Acanthotylotra alvarengai (Porifera, Demospongiae) new genus and species of sponge from Tocantins River, Pará State, Brazil

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ABSTRACT. *Acanthotylotra* a new monotypic genus of freshwater sponge is defined. Its sole species *A. alvarengai* sp. nov. is described based upon microscopic specimens recovered from the Tocantins river, Pará State, Brazil, when the deep rocky substrate was temporarily exposed downstream from the dam at the time it was closed for lake formation. A unique set of megascleres, allied to the paucity of spongin, the renieroid skeleton and the fact that gemmules or new specimens remain undetected, call for the proposition of a new monospecific genus to be retained as *incertae sedis* until new larger and probably gemmuliferous specimens come to be found.

KEYWORDS. Continental sponges, Neotropical Region, new taxa, deep benthos.

RESUMO. *Acanthotylotra alvarengai* (Porifera, Demospongiae) novo gênero e espécie de esponja do Rio Tocantins, Estado do Pará, Brasil. *Acanthotylotra*, um novo gênero monotípico de esponja de água doce, é definido e sua única espécie, *A. alvarengai* sp. nov. é descrita, com base em espécimes microscópicos coligidos no Rio Tocantins, Estado do Pará, Brasil. Os espécimes foram coligidos quando o substrato rochoso profundo ficou temporariamente exposto a jusante da represa, por ocasião do seu fechamento para a formação do lago. Um conjunto único de megascleras, aliado à escassez de espongina, ao esqueleto renieróide e ao fato de não se haver detectado gêmulas ou novos espécimes, recomenda a proposta de um novo gênero monoespecífico e sua manutenção como *incertae sedis* até que exemplares maiores e provavelmente gemulíferos sejam descobertos.

PALAVRAS-CHAVE. Esponjas continentais, Região Neotropical, novos táxons, bentos profundo.

The Tocantins river is the largest river situated entirely within Brazilian national territory. Along the middle of its course, from the town of Alcobaça, currently renamed Tucuruí, there is an extremely rocky unnavigable 12 km stretch with numerous waterfalls enclosed by high banks. It was exactly this rocky gorge along the river that was used to support the dam built to contain a lake for the Tucuruí Hydro-Electric Plant (HEP). The course of the river was completely interrupted with the inauguration of the Tucuruí HEP in September/1984 and was concluded in March/1985, when the river stretch with several waterfalls was definitively submersed and downstream was again covered by the river, as it began to receive the flow from the HEP slipway (Fig. 1). With the formation of the lake the Curupira Project was launched to rescue the large numbers of animals expelled by the flooding of the surrounding land as the lake filled and the fish and invertebrates that were exposed downstream from the dam. Among those that worked on the downstream portion of the river were Luiz Carlos F. Alvarenga and W. Zwink, from the Museu Nacional da Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, who dedicated themselves to the scientifically saving of aquatic invertebrates, particularly the molluscs. Due to their proximity, in the same habitats, several specimens of sponges were gathered and sent to the present senior author for study, identification and safekeeping. Part of this spongologic material was object of publications (Volkmer-Ribeiro & Tavares, 1995; Tavares & Volkmer-Ribeiro, 1997). During the examination of those materials small silicious nodules were noted in one of the especimens of *Drulia uruguayensis* Bonetto & Ezcurra de Drago, 1968, deposited in the scientific collection of Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, RS, Brazil (MCN-POR 1152). The microscopic examinations revealed a well-structured reticule of spicules that was, until then unknown in any genus previously registered in the literature on continental sponges. Given that these microscopic specimens contained no gemmules, the results of new surveys in Amazonic rivers were awaited for the detection of larger gemmule-bearing specimens. As, to date, this has not occurred, despite the several expeditions undertaken and material received for identification from the region, it was decided to perform the register with the material available, so producing the basis for future redescriptions and taxonomic reassessments, in the case that larger examples are found with gemmules.

MATERIAL AND METHODS

All the studied specimens were removed from the base of the specimen of *D. uruguayensis* MCN-POR 1152 (Figs. 2, 3), so that only the holotype remained fixed (Fig. 4), from which a fragment was removed for dissociation of the spicules that were deposited on a Scanning Electron Microscope (SEM) support for studies and illustration. Due to the microscopic size of the specimens, some of the paratypes were used *in totum* for dissociation of the organic matrix and release of the spicules. All the material was then mounted on slides. Each slide was numbered in accordance with the original specimen. Two of the paratypes (Figs. 5, 6) are fixed on the support of the SEM. For dissociation of the organic matrix, with

the aim of studying the spicules using Optical Microscopy or Scanning, VOLKMER-RIBEIRO & TURCQ (1996) was followed. The denomination of the spicules follows BOURY-ESNAULT & RÜTZLER, 1997.

