

Marine sponges of Pernambuco State, NE Brazil

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Introduction

The Brazilian coastline is still poorly studied from a faunistic viewpoint. Brazilian sponges are among the less studied in the world, and most of the knowledge about them comes from dredging by foreign expeditions such as the Challenger (e.g., Ridley & Dendy, 1887) and the Calypso (Boury-Esnault, 1973). Brazilian shallow-water sponges, easily accessed by divers, still remain largely unknown (Hajdu *et al.*, 1996). In this study, we describe the composition and distribution of the shallow water marine sponge fauna from the National Marine Park of Fernando de Noronha and from Tamandaré, both in Pernambuco State, Northeastern Brazil. Such basic taxonomic data can help the development of management plans for these protected areas.

Material and methods

Collections were made by SCUBA diving in February 1996, from 1-30 m deep in seven sites in Fernando de Noronha (Atalaia Pools - site 1, Iúias - site 2, Pedras Secas - site 3, Cagarras - site 4, Sancho - site 5, Ponta da Sapata - site 6, and submarine cave in Ponta da Sapata - site 7), and three sites in Tamandaré (Mamucabinha - site 8, CEPENE Docks - site 9, and Biquara Reefs - site 10) (Fig. 1). Fernando de Noronha is located approximately 550 km E-NE of Recife, Pernambuco State, and 360 km east of Natal, Rio Grande do Norte State (3°51'S-32°26'W). The archipelago is a branch of the mid-Atlantic ridge, separated from the continent by depths up to four thousand meters. It shows a variety of habitats for

benthic organisms, from mangroves to subtidal rocky shores and submarine caves. Waters are very clear, without any trace of coastal sediments, and marine life is highly diverse. Tamandaré is located approximately 200 km south of Recife (8°45'S-36°6'W), and presents two parallel fringing reefs: the first fringe, close to the beach, is shallow (maximum 5 m deep) and subjected to sediment input. The second fringe is located approximately 3 miles offshore, about 30 m deep. The docks of CEPENE are located right on the beach, with heavy sediment input.

Specimens were fixed in 70% ethanol soon after collection, brought to the laboratory for identification, and deposited in the sponge collection of the Universidade Federal do Rio de Janeiro (UFRJPOR). Species identification followed the usual techniques (Rützler, 1980).

Results

56 sponge species were found, 35 of which were identified to the species level. 25 species are new records for Pernambuco State, and 9 are new records for the Brazilian coast (Table 1). 7 species (*Plakortis* spp. 1, 2 and 3; *Oscarella* spp. 1 and 2; *Gastrophanelia* sp.; and *Haliclona* sp.) are apparently new to science, and will be described elsewhere. 14 orders were represented, including one of the Class Calcarea (Clathrinida: Clathrinidae) and 13 of the Demospongiae, comprising 28 families (Homosclerophorida: Plakinidae; Spirophorida: Tetillidae; Astrophorida: Geodiidae; Lithistida: Azoricidae; Hadromerida: Clionidae, Placospongiidae, Spirastrellidae; Chondrosida: Chondrillidae; Agelasida: Agelasidae; Halichondriida: Halichondriidae, Axinellidae,

Dictyonellidae; Poecilosclerida: Raspailiidae, Clathriidae, Mycalidae, Tedaniidae, Phoriospongiidae, Crambeidae; Haplosclerida: Chalinidae, Callyspongiidae, Niphatidae, Petrosiidae, Phloeodictyidae; Dictyoceratida: Irciniidae; Dendroceratida: Dysideidae, Dictyodendrillidae; Verongida: Aplysinidae, Druinellidae). The most diverse orders in the area were the Poecilosclerida and Haplosclerida, with 10 species each, followed by the Halichondriida (8 species) and the Homosclerophorida (7 species). The distribution of the species among the different collecting sites was heterogeneous (Table 1).

Discussion

Our results show that the sponge fauna of Pernambuco State is highly diverse and

heterogeneously distributed. The high number of new records for both Pernambuco State and the Brazilian coast (25 and 9, respectively) demonstrates the insufficiency of previous taxonomic studies on sponges from Pernambuco. The presence of 7 provisional endemics (undescribed species) reinforces the need to protect benthic communities in the area. After this study, 75 species are known from Pernambuco State (see also Carter, 1890; Mothes & Bastian, 1993), which is probably only a small fraction of the true sponge diversity in the area.

