MARINE PORIFERA OF CABO FRIO (RIO DE JANEIRO – BRAZIL). THE FAMILY MYCALIDAE LUNDBECK, 1905, WITH THE DESCRIPTION OF A NEW SPECIES

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(With 15 figures)

RESUMO

Poríferos Marinhos de Cabo Frio (Rio de Janeiro – Brasil). A Família Mycalidae Lundbeck, 1905, com a Descrição de Uma Espécie Nova

A fauna brasileira de Poríferos marinhos, possui apenas cinco citações isoladas de espécies de Mycalidae. Durante o detalhado estudo ecológico da região de Cabo Frio uma nova espécie, *Mycale arenosa*, e uma nova ocorrência para o Atlântico Sudoeste, *Carmia microsigmatosa*, foram coletadas. São apresentados a descrição precisa do material, seus dados ecológicos e sua distribuição na costa do Brasil.

Palavras-chave: Taxonomia, Demospongiae, Poecilosclerida, Mycalidae, Costa brasileira.

ABSTRACT

The Brazilian fauna of marine Porifera have only five records of Mycalidae species. During the detailed ecological study of the Cabo Frio region, a new species, *Mycale arenosa* and a new record for South West Atlantic, *Carmia microsigmatosa* have been collected. A detailed description, the ecological data, and the distribution of these species along the Brazilian coast are given.

Key words: Taxonomy, Demospongiae, Poecilosclerida, Mycalidae, Brazilian Coast.

INTRODUCTION

The Cabo Frio region is a remarkable location on the Brazilian coast. The occurrence of cold water upwelling, added to the change of direction of the coast from North-South to East-West, makes this region a transition border between two biogeographic provinces (Yoneshigue, 1985).

The family Mycalidae Lundbeck, 1905 (Poecilosclerida, Ceractinomorpha, Demospongiae) has many representatives in all oceans from the littoral to the bathyal zones. However, only five mycalids have been

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described from the Brazilian coast (Hechtel, 1976). *Mycale fusca* (Ridley and Dendy, 1887; as *Esperella fusca*), *M. nuda* (Ridley and Dendy, 1887; as *Esperella nuda*) and *M. quadripartita* Boury-Esnault, 1973 are only known by singles records from the coast of Bahia. *Paresperella spinosigma* Boury-Esnault, 1973 has been collected near 24°43'S (São Paulo coast) at 100 m depth. *Zygomycale parishi* (Bowerbank, 1875) (= *Aegogropila angulosa* following Soest (1984) – was cited by Laubenfels (1956) and Duarte and Morgado (1983) for São Sebastião (São Paulo State). Mycalids have not been recorded from the Cabo Frio region, nor from elsewhere along the coast of the Rio de Janeiro State.

The genus *Mycale* Gray, 1867 *sensu lato* is among the demosponge genera with the largest number of species. Topsent (1924) was the first to propose a subdivision into subgenera based on the characters of the ectosomal skeleton. Soest (1984) reevaluated Topsent's subdivisions and distinguished mycalids on the basis of their habit, ectosomal skeleton, choanosomal skeleton, microsclere types and size categories, and megascleres size. Bergquist and Fromont (1988) have worked upon Soest's definitions, and raised these subgenera to generic rank. In particular, they included in the definition of the genus *Mycale sensu stricto*, the presence of pore-grooves, as suggested by Dendy (1924). In the present study we have followed the system proposed by Bergquist and Fromont (1988).

MATERIALS AND METHODS

Specimens were collected by SCUBA during a survey of the marine sponge fauna of Arraial do Cabo (Rio de Janeiro, 23°S – 42°W), carried out by the research group of the Laboratório de Porifera, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro. This material was supplemented by collections from other Brazilian localities (Figs. 1 and 2). Spicular mountings and thick sections were done as described in Ruetzler (1978: 302-303).

DESCRIPTION OF LOCALITIES

– *Arraial do Cabo* (Cabo Frio – Rio de Janeiro) (Fig. 1, c; Fig. 2)

Praia do Forno (Fig. 2, 1). Generally calm, clear and warm waters. Maximum depth around 12 m. Rocky coast covered in great part by the zoanthid *Palythoa* sp.

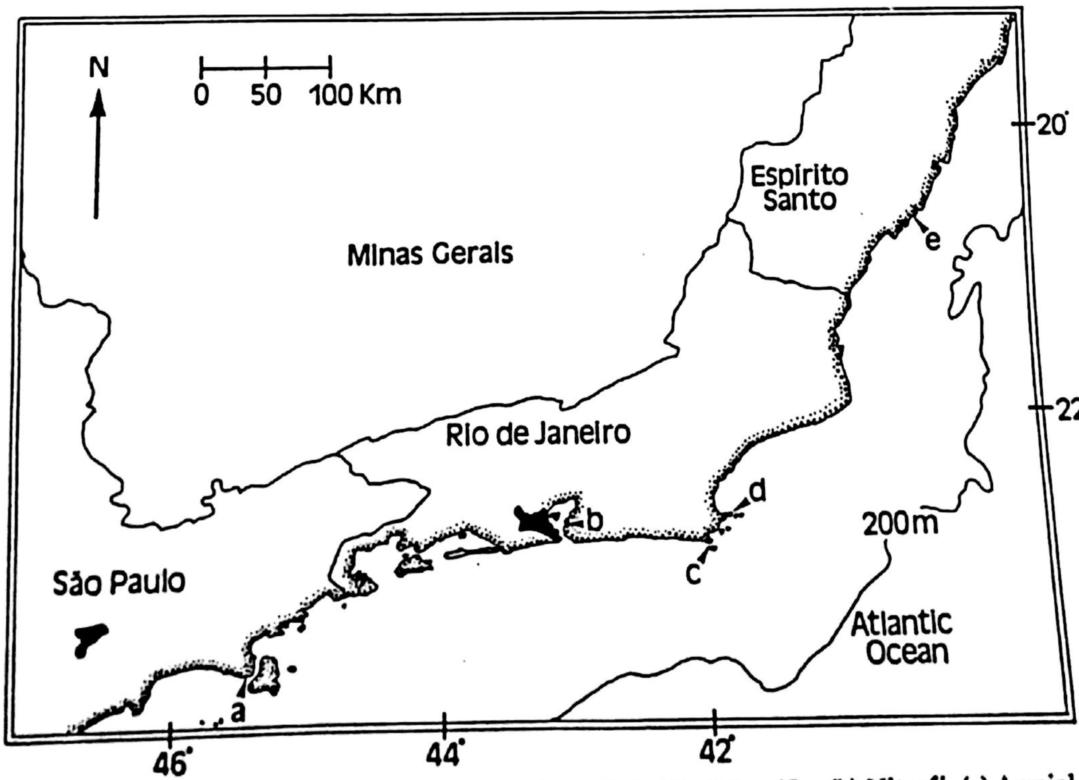

Fig. 1 – Southeast Coast of Brazil, showing the position of (a) São Sebastião, (b) Niterói, (c) Arraial do Cabo, (d) Búzios and (e) Guarapari.

