etc.). The remaining records are from the rhizomes of *Posidonia oceanica*, bryozoans, hydrozoans, cirripedes, anthozoans, polychaete tubes, bio-concretions and even epilithic.

In the Mediterranean fertile colonies of *S. fusiformis* were found in January (Gili, 1986) and April (Roca, 1986). Outside that area Ramil et al. (1992) collected colonies with gonothecae in March, May and August; Teissier (1965) between August and November and Fey (1970) in May.

Distribution.— Ramil et al. (1992) pointed out that *S. fusiformis* is well distributed in the Mediterranean and the subtropical and temperate Atlantic. Nevertheless, it has a much wider distribution, as it has been reported from the Canadian Arctic (Hudson Strait), the American Pacific coasts, from Oregon to San Francisco, and the Galápagos Islands (Fraser, 1946).

In the eastern Atlantic it has been reported from off Great Britain (Hincks, 1868; Kirchenpauer, 1884; Hartlaub, 1901a), NW of France (Teissier, 1965; Fey, 1970), Spain (Isasi, 1985; Ramil, 1988), Portugal (Da Cunha, 1950) and the Cape Verde Islands (Ritchie, 1909; Leloup, 1940; Rees & Thursfield, 1965).

In the Mediterranean it is known from the Adriatic (Hartlaub, 1901a) and off the Egyptian (Billard, 1930), French (Stechow, 1919; Leloup, 1934; Picard, 1951c), Israeli (Vervoort, 1993), Italian (Stechow, 1923b) and Spanish coasts (García Corrales, et al., 1980; Gili, 1986).

Sertularella lagenoides Stechow, 1919
(fig. 25c-e)

Sertularella lagenoides Stechow, 1919: 86, fig. C[1]; 1923b: 195; Rossi, 1950: 209; García Carrascosa, 1981: 210, pl. 14 figs a-c; Park & Rho, 1986: 14; Park, 1993: 270.
Sertularella fusiformis p.p. Picard, 1952a: 347-349; Ramil et al., 1992: 507-511, figs 8-10.
Sertularella fusiformis f. *lagenoides*; Picard, 1955: 192; 1958b: 2.
Sertularella ellisii f. *lagenoides*; Picard, 1956: 264, fig. 3a; Leloup, 1974: 28, fig. 22.
Sertularella gaudichaudi p.p. Boero & Fresi, 1986: 146.
Sertularella gr. *ellisii* p.p. Altuna, 1994: 287-297, pl. 44, figs a-c.

Material.— CONG 5, 0 m, numerous stems on *Cystoseira stricta*, with gonothecae.— CONG 6, 0 m, numerous stems on *Cystoseira stricta* (RMNH-Coel. 29784).— CONG 12, 0.5 m, numerous stems on

Cystoseira stricta, with gonothecae.— CONG 15, 0.3 m, numerous stems on *Cystoseira stricta* (RMNH-Coel. 29785).— CONG 22, 1 m, a few stems on *Cystoseira stricta*, with gonothecae (RMNH-Coel. 29786).— CONG 37, 0 m, a few stems on *Corallina elongata* (RMNH-Coel. 29787).— CONG 43, 2 m, four stems on *Corallina elongata*.— CONG 46, 5 m, a few stems on *Peyssonnelia coriacea*, *Flabellia petiolata* and *Corallina elongata* (RMNH-Coel. 29788).— CONG 63, 2 m, three stems on *Corallina elongata*.— CONG 66, 0 m, several stems on *Corallina elongata*.— CONG 82, 5 m, several stems on *Corallina elongata*, *Flabellia petiolata*, sponges and bivalves (RMNH-Coel. 29789).— ISA 13, 0 m, numerous stems on *Cystoseira stricta* (RMNH-Coel. 29790).— ISA 14, 0.3 m, one colony.— ISA 29, 6 m, a few stems on *Halopteris filicina* and *Turbicellepora* spec.— PISA 19, 2 m, a few stems.— PISA 22, 2 m, a few stems on *Corallina elongata* (RMNH-Coel. 29791).— REY 13, 0 m, two stems on *Corallina elongata*.— REY 14, 0 m, numerous stems on *Corallina elongata* (RMNH-Coel. 29792).

Description.— Colonies with a stolonal hydrorhiza giving rise to tiny and robust stems up to 10 mm high. Stem composed of a series of short hydrothecate internodes separated by oblique nodes sloping in alternate directions. Internodes with thick perisarc and sometimes indications of a basal ring.

Hydrothecae alternately arranged in two planes forming an angle of up to 90°. Hydrotheca flask-shaped and short. Hydrothecal length similar to that of internodes, distal part of hydrotheca almost reaching proximal part of succeeding hydrotheca. Abcauline hydrothecal wall convex, though distal part straight or concave. Free part of adcauline wall convex, but straight or concave distally; sometimes straight throughout. Occasionally distal part of hydrotheca shaped as a short neck. Usually hydrotheca with three intrathecal cusps, one abcauline and two adcauline; occasionally two extra cusps present, one on each side of abcauline cusp.

In the material from CONG 43 one of the stems has developed a branch, originating laterally just below a hydrotheca.

Gonothecae ovoid, with indistinct pedicel. Distal half of gonothecal wall occasionally wavy, top with three small, blunt cusps.

Ecology.— *Sertularella lagenoides* seems to be restricted to the shallowest part of the littoral zone, having been reported, in the Mediterranean, from the tidal level (García Carrascosa, 1981; Boero & Fresi, 1986) to 2 m depth (Boero & Fresi, 1986). Our material comes from zero to 6 m depth.

It has mainly been reported epibiontic on algae (Stechow, 1919; Rossi, 1950; García Carrascosa, 1981; Altuna, 1994), but also on cirripedes and vermetids (García Carrascosa, 1981). In our material it was always found epibiontic, preferably on algae (> 87% of the records), mainly on *Corallina elongata* and *Cystoseira tamariscifolia*, but also on *Flabellia petiolata*, *Peyssonnelia coriacea* and *Halopteris filicina*. The remaining records are from sponges, bryozoans and bivalves.

We did not find references concerning the fertile period of *S. lagenoides*. In our material, colonies with gonothecae were collected in July.

Distribution.— It is difficult to define the geographical distribiution of *S. lagenoides* due to scarcity of records. In the Mediterranean it has been reported from off the Algerian (Picard, 1955), French (Stechow, 1919; Picard, 1952a), Israeli (Picard, 1958b), Italian (Stechow, 1923b; Boero & Fresi, 1986) and Spanish coasts (García Carrascosa, 1981). Outside the Mediterranean there are records from the Spanish Basque coast (Altuna, 1994), Chile (Leloup, 1974) and South Korea (Park & Rho, 1986; Park, 1993).

Sertularella mediterranea Hartlaub, 1901a
(fig. 24e-f)

Sertularella mediterranea Hartlaub, 1901a: 86-87, pl. 5 figs 10-11, 15-16; Billard, 1922a: 107-111, figs 3a-c, 4; 1931: 390; Stechow, 1923b: 189-192, figs C^1, D^1a; Broch, 1933: 76; Da Cunha, 1944: 48, fig. 25; Yamada, 1965: 362; García Carrascosa, 1981: 213, pl. 14 figs d-j, pl. 35 fig. d; Gili, 1986: 124-125, figs 4.24d-e, 4.56e; Ramil, 1988: 359-367, pl. 20; Medel et al., 1991: 528-531, fig. 11; Ramil et al., 1992: 511-518, figs 11-14; Medel & López González, 1996: 204; Medel & Vervoort, 1998: 46-47.
Sertularella gaudichaudi; Billard, 1912: 464; Altuna el al., 1984: 134.
Sertularella polyzonias; Stechow, 1919: 89.
Sertularella polyzonias var. *mediterranea*; Leloup, 1934: 14; Rossi, 1950: 209-211, fig. 8a-b.
Sertularella ellisii f. *mediterranea*; Picard, 1956: 264, fig. 3b.
Sertularella ellisi f. *mediterranea*; Patriti, 1970: 38, figs 49a-c.
Sertularella mediterranea mediterranea; Millard, 1975: 294-295, figs 96b-c.
Sertularella gaudichaudi p.p. Cornelius, 1979: 282-284, fig. 20; Boero & Fresi, 1986: 146.
Sertularella picta; García Corrales et al., 1980: 37-40, fig. 12; Isasi, 1985: 78, fig. 20a; Roca, 1986: 496, fig. 83.
Sertularella gr. *ellisii* p.p. Altuna, 1994: 287-297, pl. 55 figs a-c.

Material.— CONG 1, 0.5 m, a few stems.— CONG 44, 3 m, several stems on bio-concretions of *Astroides calycularis* (RMNH-Coel. 29793).— CONG 70, 4.5 m, three stems on *Halopteris filicina*.— CONG 73, 10 m, numerous stems on *Flabellia petiolata*, *Cystoseira spinosa*, *Acrosorium uncinatum*, *Colpomenia peregrina*, *Halopteris filicina* and incrusting calcareous algae (RMNH-Coel. 29794).— ISA 12, 5 m, one stem fragment.— ISA 29, 6 m, single stem on bio-concretions of *Astroides calycularis*.— ISA 30, 15 m, two stems on *Halopteris filicina* and *Celleporina caminata*.— PCONG 1, 1 m, five stems on bryozoans (RMNH-Coel. 29795).— PISA 14, 3.3 m, numerous stems on bryozoans (RMNH-Coel. 29796).

Remarks.— The present material consists of colonies with monosiphonic, usually unbranched stems up to 22 mm high.

Ecology.— *Sertularella mediterranea* is a littoral species that in the Mediterranean has been found from the tidal level (Stechow, 1919; García Carrascosa, 1981) to 42 m depth (Medel et al., 1991); our material comes from 0.5 to 15 m. Outside the Mediterranean it has been reported from the tidal level (Ramil et al., 1992) to 73 m depth (Millard, 1975). It has been recorded epilithic (Rossi, 1950; García Carrascosa, 1981; Gili, 1986; Ramil et al., 1992) and epibiontic on numerous organisms: algae (Stechow, 1919; Broch, 1933; Rossi, 1950; García Carrascosa, 1981; Ramil et al., 1992; etc.), rhizomes and leaves of *Posidonia oceanica* (García Carrascosa, 1981; Gili, 1986), cirripedes (García Carrascosa, 1981; Ramil et al, 1992; Altuna, 1994), sponges and bryozoans (Altuna, 1994), polychaete tubes (Medel & Vervoort, 1998), mollusc shells (García Carrascosa, 1981; Isasi, 1985; Ramil et al. 1992), decapods (Broch, 1933) and hydrozoans, anthozoans and ascidians (Ramil et al., 1992). In our material, it was mainly observed on algae (> 61% of the records), especially on sciaphilic and hemiphotophilic algae, such as *Halopteris filicina*, *Flabellia petiolata*, *Acrosorium uncinatum* and *Cystoseira spinosa*. The remaining records are from bryozoans and bio-concretions of *Astroides calycularis*. It is used in turn as substratum for numerous hydroids (*Turritopsis nutricula*, *Eudendrium capillare*, *Halecium delicatulum*, *H. lankesteri*, *Antennella ansini* spec. nov., *Plumularia setacea*, *Sertularia distans*, *Campanularia hincksii*, *C. volubilis*, *Clytia gracilis*, *C. linearis* and *C. paulensis*).

In the Mediterranean fertile colonies of *Sertularella mediterranea* have been reported from January (Stechow, 1919; Gili, 1986), April (Stechow, 1919; Gili, 1986), May (Ste-

chow, 1919; Medel et al., 1991), July (Medel et al., 1991) and November (Broch, 1933). Outside the Mediterranean fertile colonies were collected in January (Medel et al., 1991), February (Medel et al., 1991; Ramil et al., 1992), March and May (Ramil et al., 1992), July (Medel et al., 1991), September and October (Ramil et al., 1992) and December (Medel et al., 1991; Ramil et al., 1992). Teissier (1965) found gonothecae from April to September and Fey (1970) from April to August. According to the available data, *S. mediterranea* seems to be fertile throughout the year at temperate latitudes.

Distribution.— According to Ramil et al. (1992), *Sertularella mediterranea* is widely distributed in the Mediterranean and eastern Atlantic, being known from Spitzbergen in the Arctic (Leloup, 1940) to the South African coasts (Millard, 1975), penetrating into the Indian Ocean as far as Natal (Millard, 1975) and the coasts of Madagascar (Billard, 1907). Millard (1975) indicated that it is also present in the Red Sea and Australasia, but as she gave no references for these records we are unable to confirm.

In the Mediterranean it has been reported from the Adriatic (Hartlaub, 1901a; Stechow, 1919; Broch, 1933), the Balearic Islands (Roca, 1986), the Strait of Gibraltar (Medel et al., 1991) and from off the French (Stechow, 1919; Leloup, 1934), Greek (Yamada, 1965), Italian (Stechow, 1919; Rossi, 1950; Boero & Fresi, 1986), Spanish (García Corrales et al., 1980; García Carrascosa, 1981; Gili, 1986) and Syrian coasts (Billard, 1931a).

Sertularella polyzonias (Linnaeus, 1758)
(fig. 25f-h)

Sertularia polyzonias Linnaeus, 1758: 813.

Sertularella polyzonias; Hincks, 1868: 235-237, pl. 46 fig. 1; Stechow, 1923b: 194, fig. D^1c; Broch, 1933: 65, figs 24a-d; Da Cunha, 1944: 47, fig. 24; Vervoort, 1946b: 224-226, fig. 96; Rossi, 1950: 210, fig. 8; Picard, 1951c: 261; Patriti, 1970: 39, fig. 50; Cornelius, 1979: 287-290, fig. 22; García Carrascosa, 1981: 222-224, pl. 17 figs a-l; Boero, 1981a: 182, 184; Marinopoulos, 1979: 120; 1981: 176; Templado et al., 1986: 98; Roca, 1986: 478-485; Boero & Fresi, 1986: 146; Medel et al., 1991: 519-521, fig. 7; Ramil et al., 1992: 500-503, figs 1b, 4, 5; Álvarez Claudio, 1993: 345-347, fig. 59; Altuna, 1994: 299-300; Medel & López González, 1996: 204; Medel & Vervoort, 1998: 47-51, fig. 13.

Sertularella polyzonias p.p. Picard, 1952a: 347.

Sertularella polyzonias polyzonias Millard, 1975: 300, figs 98f-h.

Sertularella polyzonias gigantea Millard, 1975: 301, fig. 98j.

Sertularella gayi; García Corrales et al., 1980: 33, fig. 11a-f.

Material.— B-11, 42 m, numerous stems on bryozoans, with gonothecae (RMNH-Coel. 29797).— CONGRESO BANK, numerous stems on rocks, *Rhodymenia ardissonei*, *Eudendrium racemosum* and *Ellisella paraplexauroides*, with gonothecae (RMNH-Coel. 29798).— CONG 25, 25 m, a few stems on cirripedes growing on *Ellisella paraplexauroides* (RMNH-Coel. 29799).— CONG 26, 18 m, four stems on incrusting calcareous algae (RMNH-Coel. 29800).— CONG 54, 16.8 m, numerous stems on *Eunicella* spec. and cirripedes (RMNH-Coel. 29801).— CONG 77, 20.5 m, two stems.— CONG 78, 18 m, a single stem in bad condition.— CONG 80, 15 m, two stems on *Peyssonnelia rubra*.— C-4, 34 m, several stems on stones and bivalve remnants (RMNH-Coel. 29803).— C-8, 39 m, two stems on stones.— C-8 (bis), 40 m, a single stem.— C-12, 31 m, several stems on stones and biodetritic remains (RMNH-Coel. 29802).— D-3, 24 m, three stems on bryozoans.— D-8, 30 m, numerous stems on bivalve-shells remnants, with gonothecae (RMNH-Coel. 29804).— E-2, 40 m, a few stems on bivalve remnants and *Eudendrium ramosum* (RMNH-Coel. 29805).— E-3, 25 m, three stems on *Buccinulum corneus*.— F-8, 18 m, three stems on bivalve remnants.— F-10, 10 m, two stems.— G-8, 17 m, numerous stems on *Murex trunculus*, with gonothecae (RMNH-Coel. 29806).— G-16, 22 m, several stems on *Amathia* spec. and remnants of *Posi-*

donia oceanica leaves (RMNH-Coel. 29807).— G-17, 20 m, numerous stems with gonothecae (RMNH-Coel. 29808).— H-13, 16 m, four stems on *Bougainvillia ramosa* (RMNH-Coel. 29809).— H-15, 20 m, two stems on *Cymodocea* spec.— ISA 1, 24 m, three stems on gorgonians.— ISA 4, 10 m, one stem on *Peyssonnelia* spec.— ISA 5, 35 m, a few stems on gorgonians and *Chartella papyrea* (RMNH-Coel. 29810).— ISA 19, 20 m.— ISA 21, 19.2 m, several stems on bryozoans (RMNH-Coel. 29811).— ISA 26, 34 m, three stems on anthozoans and bryozoans, with gonothecae.— ISA 28, 29 m, several stems on *Ellisella paraplexauroides* (RMNH-Coel. 29812).— REY 4, 27 m, numerous stems on *Eudendrium glomeratum*, *Pentapora fascialis*, *Turbicellepora* spec., *Adeonella calveti*, *Microporella* spec. and cirripedes (RMNH-Coel. 29813).— REY 5, 20 m, two stems on *Cystoseira spinosa*.— REY 8, 25 m, four stems on *Eudendrium* spec.— REY 11, 6 m, a single stem.

Remarks.— The present material consists of colonies with branched and monosiphonic stems up to 60 mm high.

Ecology.— *Sertularella polyzonias* is an eurybathic species that in the Mediterranean has been found from 4 (Broch, 1933) to 400 m depth (Marinopoulos, 1981); our material comes from 6 to 42 m. Outside that area it has been recorded from 2 (Fey, 1970) to 345 m (Ramil & Vervoort, 1992) or even 2500 m depth (Fraser, 1944).

In our material, *Sertularella polyzonias* was observed growing on a wide range of substrata, preferably on bryozoans, anthozoans and hydrozoans, but also on mollusc shells and cirripedes. Other records are from non-living substrata (biotic and abiotic) and occasionally from sciaphilic algae and on *Cymodocea* spec. In the literature it is also recorded from rhizomes and leaves of *Posidonia oceanica* (García Carrascosa, 1981; Boero, 1981a) and polychaete tubes (Ramil et al., 1992; Medel & Vervoort, 1998). In the material studied *S. polyzonias* served as substratum for a large number of hydroids (*Bougainvillia muscus*, *Eudendrium glomeratum*, *E. ramosum*, *Egmundella amirantensis*, *Halecium lankesteri*, *H. tenellum*, *Antennella ansini* spec. nov., *Sertularia distans*, *Campanularia hincksii*, *Clytia gracilis*, *C. hemisphaerica*, *C. linearis*, *Clytia paulensis*, *Clytia* spec., *Laomedea* spec. and *Obelia dichotoma*).

In the Mediterranean fertile colonies of *Sertularella polyzonias* have been found in February and April (Broch, 1933), May (Medel et al., 1991), August and September (Picard, 1951), November (Broch, 1933; Boero & Fresi, 1986) and December (Roca, 1986). Our fertile colonies were collected in July and August, under the summer thermocline. Outside the Mediterranean there are records of fertile colonies in February (Ramil et al., 1992), March (Medel & Vervoort, 1998), April (Fey, 1970), May (Fey, 1970; Medel & Vervoort, 1998), June (Fey, 1970; Ramil & Vervoort, 1992; Medel & Vervoort, 1998), July and August (Teissier, 1965; Fey, 1970; Ramil et al., 1992), September (Fey, 1970; Ramil et al., 1992) and October (Fey, 1970). *Sertularella polyzonias* seems to be fertile throughout the year.

Distribution.— *Sertularella polyzonias* is generally considered a cosmopolitan species (Ramil et al., 1992; Boero & Bouillon, 1993). In the eastern Atlantic has been reported from off Iceland (Broch, 1918; Kramp, 1938) to South Africa (Millard, 1975).