Acanthotylotra gen. nov.

Type species. *Acanthotylotra alvarengai* n. sp.

Etymology. The genus name, feminine, derives from the remarkable shape of its megascleres.

Diagnosis. Sponge forming initial minute whitish tufts at the base of other sponges. Consistency firm. Skeleton a renieroid reticulation with scanty spongin cementing the extremities of the megascleres together at the reticular nodes. Megascleres in two categories. Alfa megascleres thick, curved to straight acanthotylostrongyles, the curved ones with the concave section of the spicule smooth and the outer one spined. The spines grouped in small spots or forming half rings on the convex section of the spicule, the tylote extremities entirely covered with minute spines. Beta megascleres slim, straight to slightly curved anfistrongyles presenting several irregularly distributed microspined tubercules along the spicule length except at the extremities which are invariably covered with minute spines. Microscleres unknown or absent. Gemmules unknown. Adult sponge also unknown.

Scope and distribution. Monotypic genus with distribution presently restricted to the middle and quite probably the lower course of Tocantins river and its tributaries (Fig. 1).

Acanthotylotra alvarengai sp. nov.

(Figs. 3-14)

Etymology. The species name is dedicated to the memory of Dr. Luiz Carlos Alvarenga, in recognition for the sponge collection gathered at the Tocantins river during the Curupira Project and sent to the senior author for study and safekeeping.

Description. Sponge forming minute whitish mounds a few milimeters in diameter, some of them overgrown by or sticking to the fibers of a specimen of *D. uruguayensis* (Figs. 3-6). A thin basal plate can be perceived as a single spicule thick crust of irregularly distributed alfa and beta megascleres which supports a renierioid skeleton (Figs. 5, 6). Spongin scarce, present only as a cement gluing together the megasclere extremities at the reticular nodes (Figs. 7-10) of the triangular meshes. Dermal membrane conspicuous at places. Megascleres in two categories. Alfa megascleres small, curved, rarely straight, stout acanthotylostrongyles with pronouced microspined tylote extremities. The curved ones with the concave section usually smooth and the convex one spined, the spines grouped so as to form spots or half rings. The straight acanthotylostrongyles with spines irregularly distributed along the sclere except for the tylote extremities which remain identically microspined as in the curved ones (Figs. 7-12, 14). Beta megascleres abundant, singly scattered

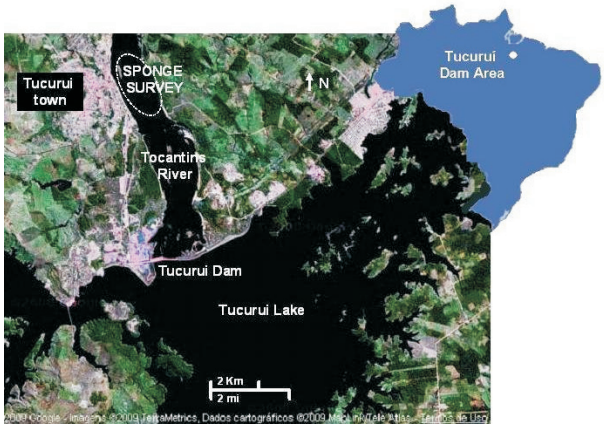
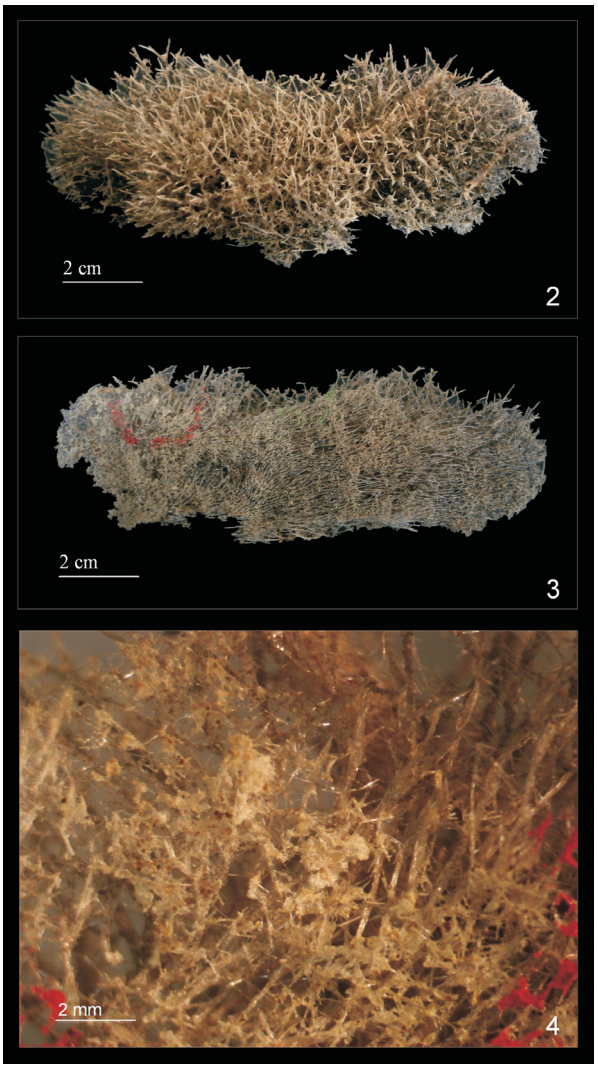


