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Marine biogeography of the Mediterranean Sea: patterns and dynamics of biodiversity

A review of the Mediterranean Sea sponge biogeography with, in appendix, a list of the demosponges hitherto recorded from this sea

MAURIZIO PANSINI*, CATERINA LONGO**
**Dip. Te. Ris. Dipartimento per lo Studio del Territorio e delle sue Risorse, Università di Genova, Corso Europa, 26, I-16132 Genova (Italy)*
***Dipartimento di Zoologia, Università di Bari, Via Orabona 4, I-70125 Bari (Italy)*

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SUMMARY

The total number of porifera species hitherto recorded from the Mediterranean Sea is 649. Demospongiae are 597, Calcarea 44, Hexactinellida 8. The demosponge distribution, studied on fifteen Mediterranean zones is not uniform, even if not proportional to the number of taxonomic studies performed in each area. The highest faunistic affinities are among the southern and eastern parts of the basin, where seawater temperature is relatively warmer. The present day Mediterranean demosponge fauna is formed by a large nucleus of endemic species (48,2 %), by cold water (19,8%), temperate (12%) and warm water (5,7%) species. Cosmopolitan species (9,3%) are probably over estimated, whereas few species migrated from the Red Sea. The present day composition and biotic affinity of the Mediterranean sponge fauna can be explained, at some extent, by the geological history of this basin. Most of the paleomediterranean fauna did not survive the messinian salinity crisis but a small number of possible Tethyan relics. The demosponge list in appendix is updated according to the Systema Porifera, the revision of all the extant sponge genera published in October 2002.

INTRODUCTION

Global changes and human pressure are certainly affecting marine ecosystems, probably reducing the available habitat. This is particularly true for semi-closed basins as the Mediterranean Sea. There is also a general concern about the decline of biodiversity, which contributes to promote research on this topic.

Biodiversity and biogeography of Mediterranean sponges have been studied in the past by several authors. Vacelet (1980a) considered the affinities of this fauna; Pulitzer-Finali (1983), Drai (1985), Pansini (1995) produced lists of species; Pansini (1992, 1996) updated the existing data and analyzed the Italian sponge fauna; Maldonado and Uriz (1995) compared the sponge fauna of Alboran Island with those of five other Atlantic–Mediterranean Islands, using the biotic affinities among these archipelagos to test various hypotheses on the origin of the

Mediterranean benthos. De Weerdt and Van Soest (1986) and Van Soest (1993) studied the distribution and biogeography of sponges in the neighbouring Atlantic regions (Mauritanian, Senegalian), which allow a better understanding of the history and affinity of the Mediterranean fauna. Other studies, eventually, aiming at explaining sponge distribution on a larger scale (Van Soest, 1994, 1998) took into consideration also the Mediterranean Sea demosponge sponge fauna.

The present article, based on most recent, validated and updated literature data, and on several unpublished records, aims to review the present knowledge and current hypotheses on the Mediterranean sponge fauna and its origin, producing also a list of the demosponges hitherto recorded from this sea.

METHODS

The distribution analysis of Mediterranean sponges has been restricted to the class Demospongiae, because this taxon is by far the most numerous within the Porifera. Hexactinellida are restricted to deep habitats or to cold marine caves in the Mediterranean Sea, and Calcarea – at least at species level – are presently poorly studied, with scant new information available.

The Mediterranean Sea has been divided in fifteen zones according to the areas investigated in the past by sponge workers:

A) Golfe du Lion
B) Ligurian Sea
C) Northern Tyrrhenian Sea
D) Northern Adriatic Sea
E) Catalunya and Balearic Islands
F) Central Tyrrhenian Sea
G) Southern Adriatic Sea
H) Southern Tyrrhenian Sea
I) Alboran Sea
J) Algerian basin
K) Tunisia, Malta, south-western Sicily
L) Ionian Sea
M) Aegean Sea
N) Levant basin, Cyprus
O) Egyptian coasts

Among the articles present in the literature only those reporting sound new data on demosponge taxonomy and distribution were selected, counted and included in Fig. 1. Geographical names have been tentatively assigned to the selected zones (marked by letters in Fig. 1) but they obviously do not match with traditional geographic divisions. Wide empty areas still remain in the Mediterranean map (e.g. eastern Sardinian, Libyan, southern Turkish coasts) because they were not object of specific studies but of occasional collections only.

Comparisons among the areas were performed calculating the Euclidean distances by a statistic software (Statsoft) for Windows operating system (1995).

A list of the demosponges hitherto recorded from the Mediterranean Sea with an indication of their distribution is added to this work. It takes into consideration all the published data, obviously personally interpreted by the authors as to the

evaluation of synonyms and very old records that sometimes may be regarded as doubtful. Nomenclature is updated to and follows the Systema Porifera (Hooper and Van Soest, 2002), the huge revision of all the sponge extant genera compiled by 45 taxonomists from 17 countries in about six years of collaborative effort. A list of genera, present in the Mediterranean Sea, that have been considered as synonyms by the authors of the Systema Porifera is also in appendix. These lists may be useful to but they are not specifically directed to sponge experts because they need to be continuously updated. Sponge data holders, instead, project to participate in a network with the aim of erecting a world sponge database that, in a near future, will be available on the net.

THE PRESENT MEDITERRANEAN SPONGE FAUNA

Notwithstanding the author personal interpretation of the data here reported a good correspondence with previous studies actually exists.

The latest published data, updated to 1995 (Pansini, 1996a), report for the Mediterranean Sea a total of 589 sponge species, encompassing 8 Hexactinellida, 44 Calcarea and 537 Demospongiae. Since then the number of Hexactinellida and Calcarea remained unchanged, while 23 new species of Demospongiae were described (Tab. I).

Tab. I - List of new species and sub-species of Demosponges described for the Mediterranean Sea in ten years (1994-2003)

	Species	Author	Area	habitat
1.	*Gellius bioxeata*	Boury-Esnault, Pansini, Uriz, 1994	Alboran, 550 m	bathyal
2.	*Bubaris sarayi*	Ilan, Ben-Eliahu, Galil, 1994	Israel, 830 m	bathyal
3.	*Pseudocorticium jarrei*	Boury-Esnault et al., 1995	Marseille	cave
4.	*Oscarella imperialis*	Muricy et al., 1996	Marseille	cave
5.	*Oscarella microlobata*	Muricy et al., 1996	Marseille	cave
6.	*Oscarella viridis*	Muricy et al., 1996	Marseille	cave
7.	*Delectona alboransis*	Rosell, 1996	Alboran	
8.	*Delectona ciconiae*	Bavestrello, Calcinai, Sarà, 1996	Alboran, Tyrrhenian Sea, western Sardinia	red coral
9.	*Asbestopluma hypogea*	Vacelet and Boury-Esnault, 1996	Marseille	cave
10.	*Dendroxea adumbrata*	Corriero et al., 1996	Ustica, Marseille	cave
11.	*Dendroxea pseudodidiscoides*	Corriero et al., 1996	Adriatic Sea	cave
12.	*Petrosia pulitzeri*	Pansini, 1996	Aegean Sea, Naples	cave
13.	*Axinella estacioi*	Carballo and Garcia Gomez, 1996	Alboran	cave
14.	*Vulcanella aberrans*	(Maldonado and Uriz, 1996)	Alboran	80-120 m
15.	*Delectona madreporica*	Bavestrello et al., 1997	Ligurian Sea	cave
16.	*Cliona parenzani*	Corriero and Scalera Liaci, 1997	Ionian Sea, 1 m	
17.	*Didiscus spinoxeatus*	Corriero et al., 1997	Tyrrhenian Sea	cave
18.	*Thymosiopsis cuticulatus*	Vacelet and Perez, 1998	Marseille	cave
19.	*Higginsia ciccaresei*	Pansini and Pesce, 1998	Ionian Sea	cave
20.	*Myceliospongia arenosa*	Vacelet and Perez, 1998	Marseille	cave
21.	*Pleraplysilla reticulata*	Maldonado and Uriz, 1999	Alboran, 24 m	
22.	*Thymosiopsis conglomerans*	Vacelet et al., 2000	Marseille, 17 m	
23.	*Acanthodendrilla levii*	Uriz and Maldonado,2000	Blanes, 100-130 m	
	Dotona pulchella mediterranea	Rosell and Uriz, 2002	Alboran	n. subsp.

It must be remarked that two of them were recorded from the bathyal, three from a depth of about 100 m, fourteen (60,8 % of the total) from marine caves and the remaining four from the littoral zone.

Between 1995 and 2002 three Atlantic species were recorded for the first time in the Mediterranean Sea (Tab. II).

Tab. II - List of new records for the Mediterranean Sea between 1995 and 2002.

1.	*Leiodermatium lynceus* Schmidt	Magnino et al., 1999	Atlantic	white corals
2.	*Cliona amplicavata* Ruetzler, 1974	Rosell and Uriz, 2002	Atlantic	regarded as *Cliona celata*
3.	*Crellastrina alecto* (Topsent, 1898)	Longo et al., 2002	Atlantic	white corals

Also in this case two of these species come from deep habitats (community of white corals), while the third one is a *Cliona* species that was previously confused with *Cliona celata* Grant, 1826.

In the same period, seven species have been regarded as synonyms of already known Mediterranean demosponges (Tab. III). They have been removed from the general list even if the authors of this article do not share all the decisions taken.

Tab. III - List of seven Mediterranean species that have been considered as synonyms of already known Demosponge species by the authors reported in the last column.

