



Sponge diversity in the Aegean Sea: check list and new information

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INTRODUCTION

Although the first written records of sponges have been given for the Aegean Sea by Homer and Aristotle, the sponge fauna of this area, as well as that of the broader region of the eastern Mediterranean, remained poorly studied until recently, in comparison to that of the other areas of the Mediterranean Sea (Pansini *et al.*, 2000; Voultziadou & Vafidis, 2004).

Our up to date knowledge on the sponge fauna of the Aegean Sea is included in 48 publications which can be classified in the following groups: i. taxonomic papers (J. M. Szymanski, 1904, Inaug. Dissert., Breslau; Rützler & Broomley, 1981; Voultziadou-Koukoura, 1987; Voultziadou *et al.*, 1991; Voultziadou-Koukoura & van Soest, 1991a, b, 1993; Voultziadou & Koukouras, 1993a; Voultziadou & Vafidis, 2004), ii. faunistic works on sponges (Saritas, 1972, 1973; Ergüven *et al.*, 1988; Katağan *et al.*, 1991; Pansini *et al.*, 2000; Topaloglou, 2001), iii. ecological works on sponges (Arndt, 1937; Koukouras *et al.*, 1985, 1992, 1996; Voultziadou-Koukoura *et al.*, 1987; Voultziadou-Koukoura & Koukouras, 1993b; Cinar & Ergen, 1998; Cinar *et al.*, 2002; Kefalas *et al.*, 2003a, b). iv. general faunistic and ecological works (Tortonese, 1947; Belloc, 1948; Pérès & Picard, 1958; Laborel, 1961; Vamvakas, 1971; Geldiay & Kocatas, 1972; Hottinger, 1974; Kocatas, 1978; Kisseleva, 1983; Bogdanos & Satsmatzis, 1983; Bianchi & Morri, 1983; Koukouras *et al.*, 1998; Morri *et al.*, 1999; Bianchi *et al.*, 1999; Cocito *et al.*, 2000; Antoniadou *et al.*, manuscript submitted), v. taxonomic papers on sponges from other Mediterranean areas (Topsent, 1920; Vacelet, 1961, 1969; Griessinger, 1971; Pulitzer-Finali & Pronzato, 1981; Pulitzer-Finali, 1983; Diaz & van Soest, 1994).

The objectives of this paper are to provide new information on the sponge fauna of the Aegean Sea and to present for the first time a check list of the sponge species of this area, thus contributing to our knowledge of demosponge diversity in the eastern Mediterranean.

MATERIALS AND METHODS

The examined specimens were collected at 153 sampling stations, in depths from 0 to 350 m, the majority of which was distributed all over the north Aegean Sea excluding the Turkish coasts (Fig. 1). These stations are part of a broad sampling program started in 1970 to study the benthic macrofauna of the north Aegean Sea. Our collection includes some specimens, collected in three stations located in the southern Aegean (sa₁, southwest of Astypalaia Island; sa₂, Lindos, Rhodes Island; sa₃, north coast of Crete Island), as well. Information on the sampling stations is given in the presentation of the species studied. Sampling was carried out by free and SCUBA diving and by various types of other devices such as trawls, dredges and grabs. Sponge specimens and spicule preparations have been deposited in the Museum of the Department of Zoology, University of Thessaloniki.

The classification followed in this work is that proposed by van Soest (2001) and by Hooper and van Soest (2002) in *Systema Porifera*. The author's citations in species presentation are the original description, where available, completed with the most recent publication giving a good description.

ABSTRACT

The examination of a demosponge collection from the Aegean Sea and a review of the existing literature on the Aegean sponges showed that the number of species known from this area is 200, constituting 37 percent of the total Mediterranean demosponge species. Twenty five of the species identified are reported for the first time from the Eastern Mediterranean. Information on the habitat and the geographic distribution of the newly recorded species is given. The check list of the Aegean demospouges is presented for the first time. The known demosponge fauna of the Eastern basin of the Mediterranean (Aegean Sea and Levantine) constitutes 43 percent of the total Mediterranean demospouges.

KEY WORDS: Sponges - Porifera - Demospongiae - Biodiversity - Distribution - Aegean Sea.

