

# Redescription of *Tetilla radiata* Selenka from the Southwestern Atlantic (Porifera, Spirophorida, Tetillidae) and designation of its neotype

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**ABSTRACT.** The first redescription of *T. radiata* Selenka, 1879 based on study of a live population and material other than the type is presented. A neotype is proposed for the species, from a locality some 400 km to the southwest as it has not been found in its original type locality, Guanabara Bay (Rio de Janeiro, Rio de Janeiro State).

**KEY WORDS.** Brazil, Guanabara Bay, São Sebastião Channel, taxonomy.

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There are ca. 70 species of marine sponges known from the coast of Rio de Janeiro State (MURICY & SILVA 1999, MURICY & RIBEIRO 1999). Only three of these were reported from Guanabara Bay, *Tetilla radiata* Selenka, 1879, *T. euplocamos* Schmidt, 1868 and *Tethya maza* Selenka, 1879. This bay is a highly impacted area nowadays due to anthropic deterioration of its surroundings including heavy loads of sewage from houses and industries of the great Rio de Janeiro City, aided by a slow renewal time of 11.4 days for 50% of its water (KJERFVE *et al.* 1997). *Tetilla radiata*'s exact type locality, Botafogo cove, is a bay within a bay, with increased water circulation restrictions.

The motivation to start this study stemmed from the realization that *T. radiata*, although occurring further south, had probably vanished in Guanabara Bay, as extensive series of dives in the 80's and 90's failed to rediscover it there. Also, in trying to identify the species in the São Sebastião Channel area, it was found out that its type material had probably been lost, thus asking for a neotype designation.

## MATERIAL & METHODS

Specimens were collected with a diver's knife through scuba diving. Preparations of dissociated spicules and of thick sections followed the usual procedures described elsewhere (MOTHE DE MORAES 1985, HOOPER 1997) for study under light microscopy. Figure 1 shows the collecting localities in the São Sebastião area, and the latter's position with regard to the south-eastern Brazilian coastline and the south-western Atlantic. Figure 2 shows the former type locality, Botafogo cove, and the present state of urban development around the area.

Abbreviation used is: MNRJ (Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil).

## RESULTS

### *Tetilla* Schmidt, 1868

Diagnosis. Tetillidae without porocalices, without cortical specialization, without auxiliary megascleres (VAN SOEST & RÜTZLER 2002). Type species: *Tetilla euplocamos* Schmidt, 1868.

### *Tetilla radiata* Selenka, 1879

Figs 3, 4, 5, 6a-c, 7a-c, 8; Tab. I

Remarks. The whereabouts of *T. radiata*'s type material has been searched for extensively, but unsuccessfully. Curators of sponge collections in Berlin, Erlangen, Frankfurt, Göttingen, Hamburg and Munich (all in Germany) were contacted but none of these hold any extant material. The Porifera Mailbase, with over 250 subscribers, has also been contacted, but no response was obtained. It is assumed accordingly that its type material has been lost and it was decided to designate a neotype, which is necessary in view of the brief description provided originally, with no data on spicule dimensions.

Neotype. BRASIL, São Paulo State: São Sebastião (off Praia Grande, 23°49'S, 45°25'W, São Sebastião Channel, 10 m depth), 17/V/1997, MNRJ 7106, E.L. Silveira *leg.*

Additional material. BRASIL, São Paulo State: Ilhabela (50 m to the SW of Ilha da Prainha, 23°51.232'S, 45°25.247'W, São Sebastião Channel, 6.5 m depth), 16/VI/1997, MNRJ 524, 525, 576, E. Hajdu *leg.*; (*idem*, 6 m depth), 05/I/2000, MNRJ 2994, E. Hajdu & M. Custódio *leg.*; (*idem*, 4 m depth), 28/XI/2001, MNRJ 5116, M. Custódio & U. Pinheiro *leg.* São Sebastião: (off Praia Grande, 23°49.000'S, 45°25.000'W, São Sebastião Channel,

Table I. Spicular micrometric data for specimens of *Tetilla radiata* Selenka, 1879. Oxeas measurements are given as smallest length – mean length – largest length/smallest width – mean width – largest width, in micrometers (N = 100). Triaesenes' measures are given as rhabdome/clad/cladome smallest length – rhabdome/clad/cladome mean length – rhabdome/clad/cladome largest length (N = 10). Rhabdomes were often broken and largest attainable lengths are likely larger than those measured here.

