Research Article

Preliminary Data On The Occurrence And Distribution Of Shallow Water Marine Sponges (Porifera) Around Maltese Coasts

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Summary. Data on the ecology of the Maltese Porifera is lacking altogether. Even documented basic information on the occurrence of commercial sponge species in Maltese coastal waters is unavailable. This study presents the results of a four year diving survey aimed at studying the occurrence and distribution of shallow water sponges around the Maltese Islands. In all, 33 species of Porifera have been identified, most of which are new records for the Maltese Islands. Information on the bathymetric distribution and abundance of these species is given. Although an extensive area has been covered in our survey, we have not recorded any commercial sponges. It is therefore likely that these species do not occur locally, at least in shallow inshore waters.

Keywords: Porifera, sponges, Maltese Islands, sponge disease, species lists, check-lists, sponge fisheries.

Sponges are a ubiquitous component of the marine benthos. Some species have considerable commercial importance as their fibrous skeleton is the familiar bathroom sponge and they have been exploited by man since antiquity. Until recently there has been a thriving fishery for sponges in the Mediterranean centered mainly on Greece, Tunisia and Turkey (FAO, 1994). Despite both their commercial importance and interesting biology, there is a lack of even the most basic biological and ecological information on the Maltese sponge fauna.

In July 1990, a FAO regional workshop was held in Malta to discuss the situation concerning the occurrence of a disease which had afflicted both commercial and non-commercial species of sponges since 1986 (FAO, 1994). This disease had a large economic impact on the Mediterranean commercial sponge fisheries, having practically eliminated this industry in some countries (Vacelet, 1991). Studies made during the past four years have suggested that the disease is due to a bacterium which normally plays a part in the digestion of the spongin skeleton of dead sponges by secreting a collagenase enzyme. In conditions stressful to sponges, this bacterium becomes virulent and also attacks the skeletal tissue of live sponges (Vacelet *et al.*, 1994). At the time of the Malta FAO workshop, the authors were asked to supply data on the local occurrence of commercial sponges and on the incidence of the sponge disease. The only information available concerning sponge fisheries in Malta were the recollections of some local fishermen (see below). A literature search for information on the local commercial and non-commercial sponge fauna revealed only a single publication, which recorded nine non-commercial species of Porifera (Micallef and Evans, 1968). These identifications are suspect, however, as the identification source used by the authors is a semi-popular guide to Mediterranean marine life which only features a handful of the species occurring in the Mediterranean, and in any case, identification of sponges is difficult without detailed histological examination. The lack of local information on commercial sponges and of a local sponge fishery contrasts with the important sponge fisheries in several nearby Mediterranean countries such as Italy, Tunisia and Greece. However, local fishermen from Wied iz-Zurrieq confirmed that foreign fishing boats had in the past collected commercial sponges off Filfla Island. From the fishermen's descriptions of the diving gear used by the sponge fishermen at that time, such an activity must have been carried out several decades ago. There is also a documented record in local newspapers of the 1890s concerning commercial sponge fishing activities in Malta (J. Inguanez, personal communication, 1991).

The lack of basic data on the local sponge fauna, such as an accurate species list, prompted the authors to initiate a survey having three primary aims:

1. To compile a checklist of the shallow water Porifera of the Maltese Islands and to provide basic ecological information on their bathymetric distribution and abundance.

2. To establish whether any commercial sponges exist locally.

3. To monitor the local occurrence of the sponge disease.

As a preliminary to this survey, J. Vacelet (Station Marine d'Endoume, Marseille) together with one of us (JAB), carried out five dives at different sites around mainland Malta to assess the incidence of the sponge disease amongst local sponge populations, to record the most commonly occurring non-commercial species, to gain experience in their field identification and to search for commercial species. Data on the incidence of the

sponge disease amongst non-commercial sponges obtained during this preliminary survey have been published in Vacelet *et al.* (1994) and FAO (1994).

