



## New records of Calcareous sponges (Porifera, Calcarea) from the Chilean coast

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### Abstract

The present study is part of a large international effort to inventory the markedly underestimated sponge diversity in the coastal south-eastern Pacific, and figure its biotic affinities with neighbouring faunas in the Antarctic peninsula, in the south-western Atlantic and in the tropical eastern Pacific. Collections were assembled between 2003 and 2007 from 20 Chilean localities, at depths varying from 8 to 35 m. Thirty nine specimens of calcareous sponges were collected totalling 7 species which are described here, 6 being new to science. Four species belong to Calcinea (*Clathrina antofagastensis* **sp. nov.**, *Clathrina fjordica* **sp. nov.**, *Guancha ramosa* **sp. nov.**, and *Leucaltis nuda* **sp. nov.**), and 3 to Calcaronea (*Leucosolenia australis*, *Sycon huinayense* **sp. nov.**, and *Sycettusa chilensis* **sp. nov.**).

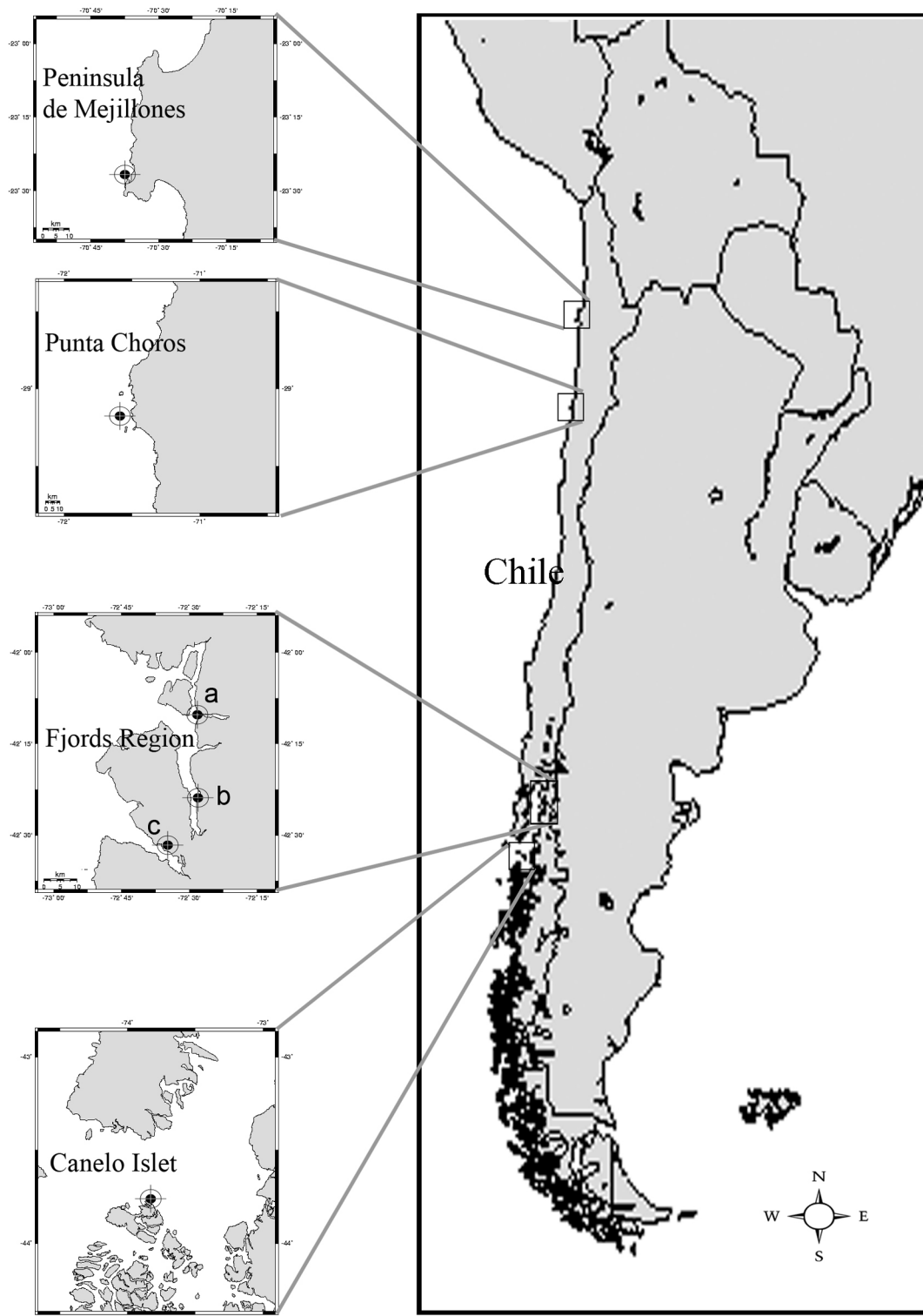
**Key words:** Calcarea, Chile, Sponges, taxonomy

### Introduction

As a likely consequence of its over 5000 km long coast (spanning 38 degrees of latitude) and possession of the world's most intricate and inaccessible system of islands, fjords and channels, Chile has a long standing deficit of taxonomic inventory of its sponge fauna (Försterra *et al.* 2005; Hajdu *et al.* 2006; Carvalho *et al.* 2007; Willenz *et al.* in press). Only about 140 species have been reported from this entire area, notably by Breitfuss (1898), Thiele (1905), Desqueyroux (1972, 1976), Desqueyroux-Faúndez & Moyano (1987) and Desqueyroux-Faúndez & van Soest (1996). Two main biogeographic regions have been recognised: the Peruvian or warm-temperate Province (ca. 6°S to 42°S) and the Magellan or cold-temperate Province (42°S to 56°S), which also spans an important segment of the south-western Atlantic (Ekman 1953).

An international effort to acquire new knowledge on Chilean marine sponges has been established, and a systematic collecting plan was implemented under the auspices of Belgian, Brazilian, Chilean and Swiss institutions, visiting over 20 localities since 2003 (between ca. 23–51°S), and undertaking nearly 100 dives for sponge collection. Among the specimens collected, several are new records of genera and/or families for the SE Pacific (Carvalho *et al.* 2007, Esteves *et al.* 2007). Several Calcareous sponges were also collected, and are reported here.

Only 4 works dealt previously with Chilean Calcarea (Haeckel 1872, Ridley 1881, Breitfuss 1898, Tanita 1942). Of the 20 recognised species, several have a dubious identification. Seven species are described here, 6 of which are new to science: *Clathrina antofagastensis* **sp. nov.**, *Clathrina fjordica* **sp. nov.**, *Guancha ramosa* **sp. nov.**, *Leucaltis nuda* **sp. nov.**, *Leucosolenia australis*, *Sycon huinayense* **sp. nov.**, and *Sycettusa chilensis* **sp. nov.**



**FIGURE 1.** Sites sampled in Chile: Central-North (Peninsula Mejillones; Punta Choros) and Central-South [(a. Quintupeu; b. Comau; c. Reñihue); Guaitecas Archipelago: Islet Canelo].

## Material and methods

A total of 39 specimens of calcareous sponges were collected by SCUBA in 6 localities of the Chilean coast, including the Central-North (Antofagasta: Peninsula Mejillones; Punta Choros: Bajo Tiburón); and Central-

South (Patagonian Fjords: Quintupeu, Comau, and Reñihue; Guaitecas Archipelago: Canelo Islet) (Fig. 1, Table 1). The collections were made from 2003 to 2007 at depths varying from 8 to 35 meters. Sponges were fixed and preserved in 93% ethanol. Preparations of spicules and sections followed standard procedures (Wörheide & Hooper 1999; Klautau & Valentine 2003).

Spicules measurements were made using an ocular micrometer. The length and width at the base of each actine were taken. The results are presented in tabular form, featuring length (minimum, mean, standard deviation [s] and maximum), width (mean and [s]) and sample size (n). Photomicrographies were taken with a digital camera mounted on a Zeiss Axioscop microscope. Additionally, spicule preparations were made for scanning electron microscopy (SEM). Identifications followed the *Systema Porifera* (Hooper & van Soest 2002).

Specimens are deposited in the sponge collection of the Museu Nacional/UFRJ (MNRJ - Rio de Janeiro), Brazil; Instituto de Zoología de la Universidad Austral de Chile (IZUA-Por - Valdivia), Chile; and the Royal Belgian Institute of Natural Sciences (RBINSc - Brussels), Belgium.

**TABLE 1.** Geographic and decimal coordinates of studied localities.

Locality	Geographic Coordinates		Decimal Coordinates	
	Latitude	Longitude	Latitude	Longitude
Antofagasta, Peninsula Mejillones	23°27'46.49"S	70°36'52.09"W	-23.5	-70.6
Comau Fjord, in front of HSFS	42°22'45.3"S	72°24'47.4"W	-42.4	-72.4
Comau Fjord, Punta Huinay	42°22'28"S	72°25'41"W	-42.4	-72.4
Comau Fjord, Punta Llonco	42°20'38.04"S	72°27'25.74"W	-42.3	-72.5
Comau Fjord, Tambor	42°24'9.24"S	72°25'13.02"W	-42.4	-72.4
Guaitecas Archipelago, Canelo Islet	43°51'1.78"S	73°44'0.52"W	-43.9	-73.7
Punta Choros, Bajo Tiburón	29°15'S	71°30'W	-29.3	-71.5
Quintupeu	42°9'49.32"S	72°26'40.32"W	-42.2	-72.4
Reñihue I	42°31'55.02"S	72°35'30.72"W	-42.5	-72.6
Reñihue II	42°31'32.46"S	72°39'45.48"W	-42.5	-72.7
Reñihue III	42°32'15.3"S	72°38'6.66"W	-42.5	-72.6
Reñihue IV	42°32'46.26"S	72°32'6.3"W	-42.5	-72.5

## Systematic Index

Class CALCAREA Bowerbank, 1864

Subclass CALCINEA Bidder, 1898

Order CLATHRINIDA Hartman, 1958

Family CLATHRINIDAE Minchin, 1900

Genus *Clathrina* Gray, 1867

*Clathrina antofagastensis* **sp. nov.**

*Clathrina fjordica* **sp. nov.**

Genus *Guancha* Miklucho-Maclay, 1868

*Guancha ramosa* **sp. nov.**

Family LEUCALTIDAE Dendy & Row, 1913

Genus *Leucaltis* Haeckel, 1872

*Leucaltis nuda* **sp. nov.**

Subclass CALCARONEA Bidder, 1898  
Order LEUCOSOLENIDA Hartman, 1958  
Family LEUCOSOLENIIDAE Minchin, 1900  
Genus *Leucosolenia* Bowerbank, 1864  
*Leucosolenia australis* Brøndsted, 1928  
Family HETEROPIIDAE Dendy, 1892  
Genus *Sycettusa* Haeckel, 1872  
*Sycettusa chilensis* **sp. nov.**  
Family SYCETTIDAE Dendy, 1892  
Genus *Sycon* Risso, 1826  
*Sycon huinayense* **sp. nov.**

## Results

### *Clathrina antofagastensis* **sp. nov.**

(Figs. 2A–D; Table 2)

**Type material.** IZUA-POR-0114 = MNRJ 9289 (holotype / alcohol). MNRJ 10051 and MNRJ 10052 (paratypes / alcohol).

**Type locality.** Peninsula Mejillones, Antofagasta, Chile.

**Material examined.** IZUA-POR-0114 = MNRJ 9289 and MNRJ 10052; Peninsula Mejillones, Antofagasta; collected by E. Hajdu & G. Lôbo-Hajdu; 24 May 2005; -13 to -15 m. MNRJ 10051; Peninsula Mejillones, Antofagasta; collected by E.H & G.L.H.; 24 May 2005; - 22 to -24 m.

**Material studied for comparison.** ZMB 1306, Slides of the lectotype of *C. primordialis*.

**Colour.** Light-beige in life and in ethanol.

**Etymology.** From the type locality.

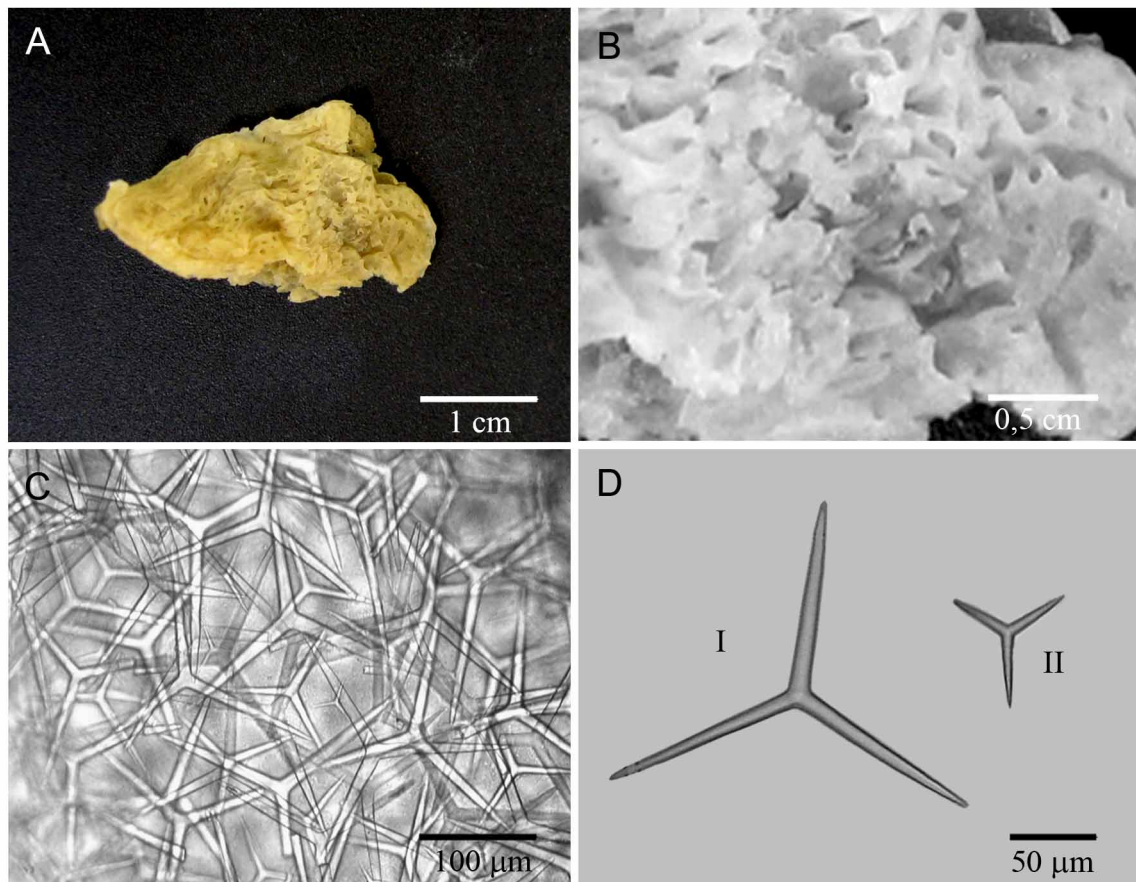
**Description.** Specimens are massive, the largest is 20 x 30 x 10 mm (Fig. 2A). Cornus is composed of large, irregular and tightly anastomosed tubes (Fig. 2B). Water-collecting tubes are not present. The skeleton is composed of two categories of triactines without organisation (Fig. 2 C).

