Cah. Biol. Mar. (1999) 40 : 283-291

Hydroids (Cnidaria: Hydrozoa) from the Aegean Sea, mostly epiphytic on algae

Carla MORRI [1] and C. Nike BIANCHI [2]
[1] *Dipartimento per lo studio del Territorio e delle sue Risorse (Zoologia), via Balbi 5, I-16126 Genova, Italy. Fax: (39) 010 2099323 - e-mail: zoologia@unige.it*
[2] *Marine Environment Research Centre, ENEA Santa Teresa, C P 316, I-19100 La Spezia, Italy. Fax (39) 0187 978213 - e-mail: bianchi@estosf.santateresa.enea.it*

Abstract: The hydroid fauna of the Mediterranean Sea is one of the best known in the world, nevertheless in the Aegean Sea this fauna remains nearly unexplored. This paper reports on 31 species collected in the two Aegean islands of Kos, in the Dodecanese, and Milos, in the Cyclades. Twenty-two species were collected on algae, chiefly on *Cystoseira*. Different hydroid species occupy specific regions of algal thalli, and different algal species harbour different hydroid assemblages. Five species were collected among the fouling communities on oceanographic instruments, eight species on other substrata. All the species collected were already known from the Western Mediterranean and showed consistent ecology and depth distribution. The present record raises to 67 the total of hydroid species (or subspecific taxa) known from the Aegean Sea and nearby waters of Greece and Turkey. This figure is extremely low by comparison with the 379 species known for the Mediterranean Sea.

Résumé : *Hydraires (Cnidaria: Hydrozoa) de la Mer Égée, en majorité épiphytes d'algues*. Bien que la faune d'hydraires de la Mer Méditerranée soit l'une des mieux connues au monde, celle de la Mer Égée est jusqu'ici presque inexplorée. Ce travail recense 31 espèces récoltées près des deux îles égéennes de Kos (Dodécanèse) et de Milos (Cyclades). Vingt-deux espèces ont été trouvées sur des algues, notamment des *Cystoseira*. Différentes espèces d'hydraires occupent des régions différentes sur les thalles des algues, et différentes espèces d'algues abritent différents peuplements d'hydraires. Cinq espèces ont été récoltées parmi les salissures sur des instruments océanographiques, huit espèces sur d'autres substrats. Toutes les espèces récoltées sont déjà connues de la Méditerranée occidentale et ont montré une écologie et une distribution bathymétrique comparables. Ces recherches portent à 67 le nombre total d'espèces (ou de taxa sous-spécifiques) d'hydraires connus pour la Mer Égée et les eaux avoisinantes de Grèce et de Turquie. Ce nombre est très faible comparé aux 379 espèces connues pour l'ensemble de la Mer Méditerranée.

Keywords : Hydroids - epiphytes - *Cystoseira* - fouling - Aegean Sea - Eastern Mediterranean Sea

Introduction

When studying the relationships between geographic distribution and life cycle patterns in hydromedusae (taking into account both their hydroid and medusa stages), Boero & Bouillon (1993) chose the Mediterranean Sea as a model because the hydroid fauna living in this sea is one of the better known in the world. It must be recognized, however, that virtually all of our knowledge on Mediterranean hydroids comes from the western and central parts of the basin, especially Spanish and Italian Seas (Avian et al.,

Reçu le 4 février 1999; accepté après révision le 2 août 1999.
Received 4 February 1999; accepted in revised form 2 August 1999.

1995; Medel & López-González, 1996; Boero et al., 1997), whereas the eastern basin is nearly unexplored.

The available information on the hydroid fauna of the Eastern Mediterranean is summarized in the papers by Picard (1958), Yamada (1965), Marinopoulos (1979b) and Vervoort (1993). Also of interest are the papers on hydromedusae collected in the plankton of eastern Mediterranean waters (Schmidt, 1973; Goy et al., 1988). Discussing the scarcity of species resulting from his investigation, Schmidt (1973) offered two explanations: i) lack of research and specialists for this group in the considered area; ii) lack of substrata for hydropolyps, hard substrates being relatively scarce.

While the first explanation seems obvious, the second might be adequate for the Levant Sea (where Schmidt's material came from) but does not seem tenable for the Aegean Sea, which is rich in islands with rocky shores.

This paper reports on a small collection of hydroids coming from two Aegean islands (Fig. 1): Kos, in the Dodecanese, and Milos, in the Cyclades. Most species were collected on algae, one of the preferred substrata for many hydroids (Nishihira, 1965; Shepherd & Watson, 1970; Gili & Hughes, 1995), but a number of other substrata were considered as well, including oceanographic instruments which were fouled by hydroids and other organisms (Bianchi et al., in press; Morri et al., in press).

Material and methods

At Kos, hydroids were collected in August 1981 by snorkelling in shallow water in two sites: Kos Bay (KB), to the Northeast of the island, and Agios Nikolaos (AN), near Kephalos, to the Southwest (Fig. 1). A description of the benthic communities around Kos was given by Bianchi & Morri (1983 a,b). At Milos, a larger sampling effort was possible and hydroids were collected in June 1996 by snorkelling or SCUBA diving down to 44 m depth in 6 sites (SR, E, ST, CR, S and VS) off Palaeochori Bay, at the south-east of the island (Fig. 1). The epibenthic communities living in that area were described by Bianchi et al. (1997) and Cocito et al. (in press). Additional hydroid material from Milos came with the fouling communities settled on oceanographic instruments left in situ for about three months (recovered on September 1996) at 10 and 90 m depth (A, C) and nine months (recovered on June 1997) at 50 m depth (L). A more complete information on sampling is given in Table 1. All the species are deposited in the first author's collection.

