Sponges from Roaringwater Bay and Lough Ine

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ABSTRACT
The sponge fauna of Roaringwater Bay and Lough Ine (South Cork) is surveyed. During a number of visits to the area a total of 60 species was found, including some new to Ireland. All species are briefly characterized and their occurrence is noted. Data on the ecological and seasonal distribution conclude the paper.

INTRODUCTION
Sherrin Island (South Cork) has now become an important link in the chain of marine biological stations along the coasts of Europe from the Mediterranean to Norway. Owing to the admirable initiative of Matt and Eileen Murphy with the creation of their Sherrin Island Field Study Centre, it is now possible to study the south-west coast of Ireland based at a field laboratory. The area is of great importance, not least on account of the rich, diverse fauna and flora, with many Lusitanian and Mediterranean elements prevailing in it. A natural first task is the description of this fauna and flora, and the present paper on the sponges of the area is a contribution to it.

We included in our survey a number of species from Lough Ine, because of the special nature of it (cf. papers by Renouf, 1931; Lily, c.s., 1953, and Norton, c.s., 1973). A list of species from Lough Ine has already been published (Lily, c.s., 1953), but in view of our own results it is suspected that a number of identifications are wrong. Some comments on this matter will be given elsewhere (Van Soest & Weinberg, 1980). During the survey some species were found which appeared to be new to the Irish fauna; these new records will be announced elsewhere (Van Soest & Weinberg, 1980). Some help in the identification of living sponges may be obtained from Guiterman (1987).

Collecting methods included shore exploration, wading, snorkelling and SCUBA-diving. Staff members and students from the Institute of Taxonomic Zoology of the University of Amsterdam assisted in the collecting. One of us (R.W.M.) received financial support from the Field Study Centre. J.D.G. & M.S. were assisted by a grant from the British Sub-Aqua Club. Mr. Th. van Koolwijk (Univ. of Amsterdam) kindly identified the calcareous sponges. J.D.G. would like to acknowledge the help of Miss S.M. Some of the British Museum for her help with identification and for ideas contained in Table 2.

DATA ON THE LOCALITIES VISITED
Below a list of localities is given, accompanied by a brief account of their nature. For more extensive data on many of the localities one is referred to Van Soest & Weinberg (1981).

1. Leith Ilmain: a semi-exposed part of the west coast of Sherrin Island near to the Field Study Centre. Collecting was done by shore exploration (rock pools) and wading.
2. Jones Island: a small islet in the north of
Roaringwater Bay in an extremely sheltered environment. The area, consisting of rock ledges sticking out of the mud, was sampled by shore exploration.

3. Foardtree Cove: an extremely exposed part of the south coast of Sherkin Island with many rock pools. Shore collecting.

4. Carriganore: exposed to semi-exposed area just south of the Field Study Centre, with many rock pools and a sheltered bay. Shore collecting, wading and snorkelling.

5. Hake Island: sheltered to semi-exposed area near the entrance to Kinish Harbour (Sherkin Island), with muddy bays, Zonitidae and shallower pools in between rock prominences. Shore collecting, wading and snorkelling.


7. Lough Ine: vias were made to the Rapids and the adjoining parts of the lough. Shore collecting, wading and snorkelling.

8. North Point (Fluennbég): the northernmost part of Sherkin Island, a fairly sheltered area with large rocks. Shore collecting.


10. East Goff Island: the northern coast of this inlet out in the southern part of Roaringwater Bay consists of rock prominences (extremely to semi-exposed) and sandy bays (semi-sheltered). Shore collecting and SCUBA-diving off the coast at a depth of 10m (vertical slopes with kelp forest and muddy sand).

11. Off Crab Rock: sublittoral survey using SCUBA-gear just off a group of emerging rocks, at 15-17m depth, in rock crevices underneath kelp forest.

12. Off Truannah Point: sublittoral survey using SCUBA-gear, off the west coast of Sherkin Island, depth 12m, sloping rock with kelp forest.

13. The Sound: sublittoral survey using SCUBA-gear and dredges in the tidal channel between Sherkin Island and Spanish Island. Bottom muddy with slopes of rock and gravel.

14. Off Turk Head and Sandy Island: sublittoral survey using SCUBA-gear and dredges of the tidal channels between the north part of Sherkin Island and the mainland. Depth 8-15m. Bottom muddy with slopes of rock and gravel.

15. Off the Field Study Centre: sublittoral survey using SCUBA-gear and dredges, just off west coast of Sherkin Island. Bottom sandy, rock slopes with kelp forests and muddy sand.