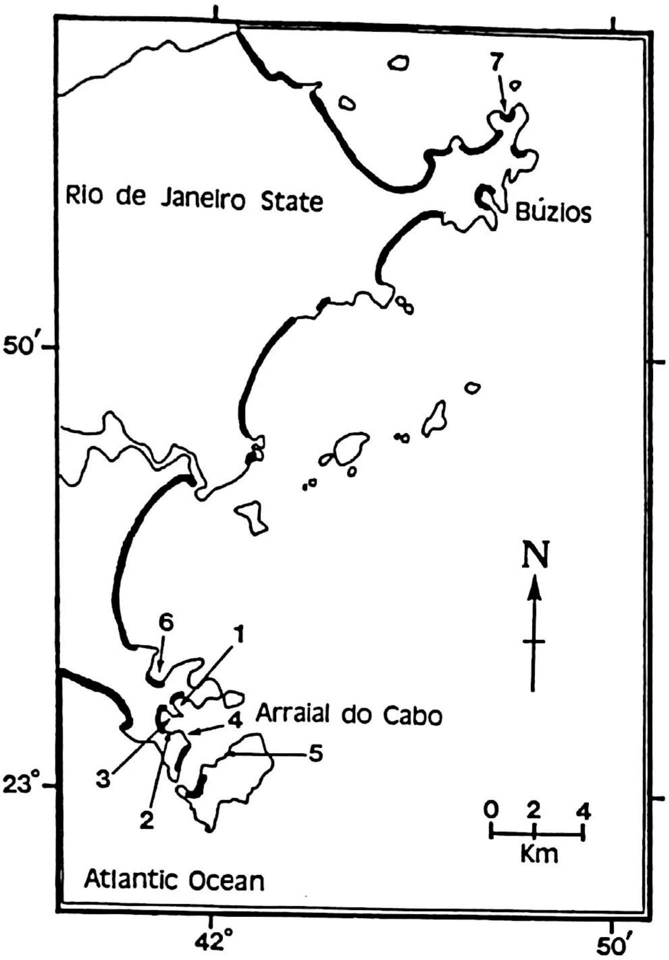

Fig. 2 – Detailed map of the Cabo Frio region, showing Arraial do Cabo and Búzios. 1 – Praia do Forno; 2 – Praia dos Anjos; 3 – Harbour; 4 – Enseada; 5 – Pedra Vermelha; 6 – Prainha; 7 – Praia de João Fernandes.

Praia dos Anjos (Fig. 2, 2). Generally calm and warm waters. Maximum depth around 4 m. Rocky coast covered by *Palythoa* sp. and mussels. Low transparency (between 0,5 and 3 m). Constant input of domestic wastes *in natura*.

Harbour (Fig. 2, 3). Extremely calm water, generally warm. Maximum depth around 15 m. High levels of fine sediment deposition. Semi-cryptobiotic habitat under the dock platform. Almost constant exposure to oil spills.

Enseada (Figs. 2, 4), small bay betweem Praia dos Anjos and Prainhas do Morro do Atalaia. Exposed to Northeast winds, which are dominant in the region, and strong currents. Water is generally clear and warm. Maximum depth around 12 m. Shallow rocks are nearly bare.

Pedra Vermelha (Figs. 2, 5), small bay Northeast of Praia do Farol at Cabo Frio Island, after Maramutá bay. Generally calm, clear and warm waters. Rocky coast covered in great part by *Palythoa* sp. Notable occurrence of stony corals and octocorals. Maximum depth around 12 m.

Prainha (Figs. 2, 6). Generally calm, clear and warm waters. Rocky coast covered by *Palythoa* sp., mussels and octocoral patches. Maximum depth around 7 m.

– Búzios (Cabo Frio – Rio de Janeiro) (Fig. 1, d; Fig. 2).

Praia de João Fernandes (Figs. 2, 7). Generally calm and warm waters. Often low transparency due to the presence of very fine sediment in suspension. Maximum depth around 5 m. Rocky coast covered principally by zoanthids and algae.

– São Sebastião (São Paulo State) (Fig. 1, a)

Praia do Segredo (23°53'S – 45°25'W). Generally calm and warm waters. Often low transparency due to the presence of very fine sediment in suspension. Maximum depth around 4 m. Rocky coast covered principally by zoanthids and algae.

– *Niterói* (Rio de Janeiro State) (Fig. 1, b)

Praia de Boa Viagem (22°54'S – 43°07'W). Generally calm and warm waters. Normally low transparency due to high levels of eutrophication of the Guanabara Bay waters. Rocky coast covered principally by mussels.

– *Guarapari* (Espirito Santo State) (Fig. 1, e)

Três Ilhas (20°36'S – 40°23'W), 2 miles off Guarapari coast.

ABBREVIATIONS

UFRJPOR – Universidade Federal do Rio de Janeiro, Porifera collection. *MNHN* – Museum National d'Histoire Naturelle, Paris, France. *BMNH* – British Museum of Natural History, London, England.