Results

A total of 31 species was found. Their depth and substrate distributions are summarized in Tables 2 and 3, respectively.

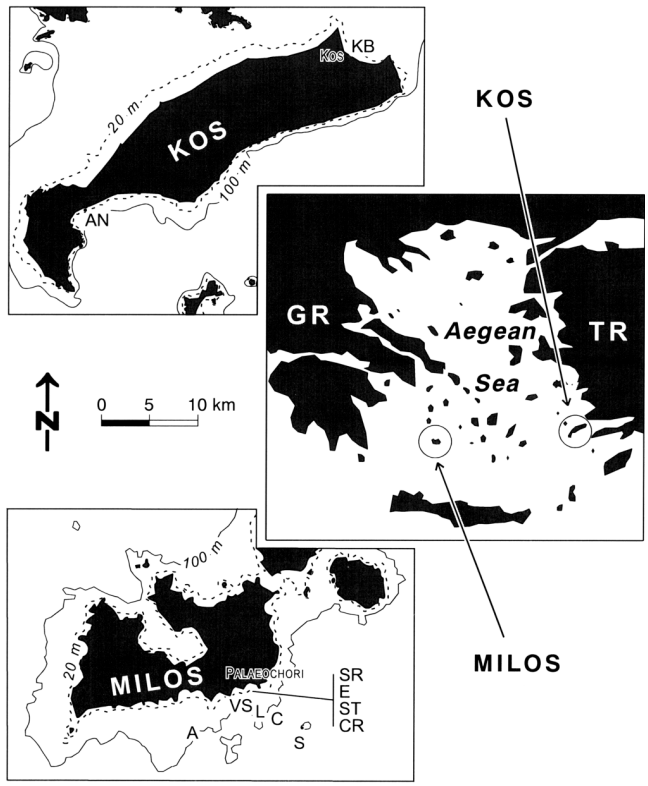

Figure 1. The islands of Kos and Milos in the Aegean Sea. The localities where the hydroids have been collected are indicated. Capital letters represent actual sampling sites (see Table 1 for further information).

Figure 1. Les îles de Kos et de Milos en Mer Égée. Les localités où les hydraires ont été récoltés sont indiquées. Les lettres majuscules montrent les sites d'échantillonnage (voir Tableau 1 pour plus d'informations).

Table 1. Sites, depth, dates and method of sampling for the present hydroid collection.

Tableau 1. Sites, profondeur, dates et méthode d'échantillonnage de la collection d'hydraires étudiée.

Station	Island	Latitude N	Longitude E	Depth	Date	Method
KB	Kos	36°53.46'	27°18.20'	3 - 4 m	August 1981	Snorkelling
AN	Kos	36°44.73'	26°59.58'	0.5 - 3 m	August 1981	Snorkelling
SR	Milos	36°40.17'	24°30.58'	0.5 - 12 m	June 1996	Snorkelling, SCUBA diving
E	Milos	36°40.22'	24°32.61'	7 - 13 m	June 1996	SCUBA diving
ST	Milos	36°40.01'	24°32.14'	9 - 31 m	June 1996	SCUBA diving
CR	Milos	36°39.73'	24°31.24'	25 - 32 m	June 1996	SCUBA diving
S	Milos	36°38.14'	24°34.50'	14 - 41 m	June 1996	SCUBA diving
VS	Milos	36°39.55'	24°31.37'	41 - 44 m	June 1996	SCUBA diving
A	Milos	36°38.50'	24°27.68'	88 - 90 m	September 1996	Fouling
C	Milos	36°39.18'	24°31.91'	10 and 90 m	September 1996	Fouling
L	Milos	36°39.49'	24°31.31'	50 m	June 1997	Fouling

Table 2. Observed depth distribution of the hydroid species collected. Species are ordered according to their apparent depth preference. + present, ++ common, +++ very common.

Tableau 2. Distribution bathymétrique observée des espèces d'hydraires récoltées. Les espèces sont classées selon leur préférence bathymétrique apparente. + présent, ++ commun, +++ très commun.

Hydroid species	Depth zone 0 – 20 m	30 – 90 m
Cladocoryne floccosa	+	.
Eudendrium capillare	+	.
Halecium pusillum	+	.
Aglaophenia tubiformis	+	.
Orthopyxis integra	++	.
Clytia linearis	++	.
Halopteris diaphana	+	.
Laomedea angulata	+	.
Aglaophenia octodonta	++	.
Antennella secundaria	++	.
Eudendrium racemosum	+++	.
Eudendrium sp.	+	.
Aglaophenia picardi	+	.
Halopteris catharina	+	.
Eudendrium armatum	++	.
Clytia noliformis	+	.
Plumularia obliqua	+	.
Kirchenpaueria pinnata	++	+
Clytia hemisphaerica	+++	+
Sertularella ellisii	+++	++
Sertularia distans	+	+++
Mitrocoma annae	+++	++
Aglaophenia elongata	.	+
Eudendrium ramosum	.	++
Halecium mediterraneum	.	+
Eudendrium glomeratum	.	+
Plumularia setacea	.	+
Obelia dichotoma	+	+++
Bougainvillia muscus	.	+++
Sertularella ornata	.	+
Obelia bidentata	.	+

Other details are given in the annotated list below. Systematic order and species names mostly follow the check list of the Italian fauna (Avian et al., 1995).