**Spicules** (Table 2). Triactine I [ $104.1 (\pm 13.3) / 10.5 (\pm 1.7) \mu\text{m}$ ]: Regular (equiangular and equiradial). Actines are slightly conical to conical, straight and blunt at the tip (Fig. 2 D).

Triactine II [ $39.6 (\pm 11.1) / 5.0 (\pm 1.4) \mu\text{m}$ ]: Regular (equiangular and equiradial) in most cases, although sagittal spicules are also present. These spicules are very small. Actines are conical, straight and blunt at the tip (Fig. 2D).

**TABLE 2.** Spicules measurements of the holotype of *C. antofagastensis* **sp. nov.** (IZUA-POR-0114) and paratypes (MNRJ 10051, MNRJ 10052).

	Spicule	Length ( $\mu\text{m}$ )				Width ( $\mu\text{m}$ )		n
		min	mean	s	max	mean	s	
IZUA-POR-0114	Triactine I	69.3	104.1	13.3	125.4	10.5	1.7	60
	Triactine II	23.1	39.6	11.1	59.4	5.0	1.4	30
MNRJ 10051	Triactine I	79.2	100.0	11.6	122.1	10.4	1.4	60
	Triactine II	33.0	49.5	7.0	56.1	6.6	0.9	30
MNRJ 10052	Triactine I	75.9	108.8	11.4	125.4	10.8	1.9	60
	Triactine II	36.3	42.9	7.2	59.4	6.6	0.8	30
All specimens	Triactine I	69.3	104.3	4.4	125.4	10.6	0.2	-
	Triactine II	23.1	44.0	5.0	59.4	6.1	0.9	-



**FIGURE 2.** External and internal morphology of *Clathrina antofagastensis* **sp. nov.**; A—Fixed specimen; B—Detail of the anastomosis of the cornus; C—Section of tube wall; D—Triactine I and Triactine II.

**Ecology.** Specimens were collected attached to macroalgae *Rhodymenia* sp.

**Remarks.** Two species belonging to *Clathrina* had been previously recognised from Chile: *C. primordialis* (Haeckel, 1872), a species originally reported from Lesina (Adriatic Sea), cited for Chile by Haeckel (1872) and erroneously cited for tropical Atlantic by Borojevic (1971), Borojevic & Peixinho (1976) and Klautau *et al.* (1994), and *C. coriacea* (Montagu, 1818), a species originally from South Devon (England) and cited for Chile by Ridley (1881).

*Leucosolenia* (*Clathrina*?) *dictyoides* (Haeckel, 1872), a species from Australia, was also cited for Chile by Breitfuss (1898). However, it is not certain that this species is valid. *L. dictyoides* was described by Haeckel (1872) as a variety of *Ascetta primordialis* after having been called *Leucosolenia dictyoides* in Haeckel (1870). In 1885, von Lendenfeld returned the var. *dictyoides* (*Leucosolenia dictyoides* Haeckel, 1870) to the specific level as *Ascetta dictyoides* in his monograph of the Australian sponges. By Haeckel's description, this species might be a *Clathrina*, however, it was not included in the revision of the genus *Clathrina* (Klautau & Valentine 2003), because none specimen identified by Haeckel was found. Consequently, as we are not sure about the validity of this species, and as there is not even a good description of it, we will not compare it with *Clathrina antofagastensis* **sp. nov.**

Considering all recognised species of *Clathrina*, the species appearing morphologically closest to *C. antofagastensis* **sp. nov.** are *C. primordialis* and *C. clara* Klautau & Valentine, 2003. All 3 species have 2 categories of triactines, however, the tip of the actines in *C. primordialis* and in *C. clara* is sharp, while in *C. antofagastensis* **sp. nov.** it is blunt. The size of the spicules is also different [*C. antofagastensis* **sp. nov.** triactine I:  $104.1 (\pm 13.3) / 10.5 (\pm 1.7) \mu\text{m}$ , triactine II:  $39.6 (\pm 11.1) / 5.0 (\pm 1.4) \mu\text{m}$ ; *C. primordialis* triactine I:  $91.9 (\pm 5.8) / 9.6 (\pm 0.5) \mu\text{m}$ , triactine II:  $86.6 (\pm 11.3) / 11.3 (\pm 0.7) \mu\text{m}$ ; *C. clara* triactine I:  $164.5 (\pm 34.3) / 21.8$

( $\pm 3.5$ ), triactine II:  $84.5 (\pm 8.8) / 9.8 (\pm 0.8) \mu\text{m}$  (Klautau & Valentine 2003)]. The organisation of the cormus differs between *C. primordialis* and *C. antofagastensis* **sp. nov.**, being loosely anastomosed in the former and tightly anastomosed in the new species. *C. clara* also differs from *C. antofagastensis* **sp. nov.** by the presence of water-collecting tubes in the former. Besides, in *C. clara* the largest category of triactines is found only on the external tubes. The other *Clathrina* species cited for Chile, *C. coriacea*, can be easily distinguished from the new species by the presence of only one category of triactines, and by the tip of the actines, which is mainly rounded in *C. coriacea*.

***Clathrina fjordica* sp. nov.**

(Figs. 3A–F, 9A; Table 3)

**Type material.** IZUA-POR-0115 = MNRJ 8143 (holotype / alcohol). MNRJ 8145 = RBINSc POR 115 and MNRJ 10321 (paratypes / alcohol).

**Type locality.** Punta Huinay, Comau Fjord, X<sup>th</sup> Region, Chile.

**Material examined.** MNRJ 8142; Tambor, Comau Fjord; collected by E.H., G.L.H. & Ph. Willenz; 20 April 2004; -20 to -25 m. IZUA-POR-0115 = MNRJ 8143; S. Huinay, Comau Fjord; collected by E.H.; 20 April 2004; -18 m. MNRJ 8145; Punta Huinay, Comau Fjord; collected by E.H., G.L.H. & Ph.W.; 17 April 2004; -15 to -18m. MNRJ 8183; “Cross” Huinay, Comau Fjord; collected by E.H., G.L.H. & Ph.W.; 18 April 2004; - 10 to -18 m. MNRJ 8197; Tambor, Comau Fjord; collected by E.H., G.L.H. & Ph.W.; 20 April 2004; - 15 to -25 m. MNRJ 8257; Comau Fjord; collected by G. Försterra; 16 September 2003; -9.5 m. MNRJ 8268; Comau Fjord; collected by G.F.; 21 September 2003; -26.4 m. MNRJ 10321; in front of HSFS, Comau Fjord; collected by E.H. & Ph.W.; 9 October 2006; - 8 to -12 m.

**Material studied for comparison.** BMNH 1882.3.6.7; Slides of the neotype of *Clathrina coriacea* (Montagu, 1818).

**Colour.** White to light beige in life and yellow to light brown in alcohol.

**Etymology.** From its known distribution, provisionally limited to fjords.

**Description.** Cormus fragile, the holotype is 60 x 45 x 7 mm (Fig. 3A). It is composed of large, irregular and loosely anastomosed tubes (Figs. 3B, 9A). Water-collecting tubes are present. The skeleton has no special organisation, and it is composed of only one category of triactine varying from cylindrical to conical actines (Fig. 3C).

**Spicules** (Table 3). Triactine [ $101.9 (\pm 7.9) / 9.0 (\pm 1.2) \mu\text{m}$ ]: Regular (equiangular and equiradiate). Actines are cylindrical to conical, undulated with blunt to rounded tips (Fig. 3D).

**TABLE 3.** Spicules measurements of the holotype of *Clathrina fjordica* **sp. nov.** (IZUA-POR-0115) and paratypes (MNRJ 8145, MNRJ 8183).

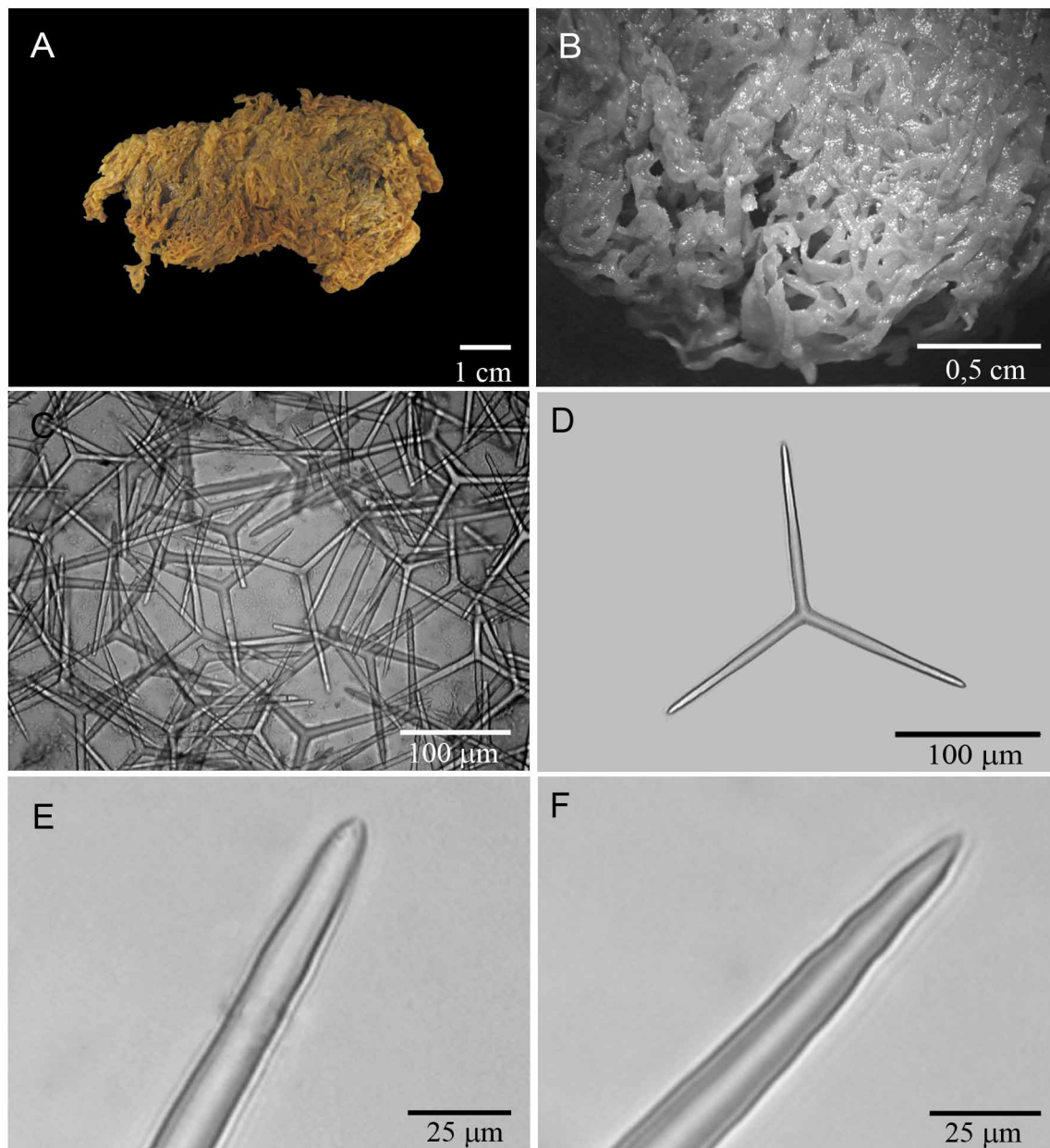
	Spicule	Length ( $\mu\text{m}$ )				Width ( $\mu\text{m}$ )		n
		min	mean	s	max	mean	s	
IZUA-POR-0115	Triactine	75.9	101.9	7.9	122.1	9.0	1.2	60
MNRJ 8145	Triactine	75.9	115.0	14.4	161.7	9.6	1.6	60
MNRJ 10321	Triactine	75.9	90.6	10.0	115.5	8.0	0.7	30
All specimens	Triactine	75.9	102.5	12.2	161.7	8.9	0.8	-

**Ecology.** This species is photophilous. Specimens were collected in depths varying from 8 to 26 m. Some of them were attached to molluscs, such as gastropods (*Crepidula* sp.) and mussels (*Mytilus chilensis*), and also to cnidarians (Hexacorallia) and polychaeta (Polynoidae).

**Remarks.** The species that appears morphologically closest to *C. fjordica* **sp. nov.** is *C. coriacea*, reported

for Chile by Ridley (1881). The new species is indeed morphologically very similar to *C. coriacea*. However, a careful comparison between spicules slides of the neotype of *C. coriacea* showed that the new species can be distinguished by a detail in the shape of the actines. *C. coriacea* presents a slight constriction near the end of the actines (Fig. 3E), while *C. fjordica* **sp. nov.** has undulated actines in the distal 1/3 of the actine (Fig. 3F). Besides, molecular data (unpublished results) support this non conspecificity. *C. coriacea* and *C. fjordica* **sp. nov.** showed high levels of genetic divergence (4.6%) when compared to *Clathrina* conspecific species (0 to 1.4%).

The other clathrinas cited for Chile are *C. primordialis* and the new species *C. antofagastensis* **sp. nov.**, described above. *C. fjordica* **sp. nov.** differs from *C. antofagastensis* **sp. nov.** and *C. primordialis* by the number of spicules categories, which are one in *C. fjordica* **sp. nov.** and two in *C. antofagastensis* **sp. nov.** and *C. primordialis*. Moreover, actines in *C. fjordica* **sp. nov.** are undulated, while in *C. antofagastensis* **sp. nov.** they are straight.