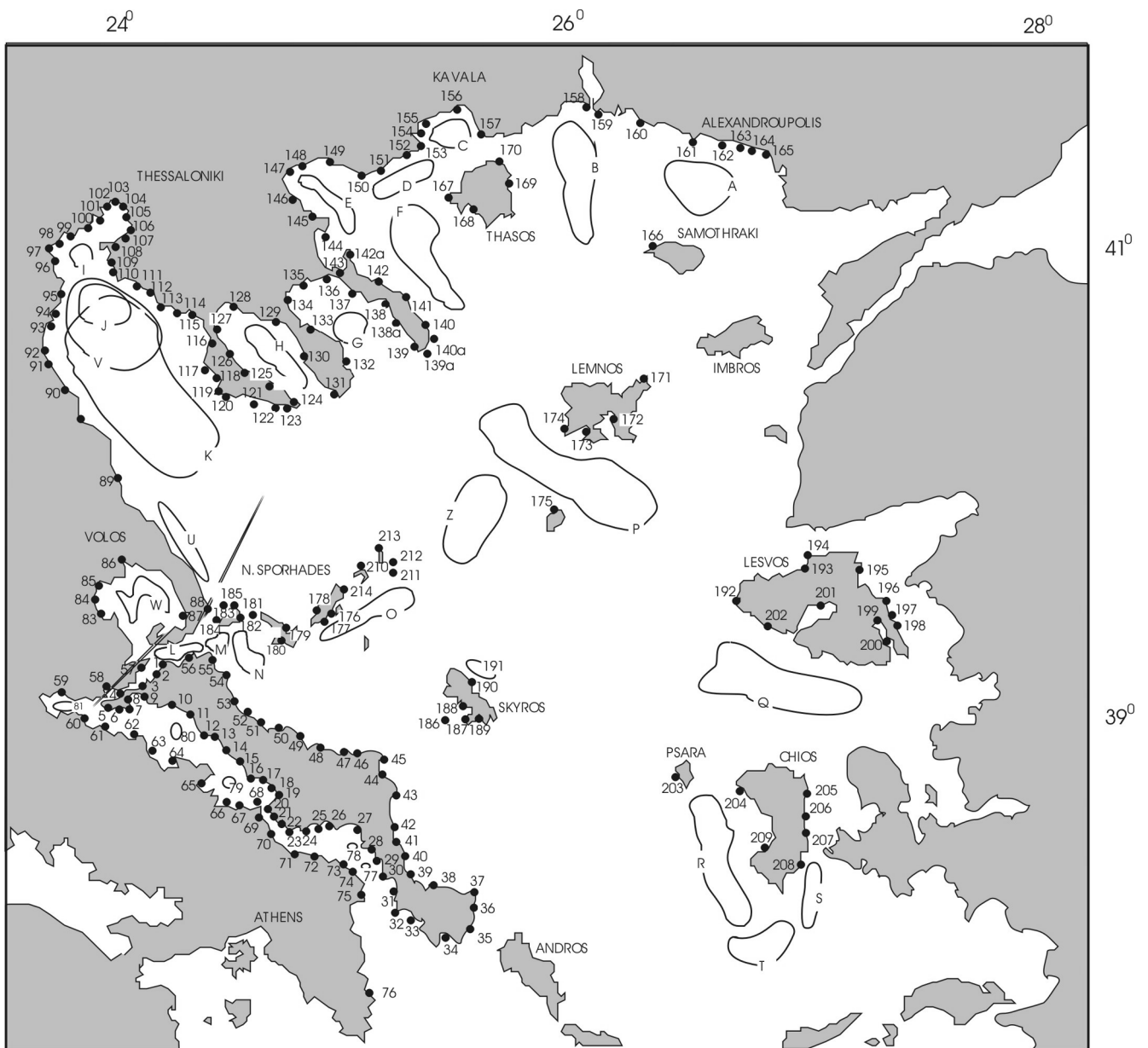


Fig. 1 - Map of the Aegean Sea, indicating the sampling stations.

RESULTS

More than 1,000 demosponge specimens were collected, belonging to 81 species. Fifty six of these were previously reported by other authors from the Aegean Sea or the Levantine and are shown in Table I, including information on the areas of collection, substrate and depth for each species. The remaining 25 species found during the present study are new records for the eastern Mediterranean (east of 20° E) and are presented below.

Plakina dilopha Schulze, 1880

Plakina dilopha Schulze, 1880, p. 422, taf. XX (2, 8-11), taf. XXII (30); Topsent, 1895, p. 552, pl. XXI(3).

Material – One specimen from station 66, on a vertical rock, in the community of photophilic algae, at a depth of 4 m.

Distribution – According to Muricy *et al.* (1998) it is a rare Mediterranean species, occurring in the NW Mediterranean and the Adriatic.

Plakina monolopha Schulze, 1880

Plakina monolopha Schulze, 1880, p. 407, taf. XX (1-7), XXII (22-29); Muricy *et al.*, 1998, p. 173, figs 2-4.

Material – One specimen from station 213, on *Caryophyllia smithii* attached on the wall of a cave, at 10 m.

TABLE I - Species found in the present study, excluding the new records for the Eastern Mediterranean. Abbreviations: r, rocks; s, stones; c, caves; ca, calcareous algae; co, corals; sp, sponges; m, mollusk shells; p, polychaete tubes; P, Posidonia; pa, photophilic algae; hs, hard substrate in sandy or silty bottoms; sb, silty bottoms.

Species	Specimens	Stations	Substrate	Depth (m)
<i>Aaptos aaptos</i>	12	5,29,34,48,66,173,180,205,212	r, s, P	0.5-30
<i>Acanthella acuta</i>	3	131,213	r, c	14-18
<i>Agelas oroides</i>	many	very common	r, co, c	0.5-150
<i>Alectona millari</i>	3	66	r	3-4
<i>Axinella cannabina</i>	many	very common	r, s, ca, P	15-55
<i>Axinella damicornis</i>	many	very common	r, s, co, ca, c	15-60
<i>Axinella polypoides</i>	many	very common	r, s, ca	10-100
<i>Axinella verrucosa</i>	many	very common	r, s, co, P	7-70
<i>Calyx nicaeensis</i>	6	13,176,188,202,sa1,sa2	r	3-10
<i>Chondrilla nucula</i>	many	very common	r, s, m, P, sp	0.5-60
<i>Chondrosia reniformis</i>	many	very common	r, s, m, ca, m	0.5-20
<i>Cliona celata</i>	many	very common	r, s, m, ca, p	2-90
<i>Cliona schmidtii</i>	1	5	r	30
<i>Cliona viridis</i>	11	20,30,79,127,176,188,200,211,P,S	r, s, ca, co	1-150
<i>Corticium candelabrum</i>	3	66,213	r	1-6
<i>Coscinoderma sporadense</i>	1	66	r	3
<i>Crambe crambe</i>	17	7,19,20,66,68	r, s, co	1-10
<i>Desmacella annexa</i>	20	E,K,V,W	ca, co, m	50-110
<i>Diplastrella bistellata</i>	2	213	c	10
<i>Discodermia polydiscus</i>	2	213,S	c, co	10-180
<i>Dictyonella marsilli</i>	3	213,R,T	c, ca	10-200
<i>Erylus discophorus</i>	15	66,112,213	r, s, c	2-10
<i>Erylus euastrum</i>	14	131,188,212,213	r, c	3-25
<i>Geodia conchilega</i>	40	5,20,29,30,55,64,66,131,188,205	r, s, co, sp, m	0.5-80
<i>Geodia cydonium</i>	many	very common	hs, r, sp, ca, m	1-150
<i>Haliclona aquaeductus</i>	1	175	ca	50
<i>Haliclona cinerea</i>	1	173	r	2
<i>Haliclona dubia</i>	2	78,79	ca, sp	50-80
<i>Haliclona fibulata</i>	1	D	s	80
<i>Haliclona simulans</i>	3	C	ca	40
<i>Haliclona rhizophora</i>	3	K,L,W	s, co	55-110
<i>Hemimycale columela</i>	1	131	r	20
<i>Hymeniacion perlevis</i>	1	212	r	20
<i>Hymerhabdia intermedia</i>	1	191	ca	30
<i>Mycale contarenii</i>	11	173,201,A,B,C,D,E,K,V	r, hs, m	3-50
<i>Mycale massa</i>	many	very common	r, hs, ca	2-100
<i>Mycale rotalis</i>	1	189	pa	8
<i>Mycale syrix</i>	12	E,G,I,J,K,W	ca, hs	50-350
<i>Mycale tunicata</i>	4	C,K,N,V	ca, hs	50-100
<i>Myxilla rosacea</i>	3	73,189,S	s, P	3-80
<i>Oscarella lobularis</i>	17	5,66,173,213,sa2	r, c	4-20
<i>Penares helleri</i>	12	213,S,R	ca, c	3-100
<i>Petrosia ficiformis</i>	many	very common	r, s, c	0.5-80
<i>Phorbaspauvertas</i>	2	173,189	r, s	1.5-5
<i>Plakina trilopha</i>	5	66	r	4
<i>Placortis simplex</i>	7	66	r	4
<i>Raspailia viminalis</i>	5	79,D,K	s, ca, m	40-100
<i>Spirastrella cunctatrix</i>	24	5,66,79,188,189,210	r, s, ca, m, p	0.5-90
<i>Spongosorites intricatus</i>	2	168,K	s, ca	10-60
<i>Stryphnus mucronatus</i>	2	131,P	r, c	20-135
<i>Tedania anbelans</i>	12	25,80,201,B,C,D,E,V	r, s, ca	3-150
<i>Tethya aurantium</i>	many	very common	r, s, m, ca, P	1-100
<i>Tethya citrina</i>	many	very common	r, s, m, ca, P	1-100
<i>Thenea muricata</i>	20	77,H,K,L,M,U,V,W	sb	60-250
<i>Topsentia contorta</i>	3	P,Q,T	s, ca	130-150

Distribution – It is considered a cosmopolitan species, but according to Muricy *et al.* (1998) most of the records outside the Mediterranean are doubtful.

