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Oncosclera - a new genus of freshwater sponges (Porifera-Spongillidae) with redescription of two species.

by CECILIA VOLKMER-RIBEIRO¹⁾

In 1963 the author described *Spongilla jewelli* n. sp. mentioning the similarities existing between the new species and *Spongilla navicella* CARTER, 1881. This species was incompletely described by Carter from a few gemmules found "in a twig in company with *Spongilla reticulata* and *Spongilla paupercula* Bk." (p. 87) and secured from the River Amazon. Recent accounts of *S. navicella* in argentinien waters by BONETTO and EZCURRA (1962) and BONETTO and EZCURRA DE DRAGO (1964, 1967, 1968) though offering a sound ecological study of the species do not provide details of skeletal and gemmular structures. Hence a redescription of *S. navicella* based upon examination of more abundant material is now given.

In 1961 Dr. E. J. FITTKAU from "Max-Planck Institut für Limnologie" made an extensive and carefull collection of amazonian spongillids and entrusted the author with study of this material. Postponement of this project for reasons beyond the control of the author delayed beginning of the study until 1968. As could be expected, *S. navicella* was found among the material from Amazon enabling the author to make a full comparison of *S. jewelli* and *S. navicella* and to confirm previous suppositions.

In 1968 PENNEY and RACEK published their brilliant revision on the Spongillidae. Material of *S. jewelli* and *S. navicella* were lacking in the collections studied by these authors so were not dealt with in their revision. It is, however, apparent that neither *S. navicella* nor *S. jewelli* can be placed in the Genus *Stratospongilla* as redefined by PENNEY and RACEK (1968). Presence of microscleres, of a pneumatic coat eventhough this may be poorly developed or situated outside the layer of gemmoscleres and of a tubular foramen are characteristics of genus *Stratospongilla* which completely lack in these two species. Similarly the two species can not find place in any of the genera established or redefined by PENNEY and RACEK (1968), thus indicating the need for a new genus to include *S. jewelli*, *S. navicella* and probably several other species which were also not represented in the materials studied by PENNEY and RACEK, or which have been tentatively referred to the genus *Stratospongilla* pending further studies. To meet this need, the new genus *Oncosclera*, is now proposed by the author.

Oncosclera, new genus

Type species — *Spongilla jewelli* VOLKMER, 1963

Definition:

Megascleres: Straight to slightly curved, slender to stout, occasionally microspined, more often smooth anfixoxea to anfistrongyla.

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Microscleres: Absent

Gemmoscleres: Stout, short, feebly to strongly curved, extremely variable anfi-strongyla or anfi-oxea; part of the scleres conspicuously inflated at middle portion; usually spined, spines being more numerous at the extremities. Extreme shortening in length may reduce inflated gemmoscleres to smooth or spined spheres.

Gemmules: Completely lack a pneumatic layer. Inner gemmular membrane forming as a small flask that slightly adheres to the outer gemmular membrane. Gemmoscleres embedded usually tangentially in thick outer gemmular membrane in one or more compact layers. Foramen or foramina with or without tube. Foraminal tube when present short. Gemmules large, of the adherent type or free but always aggregated in the basal portion of the sponge. Sponge forming thin crusts a few milimeters to 1 meter in diameter. Surface usually even.

Sponges encrusting fixed surfaces in fast streams. Found commonly close to rapids or water falls.

Oncosclera jewelli (VOLKMER, 1963)

Spongilla jewelli VOLKMER, 1963 p. 271

Spongilla (*Stratospongilla*) *jewelli* BONETTO & DE DRAGO, 1968, p. 43

Material: Paratypes and slides of types and paratypes, VOLKMER 1960 (Museu Rio-Grandense de Ciências Naturais. Catalog n^o 1).

Description: Sponge forming green patches from a few centimeters to one meter in diameter and not more than 0.5 mm thick. Encrusting rocky bottom of the river margins, submerged rocks or occasionally roots and stems of aquatic vegetation. In places not exposed to light as on the under sides of substrata the color is a dirty white indicating the green to be from associated algae. Surface even, velvetlike, with oscula radially arranged on top of relatively inconspicuous cones. The skeleton is formed of discontinuous longitudinal fibers each about six spicules thick, from which secondary transverse fibers arise at different levels. These transverse fibers anastomose with those from the other closer main longitudinal fibers thus forming a network or reticulum of elongated many angled meshes. Scales of spongin extend upward from the framework of one mesh to the next, thus the whole skeletal structure becomes a hollow but discontinuous tube bearing a little resemblance to a honeycomb. At the surface of the sponge the main longitudinal fibers project beyond the scaly dermal membrane giving the sponge its velvetlike appearance. The abundance of spicules and the mechanical advantage of the way they are meshed give a hard consistency to the entire sponge.