In the Mediterranean it has been recorded from the Adriatic (Marktanner-Turneretscher, 1890; Broch, 1933), the Balearic Islands (Roca, 1986), the Alboran Sea (Templado et al., 1986), the Strait of Gibraltar (Medel et al., 1991) and off the French (Picard, 1951c; 1952a), Greek (Marinopoulos, 1979), Italian (Rossi, 1950; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Corrales et al., 1980; García Carrascosa, 1981) and Turkish coasts (Marinopoulos, 1979). It is also known from the Black Sea (Naumov, 1969).

Genus *Sertularia* Linnaeus, 1758

Sertularia distans Lamouroux, 1816
(fig. 26a-c)

Sertularia distans Lamouroux, 1816: 191; Allman, 1877: 25, pl. 16 figs 9-10; Stechow, 1919: 94-96, fig. K[1]; Rossi, 1950: 213, fig. 10a; Picard, 1951c: 261; 1952a: 348-349; Millard, 1975: 306-307, figs 99e-h; Cornelius, 1979: 296-299, fig. 26; García Corrales et al., 1980: 49-52, fig. 17; García Carrascosa, 1981: 201-204, pl. 13 figs c-l, pl. 34 fig. a; Boero, 1981a: 182; Isasi, 1985: 81, fig. 22; Gili, 1986: 120-121, fig. 4.36d; Roca, 1986: 447-453, fig. 76; Ramil, 1988: 383-390; Izquierdo et al., 1990: 41-42, fig. 8; Medel et al., 1991: 512-514, fig. 4; Ramil & Vervoort, 1992: 227-228, fig. 63c; Boero & Bouillon, 1993: 264; Altuna, 1994: 302-305, pl. 57 figs a-b; El Beshbeeshy, 1994b: 152-153, fig. 3a; 1995a: 313-315; Migotto, 1996: 69-71, fig. 13b-e; Medel & López González, 1996: 205; Medel & Vervoort, 1998: 63-66, figs 6c, 20a-b; Morri & Bianchi, 1999: 287.

Sertularia gracilis Hincks, 1868: 262-263, pl. 53 fig. 2; Picard, 1952a: 349; Teissier, 1965: 25; Fey, 1970: 401; Patriti, 1970: 41, fig. 54.

Dynamena gracilis; Marktanner-Turneretscher, 1890: 240, pl. 5 fig. 3.

Tridentata gracilis; Stechow, 1925a: 208, fig. g; Da Cunha, 1944: 51, fig. 27.

Tridentata distans; Hirohito, 1969: 23, fig. 16a-b; Calder, 1991: 105-107, fig. 55.

Not *Tridentata gracilis*; Stechow, 1923b: 208, fig. G[1].

Material.— CONG 7, 19 m, numerous stems on *Cystoseira spinosa*, *Halopteris filicina*, *Acrosorium uncinatum*, *Aglaophenia kirchenpaueri* and *Salmacina* spec., with gonothecae (RMNH-Coel. 29814).— CONG 8, 10 m, several stems on *Cystoseira spinosa* (RMNH-Coel. 29815).— CONG 18, 4.5 m, single stem on *Acrosorium uncinatum*.— CONG 26, 18 m, several stems on *Cystoseira spinosa* (RMNH-Coel. 29816).— CONG 27, 13 m, numerous stems on *Cladostephus verticillatus* and *Sargassum* spec.— CONG 28, 9 m, single stem on *Salmacina* spec.— CONG 30, 0.2 m, numerous stems on *Corallina elongata* (RMNH-Coel. 29817).— CONG 46, 5 m, a few stems on *Peyssonnelia coriacea*, *Flabellia petiolata*, *Corallina elongata* and bryozoans.— CONG 53, 17.5 m, numerous stems on *Cystoseira spinosa*, *Dictyota dichotoma* var. *intricata*, *Rhodophyllis divaricata*, *Cutleria multifida* phase *Aglaozonia* and incrusting calcareous algae (RMNH-Coel. 29818).— CONG 54, 16.8 m, numerous stems on *Cystoseira spinosa*, *Cladostephus verticillatus*, *Rhodophyllis divaricata*, *Sertularella ellisii*, *Eunicella* spec. and polychaete tubes (RMNH-Coel. 29819).— CONG 55, 15.5 m, three stems on *Halopteris* spec.— CONG 57, 10.5 m, numerous stems on *Acrosorium uncinatum*, *Cystoseira spinosa*, *Padina pavonia* and *Halopteris* spec., with gonothecae (RMNH-Coel. 29820).— CONG 60, 8.5 m, several stems on *Corallina* spec. (RMNH-Coel. 29821).— CONG 70, 4.5 m, single stem on *Halopteris filicina*.— CONG 71, 5 m, several stems on pebbles and *Cystoseira spinosa* (RMNH-Coel. 29822).— CONG 73, 10 m, several stems on *Cystoseira spinosa* and *Sertularella mediterranea* (RMNH-Coel. 29823).— CONG 74, 11 m, a few stems on *Halopteris scoparia*.— CONG 75, 12 m, three stems on *Salacia desmoides*.— CONG 76, 13 m, numerous stems on *Cystoseira spinosa*, *Halopteris filicina*, *Acrosorium uncinatum*, sponges and *Salmacina* spec., with gonothecae (RMNH-Coel. 29824).— CONG 77, 20.5 m, several stems on *Halopteris filicina*, *Aglaozonia chilosa*, *Cystoseira spinosa* and *Sertularella polyzonias* (RMNH-Coel. 29825).— CONG 83, 5 m, three stems on *Halopteris filicina* and *Sphaerococcus coronopifolius*.— C-4, 34 m, seven stems on *Cymodocea* spec.— E-2, 40 m, one stem fragment.— F-8, 18 m, several stems on remnants of *Posidonia oceanica* rhizome scales (RMNH-Coel. 29826).— H-10, 15 m, two foreign stem fragments.— ISA 15, 5 m, a few stems on *Sargassum* spec., *Flabellia petiolata* and *Cystoseira spinosa*.— ISA 19, 20 m, three stems on *Rhodymenia ardissonei*.— ISA 22, 15 m, twelve stems on *Cystoseira spinosa*.— ISA 24, 10 m, several stems on *Cystoseira spinosa* and *Sargassum* spec. (RMNH-Coel. 29827).— I-5, 23 m, several stems on *Amathia* spec. (RMNH-Coel. 29828).— PCONG 5, 3 m, several stems on *Rhodymenia ardissonei*, *Haraldia lenormandii* and *Eudendrium racemosum* (RMNH-Coel. 29829).— PISA 13, 2 m, numerous stems on *Amphiroa rigida* and *Acrosorium uncinatum* (RMNH-Coel. 29830).— PISA 19, 2 m, several stems on *Acrosorium uncinatum*, *Dynamena disticha* and bio-concretions of *Astroides calycularis*.— PISA 22, 2 m, a few stems on *Corallina elongata*; REY 4, 27 m, single stem.—

REY 5, 20 m, numerous stems on *Cystoseira spinosa*, *Cladostephus verticillatus* and *Aglaophenia pluma*, with gonothecae (RMNH-Coel. 29831).

Remarks.— The present material consists of colonies with monosiphonic, occasionally branched stems with up to 24 pairs of hydrothecae. The internodes are usually provided with one pair of hydrothecae, though often there are two, or even three pairs of hydrothecae per internode. The presence of intrathecal cusps is variable, even in the same colony.

In the material from E-2 the branches originate in an unusual way. Typically the branches are formed through a bifurcation just above a pair of hydrothecae and are decussate in relation to each other. In the material from E-2 an extra branch originates on the posterior side of the internode, in the area existing between the adcauline hydrothecal walls. Another extra branch is inserted below the pair of hydrothecae, on the frontal side of the internode.

Some colonies have stolons at the distal end of the stems (ISA 22, ISA 24, CONG 7, CONG 26, CONG 27, CONG 54, CONG 77, F-8).

Ecology.— *Sertularia distans* is an eurybathic species that in the Mediterranean has been found from 0.5 (Morri & Bianchi, 1999) to 90 m depth (García Carrascosa, 1981); our material was collected from 0.2 to 40 m. Outside that sea, it has been reported from the tidal level (Isasi, 1985; Millard, 1975) to 826 m depth (Ramil & Vervoort, 1992).

In our material *S. distans* occurs on a wide range of substrata, though preferably on algae (>72% of the records), mainly on hemiphotophilic or sciaphilic algae, such as *Cystoseira spinosa*, *Acrosorium uncinatum* and *Halopteris filicina*. The remaining records are from *Cymodocea*, hydrozoans, bryozoans, polychaetes, anthozoans and sponges, and also bio-concretions, biodetritic remains and pebbles. In the literature there are records from the same substrata, predominantly from algae (Stechow, 1919; Broch, 1933; Rossi, 1950; Fey, 1970; García Carrascosa, 1981; Gili, 1986; Roca, 1986; Morri & Bianchi, 1999; etc), but also from seagrass (García Carrascosa, 1981; Gili, 1986). In the material studied *S. distans* was in turn observed as substratum for other hydroids (*Hebella scandens*, *Scandia gigas* and *Campanularia hincksii*).

In the Mediterranean colonies of *Sertularia distans* with gonothecae have been found in April (Gili, 1986) and August (Picard, 1951). In our material fertile colonies were collected in July and August. Outside the Mediterranean, in the nearby eastern Atlantic, gonothecae were observed between February and October (Ramil, 1988), April and September (Teissier, 1965), May and October (Altuna, 1994) and April and June (Medel & Vervoort, 1998). At temperate latitudes it seems to be fertile throughout the year, with the exception of winter.

Distribution.— *Sertularia distans* is considered to have a circumglobal (Calder, 1991) or circumtropical distribution (Boero & Bouillon, 1993). In the eastern Atlantic it is known from off the Shetland Islands (Hincks, 1868) to the South African coasts (Millard, 1975).

In the Mediterranean it has been reported from the Adriatic (Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986), the Strait of Gibraltar (Medel et al., 1991) and off the Egyptian (El Beshbeeshy, 1994b, 1995a), French (Stechow, 1919; Picard, 1952a), Italian (Neppi, 1921; Riedl, 1959; Rossi, 1950) and Spanish coasts (García Corrales et al., 1980; García Carrascosa, 1981; Gili, 1986).

Sertularia perpusilla Stechow, 1919
(fig. 26d-f)

Sertularia perpusilla Stechow, 1919: 99, fig. M[1]; Broch, 1933: 80, fig. 33; Billard, 1936: 4-5; Rossi, 1950: 213, fig. 108; 1971: 34, fig. 13; Picard, 1952a: 349; 1955: 192; De Haro, 1965: 111, fig. 8; Marinopoulos, 1979: 119-120; García Carrascosa, 1981: 204-207, pl. 13 figs a-b, pl. 34 figs c-d; Boero, 1981a: 182, 184-186, 192, figs 10-11; Boero & Fresi, 1986: 146; Gili, 1986: 121-122, fig. 4.25a-b, 4.54g; Roca, 1986: 454-460, fig. 77; Medel & López González, 1996: 205.
Tridentata gracilis; Stechow, 1923b: 208, fig. G[1].
Sertularia turbinata; García Corrales et al., 1980: 57-60, fig. 19.

Material.— CONG 8, 10 m, a few stems on remains of *Posidonia oceanica* leaves (RMNH-Coel. 29832).— CONG 74, 11 m, numerous stems on leaves of *Posidonia oceanica*, with gonothecae.— CONG 75, 12 m, numerous stems on *Posidonia oceanica* leaves, with gonothecae (RMNH-Coel. 29833).— F-17, 21 m, several stems on remains of *Posidonia oceanica* leaves (RMNH-Coel. 29834).— G-8, 17 m, on remains of *Posidonia oceanica* leaves (RMNH-Coel. 29835).— G-10, 15 m, two stems on remains of *Posidonia oceanica* leaves.— G-16, 22 m, several stems on remains of *Posidonia oceanica* leaves (RMNH-Coel. 29836).— ISA 5?, 35 m, three stems.— REY 33, 4 m, numerous stems on *Posidonia oceanica* leaves.

Remarks.— The present material consists of colonies with unbranched and monosiphonic stems with up to eight pairs of hydrothecae. Some stems have long apical stolons (CONG 75, G-16).

Ecology.— *Sertularia perpusilla* is a littoral species, having been found from 1 (Boero, 1981a) to 74 m depth (Roca, 1986). Our material comes from 4 to 12 m (the deeper samples are from death leaves of *P. oceanica*). *Sertularia perpusilla* is an exclusive epibiont of *Posidonia oceanica*.

Fertile colonies of *Sertularia perpusilla* were found in March (Stechow, 1919), June (Stechow, 1919; Rossi, 1950), July (Broch, 1933; Gili, 1986), August (Stechow, 1919; Broch, 1933) and September (Boero & Fresi, 1986). In our material colonies with gonothecae were collected in August. It is probably fertile in summer. *Sertularia perpusilla* frequently forms vegetative stolons as a way of colonizing new leaves of *Posidonia*.

Distribution.— *Sertularia perpusilla* is endemic to the Mediterranean, following the distribution of its exclusive substratum, the seagrass *Posidonia oceanica*. It has been reported from the Adriatic (Broch, 1933), the Balearic Islands (Roca, 1986), and from off the Algerian (Picard, 1955), Egyptian (Billard, 1936), French (Stechow, 1919; 1923b; Picard, 1952a), Italian (Stechow, 1919, 1923b; Rossi, 1950, 1971; Boero, 1981a; Boero & Fresi, 1986), Spanish (De Haro, 1965; García Corrales et al., 1980; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Family Campanulariidae Johnston, 1836
Genus *Campanularia* Lamarck, 1816

Campanularia hincksii Alder, 1856
(fig. 27a-b)

Campanularia hincksii Alder, 1856: 360, pl. 13 fig. 9; Hincks, 1868: 162-163, text-fig. 18, pl. 24 fig. 3; Patriti, 1970: 33, fig. 41; García Corrales et al., 1978: 18-19, figs 6a-b; Boero, 1981a: 182, 185, 191, fig. 9; Cornelius, 1982: 53-55, fig. 3; Boero & Fresi, 1986: 143; Roca, 1986: 202-210, fig. 40; Ramil, 1988: 218-224; Calder, 1991: 49-50, fig. 29; Ramil & Vervoort, 1992: 233, 235, fig. 66; Boero & Bouillon,

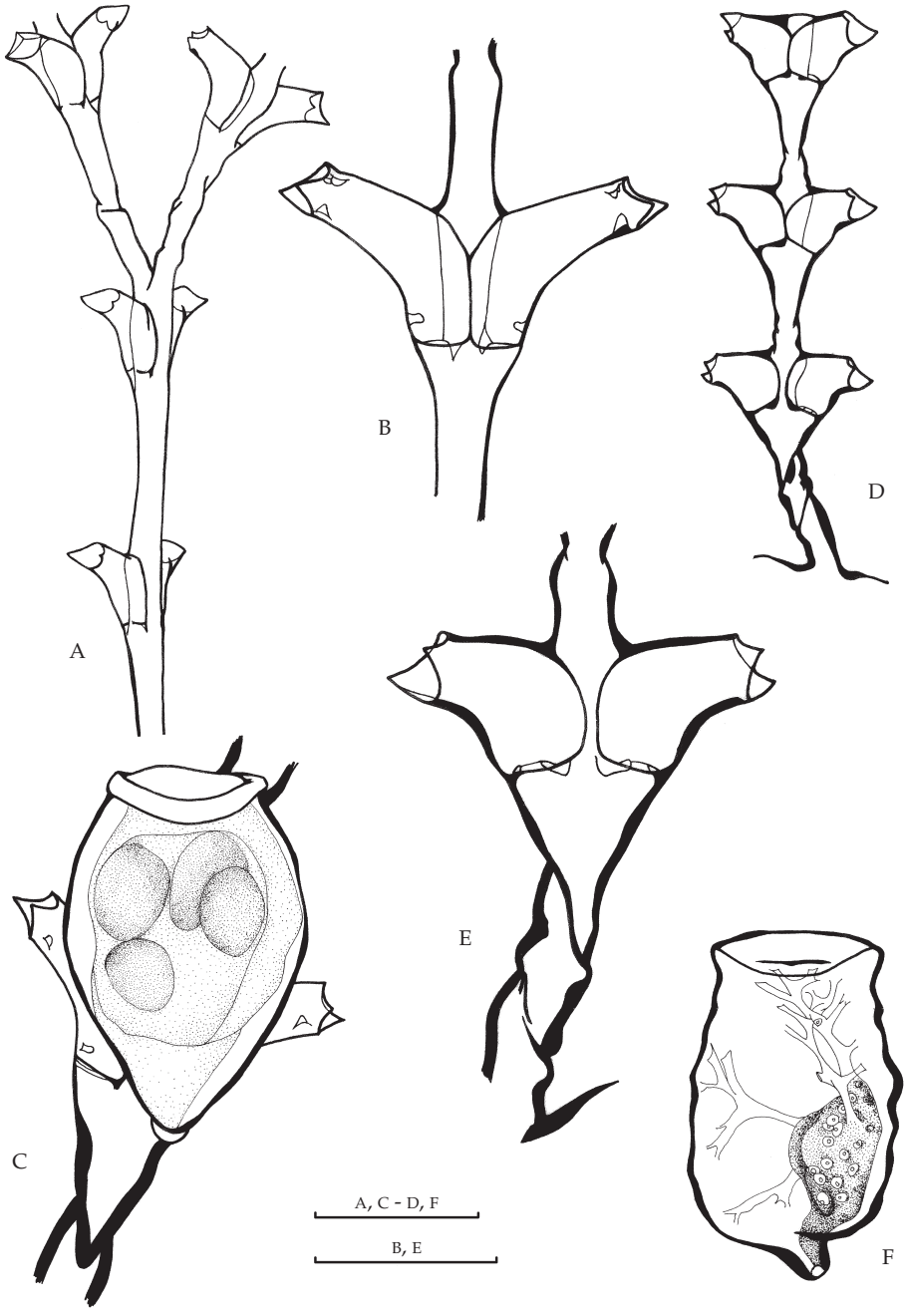

Fig. 26. A-C, *Sertularia distans* Lamouroux, 1816. A, stem fragment with branching; B, hydrothecae; C, female gonotheca. D-F, *Sertularia perpusilla* Stechow, 1919. D, stem; E, hydrothecae and basal joint; F, gonotheca. Scale bar: 250 μm (B-C, E), 500 μm (A, D, F).

1993: 264; Álvarez Claudio, 1993: 352-354, fig. 60; Altuna, 1994: 310-312; Medel & López González, 1996: 205; Medel & Vervoort, 2000: 28-30.

Campanularia alta Stechow, 1919: 54, fig. P; 1923b: 100; Picard, 1951c: 261; 1955: 186; Riedl, 1959: 631; García Carrascosa, 1981: 161-164, pl. 8 figs g-i.

Campanularia hincksi; Picard, 1951b: 278; 1951c: 261; 1952a: 349; 1955: 186; García Carrascosa, 1981: 169-171; Templado et al., 1986: 98; Gili, 1986: 180-181, figs 4.16a, 4.56c.

Orthopyxis hincksi; Picard, 1958a: 191; Rossi, 1961: 79.

Orthopyxis alta; Picard, 1958a: 191; Rossi, 1961: 79; Marinopoulos, 1979: 120.

Campanularia delicata; García Corrales et al., 1978: 22, fig. 8.

