Four new demosponge species from Terra Nova Bay (Ross Sea, Antarctica)

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ABSTRACT
Four new demosponge species: *Iophon terranovae* n. sp. (Iophonidae), *Ectyodoryx minuta* n. sp. (Coelosphaeridae), *Microxina lanceolata* n. sp. and *Microxina sarai* n. sp. (Niphatidae) are described on the basis of material collected during several Italian Antarctic expeditions. *Iophon terranovae* is based on the presence of large mucronate-oxeote-styles and on the absence of true acanthostyles. *Ectyodoryx minuta* is a bushy amorphous species based on the small size of the megascleres, the peculiar shape of the anisotornotes and the presence of two categories of anisochelae. The two other new species are assigned to *Microxina* Topsent, 1916, a genus that recently received *Hemigellius* Burton, 1932 as synonym. *Microxina lanceolata* is a branched species characterized by the lanceolate extremities of the oxeas, whereas *M. sarai* is massive lobate and has a thin ectosomal membrane with tangential oxeas (a character that is not shared by the other species in this genus).

KEY WORDS
Porifera,
Demospongiae,
Antarctica,
Ross Sea,
new species.

RÉSUMÉ

Quatre nouvelles espèces de démosponges de la baie Terra Nova (mer de Ross, Antarctique).

Quatre espèces nouvelles de démosponges, *Iophon terranovae* n. sp. (Iophonidae), *Ectyodoryx minuta* n. sp. (Coelosphaeridae), *Microxina lanceolata* n. sp. et *Microxina sarai* n. sp. (Niphatidae) sont décrites à partir du matériel récolté au cours de diverses expéditions italiennes en Antarctique. *Iophon terranovae* est caractérisée par la présence de grand styles mucronés qui ont presque l'aspect d'oxes et par l'absence de véritables acanthostyles. *Ectyodoryx minuta* est une espèce amorphe buissonnante, distinguée par la petite taille des mégasclères, la forme particulière des anisotornotes et la présence de deux catégories d'isochèles. Les deux autres espèces nouvelles ont été assignées à *Microxina* Topsent, 1916, un genre qui a récemment reçu *Hemigellius* Burton, 1932 comme synonyme. *Microxina lanceolata* est une espèce dressée et ramifiée, caractérisée par la forme lancéolée des extrémités des oxes, tandis que *M. sarai* a une forme massive lobée et une membrane ectosomique très mince avec des oxes tangentiels, ce dernier caractère étant unique dans le genre.

MOTS CLÉS
Porifera,
Demospongiae,
Antarctique,
mer de Ross,
espèces nouvelles.

INTRODUCTION

The Antarctic sponges are relatively well-known but the size of the continent is so large that every new study, even on a relatively small area, may bring new findings. The benthic Italian surveys, since 1987, were performed in the eastern Ross Sea in a locality named Terra Nova bay. A sponge-dominated community (Cattaneo-Vietti *et al.* 1999a) thrives on the bottom of the Bay between 70 m and 120 m depth, including most of the 43 demosponge species identified from Terra Nova Bay (Pansini *et al.* 1994). Sponges were collected from depths ranging from 38 and 386 m and represent less than one half of the demosponge fauna known from the entire Ross Sea area (Sarà *et al.* 1992) and nearly one fifth of the 205 species reported for the continental Antarctica by the same authors. This article describes four new species from this collection.

ABBREVIATIONS USED

MNA Antarctic National Museum in Genova;
MSNG Museum of Natural History of Genova.

MATERIAL AND METHODS

The sponge material was collected during five Antarctic campaigns (1987-1988, 1989-1990, 1993-1994, 1994-1995, 1997-1998) performed within the Italian P.N.R.A (National Program of Antarctic Research). The Italian research station in Antarctica, base of the program, is located on the rocky coast of Terra Nova Bay in the Ross Sea (Fig. 1); it has been operating since 1987.

Most material was collected by dredge and grab, except for a few specimens that, during the first campaign, became entangled in fishing nets and long-lines. The origin of the latter samples cannot be precisely located on the map, because they were only labeled by a haul number. The inshore stations, which were repeatedly sampled, are provided with the names of the nearest coastal localities (i.e. Faraglione, Adelie Cove, etc.). All other stations are pinpointed on the map and identified by acronyms (Fig. 1).

Since the material was originally collected for different purposes it was preserved 4% formaldehyde solution in salt water, ethanol, by drying

and by freezing. Spicule preparations were made by dissolving small fragments of the sponge in 65% nitric acid, both in test-tubes and directly on slides, rinsing with water, dehydrating with 90% ethanol and mounting in Eukitt resin. Whenever possible, at least 30 spicules per category were measured; averages are indicated in brackets.

Tangential and transversal sections cut by hand from partly dehydrated specimens were mounted in Eukitt to study the skeletal architecture. Dissociated spicules dried directly on stubs, and dried fragments of the skeleton were gold sputtered and examined under a Philips 515 SEM scanning electron microscope.

Black and white drawings of the spicules were also made to ease the comparison with the old literature.

The holotypes are deposited at the biological section of the Antarctic National Museum (MNA), in Genova. A complete series of paratypes and a schizotype were entrusted to the sponge collection of Museum of Natural History of Genova (MSNG). The remaining material is deposited in the personal collections of the authors.

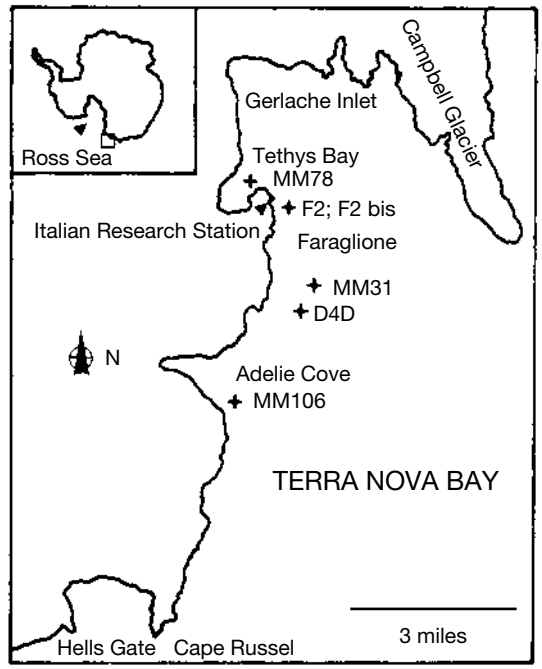

FIG. 1. — Map of Terra Nova Bay (Ross Sea), with the location of the Italian Research Station (arrow) and of the sampling stations.