Megascleres: Strong, smooth, straight, abruptly pointed anfi-oxea from 180 to 235 micra long with the largest number approximately 200 micra long and 24 micra wide (Fig. 1).

Microscleres: Absent

Gemmoscleres: Short, thick, spined anfi-strongyla conspicuously inflated at middle portion. Shape exceedingly variable with all intergrading forms between the cylindrical and the spherical forms. Spines more numerous at extremities or present only at the extremities (Fig. 1).

Gemmules: The large, spherical, yellowish gemmules are very abundant and occur in a layer one to five gemmules thick at the base of the sponge. The gemmules are free and have an inner quite thick gemmular membrane loosely adhering to an outer gemmular membrane. Gemmoscleres are embedded in the outer gemmular membrane some tangentially some at random in one or more layers. Pneumatic layer absent. Usually two foraminal apertures oriented at random. No foraminal tubes present (Fig. 2, 3).

Distribution: Hitherto known only from type locality: "Passo da Ilha" Tainhas River in the basaltic plateau northeastern part of Rio Grande do Sul State, Brasil. At this place waters of the river are swift and many small falls exist above and below.

Remarks: *Oncosclera jewelli* shows a striking similarity to *Spongilla rousseletti* KIRK PATRICK, 1906 and marked similarities to *Spongilla macrospiculata* STEPHENS, 1919 and to *Spongilla (Stratospongilla) gilsoni* TOPSENT, 1912. Structures of skeleton and of gemmules as well as spicular components of *O. jewelli* and *S. rousseletti* are practically the same. The difference between the two species lies only in the tubular foramina of *S. rousseletti*. *O. jewelli* has in common with *S. macrospiculata* structures of skeleton and of gemmules as well as gemmoscleres. The two species differ in that *S. macrospiculata* has gemmules of the adherent type with short foraminal tube, and megascleres smooth anifloxa with swollen extremities. *O. jewelli* shares with *S. (S.) gilsoni* form of gemmoscleres and structure and disposition of gemmules which lack a foraminal tube and are of the free type in both species. They differ in *S. (S.) gilsoni* having spined instead of smooth megascleres. All these species lack microscleres. *O. jewelli* shows yet some characteristics in common with *Spongilla (Stratospongilla) ponsi* BONETTO and DE DRAGO, 1968 and *Spongilla (Stratospongilla) tonolli* BONETTO and DE DRAGO, 1968. These species have in common the absence of microscleres, the absence of a pneumatic coat in gemmules and anifstrongylous gemmoscleres which show a median inflation and spines concentrated at the extremities of scleres. Both species *S. (S.) tonolli* and *S. (S.) ponsi* are found encrusting the rocky bottom of River Uruguay near rapids of Salto Grande.

Oncosclera navicella (CARTER, 1881)

Spongilla navicella CARTER, 1881, p. 87 — POTTS, 1887 p. 195 — WELTNER 1895, p. 119 — GEE, 1931 e, p. 44 — BONETTO & EZCURRA, 1962 p. 212; 1964 p. 247 — VOLKMER, 1963 p. 273.

Spongilla (Stratospongilla) navicella BONETTO & DE DRAGO 1967 p. 335; 1968 p. 430.

Spongilla navicella PENNEY & RACEK, 1968 p. 41

Material: Cuieiras River northern part of Amazon State, Brasil. E. J. FITTKAU 18. 12. 61. (Museu Rio-Grandense de Ciências Naturais Catalog n.ºs. 4, 5, 6, 7).

Description: Dry sponge forming small, dirty-white tufts fixed on extremities of the spiny processes of a *Drulia* sp. Surface, as seen under magnification, spiny. Oscula few and with no particular arrangement. Skeleton formed of main, not continuous longitudinal fibers 3 spicules thick connected at different levels by transverse secondary fibers as in *O. jewelli*. The reticular arrangement of secondary fibers is here very conspicuous due to the little amounts of spongin present. Projection of the main longitudinal fibers give the sponge its spiny surface. Consistency hard.

