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[1] A NEW SPECIES OF *XESTOSPONGIA* (PORIFERA: DEMOSPONGEA), FROM THE COLOMBIAN CARIBBEAN

By

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SUMMARY

Xestospongia rosariensis is named from coral reef habitats of the Nuestra Señora del Rosario Archipelago in the Colombian Caribbean. This sponge is tube-shaped, brown in color, hard and brittle in consistency, and is provided with sinous surface irregularities. The dense skeleton reticulation of thick spicule tracts is typical for the genus. Spicules are oxea having mean dimensions of 183.6 x 9.4 µm. *X. rosariensis* has several affinities with *X. subtriangularis,* particularly the small dimensions of spicules. Its distintive growth form makes the new species unmistakable among the members of *Xestospongia.*

RESUMEN

De los habitat de arrecifes coralinos del Archipiélago de Nuestra Señora del Rosario en el Caribe Colombiano, se describe *Xestospongia rosariensis.* Esta esponja es tubiforme, de color café, de consistencia dura y quebradiza, y su superficie tiene algunas irregularidades sinuosas. Su densa reticulación esquelética de tractos espiculares gruesos es típica del género. Las espículas son oxeas, con dimensiones promedio de 183.6 x 9.4 µm. *X. rosariensis* tiene algunas afinidades con *X. subtriangularis,* particularmente por el tamaño pequeño de las espículas. La típica forma de crecimiento de esta nueva especie la hace inconfundible entre los miembros de *Xestospongia.*

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INTRODUCTION

During an inventory of marine sponges at the National Natural Park los Corales del Rosario (an area surrounding the Nuestra Señora del Rosario Archipelago) in the Colombian Caribbean (Zea in preparation) a common but unusual sponge was found forming clusters of tall brown tubes among reef coral. Apparently other collectors had previously noted this conspicuous species because specimens are deposited at Museo del Mar, Bogota (examined by K. R. 1969, 1970; S. Z. 1980). That material also originated in the Rosario Islands. Examination of the literature and museum collections leaves no doubt that our specimens belong to an undescribed species of *Xestospongia*.

AREA STUDIED

The Nuestra Señora del Rosario Archipelago (Fig. 1) is a group of low coral islands of recent origin (5.000-10.000 years, cf. Pfaff, 1969: 20), surrounded by extensive live and well developed coral reefs. Around these islands and across to the mainland cost extends a submarine park, the Parque Nacional Natural Los Corales del Rosario (PNNCR) which was created in 1977. The Park is located along the Caribbean coast of Colombia approximately 54 km Southwest of the city of Cartagena de Indias and covers an area nearly 178 km^2 between 10° 6' - 10°-15' N and 75° 36' - 75° 50' W. Park boundaries include the eastern part of Isla Baru (actually a continental peninsula) and the islands of Nuestra Señora del Rosario Archipelago (excluding Tesoro to the North), from the highest tideline down to the 50 m isobath facing the open sea (Sistema de Parques Nacionales, 1980).

Favorable ecological and climatic conditions have fostered extensive coral reef development to a depth of 50 m. Less abundant coral growth occurs from 50-60 m (Colin, 1978: 29). Pfaff (1969: 27) and Garavito (1977: 6-7, Table I) report that sea surface temperature ranges from 27° C to 31° C, and that salinity varies from 30 to 35‰. An unusual phenomenon observed in this area during certain season is the presence of a 2-3 m thick surface layer of brackish and very turbid water originating from the outlet of the Canal del Dique, a branch of the Magdalena river, which flows into the Cartagena and Barbacoas Bays and was built by Spaniards several centuries ago. Apparently, this turbidity does not affect reef development, presumable because it does not last long -not even throughout a single day- and because beneath this turbid layer the water is very clear. The morphology of the reefs in the Archipelago is determined to a great extent by the almost constant countercurrent of the Caribbean (Perlroth, 1971; and described for the area by Ballestas, in preparation) which runs north to northeast and passes the islands through several channels, and by predominant (mainly summer) northwesternly

