

A SUMMARY OF THE PORIFERA COLLECTED DURING "EXPEDITION AZORES 1989"

DAVID L. MOSS

ARQUIPÉLAGO



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The Porifera collected by the author during the "Expedition Azores 1989" survey of Faial island are described. With some notable exceptions, especially the almost ubiquitous *Tedania anhelans*, many sponges were only recorded a few times. The Haplosclerids posed particular problems, as usual, but interestingly included the first extra-Mediterranean record of *Haliclona mamillata*, and a possible, but as yet unconfirmed, new species. The majority of the collecting was done at exposed, high energy habitats around Monte da Guia, where the sublittoral caves were particularly productive. Nonetheless, the more sheltered habitat of Horta harbour produced some interesting material.

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Os Porifera recolhidos pelo autor durante a "Expedição Açores 1989" são descritos. Com algumas exceções, especialmente da espécie quase ubíqua *Tedania anhelans*, a maioria das espécies de esponjas foram encontradas em poucas ocasiões. As esponjas Haplosclerídeas, como de costume, colocaram problemas interessantes, salientando-se a primeira ocorrência extra-Mediterrânica de *Haliclona mamillata*, e possivelmente, a ocorrência de uma nova espécie, ainda não confirmada. A maior parte da amostragem foi realizada nas zonas expostas do Monte da Guia (ilha do Faial), onde as caves sub-litorais são particularmente ricas em esponjas. Apesar disso, em zonas abrigadas, como no interior do porto da Horta, encontrou-se também material interessante.

David L. Moss, Mathematics Department, The University, Manchester M13 9PL, UK.

INTRODUCTION

This paper consists of a description of sponges collected over a period of three weeks in July 1989, as part of the "Expedition Azores 1989" survey of Faial island. The survey's diving was concentrated in and around the Monte da Guia reserve, at the south east corner of Faial, one intention being to make a broadbrush survey of habitats and species present. Some collecting was also carried in other areas. More details about "Expedition Azores 1989" can be found in MARTINS & al. (1992). Recent studies by specialist spongologists encompassing the area include those by BOURY-ESNAULT & LOPES (1985) and DE WEERDT & VAN SOEST (1986).

A list of material discussed is given in Appendix 2 and brief notes on these species are given in Section 3.

MATERIAL AND METHODS

Fairly extensive quantitative transect work was performed in the area of the Monte da Guia reserve. Sites of sublittoral transects are denoted by 'T' followed by a number in what follows. More qualitative surveys or collecting dives were performed at a number of other sites around and near Faial. The sites relevant to the description of the Porifera are listed in Appendix 1 and shown in Figs. 1a and b.

Sponge material was collected in several ways. Some came from destructive sampling of the turf. This material, which had been scraped off the substrate into a bag, and sorted later (often considerably later) in the laboratory, was usually fragmentary, and most/all morphological information about the *in vivo* appearance was lost. Identification was thus often difficult or impossible. A small quantity of material was collected casually by divers, mostly during non-destructive surveys.

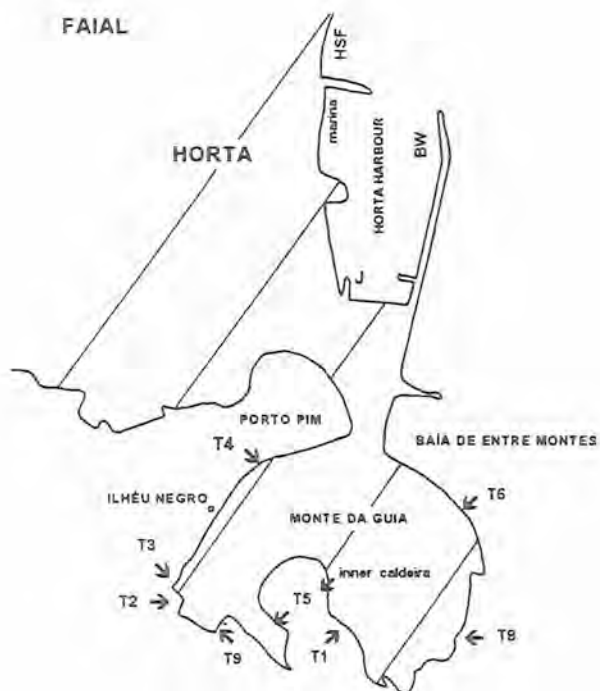


Fig. 1a - Southeastern Faial showing location of the collecting sites (T₁-T₉); BW - breakwater; HSF - Horta seafront, boulders; J - Jetty.