Megascleres: Slender, smooth, slightly curved, gradually pointed anfiõxea, 130 to 170 micra long and 6.5 micra wide. The thinner of these megascleres show a very slight microspination, a character already mentioned by PORTS (1887 p. 196) when describing *O. navicella* (Fig. 4).

Microscleres: Absent

Gemmoscleres: Very short and thick to quite long and slender, smooth and to varying degrees curved and medially inflated anfiõxea. Shape exceedingly variable with also spherical forms present. Because of complete intergrading in length between shorter and longer gemmoscleres there can be no basis for dividing them into two categories. On the other hand the longer gemmoscleres are readily told from the shorter megascleres by the strong curvature of the former (Fig. 4).

Gemmules: The large, globoelliptical, brown gemmules are of the adherent type and occur singly. Inner gemmular membrane forms an independent flask with a short pore tube (Fig. 5) which fits into tube of the outer gemmular membrane. Gemmoscleres tangentially packed together in several layers in the outer gemmular membrane form a strong armature (Fig. 6). Efforts to separate gemmules from the substratum usually result in breaking of the armature with the inner flask falling free. Pneumatic layer absent.

Distribution: Amazon River, Cuieiras River (Brasil); Iguazú Falls of Paraná River, Paraná River, Uruguay River and Plata River (Argentina).

Remarks: BONETTO & DE DRAGO who have long paid attention to the large ecomorphic variations of this species remark that in the fast waters of high Paraná River and Uruguay River specimens of *O. navicella* will develop small crusts not larger than 0.4 to 0.5 cm. (megascleres not longer than 200 micra and 10 micra thick). In middle Paraná River and in Plata River however specimens of *O. navicella* form crusts some meters in diameter and 4 to 5 cm. high (megascleres reaching lengths of 250 to 330 micra and 25 micra thick). This may be the reason why all accounts of occurrence of *O. navicella* in usually swift amazonian waters up to now record the presence of only gemmules or of little specimens as the ones we are describing. In high Paraná River, BONETTO & EZCURRA (1964 p. 248) also record the occurrence of a few gemmules of *O. navicella* adhering to the ligament and valves of a freshwater bivalve (*Anodontites trapezialis forbesianus*).

O. navicella shows marked similarities to *Spongilla* (*Stratospongilla*) *schubotzi* WELTNER, 1913; *Spongilla* (*Stratospongilla*) *petricola* BONETTO & DE DRAGO, 1967; *Spongilla* (*Euspongilla*) *stolonifera* BONETTO & DE DRAGO, 1967 and to *Spongilla clementis* ANNANDALE, 1909.

To judge from WELTNER's good though short description of *S. (S.) schubotzi* both species have quite identical smooth spicular components as well as very similar structures of skeleton and of gemmules. Difference between these species lies in the great variability of megascleres and gemmoscleres in *S. (S.) schubotzi*. A considerable identity exists also between *O. navicella* and *S. (S.) petricola* as already remarked by BONETTO and DE DRAGO (1967) when describing the latter species. The only difference between the two species is the microspined gemmoscleres of *S. (S.) petricola*. *S. (E.) stolonifera* has spined and smooth slender anfiõxea-as megascleres and though all gemmoscleres are microspined anfiõxea they display the characteristic inflation and curvature of gemmoscleres as in *O. navicella*. *S. (E.) stolonifera* has also among its gemmoscleres some which are spherical. *S. clementis*, on the other hand, seems to be a form allied to *S. (E.) stolonifera*. Both species