Plakinastrella copiosa Schulze, 1880

Plakinastrella copiosa Schulze, 1880, p. 433, taf. XXI (17-21); Uriz & Bibiloni, 1984, p. 11, fig. 1E.

Material – One specimen from station 213, on *Caryophyllia smithii* attached on the wall of a cave, at 10 m.

Distribution – Reported only from the Western Mediterranean (Schulze, 1880; Topsent, 1895; Pouliquen, 1972; Uriz & Bibiloni, 1984).

Samus anonymus Gray, 1867

Unnamed sponge Bowerbank, 1864, p. 234, pl. II (41-42).
Samus anonyma Gray, 1867, p. 526, p. 430, taf. XXI (14-16).

Material – Five specimens from station 66, excavating in a substrate of coralline algae, at a depth of 6 m.

Distribution – Cosmopolitan species known from the Western Mediterranean (Vacelet, 1976), the Adriatic (Pulitzer-Finali, 1983), and various localities of the Atlantic, Pacific and Indian Ocean. However, van Soest & Hooper (2002) consider the world-wide distribution of this species “suspect from a genetic point of view” implying the existence of separate species in the genus *Samus*.

Jaspis johnstonii (Schmidt, 1862)

Vioa johnstonii Schmidt, 1862, p. 78, taf. VII (17).
Jaspis johnstonii, Uriz, 2002, p. 115, fig. 7.

Material – Twenty specimens from stations 66, 176, 212 and 213, on rocks, on a cave wall, on the scleractinians *Cladocora caespitosa* and *Caryophyllia smithii*, on polychaete tubes, on the lower surface of other sponges like *Erylus discophorus*, *Stoeba plicatus*, on the sponge *Discodermia polydiscus* and on the shell of the bivalve *Mytilus galloprovincialis*, at depths of 0.5-10 m.

Distribution – Known from the Western Mediterranean (Schmidt, 1862; Bibiloni *et al.*, 1984), the Adriatic (Pulitzer-Finali, 1983), the Atlantic (Levi, 1952), the Red Sea (Levi, 1965) and the Indian Ocean (Dendy, 1916).

Stelletta dorsigera Schmidt, 1864

Stelletta dorsigera Schmidt, 1864, p. 31, taf. III (6-7); Uriz, 1981, p. 27, figs 14-18.

Material – One specimen from station 66, on a vertical rock, in the community of photophilic algae, at a depth of 6 m.

Distribution – Mediterranean species reported from the Western Mediterranean (Vacelet, 1960; Uriz, 1981) and the Adriatic (Schmidt, 1864).

Stelletta grubei (Schmidt, 1862)

Stelletta grubii Schmidt, 1862, p. 46, taf. IV (2a-f, a'-f'); Uriz, 1981, p. 22, figs 11-13.

Material – Seven specimens from stations 49, 68, 69, 171, 203, H and K, on rocks and stones, at depths of 0.5-140 m.

Distribution – Also known from the Western Mediterranean (Sarà, 1958; Vacelet, 1960; Uriz, 1981) and the Adriatic (Schmidt, 1862). Cosmopolitan species, reported from both sides of the Atlantic (Arndt, 1935; Laubenfels, 1953; Borojevic *et al.*, 1968) and the Pacific (Hoshino, 1981).

Stelletta hispida (Buccich, 1886)

Stelletta hispida Lendenfeld, 1894, p. 115, tav. II (19), III (31); Uriz, 1981, p. 32, figs 19-21.

Material – One specimen from station 5, on rocks in the community of sciaphilic algae, at a depth of 30 m. Polychaete tubes and algae were found on the surface of the sponge.

Distribution – Known from the western Mediterranean (Uriz, 1981; Topsent, 1984), the Adriatic (Babic, 1922), the Eastern Atlantic coast (Lévi, 1960; Rodriguez & Rodriguez, 1980) and the Azores (Boury-Esnault & Lopes, 1985).

Stelletta stellata Topsent, 1893

Stelletta stellata Topsent, 1893, p. 43; Topsent, 1894, p. 354, pl. XIII (4).

Material – Three specimens from stations 35, 66 and 146, on rocks and stones, in the community of photophilic algae, at depths of 1-6 m.

Distribution – Rarely reported only from the Western Mediterranean (Topsent, 1893; Pulitzer-Finali, 1983) and the Adriatic (Babic, 1922).

Stryphnus ponderosus (Bowerbank, 1866)

Ecionemia ponderosa Bowerbank, 1866, p. 56; Bowerbank, 1874, pl. VII, figs 8-15.
Stryphnus ponderosus, Topsent, 1894, p. 365, pl. XII (6-7), XVI (6).

Material – Three specimens from stations 5, 77 and A, on calcareous algae, at depths of 30-60m.

Distribution – Known from the Eastern Atlantic coast (Arndt, 1935; Borojevic *et al.*, 1968) and in the Mediter-

ranean, from the western basin (Uriz, 1981) and the Adriatic (Babic, 1922).

Stoeba plicatus (Schmidt, 1868)

Corticium plicatum Schmidt, 1868, p. 2, taf. III (11).
Dercitus plicatus, Boury-Esnault & Lopes, 1985, p. 156, fig. 1.

Material – Twenty seven specimens from stations 5, 66 and 213, on rocky substrates, at depths of 0.5-30 m.

Distribution – Often reported in the Mediterranean: Western basin (Vacelet, 1961; Templado *et al.*, 1986), Adriatic (Rützler, 1965) and the Tunisian coasts (Topsent, 1934). Known also from the Eastern Atlantic (Lévi, 1952) and the Azores (Boury-Esnault & Lopes, 1985).

Pachastrella monilifera Schmidt, 1868

Pachasterella monilifer Schmidt, 1868, p. 15, taf. III (7).
Pachastrella monilifera, Maldonado, 2002, p. 152, figs 1D, 1R, 2D, 2H, 10A-N, 15R, 16D.

Material – Seven specimens from stations 66, 175, 212 and K, on rocky substrates, at depths of 6-125 m.