Fig. 1b - Faial and neighbouring islands, showing collecting sites.

These were usually performed over exposed inclined rock faces, where conspicuous sponges were rare. The majority of the collection was made by the author during a relatively small number of dives, mostly near or at the sublittoral transects, undertaken with the joint purposes of collection, recording and general photography. Some material was collected whilst snorkelling. A few specimens were collected casually during littoral work (not by the author).

The material was first examined by the author, and difficult cases were then sent to experts for identification/confirmation.

Nomenclature usually follows that of HOWSON (1987) and BOURY-ESNAULT & LOPES (1985), as applicable. Synonyms are not generally given, except in some cases where there is a departure from these sources.

RESULTS

Demospongiae

Oscarella lobularis (Schmidt, 1862)

Normal appearance, all specimens found were blue in colour. Typically found under slight overhangs. Collected from T1, T3, Ma.

Stelletta hispida (Buccich, 1886)

The only example found was a small beige-white specimen in a deep inter-tidal crevice, covered with red algae. On later examination the portion removed was found to have a fragment of (unidentified) red sponge encrusting it. Collected from CP.

Erylus discophorus (Schmidt, 1862)

Thick crusts/cushions of variable colour, with cream-beige interior. Quite frequent on steeply sloping/vertical wave exposed rock around the caves of Monte da Guia. Collected from T3, T4.

Cinachyrella alloclada (Uliczka, 1929)

Three specimens were found, in two quite different habitats and forms. One specimen was massive globose, about 6 cm diameter, at ca. 1m

depth on a small rock in the sandy bay of Porto Pim. The surface of this sponge was lightly covered with sand. The colour was a beige/light brown, and small, spherical, green algal cells were embedded in the tissue. The others were collected as small, yellow tufts, on rock faces at ca. 10m. All were tentatively identified as *C. alloclada* by Dr. K. Rutzler. Collected from T1, T2, PP.

Thymosia guernei Topsent, 1896

Found at one exposed site, on vertical rock at ca. 2m. Collected from T3.

Tethya aurantium (Pallas, 1766)

Found only as scraps in destructive turf samples, so the morphology of the specimens was unhelpful for identification. However the skeleton, spiculation and texture were typical. Collected from T1, T2.

Laxosuberites ferrerhernandezi Boury-Esnault & Lopes, 1985

A solitary specimen was found, on a vertical wall in Horta harbour at ca. 4m. A thick khaki-green crust with low mounds and large oscules, giving a typical "suberites" appearance. The greenish exterior colour appears to be due to the presence of algae in the surface. Compressible, with a slight smell. The specimen fits the description of *Laxosuberites ferrerhernandezi*, a species first described by BOURY-ESNAULT & LOPES (1985). Collected from J.

Terpios fugax Duchassaing & Michelotti, 1864

Found as small, thin blue crusts at a number of sites, both inter- and sub-tidally. On rock faces, under cobble and on base of *Codium elizabethii*. Collected from T6, R, F.

Prosuberites longispina Topsent, 1893

Found as an orangey-yellow scrap in a destructive sample at 15m on a wave exposed rock slope. The distinctive spiculation allowed identification with reasonable confidence. Collected from T2.

Cliona celata Grant, 1826

Found commonly in boring form, never in raphyrus form, on substrate of calcareous algae. Collected from T1, T2, T5, T6, BEM, BW, P.

Cliona viridis (Schmidt, 1862)

This sponge formed extensive thick crusts, up to 1-2 m across. It was particularly common on horizontal or gently sloping rock surfaces in Baía entre de Montes. It could also be found as smaller specimens on vertical surfaces, e.g. Horta harbour. Collected from T1, T6, BEM, BW.

Timea unistellata (Topsent, 1892)

A solitary specimen found, as an orange scrap in a destructive turf sample at 19 m on an open, inclined rock face at T1.

Latrunculia insignis Topsent, 1892

One specimen found, in the interior of a submarine cave at ca. 35m on the outside of Monte da Guia. A small, firm, whitish crust that fits well the description of TOPSENT (1894) and VACELET (1969). Collected from near T9.