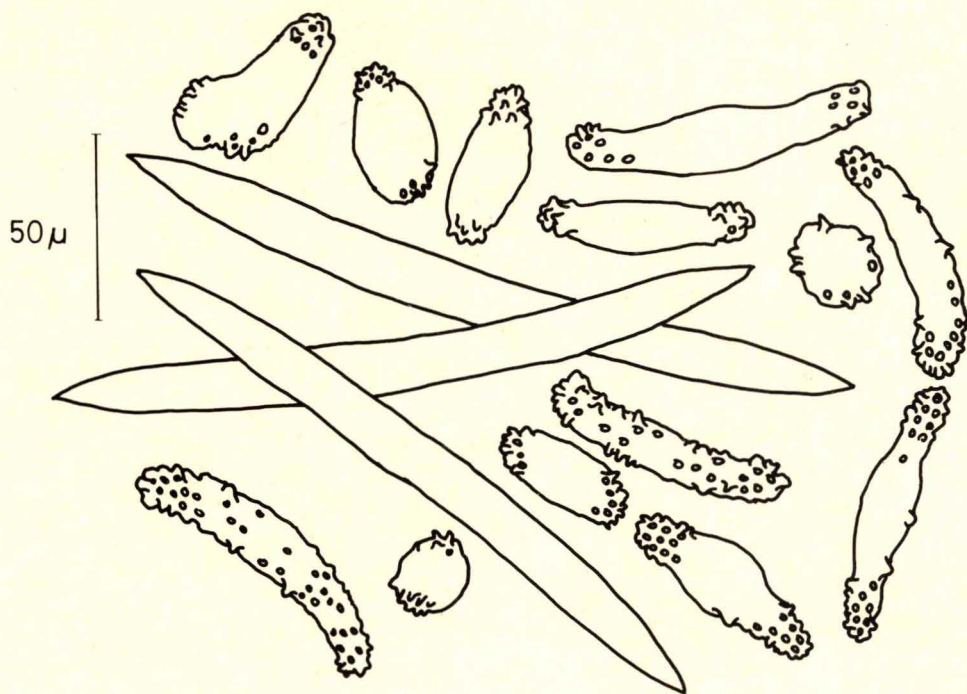


Figure 1: Spicular components of *Oncosclera jewelli*: Smooth megascleres and spiny, medially inflated gemmoscleres.

Figure 2: *Oncosclera jewelli*: Transverse section of gemmule showing thin inner gemmular membrane pulled inside and gemmoscleres embedded in thick outer gemmular membrane.

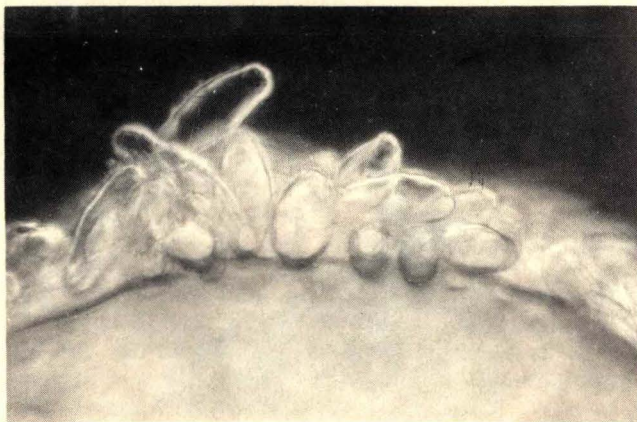
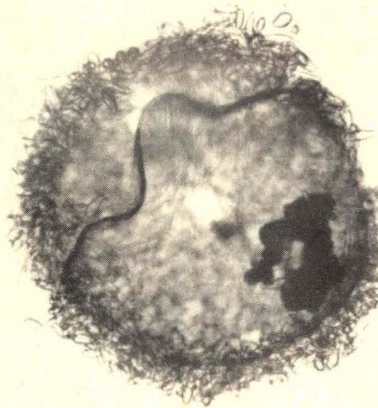


Figure 3: *Oncosclera jewelli*: Inner gemmular membrane was not taken out of place and is shown to adhere slightly to outer gemmular membrane.



