**Sponges (Porifera, Demospongiae) from Bransfield strait, off Joinville Island, collected by Brazilian Antarctic Program - PROANTAR**

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**Abstract:** This is the first taxonomic study of the sponges of Joinville Island (Bransfield Strait, Antarctica). In total, 10 species were identified, viz. *Iophon terranovae*, *Artemisina apollinis*, *Myxilla (Ectyomyxilla) mariana*, *Mycale (Oxymycale) acerata*, *Isodictya erinacea*, *Haliclona (Gellius) rudis*, *Haliclona (Rhizoniera) dancoi*, *Haliclonissa verrucosa*, *Microxina benedeni* and *Microxina phakeloides*. *Iophon terranovae* and *M. (E.) mariana* are recorded for the first time for this Antarctic region; *I. terranovae*, *M. (E.) mariana*, *H. verrucosa* and *M. phakeloides* had their bathymetric ranges extended.

**Keywords:** Antarctica, Demospongiae, distribution, taxonomy, PROANTAR

**Introduction**

The taxonomy of Antarctic sponges was studied by many authors, who described over 300 species collected through several oceanographic expeditions undertaken in the past 110 years. Highlights are the works of Topsent (1901, 1908, 1913, 1917), von Lendenfeld (1907), Kirkpatrick (1908), Hentschel (1914), Burton (1929, 1932, 1934, 1938) and Kolton (1964). More recently, new records were made by Desqueyroux-Faúndez (1989), Barthel et al. (1990, 1997), Pansini et al. (1994), Gutt and Kolton (1995), Mothes and Lerner (1995), Calcini and Pansini (2000), and Ríos et al. (2004). Additionally, important contributions were made on the taxonomy of sponges from the subantarctic region, which belongs to the Antarctic Faunistic Complex (Sarà et al. 1992), by Ridley (1881), Ridley and Condé (1887), Sollas (1888), Thiele (1905), Burton (1940), Sarà (1978), Boury-Esnault and van Beveren (1982) and Desqueyroux and Moyano (1987).

In spite of the many studies conducted, some areas are still unsatisfactorily sampled, such as the South Atlantic Ocean islands, the South Shetland Islands and neighboring areas (Ríos et al. 2004). The conduction of new faunistic surveys in the Antarctic continent will be of great importance in order to correlate abundance with environmental factors, to improve understanding of yearly changes and also to extend geographic and bathymetric distributions (Desqueyroux-Faúndez 1989), besides describing new species. The present study aims to increase the knowledge of the sponge fauna from Antarctica, and also to provide a complete illustration of all the identified species.

**Materials and methods**

The sponges studied here were collected with a ‘beam-trawl’ during the IVth expedition of the Brazilian Antarctic Program, near Joinville Island (62°53'S-56°27'W / 63°01'S-54°49'W; Fig. 1), between 82 and 274 m depth. The specimens are deposited in the Porifera collection of Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Brazil.

Taxonomic identification was based on dissociated spicules mounts and thick sections of skeletal architecture, following the techniques of Mothes-de-Moraes (1978) and Mothes et al. (2004); preparations for SEM study were done according to Mothes and Silva (2002).

Abbreviations used are BMNH (The Natural History Museum, London, England); MCNPOR (Porifera Collection, Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Brazil); MNSG (Museo Civico di Storia Naturale “Giacomo Doria”, Genova, Italy); ZMB (Zoologische Museum für Naturkunde an der Universität Humboldt zu Berlin, Berlin, Germany).
Results

Order Poecilosclerida
Suborder Microcionina
Family Acarnidae

*Iophon terranovae* Calcinaï and Pansini, 2000
(Figs. 2A-G)

Spicules: Megascleres: styles I: 350-450-550 / 12-18-21 µm (Figs. 2C-D); styles II: 330-410-520 / 2.5-4.8-9.0 µm (Fig. 2E); anisochelae: 48-55-62 µm (Fig. 2F); bipocilli: 7.5-10-12 µm (Fig. 2G).

Remarks: Slightly malformed styles I, albeit seen in comparative material, were not observed in the specimen from Joinville Island.

Distribution: Antarctica (Victoria Land, Bransfield Strait, Joinville I.). Bathymetry: 82-135 m.

Family Microcionidae

*Artemisina apollinis* (Ridley and Dendy, 1886)
(Figs. 3A-J)

*Amphilectus apollinis* Ridley and Dendy, 1886: 350.
*Artemisina apollinis*; Koltun, 1976: 188; Desqueyroux-Faúndez, 1989: 125, figs. 22a-e; Ríos *et al*., 2004: 103, figs. 5A-H.

