

A review of Iophonidae, Myxillidae and Tedaniidae occurring in the South East Pacific (Porifera: Poecilosclerida)

Ruth DESQUEYROUX-FAÚNDEZ* & Rob W. M. VAN SOEST**

*Muséum d'histoire naturelle, P.O. Box 6434, ch-1211 Geneva, Switzerland.

**Institute for Systematics and Population Biology (Zoologisch Museum),
University of Amsterdam, P.O. Box 94766, 1090 GT Amsterdam, the Netherlands.

A review of Iophonidae, Myxillidae and Tedaniidae occurring in the South East Pacific (Porifera: Poecilosclerida).- Based on collections from the coasts of Chile, Peru, and the Galapagos Islands, the SE. Pacific species of *Iophon*, *Myxilla* and *Tedania* are revised. Descriptions and illustrations are provided for eleven previously known species (including thirteen new synonymy proposals). Six new species are described: *Iophon chilense*, *I. timidum*, *I. tubiforme*, *Myxilla* (E.) *dracula*, *M. (B.) asymmetrica*, and *Tedania* (T.) *galapagensis*. A key for the identification of the species is included. The results of this study provided the basis for a revised classification of related genera and a new family assignment of *Iophon*, *Myxilla* and *Tedania*. In accordance with suggestions in the recent literature *Iophon* is assigned to the revived family Iophonidae Burton, 1929 of the suborder Microcionina Hajdu *et al.*, 1994. *Myxilla* and *Tedania* are assigned to different families of the suborder Myxillina, viz. a restricted Myxillidae Topsent, 1928 and Tedaniidae Ridley & Dendy, 1886 both of the suborder Myxillina Hajdu *et al.*, 1994. It is demonstrated that the *Myxilla*-like genera *Burtonanchora* de Laubenfels, 1936, *Ectyomyxilla* Lundbeck, 1909 and *Stelodoryx* Topsent, 1904, are based on characters without phylogenetic significance. It is proposed to retain these as subgeneric units within *Myxilla*. On similar grounds, *Trachytedania* Ridley, 1881 and *Tedaniopsis* Dendy, 1924, are considered subgenera of *Tedania*. Diagnosis and generic composition of the families are discussed.

Key-words: Iophonidae - Myxillidae - Tedaniidae - SE. Pacific - Taxonomy

INTRODUCTION

Numerous species of Poecilosclerida are reported from the coasts of the South East Pacific (RIDLEY 1881; RIDLEY & DENDY 1886, 1887; WILSON 1904; THIELE 1905; DE LAUBENFELS 1939; DESQUEYROUX 1972, 1976, DESQUEYROUX-FAÚNDEZ, 1990;

HAJDU & DESQUEYROUX-FAÚNDEZ 1994) and adjacent areas in the South West Atlantic (BURTON 1932, 1940; SARÀ 1978). Among the poecilosclerids, particularly the genera *Iophon*, *Myxilla* and *Tedania* are well-represented. However, type specimens of newly described species from the area and specimens assigned to them subsequently have never been revised, so the fauna is not well-known. Through her contacts with many Chilean institutions, the senior author has assembled a comprehensive collection of sponges from most areas of the extensive coastline of Chile; additional samples from Chile, Peru and the Galapagos Islands were obtained from the collections of the former Smithsonian Oceanographic Sorting Centre. In addition to this, the type and other specimens of previously described species were borrowed from other institutions, and this combined comprehensive collection has been revised by us. The present study is one of an ongoing series of studies of the Poecilosclerid sponges of the South East Pacific made by the senior author (cf. HAJDU & DESQUEYROUX-FAÚNDEZ 1994).

The extensiveness of the available material enabled us to make a contribution to the improvement of the classification of the Poecilosclerida initiated recently by HAJDU *et al.* (1994). The large number of species of the genera *Iophon*, *Myxilla* and *Tedania* described in the study area and adjacent areas induced us to concentrate the present study on these genera. A further reason is that they occupy key positions in the preliminary changes in the Poecilosclerida classifications proposed by HAJDU *et al.* (1994).

Assignment of species to genera and families of the myxillid Poecilosclerida is problematic because of the lack of consensus among recent authors over their content and relationships. VAN SOEST (1984) employed a wide diagnosis of Myxillidae based on the presence of diactinal (tylote or strongylote) ectosomal spicules and a reticulate choanosomal skeleton. Thus diverging genera such as *Iophon*, *Myxilla*, *Acarnus*, *Tedania*, and *Lissodendoryx* were included in a single family Myxillidae. BERGQUIST (1978) and BERGQUIST & FROMONT (1988) assigned *Tedania* to a separate family Tedaniidae based on the absence of chelas and the possession of onychaetes; they emphasized an isotropic choanosomal skeleton as a synapomorphy for a more restricted Myxillidae. Many authors, e.g. BOURY-ESNAULT & VAN BEVEREN (1982) followed in part BERGQUIST (1978).

In their preliminary review of Poecilosclerid characters, HAJDU *et al.* (1994) proposed an extensive reorganization of the genera formerly considered to be "myxillids". They observed a striking consistency in the presence or absence of toxas and the chela morphology: species and genera with arcuate and anchorate chelas (together named "tridentate" chelas) never have toxas, (with some notable exceptions, e. g. spp. of *Dendrocia*); these are confined to sponges possessing palmate chelas. This was in line with a separation between palmate and "tridentate" coelosphaerid sponges made earlier by LÉVI & LÉVI (1983). These authors proposed to recognize two families of fistular Poecilosclerida, Coelosphaeridae with arcuate chelas and Cornulidae with palmate chelas. LÉVI & LÉVI (1983) did not mention that most of their Cornulidae had microspined tylote or strongylote apices. HAJDU *et al.* (1994) suggested to include other genera with palmate chelas into the Cornulidae, and to de-

emphasize the fistular growth form. The genera concerned are *Acarus* (cf. VAN SOEST *et al.*, 1991 for a revision), *Megaciella* and also *Iophon*, all three with microspined tylotes. The latter genus, however, is a less clear-cut case because of the lack of toxas, the possession of anisochelas and the peculiar autapomorphous bipocilla. Moreover, if *Iophon* is included in the Cornulidae in the widened sense, the family name has to change to Iophonidae Burton, 1929. VAN SOEST *et al.* (1994) revised the Cornulidae s.s. and concluded these are a closely related assemblage probably related to *Iophon* and *Acarus*; however, they did not include specimens of *Iophon* in their studies. The present extensive collections contain ample material of this genus allowing a comparison with the results of Van Soest *et al.* (1994).

A further proposal of HAJDU *et al.* (1994) is a separation of myxillids possessing anchorate chelas (e.g. *Myxilla*) and those possessing arcuate chelas (e.g. *Lissodendoryx*). The substantial number of *Myxilla* s.l. species found in the study area is used to narrow down the differences between the proposed Myxillidae s.s. and an extended Coelosphaeridae. The generic contents of the Myxillidae s.s. is discussed on a preliminary basis. The Coelosphaeridae s.l. (including *Lissodendoryx*) will be treated in a forthcoming paper.

HAJDU *et al.* (1994) expressed uncertainty over the distinctness of a family Tedaniidae. The substantial number of *Tedania* species in the study area as well as a large number of borrowed type slides available to us enabled us to revise this group.

The revisions presented below are intended to give a firmer basis to discussions of poecilosclerid classification. In the absence of similar revisions of myxillids from other areas, it is not possible yet to present a definitive new system.

MATERIAL AND METHODS

Specimens from the Chilean Coast between Iquique and Seno Almirantazgo (20°-54°S) were collected during surveys realised from 1966 to 1992. Collector references, are indicated in the text as: collecting number (abbreviations are explained below), locality, geographical coordinates, date (day, month, year) and depth in m.

CHI.: Samples from the Instituto de Oceanología Universidad de Valparaíso, Chile;

Co.93: Samples from Facultad de Pesquerías y Oceanografía Universidad Austral de Chile, Puerto Montt;

Ga: Samples from SEPBOP program;

HE: Samples from Hero expedition 1969-1972 from the National Science Foundation and Departamentos de Biología Marina y Oceanografía y de Zoología de la Universidad de Concepción, Chile;.

MNHNC: Samples from the Museo nacional de Historia natural de Chile, Santiago;

MONT.: Samples from the Universidad de Chile, Valparaíso, Estación de Biología Marina de Montemar;

POR., E: Samples from Departamento de Ciencias Ecológicas, Universidad de Chile, Santiago;

VALD.: Samples from the Universidad Austral de Chile, Valdivia;

A second lot of specimens was obtained from the former Smithsonian Oceanographic Sorting Centre: several specimens from Chile, Peru and Galapagos were collected during the 1966 SE Pacific Biological Oceanography Program (SEPBOP) on board of R.V. "Anton Bruun"; other specimens were collected by individual collectors. Representative sets of specimens of this collection are deposited in the United States National Museum of Natural History at Washington, including holotypes of new species, in the Zoölogisch Museum Amsterdam, and the Muséum d'histoire naturelle de Genève.

For comparison a comprehensive set of type fragments and type slides of *Iophon*, *Myxilla* and *Tedania* species and related genera were borrowed from a number of institutions.

Abbreviations for institutions used in the text are:

BMNH:	Natural History Museum, London;
CNM:	Canadian National Museum;
IOUV:	Instituto de Oceanología Universidad de Valparaiso;
MCSN:	Museo Civico di Storia Naturale "Giacomo Doria", Genova;
MHNG:	Museum d'histoire naturelle, Geneva;
MNHN:	Muséum National d'Histoire Naturelle, Paris;
MNHNC:	Museo nacional de historia natural de Chile, Santiago;
MZSF:	Museo Zoologico de "La Specola", Firenze (Italy);
MZUC:	Museo zoología Universidad Concepción, Chile;
UCH:	Departamento de Ciencias Ecológicas, Universidad de Chile, Santiago.
USC/AHF	University of Southern California; Allan Hancock Foundation
USNM:	National Museum of Natural History, Smithsonian Institution, Washington; formerly United States National Museum;
ZMA:	Zoölogisch Museum, Amsterdam;
ZMB:	Museum für Naturkunde der Humboldt-Universität, Berlin;
ZMK:	Zoologisk Museum København;
ZMH:	Zoologisches Museum Hamburg

Skeletal slides and dissociated spicule mounts were made following Rützler (1978). The SEM study was made using a Zeiss Digital Scan Microscope dsm 940, with accelerating voltage of 20 kV and magnification up to 10,000 times.

Scales for specimens represent 0.5 cm. Scales for sem pictures are indicated with each spicule. Measurements of spicules on Tables refer to minimum-mean maximum in μm ; in text they refer to minimum-maximum, in μm .

SYSTEMATIC PART

Order: Poecilosclerida; Suborder: Microcionina Hajdu, van Soest & Hooper, 1994

Family: Iophonidae Burton (1929, as section Iophoneae)

Diagnosis: Microcionina with spined tylotes as ectosomal megascleres.

Iophon Gray, 1867

Synonyms: *Alebion* Gray (1867), *Menyllus* Gray (1867), *Ingallia* Gray (1867), *Pocillon* Topsent (1891), *Iophonopsis* Dendy (1924), *Burtonella* De Laubenfels (1928) and *Iophonota* De Laubenfels (1936).

Type species: *Halichondria scandens* Bowerbank, 1866 (by original designation).

Diagnosis: Massive, branching or encrusting Iophonidae with ectosomal skeleton of intercrossing or scattered tylotes with spined heads, choanosomal skeleton consisting of an isodictyal reticulation of smooth or spined styles, arranged singly or in two's and three's, which may or may not be echinated by acanthostyles. Microscleres include bipocilla and palmate anisochelas; toxas are absent (based on VAN SOEST *et al.* 1994).

Remarks: The suborder assignment is based on the presence of palmate chelas (as opposed to the "tridentate" chelas of the suborder Myxillina). The anisochelas are shared with *Melonchela*, *Acanthorhabdus* (see below) and outside the family with the mycalid genus *Mycale* s.l. The apparent absence of toxas is unusual for the family, shared only with *Acanthorhabdus*. The genus is traditionally assigned to Myxillidae (now in suborder Myxillina), and indeed the skeletal structure of many species is reminiscent of *Myxilla*. However, Myxillidae in the restricted sense of HAJDU *et al.* (1994) possess anchorate chelas and sigmas (cf. below). The "renieroid" or isotropic skeletal structure is found in many Poecilosclerida, e.g. *Iophon*, *Acarnus*, *Myxilla*, *Lissodendoryx*, *Antho*, *Clathria*, *Ectyoplasia* and *Plocamionida*. These are not all closely related, and accordingly we assume this character to have been developed several times in the evolution of the Poecilosclerida. A further argument for including *Iophon* in the Myxillidae would be the fact that ectosomal megascleres in *Myxilla* often are tylote-like and quite often have some spines on their apices. Again, this feature is not restricted to *Myxilla* and *Iophon*, but occurs in several other genera, e.g. *Tedania* and *Ectyodoryx*. In all these cases the tylotes are not exactly similar to the uniformly shaped *Iophon* tylotes, by being either anisotornotes (*Myxilla*, *Ectyodoryx*) or very lightly spined (*Tedania* (*Tedania*)). It is assumed again that some parallel evolution in the ectosomal megascleres has taken place (see a more extensive discussion in HAJDU *et al.*, 1994).

It can be argued that the genus name *Iophon* is threatened by *Menyllus* Gray, 1867. Gray described the latter in the same publication, but one page earlier (page 533) than *Iophon* (page 534). *Menyllus* has not been used regularly (in fact there are only half a dozen records of species as *Menyllus* in the past 50 years), and the name was considered as a *nomen oblitum* under the rules of a previous edition of the

International Code of Zoological Nomenclature. However, since this rule has been abandoned, we can only refer to Article 24 which covers the actions of the "first revisor". From among the various names available for this group of sponges, RIDLEY (1881) chose *Alebion* (for his species *A. proximum*). RIDLEY (1881) may be considered as the first revisor in the sense of Article 24, and his choice supersedes any page priority considerations. Unfortunately, *Alebion* (also used by VOSMAER, 1882) was found to be preoccupied, and subsequently RIDLEY & DENDY (1886) chose *Iophon* as the name for this group. This is here explained as according to the principle of Article 24, despite the recommendation 24A which urges the first revisor to take what is described first. Gray's diagnosis of *Iophon* and *Menyllus* were sufficiently different to explain, why RIDLEY & DENDY (1886) did not consider both synonymous, as it turned out to be later. In conclusion, *Iophon* seems to be a valid name, with *Menyllus* as a junior synonym.

Iophon species fall into two groups, those with and those without a special category of fully spined echinating acanthostyles, and these have been given separate generic status by DENDY (1924), with *Iophon* reserved for species with acanthostyles (as in the type species *I. hyndmani* (Bowerbank, 1858), senior synonym of *Halichondria scandens* Bowerbank, 1866) and *Iophonopsis* for species without them (as in the type species *I. nigricans* (Bowerbank, 1858)). This distinction has not been accepted by most authors, because in other Poecilosclerid groups the same presence or absence is found (e.g. *Clathria* versus *Isociella* for example), and accordingly we consider both as synonyms. Several authors, e.g. BAKUS (1966), went even further and accepted presence or absence of acanthostyles not even as a distinction between species. As will be shown below, this is partly true: in *Iophon proximum* the recognition of smaller fully spined acanthostyles is often difficult to make. Bakus (l.c.) synonymized a long list of *Iophon* species, including *I. proximum*, under a *I. pattersoni* (Bowerbank, 1866), now recognized as a junior synonym of *I. nigricans* (Bowerbank, 1858). However, in the sympatric Eastern Atlantic *I. hyndmani* and *I. nigricans* the acanthostyle presence coincides with other morphological features, so in these it is a species character.

Iophon species are characteristic for cold water faunas (cf. VAN SOEST, 1994), as they are common in the Northern Atlantic, North Pacific and Arctic, as well as in the Southern Ocean, including New Zealand, South America and Antarctica. In tropical and subtropical waters few species have been found, and then almost exclusively in deeper waters.

***Iophon proximum* (Ridley, 1881)**

(Figs. 1-12)

Alebion proximum RIDLEY, 1881:119, pl. x, fig. 8.

? *Iophon proximum* var. *reticularis* HENTSCHEL, 1914: 89.

Iophon proximum BURTON, 1932:296, pl. 57, figs. 1-13, figs. 21-24, [in part]; 1934: 25; 1938: 15; DESQUEYROUX 1972: 22; 1976: 103; BOURY-ESNAULT 1973: 280, text fig. 34; Sarà, 1978: 49; BOURY-ESNAULT & VAN BEVEREN 1982: 89, pl. 15, fig. 59, text figs. 25a-h; GENZANO et al., 1991: 67, lam. 7, fig. B; CUARTAS, 1992: 78, text fig. 24;

Iophon pattersoni sensu RIDLEY & DENDY, 1887: 117 & sensu THIELE, 1905 (in part) [not *I. pattersoni* (Bowerbank, 1866) = *I. nigricans* (Bowerbank, 1858)]

MATERIAL STUDIED: BMNH1879:12:27:5, holotype of *Iophon proximum* (Ridley, 1881), Strait of Magellan, Sandy Point, substrate: one valva of *Pecten*, Coll. R. Coppinger "HMS" Alert, 12-15 m; ZMH S2313, holotype of *I. proximum reticularis* Hentschel, 1914, Gauss Stn., 66°02'S 89°38'W, Deutschen Südpolar-Expedition 1901-1903, 50-200 m.; ZMB 3299, *Iophon pattersoni* sensu Thiele, 1905, Calbuco, Punta Arenas.

Material studied for comparison: BMNH 1887:5:2:116, holotype of *Iophon chelifera* Ridley & Dendy, 1886, Cape of Good Hope, 35°04'S 18°37'E, Challenger Coll., 12.1873, 274 m; cnm 1900-0266, specimen of *I. chelifera* sensu LAMBE, 1893, British Columbia, Discovery Passage, 23.06.1885, 20-25 m

A. Encrusting form, on *Zygochlamys patagonica*:

MHNG 18781, 19207-19212: 18790-18792, HE 22, 23, 33, 34, 36, 58, 59, Bahia Inútil, 53°38'S 72°46'W, 10-19.09.1972, 32-59 m; MHNG 18782, 18871, 19214: HE 20d, 52, 81c, Seno de Otway, 53°00'S 71°30'W, 17.09.1972, 3-5 m; MHNG 18791: HE 62, Punta Guale, 53°04'S 73°03'W, 24.09.1972, 70 m, on *Chaetopterus* sp.; MHNG 18792: VALD. 6.1a, Quintupeu, 42°10'S 72°24'W, 15.08.1972, 15 m.

B. Irregular form:

MHNG 18793, 19215, 19216: MONT. 4, 6, 20; San Antonio, 32°42'S 71°23'W, 09.07.1990, 5-10 m; MHNG 18794, 19217: MONT. 22, 27, El Quisco, 32°24'S 71°42'W, 09.07.1990, 10-15 m; MHNG 18795: VALD. 60.II, Estero Castro, 42°30'S 73°46'W, 03.1987, 10 m; MHNG 18796, 19218: VALD. 27.1, 45, Quintupeu, 42°10'S 72°24'W, 26.04.1971, 10-15 m; MHNG 18797, 19218, 10339: PULL.1, E.85.2, Por.5, Pullinque, 39°33'S 72°11'W, 03. 1983, 5-7 m; MHNG 18798: CO.93.40, Pelluco, 41°30'S 72°54'W, 20.12.1992, 15 m.

C. Massive form:

MHNG 18799: HE. 2, Isla Madre de Dios, 50°15'S 75°05'W, 07.10.1972, 5-25 m; MHNG 18800, 19221: MONT. 2, 10a, San Antonio, 32°42'S 71°22'W, 09.07.1990, 5-10 m; MHNG 18801: CO.93.6, Bahia Hueihue, 41°54'S 73°32'W, 09.10.1972, 5-7 m; MHNG 18802: Co.93.19, Pelluco, 42°30'S 72°54'W, 12.12.1992, 15 m; MHNG 18803, 19222: VALD. 4, 37a, Golfo de Quetalmahue, 41°52'S 73°52'W, 05-06.01.1972, 10-15 m; MHNG 18804, 19223: VALD. 8.1, 50.2, Islote Pelú, 41°38'S 73°43'W, 18.03.1972, 15 m; MHNG 18805: VALD. 15.3, Quintupeu, 42°10'S 72°24'W, 16.07.1972, 15 m; MHNG 18806: VALD. 31, Bahia Linao, 41°57'S 73°33'W, 28.06.1971, 10-15 m; MHNG 18807: VALD. 58, Estero Quitalco, 45°43'S 73°25'W, 07.07.1972, 10 m.

DESCRIPTION

Several specimens (figs. 1-6) and fragments. We differentiate three colour/growth forms of these species: form A, encrusting on *Zygochlamys patagonica* or tubes of polychaetes, with a finely corrugated and punctate surface, colour in alcohol gray, size: 41-63 x 33-48 x 3-7 mm; form B, irregular often digitate, with finely corrugated surface, colour in alcohol blackish, size: 30-74 x 31-76 x 22-48 mm; and form C, massive, with oscules in a row, with a finely conulose surface, colour in alcohol brown, size: 60-72 x 14-47 x 22-62 mm. Some specimens are agglutinating chitinous tubes or calcareous fragments. No detachable surface membrane is visible. Small (0.5-1 mm) oscules occur on conules or are scattered on the surface.

Consistency: Crumbly and friable, very fragile or firm, elastic.

Colour: Orange to yellowish alive, light beige, brownish to blackish in alcohol. The different colours in alcohol may be attributable to artificial discolouring after collection.

Skeleton: Ectosomal skeleton: bouquets of partly perpendicular, partly tangential bundles of tylotes, and abundant microscлерes.

TABLE 1

Spicule micrometries of *Iophon proximum* (Ridley, 1881). *I. proximum* (Ridley, 1881) bmnh 1879:12:27:5 holotype; *I. proximum reticularis* Hentschel, 1914 ZMHS 2313 holotype; *I. chelifera* sensu LAMBE, 1893 CNM 19001266 specimen from Elk Bay; from literature and remeasured. *I. proximum* form A, specimens from Chile.

<i>I. proximum</i> (Ridley, 1881)	Acanthostyles 1 Acanthostyles 2	Tylotes	Anisochelas	Bipocilia
BMNH 1879:12:27:5 Sandy Point	158 x 9.5 not observed	158 x 7.9	25	10.5
Remeasured	120-138-148 x 6-7-8 78-101-117 x 5-6	140-147-160 x 4	23-24-27 16-18-20	6
<i>I. proximum reticularis</i> Hentschel, 1914 Holotype ZMH S2313 66°02'S 89°38'W	104-152 not observed	120-160 not observed	18-24	Absent
Remeasured	146-160 x 9-10 134 x 6	147-163-176 x 6	16-21-26	Absent
<i>I. chelifera</i> sensu LAMBE, 1893 CNM1900-0266 British Columbia	262-327 x 13-19	220-280 x 6-8	29-36 29-36	13-18
Remeasured	259-292-316 x 8	243-261-283 x 8	32-34-38 13-17-19	14-16-18 11-12-13
<i>I. proximum</i> . Form A He 22 Bahia Inutil	106-119-125 x 6 83 x 5	109-128-138 x 4-5	11-14-18	10-12-13
He 23 Bahia Inutil	112-123-138 x 5-6-8 100 x 6	122-134-144 x 3-5-6	13-14-18	6-10-13
He 33 Bahia Inutil	141-153-163 x 6-8-10 96 x 8	170-186-208 x 6	19-22	11-12-16
He 34 Bahia Inutil x 6	141-155-176 x 3-5 91-98 x 5-6	138-163-179	10-14-19	Absent
He 36 Bahia Inutil	150-162-173 x 6-10 105 x 6	144-179-195 x 6	13-18-22	6-10-13
He 58 Bahia Inutil	154-164-176 6-9-10 96-98-102 x 5	144-164-182 x 5-6	22-23-26	13
He 59 Bahia Inutil	141-155-166 x 6-10 96 x 5	147-163-186 x 3-5-6	16-20	Absent
He 20d Seno de Otway	125-135-166 x 5-6-10 99 x 6	138-146-157 x 4	13-15-18	6-8-10

He 52 Seno de otway	134-148-160 x 5-7-10 92 x 5	131-148-166 x 3-4-5	16-18-22	10-13-16
He 81c Seno de Otway	221-241-253 x 10-10-13 102-120 x 6	218-234-253 x 6-8	26-28-32	6-7-10
He 62 Punta Guale	150-162-176 x 6-8-10 90-97-105 x 5	152-184-203 x 8	12-14-16	8
Vald. 6.1a Quintupeu	170-193-272 x 6-8-10 130 x 6	157-168-179 x 5-5-6	13-19-22	6-9-10

Choanosomal skeleton: isodictyal to subisodictyal unispicular reticulation of acanthostyles 1. Acanthostyles 2 (echinating acanthostyles) occur at the nodes; they may be very rare to moderately abundant. Bipocilla and anisochelas are also variable in abundance.

Spicules: (Table 1-3) Megascleres: Acanthostyles 1 (fig. 7) straight or slightly bent, covered by numerous small spines, more abundant at the base, diminishing regularly towards the smooth apex, 106-272 x 5-16 μ m.

Acanthostyles 2 (fig. 8) echinating, straight and entirely spined, 83-157 x 5-6 μ m.

Tylotes (fig. 9) straight, smooth except for the spines on the tyles, 109-252 x 3-10 μ m

Microscleres: Spurred anisochelas, there are no separated categories of anisochelas, differing just by the size, 10-35 μ m (fig. 10, 11) Their presence is variable: abundant, rare, and sometimes absent (?). They have the same morphology: a straight shaft, basal part shorter with spur-like structure, and alas diverging widely from shaft.

Bipocilla (fig. 12) compact, cup-shaped, with spines at the swollen extremities, 6-16 μ m. Their presence is variable: abundant, rare, or extremely rare.

Ecology: Occurring on calcareous, chitinous, cultured oysters or stone substrates, 5-32 m.

Distribution: Chilean coast: 20°S-42°S, Falkland Islands, Kerguelen (?).

Remarks: This species stands out among all *Iophon* species of the studied area in possessing a second category of small echinating acanthostyles (although they are not always easy to find, and possibly not always differentiated). This character is shared with *I. chelifera* Ridley & Dendy (1886) which may account for BURTON's (1932) synonymy assignment. We distinguished three colour/growth forms in the material at hand, but there is no matching character in the skeletal structure. All three forms have essentially similar skeletons notwithstanding a wide individual variation in spicule sizes and sometimes in the differentiation of two distinct acanthostyle categories. Future in situ studies with live specimens might reveal other more subtle differences between the three. Previous authors, starting with RIDLEY & DENDY (1887 as *I. pattersoni*) tended to include a wide range of specimens and species from all

TABLE 2

Spicule micrometries of *Iophon proximum* form B, specimens from Chile.

<i>I. proximum</i> . Form B	Acanthostyles 1 Acanthostyles 2	Tylotes	Anisochelas	Bipocilla
Mont. 4 San Antonio	141-153-163 x 6-8-10 Absent	147-168-198 x 6	19-21-22	13-14-16
Mont. 6 San Antonio	131-148-163 x 6-8-10 Absent	163-172-182 x 6	13-14-16	10-12-13
Mont. 20 San Antonio	176-197-227 x 6-11-13 Absent	189-203-218 x 6-10	13-23-35	8-9-11
Mont. 22 El Quisco	182-207-230 x 6-11-13 Absent	198-213-227 x 6	13-23-35	6-8-10
Mont. 27 El Quisco	147-160-189 x 10 Absent	145-167-182 x 6	16-17-19	10-12-13
Vald. 60.II Estero castro	195-208-224 x 6 Absent	160-182-198 x 3	16-19-24	10-12-13
Vald. 27.1 Quintupeu	157-174-186 x 10-12 Absent	170-185-208 x 6	16-27-32	10-12-13
Vald. 45 Quintupeu	150-172-186 x 6-9-10 Absent	157-174-186 x 6	16-23-32	6-9-10
Pull. 1 Pullinque	176-186-198 x 8-10 Absent	157-172-182 x 3-5-6	13-15-16	10-12-13
E.85.2 Pullinque	141-169-192 x 5-6 Absent	147-167-186 x 3-4-5	13-15-16	10-12-13
Por. 5 Pullinque	150-163-173 x 6 Absent	147-164-176 x 3-5	13-15-16	10-12-13
Co.93.40 Pelluco	179-198-222 x 12-13 Absent	191-204-218 x 8	20-26-35	8-10-12

over the world under this species name. We were unable to examine every single assignment, but nevertheless made an attempt to evaluate this alleged cosmopolitan distribution. The correct and doubtful assignments are listed above in the synonymy. Doubts remain over the identity of specimens assigned to *I. proximum* by BURTON (1938, material not examined), DESQUEYROUX (1972, 1976, material presently unavailable for reexamination), the Brazil specimen of BOURY-ESNAULT (1973) and the Kerguelen specimens of HENTSCHEL (1914) and BOURY-ESNAULT & VAN BEVEREN

TABLE 3

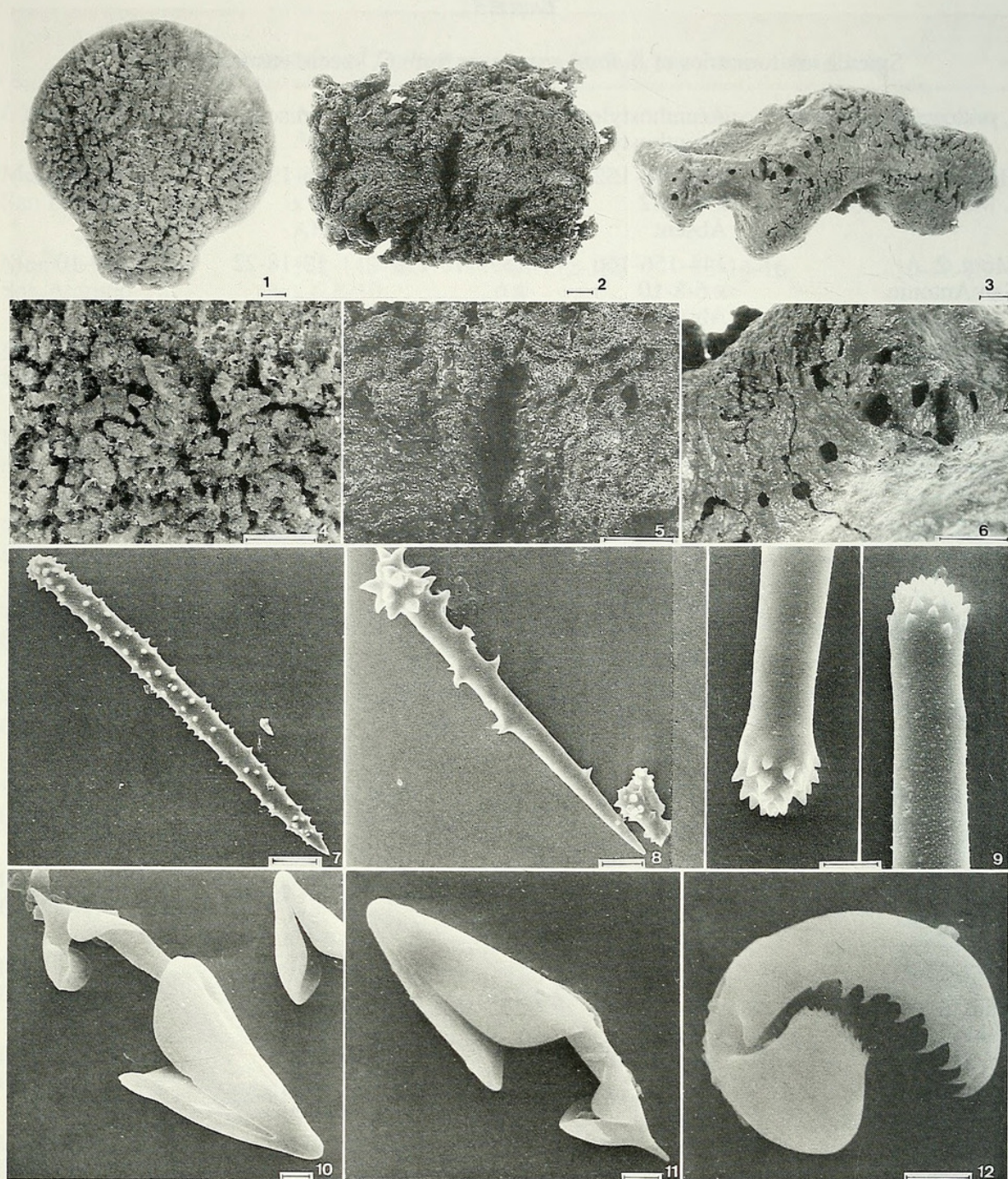
Spicule micrometries of *Iophon proximum* form C, specimens from Chile.