Distribution – It has a world-wide distribution, but according to Maldonado (2002), a global revision of material is needed before concluding that *P. monilifera* is a single cosmopolitan species. In the Mediterranean it has been reported from the western basin (Boury-Esnault, 1971; Pulitzer-Finali, 1983) and the Adriatic (Rützler, 1965).

Poecillastra compressa (Bowerbank, 1866)

Poecillastra compressa Topsent, 1894, p. 384, pl. XVI figs 6-9; Boury-Esnault *et al.*, 1994, p. 47, fig. 25.

Material – Four specimens from station K, dredged from a detritic bottom, at a depth of 110 m.

Distribution – According to Boury-Esnault *et al.* (1994), it is a cosmopolitan species.

Stelligera stuposa (Montagu, 1818)

Stelligera stuposa, Lendenfeld, 1896, p. 43, taf. VI (52A), VII (69A); Boury-Esnault *et al.*, 1994, p. 95, fig. 69.

Material – Two specimens from stations K and W, dredged from a detritic bottom (one of them attached on an empty shell of the bivalve *Turritella*), at a depth of 60 m.

Distribution – Known from the Eastern Atlantic (Arndt, 1935; Borojevic *et al.*, 1968), the Western Mediterranean (Topsent, 1934; Boury-Esnault *et al.*, 1994) and the Adriatic (Lendenfeld, 1896).

Timea stellifasciata Sarà & Siribelli, 1960

Timea stellifasciata Sarà & Siribelli, 1960, p. 34, fig. 31.

Material – One specimen from station 173, on calcareous algae, at a depth of 10 m.

Distribution – Reported from the Western Mediterranean (Sarà & Siribelli, 1960; Templado *et al.*, 1986), Eastern Atlantic coast (Cabiocch, 1968) and South America (Boury-Esnault, 1973).

Crella sigmata Topsent, 1925

Crella sigmata Topsent, 1925, p. 692, fig. 21.
Pytheas sigmata, Boury-Esnault & Lopes, 1985, p. 183, fig. 30.

Material – One specimen from station 146, attached on the sponge *Fasciospongia cavernosa*, at a depth of 0.5 m.

Distribution – Western Mediterranean (Pouliquen, 1972; Bibiloni, 1981), Adriatic (Rützler, 1967) and Azores (Boury-Esnault & Lopes, 1985; Maldonado & Uriz, 1995).

Crella fusifera Sarà, 1969

Crella fusifera Sarà, 1969, p. 91, fig. 2.
Pytheas fusifera, Duran & Rodriguez, 1982, p. 58, fig. 7.

Material – One specimen from station Q, attached on a stone, at a depth of 90 m.

Distribution – Reported from the Adriatic (Sarà, 1969), Alboran Sea (Carballo & Gomez, 1994), Atlantic coast of Spain (Duran & Rodriguez, 1982), and Canary Islands (Maldonado & Uriz, 1995).

Desmacella inornata (Bowerbank, 1866)

Desmacella inornata, Boury-Esnault *et al.*, 1994, p. 103, fig. 77.

Material – One specimen from station 175, at a depth of 50 m.

Distribution – Well known in the North-East Atlantic (Boury-Esnault *et al.*, 1994). Also reported in the Western Mediterranean (Vacelet, 1969; Pansini & Musso, 1991).

Ulosa stuposa (Esper, 1794)

Stylaxinella stuposa, Vacelet, 1960, p. 265, fig. 4.
Ulosa stuposa, van Soest, 1987, p. 19, pl. I, fig. 8-9.

Material – Seventeen specimens from stations 60, 77, 85, 146, A, C, D, K and V, attached on stones or calcareous algae, at depths from 20 to 90 m.

Distribution – According to van Soest (1987) the species is found from Ireland to West Africa and in the

Mediterranean; known from the Western Mediterranean (Vacelet, 1960; Pansini & Musso, 1991) and the Adriatic (Babic, 1922).

Hamacantha falcula (Bowerbank, 1874)

Halicbondria falcula Bowerbank, 1874, p. 208, pl. XXIV.
Hamacantha falcula, Pulitzer-Finali, 1983, p. 554.

Material – One specimen from station G, trawled at a depth of 350 m.

Distribution – Eastern Atlantic (Arndt, 1935) and Western Mediterranean (Pulitzer-Finali, 1983; Maldonado & Uriz, 1995).

Phorbas fictitius (Bowerbank, 1866)

Anchinoe fictitius, Boury-Esnault & Lopes, 1985, p. 189, fig. 37.

Material – One specimen from station C, trawled at a depth of 40 m.

Distribution – Common in the Mediterranean: western basin (Bibiloni, 1981; Uriz & Rosell, 1990), the Adriatic (Sarà, 1961) and the Sea of Marmara according to Arndt (1947). Also found in the Eastern Atlantic coast (Borojevic *et al.*, 1968) and the Azores (Boury-Esnault & Lopes, 1985).

Eurypon cinctum Sarà, 1960

Eurypon cinctum Sarà, 1960, p. 459, fig. 6.

Material – One specimen from station 5, on a mass of calcareous algae, dredged from a depth of 30 m.

Distribution – Rarely reported in the Western Mediterranean (Boury-Esnault, 1971; Solorzano & Urgorri, 1991).

Dictyonella obtusa (Schmidt, 1862)

Acanthella obtusa Schmidt, 1862, p. 5, taf. VI (8).
Dictyonella obtusa, van Soest *et al.*, 2002, p. 777, fig. 2 (A-F).

Material – Three specimens from stations 30 and P, at depths of 10 and 150 m.

Distribution – Mediterranean species with few records in the Western basin (Ferrer Hernandez, 1916; Topsent, 1934, 1938, 1945; Pulitzer-Finali, 1983) and the Adriatic (Schmidt, 1862; Topsent, 1945).

Scopalina lophyropoda Schmidt, 1862

Scopalina lophyropoda Schmidt, 1862, p. 79, taf. VII (18); van Soest *et al.*, 2002, p. 781, fig. 7 (A-E).

Material – Four specimens from stations 34, 133, 189 and C, on rocks and calcareous algae, at depths from 1 to 40 m.

Distribution – Rarely reported from the Western Mediterranean (Boury-Esnault, 1971), Adriatic (Schmidt, 1862) and East Atlantic coast (Burton, 1956).

Pachychalina rustica Schmidt, 1868

Pachychalina rustica Schmidt, 1868, p. 8, pl. 2 fig. 6; Pulitzer-Finali, 1978, p. 78, fig. 28.

Material – Two specimens from stations 186 and 212, on rocks, at depths of 20 and 25 m.

Distribution – Reported from the Algerian coast (Schmidt, 1868), the Bay of Naples (Pulitzer-Finali, 1978) and the Sea of Marmara (Arndt, 1947).