**FIGURE 3.** External and internal morphology of *Clathrina fjordica* **sp. nov.**; A—Fixed specimen; B—Detail of the anastomosis of the cormus; C—Section of tube wall; D—Triactine; E—Detail of the tip of *C. coriacea*; F—Detail of the tip of *Clathrina fjordica* **sp. nov.**



***Guancha ramosa* sp. nov.**

(Figs. 4A–D, 9B; Table 4)

**Type material.** IZUA-POR-0116 = MNRJ 10336 (holotype / alcohol), MNRJ 10313 and MNRJ 10314 (paratypes / alcohol).

**Type locality.** Quintupeu Fjord, X<sup>th</sup> Region, Chile.

**Material examined.** IZUA-POR-0116 = MNRJ 10336; North side entrance to Quintupeu Fjord; collected by E.H. & Ph.W.; 10 October 2006; -12 to -15 m. MNRJ 10313, MNRJ 10314; in front of HSFS; collected by E.H. & Ph.W.; 9 October 2006; -17.2 m. MNRJ 10414; Reñihue Fjord; collected by G.L.H.; 16 October 2006; -17.2 m.

**Colour.** Light beige in life and in alcohol.

**Etymology.** Latin *ramosus* (= branching). Describing its external morphology.

**Description.** Cormus composed of a peduncle and a clathroid body formed by fragile, irregular and loosely anastomosed tubes (20 x 12 x 0.5 mm). Oscula are localised at the end of large tubes on the surface, giving a ramified appearance to this *Guancha* (Figs. 4A, 9B). The skeleton of the clathroid body has no special organisation. It is composed of regular and sub regular triactines (Fig. 4B). The peduncle is formed by true tubes, with choanoderm, but the portion that attaches to the substrate may be solid. A special skeleton composed uniquely of parasagittal triactines forms the peduncle (Fig. 4C). The unpaired actine of these spicules is always basipetally oriented.

**Spicules** (Table 4). Triactine of the peduncle [paired actines 60.6 ( $\pm 5.3$ ) / 4.4 ( $\pm 0.7$ ), unpaired actine 101.3 ( $\pm 10.9$ ) / 4.9 ( $\pm 0.6$ )  $\mu\text{m}$ ]: Parasagittal. Actines are cylindrical with rounded tips. Paired actines are undulated while the unpaired actine is straight and about twice longer (Fig. 4D).

**TABLE 4.** Spicules measurements of the holotype of *Guancha ramosa* sp. nov. (IZUA-POR-0116) and paratypes (MNRJ 10313, MNRJ 10314).

Spicule			Length ( $\mu\text{m}$ )				Width ( $\mu\text{m}$ )		n
			min	mean	s	max	mean	s	
MNRJ 10336	Triactines from peduncle (parasagittal)	Paired	49.4	60.6	5.3	72.8	4.4	0.7	20
		Unpaired	78.0	101.3	10.9	127.4	4.9	0.6	20
	Triactines from clathroid body (regular)		52.8	70.3	8.8	85.8	4.6	0.7	30
MNRJ 10313	Triactines from peduncle (parasagittal)	Paired	44.2	58.6	5.6	65.0	3.8	0.5	20
		Unpaired	75.4	103.6	10.6	119.6	4.0	0.4	20
	Triactines from clathroid body (regular)		46.8	58.5	6.6	78.0	2.9	0.5	20
MNRJ 10314	Triactines from peduncle (parasagittal)	Paired	52.0	64.1	4.5	72.8	3.9	0.4	20
		Unpaired	91.0	106.9	8.6	127.4	4.2	0.6	20
	Triactines from clathroid body (regular)		49.4	61.0	4.9	67.6	2.8	0.5	20
All specimens	Triactines from peduncle (parasagittal)	Paired	44.2	61.1	2.8	72.8	4.0	0.3	-
		Unpaired	75.4	103.9	2.8	127.4	4.4	0.5	-
	Triactines from clathroid body (regular)		46.8	63.3	6.2	85.8	3.4	1.0	-

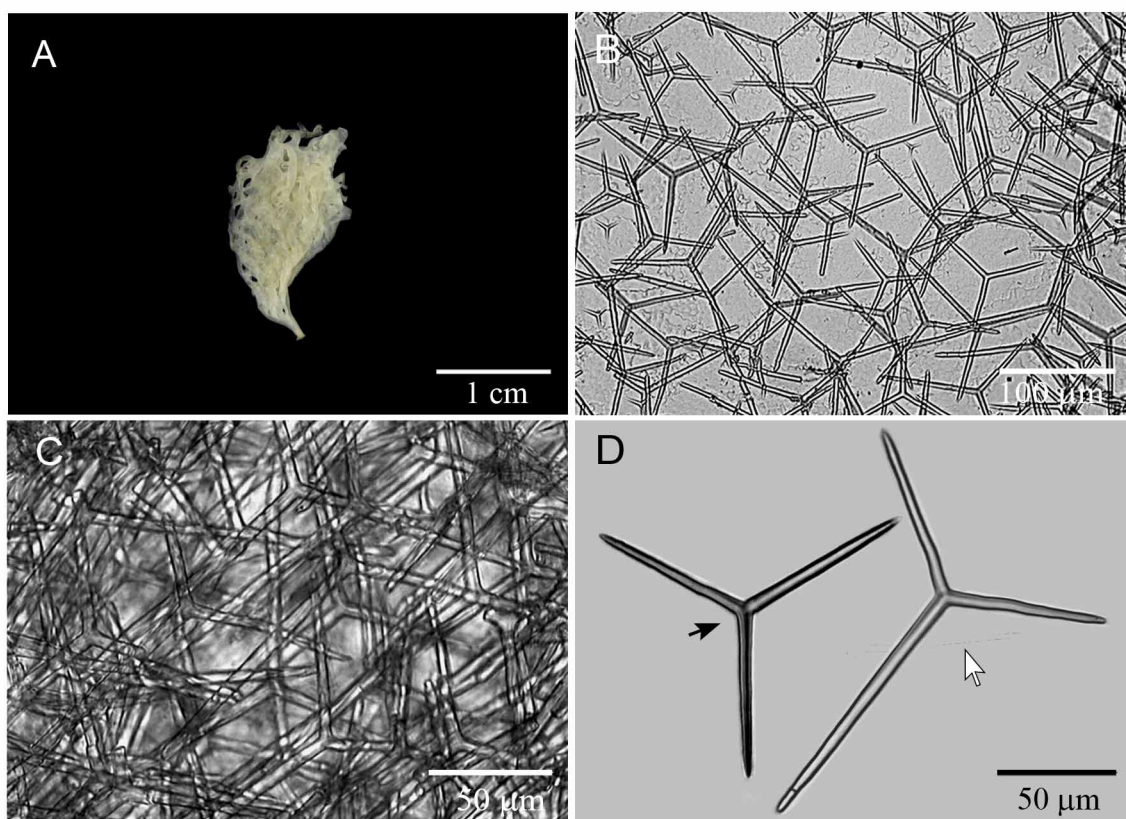
Triactine of the clathroid body [70.3 ( $\pm 8.8$ ) / 4.6 ( $\pm 0.7$ )  $\mu\text{m}$ ]: Regular (equiangular and equiradiate) or subregular. Actines are cylindrical and slightly undulated with rounded tips (Fig. 4D).

**Ecology.** Specimens were collected on hard substrate attached to a mollusc (Bivalve) shell.

**Remarks.** This is the first report on *Guancha* for Chile. *G. ramosa* sp. nov. can be differentiated from



other species of the genus mainly by the organisation of the cormus. The clathroid body in guanchas is usually well defined, composed of tightly anastomosed tubes. The only exceptions are *G. arnesenae* Rapp, 2006, *G. camura* Rapp, 2006 (both originally described from Norway) and now *G. ramosa* **sp. nov.**, which have loosely anastomosed tubes. *G. ramosa* **sp. nov.** can be easily distinguished from *G. arnesenae* because the latter has only tripodic parasagittal triactines in the skeleton, while *G. ramosa* **sp. nov.** has parasagittal as well as regular triactines. *G. ramosa* **sp. nov.** differs from *G. camura*, because it does not have the horn-shaped triactines characteristic of the latter. Furthermore, the dimensions of the spicules are very different [*G. ramosa* **sp. nov.** triactine from peduncle: paired actines  $60.6 (\pm 5.3) / 4.4 (\pm 0.7) \mu\text{m}$ , unpaired actine  $101.3 (\pm 10.9) / 4.9 (\pm 0.6) \mu\text{m}$ , triactine from clathroid body  $70.3 (\pm 8.8) / 4.6 (\pm 0.7) \mu\text{m}$ ; *G. arnesenae* triactine from peduncle: paired actines  $63.0 (\pm 5.0) / 9.5 (\pm 1.1) \mu\text{m}$ , unpaired actine  $135.0 (\pm 12.0) / 10.8 (\pm 1.2) \mu\text{m}$ , triactine from clathroid body: paired actines  $78.0 (\pm 13.0) / 8.4 (\pm 1.1) \mu\text{m}$ , unpaired actine  $131.0 (\pm 18.0) / 9.38 (\pm 1.2) \mu\text{m}$ ; *G. camura* triactine from peduncle: paired actines  $94.0 (\pm 7.0) / 9.3 (\pm 1.2) \mu\text{m}$ , unpaired actine  $135.0 (\pm 12.0) / 10.6 (\pm 1.3) \mu\text{m}$ , triactine from clathroid body:  $114.0 (\pm 12.0) / 9.6 (\pm 1.2) \mu\text{m}$ ].



**FIGURE 4.** External and internal morphology of *Guancha ramosa* **sp. nov.**; A—Fixed specimen; B—Section of the clathroid body; C—Section of the peduncle; D—Regular triactine of the clathroid body (black arrow) and Parasagittal triactine of the peduncle (white arrow).

***Leucaltis nuda* sp. nov.**

(Figs. 5A–F, 9C; Table 5)

**Type material.** IZUA-POR-0117 = MNRJ 10798 (holotype / alcohol). MNRJ 10795 = RBINSc POR 118 and MNRJ 10810 = RBINSc POR 119 (paratypes / alcohol)

**Type locality.** Reñihue Fjord I, X<sup>th</sup> Region, Chile.

**Material examined.** MNRJ 10795; Reñihue Fjord I; collected by Ph.W. & J. Biro; 20 May 2007; -23.3 m. IZUA-POR-0117 = MNRJ 10798; Reñihue Fjord I; collected by E.H. & Ph.W.; 22 May 2007; -22 m. MNRJ

10804 = RBINSc POR 120; Reñihue Fjord II; collected by E.H. & Ph.W.; 23 May 2007; -30 m. MNRJ 10810 = RBINSc POR 121; Reñihue Fjord III collected by E.H. & Ph.W.; 23 May 2007; -30 m. MNRJ 10846; Reñihue Fjord IV; collected by E.H. & Ph.W.; 25 May 2007; -31 m.

**Colour.** White in life and in alcohol.

**Etymology.** Latin *nudus* (= naked). Describing the almost absence of the choanosomal and atrial skeletons.

**Description.** The body of this species is composed of large ramified tubes covered by a thick cortex (0.5 mm) and surrounding a large atrium (0.5 to 3.0 mm) (Figs. 5A, 9C). The entire body wall is only 1.0 mm thick. Its consistency is slightly compressible and friable, and the surface is smooth. Oscula are present at the apical region and they do not have any fringe. Choanocyte chambers are elongated and ramified. Oocytes were present in all the collected specimens. The cortical skeleton is well developed, having almost the same thickness as the choanosome, and is composed of very variable tangential triactines. Subcortical large tetractines are present, but they are rare. These spicules project their apical actine into the choanosome, sometimes crossing even the atrial wall (Fig. 5B). The choanosomal skeleton may be absent or composed of the same tiny triactines and tetractines that form the atrial skeleton, which can be absent or formed by few triactines and rare tetractines (Fig. 5C).

**Spicules** (Table 5). Cortical triactine [245.0 ( $\pm 108.8$ ) / 15.3 ( $\pm 6.0$ )  $\mu\text{m}$ ]: Regular (equiangular and equiradiate). Actines are cylindrical with blunt tips (Fig. 5D).

**TABLE 5.** Spicules measurements of the holotype of *Leucaltis nuda* **sp. nov.** (IZUA-POR-0117) and paratypes (MNRJ 10795, MNRJ 10810).

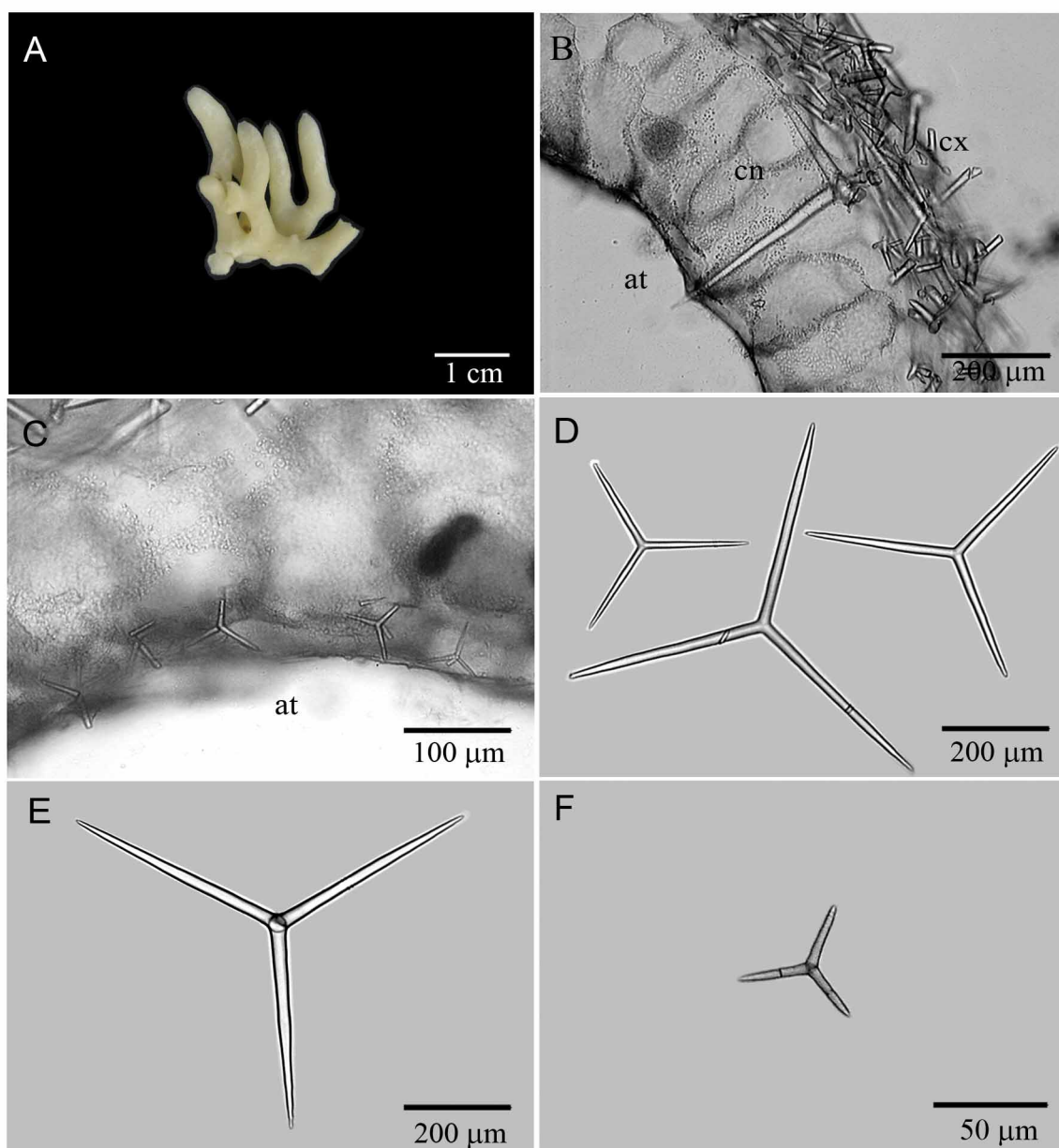
	Spicule		Length ( $\mu\text{m}$ )				Width ( $\mu\text{m}$ )		n
			min	mean	s	max	mean	s	
IZUA-POR-0117	Cortical triactine		69.3	245.0	108.8	430.9	15.3	6.0	100
	Cortical tetractine	basal	291.9	417.0	90.6	500.4	30.6	7.9	5
		apical	347.5	437.4	46.4	486.5	35.2	7.2	15
	Atrial triactine		26.4	33.4	4.1	46.2	5.8	0.8	30
MNRJ 10795	Cortical triactine		115.5	244.9	70.6	399.0	15.7	4.6	100
	Cortical tetractine	basal	252.0	367.5	79.0	451.5	21.0	4.3	7
		apical		262.5			21.0		1
	Atrial triactine		23.4	28.7	2.6	33.8	4.9	0.7	20
MNRJ 10810	Cortical triactine		84.0	250.8	83.5	388.5	19.0	5.9	100
	Cortical tetractine	basal	367.5	455.0	125.3	598.5	43.8	8.0	3
		apical		315.0			42.0		1
	Atrial triactine		23.1	35.5	8.4	59.4	5.1	1.0	30
All specimens	Cortical triactine		69.3	246.9	3.4	430.9	16.7	2.0	-
	Cortical tetractine	basal	252	413.2	43.8	598.5	31.8	11.4	-
		apical	347.5	338.3	89.7	486.5	32.7	10.7	-
	Atrial triactine		23.1	32.5	3.5	59.4	5.3	0.5	-