Further synonymy see Desqueyroux-Faúndez (1989).


Comparative material: BMNH 1908.2.5.166d - *Artemisina apollinis* (Ridley and Dendy, 1886).

Description: Massive specimen (Fig. 3A), dimensions 7.5 x 4.5 x 3.2 cm; surface hispid to the touch with ramified conules, oscules 0.3-0.4 cm diameter. Preserved material fragile, with brittle consistency, colour light brown.

Skeleton: (Fig. 3B) Ectosome without specialization. Choanosome formed by multispicular directionless tracts, whereas closer to the surface such tracts are perpendicularly arranged, producing the surface hispidation. Isochelae dispersed throughout the skeleton.

Spicules: Megascleres: styles I: 550-663-730 / 30-34-38 µm (Figs. 3C-D); styles II: 320-412-530 / 5.0-6.0-9.0 µm (Figs. 3E-F); isochelae: 12-15-16 µm (Fig. 3G); toxas I: 340-520-740 µm (Fig. 3H-I); toxas II: 118-157-195 µm (Fig. 3J).

Remarks: Spicule sizes reported for the species are varied, but nevertheless measurements obtained for the sample from Joinville Island are slightly different. The comparative material analysed has thinner styles I and smaller toxas, not separable in different size classes (remeasured, in µm: styles I: 503-582-665 / 13-15-17; styles II: 295-348-485 / 4.0-5.0-7.0; isochelas: 14-16-18; toxas: 80-186-370). Samples from Kerguelen (Koltun 1976, Boury-Esnault and van Beveren 1982) have smaller styles I, and toxas separable in distinct size classes only in some descriptions (Topsent 1908, Boury-Esnault and van Beveren 1982, Desqueyroux-Faúndez 1989).
**Distribution:** Subantarctic region (Kerguelen I.), South Atlantic (South Georgia), Antarctica (Wilhelm II Land, Graham Land, Victoria Land, South Shetland Is., Bransfield Strait, Joinville I.). Bathymetry: 7-380 m.

Suborder Myxillina  
Family Myxillidae  

*Myxilla (Ectomyxilla) mariana*  
**Ridley and Dendy, 1886**  
(Figs. 4A-J)

*Myxilla mariana* Ridley and Dendy, 1886: 472.  
*Ectomyxilla mariana*: Koltun, 1964: 76.  
Further synonymy see Koltun (1964).

**Material:** MCNPOR 1962, Est. 4865: 62°55’ S - 55°16’ W, 82 m, 03.II.1986.  
**Comparative material:** BMNH 1887.5.2.108 - *Myxilla mariana* Ridley and Dendy, 1886.

**Description:** (Fig. 4A) Fragment, 7.7 x 4.5 x 3.8 cm in dimensions; surface rugose, with ridges and grooves; several oscules scattered on the surface (< 0.1-0.2 cm diameter). Preserved material slightly compressible and fragile, colour light brown.

**Skeleton:** (Fig. 4B) Ectosome formed by megascleres in confusion. Choanosome bearing an inconspicuous reticulation which sometimes forms triangular meshes, with multispecific tracts transversed by free spicules, without any evident orientation.

**Spicules:** Megascleres: acanthostyles I: 342-438-494 / 13-16-20 µm (Figs. 4C-D); acanthostyles II: 76-104-142 / 4.0-5.0-6.0 µm (Figs. 4E-F); tylotes: 238-271-304 / 7.0-9.0-12 µm (Figs. 4G-H); isochelae: 20-25-30 µm (Fig. 4I); sigmas: 41-50-71 µm (Fig. 4J).

**Remarks:** Strongyloid tylotes were observed in the studied samples, some of which without spines. Isochelae are smaller in comparison to the measurements supplied by Ridley and Dendy (1887) and Hentschel (1914). Another unexpected observation made here were the very small numbers of acanthostyles II. The comparative material studied has spicules identical to those observed in the specimen from Joinville Island, with only a few significant differences (remeasured, in µm: acanthostyles I: 332-385-418 / 13-14-16; acanthostyles II: 103-139-193 / 8.0-10-14; tylotes: 209-244-275 / 6.0-7.0-8.0; isochelae: 17-29-49; sigmas: 34-44-57).
**Distribution:** Subantarctic region (Marion I.), South America (Chile), Antarctica (Wilhelm II Land, Queen Mary Land, Joinville I.). Bathymetry: 82-385 m.