DISCUSSION

A thorough review of the relevant literature revealed that 175 demosponge species have been reported up to date from the Aegean Sea. The present study adds 25 species to the demosponge fauna of the Aegean. A check list of the Aegean sponge fauna is given in Table II. The 200 species recorded up to date from this area are classified in 103 genera and 54 families, 14 of the 15 orders of the class Demospongiae being represented. Although all species reported by all authors were included in the list, we are reserved with some of the records, since they concern rare species recorded for the first time from the Eastern Mediterranean, without any confirmation of their identity or discussion on their distribution (e.g. the species *Cerbaris curvispiculifera* (Carter), *Eurypon major* Sarà, *Petrosia clavata* (Esper), *Spongosorites intricatus* (Topsent), listed by Kefalas *et al.*, 2003b). Specimens belonging to 132 of the 200 species known from the Aegean Sea are included in our collections deposited in the Museum of the Department of Zoology, University of Thessaloniki.

An examination of the distribution of the species recorded from the Aegean showed that 48% occur in its northern part, 17 % in the southern and 35% in both sectors. Although risky to say, this difference perhaps reflects the different conditions prevailing in the two sectors of the Aegean, making its southern part more oligotrophic than the northern (Stergiou *et al.*, 1997). Moreover, Bianchi and Morri (2000) separate zoogeographically the northern Aegean from the southern, the latter being placed with the Libyan Sea in one sector, intermediate between the former and the Levantine, which has been characterized as impoverished, on the basis of its benthic fauna, by various authors (e.g. Koukouras *et al.*, 2001). However, such a conclusion needs further confirmation, based on a thorough analysis of the distribution of sponge species in the various sub-areas of the Aegean (Voultsiadou E., submitted manuscript), since differences could be due to unequal research effort in the two areas.

TABLE II - Check list of the Aegean demosponges.