Materials and methods

A total of 31 SCUBA dives were carried out at depths ranging from zero to 45m in 17 different localities around the Maltese Islands (Figure 1). In view of the indications of a past sponge fishery off Filfla, nine out of the 31 dives were made off this island. During most dives, divers working in pairs moved underwater along 6-metre wide belt transects at pre-determined bearings. The length of these transects varied depending on the depth of the water at the site concerned. All sponges encountered in the transects were identified and recorded *in situ* where possible, but specimens were also collected for later identification in the laboratory. An estimate was made of the abundance and a particular look-out was kept for diseased individuals and commercial species. A few specimens which are included in our species list were obtained from samples collected by trawling at 40-150m off mainland Malta (Tables I and II), whilst others were collected during other studies. Most of the identifications to species level have been checked by J. Vacelet of the Station Marine d'Endoume, Marseille, France. The collection has been deposited at the museum of the Department of Biology, University of Malta.

Results

In all, 33 species of sponges have been identified, most of which are new local records. Table I gives a classified list of the species recorded while Table II provides data on the localities surveyed.

The most abundant species in shallow (1-15m), exposed waters appeared to be *Sarcotragus spinosula* and *Ircinia variabilis*. The latter also occurred, although less abundantly, at depths of 20-25m. In more sheltered shallow waters (2-6m), especially along the rocky headlands of several inlets, *Chondrilla nucula* appeared to have the highest abundance. In sciaphilic environments throughout the 15-35m depth range, *Crambe crambe* and *Agelas oroides* had the highest abundance. *Chondrosia reniformis* and *Petrosia ficiformis* were common in the 5-25m depth range in some of the sites surveyed. At Filfla, *Cacospongia scalaris* was the most abundant species in the 20-35m depth.

No commercial sponge species were encountered during this survey. Only single individuals of non-commercial sponges apparently afflicted by the sponge disease were encountered during dives carried out in 1993 and 1994.