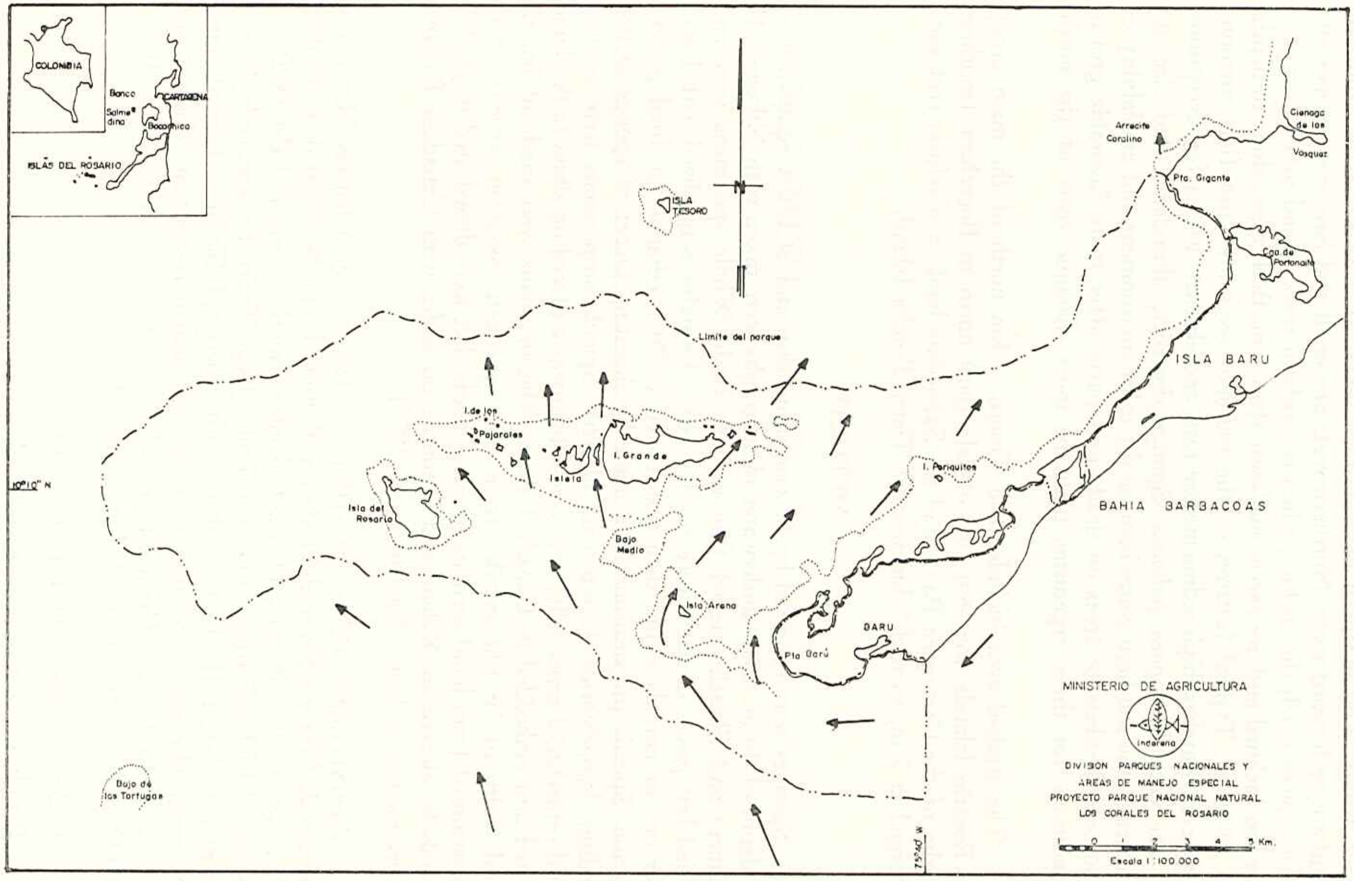

FIGURE 1. Map of study area (design by Ruth de Diago, INDERENA). Arrows indicate predominant surface currentes.

trade winds. The northern or windward reefs are very different from the southern or leeward reefs. Northern reefs are small and have steep slopes and their crowns reach the surface, whereas southern reefs extend to 1 km in size, are less inclined and are rarely shallower than 1 m. Both types slope to depths of 20-60 m. Typical features of the southern reefs are sand flats surrounding coral patches, high sedimentation rate, and absence, with a few exceptions, of the coral *Acropora palmata*. Sponge diversity, abundance and size are greater in the southern zones because the calm environment and availability of unoccupied substrate areas on dead coral parts offer more favorable growth conditions for these organisms than the more dynamic reefs of the north.

The studied area includes Isla Tesoro, 5 km north of the main group of Rosario Islands, the west cost of Isla Barú north to Bocachica (southern outlet of the Cartagena Bay), and the Salmedina bank, a platform reef submerged at 5 m, located 5 km west of Tierra Bomba Island.

METHODS

Sponges were collected by S. Zea, using skin and SCUBA equipment to a depth of 30 m. Some underwater photographs were taken with Nikonos III camera and Ektachrome 64 film without flash. Whole specimens were sun dried but pieces of each were fixed in 10% formalin neutralized with borax for one or two days and then transferred to 70% ethanol for final preservation. Spicule preparations were made by digesting pieces of sponge in hot sodium hypochloride (commercial bleach). Spicule suspensions were washed and centrifuged repeatedly, and were subsequently placed on slides to be flame dried and embedded in Canada Balsam. Measurements were made of length and width of 50-100 spicules from each specimen. Skeleton structure was determined from hand sections by razor blade that were dehydrated in graded alcohols, cleared in Xylene and mounted on slides with Canadian Balsam. Terminology is from Wiedenmayer (1977).