<i>I. proximum</i> . Form C	Acanthostyles 1 Acanthostyles 2	Tylotes	Anisochelas	Bipocilla
He 2 I. Madre de Dios	128-140-152 x 6-7-12 Absent	148-164-182 x 4-5-8	16-19-22	10-14-16
Mont. 2 San Antonio	144-156-166 x 6-8-10 Absent	157-170-179 x 6	13-18-22	6-9-10
Mont. 10a San Antonio	144-160-173 x 6-8-10 Absent	157-171-182 x 5-6	12-14-16	10-11-13
Co 93.6 Bahia Heihue	144-169-192 x 5-7-10 Absent	150-171-182 x 3-5-6	16-19-22	10-12-13
Co 93.19 Pelluco	166-180-192 x 5-6 110 x 10	138-175-195 x 3-5-6	16-22-26	10-12-13
Vald. 4 Golfo Quetalmahue	144-160-173 x 5-6 Absent	147-162-173 x 3-5	19-22-26	10-12-13
Vald. 8.1 Islote Pelú	186-201-218 x 10-12-16 93-106 x 5-6	179-199-227 x 6-6-10	14-16-22	10-12-13
Vald. 50.2 Islote Pelu	186-202-218 x 13-14-16 Absent	198-210-221 x 6-8-10	13-18-22	8-10-12
Vald. 15.3 Quintupeu	160-173-189 x 10-11-13 90-106 x 5-6	170-196-202 x 5-6	19-22-26	10-12-13
Vald. 31 Bahia Linao	179-177-211 x 5-8-10 Absent	173-185-202 x 5-6	16-22-26	10-10-11
Vald. 37a Golfo Quetalmahue	154-166-182 x 3-6 Absent	154-166-179 x 3-6	16-19-22	10-11-13
Vald. 58 Estero Quitralco	182-201-227 x 10-11-13 109-157 x 6	195-208-230 x 6-8	16-22-31	6-8-10

(1982). For the Kerguelen material the name *I. reticularis* is available if it would turn out to be a separate species.

In our opinion, the following specimens and species were associated incorrectly with *I. proximum*:

Iophon pattersoni (Bowerbank, 1866) is originally described from the British Isles. It is undoubtedly a junior synonym of *I. nigricans* (Bowerbank, 1858). This is a



FIGS 1-12

Iophon proximum (Ridley, 1881). 1, 4, form A, encrusting specimen on *Zygochlamys patagonica*, from Bahía Inútil and enlarged view of the surface. 2, 5, form B, irregular, specimen from Pullinque and enlarged view of the surface. 3, 6, form C, massive specimen from Isla Madre de Dios and enlarged view of the surface. 7, acanthostyles 1, straight or slightly bent. 8, acanthostyles 2, or echinating styles. 9, Tylotes, straight, smooth with spined tyles. 10, spurred anisochela of big size. 11, spurred anisochela of small size. 12, compact, cup-shaped bipocilla. Scales: fig. 7 = 20µm; fig. 8 = 10µm; fig. 9 = 5µm; fig. 10-12 = 2µm.

very common species in Western Europe. It differs from *I. proximum* in having no category of smaller echinating acanthostyles, which are also considerable thinner. THIELE's (1905) specimens labelled *I. pattersoni* are a mixture of *I. proximum* and *chilense* n. sp. (cf. below). *I. pattersoni sensu* Bakus (1966) probably belongs to the same, so far not further identified, species as *I. chelifera sensu* LAMBE, 1893 (cf. below).

I. chelifera Ridley & Dendy, 1886 is originally described from South Africa. It was assigned to *I. proximum* by BURTON (1932). We examined the type specimen. It is similar to *I. proximum* but differs clearly in the "cut-off" shape of the tylote heads which are also much lighter spined (only on the flattened apex) and in the clearly longer and thicker (360-420 x 16-20 μ m) and more heavily spined structural acanthostyles. *I. chelifera sensu* LAMBE, 1893 from British Columbia, that we examined, differs from *I. proximum* in having two clearly separated size categories of bipocilla (not mentioned by LAMBE), the tylotes are also lightly spined on the apices only and the structural acanthostyles are more heavily spined and thicker. It is likely that Lambe's material belongs to one of the Arctic *Iophon* species (cf. KOLTUN, 1959), and that Bakus' material of *I. pattersoni* belongs to that same species. *I. chelifera sensu* Thiele, 1905 belongs to the new species described below; it does not have the small acanthostyles. *I. chelifera ostiama* Wilson, 1904, assigned to *I. proximum* by Burton (1932) is a separate species of *Iophon*. *I. chelifera californiana* De Laubenfels, 1932 belongs to *I. lamella* Wilson, 1904 (cf. below). New Zealand specimens assigned to *I. proximum* by BERGQUIST & FROMONT (1988) are unlikely to belong to the present species; for them the name *I. semispinosus* Bergquist (1961) is available. The description of *I. proximum sensu* URIZ (1987, 1989) from South West Africa reminds strongly of *I. chelifera*, while her *I. chelifera* differs from *I. chelifera* proper in having two distinct bipocilla sizes; the latter material is likely an undescribed species.

I. lamella, *I. lamella indivisus*, and *I. indentatus*, all described by WILSON (1904) were assigned to *I. proximum* by BURTON, 1932, but are here considered a separate species. The main differences are the shape of the bipocilla and the absence of small acanthostyles.

***Iophon lamella* Wilson, 1904**

(figs. 13-18)

Iophon lamella WILSON, 1904: 146, pl. 20, figs. 3, 7-9, 12, 13, pl. 24, figs. 2-4.

Iophon indentatus WILSON, 1904: 151, pl. 19, fig. 6, pl. 20, figs. 1, 5, 6, pl. 23, fig. 4;

?*Iophon indentatus* WILSON *sensu* DICKINSON, 1945: 16, pl. 21, figs. 41, 42, pl. 22, fig. 43.

Burtonella melanokhemia DE LAUBENFELS, 1928: 361, fig. 1.

Iophon chelifera var. *californiana* DE LAUBENFELS, 1932: 82, fig. 47.

MATERIAL STUDIED: USNM 8277, holotype of *Iophon lamella* Wilson, 1904, Albatross Stn. 3405, 00°57'S 89°38'W, 95 m; USNM 8279, syntype of *Iophon indentatus* Wilson, 1904, Albatross Stn. 3405, 00°57'S 89°38'W, 95 m; USNM 21401, holotype of *Iophon chelifera* var. *californiana* De Laubenfels, 1932, S of San Pedro, California, 27.12.1916, 48 m; USNM 21369, holotype of *Burtonella melanokhemia* De Laubenfels, 1928, California; USNM 39352, ZMA 10977, MHNG 18808 Ga.III.28, fragment, SEPBOP "Anton Bruun" Exped. Cruise 18B 791C, Galapagos Islands, Santa Cruz Island, 00°26'S 90°20'W, 21.09.1966, 95 m.

TABLE 4

Spicule micrometries of: *Iophon lamella* Wilson, 1904. *I. lamella* Wilson, 1904 USNM 8277 holotype; *I. indentatus* Wilson, 1904 USNM 8279 syntype; *I. chelifer* var. *californiana* de Laubenfels, 1932 USNM 21401 holotype; *Burtonella melanokhemia* de Laubenfels, 1928 USNM 21369 holotype; from literature and remeasured. Specimen from Galapagos of *I. lamella* Wilson, 1904.

<i>Iophon lamella</i> Wilson, 1904	Acanthostyles 1	Tylotes	Anisochelas 1 Anisochelas 2	Bipocilla
Holotype USNM 8277 00°57'S 89°38'W	210-220 x 12-16	220-240 x 7-8	28 14	12-16
Remeasured	210-222-234 x 12-13-15	218-223-235 x 7-8	10-14 20-26	8-13-16
<i>Iophon indentatus</i> Wilson, 1904				
Syntype USNM8279 00°57'S 89°38'W	220 x 14-16	220 x 8	14	8
Remeasured	199-218-234 x 16	207-219-220 x 7-8	16	8
<i>I. chelifer</i> var. <i>californiana</i> de Laubenfels, 1932	265-290 x 12-13	240-250 x 6-8	not observed 15-33	15
Holotype USNM 21401 South San Pedro				
Remeasured	234-248-260 x 12	200-223-241 x 7-8	27-31-35 12-15-23	12-17-20
<i>Burtonella</i> <i>melanokhemia</i> de Laubenfels, 1928				
Holotype USNM 21369 California	210 x 13	180 x 10	12-40	as sigmas: 50
Remeasured	270-282-304 x 16-18-20	222-238-253 x 7-8	20-21-25 12-14-16	12-15-16
Galll. 28 Sepbop 18B791C 00°26'S90°20'W.	214-229-250 x 10-16	202-226-240 x 6	22-29 13-16	10-14-16

DESCRIPTION

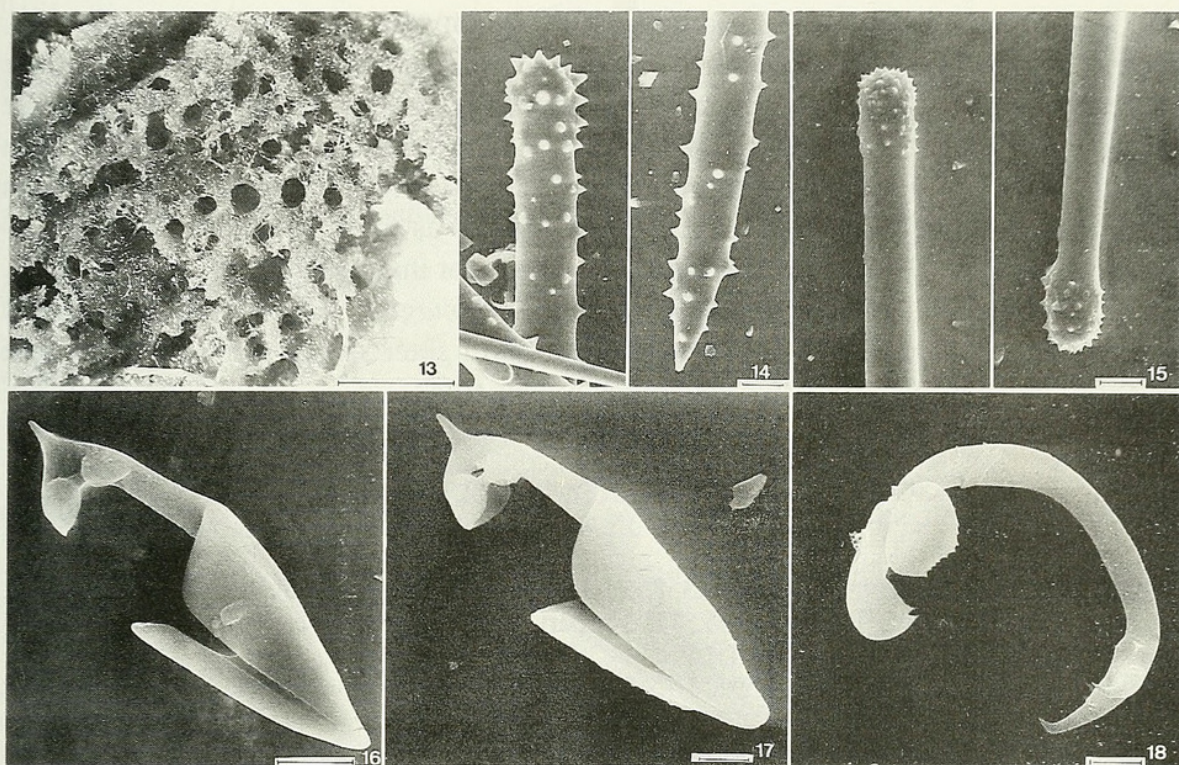
A mass of fragments of small, irregular lamellate shapes; the largest is 5 x 6 cm and 5-15 mm thick (fig.13). The surface is differentiated in a more or less undulated and punctate side and an opposite side with grooves covered by a thin, easily removed membrane.

Consistency: Firm but fragile.

Colour: Yellow or beige-brown in alcohol.

Skeleton. Ectosomal skeleton: a palisade of scattered tylotes.

Choanosomal skeleton: tight-meshed isotropical reticulation of spined styles and tylotes. Microscleres abundant.



FIGS 13-18

Iophon lamella Wilson, 1904. 13, lamellate specimen from Galapagos. 14, acanthostyle 1 heavily spined. 15, smooth tylole, swollen apices, minutely spined. 16, 17, spurred anisochela 1 and 2, both with straight shaft. 18, strongly asymmetrical trilobate bipocilla with finger like appendages. Scales: fig. 14 = 10 μ m; fig. 15, 16 = 5 μ m; fig. 17, 18 = 2 μ m.

Spicules (Table 4): Megascleres: Acanthostyles 1 (fig. 14) heavily spined all over the surface 214-250 x 10-16 μ m. No acanthostyles 2. Tyloles (fig. 15) with a straight and smooth shaft and swollen apices, minutely but heavily spined, 202-240 x 6 μ m.

Microscleres: Spurred anisochelas 1 (fig. 16) 22-29 μ m and 2 (fig. 17) 13-16 μ m, both with the same morphology, straight shaft and the alae diverging from the shaft. Bipocilla (fig. 18) strongly curved, and with one of the extremities expanded and trilobate and the other with several finger like appendages, 10-14 μ m. Both types of microscleres are abundant.

Ecology: Substrate, pebbles, 90-140 m.

Distribution: Galapagos Islands, West coast of Central America (DICKINSON, 1945) Pacific coast of Southern California, Baja California.

Remarks: This species differs from *I. proximum* in the lamellate shape and the yellow-brown colour, in the possession of two distinct categories of anisochelas, and in the much more openly curved trilobate bipocilla. These characters are shared with *Burtonella melanokhemia* De Laubenfels and *I. chelifera californiana* De Laubenfels

and accordingly these are considered junior synonyms. Wilson's specimens of *I. lamella*, *I. lamella indivisus* and *I. indentatus* differ somewhat in shape, but their skeletons, spicule categories and bipocilla shape are essentially similar, so these are united under the present species. DICKINSON's (1945) description of *I. indentatus* from California differs substantially from that of *I. lamella* and *I. indentatus*, especially in spicule size. Perhaps it belongs to the same species as the Lambe and Bakus specimens, but study of Dickinson material is necessary for that conclusion.

Despite its lamellate habit, *I. chelififer ostiamagna* Wilson (1904) is clearly separate from *I. lamella* in having much larger and lighter spined styles, only a single category of anisochelas and two categories of bipocilla.

***Iophon chilense* n. sp.**

(figs. 19-26)

Iophon chelififer sensu THIELE, 1905: 445, figs 63a-d [non: *I. chelififer* Ridley & Dendy, 1886]

Iophon pattersoni sensu THIELE, 1905: 445 (in part) [non: *I. pattersoni* (Bowerbank, 1866) = *I. nigricans* (Bowerbank, 1864)]

MATERIAL STUDIED: HOLOTYPE: MHNG 18810, He 108, Somerset Canal, 47°58'S 74°35'W, 02.10.1972, 260 m.

Paratype: MHNG 18809, HE 81 Seno de Otway, 53° 00'S 71° 30'W, 17.09.1972, 250 m.

Material studied for comparison: ZMB 3300, Thiele's specimen of *Iophon chelififer sensu* THIELE, 1905, Calbuco; ZMB 3299, Thiele's specimen of *Iophon pattersoni sensu* THIELE, 1905, Calbuco.

DESCRIPTION

Sponge irregularly encrusting on calcareous substrates and tubes of polychaetes, or massive, irregular (figs. 19, 20). Size: 35-46 x 25-39 mm. Surface membrane thin, not easily removable, punctate.

Consistency: Crumbly, soft, very fragile.

Colour: Yellowish to orange alive, light to dark brown in alcohol.

Skeleton: Ectosomal, a palisade of bundles of tylotes and abundant microscleres.

Choanosomal: Loose subisodictyal to confused reticulation of acanthostyles 1, isolated or in occasional bundles. Abundant anisochelas

Spicules: (Table 5) Megasccleres: Acanthostyles 1 (fig. 21) slightly bent, most are smooth except for spines at the base, some have the shaft abundantly microspined, 257-308 x 8-16 µm. No acanthostyles 2.

Tylotes (fig. 22, 23) straight, with swollen microspined apices, 207-259 x 5-8 µm.

Spurred anisochelas 1 (fig. 24), curved, 18-29 µm, and 2 (fig. 25) 10-16 µm.

Bipocilla (fig. 26) one of the ends trifoliate, the other with claw-like appendages, 10-16 µm.

Etymology: named after its geographic distribution.

Ecology: Occurring on calcareous, polychetes tubes, and shells, 250-260 m.

Distribution: Chilean coast, 47°S.- 53°S.

TABLE 5

Spicule micrometries of *Iophon chilense* n. sp. *I. chelififer* sensu THIELE, 1905, ZMB 3300, specimen from Plate collection; from literature and remeasured. Specimens from Chile of *I. chilense* n. sp.

<i>I. chilense</i> n. sp.	Acanthostyles 1	Tylotes	Anisochelas 1 Anisochelas 2	Bipocilla
<i>I. chelififer</i> sensu Thiele, 1905				
ZMB3300	250 x 15	210 x 7	16-28	15
Calbuco				
Remeasured	208-235-253 x 13-15-16	186-199-208 x 6	26-27-29 13-17-22	13-14-16
He 81	259-274-284	202-224-235	26-27-29	13-14-16
Seno De Otway	x 8-16	x 5-6	13-16	
Holotype MNHG 18810	257-285-308	207-249-259	18-20-21	10-12-13
He 108	x 8-16	x 5-6-8	10-12-13	

Remarks: This species differs from *I. chelififer* sensu RIDLEY & DENDY, 1886 in the absence of small acanthostyles, the almost smooth relatively short structural acanthostyles, and the much heavier spined tylote heads. From *I. proximum* and *I. lamella* it differs also in possessing almost smooth styles, furthermore its bipocilla are clearly of a different shape as those of *I. proximum* and show teeth different from those of *I. lamella*. There are no matching descriptions from the studied area.

***Iophon timidum* n.sp.**

(Figs 27-32)

MATERIAL STUDIED: HOLOTYPE: MHNG 18811: HE 12, Puerto Caracciolo, 50°28'S 75°11'W, 09.10.1972, 25 m.

PARATYPES: MHNG 18812: He 28; MHNG 19224: HE 56, same data as the holotype.

MATERIAL STUDIED FOR COMPARISON: MNHNDT 1976, specimen 421, slide of the syntype of *Iophon radiatus* Topsent, 1901, 71°19'S 87°37'W, 450 m.

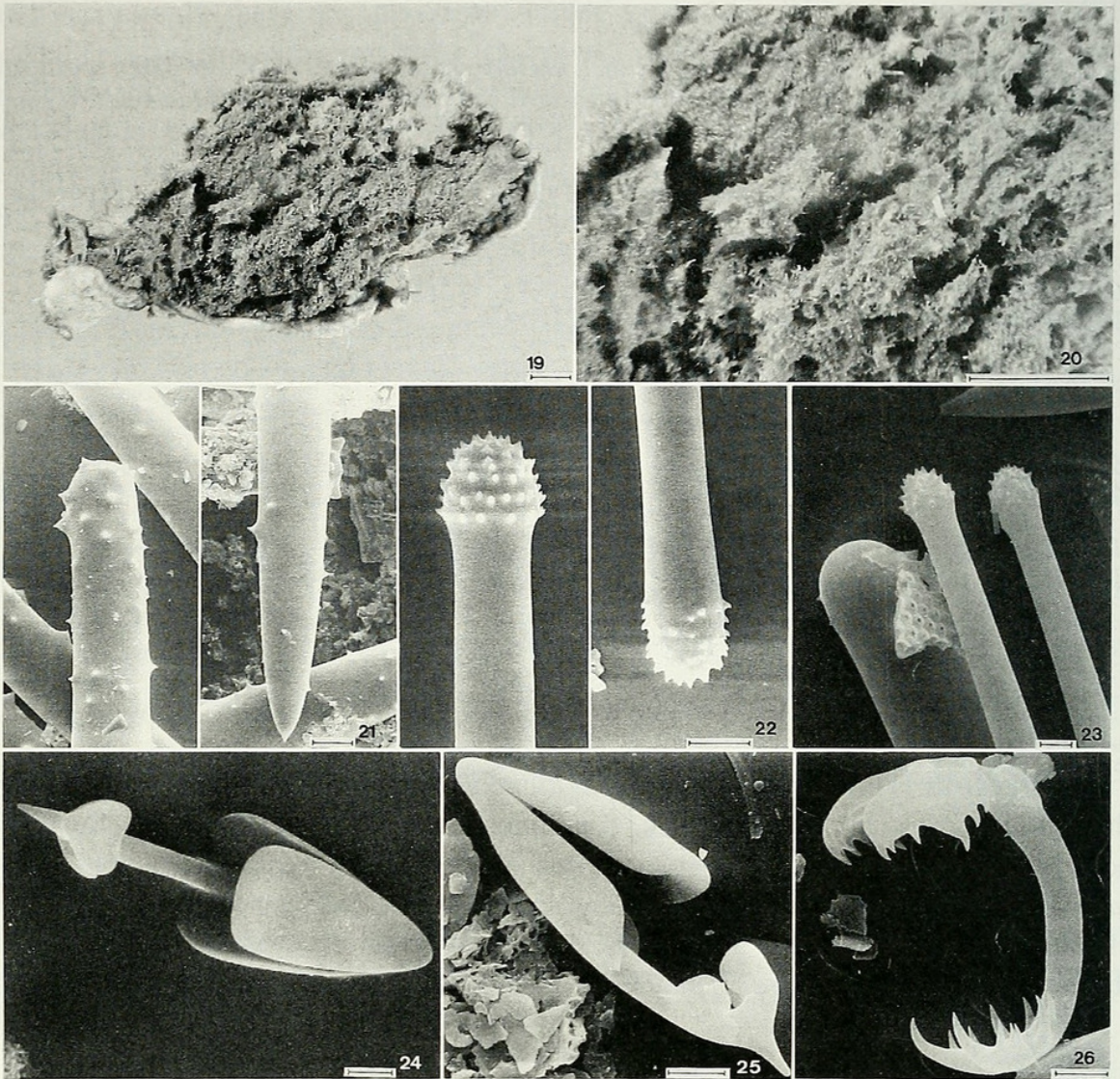
DESCRIPTION

Sponge massive (figs. 27, 28) spherical to oval, size 55-95 x 55-60 mm. Surface corrugated, irregular and covered by a thin membrane, which is easily removed. A few small oscules (1-2 mm) are irregularly distributed.

Consistency: Soft, extremely fragile, easily torn.

Colour: Beige to dark brown alive, same colour in alcohol.

Skeleton: Ectosomal skeleton: a palisade of tylotes, free or in bundles. Normal anisochelas are abundant.



FIGS 19-26

Lophon chilense n.sp. 19 [HOLOTYPE, MNHG 18810] irregular encrusting specimen from Sommerset Canal. 20, enlarged view of the surface. 21, acanthostyles 1 slightly bent, smooth, with microspined shaft. 22, 23, straight tylotes, swollen microspined apices. 24, 25, spurred anisochela 1 and 2 with curved shaft. 26, bipocilla trifoliate, with claw-like appendages. Scales: fig. 21 = 10µm; fig. 22, 23 = 5µm; fig. 24, 26 = 2µm.

Choanosomal skeleton: a loose and irregular reticulation of styles, which occasionally form longitudinal tracts connected by single styles. Anisochelas and pigment are abundant.

Spicules (Table 6): Megascleres: Smooth styles (fig. 29) with a few spines at the base and slightly bent, 186-259 x 3-6 µm. No echinating acanthostyles.

TABLE 6

Spicule micrometries of *Iophon timidum* n. sp. *I. radiatus* Topsent, 1901 LBIMDT 1976 syntypes; from literature and remeasured. Specimens from Chile of *I. timidum* n. sp.

<i>I. timidum</i> n. sp.	Styles	Tylotes	Anisochelas Bipocilla
<i>I. radiatus</i>			
Topsent, 1901			
Syntypes LB/MDT 1976			
specimen n° 306	550 x 16	300-350	17-60
71°14'S 89°14'W		x 5-6	8-12
specimen n° 421	570-580	390	17/53-70
71°19'S 87°37'W	x 20	x 8-9	8-16
Remeasured			
specimen n° 421	502-552-607	340-368-413	57-61-73
	x 16-19-24	x 8	8-16
			Anisochelas 1
			Anisochelas 2
HOLOTYPE MNHG 18811			
He 12	186-221-256	150-196-250	11-14
Puerto Caracciolo	x 3-6	x 3-6	5-6
He 28			
Puerto Caracciolo	202-234-259	154-184-243	10-16
	x 3-6	x 3-5	6-10
He 56			
Puerto Caracciolo	202-226-259	170-204-250	13-16
	x 3-6	x 3-5	6-10

Tylotes (fig. 30) thin, long and fusiform, apices swollen and strongly spined 150-250 x 3-6 μ m.

Microscleres: Spurred anisochelas 1 (fig. 31) with a straight shaft, alas widely diverging from the shaft, 10-16 μ m. Anisochelas 2 (fig. 32) with roundish concave extremities and a short axis, rare, resembling bipocilla but provided with a distinct spur, 5-10 μ m.

No bipocilla were found.

Etymology: the name refers to the shape of the anisochela 1, which looks as if it is contracted with fear.

Ecology: Occuring on stones, sand, 25 m.

Distribution: Chilean coast, 50°S 75°W.

Remarks: The new species is based on the combination of (almost) smooth styles and the second category of incurved anisochelas. Since all three specimens were exactly similar in this respect, it is clear these are stable characters. The absence of bipocilla is unusual, but reported occasionally from other *Iophon* species (cf. KOLTUN, 1959) and specimens. (e. g. *I. reticularis* Hentschel, 1914 from Gauss Stn., that we examined). It is not a reliable character for species distinction.

The smooth styles and "loose" anisotropic reticulation are shared with *I. radiatus* Topsent, 1901, originally described from the Antarctic region, but subsequently reported from along the Atlantic and Pacific coasts of South America up to 37°S. Our specimens have been compared with a type slide of *I. radiatus* and the two were found to have some clear differences, the most important being the much larger styles of *I. radiatus*, the much larger anisochelas (up to 60 µm) (neither category of anisochela is malformed) and the possession of 2 sizes of normal formed bipocillas. Unfortunately, the specimens of *I. radiatus* recorded from the study area (DESQUEYROUX, 1972) are not available for re-examination, so we cannot confirm the presence of true *I. radiatus* in our area. However, the spicule sizes reported by Desqueyroux clearly exceed those of the new species, so conspecificity with the present species is unlikely.

***Iophon tubiforme* n. sp.**

(Figs. 33-38)

MATERIAL STUDIED: HOLOTYPE: MHNG 18813: He 7, Isla Newton, Rada Shinglet, 51°51'S 73°42'W, 01.10.1972, 5-10 m.

PARATYPES: MHNG 18814: HE 11, Isla Newton, Rada Shinglet, 51°51'S 73°42'W, 01.10.1972, 5-10 m.; MHNG 18815: He 20, Seno de Otway, 53°00'S 71°30'W, 17.09.1972, 35 m; MHNG 18816: HE 21, MHNG 19225: HE 26, Caleta Chica, Faro San Pedro, 47°47'S 74°54'W, 01.10.1972, 30 m, 12 m; MHNG 18817, 18992: He 32, Co.93.31, Puerto Caracciolo, 50°26'S 75°09'W, 09.10.1972, 25 m; MHNG 18818: HE 86, Islas Grupo Porvenir, Canal Zenteno, 52°49'S 73°40'W, 11.10.1972, 30 m; MHNG 18819: HE 103, Punta Guale, 53°04'S 73°03'W, 24.09.1972, 70 m; MHNG 18820: VALD. 47, Laguna Cachaña, 45°58'S 73°45'W, 28.08.10971, 10 m.

MATERIAL STUDIED FOR COMPARISON:

Iophon unicornis Topsent, 1907, LBIMDT 1665 type, specimen 798, Ile Anvers, Antarctic, dragage, 06.01.1905, 25 m.

Iophon spatulatus Kirkpatrick, 1907, SYNTYPES, BMNH 1908:2:5:144, 144a,b, 145, 145a, Coulman Island, 1828 m, "Discovery" Coll.

DESCRIPTION

Several large specimens formed by up to 7 tubes, 81-87 mm high, of uniform diameter, 18-31 mm, issuing from a common base: 87-111 mm (fig. 33, 34). Tubes branch off into new tubes, 18-19 mm diameter and 32-62 mm high, all of the tubes possess a terminal oscule of 6 to 14 mm in diameter. The oscular canal is as long as the tube itself, tube wall is 3-10 mm large. Surface is irregular but smooth and covered by a membrane overlying large subectosomal cavities.

Consistency: Soft and easily torn.

Colour: Brown alive, light to dark brown in alcohol.

Skeleton: Ectosomal skeleton: dense brushes consisting of bundles of tylotes and free tylotes. Ectosomal brushes are pointed outwards, between them is a subdermal lacunae system covered by the aspicular membrane.