Sponge distribution in Pernambuco State is patchy, with different species composition in the sites studied. Distribution of sponge species is determined mostly by physical factors such as type of substrate, sediment input, temperature, and wave action (Sara & Vacelet, 1973; Rutzler, 1980). Sedimentation is

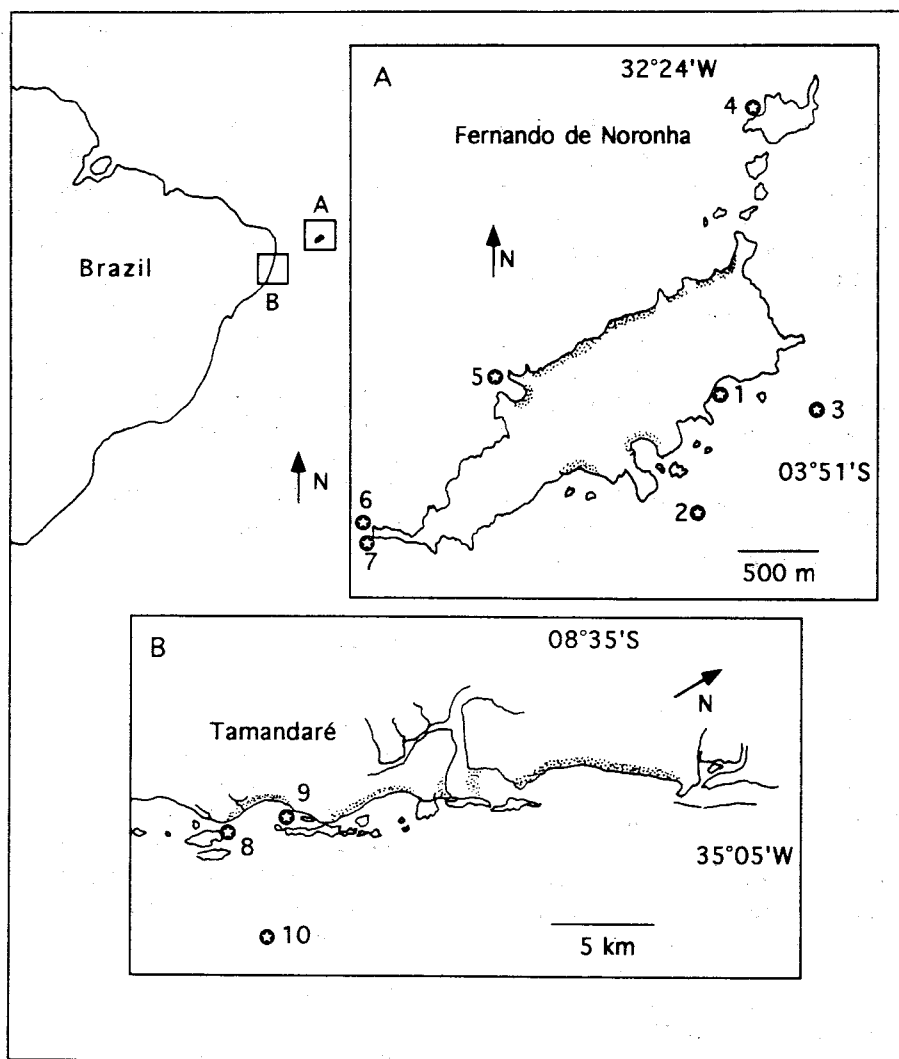


Fig. 1. Map of Brazilian coast, showing the location of the study sites. A, Fernando de Noronha: 1, Atalaia; 2, Luias; 3, Pedras Secas; 4, Cagarras; 5, Sancho; 6, Ponta da Sapata; 7, Sapata Cave. B, Tamandare: 8, Mamucabinha; 9, CEPENE Docks; 10, Biquara reef.

Table 1. Distribution and classification of marine sponges from Fernando de Noronha and Tamandaré, NE Brazil.