Figure 1. Map of the Tocantins river showing, from the bottom to the top, the Tucuruí man-made lake, the Tucuruí Dam and the river stretch surveyed. Adapted from: 2009 Google – Imagens © 2009 TerraMetrics, Dados Cartográficos © 2009 MapLink, Tele Atlas.



Figures 2-4. The *Drulia uruguayensis* Bonetto & Ezcurra de Drago, 1968 specimen (MCN-POR 1152) which overgrew the holotype of *Acanthotylotra alvarengai* sp. nov.; 2, Top view of the specimen; 3, basal view of the specimen with the red line indicating the incrusting of the holotype of *Acanthotylotra alvarengai* sp. nov.; 4, enlargening of the area marked with the red circle showing the holotype of *Acanthotylotra alvarengai* sp. nov. Photos by Vanessa de Souza Machado.

throughout the skeletal meshes, sometimes composing with the alfa megascleres at the reticular nodes, other times glued together with sand fragments, slimmer, quite long strongyles with sparsely ditributed digitiform microspined projections along the sclere, the same microspines covering the esclere extremities (Figs. 8-10, 13, 14). Microscleres unknown or absent. Gemmules unknown. Spicule measurements in Table I.

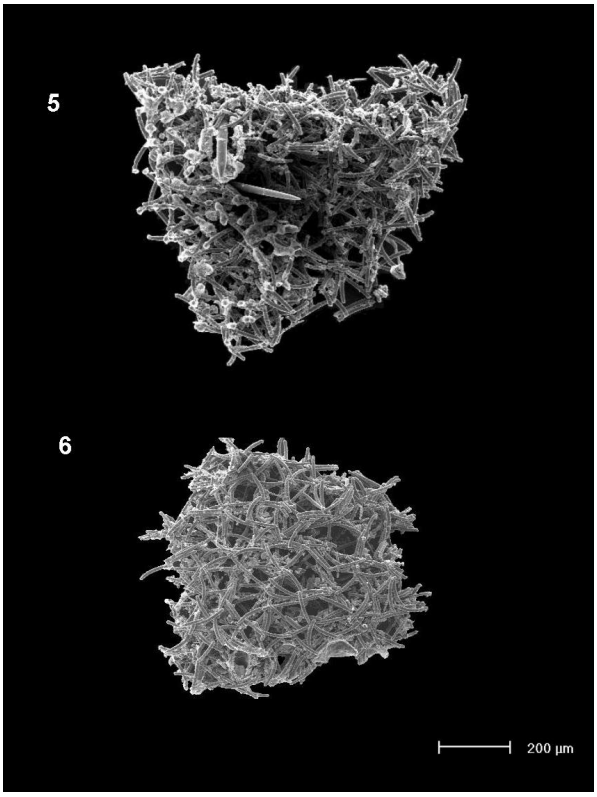
Habitat. Deep rocky substrates subjected to turbulent and well oxigenated waters.

Type locality. Tocantins river, Tucuruí, Pará State, Brazil.