16. Badger Island: sublittoral survey inshore of the island down to a depth of 20m. Bottom rock.

17. Horseshoe Harbour: survey of rocks on the south-east shore.

18. Cuver Point (southernmost point of Sherkin Island): sublittoral survey of rocky slopes.

DEPOSITION OF MATERIAL
The material upon which this paper is based is housed in the reference collection of the Sherkin Island Field Study Centre, or in the collections of the Zoological Museum of Amsterdam (from where it can be borrowed on request), or in the private collection of JDC (obtainable by writing to him).

SYSTEMATIC SECTION
Phyllum Porifera
Class Calcareae (calcareous sponges)

Order Clathrinida
Family Clathrinidae
Clathrina corticata (Montagu, 1812)
Encrusting, tightly woven masses of tubules. Colour variable, white, orange, dark red or light blue. Specules: triradiates only with rays of up to 100μm long.
Occurrence: common in crevices and under stones.

Order Leucosoleniida
Family Leucosoleniidae
Leucosolenia berytoides (Ellis & Solander, 1786)
Elongate tubiform sponge with apical oscules, fringed with collar of long stiff spicules. Consistency soft, compressible. Surface papillate, somewhat hairy. Flagellate chambers situated in cross section, loosely adhering. Ectosomal oscia thin, up to 10μm in width, may be split. Rays of triradiates up to 120μm. Quadriradiates in the same size range, with apical ray of up to 60μm.
Occurrence: common.

Order Syconida
Family Syconidae
Sycoa ciliata (Fabricius, 1780)
Elongate tubiform sponge with apical oscules, fringed with collar of long stiff spicules. Consistency soft, compressible. Surface papillate, somewhat hairy. Flagellate chambers situated in cross section, loosely adhering. Ectosomal oscia thin, up to 10μm in width, may be split. Rays of triradiates up to 120μm. Quadriradiates in the same size range, with apical ray of up to 60μm.
Occurrence: common.

Sycoa cernuta (Ellis & Solander, 1786)
Habit indistinguishable from the previous species. Of the spicule complement only the ectosomal oscia are notably different in size: the width measures up to 25μm. It is only on the evidence of Tuzet (1973) (reproductive behaviour) that both species are upheld here.
Occurrence: probably less common than S. ciliata, although no exact data are available as the species has not been distinguished in the field.

Sycoa quadrigirelua (Schmidt, 1869)
Platyform, stiff sponge with apical oscules devoid of collar. Surface smooth to slightly rough, due to short tufts of oscia on the distal four-sided crenae of the flagellate chambers. Wall of the spongocoel a thick cortex of packed triradiates. Specules: peripheral oscia up to 450-500μm. Triradiates with rays of up to 70μm long. No quadriradiates.
Spences from Roaring Water Bay and Lough Ine

550\mu\text{m}, arranged in a radiating fashion. This species resembles *P. boliformis* (cf. below). For the differences between the two cf. Table 1. Occurrence: not uncommon; distinct preference for sediment rich environments.

*C. bolariformis* (Lamarck, 1814) This differs from the above in the smoother surface, with papillae ending in a point, and less developed skeletal bundles (cf. Table 1, Fig. 2). Occurrence: Only known from sublittoral stations (Curra Point, Crab Rock, and Badger Island). Distinct preference for sloping substrates; replaced by *P. mamillaris* on horizontal substrate.

**Table 1** Differences between *Polynasia* spp. found in Roaring Water Bay

<table>
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<tr>
<th>Surface</th>
<th>P. mamillaris</th>
<th>P. boliformis</th>
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<tr>
<td>Texture</td>
<td>smooth</td>
<td>less firm</td>
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<tr>
<td>Papillae</td>
<td>firm</td>
<td>thick-walled, pointed (when preserved papillae collapse)</td>
</tr>
<tr>
<td>Skeleton</td>
<td>strong, spicle bundles radiate to surface, in between atrophic tissue</td>
<td>weak, thin spicle bundles, tissue a hexacorbe</td>
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<tr>
<td>Habitat</td>
<td>pressure horizontal substrate</td>
<td>pressure sloping substrate</td>
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</tbody>
</table>

**Fig. 1.** Perpendicular sections of peripheral skeleton in *Subertes* spp.; left, *S. demersus*; right *S. carnosus*.

*Proxopentheria epiphyllata* (Lamarck, 1816) This yellow crust on barnacles and other hard substrates. The skeleton consists of tylostyles with peculiar, pin-shaped heads, 15-45\mu\text{m}, surrounded by radiating strong 600-3000\mu\text{m}, and long-ridged ortho-triades 700\mu\text{m}.