SYSTEMATICS

Family IOPHONIDAE Burton, 1929
Genus *Iophon* Gray, 1867

Iophon terranovae n. sp.
(Figs 2; 3)

MATERIAL EXAMINED. — Holotype: Faraglione, 100 m, 20.I.1994, POR275 (MNA No. 1); paratype, 1989-1990 campaign, MOR 31 (MSNG).

ETYMOLOGY. — The new species is named after the locality on the Ross Sea where the Italian Antarctic research station has been operating since 1987.

TYPE LOCALITY. — Terra Nova Bay, Faraglione, 74°42.2'S, 164°10.9'E .

DESCRIPTION

The holotype is a subcylindrical fragment, 7 cm high and 1.5 cm across, belonging to a presumably erect specimen. The paratype fragment (Fig. 2A) is 5 cm high and 3 cm wide and seems to be part of a massive specimen. The alcohol preserved sponge is dark brown but it becomes light beige outside and a little darker inside when dry. The sponge surface is smooth with a not easily detachable ectosome, 0.3-0.5 mm thick. The choanosome is rather cavernous. The consistency when wet is soft and elastic, but dry the sponge becomes crumbly, with a crusty ectosome whose edges tend to roll up. A single, slightly raised osculum, 0.4 mm in diameter, is detectable.

Skeleton

The ectosome is formed by a thick layer of acanthostyles arranged perpendicular to the surface (Fig. 2B, C). In the dry state, these spicules tend to assume a paratangential arrangement and form slightly diverging bunches. A few anisochelae and abundant bipocilla are enclosed in a very thin dermal membrane perforated by ostia. The ectosome is bound to the choanosome by spicule tracts formed by smooth acanthostyles and slender styles which form an irregular reticulation with elongated meshes and abundant interstitial

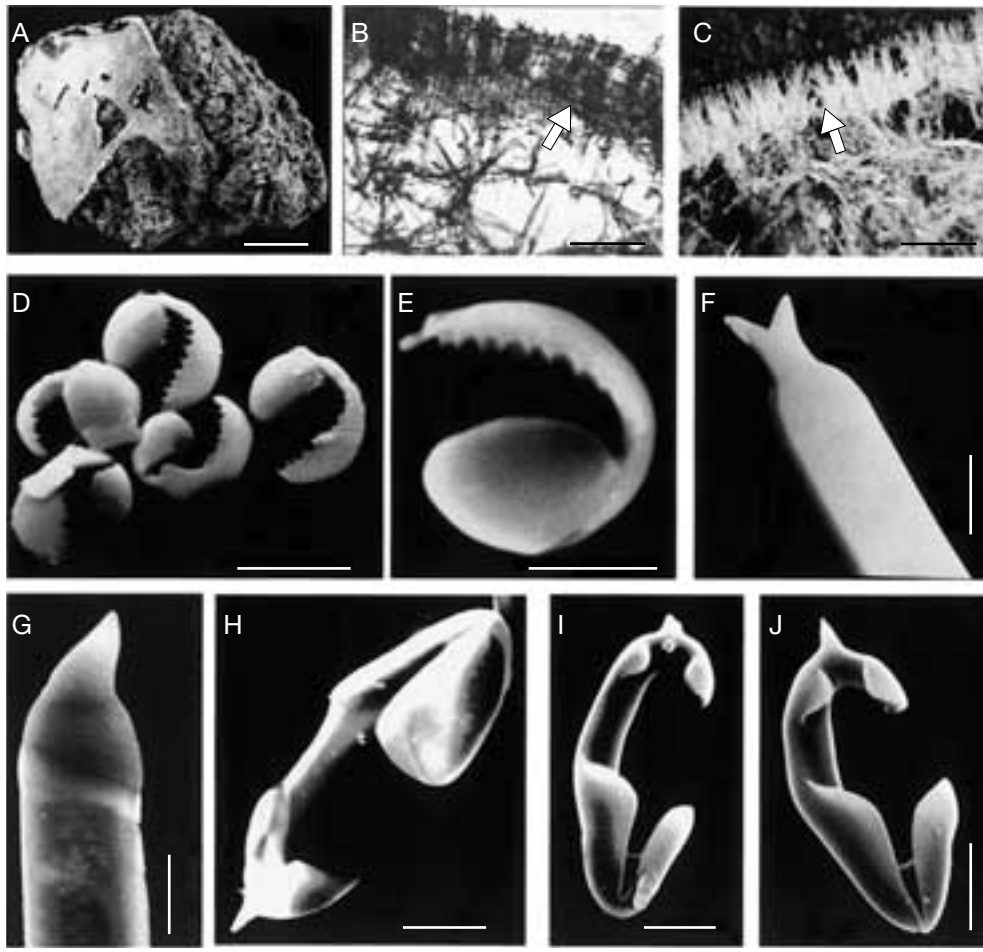

FIG. 2. — *Iophon terranovae* n. sp.; **A**, paratype; **B**, **C**, thick ectosomal layer of vertically arranged acanthostyles (arrow) supported by the choanosomal reticulation; **D**, **E**, unequal ended bipocilla; **F**, **G**, bifid and hooked extremities of acanthostyles; **H-J**, palmate isochelae. Scale bars: A, 1 cm; B, C, 700 µm; D, F-J, 10 µm; E, 5 µm.

spicules (Fig. 2B, C). Tracts, which are formed by five to eight spicules, become thicker toward the sponge surface. The palmate anisochelae are scattered, not grouped in rosettes. The tylotes are very rare in the spicule preparations and their position in the skeleton is not detectable.

Spicules

Oxeote-styles almost smooth, straight or gently curved and seldom malformed (Fig. 3A). Their basal extremity bears typically a mucron which can be straight or hooked, bifid or almost inconspicuous (Figs 2F, G; 3E). The other end is alike or more or less acerate. The presence of a subterminal swelling is frequent and short, polytylote forms are not rare (Fig. 3A). The swellings may be finely spined and the terminal part of the styles may be seldom rugose. Single spines may be found at the basal end of the acanthostyles which measure 200-580 (431) × 18-24 (22) µm.

Slender styles, straight or curved, with a small, single spine on the head (Fig. 3C). They are rather numerous in the choanosome but almost absent in the ectosome. They are 375-540 (440) µm long and not more than 4-5 µm thick. They are generally considered to be juvenile spicules (Topsent 1907).