Material.— B-11, 42 m, numerous colonies on *Sertularella polyzonias* and gorgonians (RMNH-Coel. 29837).— CONGRESO BANK, numerous hydrothecae on *Rhodymenia ardissonei*, *Cystoseira spinosa*, *Eudendrium racemosum*, *Sertularella polyzonias*, *Aglaophenia kirchenpaueri* and *Cellepora* spec. (RMNH-Coel. 29838).— CONG 1, 0.5 m, a few colonies on *Peyssonnelia coriacea* (RMNH-Coel. 30015).— CONG 7, 19 m, a few hydrothecae on *Cystoseira spinosa*, *Acrosorium uncinatum*, *Aglaophenia kirchenpaueri* and *Sertularia distans* (RMNH-Coel. 29839).— CONG 8, 10 m, a few hydrothecae on *Cystoseira spinosa* and *Cladostephus verticillatus* (RMNH-Coel. 29840).— CONG 18, 4.5 m, a few hydrothecae on *Halopteris filicina* and *Acrosorium uncinatum*.— CONG 25, 25 m, several hydrothecae on *Sertularella ellisii* and *Eudendrium rameum* (RMNH-Coel. 29841).— CONG 26, 18 m, a few hydrothecae on *Halopteris filicina* and *Adeonella* spec. (RMNH-Coel. 29842).— CONG 28, 9 m, numerous hydrothecae on *Aglaophenia kirchenpaueri* (RMNH-Coel. 29843).— CONG 35, 2 m, two hydrothecae on *Flabellia petiolata*.— CONG 44, 3 m, a few hydrothecae on *Peyssonnelia rubra*, *Flabellia petiolata*, *Plocamium coccineum*, *Acrosorium uncinatum*, *Sertularella ellisii* and *Scrupocellaria maderensis* (RMNH-Coel. 29844).— CONG 46, 5 m, several colonies on *Peyssonnelia coriacea*, *Flabellia petiolata*, cirripedes and bio-concretion of *Astroides calycularis* (RMNH-Coel. 29845).— CONG 53, 17.5 m, three hydrothecae on *Cystoseira spinosa*.— CONG 54, 16.8 m, numerous hydrothecae on *Eudendrium glomeratum* and cirripedes (RMNH-Coel. 29846).— CONG 55, 15.5 m, two hydrothecae on *Sphaerococcus coronopifolius*.— CONG 57, 10.5 m, a few hydrothecae on *Cystoseira spinosa* (RMNH-Coel. 29847).— CONG 59, 9 m, several hydrothecae on *Halopteris filicina*, *Peyssonnelia rubra* and *Myriapora truncata* (RMNH-Coel. 29848).— CONG 61, 4 m, several hydrothecae on *Peyssonnelia rubra* and *Halopteris filicina*.— CONG 70, 4.5 m, a single hydrotheca on rock.— CONG 71, 5 m, numerous colonies with a few hydrothecae on pebbles and *Halopteris scoparia*.— CONG 74, 11 m, a few hydrothecae on *Halopteris scoparia* (RMNH-Coel. 29849).— CONG 76, 13 m, several colonies with a few hydrothecae on *Halopteris filicina*, *Cystoseira spinosa* and *Acrosorium uncinatum* (RMNH-Coel. 29850).— CONG 79, 17 m, numerous hydrothecae on *Sertularella ellisii*.— CONG 80, 15 m, a single hydrotheca.— C-3, 45 m, three hydrothecae on tube of benthic organism.— C-8 (bis), 40 m, five hydrothecae on *Arca noae*.— E-2, 40 m, a single hydrotheca on *Eudendrium ramosum*.— E-7, 19 m, two hydrothecae on bryzozoans.— F-2, 40 m, a single hydrotheca on anthozoan remnants.— F-8, 18 m, a few hydrothecae on *Cystoseira spinosa*, *Eudendrium* spec. and remains of *Posidonia oceanica* scales.— F-17, 21 m, numerous hydrothecae on remains of *Posidonia oceanica* leaves (RMNH-Coel. 29851).— G-2, 38 m, a few hydrothecae on *Cladophora hutchinsiae*.— G-8, 17 m, a few hydrothecae on *Cystoseira zosteroides*.— G-9, 18 m, a single hydrotheca on *Gracilaria* sp.— G-16, 22 m, a few hydrothecae on *Amathia* spec. and remains of *Posidonia oceanica* leaves (RMNH-Coel. 29852).— G-17, 20 m, several hydrothecae on *Sertularella polyzonias*, *Bougainvillia ramosa*, *Eudendrium ramosum* and *Eudendrium glomeratum* (RMNH-Coel. 29853).— H-12, 14 m, five hydrothecae on *Bougainvillia muscus*.— H-13, 16 m, numerous hydrothecae on *Eudendrium* spec. (RMNH-Coel. 29854).— ISA 5, 35 m, a few hydrothecae on *Dendrophyllia* spec. and *Chartella papyrea*.— ISA 9, 12 m, three hydrothecae on *Pentapora* spec.— ISA 10, 10 m, five hydrothecae on *Cystoseira spinosa* and *Halopteris filicina*.— ISA 12, 5 m, a few hydrothecae on *Peyssonnelia* spec., *Plocamium cartilagineum* and *Aglaophenia kirchenpaueri* (RMNH-Coel. 29855).— ISA 14, 0.3 m, several hydrothecae on *Laurencia* spec.— ISA 16, 7 m, single hydrotheca on *Peyssonnelia bornetii*.— ISA 17, 3 m, a few hydrothecae on *Plocamium cartilagineum* and *Aglaophenia kirchenpaueri* (RMNH-Coel. 29856).— ISA 19, 20 m, numerous hydrothecae on *Aglaophenia pluma*, with gonothecae (RMNH-Coel. 29857).— ISA 21, 19.2 m, three hydrothecae.— ISA 22, 15 m, two hydrothecae on *Cystoseira spinosa*.— ISA 24, 10 m, three hydrothecae on *Halopteris scoparia*.— ISA 25, 10 m, several hydrothecae on *Peysson-*

nelia rubra, *Obelia dichotoma* and *Celleporina* spec. (RMNH-Coel. 29858).— ISA 26, 34 m, a few hydrothecae on *Cellaria salicornoides* and *Pentapora fascialis* (RMNH-Coel. 29859).— ISA 27, 25 m, two hydrothecae on *Cellaria salicornoides*.— ISA 29, 6 m, numerous hydrothecae on *Peyssonnelia coriacea*, *Halopteris filicina*, *Scrupocellaria scruposa* and bio-concretions of *Astroides calycularis* (RMNH-Coel. 29860).— ISA 30, 15 m, a few hydrothecae on *Peyssonnelia coriacea* and *Halopteris filicina* (RMNH-Coel. 29861).— I-3, 26 m, several hydrothecae on remains of *Posidonia oceanica* leaves (RMNH-Coel. 29862).— I-8, 17 m, single hydrotheca on *Gracilaria* spec.— I-15, 17 m, a few hydrothecae on mollusc eggs (RMNH-Coel. 29863).— PISA 3, 3 m, several hydrothecae on *Plocamium cartilagineum* (RMNH-Coel. 29864).— PISA 13, 2 m, single hydrotheca on *Acrosorium uncinatum*.— PISA 14, 3.3 m, numerous hydrothecae on *Sertularella mediterranea* (RMNH-Coel. 29865).— PISA 15, 1 m, a few hydrothecae on *Rhodymenia* spec., *Aglaophenia octodonta* and *Laomedea* spec. (RMNH-Coel. 29866).— PISA 17, 1 m, two hydrothecae on algae.— PISA 18, 30 m, three hydrothecae on *Microporella* spec., and incrusting calcareous algae.— PISA 19, 2 m, a few hydrothecae on *Rhodymenia ardissonei* and bio-concretions of *Astroides calycularis*.— PISA 21, 2 m, two hydrothecae.— PISA 27, 1 m, a few hydrothecae on *Peyssonnelia coriacea* (RMNH-Coel. 29867).— PREY 1, 13 m, a few hydrothecae on *Cystoseira spinosa*.— REY 4, 27 m, several hydrothecae on *Flabellia petiolata*, *Eudendrium glomeratum*, *Sertularella polyzonias*, *Pentapora fascialis*, *Turbicellepora* spec. and *Microporella* spec. (RMNH-Coel. 29868).— REY 5, 20 m, numerous hydrothecae on *Cystoseira spinosa*, *Cladostephus verticillatus*, *Halopteris filicina* and *Aglaophenia pluma* (RMNH-Coel. 29869).— REY 6, 10 m, a few hydrothecae on *Cystoseira spinosa* and *Aglaophenia pluma* (RMNH-Coel. 29870).— REY 8, 25 m, a few hydrothecae on *Eudendrium* spec.— REY 11, 6 m, a single hydrotheca on *Halopteris scoparia*.— REY 17, 2 m, a few hydrothecae on *Peyssonnelia coriacea* (RMNH-Coel. 29871).— REY 20, 3 m, single hydrotheca on *Corallina elongata*.— REY 27, 1.5 m, a few hydrothecae on *Cystoseira spinosa* (RMNH-Coel. 29872).

Remarks.— The length of the hydrothecae is 472-1328 μm and the diameter at the aperture is 200-736 μm. The hydrothecal rim has 9-18 cusps separated by rounded embayments. The cusps are either long and thin, with blunt ends, or wide and distally truncated. Only female gonothecae are present.

Ecology.— *Campanularia hincksii* is an eurybathic species. In the Mediterranean it has been found from the tidal level (Roca, 1986) to 395 m depth (Ramil & Vervoort, 1992); our material comes from 0.3 to 45 m. Outside the Mediterranean it has been reported from the tidal level (Ramil, 1988) to 800 m depth (Kramp, 1938). It has frequently been found epibiontic on algae (Stechow, 1923b; Rossi, 1961; García Carrascosa, 1981; Roca, 1986; Gili, 1986; Boero & Fresi, 1986), rhizomes of *Posidonia oceanica* (García Carrascosa, 1981; Boero, 1981a; Roca, 1986), hydrozoans (Stechow, 1919; García Carrascosa, 1981; Roca, 1986; Boero & Fresi, 1986; Gili, 1986; Ramil, 1988; Ramil & Vervoort, 1992; Medel & Vervoort, 2000; etc.), bryozoans, cirripedes, sponges and ascidians (García Carrascosa, 1981; Boero & Fresi, 1986; etc.), mollusc shells and polychaete tubes (Ramil, 1988), on bio-concretions (García Carrascosa, 1981) and epilithic (Ramil, 1988). In our material, it was found on a wide range of substrata, of which algae, hydrozoans and bryozoans were the most important. Amongst algae the most frequently used are hemiphotophilic and sciaphilic algae, such as *Cystoseira spinosa*, *Halopteris filicina*, *Peyssonnelia* spp., *Acrosorium uncinatum*, etc. The remaining occasions it was observed on cirripedes, anthozoans, bivalves, *Posidonia oceanica* and on non-living substrata, both biotic (bio-concretions and invertebrate remains) and abiotic (rocks and pebbles). It is in turn used as substratum for colonies of *Egmundella amirantensis*.

In the Mediterranean *C. hincksii* seems to be fertile throughout the year; colonies with gonothecae have been found in January (Boero & Fresi, 1986), March (Picard, 1955), April (Picard, 1955; Gili, 1986), July (Roca, 1986), October (Boero & Fresi, 1986)

and November and December (Broch, 1933; Boero & Fresi, 1986). In our material the only fertile colony was collected in July. Outside the Mediterranean it has been found with gonothecae in March (Medel & Vervoort, 2000), April (Cornelius, 1982), May (Altuna, 1994; Medel & Vervoort, 2000), June (Ramil & Vervoort, 1992; Altuna, 1994; Medel & Vervoort, 2000), from July to September (Teissier, 1965), October (Teissier, 1965; Ramil, 1988; Altuna, 1994) and November (Ramil, 1988).

Distribution.— *Campanularia hincksii* has been considered a North Atlantic (Picard, 1958a), cosmopolitan (Millard, 1975; Boero & Bouillon, 1993) or circumglobal species (Calder, 1991). Its absence from polar waters makes circumglobal distribution the most likely. In the eastern Atlantic it has been reported from off Iceland (Broch, 1918) to South Africa (Millard, 1975).

In the Mediterranean it is known from the Adriatic (Broch, 1912, 1933), the Balearic Islands (Roca, 1986; Gili, 1986), the Alboran Sea (Templado et al., 1987; Ramil & Vervoort, 1992) and from off the Algerian (Picard, 1955), French (Stechow, 1919; Leloup, 1934; Picard, 1951b, c, 1952a), Italian (Stechow, 1923b; Rossi, 1961; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Campanularia volubilis (Linnaeus, 1758)
(fig. 27c-d)

Sertularia volubilis Linnaeus, 1758: 811.

Campanularia volubilis; Alder, 1856: 358, pl. 13 fig. 7; Hincks, 1874: 147; Broch, 1918: 157; Leloup, 1934: 11; Fraser, 1937: 63, pl. 13 figs 55a-c; 1944: 120, pl. 21 figs 91a-c; 1946: 59, 194; Da Cunha, 1944: 58, fig. 32; Naumov, 1969: 273, fig. 139; Calder, 1970: 1520, pl. 4 fig. 5; Cornelius, 1982: 55, figs 4a-d; Antsulevich, 1987: 33-34; Cornelius et al., 1990: 131, fig. 4.10; Boero & Bouillon, 1993: 264; Medel & López González, 1996: 205.

?*Campanularia volubilis*; Stechow, 1919: 156; 1923b: 104, fig. L.; Leloup, 1934: 11.

?*Campanularia cf. volubilis*; Altuna, 1994: 312-314.

Material.— CONG 8, 10 m, five hydrothecae on *Dictyota dichotoma*.— CONG 13, 2 m, two hydrothecae on *Cladostephus verticillatus*.— CONG 21, 8 m, several hydrothecae on *Halopteris scoparia* (RMNH-Coel. 29873).— CONG 23, 8 m, two hydrothecae on *Halopteris scoparia*.— CONG 27, 13 m, numerous hydrothecae on *Sargassum* spec. (RMNH-Coel. 29874).— CONG 30, 0.2 m, several hydrothecae on *Corallina elongata* and *Gigartina teedii* (RMNH-Coel. 29875).— CONG 32, 7 m, a few hydrothecae on *Halopteris scoparia* (RMNH-Coel. 29876).— CONG 39, 0.4 m, a few hydrothecae on *Acrosorium uncinatum* (RMNH-Coel. 29877).— CONG 43, 2 m, several hydrothecae on *Corallina elongata* (RMNH-Coel. 29878).— CONG 46, 5 m, a few hydrothecae.— CONG 59, 9 m, a few hydrothecae on *Myriapora truncata*.— CONG 61, 4 m, a few hydrothecae on *Peyssonnelia rubra* (RMNH-Coel. 29879).— CONG 69, 2.5 m, single hydrotheca on *Halopteris filicina*.— CONG 71, 5 m, a few hydrothecae.— CONG 72, 7 m, four hydrothecae on *Halopteris scoparia*.— CONG 73, 10 m, a few hydrothecae on *Acrosorium uncinatum*, *Halopteris filicina*, *Flabellia petiolata*, *Aglaophenia kirchenpaueri* and *Sertularella mediterranea* (RMNH-Coel. 29880).— CONG 76, 13 m, a few hydrothecae (RMNH-Coel. 29881).— CONG 82, 5 m, several hydrothecae on *Rhodymenia ardissonei*, *Corallina elongata*, *Flabellia petiolata*, bivalve shells and bio-concretion of *Astroides calycularis* (RMNH-Coel. 30016).— CONG 83, 5 m, four hydrothecae on *Sphaerococcus coronopifolius*.— ISA 7, 15 m, a few hydrothecae on *Cystoseira spinosa* (RMNH-Coel. 29882).— ISA 10, 10 m, a few hydrothecae.— ISA 19, 20 m, a few hydrothecae on *Aglaophenia pluma*.— PCONG 6, 2 m, two hydrothecae on *Eudendrium racemosum*.— PISA 17, 1 m, a few hydrothecae.— PISA 22, 2 m, five hydrothecae on *Corallina elongata* and *Aglaophenia octodonta*.— PISA 24, 2 m, a few hydrothecae on cirripedes and *Aglaophenia picardi* (RMNH-Coel. 29883).— REY 23, 0 m, twelve hydrothecae on *Rhody-*

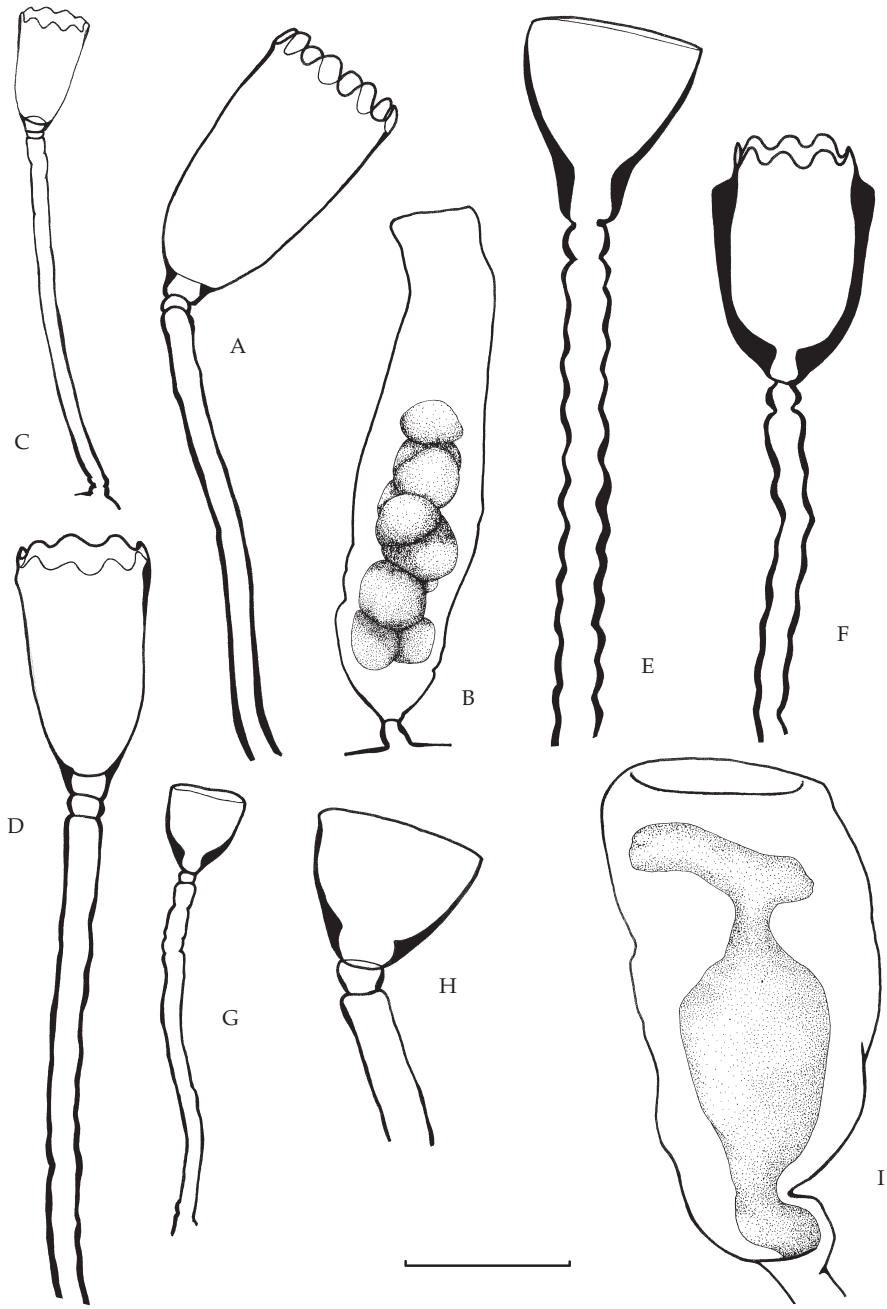

Fig. 27. A, B, *Campanularia hincksii* Alder, 1856. A, hydrotheca; B, gonotheca. C, D, *Campanularia volubilis* (Linnaeus, 1758), hydrothecae. E, *Orthopyxis asymmetrica* (Stechow, 1919), hydrotheca. F, *Orthopyxis crenata* (Hartlaub, 1901), hydrotheca. G-I, *Orthopyxis integra* (Macgillivray, 1842). G-H, hydrothecae; I, gonotheca. Scale bar: 250 μm (A, D-F, H-I), 500 μm (B-C, G).

menia spec. and *Cladophora lehmanniana* (RMNH-Coel. 29884).— REY 24, 0 m, a few hydrothecae on *Pterocladia capillacea*, *Corallina elongata* and *Flabellia petiolata* (RMNH-Coel. 29885).

Description.— Stolonal hydrorhiza giving rise, through a short apophysis, to pedicels supporting a single hydrotheca. Wall of pedicel smooth or spirally waved; sometimes with basal rings.