ABREVIATIONS: ICN-MHN (Po) = Instituto de Ciencias Naturales-Museo de Historia Natural-Porifera collection, Univ. Nacional de Colombia, Ap. Aéreo 7495, Bogotá, D. E., Colombia, South America; MM-POR = Museo del Mar-Porifera collection, Univ. Jorge Tadeo Lozano, calle 23 número 4-47, Bogotá, D. E., Colombia, South America; USNM = United States National Museum of Natural History. Smithsonian Institution. Washington, D. C. 20560, U.S.A. The holotype and six paratypes are deposited at ICN-MHN, other paratypes at MM and USNM.

Order Haplosclerida Topsent, 1928

Family Petrosiidae van Soest, 1980

Genus *Xestospongia* de Laubenfels, 1932

Xestospongia rosariensis new species Figures 2-7, Table I

Cylindral tubes emerging from a basal mass; height 4-78 cm, diameter 1.4-13.0 cm, pseudoscular diameter 0.7-2.4 cm, wall thickness 0.1-2.0 cm. Color dark brown in live specimens, lighter in dry state; choanosome yellowish. Consistency very firm, nonelastic; stony when dry. Surface smooth with sinuous depressions. Ectosomal skeleton forming tangential reticulum (30-260 μm meshes) of single spicules or confused tracts (tract diameter 240 μm maximum). Choanosomal skeleton dense and confused, subisodictyal to radiate-accretive towards periphery; meshes were distinguishable 40-1.100 μm, tracts reaching 240 μm diameter. Spicules: hastate oxeas to strongyloxeas slightly curved; less frequent fusiform oxeas, styloids and styles; 100.0-**183.6**-212.4 μm length, 0.8-**9.4**-15.6 μm width (range and **means** for all specimens).

Shape and size (Figs. 2, 3): One or several cylindrical tubes emerge from a basal mass. The height of the tubes of all specimens studied is 4-78 cm, the diameter 1.4-13.0 cm, most commonly 4-9 cm. The apical opening or pseudoscule of the tubes has a diameter of 0.7-2.4 cm, or even more in large specimens. The rim tapers to a narrow edge. Thickness of the wall ranges from 0.1 cm at this edge to 2 cm at middle and lower sections. The inner cavity is of uniform diameter and generally extends to the base of the tube. Some tubes were noted to be closed and rounded at the upper end, with an opening sideways bellow the top. The basal mass generally does not spread beyond the diameter of the tube or tube cluster although a few broader incrusting basal masses are found. Some specimens have decumbent or even repent stolons from which erect tubes like chimneys arise at regular intervals. Several tumbled specimens were seen that had reattached sideways to the substrate; the tubes had then changed the direction of their growth, taking the vertical position again. Most individuals of this species are fixed to hard substrates; however, in calm environments they are also found attached to pieces of dead coral among sand and coral rubble and at times are even partly buried in the substrate.

Color: Living specimens are dark brown, some with dark orange shades. Some specimens may appear lighter because of sediment adhering to the surface. The choanosome is light yellow, abruptly darkening toward the surface. Dry specimens are light brown or cinnamon colored; the pseudoscular rim keeps its darker shade.