	Synonym	Valid name	Authors
1.	*Cliona cretensis* Pulitzer-Finali, 1983	*Cliona thoosina* Topsent,1887	Rosell and Uriz, 2002
2.	*Cliona copiosa* Sarà, 1959	*Cliona viridis* Schmidt, 1862	Rosell and Uriz, 2002
3.	*Cliona tremitensis* Sarà, 1964	*Cliona viridis* Schmidt, 1862	Rosell and Uriz, 2002
4.	*Stylostichon equiosculatum* Pansini, 1987	*Stylostichon plumosum* (Montagu, 1818)	Maldonado and Uriz, 1995
5.	*Tylexocladus joubini* Topsent, 1898	*Atergia corticata* Stephens, 1915	Hooper and van Soest, 2002
6.	*Coelectys insinuans* Topsent, 1936	*Chaetodoryx richardi* Topsent, 1927	Hooper and van Soest, 2002
7.	*Pleraplysilla minchini* Topsent, 1905	*Pleraplysilla spinifera* Schulze, 1878	Hooper and van Soest, 2002

According to this updating and to the revision of previous lists, the sponge species hitherto recorded from the Mediterranean Sea (Tab. IV) are 597. A steady increase of this number has been recorded since 1980, apart from a single drop between 1983 and 1992, that was due to the interpretation of literature data (Pulitzer-Finali, 1983) and of an unpublished list (Vacelet's personal files) by Pansini (1992).

Tab. IV - Number of Mediterranean sponge species reported in the biogeographic sponge literature since 1980. Only Pulitzer-Finali (1983) included a list in his article.

	Hexactinellida	Calcarea	Demospongiae	Total
Vacelet, 1980	5	44	453	502
Pulitzer-Finali, 1983			547	
Pansini, 1992	8	44	512	564
Pansini, 1996	8	44	536	588
Present paper, 2003	8	44	597	649

THE MEDITERRANEAN SPONGE DISTRIBUTION PATTERNS

Studies on the demosponge distribution patterns worldwide (Van Soest, 1994) consider the Mediterranean Sea as a hotspot of sponge biodiversity (Pronzato, this volume). However there is no uniformity in the sponge distribution between the western and the eastern part of the basin, separated by an ideal border line starting from Tunisia (Cape Bon) and arriving to Greece, encompassing the southern Italian coasts (Fig. 1). The western basin with 572 species (updated to 2002) is much richer than the eastern one that counts only 194 species. The Black Sea sponge fauna is very poorly known (Laubenfels, 1951) and is not considered in this study.

In the westernmost part of the Mediterranean Sea the highest specific richness (more than 250 species) was recorded along the northern coast of the basin, along an arch starting from the Gulf of Naples and ending to the Balearic Islands. Actually these coasts were intensely studied both in the nineteenth and twentieth centuries by traditional techniques and in the last forty years also by scuba diving. Sponge taxonomists as Bavestrello, Bibiloni, Boury-Esnault, Lévi, Pansini, Pronzato, Pulitzer-Finali, Sarà, Topsent, Uriz, Vacelet, Vosmaer and others produced as many as 85 studies on this area. Their work was facilitated by the presence of important and sometimes historical marine research institutions in Blanes, Banyuls, Marseille, Monaco, Genoa and Naples that offered the facilities for collecting at sea. Presently in Blanes, Marseille and Genoa still exist active groups of spongiologists.

In the southern part of the western basin recent studies by Boury-Esnault, Maldonado, Pansini, Uriz (see references) concentrated on the Alboran Sea,

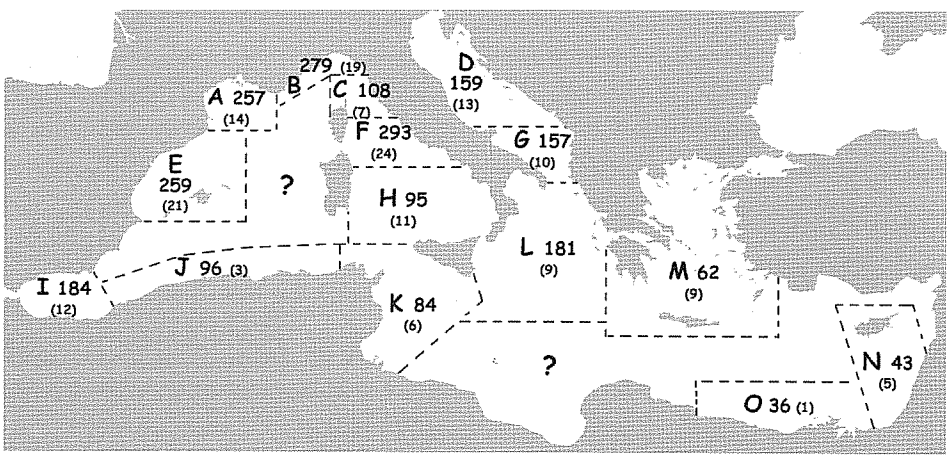

Fig. 1 - Demosponge distribution in the Mediterranean Sea. The divisions (see methods) identify fifteen zones where sponges were investigated in the past. Bigger numbers indicate the number of species; numbers in brackets refer to the number of studies on sponge taxonomy performed in each area.

recording 184 species in 10 articles, the oldest of which dates back to 1987. Only 3 studies – more than a century ago - were performed along the Algerian coast by Schmidt and Topsent. More recent information is available for the coasts of Tunisia, Malta, southwestern Sicily and some banks of the Sicily Channel. The few published taxonomic papers (6) are by Topsent, Rützler, Pansini, Borg and Schembri, but some sponge specialist as Ben Mustapha and colleagues are now working in Tunisia with the collaboration of French spongiologists from Marseille. Libyan coasts are unknown whereas a single work by Burton (1936) exists for the fishery grounds near Alexandria (Egyptian coasts). Thirty-six out the forty-two demosponge species recorded by this author may be recognized and regarded as valid. In the eastern part of the Levant basin some French and Israeli authors (Lévi, Tsurnamal, Ilan and others) published a few articles (5) recording only 43 demosponge species. Another poorly studied area, considering the extension of its mainland and island coasts is the Aegean Sea, where only 9 studies, recording 62 species were performed. Greek authors worked there in the nineties (Koukouras, Voultsiadou-Koukoura and others, in collaboration with van Soest). Pulitzer-Finali and Rützler report occasional data for that area. The Ionian Sea sponges were carefully studied (181 species recorded) along the Apulian coasts by several authors as Corriero, Longo, Pansini, Pulitzer-Finali, Sarà, Scalera-Liaci and others, mainly working at the University of Bari. Less investigated are the Calabrian and Sicilian coasts, together with the abyssal area of the Ionian Sea, where Zibrowius (1985) observed but not collected some Hexactinellid sponges. The study of the northern and southern parts of the Adriatic Sea, where 159 and 157 demosponge species were recorded, was almost balanced. Early authors as Olivi (1792), Martens (1824), Nardo (1847) and Schmidt (1862) began to work on the northern part, but investigations were soon extended. Taxonomists as Babic, Buccich, Corriero, Gamulin Brida, Lendenfeld, Longo, Marenzeller, Melone, Pansini, Pulitzer-Finali, Rützler, Sarà, Scalera Liaci, Volz and others intensively worked on this sea where Mediterranean sponge science was born.

All these data clearly show that the knowledge of the distribution of the Mediterranean sponge fauna is far from uniform, even if not directly proportional to the number of studies performed in each area. It is highly probable, therefore, that the actual differences among the sponge-faunas of the considered zones are over estimated. Considerably more collecting is necessary, especially along the eastern and southern coasts before a comprehensive distribution study can be attempted.

FAUNISTIC AFFINITIES AMONG DIFFERENT MEDITERRANEAN AREAS

The faunistic affinities among the 15 zones obtained by our division of the Mediterranean Sea have been represented in the tree diagram of Fig. 2. The

highest affinities are between the southern (Algerian coasts, Tunisia, Malta, south western Sicily) and the eastern Mediterranean (Aegean Sea, Levant basin, Egyptian coasts), which are also the warmest parts of the basin. Since Quaternary westerlies in the past and Atlantic surface waters entering the Mediterranean at present are associated with eastbound currents along the African coasts, the transport of larvae may have caused this affinity. Southern (H) and northern Tyrrhenian Sea (C) are also similar, whereas the central Tyrrhenian area (F) forms a cluster with Ligurian Sea (B), Golfe du Lyon (A), Catalunya and Balearic Islands (E) which are the best studied areas (more than 250 recorded species) of the whole basin. Southern Adriatic (G) and Ionian Sea (L), being close one another, show a certain affinity.

The position of the northern Adriatic Sea (D) – separated by its southern part and approaching the cluster formed by eastern and southern areas together with northern and southern Tyrrhenian Sea is difficult to interpret and no hypotheses can be advanced. The Alboran Sea (I), probably due to its Atlantic affinity, clearly separates from a large and heterogeneous cluster.

Even the interpretation of the faunistic affinities seems to be affected by an incomplete and not uniform knowledge of the Mediterranean demosponges.