Order HOMOSCLEROPHORIDA			
Family PLACINIDAE			
<i>Corticium candelabrum</i> (Schmidt, 1862)	L ₂₅ ▲	<i>Pseudosuberites hyalinus</i> (Ridley & Dendy, 1886)	L ₂₁ ▲
<i>Oscarella lobularis</i> (Schmidt, 1862)	L ₅ ▲	<i>Pseudosuberites sulphureus</i> (Bowerbank, 1866)	L ₂₁ ▲
<i>Plakina dilopha</i> Schulze, 1880	[*]	<i>Rhizaxinella pyrifer</i> (Delle Chiaje, 1828)	L ₁₁ ▲
<i>Plakina monolopha</i> Schulze, 1880	[*]	<i>Suberites carnosus</i> (Johnston, 1842)	L ₂₁ ▲
<i>Plakina trilopha</i> Schulze, 1880	L ₂₄ ▲	<i>Suberites domuncula</i> (Olivi, 1792)	L ₁₈ ▲
<i>Plakinastrella copiosa</i> Schulze, 1880	[*]	<i>Suberites ficus</i> (Linnaeus, 1767)	L ₂₁ ▲
<i>Placortis simplex</i> Schulze, 1880	L ₂₅ ▲	<i>Suberites massa</i> Nardo, 1847	L ₂₁ ▲
		<i>Suberites syringella</i> (Schmidt, 1868)	L ₂₁ ▲
		<i>Terpios coerulea</i> (Carter, 1882)	L ₅ ▲
Order SPIROPHORIDA		Family TETHYIDAE	
Family TETILLIDAE		<i>Tethya aurantium</i> (Pallas, 1766)	L ₅ ▲
<i>Craniella cranium</i> (Müller, 1776)	L ₁₁	<i>Tethya citrina</i> Sarà & Melone, 1965	L ₁₂ ▲
Family SAMIDAE		Family TIMEIDAE	
<i>Samus anonyma</i> Gray, 1867	[*]	<i>Timea chondrilloides</i> (Topsent, 1904)	L ₉
Order ASTROPHORIDA		<i>Timea geministellata</i> Pulitzer-Finali, 1978	L ₂₉ ▲
Family ANCORINIDAE		<i>Timea mixta</i> (Topsent, 1896)	L ₁₂
<i>Holoxea furtiva</i> Topsent, 1892	L ₁₂	<i>Timea stellata</i> (Bowerbank, 1866)	L ₁₂ ▲
<i>Jaspis johnstoni</i> (Schmidt, 1862)	[*]	<i>Timea stellifasciata</i> Sarà & Siribelli, 1960	[*]
<i>Penares belleri</i> (Schmidt, 1864)	L ₁₈ ▲	<i>Timea unistellata</i> (Topsent, 1892)	L ₁₇
<i>Stelletta dorsigera</i> Schmidt, 1862	[*]	Family ALECTONIDAE	
<i>Stelletta grubii</i> Schmidt, 1862	[*]	<i>Alectona millari</i> Carter, 1879	L ₁₂ ▲
<i>Stelletta hispidata</i> (Buccich, 1886)	[*]	<i>Spiroxya heteroclita</i> Topsent, 1896	L ₂₉ ▲
<i>Stelletta mediterranea</i> (Topsent, 1893)	L ₁₁	Order CHONDROSIDA	
<i>Stelletta stellata</i> Topsent, 1893	[*]	Family CHONDRILLIDAE	
<i>Stryphnus mucronatus</i> (Schmidt, 1868)	L ₂₅ ▲	<i>Chondrilla nucula</i> Schmidt, 1862	L ₅ ▲
<i>Stryphnus ponderosus</i> (Bowerbank, 1966)	[*]	<i>Chondrosia reniformis</i> Nardo, 1847	L ₅ ▲
Family CALTHROPELLIDAE		"LITHISTID" Demospongiae	
<i>Pachastrissa pathologica</i> (Schmidt, 1868)	L ₂₉ ▲	Family THEONELLIDAE	
<i>Calthropella stelligera</i> (Schmidt, 1868)	L ₂₉ ▲	<i>Discodermia polydiscus</i> du Bocage, 1869	L ₉ ▲
Family GEODIDAE		Family AZORICIDAE	
<i>Erylus discophorus</i> (Schmidt, 1862)	L ₁₂ ▲	<i>Leiodermatium lynceus</i> Schmidt, 1870	L ₁₁
<i>Erylus euastrum</i> (Schmidt, 1868)	L ₂₆ ▲	Order POECILOSCLERIDA	
<i>Geodia barretti</i> Bowerbank, 1858	L ₂₉ ▲	Family ACARNIDAE	
<i>Geodia conchilega</i> Schmidt, 1862	L ₁₁ ▲	<i>Acarnus tortilis</i> Topsent, 1892	L ₁₃
<i>Geodia cydonium</i> (Jameson, 1811)	L ₁₁ ▲	Family COELOSPHAERIDAE	
Family PACHASTRELLIDAE		<i>Lissodendoryx cavernosa</i> (Topsent, 1892)	L ₁₃
<i>Pachastrella monilifera</i> Schmidt, 1868	[*]	<i>Lissodendoryx isodictyalis</i> (Carter, 1882)	L ₁₂
<i>Poecillastra compressa</i> (Bowerbank, 1866)	[*]	Family CRAMBEIDAE	
<i>Stoeba plicatus</i> (Schmidt, 1868)	[*]	<i>Crambe crambe</i> (Schmidt, 1862)	L ₁₂ ▲
<i>Thenea muricata</i> Bowerbank, 1858	L ₁₁ ▲	Family CRELLIDAE	
<i>Wulcanella gracilis</i> Sollas, 1888	L ₉	<i>Crella fusifera</i> Sarà, 1969	[*]
		<i>Crella sigmata</i> (Topsent, 1925)	[*]
Order HADROMERIDA		Family DESMACELLIDAE	
Family CLIONAIDAE		<i>Desmacella annexa</i> (Schmidt, 1870)	L ₉ ▲
<i>Cliona celata</i> Grant, 1826	L ₁₆ ▲	<i>Desmacella inornata</i> (Bowerbank, 1866)	[*]
<i>Cliona nigricans</i> (Schmidt, 1862)	L ₂₆	Family ESPERIOPSIDAE	
<i>Cliona rhodensis</i> Rützler & Bromley, 1981	L ₁₄	<i>Ulosa stuposa</i> (Esper, 1794)	[*]
<i>Cliona schmidti</i> (Ridley, 1881)	L ₁₂ ▲	<i>Ulosa tenellula</i> (Pulitzer-Finali, 1983)	L ₂₈
<i>Cliona thosina</i> Topsent, 1887	L ₁₅	Family HAMACANTHIDAE	
<i>Cliona vermifera</i> (Hancock, 1867)	L ₁₂	<i>Hamacantha falcula</i> (Bowerbank, 1866)	[*]
<i>Cliona viridis</i> (Schmidt, 1862)	L ₅ ▲	Family HYMEDESMIIDAE	
<i>Cliothosa hancocki</i> (Topsent, 1887)	L ₁₂	<i>Hemimycale collumela</i> (Bowerbank, 1866)	L ₁₈ ▲
Family HEMIASTERELLIDAE		<i>Hymedesmia peachi</i> (Bowerbank, 1882)	L ₂₈
<i>Hemiassterella aristoteliana</i> Voultziadou & van Soest, 1991	L ₁₉ ▲	<i>Hymedesmia simillima</i> Lundbeck, 1910	L ₂₉ ▲
<i>Paratimea pierantonii</i> (Sarà, 1958)	L ₁₁	<i>Hymedesmia versicolor</i> (Topsent, 1893)	L ₂₈
<i>Stelligera stuposa</i> (Montagu, 1818)	[*]	<i>Phorbas fictitius</i> (Bowerbank, 1866)	[*]
Family PLACOSPONGIIDAE		<i>Phorbas paupertas</i> (Topsent, 1934)	L ₂₈ ▲
<i>Placospongia decorticans</i> (Hanitsch, 1985)	L ₁₂	<i>Phorbas posidoni</i> Voultziadou & van Soest, 1991	L ₂₀ ▲
Family POLYMASTIIDAE		<i>Phorbas tenacior</i> (Topsent, 1925)	L ₁₅
<i>Weberella verrucosa</i> Vacelet, 1960	L ₂₈ ▲	Family MERLIIDAE	
Family SPIRASTRELLIDAE		<i>Merlia normani</i> Kirkpatrick, 1908	L ₁₅
<i>Diplastrella bistellata</i> (Schmidt, 1862)	L ₁₁ ▲	Family MICROSIONIDAE	
<i>Diplastrella ornata</i> Ruetzler & Sarà, 1962	L ₁₅	<i>Antho involvens</i> (Schmidt, 1864)	L ₂₇
<i>Spirastrella cunctatrix</i> Schmidt, 1868	L ₁₆ ▲	<i>Clathria cleistochela</i> (Topsent, 1925)	L ₂₈
Family STYLOCORDYLIDAE		<i>Clathria coralloides</i> (Olivi, 1792)	L ₁₈
<i>Stylocordyla pellita</i> (Topsent, 1904)	L ₉	<i>Clathria gradalis</i> (Topsent, 1925)	L ₂₈
Family SUBERITIDAE		<i>Clathria jolicoeuri</i> (Topsent, 1892)	L ₁₃
<i>Aaptos aaptos</i> (Schmidt, 1864)	L ₂₆ ▲	<i>Clathria toxistyla</i> (Sarà, 1959)	L ₂₇
<i>Aaptos papillatus</i> (Keller, 1880)	L ₂₉ ▲	<i>Clathria toxivaria</i> (Sarà, 1959)	L ₂₈
<i>Protosuberites ectyoninus</i> (Topsent, 1900)	L ₁₁	<i>Clathria translata</i> (Pulitzer-Finali, 1978)	L ₂₉ ▲
<i>Prosuberites epiphytum</i> (Lamarck, 1815)	L ₁₃		
<i>Prosuberites longispinus</i> Topsent, 1893	L ₁₁		