Bougainvillia muscus (Allman)

Occurrence: A, L, C, VS.
Depth: 44 to 90 m.
Substratum: *Sargassum acinarium* (L.) C. V. Agardh, other algae and recovered oceanographic instruments.
Remarks: Always found fertile. Stem polysiphonic, 4 to 10 cm high. This species has been known for a long time under the invalid name *Bougainvillia ramosa* (van Beneden) (Calder, 1988).

Eudendrium armatum Tichomiroff

Occurrence: CR, S, ST.
Depth: 10 to 20 m.
Substratum: massive sponges (*Ircinia*, *Petrosia*).
Remarks: Stout colonies, under rock overhangs.

Eudendrium capillare Alder

Occurrence: AN.
Depth: 0.5-2 m.
Substratum: the brown alga *Cystoseira crinita* (Desfontaines) Bory.
Remarks: Creeping hydrorhizae with short stems, mostly unbranched.

Eudendrium glomeratum Picard

Occurrence: VS.
Depth: 44 m.
Substratum: *Sargassum acinarium*.
Remarks: A single colony.

Eudendrium racemosum (Gmelin)

Occurrence: AN, SR.
Depth: 0.5 to 12 m.
Substratum: rock and encrustations by the coralline alga *Mesophyllum lichenoides* (Ellis) Lemoine.
Remarks: Some polyps showed the typical finger-shaped cnidophore. Colonies up to 15 cm tall and densely branched, dominated the sessile community on rock walls just below sea surface.

Eudendrium ramosum (L.)

Occurrence: VS.
Depth: 44 m.
Substratum: bioconcretion.
Remarks: Small colonies, with most stems deprived of polyps, on thickets of the coralline alga *Mesophyllum lichenoides*.

Eudendrium sp.

Occurrence: SR.
Depth: 8 m.
Substratum: bioconcretion.
Remarks: A small colony, with damaged polyps, on a nodule of the coral *Madracis pharensis* (Heller), under a rock roof.

Cladocoryne floccosa Rotch

Occurrence: AN.
Depth: 0.5-2 m.
Substratum: *Cystoseira crinita*
Remarks: A small colony on a side branch of the alga.

Table 3. Distribution of the hydroids on the different sampled substrata. Hydroid species and substrata were ordered to show reciprocal connections. Open circle: present; full circle: frequent and/or abundant.

Tableau 3. Distribution des hydraires sur les différents substrats échantillonnés. Les espèces d'hydraires et les substrats ont été classés afin de montrer les relations réciproques. Cercles vides: présent; cercles pleins: fréquent et/ou abondant.

Hydroid species	Substrata											
	Cystoseira barbata	*C. spinosa*	*C. schiffnerii*	*C. crinita*	*C. corniculata*	*Sargassum acinarium*	Other algae	*Cymodocea nodosa*	Hydroids	Sponges	Rock and biocon-cretion	Fouling
Aglaophenia picardi	○	.	.	.	.	.	.	.	.	.	.	.
Clytia noliformis	○	.	.	.	.	.	.	.	.	.	.	.
Plumularia obliqua	○	.	.	.	.	.	.	.	.	.	.	.
Halopteris catharina	.	○	.	.	.	.	.	.	.	.	.	.
Aglaophenia octodonta	○	.	.	●	.	.	.	.	.	.	.	.
Antennella secundaria	.	○	.	●	.	.	.	.	.	.	.	.
Orthopyxis integra	.	.	○	●	.	.	.	.	.	.	.	.
Sertularia distans	.	.	●	●	.	.	.	.	.	.	.	.
Sertularella ellisii	○	.	○	○		○	●	.	.	.	.	.
Aglaophenia tubiformis	.	.	.	○	.	.	.	.	.	.	.	.
Halecium pusillum	.	.	.	○	.	.	.	.	.	.	.	.
Cladocoryne floccosa	.	.	.	○	.	.	.	.	.	.	.	.
Eudendrium capillare	.	.	.	○	.	.	.	.	.	.	.	.
Clytia linearis	.	.	.	○	○	.	.	.	.	.	.	.
Halopteris diaphana	.	.	.	.	○	.	.	.	.	.	.	.
Kirchenpaueria pinnata	.	.	.	○	○	.	○	.	.	.	.	.
Halecium mediterraneum	.	.	.	.	.	○	.	.	.	.	.	.
Aglaophenia elongata	.	.	.	.	.	○	.	.	.	.	.	.
Eudendrium glomeratum	.	.	.	.	.	○	.	.	.	.	.	.
Obelia dichotoma	.	.	.	.	.	●	.	.	.	.	.	○
Laomedea angulata	.	.	.	.	.	.	.	○	.	.	.	.
Clytia hemisphaerica	.	.	.	○	.	●	.	.	.	○	○	●
Mitrocoma annae	.	.	.	.	.	.	.	.	●	.	.	.
Bougainvillia muscus	.	.	.	.	.	○	○	.	.	.	.	●
Eudendrium armatum	.	.	.	.	.	.	.	.	.	●	.	.
Eudendrium racemosum	.	.	.	.	.	.	.	.	.	○	●	.
Eudendrium sp.	.	.	.	.	.	.	.	.	.	.	○	.
Eudendrium ramosum	.	.	.	.	.	.	.	.	.	.	●	.
Plumularia setacea	.	.	.	.	.	.	.	.	.	.	○	.
Obelia bidentata	.	.	.	.	.	.	.	.	.	.	.	●
Sertularella ornata	.	.	.	.	.	.	.	.	.	.	.	●

Mitrocoma annae Haeckel

Occurrence: A, AN, C, VS.