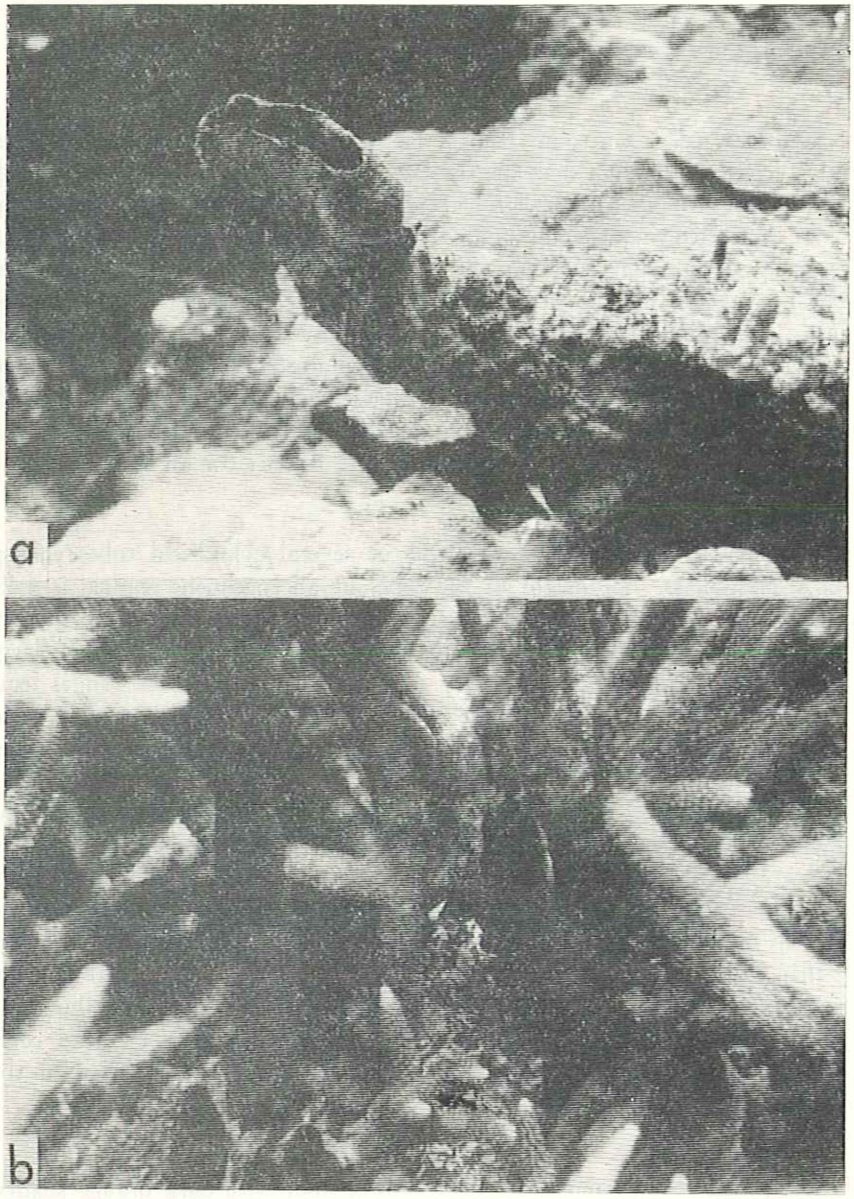

FIGURE 2. Underwater views of *Xestospongia rosariensis:* (a) specimen ICN-MHN (Po) 007 attached to base of coral *Montastrea annularis;* (b) specimen ICN-MHN (Po) 003 among coral *Acropora cervicornis.*