Continued

TABLE II - *Continued*

Family MYCALIDAE		<i>Haliclona elegans</i> (Bowerbank,1866)	L ₂₈
<i>Mycale contarenii</i> (Martens,1824)	L ₁₃ ▲	<i>Haliclona fibulata</i> (Schmidt,1862)	L ₁₃ ▲
<i>Mycale lingua</i> (Bowerbank,1866)	L ₂₆	<i>Haliclona fulva</i> (Topsent,1893)	L ₂₇
<i>Mycale macilentia</i> (Bowerbank,1866)	L ₁₃	<i>Haliclona implexa</i> (Schmidt,1868)	L ₂₇
<i>Mycale massa</i> (Schmidt,1862)	L ₁ ▲	<i>Haliclona mamillata</i> Griessinger,1971	L ₁₀
<i>Mycale retifera</i> Topsent,1924	L ₂₆	<i>Haliclona mediterranea</i> Griessinger,1971	L ₁₀
<i>Mycale rotalis</i> (Bowerbank,1874)	L ₁₃ ▲	<i>Haliclona montagui</i> (Fleming, 1828)	L ₁₈
<i>Mycale serrulata</i> Sarà & Siribelli,1960	L ₂₉ ▲	<i>Haliclona mucosa</i> (Griessinger,1971)	L ₂₈
<i>Mycale syrinx</i> (Schmidt,1862)	L ₂₇ ▲	<i>Haliclona sarai</i> (Pulitzer-Finali,1969)	L ₁₀
<i>Mycale tunicata</i> (Schmidt,1862)	L ₁₃ ▲	<i>Haliclona simulans</i> (Johnston,1842)	L ₂₇ ▲
Family MYXILLIDAE		<i>Haliclona subtilis</i> (Griessinger,1971)	L ₂₈
<i>Myxilla rosacea</i> (Lieberkühn,1859)	L ₁₂ ▲	<i>Haliclona rizophora</i> (Vacelet,1969)	L ₉ ▲
Family RASPAILIDAE		Family NIPHATIDAE	
<i>Eurypon cinctum</i> Sarà,1960	[*]	<i>Pachybalina rustica</i> Schmidt,1868	[*]
<i>Eurypon clavatum</i> (Bowerbank,1866)	L ₁₁	Family PETROSIDAE	
<i>Eurypon coronula</i> (Bowerbank,1874)	L ₉	<i>Petrosia clavata</i> (Esper,1794)	L ₂₇
<i>Eurypon major</i> Sarà & Siribelli,1960	L ₂₇	<i>Petrosia ficiformis</i> (Poiret,1798)	L ₅ ▲
<i>Raspaciona aculeata</i> (Johnston,1842)	L ₁₁	<i>Petrosia vansoesti</i> Boury-Esnault, Pansini & Uriz,1994	L ₂₉ ▲
<i>Raspailia viminalis</i> Schmidt,1862	L ₁₁ ▲	Family PHLEODICTYIDAE	
Family RHABDEREMIDAE		<i>Calyx nicaeensis</i> (Risso,1862)	L ₅ ▲
<i>Rhabderemia topsenti</i> van Soest & Hooper,1993	L ₁₃	<i>Oceanapia fistulosa</i> (Bowerbank,1873)	L ₂₇
Family TEDANIIDAE		Order DICTYOCERATIDA	
<i>Tedania anbelans</i> (Lieberkühn,1859)	L ₁ ▲	Family IRCINIIDAE	
Order HALICHONDRIDA		<i>Ircinia dendroides</i> (Schmidt,1862)	L ₁ ▲
Family AXINELLIDAE		<i>Ircinia fasciculata</i> (Pallas,1766)	L ₁ ▲
<i>Axinella cannabina</i> (Esper,1794)	L ₂ ▲	<i>Ircinia oros</i> (Schmidt,1864)	L ₂₃ ▲
<i>Axinella damicornis</i> (Esper,1794)	L ₉ ▲	<i>Ircinia paucifilamentosa</i> Vacelet,1961	L ₈ ▲
<i>Axinella polyoides</i> Schmidt,1862	L ₅ ▲	<i>Ircinia pipetta</i> (Schmidt,1868)	L ₂₉ ▲
<i>Axinella verrucosa</i> (Esper,1794)	L ₁₁ ▲	<i>Ircinia variabilis</i> (Schmidt,1866)	L ₁ ▲
Family BUBARIDAE		<i>Ircinia vestibulata</i> Szymanski,1904	L ₁
<i>Hymenobdella intermedia</i> Sarà & Siribelli,1960	L ₁₁ ▲	<i>Sarcotragus muscarum</i> Schmidt,1864	L ₁ ▲
<i>Cerbaris curvispiculifera</i> (Carter,1880)	L ₂₇	<i>Sarcotragus spinosulus</i> Schmidt,1862	L ₂₃ ▲
Family DESMOXYIDAE		Family SPONGIIDAE	
<i>Didiscus styliferus</i> Tsurumal, 1969	L ₁₅	<i>Coscinoderma sporadense</i> Voultsiadou,	
<i>Myrmekioderma spelea</i> (Pulitzer-Finali,1983)	L ₂₉ ▲	van Soest & Koukouras,1991	L ₂₂ ▲
Family DICTYONELLIDAE		<i>Hippospongia communis</i> (Lamarck,1814)	L ₃ ▲
<i>Acanthella acuta</i> Schmidt,1862	L ₂₇ ▲	<i>Spongia agaricina</i> Pallas,1766	L ₃ ▲
<i>Dictyonella incisa</i> (Schmidt,1880)	L ₂₇	<i>Spongia nitens</i> (Schmidt,1862)	L ₂₃ ▲
<i>Dictyonella marsilli</i> (Topsent,1893)	L ₂₇ ▲	<i>Spongia officinalis</i> Linnaeus,1759	L ₁ ▲
<i>Dictyonella obtusa</i> (Schmidt,1862)	[*]	<i>Spongia virgultosa</i> (Schmidt,1868)	L ₂₃ ▲
<i>Dictyonella plicata</i> (Schmidt,1864)	L ₁	<i>Spongia zimocca</i> Schmidt,1862	L ₃ ▲
<i>Scopalina lophyropoda</i> Schmidt,1862	[*] ₁	Family THORECTIDAE	
Family HALICHONDRIIDAE		<i>Cacospongia mollior</i> Schmidt,1862	L ₁ ▲
<i>Halichondria aurantiaca</i> (Schmidt,1864)	L ₂₇	<i>Scalarispongia scalaris</i> (Schmidt,1862)	L ₁ ▲
<i>Halichondria panicea</i> (Pallas,1766)	L ₁	<i>Fasciospongia cavernosa</i> (Schmidt,1862)	L ₁
<i>Hymeniacidon perlevis</i> (Montagu,1818)	L ₄ ▲	Family DYSIDEIDAE	
<i>Spongosorites flavens</i> Pulitzer-Finali,1983	L ₂₇	<i>Dysidea avara</i> (Schmidt,1862)	L ₁₈ ▲
<i>Spongosorites intricatus</i> (Topsent,1892)	L ₂₇ ▲	<i>Dysidea fragilis</i> (Montagu,1818)	L ₁₁ ▲
<i>Topsentia contorta</i> Sara,1961	L ₂₇ ▲	<i>Dysidea incrustans</i> (Schmidt,1862)	L ₂₃ ▲
<i>Topsentia subtilis</i> (Pulitzer-Finali,1983)	L ₂₇	<i>Dysidea tupha</i> (Martens,1824)	L ₂₃ ▲
Order AGELASIDA		<i>Pteraphysilla spinifera</i> (Schulze,1878)	L ₂₃ ▲
Family AGELASIDAE		Order DENDROCERATIDA	
<i>Agelas oroides</i> (Schmidt,1864)	L ₆ ▲	Family DARWINELLIDAE	
Order HAPLOSCLERIDA		<i>Aphysilla rosea</i> (Barrois,1876)	L ₂₃ ▲
Family CALLYSPONGIIDAE		<i>Dendrilla acantha</i> Vacelet,1958	L ₇
<i>Callyspongia septimaniensis</i> Griessinger,1971	L ₂₉ ▲	Family DICTYODENDRILLIDAE	
<i>Siphonochalina expansa</i> Sarà,1960	L ₂₇	<i>Spongionella pulchella</i> (Sowerby,1804)	L ₂₃ ▲
Family CHALINIDAE		Order HALISARCIDA	
<i>Dendroxea lenis</i> (Topsent,1892)	L ₂₇	Family HALISARCIDAE	
<i>Haliclona aquaeductus</i> (Schmidt,1862)	L ₁ ▲	<i>Halisarca dujardini</i> Johnston,1842	L ₂₃ ▲
<i>Haliclona cinerea</i> (Grant, 1862)	L ₂₈ ▲	Order VERONGIDA	
<i>Haliclona cratera</i> (Schmidt,1862)	L ₁	Family APLYSINIDAE	
<i>Haliclona crassa</i> (Topsent, 1925)	L ₁₈	<i>Aphysina aerophoba</i> Nardo,1843	L ₁ ▲
<i>Haliclona dubia</i> (Babic,1922)	L ₁₃ ▲	<i>Aphysina cavernicola</i> (Vacelet,1959)	L ₂₇ ▲