Hydrotheca resting on a basal spherule, small and bell-shaped, with a diaphragm delimiting a small basal chamber and above it a ring of desmocytes for attachment of the polyp. No inflexion point between basal chamber and remaining hydrotheca. Hydrothecal diameter smoothly increasing upwards; maximum diameter at aperture. Hydrothecal aperture circular; rim provided with 8-9 blunt cusps, separated by shallow embayments that are slightly curved inwards. A few hydrothecal renovations have been observed.

No gonothecae.

Remarks.— According to Cornelius (1982) *Campanularia groenlandica* Levinsen, 1893, is conspecific with *C. volubilis*, though they have usually been considered different species, his arguments being the shape of the pedicel, the hydrothecal cusps and the gonothecae that are identical. However, Cornelius did not consider some typical features of Levinsen's species, such as the polygonal cross-section of the hydrothecae and the presence of distinct lines running from the bottom of the embayments between the marginal cusps to the hydrothecal base (Broch, 1918; Calder, 1970). Antsulevich (1987) kept both species separate, as we are doing here.

Campanularia volubilis has been reported from the Mediterranean by Stechow (1919, 1923b) and Leloup (1934), though we doubt those records. Stechow's (1923b) figure, for example, could also represent *Campanularia hincksii* Alder, 1856. *Campanularia volubilis*, however, has also been recorded from the Black Sea (Naumov, 1969).

Ecology.— *Campanularia volubilis* is a littoral and shelf species, having been found from the tidal zone (Fraser, 1946) to 250 m depth (Naumov, 1969). Our material comes from the tidal level to 20 m. It has mainly been observed epibiontic on hydrozoans (Billard, 1931b; Kramp, 1938; Vervoort, 1949; Cornelius et al., 1990; Altuna, 1994) and less frequently on bryozoans, sponges and cirripedes, as well as on algae (Altuna, 1994). In our material it was found preferably on algae (> 72% of the records), but also on hydrozoans and, occasionally, on cirripedes, bivalves, bryozoans and bio-concretions.

Only Hamond (1957) reported fertile colonies from the British Isles in June.

Distribution.— *Campanularia volubilis* has been considered a boreal-circumpolar (Broch, 1918), boreal (Boero & Bouillon, 1993) or circumboreal species with cold-temperate affinities (Altuna, 1994). Although frequently reported from Arctic waters (Broch, 1918; Kramp, 1938; Fraser, 1946; Naumov, 1969), there are also records from low latitudes, as for instance the Pacific coast of Mexico and the Galápagos Islands (Fraser, 1946). In the eastern Atlantic it has been reported from off Iceland (Broch, 1918) and the Baltic coast of Sweden (Jäderholm, 1909) to the Mauritanian coasts (Billard, 1931b).

In the Mediterranean it has been reported from off the French coast (Stechow, 1919, 1923b; Leloup, 1934).

Genus *Clytia* Lamouroux, 1812

Clytia gracilis (M. Sars, 1850)
(fig. 28a-b)

Laomedea gracilis p.p. M. Sars, 1850: 138; Leloup, 1934: 9; 1952: 155-157, fig. 88.
Laomedea (*Campanularia*) *gracilis*; M. Sars, 1857: 161, pl. 1 figs 1-3, 5.
Gonothyraea gracilis; Hincks, 1868: 183-184, pl. 36 fig. 1; Jäderholm, 1909: 64, pl. 6 fig. 3; Stechow, 1919: 51-52.
Campanularia pelagica Van Breemen, 1905: 205-209, fig. 18.
Laomedea (*Gonothyraea*) *gracilis*; Broch, 1912: 53-54, fig. 18a-b.
Laomedea (*Clytia*) *gracilis*; Broch, 1933: 98-99.
Laomedea pelagica; Vervoort, 1946b: 285-288, fig. 126; Gili, 1986: 186, fig. 4.16b.
Clytia gracilis; Picard, 1951c: 261; 1952a: 349; 1955: 185; Rossi, 1961: 79; Patriti, 1970: 33, fig. 40; Cornelius & Östman, 1986: 165-166; Calder, 1991: 54-57, fig. 31; Ramil & Vervoort, 1992: 235-236, 238, fig. 67a; Vervoort, 1993: 557-558; El Beshbeeshy, 1993: 236-239, fig. 1a; Álvarez Claudio, 1993: 357-359, fig. 61; Altuna, 1994: 314-316, pl. 60 figs a-f; Medel & López González, 1996: 205; Migotto, 1996: 81-82, fig. 15c; Medel & Vervoort, 2000: 32-34.
Laomedea (*Phialidium*) *pelagica*; Vervoort, 1959: 313-315, fig. 55b-c; 1968: 15-17, fig. 5.
Clytia hemisphaerica p.p. Rees & Thursfield, 1965: 95; Leloup, 1974: 14; Millard, 1975: 217, fig. 72; Cornelius, 1982: 73, fig. 9; Isasi, 1985: 57-58, fig. 11.
Obelia gracilis; Naumov, 1969: 287-288, fig. 153.
Laomedea (*Clytia*) *pelagica*; Vervoort, 1972: 91-92, fig. 26c; García Corrales et al., 1978: 28-29, figs 11a-b.
Clytia sarsi Cornelius, 1982: 78.
Clytia pelagica; Ramil, 1988: 245-252, pl.16.

Material.— B-8, 47 m, several hydrothecae on mollusc eggs (RMNH-Coel. 29886).— B-15, 35 m, numerous hydrothecae on *Aporrhais pespelecani* and *Amathia* spec., with gonothecae (RMNH-Coel. 29887).— CONG 1, 0.5 m, numerous hydrothecae on *Peyssonnelia coriacea* (RMNH-Coel. 29937).— CONG 2, 1 m, a few hydrothecae on *Corallina elongata* and *Flabellia petiolata* (RMNH-Coel. 29888).— CONG 43, 2 m, a few hydrothecae.— CONG 44, 3 m, three hydrothecae on *Peyssonnelia rubra*.— CONG 59, 9 m, two hydrothecae on algae.— CONG 64, 1 m, numerous hydrothecae on *Cladostephus verticillatus* (RMNH-Coel. 29889).— CONG 67, 0 m, several hydrothecae on *Laurencia* spec. (RMNH-Coel. 29890).— C-3, 45 m, a few hydrothecae on *Eudendrium glomeratum*.— C-4, 34 m, several hydrothecae on stones and bivalve remains (RMNH-Coel. 29891).— C-8, 39 m, several stems with up to five hydrothecae on bivalve remains (RMNH-Coel. 29892).— C-8 (bis), 40 m, several hydrothecae on *Eudendrium ramosum*, with gonothecae.— D-2, 41 m.— D-8, 30 m, a few hydrothecae on mollusc remains and *Sertularella polyzonias* (RMNH-Coel. 29893).— E-3, on *Buccinulum corneus*.— E-16, 25 m, seven hydrothecae on mollusc eggs.— F-8, 18 m, a few hydrothecae on *Halopteris filicina* (RMNH-Coel. 29894).— F-9, 17 m, two hydrothecae on *Amathia* spec. (RMNH-Coel. 29894).— F-17, 21 m, a few hydrothecae on mollusc eggs, *Bougainvillia muscus* and *Eudendrium ramosum* (RMNH-Coel. 29895).— G-8, 17 m, a few hydrothecae on *Cystoseira zosteroides*, *Dictyota dichotoma*, *Cladophora* spec., *Chondria curvilineata* and *Sertularella ellisii*, with gonothecae (RMNH-Coel. 29896).— G-10, 15 m, three hydrothecae on athecate hydroid.— G-14, 20 m, several hydrothecae on biodetritic remains, *Dictyota dichotoma* and *Amathia* spec. (RMNH-Coel. 29897).— G-15, 21 m, three hydrothecae and one stem with several hydrothecae on *Amathia* spec. and *Turritella communis*, with gonothecae.— G-16, 22 m, a few hydrothecae on *Bougainvillia muscus*, *Amathia* spec. and remnants of *Posidonia oceanica* leaves (RMNH-Coel. 29898).— G-17, 20 m, several hydrothecae on *Chaetomorpha* spec., *Eudendrium glomeratum* and remnants of *Posidonia oceanica* leaves, with gonothecae (RMNH-Coel. 29899).— H-10, 15 m, a few hydrothecae on *Eudendrium ramosum*.— H-12, 14 m, a few hydrothecae on *Bougainvillia ramosa*.— ISA 5, 35 m, a few hydrothecae (RMNH-Coel. 29900).— ISA 14, 0.3 m, numerous hydrothecae on *Laurencia* spec., *Cystoseira* spec., incrusting calcareous algae, *Vermetus* spec. and cirripedes (RMNH-Coel. 29901).— ISA 18, 20 m, one colony on *Aglaophenia acacia*.— ISA

21, 19.2 m, two hydrothecae on polychaete tubes.— ISA 28, 29 m, a few hydrothecae on *Eudendrium* spec. and *Turbicellepora* spec.— I-7, 20 m, a few hydrothecae on mollusc eggs and *Eudendrium* spec. (RMNH-Coel. 29902).— I-15, 17 m, numerous hydrothecae on *Gracilaria* spec., with gonothecae (RMNH-Coel. 29903).— PISA 12, 2 m, numerous hydrothecae on rock, incrusting calcareous algae and *Aglaophenia octodonta*.— PISA 14, 3.3 m, several hydrothecae on *Sertularella mediterranea* (RMNH-Coel. 29904).— REY 8, 25 m, five hydrothecae on serpulids.— REY 20, 3 m, two hydrothecae on pebbles.— REY 22, 0 m, four hydrothecae on *Sargassum vulgare*.— REY 24, 0 m, a few hydrothecae on *Pterocladia capillacea* (RMNH-Coel. 29905).— REY 28, 2 m, a few hydrothecae on pebbles.

Remarks.— The present material consists of colonies with either unbranched pedicels with a single distal hydrotheca or branched pedicels with up to 13 hydrothecae. The length of the hydrothecae is 336-1200 μm and the diameter at the aperture is 160-488 μm. The hydrothecal rim is provided with 8-14 long and sharp cusps, directed slightly inwards and laterally, separated by rounded embayments; the cross section of the hydrotheca at that level is wavy.

Ecology.— *Clytia gracilis* is a littoral and shelf species. In the Mediterranean it has been reported from 5 (Gili, 1986) to 205 m depth (Ramil & Vervoort, 1992); our material comes from the tidal level to 47 m. Outside the Mediterranean it has been recorded from 0.5 (Calder, 1991) to 544 m depth (Ramil & Vervoort, 1992). It has been found epibiontic on algae (Broch, 1912, 1933; Stechow, 1919; Rossi, 1961; Naumov, 1969; Altuna, 1994), hydrozoans (Stechow, 1919; Naumov, 1969; Ramil, 1988; Ramil & Vervoort, 1992; Vervoort, 1993; Altuna, 1994; Medel & Vervoort, 2000), sponges (Stechow, 1919; Ramil, 1988), bryozoans (Broch, 1933; Naumov, 1969; Altuna, 1994), mollusc shells and polychaete tubes (Ramil, 1988), on bio-concretions (Rossi, 1961) and epilithic (Altuna, 1994). In our material it was observed on a wide range of substrata, epibiontic on algae, hydrozoans, bryozoans, polychaete tubes, gastropod shells and cirripedes, and on non-living substrata, both biotic (mollusc eggs, remnants of invertebrates) and abiotic (rock and pebbles).

In the Mediterranean fertile colonies were found in June (Stechow, 1919), September (Gili, 1986), October (Vervoort, 1993) and November (Broch, 1933). In our material colonies with gonothecae were collected in July and August. Outside the Mediterranean Ramil (1988) found fertile colonies in April, May and August, Altuna (1994) from April to September and Medel & Vervoort (2000) in June. In temperate latitudes it seems to be fertile throughout the year, with the exception of winter.

Distribution.— *Clytia gracilis* has a wide geographical distribution, having been considered cosmopolitan (Rossi, 1961; Patriti, 1970), circumglobal (Calder, 1991) or boreal (Boero & Bouillon, 1993). Although previous confusion with *C. hemisphaerica* prevents us from establishing an exact distributional pattern for *C. gracilis*, it seems to be a circumglobal species, reaching sub-Artic (Naumov, 1969) and sub-Antarctic waters (Stepan'yants, 1979). In the eastern Atlantic it has been reported from the Barents Sea (Naumov, 1969) and from off Iceland (Broch, 1918) to the South African coasts (Millard, 1975).

In the Mediterranean it is known from the Adriatic (Broch, 1912, 1933), the Balearic Islands (Gili, 1986), the Alboran Sea (Ramil & Vervoort, 1992) and from off the Algerian (Picard, 1955), Israeli (Vervoort, 1993), Italian (Rossi, 1961), Egyptian (El Beshbeeshy, 1993), French (Stechow, 1919; Leloup, 1934; Picard, 1951c, 1952a) and Spanish coasts (García Corrales et al., 1978; Gili, 1986).

Clytia hemisphaerica (Linnaeus, 1767)
(fig. 28c-d)

Medusa hemisphaerica Linnaeus, 1767: 1098.
Campanularia Johnstoni Alder, 1856: 359, pl. 13 fig. 8; Broch, 1918: 163-164.
Campanularia raridentata Alder, 1862: 315, pl. 14 fig. 5; Stechow, 1919: 58-60, figs Qa-c; Gili, 1986: 181, figs 4.18b, 4.19b.
Clytia johnstoni; Stechow, 1919: 43; Billard, 1931a: 390; 1936: 3; Fraser, 1937: 74, pl. 15 fig. 71; 1944: 138, pl. 24 fig. 11; Picard, 1951c: 261; 1952a: 349; 1955: 185; Rossi, 1961: 79; Patriti, 1970: 32, fig. 39.
Thaumantias raridentata; Stechow, 1923b: 107-109, fig. M.
Clytia uniflora; Stechow, 1923b: 111; Picard, 1951b: 278; Marinopoulos, 1979: 120.
Campanularia (*Phialidium*) *johnstoni* f. *typica*; Broch, 1933: 93-96.
Campanularia (*Phialidium*) *johnstoni* f. *crassa*; Broch, 1933: 96-97, fig. 40.
Phialidium hemisphaericum; Teissier, 1965: 15.
Clytia hemisphaerica p.p. Millard, 1975: 217, figs 72a-d; Cornelius, 1982: 73-82, fig. 9; Isasi, 1985: 57-58, fig. 12; Roca, 1986: 212, fig. 41; Gili et al., 1987: 106, figs 30b-c.
Clytia hemisphaerica; García Corrales et al., 1978: 25, fig. 10; García Carrascosa, 1981: 171, pl. 31 fig. d; Boero, 1981a: 182, 184-185; Gili, 1986: 175, figs 4.18c-f, 4.56b; Boero & Fresi, 1986: 144; Ramil, 1988: 225, pl. 15 figs a-b; Calder, 1991: 57-61, figs 32a-b; Boero & Bouillon, 1993: 264; El Beshbeeshy, 1993: 239-240, fig. 1b; 1995a: 313-314; Álvarez Claudio, 1993: 361-365, fig. 62; Migotto, 1996: 82-84, fig. 15d-f; Medel & López González, 1996: 205; Morri & Bianchi, 1999: 287; Medel & Vervoort, 2000: 34-38.

Material.— B-11, 42 m, several hydrothecae on mollusc eggs (RMNH-Coel. 29906).— CONGRESO BANK, a few hydrothecae on algae, with gonothecae.— CONG 18, 4.5 m, a few hydrothecae on *Cystoseira* spec. (RMNH-Coel. 29907).— CONG 23, 8 m, two hydrothecae on *Halopteris scoparia*.— CONG 25, 25 m, a few hydrothecae on *Sargassum* spec. (RMNH-Coel. 29908).— CONG 44, 3 m, single hydrotheca on *Plocamium coccineum*.— CONG 58, 9 m, two hydrothecae on *Padina pavonia*.— CONG 63, 2 m, five hydrothecae on *Padina pavonia*.— CONG 74, 11 m, a few hydrothecae on *Posidonia oceanica* leaves (RMNH-Coel. 29909).— CONG 77, 20.5 m, several hydrothecae on algae (RMNH-Coel. 29910).— CONG 80, 15 m, single hydrotheca on bryozoans.— C-4, 34 m, three hydrothecae on *Eudendrium glomeratum* and *Eudendrium ramosum*.— C-8 (bis), 40 m, several hydrothecae on *Cystoseira spinosa*, with gonothecae (RMNH-Coel. 29911).— D-3, 24 m, four hydrothecae on *Chondria curvilineata*.— D-15, 27 m, a few hydrothecae on rope (RMNH-Coel. 29912).— E-3, 25 m, two hydrothecae on *Chondria curvilineata*.— E-16, 25 m, three hydrothecae on *Gracilaria* spec.— F-9, 17 m, a single hydrotheca on *Amathia* spec.— F-10, 10 m, two hydrothecae on *Amathia* spec.— F-12, 8 m, a few hydrothecae on *Gracilaria* spec., *Chondria curvilineata*, *Polysiphonia* spec. and *Amathia* spec., with gonothecae (RMNH-Coel. 29913).— F-17, 21 m, numerous hydrothecae on mollusc eggs, *Chaetomorpha* spec. and *Gracilaria* spec., with gonothecae (RMNH-Coel. 29914).— G-8, 17 m, numerous hydrothecae on *Gracilaria* spec., *Cladophora* spec., *Cystoseira zosteroides* and remains of *Posidonia oceanica* leaves, with gonothecae (RMNH-Coel. 29915).— G-9, 18 m, two hydrothecae.— G-16, 22 m, numerous hydrothecae on mollusc eggs, *Gracilaria* spec. and *Eudendrium ramosum*, with gonothecae (RMNH-Coel. 29916).— G-17, 20 m, numerous hydrothecae on *Chaetomorpha* spec., *Polysiphonia* cf. *denudata* and *Sertularella polyzonias*, with gonothecae (RMNH-Coel. 29917).— H-15, 20 m, a few hydrothecae on *Cymodocea* spec.— H-16, 20 m, several hydrothecae on *Gracilaria* spec. (RMNH-Coel. 29918).— ISA 5, 35 m, five hydrothecae on *Flabellia petiolata*.— ISA 19, 20 m, a few hydrothecae on algae.— ISA 26, 34 m, a few hydrothecae on *Eudendrium* spec., *Cellaria salicornoides*, *Schizomavella* spec. and polychaete tubes.— I-8, 17 m, several hydrothecae on mollusc eggs, with gonothecae (RMNH-Coel. 29919).— I-15, 17 m, a few hydrothecae on *Gracilaria* spec. (RMNH-Coel. 29920).— REY 8, 25 m, a few hydrothecae on *Eudendrium* spec., with gonothecae (RMNH-Coel. 29921).

Remarks.— The length of the hydrothecae is 400-808 μm and the diameter at the aperture is 176-400 μm. The rim of the hydrothecal aperture is provided with 8-14 rounded cusps.