Choanosomal skeleton: plumose, formed by longitudinal tracts of styles (2-4 across) connected by single styles. Numerous juvenile styles are present.

TABLE 7

Spicule micrometries of *Iophon tubiforme* n. sp. *I. unicornis* Topsent, 1907 LBIMDT 1665, HOLOTYPE; from literature and remeasured. Specimens from Chile of *I. tubiforme* n. sp.

<i>I. tubiforme</i> n. sp.	Styles	Tylotes	Anisochelas	Bipocilla
<i>I. unicornis</i>				
Topsent, 1907				
HOLOTYPE LBIMDT 1665	435-470	240-10	18-20	Not observed
Ile Anvers	x 15			
Remeasured	405-443-486	194-222-243	16-19-24	32
	x 12-15-16	x 8		
HOLOTYPE MNHG 18813				
He 7	195-207-218	186-202-221	17-19	8-12-16
Isla Newton	x 8-10-11	x 6-8-10		
He 11	150-173-192	141-157-170	8-10	6-10-13
Isla Newton	x 5-6-10	x 3-5-6		
He 20	170-186-195	141-158-166	12-15-16	8-10
Seno de Otway	x 6-8	x 5-6		
He 21	218-237-272	173-200-218	11-14-16	16-17-19
Caleta Chica	x 6-7-10	x 3-6		
He 26	170-184-202	134-158-173	13-16	10-16
Caleta Chica	x 5-6	x 3-6		
He 32	202-234-262	182-199-218	10-11-13	16-18-19
Puerto Caracciolo	x 6-10-13	x 3-6		
He 86	163-179-189	147-157-166	13-16	6-9-10
Canal Zenteno	x 4-6	x 3		
He 103	218-227-262	211-221-243	10-11-13	13-14-16
Punta Guale	x 6	x 3-6		
Vald. 47	192-228-262	173-196-211	13-14-16	6-8-10
Laguna Cachaña	x 10-13	x 5-10		

Spicules: (Table 7) Megascleres: mucronate, smooth, oxeote styles (fig. 35) slightly bent, 150-272 x 5-13 μm .

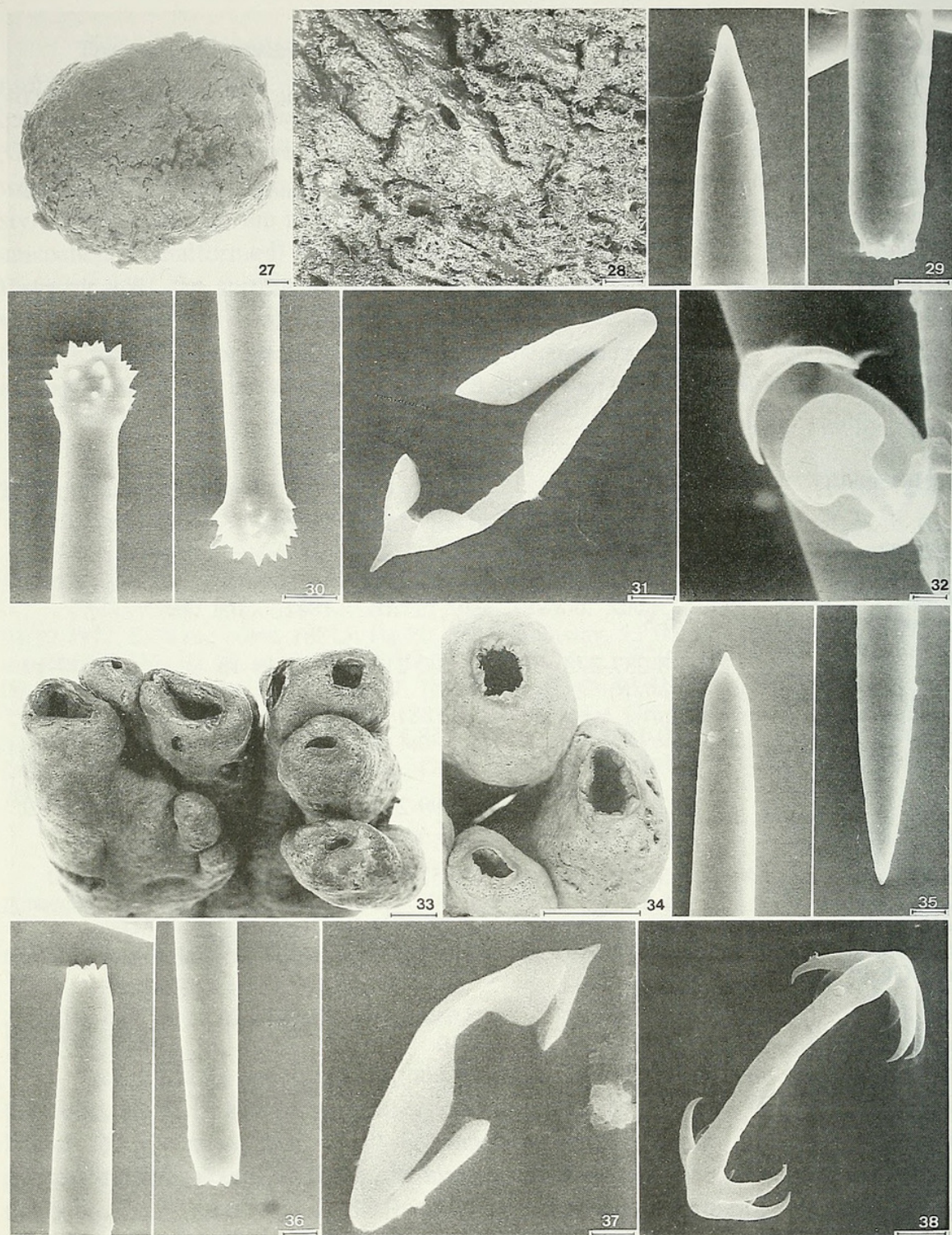
Tylotes (fig. 36) strongylote, fusiform, straight, with barely swollen, strongly microspined apices 141-243 x 3-10 μm .

Microscleres: Spurred anisochelas in a single size category (fig. 37) common, with curved shaft 8-19 μm .

Bipocilla (fig. 38) uncommon, fragile, terminal apices diverging like small fingers or teeth, 6-19 μm .

Etymology: Refers to the morphology: a mass of tubes

Ecology: Stones, fine sand, mud, 10-70 m.



FIGS 27-38. *Iophon timidum* n.sp. 27 [holotype, MNHG 18811] massive specimen from Puerto Caracciolo. 28, enlarged view of the surface. 29, smooth styles with a few spines at the base. 30, long, fusiforme tylots with swollen apices, strongly spined. 31, spurred anisochela 1, with straight shaft. 32, malformed anisochela 2, rounded concave extremities and short axis. *Iophon tubiforme* n.sp. 33 [holotype, MNHG 18816] specimen from Caleta Chica. 34, enlarged view of the surface. 35, mucronate smooth style. 36, smooth strongylote with fusiforme swollen microspined apices. 37, spurred anisochela, with curved shaft. 38, bipocilla uncommon with finger like appendages. Scales: fig. 29, 30 = 5µm; fig. 31 = 2µm; fig. 32 = 1µm.; fig. 35, 36 = 5µm; fig. 37, 38 = 2µm.

Distribution: Chilean coast, 45°S - 53°S.

Remarks: The new species shares with *I. timidum* the smooth structural spicules and the loose skeletal reticulation; in this the two differ from all other *Iophon* of the study area. Between them they differ clearly in the form of these spicules (normal styles vs. oxeote/mucronate styles) and also in the form and spination of the tylote heads.

There is a striking match between the new species and the Antarctic *I. unicornis* Topsent (1907) in the form of the structural spicules (mucronate oxeotes). We compared the new species with the description and a slide made of the holotype of *I. unicornis*, and found several clear differences: *I. unicornis* is not tubiform, its mucronate oxeotes are about twice as long and thick as those of the new species, and its tylotes have clearly swollen apices. We also studied slides of the type of *I. spatulatus* Kirkpatrick (1907) and can confirm that this is conspecific with *I. unicornis*, as suggested by BOURY-ESNAULT & VAN BEVEREN (1982). Since TOPSENT's paper is dated July 1907 and KIRKPATRICK's September 1907, TOPSENT's name has priority.

I. spatulatus has been recorded from the study area (Isla Huemules) by DESQUEYROUX (1976) without description; since this material is not available for study, we can only speculate, that it conformed to our new species.

It is likely that Boury-Esnault's record of *I. unicornis* from Kerguelen concerns a separate new species, since its form is cup-shaped. The three mucronate-oxeote styles bearing species, one Antarctic, one Southern South America, and one Kerguelen, probably form a monophyletic group within *Iophon*.

***Iophon ostiamagna* Wilson, 1904**

Iophon chelifer var. *ostiamagna* WILSON, 1904: 143, pl. 20, figs. 2, 4, 10, 11, pl. 24, fig. 1

MATERIAL STUDIED: HOLOTYPE: USNM 8280, Stn. 3384, 07°31'N 79°14'W, 08.03.1891, 880 m.

Not represented in our material, so only a diagnosis is given:

Lamellate growth form, 5-8 mm in thickness. Skeleton loosely reticulate. Acanthostyles long and robust, lightly spined, 450 x 20 µm. No echinating acanthostyles. Tylotes with lightly spined heads, 325 x 10 µm. Spurred anisochelas in a single category, 12-20 µm. Bipocilla in two categories, 1: 20 µm, 2: 12 µm.

Ecology: Substrate, sand, 880 m.

Distribution: 07°31'N 79°14'W.

Remarks: It is similar to the sympatric *I. lamella*, but differs in having much larger and more lightly spined acanthostyles, a single category of anisochelas and two categories of bipocilla.

***Iophon radiatus* sensu DESQUEYROUX, 1972**

?*Iophon radiatus* TOPSENT, 1901: 21, pl. 3, fig. 13.

Iophon radiatus DESQUEYROUX, 1972: 23, figs. 70-75.

MATERIAL STUDIED: LBIMDT.1976, microscopic slide of Topsent's type, specimen 421.

Not represented in our material, so only a diagnosis of Desqueyroux's material, which is from the study area, is given here:

Massive, with a loosely reticulated skeleton. Long smooth styles, 460-520 x 16 μm . No echinating acanthostyles. Tylotes with distinctly spined heads, 280-350 x 9 μm . Spurred anisochelas in two widely different size categories, 1: 70 μm , 2: 14 μm . Bipocilla 6-16 μm .

Ecology: Substrate, stones, 600 m.

Distribution: Chilean coast, 20°S.

Remarks: Topsent's material from Antarctica was similar in spicule sizes, and since the species has also been recorded from the Falkland Islands (BURTON, 1934) and South Georgia (BURTON, 1940), it may be a wide-spread species.

REVIEW OF THE FAMILY IOPHONIDAE

Shapes in this microcionine family are varied (fistular, encrusting, lobate, branching, vase-shaped). The spiculation includes those typical for the suborder: smooth or spined styles, palmate chelas and toxas (although these are absent in *Iophon* and *Acanthorhabdus*); sigmas are absent. Skeletal architecture in non-fistular forms is variously anisotropic, plumose, or isotropic.

This new concept of a revived family was first introduced by HAJDU *et al.* (1994) and elaborated by VAN SOEST *et al.* (1994). The following fistular genera conform to it: *Cornulum* (with junior synonym *Coelosphaerella*) *Paracornulum* (with junior synonym *Cornulacantha*) *Zyzya* (with junior synonym *Damirina*) *Acheliderma* (with junior synonyms *Astylinifer* and *Fusifera*) *Damiria*, *Melonchela*, *Anisotylacanthaea* and *Xytopsene*. These genera were previously united in the subfamily Cornulinae LÉVI & LÉVI (1983). In addition, four non-fistular genera are considered to belong in this family, viz. *Iophon*, *Acarnus*, *Megaciella* and *Acanthorhabdus*.

In VAN SOEST *et al.* (1994) the fistular members are described and discussed. These sponges are not represented so far in the SE Pacific, so for more information on these one is referred to that paper. The remaining genera are here briefly discussed.

Acarnus Gray, 1867

Synonyms: *Fonteia* Gray, 1867 and *Trefortia* Deszö, 1880.

Type species: *Acarnus innominatus* Gray, 1867: 544 (by monotypy).

Diagnosis (from VAN SOEST *et al.*, 1994): Massive, branching or encrusting Iophonidae with ectosomal skeleton of scattered tylotes with spined heads, choanosomal skeleton consisting of an isodictyal, isotropic or anisotropic, reticulation of styles and cladotylotes, arranged singly or in tracts of several spicules, which may or may not be echinated by acanthostyles and/or cladotylotes. In thinly encrusting specimens, the choanosomal skeleton is hymedesmioid, i.e. with styles or cladotylotes erect on the substrate. The cladotylotes occur normally in two categories, but

exceptionally in three or a single one. Microscleres include up to three categories of toxas, and chelas.

Remarks: *Acarnus* has been revised and monographed recently by VAN SOEST *et al.* (1991) (with additional data in HOOPER & LÉVI, 1993). A species of that genus occurring in the region is *Acarnus peruanus* Van Soest *et al.*, 1991; for a description one is referred to that paper. An additional specimen of that species is here recorded from the Galapagos Islands (ZMA data collections).

Genus **Megaciella** Hallmann, 1920

Type species: *Amphilectus pilosus* Ridley & Dendy, 1886 (by original designation).

Diagnosis (from VAN SOEST *et al.*, 1994): Branching or encrusting Iophonidae with ectosomal brushes of tylotes with spined heads, with a reticulate or confused choanosomal skeleton consisting of smooth styles with spined or smooth heads, arranged singly or in two's or three's. Thinly encrusting specimens have the styles erect on the substrate. Microscleres are palmate isochelas and toxas.

Remarks: The type species lacks echinating acanthostyles, but similar species with acanthostyles exist. There are no species answering to this diagnosis of *Megaciella* recorded from the SE Pacific. The Californian species *Myxichela microtoxa* De Laubenfels, 1935 is a clear *Megaciella* and "may be nearest representative" of that genus in the area.

Genus **Acanthorhabdus** Burton, 1929

Type species: *Acanthorhabdus fragilis* Burton, 1929 (by monotypy).

Diagnosis (from VAN SOEST *et al.*, 1994): Iophonidae with modified styles in the form of anisoxeas often provided with a mucron arranged in a coarse but ill-defined plumoreticulation. Ectosomal megascleres are acanthorhabds with heavy spines and microspined tylote apices. Microscleres are spurred palmate anisochelas.

Remarks: BURTON (1929) placed this rather enigmatic monotypical genus in his section Mycaleae on account of its anisochelae, but the presence of the special ectosomal megascleres makes it thoroughly untypical of this group. VAN SOEST *et al.* (1994) proposed to assign this species to Iophonidae, because the spurred anisochelae are shared with *Iophon* and the acanthorhabds have spined tylote apices found in all members of the Iophonidae. Although the occurrence of the species is technically outside the study area, we decided to examine the holotype (BMNH 1926.10.26.189), to supply more data on this intriguing species: the skeleton consists of massive plumose columns of smooth oxea-like megascleres, carrying a surface crust of acanthose spicules. The smooth oxeotes of 550 by 35 μm are decidedly asymmetrical, and often a distinct mucron (not unlike *Iophon unicornis*) is present at one end; occasionally there is a single spine at one end. The acanthorhabds of 400 by 25 μm are fusiform, heavily spined, with spines curved towards the middle of the spicules,

clearly demonstrating their diactinal nature. The apices of the acanthorhabds are both provided with small spines not unlike the heads of the tylotes of *Iophon*; it is assumed - also by their position in the sponge skeleton - that these spicules are homologous to ectosomal tylotes. The spurred anisochelas of 25-30 μm length are very similar to those of various *Iophon* species. No further material of this species has become available.

KEY TO THE SPECIES OF *Iophon* OCCURING IN THE SE PACIFIC COAST

- 1 With two size categories of choanosomal styles. *I. proximum*
- Single size category of choanosomal styles. 2
- 2 Styles spined, bipocilla strongly asymmetrical. 3
- Styles smooth bipocilla almost symmetrical or absent. 4
- 3 Spines on styles regularly distributed. Bipocilla trilobate. Galapagos Islands
. *I. lamella*
- Spines on styles irregularly distributed Bipocilla trifoliate. Chilean coast.
. *I. chilense* n.sp.
- 4 Bipocilla absent. The small category of anisochelas is malformed
. *I. timidum* n.sp.
- Bipocilla present, almost symmetrical. *I. tubiforme* n.sp.

Suborder: Myxillina Hajdu, van Soest & Hooper, 1994

Family: Myxillidae Topsent, 1928

Diagnosis: Myxillina with smooth, mucronate or microspined tornote or tylote ectosomal megascleres arranged as bouquets, with smooth or spined monactinal or diactinal choanosomal megascleres arranged in isotropic, anisotropic or plumose reticulation. Microscleres include anchorate isochelas and/or derivatives thereof (spatulate, unguiferate or birotulate chelas), and smooth sigmas.

Myxilla Schmidt, 1862

Synonyms: *Burtonanchora* De Laubenfels, 1936; *Crellomyxilla* Dendy, 1924; *Dendoryx* Gray, 1867; *Emplocus* Gray, 1867; *Ectyomyxilla* Lundbeck, 1909; *Hastatus* Vosmaer, 1880; *Stegxella* Bowerbank, 1874; *Stelodoryx* Topsent, 1904; *Styloptilon* Cabioch, 1968; *Tereus* Gray, 1867).

Type species: *Halichondria rosacea* Lieberkühn, 1859.

Diagnosis: Myxillidae with ectosomal spicules which are variably mucronate, stronglylotylote or tornote, frequently with one or a few prominent spines on the apices. The choanosomal spicules are stylote, usually styles, with or without spination. As is usual for the family, the microscleres are anchorate chelas -spatulate and/or unguiferate- and sigmas, both types frequently in two categories.

Remarks: The suborder assignment is based on the "tridentate" nature of the chelas. The family assignment is based on the combination of tornotes, anchorate

chelas and true sigmas (other myxilline genera with anchorate chelas do not have tornotes and proper sigmas, and are united in the family Crambeidae new family name).

The skeleton of the type species is a tight meshed isotropic reticulation of strongly spined styles, but other species may have more loosely constructed skeletons and smooth styles.

The possession of unguiferate chelas instead of or in addition to the spatulate anchorates occurs in several *Myxilla*-like sponges as well as in the unrelated genus *Monanchora* (cf. VAN SOEST, 1990), but is not considered evidence for a monophyletic group. However, for convenience sake, we propose to distinguish a subgeneric unit for *Myxilla* species with these chelas. The name *Stelodoryx* Topsent, 1904 (type *S. procera* Topsent, 1904) is available for these sponges.

The possession of smooth instead of spined styles also is not coinciding with other features and accordingly is not considered evidence for a monophyletic group. However, for convenience sake, we propose to distinguish a subgeneric unit for *Myxilla* species with smooth styles. For these, the name *Burtonanchora* De Laubenfels, 1936 (type *Myxilla crucifera* Wilson, 1925) is available.

A separate genus *Ectomyxilla* Lundbeck, 1909 with echinating strongly spined styles is likewise not recognized as a monophyletic group, because the presence of these spicules does not coincide with other morphological features. However, it is useful as a subgeneric unit. Technically, the name *Ectomyxilla* is a nomen nudum because LUNDBECK (1909) did not mention any species when erecting this genus. However, since the name was proposed before 1930, the subsequent use of the name by HENTSCHEL (1914) for *E. kerguelensis* HENTSCHEL 1914, satisfies Article 13 (i) of the ICZN code (1985) as subsequent type species designation.

The remaining genera listed as junior synonyms above are synonyms of *Myxilla* (*Myxilla*).

This wide diagnosis of *Myxilla* encompasses species from all areas of the world.

Subgenus **Myxilla** Schmidt, 1862

Diagnosis: *Myxilla* with tight meshed isotropic skeleton and exclusively spatulate anchorate chelae; without a special category of echinating acanthostyles.

Myxilla (**Myxilla**) **mexicensis** Dickinson, 1945

(Figs. 39-53)

Myxilla mexicensis DICKINSON, 1945: 18, pl. 24, figs. 47, 48, pl. 25, figs. 49, 50.

MATERIAL STUDIED: AHF 9, holotype of *Myxilla mexicensis* Dickinson, 1945, Stn. 513.36, off San Francisco Island, Gulf of California, 60 m.

USNM 37917, MHNG 18958: Ga.II.3, Stn. 17, Galapagos Islands, Kicker Rock, coll. W.D.Hope, 02.1978, 23 m; USNM 37918, MHNG 18959: Ga.II.8, Galapagos Islands, Kicker Rock; USNM 37919, MHNG 18960, ZMA 10978, USNM 39360: Ga.II.4, Stn. 8, Galapagos Islands, Punta Vicente Roca, Isla Isabela, 02.1978, 18 m; USNM 39360, MHNG 18961: Ga.IV.33, Cruise 18B 794E, Galapagos Islands, Santiago Island, 00°12'S 90°51'W, 23.09.1966, 34 m; ZMA 10979, Cruise 18B 791C, Galapagos Islands, Santa Cruz Island, 00°26'S 90°20'W, 21.09.1966, 95 m.

DESCRIPTION

Five specimens (figs 39-42): 45-80-100-120 x 30-60-100-70 mm and 3 fragments: 20-50-80 x 10-20-50 mm, high and diameter. Sponge tubiform, with the basal part slightly enlarged and a central canal from 50 to 80 mm diameter in the different specimens and fragments studied. Surface strongly tuberculate and irregular (somewhat resembling *Xestospongia*) and covered by a membrane. The interior of the sponges shows large open spaces and canals. Pores irregularly scattered in surface depressions; oscules scattered over the inner wall of the tube.

Consistency: hard and fragile, crumbly.

Colour: Orange-brownish in formalin, brownish to yellow-white in alcohol.

Skeleton: Ectosomal skeleton a perpendicular compact palisade of tylotornotes and free microscleres.

Choanosomal skeleton: an tight meshed isotropic reticulation of strongly spined styles, abundant microscleres, especially sigmas.

Spicules (Table 8): Megascleres: strongly spined styles (figs 43, [44 holotype]) slightly bent and with strong spines, scarcely distributed but more abundant at the base, 163-208 x 3-10 µm.

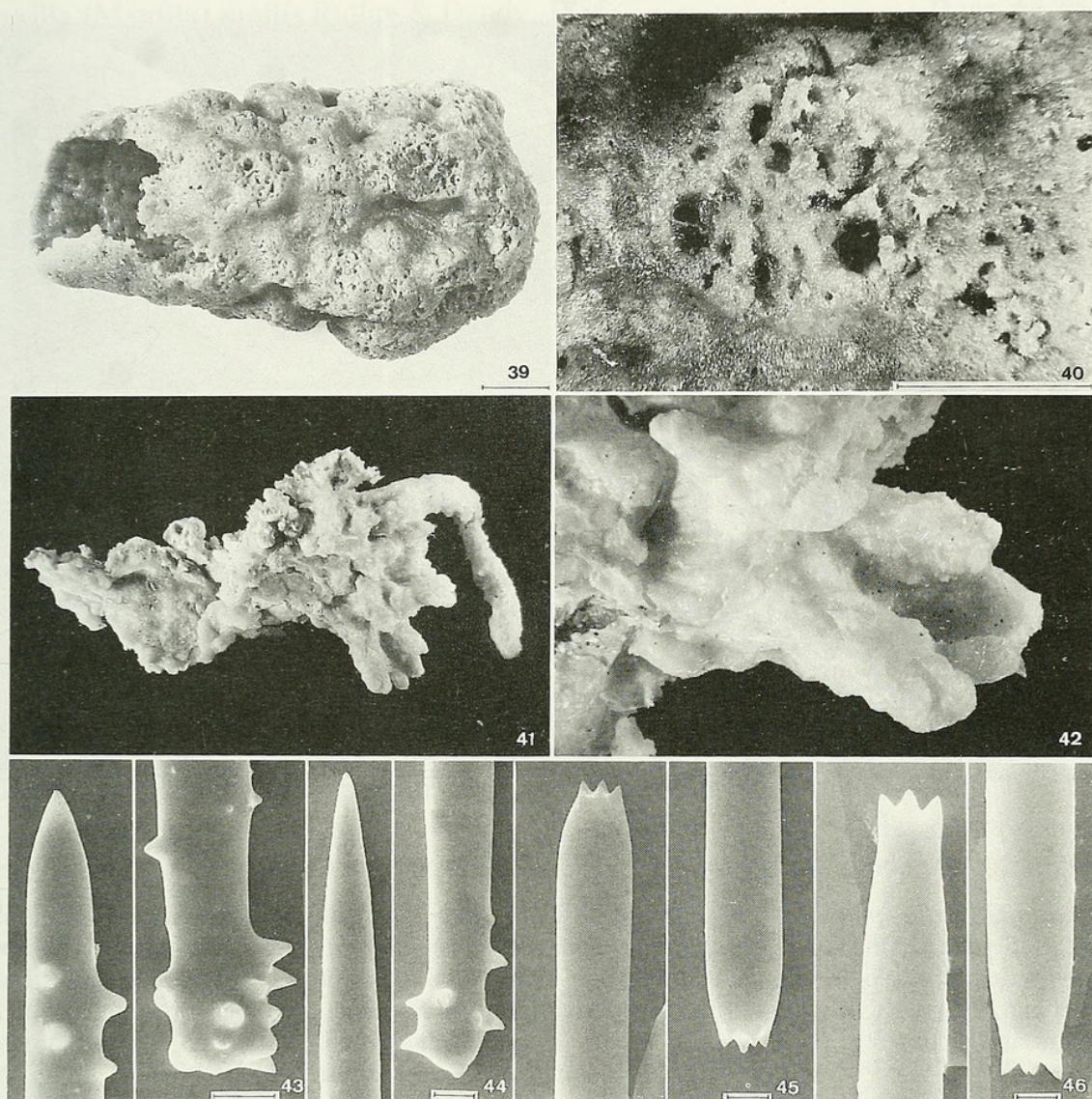
TABLE 8

Spicule micrometries of *M. (Myxilla) mexicensis* Dickinson, 1945. *M. mexicensis* Dickinson, 1945 AHF 9 holotype; from literature and remeasured. Specimens from Galapagos of *M. (M.) mexicensis*.

<i>M. (Myxilla)</i> <i>mexicensis</i> Dickinson, 1945	Spined styles	Tylotornotes	Isochelas 1 Isochelas 2	Sigmas 1 Sigmas 2
HOLOTYPE AHF.9 San Francisco Island	not indicated	not indicated	not observed 10-12	32 14
Remeasured	176-208-226 x 6-8-10	144-166-176 x 4	23-28-31 12-18-20	20-28-35 12-14-15
GA.II.3 Kicker Rock. Stn. 17 USNM 37917	163-178-195 x 3-6-10	144-159-173 x 3	22-27-29 10-13-16	22-28-32 11-15-19
GA.II.4 Kicker Rock USNM 37919	173-184-195 x 6-7-10	144-160-173 x 3-4-5	22-25-29 11-13-18	22-26-32 10-11-13
Ga.IV.33 18B794E Santiago Island	182-199-214 x 10-11-13	154-165-179 x 3-4-6	22-29-32 10-13-19	19-25-29 11-14-16

Tylotornotes (figs.45, [46 holotype]) straight, regular diameter and with barely swollen "cut-off" spined apices, about four to five spines at each end, 141-273 x 3-5 µm.

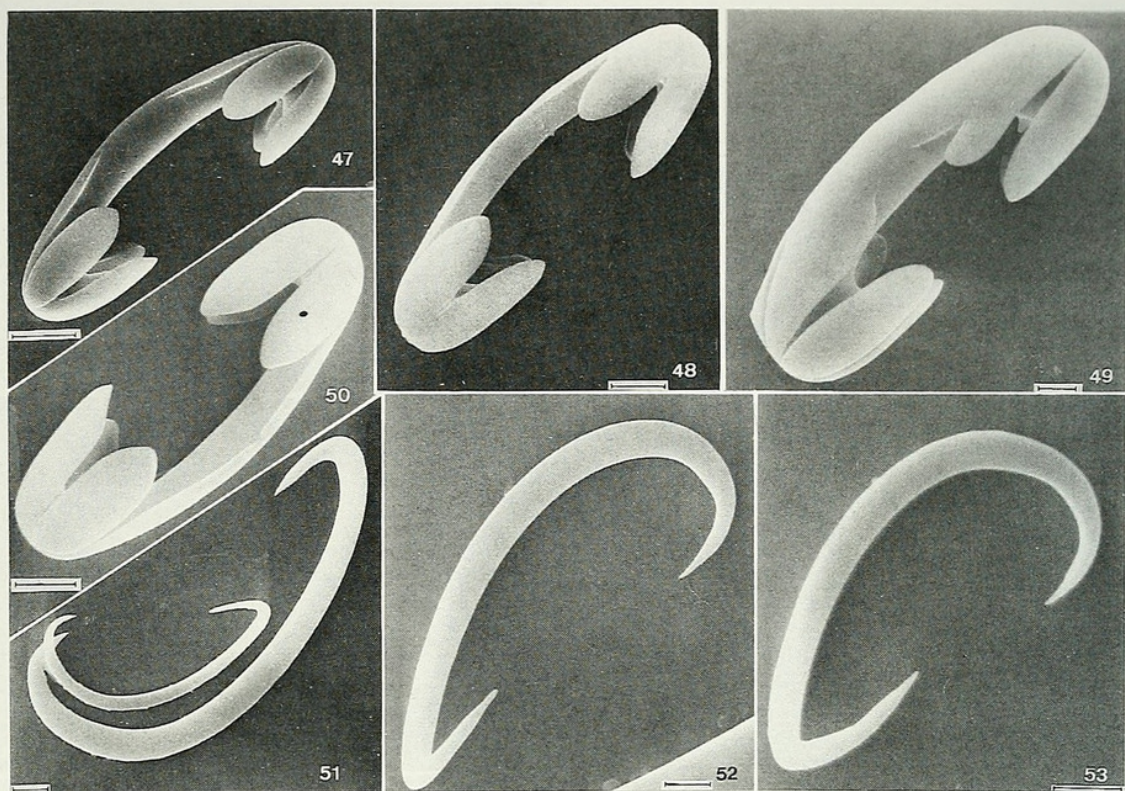
Microscleres: Anchorate spatuliferous isochelas 1 (figs.47, [49 holotype]) 22-29 µm, with a shaft only slightly curved, with three free alas of the same length, the innermost longer than the others and attached to the shaft. Anchorate spatuliferous



FIGS 39-46

Myxilla (Myxilla) mexicensis Dickinson, 1945. 39, specimen from Galapagos Islands. 40, enlarged view of the surface. 41 [HOLOTYPE, AHF 9] from Gulf of California. 42, enlarged view of the surface. 43, slightly bent styles, strongly spined, spines scarcely distributed. 44, style from holotype. 45, tylotornotes straight, regular diameter and with barely swollen "cut-off" spined apices about four to five spines at each end. 46, tylotornotes from holotype. Scales: figs 43, 44, 46 = 5 μ m.

isochelas 2 (figs 48, [50 holotype]) 10-19 μ m, shaft slightly bent, three teeth are visible in frontal view, the innermost longer than the others and attached to the shaft. Since these chelas are morphologically identical, it is not entirely certain that the size categories are genuine.