SYSTEMATICS

Order Poecilosclerida Topsent, 1928
Family Mycalidae Lundbeck, 1905
Genus *Mycale* Gray, 1867 emended
sensu Bergquist and Fromont, 1988, p. 17:

Diagnosis: Mycalidae in which the choanosomal skeleton consists of plumose or plumo-reticulate tracts of styles or subtylostyles. The ectosomal skeleton consists

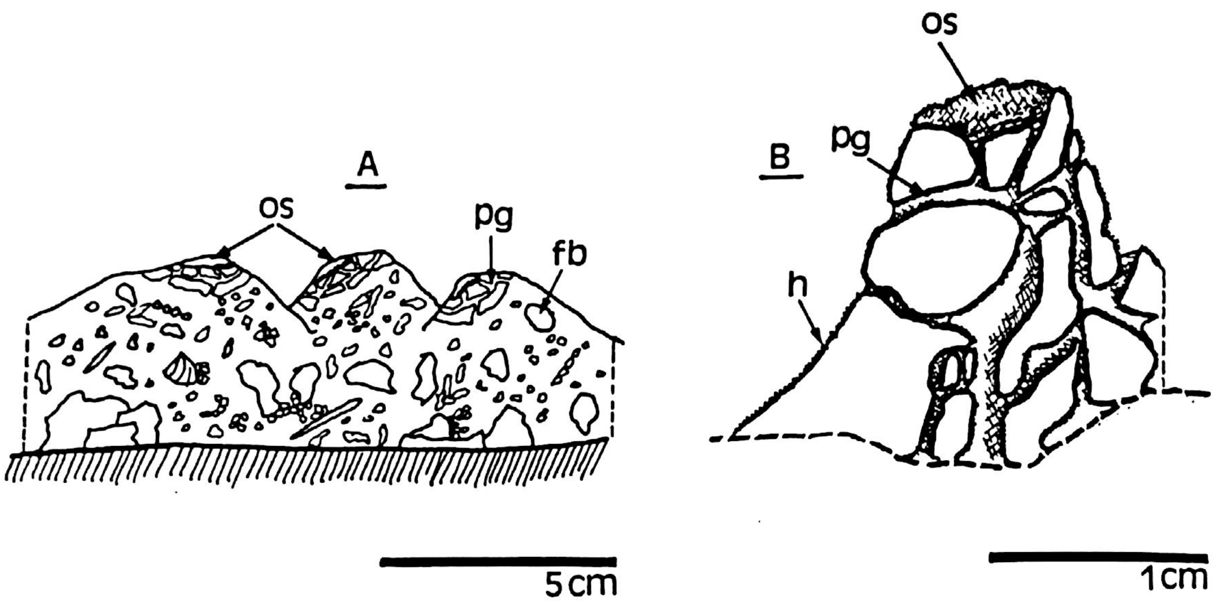

Fig. 3 – Habitus scheme of *Mycale arenosa* sp.n. A) Specimen *in situ;* os: oscula, pg: pore-grooves, fb: foreign-bodies; B) Detailed view of the pore-grooves area, note the absence of detritus; os: osculum, pg: pore-grooves, h: hispidation.

of spicules identical to those making up the choanosomal skeleton, but arranged as a multilayered tangential skeleton supported by erect spicule brushes. Microscleres are anisochelae, which may be accompanied by sigmas and raphides. The sponge surface is marked by pore-grooves and plates.

Mycale arenosa **sp.n.**
Mycale fusca: Solé-Cava *et al.*, 1981
(Non: *Esperella fusca* Ridley and Dendy, 1887)

Material examined: (Figs. 1 and 2):

Holotype: UFRJPOR 2431, Type locality, Rio de Janeiro, Arraial do Cabo, Praia do Forno, interface between the rocky-coast and the sand, 4 m depth.

Paratypes: UFRJPOR 2432, 2433, 2434, 2435; Praia do Forno, 3-4 m depth. UFRJPOR 2436, 2437; Enseada 2 m depth. UFRJPOR 2438, Praia de João Fernandes, 3 m depth.

Schizotypes from the holotype: MNHN, deposited at the Museum National d'Histoire Naturelle de Paris (France); BMNH-1989: 6: 12: 1, deposited at the British Museum of Natural History (London – England).

Others: UFRJPOR 2439, Espírito Santo, Guarapari, Três Ilhas.

Description

This sponge occurs as large specimens covering areas of more than 200 cm^2 and reaching up to 5 cm in thickness. It is massive, amorphous, with conical protuberances up to 3 cm high, bearing a large osculum up to 1 cm in diameter (Fig. 3). The ostia are located in special areas called pore-grooves. Young individuals look like isolated papillae protruding from the sediment, 2 cm high and less than 1 cm in diameter.

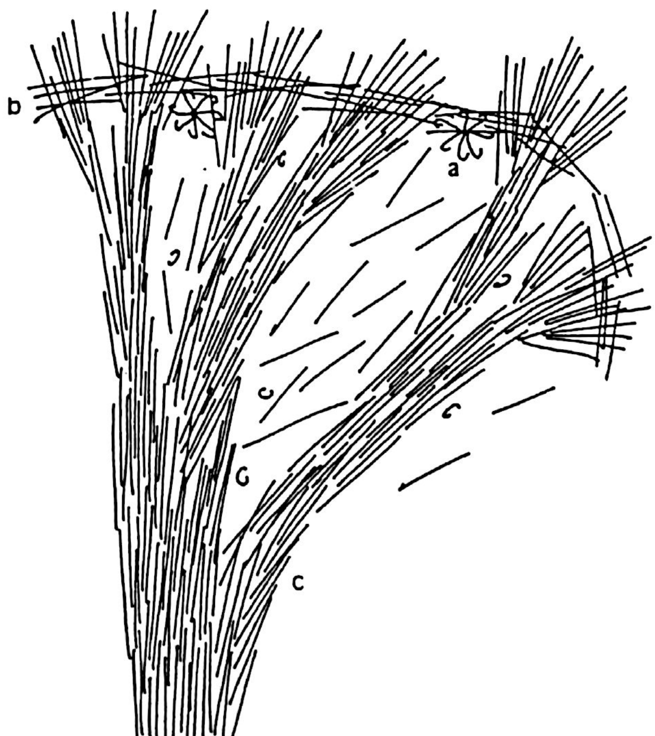

Fig. 4 – Skeleton scheme of *Mycale arenosa* sp.n. a: rosette, b: tangential layer of subtylostyle-2, c: ascending choanossomal tracts.