Halichondria bowerbanki Burton, 1930

A green, quite massive, sponge, "hanging from" *Spirographis* tubes under marina pontoons in Horta harbour. Conspicuous, rather papery, oscules are present on tubes. In the surface there is a rather irregular net, mostly 3-4 spicules thick, of oxea more than 300 microns in length, without spongin. The interior is similar. Collected from M.

Halichondria panicea (Pallas, 1766)

This species was found as a massive, firm, slightly compressible, sponge, roughly spherical in shape and yellow in colour; on vertical surfaces at wave exposed sites at ca. 10m. When stored in alcohol the surface becomes whitish, with yellowish patches. The surface has moderate friction: there is no distinct smell. The interior skeleton consists of somewhat disorganized, multi-spicular, fibres of oxea, with stray oxea between the fibres. Some of the oxea are bent almost to the form of toxa and

occasional styloid ends are present. Most spicules are in the size range 300-600 microns, with a few to ca. 200 microns. The surface has an irregular, tangential net of oxea in fibres, with a few styles, and the skeleton is generally less organized than that of the interior. These oxea are generally shorter than those of the interior. Collected from T2, T8.

Unidentified Halichondrid

A pale orange to pink, quite extensive, thin crust, found on the overhung surface of a boulder, overgrowing barnacles. The skeleton is an irregular net of oxea, ca. 450 x 10 microns. At the surface there is an ill-defined tangential skeleton, 2-4 spicule fibres thick. Red, unicellular algae are present in the body of the sponge. No spongin is visible. Collected from R.

Hymeniacidon perleve (Montagu, 1818)

Two forms were found. The taxonomy of the species is not completely resolved, and it is possible that the forms collected may represent separate species (cf. ACKERS & al. 1985).

1. Intertidal. Small, orange, thick cushion, perhaps amongst algae. These forms retained an orange colour in alcohol. Collected from C, Ca, PN.

2. Subtidal. Thin, pale orange, crust, becoming brownish in alcohol. Collected from J.

Ulosa stuposa (Esper, 1794)

Synonym: *Ulosa digitata* (Schmidt)

On vertical rock at ca. 6 m, as a thin orange crust. Only recorded from T1.

Mycale contareni (Martens, 1824)

Found from 0-10 m as small yellow-beige crusts, in some cases from turf samples, around Monte da Guia. Collected from T2, T4, T5.

Mycale rotalis (Bowerbank, 1874)

A yellow-orange crust, found only in Horta harbour: under sea-defence boulders on Horta sea-front, on the breakwater and underneath the marina pontoons. Collected from BW, HSF, M.

Mycale similis (Bowerbank, 1874)

Found only in Horta harbour: as extensive, soft orange crusts around tubes of the sabellid worm *Spirographis spallanzanii*, hanging from the undersides of the marina pontoons, and also on a tyre on the bottom of Horta harbour, at ca. 9 m. Collected from H, M.

Tedania anhelans (Lieberkühn, 1859)

This sponge was the most commonly encountered species. Its habit is encrusting, with oscular tubes raised from the substrate. At exposed sites in shallow water it is buried by the algal turf, with only the tips of the oscules readily visible, and the colour is a somewhat brownish orange. In deeper water the sponge is larger, it is less hidden by the thinner turf, and the colour is a brownish orange to a bluish black. In Horta harbour this form occurred encrusting rock and debris in the absence of a turf. A rather anomalous specimen was found in the harbour, as a distinctly red crust, 10-20 cm across, with long, finger-like projections. This specimen resembled somewhat the description of *T. ignis* in WIEDENMAYER (1977), but identification as *T. anhelans* was confirmed by Dr R. van Soest. Collected from T1, T2, T3, T5, T6, BS, C, Ca, F, J, P, PA, PP.

Myxilla rosacea (Lieberkühn, 1859)

One of the more common and conspicuous sponges, forming extensive fleshy crusts that exuded considerable quantities of slime on collection. Typically found on steeply inclined/vertical rock surfaces around Monte da Guia, mostly from 0-10 m. Collected from T2, T3, T6, T8, BEM, C.

Ectoforcepia psammophila Cabioch, 1968

The only specimen found was a small, yellow crust inside a large barnacle, collected intertidally at C. (Dr R. van Soest comments that the genus *Ectoforcepia* may be artificial).