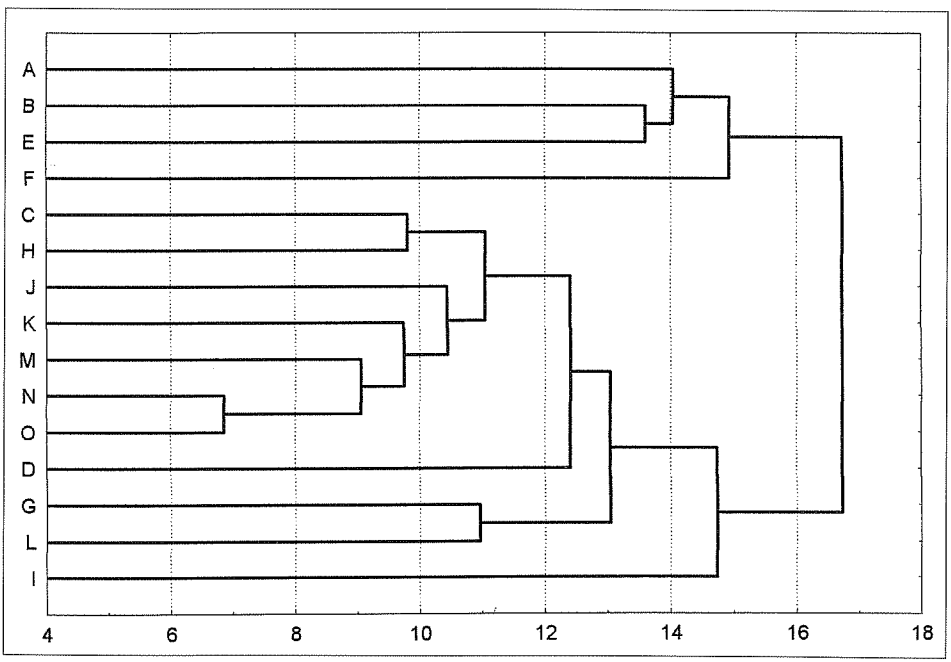

Fig. 2 - Tree diagram of the Euclidean distances (complete linkage) among the demosponge species recorded in the Mediterranean zones considered in this study. A) Golfe du Lion; B) Ligurian Sea; C) Northern Tyrrhenian Sea; D) Northern Adriatic Sea; E) Catalunya and Balearic Islands; F) Central Tyrrhenian Sea; G) Southern Adriatic Sea; H) Southern Tyrrhenian Sea; I) Alboran Sea; J) Algerian basin; K) Tunisia, Malta, south-western Sicily; L) Ionian Sea; M) Aegean Sea; N) Levant basin, Cyprus; O) Egyptian coasts.

THE COMPOSITION AND BIOGEOGRAPHIC AFFINITY OF THE MEDITERRANEAN DEMOSPONGE FAUNA

The ecological factors determining the present conditions and the history of a basin are the main clues to interpret the composition of each fauna (Sarà, 1994, van Soest, 1994). This is particularly true for a semi-closed sea as the Mediterranean. The historical background of the Mediterranean Sea was carefully resumed by Maldonado and Uriz (1995). The crucial point in the Mediterranean history is the Messinian period, with the major salinity crisis and the probable desiccation of the whole basin, causing the disappearance of all but a few components of the paleofauna. However such a vision is not more generally accepted and the persistence of restricted briny habitats where marine organism could have survived may be inferred (Benson, 1976; Sonnenfeld and Finetti, 1985). Demosponges can support the latter possibility, since very ancient species considered of probable Tethyan origin where recently found in the Mediterranean Sea. Such is the case of *Crambe tuberosa* (Maldonado and Benito, 1991) and *Discorhabdella hindei* (Boury-Esnault, Pansini and Uriz, 1992) from the Alboran Sea and of *Higginsia ciccaresei* (Pansini and Pesce, 1998) from a marine cave of the Ionian Apulian coast.

Besides these important but numerically negligible elements the current Mediterranean fauna results from the alternate immigration of species contingents from the Atlantic, by species evolving in the peculiar conditions of the basin (endemics) and by very few elements (till now) of lessepsian origin.

The Mediterranean endemics (48,2 %) are the most important group of the demosponge fauna, due to the habitat variety and peculiar characteristics of this

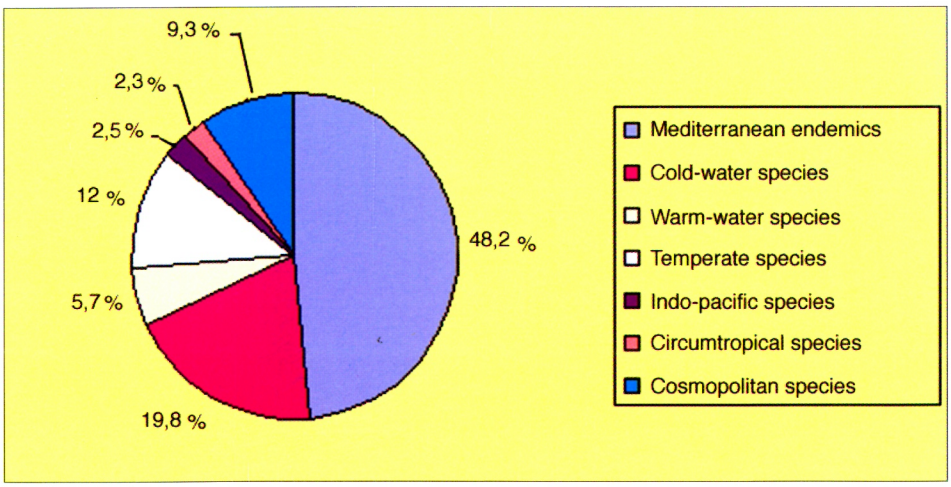

Fig. 3 - The per cent composition and biogeographic affinity of the Mediterranean demosponges.

sea, to the continuous research activity involving the frequent description of new species, notwithstanding the intense exchange (in both directions) with the Atlantic. Species in common with the Lusitanian and Mauritanian biogeographic regions and with the boreal province – which can be regarded as cold-water elements – amount to 19,8 per cent. Warm-water species (5,7 % of the total) are those shared with the same neighbouring regions (Mauritanian, Lusitanian) and with the Senegalese region. This group includes also very few species with an amphi-atlantic distribution. Temperate species, shared only with Mauritanian and Lusitanian regions are 12 % of the total. Minor groups encompass the species of Indo-pacific (2,5 %) origin, including those entered through the Suez Canal, and the circumtropical elements (2,3 %). A last group of species with a large distribution pattern (cosmopolitan) appears to be very numerous (9,3 % of the total) but is certainly over estimated. The current use of new techniques as electronic microscopy, genetic divergence, cytological criteria and molecular taxonomy is steadily reducing the number of these taxa (Boury-Esnault, Pansini and Uriz, 1993). In effect the accurate study of species regarded as cosmopolitan by such means often allows to split them into more than one species.

CONCLUSIVE REMARKS

Recent studies on demosponge distribution patterns (van Soest, 1994, 1998; Zea, 2001) and on sponge biodiversity "hotspots" (Hooper et al., 2002), based on cladistic biogeography, contributed to clarify the general criteria regulating the distribution of porifera. According to van Soest (1994) species distribution is typically regional, being restricted to single areas or parts of them, and only genera may have larger ranges, (cosmopolitan, Tethyan, Indo-Australian, cold-water). Disjunct distributions are probably an artefact and may be found in less than 10 % of the examined genera. These considerations are verified in the Mediterranean area, where the demosponge distribution tends to be regional, at least in the areas that are best studied from a biogeographical point of view (Maldonado and Uriz, 1995).

The dispersal capacity of sponge larvae had been traditionally considered low (Bergquist, 1978). However data on larval behaviour refer only to about 100 out of more than 7000 described sponge species and derive from incubated larvae, while larvae produced by oviparous sponge species remain almost unknown (Maldonado and Bergquist, 2002). Most sponge larvae are externally ciliated and use cilia for periods of active swimming alternated with periods of passive drifting (Maldonado and Bergquist, 2002). The dispersal phase of sponge larvae, that are lecitotrophic, is relatively short, lasting – according to species – from a few hours to a few days in free-swimming larvae and to few weeks in some crawling larvae (Maldonado and Bergquist, 2002). However the delay of

metamorphosis may compromise the survival of early juvenile stages (Maldonado and Young, 1999). These data confirm that marine currents should play a major role in the dispersal of larvae and certainly affect the sponge distribution patterns. Maldonado and Uriz (1995) in their biogeographic study on a transitional zone between the Atlantic and the Mediterranean demonstrated that biotic distances between different study areas are not correlated with real geographical distances, because both present day and past marine currents may have created "fictitious" nearness between distant areas. In effect, the morphology of the Mediterranean basin, where peninsulas, islands, straits etc. create continuous obstacles to water circulation, is so complex, that marine currents, repeatedly changing their course, may affect and complicate the sponge distribution patterns. However, in order to have a more complete appreciation of these patterns, future research should be focused on less known areas of southern and eastern Mediterranean Sea.

The present day composition and biotic affinity of the Mediterranean sponge fauna can be explained, at some extent, by the geological history of this basin. The study of demosponges tells us that most of the paleomediterranean fauna did not survive the messinian salinity crisis, apart from a small number of possible Tethyan relics. The repopulation of the Mediterranean at the beginning of Pleistocene was mainly due to the introduction through Gibraltar of a cold-water Atlantic fauna. However, important sea level variations recorded in upper and middle Pleistocene may have altered the coastal line, not excluding that shallow water extensions could have maintained a communication with the Red Sea (Antonioli, present volume).

A well-known inflow of Senegalian-Mauritanian warm-water elements occurred during Tyrrhenian, at the end of Quaternary (Pérès, 1989). Maldonado and Uriz (1995) attributed to that inflow the present day biotic affinity of the Canary Islands demosponge fauna with that of some western Mediterranean islands (Cabrera, Medas, Ischia). Alternating migrations, bound to glacial and interglacial Quaternary periods, causing the reversal of surface and deep water flows through the Gibraltar Strait, further enriched the Mediterranean sponge fauna of new elements coming from the Mauritanian, Lusitanian and Senegalian regions (Mars, 1963). Both these phenomena may explain the presence of an important contingent of warm-water (5,7 %) and temperate (12 %) species in the Mediterranean demosponge fauna.