TABLE I

Comparative table of spicular micrometry of the holotype, paratypes and Solé-Cava's (1981) material of *Mycale arenosa* sp.n. All measurements (ranges, means underlined) are in micrometers. Sample size: 20

	Holotype UFRJPOR 2431 (Arraial)	Paratype UFRJPOR 2432 (Arraial)	Paratype UFRJPOR 2433 (Arraial)
Subtylostyle 1	598-665-735/ 10.4-13.0-17.3	546-624-699/ 9.9-12.0-13.2	559-615-706/ 9.7-11.2-12.7
Subtylostyle 2	343-434-500/ 8.1-13.0-15.6	392-424-477/ 6.6-11.5-13.2	323-424-490/ 5.8-10.0-12.7
Anisochela 1	59.8-61.6-63.3	49.7-56.8-68.9	52.9-56.3-59.6
large end height	16.1-18.4-19.6	13.2-14.7-16.6	13.8-16.4-18.4
small end height	16.1-16.8-18.4	13.2-14.8-16.6	13.8-16.5-18.4
frontal axis width	8.1- 9.6-11.5	9.2-10.1-12.0	9.2-10.0-10.4
Anisochela 3	18.0-20.1-22.9	19.6-22.9-25.5	17.7-19.8-21.6
large end heigth	10.7-11.7-13.1	9.8-12.0-13.1	
small end heigth	3.3- 4.8- 6.5	2.9- 3.6- 4.1	
Sigma	29.8-34.8-39.1 /2.8- 2.9- 3.3	33.1-35.1-38.1 /2.5- 3.1- 3.6	29.8-32.8-34.8 /2.2- 2.8- 3.3
Tricho-dragmata	77.5-94.0-113 6.3-13.5- 20	70 -82.8-108	

	Paratype UFRJPOR 2434 (Arraial)	Paratype UFRJPOR 2435 (Arraial)	Paratype UFRJPOR 2436 (Arraial)
Subtylostyle 1	617-675-706/ 6.9-12.2-15.0	578-645-706/ 9.7-12.1-13.8	588-634-696/ 10.4-13.0-16.1
Subtylostyle 2	343-436-588/ 4.4-10.0-13.8	392-430-461/ 6.9-11.4-13.8	402-444-519/ 8.1-11.9-15.0
Anisochela 1	53 -58 -59.6	49.7-55.8-61.3	59.8-61.7-63.3
large end heigth	16.1-17.1-18.4	16.1-17.0-18.4	15.0-15.9-16.1
small end height	16.1-17.3-18.4	15.6-17.0-18.4	16.1-17.0-18.4
frontal axis width	10.4-11.4-12.7	6.9- 9.7-11.5	9.2-11.6-13.8
Anisochela 3 large end heigth small end heigth	19.6-20.7-23.5	17.2-20.2-24.6	32.7-33.8-35.4
Sigma	28.2-31.6-34.8 /2.2- 2.7- 3.3	28.2-32.6-36.4 /2.5- 2.9- 3.3	34.5-38.1-43.7 /2.5- 2.7- 3.2
Tricho-dragmata	80.5-92.7-106 4.6- 8.6-18.4		

	Paratype UFRJPOR 2437 (Arraial)	Paratype UFRJPOR 2438 (Búzios)	Solé-Cava *et al.*, 1981 UFRJPOR 2439 (Guarapari)
Subtylostyle 1	627-660-706/ 11.5-13.4-16.1	608-658-696/ 9.2-11.0-12.7	633-701-754/ 11.5-12.9-15.2
Subtylostyle 2	431-491-549/ 5.8-12.6-16.8	421-459-490/ 8.1-10.1-13.5	382-454-549/ 11.5-13.3-16.1
Anisochela 1	57.5-62.1-69.0	57.5-60.3-64.4	52.9-58.3-62.1
large end heigth	13.8-16.8-18.4	13.8-16.8-19.6	13.8-16.2-18.4
small end height	16.1-18.3-23.0	16.1-16.9-18.4	13.8-16.5-18.4
frontal axis width	8.1- 9.2-10.4	8.1- 9.8-11.5	11.5-12.9-16.1
Anisochela 3 large end heigth small end heigth	32.7-36.8-40.9	30.0-33.4-38.1	25.3-34.2-40.9
Sigma	29.9-36.2-43.7 /2.5- 2.7- 3.3	34.5-37.8-41.4 /2.5- 2.7- 32	34.5-37.5-43.7 /2.3- 2.8- 3.3
Tricho-dragmata	55.2-84.0-98.9 /4.6- 9.7-17.3		

The colour in life is bright-yellow to pale-orange; in alcohol it becomes light-brown. The texture is compressible but firm.

The surface is largely covered by detritus (sediment particles, sea-urchin spines, small shells or fragments of shells) which are partially or fully embedded in the ectosome. Detritus can be found in the subectosomal region. Pore-grooves are the only areas free of foreing bodies. In this area the microhispidation of the surface can be observed.

Skeleton (Fig. 4)

In the detritus-free part of the ectosome, the skeleton is composed of several tangential layers of subtylostyles-2 sustained by the terminal divergent brushes of the ascending choanosomal tracts. Anisochelae-1 in rosettes about 150 μm in diameter and raphides in trichodragmata are both abundant in the ectosome.

The choanosomal skeleton consists of large ascending tracts of subtylostyles-1 (about 4 mm in diameter at their base) which branch towards the surface, giving rise to the ectosomal brushes. Anisochelae-3 and sigmas are abundant in the choanosome and near the surface of the canals.

Spicules (Table I; data for each specimen): Dimensions: min-*mean*-max length/ min-*mean*-max width, when considering all the studied specimens, s = standard deviation.

Megascleres

Subtylostyles-2 (Fig. 5, f): Distinguished straight. They have scarcely visible heads with shafts just slightly wider, sharply pointed at the apex. 546-***645.5***-754 (s = 36.5)/6.9-***12.3***-17.3 μm.

Sybtylostyles-2 (Fig. 5, f): Distinguished from the choanosomal ones by the smaller size and little curvature. 323-***440.8***-588 (s = 38.0)/4.4-***11.5***-16.8 μm.