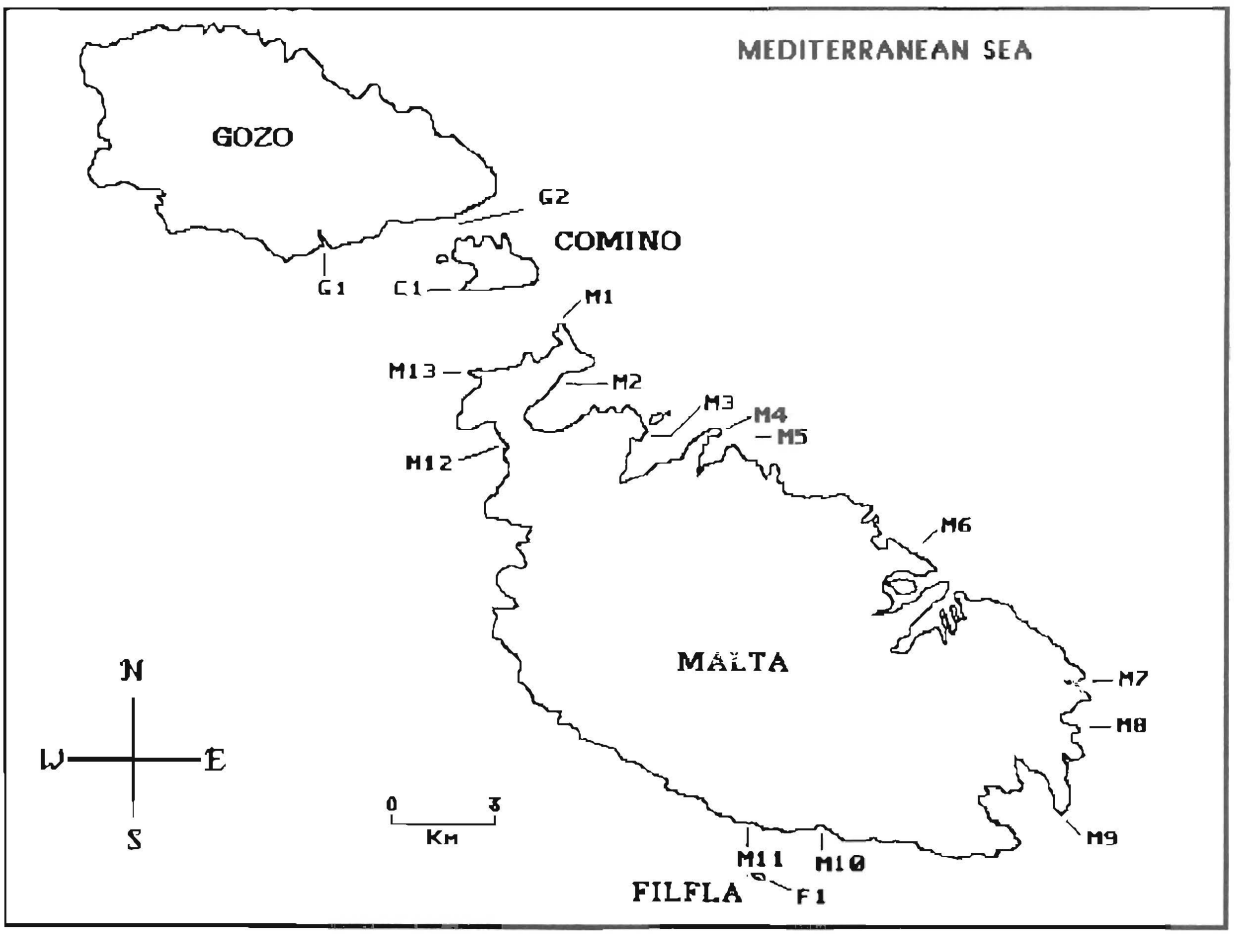

Figure 1: Map of the Maltese Archipelago showing the localities surveyed for sponges.

	Species	Site
Class CALCAREA		
Subclass CALCINEA		
1	*Clathrina clathrus* (SCHMIDT)	M6
Subclass CALCARONEA		
2	*Leuconia* sp.	Xghajra
3	*Petrobiona massiliana* (VACELET)	M13
4	*Sycon elegans* (BOWERBANK)	M12
5	*Ute glabra* (SCHMIDT)	Xghajra
Class DEMOSPONGIAE		
6	*Acanthella acuta* (SCHMIDT)	M6
7	*Agelas oroides* (SCHMIDT)	M1, M5, M9, M10, M12, M13, C1, F1
8	*Anchinoe* sp.	M1,
9	*Anchinoe paupertas* (BOWERBANK)	C1
10	*Aplysina aerophoba* (SCHMIDT)	M2, M4
11	*Axinella verrucosa* (ESPER)	C1
12	*Batzella inops* (TOPSENT)	M1, M10
13	*Cacospongia scalaris* (SCHMIDT)	M2, M3, M4, M6, F1
14	*Cacospongia mollior* (SCHMIDT)	M6, M13
15	*Chondrilla nucula* (SCHMIDT)	M2, M3, M4, M6, M7, M10, M10, M11, G2
16	*Chondrosia reniformis* (NARDO)	M1, M2, M4, M6, M7, M8, M9, M10, M11, M13, C1, C2
17	*Crambe crambe* (SCHMIDT)	M1, M2, M4, M5, M6, M9, M10, M11, M12, M13, C1, G1, G2, F1
18	*Dictyonella incisa* (SCHMIDT)	M3
19	*Dysidea* cf. *fragilis* (MONTAGU)	M1
20	*Dysidea* sp.	M1
21	*Fasciospongia* sp.	M1
22	*Haliclona* sp.	Off Ras il-Wahx
23	*Ircinia dendroides* (SCHMIDT)	C1
24	*Ircinia oros* (SCHMIDT)	M1, M8, M9, M13, C1
25	*Ircinia variabilis* (SCHMIDT)	M1, M2, M4, M5, M6, M8, M9, M10, M12, M13, C1, G1 M9, M10, F1
26	*Oscarella lobularis* (SCHMIDT)	M6
27	*Petrosia ficiformis* (POIRET)	M1, M5, M6, M8,
28	*Raspaciona aculeata* (JOHNSTON)	Off Qammieh
29	*Sarcotragus spinosula* (SCHMIDT)	M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, C1, G1, G2, F1
30	*Scopalina lophyropoda* (SCHMIDT)	Off Qammieh
31	*Siphonochalina* sp.	Off Qammieh
32	*Spiratrella cunctatrix* (SCHMIDT)	M1, M9, M10,M11
33	*Tethya aurantium* (PALLAS)	M12, G1

Table I. Classified list of species recorded. The sites where the species were recorded are indicated by a code corresponding to that in Fig. 1. Sites indicated by their actual name were not surveyed by SCUBA diving but the specimens were obtained from other workers.