Hymedesmia peachii Bowerbank, 1882

Very thin yellow-orange-reddish (even pale green) crusts were quite frequent on steeply sloping to overhung rock faces around Monte da

Guia and elsewhere. On examination all those collected appeared to correspond to the description of *H. peachii* in, for example, BOURY-ESNAULT & LOPES (1985), and the other *Hymedesmia* species reported by those authors were not found. However this is a taxonomically difficult group. Collected from T2, T3, T6, T8, BW, R.

Phorbast fictitius Duchassaing & Michelotti, 1864

Synonym: *Anchinoe fictitius* (Bowerbank)

This distinctive, dark red, thin crust with slightly raised oscules and pronounced, self-coloured, pore areas was frequent on steep to vertical surfaces around the outside of Monte da Guia and near the end of the breakwater in Horta harbour, down to ca. 6 m. Collected from T1, T2, BW.

Phorbast plumosus Duchassaing & Michelotti, 1874

Synonym: *Pronax plumosa* (Montagu)

Found on shallow, vertical faces around Monte da Guia. Collected from T1, T3.

Hemimycala columella (Bowerbank, 1874)

Typical specimen, recorded only from cave at site T8.

Clathria coralloides (Olivi, 1792)

A single specimen was found, as an orange scrap in a destructive turf sample, from 10 m at T1.

Microcionia strepsitoxa Hope, 1889

Found as thin, sometimes extensive, bright orange-red crusts, on near-vertical surfaces, generally at wave exposed sites. One specimen, found on the side of a large boulder at T6, was both unusually large (more than 1 m across) and of atypical spiculation, with an almost complete absence of isochelae, although the other spicule categories present corresponded to those in the usual description of *M. strepsitoxa*. Dr C. Levi considered this specimen to be an atypical *M. strepsitoxa*. Collected from T6, BW, J.

Dendroxea lenis (Topsent, 1892)

A thin, whitish-violet translucent crust. Collected as a ca. 50 cm diameter specimen on a shaded vertical surface at ca. 2m (T3), and as a crust ca. 3 cm in extent on the oyster *Pteria hirunda* at 48 m (T8).

Haliclona fistulosa (Bowerbank, 1866)

Of typical form, a thick purplish crust with an orangey beige interior. Found on vertical surfaces in caves around Monte da Guia, etc, at 5-10 m. Collected from T3, T8, BW.

Haliclona mamillata (Griessinger, 1971)

A small, very soft crust/cushion, purplish in colour. Only found at one site in Horta harbour, at 4-6 m. Slightly slimy when squeezed. Identification was confirmed by Dr W. de Weerd; this is the first record from outside of the Mediterranean. Collected from BW.

Haliclona mediterranea Griessinger, 1971

A solitary specimen was found, as a soft, somewhat bluish crust with long, translucent oscular chimneys. Collected from H.

Haliclona simulans (Johnston, 1842)

Found as a firm, beige (with a hint of rose) crust, 2-3mm thick, under large sea-defence boulders, on Horta seafront (HSF).

Haliclona sp. A

Found as a whitish-orange, soft/compressible crust, and as a scrap in a turf sample from T1. The surface detaches readily, with a regular, isodictyal net of oxea, ca. 100 - 150 x 6 - 9 microns. The interior skeleton consists of a 1-2 spicule net of similar oxea with additionally a few thin, inter-net oxea. According to Dr W. de Weerd, this is a member of the "fistulosa" group (cf. DE WEERDT 1989). Collected from T1, T8.

Haliclona sp. B

A small, soft/compressible, purple crust with a typically *Haplosclerid* appearance and a slight, pungent smell. A solitary specimen was found, on a vertical surface in a sheltered position in Faial harbour. The surface skeleton consisted of a tangential, isodictyal net of oxea, strongyles and styles. The interior has a similar net, perhaps somewhat more disordered. In both the interior and at the surface, styles were the dominant spicule category. The spicule lengths are in the range 110-140 microns. Spongin is present at the nodes only.

According to Dr W. de Weerd, this is a *Haliclona* sp. of the "aquaeductus" group (cf. DE WEERDT 1989), but differs in spiculation from all members of that group, and is possibly a new species. Collected from J.