Cortical tetractine [basal 417.0 ( $\pm 90.6$ ) / 30.6 ( $\pm 7.9$ )  $\mu\text{m}$ , apical 437.4 ( $\pm 46.4$ ) / 35.2 ( $\pm 7.2$ )  $\mu\text{m}$ ]: Regular (equiangular and equiradiate). Actines are conical with blunt tips (Fig. 5E). The apical actine is frequently longer than the basal ones. It is also conical with blunt tip.

Choanosomal and atrial triactine [33.4 ( $\pm 4.1$ ) / 5.8 ( $\pm 0.8$ )  $\mu\text{m}$ ]: Regular (equiangular and equiradiate). Actines are conical with blunt tips (Fig. 5F).

Choanosomal and atrial tetractine: Regular (equiangular and equiradiate). Actines are conical with blunt tips. The apical actine is thicker than the basal ones. It is conical, smooth, blunt and slightly curved at the end.

**Ecology.** Specimens were found on vertical hard substrate from -22 to -31 m.



**FIGURE 5.** External and internal morphology of *Leucaltis nuda* **sp. nov.**; A – Fixed specimen; B—Transversal section of tube wall (cx: cortex, cn: choanosome, at: atrium); C—Detail of the atrial skeleton (at: atrium); D—Cortical triactines; E—Cortical tetractine; F—Atrial triactine.

**Remarks.** The genus *Leucaltis* was proposed by Haeckel (1872) for the specimen *Leucaltis clathria* Haeckel, 1872 and redefined by Dendy & Row (1913), which concluded that it was a monospecific genus. Since then, *L. clathria* has been considered to be cosmopolitan, being present in all tropical seas, from the type locality, Florida, to Australia. In 1929, Hôzawa described another species for the genus, *L. tenuis*, a species from Japan. Although this species has not been recollected since its original description, it was mentioned by Tanita (1943) and Burton (1963) as a valid species. In the revision of the subclass Calcinea (Borojevic *et al.* 1990), however, *L. tenuis* was probably overlooked and *L. clathria* was considered again “the unique species” of the genus, which was stated again in the Systema Porifera (Borojevic *et al.* 2002).

*Leucaltis nuda* **sp. nov.** is the third species of the genus. This new species is more similar to *L. clathria*, but it can be differentiated mainly by the choanosomal and atrial skeletons, which are almost absent in *L. nuda* **sp. nov.** Moreover, in our species, the spicules of the atrial skeleton (triactines and tetractines) are equiradiate

and equiangular, and not sagittal as in *L. clathria*. *L. nuda* **sp. nov.** can be differentiated from *L. tenuis* by the atrial skeleton, which is almost absent in the new species and “fairly well developed” in *L. tenuis* (Hôzawa, 1929). Besides, even when the atrial skeleton is present in *L. nuda* **sp. nov.**, the triactines are much smaller (23 to 59 / 5.5  $\mu\text{m}$ ) than in *L. tenuis* (200 to 550 / 16 to 40  $\mu\text{m}$ ).

The original measurements of spicules of *L. clathria* and *L. tenuis* are given here. *L. clathria* – cortical triactine: 400–600/30–50  $\mu\text{m}$ , cortical tetractine: basal 800–1,200/100–150  $\mu\text{m}$ , apical approximately with the same length, sagittal choanosomal and atrial triactine and tetractine: paired 50–70/2–3  $\mu\text{m}$ , unpaired 30–40/2–3  $\mu\text{m}$ , apical usually as long as the basal actines, rare regular and subregular choanosomal and atrial triactine and tetractine: 40–70/1–2  $\mu\text{m}$ ; *L. tenuis*—cortical triactine 300–570/20–650  $\mu\text{m}$ , cortical tetractine: basal 250–700/30–80  $\mu\text{m}$ , apical 400–970  $\mu\text{m}$  long, atrial triactine and tetractine: 200–550/16–40  $\mu\text{m}$ ; *L. nuda* **sp. nov.**—cortical triactine 69.3–430.9/15.3 ( $\pm 6$ )  $\mu\text{m}$ , cortical tetractine: basal 291.9–500.4/30.6 ( $\pm 7.9$ )  $\mu\text{m}$ , apical 347.5–486.5  $\mu\text{m}$  long, atrial triactine and tetractine: 26.4–46.2/5.8 ( $\pm 0.8$ )  $\mu\text{m}$ .

***Leucosolenia australis* Brøndsted, 1928**  
(Figs. 6A–F, 9D; Table 6)

**Material examined.** MNRJ 10320; in front of HSFS, Comau Fjord; collected by E.H. & Ph.W.; 9 October 2006; -8 to -12 m.

**Colour.** Beige in life and in alcohol.

**Description.** Sponge delicate formed by erect asconoid tubes (6 mm in length and 2 mm in diameter) connected by a stolon (Fig. 6A). At the end of each tube there is an apical osculum without fringe. Surface is slightly hispid because of the presence of diactines. The microdiactines are disposed in parallel to the surface, while the diactines protrude through the surface. The skeleton is also composed of triactines and tetractines tangentially disposed on the surface (Fig. 6B). The apical actine of the tetractines is projected inside the lumen (Fig. 6C).

**Spicules** (Table 6). Microdiactine [46.6 ( $\pm 2.8$ ) / 1.2 ( $\pm 0.0$ )  $\mu\text{m}$ ]: Fusiform and straight, with sharp tips. One of the tips has spines (Fig. 6D).

**TABLE 6.** Spicules measurements of the specimen of *Leucosolenia australis* (MNRJ 10320).

Spicule		Lenght ( $\mu\text{m}$ )				Width ( $\mu\text{m}$ )		n
		min	mean	s	max	mean	s	
<b>MNRJ 10320</b>	Microdiactine	41.3	46.6	2.8	48.6	1.2	0.0	6
	Diactine	62.7	198.4	73.3	346.5	6.7	1.1	30
	Triactine	66.0	83.1	9.5	105.6	6.2	0.8	30
		69.3	93.3	13.4	122.1	5.8	0.9	30
	Tetractine	69.3	85.3	7.1	99.0	6.6	0.6	30
		66.0	95.0	13.3	118.8	6.3	0.6	30
		26.7	34.0	6.9	41.3	4.1	0.7	5

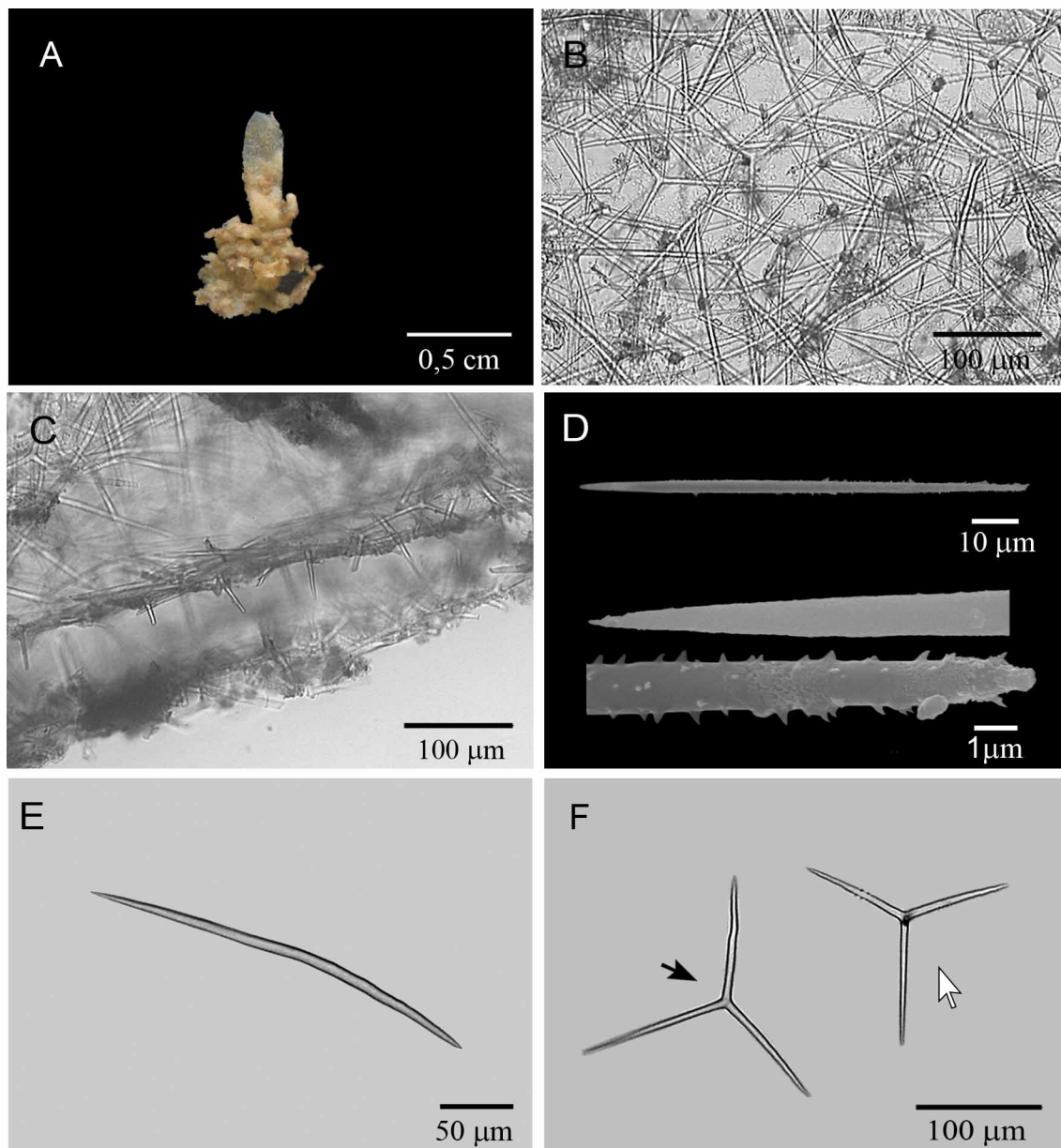
Diactine [198.4 ( $\pm 73.3$ ) / 6.7 ( $\pm 1.1$ )  $\mu\text{m}$ ]: Curved, with sharp tips. The tip projected outside the sponge sometimes has a lance shape. Near the other tip the spicule is thicker, and sometimes it has a bend, which is occasionally abrupt (Fig. 6E).

Triactine [paired actines 83.1 ( $\pm 9.5$ ) / 6.2 ( $\pm 0.8$ )  $\mu\text{m}$ , unpaired actine 93.3 ( $\pm 13.4$ ) / 5.8 ( $\pm 0.9$ )  $\mu\text{m}$ ]: Sagittal. Actines are slightly conical and sharp. The unpaired actine is a little longer than the paired ones (Fig. 6F).

Tetractine [paired actines 85.3 ( $\pm 7.1$ ) / 6.6 ( $\pm 0.6$ )  $\mu\text{m}$ , unpaired actine 95.0 ( $\pm 13.3$ ) / 6.3 ( $\pm 0.6$ )  $\mu\text{m}$ , apical actine 34.0 ( $\pm 6.9$ ) / 4.1 ( $\pm 0.7$ )  $\mu\text{m}$ ]: Sagittal. Actines are slightly conical and sharp. The unpaired actine is a



little longer than the paired ones. The apical actine is much shorter than the basal ones, smooth, sharp and curved in the direction of the paired actines (Fig. 6F).



**FIGURE 6.** External and internal morphology of *Leucosolenia australis*; A—Fixed specimen; B—Tangential view of tube wall; C—Detail showing the apical actine of tetractines penetrating into the lumen; D—Microdiactine with detail of the two tips; E—Diactine; F—Triactine (black arrow) and tetractine (white arrow).

**Ecology.** Collected specimens were attached to a gastropod shell (Mollusca). A Demospongiae was also attached to this shell.