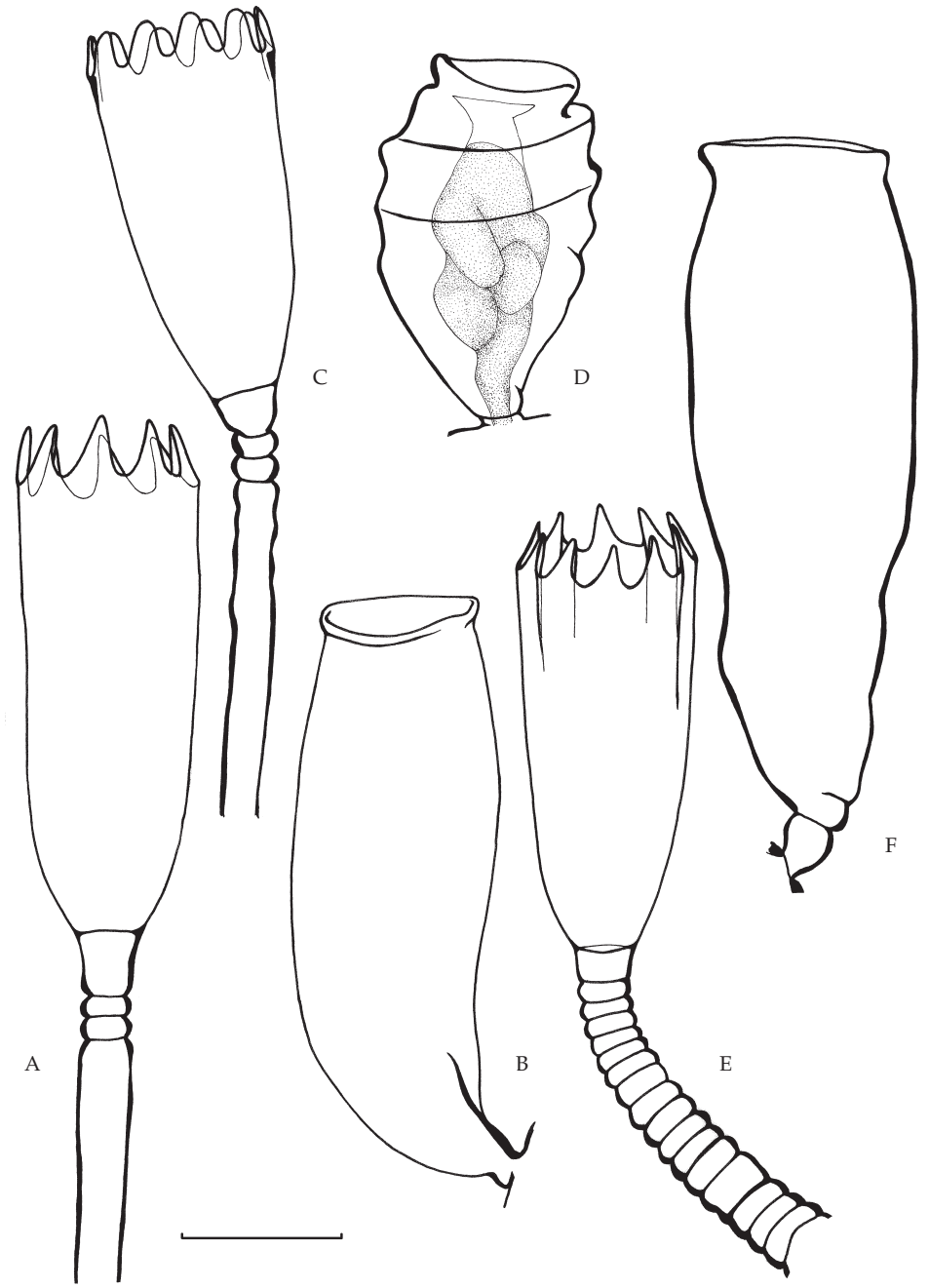

Fig. 28. A, B, *Clytia gracilis* (M. Sars, 1850). A, hydrotheca; B, gonotheca. C, D, *Clytia hemisphaerica* (Linnaeus, 1767). C, hydrotheca; D, gonotheca. E, F, *Clytia linearis* (Thornely, 1899). E, hydrotheca; F, gonotheca. Scale bar: 250 μm.

Ecology.— *Clytia hemisphaerica* is an eurybathic species that, in the Mediterranean, has been found from the tidal level (Broch, 1933) to 144 m depth (Roca, 1986); our material was collected from 2 to 42 m. Outside the Mediterranean it has been reported deeper, e.g., 702 m depth (Álvarez Claudio, 1993).

It has frequently been found epibiontic on algae (Broch, 1933; Billard, 1936; Rossi, 1961; García Carrascosa, 1981; Boero & Fresi, 1986; Ramil, 1988; Morri & Bianchi, 1999; etc), *Posidonia oceanica* (Stechow, 1919, 1923b; Billard, 1936; Boero, 1981a; García Carrascosa, 1981) and other seagrasses (Billard, 1931a; Piraino & Morri, 1989), on hydrozoans (Stechow, 1919, 1923b; Picard, 1951b; Rossi, 1961; Boero & Fresi, 1986; Ramil, 1988; Medel & Vervoort, 2000; etc.) and many other invertebrates (García Carrascosa, 1981; Boero & Fresi, 1986; Ramil, 1988; Migotto, 1996; Morri & Bianchi, 1999; etc.), on floating objects (García Carrascosa, 1981; Gili, 1986; Altuna, 1994) and on recovered instruments (Morri & Bianchi, 1999). In our material, it was observed on a wide range of substrata, mainly on algae (>57% of the records), bryozoans and hydrozoans, but also on polychaete tubes, *Posidonia oceanica*, *Cymodocea* spec. and on non-living biotic substrata (fibres, invertebrate remains and mollusc eggs). Moreover, it was observed as substratum for other hydroids (*Egmundella amirantensis*).

In the Mediterranean *Clytia hemisphaerica* seems to be fertile throughout the year. Colonies with gonothecae have been found in January (Stechow, 1923b; Boero & Fresi, 1986), February (Stechow, 1923b; Picard, 1951b; Gili, 1986; Boero & Fresi, 1986), March (Stechow, 1923b; Rossi, 1961; Roca, 1986; Boero & Fresi, 1986), April (Stechow, 1919; Picard, 1955; Roca, 1986), May (Stechow, 1919; Gili, 1986; Roca, 1986; Piraino & Morri, 1989), June (Stechow, 1919; Roca, 1986; Morri & Bianchi, 1999), August, September and October (Boero & Fresi, 1986), November (Rossi, 1961; Boero & Fresi, 1986; Piraino & Morri, 1989) and December (Boero & Fresi, 1986). In our material fertile colonies were collected in July and August. Along the Atlantic coasts of Europe Ramil (1988) found gonothecae from February to July, August, September and November, and Altuna (1994) from March to October.

Distribution.— *Clytia hemisphaerica* is considered either a cosmopolitan (Boero & Bouillon, 1993) or circumglobal (Calder, 1991) species. Its absence from Antarctic and truly Arctic waters gives support to the latter. In the eastern Atlantic it has been reported from off Iceland (Broch, 1918) to South Africa (Millard, 1975).

In the Mediterranean it is known from the Adriatic (Broch, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Roca, 1986; Gili, 1986), Corsica (Stechow, 1919) and from off the Algerian (Picard, 1955), Egyptian (Billard, 1936; El Beshbeeshy, 1993, 1995a), French (Stechow, 1919, 1923b; Picard, 1951b-c, 1952a), Greek (Marinopoulos, 1979), Italian (Stechow, 1923b; Rossi, 1961; Boero, 1981a; Boero & Fresi, 1986; Piraino & Morri, 1989), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986), Syrian (Billard, 1931a) and Turkish coasts (Marinopoulos, 1979). It is also present in the Black Sea (Naumov, 1969).

Clytia linearis (Thornely, 1900)
(fig. 28e-f)

Obelia linearis Thornely, 1900: 453, pl. 44 fig. 6.
Campanularia Gravieri Billard, 1904b: 482, fig. 1.
Clytia gravieri; Picard, 1951b: 278; 1951c: 261; 1952a: 346-347, 349; 1958a: 191; Rossi, 1961: 80; Millard &

Bouillon, 1973: 51-54, figs 7e-g; Millard, 1975: 215-217, figs 71f-h; García Corrales et al., 1978: 29-30, fig. 12; Marinopoulos, 1979: 120; García Carrascosa, 1981: 178-181, pl. 32 figs d-e; Marinopoulos, 1981: 176.

Clytia linearis; Boero, 1981a: 182, 184; Cornelius, 1982: 84-86, fig. 12; Isasi, 1985: 58, fig. 13a; Gili, 1986: 176-177, fig. 4.19c-d; Roca, 1986: 227-233, fig. 42; Templado et al., 1986: 98; Boero & Fresi, 1986: 144; Rees & Vervoort, 1987: 94-95; Calder, 1991: 62-64, fig. 34; Ramil & Vervoort, 1992: 238, fig. 67b; Boero & Bouillon, 1993: 321-325; Altuna, 1994: 321-325; Migotto, 1996: 85-86, fig. 16a-b; Medel & López González, 1996: 206; Morri & Bianchi, 1999: 288; Medel & Vervoort, 2000: 38-39.

Material.— CONGRESO BANK, a few stems on *Sertularella polyzonias*.— CONG 7, 19 m, a few stems on *Cystoseira spinosa* and *Aglaophenia kirchenpaueri* (RMNH-Coel. 29922).— CONG 8, 10 m, several stems on *Padina pavonia* (RMNH-Coel. 29923).— CONG 13, 2 m, several stems on *Cladostephus verticillatus*.— CONG 15, 0.3 m, numerous stems on *Cystoseira tamariscifolia*, with gonothecae (RMNH-Coel. 29924).— CONG 18, 4.5 m, a few stems on *Halopteris filicina*, *Cystoseira* spec. and *Corallina granifera* (RMNH-Coel. 29925).— CONG 25, 25 m, several stems on *Sargassum* spec., anthozoans and polychaete tubes (RMNH-Coel. 29926).— CONG 35, 2 m, numerous stems on *Halopteris filicina* and *Flabellia petiolata* (RMNH-Coel. 29927).— CONG 43, 2 m, a few stems on *Corallina elongata*, *Padina pavonia*, *Boergeseniella fruticulosa*, *Sargassum* spec., *Valonia utricularis* and *Dictyota* spec. (RMNH-Coel. 29928).— CONG 44, 3 m, two stems on *Flabellia petiolata*.— CONG 54, 17 m, a few stems on *Sertularella ellisii*.— CONG 56, 15 m, several stems on *Padina pavonia* (RMNH-Coel. 29929).— CONG 57, 10.5 m, five stems on *Peyssonnelia rubra*, *Cystoseira spinosa*, *Acrosorium uncinatum* and sponges.— CONG 58, 9 m, three stems on *Padina pavonia*.— CONG 59, 9 m, six stems on *Halopteris filicina* and *Peyssonnelia rubra*.— CONG 69, 2.5 m, three stems on *Halopteris filicina*.— CONG 72, 7 m, a few stems on *Halopteris scoparia* (RMNH-Coel. 29930).— CONG 73, 10 m, a single hydrotheca on *Acrosorium uncinatum*.— CONG 76, 13 m, two stems on *Cystoseira spinosa*.— CONG 79, 17 m, two stems on *Cellaria salicornoides*.— CONG 80, 15 m, numerous stems on *Erythroglossum sandrianum*, *Griffithsia* spec., *Peyssonnelia rubra*, *Valkeria tuberosa* and bio-concretion of *Astroides calycularis* (RMNH-Coel. 29931).— CONG 82, 5 m, three stems on *Flabellia petiolata*.— C-4, 34 m, several stems on tube of benthic organism, with gonothecae (RMNH-Coel. 29932).— E-2, 40 m, a few stems on *Eudendrium ramosum*, with gonothecae.— F-12, 8 m, a few stems on *Polysiphonia* cf. *denudata* and *Amathia* spec. (RMNH-Coel. 29933).— G-17, 20 m, numerous stems with gonothecae; ISA 1, 24 m, a single stem.— ISA 3, 12 m, several stems on *Sargassum* spec. (RMNH-Coel. 29934).— ISA 5, 35 m, several stems on *Dendrophyllia* spec. and *Chartella papyrea*, with gonothecae (RMNH-Coel. 29935).— ISA 9, 12 m, single stem on bryozoans, with gonothecae.— ISA 10, 10 m, a single hydrotheca.— ISA 12, 5 m, a few stems on *Plocamium cartilagineum*, *Aglaophenia kirchenpaueri* and *Turbicellepora* spec. (RMNH-Coel. 29936).— ISA 14, 0.3 m, a few stems on incrusting calcareous algae, *Laurencia* spec. and *Vermetus* spec.— ISA 15, 5 m, three stems on *Flabellia petiolata*, *Sargassum* spec. and *Caberea boryi*.— ISA 18, 20 m, one colony on *Cystoseira spinosa*.— ISA 22, 15 m, a few stems on *Cystoseira spinosa* (RMNH-Coel. 29938).— ISA 24, 10 m, a few stems on *Halopteris scoparia* (RMNH-Coel. 29939).— ISA 25, 10 m, several stems on *Myriapora truncata*, *Celleporina* spec. and sponges (RMNH-Coel. 29940).— ISA 26, 34 m, numerous stems on *Obelia dichotoma*, *Cellaria salicornoides*, *Schizomavella* spec. and *Turbicellepora* spec. (RMNH-Coel. 29941).— ISA 27, 25 m, numerous stems on *Cornularia* spec., *Cellaria salicornoides*, *Sertella beaniana* and *Celleporina* spec., with gonothecae (RMNH-Coel. 29942).— ISA 28, 29 m, a few stems on *Ellisella paraplexauroides*, *Cellaria salicornoides*, *Valkeria* spec. and *Turbicellepora* spec., with gonothecae (RMNH-Coel. 29943).— ISA 29, 6 m, two stems on bio-concretions of *Astroides calycularis*.— ISA 30, 15 m, a few stems on *Peyssonnelia coriacea*, *Halopteris filicina*, *Pentapora fascialis* and *Balanus* spec. (RMNH-Coel. 29944).— PCONG 1, 1 m, numerous stems on *Acrosorium uncinatum*, *Sertularella mediterranea*, cirripedes and bryozoans, with gonothecae (RMNH-Coel. 29945).— PCONG 3, 2 m, two stems on *Eudendrium racemosum*, with gonothecae.— PCONG 6, 2 m, a few stems on *Haraldia lenormandii* and *Eudendrium racemosum*.— PISA 1, 2.5 m, several stems on incrusting calcareous algae and *Aglaophenia octodonta* (RMNH-Coel. 29946).— PISA 3, 3 m, two stems on *Plocamium cartilagineum*.— PISA 6, 2.7 m, several stems on *Amphiroa* spec. and *Aglaophenia octodonta* (RMNH-Coel. 29947).— PISA 9, 1 m, numerous stems on incrusting calcareous algae, with gonothecae (RMNH-Coel. 29948).— PISA 10, 1 m, numerous stems on incrusting calcareous algae, with gonothecae (RMNH-Coel. 29949).— PISA 14, 3.3 m, a few

stems on *Sertularella mediterranea*.— PISA 15, 1 m, several stems on *Rhodymenia* spec., *Aglaophenia octodonta* and *Turbicellepora* spec. (RMNH-Coel. 29950).— PISA 18, 30 m, several stems on bryozoans.— PISA 21, 2 m, four hydrothecae.— PISA 22, 2 m, several stems on incrusting calcareous algae.— PISA 23, 3 m, a few stems on *Eudendrium racemosum*.— PISA 25, 1 m, numerous stems on bio-concretions, with gonothecae (RMNH-Coel. 29951).— PISA 27, 1 m, numerous stems on *Valonia utricularis*, *Peyssonnelia coriacea* and incrusting calcareous algae, with gonothecae (RMNH-Coel. 29952).— PREY 1, 13 m, several stems on *Cystoseira spinosa*.— REY 4, 27 m, two stems.— REY 5, 20 m, a few stems on *Cystoseira spinosa*, *Halopteris filicina* and *Mesophyllum lichenoides* (RMNH-Coel. 29953).— REY 6, 10 m, a few stems on *Cystoseira spinosa* and *Aglaophenia pluma* (RMNH-Coel. 29954).— REY 8, on *Eudendrium* spec. and gorgonians.— REY 10, 16 m, a single hydrotheca.— REY 11, 6 m, four stems on *Crisia* spec.— REY 17, 2 m, numerous stems on *Rhodymenia ardissonei*, *Peyssonnelia coriacea* and cirripedes, with gonothecae (RMNH-Coel. 29955).— REY 20, 3 m, a few stems on *Valonia utricularis*.— REY 22, 0 m, several stems on *Sargassum vulgare* (RMNH-Coel. 29956).

Remarks.— The present material consists of colonies with monosiphonic stems with up to ten hydrothecae. The length of the hydrothecae is 600-1216 μm and the diameter at the aperture is 248-424 μm. The hydrothecal rim is provided with 11-12 large, sharp cusps separated by rounded embayments. The hydrothecal distal part is wavy in cross-section because of the internal position of cusps at the rim in relation to the embayments.

Ecology.— *Clytia linearis* is a littoral and shelf species that, in the Mediterranean, has been found from the tidal level to 200 m depth (Marinopoulos, 1981); our material comes from zero to 40 m. Outside the Mediterranean it has a similar bathymetrical distribution, being also known from the tidal zone (Millard, 1975) to 150 m depth (Ramil & Vervoort, 1992). It is usually observed epibiontic on algae (Rossi, 1961; García Carrascosa, 1981; Boero & Fresi, 1986; Roca, 1986; Gili, 1986; Altuna, 1994; Migotto, 1996; Morri & Bianchi, 1999) and hydrozoans (Picard, 1951b; Rossi, 1961; Millard, 1975; García Carrascosa, 1981; Gili, 1986; Boero & Fresi, 1986; Ramil & Vervoort, 1992; Migotto, 1996), and rarely on sponges (García Carrascosa, 1981; Boero & Fresi, 1986; Altuna, 1994), bryozoans and polychaete tubes (Boero & Fresi, 1986; Roca, 1986; Altuna, 1994), mollusc shells (Migotto, 1996; Medel & Vervoort, 2000), anthozoans and cirripedes (Migotto, 1996), *Posidonia oceanica* (Boero, 1981a; Boero & Fresi, 1986) and epilithic (Migotto, 1996). In our material, it was observed on a wide variety of substrata, though with a slight preference for algae (>53% of the records). It was also frequently found on bryozoans and hydrozoans, and occasionally on anthozoans, polychaete tubes, sponges, gastropods, cirripedes and on bio-concretions. It was observed in turn as substratum for other hydroids (*Egmundella amirantensis*, *Filellum* spec., *Mitrocomium* spec., *Clytia paulensis* and *Laomedea* spec. 2).

In the Mediterranean *C. linearis* has been found with gonothecae in January (Picard, 1955), April (Boero & Fresi, 1986; Gili, 1986), June (Boero & Fresi, 1986; Roca, 1986), August and September (Boero & Fresi, 1986) and November (Picard, 1951b; Boero & Fresi, 1986). Our fertile material was collected in July and August. It seems to be fertile throughout the year.

Distribution.— *Clytia linearis* is usually considered a circumtropical species (Picard, 1958a; Millard & Bouillon, 1973; Boero & Bouillon, 1993), widely distributed over tropical and subtropical waters of the Atlantic, Indian and Pacific oceans (Rees & Vervoort, 1987). In the eastern Atlantic it is known from the north of Spain (Altuna, 1994) to South Africa (Millard, 1975).

In the Mediterranean it has been reported from the Balearic Islands (Gili, 1986; Roca, 1986), Alboran Sea (Templado et al., 1986; Ramil & Vervoort, 1992), Aegean Sea (Morri & Bianchi, 1999), and from off the Algerian (Picard, 1955), French (Picard, 1951b, c, 1952a; Marinopoulos, 1981), Greek (Marinopoulos, 1979), Italian (Rossi, 1961; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Clytia paulensis (Vanhöffen, 1910)
(fig. 29a-c)

Campanularia paulensis Vanhöffen, 1910: 272, 298, fig. 19a-b; Leloup, 1934: 11.
Clytia (?) *paulensis*; Stechow, 1919: 45.
Clytia (?) *ulvae* Stechow, 1919: 47, fig. N; Leloup, 1934: 9.
Clytia paulensis; Stechow, 1923b: 110, fig. N; Picard, 1951c: 261; 1952a: 349; 1955: 186; 1958a: 191; Fey, 1970: 393; Calder, 1971: 51-52, pl. 3 fig. 1; Millard, 1975: 221, figs 73a-d; Marinopoulos, 1979: 120; 1981: 176; Boero, 1981a: 182, 184; García Carrascosa, 1981: 175, pl. 9 figs a-c; Isasi, 1985: 58; Gili, 1986: 176, fig. 4.17c-d; Roca, 1986: 234, pl. 43; Boero & Fresi, 1986: 144; Ramil, 1988: 240; Ramil & Vervoort, 1992: 239, figs 67c-d; Boero & Bouillon, 1993: 264; Álvarez Claudio, 1993: 267-269, fig. 63; Altuna, 1994: 325-327; Medel & López González, 1996: 206; Medel & Vervoort, 2000: 39-41.
Clytia longitheca Fraser, 1937: 75-76, pl. 15 fig. 73; 1946: 62, 217.