Specimens	Oxeas	Protriaenes	Anatriaenes
MNRJ 7106 Neotype	800-1,129-1,800/ 5-7.9-10	2,750/80/50- 3,053/100/50- 3,500/120/50	2,200/40/50-3,074/48/50-5,600/50/50
MNRJ 524	446-1,077.8-1,824/ 5-8-15	892/49/39-1,097.1/99.9/48.5-1,358/146/58	825/29/29-1,402.6/35/32-2,202/39/39
MNRJ 525	582-1,086.5-1,601/ 4-7.7-15	1,581/58/29-1,943.8/85.4/37.8-2,483/97/39	902/39/39-1,479.3/43.6/39.7-2,037/49/49
MNRJ563	485-984.3-1,746/ 5-7.7-10	834/78/29- 1,297.9/106.7/38.8- 1,785/194/49	1,019/39/39-1,315.3/38.8/43.7-2,231/49/49
MNRJ 576	485-1,008.1-1,649/ 5-7.9-15	1,310/78/39- 1,455/107.7/51.4- 1,795/149/78	873/39/39-1,362.9/38.8/38.8-1,843/39/39
MNRJ 1731	776-1,010.3-1,455/ 5-8.1-10	–	–
MNRJ 2994	786-1,103-2,231/ 5-8.7-15	922/78/39-1,201.8/91.2/38.8-1,698/97/49	601/29/37-709/31/39.7-844/39/49
MNRJ 5116	776-907.5-1,116/ 5-4.9-5	873/78/39-970/75.6/47.5- 1,067/97/49	970/39/39-1,195/39.7/39.7-1,455/49/49

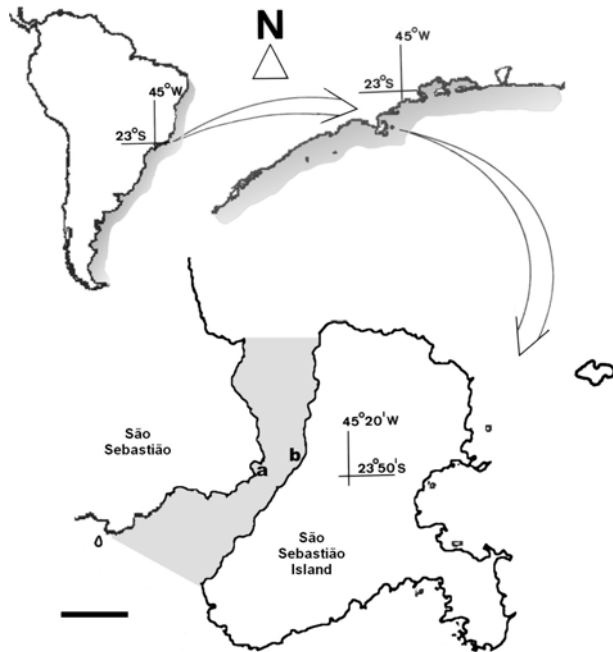


Figure 1. Map showing South America, a section of the southeastern Brazilian coastline; and, in detail, the São Sebastião Island and the Channel, with the collecting localities for *Tetilla radiata* indicated. (a) Off Praia Grande (23°49'S, 45°25'W); (b) 50 m to the SW of Ilha da Prainha (23°51.232'S, 45°25.247'W). Scale bar = 5 km.

10 m depth), 17/V/1997, MNRJ 563, F.L. Silveira leg. Ubatuba: Andorinha Rock (23°31'S, 45°06'W, Flamengo cove, 3 m depth), 20/I/1963, MNRJ 1731, L. Forneris leg.

Diagnosis. *Tetilla radiata* is set apart from other Brazilian species of *Tetilla* by its red-wine to pinkish colour alive, and

small size, less than 2 cm in height.