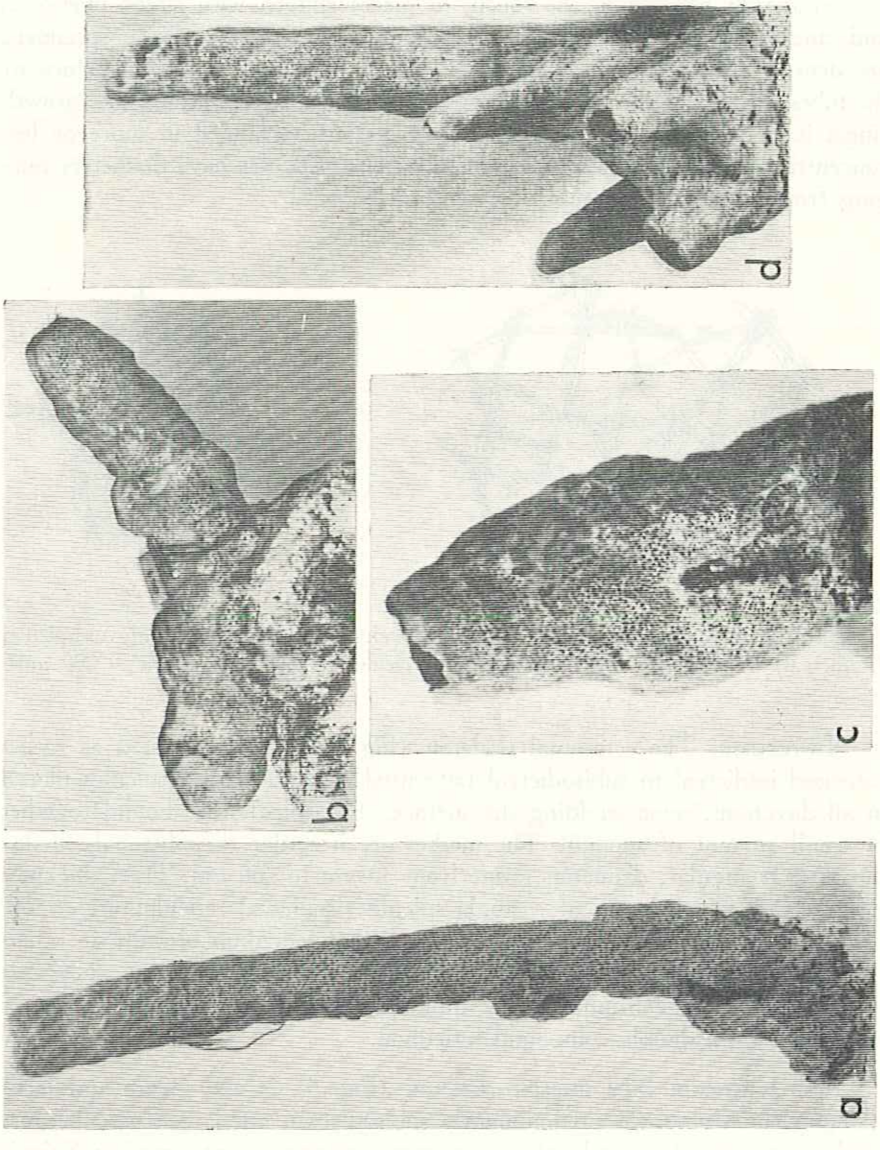

FIGURE 3. Variation in growth form of *Xestospongia rosariensis:* (a) holotype ICN-MHN (Po) 001; (b) ICN-MHN (Po) 005; (c) ICN-MHN (Po) 004; (d) ICN-MHN (Po) 006. (For sizes, see table 1).

CONSISTENCY: Very hard, nonelastic, brittle; stony when dried.

SURFACE: Smooth to the touch, in places rugose, with slight uneveness and sinuosities, or with large protuberances in some areas. Some specimens are densely covered by the zoanthid *Parazoanthus* sp. The inner surface of the tubes is rough to the touch and shows low concentric elevations, like growth rings; it is densely perforated by oscules that are arranged in more or less concentric rings, probably also a growth pattern. Oscules have diameters ranging from 0.6 mm to 3.4 mm.

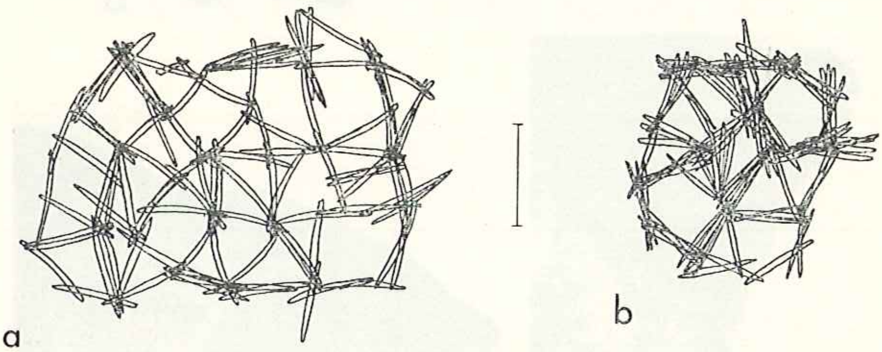

FIGURE 4. *Xestospongia rosariensis,* ectosomal skeleton: (a) predominantly unispicular (isodictyal) reticulation; (b) subisodictyal spicule arrangement (scale = 200 μm).

ECTOSOME: The ectosomal skeleton (Fig. 4) is differentiated as rather confused isodictyal to subisodictyal tangential reticulum, with spicules placed in all directions, some studding the surface. The spicules are bound together by small amount of spongin. The meshes are irregular to polygonal, predominantly triangular; diameters range from 30 μm to 260 μm. Tract thickness ranges from the diameter of a single spicule (isodictyal reticulation) to 240 μm (subisodictyal). In some zones the isodictyal reticulum prevails, in others the subisodictyal arrangement; in most areas, however, the two types are interspersed. Some continuous thick multispiculated tracts surround isodictyal areas forming a double-compound reticulum.

CHOANOSOME: The interior skeleton (Fig. 5) is very dense and lacks spongin. Its structure is predominantly subisodictyal, but is confused because of the density of the spicules that form more or less triangular meshes. Spicule tracts range from the diameter of one spicule to 240 μm. Meshes measure 40μm to 1.100 μm and enclose clusters of spicules without orientation. Toward the periphery of the tubes and particularly near the apex skeleton structure becomes more regular, turning anisotropic with pillar-like ascending multispi-

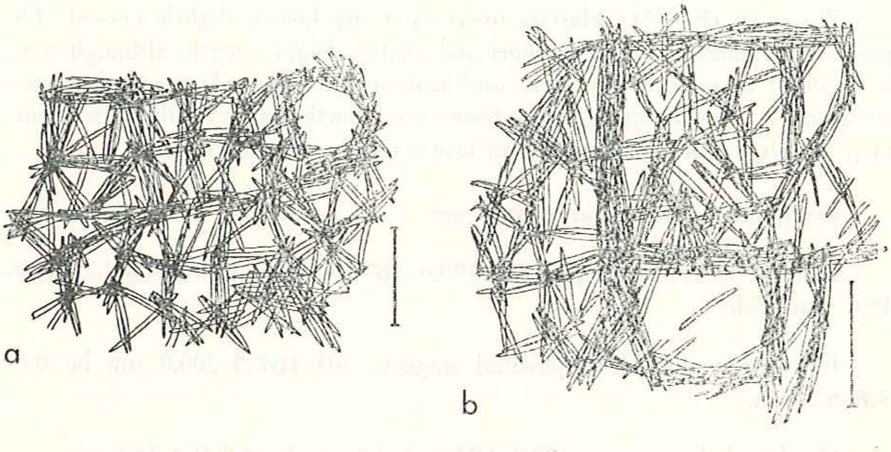

FIGURE 5. *Xestospongia rosariensis,* choanosomal skeleton: (a) subisodictyal to confused; (b) forming distinct tracts (scale = 200 μm).