Material.— A-10, 41 m, on *Murex brandaris*.— A-7, 57 m, two hydrothecae on mollusc eggs.— B-11, 42 m, four hydrothecae on *Halopteris* spec. and *Sertularella polyzonias* (RMNH-Coel. 29957).— B-15, 35 m, a few hydrothecae on *Aporrhais pespelecani*.— CONGRESO BANK, a few hydrothecae on *Eudendrium racemosum*.— CONG 1, 0.5 m, a few hydrothecae on *Flabellia petiolata* and *Salmacina* spec. (RMNH-Coel. 29958).— CONG 18, 4.5 m, two hydrothecae on *Aglaophenia tubiformis*.— CONG 21, 8 m, three hydrothecae on *Halopteris scoparia*.— CONG 32, 7 m, two hydrothecae on *Halopteris scoparia*.— CONG 61, 4 m, four hydrothecae on algae.— CONG 79, 17 m, a few hydrothecae on *Caberea boryi*.— CONG 80, 15 m, several hydrothecae on *Erythroglossum sandrianum*, incrusting calcareous algae, bio-concretion of *Astroides calycularis*, polychaete tubes, *Scrupocellaria* spec. and *Valkeria tuberosa* (RMNH-Coel. 29959).— C-4, 34 m, several hydrothecae on *Nemertesia ramosa*, *Eudendrium glomeratum*, *Eudendrium ramosum* and *Amathia* spec. (RMNH-Coel. 29960).— C-16, 29 m, several hydrothecae on fibre (RMNH-Coel. 29961).— D-2, 41 m, a few hydrothecae on *Turritella communis*.— E-2, 40 m, a few hydrothecae on *Eudendrium ramosum*, *Nemertesia ramosa* and *Sertularella ellisii ornata* (RMNH-Coel. 29962).— E-16, 25 m, several hydrothecae on *Gracilaria* spec., *Eudendrium ramosum* and *Amathia* spec., with gonothecae (RMNH-Coel. 29963).— F-2, 40 m, several hydrothecae on coral remains, gastropods, bivalves, hydrozoans and *Alcyonium* spec. (RMNH-Coel. 29964).— F-8, 18 m, a few hydrothecae on bivalve remains, *Polysiphonia* cf. *denudata*, *Halecium sibogae marocanum* and *Amathia* spec.— F-9, 17 m, four hydrothecae on *Amathia* spec.— F-12, 8 m, seven hydrothecae on *Cladophora hutchinsiae*.— F-17, 21 m, numerous hydrothecae on mollusc eggs, *Chaetomorpha* spec., *Bougainvillia muscus* and *Eudendrium ramosum*, with gonothecae (RMNH-Coel. 29965).— G-2, 38 m, a few hydrothecae on *Cladophora hutchinsiae*, with gonothecae.— G-8, 17 m, numerous hydrothecae on *Cystoseira zosteroides*, *Dictyota dichotoma*, *Sertularella polyzonias*, *Eudendrium ramosum*, *Sertularella ellisii*, *Sertularia perpusilla*, *Amathia* spec. and remains of *Posidonia oceanica* leaves (RMNH-Coel. 29966).— G-9, 18 m, a few hydrothecae on *Gracilaria* spec., with gonothecae (RMNH-Coel. 29967).— G-10, 15 m, numerous hydrothecae on *Cystoseira spinosa*, *Eudendrium* spec., *Amathia* spec. and remnants of *Posidonia oceanica* leaves, with gonothecae (RMNH-Coel. 29968).— G-14, 20 m, several hydrothecae on *Amathia* spec. (RMNH-Coel. 29969).— G-15, 21 m, a few hydrothecae on *Cancellaria cancellata*.— G-16, 22 m, numerous hydrothecae on mollusc eggs, *Chaetomorpha aerea*, *Gracilaria* spec., *Polysiphonia* af. *denudata*, *Bougainvillia muscus*, *Eudendrium ramosum* and *Amathia* spec., with gonothecae (RMNH-Coel. 29970).— G-17, 20 m, a few hydrothecae on *Chaetomorpha* spec., *Polysiphonia* cf. *denudata*, *Bougainvillia muscus*, *Eudendrium ramosum*, *Eudendrium glomeratum*, *Sertularella poly-*

zonias and *Obelia dichotoma*, with gonothecae (RMNH-Coel. 30017).— H-10, 15 m, four hydrothecae on *Bougainvillia muscus*.— H-12, 14 m, numerous hydrothecae on mollusc eggs, *Dictyota dichotoma*, *Spyridia filamentosa*, *Bougainvillia muscus* and *Eudendrium ramosum*, with gonothecae (RMNH-Coel. 29971).— H-13, 16 m, numerous hydrothecae on *Cladophora hutchinsiae*, *Eudendrium* spec. and *Bougainvillia muscus* (RMNH-Coel. 29972).— H-15, 20 m, numerous hydrothecae on algae, *Bougainvillia muscus* and *Amathia* spec., with gonothecae (RMNH-Coel. 29973).— H-16, 20 m, four hydrothecae on *Gracilaria* spec.— ISA 5, 35 m, a few hydrothecae on *Dendrophyllia* spec.— ISA 9, 12 m, three hydrothecae on *Flabellia petiolata*.— ISA 17, 3 m, three hydrothecae on *Caberea boryi*.— ISA 18, 20 m, a few hydrothecae on *Aglaophenia acacia* and *Eudendrium* spec. (RMNH-Coel. 29974).— ISA 25, 10 m, four hydrothecae on *Peyssonnelia rubra*, *Caberea boryi* and *Celleporina* spec.— ISA 27, 25 m, several hydrothecae on *Clytia linearis* and *Celleporina* spec.— ISA 29, 6 m, a few hydrothecae on *Plocamium cartilagineum* and *Clytia linearis* (RMNH-Coel. 29975).— I-7, 20 m, on *Amathia* spec.— I-8, 17 m, numerous hydrothecae on *Gracilaria* spec. and *Aporrhais pespelecani*, with gonothecae (RMNH-Coel. 29976).— I-14, 16 m, one hydrotheca on *Amathia* spec.— I-15, 17 m, numerous hydrothecae on mollusc eggs, *Gracilaria* spec., *Obelia dichotoma*, *Murex brandaris*, *Ocenebra erinaceus* and *Amathia* spec. (RMNH-Coel. 29977).— J-8, 15 m, a few hydrothecae on *Amathia* spec., with gonothecae.— PCONG 2, 3 m, single hydrotheca on *Eudendrium racemosum*.— PISA 14, 3.3 m, numerous hydrothecae on *Sertularella mediterranea* (RMNH-Coel. 29978).— PISA 23, 3 m, a few hydrothecae on *Halopteris filicina* (RMNH-Coel. 29979).— REY 4, 27 m, a few hydrotheae on *Sertularella polyzonias*, *Halecium tenellum*, *Eudendrium glomeratum* and *Adeonella calveti* (RMNH-Coel. 29980).

Ecology.— *Clytia paulensis* is a littoral and shelf species that, in the Mediterranean, has been found from the tidal level (Stechow, 1923b) to 250 m depth (Marinopoulos, 1981); our material comes from 0.5 to 57 m. Outside the Mediterranean, it is known from the tidal zone (Millard, 1975) to 227 m depth (Álvarez Claudio, 1993). It has mainly been reported epibiontic on hydrozoans (Stechow, 1919, 1923b; Picard, 1955; Fey, 1970; García Carrascosa, 1981; Boero & Fresi, 1986; Gili, 1986; Ramil, 1988; Ramil & Vervoort, 1992; Altuna, 1994; Medel & Vervoort, 2000; etc.), but also on polychaete tubes (García Carrascosa, 1981; Ramil, 1988), bryozoans (Stechow, 1919; Boero & Fresi, 1986; Ramil, 1988; Ramil & Vervoort, 1992; Altuna, 1994), ascidians (García Carrascosa, 1981; Ramil, 1988), mollusc shells (Ramil, 1988), algae (Stechow, 1919; Isasi, 1985; Boero & Fresi, 1986; Gili, 1986; Ramil, 1988), and rhizomes and leaves of *Posidonia oceanica* (Boero, 1981a), as well as epilithic on stones (Ramil, 1988). In our material it was observed almost exclusively epibiontic, mainly on other invertebrates such as hydrozoans, bryozoans, anthozoans, polychaetes, gastropods (> 63% of the occasions), but also on algae (> 27%). On the remaining occasions it was found on non-living biotic substrata (molluscs eggs, biodetritic remains and bio-concretions).

In the Mediterranean there are records of fertile colonies of *C. paulensis* from April (Gili, 1986) and May (Stechow, 1923b); in our material colonies with gonothecae are from July and August, always under the depth at which the summer thermocline is formed. Outside the Mediterranean fertile colonies were found in June (Ramil & Vervoort, 1992) and July (Isasi, 1985).

Distribution.— Boero & Bouillon (1993) considered *Clytia paulensis* a cosmopolitan species. However, it rather seems to have a circumtropical distribution, spreading over temperate waters. In the eastern Atlantic it has been reported from off the south of Great Britain (Cornelius, 1982) to Guinea-Bissau (Gili et al., 1989), whereas in the western Atlantic it is known from Cheaspeake Bay (Calder, 1971). In the east-

ern Pacific it has been recorded from Vancouver Island to Tangola Tangola in Mexico (Fraser, 1946). On the southern hemisphere it is known from off the south and east coasts of South Africa (Millard, 1975), Mozambique (Millard & Bouillon, 1974), Saint Paul (Vanhöffen, 1910) and the Argentine coasts (Blanco, 1968).

In the Mediterranean it has been found at the Balearic Islands (García Carrascosa, 1981; Gili, 1986; Roca, 1986), the Alboran Sea (Ramil & Vervoort, 1992) and from off the Algerian (Picard, 1955), French (Stechow, 1919, 1923b; Picard, 1951c, 1952a; Marinopoulos, 1981), Italian (Stechow, 1923b; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Clytia spec.
(fig. 29d-f)

Material.— A-11, 46 m, a few hydrothecae on gorgonian remains (RMNH-Coel. 29981).— CONG 25, 25 m, a few hydrothecae.— CONG 26, 18 m, several hydrothecae on *Adeonella* spec. (RMNH-Coel. 29982).— CONG 33, 9 m, one hydrotheca on bryozoans.— CONG 56, 15 m, a few hydrothecae on *Sargassum* spec. (RMNH-Coel. 29983).— CONG 77, 20.5 m, several hydrothecae on *Aglaozonia chilosa* (RMNH-Coel. 29984).— CONG 80, 15 m, a few hydrothecae on *Lithophyllum expansum* and polychaetous tubes.— C-4, 34 m, a few hydrothecae on *Eudendrium ramosum*, *Eudendrium glomeratum* and bivalve remnants (RMNH-Coel. 29985).— D-2, 41 m, single hydrotheca.— ISA 5, 35 m, a few hydrothecae on *Dendrophyllia* spec., *Caberea boryi* and *Pentapora fascialis* (RMNH-Coel. 29986).— ISA 6, 28 m, a few hydrothecae.— ISA 21, 19.2 m, single hydrotheca on polychaetous tube.— ISA 26, 34 m, two hydrothecae on *Halecium tenellum*.— ISA 27, 25 m, several hydrothecae (RMNH-Coel. 29987).— ISA 28, 29 m, a few hydrothecae on *Ellisella paraplexauroides*.— PISA 18, 30 m, a few hydrothecae on *Haplopoma* spec. (RMNH-Coel. 29988).— REY 5, 20 m, a few hydrothecae.

Description.— Stolonal hydrorhiza giving rise to pedicels supporting a single distal hydrotheca. In the material from ISA 5 a second-order pedicel is present, basally curved and upwardly directed. Walls of pedicel smooth, with the exception of 8-9 basal and 2-8 distal rings and sometimes with extra sets of irregularly distributed rings.

Hydrotheca bell-shaped, delicate, thin and deep (408-656 μm length), with a diaphragm delimiting a basal chamber. Hydrothecal aperture circular; rim with 6-8 cusps separated by asymmetrical and wavy embayments. Hydrothecal cusps inwardly directed; hydrothecal cross-section at aperture being undulated. Hydrothecal diameter smoothly increasing distally, though more strongly after the diaphragm; maximum diameter at hydrothecal aperture (176-264 μm).

Gonothecae inserted on short pedicels, usually with a single ring. Gonotheca elongate, markedly widening at the base, reaching quickly its maximum diameter, which is more or less kept to the truncated end where the aperture is situated.

Remarks.— Although *Clytia* spec. is allied to *C. paulensis*, the different shape of the embayments between the hydrothecal cusps (asymmetrical and wavy) prevent us from referring it to any of the known species of the genus.

Ecology.— Colonies of *Clytia* spec. were found in samples collected from 9 to 46 m depth. It was observed almost exclusively epibiontic on other organisms, mainly bryozoans, hydrozoans, anthozoans and polychaete tubes (>76% of the records), but also on algae. The remaining records are from biodetritic remains. Fertile colonies were collected in July.

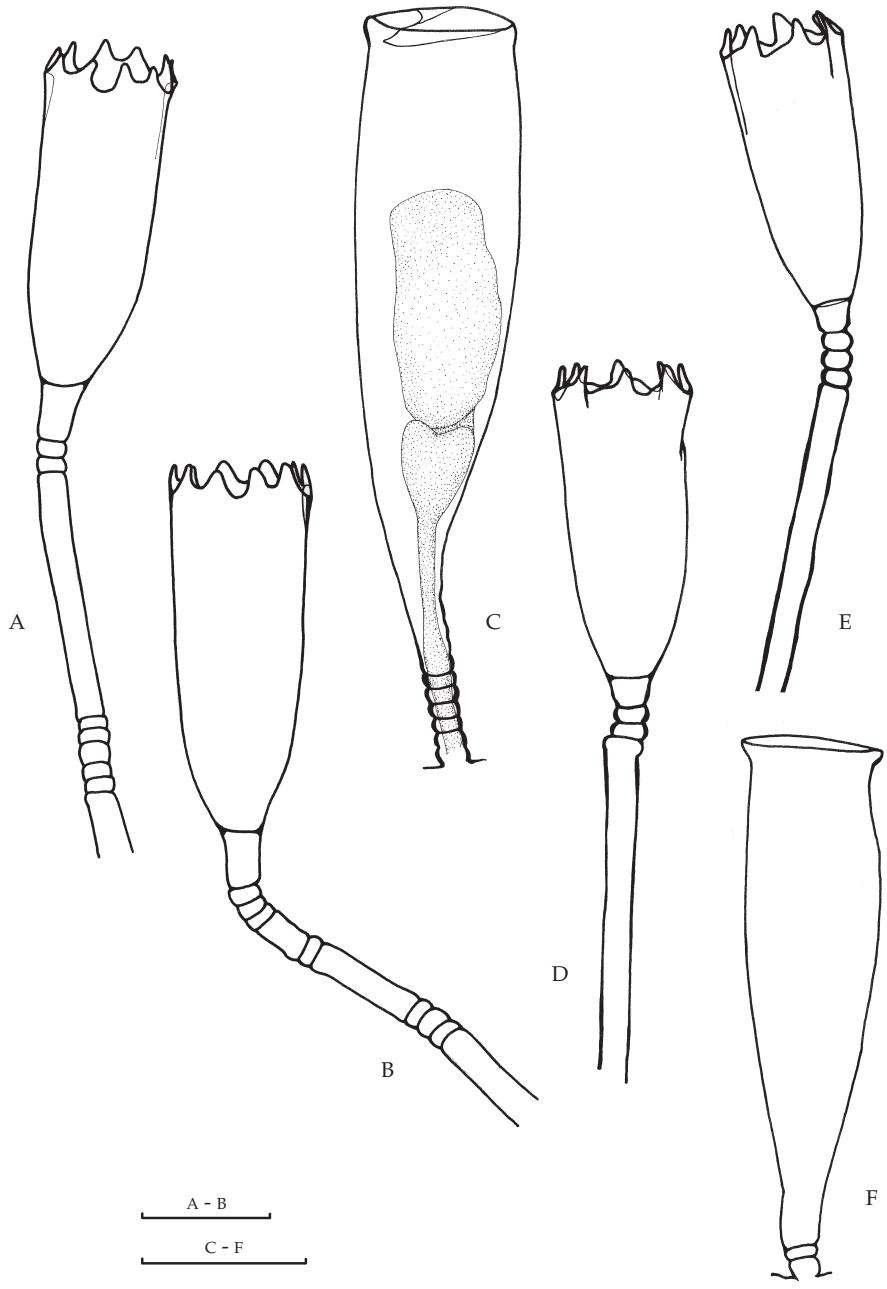

Fig. 29. A-C, *Clytia paulensis* (Vanhöffen, 1910). A-B, hydrothecae; C, gonotheca. D-F, *Clytia* spec. D-E, hydrothecae; F, gonotheca. Scale bar: 100 μm (A-B), 250 μm (C-F).

Genus *Laomedea* Lamouroux, 1812

Laomedea pseudodichotoma Vervoort, 1959
(fig. 30a-b)

Laomedea (*Eulaomedea*) *pseudodichotoma* Vervoort, 1959: 316-318, figs 56-57; 1966: 104; Redier, 1971: 505.
Laomedea pseudodichotoma; Cornelius, 1982: 111-112, fig. 21; Ramil & Vervoort, 1992: 240-241, fig. 67e; Álvarez Claudio, 1993: 376-377, fig. 65; Medel & López González, 1996: 206; Medel & Vervoort, 2000: 44-46, figs 10b, 11.

Material.— B-8, 47 m, one stem.— H-10, 15 m, single stem.— ISA 22, 15 m, two stems on ascidians (RMNH-Coel. 29989).

Description.— Colonies composed of slightly geniculate, monosiphonic stems up to 20 mm high; in the material from B-8 stem proximally polysiphonic. Stem divided into internodes arranged more or less in a straight line, provided with 2-3 proximal and 3-4 distal rings. Succeeding internodes arising a little below the distal rings, each internode bearing a distal hydrotheca.

Hydrotheca bell-shaped and deep (length 510-576 μm). Hydrothecal diameter smoothly increasing towards the circular aperture where the maximum diameter is reached (240-280 μm). Rim of hydrotheca even. Hydrotheca provided with an oblique diaphragm at one-fifth of its height, delimiting a small basal chamber (144 μm in diameter and 104 μm high).

Gonothecae inserting at distal part of internode between distal rings and beginning of following internode. Gonotheca fusiform, either distally truncated or with a neck; basally with a short, completely ringed pedicel (c. 200 μm long). Gonothecal aperture distal. Gonothecae 1300-1600 μm long (pedicel included) and 200-220 μm wide.

Remarks.— The present material constitutes the first record of this species from the Mediterranean.

Ecology.— *Laomedea pseudodichotoma* has been found from 35 (Vervoort, 1959) to 180 m depth (Ramil & Vervoort, 1992). In our material it was collected from 15 to 47 m. It seems to be a littoral and shelf species that in the Mediterranean has its upper bathymetrical limit set by the summer thermocline. Vervoort (1959) observed it epibiontic on *Sertularella cylindritheca*; we found it on ascidians.

Laomedea pseudodichotoma has been found with gonothecae in January (Vervoort, 1959), March (Vervoort, 1966; Medel & Vervoort, 2000), April (Vervoort, 1959), May and June (Medel & Vervoort, 2000) and immature gonothecae in August (Medel & Vervoort, 2000). In our collection fertile material was found in July.

Distribution.— *Laomedea pseudodichotoma* is distributed in the Guinean and Mauritanian provinces. It was originally found off Ghana (Ivory Coast) and Senegal (Vervoort, 1959) and later in the Gulf of Cádiz (Ramil & Vervoort, 1992), Madeira and the Canary Islands (Medel & Vervoort, 2000). Our record from the Chafarinas Islands constitutes the first from the Mediterranean where it could be restricted to the Alborán Sea.

Laomedea spec. 1
(fig. 30c-d)

Material.— C-4, 34 m, four stems on stones and *Sertularella polyzonias*.— D-2, 41 m, numerous stems on *Sertularella ellisii* (RMNH-Coel. 29990).— F-2, 40 m, several stems on algae and bivalve remains.