FIGS 47-53

Myxilla (Myxilla) mexicensis Dickinson, 1945. 47 [49 holotype] anchorate spatuliferous isochela 1 with a shaft only slightly curved, with three free alas of the same length, the innermost longer than the others and attached to the shaft. 48 [50 holotype] anchorate spatuliferous isochela 2, shaft slightly bent, three teeth visible in frontal view, the innermost longer than the others and attached to the shaft. 51, sigmas 1 and 2. 52, sigma 1. 53, sigma 2 from holotype. Scales: fig. 47 = 5 μ m; figs 48-53 = 2 μ m.

Sigmas (fig. 51): Sigma 1, 19-35 μ m (fig. 52) and sigmas 2: 11-19 μ m (fig. 53 [holotype]) with one of the apices strongly bent and the other largely open, both abruptly pointed.

Ecology: Presumably fixed to hard bottom, no visible attaching points, 18-60 m.

Distribution: Galapagos, Southern California.

Remarks: The specimens were compared with a fragment of DICKINSON's type and found to be essentially similar, as is apparent from figs 39-42. DICKINSON (1945) reported only a single category of isochelas of 10-12 μ m, but we found the same size range as in our specimens (cf. figs 47-50). Although the growth form of Dickinson's specimen was not tube-shaped, it was a much smaller specimen. One of our specimens also was smaller and it showed only a widened oscule instead forming a definite tube. We assume the growth form to be a tube only in mature specimens.

In spicule form, size and skeletal arrangement this species is closely related to the type species of *Myxilla*, viz. *M. rosacea* (Lieberkühn, 1859), and to other Northern Hemisphere species as *M. fimbriata* (Bowerbank, 1866) and *M. incrustans* (Johnston, 1842).

Myxilla (Myxilla) mollis Ridley & Dendy, 1886

(Figs. 54-65)

Myxilla mollis RIDLEY & DENDY, 1886: 471; 1887: 133, pl. xxvii, figs. 4, 4a-b; Burton, 1932: 309, pl. lv, figs 1-4; 1934: 28; 1940: 107.

Myxilla spongiosa RIDLEY & DENDY, 1886: 471, 1887: 134, pl. xxvii, figs. 3, 3a-f.

MATERIAL STUDIED: BMNH 1887:5:2:112, holotype of *Myxilla mollis* Ridley & Dendy, 1886, Challenger Exped. Stn. 311, off sw coast of Patagonia, 52°45'S 73°46'W, 11.01.1876, 448 m; BMNH 1887:5:2:131, Stn. 308, 05.01.1876, 50°08'S 74°41'W, 320 m; BMNH 1887:5:2:93, holotype of *Myxilla spongiosa* Ridley & Dendy, 1886, Challenger Stn. 320, off mouth of the Rio de la Plata, 37°17'S 53°52'W, 14.02.1876, 1097 m.

MHNG 18962: HE 8, HE 16, Boca Seno Baker, 47°49'S 74°38'W, 01.10.1972, 300 m; MHNG 18963: HE 48, Isla Topar, 50°06'S 74°41'W, 16.01.1972, 150 m.

DESCRIPTION

Several specimens (figs. 54, 55) and fragments with basal holdfast, 41-97 x 30-80 x 10-23 mm. Sponge massive. Surface irregularly tuberculate or minutely conulose, covered by a thin membrane; where this is damaged, an irregular system of small subdermal cavities is revealed. Several small oscules 2-4 mm diameter, scattered on the surface, in one specimen, some of them are at the end of a small tube.

Consistency: Soft and compressive, elastic.

Colour: Yellowish-orange to grey alive; light to dark brown in alcohol.

Skeleton: Ectosomal skeleton: tangentially arranged anisotylotes in a loose palisade. Abundantly distributed microscleres, producing a continuous crust.

Choanosomal skeleton: a loose reticulation of smooth styles, occasionally arranged side by side (4-5). No continuous tracts. Microscleres abundantly scattered all over the choanosome, but especially around the aquiferous canals.

Spicules (Table 9): Slightly spined styles to subtylostyles (figs. 56 [60 holotype]) smooth, swollen base with a few spines, slightly curved, 414-526 x 10-13 µm.

Anisotylotes (figs. 57 [61 holotype]) straight, apices swollen unequally, one end being more elongated than the other, with small spines on both extremities 221-280 x 7-10 µm.

Microscleres: Spatuliferous anchorate isochelas 1 (fig. 58), three to five relatively long teeth, only slightly curved, 34-49 µm. Spatuliferous anchorate isochelas 2 of similar shape (figs. 59 [62 holotype]) 16-22 µm.

Sigmas 1, 34-79 and 2 20-32 µm (figs. 63-65) common, C - or S - shape.

Ecology: Stones and calcareous substrate, 150-1097 m.

Distribution: West and east coast of South America: 47°S-52°S, 37°S; Falkland Islands; South Georgia.

Remarks: Our material was compared to the type specimen of Ridley & Dendy, and found to be quite similar, with the characteristic almost smooth styles, except at the slightly spined base and two categories of chelas and sigmas. The smooth styles are shared with *M. (Burtonanchora) asymmetrica* n.sp. (cf. below), but that species has and asymmetric chelas, and with *M. discoveryi* but that species has unguiferate chelas.

Records of this species by BURTON (1932, 1934, 1940) presumably are correct, extending the distribution to the east coast of South America, and to the Falkland Islands and South Georgia.

TABLE 9

Spicule micrometries of *M. (Myxilla) mollis* Ridley & Dendy, 1886. *M. mollis* Ridley & Dendy BMNH 1887:5:2.112 holotype; *Myxilla spongiosa* Ridley & Dendy, 1886 BMNH 1887:5:2:93 holotype; from literature and remeasured. Specimens from Chile of *M. (M.) mollis*.

<i>M. (Myxilla) mollis</i> R. & D., 1886	Styles	Anysotylotes	Isochelas 1 Isochelas 2	Sigmas 1 Sigmas 2
<i>M. mollis</i> R. & D. 1886 BMNH1887:5:2:112 sw. Patagonia Remeasured	420 x 10 421-457-486 x 8	220 x 6 227-259-283 x 4-6-8	40 not observed 32-34-40 24-26-28	63 40-45-49 16-22-28
<i>M. spongiosa</i> R. & D. 1886 BMNH1887:5:2:93 Off Rio de la Plata Remeasured	700 x 20 539-586-617 x 15-17-20	400 x 10 250-280-300 x 8-9-10	50 not observed 47-49-55 20-21-23	45-63 not observed 45-65-79 20-26-31
He 8 Boca Seno Baker	428-468-526 x 10-11-13	222-247-257 x 8-10	36-43-46 17-19-22	46-54-79 20-23-24
He 16 Boca Seno Baker	414-477-513 x 10-13	221-236-249 x 7	34-43-49 16-19-22	40-51-58 21-25-32
He 48 Isla Topar	428-471-503 x 10-12-13	250-267-280 x 7	41-48 16-18-21	34-49-58 21-24-26

By comparing microscopical slides of the types of *M. mollis* and *M. spongiosa* Ridley & Dendy, 1886 from the area off Argentina (37°S), we could ascertain that this is likely to be a junior synonym of *M. mollis* (the latter has page priority). Like *M. mollis* occasional spines occur on the styles of the type specimen. The only difference is the somewhat larger megasclere sizes of *M. spongiosa*. Hentschel's (1914) record of this species from Antarctica is probably incorrect as the styles are reported as spined. Hentschel's material has been elevated to a separate species *M. hentscheli* (in subgenus *Ectomyxilla*) by BURTON (1929).

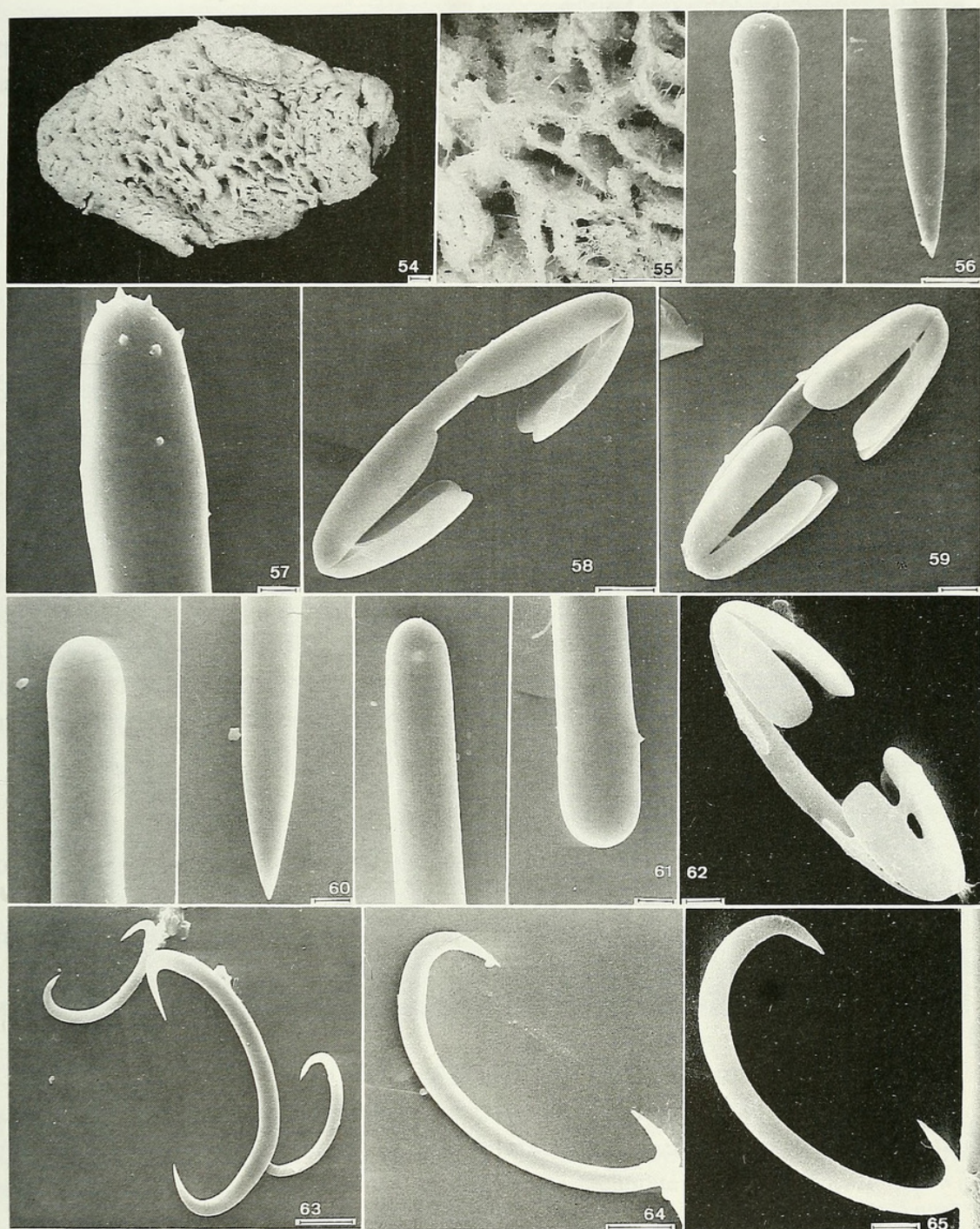
***Myxilla (Myxilla) caliciformis* Sarà, 1978**

Myxilla caliciformis SARÀ, 1978: 46, figs. 28, 29.

MATERIAL STUDIED: EAI-76, holotype of *Myxilla caliciformis* Sarà, 1978, Puerto Roca, Isla Dos Estados, 11.01.74, 2-3 m.

Not represented in our material so only a diagnosis will be given:

Cup-shaped sponge. Anisotropic skeleton superimposed on the isotropic meshes as usuals for the genus. Acanthostyles small, strongly spined, 120 x 6 µm. Tornotes with heavily spined apices, 120 by 3 µm. Spatuliferous anchorate chelas in two size categories: 18 and 12 µm. Sigmas 30 µm.



FIGS 54-65

Myxilla (Myxilla) mollis Ridley & Dendy, 1886. 54, massive specimen from Isla Topar. 55, enlarged view of the irregular tuberculate surface. 56 [60, holotype, BMNH 1887:5:2:112] slightly spined styles to subtylostyles. 57 [61, holotype] spined swollen apex from anisotylotes. 58, spatuliferous anchorate 1. 59, spatuliferous anchorate isochela 2 [62 holotype]. 63, sigmas 1 and 2. 64 [65 holotype], sigma 2. Scales: figs. 56, 63 = 10 μ m; figs. 57, 59, 62, = 2 μ m; figs. 58, 60, 61, 64, 65 = 5 μ m.

Distribution: Tierra del Fuego.

Remarks: Through its cup-shaped growth form this species stands out among the *Myxilla* species of the study area. Judged from the spicules and skeletal structure its closest relative is *M. (M.) mexicensis*.

Subgenus **Burtonanchora** de Laubenfels, 1936

Diagnosis: *Myxilla* with smooth instead of spined styles.

Myxilla (Burtonanchora) asymmetrica n. sp. (Figs. 66-73)

MATERIAL STUDIED: USNM 39335, HOLOTYPE: MHNG 18831, ZMA 10980: Ga.44 SEPBOB "Anton Bruun" Exped., Cruise 18B 754, Peru, 07°49'S 80°38'W, 06.09.1966, 605-735 m.

DESCRIPTION

Numerous specimens (figs. 66 [67 Holotype]) of 20-40 x 10-25 mm, and numerous fragments of 10-20 mm, of an encrusting to conical to massive sponge. Although the substrate is no longer preserved with the sponge, impression marks on the undersides of the specimens indicate that this species probably encrusts gastropod molluscs. Surface rugose and irregular, several small oscules, 1.5-2 mm diameter are visible.

Consistency: Soft and elastic, very fragile.

Colour: Greyish to brownish in alcohol.

Skeleton: Ectosomal skeleton: tangentially arranged compact palisade of tylotes and microscleres abundantly distributed.

Choanosomal skeleton: a loose reticulation of smooth styles, irregular aquiferous spaces rounded by isochelas.

Spicules (Table 10): Megascleres: Smooth styles (figs. 68, 69) irregularly bent and of uniform diameter, 478-571 x 16 µm.

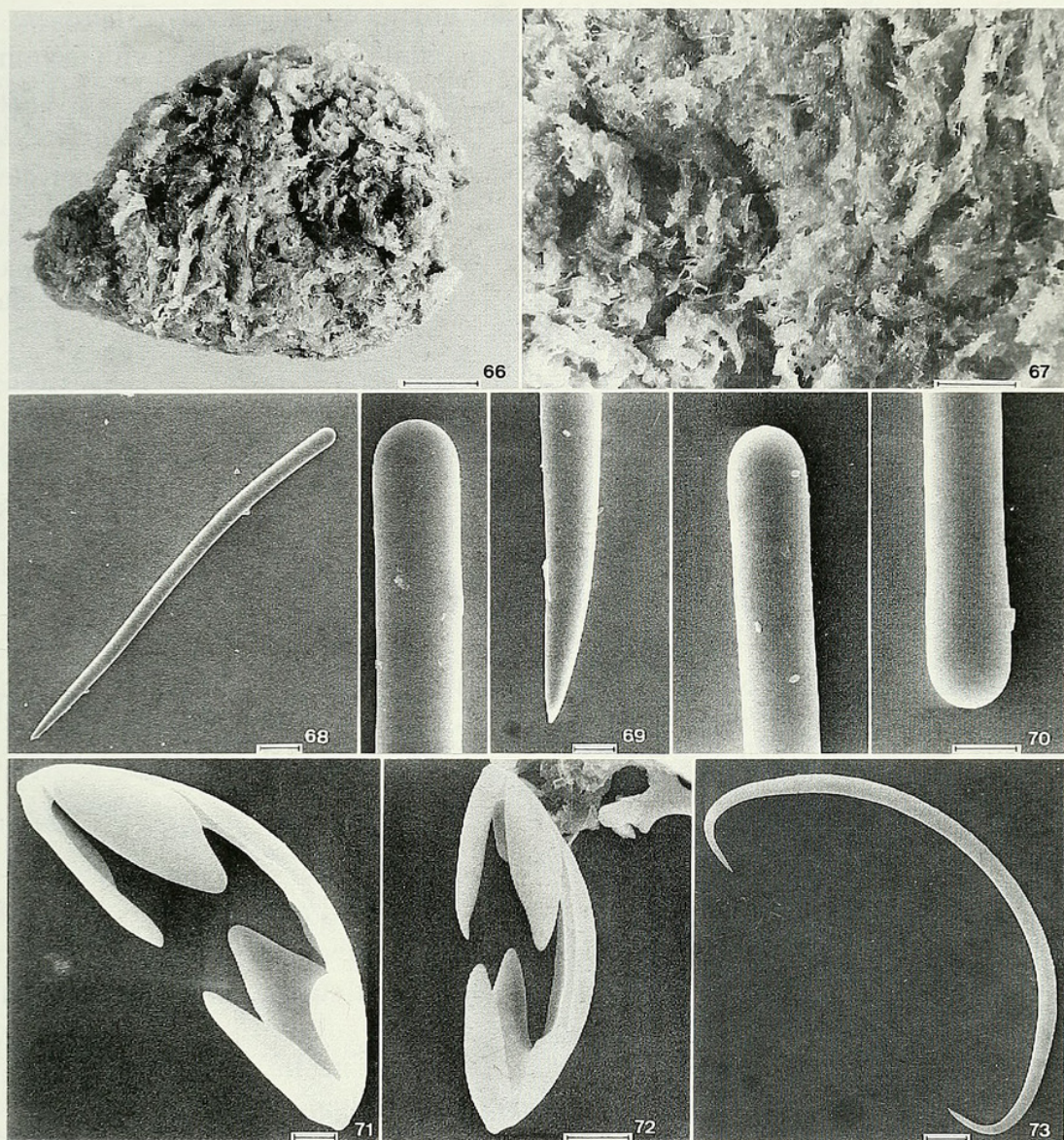
Smooth isotylotornotes (fig. 70): 219-283 x 5 µm.

Microscleres: Asymmetrical spatuliferous anchorate isochelas (figs 71, 72) that at first glance appear arcuate, but the curved shaft is sheathed in continuous fimbriae

TABLE 10

Spicule micrometries of *M.(Burtonanchora) asymmetrica* n. sp. USNM holotype from Peru.

<i>M. (Burtonanchora) asymmetrica</i> n. sp.	Styles	Isotylotornotes	Isochelas	Sigmas
Holotype USNM 39335 Ga.44 18B754 07°49'S 80°38'W	478-515-551 x 16	219-245-283 x 5	20-26-32	49-65



FIGS 66-73

Myxilla (Burtonanchora) asymmetrica n.sp. 66 [holotype, USNM 39335] massive specimen from Galapagos. 67, enlarged view of the surface. 68, 69, smooth styles irregularly bent. 70, smooth isotylotornote. 71, 72, asymmetrical spatuliferous anchorate isochela. 73, sigma widely open. Scales: fig. 68 = 50 μ m; fig. 69 = 10 μ m; figs. 70, 72, 73 = 5 μ m; fig. 71 = 2 μ m.

next to the three alae. The asymmetrical aspect is found in the length of the lateral alae of which one is always considerably shorter than the central one. This modification occurs always in opposite position. Many of the alae have frayed or denticulated rims. Size 20-32 μ m.

Sigmas (fig. 73): widely curved and abruptly pointed, abundant, 49-65 μ m.

Ecology: Probably encrusting gastropods, 605-735 m depth.

Distribution: Peru, 07°49'S 80°38'W.

Remarks: The asymmetrical chelas are unique for the genus. There are no matching descriptions in the literature. In other families, also species with asymmetrical chelas have been described: *Esperiopsis glomeris* Topsent, 1904 and *E. pulchella* Boury-Esnault & Van Beveren, 1982 (family Mycalidae) and *Phorbas dayi* (Lévi, 1963 as *Anchinoe*) (family Anchinoidae). These represent convergent developments.

Subgenus **Ectyomyxilla** Lundbeck, 1909

Diagnosis: *Myxilla* with echinating strongly spined styles.

Myxilla (Ectyomyxilla) chilense Thiele, 1905

(figs 74-81)

Myxilla chilensis THIELE, 1905: 443, figs. 22, 62 a-e; BURTON 1932: 311, pl. liv, fig. 10; 1934 [in part]: 28; 1940: 108; BOURY-ESNAULT & VAN BEVEREN 1982, as *Crellomyxilla* [in part?]: 84, pl. xiv, fig. 53, fig. 24 a-e.

MATERIAL STUDIED: ZMB 3298, holotype of *Myxilla chilensis* Thiele, 1905, Calbuco, 41°46'S 73°08'W. MHNG 18965-18967: VALD. 44.1, Quintupeu, 42°10'S 72°24'W, 23.07.1971, 12 m; VALD. 53.7, Islote Caleta Lobato, 45°5'S 74°47'W, 17.07.1972, 15 m; Co 93-51, Pelluco, 41°30'S 72°54'W, 20.12.1990, 15 m.

DESCRIPTION

One specimen (figs. 74, 75), 50 x 40 x 30 mm, and two fragments of 31-48 x 30-39 x 29-39 mm. Sponge largely massive. Surface uneven, hispid, minutely corrugated or conulose and covered by a thick, transparent surface membrane. Oscules numerous, scattered, 1.5-3 mm diameter.

Consistency: compressible.

Colour: bright yellow, yellowish-orange alive, pink to whitish in alcohol.

Skeleton: The ectosomal skeleton is a variable thick, dense palisade of tornotes and acanthostyles 2 positioned at oblique angles, forming part of the detachable surface membrane. The choanosomal skeleton is a dense and irregular to subisodictyal network of spined styles 1 and abundant microscleres. Numerous aquiferous canals are distributed all over the choanosome.

Spicules: (Table 11) Megascleres: Strongly spined acanthostyles 1 (fig. 76) almost straight, abundantly distributed spines, which are longer at the basal end, sharp apex, 176-229 x 8-13 µm. Spined acanthostyles 2 (fig. 77) slightly curved, numerous small spines, sharp apex, 83-144 x 3-6 µm.

Tornotes (fig. 78) smooth, straight, sharp, abrupt apices, 157-211 x 4-10 µm.

Microscleres: Spatuliferous anchorate isochelas 1 (fig. 79) curved shaft, common 18-45 µm. Spatuliferous anchorate isochelas 2 (fig. 80) curved shaft, common, 10-16 µm.

Sigmas, C- or S - shaped (fig. 81) common, tapering abruptly 32-64 µm.

Ecology: Pebbles, calcareous and bryozoa fragments, 12-15 m.

TABLE 11

Spicule micrometries of *M. (Ectyomyxilla) chilense* Thiele, 1905. *M. chilensis* Thiele, 1905 ZMB 3298, HOLOTYPE; from literature and remeasured. Specimens from Chile of *M. (E.) chilensis*.

<i>M. (Ectyomyxilla) chilense</i> Thiele, 1905	Acanthostyles 1 Acanthostyles 2	Tornotes	Isochelas 1 Isochelas 2	Sigmas
Holotype ZMB 3298 Calbuco	170-200 x 10-12 not observed	170-190 x 6-7	20-35 12-15	45-47
Remeasured	182-195-208 x 6-8-10 102-122-134 x 6	163-181-202 x 6	19-26-29 11-14-16	45-47-51
Vald. 44-1 Quintupeu	205-216-229 x 8 83-119-144 x 3-6	192-201-211 x 4-6	18-20-29 10-14-16	35-54-64
Vald. 53-7 I. Caleta Lobato	176-191-202 x 8-10-11 112-125-138 x 3-6	157-181-298 x 5-6	38-40-45 10-14-16	32-43-48
Co.93-51 Pelluco	176-198-218 x 10-11-13 128-132-144 x 6	166-184-195 x 4-7-10	19-22-29 10-14-16	38-40-45

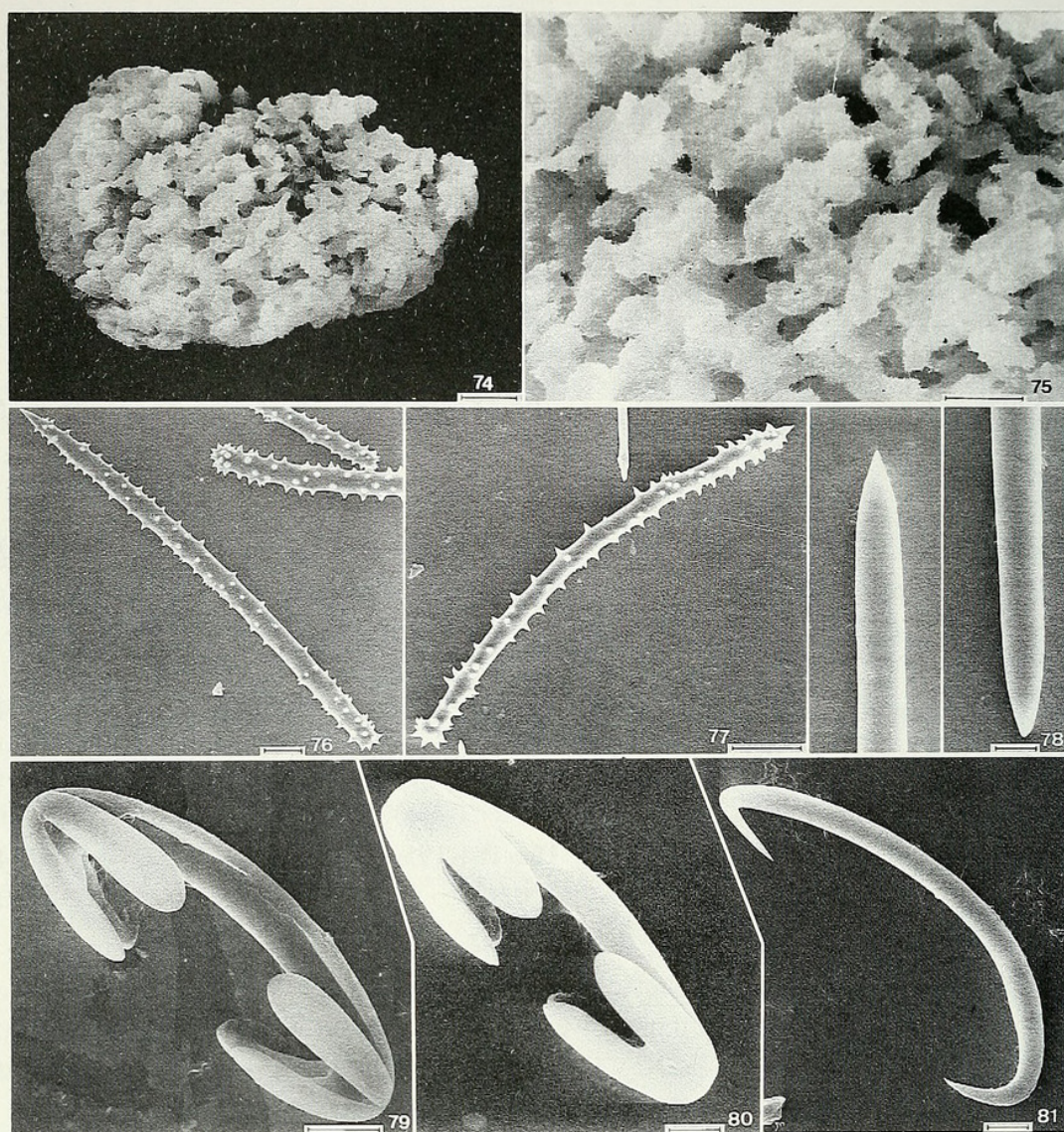
Distribution: Chilean coast : 41°S-45°S; Falkland Islands; Kerguelen ?

Remarks: BOURY-ESNAULT & VAN BEVEREN (1982) recorded "*Crellomyxilla*" *chilensis* and "*C. kerguelensis*" sympatrically from the Kerguelen Islands. Apparently, the two species may be distinguished on the different size of the sigmas, 45-58 and 12-32 µm. Other authors (e.g. BURTON 1934) considered the two as conspecific. *Crellomyxilla* Dendy (1924) with type species *C. intermedia* Dendy, 1924 from northern New Zealand, is a junior synonym of *Ectyomyxilla*. Dendy interpreted the acanthostyles 2, which are mixed in among the ectosomal tornotes, as evidence for crellid affinity. This character, however, is also found in *M. kerguelensis*, the type of *Ectyomyxilla*, so synonymy is clear. If *M. chilensis*, *M. kerguelensis*, and *M. intermedia* are distinct species, they may be separated as a monophyletic subgenus from other other *Myxilla* species possessing acanthostyles 2.

***Myxilla (Ectyomyxilla) dracula* n. sp.**

(Figs. 82-90)

HOLOTYPE: USNM 39351, MHNG 18968, ZMA 10981: Ga.III.36, SEPBOP "Anton Bruun" Cruise 16 627 A, Peru, 05°01'S 81°25'W, 06.1966, 200 m.



FIGS 74-81

Myxilla (Ectomyxilla) chilense Thiele, 1905. 74, massive specimen from Quintupeu. 75, enlarged view of the surface. 76, acanthostyle 1, strongly spined, 77, acanthostyle 2, slightly curved. 78, smooth oxotornote. 79, 80, spatuliferous anchorate isochela 1 and 2. 81, sigma, abruptly pointed, C-shaped. Scales: figs. 76, 77 = 20µm; figs. 78, 79, 81 = 5µm; fig. 80 = 2µm.

DESCRIPTION

Small, thinly encrusting layer on a mass of hydroid chitinous stolons (figs. 82, 83). Surface irregular and covered by a spiculous membrane. No oscules are visible.

Consistency: Very fragile, but elastic.

Colour: Grayish in alcohol.

Skeleton: Ectosomal skeleton: a palisade of densely packed bundles of tylo-tornotes and abundant free tylo-tornotes. Microscleres are abundant too.

Choanosomal skeleton: A loose and confused reticulation of strongly to moderately spined acanthostyles 1 and 2 and extremely abundant microscleres. The sponge skeleton surrounds the mass of hydroid stolons.

Spicules (Table 12): Megascleres: Acanthostyles 1 (fig. 84) almost straight, with only a few strong spines, 308-397 x 8 μm . Acanthostyles 2 (fig. 85) slightly bent, spines abundant, 140-160 x 2 μm .

TABLE 12

Spicule micrometries of *M. (Ectyomxilla) dracula* n. sp. MNHG 18968, holotype from Galapagos.