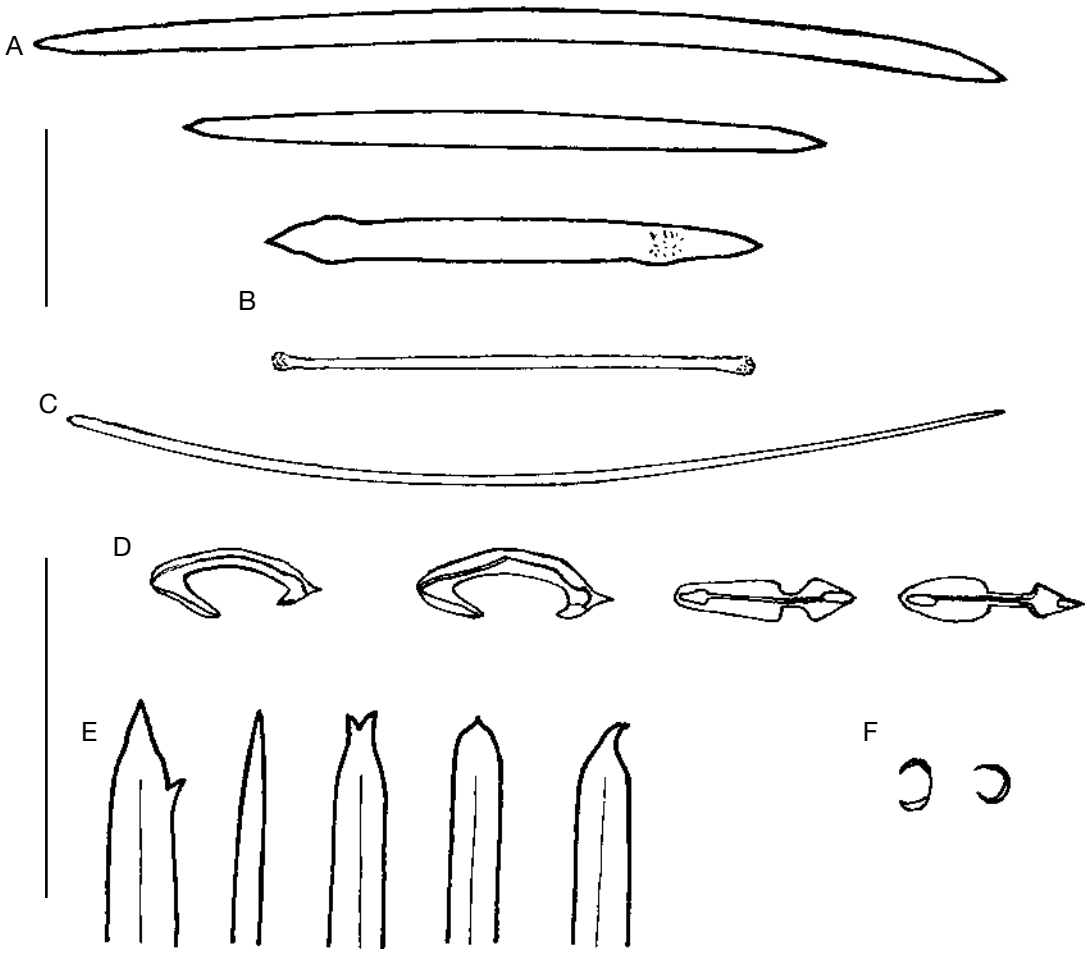

FIG. 3. — *Iophon terranovae* n. sp.; **A**, oxeote-styles; **B**, tylote ; **C**, slender style; **D**, palmate anisochelae; **E**, oxeote-style ends; **F**, bipocilla. Scale bars: A-C, 100 µm; D-F, 100 µm.

Tylotes straight, with slightly swollen extremities (Fig. 3B). Very small spines are uniformly distributed on the tyles or restricted to the spicule extremities. These spicules are rare and were only found in the holotype. They measure 265-275 (270) × 7-10 (9) µm.

Palmate anisochelae, with the smaller end bearing a single or a bifid mucron (Figs 2H-L; 3D). They belong to a single size category and are 51-64 (57.3) µm long. The shaft is arcuate and 7-8 µm thick.

Bipocilla almost closed, with a bent shaft and cup-shaped ends (Figs 2D, E; 3F). The larger cup is finely toothed. They are very abundant and measure 9-15 (11.3) µm.

REMARKS

The new species is based on the presence of almost smooth spurred styles, large anisochelae, and very abundant bipocilla. It belongs to the group of *Iophon* devoid of true acanthostyles that was distinguished by Dendy (1924) under the generic name *Iophonopsis,* now abandoned (Desqueyroux-Faundez & Van Soest 1996). The numerous specimens of *Iophon* devoid of true acanthostyles (excluding *I. proximum*) recorded along the coast of continental Antarctic are now commonly referred to three valid species (Sarà *et al.* 1992): *I. unicornis* Topsent, 1907, *I. radiatus* Topsent, 1901 and *I. aceratus* Hentschel, 1914.