**Remarks.** Five species of *Leucosolenia* have been described from the Southern region of South America (Table 7): *L. australis* Brøndsted, 1928; *L. falklandica* Breitfuss, 1898; *L. feuerlandica* Tanita, 1942; *L. lucasi* Dendy, 1891 and *L. variabilis* Haeckel, 1870 (Breitfuss 1898, Tanita 1942). Comparing our specimen to the original description of these species, we found a great similarity with *L. australis* and *L. lucasi*. The first species was originally described from Kerguelen (Subantarctic) and was found later in the Magellanic region (Tanita, 1942). The second species, *L. lucasi*, was originally described from Australia (Port Phillip Heads), and reported by Tanita (1942) from southern South America (Strait of Magellan). Both species have the same

spicular composition (diactines, triactines, and tetractines) and their shape and size are very similar. However, comparing the illustrations provided in the original descriptions, they can be distinguished by the shape of the diactines. According to Brøndsted (1928), *L. australis* has fusiform and curved or straight diactines, while *L. lucasi* has diactines with one lance shaped tip and a bend tip. The collected Chilean specimen has both types of spicules, and also microdiactines. It is possible that Dendy and Brøndsted have not observed those spicules, however, as we had no access to the holotypes, we could not confirm this hypothesis. Besides, as we found both diactine types in our specimen, it is possible that they are also present in both species, and that they are in fact synonyms. As we cannot prove this at the moment, we decided to call the Chilean species *L. australis* until the holotypes are analysed.

The original measurements of spicules of *L. australis* and *L. lucasi* are given here. *L. australis* – diactine: 160/5 µm, triactine and tetractine: paired 70-5 µm, unpaired 100-5 µm. *L. lucasi* – diactine: 150-400/8-12 µm; triactine and tetractine: paired 75-110/6-10 µm, unpaired 80-120/6-10 µm, apical 25-80 µm long.

**Known geographic distribution.** Kerguelen (Brøndsted, 1928); Strait of Magellan (Tanita, 1942)

**TABLE 7.** Skeleton characters and world distribution of *Leucosolenia* species from the Southern region of South America.

Species	Skeleton Composition	World Distribution
<i>Leucosolenia australis</i>	Triactine, tetractine, diactine	Kerguelen; Strait of Magellan
<i>Leucosolenia falklandica</i>	Triactine, tetractine	Falkland Islands; Ushuaia, near the Strait of Magellan
<i>Leucosolenia feuerlandica</i>	Triactine, tripod, tetractine, diactine	Tierra del Fuego
<i>Leucosolenia lucasi</i>	Triactine, tetractine, diactine	Australia; New Zealand; Ushuaia, near the Strait of Magellan
<i>Leucosolenia variabilis</i>	Triactine sagittal, tetractine sagittal, diactine	Arctic; Mediterranean Sea; Atlantic Sea; Morocco; South Africa; Ushuaia, near the Strait of Magellan; Iquique, Chile

***Sycon huinayense* sp. nov.**

(Figs. 7A–M, 9E; Table 8)

**Type material.** IZUA-POR-0118 = MNRJ 8144 (holotype / alcohol). MNRJ 8147 (paratype / alcohol).

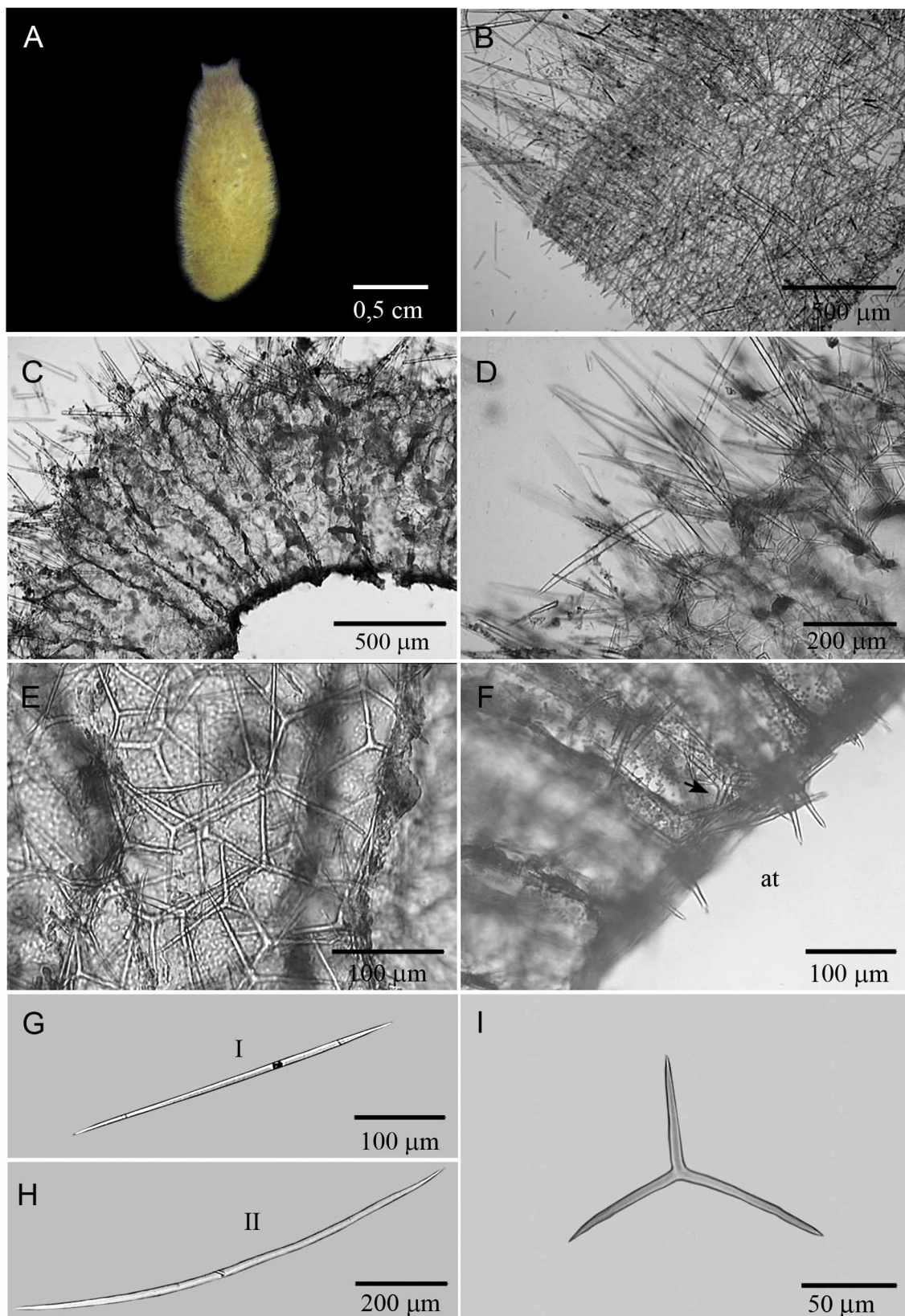
**Type locality.** Comau Fjord, X<sup>th</sup> Region, Chile.

**Material examined.** (IZUA-POR-0118 = MNRJ 8144, MNRJ 12372, MNRJ 12373, MNRJ 12374, MNRJ 12384); in front of HSFS, Comau Fjord; collected by E.H. & Ph.W.; 22 April 2004; -6.5 m. MNRJ 8147, MNRJ 12375, MNRJ 12376, MNRJ 12377, MNRJ 12378, MNRJ 12379, MNRJ 12380, MNRJ 12381, MNRJ 12382, MNRJ 12383; Punta Llonco, Comau Fjord; collected by V. Häussermann & G.F.; 12 February 2004; -10 m.

**Colour.** Beige in life and in alcohol.

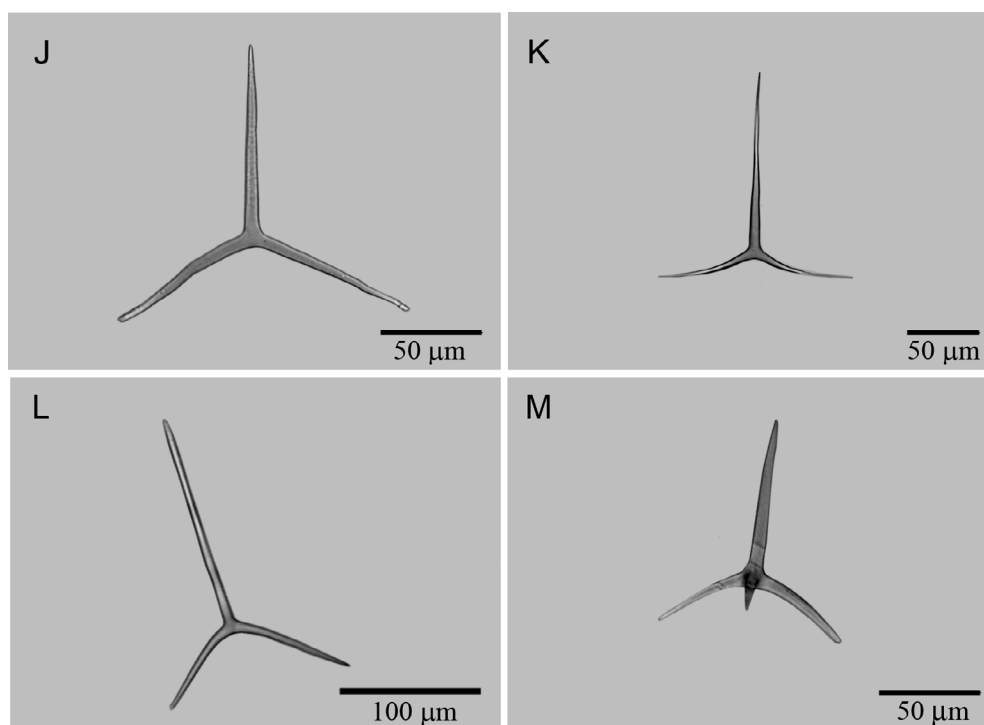
**Etymology.** Named after the Fundación San Ignacio del Huinay (HSFS).

**Description.** Sponge tubular, very hispid (Fig. 9E). The holotype is 16 mm long and 6 mm wide (Fig. 7A). The osculum is apical surrounded by a delicate fringe of trichoxeas supported by an organised skeleton of sagittal triactines disposed parallel to each other with the unpaired actine directed towards the basal region (Fig. 7B). A suboscular region is present between the base of the crown and the first choanocyte chambers. At



**FIGURE 7A–I.** External and internal morphology of *Sycon huinayense* **sp. nov.** A—Fixed specimen; B—Detail of the oscular skeleton; C—Transversal section; D—Detail of the distal cone; E—Detail of the tubar skeleton; F—Subatrial (arrow shows a subatrial triactine) and atrial skeletons (at: atrium); G— Diactine I; H—Diactine II; I –Triactine of the cone.





**FIGURE 7J–M.** External and internal morphology of *Sycon huinayense* **sp. nov.** J—Tubar triactine; K—Subatrial triactine; L—Atrial triactine; M—Atrial tetractine.

this region, there are diactines protruding through the surface. The atrium is central and the wall is 1 mm thick. The radial tubes are fully coalescent (Fig. 7C) and have trichoxeas and 2 kinds of diactines protruding through the distal cones (Fig. 7D). These diactines are similar to those of the suboscular region. The proximal side of the diactines occasionally crosses the atrial skeleton. The cones are supported by triactines with thicker actines than those of the tubar skeleton. Their unpaired actine crosses the distal part of the cones. The inhalant canals are closed by a thin membrane supported by actines of the spicules of the distal cones. The tubar skeleton is articulated, composed of rows of triactines that point their unpaired actine, which is a little longer than the paired ones, to the surface (Fig. 7E). The subatrial skeleton is composed of sagittal triactines (and rare tetractines) that point their unpaired actine, which is longer than the paired ones, towards the distal cones. The atrial skeleton is composed of triactines and tetractines tangentially disposed. The apical actine of the tetractines is shorter than the basal ones and as thick as the basal ones. They are projected into the atrium (Fig. 7F). Trichoxeas are also present in the atrium, where they lay tangentially. The holotype shows reproductive structures (amphiblastula larvae).

**Spicules** (Table 8). Trichoxeas of the perioscular crown ( $>1,668 / 4.9 \mu\text{m}$ ) and of the distal cones ( $>117 / 2.4 \mu\text{m}$ ): As they were frequently broken, it was difficult to measure them.

Diactines I of the suboscular region and of the distal cones [ $343.0 (\pm 59.2) / 7.6 (\pm 1.3) \mu\text{m}$ ]: These spicules are cylindrical and straight. Both tips are sharp but one tip is thicker than the other (Fig. 7G).

Diactines II of the suboscular region and of the distal cones [ $673.1 (\pm 390.2) / 14.2 (\pm 4.8) \mu\text{m}$ ]: Large, slightly curved, undulated and fusiform. Both tips are sharp, but one of them is lanceolate (Fig. 7H). They have very variable size and the smaller spicules are more abundant. Each cone has at least 3 of these diactines.

Triactines of the distal cones [unpaired actine  $70.6 (\pm 12.6) / 6.2 (\pm 0.7) \mu\text{m}$ , paired actines  $95.0 (\pm 9.4) / 6.2 (\pm 0.7) \mu\text{m}$ ]: Sagittal. Actines are conical and sharp. Paired actines are frequently curved, accompanying the shape of the distal cones. They are longer than the unpaired actine, which points to the surface (Fig. 7I).

Tubar triactines [unpaired actine  $135.1 (\pm 30.6) / 6.8 (\pm 0.5) \mu\text{m}$ , paired actines  $84.6 (\pm 9.6) / 6.2 (\pm 0.7) \mu\text{m}$ ]: Sagittal. Actines are conical, undulated and sharp. Paired actines are curved and shorter than the unpaired one, which points to the surface. Frequently one of the paired actines is shorter than the other (Fig. 7J).

Subatrial triactines and tetractines [triactines - unpaired actine  $127.5 (\pm 18.3) / 6.8 (\pm 1.0) \mu\text{m}$ , paired actines  $80.8 (\pm 12.4) / 5.5 (\pm 0.6) \mu\text{m}$ ]: Sagittal to subregular, with curved paired actines. Actines are conical and sharp. The unpaired actine is longer than the paired ones, and points to the surface (Fig. 7K). The rare tetractines are very similar to the triactines, but they show a thin apical actine shorter than the basal ones. It is curved, smooth, conical and sharp.