**Fig. 2.** Habits in cross-section of *Polynasia* spp.; left *P. mamillaris*, right *P. boliformis*.

*Subertes demococula* (Olivier, 1792) (Syn.: *Ficulina* fam. of authors) Globular, orange papillae on a perfectly smooth surface. Size may be considerable when seen alive: up to 60\text{cm} in diameter in Lough Ine. Skeleton consisting of tylostyles 100-500\mu\text{m}, arranged in confluence with a tendency to lie in ill-defined reticulate tracts except for the regular dermal palisade. Rare microcrabs (15-50\mu\text{m}). The species resembles *Subertes carnosus* (cf. below and Table 2). Occurrence: common, in sheltered water. *Subertes carnosus* (Johnson, 1842) Differs from the preceding species by the smaller size and plumose surface bundles (instead of dermal palisades). Spicules more restricted in size range. No microcrabs (cf. Table 2 and Fig. 3 for differences). Occurrence: common at Crab Rock, sublittoral, in open water.

**Fig. 3.** Cauliflower sections of peripheral skeleton in *Subertes* spp.; left, *S. demersus*; right *S. carnosus*.
| TABLE 2 Differences between *Sorites domuncula* (= *Ficulina fucic*) and *Sorites carnosus* |

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<tr>
<th></th>
<th><em>S. domuncula</em></th>
<th><em>S. carnosus</em></th>
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<tr>
<td>Form</td>
<td>irregular lump</td>
<td>fleshy or spherical</td>
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<td>Surface skeleton</td>
<td>spicle form a palisade</td>
<td>plumeous bundles of spicules, not forming a palisade</td>
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<tr>
<td>Chaetaless skeleton</td>
<td>tending to form an ill-defined reticulum</td>
<td>irregularly arranged</td>
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<tr>
<td>Size range of spicules</td>
<td>great</td>
<td>much more restricted</td>
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<tr>
<td>Microsceres</td>
<td>centrocyte types (microhairs)</td>
<td>no microhairs</td>
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<tr>
<td>Habitat</td>
<td>sheltered</td>
<td>open waters</td>
</tr>
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</table>

Lough Ine (not reported by Lilly, c.a., 1953). This species is considered synonymous with *H. paniaca* by Arndt, 1935, but this is obviously incorrect.

**Family Hymeniacidonidae**

*Hymeniacidon perforis* (Montag, 1818)

This species is probably polytypic; future studies are expected to reveal that it consists of more than one species. For the time being we have to consider all the orange-red spicules with a confined skeleton (tending to form this bundle) as styles of one. Both smooth and tuberculate to papillate specimens were found, and colours may range from light yellow to blood-red. Styles 180-390/3-12 mm (cf. Van Soest, 1977: 270, Fig. 5, Pl. 3D).

Occurrence: extremely common in the intertidal, particularly in more silty environments. Confusion of this species with *Rhapidostyla kitchingi* Burton, 1930, may occur easily.

**Hymeniacidon concavus** (Bowerbank, 1874)

Massive with a very characteristic surface pattern of circular light coloured rims, colour red-pink. Skeleton consisting of strongyles and styles, 350-400/5-8 mm, arranged into thick tracts.

Occurrence: found only once by K. Hiscock at 15.20 m in RoaringWater Bay (type specimen in Sherkin Island Field Study Centre Reference collection). Care should be taken to avoid confusion with *Porites panicea*, which has dark coloured rims.

**Rhapidostyla inca* (Schmidt, 1880)

A wedge-shaped, light yellow-orange sponge with a sticky tuberculate upper surface and smooth sides. Skeleton consisting of tracts of very long styles, 1500-2000/10 mm, radiating towards the periphery (cf. Van Soest & Weisberg, 1980).

Occurrence: collected once by M. C. van Duyt and M. J. Lea at 6 m in the narrows between Sherkin Island and Skiddy Island. This species is still known only from the Western Mediterranean (e.g. Bouys-Favaux, 1959) and thus represents the first record for Ireland and the northern Atlantic. The present specimen has been compared to preserved Mediterranean specimens in the collections of the Zoological Museum of Amsterdam. There is one other *Rhapidostyla* species known from the British Isles, viz. *R. kitchingi* Burton, 1935.

This species has unusually small styles (220/3-4 mm, cf. below).