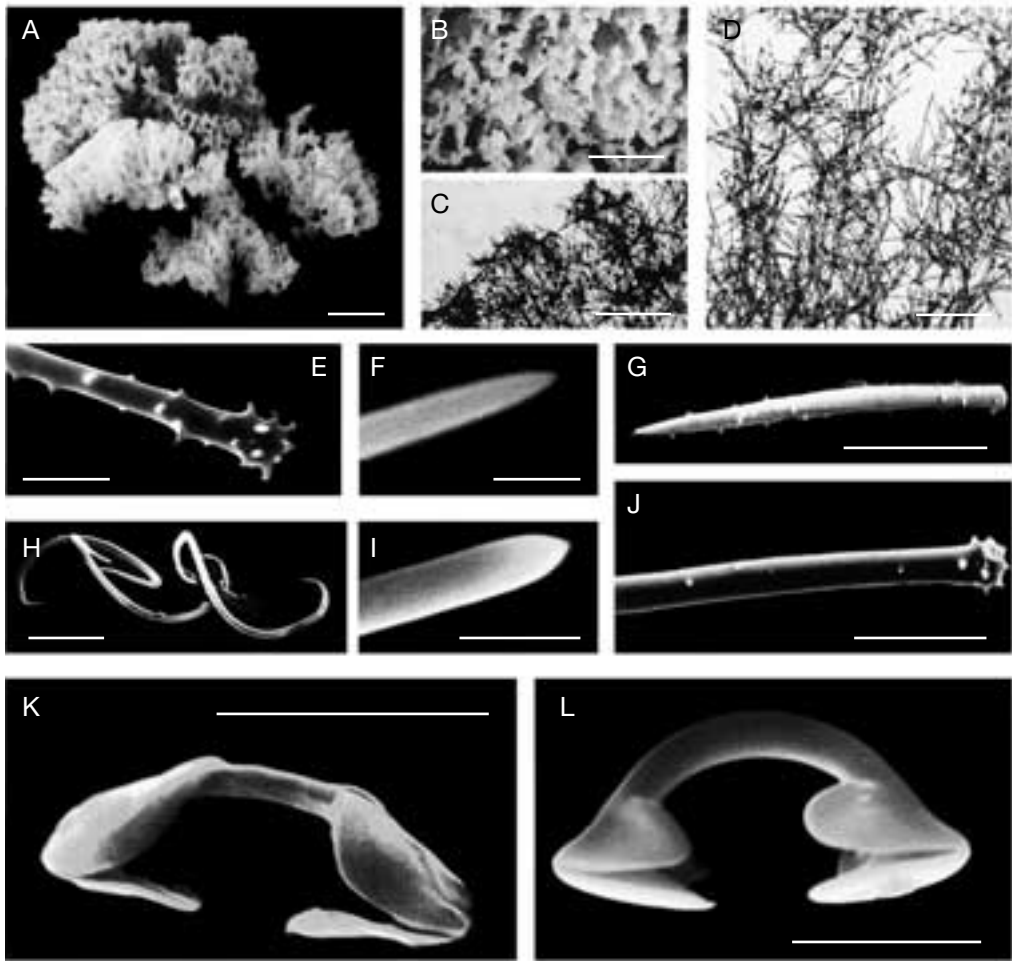

FIG. 4. — *Ectyodoryx minuta* n. sp.; **A**, holotype; **B**, detail of the sponge surface; **C**, ectosome; **D**, choanosomal skeleton; **E**, head of an echinating acanthostyle; **F**, **I**, extremities of anisotornotes; **G**, **J**, acanthostyles forming the choanosomal reticulation; **H**, group of sigmas; **K**, slender isochela; **L**, thick and arcuate isochela. Scale bars: A, 1 cm; B, 3 mm; C, 600 µm; D, 160 µm; E, H, K, L, 10 µm; F, I, 5 µm; G, 100 µm; J, 40 µm.

The first and the second ones were recorded from Terra Nova Bay (Pansini *et al.* 1994) and are sympatric with the new species. *Iophon unicornis*, which receives as synonym *I. spatulatus* Kirkpatrick, 1907 (see Koltun 1964; Boury-Esnault & Van Beveren 1982; Desqueyroux-Faundez & Van Soest 1996), has smooth, spurred styles resembling those of *I. terranovae* n. sp. but smaller in size, acanthostrongyles instead of acanthotylotes and anisochelae which are only 17 µm long (average) instead of 57 µm. *Iophon radiatus* has anisochelae as large as *I. terranovae*, even though they belong to two size categories, and similar bipocilla, but differs distinctly by shape and spinulation of the acanthostyles. *Iophon radiatus sensu* Desqueyroux (1972), which is not a synonym of *I. radiatus* sensu Topsent (1901) (Desqueyroux-Faundez & Van Soest 1996) is rather close to the new species in spicule size, but has a very different shape. *Iophon aceratus* Hentschel, 1914 has smooth styles similar to those of *I. terranovae* n. sp. but differs by having distally spined strongyles instead of tylotes, anisochelae with very different extremities, and bipocilla with long tapered cup edges. Shape in these three Antarctic *Iophon* species is not a good

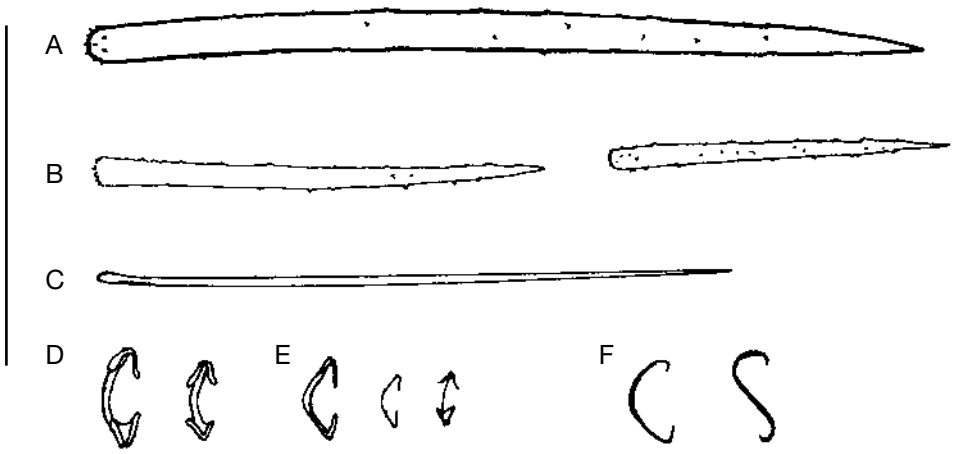

FIG. 5. — *Ectyodoryx minuta* n. sp.; **A**, large acanthostyle; **B**, small, echinating acanthostyles; **C**, anisotornota with a slightly swollen end; **D**, arcuate and thick isochelae; **E**, slender isochelae; **F**, sigmas. Scale bar: 100 µm.

distinctive character because all are more or less globular and have digitiform, branching outgrowths. The new species may be part of the "mucronate-oxeote-styles bearing species" (i.e. *I. unicornis* Topsent, 1907, *I. timidum* Desqueyroux-Faundez & Van Soest, 1996, *I. tubiforme* Desqueyroux-Faundez & Van Soest, 1996, as suggested by the latter authors in their 1996 paper).

Family COELOSPHAERIDAE Hentschel, 1923
Genus *Ectyodoryx* Lundbeck, 1909

Ectyodoryx minuta n. sp.
(Figs 4; 5)

MATERIAL EXAMINED. — Holotype: POR23 (MNA No 2); paratype: stn MM31, 12.I.1990, rock, 197 m, POR23 (MSNG).

ETYMOLOGY. — The small size of the megascleres compared with congeneric Antarctic species suggested the specific name.

TYPE LOCALITY. — Terra Nova Bay, 74°42.2'S, 164°10.9'E.

DESCRIPTION

The only specimen collected is 3.5 cm by 2 cm and overgrowing serpulid tubes (Fig. 4A). The overall appearance of the sponge is bushy amorphous but, on a closer examination, the surface pattern is drawn by the rounded extremities of the branches (Fig. 4B). The alcohol-preserved specimen is very fragile and the holotype is broken into fragments.