Atrial triactines and tetractines [triactines—unpaired actine  $127.3 (\pm 27.5) / 6.8 (\pm 0.8) \mu\text{m}$ , paired actines  $86.1 (\pm 18.3) / 5.6 (\pm 0.7) \mu\text{m}$ ; tetractines—unpaired actine  $160.4 (\pm 28.7) / 7.6 (\pm 0.5) \mu\text{m}$ , paired actines  $106.0 (\pm 30.4) / 6.8 (\pm 0.9) \mu\text{m}$ , apical actine  $40.5 (\pm 5.4) / 7.5 (\pm 0.0) \mu\text{m}$ ]: Sagittal to subregular, with curved paired actines. They are tangentially disposed. Actines are conical and sharp. The unpaired actine is longer than the paired ones. The tetractines are less abundant than the triactines. Their apical actine is shorter than the basal ones, conical, smooth and sharp and penetrates the atrium (Fig. 7L and 7 M).

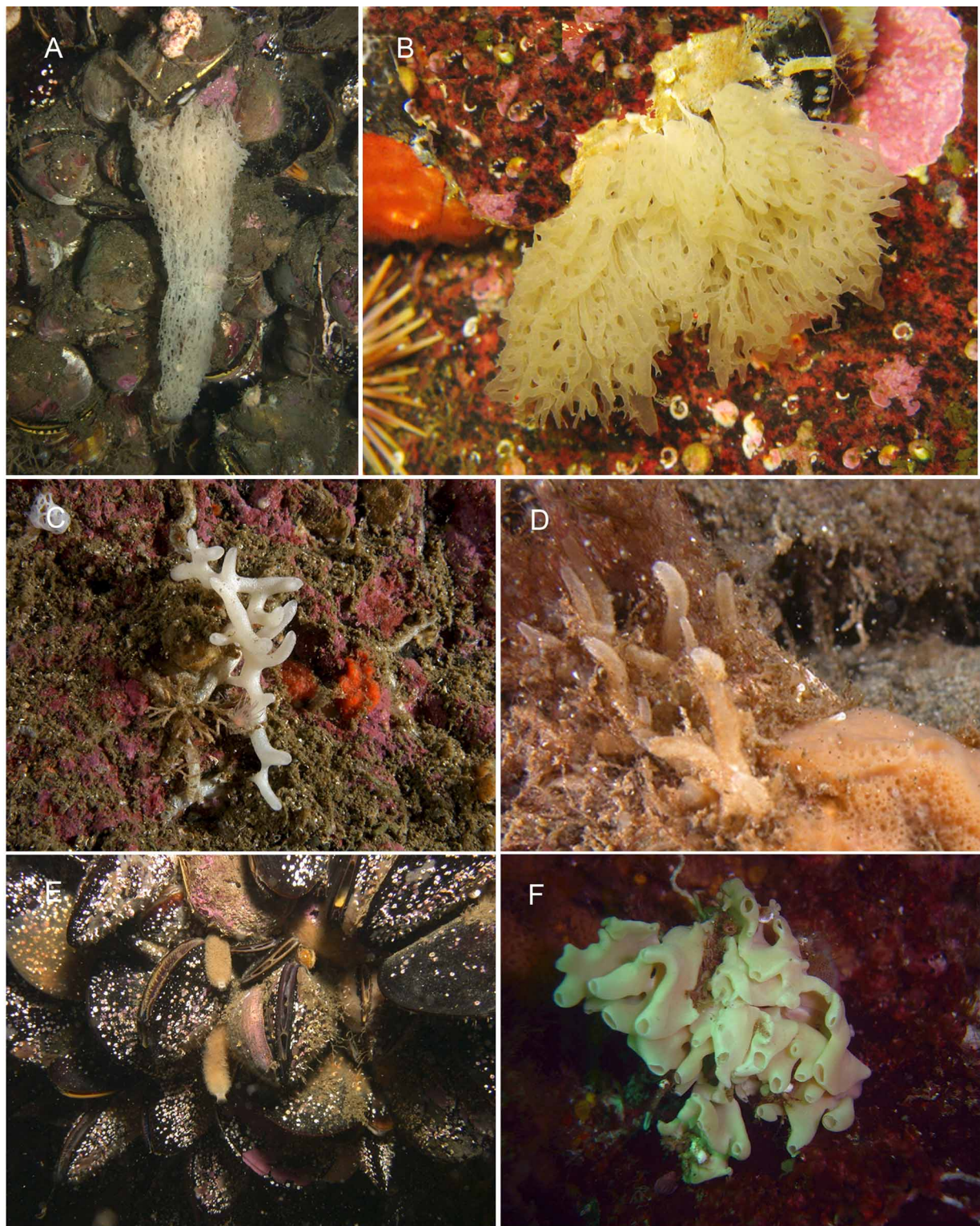
**Ecology.** Specimens are found on vertical hard substrate, associated to mussels (*Mytilus chilensis*) and exposed to sunlight. Its relatively shallow occurrence denotes resistance to reduced salinity levels found in the upper layers of the fjord.

**Remarks.** Five species of *Sycon* have been previously documented off the Chilean coast (Table 9): *S. raphanus* var. *proboscidea* Haeckel, 1870, reported by Breitfuss (1898); *S. coronatum* var. *commutata* Haeckel, 1872, reported by Breitfuss (1898); *S. incrustans* Breitfuss, 1898, originally described from Chile; *S. coronatum* (Ellis & Solander, 1786), reported by Tanita (1942); and *S. ornatum* Kirk, 1897, cited by Tanita (1942). *S. coronatum* was synonymised to *S. ciliatum* (Fabricius, 1780) by Burton (1963) and this synonymy was subsequently accepted by Borojevic (1967). The same happened to *S. commutatum* as it was a variety of *S. coronatum*, however, we decided not to consider this synonym until a revision of the genus is done.

As the Chilean specimens of *S. coronatum* var. *commutata*, *S. raphanus* var. *proboscidea* and *S. coronatum* were not formally described by Breitfuss (1898) and Tanita (1942), we could not confirm their identifications. Therefore, we compared *S. huinayense* **sp. nov.** to the original descriptions of these species instead, pending a re-examination of Breitfuss' and Tanita's materials.

The presence of a suboscular region in *S. huinayense* **sp. nov.** differentiate it from all other *Sycon* spp. cited for Chile, but further differences were also found.

*S. huinayense* **sp. nov.** can be also differentiated from *S. coronatum* by the size of the apical actine of the atrial tetractines, which is as long as the basal actines in *S. coronatum* and much shorter than the basal actines in our species. This distinctive feature is also present in the former variety of *S. coronatum*, viz. *S. commutatum*. *S. proboscideum* can also be differentiated by the size of the diactines, which is much larger in this species (e.g. 1000 to 3000  $\mu\text{m}$  long and 30 to 40  $\mu\text{m}$  thick) and organised differently, with a single largest diactine in the centre of each tuft of diactines of the cone. Besides, Haeckel (1872) mentioned that the apical actine of the atrial tetractines was a little shorter than the basal actines, while in *S. huinayense* **sp. nov.** the apical actine is much shorter. In relation to *S. incrustans*, the atrial skeleton is composed only of triactines and rare tetractines with vestigial apical actine. In *S. huinayense* **sp. nov.** atrial tetractines are abundant (although less abundant than the triactines) and their apical actines are not vestigial. Finally, *S. ornatum*, a species from the Cook Strait, can be differentiated by the thickness of all actines (thinner in the new species) and by the absence of triactines in the atrial skeleton of *S. ornatum*.



**FIGURE 9.** Specimens *in situ*: A—*Clathrina fjordica* **sp. nov.**; B—*Guancha ramosa* **sp. nov.**; C—*Leucaltis nuda* **sp. nov.**; D—*Leucosolenia australis*; E—*Sycon huinayense* **sp. nov.**; F—*Sycettusa chilensis* **sp. nov.**

**TABLE 8.** Spicules measurements of the holotype of *Sycon huinayense* **sp. nov.** (IZUA-POR-0118) and paratypes (MNRJ 8147, MNRJ 12372).

	Spicule		Length (µm)				Width (µm)		n
			min	mean	s	max	mean	s	
IZUA-POR-0118	Diactine I		241.5	343.0	59.2	493.5	7.6	1.3	30
	Diactine II		315.0	673.1	390.2	1,449.0	14.2	4.8	30
	Triactine from the cones	Unpaired	49.5	70.6	12.6	92.4	6.2	0.7	30
		Paired	72.6	95.0	9.4	115.5	6.2	0.7	30
	Tubar triactine	Unpaired	89.1	135.1	30.6	217.8	6.8	0.5	30
		Paired	69.3	84.6	9.6	112.2	6.2	0.7	30
	Subatrial triactine	Unpaired	93.6	127.5	18.3	150.8	6.8	1.0	30
		Paired	44.2	80.8	12.4	109.2	5.5	0.6	30
	Atrial triactine	Unpaired	81.6	127.3	27.5	195.0	6.8	0.8	30
		Paired	59.8	86.1	18.3	124.8	5.6	0.7	30
	Atrial tetractine	Unpaired	91.0	160.4	28.7	208.0	7.6	0.5	20
		Paired	57.2	106.0	30.4	150.8	6.8	0.9	20
		Apical	30	40.5	5.4	50.0	7.5	0.0	20
MNRJ 8147	Diactine I		220.5	394.2	117.5	724.5	6.9	1.7	26
	Diactine II		367.5	804.3	445.8	2,100.0	12.8	4.1	30
	Triactine from the cones	Unpaired	39.0	61.8	13.2	91.0	5.5	0.5	20
		Paired	65.0	87.6	10.3	101.4	5.5	0.5	20
	Tubar triactine	Unpaired	91.0	115.8	21.8	156.0	6.0	0.8	20
		Paired	70.2	88.9	11.0	106.6	5.7	0.7	20
	Subatrial triactine	Unpaired	104.0	149.8	16.7	176.8	6.6	1.2	20
		Paired	57.2	81.4	11.7	104.0	5.5	0.6	20
	Atrial triactine	Unpaired	85.8	128.8	28.9	195.0	6.0	0.8	20
		Paired	65.0	91.7	24.2	143.0	5.5	0.8	20
	Atrial tetractine	Unpaired	91.0	133.1	33.7	189.8	7.4	0.8	11
		Paired	83.2	121.5	22.1	156.0	6.6	0.9	11
		Apical	18.2	32.1	5.9	44.2	7.3	0.9	20
MNRJ 12372	Diactine I		315.0	386.9	58.7	525.0	6.9	1.4	20
	Diactine II		294.0	646.8	371.4	1,365.0	13.2	4.3	30
	Triactine from the cones	Unpaired	46.8	70.7	11.6	96.2	7.3	0.8	20
		Paired	57.2	84.0	15.9	114.4	6.6	0.7	20
	Tubar triactine	Unpaired	70.2	113.5	23.4	174.2	7.0	1.0	20
		Paired	59.8	84.1	10.7	104.0	6.2	1.2	20
	Subatrial triactine	Unpaired	98.8	132.1	22.8	169.0	6.6	1.1	20
		Paired	57.2	78.3	11.2	96.2	5.2	0.0	20
	Atrial triactine	Unpaired	70.2	150.2	47.5	236.6	8.3	0.9	20
		Paired	49.4	95.7	27.0	158.6	7.2	1.0	20
	Atrial tetractine	Unpaired	122.2	140.0	20.1	166.4	7.8	0.0	6
		Paired	65.0	110.5	34.8	156.0	6.5	1.4	6
		Apical	31.2	37.1	6.2	52.0	7.7	0.9	20
All specimens	Diactine I		220.5	374.7	27.7	724.5	7.1	0.4	-
	Diactine II		294.0	708.1	84.4	2,100.0	13.4	0.7	-
	Triactine from the cones	Unpaired	39.0	67.7	5.1	96.2	6.3	0.9	-
		Paired	57.2	88.9	5.6	115.5	6.1	0.6	-
	Tubar triactine	Unpaired	70.2	121.5	11.9	217.8	6.6	0.5	-

to be continued.



**TABLE 8.**

	Spicule		Length (µm)				Width (µm)		n
			min	mean	s	max	mean	s	
	Subatrial triactine	Paired	59.8	85.9	2.6	112.2	6.0	0.3	-
		Unpaired	93.6	136.5	11.8	176.8	6.7	0.1	-
		Paired	44.2	80.2	1.6	109.2	5.4	0.2	-
	Atrial triactine	Unpaired	70.2	135.4	12.8	236.6	7.0	1.2	-
		Paired	49.4	91.2	4.8	158.6	6.1	1.0	-
	Atrial tetractine	Unpaired	91.0	144.5	14.2	208.0	7.6	0.2	-
		Paired	57.2	112.7	8.0	156.0	6.6	0.2	-
		Apical	18.2	36.6	4.2	52.0	7.5	0.2	-