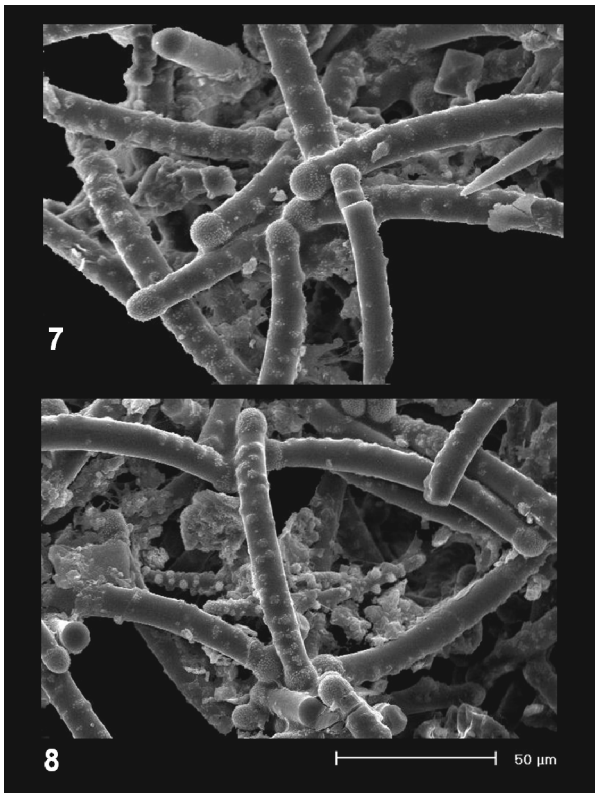
Remarks. The sponge was detected when a collection of sponges was studied encompassing mostly specimens gathered from the rocky deep substrates of amazonian rivers exposed at the time when the dams of hydro-electric power projects were closed for lake formation. Due to the small size of the specimens and the absence of gemmules the decision was taken to wait for

Table I. Measures in µm of the spicules of *Acanthotylotra alvarengai* sp. nov. (MCN-POR 2700, 3146, 3147 e 3148) from the Tucuruí river, Pará, Brazil. (Min, minimum; Max, maximum; Ave, average; SD, standard deviation).

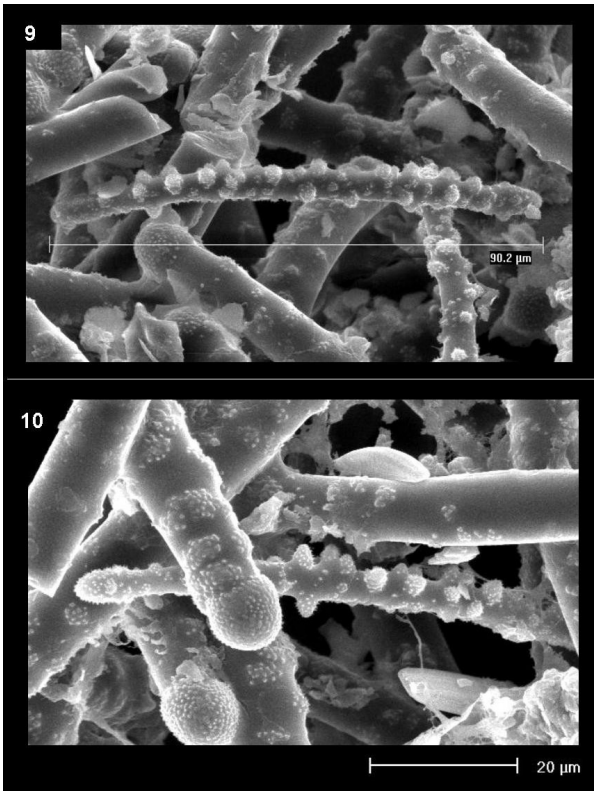
	Alfa megascleres		Beta megascleres	
	Length	Width	Length	Width
Min	91,76	12,21	79,92	5,18
Max	167,98	25,53	118,4	15,17
Ave	141,74	18,11	104,32	9,95
SD	12,46	2,76	7,85	2,19



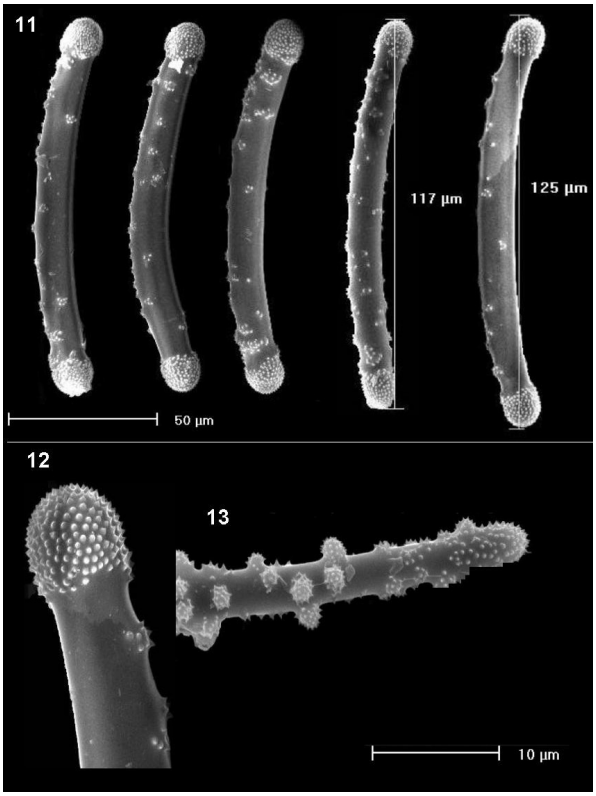
Figures 5, 6. *Acanthotylotra alvarengai* sp. nov. SEM images of Paratypes. 5, MCN-POR 3151 (the large oxea megasclere belongs to the *Drulia uruguayensis* Bonetto & Ezcurra de Drago, 1968 skeleton); 6, MCN-POR 8112.