Skeleton

Most of the ectosome has been torn off probably during sampling by the dredge, but in a few positions a thin (50-150 µm) but dense layer of microscleres and paratangential anisotornotes is still detectable; the megascleres never form brushes (Fig. 4C). Choanosomal acanthostyles protrude through this layer rendering the sponge surface bristly. The choanosomal skeleton consists of indistinctly square-meshed reticulation and tracts formed by single or few (2-5) almost smooth acanthostyles (Fig. 4D). These tracts are sparingly echinated by smaller more spiny acanthostyles. Abundant microscleres are included into the reticulation. Spongin is scarce.

Spicules

Large acanthostyles, gently curved, with roundish, weakly pronounced head (Figs 4G, J; 5A). Spines are small, few and scattered, generally concentrated over the head. They measure 219-260 (238.5) × 7-10 (8.6) µm.

Small, echinating acanthostyles, straight or gently curved, more fusiform than the larger acanthostyles and with spines uniformly distributed over the head and shaft (Figs 4E; 5B). They measure 102-132 (115) × 5-10 (7) µm. The size of

the two categories of acanthostyles is overlapping, but they may be distinguished by their shape.
Anisotornotes, slender and straight, having one slightly swollen extremity and the other one tapering into a point (Figs 4F, I; 5C). They have a stylote appearance and measure 183-199 (188) × 2.6-5 µm.
Two categories of arcuate isochelae: slender and rather straight 14-18 (15.7) × 1-1.3 µm (Fig. 5E); and thick and more arcuate 20-30 (25) × 2.5-4 µm (Fig. 5D). The shape of the two forms is similar under the optical microscope but very different when viewed by SEM (Fig. 4K, L).
Sigmas: "C" – and "S" – shaped, thin and very abundant (Figs 4H; 5F); 20-56 (27) × 1-2 µm.

REMARKS
The new species is assigned to the genus *Ectyodoryx* Lundbeck, 1909 because of its reticulated choanosome, ectosome with anisotornotes (though not forming brushes), absence of acanthostyles, and presence of arcuate isochelae and sigmas as microscleres (see Bergquist & Fromont 1988). Three other species, *Ectyodoryx antarctica* (Hentschel, 1914), *E. nobilis* (Ridley & Dendy, 1886) and *E. ramilobosa* (Topsent, 1916), belong to the fauna of Terra Nova Bay (Pansini *et al.* 1994). Two more species are recorded from the Antarctic, *E. anacantha* Hentschel, 1914 and *E. plumosa* Hentschel, 1914, although Koltun (1976) considers them very close. Both differ from the new species by the external morphology and by the shape and size of the spicules. *Ectyodoryx crelloides* Brøndsted, 1924 from New Zealand has the branching habit, reduced choanosomal echination, and the small spicule size of *E. minuta* n. sp., but the spicule shape is completely different. *Ectyodoryx minuta* n. sp. is distinguished from all other species of the genus by the small size of the megascleres, the peculiar shape of the anisotornotes, and the presence of two categories of isochelae.

Family NIPHATIDAE Van Soest, 1980
Genus *Microxina* Topsent, 1916

Microxina lanceolata n. sp.
(Figs 6; 7)

MATERIAL EXAMINED. — Holotype: stn F2, rock, 70 m, 27.XII.1989, POR64 (MNA No 3); paratypes: stn MM78, sand, gravel, 235 m, 25.I.1990, POR28 (MSNG). — Stn D4D, 100 m, 3.I.1990, POR65. — Stn Adelie Cove, 10.I.1994, POR273, POR274. — Stn F2bis, 67 m, POR24; 13.I.1988, POR91; haul 24, 20.I.1988, POR92, POR96; 70 m, 13.I.1990, POR157; 1987-1988 campaign, POR272.

ETYMOLOGY. — The name is suggested by the shape of one oxea extremities which resembles a spear.

TYPE LOCALITY. — Terra Nova Bay, 74°42'20S, 164°10'90E.

DESCRIPTION
The sponge is erect and forms numerous cylindrical branches (1-2 cm in diameter), which arise from a common base and divide dichotomically (Fig. 6A). Some specimens may attain a height of 30-40 cm and look bushy. The colour of alcohol-preserved specimens is pale yellow, beige, grey or brown. The consistency is soft and fragile. The surface is areolate; most areolae bear pore sieves and some oscules; both are supported by an erect series of oxeas forming a rim (Fig. 6D, E). Only well-preserved specimens retain this ectosomal specialization which is easily lost.

Skeleton
The ectosome includes perpendicular tufts of oxea surrounding the areolae and is supported by extensions of the choanosomal spicule tracts (Fig. 6B, C). Tangential spicules are absent even between the areolae.
The rather loose choanosomal skeleton is made up by ascending paucispicular (three to eight) tracts (50-180 µm thick) which are parallel or slightly plumose and connected by transverse spicules (two to three) (Fig. 6F). The spicule tracts diverge towards the sponge surface and merge with the ectosomal oxea layer. Interstitial spicules and dispersed microscleres (sigmas) are rare. Several yellow-brown embryos with a diameter of about 200 µm are incubated within the choanosome.

Spicules
Oxeas are mostly straight or seldom slightly curved (Fig. 7A), their ends are generally acerate although abruptly bent tips and lanceolate extremities are common (Figs 6G; 7C). Oxea