Description of the neotype. Olive-shape. Surface hispid, velvety. Specimen 22 mm height. A single apical oscule, simple, circular, 1 mm in diameter. Consistency firm but compressible. Live colour red-wine to pinkish, with a light yellowish-gray base. Grayish brown in ethanol.

Description. Olive-shape. Surface hispid, velvety. A single apical oscule, simple, circular, 1-5 mm in diameter. Consistency firm but compressible. Live colour red-wine to pinkish, with a light yellowish-gray base (Fig. 3). Grayish brown in ethanol (Fig. 4).

Anatomy. Perfectly radial (Figs 5, 6a), without a discernible cortex. Bundles of oxeas originate from a central point and run all the way to the surface, ramifying here and there but mostly not anastomosing. Protriaenes are intermingled with the oxeas and pierce the surface (Fig. 6b). Anatriaenes from the root bundles where they are disposed upside-down acting as hooks in the soft substrate (Fig. 6c). Transverse sections revealed (nearly) abundant longitudinal canals (150-300 µm thick) close to the oscule. These are not seen near the basal parts of the sponges.

Spicules. Megascleres are straight oxeas with sharp points (446-1,038.3-2,231/4-7.6-15 µm, length/width, Fig. 7a, 8); protriaenes with slender cladi, long rhabdomes with sharp points (rhabdome: > 3,500 µm, which was broken, cladi: 49-95.1-194 µm and cladome: 29-44.7-78 µm; Fig. 7b); and uniform anatriaenes with slender cladi, long rhabdomes with sharp points (rhabdome: > 5,600 µm, which was broken, cladi: 29-39.2-50 µm and cladome: 29-40.5-50 µm; Fig. 7c). Without microscleres.

Ecology. Found in soft substrates (fine-grained muddy-sand), hooked through their spicular tuft of anatriaenes. The species attained densities of up to a hundred specimens per square meter, being the only sponge found in this biotope. Some specimens had nudibranch egg-masses attached on them (e.g. MNRJ 524).

Distribution: from 23°31'S to 23°51'S, in southeastern Brazil.