<i>M. (Ectyomxilla)</i>	Acanthostyles 1	Anisotylotornotes	Isochelas 1	Sigmas 1
<i>dracula</i> n. sp.	Acanthostyles 2		Isochelas 2	Sigmas 2
HOLOTYPE USNM 39351			2	
Ga.III.36	308-355-397	170-182-194	40-45-49	32-42-51
16627A	x 8	x 4	12-13-16	18-21-24
05°01'S 81°25'W	140-160			
	x 2			

Anisotylotornotes (fig. 86) with a few small spines at the apices, 170-194 x 4 μm .

Microscleres: Spatuliferous anchorate isochelas 1 (fig. 87) straight shaft, 40-49 μm . Peculiarly small anchorate isochelas 2 (fig. 88) strongly curved and with long narrow alas sharply bent inwards and almost meeting in the centre, 12-16 μm .

Sigmas 1 and 2 (figs. 89, 90) largely open and abruptly pointed, 32-51 and 19-24 μm .

Etymology: the name refers to the long thin teeth of the chela 2, which evoke associations of dragon's teeth.

Ecology: 200 m depth.

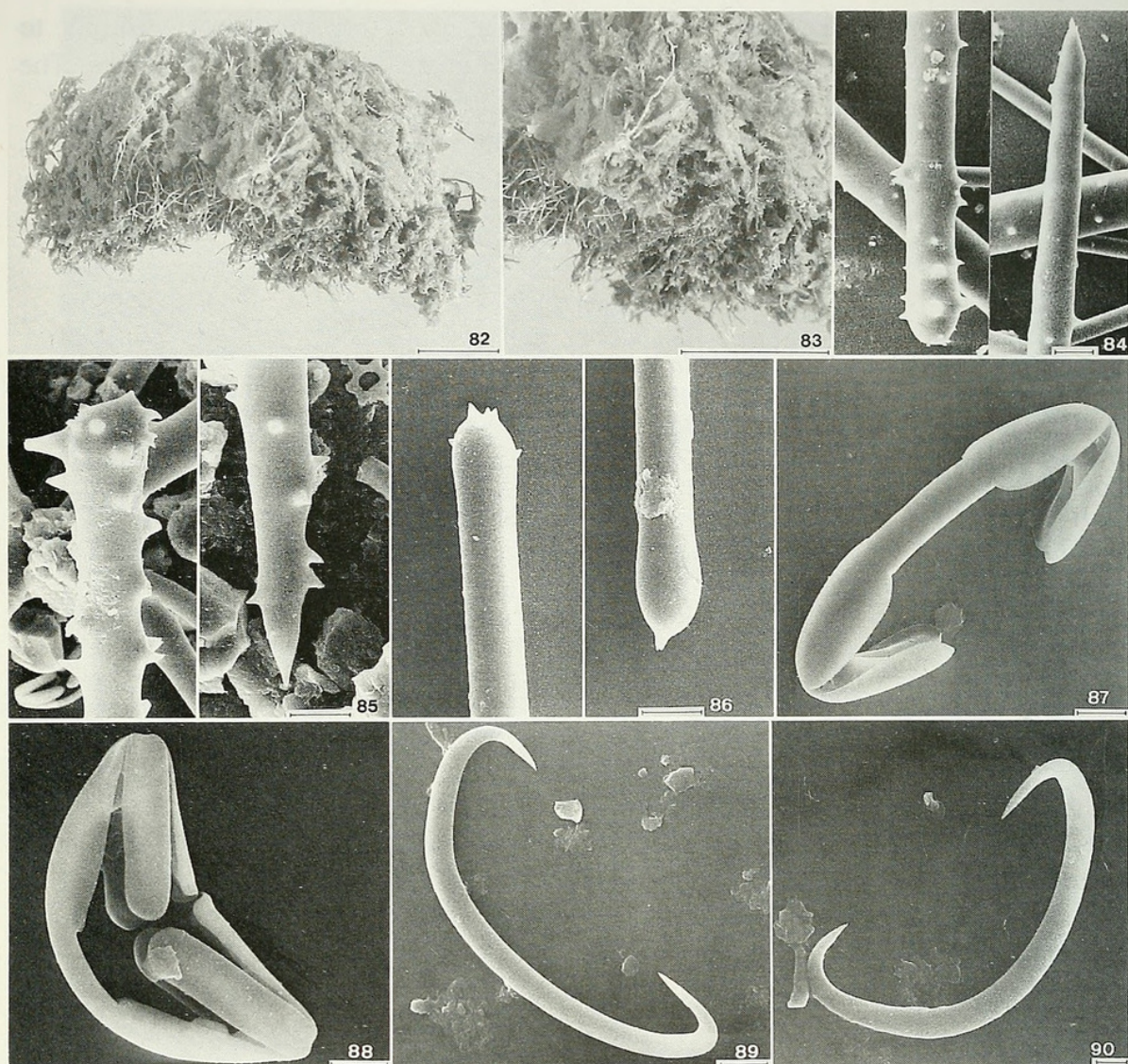
Distribution: Peru, 05°01'S 81°25'W.

Remarks: The characteristic curved chelas 2 make this new species distinct from any known species of the genus. Apart from these peculiar chelas, the new species shows similarities with *Myxilla massa* Ridley & Dendy, 1886 (cf. below), described from Chile. This species has only a single category of sigmas and the acanthostyles 1 are fully spined.

***Myxilla (Ectyomxilla) massa* Ridley & Dendy, 1886**

Myxilla mariana var. *massa* RIDLEY & DENDY, 1886: 473; 1887: 138, pl. xxvii, figs. 6, 6a-f.

MATERIAL STUDIED: BMNH 1887:5:2:95, HOLOTYPE of *M. mariana* var. *massa* Ridley & Dendy, 1886, Challenger Expedition, Station 311, off the south west coast of Patagonia, 52°45'S 73°46'W, 01.1876, 448 m; BMNH 1887:5:2:108, holotype of *M. massa* Ridley & Dendy, 1886, Challenger Expedition, Station 142, off Marion Island, 35°04'S 18°37'W, 12.1873, 274 m.



FIGS 82-90

Myxilla (Ectyomyxilla) dracula n.sp. 82 [holotype USNM 39351] encrusting specimen from Galapagos. 83, enlarged view of the surface. 84, acanthostyle 1 almost straight with only few strong spines. 85, acanthostyle 2 slightly bent abundantly spined. 86, anisotylotornotes with a few small spines at the apices. 87, spatuliferous anchorate isochela 1. 88, peculiarly incurved small isochela 2. 89, 90, sigmas 1 and 2, largely open, abruptly pointed. Scales: fig. 84 = 10µm; figs 85-87 = 5µm; figs. 88, 90 = 2µm.

Not represented in our material, so only a diagnosis is given:

Massive sponge. Loosely reticulated skeleton. Acanthostyles 1 fully spined, 400-420 by 10 µm. Acanthostyles 2 fully spined, 140-150 by 6 µm. Smooth tornotes 250-280 by 4.5 µm. Spatuliferous anchorate isochelas 1 and 2, 30-37 and 18 µm. Sigmas 45-56 µm.

Distribution: Chilean Patagonia, 52°S.

Remarks: As discussed above, *M. (E.) dracula* n.sp. is similar to *M. (E.) massa* but has strongly incurved isochelas and sparingly spined styles. *M. massa* was

synonymized with *M. mariana* Ridley & Dendy, 1886 from Marion Island (Indian Ocean) by KOLTUN (1964). We examined a slide made from the type specimen and found that a separate acanthostyles 2 category is not well differentiated. Also, the tornotes have rounded smooth oval heads instead of the mucronate ones of *M. massa*. We assume that these differences are evidence for specific distinctness.

?**Myxilla (Ectyomyxilla) tenuissima** (Thiele, 1905)

Hymedesmia tenuissima THIELE, 1905: 454, figs. 70a-f.

Ectyomyxilla tenuissima (Thiele, 1905); LÉVI, 1963: 36, fig. 39; DESQUEYROUX, 1976: 102.

No material examined, so only tentative remarks can be made:

Thinly encrusting sponge. Hymedesmioid skeleton or regular reticulation. Acanthostyles 1 180-290 by 10-15 μ m. Acanthostyles 2 100-150 by 7-10 μ m. Tornotes oxea-like, with microspined ends. Anchorate chelas 10-30 μ m. Sigmas: 45-48 μ m.

Distribution: Calbuco, Chilean coast, 41-42°S; South Africa, 31°14'S 16°36'E, 12-272 m.

Remarks: On paper this description comes close to *M. chilensis*, with as the only tangible difference the microspined condition of the tornotes. Type specimen is not extant at ZMB, for the time being this species must be considered as incertae sedis.

Subgenus **Stelodoryx** Topsent, 1904

Diagnosis: *Myxilla* with unguiferate instead of or in addition to spatulate anchorate chelae.

Myxilla (Stelodoryx) cribrigera Ridley & Dendy, 1886 (Figs. 91-98)

Myxilla cribrigera RIDLEY & DENDY, 1886: 472, 1887: 135, pl. xxvii, figs. 7, 7a,b.

Stelodoryx discoveryi BURTON, 1932: 316, fig. 28.

?*Myxilla verrucosa* BURTON, 1932: 312, text fig. 27; DESQUEYROUX, 1972: figs. 81-86; 1976: 101.

MATERIAL STUDIED: BMNH 1887:5:2:138, HOLOTYPE of *Myxilla cribrigera* Ridley & Dendy, 1886, Challenger Expedition, Stn. 306A, off the south-west coast of Patagonia, 48°27'S 74°30'W, 02.01.1876, 631 m; BMNH 1928:2:15:426, holotype of *Stelodoryx discoveryi* Burton, 1932, St. WS 88, Falkland Islands, 54°07'S 58°16'W, 06.04.1927, 96-127 m; MHNG 18969-18974: He 178, Seno de Otway, 53°00'S 71°30'W, 17.09.1972, 30 m; MNHNC 65, 50°43'S 76°08'W, 10.03.1978, 248 m; Vald. 66a, Punta Roja, 43°21'S 73°44'W, 24.05.1971, 25 m; Co 93-27, Quintupeu, 42°10'S 72°24'W, 25.03.1972, 25 m; Co 93-47, Pelluco, 41°30'S 72°54'W, 10.02.1992, 20 m; GA III 21, SEPBOB "Anton Bruun" Exped., 18B791C, Galapagos Islands, 00°37'S 90°51'W, 08.05.1966, 78 m.

DESCRIPTION

Several fragments and one specimen (figs. 91, 92) 21-27 x 17-19 and 32 x 23 mm. Sponge cylindrical, but the basal part is missing. Surface even, microhispid,

covered by a thin transparent membrane, in a continuous layer firmly attached. Terminal oscule, 3-7 mm diameter, from which diverge 4-5 aquiferous canals. Numerous small oscula, 1.5-3 mm diameter, are scattered on the surface.

Consistency: Soft and fragile, elastic.

Colour: Varying from light brown to dark-brown, in alcohol.

Skeleton: Ectosomal skeleton: arranged as palisade of bundles of tylotornotes and a continuous cover of spatuliferous anchorate isochelas.

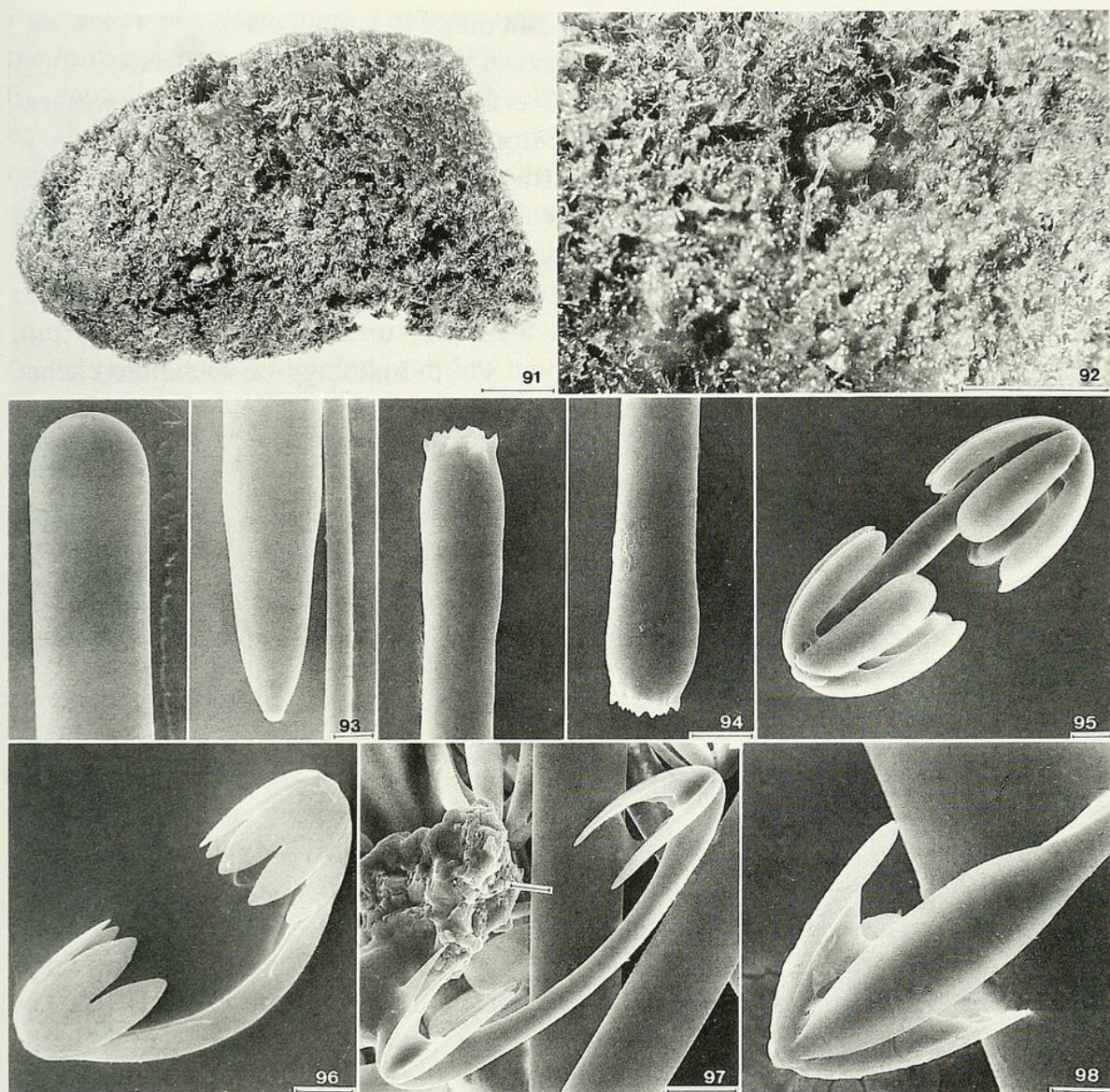
Choanosomal skeleton: isodictyal reticulation of polyspicular tracts of styles, ending by subectosomal bundles of styles passing through the surface (causing a hispid surface). Longitudinal tracts connected by transverse bundles of styles (3-4) or by single styles. Microscleres abundant.

Spicules (Table 13): Megasccleres: styles (fig. 93) smooth, slightly curved 345-632 x 8-24 μm .

TABLE 13

Spicule micrometries of *M. (Stelodoryx) cribriger*a Ridley & Dendy, 1886. *Myxilla cribriger*a Ridley & Dendy, 1886, BMNH 1887:5:2:138, holotype; *Stelodoryx discoveryi* Burton, 1932 BMNH 1928:2:15:426, holotype; from literature and remeasured. Specimens from Chile of *M. (S.) cribriger*a.

<i>Myxilla (Stelodoryx) cribriger</i> a R. & D., 1886	Styles	Tylotornotes	Isochelas 1 Isochelas 2
<i>M. cribriger</i> a R. & D. 1886 BMNH 1887:5:2:138 off sw coast Patagonia Remeasured	650 x 25 502-576-607 x 16-23-24	300 x 8 243-279-316 x 8	80 57-63-79 32-39-43
<i>Stelodoryx discoveryi</i> Burton, 1932 BMNH 1928:2:15:426 Falkland Islands Remeasured	225 x 6 324-351-373 x 8	165 x 5 227-238-251 x 8	35-45 not observed 36-47-57 40-46-49
He 178 Seno de Otway MNHNC 65 50°43'S 76°08'W	389-460-494 x 12-18-20 446-499-527 x 12-22-24	202-235-250 x 6-7-8 243-265-284 x 6-7-8	48-49-58 48-53-62 61-63-67 48-51-57
Vald. 66a Punta Roja Co 93-27 Quintupeu	345-405-470 x 12-15-16 454-476-494 x 6	214-233-307 x 6-8 182-193-198 x 6-8	49-57-64 48-60 51-60-67 35-42-48
Co 93.47 Pelluco Ga.III.21 18B791C 00°37'S 90°51'W	348-352-356 x 8-13-16 567-608-632 x 16-22-24	179-220-251 x 6-8 227-254-283 x 8	48-54-57 37-47-51 81-86-89 74-78-86



FIGS 91-98

Myxilla (Stelodoryx) cribrigera Ridley & Dendy, 1886. 91, fragment of a cylindrical specimen. 92, enlarged view of the surface. 93, smooth slightly curved styles. 94, tylotornotes smooth with equally swollen microspined cut-off apices. 95, 96, spatuliferous anchorate isochela 1. 97, unguiferous anchorate isochela 2. 98, terminal enlarged region of the apex. Scales: figs. 93, 97 = 10 μ m; figs. 94, 95, 98 = 5 μ m; fig. 96 = 2 μ m.

Tylotornotes (fig. 94) smooth, straight, with equal, slightly swollen microspined apices which have a characteristic "cut-off" shape, 179-307 x 6-8 μ m.

Microscleres: Spatuliferous anchorate isochelas 1 (figs. 95, 96) with slightly curved shaft and 5 to 9 spatuliferous teeth, parallel to each other, very common, forming a continuous layer on surface, 48-89 μ m. Unguiferous anchorate isochelas 2 (figs. 97, 98) less numerous, present only in the choanosome, shaft almost straight, with 5 teeth, the innermost alae visible only as slightly enlarged region of the shaft, 35-86 μ m.

Ecology: no data about substrate, 20-248 m.

Distribution: Galapagos, Chilean coast, 41°S - 53° S ; Falkland Islands.

Remarks: The conspecificity of *M. cribrigera* and *M. discoveryi* was established in a comparison of the slides made from both holotypes.

The unguiferous chelas are also described for *Myxilla verrucosa* Burton, 1932, which was described simultaneously with *M. discoveryi* both from the Falkland Islands. Differences are found in the spicule sizes (*M. verrucosa*: styles 240 x 8-18 µm, tornotes 160 x 7 µm, chelas 35 µm). DESQUEYROUX (1972) reported *M. verrucosa* from Golfo Corcovado: styles 250-400 x 8-21 µm, tornotes 170-240 x 7-8 µm, isochelas 33-66. There is not indication about the morphology of anchorate chelas. DESQUEYROUX (1976) reported *M. verrucosa* from San Pedro, Chile, but gave no description of her material. It is here left undecided whether *M. verrucosa* is a separate species.

Stelodoryx was erected on the possession of unguiferous chelas in combination with a stalked growth form. This combination is not found in the present species, but we assume that a stalked habit is an adaptation to special environmental conditions. In view of the widespread occurrence in many different groups of sponges, it is likely that this character has no supraspecific significance.

REVIEW OF THE FAMILY MYXILLIDAE

Remarks: The above given diagnosis of the family Myxillidae excludes traditional Myxillid genera, such as *Lissodendoryx* and *Ectydoryx*, which have arcuate chelas. These are united with the fistular genera *Coelosphaera* and *Forcepia*, which also have arcuate isochelas, into an emended family Coelosphaeridae. For a discussion and further arguments on this new assemblage cf. HAJDU *et al.* (1994). The major synapomorphy distinguishing the Myxillidae from the Coelosphaeridae is the anchorate condition of the chelas; other features are the more frequent spination of the ectosomal tornotes which are also predominantly oxete or strongylote rather than tylote.

Genera possessing birotulate chelas (*Amphiasterella* Dendy, 1924, *Hymetrochota* Topsent, 1904 (with synonym *Hymenotrocha* Burton, 1930), *Iotrochota* (with synonyms *Hiattrochota*, *Iotrochostyla* and *Iotrochopsamma*, all of DE LAUBENFELS, 1950, 1954, cf. VAN SOEST, 1987), *Plocamiancora* Topsent, 1927, and *Rotuloplocamia* Lévi, 1952) have traditionally been spread over various families of the Poecilosclerida (Desmacididae, Hymedesmiidae, Coelosphaeridae, Myxillidae and Microcionidae), see for example discussion in VAN SOEST (1987). However, the idea that birotulates have been developed only once and thus that all birotuliferous genera are monophyletic (suggested in HAJDU *et al.*, 1994) has considerable merit. The polydentate condition of the birotulate chelas reminds of the polydentate-unguiferous chelas of several Myxillid genera. Also in one genus, *Iotroata*, both birotulate and anchorate chelas are found. However, birotulates in a clearly *Antho*-like sponge as *Rotuloplocamia octoradiata* Lévi, 1952, almost birotulate-like palmate chelas of

Plocamiancora denticulata Topsent, 1928, or clearly anchorate-derived condition of the *Iotroata spinosa* (Lundbeck, 1905) (see SEM photo in VAN SOEST, 1987, plate I fig. 6), are indications that convergent development of the birotulate condition may be equally likely. Since no birotuliferous genera are represented in the se Pacific, we refrain from commenting upon their family assignment (excepting *Iotroata* which is a clear myxillid); we merely list them for future treatment.

The following genera are thought to belong to the new concept of Myxillidae:

Genus Desmacidon Bowerbank, 1864

Type species: *Spongia fruticosa* Montagu, 1818 (topotypical specimens examined).

Diagnosis: In the ectosome smooth oxete spicules are arranged in bouquets. Tracts of the same smooth oxete spicules form an isodictyal reticulation in the choanosome. Microscleres are spatuliferous anchorate isochelas and sigmas very similar in shape to those of *Myxilla*.

Remarks: The megascleres are assumed to be tornotes, which have replaced the usual styles in the choanosomal tracts. It is quite possible that *D. fruticosum* is a *Myxilla* which has lost its styles, and synonymy of these genera may be warranted. In the past, the genus has been in frequent use for a wide variety of sponges, most of which are not closely related to *D. fruticosum*.

Desmapsamma Burton, 1934

Type species: *Fibulia anchorata* Carter, 1882 (topotypical specimens examined).

Diagnosis: Ectosomal coat of sand grains, partly replacing the ectosomal bouquets of oxeads. Choanosomal skeleton a paucispicular isotropic reticulation of oxeads similar to those of the ectosome. Microscleres anchorate chelas and sigmas.

Remarks: Use of *Desmapsamma* as a subgeneric unit has merit in order to manage the many arenaceous species known to live in the southern oceans (e. g. WIEDENMAYER, 1989). This sponge is similar to *D. fruticosum* in most respects, but oxeads are thinner. Chelas and sigmas smaller. Synonymy of *Desmapsamma* and *Desmacidon* seems inescapable.

Ectyonancora Lévi, 1963

Type species: *E. flabellata* Lévi, 1963. (HOLOTYPE LBIMDCL 548, 549, examined)

Diagnosis: Smooth hastate/mucronate tornotes and an isotropic reticulation of thick acanthostrongyles echinated by thick acanthostyles. Chelas are robust, spatuliferous. No sigmas.

Remarks: The generic distinctness rests on the acanthostrongyles being different from the often blunt-ending spined styles of *Myxilla*. The use of this genus name so far is limited to South African waters (including Namibia and Kerguelen).

Hymenancora Lundbeck, 1910

Type species: *Leptosia umbellifera* Topsent, 1904 (not examined).

Diagnosis: Smooth strongyles as ectosomal spicules and hymedesmioid architecture, i.e. with acanthostyles erect on the substrate. The anchorate isochelas are unguiferous with 7-9 teeth.

Remarks: The genus is customarily assigned to Hymedesmiidae because of its thinly encrusting habit and skeletal architecture. Four species have been described under this genus name, all from cold deep waters.

Iotroata De Laubenfels, 1936 (junior synonym: *Iotaota* De Laubenfels, 1936).

Type species: *Iotrochota acanthostylifer* Stephens, 1916 (not examined).

Diagnosis: Smooth ectosomal tylotes. Isotropic reticulation of smooth or acanthose styles, occasionally oxeas. Chelas include both anchorates and birotulates. No sigmas.

Remarks: The birotulates are clearly derived from anchorates, as neighbouring teeth show evidence of being the product of subdivision of a former ala. Several North Atlantic species originally described under *Iotrochota* belong to this genus (cf. VAN SOEST 1987); at least one, *I. spinosa* (Lundbeck, 1905) (examined for this study), has only birotulates, no anchorates. It is confined to cold and deep water. Possibly, the genus needs to be united with *Hymetrochota* Topsent, 1904 (cf. below).

Melonanchora Carter, 1874

Type species: *M. elliptica* Carter, 1874 (topotypical specimen examined).

Diagnosis: Fistular growth form with a paper-like thin ectosome. Ectosomal smooth tylotes, choanosomal spicules are smooth styles. Microscleres melonchelas and anchorate chelas.

Remarks: The fistular growth form and ectosomal smooth tylotes make this genus similar to many Coelosphaeridae. However, the melonchelas are clearly derived from anchorate chelas, as the youngest growth stages of these are indeed perfect anchorates. Confined to cold and deep water.

Styloptilon Cabioch, 1968

Type species: *Styloptilon ancoratum* Cabioch, 1968 (examined).

This species is similar in spiculation to *Myxilla* but has a plumose rather than an isotropic skeleton. In view of the variability of the skeletal structure a separate

genus *Styloptilon* for species with plumose skeletons is not accepted as valid, but if there are more species like its type, then this can serve as a subgeneric unit.

Onychomyxilla Topsent, 1927

Type species: *Dendoryx pectinata* Topsent, 1892 (not examined).

Diagnosis: The ectosomal spicules are smooth tylotes; the choanosomal skeleton is an isotropic reticulation of acanthostyles echinated by smaller acanthostyles. The chelas are unguiferous verging towards birotulates, and there are no sigmas.

Remarks: The genus so far is monotypical and very close to *Myxilla* (*Ectomyxilla*) differing in the unguiferous condition of the chelas and the lack of sigmas. It is also close to *Myxilla* (*Stelodoryx*) differing in the possession of echinating acanthostyles. Finally, the peculiar condition of the chelas indicates that it may be close to *Iotroata* but differs from it in the possession of echinating acanthostyles.

Plocamissa Burton, 1935

Type species: *Plocamia igzo* De Laubenfels, 1930 (not examined).

Diagnosis: The ectosomal spicules are smooth tornotes; the choanosomal skeleton is "plocamiid", i.e. an isotropic basal reticulation of single acanthostrongyles echinated by long microspined styles. The chelas are spatuliferous anchorates.

Remarks: The family assignment rests on the presumed anchorate condition of the chelas, but it is otherwise similar to microcionids (genus *Antho*). The genus is monotypical, known only from the west coast of North America.

Pseudomyxilla Koltun, 1955 (with junior synonym *Stelotrochota* Bakus, 1966).

Type species: *P. vitiazi* Koltun, 1955 (not examined).

Diagnosis: Ectosomal tornotes and the choanosomal styles similar to those of the type of *Myxilla*; the chelas are unguiferous and there are no sigmas.

Remarks: The genus is very close to *Myxilla* (*Stelodoryx*) and should probably be considered synonymous. Species are described from Antarctic or Subantarctic waters, and from the west coast of North America.

CONCLUSIONS

Next to several well-defined genera (*Myxilla*, *Melonanchora*, *Iotroata*) there is a large number of smaller genera with dubious synapomorphies which need to be closely compared:

-*Desmacidon* + *Desmapsamma*: like *Myxilla* but lacking proper choanosomal megascleres different from the ectosomal ones.

-*Hymenancora* + *Onychomyxilla* + *Pseudomyxilla* : like *Myxilla* (*Stelodoryx*), but with echinating acanthostyles.

- *Ectyonancora* + *Plocamissa*: like *Antho* (Microcionidae) but with spatulate anchorate chelas

The following genera with anchorate chelas are excluded from the Myxillidae, and assigned to a separate family Crambeidae:

Crambe Vosmaer, 1887: no ectosomal tornotes.

Discorhabdella Dendy, 1924: ectosomal subtylostyles

Leptosiopsis Topsent, 1927: polytylote ectosomal styles

Monanchora Carter, 1883: ectosomal subtylostyles

Psammochela Dendy, 1896: no ectosomal tornotes.

KEY TO THE SUBGENERA AND SPECIES OF *Myxilla* OCCURRING ON THE SE. PACIFIC COAST

- 1 Single category of smooth styles. 2
- Two categories of styles: Larger spined or smooth styles. Smaller fully spined styles. Subgenus *Ectyomyxilla* 5
- 2 Styles slightly to strongly spined styles, 2 sizes of spatuliferous anchorate isochelas Subgenus *Myxilla* 3
- Smooth styles. 7
- 3 Spines on styles concentrated at the apices. Shaft largely smooth. 4
- Strongly spined styles all over *M. (Myxilla) caliciformis*
- 4 Sigma 1 small, from 20 to 35, sigma 2 from 10 to 20. . *M. (Myxilla) mexicensis*
- Sigmas 1 big, from 30 to 80, sigmas 2 from 20 to 30 *M. (Myxilla) mollis*
- 5 With mucronate tornotes, two categories of spatuliferous anchorate isochelas and one size of sigmas *M. (Ectyomyxilla) massa* 6
- With tylotornotes, one category of normal and one of peculiarly in-curved spatuliferous anchorate isochelas and two sizes of sigmas *M. (Ectyomyxilla) dracula*
- 6 Sigmas longer than 30 μ m. *M. (Ectyomyxilla) chilensis*
- Sigmas shorter than 30 μ m *M. (Ectyomyxilla) tenuissima*
- 7 A single category of asymmetrical spatuliferous anchorate chelas and a single category of sigmas *M. (Burtonanchora) asymmetrica*
- A single category of spatuliferous anchorate chelas, and one category of unguiferate anchorate chelas, without sigmas *M. (Stelodoryx) cribrigera*

Tedaniidae Ridley & Dendy, 1886

Diagnosis: Myxillina without microscleres other than onychaetes. Skeletal architecture variously isotropic, anisotropic, or plumose.

Tedania Gray, 1867

Synonyms: *Trachytedania* Ridley, 1884, *Tedaniopsis* Dendy, 1924, *Paratedania* Burton, 1929, *Oxytedania* Sarà, 1978).

Type species *Reniera digitata* Schmidt, 1862 (junior synonym of *Halichondria anhelans* Lieberkühn, 1859).

Diagnosis: Tedaniidae possessing morphologically distinct ectosomal and choanosomal megascleres. The type species has microspined tylotes as ectosomal spicules and smooth styles as choanosomal spicules.