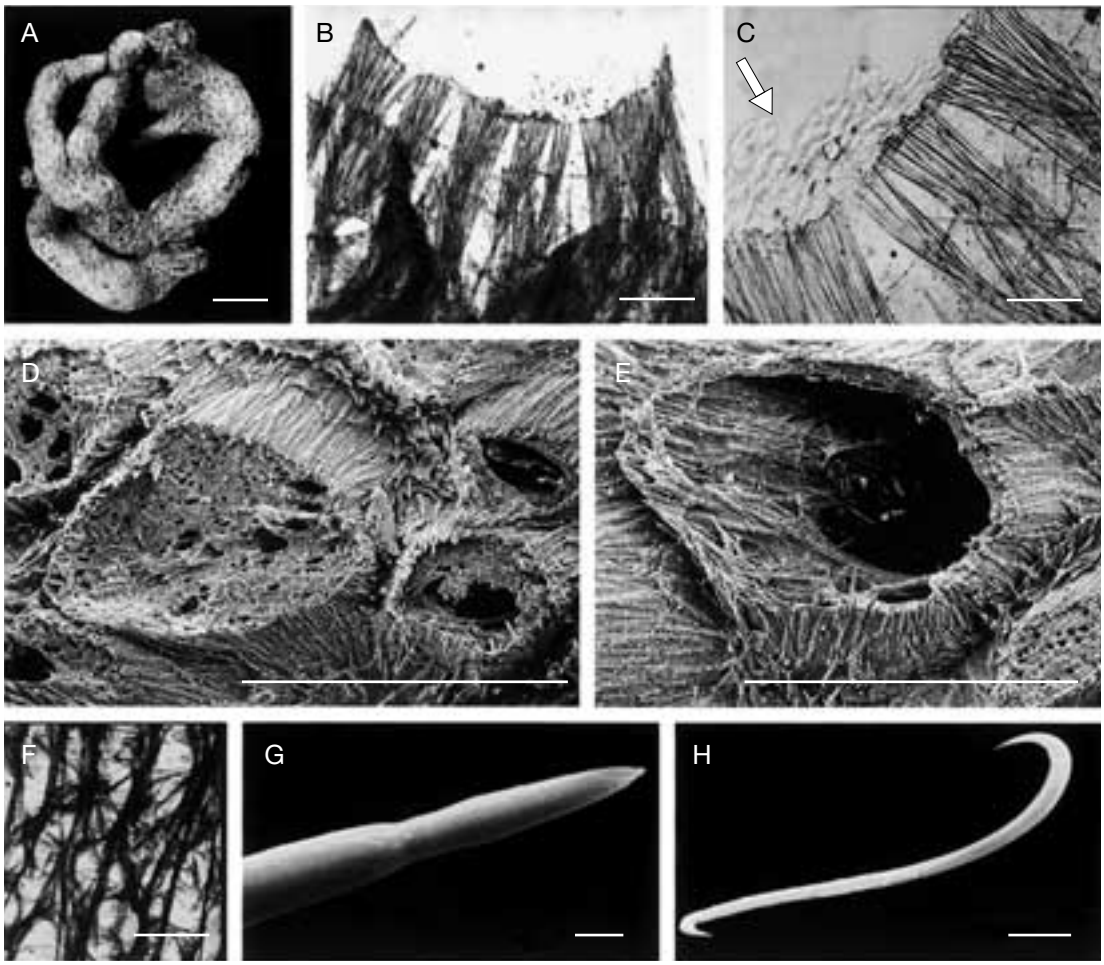

FIG. 6. — *Microxina lanceolata* n. sp.; **A**, paratype; **B**, **C**, ectosomal oxeas which form tufts supporting the pore sieve membrane (arrow); **D**, areolate surface showing the inhalant sieves supported by the oxeas; **E**, oscule; **F**, choanosomal skeleton; **G**, lanceolate extremity of an oxea; **H**, sigma. Scale bars: A, 1 cm; B, 50 µm; C, 20 µm; D, E, 1.5 mm; F, 400 µm; G, H, 10 µm.

measure 390-525 (450) × 11-20 (16.3) µm. Straight, slender and much thinner oxeas (8 µm) are considered developmental stages (Fig. 7A).
Sigmas are always present but not abundant (Figs 6H; 7B); they measure 25-60 (42.6) × 2-4 µm.

REMARKS

A remarkable number of Haplosclerida with sigmas and microxeas were recorded from continental Antarctic and *circum* Antarctic islands (Sarà *et al.* 1992) and attributed to the genera *Gellius, Haliclona* and *Microxina.* However, as Boury-Esnault & Van Beveren (1982) pointed out, there is confusion in the taxonomy of this group and a worldwide revision is needed. Boury-Esnault & Van Beveren (1982) decided to use the genus *Gellius* in a broad sense in their study of the demosponges of the Kerguelen and Heard Islands. More recently, Wiedenmayer (1989: 105) synonymized *Hemigellius* Burton, 1932 with *Microxina* Topsent, 1916, two genera that are nearly identical except for the microscleres, sigmas in the former and microxeas in the latter (see Van Soest 1980: 109). This decision seems justified because *Microxina* species which have

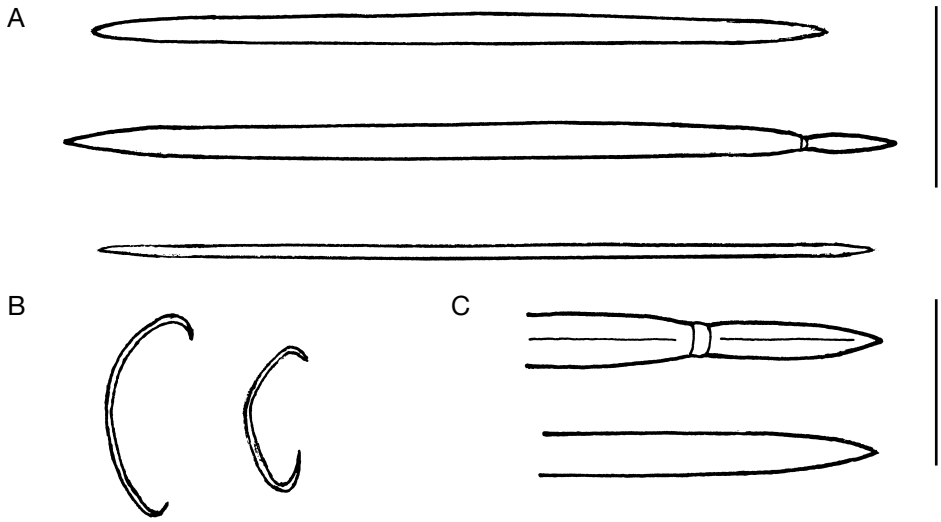

FIG. 7. — *Microxina lanceolata* n. sp.; **A**, straight oxeas; **B**, sigmas; **C**, oxea extremities. Scale bars: A, 100 µm; B, C, 50 µm.

both sigmas and microxeas as microscleres actually exist (e.g. *M. benedeni* (Topsent, 1901)). Wiedenmayer (1989) stated that "toxa also occur in some species of Niphatidae (*Microxina)* of which *Hemigellius* is here considered a synonym" emending *de facto* the definition of the genus *Microxina* to receive also species bearing toxas. This allowed Hooper & Wiedenmayer (1994) to attribute to *Microxina* several species of Haplosclerida with toxas, such as *M. phakelloides* (Kirkpatrick, 1907) and *M. spongiosa* (Topsent, 1916), and "*Microxina" flagellifer* (Ridley & Dendy, 1886). We agree with the proposed synonymy but, for the moment, will restrict its use to species that being devoid of toxas would have previously been placed in *Hemigellius*.

The new species is attributed to *Microxina* on account of its skeletal structure. It is well separated from other species by its shape, spear-shaped oxea extremities, peculiar cribrose appearance of its surface, and absence of tangentially arranged ectosomal spicules.