Besides these historical contingents, the present day Mediterranean fauna encompasses a steadily growing nucleus of new species that evolved in the peculiar conditions of this sea, further increasing the number of endemic species. Since there is some evidence that a rising of seawater temperature is inducing changes in the Mediterranean biodiversity patterns (Francour et al., 1994; Bianchi and Morri, 2000; Morri and Bianchi, 2001) variations of sponge biodiversity may be enhanced in a near future.

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List of Demosponges hitherto recorded from the Mediterranean Sea and their distribution in fifteen areas of the basin: A) Golfe du Lion; B) Ligurian Sea; C) Northern Tyrrhenian Sea; D) Northern Adriatic Sea; E) Catalunya and Balearic Islands; F) Central Tyrrhenian Sea; G) Southern Adriatic Sea; H) Southern Tyrrhenian Sea; I) Alboran Sea; J) Algerian basin; K) Tunisia, Malta, south-western Sicily; L) Ionian Sea; M) Aegean Sea; N) Levant basin, Cyprus; O) Egyptian coasts.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Plakinidae															
Corticium bowerbanki Sarà, 1960						*	*					*			
Corticium candelabrum Schmidt, 1862	*	*	*	*	*	*	*			*		*		*	
Corticium reductum Pulitzer-Finali, 1983												*			
Corticium topsenti Pouliquen, 1972	*					*									
Oscarella imperialis Muricy et al.,1996	*														
Oscarella lobularis (Schmidt, 1862)	*	*	*	*	*	*	*	*		*	*	*		*	
Oscarella microlobata Muricy et al.,1996	*														
Oscarella tuberculata (Schmidt, 1868)	*														
Oscarella viridis Muricy et al., 1996	*														
Placinolopha moncharmonti (Sarà, 1960)		*				*									
Plakina dilopha Schulze, 1880	*	*				*									
Plakina monolopha Schulze, 1880	*	*	*		*	*	*	*	*						
Plakina trilopha Schulze, 1880	*	*		*	*	*	*		*			*			
Plakinastrella copiosa Schulze, 1880	*	*			*										
Plakinastrella mixta Maldonado, 1992									*						
Plakortis simplex Schulze, 1880	*	*	*	*	*	*	*	*		*		*			
Pseudocorticium jarrei Boury-Esnault et al., 1995	*														
Tetillidae															
Cinachyra cavernosa (Lamarck, 1815)														*	*
Cinachyrella tarentina (Pulitzer-Finali, 1983)												*			
Craniella cranium (Müller, 1789)		*		*	*		*		*						
Craniella repens Sarà, 1958						*									
Samidae															
Samus anonymus Gray, 1867						*	*					*			
Ancorinidae															
Stelletta defensa Pulitzer-Finali, 1983		*													
Stelletta dichoclada Pulitzer-Finali, 1983		*													
Stelletta dorsigera Schmidt, 1864	*	*		*	*	*									
Stelletta grubii Schmidt, 1862	*	*		*	*	*	*			*		*			
Stelletta hispida (Buccich, 1886)	*				*	*	*		*						
Stelletta lactea Carter, 1871	*	*	*		*	*						*			
Stelletta mediterranea Topsent, 1893					*				*						
Stelletta pumex (Nardo, 1847)				*		*						*			
Stelletta simplicissima (Schmidt, 1868)				*						*					
Stelletta stellata Topsent, 1893		*		*	*		*					*			
Jaspis incrustans (Topsent, 1890)					*				*						
Jaspis johnstoni (Schmidt, 1862)	*	*	*	*	*	*	*	*	*			*			
Ancorina radix Marenzeller, 1889				*	*	*	*								
Ancorina wageneri (Schmidt, 1862)				*		*	*								

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Stryphnus mucronatus (Schmidt, 1868)	*	*		*	*	*			*	*		*			
Stryphnus ponderosus (Bowerbank, 1866)				*	*				*						
Penares candidata (Schmidt, 1868)					*				*	*					
Penares helleri (Schmidt, 1864)	*	*	*	*	*	*	*					*		*	
Holoxea furtiva Topsent, 1892	*	*			*	*	*			*					
Calthropellidae															
Calthropella inopinata Pulitzer-Finali, 1983															
Calthropella pathologica (Schmidt, 1868)	*								*	*		*			
Calthropella recondita Pulitzer-Finali, 1972						*									
Calthropella stelligera (Schmidt, 1868)				*						*					
Geodiidae															
Erylus corsicus Pulitzer-Finali, 1983		*													
Erylus deficiens (Topsent,1927)		*													
Erylus discophorus (Schmidt, 1862)	*	*	*	*	*	*	*	*		*		*	*		
Erylus euastrum (Schmidt, 1868)	*	*	*	*	*	*	*	*		*		*			
Erylus expletus Topsent, 1927	*														
Erylus mamillaris (Schmidt, 1862)						*				*					
Erylus papulifer Pulitzer-Finali, 1983		*							*			*			
Caminus vulcani Schmidt, 1862	*			*	*	*	*		*						
Pachymatisma intermedia (Schmidt, 1868)										*					
Pachymatisma johnstonia (Bowerbank, 1844)						*									
Geodia conchilega Schmidt, 1862	*	*		*	*	*	*			*		*		*	*
Geodia cydonium (Jameson, 1811)	*	*	*	*	*	*	*	*	*	*		*	*		*
Geodia micropunctata Row, 1911														*	
Geodia tuber Lendenfeld, 1894				*											
Isops anceps (Vosmaer, 1894)						*			*						
Isops canaliculata (Schmidt, 1868)										*					
Isops intuta (Topsent, 1892)	*	*			*		*		*						
Isops loricata (Lendenfeld, 1894)							*								
Sidonops geodina (Schmidt, 1868)						*				*					
Pachastrellidae															
Characella tripodaria (Schmidt, 1868)									*	*					
Dercitus plicatus (Schmidt, 1868)	*	*	*	*	*	*	*	*	*	*	*	*			
Pachastrella echinorhabda Pulitzer-Finali, 1972						*									
Pachastrella monilifera Schmidt, 1868	*	*		*	*	*	*		*	*		*			
Pachastrella amygdaloides (Carter, 1876)		*			*	*									
Poecillastra compressa (Bowerbank, 1866)	*	*	*	*	*	*			*	*		*			
Poecillastra dissimilis (Sarà, 1959)						*	*					*			
Poecillastra rudiastra Pulitzer-Finali, 1983		*													
Poecillastra saxicola (Topsent, 1892)		*			*										
Stoeba lesinensis (Lendenfeld, 1894)							*								
Thenea muricata (Bowerbank, 1858)	*	*	*	*	*	*	*		*		*	*			
Triptolemma simplex (Sarà, 1959)		*				*									

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Vulcanella aberrans (Maldonado & Uriz, 1996)									*						
Vulcanella gracilis (Sollas, 1888)	*	*			*				*			*	*		
Vulcanella (Annulastrella) verruculosa (Pulitzer-Finali, 1983)		*													
Thrombidae															
Thrombus abyssi (Carter, 1873)	*					*						*			
Clionaidae															
Cliona amplicavata Rützler, 1974					*										
Cliona burtoni Topsent, 1932		*													
Cliona celata Grant, 1826	*	*		*	*	*	*	*		*	*	*			
Cliona janitrix Topsent, 1932	*	*	*								*				
Cliona lobata Hancock, 1849	*	*	*			*									
Cliona parenzani Corriero & Liaci, 1997												*			
Cliona rhodensis Rützler & Bromley, 1981	*			*			*				*	*	*		
Cliona schmidtii (Ridley, 1881)		*		*	*	*	*	*	*		*	*		*	
Cliona thoosina Topsent, 1887													*		
Cliona topsenti (Lendenfeld, 1896)							*					*			
Cliona vermifera Hancock, 1867	*		*	*			*					*			
Cliona viridis Schmidt, 1862	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cliothosa hancocki (Topsent, 1888)		*	*	*		*	*				*	*			
Pione vastifica (Hancock, 1849)	*	*		*	*	*	*	*	*		*	*			
Thoosa armata Topsent, 1888	*														
Thoosa mollis Volz, 1939	*			*	*	*	*	*				*			
Volzia albicans (Volz, 1939)				*								*			
Volzia rovignensis (Volz, 1939)				*											
Hemiastrellidae															
Hemiasterella aristoteliana Voultsiadou-Koukoura & van Soest, 1991													*		
Paratimea constellata (Topsent, 1893)		*			*				*						
Paratimea oxeata Pulitzer-Finali, 1978						*									
Paratimea pierantonii Sarà, 1958						*									
Stelligera nux Lendenfeld, 1896							*								
Stelligera rigida (Montagu, 1818)	*				*				*						
Stelligera stuposa (Ellis & Solander, 1786)		*		*		*			*			*			
Placospongiidae															
Placospongia decorticans (Hanitsch, 1895)						*	*	*				*			
Polymastiidae															
Polymastia inflata Cabioch, 1968		*				*									
Polymastia mammillaris (Müller, 1806)	*	*	*	*	*	*			*						
Polymastia polytylota Vacelet, 1969	*	*							*						
Polymastia robusta (Bowerbank, 1861)	*	*		*		*	*								
Polymastia sola Pulitzer-Finali, 1983		*													