Remarks: *Tedania anhelans* (Lieberkühn, 1859), originally described from the Mediterranean-Atlantic area, is a soft irregularly lobate sponge with rather variable colour (brownish, greenish, bluish) and smooth surface. Ectosomal spicules are tylotes of 140-300 by 2-7 μm with well developed microspined heads, arranged in bouquets and scattered singly in the peripheral region. Choanosomal spicules are smooth styles 170-280 by 5-11 μm arranged in a loose reticulation with square meshes. Microscleres are thin rugose asymmetrical onychaetes in the size range between 40 and 200 μm .

Closely similar species have been reported from almost all subtropical and tropical seas of the world. It is proposed here, in continuation of proposals made the previous genera, to acknowledge the existence of a complex of probably closely related species by erecting a nominal subgenus *Tedania* for them. Species assigned to *Tedania* s.s.: *T. anhelans* (Lieberkühn, 1859) (Mediterranean-Atlantic), *T. ignis* (Duchassaing & Michelotti, 1864) (Caribbean-Brazil), *Tedania tepitootehenuaensis* Desqueyroux-Faúndez, 1990 (Isla de Pascua), and about 40 further species described from all tropical and temperate seas of the world.

The genus *Trachytedania* Ridley, 1881 (with type species *T. spinata* Ridley, 1881) was differentiated from *Tedania* proper by the alleged spination of the choanosomal styles. Re-examination of Ridley's type slides revealed that only very few styles with spines are present; few authors have accepted the occasional spines on the styles as sufficient ground for upholding a separate genus. There is, however, a further difference with species of the subgenus *Tedania*: the ectosomal spicules differ rather strongly from *T. anhelans* in being mucronate-oxeote, without spination on the apices. The skeletal structure is very loose and no distinct meshes are recognized. It is proposed here to retain *Trachytedania* as a subgenus of *Tedania*.

Species assigned to this subgenus are: *Tedania spinata* (Ridley, 1881) (with junior synonym *Tedania murdochi* Topsent, 1904) (Magellan), *Tedania patagonica* (Ridley & Dendy, 1886) (with junior synonym *Tedania inflata* Sarà, 1978) (Magellan), *Tedania gurjanovae* Koltun, 1958 (Arctic), *Tedania microrhaphidiophora* Burton, 1935 (North Pacific and Arctic), *Tedania mucosa* Thiele, 1905 (with junior synonyms *T. fuegiensis* Thiele, 1905, *T. pectinicola* Thiele, 1905, and *T. excavata* Thiele, 1905) (Magellan, SE Pacific), and possibly *T. toxicalis* De Laubenfels, 1930 (cf. below).

The genus *Tedaniopsis* Dendy, 1924 (with type species *T. turbinata* Dendy, 1924) was erected because of the replacement of choanosomal styles by strongylotylotes. *T. turbinata* is an elaborate stalked species from New Zealand, related to *T. massa* in spicule sizes, form and skeletal structure. The structural spicules are thick

large strongylotylotes, differing from the often strongylote spicules of *T. massa*, but they are similar in size. Ectosomal spicules are thinner strongylotylotes with mucronate apices, often on one side provided with two rather than a single spine. The onychaetes 1 are long and thick, and have a clearly developed tyle. No further species with exactly similar spiculation have been described. However, the large sizes of the spicules and the irregular skeletal architecture unite the present species with several others, and accordingly it is proposed to recognize a distinct subgenus for them.

Species assigned are: *Tedania massa* Ridley & Dendy, 1886 (with junior synonyms *T. actiniformis* Ridley & Dendy, 1886 and *Tedania tantula* (Kirkpatrick, 1907 as *Oceanapia*)) (Antarctic, Magellan) *Tedania charcoti* Topsent, 1917 (Antarctic, Magellan, se Pacific) *Tedania infundibuliformis* Ridley & Dendy, 1886 (se Pacific) *Tedania tenuicapitata* Ridley, 1881 (Magellan, SE Pacific) *Tedania turbinata* (Dendy, 1924) (New Zealand) *Tedania oxedata* Topsent, 1917 (Antarctic) *Tedania vanhoeffeni* Hentschel, 1914 (Antarctic) *Tedania phacellina* Topsent, 1928 (deep water North Atlantic).

The genus *Paratedania* Burton, 1929 (with type species *Oceanapia tantula* Kirkpatrick, 1907, which is probably a junior synonym of *Tedania massa* Ridley & Dendy, 1886) was erected because of a densely packed layer of tangential megascleres, as opposed to the bouquet-type arrangement of all other Tedaniidae. *Oceanapia tantula* (persistently named *tarantula* by BURTON, 1929, 1932) is a lobate to erect sponge with smooth anisostrongyles as structural megascleres and tylotornotes with an occasional mucron at one of the apices. The tangential arrangement at the surface, however, was probably entirely induced by the periostracum of mollusc shells on which the specimens were found to be attached, and thus must be considered artifactual. BURTON (1932) withdrew this genus himself, and suggested that the type was a junior synonym of *Tedania massa*. Examination of type material of both revealed some differences in the shape of tornote endings (hastate in *T. massa*), but in view of the variability of this character, conspecificity of both is certainly possible. Both are also similar to *Tedania turbinata*, and accordingly *Paratedania* is considered a junior synonym of the subgenus *Tedaniopsis*.

The genus *Oxytedania* Sarà, 1978 (with type species *O. bifaria* Sarà, 1978) was erected for a species with the spicule combination of typical *Tedania* in addition to a reticulate skeleton of oxeads. The type specimen available to us for study did not contain any of the Tedaniid spicules described by Sarà. The skeletal architecture was typically that of the Haplosclerid family Niphatidae with multispicular tracts of oxeads in a tight reticulation. It is assumed that the genus is based on a contamination of *Tedania spinata* spicules in a niphatid specimen. Indications for this conclusion is not only our failure to find any *Tedania* - like spicules, but also the fact that Sarà not only pictures the oxeads as structural megascleres, but also styles of quite dissimilar size and form as a second category of structural megascleres. Two such different structural megasclere categories together in a single sponge are unlikely to occur in a tedaniid. Accordingly this genus is pronounced unrecognizable c.q. a junior synonym of *Tedania*.

Subgenus **Tedania** Gray, 1867:

Diagnosis: *Tedania* possessing smooth, relatively small styles, occasionally strongylote styles, as structural megascleres and microspined tylotes as ectosomal megascleres.

Tedania (Tedania) galapagensis n.sp.

(Figs. 99-104)

MATERIAL STUDIED: HOLOTYPE USNM 39355, MHNG 18975 GA III 5 SEPBOP "Anton Bruun" Cruise. 18B stat. 795D, Galapagos, 0°S 90°W, 78 m.

MATERIAL STUDIED FOR COMPARISON: USNM 21492, HOLOTYPE of *Tedania toxicalis*, de Laubenfels, 1930, Point Pinos, Pacific Grove, California, 07.1925, intertidal; USNM 21490, HOLOTYPE of *T. topsenti*, De Laubenfels, 1930, Pescadero Point, near Carmel, California, 07.1926, intertidal.

DESCRIPTION

Several small fragments (figs. 99, 100) sizes 7-12-35 x 10-15 x 2-3 mm. Surface smooth, covered by a thin membrane which is not detachable. Several small oscules 0.5-1 mm diameter, irregularly scattered. Small aquiferous cannals are visible under the membrane.

Consistency : fragile, very soft.

Colour: whitish to pinkish in alcohol.

Skeleton: Ectosomal: palisade of bundles of tylotes partially included in the membrane, and abundant onychaetes.

Choanosomal: tight meshed reticulation of short longitudinal tracts of smooth styles connected by tylotes and abundant free onychaetes.

Spicules (Table 14): Megascleres: Thin, smooth styles (fig. 101) slightly curved, 192-246 x 6-7 µm.

TABLE 14

Spicule micrometries of *Tedania (Tedania) galapagensis* n. sp. *T. toxicalis* de Laubenfels, 1932. USNM 21492 holotype; from literature and remeasured. Specimen from Galapagos of *T. (T.) galapagensis* n. sp.

<i>T. (Tedania)</i> <i>galapagensis</i> n.sp.	Styles	Tylotes	Onychaetes 1 Onychaetes 2
<i>T. toxicalis</i> de Laubenfels, 1932			
Holotype USNM 21492 Point Pinos	100-200 x 2-7	200 x 8-14	150 not observed
Holotype USNM 39355 Ga.III.5-18B795D 00°S90°W	192-226-246 x 6	179-198-234 x 3	173-188-205 x 2 61-78-93 x 0.5-1

Smooth tylotes (fig. 102) with oval microspined apices, regular diameter, 179-234 x 3-4 μm .

Microscleres: Onychaetes 1 (fig. 103) 173-205 x 2 μm and 2 (fig. 104) 61-93 μm x 0.5-1 μm , strongly spined.

Ecology: 78 m.

Distribution: Galapagos Islands.

Remarks: *T. toxicalis* De Laubenfels, 1930 from California on paper sounds close to this species, but re-examination of the type revealed some clear differences. The choanosomal skeleton is a loose plumoreticulation with single or two spicules interconnecting longitudinal tracts of 5-7 spicules thick; the styles have a swollen head and frequently have one or two spines. The ectosomal spicules are smooth tylotornotes with elongate heads. In fact, these characters make it likely that *T. toxicalis* belongs in the subgenus *Trachytдания*.

Other *Tedania* (*Tedania*) species in the E Pacific are *T. tepitootehenuaensis* Desqueyroux-Faúndez, 1990, which has predominantly styles as choanosomal megascleres, and *T. "nigrescens"* *sensu* GREEN & GÓMEZ (1986) which has onychaetes not exceeding 100 μm and thinner tylotes: 153-173 x 3-4.5 μm . *T. nigrescens* (Schmidt, 1862) is a junior synonym of the Mediterranean-Atlantic *T. anhelans*.

Tedania topsenti De Laubenfels, 1930, is a second species from California. It differs quite substantially from *T. toxicalis* in having much more robust megascleres: smooth styles averaging 360 by 14 μm and smooth fusiform tylotes averaging 330 by 9 μm and. Onychaetes are rare, possibly absent. The species could indeed be a *Kirkpatrickia* as DE LAUBENFELS suggested himself.

***Tedania* (*Tedania*) *tepitootehenuaensis* Desqueyroux-Faúndez, 1990**

Tedania tepitootehenuaensis DESQUEYROUX-FAUNDEZ, 1990: 383, figs. 43-48.

MATERIAL STUDIED: MHNG 972229, HOLOTYPE of *T. tepitootehenuaensis*, Hotu Iti, 10.1972, 0 m.

Not represented in the present material, so only a brief diagnosis is given: is a species from Easter Island with small thin styles, 240-272 x 4-9 μm , straight tylotes, oval microspined apices. Onychaetes are of two sizes: 160-285 x 2-3 μm and 48-76 x 0.6 μm . It differs from *T. mucosa* from the Chilean coast, in having smooth, thin styles and straight tornotes with oval heads instead of mucronate. It is probably an endemic species.

Subgenus *Tedaniopsis*:

Diagnosis: *Tedania* with relatively long thick, smooth styles, occasionally modified to anisostrongyles or anisoxeas, as structural megascleres. Ectosomal megascleres are mucronate or tylostrongylote tornotes occasionally with one or more vestigial spines.

Tedania (Tedaniopsis) charcoti Topsent, 1907

(Figs. 105-110)

Tedania charcoti TOPSENT, 1907: 69; 1908: 30, pl. I, fig. 3, pl. III, fig. 3, pl. V, fig. 6; Capon *et al.*, 1993: 263.

Tedania tenuicapitata sensu RIDLEY & DENDY, 1887: 52, pl. XI, fig. 5 [non: *T. tenuicapitata* Ridley, 1881].

Tedania armata SARA, 1978: 51, figs. 30, 31.

MATERIAL STUDIED: LBIMDT 679, HOLOTYPE of *Tedania charcoti* Topsent, 1907, Ile Wandel, Port Charcot, Stn. 346, 65°04'S 64°00'W, 30.03.1904, 40 m; MHNG 18845: He 3 Seno de Otway, 53°00'S 71°30'W, 16.09.1972, 260 m; MHNG 18848: He 114 Caleta Hale, 47°57'S 74°39'W, 01.10.1972, 40-50 m, MHNG 10689: CHI.9, Zapallar, 32°33'S 71°43'W, 02.08.1985, 300 m; usnm 39353, MHNG 18854, ZMA 10982: Ga.III.3, SEPBOP "Anton Bruun" Exped., 18A 697, Chile, 35°27'S 73°01'W, 1966, 290-450 m.

MATERIAL STUDIED FOR COMPARISON: BMNH 1887:5:2:260, specimen of *Tedania tenuicapitata*, Challenger Expedition, Stn. 311, off the south west coast of Patagonia, 52°45'S 73°46'W, 11.01.1876, 448 m; Ant 3, PARATYPE of *Tedania armata* Sarà, 1978, Spedizione Antartica Italiana, 1882, Staz. VI, Tierra del Fuego, leg. D. Vinciguerra, .

DESCRIPTION

Sponge irregularly massive to lamellate (figs. 105, 106) size 27-30-60 x 19-40-50 mm. Surface conulose, mammilate or minutely tuberculate. Oscules numerous, 1-5 mm diameter. Surface uneven and punctate, with a thin membrane.

Consistency: Soft, elastic, fragile.

Colour: Grayish to brownish in alcohol.

Skeleton: Ectosomal: A palisade of tornotes, free and in bundles. Abundant free onychaetes

Choanosomal: Loose, irregular and confused reticulation of longitudinal tracts of styles, and abundant free onychaetes.

Spicules (Table 15): Megascleres: Long, slightly bent, smooth styles (fig.107), 361-445 x 8-16 µm.

Smooth mucronate straight tornotes (fig. 108), regular diameter, 202-300 x 4-6 µm.

Microscleres: Onychaetes 1 (fig. 109) 112-392 x 2 µm and 2 (fig. 110) 35-97x 0.5 µm., straight, with numerous strong spines.

Ecology: Substrat, stones, 40-500 m.

Distribution: Chilean coast, 32°S - 53° S; east of the Strait of Magellan, 51°S 65°W, as *T. tenuicapitata sensu* RIDLEY & DENDY, 1887, Tierra del Fuego; 54°S 59°W, as *T. armata* Sarà, 1978; Wandel Island, Port Charcot, 65°S 64°W as *T. charcoti*, Topsent, 1907.

Remarks: This species is close to *T. tenuicapitata*, but differs clearly in having much shorter onychaetes 1; the tornotes are also different, having a more pronounced pointed end at one or both ends. The Challenger specimen assigned to *tenuicapitata* conforms to the type of *T. charcoti* and our specimens.

TABLE 15

Spicule micrometries of *Tedania* (*Tedaniopsis*) *charcoti* Topsent. *T. charcoti* Topsent, 1907, HOLOTYPE LBIMDT 679; *T. armata* Sarà, 1978 Ant 3, PARATYPE; from literature and remeasured. Specimens from Chile of *T. (T.) charcoti*.

<i>T. (Tedaniopsis)</i> <i>charcoti</i> Topsent, 1907	Styles	Tornotes	Onychaetes 1 Onychaetes 2
<i>T. charcoti</i> Topsent, 1907 I Wandel. Port Charcot HOLOTYPE LBIMDT 679	420-450 x 13	305-340 x 10	250-265 90-120
Remeasured	410-463-549 x 10-12	314-325-353 x 8-10-12	235-264-365 98-116-127
Sàrà, 1978 T. del Fuego PARATYPE ANT.3	300-350 x 6-8	240 x 2-3	200-280 150-180
Remeasured	308-336-373 x 8	219-243-267 x 4	162-174-194 97-126-146
He 3 Seno de Otway	361-374-401 x 9	202-233-271 x 6	112-148-176 48-59-70
He 114 Caleta Hale	298-339-355 x 8-9-10	208-237-259 x 6	160-177-204 35-44-54
CHI-9 Zapallar	377-403-426 x 9-11-13	262-274-291 x 5-6	147-271-393 38-60-96
GA III 3a USNM 39353 18A697 32°27'S 73°01'W	381-415-445 x 12-14-16	251-269-300 x 4	154-206-292 65-83-97

***Tedania* (*Tedaniopsis*) *tenuicapitata* Ridley, 1881**

(Figs. 111-116)

Tedania tenuicapitata RIDLEY, 1881: 124, pl. xi, fig. 1.

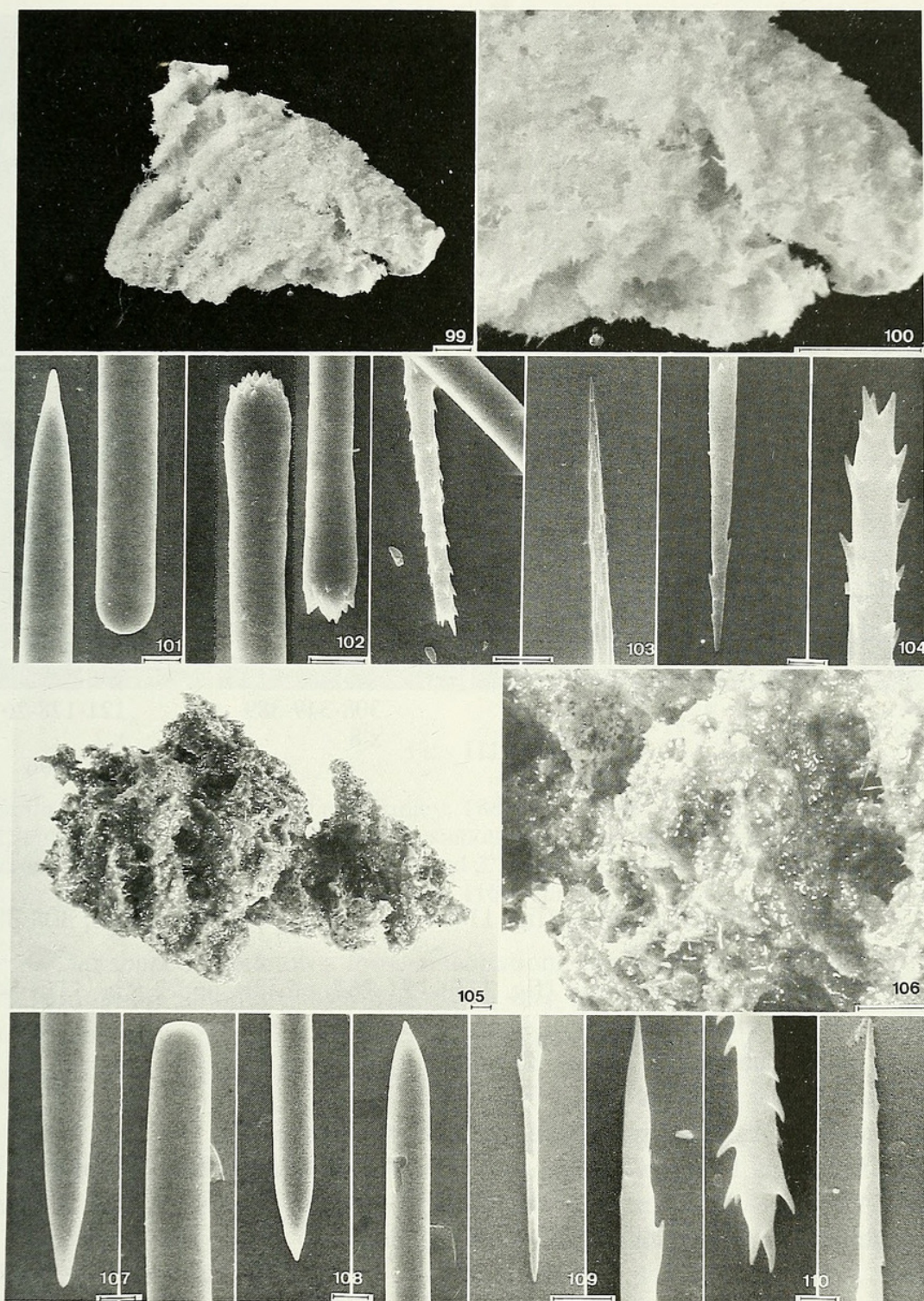
[non *Tedania tenuicapitata sensu* RIDLEY & DENDY, 1887: 52, pl. xi, fig. 5, = *T. charcoti* Topsent, 1907].

MATERIAL STUDIED: BMNH:1879:12:27:12, HOLOTYPE of *Tedania tenuicapitata* Ridley, 1881, Trinidad Channel, 50°00'S 75°00'W, near Madre de Dios Island, off SW Patagonia, 54.8 m. MHNG 18976, Chi. 22, 52°42'S 75°23'W, 30 m.

MATERIAL STUDIED FOR COMPARISON: LBIMDT 679, HOLOTYPE of *Tedania charcoti* Topsent, 1907, Ile Wandel, Port Charcot, Stn. 346, 65°04'S 64°00'W, 30.03.1904, 40 m; BMNH 1887:5:2:260, specimen de *Tedania tenuicapitata sensu* Ridley & Dendy, 1887, Challenger Exped. Stn. 311, off the south west coast of Patagonia, 52°45'S 73°46'W, 21.01.1876, 448 m.

Description: One specimen 27 x 14 x 10 mm (figs 111, 112) and a fragment of a massive sponge. Surface smooth, covered by a thin membrane. Small oscules (1.5-2 mm diameter) irregularly scattered.

Consistency: Very soft and fragile.



FIGS 99-110. *Tedania (Tedania) galapagensis* n.sp. 99, holotype, USNM 39355, fragment of specimen. 100, enlarged view of the surface. 101, smooth styles slightly curved. 102, smooth tylotes with oval microspined apices. 103, 104, onychaetes 1 and 2 strongly spined. Scales: figs. 101-103 = 5 μ m; fig. 104 = 1 μ m. *Tedania (Tedaniopsis) charcoti* Topsent, 1907. 105, massive specimen from Caleta Hale. 106, enlarged view of the surface. 107, long smooth slightly bent styles, 108, smooth mucronate tornotes. 109, 110, onychaetes 1 and 2. Scales: figs. 107, 108 = 5 μ m; fig. 109 = 2 μ m; fig. 110 = 1 μ m.

Colour: Whitish to light beige in alcohol.

Skeleton: Ectosomal, dense palisade of smooth tornotes and onychaetes.

Choanosomal: Loose and irregular to slightly isotropic reticulation of styles and onychaetes.

Spicules (Table 16) Megascleres: long, smooth styles (fig.113), slightly bent, 437-543 x 8-16 µm.

TABLE 16

Spicule micrometries of: *Tedania (Tedaniopsis) tenuicapitata* Ridley, 1881, HOLOTYPE BMNH 1879:12:27:12; from literature and remeasured. Specimen from Chile of *T. (T.) tenuicapitata*.

<i>T. (Tedaniopsis) tenuicapitata</i> Ridley, 1881	Styles	Tomotes	Onychaetes 1 Onychaetes 2
<i>T. tenuicapitata</i> Ridley, 1881 BMNH 1879:12:27:12 Trinidad Channel Remeasured	380 x 12.7	279 x 6	316
	296-340-387 x 12-13	185-221-270 x 4	132-263-327 52-64-75
CHI-22 52°42'S 74°23'W	437-500-543 x 8-14-16	308-349-389 x 8	121-178-267 x 2 54-76-96 x 1

Smooth mucronate tornotes (fig. 114) with strongly pointed apices, 308-389 x 8 µm.

Microscleres: Onychaetes 1 (fig. 115) 121-267 x 2 µm, and 2 (fig. 116) 54-96 x 0.5µm, strongly spined.

Ecology: Pebbles and stones, 30 m.

Distribution: Chilean coast, 50°S - 52°S.

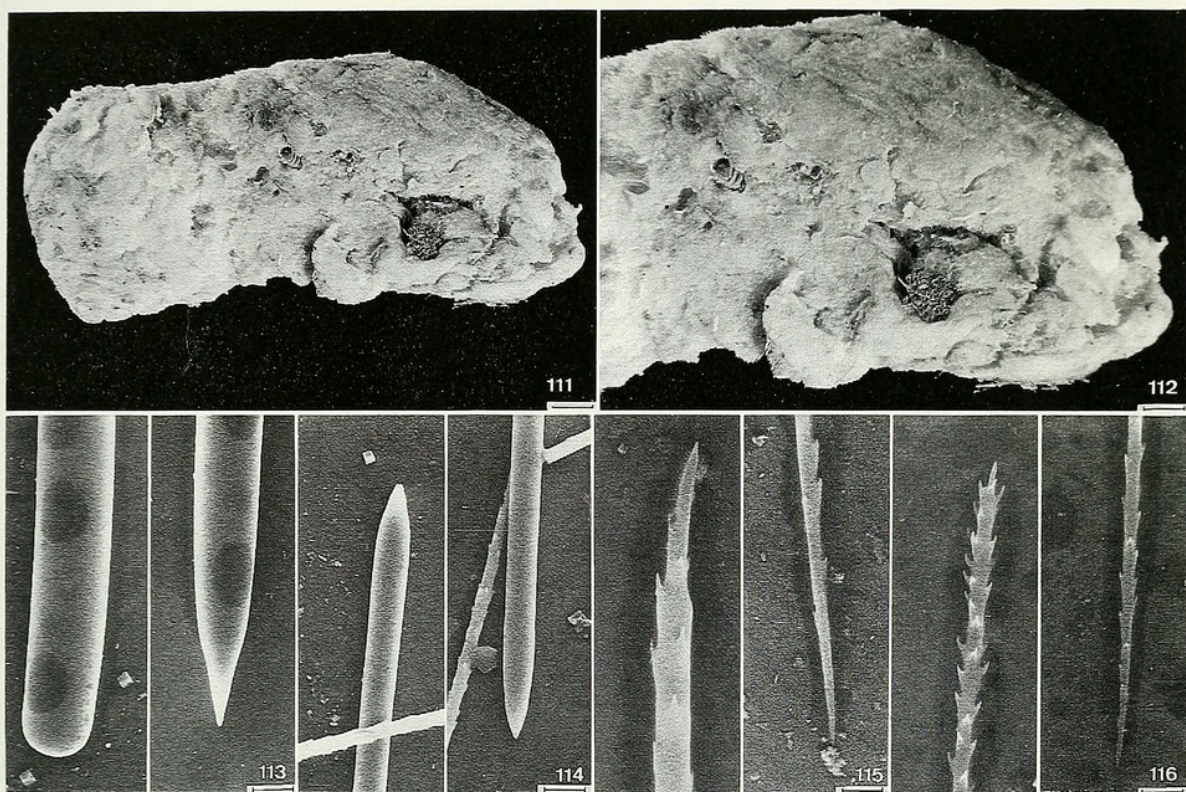
Remarks: As discussed above, the nearest relative is *T. charcoti*, which has smaller onychaetes 1, *T. tenuicapitata sensu* Ridley & Dendy, 1887 conforms to that species. A further closely related species is *T. infundibuliformis* Ridley & Dendy, 1886 which is cup-shaped, but similar in spiculation.

***Tedania (Tedaniopsis) infundibuliformis* Ridley & Dendy, 1886**

Tedania infundibuliformis RIDLEY & DENDY, 1886: 335; 1887: 54, pl. xi, fig. 1, pl. xxix, figs. 2, 2a.

MATERIAL STUDIED: BMNH 1887:5:2:151, HOLOTYPE of *Tedania infundibuliformis* Ridley & Dendy, 1886, Challenger Expedition, Stn. 311, off the south west coast of Patagonia, 52°45'S 73°46'W, 21.01.1876, 448 m.

Not represented in our material so only a brief diagnosis can be given:



FIGS 111-116

Tedania (Tedaniopsis) tenuicapitata Ridley, 1881. 111, massive specimen from 52°S 75°W. 112, enlarged view of the surface. 113, smooth style, strongly pointed apex. 114, smooth mucronate tornote. 115, 116, onychaetes 1 and 2, strongly spined. Scales: figs. 113, 114 = 5µm; figs. 115, 116 = 2µm.

Cup-shaped. Skeleton a loose reticulation. Long smooth styles averaging 500 by 12 µm. Short, smooth tylotes with a few very faint spines on the heads, 280 by 6 µm. Onychaete 1, 360 µm, onychaetes 2, 60-70 µm.

Distribution: Chilean coast 52°S.

Subgenus **Trachytedania** Ridley, 1881

Diagnosis: *Tedania* of which the structural spicules are relatively small styles at least some of which show (a few) spines. The ectosomal megascleres are mucronate or oxeote tornotes.

Tedania (Trachytedania) mucosa Thiele, 1905 (Figs 117-128)

Tedania mucosa THIELE, 1905: 430, figs. 50a-c.; BURTON, 1934: 27.

Tedania excavata THIELE, 1905: 431, figs. 51a-c.

Tedania pectinicola THIELE, 1905: 432, figs. 52a-d.

Tedania fuegiensis THIELE, 1905: 433, figs. 53a-d.

MATERIAL STUDIED: ZMB 3284, HOLOTYPE of *Tedania mucosa* Thiele, 1905, Calbuco, 41°46'S 73°08'W; ZMB 3285, HOLOTYPE of *T. excavata* Thiele, 1905, Calbuco; ZMB 3286, HOLOTYPE of *T. pectinicola* Thiele, 1905, Calbuco; ZMB 3287, HOLOTYPE of *T. fuegiensis* Thiele, 1905, Cabo del Espiritu Santo, 52°58'S 68°36'W, Tierra del Fuego; MHNG 18857, 18977: He 25, 179, Seno de Otway, 53°00'S 71°30'W, 17.09.1972, 30 m; MHNG 18858, 10690: He 61, 127, Caleta Hale, 47°57'S 74°37'W, 01.10.1972, 40-50 m; MHNG 18860: He 189, Bahia Scotchwell, 55°28'S 68°07'W, 10.1972, 50-95 m; MHNG 18861: VALD. 10.1, Canal Quinchao, 42°25'S 72°35'W; MHNG 18859, 18876: VALD. 46.1, 53.2, Palena 43°45'S 73°00'W, 10.01.1972, 10-15 m; MHNG 18862: VALD. 53.5a, Islote Caleta Lobato, 45°05'S 74°47'W, 10-15 m; MHNG 18863, 18873, 18983, 18993: Mont. 8, 9, 10, 30, San Antonio, 32°48'S 71°23'W, 10-15 m; MHNG 18864, 18823: Co.8, VALD. 14.1, Quetalmahue, 41°32'S 73°52'W; MHNG 18999, 18865, 19228, 19229: Co.93.38, 48, 49, 53, Pelluco, 41°30'S 72°54'W; MHNG 18866, 19230, 19231: MNHNC 25, 36, 57, 43°15'S 74°32'W, 266 m; MHNG 10691: Por.2, Pullinque, 39°33'S 72°11'W, 7 m,

DESCRIPTION

Several specimens and fragments. Sponge polymorphe, massive, (figs. 117, 118) irregularly roundish and lobate to lamellate and tubiforme 77-112 x 55-84 x 28-89 mm, or repent and sending out cylindrical processes or stolon-like branches (figs. 119, 120), 40-55 x 37-59 x 9-17 mm. Surface uneven, tuberculate and conulose. Minutely and entirely punctate and with numerous aquiferous canals visible at the surface. Oscules at the summit of the conules, irregularly scattered on the surface, or arranged along the edge of branches.