Microscleres

Anisochelae-1 (Figs. 5, a, b; 6, 7, 8, 9): Shaft markedly curved. In frontal view, the large end, the small end, and the shaft between them have normally almost the same height. Total length: 49.7-***58.4***-69.0 μm (s = 2.4); frontal shaft width 6.9-***10.5***-16.1 μm;

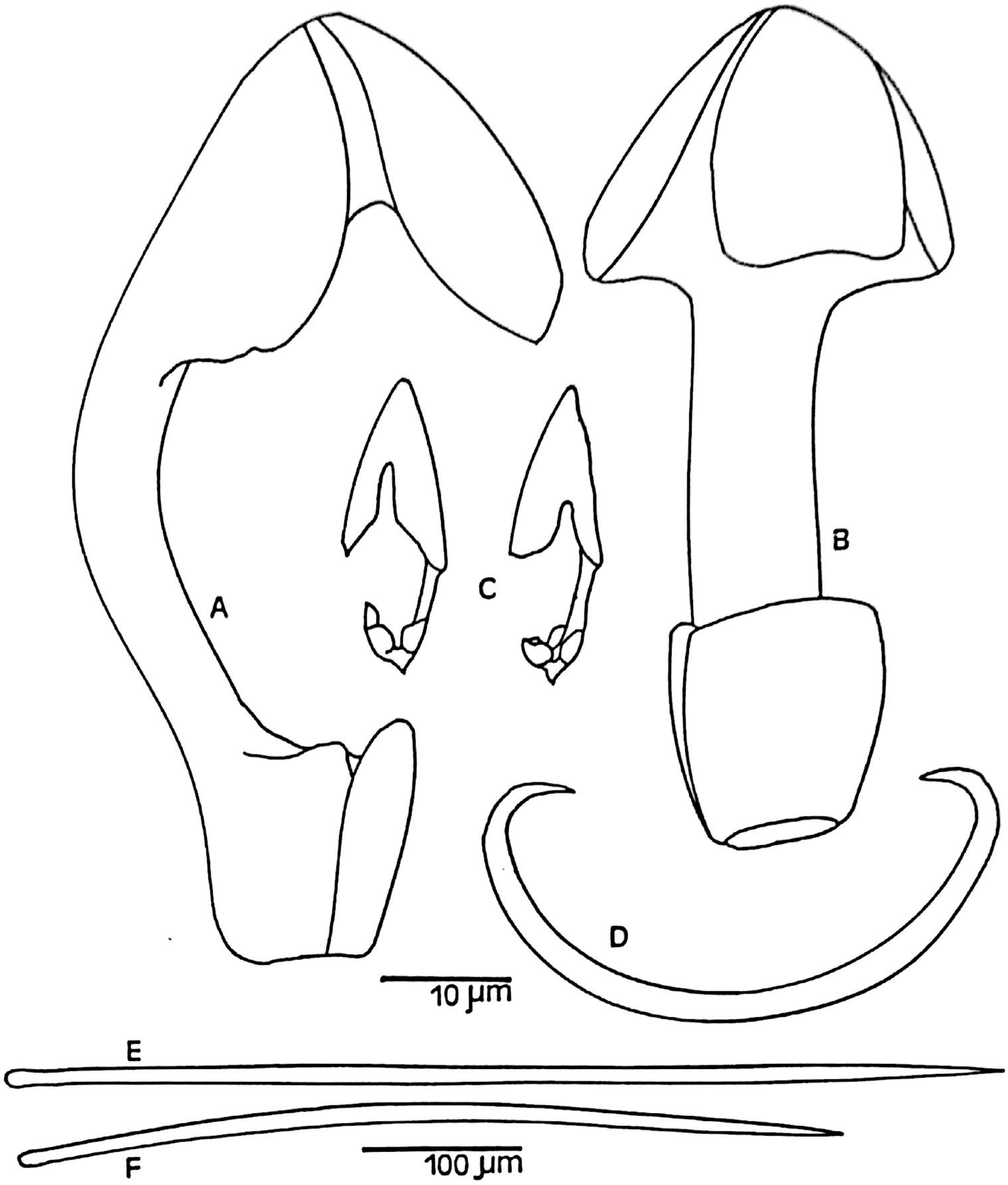

Fig. 5 – *Mycale arenosa* sp.n.: (A) anisochela-1, profile view; (B) anisochela-1, frontal view; (C) anisochela-3; (D) sigma; (E) subtylostyle; (F) subtylostyle-2.

large end height 13.2-***16.5***-19.6 µm; small end height 13.2-***16.7***-23.0 µm. Large end is wider than small one, both in lateral and frontal views , and makes a large angle with the shaft when seen laterally.

Anisochelae-2: Same shape as anisochelae-1, but smaller. Very rare. Total length around 40 µm.

Anisochelae-3 (Figs. 5, c; 10): Total length 17.2-***26.8***-40.9 µm (s = 2.0). Large end higher than the rest of the spicule. Very small angle between the large end and the shaft. Large end frontal-teeth may be more or less fused laterally. Shaft almost straight. A remarkable characteristic is the presence of a spur-like projection extending from the shaft basis.

Sigmas (Figs. 5, d; 11): Only one category: smooth. Sharp endings. 28.2-***35***-43.7 (s = 2.6)/2.2-***2.8***-3.6 µm.

Raphides in trichodragmata: 55.2-***88.4***-113 (s = 11.3)/4.6-***10.6***-20 µm.

Distribution

Arraial do Cabo (localities 1 and 4) and Búzios (locality 7) in the Rio de Janeiro State, and Guarapari (Locality e) in Espírito Santo State (Figs. 1 and 2).