Depth: 0.5 to 90 m.

Substratum: other hydroids.

Remarks: Abundant on *Sertularella ornata*, but frequent on several other hydroid species (*Aglaophenia tubiformis*, *Bougainvillia muscus*, *Clytia hemisphaerica*, *C. linearis*, *Obelia dichotoma*).

Halecium mediterraneum Weismann

Occurrence: VS.

Depth: 44 m.

Substratum: *Sargassum acinarium*.

Remarks: A colony on a *Sargassum* blade.

Halecium pusillum (M. Sars)

Occurrence: AN.

Depth: 0.5-2 m.

Substratum: *Cystoseira crinita*.

Remarks: Several small colonies on the apical portion of the alga.

Aglaophenia elongata Meneghini

Occurrence: VS.

Depth: 44 m.

Substratum: *Sargassum acinarium*.

Remarks: A few colonies.

Aglaophenia octodonta (Heller)

Occurrence: AN, SR.

Depth: 0.5 to 12 m.
Substratum: two species of *Cystoseira*.
Remarks: Extremely abundant on *C. crinita*, one colony on *C. barbata* C. Agardh.

Aglaophenia picardi Svoboda

Occurrence: SR.
Depth: 12 m.
Substratum: *Cystoseira barbata*.
Remarks: A single colony.

Aglaophenia tubiformis Marktanner-Turneretscher

Occurrence: AN.
Depth: 0.5-2 m.
Substratum: *Cystoseira crinita*.
Remarks: Few colonies with hydrothecae about 1.5 times longer than broad.

Antennella secundaria (Gmelin)

Occurrence: AN, E.
Depth: 0.5 to 13 m.
Substratum: two species of *Cystoseira*.
Remarks: Abundant on *C. crinita*, one colony on *C. spinosa* Sauvageau. Gonothecae present in both cases.

Halopteris catharina (Johnston)

Occurrence: E.
Depth: 13 m.
Substratum: *Cystoseira spinosa*.
Remarks: A single colony.

Halopteris diaphana (Heller, 1868)

Occurrence: AN.
Depth: 2 m.
Substratum: *Cystoseira corniculata* (Wulfen) Zanardini.
Remarks: A colony, with gonothecae.

Kirchenpaueria pinnata (L.)

Occurrence: AN, VS.
Depth: 0.5 to 44 m.
Substratum: two species of *Cystoseira* and the green alga *Flabellia petiolata* (Turra) Nizamuddin.
Remarks: There are contrasting views about the status of several species of *Kirchenpaueria* in European waters (e. g., Roca & Moreno, 1987; Cornelius, 1995). According to Medel & Vervoort (1995), *K. pinnata* is a highly variable species, and the other three nominal species *K. echinulata* (Lamarck), *K. similis* (Hincks) and *K. elegantula* (G. O. Sars) should be considered as synonyms.

Plumularia obliqua (Thompson)

Occurrence: S.
Depth: 15 m.
Substratum: *Cystoseira barbata*.
Remarks: Several colonies on the basal part of the algal thallus.

Plumularia setacea (L.)

Occurrence: VS.
Depth: 44 m.
Substratum: bioconcretion.
Remarks: A colony, with gonothecae.

Sertularella ellisii (Deshayes & Milne-Edwards)

Occurrence: AN, SR, CR, S, VS.
Depth: 0.5 to 44 m.
Substratum: three species of *Cystoseira* and other algae: *Mesophyllum lichenoides*, *Osmundaria volubilis* (L.) R. E. Norris, *Sargassum acinarium*.
Remarks: After Cornelius (1979), the Mediterranean hydroids called *S. ellisii* by Picard (1956) have been often synonymyzed with *S. gaudichaudi* (Lamouroux) in recent literature. This view has been contrasted by Ramil et al. (1992) and Vervoort (1993). According to Cornelius (1995) the true identity of the nominal species *gaudichaudi* and *ellisii* remains problematic.

Sertularella ornata (Lamouroux)

Occurrence: A.
Depth: 90 m.
Substratum: recovered instruments.
Remarks: Many colonies, some with gonothecae. We follow Medel Soteras et al. (1991) and Vervoort (1993) in keeping this species separated from both *S. ellisii* and *S. gaudichaudi* (see also above).

Sertularia distans Lamouroux

Occurrence: AN, VS.
Depth: 0.5 to 44 m.
Substratum: two species of *Cystoseira*.
Remarks: Many colonies on the apical parts of *Cystoseira* thalli. Stem up to 15 mm high. Gonothecae in August on *C. crinita*.

Clytia hemisphaerica (L.)