**Rhapidostyla kitchingi** (Burton, 1925)

Shape ill-defined, branched or lump-like. Consistency soft, not bristly. Tissue turns liquid when stirred with a needle. Colour orange-yellow, brown. Skeleton of whipple bundles of thin, often hair-like styles, up to 320/20-5 mm long (styles of *Hymeniacidon perforis* are longer and thicker; also, *H. perforis* turns dark after some time in alcohol).

Occurrence: common in sheltered sublittoral sites. It forms a distinct zone at the southern end of Lough Ine. This is the first record from Lough Ine.

**Order Poecilocelidae**

**Family Mycidae**

*Mycia consorsium* (Van Marrooney, 1824)

A light brown, tuberculate cushion of firm consistency. The skeleton consists of thin spicular tracts cemented by spongin. The spiculation is composed of tylostyles, 225-360/6-2 mm, two categories of sigma, 16-22 and 43-61 mm, toxa, 42-64 mm, and three categories of anotheclae, 12-14, 18-23 and 31-42 mm (cf. also Butler & Van Soest, 1977).

Occurrence: common under boulders in large pools and bays with oxygenated sediment.

**Family Spongiidae**

*Bohemia varians* (Bowerbank, 1866)

A thin brown encrustation. Skeleton: plume tracts of peculiar bent styles, 245-997/17 mm, complemented by rhaphides 41-162 mm and two categories of sigmas 12-26 and 69-98 mm, the smaller ones known as "commissa" (cf. Bowerbank, 1874: Pl. 33).

Occurrence: found twice at Halbe Island and under boulders in Lough Ine. This is the first record for Ireland, although it is fairly common in the North Atlantic and United Kingdom.

**Family Cleidiidae**

*Spongiomorpha arctica* (Bowerbank, 1866)

A distinctive bright orange yellow, orange encrustation, often on chlamys and other molluscs. Skeleton: vague tracts of thin styles, 220-300/5-4 mm, reddish by acanthostyles, 752-4 mm (cf. Bowerbank, 1874: Pl. 54).

Occurrence: common in Lough Ine under boulders, not found elsewhere so far.
Family Mystilidae
Mystis variegata (Johnston, 1842)

Mabbranta rona (Liebeltl, 1859)
This species differs from M. incrusta in the mature part of the tentacles, which are slightly yellow and microspined, whereas these of M. incrusta are straight with only two distinct spines (cf. Fig. 4). Colour is often pink, but may be yellow.

Occurrence: found once at Curra Point.

Fig. 4. Tentacle endings in Mystis spp.; left M. rona, right M. incrusta.

Mystis ingalli (Bowerbank, 1866)
Yellow or brown encrustations with an irregular surface. Skeleton consisting of an ill-defined branching net-work of acanthostyles, 180-241/5-9 mm, dermal tritones, 188-211/1-5 mm, annelidinid, 19-25 μm, and peculiar spicules, 7-16 μm (cf. Bowerbank, 1874: Pl. 78).

Occurrence: under boulders in Lough Ine, common on Ballyduff Island.

Family Hymedesmiidae
Hymedesmia petersi (Bowerbank, 1882)
Thin, soft, brownish encrustations. Skeleton consisting of acanthostyles of two sizes, 220-280/4-7 mm and 75-97/1-3 mm, standing upright on the surface. Ectosomal skeleton: anisotorne, 168-206/2-3 mm, and isochelae, 17-24 μm.

Occurrence: fairly common under stones and on Laminaria holdfasts.

Note: The Hymedesmia species are difficult to identify, and the systematics of this genus needs revision. The present identification has been made by using the key constructed by Burton (1910b).

Hymedesmia braidandi (Burton, 1908)
Thin, brown slippery crust. Surface can be seen under the stereomicroscope to be full of small pits; it looks like a net curtain. Oscules have clear lines radiating from them showing the position of underlying water channels. Skeleton of acanthostyles erect on the substrate and ectosomal and choanosomal spicules, which may be slightly tylote at both ends. No chieles.

Occurrence: Encrusting Laminaria-stipes and stones in the shallow sublittoral at Curra Point (25 m) and in Lough Ine.

Family Choristidae
Microciona australiensis (Bowen Bank, 1886)
A reddish, tube-like crust to brushy encrustation. Skeleton: plumose, spicule-rich tracts of acanthostyles, 75-250/5-7 mm, and smooth styles, 250-520/10 μm; ectosomal skeleton of smooth styles, 65-350/2-12 μm; isochelae: isochelae, 10-12 μm, and deeply bent tona, 35-110 μm (cf. Arndt, 1935: 78).

Occurrence: under boulders, rare.