Suborder Mycalina  
Family Mycalidae

*Mycale (Oxymycale) acerata* (Kirkpatrick, 1907)  
(Figs. 5A-H)


Further synonymy see Desqueyroux-Faúndez (1989).

**Material:** MCNPOR 1983, Est. 4864: 63°01’ S - 54°49’ W, 275 m, 02.II.1986.

**Comparative material:** BMNH 1908.2.5.171b - *Mycale acerata* Kirkpatrick, 1907.

**Description:** (Fig. 5A) Erect and ramified specimen, dimensions: 9.0 x 7.0 x 9.5 cm; surface partially destroyed. Preserved material bears hard consistency and little flexibility, colour mostly white, with light brown shades in some regions.

**Skeleton:** Ectosome a tangential reticulation composed by multispicular tracts, forming triangular meshes (Fig. 5B). Choanosome with thick and compact multispicular tracts, connected by secondary tracts (Fig. 5C). Both types of anisochelae, as well as the raphids, are distributed along the entire tracts.
Spicules: Megascleres: oxeas: 650-806.4-890 / 12.5-17.1-20 µm (Figs. 5D-E); raphids: 25-31-35 µm (Fig. 5F); anisochelae I: 87.5-104.6-117.5 µm (Fig. 5G); anisochelae II: 30-44.8-52.5 µm (Fig. 5H).


Distribution: Subantarctic region (Macquarie I., Kerguelen I.), South America (Chile, Argentina, Falkland Is.), South Atlantic Ocean (Shag Rocks, South Georgia, South Orkneys), Antarctica (Victoria Land, Graham Land, Adelie Land, Wilhelm II Land, Banzare Land; McRobertson Land; Princess Ragnhild Land, Enderby Land, Weddell Sea, South Shetland Is., Joinville I.). Bathymetry: 0-731 m.

Family Isodictyidae

*Isodictya erinacea* (Topsent, 1916) (Figs. 6A-E)

*Homoeodictya erinacea* Topsent, 1916: 169

*Isodictya erinacea*; Koltun, 1964: 40, pl. VIII, figs. 4-7; 1976: 171; Desqueyroux, 1972: 52; 1975: 59, pl. II, figs. 18-20; Vacelet and Arnaud, 1972: 15; Desqueyroux-Faúndez, 1989: 114, pl. III, figs. 12a-c, pl. IX, figs. 53-55; Barthel *et al*., 1990.
Fig. 5: Mycale (Oxymycale) acerata (Kirkpatrick, 1907). A. Specimen. B. Ectosome. C. Choanosome. D. Oxea. E. Extremities of oxea. F. Raphid. G. Anisochelae I, H. Anisochelae II.


Description: (Fig. 6A) Ramose fragment, dimensions: 14 x 3.5 x 2.0 cm; spiny surface, branching from the central axis. Preserved material of stiff consistency, colour light brown.

Skeleton: (Fig. 6B) Ectosome absent. Choanosome composed of thick longitudinal multispecificular tracts (400-820 µm thickness), irregularly connected by megascleres in criss-cross arrangement, forming rounded to polygonal meshes (370-810 µm diameter). Isochelae dispersed along the tracts.

Spicules: Megascleres: oxeas: 600-718.4-800 / 18.8-27.1-31.3 µm (Figs. 6C-D); isochelae: 42.5-52.7-57.5 µm (Fig. 6E).

Remarks: Desqueyroux-Faúndez (1989) found a second category of smaller isochelae in her samples. In the samples studied by Ríos et al. (2004), as well as in the present study, such spicules were also seen, but considered to be growth stages of the larger ones.

Distribution: South Atlantic Ocean (South Georgia, Burdwood Bank), Antarctica (Graham Land, Palmer Archipelago, Victoria, Banzare Land; McRobertson Land, Enderby Land, Adelie Land, Weddell Sea, Joinville I., South Shetland Is., Bransfield Strait). Bathymetry: 20-920 m.
Order Haplosclerida
Suborder Haplosclerina
Family Chalinidae

**Haliclona (Gellius) rudis** (Topsent, 1901)
(Figs. 7A-G)

_Gellius rudis_ Topsent, 1901: 14, pl. I, fig. 9, pl. III, fig. 4; Desqueyroux-Faúndez, 1989: 127, pl. IV, figs. 24a-b, pl. XV, fig. 86; Barthel _et al._, 1990: 123; Pansini _et al._, 1994: 80; Cattaneo-Vietti _et al._, 1999: 540.

Further synonymy see Desqueyroux-Faúndez (1989).