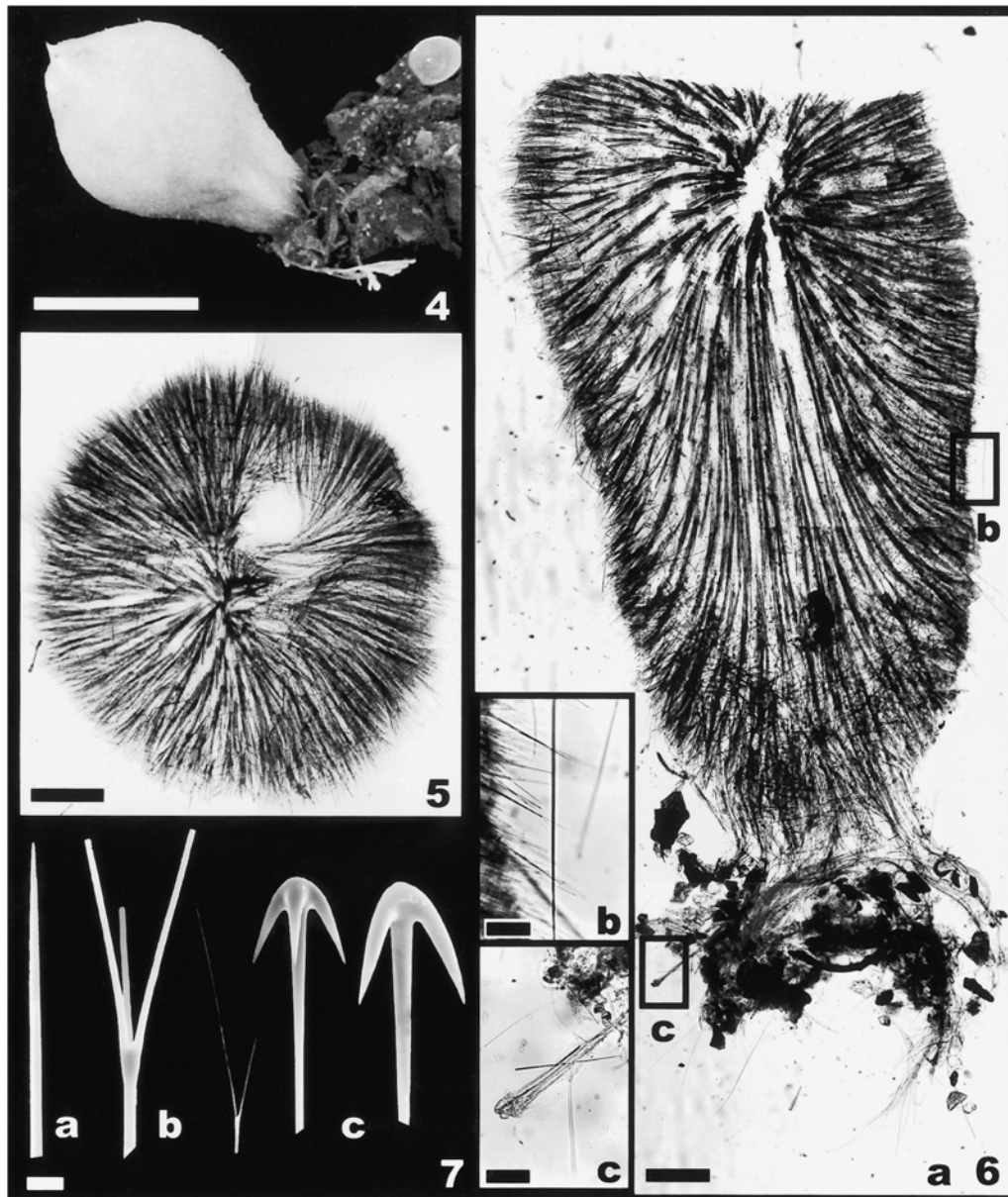


Figures 2-3. (2) Former type locality, Botafogo cove (arrow; Guanabara Bay, Rio de Janeiro), and the present state of urban development around the area; (3) *Tetilla radiata*; specimens *in situ* in the species's typically patchy distribution: 50 m to the SW of Ilha da Prainha (23°51.232'S, 45°25.247'W).

### DISCUSSION

The large conspicuous longitudinal aquiferous canals encountered by SELENKA (1879) in specimens split in two hemispheric halves was not found. From preliminary observations made in aquaria and *in situ*, it is apparent that specimens undergo marked contraction upon collection and handling, which

might account for this observed difference. Figure 8 shows the frequency distribution of size-classes for the oxeas. Despite the fact that some bar graphs suggest the existence of length gaps (e.g. MNRJ 524, 525, 1731), these were considered unimportant. The obtention of confident length measurements for the oxeas is hampered by the fact that the exceedingly thin triaenes



Figures 4-7. *Tetilla radiata*. (4) Specimen (MNRJ 2994) in its current state of preservation, after fixation in ethanol. Scale bar = 1 cm; (5) transversal section at the level of the oscule, scale bar = 100  $\mu$ m; (6a) longitudinal section of the radial skeleton, scale bar = 100  $\mu$ m; (6b) protriaenes piercing the surface, scale bar = 100  $\mu$ m; (6c) a tuft of anatriaenes, scale bar = 100  $\mu$ m; (7) megascleres: (a) oxea, (b) protriaenes, (c) anatriaenes, scale bar = 10  $\mu$ m.

are often broken, and their fragments are hard to tell apart from the thinner oxeas under light microscopy alone.