Figures 7, 8. *Acanthotylotra alvarengai* sp. nov. SEM images showing the renieroid structure of the skeleton, the paucity of spongin and the loose arrangement of the beta megascleres. 7, MCN-POR 3151; 8, MCN-POR 8112.



Figures 9, 10. SEM images of *Acanthotylotra alvarengai* sp. nov. 9, two beta megascleres and several alfa megascleres; 10, details of the spine covering at the alpha and beta megascleres.



Figures 11-13. *Acanthotylotra alvarengai* sp. nov. 11, details of the alfa megascleres shape and spine covering; 12, detail of the spine covering of the alfa megascleres extremities; 13, detail of the shape and spine covering of the beta megascleres.

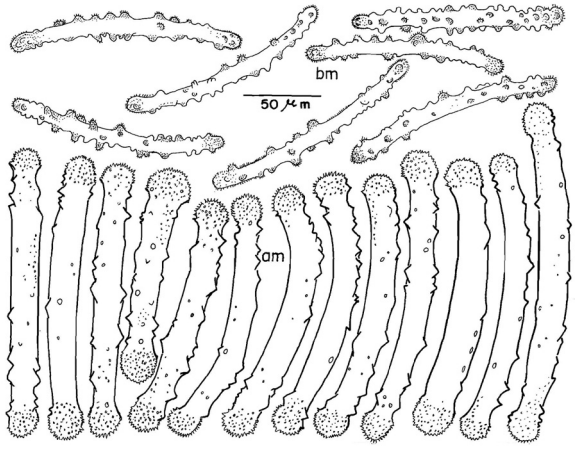


Figura 14. *Acanthotylotra alvarengai* sp. nov. Camera lucida drawings of the alfa megascleres (am) and the beta megascleres (bm) variation.

the completion of new surveys in the area so that new specimens with gemmules might be found. To date, although several surveys have been carried out in the area, no new material has been found. However evidence of the presence of this sponge in the area drained by the Tocantins river continues to be produced, as shown by the detection of its megascleres in dredged present and past sediments (C. Volkmer-Ribeiro, pers. comm.). Therefore, it can be concluded that the species is a dweller of deep river substrates, either stony or smooth continuous rocky beds. In order not to obscure future findings, the authors took the decision to offer the present description in the hope that future surveys come up with larger and gemmuliferous specimens. The specimens described herein are thus considered to be young or dislodged from the species preferred depths.

The set of megascleres presented by the studied materials is not common or similar to any other presently known species among the world freshwater sponge fauna (MANCONI & PRONZATO, 2002). The proposition to have this new monotypic genus in the condition of *incertae sedis* is based on the fact that gemmules and larger specimens, whenever they are discovered, will produce characteristics sufficiently reliable to proceed with the family inclusion.

Type-material. Holotype, BRAZIL, **Pará**: Tucuruí (Tocantins River), 15.IX.1984, L.C. Alvarenga & Zwink leg. (MCN-POR 2700). Paratypes: Tucuruí (Tocantins River), 15.IX.1984, L.C. Alvarenga & Zwink leg. (permanent slides with dissociated spicules, MCN-POR 3146-3148), (dry specimens MCN-POR 3149) (on SEM stub, MCN-POR 3151, 8112).

Acknowledgments. The authors acknowledge Vanessa de Souza Machado (M. Sc. fellow of CAPES) for the photographs of figs. 2-4 and the map in fig. 1; Agnes Caroline dos Reis (IC-PIBIC fellow of CNPq) for the drawings in fig. 14; Rejane Rosa from Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, for art assistance in fig. 14. They are indebt to Dr. Inez Ezcurra de Drago and an anonimous referee for the valuable suggestions offered. C. Volkmer-Ribeiro and K. F. de Oliveira acknowledge CNPq for respectively a research fellowship and a PIBIC fellowship.

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Recebido em agosto de 2008. Aceito em agosto de 2009. ISSN 0073-4721
Artigo disponível em: www.scielo.br/isz