Ecology

This species is common in the infralittoral (2-4 m depth) and only occurs at the transition zone between the rocky shore and the sandy bottom; the sponges are almost

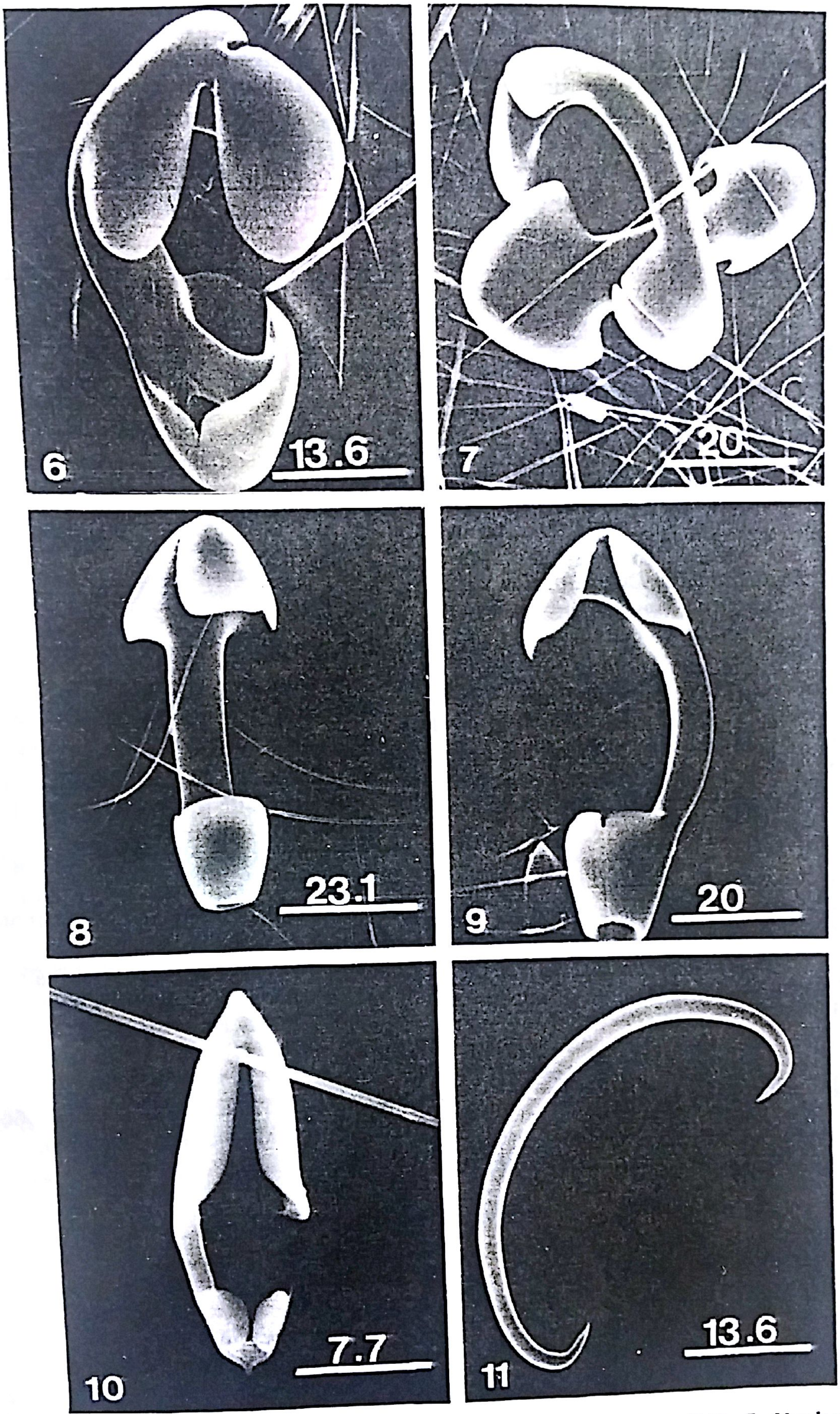

Fig. 6 – *Mycale arenosa* sp.n.: scanning micrograph of anisochela-1 large end in detail; Fig. 7 – *Mycale arenosa* sp.n.: scanning micrograph showing anisochelae-1 lateral and dorsal views; Fig. 8 – *Mycale arenosa* sp.n.: scanning micrograph of anisochela-1 frontal view; Fig. 9 – *Mycale arenosa* sp.n.: scanning micrograph of anisochela-1 profile; Fig. 10 – *Mycale arenosa* sp.n.: scanning micrograph of anisochela-3 profile view; Fig. 11 – *Mycala arenosa* sp.n.: scanning micrograph of sigma.

always covered by sediment. *Phylogorgia dilatata* (Esper, 1806) (Octocorallia), *Amphimedon viridis* (Duchassaing and Michelotti, 1864) (Haplosclerida), *Carmia microsigmatosa* (Arndt, 1927) (Poecilosclerida) and *Aplysina fulva* (Pallas, 1766) (Verongida) were observed at the same biotope.

Discussion

The following characteristics put this species into the genus *Mycale* as defined by Bergquist and Fromont (1988): the robust choanosomal subtylostyle tracts, the tangential subectosomal layer, the terminal divergent subtylostyle brushes, the presence of pore-grooves and anisochelae-1 in rosettes. This definition also applies to a group of very close species (based on Dendy, 1924: Lévi, 1963; Soest, 1984 and Bergquist and Fromont, 1988): *M. lingua* (Bowerbank, 1866), *M. massa* (Schmidt, 1870), *M. placoides* (Carter, 1876) and *M. anisochela* Lévi, 1963, from the atlantic; and *M. murrayi* (Ridley and Dendy, 1887) and *M. novaezelandiae* Dendy, 1924, from the South Pacific; they are, at the moment, the only known members of the genus *Mycale sensu stricto*.

In this group, *M. lingua, M. massa, M. anisochela*, and *M. murrayi* are described with only one category of megascleres and *M. placoides* and *M. novaezelandiae* with two, as the present species.

The shape of the anisochela-1 is shared only with *M. novaezelandiae*, the spur-like projection of the anisochela-3 with *M. massa* and *M. anisochela*, and one size-class of sigmas with *M. lingua* and *M. placoides*.

The Brazilian species is the only species of genus *Mycale sensu stricto* to have all the following characteristics:

– abundant foreign bodies embedded in the ectosome

– two size-classes of megascleres

– anisochela-1 markedly curved, their two ends and the shaft between them of almost the same height and a large angle between the shaft and the head

– anisochela-3 with a spur-like projection

– one size-class of sigmas and raphides in trichodragmata.

Solé-Cava *et al.* (1981) described a *M. fusca* (Ridley and Dendy, 1887) from Espírito Santo. We had the opportunity to reexamine this material and came to the conclusion that it is conspecific with *M. arenosa* sp.n.

Etymology

The name *M. arenosa* refers to the great amount of detritus embedded in the sponge.