Occurrence: AN, C, SR, VS.
Depth: 0.5 to 44 m.
Substratum: *Cystoseira crinita*, *Sargassum acinarium*, recovered instruments and sessile animals: the bryozoan *Myriapora truncata* (Pallas) and the sponge *Ircinia variabilis* (Schmidt).

Remarks: gonothecae observed throughout the depth range, in both June and September. When found on algae, the species occurred mostly on side branches and apical portions (*Cystoseira*) and on blades and bladders (*Sargassum*).

Clytia linearis (Thornely)

Occurrence: AN.
Depth: 0.5-3 m.
Substratum: two species of *Cystoseira*.
Remarks: Several colonies, on the apical parts of the algal thalli. Gonothecae only found on *C. crinita*.

Clytia noliformis (Mc Crady)

Occurrence: S.
Depth: 15 m.
Substratum: *Cystoseira barbata*.
Remarks: A few colonies on the basal portion of the thallus.

Laomedea angulata (Hincks)

Occurrence: KB.
Depth: 3-4 m.
Substratum: the seagrass *Cymodocea nodosa* (Ucria) Ascherson.
Remarks: Epiphytic on the seagrass leaves.

Obelia bidentata Clarke

Occurrence: A.
Depth: 90 m.
Substratum: recovered instruments.
Remarks: Many colonies, with polysiphonic stems up to 6 cm high.

Obelia dichotoma (L.)

Occurrence: A, C, VS.
Depth: 10 to 90 m.
Substratum: *Sargassum acinarium*, recovered instruments.
Remarks: Gonothecae in September, at 90 m. On *Sargassum*, colonies were found on blades, bladders and branchlets.

Orthopyxis integra (MacGillivray)

Occurrence: AN.
Depth: 0.5-3 m.
Substratum: two species of *Cystoseira*.
Remarks: Many colonies, with gonothecae, on the apical portions and side branches of the algal thalli.

Discussion

The tall and frondose brown alga *Cystoseira crinita* provided the greatest number of species (12), including four species found exclusively there. Similarly, three further hydroid species were exclusive to *C. barbata*, one to *C. spinosa* and one to *C. corniculata* (Table 3). *C. schiffneri* Hamel, on the contrary, showed no exclusive hydroid species, all being also found on *C. crinita*. *Sargassum acinarium* provided seven species, three of which exclusive. This might suggest species-specific relationships between certain hydroids and the alga, but our records were too few to allow any conclusion in this respect. Although many hydroids colonize algae (Nishihira, 1965; Shepherd & Watson, 1970; Genzano & Rodriguez, 1998), substratum selectivity is known for only a few species (Gili & Hughes, 1995). Kokatas (1976) found seven hydroid species epiphytic on *C. crinita* in a different Aegean locality (Gulf of Izmir), and only four were in common with our record.

As a general rule, most epiphytic hydroids settled preferentially on the apical portions, the only exceptions being *Plumularia obliqua* and *Clytia noliformis*, which preferred the basal parts. The occupation of specific regions of algal thalli by different hydroid species has been described by many authors (see Hayward, 1980, and Gili & Hughes, 1995, for reviews). This can be the outcome of response to environmental gradients along the thalli (Seed & O' Connor, 1981) or competition for the substratum, both within hydroids and with other organisms (Katô et al., 1961). On the *Cystoseira* species observed, and especially on *C. crinita*, hydroids were by far the principal epiphytes. The dominant species, such as *Orthopyxis integra* and *Sertularia distans*, occupied different tufts of the same algal thallus, monopolizing the whole branch. On *Sargassum*, hydroids coexisted with serpuloideans and many bryozoan species, and no substratum monopolization was evident. The remaining algal species (*Flabellia petiolata*, *Osmundaria volubilis*, etc.) had less epiphytes.

Laomedea angulata was the only species collected on seagrass leaves. Several Mediterranean hydroids are obligate epiphytes of *Posidonia oceanica* (L.) Delile (Boero, 1987). *Posidonia* meadows are known for both Kos (Bianchi & Morri, 1983a,b) and Milos (Aliani et al., 1998), but we had only samples of *Cymodocea nodosa*. *Laomedea angulata* seems characteristic of this seagrass (Morri et al., 1991). A study on the hydroid epiphytes of *P. oceanica* in the Eastern Mediterranean, as the one done by Hayward (1975) for bryozoans, would be of interest to allow comparisons with the western basin.

Mitrocoma annae was always found epizootic on other hydroid species, a frequent habit among hydroids (Genzano, 1998). Even when collected on algae, *M. annae* was attached to epiphytic hydroids, rather than to the alga itself. Six species, among which four *Eudendrium* species, where found on massive sponges or directly on the primary substratum. The observed depth distribution of the different species of *Eudendrium* is consistent with that known in the Western Mediterranean (e. g., Marinopoulos, 1979a).

Table 4. Hydroid species reported from the Aegean Sea and nearby waters of Greece and Turkey according to literature information and the present collection.

Tableau 4. Espèces d'hydraires signalées de la Mer Égée et des régions avoisinantes de Grèce et de Turquie d'après la littérature et notre collection.