Code	Name of site	Date of dive/s	Max. depth	Bottom type
M1	Ahrax Point	May '90	25m	Bedrock/Boulders/*Posidonia oceanica* meadows
		Aug '90	15m	Bedrock/Boulders/*Posidonia oceanica* meadows
M2	Mellieha Bay	Aug '91	15m	Bedrock/Boulders/*Posidonia oceanica* meadows
		Sept '91	20m	Bedrock/Boulders/*Posidonia oceanica* meadows
		Oct '91	15m	Bedrock/Boulders/*Posidonia oceanica* meadows
M3	St Paul's Bay	Oct '94	15m	Bedrock/*Posidonia oceanica* meadows
M4	Qawra Point	May '90	35m	Bedrock/*Posidonia oceanica* meadows
M5	Qawra reef	Sept '91	27m	Bedrock/*Posidonia oceanica* meadows
		Sept '91	27m	Bedrock/*Posidonia oceanica* meadows
M6	Sliema	May '90	30m	Bedrock/*Posidonia oceanica* meadows
M7	Zonqor Point	May '92	15m	Bedrock/*Posidonia oceanica* meadows
M8	Muuxar	Jan '93	35m	Bedrock/Boulders/*Posidonia oceanica* meadows
M9	Delimara	Aug '92	30m	Bedrock/*Posidonia oceanica* meadows
M10	Wied iz-Zurrieq	Aug '91	30m	Bedrock/*Posidonia oceanica* meadows
		Aug '91	35m	Bedrock/*Posidonia oceanica* meadows
M11	Ghar Lapsi	May '90	15m	Bedrock/*Posidonia oceanica* meadows
M12	Anchor Bay	Oct '90	15m	Bedrock/Boulders/*Posidonia oceanica* meadows
M13	Cirkewwa	May '90	30m	Bedrock/*Posidonia oceanica* meadows
		Aug '91	25m	Bedrock/*Posidonia oceanica* meadows
C1	Irqieqa Point	Oct '91	30m	Bedrock/Boulders/*Posidonia oceanica* meadows
G1	Imgarr ix-Xini	Oct '91	25m	Bedrock/*Posidonia oceanica* meadows
G2	Hondoq ir-Rummien	Aug '93	16m	Bedrock/Boulders/*Posidonia oceanica* meadows
F1	Filfla	Aug '92	30m	Boulders/Sand
		Aug '92	30m	Boulders/Sand
		Aug '92	25m	Boulders/Sand
		Aug '92	25m	Bedrock/Boulders/Sand
		Aug '92	25m	Bedrock/Boulders/Sand
		Sept '92	30m	Boulders/Sand
		Sept' 92	25m	Bedrock/Boulders/Sand
		Sept '94	30m	Bedrock/Boulders/Sand
		Sept '94	25m	Boulders/Sand
/	Off Qammieh	Aug '92	40m	Bedrock/Sand
/	Off Ras il-Wahx	Mar '93	150m	Sand/mud
/	Xghajra	Aug '90	0-0.5m	Mediolittoral/Upper infralittoral Bedrock

Table II. Details of the sites surveyed for sponges.

Conclusions

As expected, the majority of sponges recorded during this study belong to the class Demospongiae. Due to the search and sampling methods employed in this study, small sized epibenthic and epiphytic species such as those found in meadows of the seagrass *Posidonia oceanica* may have been overlooked. As a result, our species list is considerably shorter than for other parts of the Mediterranean (see for example Pansini and Pronzato, 1985; Carballo and Garcia-Gomez, 1994) and many more species no doubt occur; there are currently about 554 known species of marine Porifera in the Mediterranean (Pansini, 1990). Nevertheless, on the basis of our results we are able to state that:

1. The shallow water sponge fauna of the Maltese Islands appears to be similar to that of other parts of the Mediterranean.

2. There do not appear to be any large commercial sponge beds in Maltese shallow coastal waters that could be economically exploited, and indeed, no commercial sponge species were recorded.

We suggest that future work on the local marine sponge fauna should aim at quantifying species abundance, compiling a more complete species list and at identifying the more important species involved in interspecific relationships with other marine plants and animals.

Acknowledgements

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