cular tracts connected by tangential tracts leaving rectangular meshes. The quite regular radiateaccretive skeleton structure of the peripheral growth regions is best observed at fairly low magnification (Fig. 6). The choanosome is rather cavernous, particularly in the older (lower) parts of the sponge tubes where aquiferous channels with diameters of 80 μm to 8 mm or more run in all directions.

The inner tube surface has a predominantly subisodictyal fiber arrangement without a tangential reticulum. More spicules and groups of spicules stud the inner surface than the ectosome.

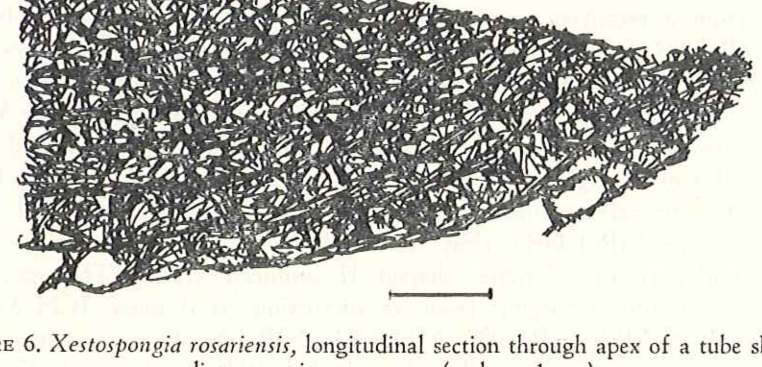

FIGURE 6. *Xestospongia rosariensis,* longitudinal section through apex of a tube showing radiate-accretive structure (scale = 1 ~~cm~~).
mm

SPICULES (Fig. 7): Hastate oxeas to strongyloxeas, slightly curved. The points are rounded to conical, short and nearly always smooth, although some have slight annular constrictions and mammiform tips. Shorter and thinner fusiform oxeas with intergrading forms are growth stages of the more common spicules. A few hastate to fusiform styles or styloids occur.

Dimensions (range and means) are:

Hastate oxeas to strongyloxeas: 100.0-**187.9**-212.5 μm long by 4.7-**10.0**-15.6 μm wide.

Fusiform oxeas (developmental stages): 103-**167.5**-200.0 μm by 0.8-**3.8**-6.3 μm.

Combined dimensions: 100.0-**183.6**-212.4 μm by 0.8-**9.4**-15.6 μm.

TYPE LOCALITY: Archipiélago de Nuestra Señora del Rosario, Departamento de Bolívar, Colombia, South America, 10° 6' - 10° 15' N; 75° 36' - 75° 50' W.

TYPE MATERIAL: Holotype and eleven paratypes (six schizoparatypes) (for dimensions, see Table I). Holotype: ICN-MHN (Po) 001 (Fig. 3). One dry specimen and preserved pieces, collected on 14 Aug 1980, south of Isleta, at a depth of 10 m, on coral rubble and sand in depression between coral patches, located immediately before the beginning of the reef slope. The specimen comprises a single erect tube, with its basal portion inclined and forming relatively narrow basal mass. Paratypes: ICN-MHN (Po) 002. One dry specimen and preserved pieces, collected on 22 Nov 1979, northwest of Isla Barú, at a depth of 28-30 m, growing on the dead part of a calix-shaped colony of *Montastrea annularis* on the outside slope of the reef, the fore-reef. The specimen comprises a single erect tube (broken at middle now), arising from a relatively narrow basal mass. ICN-MHN (Po) 003, ICN-MHN (Po) 004. Dry and preserved parts (schizoparatypes) of two specimens collected on 1 May 1979, southwest of Isla Grande in a zone where very high *Acropora cervicornis* are prevalent, with sandy depressions surrounded by *Montastrea annularis*. The first specimen [(Po) 003], (Fig. 2b) was found at a depth of 1.5 m among *A. cervicornis*. It consists of a broad incrusting basal mass with four arising tubes of different sizes, slightly inter-spaced. The second specimen [(Po) 004], (Fig. 3c) was found at a depth of 4 m, growing on the dead parts of a kindney shaped *M. annularis* colony. This specimen comprises one tube emerging from an incrusting basal mass. ICN-MHN (Po) 005, ICN-MHN (Po) 006, MM:4689 POR:100. Three dry specimens and preserved parts of each, collected on 16 Feb 1980, south of Isla Grande,