	Yamada (1965)	Picard (in Kokatas, 1976)	Marinopoulos (1979)	Morri & Bianchi (present paper)
Aglaophenia elongata	.	.	.	+
Aglaophenia cfr *elongata*	.	.	+	.
Aglaophenia octodonta	+	*pluma*	+	+
Aglaophenia picardi	.	.	+	+
Aglaophenia tubiformis	.	.	.	+
Antennella secundaria	.	.	*Polyplumaria*	+
Bougainvillia muscus	.	.	+	+
Cladocoryne floccosa	.	.	.	+
Clytia hemisphaerica	.	.	*uniflora*	+
Clytia linearis	.	.	*gravieri*	+
Clytia noliformis	.	.	.	+
Clytia paulensis	.	.	+	.
Clytia sp.	+	.	.	.
Cordylophora neapolitana	.	.	+	.
Coryne pusilla	+	.	.	.
Dynamena desmoides	.	.	+	.
Dynamena disticha	.	.	+	.
Eudendrium armatum	.	.	.	+
Eudendrium capillare	+	+	+	+
Eudendrium glomeratum	.	.	+	+
Eudendrium motzkossowskae	.	.	+	.
Eudendrium racemosum	+	.	+	+
Eudendrium ramosum	.	.	+	+
Eudendrium sp.	.	.	.	+
Fillelum serratum	.	.	+	.
Garveia grisea	.	.	+	.
Halecium banyulense	.	.	+	.
Halecium lankesteri	.	.	+	.
Halecium mediterraneum	.	.	+	+
Halecium nanum	.	.	+	.
Halecium pusillum	.	+	+	+
Halocoryle disticha	+	.	+	.
Halopteris catharina	.	.	*Polyplumaria*	+
Halopteris diaphana	.	.	*Polyplumaria*	+
Hebella parasitica	.	.	+	.
Hebella scandens	.	.	+	.
Hydractinia (?) sp.	+	.	.	.
Kirchenpaueria echinulata	.	.	+	.
Kirchenpaueria echinulata f. *minuta*	.	.	+	.
Kirchenpaueria echinulata f. *similis*	.	.	+	.
Kirchenpaueria pinnata	.	.	+	+
Laodicea undulata	.	.	+	.
Laomedea angulata	.	.	.	+
Laomedea calceolifera	.	.	+	.
Mitrocoma annae	.	.	.	+
Monotheca posidoniae	.	.	+	.
Obelia bidentata	.	.	+	+
Obelia dichotoma	.	.	.	+
Obelia geniculata	+	+	.	.
Orthopyxis alta	.	.	+	.
Orthopyxis crenata	.	.	+	.
Orthopyxis integra	*caliculata*	.	*caliculata*	+
Orthopyxis sp.	.	+	.	.
Plumularia obliqua	.	.	*Monotheca*	+
Plumularia setacea	+	.	+	+
Podocoryna fucicola	.	.	+	.
Scandia pocillum	.	.	+	.
Sertularella ellisii	.	.	+	+
Sertularella e. lagenoides	.	+	.	.
Sertularella mediterranea	+	.	.	.
Sertularella ornata	.	.	.	+
Sertularella polyzonias	.	.	+	.
Sertularia distans	.	.	.	+
Sertularia marginata	.	.	+	.
Sertularia perpusilla	.	.	+	.
Syncoryne pulchella	+	.	.	.
Tubularia larynx	.	+	.	.

Examination of other authors' collections was not possible and no taxonomic revision was attempted. Species are therefore cited under the names originally used by the authors. Putative correspondences are suggested when species were likely to be in common with the present collection.

L'examen des collections des autres auteurs n'a pas été possible et aucune révision taxinomique n'a été entreprise. Par conséquent, les espèces sont citées sous les noms utilisés par les auteurs. Les correspondances probables sont suggérées pour les espèces qui paraissent identiques à celles de notre collection.

Finally, five species were obtained with the fouling on oceanographic instruments. All of them, but *Sertularella ornata*, are common constituent of coastal fouling communities in European waters (Morri & Boero, 1986). *Clytia hemisphaerica* was collected on a buoy at 10 m depth, the remaining species in deeper (50 to 90 m) water. *Bougainvillia muscus* was abundant in comparably deep fouling on offshore platforms in the Ionian and Adriatic seas (Montanari & Morri, 1977: *B. ramosa*). *S. ornata* was collected on shell at about 80 m depth in the Levant Sea (Vervoort, 1993).

The present record of 31 species, all of which already known in the Western Mediterranean, constitutes a significant increase in the number of hydroid species recorded in the Aegean Sea. Yamada (1965) reported twelve species from near Athens, Kocatas (1976) (hydroids identified by Picard) seven species from the Gulf of Izmir, Marinopoulos (1979b) 45 species (or subspecific taxa) from several Turkish and Greek localities (Table 4). Taking into account the species in common to two or more inventories, the total of hydroid species (or subspecific taxa) known from the Aegean Sea and nearby waters of Greece and Turkey rises to 67. Picard (1958) reported 13 species and Vervoort (1993) 26, from the Mediterranean coasts of Israel (Levant Sea).

These figures are extremely low by comparison with the 379 species known for the whole Mediterranean (Boero et al., 1997) and clearly underline the need of further investigations on the Eastern Mediterranean hydroid fauna. Recent work on other faunal taxa (e. g., bivalves: Zenetos, 1997) showed that the biodiversity of the Aegean Sea is not as low as traditionally believed, and we see no reason to think that future research will not demonstrate that the same is true also for the hydroids.