Based on the skeleton structure, the closest species is *Microxina (Hemigellius) pachydermata* Burton, 1932 which too has a dermal palisade of oxeas but differs from *M. lanceolata* by its even surface (with regularly distributed pores), by shape and size of oxeas, and by absence of sigmas. *Microxina rudis sensu* Topsent, 1901 (see Boury-Esnault & Van Beveren 1982: 117 regarding the genotype of *Hemigellius*) differs from the new species by its massive shape, by having thin, often centrotylote sigmas, and by an ectosomal reticulation of tangentially arranged oxeas. Finally, *Microxina (Hemigellius) pilosa* (Kirkpatrick, 1907) is erect and ramified like *M. lanceolata* but has flattened branches, a slightly conulose surface with large, round oscules, a different shape of oxeas, and smaller sigmas. Both *M. rudis* and *M. pilosa* were recorded from Terra Nova Bay.

Microxina sarai n. sp.
(Figs 8; 9)

MATERIAL EXAMINED. — Holotype: stn MM106, 1995-1996 campaign, 95-110 m, POR226 (MNA No. 4); paratypes: haul 24, 20.I.1988, POR271 (MSNG). — Stn Faraglione, 100 m, 19.II.1998, POR265; 1993-1994, POR169, POR172, POR174; 13.I.1994, POR278, POR279. — Stn Adelie Cove, 10.I.1994, POR276, POR277; 1989-1990 campaign, POR280.

ETYMOLOGY. — The new species is dedicated to Prof. Michele Sarà who has been heading a benthic research unit of the Italian National Program of Antarctic Research for ten years.

TYPE LOCALITY. — Terra Nova Bay, 74°42'20S, 164°10'90E.

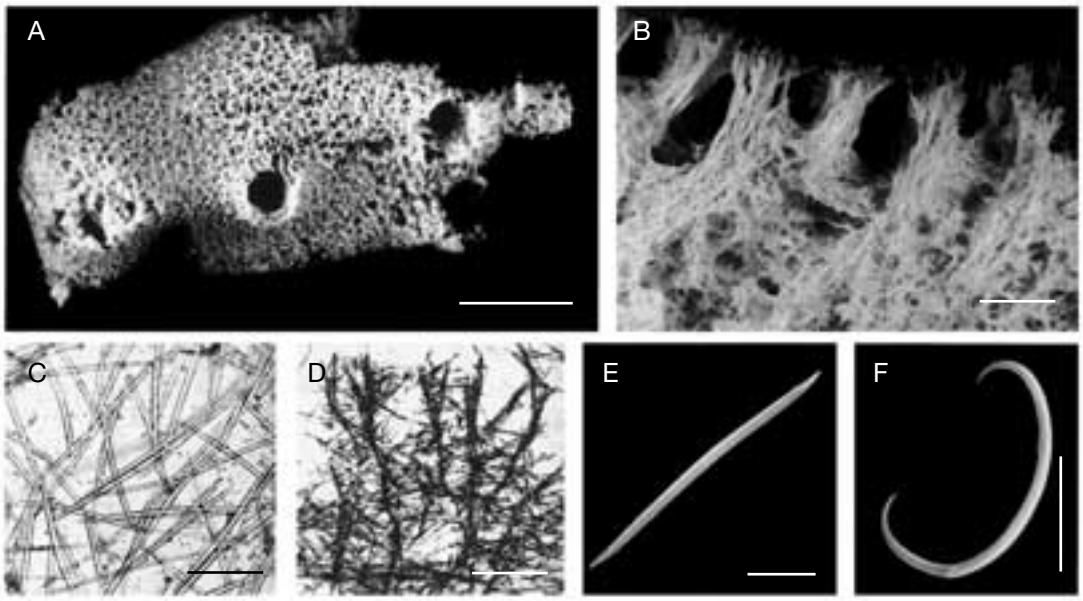

FIG. 8. — *Microxina sarai* n. sp.; **A**, paratype; **B**, skeletal architecture showing the ascending tracts of oxeas forming superficial brushes; **C**, thin, spicular ectosomal membrane; **D**, choanosomal skeleton; **E**, microxea; **F**, sigma. Scale bars: A, 1 cm; B, 2.5 mm; C, 140 µm; D, 700 µm; E, F, 10 µm.

DESCRIPTION

From the broken specimens available (the biggest is 10 cm high and 5 cm across), the sponge is massive amorphous with large lobate processes and may reach a large size (Fig. 8A.) The colour is pale yellow or beige. The sponge is inelastic, tough but very fragile, both wet and dry. The surface is bristly from the protruding spicule brushes. A thin ectosomal membrane is lost in most of the dredged specimens. Oscules are round, slightly raised (1-2 mm), with a diameter of 6-8 mm (Fig. 8A).

Skeleton

The ectosome is a thin layer of disorderly arranged tangential oxeas with abundant microscleres (Fig. 8C). The choanosomal skeleton is formed by multispicular (six to ten) tracts of oxeas which dichotomically divide or merge forming a regular ascending pattern (Fig. 8D). Primary tracts are connected by oxeas (one to three) thus forming a loose reticulation with scarce spongin. In proximity of the sponge surface, the ascending tracts diverge to form tufts of oxeas (Fig. 8B) which penetrate the dermal membrane. Interstitial oxeas and microscleres are abundant, also in the choanosome.

Spicules

Oxeas straight or slightly curved (Fig. 9A), measuring 209-382 (278.9) × 14-20 (17.3) µm. Slender forms, which are always straight and generally longer than average are rather frequent (Fig. 9A).

Sigmas occur in two categories. Small sigmas are thin and more closed: 16-24 (25.3) × 1-2 µm (Figs 8F; 9B). Large sigmas are slightly thicker and more open in shape (Fig. 9C): 36-62 (45.9) × 1-3 µm.

Microxeas straight or very slightly curved, sometimes with the tips bent back (Figs 8E; 9D). They measure 50-80 (62.8) × 1-2 µm.