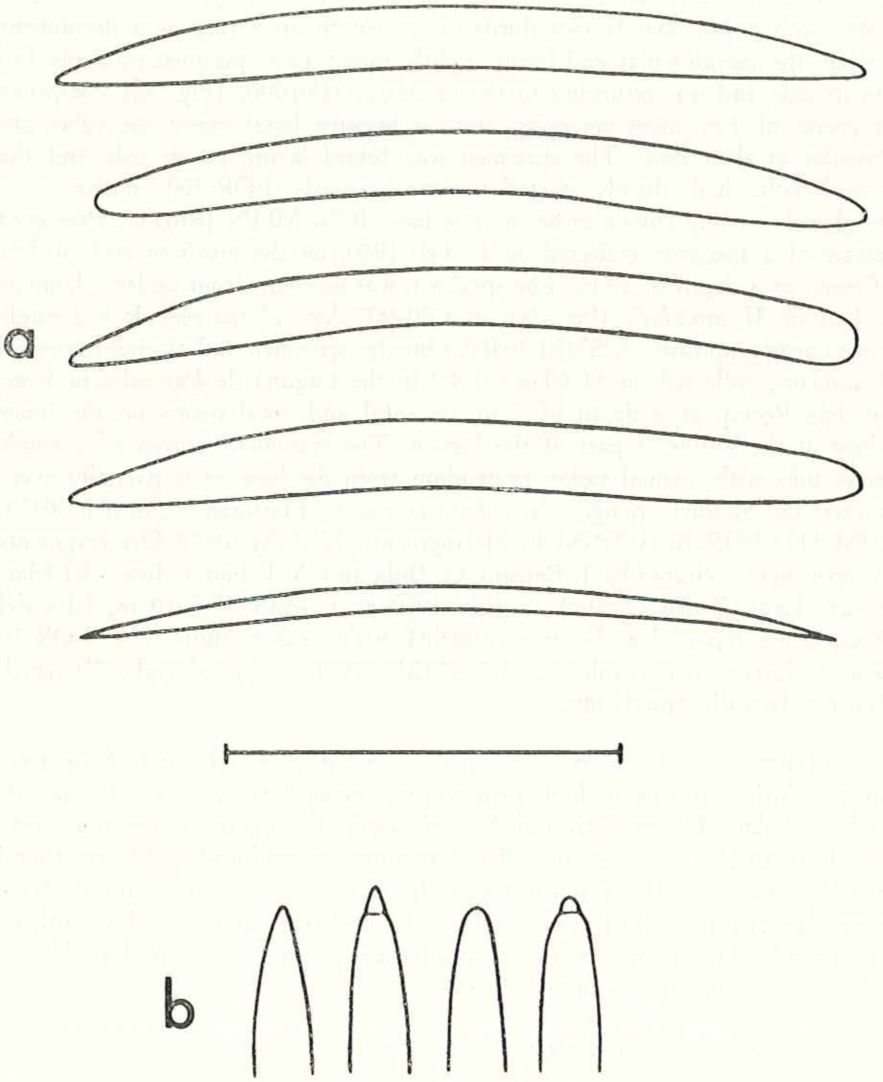

FIGURE 7. *Xestospongia rosariensis,* spicules: (a) variation in shape of oxea from hastate to fusiform, including stylote forms; (b) examples of oxea points (scale = 100 μm).

at a depth of 4-5 m, on coral debris and sand in depressions between patches of coral, mainly *Montastrea annularis* and *Siderestrea siderea,* located immediately before the beginning of the reef slope. (Po) 005, (Fig. 3b) is an inclined tube, with approximately two thirds of its length appearing as a decumbent stolon, the pseudoscular end being slightly raised (the specimen probably fell on its side and was returning to the vertical). (Po) 006, (Fig. 3d) comprises a group of five tubes emerging from a massive basal mass; the tubes are broader at their base. The specimen was found laying on its side and the pseudoscules had already started turning upwards. POR: 100 consists of a single tube arising from a rather narrow base. ICN-MHN (Po) 007. Preserved pieces of a specimen collected on 17 Feb 1980, on the northern reef of Isla Tesoro, at a depth of 25 m. The specimen was growing from under a laminar colony of *M. annularis* (Fig. 2a) on a 80-90° slope of the reef. It is a single tube curving upwards. USNM 30480. One dry specimen and alcohol preserved fragments, collected on 23 March 1980 in the Laguna de Pajarales in front of Isla Rosita, at a depth of 7 m, on sand and coral debris on the inner slope at the southeast part of the lagoon. The specimen consists of a single erect tube with a small stolon protruding from the base; it is partially overgrown by another sponge, *Neofibularia oxeata* Hartman. USNM 30475, MM: 1111 POR: 16 (USNM 30481 fragment), USNM 30479. Dry fragments of specimens collected by J. Barreto, G. Bula and A. Pabón (Museo del Mar, Univ. Jorge Tadeo Lozano) in July 1970 at a depth of 3-10 m. Islas del Rosario are reported as location. USNM 30475 was a single tube; POR: 16 was a cluster of five tubes, and USNM 30479 comprised eight flattened, flaring, laterally fused tubes.