Acknowledgements

Part of this study received support from the project AG-HY-FL of the European Community (contract MAS3-CT95-0021). Logistics were organized by S. Varnavas in Milos, by E. Bacci and E. Morri in Kos. A. Peirano (La Spezia) collected samples at Milos, whereas S. Aliani (La Spezia) and P. Dando (Bangor) let us have the fouling communities settled on their oceanographic instruments. Thanks are also due to G. Bressan (Trieste) and G. Sartoni (Firenze) for the identification of the algae on which hydroids were attached, and to G. Bavestrello (Genova) for help with species of the genus *Eudendrium*.

References

Aliani S., Bianchi C. N., Cocito S., Dando P. R., Meloni R., Morri C., Niemeyer A., Peirano A. & Ziebis W. 1998. A map of seagrass meadows in Palaeochori Bay (Milos Island, Greece), a marine area with hydrothermal activity. *Rapports et procès-verbaux de la Commission internationale pour l'exploration scientifique de la Mer Méditerranée*, **35** (2): 512-513.

Avian M., Boero F., Mills C., Rossi L. & Rottini-Sandrini L. 1995. Cnidaria, Ctenophora. In: *Checklist delle specie della fauna italiana*. (A. Minelli, S. Ruffo & S. La Posta eds), No. 3. Calderini: Bologna. 38 pp.

Bianchi C. N., Aliani S., Balduzzi A., Boyer M., Cocito S., De Biasi A M., Ferdeghini F., Morri C., Pansini M., Peirano A. & Pestarino M. 1999. Biodiversità dell'epifauna marina sessile in un'isola del Mar Egeo: Milos, Cicladi. *Biologia marina mediterranea*, **6** (1): 179-183.

Bianchi C. N., Cocito S., Peirano A., Morri C., Aliani S., Meloni R., De Biasi A. M. & Dando P. R. 1997. The epibenthic communities of an area with hydrothermal vents at Milos Island (Aegean Sea). In: *Progress in oceanography of the Mediterranean Sea*, pp. 391-392. CNR: Rome.

Bianchi C. N. & Morri C. 1983a. Compte rendu préliminaire de quelques observations sur les fonds benthiques superficiels de l'île de Cos (Dodécanèse, Grèce). *Rapports et procès-verbaux de la Commission internationale pour l'exploration scientifique de la Mer Méditerranée*, **28** (3): 227-230.

Bianchi C. N. & Morri C. 1983b. Note sul benthos marino costiero dell'Isola di Kos (Egeo sud-orientale). *Natura*, **74** (1-2): 96-114.

Boero F. 1987. Evolutionary implications of habitat selection in the hydroids of *Posidonia oceanica* meadows. In: *Modern trends in the systematics, ecology, and evolution of Hydroids and Hydromedusae* (J. Bouillon, F. Boero, F. Cicogna & P. F. S. Cornelius eds), pp. 251-256. Clarendon Press: Oxford.

Boero F. & Bouillon J. 1993. Zoogeography and life cycle patterns of Mediterranean hydromedusae (Cnidaria). *Biological Journal of the Linnean Society*, **48**: 239-266.

Boero F., Gravili C., Denitto F., Miglietta M. P. & Bouillon J. 1997. The rediscovery of *Codonorchis octaedrus* (Hydroidomedusae, Anthomedusae, Pandeidae), with an update of the Mediterranean hydroidomedusan biodiversity. *Italian Journal of Zoology*, **64**: 359-365.

Calder D. R., 1988. Shallow-water hydroids from Bermuda. The Athecatae. *Royal Ontario Museum Life Science Contributions*, **148**: 1-107.

Cocito S., Bianchi C. N., Morri C. & Peirano A. (in press). The sessile communities on subtidal rocks in an area with hydrothermal vents: Milos Island, Aegean Sea. *Hydrobiologia*

Cornelius P. F. S. 1979. A revision of the species of Sertulariidae (Coelenterata: Hydroida) recorded from Britain and nearby seas. *Bulletin of the British Museum (Natural History)*, Zoology series, **34** (6): 243-321.

Cornelius P. F. S. 1995. *North-West European Thecate Hydroids and their Medusae. Part 2. Sertulariidae to Campanulariidae*. In: Synopsis of the British fauna (R. S. K. Barnes & J. H. Crotters eds), new series, No. 50. Field Studies Council: Shrewsbury. vii + 386 pp.

Genzano G. N., 1998. Hydroid epizoites on hydroids *Tubularia crocea* and *Sertularella mediterranea* from the intertidal of Mar del Plata (Argentina). *Russian Journal of marine Biology*, **24** (2): 123-126.

Genzano G. N. & Rodriguez G. M., 1998. Association between hydroid species and their substrates from the intertidal zone of Mar del Plata (Argentine). *Miscellània zoològica*, **21** (1): 21-29.

Gili J. M. & Hughes R. G. 1995. The ecology of marine benthic hydroids. *Oceanography and marine Biology: an annual Review*, **33**: 351-426.

Goy J., Lakkis S. & Zeidane R. 1988. Les méduses de la Méditerranée orientale. *Rapports et procès-verbaux de la Commission internationale pour l'exploration scientifique de la Mer Méditerranée*, **31**: 299.

Hayward P. J. 1975. Observations on the Bryozoa epiphytes of *Posidonia oceanica* from the island of Chios (Aegean Sea). *Documents du Laboratoire de Géologie de la Faculté de Sciences de Lyon*, hors-série **3** (2): 347-356.