Microciona stricta (Hoffe, 1889)
Reddish, thin encrustations with smooth surface. Spiculation of tylostyles, 195-444/2-16 μm, acanthostyles, 116-192/2-7 μm, isochelae, 15-19 μm, and two categories of tona: small deeply bent tons, 70 μm, and long straight ones with a spiral twist, 130-319 μm (cf. Van Soest & Weiberg, 1980).

Occurrence: under boulders in Lough Ine, rare, elsewhere.

Microciona spinosa (Carter, 1889)
Yellowish-brown encrustations with irregular surface. Spiculation of ectosomal tylostyles, 150-230/1 μm, acanthostyles, 90-380/1-12 μm, and large thick tons with heavily acanthose apices, 60-350 μm (cf. Van Soest & Weiberg, 1980).

Occurrence: fairly common under boulders in Lough Ine, absent elsewhere. This is the first record from Ireland.

Ophiothrix sericea (Grant, 1826)
Tough, fairly thick, blood-red encrustations with a smooth surface, oscules evenly distributed, flesh with surface. Skeleton: a beautifully regular isodictyal mesh work of sponge fibres coiled by thick smooth styles, 100-160/9-12 μm, and elongated by thick tons 50-150 μm (cf. Arndt, 1935: 2).

Occurrence: common under stones and in crevices.

Placamilla corvicea (Bowerbank, 1866)
Yellow encrustations. Skeleton consisting of a subiculoles of acanthostyles, 70-160/7 μm, and smooth tylostyles with acanthostyles, 200-310/7 μm, covered by an ectosomal skeleton of styles, 130-180/1-3 μm. Microcellae: tons, 50-120 μm, and isochelae, 12-22 μm (cf. Bowerbank, 1874: Pl. 76).

Occurrence: not uncommon under boulders in Lough Ine, absent elsewhere.

Amphiplocia fuscata (Bowerbank, 1874)

Occurrence: fairly common, especially in the Sound.

Order Haploclerida Family Halichondiidae
Remark: The species described below all belong to the closely related genera Actida, Halichondra and Reniera, the taxonomy of which is still in a state of turmoil. The present material has been examined carefully (cf. Table 3) and compared with descriptions given by Johnston (1842), Bowerbank (1864, 1866, 1874 and 1883), Troup (1891, 1894), and Burton (1926, 1930), but the results are still to be regarded with considerable reserve. Question marks should be put notably at the identification of Halichondra montagui (Bowerbank, 1866) (the original description mentions spicules much more robust than those of our specimens), Reniera macrodactylus (Bowerbank, 1866) (original description mentions an irregular surface, while it is smooth in our material), Reniera roosa (Bowerbank, 1866) (which needs comparison with Halichondra penicillata (Bowerbank, 1866), Reniera aquatilis Schmidt, 1862 and Reniera cincta (Grant, 1835), and Reniera paechta (Bowerbank, 1866) (which needs comparison with R. cincta).

Also, the generic definitions are by no means unchangeable, although recent attempts have been made to clarify them (Griesinger, 1971; Wiedenmayer, 1977; Van Soest, 1988). It is high time a complete revision of western European Haplocleridae is undertaken, as many of the genera of this order have European type species:

Actida radians (Johnston, 1842)
Repetent fawn, firm, brittle sponges with flat oscules, brownish or greenish in colour.
Sponges from Roaringwater Bay and Lough Ine

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<th>H. elegans</th>
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**TABLE 4**

The occurrence of sponges of Roaringwater Bay and Lough Ine at different stations (numbers 1 to 18; for details of text) and in different months (a to d; a = July, b = August, c = September, d = October)
Occurrence: found once at Hale Island, under stones in tidal pool.

Order Dendroceratida
Family Aplysinidae
Aplysilla fusa (Schulze, 1878)


Table 4 lists the local and seasonal distribution of the sponges. From this we may infer ecological preferences, rarity and seasonal occurrence.

Sponges from Roaringwater Bay and Lough Ine


REFERENCES

DISCUSSION
It is becoming more and more apparent that the absence of a good identification guide to the shallow water sponges of the British Isles is seriously hampering any field study of the sponges of this area. One has to fall back to Arndt’s (1935) guide to the North Sea sponges, which now has become outdated and lacks descriptions of many common species of the Atlantic coasts. The alternative is to go through a multiplicity of publications dealing with both genera and species, spread widely over a range of scientific journals. Until this guide is produced, it remains very confusing to publish lists of species without descriptions, such as those of Lilljeborg (1861) and Håkansson (1967), as it is impossible to say whether these identifications conform with each other.

REFERENCES