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Polymastia tissieri (Vacelet, 1961)		*			*						*				
Atergia corticata Stephens, 1915									*						
Quasillina brevis (Bowerbank, 1861)	*			*					*		*				
Radiella sol Schmidt, 1870		*													
Radiella sarsi (Ridley & Dendy, 1886)					*										
Weberella verrucosa Vacelet, 1960	*	*			*										
Pseudotrachya hystrix (Topsent, 1892)	*					*			*						
Pseudotrachya oxystyla Sarà, 1959		*				*									
Spirastrellidae															
Diplastrella bistellata (Schmidt, 1862)	*	*		*	*	*	*	*	*	*		*			
Diplastrella ornata Rützler & Sarà, 1962						*	*					*	*		
Spirastrella cunctatrix Schmidt, 1868	*	*			*	*	*	*	*	*	*	*	*	*	*
Spirastrella minax (Topsent, 1888)	*	*			*	*	*	*	*						
Stylocordylidae															
Stylocordyla pellita (Topsent, 1904)													*		
Suberitidae															
Aaptos aaptos (Schmidt, 1864)	*	*	*	*	*	*	*	*	*	*	*	*		*	*
Aaptos papillata (Keller, 1880)		*				*									
Prosuberites epiphytum (Lamarck, 1815)	*	*			*	*	*	*				*			
Prosuberites longispina Topsent, 1893	*		*	*	*	*				*		*			
Prosuberites modestus Pulitzer-Finali, 1978						*									
Prosuberites rugosus Topsent, 1893	*				*				*						
Protosuberites ectyoninus (Topsent, 1900)		*			*										
Protosuberites ferrerrhernandezi (Ferrer-Hernandez, 1921)					*										
Protosuberites rugosus (Schmidt, 1868)					*		*			*					
Pseudosuberites hyalinus (Ridley & Dendy, 1887)	*		*		*		*		*				*		
Pseudosuberites mollis Topsent, 1925	*														
Pseudosuberites sulphureus (Bowerbank, 1866)		*				*	*		*	*	*	*	*		
Rhizaxinella elongata (Ridley & Dendy, 1887)	*	*		*		*									
Rhizaxinella gracilis (Lendenfeld, 1896)	*	*		*		*									
Rhizaxinella pyrifera (Delle Chiaje, 1828)	*	*	*	*	*	*			*				*		
Suberites carnosus (Johnston, 1842)	*	*	*	*	*	*		*	*	*	*	*	*		
Suberites domuncula (Olivi, 1792)	*	*	*	*	*	*	*		*	*	*	*	*		
Suberites ficus (Esper, 1806)		*	*	*	*		*		*				*		
Suberites massa Nardo, 1847				*		*				*			*		
Suberites syringella (Schmidt, 1868)		*				*				*			*		
Terpios fugax (Duchassaing & Michelotti, 1864)		*	*	*	*	*	*	*				*	*		
Tethyidae															
Tethya aurantium (Pallas, 1766)	*	*	*	*	*	*	*	*	*	*	*	*		*	*
Tethya citrina Sarà & Melone, 1965	*	*	*	*		*	*	*				*			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Timeidae															
Timea bifidostellata Pulitzer-Finali, 1983							*								
Timea chondrilloides (Topsent, 1904)	*	*										*			
Timea crassa (Topsent, 1900)	*					*		*	*			*			
Timea cumana Pulitzer-Finali, 1978						*			*						
Timea fasciata Topsent, 1934	*	*	*		*	*	*	*				*			
Timea geministellata Pulitzer-Finali, 1978						*									
Timea irregularis Sarà & Siribelli, 1960		*				*									
Timea mixta (Topsent, 1896)		*			*										
Timea simplicistellata Pulitzer-Finali, 1983		*										*			
Timea stellata (Bowerbank, 1866)		*		*	*	*	*	*			*	*			
Timea stellifasciata Sarà & Siribelli, 1960						*	*								
Timea unistellata (Topsent, 1892)		*			*	*	*	*	*		*	*			
Alectonidae															
Alectona millari Carter, 1879	*	*	*		*	*	*	*	*			*			
Delectona alboransis Rosell, 1996									*						
Delectona ciconiae Bavestrello et al., 1996			*												
Delectona madreporica Bavestrello et al., 1997		*													
Dotona pulchella mediterranea Carter, 1880									*						
Spiroxya heteroclita Topsent, 1896			*		*	*						*			
Spiroxya levispira (Topsent, 1898)	*					*						*			
Spiroxya pruvoti (Topsent, 1900)					*										
Spiroxya sarai (Melone, 1965)		*	*		*										
Chondrillidae															
Chondrosia plebeja Schmidt, 1868										*					
Chondrosia reniformis Nardo, 1847	*	*	*	*	*	*	*	*		*	*	*	*	*	*
Chondrilla nucula Schmidt, 1862	*	*	*	*	*	*	*	*			*	*			*
Thymosiopsis conglomerans Vacelet et al., 2000	*														
Thymosiopsis cuticulatus Vacelet & Perez, 1998	*														
Corallistidae															
Corallistes masoni (Bowerbank, 1869)	*	*				*									
Theonellidae															
Discodermia polydiscus Bocage, 1870	*												*		
Siphonidiidae															
Siphonidium ramosum (Schmidt, 1870)	*	*				*						*			
Azoricidae															
Leiodermatium lynceus Schmidt, 1870						*									
Desmanthidae															
Desmanthus incrustans (Topsent, 1889)	*	*				*						*			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Petromica grimaldi Topsent, 1898						*			*						
Sulcastrella tenens (Vacelet, 1969)	*					*									
Acarnidae															
Acarnus souriei (Lévi, 1952)		*													
Acarnus polytylus Pulitzer-Finali, 1983												*			
Acarnus tortilis Topsent, 1892	*	*			*	*	*		*		*	*			
Acheliderma lemniscata Topsent, 1892					*										
Damiria curvata (Vacelet, 1969)	*														
Iophon hyndmani Bowerbank, 1866					*				*						
Iophon nigricans (Bowerbank, 1866)									*						
Iophon pattersoni (Bowerbank, 1866)				*											
Microcionidae sub fam Microcioninae															
Clathria anchorata (Carter, 1874)	*								*						
Clathria arroyoi Uriz, 1984					*										
Clathria coralloides (Olivi, 1792)	*	*		*	*	*	*		*	*		*			
Clathria compressa Schmidt, 1862	*	*		*	*	*				*					
Clathria depressa Sarà & Melone, 1966		*													
Clathria marissuperi Pulitzer-Finali, 1983				*											
Clathria oxeifera (Ferrer Hernandez, 1921)					*										
Clathria pluricyla Pulitzer-Finali, 1983		*													
Clathria toxistricta Topsent, 1925	*		*		*	*									
Clathria toxistyla (Sarà, 1959)		*				*	*					*			
Clathria toxivaria (Sarà, 1959)	*	*	*		*	*	*					*			
Clathria (Microciona) angularis (Sarà & Siribelli, 1960)						*									
Clathria (Microciona) armata (Bowerbank, 1866)				*					*			*			
Clathria (Microciona) atrasanguinea (Bowerbank, 1862)	*	*			*	*									
Clathria (Microciona) chelifera (Lévi, 1960)								*			*				
Clathria (Microciona) cleistochela (Topsent, 1925)		*				*						*			
Clathria (Microciona) duplex (Sarà, 1958)						*		*	*						
Clathria (Microciona) frogeti (Vacelet, 1969)	*														
Clathria (Microciona) gradalis (Topsent, 1925)	*	*				*			*			*			*
Clathria (Microciona) haplotoxa (Topsent, 1928)											*				
Clathria (Microciona) levii (Sarà & Siribelli, 1960)						*									
Clathria (Microciona) poecilosclera (Sarà & Siribelli, 1960)						*									
Clathria (Microciona) spinarcus (Carter & Hope, 1889)	*			*	*	*			*		*				
Clathria (Microciona) strepsitoxa (Hope, 1889)	*				*	*					*	*			
Clathria (Microciona) cfr. *tenuissima* (Stephens, 1916)					*										
Clathria (Microciona) toximajor (Topsent, 1925)					*	*									
Clathria (Microciona) toxirecta (Sarà & Siribelli, 1960)						*									
Clathria (Microciona) toxitenuis (Topsent, 1925)	*	*			*	*	*					*			
Clathria (Thalysias) jolicoeuri (Topsent, 1892)	*	*			*	*									*
Microcionidae sub fam Ophlitaspongiinae															
Antho dichotoma (Esper, 1794)									*						
Antho involvens (Schmidt, 1864)	*	*	*	*	*	*	*		*	*	*	*			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Antho involvens inconstans Topsent, 1925						*									
Antho paradoxa Babic, 1922				*											
Antho paucispina Sarà & Siribelli, 1962						*									
Antho arcitenens (Topsent, 1892) *incertae sedis*					*										
Antho (Acarnia) circonflexa (Lévi, 1960)						*									
Antho (Acarnia) coriacea (Bowerbank, 1874)						*									
Antho (Acarnia) cfr. *novizelanica* (Ridley, 1881)									*						
Antho (Acarnia) dirrhopalina (Topsent, 1927)					*										
Ophlitaspongia seriata (Grant, 1826)				*											
Ophlitaspongia translata Pulitzer-Finali, 1978						*									
Raspailiidae															
Raspailia gracillima Topsent, 1894										*	*				
Raspailia viminalis Schmidt, 1862	*	*	*	*	*	*				*				*	
Raspailia virgultosa (Bowerbank, 1866)		*		*											
Aulospongus spinosum (Topsent, 1928)									*						
Endectyon delaubenfelsi Burton, 1930		*				*									
Endectyon pilosus (Vacelet, 1961)		*			*										
Eurypon cinctum Sarà, 1960		*			*	*			*						
Eurypon clavatum (Bowerbank, 1866)	*	*				*						*			
Eurypon coronula (Bowerbank, 1874)	*	*			*				*						
Eurypon denisae (Vacelet, 1969)	*														
Eurypon hispidulum (Topsent, 1904)	*														
Eurypon lacazei (Topsent, 1891)	*	*			*	*									
Eurypon major Sarà & Siribelli, 1960		*				*	*								
Eurypon obtusum (Vacelet, 1969)	*														
Eurypon pilosella (Topsent, 1904)									*						
Eurypon topsenti Pulitzer-Finali, 1983		*										*			
Eurypon vescicularis Sarà & Siribelli, 1960		*				*	*								
Eurypon viride (Topsent, 1889)	*	*			*	*		*	*	*		*			
Hymeraphia stellifera (Bowerbank, 1866)						*									
Raspaciona aculeata (Johnston, 1842)	*	*			*	*	*				*	*		*	
Raspaciona calva Sarà, 1958						*									
Raspaciona robusta Sarà, 1958						*									
Rhabdeurypon spinosum Vacelet, 1969	*				*										
Ceratopsion minor Pulitzer-Finali, 1983		*													
Lithoplocamia spinispiculum (Carter, 1876)	*								*						
Rhabderemiidae															
Rhabderemia indica Dendy, 1905		*					*					*			
Rhabderemia minutula (Carter, 1876)	*	*			*	*	*								
Rhabderemia toxigera Topsent, 1892					*										
Rhabderemia spinosa Topsent, 1896	*														
Chondropsidae															
Batzella friabilis Pulitzer-Finali, 1978						*									