**Material:** MCNPOR 1984, Est. 4866: 62°53’ S - 56°27’ W, 194 m, 03.II.1986.

**Description:** (Fig. 7A) Digitiform specimen, dimensions: 8.0 x 5.5 cm; surface hispid to the touch, with ridges and grooves; oscules 0.1-0.2 cm diameter, positioned on top of conules; small pores observed on surface (< 0.1 cm diameter). Preserved material with friable consistency, colour light brown.

**Skeleton:** (Fig. 7B) Ectosome without specialization. Choanosome formed by a dense arrangement of multispicular tracts, interconnected by isolated megascleres. Part of the skeleton is halichondrioid, confused and irregular, with tracts oriented in several directions. Sigmas are seen at the nodes of megascleres.
The spicules in the present material differ from those reported in most previous studies. In the present study two size classes of oxeas were found, a feature previously reported only by Boury-Esnault and van Beveren (1982).

**Remarks:** The spicules in the present material differ from those reported in most previous studies. In the present study two size classes of oxeas were found, a feature previously reported only by Boury-Esnault and van Beveren (1982).

**Distribution:** Subantarctic region (Kerguelen I.), Antarctica (Bellingshausen Sea, Graham Land, Victoria Land, Weddell Sea, Joinville I., South Shetland Is., Bransfield Strait). Bathymetry: 20-500 m.

**Haliclona (Rhitomina) dancoi** (Topsent, 1901)

(Figs. 8A-D)

**Material:** MCNPOR 1986, Est. 4867: 62º57' S - 56º50' W, 95 m, 03.II.1986.

**Description:** (Fig. 8A) Partially broken specimen, arborescent, dimensions: 5.2 x 1.2 x 1.4 cm; surface hispid to the touch, with protruding spicules; oscules 0.1-0.2 cm in diameter. Preserved material with friable consistency, colour beige.

**Skeleton:** (Fig. 8B) Ectosome formed by the ends of primary tracts, partially arranged in discrete bouquets. Choanosomal network composed by multispicular primary tracts (65-140 µm thickness), connected by uni to paucispicular secondary tracts, forming polygonal to triangular meshes.

**Spicules:** Megascleres: oxeas: 380-468.2-590 / 16.3-23.6-30 µm (Figs. 8C-D).
Remarks: Comparing the measurements of spicules from previous records (Topsent 1901, 1908, Kirkpatrick 1908, Hentschel 1914, Koltun 1964, 1976) with measurements obtained in the present study, some variation was observed; however this particularity is interpreted as intraespecific variation.

Distribution: South Atlantic Ocean (South Orkneys), Antarctica (Bellingshausen Sea, Graham Land, Victoria Land, Wilhelm II Land, Princess Elisabeth Land, McRobertson Land, Enderby Land, Adelie Land, Sabrina Land, Weddell Sea, Joinville I., South Shetland Is.). Bathymetry: 18-2267 m.

Family Niphatidae

Haliclonissa verrucosa Burton, 1932
(Figs. 9A-F)

Haliclonissa verrucosa Burton, 1932: 270, pl. LI, fig. 3, text-fig. 8; 1940: 100; Koltun, 1964: 102; Desqueyroux, 1972: 54; Barthel et al., 1990: 123.


Comparative material: BMNH 1928.2.15.723a - Haliclonissa verrucosa Burton, 1932.

Description: (Fig. 9A) Cylindrical sponge; dimensions: 5.0 x 1.9 x 1.2 cm; surface verrucose and hispid to the touch. Oscules 0.1-0.3 cm in diameter. Preserved material showing very friable consistency, colour beige.

Skeleton: (Fig. 9B) Ectosome formed by the ends of choanosomal tracts, in varied positions. Choanosome composed by longitudinal multispicular tracts, which protrude through the surface, irregularly connected by secondary tracts. Both types of oxeas form the tracts, although few oxeas II are present in the specimens studied.

Spicules: Megascleres: oxeas I: 351.5-412.1-503.5 / 10.4-12.4-15 µm (Figs. 9C-D); oxeas II: 256.5-288.2-323 / 2.5-4.3-6.9 µm (Figs. 9E-F).

Remarks: Desqueyroux-Faúndez and Valentine (2002) added new information concerning the spicular content of this species, recording a second category of oxeas which were also observed in the present study.

Distribution: South America (Uruguay, Argentina), Antarctica (Palmer Archipelago, Victoria Land, Weddell Sea, Joinville I., South Shetland Is.). Bathymetry: 25-194 m.
Microxina benedeni (Topsent, 1901)
(Figs. 10A-E)

Gelliodes benedeni Topsent, 1901: 16, pl. II, fig. 3, pl. III, fig. 5.