Consistency: Hard, slightly compressible.

Colour: Brown to reddish alive, colouring the alcohol when fixed and producing great amounts of mucus.

Skeleton: Ectosomal skeleton: a perpendicular palisade of densely arranged mucronate tornotes. Onychaetes are numerous.

Choanosomal skeleton: Loose or dense reticulation of tracts of styles. Onychaetes abundant, free or in bundles.

Spicules (Table 17): Megascleres: Smooth styles (figs. 121, [122 holotype]) slightly bent, with sharp to roundish apex, 163-320 x 5-16 µm.

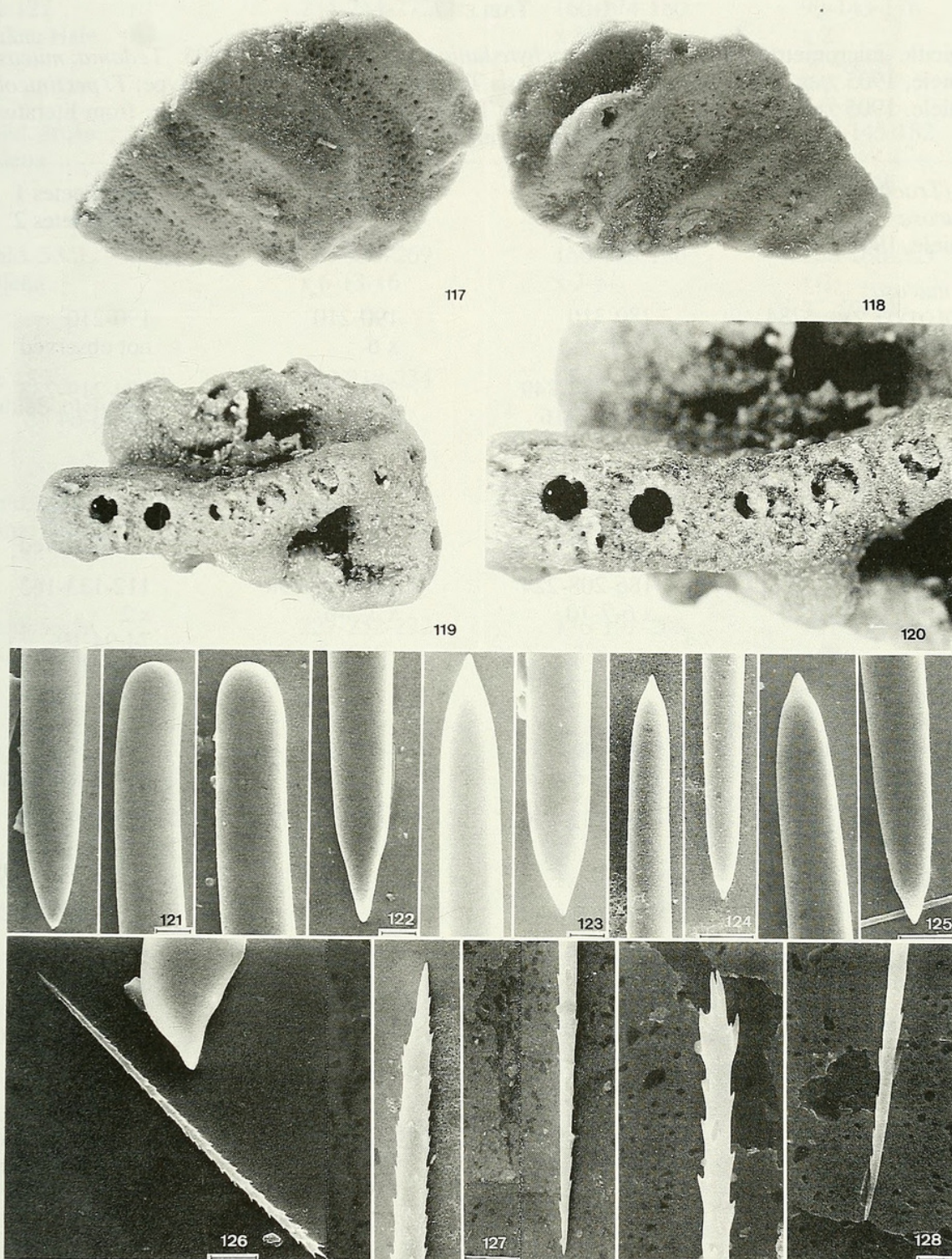
Mucronate tornotes (figs. [123 holotype] 124, 125) regular diameter, 128-267 x 3-6 µm.

Microscleres: Onychaetes 1, 99-235 x 2 µm and 2, 26-99 x 1 µm, (figs. [126 holotype] 127, [128 holotype]) some of them present a tyle near the base.

Ecology: On stones, 7-266 m depth.

Distribution: Chilean coast, 32°S - 55°S; Argentinan Atlantic coast up mouth of Rio de La Plata (37°S), BURTON, 1934.

Remarks: THIELE (1905) described four species based on minor differences which were found to be partly incorrect: *T. excavata* was stated to have a digitate growth form and to possess only a single onychaete category. *T. pectinicola* would be encrusting and have a single onychaete category with distinct tyles ("tylonychaetes"). *T. fuegiensis* would have styles with occasional spines. We found a large variation in growth forms among specimens all of which in their skeletal characteristics were indistinguishable from the type of *T. mucosa*. All type specimens of the four Thiele species had two categories of onychaetes, and minor differences in spicule sizes



FIGS 117-128. *Tedania* (*Trachytedania*) *mucosa* Thiele, 1905. 117, 118, lamellate to massive specimen, from 43°S Chile, and enlarged view of the surface. 119, 120, repent specimen, and enlarged view of the surface. 121, smooth styles, slightly bent. 122, ZMB 3284, holotype of *T. mucosa* Thiele, 1905 from Calbuco, smooth styles. 123, ZMB 3286 holotype, of *T. pectinicola* Thiele, 1905 from Calbuco, mucronate smooth tornotes. 124, Chilean specimen from Calbuco, mucronate smooth tornote. 125, ZMB 3284, mucronate smooth tornotes. 126, ZMB 3286, onychaete 1. 127, Chilean specimen from Calbuco, onychaete 1. 128, ZMB 3284, onychaetes 2.

Scales: fig. 121 = 10µm; figs. 122-127 = 5µm; fig. 128 = 2µm.

TABLE 17

Spicule micrometries of *Tedania* (*Trachytodania*) *mucosa* Thiele, 1905. *Tedania mucosa* Thiele, 1905 ZMB 3284 holotype; *T. fuegiensis* Thiele, 1905 ZMB 3287 holotype; *T. pectinicola* Thiele, 1905 ZMB 3286 holotype; *T. excavata* Thiele, 1905 ZMB 3285 holotype; from literature and remeasured. Specimens from Chile of *T. (T.) mucosa*.

<i>T. (Trachytodania)</i> <i>mucosa</i> Thiele, 1905	Styles	Tornotes	Onychaetes 1 Onychaetes 2
<i>T. mucosa</i> HOLOTYPE ZMB 3284 Calbuco	280-310 x 14	190-210 x 6	190-210 not observed
Remeasured	304-364-349 x 12-13-16	208-213-220 x 5-6-7	204-219-233 40-53-64
<i>T. fuegiensis</i> Thiele, 1905 HOLOTYPE ZMB 3287 T. del Fuego	200-225 x 8	160-200 y 6	120 not observed
Remeasured	186-208-224 x 6-7-10	176-179-198 x 3-5-6	112-133-163 x 2 74-94-10 x 0.5-1
<i>T. pectinicola</i> Thiele, 1905 HOLOTYPE ZMB 3286 Calbuco	240 x 8	160 x 5	140 not observed
Remeasured	205-225-246 x 6	147-158-173 x 3	102-119-134 x 2 45-73-93 x 1
<i>T. excavata</i> HOLOTYPE ZMB 3285 Calbuco	240 x 13-15	150 x 6	190 not observed
Remeasured	208-253-275 x 10-12-13	157-178-192 x 6	122-155-186 x 2 58-78-99 x 1
He 25 Seno De Otway	251-370-413 x 8	194-246-267 x 4	105-156-235 x 2 49-74-97 x 1
He 179 Seno De Otway	275-299-320 x 10-12-13	166-207-234 x 3-6	157-194-230 x 2 35-54-83 x 1
He 61 Caleta Hale	202-232-246 x 6-9-13	163-178-192 x 3-5-6	106-149-189 x 2 26-65-99 x 1

He 127 Caleta Hale	234-244-272 x 6-9-13	160-174-180 x 5-6	99-143-176 x 2 35-44-51 x 1
Vald. 46.1a Palena	202-247-278 x 13-14-16	163-178-192 x 3-6	112-145-182 x 2 45-70-99 x 1
Vald. 53.2 Palena	163-237-269 x 6-13-16	150-170-186 x 3-6	106-160-205 x 2 32-59-99 x 1
He 189 BahiaScotchwell	199-218-234 x 6-10-12	152-167-180 x 4-5	109-154-183 x 2 31-42-74 x 1
Vald. 10.1 Canal Quinchao	230-252-272 x 6-9-10	186-201-224 x 3-4-6	102-144-179 x 2 29-52-86 x 1
Vald. 53.5a I. Caleta Lobato	227-252-272 x 6-7-10	176-193-208 x 3-5	121-171-192 x 2 31-39-51 x 1
Mont. 8 San Antonio	230-243-260 x 6-7-8	180-189-198 x 5-6	154-161-166 x 2 32-43-61 x 1
Mont. 9 San Antonio	228-244-262 x 9-10-12	186-206-221 x 6	144-175-198 x 2 48-51-58 x 1
Mont. 10 San Antonio	170-189-205 x 5-6	128-148-160 x 3	102-113-144 x 2 29-44-70 x 1
Co. 8 Quetalmahue	237-254-270 x 10	179-199-214 x 6	125-155-176 x 2 43-51-70 x 1
Co. 93-48 Pelluco	220-237-256 qx 6-8-10	178-209-251 x 6	138-155-176 x 2 38-64 x 1
Co. 93.49 Pelluco	237-256-282 x 6-8-10	182-215-246 x 6	160-170-176 x 2 35-44-64 x 1

Co. 93.53 Pelluco	269-306-326 x 10	202-207-211 x 6	208-218-224 x 2 38-48-64 x 1
MNHNC.25 43°15'S 74°32'W	218-237-254 x 8-13-16	163-173-208 x 5-6	134-163-192 x 2 35-42-47 x 1
MNHNC.36 43°15'S 74°32'W	224-241-256 x 10-12-13	157-171-208 x 5-6	80-115-179 x 2 35-40-45 x 1
MNHNC.57 43°15'S 74°32'W	210-240-256 x 10-12-16	166-173-182 x 6	86-122-144 x 2 35-40-45 x 1
Por. 2 Pullinque	201-229-246 x 5-6	179-192-208 x 3	99-131-166 x 2 35-44-51 x 1

reported by Thiele could not be substantiated in remeasured series of spicules in slides made from the four types. Occasional spines were found in several specimens, including the type of *T. mucosa*. It is clear to us that all four are part of the same rather variable species.

T. fuegiensis sensu SARÀ, 1978 is conspecific with *T. spinata*.

T. mucosa is similar to *T. spinata* (Ridley, 1881), but it has clearly thicker, more robust styles, and the skeleton is denser and more confused.

Tedania (Trachytodania) spinata (Ridley, 1881)

(Figs. 129-134)

Trachytodania spinata RIDLEY, 1881:122. pl. x, fig. 10.

Tedania murchisoni TOPSENT, 1913: 629, pl. v, fig. 5.

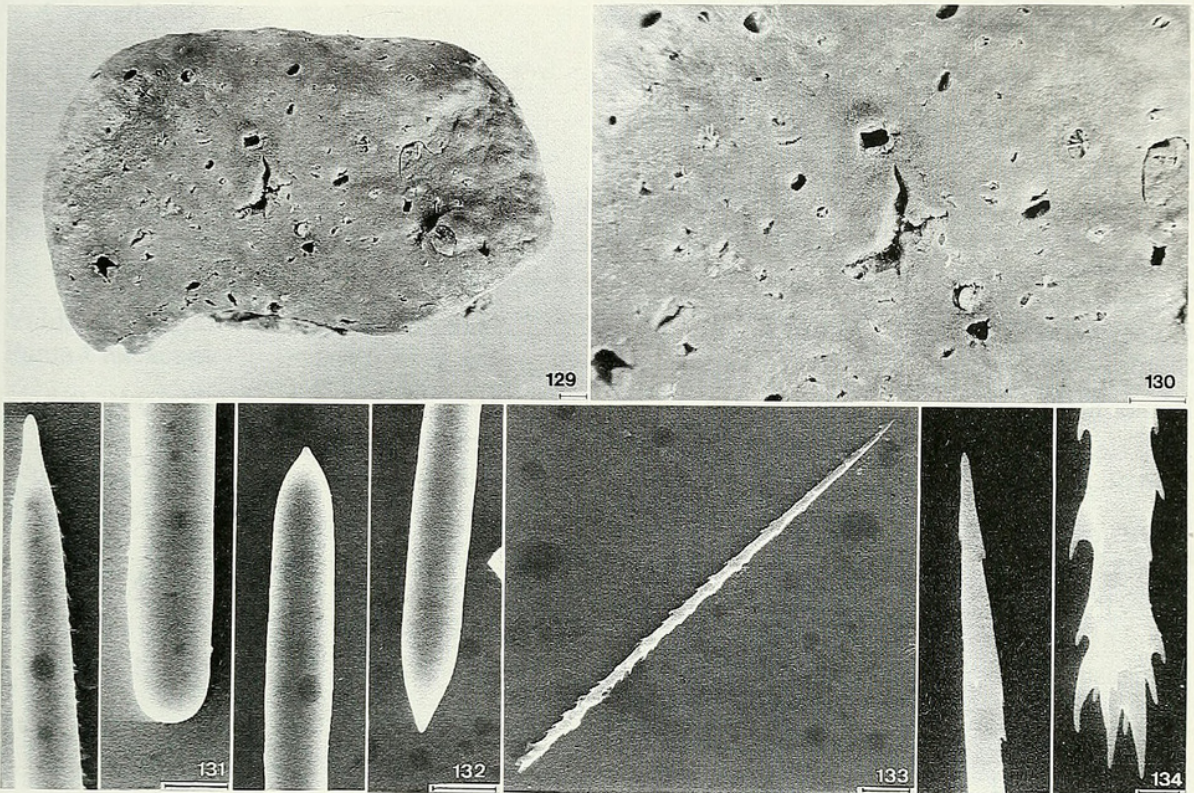
Tedania corticata SARA, 1978: 56, figs.34-35

Tedania fuegiensis sensu Sara, 1978 [non: *Tedania fuegiensis* Thiele, 1905: 50 = *T. mucosa*]

Tedania laminariae SARA, 1978: 54, figs. 32, 33.

MATERIAL STUDIED: BMNH:1879:12:27:9, HOLOTYPE of *Tedania (Trachytodania) spinata* Ridley, 1881, Portland Bay, 50°15'S 74°44'W, Chili (opposite the chief island of Madre de Dios Archipelago) 18.8 m; LBIMDT 1591, HOLOTYPE of *Tedania murchisoni* Topsent, 1913, Stn. 118, Stanley, Falkland Islands, 01.02.1904, 20 m; SAI 7, PARATYPE of *Tedania corticata* Sara, 1978 Spedizione Antartica Italiana, 1882 (locality and date not precised), SAI 1, 8, *Tedania fuegiensis sensu* Sara, 1978, Spedizione Antartica Italiana, 1882, (locality and date not precised); C-75, PARATYPE of *Tedania laminariae* Sara, 1978, Exped. 7, AMF MARES, GRST SAI, Bahia Golondrina, Ushuaia, 54°49'S 68°16'W, 16.01.1974, on the beach, Sarà coll.; MHNG 18877, 19232-19234: HE 15, 43, 63, 69, Puerto Caracciolo, 50°26'S 75°09'W, 09.10.1972, 25 m; MHNG 18878, 19235, 19236: HE 30, 40, 50, Isla Madre de Dios, Caleta Henry, 50°00'S 75°19'W, 6-28 m; MHNG 18825: HE 39, Puerto Eden, 49°10'S 74°23'W, 05.10.1972, 20 m; MHNG 18826: VALD. 1, Punta Caucacura, 43°08'S 73°30'W, 16.01.1972, 20 m; MHNG 18827:

VALD. 5, Estero Quinchao, 42°32'S 73°26'W, 15.01.1972, 10 m; MHNG 18832: VALD. 22.1, Compu, 42°52'S 73°33'W, 14.12.1971, 15 m; MHNG 18836: VALD. 32, Linao, 41°57'S 73°33'W, 27.06.1971, 15 m; MHNG 18837: VALD. 43, Quintupeu, 42°10'S 72°24'W, 23.07.1971, 10 m; MHNG 18864: VALD. 51, Corral, 39°52'S 73°25'W, 29.03.1981, 10 m; MHNG 18855: Co.9, Bahia de Ancud, 41°50'S 73°47'W, 11.1983, 10 m; MHNG 18868: Co. 93.34, Pelluco, 41°30'S 72°54'W, 09.12.1992, 15 m; MHNG 18869: MNHNC 28c, Golfo Corcovado, Off Morro Yeli, 43°31'S 73°03'W, 30.05.1966, 69 m, MHNG 10692: POR. 14, Quetalmahue, 41°50'S 73°52'W, 04.1984, 10-15 m.



FIGS 129-134

Tedania (Trachytodania) spinata (Ridley, 1881) 129, massive specimen from Puerto Eden. 130, enlarged view of the surface. 131, small smooth styles. 132, smooth mucronate tornotes. 133, 134, onychaetes 1 and 2, strongly spined. Scales: figs. 131-133 = 5µm; fig. 134 = 1µm.

DESCRIPTION

Massive sponge (figs. 129, 130): 82-115 x 30-84 mm. Surface smooth, covered by a translucent membrane, which is darker than the choanosome. Oscules, 2-3 mm diameter, irregularly scattered.

Consistency: Compact, soft, compressible.

Colour: Surface dark gray, internally brownish to grayish.

Skeleton: Surface, dense perpendicular palisade of tornotes reinforced by the terminal part of styles and abundant onychaetes.

TABLE 18

Spicule micrometries of: *Tedania* (*Trachytodania*) *spinata* (Ridley, 1881). *Trachytodania spinata* Ridley 1881 BMNH 1879:12:27:9 holotype; *T. murchisoni* Topsent, 1913 LBIMDT 1591 holotype; *T. corticata* Sarà, 1978 SAI-7, paratype; *T. fuegiensis* sensu Sarà, 1978 SAI-8, specimen from Tierra del Fuego; *T. laminariae* Sarà, 1978 C-75 paratype from Ushuaia; from literature and remeasured. Specimens from Chile of *T. (T.) spinata*.

MNHNC.25 <i>T. (Trachytodania)</i> <i>spinata</i> (Ridley, 1881)	218-237-254 Styles	163-173-208 Tornotes	134-163-192 Onychaetes 1 Onychaetes 2
<i>Trachytodania spinata</i> Ridley, 1881 BMNH 1879:12:27:9 Portland bay Remeasured	165 x 6 148-159-163 x 4-5	177-187 x 4 148-167-191 x 3-4	152 117-131-150 x 2
<i>T. murchisoni</i> Topsent, 1913 Holotype LBIMDT 1591 Stanley Remeasured	225-250 x 7-10 171-216-240 x 8-10	200-240 x 5-6 191-208-230 x 4	40-175 109-140-168 x 2 47-78 0.5
<i>T. corticata</i> Sarà, 1978 Paratype SAI-7 Remeasured	200-240 x 5-7 218-229-257	200-240 x 2-5 200-222-242	100-240 136-181-210 x 2
<i>T. fuegiensis</i> sensu SARÀ, 1978 SAI-8	200-240 x 6-10	160-200 x 4-6	100-200
<i>T. laminariae</i> Sarà, 1978 Paratype C-75 Ushuaia Remeasured	150-200-260 x 2-4-6 190-209-240 x 5-6-7	180-200 x 1-3-4 180-193-200 x 4-6	80-200 x 0.5-1 115-122-150 x 0.5-1 38-48-60 x 0.5-1
He 15 Puerto Caracciolo	217-240-256 x 3-7-10	172-185-230 x 3-6	115-162-201 x 2 29-61-90 x 1
He 43 Puerto Caracciolo	192-214-237 x 6-8-10	122-167-214 x 3-5-6	106-148-214 x 2 48-62-73
He 63 Puerto Caracciolo	195-236-262 x 3-6	202-222-234 x 3	106-127-147 x 2 38-63-99 x 1

He 69 Puerto Caracciolo	214-239-266 x 6-7-10	154-180-221 x 3-6	106-144-186 x 2 32-62-99 x 1
He 30 Isla Madre de Dios	205-239-272 x 5-6	179-203-230 x 3-5	112-131-157 x 2 Absent
He 40 Isla Madre de Dios	208-224-246 x 3-4-5	192-206-283 x 3-4-5	128-199-154 x 2 Absent
He 50 Isla Madre de Dios	240-257-275 x 6-8-10	189-203-234 x 3	189-209-214 x 2 Absent
He 39 Puerto Edén	161-219-253 x 3-5-6	186-199-214 x 3-6	128-155-195 x 2 Absent
Vald. 1 Punta Cauacura	189-214-227 x 6-7-10	153-165-170 x 3	99-119-144 x 2 32-43-73 x 0.5
Vald. 5 Estero Quinchao	211-248-277 x 6-8-9	191-209-242 x 4	152-154-171 x 2 35-49-81 x 1
Vald. 22-1 Compu	189-206-221 x 6-7-10	150-163-179 x 3-4-5	93-115-157 x 2 38-50-89 x 1
Vald. 32 Linao	230-251-259 x 6-7-10	198-210-230 x 3-4-6	144-157-166 x 2 Absent
Vald. 43 Quintupeu	230-251-275 x 6-7-10	166-193-221 x 3	128-174-202 x 2 35-52-93 x 1
Vald. 51 Corral	240-246-278 x 6-7-10	198-215-230 x 3	147-171-189 x 2 32-57-99 x 1
Co.9 Bahia de Ancud	224-242-256 x 6-8-10	170-184-201 x 3-5-6	93-134-160 x 2 32-43-54 x 1
Co.93-34 Pelluco	230-251-307 x 6-7-10	186-201-214 x 3-4-6	112-159-192 x 2 Absent

MNHNC 28c	214-227-234	160-167-170	96-124-144
Golfo Corcovado	x 6-9-10	x 3	51-55-70
			x 1
Por.14	208-243-284	182-201-214	128-163-228
Quetalmahue	x 6-8-10	x 3-5-6	x 2
			35-43-86
			x 1

Choanosomal: Loose, irregular to isotropic reticulation of longitudinal (3-4 spicules) and transversal (2-3 spicules) tracts of smooth styles. Abundant free and in bundles onychaetes.

Spicules (Table 18): Megascleres: predominantly relatively small smooth styles (fig. 131) with occasionally one or a few at the base spines, 161-284 x 3-10 μm .

Smooth mucronate tornotes (fig. 132) abruptly pointed, 122-283 x 3-6 μm .

Microscleres: Onychaetes 1 (fig. 133) 93-228 x 2 μm , and 2 (fig. 134) 29-99 x 0.5 μm length, straight, strongly spined.

Ecology: Stones pebbles, sand, 10-69 m.

Distribution: Chilean coast, 39°S - 50°S, Atlantic coast, 50°-54°S, Falkland Islands.

Remarks: RIDLEY (1881) emphasized the presence of spines on the heads of the styles when describing *T. spinata*, but re-examination of the type specimen by BURTON (1932) and by us failed to reveal any but the faintest and rarest of spines in Ridley's material. Such occasional spines are found in many species of *Tedania* and not worthy of emphasis.

The type specimens of *T. murdochi* Topsent, 1904, *T. corticata* Sarà, 1978 and *T. laminariae* Sarà, 1978 were re-examined and could not be separated from *T. spinata*, on skeletal structure, spicule sizes and form, so their conspecificity is likely.

T. toxicalis De Laubenfels, 1930 (cf. above) from California is a close relative, also possessing styles with vestigial spines. It differs from *T. spinata* in having tylotornotes in stead of mucronate tornotes; onychaetes 2 are distinctly longer in *T. toxicalis* (100-130 μm).

***Tedania* (Trachytedania) patagonica** Ridley & Dendy, 1886

Trachytedania patagonica RIDLEY & DENDY, 1886:336; 1887: 57, pl.xxiii, figs. 6, 6a-c.

? *Tedania biraphidora* BOURY-ESNAULT, 1973: 281, fig. 36.

Tedania inflata SARÀ, 1978: 59, figs. 36, 37.

MATERIAL STUDIED: SAI 5, PARATYPE of *Tedania inflata* Sarà, 1978, Spedizione Antartica Italiana, Patagonia.

Not represented in our material, so only a brief diagnosis is given here:

Massive sponge, soft and fragile. Surface uneven and hispid. Skeleton as a loose isodictyal network. Spicules: Styles fully spined all over, 350 x 13 μm . Oxeotornotes 245 x 7 μm . Onychaetes 100-200 μm .

Distribution: Chilean coast, 50°S, Patagonia, Brazil, 24°S (?).

If a separate genus for *Tedania* with spined styles would have needed to be erected, then this species would much more deserve to be in that genus than *T. spinata*. To date, this is the only known species of *Tedania* with fully spined styles.

KEY TO THE SUBGENERA AND SPECIES OF *Tedania* OF THE SE PACIFIC COAST

- 1 Long (from 300 to 700 μm) thick smooth styles, tornotes of diverse shapes *Subgenus Tedaniopsis* 2
- Short (from 150 to 300 μm) to relatively short styles. 3
- 2 Tornotes tylotornotes. *T. (Tedaniopsis) infundibuliformis*
- Tornotes mucronate or oxotornotes 4
- 3 Smooth styles, tylotornotes with microspined apices. *Subgenus Tedania* . . . 8
- Smooth or spined styles. With oxeote tornotes or mucronate tornotes *Subgenus Trachytedania* 6
- 4 With oxotornotes, long onychaetes 1 (800 μm) small onychaetes 2 (80 μm). *T. (Tedaniopsis) massa*
- With mucronate tornotes, onychaetes 1 up 400 μm , onychaetes 2 up 100 μm 5
- 5 Onychaetes 2 occasionally "tylonychaetes". Chile, S.W. Atlantic and Antarctic. *Tedania (Tedaniopsis) charcoti*
- Onychaetes 2 not "tylonychaetes". Chile (50-52°S) *T. (Tedaniopsis) tenuicapitata*
- 6 Smooth styles with occasional spines, smooth mucronate tornotes. 7
- Styles fully spined, smooth oxeote tornotes. *T. (Trachytedania) patagonica*
- 7 Thin styles (from 3 to 10 μm), Chilean, S.W. Atlantic, Falkland Islands sponge. *T. (Trachytedania) spinata*
- Thicker, robust styles from 6 to 16 μm , Chilean, S.W. Atlantic sponge *T. (Trachytedania) mucosa*
- 8 Tylotes oval spined apices, from 190 to 250 μm , Onychaetes 1 from 160 to 285 μm , onychaetes 2 from 48 to 76 μm . Easter Island sponge *T. (Tedania) tepitootehenuaensis*
- Tylotes from 197 to 234 μm . Onychaetes 1 from 197 to 234 μm , onychaetes 2 from 60 to 90 μm . Galapagos sponge. *T. (Tedania) galapagensis*

REVIEW OF THE FAMILY TEDANIIDAE

Further genera assigned to the Tedaniidae, but not represented in the present material are the following:

Genus **Tedanione** Wilson, 1894

Type species *T. foetida* Wilson, 1894 (topotypical specimen examined).

Diagnosis: Tedaniidae with smooth strongyles as the only megascleres. Microscleres as usual onychaetes in single or two size classes.

Remarks: *Tedanione foetida* Wilson, 1894 (junior synonym *Hemitedania baki* Van Soest, 1984) from the Caribbean is a thinly encrusting cryptic sponge, with a loosely plumose skeleton. The major synapomorphy is the possession of a single type of megasclere, viz. smooth strongyles. In this respect, the genus is similar to *Hemitedania*, which, however, has sharply pointed oxeas as megascleres. The onychaetes of *foetida* often have distinct tyles, a feature emphasized by VAN SOEST, 1984, but now thought to be of little significance because of widespread occurrence in various unrelated Tedaniidae. Since at least a second species of *Tedanione*, *T. wilsoni* Dendy, 1922 exists, the genus is considered valid.

Genus **Hemitedania** Hallmann, 1914

Synonym: *Tedaniopsamma* Burton, 1934

Type species *Amorphina anonyma* Carter, 1886 (type specimen examined).

Diagnosis: Tedaniidae with sharp pointed oxeas as the only megascleres. Microscleres as usual onychaetes.

Remarks: *Hemitedania anonyma* (Carter, 1886) from South Australia is an elaborate sponge containing a large quantity of sand grains. It is one of the "sand sponges", i.e. sponges of various families of sponges which apparently replaced parts or whole of their skeleton by sand grains (WIEDENMAYER, 1989), and the possibility cannot be excluded that the choanosomal styles have become lost, while the ectosomal oxea-like tornotes have been retained. The genus is monotypical, although *Hemitedania baki* Van Soest, 1984, was reported from the Caribbean and a *Hemitedania* spec. from West Africa by VAN SOEST, 1993; both records, however, very probably concern *Tedanione foetida*. In view of its deviating characters it is proposed to keep the genus as valid and separate from *Tedanione*.

Tedaniopsamma Burton, 1934 (with type species *Hircinia flabellopalmeta* Carter, 1885: 113 (holotype figured in Von Lendenfeld, 1889 as *Sigmatella*) (not examined) is a probable synonym of *Hemitedania*. *T. flabellopalmeta* is also a sand sponge, and its tedaniid nature has not been established with certainty, because the spicules, including the "raphides" have never been properly described or figured. If these raphides are indeed onychaetes, then the species would fall to *Hemitedania* on account of its curved 180 µm long oxeas/strongyles (due to their thinness the exact nature has not become clear) and sand cored fibres. A second species of *Tedaniopsamma* described by VACELET & VASSEUR (1971), *T. arenosa*, appears to be a normal *Tedania* (*Tedania*).

Three more genera have been associated with the family, viz. *Kirkpatrickia* Topsent, 1912, *Tedaniophorbas* De Laubenfels, 1936 and *Tedandoryx* De Laubenfels, 1954. However, the type species of these genera do not possess onychaetes, and the two latter have chelas. They belong to other families of the Poecilosclerida: *Kirkpatrickia* goes to Anchinoidae because of its surface areoles; *Tedaniophorbas* is a probable junior synonym of *Megaciella* (family Iophonidae), and *Tedandoryx* either is a Myxillidae, or possibly represents a commonplace *Tedania* (*Tedania*) contaminated with some arcuate isochelas.