**TABLE 9.** Skeleton characters and world distribution of *Sycon* species from Chile.

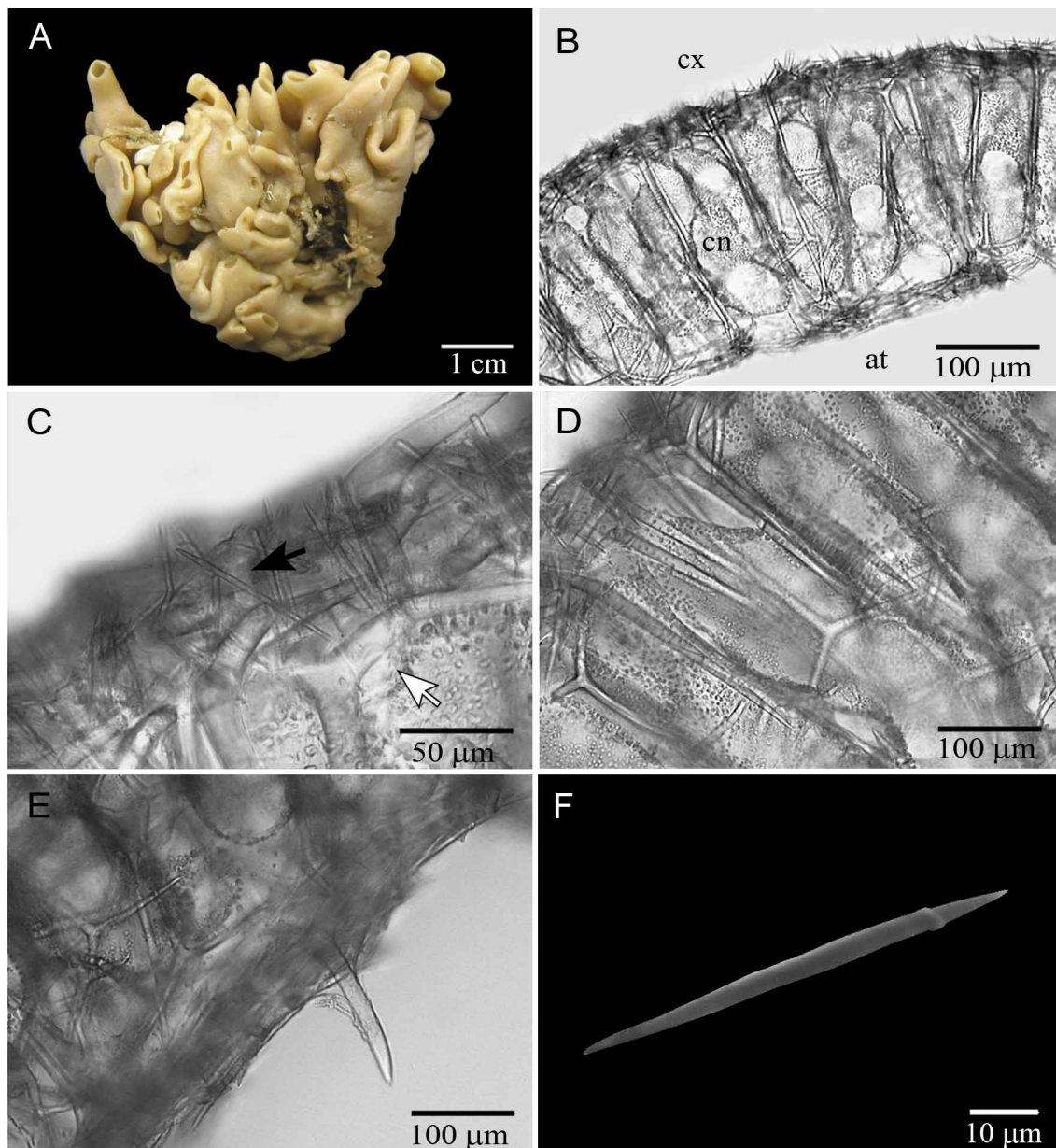
Species	Skeleton of the distal cones	Tubar Skeleton	Subatrial Skeleton	Atrial Skeleton	World Distribution
<i>Sycon commutatum</i>	Diactine	Triactine	Triactine	Tetractine	Cosmopolitan
<i>Sycon incrustans</i>	Diactines (2)	Triactine	Triactine	Triactine	Tumbes, Chile
<i>Sycon ornatum</i>	Trichoxea, diactines (2)	Triactine	Triactine	Tetractine	Cook Strait, New Zealand; Japan; Strait of Magellan
<i>Sycon proboscideum</i>	Diactines (2)	Triactine	Triactine	Tetractine	Cosmopolitan
<i>Sycon huinayense</i> sp. nov.	Trichoxea, diactines (2), triactine	Triactine	Triactine	Triactine, tetractine	Chile

***Sycettusa chilensis* sp. nov.**

(Figs. 8A–J, 9F; Table 10)

**Type material.** IZUA-POR-0119 = MNRJ 9250 (holotype / alcohol). MNRJ 9242 (paratype / alcohol).**Type locality.** Punta Choros, IV<sup>th</sup> Region, Chile.**Material examined.** MNRJ 9115; Canelo Islet, Guaitecas Archipelago; collected by V.H. & G.F.; 08 March 2005; -15 m. MNRJ 9242 and IZUA-POR-0119 = MNRJ 9250; Bajo Tiburón, Punta Choros; collected by E.H. & G.L.H.; 21 May 2005; -12 to -15 m.**Colour.** White or light beige in life and beige when preserved.**Etymology.** From the type locality.

**Description.** Massive, soft to friable sponge forming large folds with apical oscula sometimes surrounded by a fringe of trichoxeas (Fig. 8A, 9F). Surface is slightly hispid. Atrium is central, with a thin wall (1mm), and the aquiferous system is syconoid (Fig. 8B). The cortical skeleton is composed of tangential triactines and perpendicular microdiactines that protrude through the surface (Fig. 8C). A subcortical skeleton is present, composed of pseudosagittal triactines, which point their longest paired actine centripetally (Fig. 8C). The choanoskeleton is inarticulate, although more than one layer of subatrial spicules is sometimes observed. It is composed of the centripetal paired actines of subcortical triactines and of the unpaired actine of subatrial triactines (Fig. 8D). The atrial skeleton comprises triactines and tetractines (Fig. 8E).



**FIGURE 8A–F.** External and internal morphology of *Sycettusa chilensis* **sp. nov.** A—Fixed specimen; B—Transversal section (cx: cortex, cn: choanosome, at: atrium); C—Detail of the cortical skeleton showing microdiactines (black arrow) and a pseudosagittal triactine (white arrow); D—Detail of the choanosome; E—Detail of the atrial skeleton with a large apical actine; F—Cortical microdiactine.

**TABLE 10:** Spicules measurements of the holotype of *Sycettusa chilensis* **sp. nov.** (IZUA-POR-0119) and paratypes (MNRJ 9115, MNRJ 9242).

	Spicules		Length (µm)				Width (µm)		n
			min	mean	s	max	mean	s	
IZUA-POR-0119	Microdiactine		34.5	59.5	8.0	82.5	3.3	0.6	30
	Cortical triactine	Unpaired	96.0	123.3	18.3	156.0	10.4	1.5	28
		Paired	75.0	104.5	11.4	126.0	9.8	1.3	28
	Subcortical triactine	Unpaired	51.0	84.5	13.4	111.0	11.1	1.7	30
		Paired 1	126.0	166.7	26.0	219.0	12.9	2.1	30
		Paired 2	87.0	104.2	13.7	141.0	12.4	2.1	30
	Subatrial triactine	Unpaired	120.0	170.7	28.9	219.0	12.5	1.3	30
		Paired	75.0	105.4	17.2	135.0	10.9	1.3	30
	Atrial triactine	Unpaired	66.0	90.9	13.4	111.0	7.4	0.9	30
		Paired	63.0	86.3	11.0	114.0	7.1	1.0	30
	Atrial tetractine	Unpaired	104.0	145.0	22.7	174.2	17.8	1.8	13
		Paired	135.2	154.6	17.1	192.4	17.0	1.7	13
		Apical	67.6	114.8	24.5	161.2	16.5	3.0	13
MNRJ 9115	Microdiactine		60.0	74.3	6.7	87.0	3.3	0.6	30
	Cortical triactine	Unpaired	90.0	125.4	13.7	147.0	13.3	1.7	30
		Paired	117.0	140.8	11.8	165.0	12.6	1.3	30
	Subcortical triactine	Unpaired	63.0	89.4	14.0	114.0	17.9	1.2	14
		Paired 1	177.0	222.2	34.5	273.0	17.9	2.5	14
		Paired 2	84.0	125.4	16.6	150.0	16.5	1.3	14
	Subatrial triactine	Unpaired	162.0	211.9	31.4	264.0	15.9	2.0	30
		Paired	111.0	129.0	10.9	153.0	13.3	1.7	30
	Atrial triactine	Unpaired	83.2	114.1	16.2	143.0	14.0	1.2	20
		Paired	96.2	138.8	14.6	156.0	12.5	1.1	20
	Atrial tetractine	Unpaired	117.0	151.7	26.8	182.0	27.1	2.7	6
		Paired	137.8	180.1	33.1	244.5	24.3	1.8	4
		Apical	44.2	86.6	24.2	111.8	23.4	4.2	13
MNRJ 9242	Microdiactine		46.8	60.1	5.8	70.2	3.6	0.9	20
	Cortical triactine	Unpaired	96.2	123.8	17.5	166.4	10.5	1.3	20
		Paired	88.4	101.1	8.3	117.0	10.3	1.3	20
	Subcortical triactine	Unpaired	52.0	72.8	14.5	101.4	11.5	0.9	20
		Paired 1	143.0	176.9	18.7	208.0	14.0	1.6	20
		Paired 2	104	97.4	23.3	120	12.8	1.1	20
	Subatrial triactine	Unpaired	148.2	169.8	11.6	187.2	12.0	1.3	20
		Paired	85.8	107.0	11.2	130.0	12.2	1.0	20
	Atrial triactine	Unpaired	67.6	85.4	9.6	104.0	9.4	0.9	20
		Paired	88.4	107.5	12.9	135.2	9.8	1.0	20
	Atrial tetractine	Unpaired	93.6	116.6	18.4	119.6	10.4	0.0	2
		Paired	109.2	113.1	5.5	117.0	11.1	0.9	2
		Apical	78.0	85.8	11.0	93.6	9.1	1.8	2
All specimens	Microdiactine		34.5	64.6	8.4	87.0	3.4	0.2	-
	Cortical triactine	Unpaired	90.0	124.2	1.1	166.4	11.4	1.6	-
		Paired	75.0	115.5	22.0	165.0	10.9	1.5	-
	Subcortical triactine	Unpaired	51.0	82.2	8.5	114	13.5	3.8	-

to be continued.



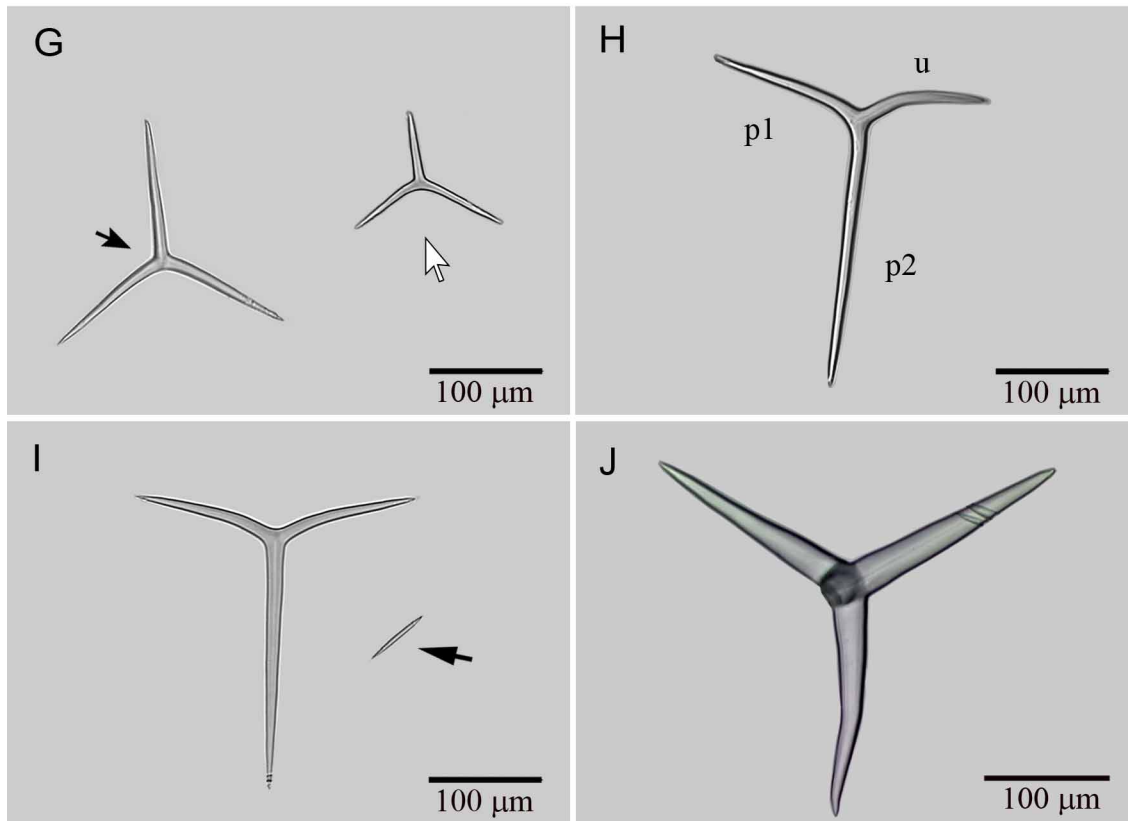
**TABLE 10** (continued)

Spicules			Length (µm)				Width (µm)		n
			min	mean	s	max	mean	s	
Subatrial triactine	Paired 1		126.0	188.6	29.5	273.0	14.9	2.6	-
	Paired 2		84.0	109.0	14.6	150.0	13.9	2.3	-
	Unpaired		120.0	184.1	24.1	264.0	13.5	2.1	-
	Paired		75.0	113.8	13.2	153.0	12.1	1.2	-
Atrial triactine	Unpaired		66.0	96.8	15.2	143.0	10.3	3.4	-
	Paired		63.0	110.9	26.4	156.0	9.8	2.7	-
Atrial tetractine	Unpaired		93.6	137.8	18.6	182.0	18.4	8.4	-
	Paired		109.2	149.3	33.8	244.5	17.5	6.6	-
	Apical		44.2	95.7	16.5	161.2	16.3	7.2	-

**TABLE 11.** Skeleton characters and world distribution of *Sycettusa* species.

Species	Cortical Skeleton	Subcortical Skeleton	Subatrial Skeleton	Atrial Skeleton	World Distribution
<i>Sycettusa glacialis</i> (Haeckel, 1872)	Triactine	Triactine	Triactine	Tetractine	Arctic
<i>Sycettusa nitida</i> (Arnesen, 1901)	Triactine, diactine	Triactine	Triactine	Tetractine	Arctic; Norway
<i>Sycettusa lanceolata</i> (Breitfuss, 1898)	Triactine, diactine	Triactine	Triactine	Triactine, tetractine	Arctic
<i>Sycettusa thompsoni</i> (Lambe, 1900)	Triactine, diactine, microdiactine	Triactine	Triactine	Triactine, tetractine	Canada
<i>Sycettusa kuekenthali</i> (Breitfuss, 1896)	Triactine, diactine	Triactine	Triactine	Triactine	Arctic
<i>Sycettusa murmanensis</i> (Breitfuss, 1898)	Triactine, tetractine	Triactine	Triactine	no	Arctic
<i>Sycettusa hastifera</i> (Row, 1909)	Triactine, diactine	Triactine	Triactine	Triactine	Red Sea
<i>Sycettusa glabra</i> (Row, 1909)	Triactine, diactine	Triactine	Triactine	Triactine	Red Sea
<i>Sycettusa poculum</i> (Poléjaeff, 1883)	Triactine, diactine	Triactine	Triactine	Triactine	Australia
<i>Sycettusa sycilloides</i> (Schuffner, 1877)	Triactine	Triactine	Triactine	Triactine	Indonesia
<i>Sycettusa stauridia</i> Haeckel, 1872	Triactine	Triactine	Triactine	Triactine	Red Sea
<i>Sycettusa simplex</i> (Jenkin, 1908)	Triactine	Triactine	Triactine	Triactine	Africa
<i>Sycettusa chilensis</i> <b>sp. nov.</b>	Triactine, microdiactine	Triactine	Triactine	Triactine, tetractine	Chile

**Spicules** (Table 10). Microdiactines [ $59.5 (\pm 8.0) / 3.3 (\pm 0.6) \mu\text{m}$ ]: These spicules are straight and fusiform with a slight enlargement near the end (lanceolate) that protrudes through the surface. Both tips are sharp (Fig. 8F, I).