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Batzella inops (Topsent, 1891)	*	*	*		*	*	*	*	*	*	*	*			
Psammoclema nicaeense (Pulitzer-Finali & Pronzato, 1980)		*													
Coelosphaeridae															
Chaetodoryx richardi Topsent, 1927		*				*	*								
Coelospahera (Histodermion) cryosi (Boury-Esnault et al., 1994)									*						
Forcepia (Leptolabis) brunnea (Topsent, 1904)		*			*	*			*						
Forcepia (Leptolabis) exilis (Topsent, 1892)	*														
Forcepia (Leptolabis) luciensis (Topsent, 1888)	*	*				*			*	*					
Forcepia (Leptolabis) megachela (Maldonado, 1992)									*						
Histodermella apuliae Sarà, 1969							*								
Lissodendoryx cavernosa (Topsent, 1892)						*	*					*			
Lissodendoryx schmidti (Ridley, 1844)														*	
Lissodendoryx basispinosa Sarà, 1958					*	*									
Lissodendoryx caduca (Schmidt, 1868)										*					
Lissodendoryx cavernosa (Topsent, 1892)	*	*				*						*			
Lissodendoryx isodictyalis (Carter, 1882)		*		*		*		*	*			*			
Lissodendoryx lundbecki Topsent, 1913									*						
Crambeidae															
Crambe crambe (Schmidt, 1862)	*	*	*	*	*	*	*	*	*	*	*	*	*		*
Crambe tailliezi Vacelet & Boury-Esnault, 1982	*	*			*				*						
Crambe tuberosa Maldonado & Benito, 1991									*						
Discorhabdella hindei Boury-Esnault et al., 1992									*						
Crellidae															
Anisocrella hymedesmina Topsent, 1927	*								*						
Crella elegans (Schmidt, 1862)	*	*	*	*	*	*			*						
Crella pulvinar (Schmidt, 1868)	*	*	*		*	*			*	*					
Crella rubiginosa (Schmidt, 1862)				*											
Crella (Pytheas) alba (Vacelet, 1969)	*														
Crella (Pytheas) digitifera (Lévi, 1959)		*													
Crella (Pytheas) fusifera (Sarà, 1969)							*								
Crella (Pytheas) nodulosa (Sarà, 1959)						*									
Crella (Pytheas) rosea (Topsent, 1892)	*	*	*		*	*			*	*	*	*			
Crella (Pytheas) sigmata (Topsent, 1925)	*	*			*	*			*						
Crella (Yvesia) pyrula (Carter, 1876)									*						
Crella (Yvesia) topsenti (Babic, 1922)		*	*	*											
Crellastrina alecto (Topsent, 1898)												*			
Desmacididae															
Desmacidon adriatica Sarà, 1969							*								
Desmacidon fruticosa Montagu, 1818	*				*				*						
Hymedesmiidae															
Hemimycale columella (Bowerbank, 1874)	*	*	*	*	*	*	*	*	*	*		*			
Hamigera hamigera (Schmidt, 1862)				*	*		*				*	*			

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Hymedesmia baculifera (Topsent, 1901)		*			*	*			*	*					
Hymedesmia bronstedi Burton, 1930					*										
Hymedesmia castanea Sarà, 1964		*													
Hymedesmia consanguinea Lundbeck, 1910				*											
Hymedesmia cfr. *depressa* Topsent, 1928									*						
Hymedesmia gracilisigma Topsent, 1928	*	*													
Hymedesmia inflata Vacelet, 1969	*														
Hymedesmia koehleri (Topsent, 1896)									*						
Hymedesmia mollis Lundbeck, 1910				*											
Hymedesmia mutabilis (Topsent, 1904)	*											*			
Hymedesmia omissa Topsent, 1938										*					
Hymedesmia pansa Bowerbank, 1882		*	*		*	*		*	*			*			
Hymedesmia peachi Bowerbank, 1882	*	*			*	*	*		*			*			
Hymedesmia pennata Bronsted, 1932									*						
Hymedesmia plicata Topsent, 1928	*														
Hymedesmia cfr. *pugio* Lundbeck, 1910									*						
Hymedesmia rissoi (Topsent, 1936)		*				*									
Hymedesmia serrulata Vacelet, 1969	*														
Hymedesmia versicolor (Topsent, 1893)		*			*	*	*					*			
Hymetrichita rectirhaphis Pulitzer-Finali, 1983						*									
Hymedesmia (Stylopus) dujardini (Bowerbank, 1866)		*	*		*	*			*	*	*	*			
Hymedesmia (Stylopus) nigrescens (Topsent, 1925)		*				*		*							*
Hymedesmia (Stylopus) pulposus (Topsent, 1925)	*	*				*									
Phorbas dendyi (Topsent, 1892)				*	*										
Phorbas dives (Topsent, 1891)		*			*	*			*		*	*			
Phorbas fibulatum (Topsent, 1893)		*			*	*			*						
Phorbas fictitius Bowerbank, 1866	*	*	*	*	*	*	*	*	*	*		*			
Phorbas coriaceus (Fristedt, 1885)		*			*	*			*						
Phorbas lieberkuhni (Burton, 1930)		*		*			*								
Phorbas mercator Schmidt, 1868		*		*					*	*	*	*			
Phorbas paupertas Bowerbank, 1866	*	*	*			*	*	*	*		*	*			
Phorbas plumosum (Montagu, 1818)		*		*		*	*		*						
Phorbas posidoni Voultsiadou-Koukoura & van Soest, 1991													*		
Phorbas tenacior (Topsent, 1925)	*	*	*		*	*	*	*				*	*		
Plocamionida ambigua (Bowerbank, 1866)	*	*			*				*						
Spanioplon armaturum (Bowerbank, 1866)	*	*			*							*			
Spanioplon osculosum (Topsent, 1892)	*														
Myxillidae															
Melonanchora emphysema (Schmidt, 1875)	*	*													
Myxilla incrustans (Topsent, 1892)	*								*	*	*				
Myxilla iotrochotina (Topsent, 1892)	*					*		*				*			
Myxilla macrosigma Boury-Esnault, 1971	*				*										
Myxilla prouhoi (Topsent, 1892)	*	*		*	*	*				*				*	*
Myxilla rosacea (Lieberkühn, 1859)	*	*	*	*	*	*	*	*	*	*		*		*	*

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Tedaniidae															
Tedania anhelans (Lieberkühn, 1859)	*	*	*	*	*	*	*	*	*			*			
Tedania digitata (Schmidt, 1862)				*	*	*				*	*				
Cladorhizidae															
Asbestopluma hypogea Vacelet & Boury-Esnault, 1996	*														
Cladorhiza abyssicola Sars, 1872		*		*					*						
Desmacellidae															
Biemna partenopea Pulitzer-Finali, 1978			*			*			*						
Biemna peachi Bowerbank, 1861	*								*						
Biemna tenuisigma Pulitzer-Finali, 1978						*									
Biemna variantia (Topsent, 1927)									*						
Desmacella inornata (Bowerbank, 1866)	*	*	*						*		*	*			
Desmacella annexa (Schmidt, 1870)	*	*	*	*	*	*			*			*			
Desmacella campechianum (Topsent, 1889)											*				
Dragmatella aberrans (Topsent, 1890)	*	*							*						
Esperiopsidae															
Esperiopsis fucorum Esper, 1794					*				*						
Esperiopsis strongylophora Vacelet, 1969	*														
Ulosa digitata (Schmidt, 1866)		*	*	*	*	*									
Ulosa stuposa (Esper, 1794)	*	*	*		*				*			*			
Ulosa tenellula Pulitzer-Finali, 1983												*			
Ulosa tubulata Pulitzer-Finali, 1983		*													
Hamacanthidae															
Hamacantha falcula (Bowerbank, 1874)	*	*				*			*		*				
Hamacantha implicans Lundbeck, 1902	*	*										*		*	
Hamacantha johnsoni (Bowerbank, 1864)	*	*		*					*			*			
Hamacantha lundbecki Topsent, 1904	*														
Hamacantha megancistra Pulitzer-Finali, 1978						*									
Mycalidae															
Mycale contarenii (Martens, 1824)	*	*		*	*	*					*	*			
Mycale dentata (Sarà, 1958)						*									
Mycale lingua (Bowerbank, 1866)		*				*	*					*			
Mycale macilenta (Bowerbank, 1866)	*	*		*	*	*			*	*	*				
Mycale massa (Schmidt, 1862)	*	*		*	*	*	*					*		*	*
Mycale minima (Waller, 1880)		*													
Mycale retifera Topsent, 1924		*	*		*	*		*							*
Mycale rotalis (Bowerbank, 1874)	*	*			*	*	*	*	*						
Mycale sanguinea Tsurnamal, 1969														*	
Mycale similaris (Bowerbank, 1874)						*									
Mycale syrinx (Schmidt, 1862)		*	*	*	*	*			*		*	*			
Mycale tunicata (Schmidt, 1862)		*	*	*	*	*	*								
Mycale (Paresperella) serrulata (Sarà & Siribelli, 1960)	*					*			*						