Genus ***Carmia*** Gray, 1867
sensu Bergquist and Fromont, 1988, p. 31:

Diagnosis: Mycalidae with a choanosomal skeleton of dendritic plumose tracts of styles or subtylostyles. There is no definite ectosomal skeleton, rather, the plumose tracts extend to the surface of the sponge where they occasionally expand into brushes. Microscleres are anisochelae which may be accompanied by sigmas and toxas.

Carmia microsigmatosa (Arndt, 1927)
For synonymies see Soest (1984, p. 24 as *Mycale (Carmia) microsigmatosa*)

Material examined (Figs. 1 and 2): UFRJPOR 2497 to 2511, Praia do Forno, from 0.5 to 5 m depth; UFRJPOR 2512 to 2524, Praia dos Anjos, from 0.5 to 4 m depth; UFRJPOR 2525 to 2529, Pedra Vermelha, from 0.5 to 12 m depth; UFRJPOR 2530 to 2532, harbour, intertidal to 5 m depth; UFRJPOR 2533 to 2535, Prainha, from 0.5 to 6 m depth; Cabo Frio – Rio de Janeiro; UFRJPOR 3131, Praia de Boa Viagem, not fixed, at 0.5 m depth; Niterói – Rio de Janeiro; UFRJPOR 2536, Praia do Segredo, 2m depth; São Sebastião, São Paulo; UFRJPOR 2537, Farol da Barra, 2 m depth; Salvador (13°00'S – 38°30'W), Bahia.

Description

This sponge usually does not exceed 20 cm^2 in area. It is generally incrusting (normally less than 0.5 cm thick). Some specimens were found to have globular or massive shape, with or without conical protuberances as high as 4 cm. The colour in life is dark red; it turns to light grayish-brown in spirit.

Incrusting and massive specimens are soft and fragile, while globular ones are compressible and resistant.

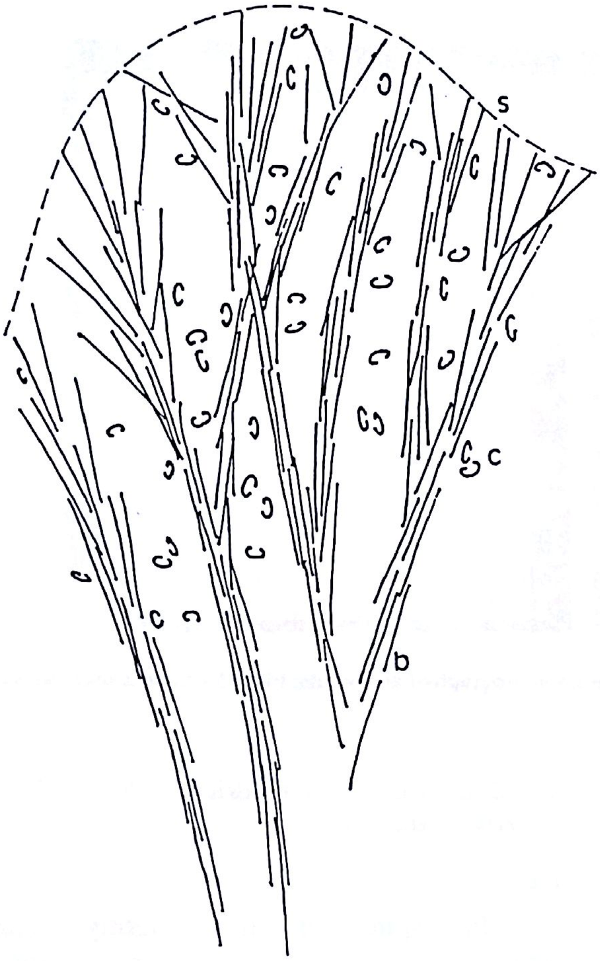

Fig. 12 – Skeleton scheme of *Carmia microsigmatosa* (Arndt, 1927). s: surface, b: subtylostyle tracts, c: scattered sigmas.

The surface is smooth and almost always easily detachable; it is irregular if endo– and ectobionts (mainly polychaete tubes, which can be very abundant) are present. Oscules are distributed irregularly and situated on the top of fragile membranous chimneys, which are rather contractile and may reach 0.5 cm in height and diameter.

Skeleton (Fig. 12)

Subtylostyle tracts containing variable amounts of spicules run through the choanosome in a plumo-reticulate manner, diverging near the ectosome. The tracts may be few or abundant, and vary from almost straight to totally sinuous (11-*24*-50 µm width). Scattered megascleres occur in the choanosome, sometimes in great amounts. Sigmas are dispersed all through the specimen, being also of variable abundance. Anisochelae are very rare.

Spicules:
Megascleres

Subtylostyles (Fig. 13, a): Straight or slightly curved and sharply pointed at the apex, middle part wider and head of almost