Species	Fernando de Noronha							Tamandaré		
	1 Atalaia	2 Itúias	3 Pedras Secas	4 Cagarras	5 Sancho	6 Ponta Sapata	7 Sapata Cave	8 Marmuca- binha	9 CEPENE	10 Biquara
Calcarea: Clathrinida										
<i>Clathrina aurea</i> Solé-Cava <i>et al.</i> , 1991*			x							
<i>Clathrina</i> sp.		x	x							
Demospongiae:										
Homosclerophorida										
<i>Plakortis angulospiculatus</i> (Carter, 1879)**		x	x				x			x
<i>Plakortis</i> sp. 1* ⁺			x							
<i>Plakortis</i> sp. 2* ⁺							x			
<i>Plakortis</i> sp. 3* ⁺							x			
<i>Oscarella</i> sp. 1* ⁺							x			
<i>Oscarella</i> sp. 2* ⁺							x			
<i>Plakina</i> sp.*							x			
Spirophorida										
<i>Cinachyrella alloclada</i> Uliczka, 1929								x		
Astrosporidida										
<i>Geodia corticostylifera</i> Hajdu <i>et al.</i> , 1992										x
<i>Geodia</i> cf. <i>papyracea</i> Hechtel, 1965								x		
<i>Erylus formosus</i> Sollas, 1886		x	x							
Lithistida										
<i>Gastrophanella</i> sp. ** ⁺							x			
Hadromerida										
<i>Cliona</i> cf. <i>celata</i> Grant, 1826									x	
<i>Anthosigmella varians</i> (Duch. & Mich., 1864)*	x							x		
<i>Placospongia intermedia</i> Ridley & Dendy, 1887								x		
<i>Spirastrella coccinea</i> (Duch. & Mich., 1864)	x	x	x	x				x		
Chondrosiida										
<i>Chondrosia collectrix</i> (Schmidt, 1870)		x	x							
<i>Chondrilla nucula</i> Schmidt, 1862		x	x					x		
Agelasida										
<i>Agelas dispar</i> Duch. & Mich., 1864		x	x	x						x
<i>Agelas clathrodes</i> (Schmidt, 1870)*		x	x	x						x
Halichondriida										
<i>Pseudaxinella reticulata</i> (Ridley & Dendy, 1886)*					x	x				x
<i>Axinella corrugata</i> George & Wilson, 1919										x
<i>Halichondria magniconulosa</i> Hechtel, 1969*								x		
<i>Halichondria</i> sp.*									x	
<i>Topsentia ophiraphidites</i> (de Laubenfels, 1954)		x	x	x						x
<i>Petromica ciocalyptoides</i> (Soest & Zea, 1986)*							x			
<i>Dictyonella</i> sp.		x	x							
<i>Scopalina ruetzleri</i> (Wiedenmayer, 1977)*		x	x	x						x
Poecilosclerida										
<i>Ectyoplasia ferox</i> (Duch. & Mich., 1864)**				x			x			x
cf. <i>Eurypon</i> sp.*								x		
<i>Mycale angulosa</i> (Duch. & Mich., 1864)*								x	x	
<i>Tedania ignis</i> (Duch. & Mich., 1864)								x	x	
<i>Monanchora arbuscula</i> (Duch. & Mich., 1864)		x	x	x			x			x
<i>Clathria (Thalysias) cf. venosa</i> (Alcolado, 1984)**								x		x
<i>Clathria (Thalysias) minuta</i> (van Soest, 1984)**		x	x							
<i>Echinoclathria (Holopsamma) helwigi</i> (de Laubenfels, 1936)**										x
<i>Batzella</i> sp.*		x	x				x			
<i>Strongylacidon</i> sp.*				x	x					

Table 1 (cont.).

Species	Fernando de Noronha							Tamandaré		
	1 Atalaia	2 Íúias	3 Pedras Secas	4 Cagarras	5 Sancho	6 Ponta Sapata	7 Sapata Cave	8 Mamuca- binha	9 CEPENE	10 Biquara
Haplosclerida										
<i>Haliclona</i> sp. ⁺									x	
<i>Callyspongia pergamentacea</i> (Ridley, 1881)*				x						x
<i>Callyspongia</i> sp.					x					x
<i>Niphates amorpha</i> Wiedenmayer, 1977**		x	x	x				x		
<i>Niphates</i> sp.				x						
<i>Amphimedon viridis</i> Duch. & Mich. 1864*								x	x	
<i>Amphimedon</i> sp.				x	x					x
<i>Oceanapia</i> sp.								x		
<i>Petrosia</i> sp.**							x			x
<i>Xestospongia</i> sp.*		x								
Dictyoceratida										
<i>Ircinia strobilina</i> (Lamarck, 1816)*		x	x			x				x
<i>Hyrtios proteus</i> Duch. & Mich., 1864**			x							
Dendroceratida										
<i>Dysidea</i> sp.		x			x	x				x
<i>Igernella notabilis</i> (Duch. & Mich., 1864)*					x					
Verongida										
<i>Aplysina cauliformis</i> (Carter, 1882)*								x		x
<i>Aiolochoira crassa</i> (Hyatt, 1875)*		x	x	x		x		x	x	x
Number of species	2	19	20	13	6	8	8	16	6	20

Key: **, new record for the Brazilian coast; *, new record for Pernambuco State;

⁺, undescribed species.

particularly high in sites 8 and 9 (Mamucabinha and CEPENE docks, both in Tamandaré), and wave action is important in the five shallow-water sites: Mamucabinha and CEPENE docks in Tamandaré, Cagarras (site 4), Sancho (site 5) and Sapata point (site 6), in Fernando de Noronha. Both factors seem to decrease species richness of sponges in these sites. The number of sponge species is much higher in the deeper-water, sediment-free sites Íúias (site 2), Pedras Secas (site 3) and Biquara reefs (site 10) (Table 1). Although with a low number of species sampled (8), species composition in Sapata Cave (site 7) is markedly different from that of the other sites. Several new species were found in this cave, which needs further exploration.

The heterogeneous distribution of sponge species indicates a need to preserve large areas including different benthic environments, to protect most of the sponge diversity in Pernambuco state. Protected habitats should include at least shallow-water fringing reefs, deeper-water reefs, exposed and sheltered rocky shores, and submarine caves. Such habitats are already protected in Fernando de Noronha, but the degree of effective environmental protection in Tamandaré is still very low and should be increased.

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