Hayward P. J. 1980. Invertebrate epiphytes of coastal marine algae. In: *The shore environments. Vol. 2. Ecosystems* (J. H. Price, D. E. G. Irvine & W. F. Farnham eds), pp. 761-787. Academic Press: London.

Katô M., Nakamura K., Hirai E. & Kakinuma Y. 1961. The distribution pattern of Hydrozoa on seaweed with some notes on the so-called coaction among hydrozoan species. *Bulletin of the Marine Biological Station of Asamushi*, **8**: 179-181.

Kocatas A. 1976. Note sur le peuplement à *Cystoseira crinita* Bory dans le Golfe d'Izmir (Turquie). *Tethys*, **7** (2-3): 241-248.

Marinopoulos J. 1979a. Distribution des *Eudendrium* dans la région marseillaise (étude préliminaire). *Rapports et procès-*

verbaux de la Commission internationale pour l'exploration scientifique de la Mer Méditerranée, **25/26** (4): 117-118.

Marinopoulos J. 1979b. Biological survey of the eastern Mediterranean Sea: Hydroids (preliminary study). *Rapports et procès-verbaux de la Commission internationale pour l'exploration scientifique de la Mer Méditerranée*, **25/26** (4): 119-120.

Medel M. D. & López-González P. J. 1996. Updated catalogue of the Hydrozoans from the Iberian Peninsula and Balearic Islands, with remarks on zoogeography and affinities. *Scientia marina*, **60** (1): 183-209.

Medel M. D. & Vervoort W. 1995. Plumularian hydroids (Cnidaria: Hydrozoa) from the Strait of Gibraltar and nearby areas. *Zoologische Verhandelingen, Leiden*, **300**: 1-72.

Medel Soteras M. D., García F. J. & García-Gomez J. C., 1991. La familia Sertulariidae (Cnidaria: Hydrozoa) en el estrecho de Gibraltar y la península Ibérica: Aspectos taxonómicos y zoogeográficos. *Cahiers de Biologie marine*, **32** (4): 503-543.

Montanari M. & Morri C. 1977. Fouling di alcune piattaforme off-shore dei mari italiani: V. Gli Idroidi. In: *Atti del IX congresso della società italiana di biologia marina* (F. Cinelli, E. Fresi & L. Mazzella eds), pp. 293-302. SIBM: Genova.

Morri C., Bavestrello G. & Bianchi C. N. 1991. Faunal and ecological notes on some benthic cnidarian species from the Tuscan Archipelago and eastern Ligurian Sea (western Mediterranean). *Bollettino dei Musei e degli Istituti biologici dell'Università di Genova*, **54-55** (1988-1989): 27-47.

Morri C., Bianchi C. N., Cocito S., Peirano A., De Biasi A. M. , Aliani S., Pansini M., Boyer M., Ferdeghini F., Pestarino M. & Dando P. (in press). Biodiversity of marine sessile epifauna in an Aegean island: Milos, Eastern Mediterranean Sea. *Marine Biology*

Morri C. & Boero F. 1986. Hydroids. In: *Catalogue of main marine fouling organisms,* **7**. ODEMA, Bruxelles. 91 pp.

Nishihira M. 1965. The association between Hydrozoa and their attachment substrata with special reference to algal substrata. *Bulletin of the Marine Biological Station of Asamushi*, **12**: 75-92.

Picard J. 1956. Les espèces et formes méditerranéennes du genre *Sertularella*. *Vie et Milieu*, **7** (2): 258-266.

Picard J. 1958. Notes sur une collection d'hydroides provenant des côtes méditerranéennes d'Israel. *Bulletin of the Sea Fisheries Research Station, Haifa*, **15**: 1-3.

Ramil F., Parapar J. & Vervoort W. 1992. The genus *Sertularella* Gray, 1848 (Cnidaria: Hydroida) along the coasts of Galicia (Spain). *Zoologische Verhandelingen, Leiden*, **66** (37): 493-524.

Roca I. & Moreno I. 1987. Consideraciones sobre la subfamilia Kirchenpaueriinae (Cnidaria, Hydrozoa, Plumulariidae) y sus representantes en las aguas costeras de Mallorca. *Thalassas*, **5** (1): 45-51.

Schmidt H. E. 1973. Hydromedusae from the eastern Mediterranean Sea. *Israel Journal of Zoology*, **22**: 151-167.

Seed R. & O' Connor R. J., 1981. Community organization in marine algal epifaunas. *Annual Review of Ecology and Systematics*, **12**: 49-74.

Shepherd S. A. & Watson J. E. 1970. The sublittoral ecology of West Island, South Australia. 2. The association between hydroids and algal substrate. *Transactions of the Royal Society of South Australia*, **94**: 139-146.

Vervoort W. 1993. Report on hydroids (Hydrozoa, Cnidaria) in the collection of the Zoological Museum, University of Tel-Aviv, Israel. *Zoologische Verhandelingen, Leiden*, **67** (40): 537-565.

Yamada M. 1965. Marine hydroids from Greece. *Publications of the Seto Marine Biological Laboratory*, **12** (5): 25-28.

Zenetos A. 1997. Diversity of marine bivalvia in Greek waters: effects of geography and environments. *Journal of the marine biological Association of the United Kingdom*, **77**: 463-472.