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Merliidae															
Merlia deficiens Vacelet, 1980		*													
Merlia lipoclavidisca Vacelet & Uriz, 1991					*										
Merlia normani Kirkpatrick, 1908	*				*	*	*	*				*	*		
Podospongiidae															
Podospongia lovenii Du Bocage, 1870	*	*							*						
Latrunculiidae															
Latrunculia citharistae Vacelet, 1969	*				*				*						
Latrunculia insignis Topsent, 1892	*								*			*			
Latrunculia tarentina Pulitzer-Finali, 1983												*			
Latrunculiidae incertae sedis															
Microstylifer rugosus Vacelet, 1969	*														
Axinellidae															
Auletta pedunculata (Topsent, 1896)		*													
Axinella agnata Topsent, 1896									*						
Axinella babici Vacelet, 1961		*													
Axinella cannabina (Esper, 1794)				*		*	*	*		*		*	*	*	
Axinella centrotylota Pansini, 1982			*		*										
Axinella damicornis (Esper, 1794)	*	*	*	*	*	*	*	*	*	*		*	*		
Axinella egregia (Ridley, 1881)									*						
Axinella estacioi Carballo & Garcia Gomez, 1996									*						
Axinella fibrosa Ridley & Dendy					*										
Axinella guiteli Topsent, 1826	*				*										
Axinella macrostyla Babic, 1922				*											
Axinella mahonensis Ferrer Hernandez, 1916					*										
Axinella minuta Lévi, 1957		*												*	
Axinella polypoides Schmidt, 1862	*	*	*	*	*	*	*			*		*		*	
Axinella pseudominuta Bibiloni, 1993					*										
Axinella pumila Babic, 1922				*	*				*						
Axinella salicina Schmidt, 1868									*	*					
Axinella vaceleti Pansini, 1982	*	*			*										
Axinella verrucosa (Esper, 1794)	*	*		*	*	*	*	*	*	*	*	*		*	
Phakellia hirondellei (Topsent, 1892)									*						
Phakellia robusta Bowerbank, 1866	*				*	*			*						
hakellia rugosa (Bowerbank, 1866)					*							*			
Phakellia ventilabrum (Linné, 1767)	*	*		*	*				*						
Bubaridae															
Bubaris carcisis Vacelet, 1969	*	*				*									
Bubaris sarayi Ilan et al., 1994														*	
Bubaris subtyla Pulitzer-Finali, 1983		*			*										
Bubaris vermiculata (Bowerbank, 1866)	*	*		*	*	*	*		*			*			*

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Cerbaris alborani (Boury-Esnault et al., 1994)									*						
Cerbaris implicata (Pulitzer-Finali, 1983)		*													
Cerbaris curvispiculifera (Carter, 1880)	*				*										
Hymerhabdia contracta Sarà & Siribelli, 1962						*									
Hymerhabdia intermedia Sarà & Siribelli, 1960						*									
Hymerhabdia oxytrunca Topsent, 1904	*	*			*										
Hymerhabdia papillosa Sarà & Siribelli, 1962	*					*									
Hymerhabdia pori Tsurnamal, 1969														*	
Hymerhabdia reichi Tsurnamal, 1969														*	
Hymerhabdia typica Topsent, 1892		*				*									
Monocrepidium vermiculatum Topsent, 1898	*	*			*	*		*							
Desmoxyidae															
Didiscus spinoxeatus Corriero et al., 1997								*							
Didiscus styliferus Tsurnamal, 1969						*						*		*	
Halicnemia geniculata Sarà, 1958	*					*									
Halicnemia patera Bowerbank, 1864	*	*		*	*	*		*		*					
Halicortex loricata Sarà, 1958		*				*									
Higginsia ciccaresei Pansini & Pesce, 1998												*			
Higginsia mediterranea Pulitzer-Finali, 1978						*									
Myrmekioderma lacazii (Tsurnamal, 1969)										*				*	
Myrmekioderma laxa (Topsent, 1892)	*					*									
Myrmekioderma spelaea (Pulitzer-Finali, 1983)					*	*	*					*			
Dictyonellidae															
Acanthella acuta Schmidt, 1862	*	*	*	*	*	*	*	*	*	*	*	*			
Acanthella annulata Sarà, 1958						*									
Dictyonella incisa (Schmidt, 1880)	*	*	*		*	*	*	*	*		*	*			
Dictyonella marsillii (Topsent, 1893)		*			*	*	*		*	*					*
Dictyonella obtusa (Schmidt, 1862)	*	*		*	*	*				*					
Dictyonella pelligera (Schmidt, 1864)	*	*		*	*	*	*								*
Scopalina azurea Bibiloni, 1993					*										
Scopalina lophyropoda Schmidt, 1862	*	*		*	*						*				
Tethyspira spinosa (Bowerbank, 1874)		*				*		*				*			
Halichondriidae															
Amorphinopsis filigrana (Schmidt, 1862)				*											
Amorphinopsis pallescens (Topsent, 1892)												*			
Axinyssa luteus (Lendenfeld, 1896)				*											
Ciocalypta penicillus Bowerbank, 1864	*	*			*	*		*							*
Halichondria agglomerans Cabioch, 1968					*										
Halichondria aurantiaca Ferrer-Hernandez, 1916					*				*						
Halichondria bowerbanki Burton, 1930	*	*		*		*		*	*						
Halichondria convolvens Sarà, 1960						*									
Halichondria membrana (Bowerbank, 1866)															
Halichondria panicea (Pallas, 1766)	*	*		*		*	*	*	*			*			

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Halichondria magna (Vacelet, 1969)	*				*										
Halichondria semitubulosa (Lieberkühn, 1859)		*	*	*	*	*	*	*	*			*			*
Hymeniacidon mammeata Bowerbank, 1866		*		*											
Hymeniacidon sanguinea (Grant, 1826)	*	*	*	*	*	*	*	*	*	*	*	*			
Laminospongia subtilis Pulitzer-Finali, 1983		*													
Spongosorites cavernicola Bibiloni, 1993					*										
Spongosorites flavens Pulitzer-Finali, 1983		*			*	*	*		*			*			
Spongosorites genitrix (Schmidt, 1870)					*									*	
Spongosorites intricatus (Topsent, 1892)	*	*		*	*	*	*					*			
Spongosorites maxima Uriz, 1983					*										
Spongosorites pachastrelloides (Topsent, 1892)		*		*					*						
Topsentia aurantiaca (Schmidt, 1862)		*	*	*	*	*						*			
Topsentia contorta Sarà, 1961		*			*	*	*								
Topsentia garciae Bibiloni, 1993					*										
Topsentia hyalina (Pulitzer-Finali, 1978)						*									
Topsentia mixta Sarà, 1958						*									
Agelasidae															
Agelas oroides (Schmidt, 1864)	*	*	*		*	*	*	*		*	*	*	*	*	*
Callyspongiidae															
Callyspongia septimaniensis Griessinger, 1971	*														
Siphonochalina asterigena Schmidt, 1868										*					
Siphonochalina balearica Ferrer-Hernandez, 1916					*				*		*	*			
Siphonochalina coriacea Schmidt, 1868	*					*		*	*	*	*	*			
Siphonochalina expansa Sarà, 1960						*									
Siphonochalina subcornea Griessinger, 1971	*	*			*										
Chalinidae															
Dendroxea adumbrata Corriero et al., 1996								*							
Dendroxea lenis (Topsent, 1892)	*				*	*						*			
Dendroxea pseudodidiscoides Corriero et al., 1996							*								
Haliclona (Gellius) angulatus (Bowerbank, 1866)	*	*	*	*	*	*	*		*			*			
Haliclona (Gellius) apertus (Sarà, 1960)	*				*	*									
Haliclona (Gellius) arnesenae (Arndt, 1927)	*														
Haliclona (Gellius) bioxeata (Boury-Esnault et al., 1994)									*						
Haliclona (Gellius) cucurbitiformis (Kirkpatrick, 1907)				*					*						
Haliclona (Gellius) dubius (Babic, 1922)		*		*	*	*	*								
Haliclona (Gellius) fibulatus (Schmidt, 1862)	*	*	*	*	*	*	*					*		*	*
Haliclona (Gellius) flagellifer (Ridley & Dendy, 1886)	*	*	*	*	*	*			*						
Haliclona (Gellius) luridus (Lundbeck, 1910)					*										
Haliclona (Gellius) lacazei (Topsent, 1893)	*				*				*	*					
Haliclona (Gellius) marismedi (Pulitzer-Finali, 1978)						*									
Haliclona (Gellius) microsigma (Babic, 1922)		*		*	*										
Haliclona (Gellius) microxifer (Topsent, 1925)						*					*				
Haliclona (Gellius) ravus (Stephens, 1912)		*													