Dysidea fragilis (Montagu, 1818)

Found in typical form, on vertical rock at 1-15 m. Collected from T3, T8.

Cacospongia scalaris (Schmidt, 1862)

Common on vertical/steeply sloping, wave exposed rock faces around Monte da Guia. Extends deep into caves, from ca. 1m downwards. Collected from T2, T3, T8, BS.

Ircinia dendroides (Schmidt, 1862)

A small, ramified *Ircinia* sp. was found in a turf sample, and was tentatively identified as *I. dendroides* from its general morphology. Collected from T2.

Ircinia fasciculata (Pallas, 1766)

Quite frequent in caves around Monte da Guia. The specimen collected was a toughish crust of several cm diameter. Collected from T8.

Ircinia sp.

This was a scrap from a destructive turf sample. The skeleton and presence of "threads" indicated *Ircinia* sp., but the nature of the material made

further identification impossible. Collected from T2.

Aplysina aerophoba Schmidt, 1862

Typically found well inside caves around Monte da Guia, within a few metres of the surface. The distinctive oscular chimneys are rather short and blunt. Collected from T3.

Unidentified sp.

Two specimens were found, on overturned sea defence boulders on Horta seafront. One was bleached and dried, but the other had retained some orange colour, together with a pungent smell. It is not clear whether this would be present in a healthier specimen! The form is that of an extensive sheet, a few mm thick, the skeleton a multispicular net of relatively short, fat styles to ca. 125 microns by 9 microns, with a few oxea of similar appearance intermingled. The main net fibres are 10 - 12 spicules thick, others contain typically 3-5 spicules, and very little spongin is present. According to Dr W. de Weerd, this is possibly *Stylinos jullieni* (cf. TOPSENT 1892, from Faial), although Topsent's description does not mention the presence of oxea. Collected from HSF.

Calcarea

Clathrina coriacea (Montagu, 1818) sensu Burton

Of typical appearance, white, pale yellow or salmon-pink in colour. Collected from T1, T3, T8, Ma.

Scypha ciliata (Fabricius, 1780) sensu Burton

A solitary individual, ca. 5 mm long, embedded in the algal turf. Plausibly this species is more widespread than suggested by this single record - it would be easily overlooked. Collected from Ca.

Unidentified sp.

Quite frequent, with a "colonial" form, typically with about 6 oscules to a group, to ca. 20 m. Collected from T1, T3, T5, BS, H.

DISCUSSION

The generally unsystematic collection makes it impossible to attempt to draw any general conclusions about, for example, the distribution or relative abundances of the sponge fauna of Faial or even of the restricted area of Monte da Guia.

A few general comments can be made. On open, well-lit, inclined rock surfaces the algal turf, extending to 20-30 m, outcompeted nearly all the Porifera except for the ubiquitous *Tedania anhelans*. Even this species grew to a larger size in deeper water, where the turf was thinner (there was also a colour change.) Small specimens of other sponge species were found in the turf, nearly all as the result of destructive sampling, but none appeared to make a significant contribution either to the community or to the total biomass.

In contrast, in and near the caves (typically having entrances extending to sea level), in conditions that varied from just out of the direct sunlight to very well shaded, with predominant near vertical rock faces, sponge cover in places approached 100%. In the caves proper, the violent surge seemed to preclude the establishment of anything but the thinnest crusts and there were large areas of apparently bare rock. Thus the regions near the cave mouths, where the water movement is a little more gentle, provided the richest habitats, especially where out of direct sunlight for much of the day. (We entered the caves on rare "calm" days; even then the surge was so strong as to make collection very difficult and unsystematic, and photography almost impossible. Winter storms are clearly a very different matter!) Near the cave mouths, *Myxilla rosacea* was particularly conspicuous (as noted by BOURY-ESNAULT & LOPES 1985) but other encrusting species were also common, especially within a few metres of the surface. On the vertical walls of shallow water surge gullies around Monte da Guia and Baía entre de Montes many of the same encrusting species were found.

More massive species were comparatively rare. Notable exceptions were *Cacospongia scalaris* and *Halichondria panicea* and, on more gently sloping to horizontal surfaces, the extensive (to more than 1m across) growths of *Cliona viridis* were conspicuous.