SCHMIDT (1868) reported *Tetilla euplocamos* for Desterro (nowadays, Florianópolis, Santa Catarina State), from material collected by Fritz Müller. The same species was lately found by SELENKA (1879) at Guanabara Bay, and reported to be olive-

green to yellowish-brown. Continued dedication to the study of marine sponge biodiversity in the coasts of Rio de Janeiro and São Paulo States by Hajdu and collaborators (*e.g.* HAJDU *et al.* 1999), and of Santa Catarina State by Lerner and collaborators (MOTHES & LERNER 1994, LERNER 1996) in the last decades failed to find the species again. The available descriptions for

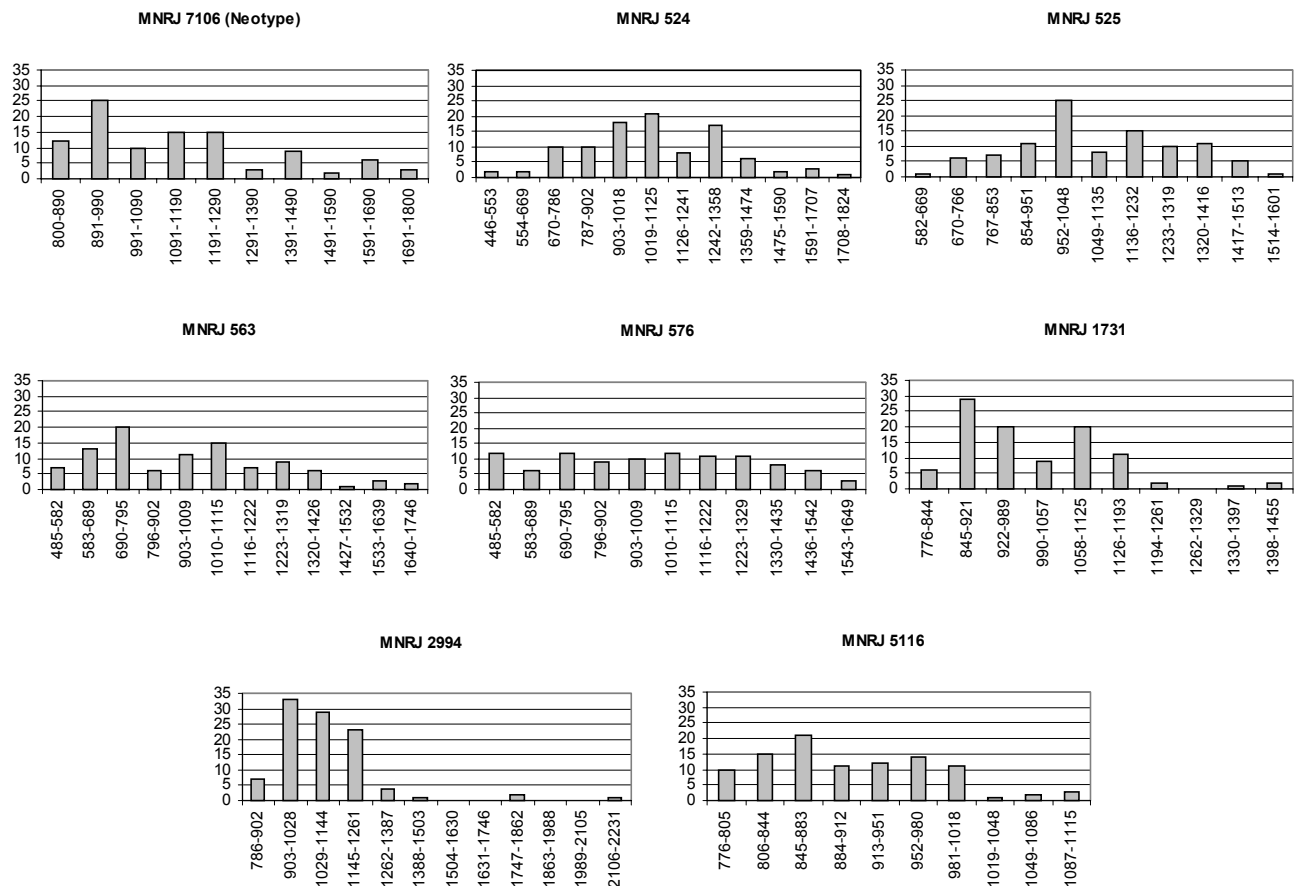


Figure 8. *Tetilla radiata*. Distribution frequency of the size-classes ( $\mu\text{m}$ ) of the oxeads ( $N = 100$ ) of the neotype (MNRJ 7106) and additional specimens.