**FIGURE 8.** External and internal morphology of *Sycettusa chilensis* **sp. nov.** G—Cortical triactine (black arrow) and atrial triactine (white arrow); H—Pseudosagittal triactine (p1: short paired actine; p2: large paired actine; u: unpaired actine); I—Subatrial triactine and a cortical microdiactine (arrow); J—Atrial tetractine.

Cortical triactines [unpaired actine  $123.3 (\pm 18.3) / 10.4 (\pm 1.5) \mu\text{m}$ , paired actines  $104.5 (\pm 11.4) / 9.8 (\pm 1.3) \mu\text{m}$ ]: Sagittal. Actines are conical, straight and blunt. The unpaired actine is a little longer than the paired ones. Paired actines are curved (Fig. 8G).

Subcortical triactines [unpaired actine  $84.5 (\pm 13.4) / 11.1 (\pm 1.7) \mu\text{m}$ , paired 1 actine  $166.7 (\pm 26.0) / 12.9 (\pm 2.1) \mu\text{m}$ , paired 2 actine  $104.2 (\pm 13.7) / 12.4 (\pm 2.1) \mu\text{m}$ ]: Pseudosagittal. The unpaired actine and the shortest paired actine of these spicules are adjacent to the cortex, while the longest paired actine points toward the atrial cavity. The paired actines are conical with sharp tips, while the unpaired one is curved. (Fig. 8H).

Subatrial triactines [unpaired actine  $170.7 (\pm 28.9) / 12.5 (\pm 1.3) \mu\text{m}$ , paired actines  $105.4 (\pm 17.2) / 10.9 (\pm 1.3) \mu\text{m}$ ]: Sagittal. These spicules point their unpaired actine, which is longer than the paired ones, towards the surface. Actines are conical, straight and sharp. The paired actines are the same length and, sometimes they are curved (Fig. 8I).

Atrial triactines [unpaired actine  $90.9 (\pm 13.4) / 7.4 (\pm 0.9) \mu\text{m}$ , paired actines  $86.3 (\pm 11.0) / 7.1 (\pm 1.0) \mu\text{m}$ ]: Sagittal. The unpaired actine is much shorter than the paired ones. Actines are conical and blunt (Fig. 8G).

Atrial tetractines [unpaired actine  $145.0 (\pm 22.7) / 17.8 (\pm 1.8) \mu\text{m}$ , paired actines  $154.6 (\pm 17.1) / 17.0 (\pm 1.7) \mu\text{m}$ , apical actine  $114.8 (\pm 24.5) / 16.5 (\pm 3.0) \mu\text{m}$ ]: Sagittal. The unpaired actine is shorter than the paired ones. Actines are conical and blunt. The apical actine is very thick and penetrates the atrium. It is conical, blunt, and smooth. These spicules are larger than the atrial triactines (Fig. J).

**Ecology.** Specimens were growing attached to red macroalgae *Aphanocladia* sp. and *Cryptopleura* sp.

**Remarks.** *Sycettusa chilensis* **sp. nov.** is the 13<sup>th</sup> species of the genus (Table 11). Two groups of sycettusas were recognised by Borojevic *et al.* (2002): the Arctic and the Indo-Pacific groups. The Arctic group comprises *S. glacialis* (Haeckel, 1872), *S. kuekenethali* (Breitfuss, 1896), *S. lanceolata* (Breitfuss, 1898), *S. murmanensis* (Breitfuss, 1898), *S. thompsoni* (Lambe, 1900), and *S. nitida* (Arnesen, 1901). The Indo-Pacific

**TABLE 12.** List of 20 species of *Calcarea* cited for Chile, including the type locality, distribution along the Chilean Coast, references and worldwide distribution pattern: Amphi-Pacific; Discontinuous; Provisionally endemic; Subantarctic/Magellanic; Supposedly cosmopolitan.

Species	Type Locality	Distribution in Chilean coast	References	Status of species
<i>Ascaltis poterium</i> (Haeckel, 1872) [as <i>Clathrina poterium</i> (Haeckel, 1872) and <i>Leucosolenia poterium</i> (Haeckel, 1872)]	Australia	Tom Bay and Calbuco, Chile	Ridley (1881) Breitfuss (1898)	Amphi-Pacific
<i>Clathrina coriacea</i> (Montagu, 1818)	S. Devon, England	Tom Bay, Chile	Ridley (1881)	Discontinuous
<i>Clathrina primordialis</i> (Haeckel, 1872)	Lesina, Adriatic Sea	Valparaíso, Chile	Haeckel (1872)	Discontinuous
<i>Grantia genuina</i> Row & Hôzawa, 1931	Shark's Bay District, Australia	Strait of Magellan	Tanita (1942)	Amphi-Pacific
<i>Leucandra fernandensis</i> (Breitfuss, 1898)	Juan Fernandez, Chile	Juan Fernandez, Chile	Breitfuss (1898)	Provisionally endemic
<i>Leucandra haurakii</i> Brøndsted, 1926	Hauraki Gulf, New Zealand	Puerto Pantalón, Chile	Tanita (1942)	Amphi-Pacific
<i>Leucandra masatierrae</i> (Breitfuss, 1898)	Juan Fernandez, Chile	Juan Fernandez, Chile	Breitfuss (1898)	Provisionally endemic
<i>Leucandra platei</i> (Breitfuss, 1898)	Punta Arenas, Chile	Punta Arenas, Chile	Breitfuss (1898)	Provisionally endemic
<i>Leucandra reniformis</i> Tanita, 1942	Picton Island, Chile	Picton Island, Chile	Tanita (1942)	Provisionally endemic
<i>Leucetta primigenia</i> Haeckel, 1872	Haeckel did not indicate holotype nor type locality	Valparaíso, Chile	Haeckel (1872)	Supposedly cosmopolitan
<i>Leucosolenia australis</i> Brøndsted, 1928	Observatory Bay, Kerguelen	Strait of Magellan	Tanita (1942)	Subantarctic / Magellanic
<i>Leucosolenia dictyoides</i> (Haeckel, 1872) [probably <i>Clathrina dictyoides</i> ]	Australia	Juan Fernandez, Chile	Breitfuss (1898)	Amphi-Pacific
<i>Leucosolenia variabilis</i> Haeckel, 1870	Haeckel did not indicate holotype nor type locality	Iquique, Chile	Tanita (1942)	Supposedly cosmopolitan
<i>Sycon commutatum</i> (Haeckel, 1872) [as <i>S. coronatum</i> var. <i>commutata</i> ; Syn. <i>Sycon coronatum</i> Ellis & Solander, 1786]	Haeckel did not indicate holotype nor type locality	Punta Arenas, Chile	Breitfuss (1898); Tanita (1942)	Supposedly cosmopolitan
<i>Sycon incrustans</i> Breitfuss, 1898	Tumbes, Chile	Tumbes, Chile	Breitfuss (1898)	Provisionally endemic
<i>Sycon ornatum</i> Kirk, 1897	Cook Strait, New Zealand	Punta Arenas, Chile; Strait of Magellan	Tanita (1942)	Amphi-Pacific
<i>Sycon proboscideum</i> (Haeckel, 1872) [as <i>S. raphanus</i> var. <i>p.</i> ; Syn. <i>Sycon raphanus</i> Schmidt, 1862]	Haeckel did not indicate holotype nor type locality	Punta Arenas, Chile; Strait of Magellan	Breitfuss (1898)	Supposedly cosmopolitan

to be continued.

TABLE 12. (continued)

Species	Type Locality	Distribution in Chilean coast	References	Status of species
<i>Vosmaeropsis inflata</i> Tanita, 1942	Punta Arenas, Chile	Punta Arenas, Chile	Tanita (1942)	Provisionally endemic
<i>Vosmaeropsis ovata</i> Tanita, 1942	Sarmiento, Chile	Sarmiento, Chile	Tanita (1942)	Provisionally endemic
<i>Vosmaeropsis sericatum</i> (Ridley, 1881) [as <i>Aphroceras sericatum</i> and <i>Leuconia sericatum</i> ]	Vitoria Bank, Brazil	Punta Arenas, Chile; Strait of Magellan	Ridley (1881); Breitfuss (1898)	Discontinuous

group includes *S. stauridia* (Haeckel, 1872), *S. sycilloides* (Schuffner, 1877), *S. poculum* (Poléjaeff, 1883), *S. simplex* (Jenkin, 1908), *S. glabra* (Row, 1909), *S. hastifera* (Row, 1909), and from now on *Sycettusa chilensis* **sp. nov.** Only other 2 species have microdiactines: *S. thompsoni* and *S. nitida*. Nonetheless these species also have large diactines (260/14  $\mu\text{m}$  and 210/7  $\mu\text{m}$ , respectively).

## Discussion

Table 12 lists the 20 species of Calcarea that had been previously reported from the Chilean coast and oceanic islands. The largest component of this fauna is of Chilean provisional endemics (7/20). A series of minor distribution patterns follows: Amphi-Pacific (5/20), supposedly cosmopolitan (4/20), discontinuous distributions (3/20), and Subantarctic/Magellanic (1/20). The 6 new species described here join the group of provisional Chilean endemics, which represents now 50% (13/26) of all known Calcarea from the country. This number is possibly underestimated by the fact that the proposed cosmopolitan (*Leucetta primigenia*, *Leucosolenia variabilis*, *Sycon proboscideum*, *Sycon commutatum*) and discontinuous (*Clathrina coriacea*, *Clathrina primordialis*, *Vosmaeropsis sericatum*) species, most probably, will eventually turn out to pertain to complexes of sibling species, with Chilean populations possibly found to represent provisional endemics. On the other hand, it is also conceivable that some overestimation occurs too due to the limited inventory of Calcarea undertaken in both the Argentinean (17 spp; Tanita 1942; López Gappa & Landoni 2005) and Peruvian (0 spp.) coasts.

Apart from the oceanic islands, there are no known marine areas of endemism in Chile, which translates into provisional endemics, likely either extending their ranges into Peruvian waters to the north or into Argentinean ones to the east. Nevertheless, with such an expressive fraction of provisional endemics, the distribution of Chilean Calcarea deserves a closer look. Of the 13 known provisional Calcarea endemics, only one has already been found in more than a single locality, with distribution ranges spreading over many degrees of latitude, *Sycettusa chilensis* **sp. nov.** (ca. 29–44° S). This species was described here and reflects the comprehensiveness searched for by the faunistic inventory undertaken by ourselves and our team of collaborators in the series of exploratory expeditions held along Chile since 2003. The remaining 12 species are all single locality records (10 spp.) or nearly so (*Clathrina fjordica* **sp. nov.**—several locations in Comau fjord, ca. 42° S; *Guancha ramosa* **sp. nov.**—Quintupeu, Comau and Reñihue fjords, ca. 42° S). Areas/localities emerging as sources of provisional endemics are Punta Arenas (*Leucandra platei*, *Vosmaeropsis inflata*) and the Juan Fernandez Archipelago (*Leucandra fernandensis*, *Leucandra masatierrae*). Other areas with provisional local endemics have a single one each: Comau fjord (*Sycon huinayense* **sp. nov.**), Peninsula de Mejillones (ca. 23° S, *Clathrina antofagastensis* **sp. nov.**), Picton Island (Beagle Channel, ca. 55° S, *Leucandra reniformis*), Reñihue Fjord (ca. 42° S, *Leucaltis nuda* **sp. nov.**), Sarmiento (possibly ca. 52° S, *Vosmaeropsis ovata*) and Tumbes (ca. 37° S, *Sycon incrustans*). No calcareous sponge has this far been reported from Easter Island.

*Leucandra*, with five species known, is a particularly rich genus in Chile, but at the moment, no species of this genus was found by us. This is a very rich genus worldwide, with 140 recognised species (van Soest *et al.* 2008). The generation of hypotheses of phylogenetic relationships for species groups within it, potentially will elucidate the general historical patterns in the evolution of the south eastern Pacific marine biota.

*Sycon ciliatum* and *S. huinayense* **sp. nov.** share the possession of atrial triactines and tetractines, which could be suggestive of a closer relationship. Nevertheless, the extensive list of localities wherefrom the former species has been reported, prevents any inference of biogeographic affinity between the areas of occurrence of both species. A taxonomic revision of *S. ciliatum* is necessary.

Thirteen species of *Sycettusa* are known in the world including the new species described above (Borojevic *et al.* 2002). Table 11 includes the spicular data (categories), as well as the known distribution of these. The only possible closer affinities detected are those of species sharing atrial triactines and tetractines, and of species that possess only atrial tetractines. The latter group comprises only Arctic species, viz. *S. glacialis* and *S. nitida*; while the former has three species, *S. lanceolata*, *S. thompsoni* and *S. chilensis* **sp. nov.**, comprising an Arctic—Boreal western Atlantic—southern South-american antitropical distribution. It is premature to offer any possible scenario for these groups in the absence of a formal phylogenetic analysis. Most of the areas concerned are widely distant from the focus of this study and any inference on their affinities would necessarily imply in a deeper study of the species occurring there, which has not been done here.

Only three species of *Leucaltis* are indisputably recognised in the world now. The new species described above, *L. clathria*, reported from the Caribbean (Florida and Bermuda), Portugal, western and central Indian Ocean, Australia and Japan (Burton 1963), and *L. tenuis*, from Japan. With such an extensive distribution reported for *L. clathria*, it is difficult to infer the biogeographic history of this species, and of the whole genus. *Leucaltis clathria*'s type locality is Florida, and Burton's (1963) proposed synonymy of Indian Ocean (*L. bathybia* var. *mascarenica* Ridley, 1884) as well as Australian species (*Clathrina latitubulata* Carter, 1886) is likely to be mistaken, even though maintained up to now by Wörheide & Hooper (1999) and van Soest *et al.* (2008). It is quite possible that the unlikely synonyms of *L. clathria* just quoted might represent distinct species in a sibling complex. In this case, the biogeographic affinity of *L. nuda* **sp. nov.** might call for one out of 3 possibilities: Magellanic—Caribbean, Magellanic—Western Indian Ocean, or Magellanic—Australian. Or, alternatively, a widely distributed Tethyan ancestor might have vicariated in southern South America after the onset of the Circumpolar Current in the Eocene-Oligocene.

Intriguingly, another species found in Chile, but not included in this article, is *Clathrina brasiliensis* Solé-Cava *et al.* 1991. This species was originally described from Brazil and morphological and molecular studies are being currently performed, comparing populations from Brazil, Argentina and Chile. Results of this work and a re-description of this species will be given soon.

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