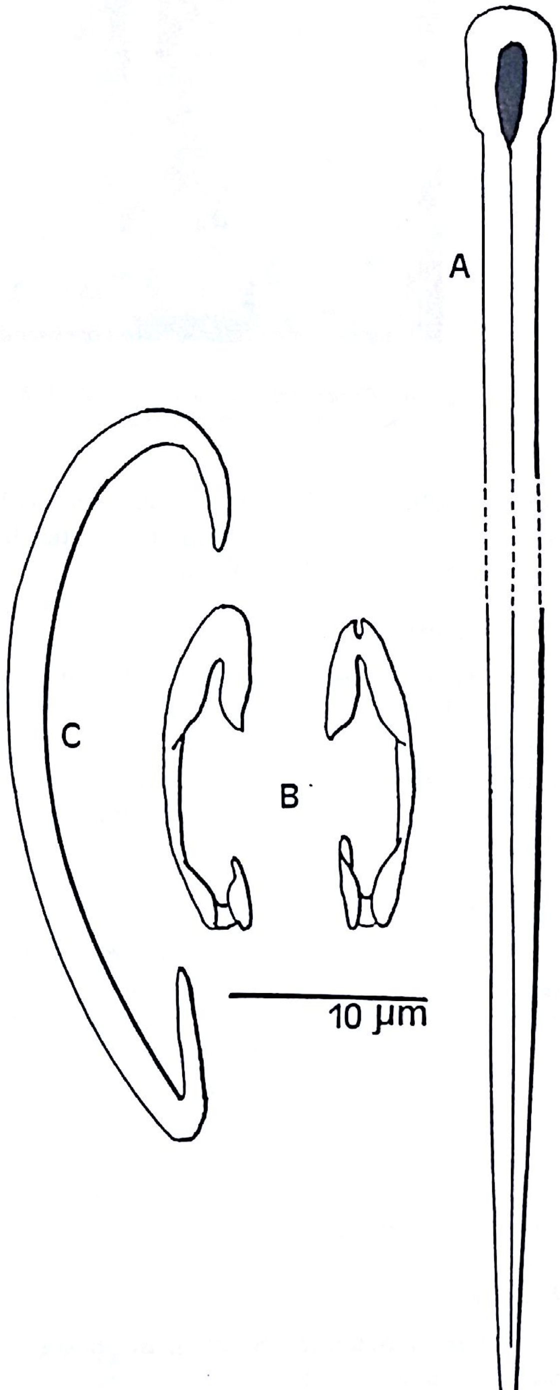

Fig. 13 – *Carmia microsigmatosa* (Arndt, 1927): (A) subtylostyle; (B) anisochelae; (C) sigma.

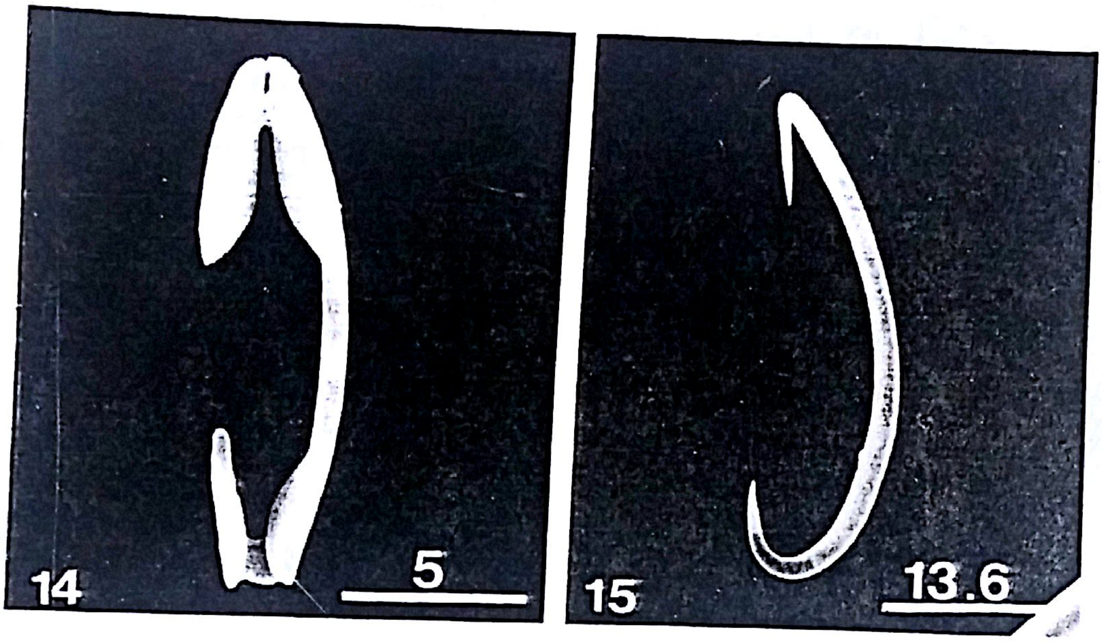

Fig. 14 – *Carmia microsigmatosa* (Arndt, 1927): scanning micrograph of anisochela; Fig. 15 – *Carmia microsigmatosa* (Arndt, 1927): scanning micrograph of sigma.

same width. Needle-shaped due to a swelling of the central spicular canal, in the head. 180-***215***-252/2.9-***3.3***-4.0 µm.

Microscleres

Anisochelae (Figs. 13, b; 14): Very small. Large end represents half of the microsclere length. Frontal tooth slightly breaks inward. 11.5-***12.4***-15 µm.

Sigmas (Figs. 13, c; 15). Sharp endings. 23-***28.3***-34 µm.

Distribution (Figs. 1 and 2)

Carmia microsigmatosa is very abundant in the Cabo Frio region (localities 1, 2, 3, 5, 6) and widely distributed along the Brazilian coast: Niterói, Rio de Janeiro State; São Sebastião, São Paulo State and Salvador, Bahia State. This species has been previously described from Caribbean and Colombian coasts (Arndt, 1927; Hechtel, 1965, Soest, 1984; Zea, 1987).

Ecology

This species is abundant in photophilous habitats, intertidal to 6 m depth, as well as in semisciaphilous habitats like crevices and small-cave entrancies. The largest specimens were seen at the transition zone between the rocky shore and the sandy bottom. *Carmia microsigmatosa* has shown to be tolerant to oil and domestic wastes (Muricy, 1989; as *Mycale microsigmatosa*).

Discussion

In spite of the slightly smaller dimensions of spicules, the Brazilian specimens are considered conspecific with the Caribbean ones described by Hechtel (1965) and Soest (1984). All the so far observed Brazilian *Carmia microsigmatosa* were red, contrasting with the variable colour of the Caribbean specimens.

BIOGEOGRAPHICAL REMARKS

These two mycalid species have a very different pattern of geographical distribution.

Mycale arenosa sp.n. is very well characterized and easly distinguishable from close species on the basis of morphological and skeletal criteria. It apparently has a very restricted distribution area from 20°36' to 23°S at the South-West Atlantic.

Carmia microsigmatosa is a very common species in the Western tropical Atlantic (Soest, 1984). The present records are the first from the South-West Atlantic (13° to 23°50'S). If *Mycale senegalense* Lévi, 1952 and *Mycale sanguinea* Tsurnamal, 1969 are confirmed to be synonymous with *Carmia microsigmatosa* as suggested by Soest (1984) the distribution would actually be even wider.

Carmia microsigmatosa has few morphological and skeletal characteristic features, and some spicule categories may even be absent. It must be wondered if the wide distribution of this species has largely been overestimated and is in fact due to difficulties in distinguishing genetically different but morphologically similar species (Solé-Cava *et al.*, in press). Comparisons of populations from widely separated areas, e.g. the Caribbean, the Brazilian coast, Africa and the Mediterranean will have to be undertaken using biochemical or genetical analysis to confirm identifications and to determine specific variability.

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