To summarize, the family Tedaniidae comprises three valid genera, *Tedania* (with subgenera *Tedania*, *Trachytedania* and *Tedaniopsis*), *Tedanione*, and *Hemitedania*.

DISCUSSION

SYSTEMATICS

The three genera treated here were previously considered members of a loosely defined giant family Myxillidae. *Tedania* was more often than the other two genera, separated into a family of its own (Tedaniidae) because of its lack of chelas and its possession of onychaetes. For inexplicable reasons, *Iophon* did not receive the same appreciation although in its peculiar bipocilla and its palmate anisochelas it had strongly deviating characters, too. The proposal (HAJDU *et al.* 1994) to put these three genera in three different families is here supported, because it increases the internal consistency of the poecilosclerid families.

Judged on characters other than the anchorate chelas the family Crambeidae is not an obvious sistergroup of Myxillidae. Relationships within the suborder Myxillina still need to be further evaluated. It has been postulated by HAJDU *et al.* (1994) that the arcuate chela is plesiomorphous, which means that families with arcuate chelas (Coelosphaeridae, Crellidae, Anchinoidae, Hymedesmiidae) need additional defining characters, and cannot be considered closely related by the possession of the arcuate condition. The latter three families share similar surface structures, the pore sieves, which indicates they might form a monophyletic group. Those three families as well as Coelosphaeridae and Myxillidae share the possession of diactinal ectosomal megascleres (as opposed to the monactinal ones in the family Crambeidae), which is tentatively assumed to indicate that Crambeidae fall outside the five family group.

To test these ideas a preliminary character analysis of some major Poecilosclerid families was performed.

The following families were studied: Mycalidae (outgroup), Microcionidae (to seek support for the Microcionid nature of Iophonidae), Iophonidae, Myxillidae, Tedaniidae, Coelosphaeridae *sensu* HAJDU *et al.* 1994 (to investigate whether they are close to Myxillidae), Crambeidae, Hymedesmiidae, Crellidae and Anchinoidae (to see whether arcuate and anchorate chela morphology is convergent with other morphological characters).

The following characters and states were distinguished:

1. Chela morphology (with states: absent, palmate, arcuate and anchorate)
2. Ectosomal megascleres (with states: absent, monactinal and diactinal)
3. Spination of ectosomal megascleres (with states: absent and present; outgroup is scored as "?")
4. Echinating acanthostyles (with states: absent and present)
5. Choanosomal reticulation (with states: plumose, anisotropic and isodictyal)
6. Sigmas (with states: present and absent)
7. Toxas (with states: present and absent)
8. Pore sieves (with states: absent and present)

The matrix of families and character states scores was analyzed with PAUP 3.1 (SWOFFORD, 1993), using the heuristics and unweighted characters option. The result was a single tree of 18 steps length (consistency index 0.667, retention index 0.684, rescaled consistency index 0.456). This tree is depicted in Fig. 135. Only characters 6 and 8 had a consistency of 1.00, indicating a lot of conflicting character distributions and it is stressed here that this result is considered tentative.

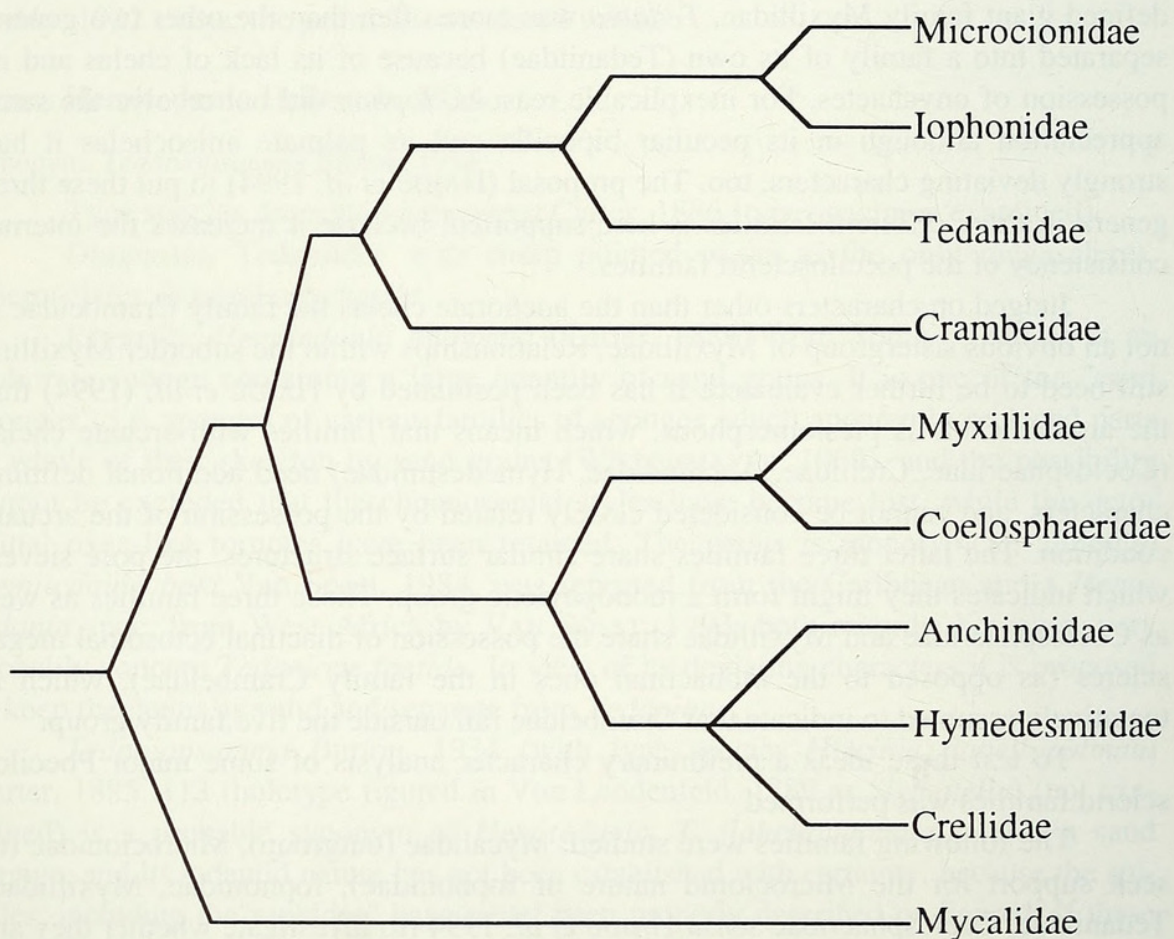


FIG. 135

Cladogram obtained by treating the matrix of families and character states in Table 19. Tree CI = 0.667, RI = 0684, RCI = 0456.

Iophonidae is indeed the sister group of Microcionidae (but Raspailiidae was not included in the analysis), Myxillidae and Coelosphaeridae are also sister groups, clearly separated from the closely related family group Hymedesmiidae-Crellidae-Anchinoidae. The position of Crambeidae and Tedaniidae on the branch of Microcionidae-Iophonidae indicates the lack of support for a clear association of these families with the "myxilline" group. There is only a single character shared with the Iophonidae-Microcionidae group (absence of sigmas), but no character is shared between Tedaniidae-Crambeidae and the "myxilline" group. Their position remains problematical.

BIOGEOGRAPHY

The biogeography of Chilean sponges was treated extensively in previous papers by one of us (DESQUEYROUX-FAUNDEZ & MOYANO, 1989, DESQUEYROUX-FAUNDEZ, 1994), as well as by older authors (e.g. EKMAN, 1953; BRIGGS, 1974). A study of Magellanic-Antarctic sponge relationships was performed by SARÀ (1992). From these studies two remaining questions are apparent:

- the existence of more than a single area along the coast of Chile
- the relationship and origin of the Chilean sponge fauna

Below, we will discuss to what extent our monographic treatments of the three genera contribute to solving these questions.

The genus *Iophon* has a predominantly coldwater distribution, with only few species recorded from the tropical or subtropical regions (VAN SOEST, 1994). In our study it is reconfirmed that *Iophon lamella* and *I. ostiamagna* are genuine endemics of the tropical-subtropical East Pacific. The other species reported here conform to the general cold water distribution by being confined to the SE Pacific and (in the case of *I. proximum*) to the area on both sides of South America. Endemism in this genus seems to indicate the existence of two areas along the coasts of Chile, viz. 20°-42°S (*Iophon proximum*) and 43°-53°S (*I. timidum* and *I. chilense*). Since so many more species of *Iophon* are found in the Southern Ocean and along the coasts of Antarctica, and relatively few in the Arctic and boreal waters, it is likely that the genus originated in the seas surrounding the southern continents.

The genus *Myxilla* is cosmopolitan but also has a predominance in cold water (VAN SOEST, 1994). Since this is a very large genus, with almost certainly some distinct subgeneric groups, a further analysis will have to demonstrate whether all the records from tropical regions are indeed *Myxilla*. We can here record at least one species, *M. (Myxilla) mexicensis*, from the Galapagos Islands, with characters similar to that of the type species. Another species from the Galapagos is *M. (Stelodoryx) cribrigera*. Two further tropical records are *M. (Myxilla) asymmetrica* n. sp. and *Myxilla (Ectyomyxilla) dracula* n. sp. from Peru, but there were collected in deep water (200-600 m). The *Myxilla* distributions do not support a subdivision of a northern and a southern Chilean area of endemism separated at about 42°S, most species being confined to the tropics or to both sides of southern South America. One species, *M. (Stelodoryx) cribrigera* occurs over the whole study area. The subgeneric

units of *Myxilla* used here are not likely to represent monophyletic groupings. Thus their distributions cannot provide us with firm clues as to their origin. However, *Myxilla* species in the study area (and also in neighbouring areas of the Southern Ocean), with the exception of *M. (M.) mexicensis* have "loose" skeletons with a tendency to form ill-defined plumoreticulate architecture. Styles often have only a few spines. These characters may indicate supraspecific endemism in the southern oceans. The *Myxilla* species of the Arctic-boreal regions are not well-studied, but an obvious close relationship with southern ocean *Myxilla* is not apparent.

The genus *Tedania* is considered to have originated in the Antarctic-Antiboreal regions (VAN SOEST, 1994), because most species have been reported from these parts of the world. As indicated above, the tropical and subtropical regions contain *Tedania* species with very similar characteristics, which by some authors are considered members of a single cosmopolitan species (*T. anhelans*), or a complex of closely related sibling species. From the Galapagos we describe here also a member of this complex, *Tedania (Tedania) galapagensis*, while in a previous study of sponges of Isla de Pascua (DESQUEYROUX-FAUNDEZ, 1990) a further species from the study area was reported. The other *Tedania* species from the area belong to clearly different subgeneric units, and their distributions are limited to both sides of southern South America. Like the *Myxilla* distributions they confirm the existence of a Magellan area on both sides of South America (EKMAN, 1953, BRIGGS, 1974), but do not present evidence for a northern Chilean area of endemism. Some of the Arctic-boreal *Tedania* belong to the subgeneric units occurring in the study area, but their number is limited.

In summary: endemism in the tropical region including the Galapagos fauna and tropical continental faunas is clearly present in all three genera. The Chile-Peru and Magellan regions are not clearly separated in the three genera, although *Iophon* shows some evidence of the existence of these two separate areas. The close relationship with faunas of Antarctica and other Southern Ocean regions is clear for all three. The Arctic-boreal regions also show close relationships with the study area, but most (sub) generic units appear poorer in species number. This perhaps indicates a southern origin.

EKMAN (1953) and BRIGGS (1974) maintain that the Chilean fauna despite is high degree of endemism is closely similar to that of the Pacific coast of North America, with many species the same in both regions. VERMEIJ (1991) postulates a Transequatorial interchange of north and south East Pacific faunas during the Pliocene, following the gradual closure of the Panama seaway. This interchange was mostly from north to south, although the subsequent Pleistocene interchange between the regions supposedly was bothways. Before the Pliocene the tropical region was too strong and currents too adverse for faunal interchange. We find little evidence to support that 1) much interchange has occurred, and 2) that the main stream was north-south. This may have several causes, the most important probably being lack of knowledge of the northern North Pacific fauna. Since the days of Lambe at the end of last century no serious systematic work on sponges from the northern part of the area has been done. Still, the large numbers of *Tedania* and *Iophon* in the south Pacific as compared to those of the north are hardly likely to be an artifact. Also the morpho-

logical distinctness of Southern Ocean *Tedania* indicates that endemism in the south is of a high taxonomic level and likely to be at least of Tertiary age. The few Arctic-boreal *Tedania* may have invaded the north during Pleistocene times (following VERMEIJ). Pliocene northern immigrants in the study area are not apparent.

Relationships with Antarctica are distinct in all three genera. Both in *Iophon* and *Tedania* there are species described from the study area with peculiar morphological traits shared with Antarctic species (*Iophon chilense* and *I. unicornis*, *Tedania charcoti*, *T. spinata*). This indicates fairly recent interchange and subsequent speciation. During the Pleistocene, Antarctica and southern Chile were covered by a thick icecap, possibly destroying the littoral fauna to considerable depths. Subsequent reinvasion of these areas were inevitably from the north (VAN OPPEN et al., 1994), and possibly the distribution of *Tedania charcoti* in Chile and Antarctica is a product of that reinvasion.

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REFERENCES

- BAKUS, G. J. 1966. Marine poeciloscleridan sponges of the San Juan Archipelago, Washington. *Journal of the Zoological Society of London*, 149: 415-531.
- BERQUIST, P. R. 1961. A collection of Porifera from northern New Zealand, with descriptions of seventeen new species. *Pacific Science*, 15 (1): 33-48.
- BERQUIST, P. R. 1978. *Sponges*. London: Hutchinson (eds) 268 pp.
- BERQUIST, P. R. & J. P. FROMONT. 1988. The marine fauna of New Zealand: Porifera, Demospongiae, Part 4 (Poecilosclerida). *New Zealand Oceanographic Institute*, Mem. 96, 122 pp.
- BOURY-ESNAULT, N. 1973. Spongiaires. Campagnes de la "Calypso" au large des côtes atlantiques de l'Amérique du Sud (1961-1962). *Résultats scientifiques des Campagnes de la "Calypso"*, 10: 263-295.
- BOURY-ESNAULT, N. & M. VAN BEVEREN. 1982. Les démosponges du plateau continental de Kerguelen-Heard. *Comité national français des recherches antarctiques*, 52: 9-175.
- BOWERBANK, J. S. 1858. On the anatomy and physiology of the Spongiadae. Part. 1: On the spicula. *Philosophical Transactions of the Royal Society*, 148: 279-332.
- BOWERBANK, J. S. 1864. *A monograph of the British Spongiadae*, 1. London: Ray Society, 289 pp.
- BOWERBANK, J. S. 1866. *A monograph of the British Spongiadae*, 2. London: Ray Society, 388 pp.
- BRIGGS, J. C. 1974. *Marine Zoogeography*. McGraw-Hill Series in Population Biology. New York, 461 pp.
- BURTON, M. 1929. Porifera. Part. 2. Antarctic sponges. *Natural History Report. British Antarctic "Terra-Nova" Expedition, 1910* (Zool.) 6 (4): 393-458.
- BURTON, M. 1932. Sponges. *"Discovery" Reports*, 6: 237-392.
- BURTON, M. 1934. Sponges. *Further Zoological Result of the Swedish Antarctic Expedition, 1901-03*, 3: 1-58.
- BURTON, M. 1935. The family Plocamiidae, with descriptions of four new genera of sponges. *Annals and Magazine of natural History* (ser. 10) 15: 399-404.
- BURTON, M. 1940. Las esponjas marinas del Museo Argentino de Ciencias Naturales. *Anales del Museo Argentino de Ciencias Naturales « Bernardino Rivadavia »*, 40: 95-121.
- CABIOCH, L. 1968. Contribution à la connaissance de la faune des Spongiaires de la Manche occidentale. Démosponges de la région de Roscoff. *Cahiers de Biologie marine*, 9: 211-246.
- CAPON, R. J., K. ELSBURG, M. S. BUTLER, C. C. LU, J. N. A. HOOPER, J. A. P. ROSTAS, J. K. O'BRIEN, M. MUDGE & A. T. R. SIM. 1993. Extraordinary levels of cadmium and zinc in a marine sponge, *Tedania charcoti* Topsent: inorganic chemical defense agent. *Experientia* 49: 263-264.
- CARTER, H. J. 1874. Descriptions and figures of deep-sea sponges and their spicules from the Atlantic ocean, dredged up on board H. M. S. "Porcupine" chiefly in 1869; with figures and descriptions of some remarkable spicules from the Agulhas Shoal and Colon, Panama. *Annals and Magazine of natural History* (ser. 4) 14: 207-221.
- CARTER, H. J. 1886. Descriptions of sponges from the neighbourhood of Port Philip Heads, South Australia. *Annals and Magazine of natural History* (ser. 5) 17: 40-53, 112-27, 431-41, 502-16 (ser. 5) 18: 34-55, 126-49.
- CUARTAS, E. I. 1992. Poríferos de la provincia biogeográfica Argentina. III. Poecilosclerida (Demospongiae) del litoral marplatense. *Physis*, Secc. A, 47: 73-88.
- DENDY, A. 1922. Report on the Sigmatotetragonida collected by H. M. S. "Sealark" in the Indian Ocean. *Transactions of the Linnean Society of London* (Zool.) 18: 1-164.
- DENDY, A. 1924. Porifera. Part. I. non-Antarctic sponges. *Natural History Report. British Antarctic "Terra-Nova" Expedition, 1910* (Zool.) 6: 269-396.

- DESQUEYROUX, R. 1972. Demospongiae (Porifera) de la costa de Chile. *Gayana*, 20: 3-71.
- DESQUEYROUX, R. 1976. Démosponges signalées pour la région des Canaux du Chili. *Cahiers de Biologie Marine*, 17: 93-109.
- DESQUEYROUX-FAUNDEZ, R. 1990. Spongiaires (Demospongiae) de l'Ile de Pâques (Isla de Pascua). *Revue suisse de zoologie*, 97 (2): 373-409.
- DESQUEYROUX-FAUNDEZ, R. 1994. Biogeography of Chilean marine sponges (Porifera-Demospongiae). In: R. W. M. van Soest, T. M. G. van Kempen & J.C. Braekman (eds) *Sponges in time and space. Proceedings of the IV th International Porifera Congress, Amsterdam/Netherlands*: 183-189.
- DESQUEYROUX-FAUNDEZ, R. & H. I. MOYANO. 1989. Zoogeografía de demospongas chilenas. *Boletín de la Sociedad de biología de Concepción*, 58: 39-66.
- DICKINSON, M. G. 1945. Sponges of the Gulf of California. *Allan Hancock Pacific Expedition*, 11 (1): 1-251.
- EKMAN, S. 1953. *Zoogeography of the sea*. London. Sigwick and Jackson (eds) 417 pp.
- GENZANO, G., E. CUARTAS & A. EXCOFFON. 1991. Porifera y Cnidaria de la Campaña Oca Balda 05/88. *Thalassas*, 9: 63-78.
- GREEN, G. & P. GOMEZ. 1986. Estudio taxonómico de las esponjas de la bahía de Mazatlán, Sinaloa, México. *Anales del Instituto de Ciencias del Mar y Limnología*, 13 (3): 273-300.
- GREEN, G., L. E. FUENTES VELAZQUEZ & P. GOMEZ LOPEZ. 1986. Nuevos registros de Porifera del arrecife La Blanquilla, Veracruz. *Anales del Instituto de Ciencias del Mar y Limnología*, 13 (3): 127-146.
- HAJDU, E. & R. DESQUEYROUX-FAUNDEZ. 1994. A synopsis of South American Mycale (Mycale) (Poecilosclerida, Demospongiae), with description of three species and a cladistic analysis of Mycalidae. *Revue suisse de zoologie*, 101 (3): 563-600.
- HAJDU, E., R. W. M. VAN SOEST, & J. N. A. HOOPER. 1994. Proposal for a phylogenetic subordinal classification of poecilosclerid sponges. In: R. W. M. van Soest, Th. M. G. van Kempen & J. C. Braekman (eds) *Sponges in time and space. Proceedings of the IV th International Porifera Congress, Amsterdam/Netherlands*: 123-139.
- HALLMANN, E. F. 1914. A revision of the monaxonid species described as new in Lendenfeld's "Catalogue of the sponges in the Australian Museum". Part. I. *Proceedings of the Linnean Society of the New South Wales*, 39 (2): 263-315- Part. II. Ibid.: 327-376.
- HENTSCHEL, E. 1914. Monaxone Kieselschwämme und Hornschwämme der deutschen Südpolar Expedition 1901-1903. *Deutsche Südpolar Expedition*, 1901-03, Bd. 15. (Zool.) 7: 35-141.
- HOOPER, J. N. A. & C. LÉVI. 1993. Poecilosclerida (Porifera-Demospongia) from the New Caledonia Lagoon. *Invertebrate Taxonomy*, 7: 1221-302.
- ICZN. 1985. *International Code of Zoological Nomenclature adopted by the XX General Assembly of the International Union of Biological Sciences* (3rd ed.). W. D. L. Ride, C. W. Sabrosky, G. Bernardi & R. V. Melville (eds) 338 pp. London, International Trust for Zoological Nomenclature in association with British Museum (Natural History). Berkeley and Los Angeles, University of California Press.
- KIRKPATRICK, R. 1907. Preliminary report on the Monaxonellida of the National Antarctic Expedition. *Annals and Magazine of natural History*, (7) 20: 271-291.
- KIRKPATRICK, R. 1908. Tetraxonida. *National Antarctic Expedition, (1901-1904). Natural History*, 4: 1-56.
- KOLTUN, B. M. 1959. Cornacuspongida sponges from the northern and far eastern seas of the USSR. *Opredeliteli po faune sssr* 67 : 1-227. [In Russian].
- KOLTUN, B. M. 1964. Sponges of the Antarctic. Part 1. Tetraxonida and Cornacuspongida. *Biological Reports of the Soviet Antarctic Expedition (1955-1958)*, 2. *Akademya Nauk SSSR*: 6-116.

- LAMBE, L. M. 1893. Sponges from the Pacific Coast of Canada. *Proceedings and Transactions of the Royal Society of Canada*, 11 (4): 25-43
- LAUBENFELS, M. W. DE. 1928. A new genus and species of sponge from Puget Sound. *Publications of the Puget Sound Marine Biological Station of the University of Washington*, 5: 361-363.
- LAUBENFELS, M. W. DE. 1930. The sponges of California. *Stanford University Publications*, 5: (98): 24-29.
- LAUBENFELS, M. W. DE. 1932. The marine and fresh-water sponges of California. *Proceedings of the United States National Museum*, 81: 1-140.
- LAUBENFELS, M. W. DE. 1936. A discussion of the sponge fauna of the Dry Tortugas in particular and the West Indies in general, with material for a revision of the families and orders of the Porifera. *Papers from Tortugas Laboratory*, 30: 1-225.
- LAUBENFELS, M. W. DE. 1939. Sponges collected on the presidential Cruise of 1938. *Smithsonian miscellaneous collections*, 98 (15) 1-7.
- LAUBENFELS, M. W. DE. 1950. The Sponges of Kaneohe Bay, Oahu. *Pacific Science*, 4: 3-36.
- LAUBENFELS, M. W. DE. 1954. The Sponges of the West Central Pacific. *Oregon State Monographs. Studies in Zoology*, 7: 1-306.
- LENDENFELD, R. VON. 1889. A monograph of the Horny Sponges. *Trübner and Company*, 936 pp.
- LEVI, C. 1952. Spongiaires de la Côte du Sénégal. *Bulletin de l' Institut français d' Afrique Noire*, 14: 34-59.
- LÉVI, C. 1963. Spongiaires d'Afrique du sud. (1) Poecilosclerides. *Transactions of the Royal Society of South Africa*, 37 (Part. 1): 1-72.
- LÉVI, C. & P. LÉVI. 1983. Démospouges bathyales récoltées par le N/O "Vauban" au sud de la Nouvelle-Calédonie. *Bulletin du Muséum national d'histoire naturelle*, 5 (4) 931-997.
- LUNDBECK, W. 1909. The Porifera of East Greenland. *Meddelelser om Grønland*, 24: 421-466.
- LUNDBECK, W. 1910. Porifera (part. III) Desmacidonidae (pars.). *Danish Ingolf Expedition*, 6: 1-124.
- RIDLEY, S. O. 1881. Spongida collected during the survey of H. M. S. "Alert" in the Straits of Magellan and the coast of Patagonia. *Proceedings of the Zoological Society*, 107-137.
- RIDLEY, S. O. & A. DENDY. 1886. Preliminary report on the Monaxonida collected by H. M. S. "Challenger". *Annals and Magazine of natural History*, 18 (5): 325-351, 470-493.
- RIDLEY, S. O. & A. DENDY. 1887. Report on the Monaxonida collected by H. M. S. "Challenger" during the years 1873-1876. *Report on the scientific results of the Voyage of H.M.S "Challenger"* (Zool.) 20 (59): 1-275.
- RÜTZLER, K. 1978. Sponges in coral reefs. In: D. R. Stoddart & R. E. Johannes (eds). Coral reefs research methods. *Monographs on oceanographic methodology*, (UNESCO) 5: 299-313.
- SARA, M. 1978. Demospougie di acque superficiali della Terra del Fuoco. *Bolletino dei musei e degli istituti biologici della (R.) Università di Genova*, 46: 7-117.
- SARA, M. 1992. Porifera in the Antarctic ecosystem: the magellanic province. In: Gallardo, Ferretti & Moyano (eds) *Oceanografía en Antártica. Actas Seminario Internacional Concepción*: 518-522.
- SOEST, R. W. M. VAN. 1984. Marine sponges from Curaçao and other Caribbean localities. Part. III. Poecilosclerida. *Studies on the Fauna of Curaçao and other Caribbean Islands*, 66 (199): 1-167.
- SOEST, R. W. M. VAN. 1987. Biogeographic and taxonomic notes on some eastern Atlantic sponges. In: W. Clifford-Jones (ed). *European contributions to the taxonomy of sponges. Sherklin Island Marine Station*: 4-28.
- SOEST, R. W. M. VAN. 1990. Monanchora stocki n. sp. (Porifera, Poecilosclerida) from the Mid-Atlantic islands. *Bijdragen tot de Dierkunde*, 60 (3/4): 249-255.

- SOEST, R. W. M. VAN 1993. Affinities of the Marine Demosponge Fauna of the Cape Verde Islands and Tropical West Africa. *Courier Forschungs Institut Senckenberg*, 159: 205-219.
- SOEST, R. W. M. VAN. 1994. Demosponge distribution patterns. In: R. W. M. van Soest, Th. M. G. van Kempen & J. C. Braekman (eds), *Sponges in time and space. Proceedings of the IV th International Porifera Congress, Amsterdam/Netherlands*: 213-223.
- SOEST, R. W. M., VAN, J. N. A. HOOPER & F. HIEMSTRA. 1991. Taxonomy, phylogeny and biogeography of the marine sponge genus *Acarus* (Porifera: Poecilosclerida). *Beaufortia*, 42 (3): 49-88.
- SOEST, R. W. M., S. ZEA & M. KIELMAN. 1994. New species of *Zyzya*, *Cornulella*, *Damiria* and *Acheliderma* (Porifera: Poecilosclerida) with a review of fistular genera of Iophonidae. *Bijdragen tot de Dierkunde*, 64 (3): 163-192.
- SWOFFORD, D. 1993. *PAUP*, version 3.0. Computer program, Illinois Natural History Survey, Illinois.
- THIELE, J. 1905. Die Kiesel und Hornschwämme der Sammlung Plate. In: *Zoologische Jahrbücher*, Suppl. 6: 407-496.
- TOPSENT, E. 1901. Spongiaires. *Résultats voyage S. Y. Belgica 1897-1899* (Zool.) 4: 1-54.
- TOPSENT, E. 1904. Spongiaires des Açores. *Résultats des Campagnes Scientifiques du Prince Albert de Monaco*, 25: 1-280.
- TOPSENT, E. 1907. Poesclerides nouvelles recueillies par le Français dans l'Antarctique. *Bulletin du Musée d'histoire naturelle*, 13: 69-76.
- TOPSENT, E. 1908. *Spongiaires*. In: Expédition Antarctique Française (1903-1905). Documents scientifiques. Masson et Cie. (eds) 37 pp.
- TOPSENT, E. 1913. Spongiaires de l'expédition antarctique nationale Ecosaise. *Transactions of the Royal Society of Edinburgh*, 49 part 3 (9): 77-643.
- TOPSENT, E. 1927. Diagnoses d'éponges nouvelles recueillies par le Prince Albert de Monaco. *Bulletin de l'Institut océanographique*, 502: 1-19.
- URIZ, M. J. 1987. Estado actual del conocimiento de las esponjas antárticas, peculiaridades faunísticas y temas de interés en investigación. In: Actas del segundo Symposium español de estudios antárticos. *Consejo superior de investigaciones científicas*: 366-374.
- URIZ, M. J. 1989. Deep-water sponges from the continental shelf and slope off Namibia (South-west Africa: Classes Hexactinellida and Demospongia). *Monografias de Zoología marina*, 3: 9-157.
- URIZ, M. J. 1988. Deep-water sponges from the continental shelf and slope off Namibia (South West Africa): Classes Hexactinellida and Demospongia. *Monografias de Zoología Marina*, 3: 9-157.
- VACELET, J. & P. VASSEUR. 1971. Eponges des récifs coralliens de Tuléar (Madagascar) *Tethys*, suppl. 1: 51-126.
- VAN OPPEN, M. J. H., O. E. DIEKMANN, C. WIENCKE, W. STAM & J. L. OLSEN, 1994. Tracking dispersal routes: Phylogeography of the Artic-Antartic disjunct seaweed *Acrosiphonia arctica* (Chlorophyta). *Journal of Phycology*, 30: 67-80.
- VERMEIJ, G. J., 1991. When biotas meet: Understanding biotic interchange. *Science*, 253: 1099-1104.
- VOSMAER, G. C. J. 1882. Report on the sponges dredged up in the Arctic Sea by the Willem "Barents" in the years 1878 and 1879. *Niederländisches Archiv für Zoologie*, 1 (3): 1-58.
- WIEDENMAYER, F. 1989. Demospongiae (Porifera) from northern Bass Strait, Southern Australia. *Memoirs of the Museum of Victoria*, 50 (1): 1-242.
- WILSON, H. W. 1904. The Sponges. *Memoirs of the Museum of Comparative Zoology of Harvard College*, 30: 164 pp.



Desqueyroux-Faúndez, Ruth and Soest, R. W. M. van. 1996. "A review of Iophonidae, Myxillidae and Tedaniidae occurring in the South East Pacific (Porifera: Poecilosclerida)." *Revue suisse de zoologie* 103, 3–79.

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