The sheltered waters of the harbour (sites BW, H, J, M) provided a marked contrast to Monte da Guia, and the balance of species from here was significantly different. The various habitats of the harbour region (e.g. vertical walls of Jetty and Breakwater, underneath pontoons, loose and thick algal turf, rock piles and isolated rocks and debris on muddy bottom) would certainly repay further investigation. The sea defence work in progress gave an interesting opportunity to sample a fairly inaccessible niche, namely the crevices formed by the bases of the large sea defence boulders (conveniently upturned!), another high energy habitat.

With the exception of *Cinachyrella alloclada*, the sponge fauna consists of northeastern Atlantic and Mediterranean species.

ACKNOWLEDGEMENTS

As a group the Haplosclerids presented their usual problems, and the assistance of Dr W. de Weerdt is gratefully acknowledged. Thanks are also due to Dr C. Levi, Mr B. Picton, Dr K. Rutzler, Miss S.M. Stone and Dr R. van Soest for their assistance.

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APPENDIX I. List of sites

- BEM - Baía de entre Montes.
 BS - Baixa do Sul - seamount in Pico channel.
 C - Capelinhos (intertidal).
 Ca - Inner Caldeira, Monte da Guia (intertidal).
 CP - Caís do Pico (intertidal).
 F - Feteira (intertidal).
 HSF - Boulders, Horta sea front.
 H - Horta harbour.
 J - Jetty (for ferry to Pico), Horta harbour.
 M - Marina pontoons, near Horta harbour.
 Ma - Near volcanic islets off Madalena, in Pico channel.
 PA - Praia do Almoxarife (intertidal).
 PN - Praia do Norte (intertidal).
 PP - Porto Pim.
 R - Ribeirinha (few hundred metres offshore).
 Tn - Transect number "n", Monte da Guia.

APPENDIX 2. List of Species.

DEMOSPONGIAE

HOMOSCLEROPHORIDA

Oscarella lobularis (Schmidt, 1862)

Stelletta hispida (Buccich, 1886)

Erylus discophorus (Schmidt, 1862)

SPIROPHORIDA

Cinachyrella alloclada (Uliczka, 1929)

HADROMERIDA

Thymosia guernei Topsent, 1896

Tethya aurantium (Pallas, 1766)

Laxosuberites ferrerhernandezii Boury-Esnault & Lopes, 1985

Terpios fugax Duchassaing & Michelotti, 1864

Prosuberites longispina Topsent, 1893

Cliona celata Grant, 1826

Cliona viridis (Schmidt, 1862)

Timea unistellata (Topsent, 1892)

Latrunculia insignis Topsent, 1892

HALICHONDRIIDA

Halichondria bowerbanki Burton, 1930

Halichondria panicea (Pallas, 1766)

Unidentified Halichondrid

Hymeniacidon perleve (Montagu, 1818)

Ulosa stuposa (Esper, 1794)

POECILOSCLERIDA

Mycale contarenii (Martens, 1824)

Mycale rotalis (Bowerbank, 1874)

Mycale similaris (Bowerbank, 1874)

Tedania anhelans (Lieberkühn, 1859)

Myxilla rosacea (Lieberkühn, 1859)

Ectoforcepia psammophila Cabioch, 1968

Hymedesmia peachii Bowerbank, 1882

Phorbas fictitius Duchassaing & Michelotti, 1864

Phorbas plumus Duchassaing & Michelotti, 1874

Hemimycale columella (Bowerbank, 1874)

Clathria coralloides (Olivi, 1792)

Microciona strepsitoxa Hope, 1889

HAPLOSCLERIDA

Dendroxea lenis (Topsent, 1892)

Haliclona fistulosa (Bowerbank, 1866)

Haliclona mamillata (Griessinger, 1971)

Haliclona mediterranea Griessinger, 1971

Haliclona simulans (Johnston, 1842)

Haliclona sp. A

Haliclona sp. B

DICTYOCERATIDA

Dysidea fragilis (Montagu, 1818)

Cacospongia scalaris (Schmidt, 1862)

Ircinia dendroides (Schmidt, 1862)

Ircinia fasciculata (Pallas, 1766)

Ircinia sp.

VERONGIDA

Aplysina aerophoba Schmidt, 1862

Unidentified sp.

CALCAREA

Clathrina coriacea (Montagu, 1818) sensu Burton

Scypha ciliata (Fabricius, 1780) sensu Burton

Unidentified sp.