Description.— Colonies composed of monosiphonic and geniculate stems up to 30 mm high. Stems unbranched or scarcely branched, divided into hydrothecate internodes arranged in an indistinct zigzag fashion and provided with 4-5 proximal and 5 distal rings. Following internodes originating just below distal annulation; all internodes provided with a distal hydrotheca.

Hydrothecae alternately arranged in one plane. Hydrotheca bell-shaped, deep (776-840 μm long). Hydrothecal diameter smoothly increasing distally, with its maximum (432-480 μm) at the aperture. Just below the hydrothecal aperture diameter increasing distinctly. Hydrothecal aperture circular; rim even and smooth. Hydrotheca with a slightly oblique diaphragm at one-seventh of its height, delimiting a small basal chamber (224 μm in diameter and 128 μm long).

Remarks.— *Laomedea* spec. 1 is allied to *Laomedea pseudodichotoma* Vervoort, 1959. We have kept both species separated because in *Laomedea* spec. 1 the stems, even those 30 mm high, are monosiphonic and the hydrothecae are distinctly larger.

Ecology.— *Laomedea* spec. 1 was found from 34 to 41 m depth, growing on hydrozoans and on non-living susbstrata, both biotic (bivalve and seaweeds remains) and abiotic (pebbles).

Laomedea spec.2
(fig. 30e)

Material.— PISA 9, 1 m, numerous stems on *Clytia linearis* and incrusting calcareous algae.— PISA 15, 1 m, several stems on *Turbicellepora* spec. (RMNH-Coel. 29991).

Description.— Scarcely developed colonies composed of stolonal hydrorhiza giving rise to geniculate stems up to 8 mm high. Stems usually unbranched (only one stem with a small branch arising from a stem internode below distal annulation). Stem internodes provided with 4-6 proximal (8-14 in first stem internode) and 4-5 distal rings. Following internodes arising a little below distal rings. Each internode with a distal hydrotheca.

Hydrothecae bell-shaped, 260-300 μm long. Hydrothecal diameter markedly increasing towards the aperture where a maximum diameter of 200-230 μm is reached. Hydrothecal aperture circular; rim even and smooth. Hydrotheca with an oblique diaphragm at proximal fifth delimiting a small basal chamber (100 μm in diameter and 48 μm high).

Remarks.— *Laomedea* spec. 2 is allied to *Laomedea flexuosa*, from which it differs, however, by the scarcely curved cauline internodes and the shape of the hydrothecae (they are truncated cone-shaped instead of bell-shaped as occurs in *L. flexuosa*). This, together with the lack of gonothecae, prevents us from referring it to any known species.

Ecology.— Colonies of *Laomedea* spec. 2 were found at 1 m depth, epibiontic on incrusting calcareous algae, *Clytia linearis* and *Turbicellepora* spec.

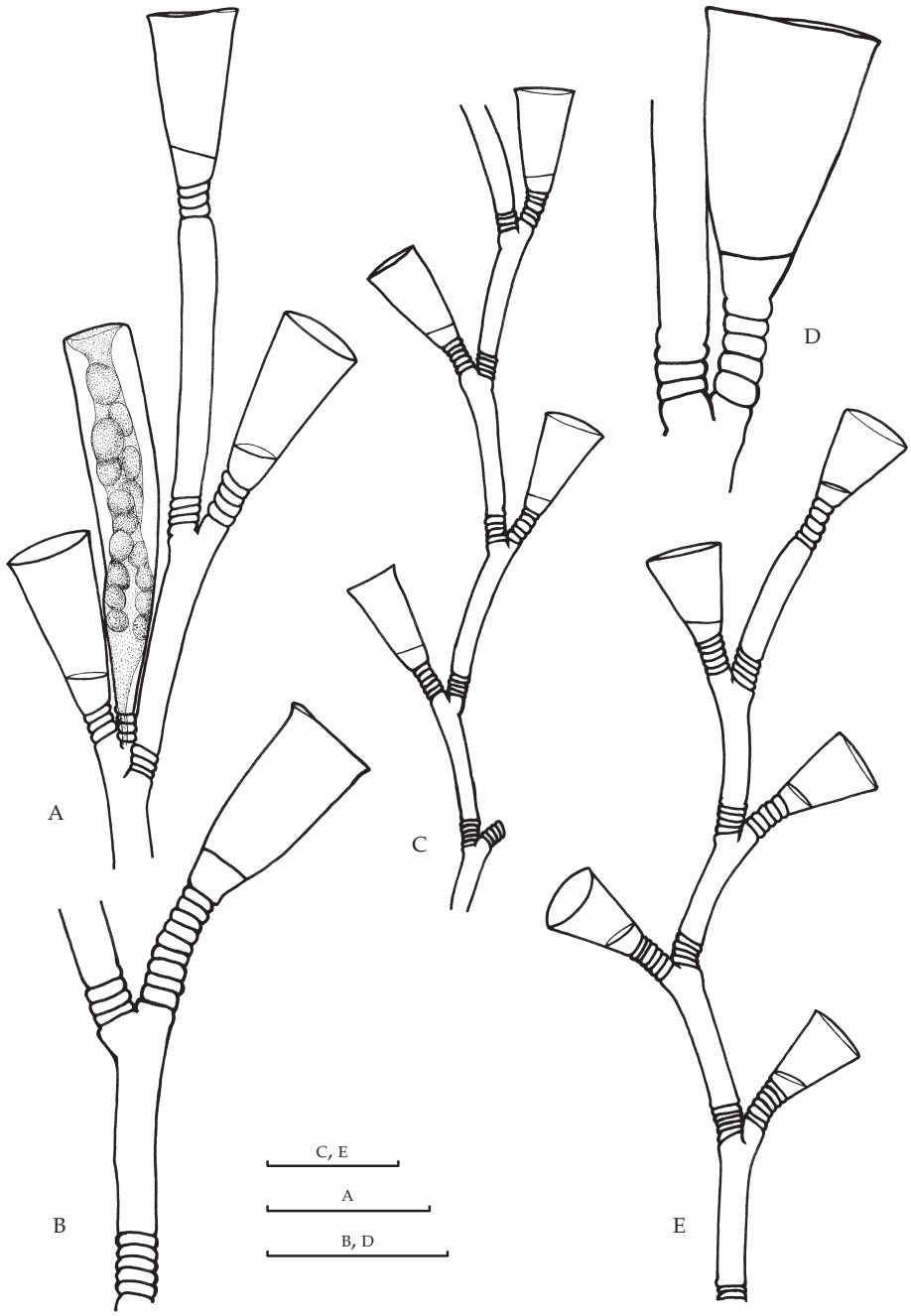

Fig. 30. A, B, *Laomedea pseudodichotoma* Vervoort, 1959. A, stem fragment with hydrothecae and one gonotheca; B, hydrotheca. C, D, *Laomedea* spec. 1. C, stem fragment; D, hydrotheca. E, *Laomedea* spec. 2, stem fragment. Scale bar: 500 μm (A-B, D-E), 1 mm (C).

Genus *Obelia* Péron & Lesueur, 1810

Obelia bidentata Clarke, 1875
(fig. 31a)

Obelia bidentata Clarke, 1875: 58, pl. 9 fig. 2; Teissier, 1965: 16; Fey, 1970: 393; Cornelius, 1975a: 260-265, fig. 2; 1982: 113-117; 1990: 547-550, fig. 1; Isasi, 1985: 67, fig. 15; Roca, 1986: 246-252, fig. 45; Boero & Fresi, 1986: 144; Gili, 1986: 182-183, fig. 4.19a; Izquierdo et al., 1986a: 91-93, fig. 8; Ramil, 1988: 273-277; Cornelius et al., 1990: 133, fig. 4.11; Calder, 1991: 70-72, fig. 37; Ramil & Vervoort, 1992: 241, 243, fig. 68a-b; Boero & Bouillon, 1993: 265; Álvarez Claudio, 1993: 380-383, fig. 66; Altuna, 1994: 335-337; Migotto, 1996: 87-88, fig. 16c; Medel & López González, 1996: 206; Morri & Bianchi, 1999: 288; Medel & Vervoort, 2000: 46-49, fig. 12.

Obelia bicuspidata Clarke, 1875: 58, pl. 9 fig. 1; Picard, 1955: 186; 1958a: 191; Patriti, 1970: 36, fig. 46; Millard, 1975: 226-227, fig. 75c-d; García Carrascosa, 1981: 197-200, pl. 9 figs d-g, pl. 32 figs a-c.

Laomedea (*Gonothyraea*) *bidentata*; Babic, 1913b: 284, fig. 1.

Obelia (?) *oxydentata* Stechow, 1919: 50.

Gonothyraea bicuspidata; Stechow, 1919: 50-51.

Laomedea neglecta; Da Cunha, 1944: 67, fig. 38; 1950: 142, fig. 9.

Laomedea (*Obelia*) *bicuspidata*; García Corrales et al., 1978: 31, fig. 13.

Material.— REY 5, 20 m, three stem fragments.

Ecology.— *Obelia bidentata* is an eurybathic species that in the Mediterranean has been found from 6 to 200 m depth (García Carrascosa, 1981); our material was collected at 20 m. Outside the Mediterranean it has been reported from the tidal level (Ramil, 1988) to 702 m depth (Álvarez Claudio, 1993).

Obelia bidentata has been observed epibiontic on algae (Fey, 1970; Millard, 1975; García Carrascosa, 1981; Gili, 1986; Migotto, 1996), rhizomes and basal leaves of *Posidonia oceanica* (García Carrascosa, 1981), bryozoans (García Carrascosa, 1981; Altuna, 1994; Migotto, 1996; Medel & Vervoort, 2000), hydrozoans (Migotto, 1996; Medel & Vervoort, 2000), cirripedes (Medel & Vervoort, 2000), ascidians (García Carrascosa, 1981), polychaete tubes (Altuna, 1994; Medel & Vervoort, 2000), mollusc shells (Medel & Vervoort, 2000), on bio-concretions (Boero & Fresi, 1986), on hulls of vessels (Millard, 1975), on recovered instruments (Morri & Bianchi, 1999), and frequently epilithic (Fey, 1970; Isasi, 1985; Boero & Fresi, 1986; Gili, 1986; Izquierdo et al., 1986a; Ramil, 1988). It is used in turn as substratum by other hydroids, such as *Hebella scandens*, *Opercularella lacerata*, *Halecium lankesteri* and *Clytia paulensis* (Altuna, 1994).

In the Mediterranean fertile colonies of *Obelia bidentata* were found in May (Boero & Fresi, 1986), June (Roca, 1986), October (Gili, 1986) and November (Gili, 1982). In the nearby Atlantic colonies with gonothecae were observed in May (Altuna, 1994), June (Medel & Vervoort, 2000), July (Teissier, 1965; Fey, 1970), August (Fey, 1970) and from September to October (Fey, 1970; Altuna, 1994). At temperate latitudes, therefore, it seems to be fertile throughout the year, with the exception of winter.

Distribution.— *Obelia bidentata* has a circumtropical distribution (Boero & Bouillon, 1993), being present in tropical and temperate waters of Atlantic, Pacific and Indian Ocean (Millard & Bouillon, 1973). Calder (1991) considered it a circumglobal species. In the eastern Atlantic it is known from the North Sea (Leloup, 1960) and the south-east coasts of Great Britain (Cornelius, 1990) to the coasts of South Africa (Mil-

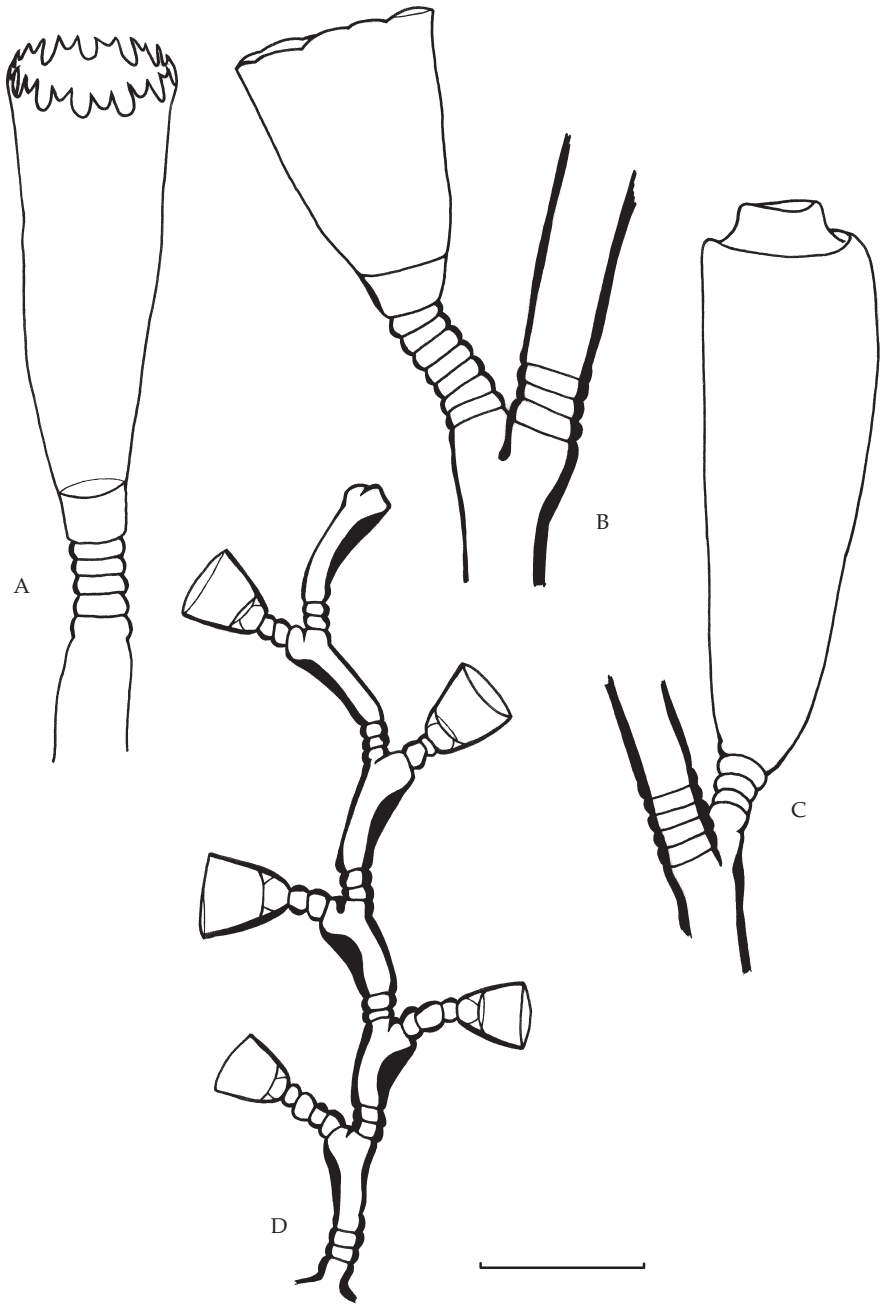

Fig. 31. A, *Obelia bidentata* Clarke, 1875, hydrotheca. B, C, *Obelia dichotoma* (Linnaeus, 1758). B, hydrotheca; C, gonotheca. D, *Obelia geniculata* (Linnaeus, 1758), stem. Scale bar: 250 μm (A-C), 500 μm (D).

lard, 1975). It has frequently been reported from off the north and north-west coasts of France (Teissier, 1965; Fey, 1970), the northern coast of Spain (Ramil, 1988; Álvarez Claudio, 1993; Altuna, 1994) and the coast of Portugal (Da Cunha, 1944, 1950; Ramil & Vervoort, 1992), but also from off Morocco (Patriti, 1970) and the Canary and Cape Verde Islands (Medel & Vervoort, 2000).

In the Mediterranean it has been reported from the Adriatic (Babic, 1913b), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (García Carrascosa, 1981; Roca, 1986), and from off the Algerian (Picard, 1955), French (Stechow, 1919; Picard, 1951c), Italian (Boero & Fresi, 1986) and Spanish coasts (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986).

Obelia dichotoma (Linnaeus, 1758)
(fig. 31b-c)

Sertularia dichotoma Linnaeus, 1758: 812.
Obelia dichotoma; Hincks, 1868: 156-157, pl. 28 figs 1, 1a-b; Stechow, 1919: 49; Billard, 1931a: 390; 1936: 3; Picard, 1951a: 111; 1951b: 278; 1951c: 261; 1952a: 347, 349; 1958a: 191; Rossi, 1961: 80; Teissier, 1965: 16-17; Fey, 1970: 394; Patriti, 1970: 36, fig. 45; Millard, 1975: 303, fig. 4d; García Corrales et al., 1978: 34, fig. 14; Boero, 1981a: 182, 184-185; García Carrascosa, 1981: 193-196, pl. 10 figs c-e; Isasi, 1985: 70, fig. 16; Roca, 1986: 252-261, fig. 46; Gili, 1986: 184-185, fig. 4.20b; Boero & Fresi, 1986: 144; Ramil, 1988: 278-286; Cornelius, 1990: 550-555, figs 2-3; Calder, 1991: 72-76, fig. 38; Ramil & Vervoort, 1992: 243-244, fig. 68c; Boero & Bouillon, 1993: 265; Álvarez Claudio, 1993: 385-388, fig. 67; Altuna, 1994: 337-341, pl. 64 figs a-c; Migotto, 1996: 89-90, fig. 16d; Medel & López González, 1996: 206; Morri & Bianchi, 1999: 288; Medel & Vervoort, 2000: 49-53.
Laomedea (*Obelia*) *dichotoma*; Broch, 1912: 54, fig. 19a-c; 1933: 105-109.
Laomedea dichotoma; Kramp, 1938: 20-21.
Obelia dichotoma p.p. Cornelius, 1975a: 265-272, figs 3-4; 1982: 117-119.

Material.— B-11, 42 m, a few stems on mollusc eggs.— CONGRESO BANK, a few stems on *Sertularella polyzonias*.— CONG 8, 10 m, a few stems on sponges.— CONG 25, 25 m, a single stem on *Eudendrium rameum*, with gonothecae.— E-2, 40 m, a few stems on *Bougainvillia muscus* (RMNH-Coel. 29992).— E-3, 25 m, a few stems on *Eudendrium* spec. and *Sertularella polyzonias* (RMNH-Coel. 29993).— E-16, 25 m, a few stems on mollusc eggs (RMNH-Coel. 29994).— F-17, 21 m, two stems.— G-16, 22 m, several stems on mollusc eggs, *Gracilaria* spec. and *Bougainvillia muscus*, with gonothecae (RMNH-Coel. 29995).— G-17, 20 m, numerous stems on *Chaetomorpha* spec., mollusc eggs and remnants of *Posidonia oceanica* rhizomes (RMNH-Coel. 29996).— H-15, 20 m, one stem fragment.— H-16, 20 m, several stems on *Gracilaria* spec. (RMNH-Coel. 29997).— ISA 4, 10 m, two stems.— ISA 5, 35 m, several stems on *Sertularella polyzonias*, gorgonians and *Chartella papyrea* (RMNH-Coel. 29998).— ISA 25, 10 m, one stem on *Myriapora truncata*.— ISA 26, 34 m, several stems on *Schizomavella* spec., *Turbicellepora* spec. and *Pentapora fascialis*.— ISA 27, 25 m, numerous stems on *Celleporina* spec. (RMNH-Coel. 29999).— ISA 28, 29 m, several stems on bryozoans.— I-8, 17 m, a few stems on mollusc eggs (RMNH-Coel. 30000).— I-15, 17 m, numerous stems on mollusc eggs, *Gracilaria* spec. and *Cancellaria cancellata*, with gonothecae (RMNH-Coel. 30001).— REY 4, 27 m, numerous stems on *Adeonella calveti*, with gonothecae (RMNH-Coel. 30002).— REY 5, 20 m, two stems on *Cystoseira spinosa* and *Sargassum* spec.— REY 8, 25 m, numerous stems on *Eudendrium* spec., with gonothecae (RMNH-Coel. 30003).— REY 10, 16 m, a single stem.

Remarks.— The present material consists of colonies with monosiphonic stems up to 30 mm high. The length of the hydrotheca is 368-560 μm and the diameter at the aperture is 240-368 μm.