*T. euplocamos* (SCHMIDT 1868, SELENKA 1879, SOLLAS 1888, VAN SOEST & RÜTZLER 2002), do not allow its recognition. VAN SOEST & RÜTZLER (2002) redescribed *T. euplocamos* type material, but the species remains unrecognizable, as these authors were unable to state confidently which categories of triaenes are present and how much they measure in micrometers. Even though *Tetilla* can be made out from the descriptions available for its type species, confidence on the taxonomic status of additional species assigned to the genus is compromised by uncertainties regarding the characterization of *T. euplocamos*.

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#### REFERENCES

- HAJDU, E.; BERLINCK, R.G.S & J.C. FREITAS. 1999. Porifera, p.19-32. In A.E. MIGOTTO & C.G. TIAGO (Eds). *Biodiversidade do Estado de São Paulo, Brasil (3): Invertebrados Marinhos*. São Paulo, Fundação de Amparo à Pesquisa do Estado de São Paulo, 310p.
- HOOPER, J.N.A. 1997. *Guide to sponge collection and identification*. Queensland, Qld. Museum, 143p.
- KJERFVE, B.; C.H.A. RIBEIRO; G.T.M. DIAS; A.M. FILIPPO & V.S.Q. QUARESMA. 1997. Oceanographic characteristics of an impacted coastal bay: Baía de Guanabara, Rio de Janeiro, Brazil. *Continental Shelf Research*, Southampton, 17 (13): 1609-1643.
- LERNER, C.B. 1996. Esponjas da Ilha da Galé, Reserva Marinha Biológica do Arvoredo, Santa Catarina, Brasil (Porifera; Demospongiae). *Biociências*, Porto Alegre, 4 (2): 101-129.
- MOTHES DE MORAES, B. 1985. *Manual de técnicas para a prepa-*

- ração de coleções zoológicas. 2. Esponjas Marinhas. São Paulo, Sociedade Brasileira de Zoologia, 3p.
- MOTHES, B. & C.B. LERNER. 1994. Esponjas marinhas do infralitoral de Bombinhas (Santa Catarina, Brasil) com descrição de três espécies novas (Porifera: Calcarea e Demospongiae). *Biociências*, Porto Alegre, 2 (1): 47-62.
- MURICY, G. & S.M. RIBEIRO. 1999. Shallow-water Haplosclerida (Porifera, Demospongiae) from Rio de Janeiro state, Brazil (Southwestern Atlantic). *Beaufortia*, Amsterdam, 49 (6): 47-60.
- MURICY, G. & O.C. SILVA. 1999. Esponjas marinhas do Estado do Rio de Janeiro: um recurso renovável inexplorado, p. 155-178. *In*: S.H.G. SILVA & H.P. LAVRADO (Eds). *Ecologia de Ambientes Costeiros do Estado do Rio de Janeiro*. Rio de Janeiro, PPGE-UFRJ, Série Oecologia Brasiliensis, vol. 7, 304p.
- SCHMIDT, O. 1868. *Die Spongien der Küste von Algier*. Leipzig, Mit Nachträgen zu den Spongien des Adriatischen Meeres (drittes Supplement), p. I-IV, p. 1-44.
- SELENKA, E. 1879. Ueber einen Kieselschwamm von achtstrahligem Bau, und über Entwicklung der Schwammknospen. *Zeitschrift für wissenschaftliche Zoologie*, Erlangen, 33 (2): 467-476.
- SOLLAS, W.J. 1888. Report on the Tetractinellida collected by H.M.S. 'Challenger' during the years 1873-76. *Report of the Scientific Results of the Voyage of H.M.S. 'Challenger' 1873-76*, vol. 25, p. 1-458.
- VAN SOEST, R.W.M. & K. RÜTZLER. 2002. Family Tetillidae, p. 85-98. *In*: J.N.A. HOOPER & R.W.M. VAN SOEST (Eds). *Systema Porifera. Guide to the supraspecific classification of Phylum Porifera*. New York, Kluwer Academic/Plenum Publishers, 1708p.

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