Abbreviations: ▲, Author's collection; [*], first record of the species from the Eastern Mediterranean in the present study; L₁₋₂₉, the Authors who first recorded the species from the Aegean Sea (L₁, J. M. Szymanski, 1904 Inaug. Dissert., Braslau; L₂, Topsent, 1920; L₃, Arndt, 1937; L₄, Tortonese, 1947; L₅, Peres & Picard, 1958; L₆, Laborel, 1960; L₇, L₈, L₉, Vacelet, 1958, 1961, 1969; L₁₀, Griessinger, 1971; L₁₁, Vamvakas, 1971; L₁₂, L₁₃, Saritas, 1972, 1973; L₁₄, Rützler & Broomley, 1981; L₁₅, Pulitzer-Finali, 1983; L₁₆, Bianchi & Morri, 1983; L₁₇, Kisseleva, 1983; L₁₈, Ergüven *et al.*, 1988; L₁₉, L₂₀, L₂₁, Voultsiadou & van Soest, 1991a, b, 1993; L₂₂, Voultsiadou *et al.*, 1991; L₂₃, Voultsiadou & Koukouras, 1993a; L₂₄, Diaz & van Soest, 1994; L₂₅, Koukouras *et al.*, 1998; L₂₆, Pansini *et al.*, 2000; L₂₇, Kefalas *et al.*, 2003a; L₂₈, Kefalas *et al.*, 2003b; L₂₉, Voultsiadou & Vafidis, 2004).

The total number of the Mediterranean sponge species has been estimated to 589 species (537 demosponges) (Pansini, 1996; Pansini *et al.*, 2000). However, the various areas of the Mediterranean Sea have been unequally studied. The best studied area is that of the western Mediterranean (where about 88% of the Mediterranean sponges have been found), followed by the Adriatic (~40%) and the eastern basin (~20%) (Drai, 1985 in Pansini *et al.*, 2000). After the estimation of the present study, the Aegean demosponges constitute 37% of the total Mediterranean demosponge species.

It is worth mentioning that, according to the literature (Arndt, 1947; Demir, 1952 in Kocatas, 1986-1987; Caspers, 1968; Topaloglou, 2000), a number of sponge species has been found in the Sea of Marmara, an area connecting the north part of the Aegean with the Black Sea. Seven of these species are not known yet from the Aegean: *Ancorina cerebrum* Schmidt, 1862, *Chalinula limbata* Montagu, 1818, *Crella elegans* (Schmidt, 1862), *Geodia tuber* Lendenfeld, 1894, *Haliclona alba* (Schmidt, 1862), *H. semitubulosa* (Lieberkühn, 1859) and *Polymastia mammillaris* (Müller, 1806).

In order to have a complete picture of the sponge fauna of the eastern Mediterranean, we should take into account an additional number of species recorded from the Levantine. According to the relevant literature (Burton, 1936; Levi, 1956; Tsurumal, 1967, 1969a, b; Ilan *et al.*, 1994; Muricy *et al.*, 1998; Carteron, 2002; Perez *et al.*, 2004), 32 demosponge species, not included in the fauna of the Aegean, have been found on the coasts of Israel, Egypt, and Lebanon: *Axinella minuta* Levi, 1956, *Axinyssa digitata* Cabioch, 1968, *Bubaris vermiculata* (Bowerbank, 1866), *B. sarayi* Ilan, Ben-Eliahu & Galil, 1994, *Callites lacazei* Schmidt, 1868, *Calinula renieroides* Schmidt, 1868, *Chelonaplysilla erecta* Row, 1911, *Cinachyra cavernosa* (Lamarck, 1815), *Ciocalypta penicillus* Bowerbank, 1864, *Dictyonella pelligera* (Schmidt, 1864), *Gastrophanella phoemciensis* Perez, Vacelet, Bitar & Zibrowius, 2004, *Geodia micropunctata* Row, 1911, *Haliclondria sitiens* (Schmidt, 1870), *Haliclona grossa* (Schmidt, 1864), *H. semitubulosa* (Lieberkühn, 1859), *H. steueri* Burton, 1936, *H. viridis* (Keller, 1881), *Hexadella racouitzai* Topsent, 1896, *Hymeniacion kitchingi* (Burton, 1935), *Hymerhabdia pori* Tsurumal, 1969, *H. reichi* Tsurumal, 1969, *Hyrtios erecta* (Keller, 1891), *Ircinia retidermata* Pulitzer-Finali & Pronzato, 1980, *Lissodendoryx* (= *Damiriana*) *schmidti* (Ridley, 1884), *Microscleroderma lamina* Perez, Vacelet, Bitar & Zibrowius, 2004, *M. sanguinea* Tsurumal, 1969, *Myxilla prouboi* (Topsent, 1892), *Oceanapia tuber* (Lundbeck, 1909), *Oscarella microlobata* Muricy, Boury-Esnault, Bezac & Vacelet, 1998, *Placina reducta* (Pulitzer-Finali, 1983), *Placina weinbergi* (Muricy, Boury-Esnault, Bezac & Vacelet, 1998 and *Spongisorites genitrix* (Schmidt, 1870). These species included, the demosponge fauna of the eastern basin of the Mediterranean (Aegean Sea and Levantine) constitutes 43% of the Mediterranean demosponge fauna.

The diversity of sponges in the Aegean Sea is not well known in comparison to that of other benthic groups. Koukouras *et al.* (2001) in a review of our up to date knowledge on the various benthic groups in the Mediterranean areas, report that 67.4% of the Mediterranean decapod species have been recorded from the Aegean, while the corresponding percentages for echinoderms, amphipods, polychaetes and gastropods, are 66.7, 57.9, 55.3 and 48.0. If we take into account the fact that the present study added a considerable number of sponge species to the fauna of the Aegean, it becomes obvious that further investigation will reveal the presence of a rich sponge fauna in this area.

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