Further synonymy see Desqueyroux (1975).


Description: (Fig. 10A) Cylindrical specimen; dimensions: 7.3 x 2.2 x 2.4 cm; surface densely spiny due to the presence of stiff conules; oscules 0.1-0.3 cm diameter. Preserved material very firm and incompressible in consistency, colour light brown.

Skeleton: (Fig. 10B) Ectosome without tangential specialization. Choanosome composed by longitudinal multispicular tracts (320-700 µm thickness), forming tufts

Fig. 9: Haliclonissa verrucosa
which characterize the superficial texture; between the tracts the spicules occur in an irregular arrangement which can bear irregular meshes.

**Spicules:** Megascleres: oxeas: 408.5-804.1-902.5 / 27.5-30.3-55 µm (Figs. 10C-D); sigmas: 20-30.4-55 µm (Fig. 10E).

**Remarks:** The present sample has only sigmas as microscleres, which occur in low frequency.

**Distribution:** South America (Falkland Is.), South Atlantic Ocean (South Georgia), Antarctica (Bellinghausen Sea, Graham Land, Victoria Land, Palmer Archipelago, Banzare Land; Princess Elisabeth Land, McRobertson Land, Enderby Land, Weddell Sea, Joinville I., South Shetland Is.). Bathymetry: 81-1266 m.

**Microxina phakelloides** (Kirkpatrick, 1907)  
(Figs. 11A-F)

**Sigmaxynissa phakelloides** Kirkpatrick, 1907: 272.

**Gellius phakelloides:** Barthel et al., 1990: 123.


Further synonymy see Koltun (1964).

**Material:** MCNPO 2046, Est. 4865: 62°55’ S - 55°16’ W, 82 m, 03.II.1986.

**Description:** (Fig. 11A) Massive and amorphous specimen; dimensions: 7.8 x 6.3 x 1.1 cm; surface conulose; oscules 0.1 cm diameter. Preserved material with friable consistency, colour light brown.

**Skeleton:** (Fig. 11B) Ectosome formed by thick multispicicular tracts, perpendicular to the surface, where megascleres are positioned in tufts which render the surface hispid. Choanosome with uni- to paucispicicular tracts forming polygonal meshes, diameter 300-380 µm. Sigmas and toxas between the meshes.

**Spicules:** Megascleres: oxeas: 627-707-779 / 25.3-32.7-36.8 µm (Figs. 11C-D); sigmas: 52.9-83.9-128.8 / 2.5-3.9-5.0 µm (Fig. 11E); toxas: 94.3-130-184 / 2.5-3.9-5.0 µm (Fig. 11F).

**Remarks:** The spicules of the species are very characteristic, with oxeas of great dimensions, sigmas with remarkable
deformation in its contour and centroangulate toxas. The values registered by Kirkpatrick (1908), Hentschel (1914) and Koltun (1964) for the spicular measurements are very similar to the samples of the present study.

**Distribution:** Antarctica (Victoria Land, Knox Land, Banzare Land, Wilhelm II Land, Weddell Sea, South Shetland Is., Joinville I., Bransfield Strait). Bathymetry: 66-550 m.

**Concluding remarks**

The species dealt with here are all first records for Joinville Island. With the new occurrences of *Iophon terranovae*, *Myxilla (Ectomyxilla) mariana* and *Haliclona (Rhizoniera) dancol* for this island, their distribution is extended. The known bathymetric ranges for *I. terranovae*, *M. (Ectomyxilla) mariana*, *Haliclonissa verrucosa* and *Microxina phakelloides* were also extended in the present contribution.

This new panorama of the sponges in Antarctica corroborates the ideas of Desqueyroux-Faúndez (1989) and Ríos *et al.* (2004), in revealing the necessity for new collections, mainly in the region comprising the Graham Land and Palmer Archipelago, along with South Shetland Is., South Orkneys and the vicinity of South Sandwich. Accomplishment of this task would permit a better understanding of the real geographic and bathymetric distribution of the species belonging to the Antarctic complex. All the species recorded for Joinville I. until the present also occur at continental antarctic areas, and the majority generally extends their occurrence for the southernmost tip of South America, to

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**Fig. 11:** *Microxina phakelloides* (Kirkpatrick, 1907). A. Specimen. B. Skeleton. C. Oxea. D. Extremities of oxea. E. Sigmas. F. Toxas.
South Atlantic localities (South Georgia and South Orkneys) and to Kerguelen I. in Subantarctic region.

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