REMARKS

The new species is placed in *Microxina* Topsent, 1916 based on its choanosomal skeleton with characteristic polyspicular tracts ending in superficial tufts and presence of microxeas and sigmas as microscleres. The presence of a thin ectosomal membrane with tangential oxeas is an important

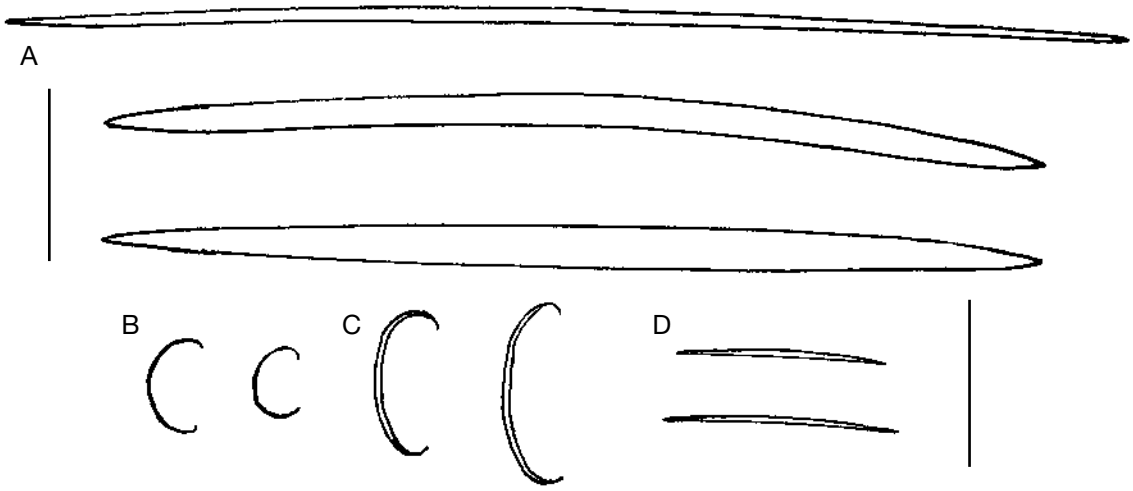

FIG. 9. — *Microxina sarai* n. sp.; **A**, oxeas; **B**, small sigmas; **C**, big, open sigmas; **D**, microxeas. Scale bars: A, 100 µm; B-D, 50 µm.

character of *M. sarai* n. sp. that is not shared by the other species in this genus. Two other species of *Microxina* with microxeas as microscleres are known from the Antarctic: *M. benedeni* (Topsent, 1901) and *M. simplex* (Topsent, 1916). They share with the new species the structure of the choanosomal skeleton, but the polyspicular tracts (15-20 oxeas) are much stouter and the oxea size is at least twice as big. Also their external morphology is different because they have an uneven surface covered by long slender processes (especially in *M. benedeni*) that gives them a peculiar spiny appearance. Several specimens of *M. benedeni* were recorded from Terra Nova Bay.

ECOLOGY

The species is abundant on the continental shelf of Terra Nova Bay between 95 and 110 m depth on hard bottoms with a clear sponge predominance (Cattaneo-Vietti *et al*. 1999b). It may attain a remarkable size (at least 30 cm in height) as seen on the R.O.V. videos but since it looks very similar to *Microxina rudis* (Topsent, 1901) in the same area, the image interpretation requires caution.

REFERENCES

Bergquist P. R. & Fromont P. J. 1988. — The marine fauna of New Zealand: Porifera, Demospongiae. Part 4: Poecilosclerida. *New Zealand Oceanographic Institute Memoirs* 96: 1-197.

Boury-Esnault N. & Van Beveren M. 1982. — Les Démosponges du plateau continental de Kerguelen-Heard. *Comité national français des Recherches antarctiques* 52: 1-175.

Cattaneo-Vietti R., Chiantore M., Gambi M. C., Albertelli G., Cormaci M. & Di Geronimo I. 1999a. — Spatial and vertical distribution of benthic littoral communities in Terra Nova Bay: 503-514, *in* Faranda F. (ed.), *Benthic Ecology of Terra Nova Bay*. Springer-Verlag, Berlin.

Cattaneo-Vietti R., Bavestrello G., Cerrano C., Gaino E., Mazzella L., Pansini M. & Sarà M. 1999b. — The sponges of Terra Nova Bay Ecosystem: 539-549, *in* Faranda F. (ed.), *Benthic Ecology of Terra Nova Bay*. Springer-Verlag, Berlin.

Dendy A. 1924. — Porifera. Part I: Non-Antarctic sponges, *in* British Antarctic "Terra Nova" Expedition 1910. *Zoology*, London, 6 (3): 269-392.

Desqueyroux R. 1972. — Demospongiae (Porifera) de la costa de Chile. *Gayana, Instituto Central de Biologia* 20: 3-71.

Desqueyroux-Faundez R. & Van Soest R. W. M. 1996. — A review of Iophonidae, Myxillidae and Tedaniidae occurring in the South East Pacific (Porifera: Poecilosclerida). *Revue suisse de Zoologie* 103 (1): 3-79.

Hooper J. N. A. & Wiedenmayer F. 1994. — Porifera: 624 p., *in* Wells A. (ed.), *Zoological Catalogue of Australia.* Volume 12. CSIRO Australia, Melbourne.

Koltun V. M. 1964. — Sponges of the Antarctic. Part 1: Tetraxonida and Cornacuspongida. *Biological Reports of the Soviet Antarctic Expedition* (1955-1958) 2: 1-116.

Koltun V. M. 1976. — Porifera. Part I: Antarctic sponges. *B.A.N.Z. Antarctic Research Expedition (1929-1931) Reports* S. B 9 (4): 147-198.

Pansini M., Calcinai B., Cattaneo-Vietti R. & Sarà M. 1994. — Demosponges from Terra Nova Bay (Ross Sea, Antarctica): 1987/88 and 1989/90 P.N.R.A. expeditions. *National Scientific Commission for Antarctica, Data Report* III: 67-100.

Sarà M., Balduzzi A., Barbieri M., Bavestrello G. & Burlando B. 1992. — Biogeographic traits and checklist of Antarctic demosponges. *Polar Biology* 12: 559-585.

Topsent E. 1901. — Spongiaires. Résultats du voyage du S.Y. *Belgica* en 1897-1898-1899. *Rapports scientifiques, Zoologie* 5 (1): 1-54.

Topsent E. 1907. — Éponges calcaires recueillies par le *Français* dans l'Antarctique (Expédition du Dr Charcot). *Bulletin du Muséum national d'Histoire Naturelle*, Paris 7: 539-544.

Van Soest R. W. M. 1980. — Marine sponges from Curaçao and other Caribbean localities. Part 2: Haplosclerida: 1-173, *in* Wagenaar Hummelinck P. & Van Der Steen L. J. (eds), *Amsterdam Studies on the Fauna of Curaçao and Other Caribbean Islands*. Volume 62. Foundation for Scientific Research in Suriname and the Netherlands Antilles.

Wiedenmayer F. 1989. — Demospongiae (Porifera) from northern Bass Strait, southern Australia. *Memoirs Museum Victoria* 50: 1-242.

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