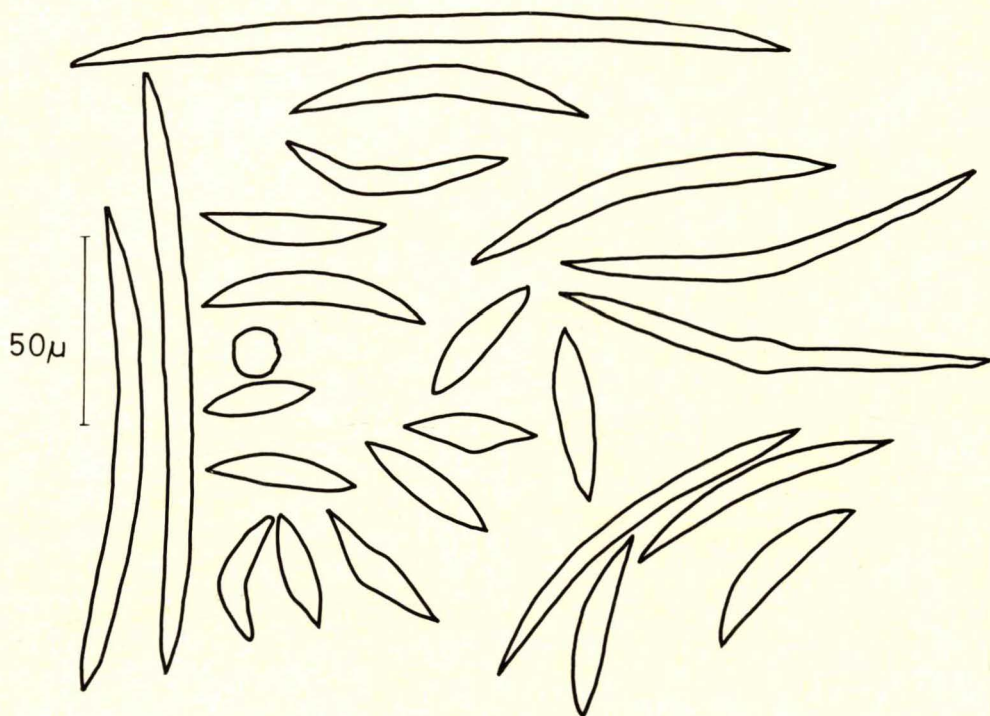


Figure 4: Spicular components of *Oncosclera navicella*: Straight smooth megascleres and assorted variations of the gemmoscleres.

Figure 5: *Oncosclera navicella*: Inner gemmular membrane forming independent flask with short tube.

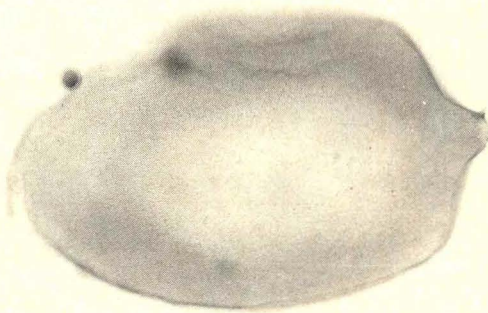


Figure 6: *Oncosclera navicella*: Outer gemmular membrane showing several layers of gemmoscleres tangentially embedded.



have gemmoscleres with a terminal spine surrounded by spines at right angles to it, gemmules with a short foraminal tube, of the adherent type and lacking a pneumatic coat and structure of the skeleton conforming the spicular arrangement seen in *O. navicella* and *O. jewelli*.

Discussion

The new genus is closely related to genus *Stratospongilla* as redefined by PENNEY and RACEK (1968). It differs from *Stratospongilla* in the absence of free microscleres from inner symplasm and dermal membrane, in the total absence of a pneumatic layer in gemmules and in the great variability and peculiar form of gemmoscleres.

PENNEY and RACEK (1968) though advancing the probability of erecting a new genus gathering all those species of *Stratospongilla* devoid of microscleres did not attempt such a division because specimens of such forms were missing in the collections studied by these authors. A Study of plenty of material of *O. jewelli* and of complete specimens of *O. navicella* rendered it evident that these two sponges could not be placed under *Stratospongilla* and that creation of a new genus, for at least these two forms, could not be postponed.

On the other hand one cannot escape comparison of these two species with all those devoid of microscleres and provisionally placed under *Stratospongilla*. What such a comparison brings out is a number of striking similarities both among spicular components and among structures of skeleton, not to speak of a marked preference for a same particular habitat.

Pending renewed occurrences and study of all the species here related to *O. jewelli* and *O. navicella* the new genus would consist of two main groups of species with two intergrading species in between. One group would be represented by *O. jewelli* and related species with anfistrongylous gemmoscleres passing through *S. (S.) ponsi* and *S. (S.) tonolli*, with gemmoscleres that start taking stronger curvature and slendering, to the group of species with anfiocous gemmoscleres. *O. navicella* would stand, up to now, for the most extreme representant of this last group. At the same time location along this gradient of species from *O. jewelli* to *O. navicella* seems to progress from species showing preference for turbulent waters to species like *O. navicella* attaining full development in more calm waters.

Summary

A new genus of freshwater sponges consisting presently of two species is established. The two species are redescribed and compared to several other species which have been tentatively referred to genus *Stratospongilla* but which may, pending further studies, be included in the new genus.

Sumário

Um novo gênero de esponjas de água doce é caracterizado no presente trabalho bem como redescritas as duas espécies que o integram. Apontam-se ainda várias afinidades existentes entre as espécies redescritas e diversas outras até aqui provisoriamente incluídas no gênero *Stratospongilla* mas que mediante novos estudos serão muito provavelmente incluídas no novo gênero.

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