Ecology.— *Obelia dichotoma* is an eurybathic species that in the Mediterranean has

been found from the tidal level (García Carrascosa, 1981) to 205 m depth (Ramil & Vervoort, 1992); our material comes from 10 to 42 m. Outside the Mediterranean there are records from the tidal zone (Isasi, 1985) to 521 m depth (Ramil & Vervoort, 1992). It has been found growing epibiontic on algae (Stechow, 1919; Broch, 1933; Billard, 1936; Fey, 1970; García Carrascosa, 1981; Boero & Fresi, 1986; Roca, 1986; Morri & Bianchi, 1999; Medel & Vervoort, 2000), rhizomes and leaves of *Posidonia oceanica* (Boero, 1981a; García Carrascosa, 1981), hydrozoans (Broch, 1933; Billard, 1936; Picard, 1951b; Rossi, 1961; Isasi, 1985; Roca, 1986; Ramil, 1988; Ramil & Vervoort, 1992; Medel & Vervoort, 2000), bryozoans (Broch, 1933; García Carrascosa, 1981; Boero & Fresi, 1986; Ramil, 1988) and many other invertebrates (García Carrascosa, 1981; Boero & Fresi, 1986; Ramil, 1988; Migotto, 1996), as well as epilithic (Isasi, 1985; Migotto, 1996), and on recovered instruments (Morri & Bianchi, 1999). In our material it was found on a wide range of substrata without any clear preference. It was observed on hydrozoans, bryozoans, anthozoans, sponges, polychaetes, algae and on non-living biotic substrata, such as mollusc eggs and remains of organisms. It served in turn as substratum for other hydroids (*Egmundella amirantensis*, *Filellum* spec., *Halecium tenellum*, *Campanularia hincksii*, *Clytia linearis* and *C. paulensis*).

In the Mediterranean *Obelia dichotoma* is fertile throughout the year; colonies with gonothecae have been found in January and February (Broch, 1933; Gili, 1986; Boero & Fresi, 1986), March (Boero & Fresi, 1986; Gili, 1986), April (Stechow, 1919; Broch, 1933; Boero & Fresi, 1986; Gili, 1986), May (Boero & Fresi, 1986), June and July (Broch, 1933), September (Broch, 1933; Morri & Bianchi, 1999), November (Broch, 1933; Boero & Fresi, 1986) and December (Broch, 1933; Boero & Fresi, 1986; Gili, 1986). In our material fertile colonies are from July. In the European Atlantic Ramil (1988) found gonothecae from January to May and from August to October, Álvarez Claudio (1993) in April and June, and Altuna (1994) throughout the year, except February.

Distribution.— *Obelia dichotoma* is considered to have a cosmopolitan distribution (Picard, 1958a; Millard, 1975; Boero & Bouillon, 1993). Nevertheless, it seems to be absent from Arctic and Antarctic waters (cf. Stepan'yants, 1979; Broch, 1918; Naumov, 1969; Calder, 1970), where its place is taken by its congener *O. longissima* (Pallas, 1766). In the eastern Atlantic it is known from off Iceland (Kramp, 1938) to South Africa (Millard, 1975).

In the Mediterranean it has been reported from the Adriatic (Broch, 1912, 1933), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (Gili, 1986; Roca, 1986), the Alboran Sea (Ramil & Vervoort, 1992) and from off the Egyptian (Billard, 1936), French (Stechow, 1919; Picard, 1951b-c, 1952a), Italian (Stechow, 1923b; Rossi, 1961; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986), Syrian (Billard, 1931a) and probably also Israeli coasts (Vervoort, 1993).

Obelia geniculata (Linnaeus, 1758)
(fig. 31d)

Sertularia geniculata Linnaeus, 1758: 812.

Obelia geniculata; Hincks, 1868: 149, pl. 25 figs 1,1a; Marktanner Turneretscher, 1890: 207-208, pl. 3 fig. 9; Stechow, 1919: 50; 1923b: 114-115; Billard, 1936: 4; Picard, 1951a: 111; 1951b: 278; 1952a: 349; 1955: 186; 1958a: 191; 1958b: 1; Teissier, 1965: 16; Yamada, 1965: 361; Fey, 1970: 394; Patriti, 1970: 35, figs 44, 44bis; Cornelius, 1975a: 272, figs 1a-d, 5a-c; 1982: 119-120; 1990: 550-557, fig. 4; Millard,

1975: 229, fig. 75; Chas & Rodriguez Babio, 1977: 25, fig. 8; García Corrales et al., 1978: 37, figs 15-16; Marinopoulos, 1979: 120; Morri, 1981a: 69, fig. 22, pl. 1 fig. 8; Boero, 1981a: 182, 185; García Carrascosa, 1981: 190-193, pl. 10 figs a-b, pl. 31 fig. a; Isasi, 1985: 72, fig. 17; Gili, 1986: 183-184, fig. 4.20a; Roca, 1986: 261-270, fig. 47; Ramil, 1988: 287-293; Cornelius et al., 1990: 133, fig. 4.11; Vervoort, 1993: 558-559; Boero & Bouillon, 1993: 265; El Beshbeeshy, 1993: 242-245, fig. 2a-c; 1995a: 313-314; Altuna, 1994: 341-343; Migotto, 1996: 90-91, fig. 16e; Medel & López González, 1996: 206; Medel & Vervoort, 2000: 54-58.

Laomedea geniculata; Broch, 1918: 166-167; Da Cunha, 1944: 61, fig. 35; Rossi, 1950: 207, fig. 6.

Material.— CONG 5, 0 m, several stems on *Cystoseira tamariscifolia* (RMNH-Coel. 30004).

Ecology.— *Obelia geniculata* is a littoral species, in the Mediterranean occurring from the tidal level (Boero & Fresi, 1986) to 35 m depth (Vervoort, 1993); our material was collected at 0 m depth. Outside the Mediterranean it has been reported up to 80 m depth (Medel & Vervoort, 2000). It has frequently been reported growing epibiontic on algae (Billard, 1936; García Carrascosa, 1981; Isasi, 1985; Gili, 1986; Boero & Fresi, 1986; Roca, 1986; Ramil, 1988; Vervoort, 1993; Altuna, 1994), *Posidonia oceanica* (Picard, 1955; Boero, 1981a; García Carrascosa, 1981; Roca, 1986), hydrozoans (Roca, 1986; Gili, 1986), bryozoans (Roca, 1986; Ramil, 1988), molluscs (García Carrascosa, 1981; Boero & Fresi, 1986; Ramil, 1988), cirripedes (Roca, 1986; Stechow, 1923b) and other invertebrates (Stechow, 1923b; Ramil, 1988). We found it on the alga *Cystoseira tamariscifolia*.

In the Mediterranean fertile colonies of *Obelia geniculata* were found in January (Boero & Fresi, 1986; Vervoort, 1993), February (Gili, 1986), March (Boero & Fresi, 1986; Gili, 1986; Roca, 1986), April (Roca, 1986), May (Stechow, 1919; Morri, 1981a; Boero & Fresi, 1986; Roca, 1986), June (Morri, 1981a; Roca, 1986), July (Picard, 1958b; Morri, 1981a; Boero & Fresi, 1986), August (Picard, 1958b; Morri, 1981a), September (Morri, 1981a), October (Billard, 1936; Boero & Fresi, 1986) and November (Boero & Fresi, 1986; Gili, 1986). Outside the Mediterranean, Altuna (1994) found gonothecae in January and from March to November and Teissier (1965) from May to December. At temperate latitudes it seems to be fertile throughout the year.

Distribution.— *Obelia geniculata* is widely considered a cosmopolitan species (Picard, 1958a; Millard, 1975; Boero & Fresi, 1993). In the eastern Atlantic is has been reported from off Iceland (Broch, 1918) to South Africa (Millard, 1975).

In the Mediterranean it is known from the Balearic Islands (García Carrascosa, 1981; Roca, 1986) and off the Algerian (Picard, 1955), Egyptian (Billard, 1936; El Beshbeeshy, 1993, 1995a), French (Stechow, 1919; Picard, 1951b, 1952a), Greek (Yamada, 1965), Israeli (Picard, 1958b; Vervoort, 1993), Italian (Stechow, 1923b; Boero, 1981a; Boero & Fresi, 1986), Spanish (García Corrales, 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Genus *Orthopyxis* Agassiz, 1862

Orthopyxis asymmetrica Stechow, 1919
(fig. 27e)

Orthopyxis (?) *asymmetrica* Stechow, 1919: 71, fig. 10.

Campanularia asymmetrica; Picard, 1952a: 349; García Carrascosa, 1981: 164-166, pl. 8 figs e-f; Boero, 1981a: 182, 184-186, 190, fig. 8; Gili, 1986: 179-180, fig. 4.18g.

Orthopyxis asymmetrica; Picard, 1952b: 220; 1958a: 191; Roca, 1986: 272-276, fig. 48; Roca, 1987: 211; Piraino & Morri, 1990: 52-53, fig. 7; Boero & Bouillon, 1993: 265; Medel & López González, 1996: 206.

Material.— CONG 74, 11 m, numerous hydrothecae on *Posidonia oceanica* (RMNH-Coel. 30005).

Description.— Colonies composed of stolonal hydrorhiza giving rise to pecidels twisted spirally over their whole length and bearing a single distal hydrotheca with a large and slightly asymmetrical basal spherule. Hydrotheca bell-shaped, low (c. 336 μm high), with strongly thickened walls, provided with a diaphragm at its basal third and delimiting a basal chamber. Internal walls of basal chamber almost straight due to perisarc thickening which is maximal at the level of the diaphragm and smoothly decreases towards the aperture. Hydrotheca with a ring of desmocytes for attachment of the polyp just above diaphragm. Hydrotheca strongly increasing in diameter towards the diaphragm, from thereon smoothly increasing in diameter towards the aperture; maximum diameter (c. 320 μm) at the rim.

No gonothecae.

Remarks.— Cornelius (1982), after examining the type material of *Orthopyxis asymmetrica*, considered this species conspecific with *Orthopyxis integra*. However, authors studying Mediterranean material (García Carrascosa, 1981; Roca, 1986, 1987; Gili, 1986; Boero, 1987) kept the two separate. Although Piraino & Morri (1990) did not find differences in the shape of the female gonothecae that would have confirmed that both species are valid, they indicated that differences in the thickness of the hydrothecal wall and the shape of the basal chamber, together with the fact that *O. asymmetrica* exclusively lives on *Posidonia oceanica*, support the separation of both species. On the other hand, Östman et al. (1987), who did not find distinct differences between the cnidomes of both species, indicated that the dimensional differences are too small for a conclusion on the validity of *O. asymmetrica*. After studying our material, we have kept both species separate, following in this respect the opinion of other Mediterranean authors, basing ourselves on the slight differences in hydrothecal shape, principally of the basal chamber, and on the specificity of the substratum.

Ecology.— *Orthopyxis asymmetrica* is a littoral species reported from near the tidal level (Gili, 1986) to 25 m depth (García Carrascosa, 1981); our material was collected at 11 m. It was found growing on leaves of *Posidonia oceanica*, which is in complete agreement with the literature, where it is considered an exclusive epibiont of that species of seagrass.

There is a single report of fertile colonies in May (Piraino & Morri, 1990).

Distribution.— *Orthopyxis asymmetrica* is considered endemic to the Mediterranean (Picard, 1958a; Boero & Bouillon, 1993). It is known from the Balearic Islands (García Carrascosa, 1981; Roca, 1986, 1987) and from off the French (Stechow, 1919; Picard, 1952a), Italian (Boero, 1981a; Piraino & Morri, 1990) and Spanish coasts (García Carrascosa, 1981; Gili, 1986; García Rubies, 1987).

Orthopyxis crenata (Hartlaub, 1901b) (fig. 27f)

Eucopella crenata Hartlaub, 1901b: 364, pl. 22 figs 27-31, 33-35.

Orthopyxis crenata; Nutting, 1915: 64, pl. 16 figs 3-5; Picard, 1958a: 191; Leloup, 1974: 17, fig. 15; Marinopoulos, 1979: 120; Cornelius, 1982: 58, fig. 5; Isasi, 1985: 56-57, fig. 10; Gili, 1986: 177-178, fig. 4.18a; Roca, 1986: 276, fig. 49; Ramil, 1988: 299-303; Boero & Bouillon, 1993: 265; Altuna, 1994: 345-348, pl. 65 figs a-c; Medel & López González, 1996: 207; Medel & Vervoort, 2000: 58-59, fig. 13a.

Campanularia (?) *intermedia* Stechow, 1919: 66-68, figs Va-f.

Campanularia crenata; Picard, 1955: 186; Millard & Bouillon, 1973: 47-48, figs 6b-f; Millard, 1975: 204, fig. 68a-c; García Corrales et al., 1978: 19, fig. 7; Boero, 1981a: 182; García Carrascosa, 1981: 167-168, pl. 33 fig. c.

Material.— CONG 5, 0 m, numerous hydrothecae on *Cystoseira tamariscifolia*.— CONG 81, 8 m, several hydrothecae on *Sargassum* spec. (RMNH-Coel. 30006).

Description.— Colonies composed of stolonal hydrorhiza giving rise to pedicels bearing a single distal hydrotheca. Wall of pedicel more or less spirally twisted.

Hydrotheca bell-shaped, short (344-432 μm long). Rim of hydrothecal aperture provided with 10 blunt cusps separated by shallow, rounded embayments. Hydrothecal diaphragm delimiting a small basal chamber; a more or less globular basal spherule being present. No external inflexion point between basal chamber and remaining hydrothecal wall; a ring of desmocytes near the diaphragm for attachment of the polyp. Hydrothecal wall with strong perisarc thickening, thinning out towards hydrothecal aperture; maximal perisarc thickening just under diaphragm. Hydrotheca flattened, being wider frontally (384-408 μm).

No gonothecae.

Ecology.— *Orthopyxis crenata* is a littoral species that in the Mediterranean has been reported from near the tidal level (Gili, 1986) to 25 m depth (García Carrascosa, 1981); our material was collected from zero to 8 m. Outside the Mediterranean Ramil (1988) found it from the tidal level to 21 m depth. It is exclusively epibiontic and has frequently been reported on algae (Millard, 1975; García Corrales et al., 1978; Isasi, 1985; Roca, 1986; Gili, 1986; Ramil, 1988; Altuna, 1994; Medel & Vervoort, 2000), *Posidonia oceanica* (Stechow, 1919; Gili, 1986), *Cymodocea* (Picard, 1955), bryozoans (Stechow, 1919; García Carrascosa, 1981), sponges and hydrozoans (Ramil, 1988) and ascidians (García Carrascosa, 1981). In our material it occurs on algae (*Cystoseira tamariscifolia* and *Sargassum* spec.).

The only Mediterranean records of fertile colonies are from March (Stechow, 1919; Gili, 1986). In the eastern Atlantic Altuna (1994) found gonothecae in April, July and from September to October.

Distribution.— *Orthopyxis crenata* has a circumtropical distribution (Picard, 1958a; Boero & Bouillon, 1993), being present in tropical and temperate waters of all the oceans (Millard & Bouillon, 1973). In the north-eastern Atlantic it reaches the north coasts of Spain (Altuna, 1994).

In the Mediterranean it has been reported from off the Balearic Islands (Gili, 1986; Roca, 1986) and the Algerian (Picard, 1955), French (Stechow, 1919; Picard, 1951c), Spanish (García Corrales et al., 1978; García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

Orthopyxis integra (Macgillivray, 1842)
(fig. 27g-i)

Campanularia integra Macgillivray, 1842: 465; Hincks, 1868: 164, pl. 31 figs 1a-b; Rossi, 1950: 202, fig. 5; Millard, 1975: 208, fig. 69; García Carrascosa, 1981: 158-161, pl. 8 figs a-d; Boero & Fresi, 1986: 144.
Campanularia caliculata Hincks, 1853: 178-179, pl. 5 fig. b; 1868: 164-167, pl. 51 fig. 2.
Campanularia compressa Clarke, 1876: 214, pl. 8 figs 5-6; Leloup, 1934: 9; Patriti, 1970: 34, fig. 43.
Campanularia integriformis Marktanner Turneretscher, 1890: 206, pl. 3 fig. 2.
Orthopyxis caliculata; Bale, 1914: 74, pl. 11 fig. 1, pl. 12 fig. 1; Stechow, 1919: 68-69, fig. Wa; Marinopoulos, 1979: 120.
Orthopyxis compressa; Bale, 1914: 80; Stechow, 1919: 69; Picard, 1951a: 110; 1952a: 349; 1958a: 191; 1958b: 1.
Orthopyxis integra; Broch, 1918: 159-162; Philbert, 1935: 28, fig. 6; Teissier, 1965: 17; Cornelius, 1982: 60, figs 6a-h; Isasi, 1985: 55-56, fig. 9; Roca, 1986: 280, fig. 50; Ramil, 1988: 304-309; Gili et al., 1989: 108-109, fig. 33; Boero & Bouillon, 1993: 265; Vervoort, 1993: 559-560; Altuna, 1994: 348-351; Medel & López González, 1996: 207; Morri & Bianchi, 1999: 288; Medel & Vervoort, 2000: 59-62, fig. 13b-c.

Material.— CONG 5, 0 m, numerous hydrothecae on *Cystoseira tamariscifolia*, with gonothecae.— CONG 46, 5 m, numerous hydrothecae on *Corallina elongata*, *Flabellia petiolata*, *Pterocladia capillacea* and *Acrosorium uncinatum*, with gonothecae (RMNH-Coel. 30007).— REY 11, 6 m, a few hydrothecae on *Sargassum* spec. and *Halopteris scoparia* (RMNH-Coel. 30008).

Ecology.— *Orthopyxis integra* is an eurybathic species. In the Mediterranean, has been found from the tidal level (Stechow, 1919) to 35 m depth (Gili, 1986); our material was collected from zero to 6 m. Outside the Mediterranean, it has been reported up to 470 m depth (Kramp, 1929).

Orthopyxis integra has mainly been found epibiontic on algae (Stechow, 1919; Picard, 1951a; García Carrascosa, 1981; Isasi, 1985; Boero & Fresi, 1986; Gili, 1986; Roca, 1986; Ramil, 1988; Gili et al., 1989; Vervoort, 1993; Altuna, 1994; Morri & Bianchi, 1999; Medel & Vervoort, 2000), but also on hydrozoans and cirripedes (Boero & Fresi, 1986), bryozoans (Altuna, 1994), mussels (Isasi, 1985; Boero & Fresi, 1986; Ramil, 1988) and anthozoans (Teissier, 1965), as well as epilithic (Ramil, 1988). In our material it always occurs on algae.

In the Mediterranean fertile colonies of *Orthopyxis integra* have been found in April (Stechow, 1919), May (Boero & Fresi, 1986), June (Stechow, 1919; Boero & Fresi, 1986), July (Picard, 1958b; Boero & Fresi, 1986), August (Boero & Fresi, 1986; Morri & Bianchi, 1999) and September (Boero & Fresi, 1986); in our material gonothecae were observed in July. Outside the Mediterranean colonies with gonothecae were found in May (Teissier, 1965), June and July (Teissier, 1965; Altuna, 1994), August (Teissier, 1965; Isasi, 1985), September (Teissier, 1965; Altuna, 1994) and October (Teissier, 1965; Medel & Vervoort, 2000). At temperate latitudes it seems to be fertile throughout the year, with the exception of winter.

Distribution.— *Orthopyxis integra* is considered a cosmopolitan species (Broch, 1918; Millard, 1975; Boero & Bouillon, 1993); Cornelius (1982) believes this is one of the most widely distributed hydroids. In the eastern Atlantic it has been reported from the Arctic (Broch, 1918) to the South African coasts (Millard, 1975).

In the Mediterranean it is known from the Adriatic (Marktanner Turneretscher, 1890), the Aegean Sea (Morri & Bianchi, 1999), the Balearic Islands (García Carrascosa,

1981; Roca, 1986), Corsica (Stechow, 1919) and off the French (Stechow, 1919; Leloup, 1934; Picard, 1952a), Israeli (Picard, 1958b; Vervoort, 1993), Italian (Rossi, 1950; Boero & Fresi, 1986), Spanish (García Carrascosa, 1981; Gili, 1986) and Turkish coasts (Marinopoulos, 1979).

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