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Haliclona (Gellius) tenuisigma (Sarà & Siribelli, 1960)						*									
Haliclona (Gellius) uncinatus (Topsent, 1892)					*										
Haliclona citrina (Topsent, 1892)	*				*				*						
Haliclona elegans (Bowerbank, 1866)	*	*		*			*	*	*			*			
Haliclona fertilis (Keller, 1879)	*					*		*							
Haliclona fistulosa (Bowerbank, 1866)											*				
Haliclona griessingeri (Griessinger, 1971)					*										
Haliclona limbata (Montagu, 1818)	*	*		*		*		*	*						
Haliclona mediterranea Griessinger, 1971	*	*	*	*	*	*	*	*				*	*		*
Haliclona membranacea (Schmidt, 1868)										*					
Haliclona renieroides (Schmidt, 1868)						*		*		*					
Haliclona stirpescens (Topsent, 1925)	*			*		*						*			
Haliclona subtilis Griessinger, 1971	*						*		*		*	*			
Haliclona cribrata (Pulitzer-Finali, 1983)								*							
Haliclona laevis (Griessinger, 1971)									*						
Haliclona palmata (Schmidt, 1862)				*		*									
Haliclona reptans (Griessinger, 1971)	*		*						*						
Haliclona simulans (Johnston, 1842)	*	*	*	*	*	*		*	*	*				*	
Haliclona varia (Sarà, 1958)		*			*	*	*	*				*			
Haliclona venata (Sarà, 1960)						*		*							
Haliclona (Rhizoniera) rhizophora (Vacelet, 1969)	*	*			*										
Haliclona (Reniera) alba (Schmidt, 1862)				*											
Haliclona (Reniera) aquaeductus (Schmidt, 1862)	*	*		*	*	*			*						
Haliclona (Reniera) arenata (Griessinger, 1971)	*				*		*								
Haliclona (Reniera) crassa (Topsent, 1925)	*	*	*					*							
Haliclona (Reniera) cratera (Schmidt, 1862)	*	*	*	*	*	*	*	*			*	*	*	*	
Haliclona (Reniera) flavescens (Topsent, 1893)					*										
Haliclona (Reniera) fulva (Topsent, 1893)	*	*			*	*	*		*			*			
Haliclona (Reniera) grossa (Schmidt, 1864)				*	*	*	*			*					*
Haliclona (Reniera) implexa (Schmidt, 1868)	*	*		*	*	*	*		*						*
Haliclona (Reniera) mamillata (Griessinger, 1971)		*			*		*				*	*	*		
Haliclona (Reniera) mucosa (Griessinger, 1971)	*	*	*		*	*	*		*						
Haliclona (Reniera) omissa (Griessinger, 1971)					*	*									
Haliclona (Reniera) perlucida (Griessinger, 1971)	*				*			*	*		*	*			
Haliclona (Reniera) plana (Topsent, 1892)	*				*	*									
Haliclona (Reniera) pocilliformis (Griessinger, 1971)			*						*						
Haliclona (Reniera) poecillastroides (Vacelet, 1969)	*	*	*												
Haliclona (Reniera) sarai (Pulitzer-Finali, 1969)	*	*	*	*	*	*	*	*				*	*		
Haliclona (Reniera) valliculata (Griessinger, 1971)	*	*			*	*						*			
Haliclona (Reniera) viscosa (Topsent, 1888)		*					*					*			
Niphatidae															
Amphimedon rustica (Schmidt, 1868)						*				*					
Phloeodictydae															
Aka labyrinthica (Hancock, 1849)	*	*	*		*						*				
Calyx nicaeensis (Risso, 1826)	*	*	*		*	*	*				*	*			
Oceanapia constructa (Rützler, 1965)				*											

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Oceanapia decipiens (Sarà, 1958)						*		*							
Oceanapia isodictyiformis (Carter, 1882)	*			*			*	*				*			
Oceanapia perforata (Sarà, 1960)						*									
Oceanapia vacua (Sarà, 1961)	*						*								
Pachypellina parietalis (Topsent, 1893)					*		*								
Dendrectilla tremitensis Pulitzer-Finali, 1983							*								
Petrosidae															
Petrosia clavata (Esper, 1794)		*													
Petrosia ficiformis (Poiret, 1789)	*	*	*	*	*	*	*	*		*	*	*	*	*	*
Petrosia pulitzeri Pansini, 1996						*									
Petrosia raphida Boury-Esnault et al., 1994									*						
Irciniidae															
Ircinia chevreuxi (Topsent, 1894)											*				
Ircinia dendroides (Schmidt, 1862)	*	*	*	*	*	*	*		*	*	*	*	*		
Ircinia oros (Schmidt, 1864)	*	*	*	*	*	*	*				*	*	*		*
Ircinia paucifilamentosa Vacelet, 1961													*		
Ircinia pipetta (Schmidt, 1868)			*			*			*	*					
Ircinia retidermata Pulitzer-Finali & Pronzato, 1980		*												*	
Ircinia variabilis (Schmidt, 1862)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Sarcotragus foetidus Schmidt, 1862	*	*	*	*	*	*	*				*	*	*	*	
Sarcotragus spinosulus Schmidt, 1862	*	*	*	*	*	*	*	*	*		*	*	*		
Thorectidae															
Cacospongia mollior Schmidt, 1862	*	*	*	*	*	*	*	*		*	*		*		*
Cacospongia proficens Pulitzer-Finali & Pronzato, 1980							*								
Cacospongia scalaris Schmidt, 1862	*	*	*	*	*	*	*	*		*	*	*	*		*
Hyrtios collectrix (Schulze, 1879)	*	*			*	*	*		*	*	*				
Hyrtios erecta (Keller, 1889)														*	
Fasciospongia cavernosa (Schmidt, 1862)	*	*	*	*	*	*	*			*		*	*	*	*
Fasciospongia caerulea Vacelet, 1959											*				
Spongiidae															
Spongia agaricina Pallas, 1766	*	*	*		*							*	*		
Spongia nitens (Schmidt, 1862)	*	*		*	*	*			*		*	*	*		
Spongia officinalis Linné, 1759		*	*	*	*	*	*	*	*	*	*	*	*	*	*
Spongia officinalis adriatica (Schmidt, 1862)	*			*	*	*									
Spongia virgultosa (Schmidt, 1868)	*	*	*		*	*	*	*	*	*		*	*		
Spongia zimocca Schmidt, 1862		*		*							*		*		
Hippospongia communis (Lamarck, 1813)	*	*	*		*	*		*		*	*	*	*		*
Coscinoderma sporadense Voultsiadou-Koukoura et al., 1991													*		
Dysideidae															
Dysidea avara (Schmidt, 1862)	*	*	*	*	*	*	*	*				*	*		
Dysidea avara pallescens (Schmidt, 1862)				*	*	*				*		*			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Dysidea fragilis (Montagu, 1818)	*	*	*	*	*	*	*	*	*		*	*	*		*
Dysidea incrustans (Schmidt, 1862)		*	*	*		*		*			*	*	*		
Dysidea perfistulata Pulitzer-Finali & Pronzato, 1980							*								
Dysidea tupha (Martens, 1824)	*	*	*	*	*	*							*		
Pleraplysilla reticulata Maldonado & Uriz, 1999									*						
Pleraplysilla spinifera (Schulze, 1878)	*	*	*		*	*		*	*		*	*	*		
Darwinellidae															
Darwinella australiensis Carter, 1885		*			*	*									
Darwinella dalmatica Topsent, 1905							*								
Darwinella gardineri Topsent, 1905		*													
Darwinella intermedia Topsent, 1893					*										
Darwinella viscosa Boury-Esnault, 1971					*										
Aplysilla rosea (Barrois, 1876)	*	*	*		*	*	*	*	*		*	*	*		
Dendrilla acantha Vacelet, 1958													*		
Dendrilla cirsioides Topsent, 1893	*				*					*					
Chelonaplysilla erecta Tsurnamal, 1967														*	
Chelonaplysilla psammophila (Topsent, 1928)	*	*			*										
Chelonaplysilla noevus (Carter, 1876)	*	*			*	*	*					*			
Dictyodendrillidae															
Spongionella gracilis (Vosmaer, 1883)			*			*									
Spongionella pulchella (Sowerby, 1806)	*	*			*	*			*	*	*	*	*		
Acanthodendrilla levii Uriz & Maldonado, 2000					*										
Halisarcidae															
Halisarca dujardini Johnston, 1842	*	*		*	*	*				*			*		
Halisarca sputum Topsent, 1893					*		*								
Aplysinidae															
Aplysina aerophoba Schmidt, 1862	*	*	*	*	*	*	*	*		*	*	*	*		
Aplysina cavernicola Vacelet, 1959	*	*	*	*	*	*	*	*					*		
Ianthellidae															
Hexadella detritifera Topsent, 1913		*										*			
Hexadella racovitzai Topsent, 1896	*	*			*						*	*		*	
Incertae sedis															
Myceliospongia arenosa Vacelet & Perez, 1998	*												*		