HABITAT: *Xestospongia rosariensis* is encountered only in reef environments. Although seen in high density coral areas (*Acropora cervicornis, A. palmata,* platy *M. annularis* and *Agaricia* spp.), the species occurs most commonly in patch reef areas where large amounts of sand and rubble are found in the depressions between coral growth; it is also very abundant in large inner lagoons (e. g. Pajarales) and on the back reef and reef flat south of the islands. This sponge adhers to dead coral patches or to coral rubble; in places it is cemented to other sponges.

ETYMOLOGY: Named after the type locality.

DISCUSSION

The recent sponge monographs by Wiedenmayer (1977) and van Soest (1980) have elucidated the taxonomic status of *Xestospongia.* On the basis of these works and our own examination of species types we now confirm the existence of six members of *Xestospongia* in the tropical western Atlantic.

Xestospongia muta (Schmidt) occurs in Florida, the Bahamas, throughout the Caribbean and in Brazil; *Xestospongia portoricensis* van Soest and *Xestospongia rampa* (de Laubenfels) are kown only from Puerto Rico; *Xestospongia rosariensis,* new species, has not yet been found outside of the type locality, Islas del Rosario, Colombian Caribbean; *Xestospongia subtriangularis* (Duchassaing) has a range from Florida and the Bahamas throughout the Caribbean; *Xestospongia wiedenmayeri* van Soest is known only from Curaçao.

We agree with van Soest (1980: 79) that *Strongylophora rampa* de Laubenfels belongs to *Xestospongia* but not that it is close to *Prianos tierneyi* de Laubenfels. The latter species, mistakenly transferred to *Xestospongia* by Wiedenmayer (1977), is a member of the order Hadromerida (Rützler and Vicente, in preparation).

Spicule dimensions indicate that *Xestospongia rosariensis* (oxea means 184 x 9 μm) is most closely related to *Xestospongia subtriangularis* (159 x 6 μm). All other members of the genus have oxeas or strongyles that are at least 350 μm long and 12 μm wide. The intermediate position of *Xestospongia rosariensis,* where spicule size is concerned, weakens the argument (van Soest, 1980: 74) that *Xestospongia subtriangularis* may not be a valid member of this genus.

ACKNOWLEDGMENTS

We especially wish to thank Fernando Duque (Head of Scientific Project, PNNCR), without whose help this work would not have been possible. Julio García-Gómez and Donald R. Moore (Rosenthiel School of Marine and Atmospheric Science, University of Miami) kindly carried a specimen to Miami and subsequently forwarded it to Washington, reviewed the manuscript and gave helpfull suggestions. Rob van Soest (Institute of Taxonomic Zoology, University of Amsterdam) allowed us to consult a manuscript copy of his work on Haplosclerida and confirmed the taxonomic status of the new species. Polidoro Pinto-Escobar (Director ICN-MHN) kindly admitted the type material to the Museum. Elvira María Alvarado (Biologist, MM) helped us in locating the MM material. We thank Margarita Sjöberg de Zea for translating this mauscript into English, Verenka Macintyre for editorial advice, Ruth de Diago (INDERENA, Instituto de Desarrollo de los Recursos Naturales Renovables y del Ambiente, Colombia) for desingning the map of the study area, and Mary Parrish for typing this contribution. The present investigation was sponsored by the Zea-Sjöberg Family: transport and preservation material was donated by INDERENA, PNNCR Project. Analyses were carried out at the laboratories of the Facult. de Ciencias del Mar, Biología Marina, Universidad Jorge Tadeo Lozano, Cartagena, Colombia.

ADDITIONAL NOTE: And additional specimen of *X. rosariensis,* filed in the collection of the "Instituto de Investigaciones Marinas de Punta de Betín (INVEMAR)" in Santa Marta on the north coast of Colombia, is registered (reg. number INVEMAR-POR: 196). This specimen was collected by H. Sánchez in Aug 1981 at "El Morro" (a small granitic islet facing the Santa Marta Bay, 74° 13' N; 11° 15' W) at a depth of 30 m on broken dead corals and coral debris, just beyond the outer slope of the coral formation surrounding the islet [for description of the area see Erhardt, H. & B. Werding. 1975. Los corales (Anthozoa e Hidrozoa) de la Bahía de Santa Marta, Colombia. Boletín del Museo del Mar, Universidad Jorge Tadeo Lozano, Bogotá, **4:** 3-50, 4 Figs., 28 fotos]. The specimen (Fig. 8) is a mass of approximately 15 cm long max., 10 cm wide, and 9 cm high. Although its shape differs from the usual in this species, its other characteristics coincide, and it is undoubtedly conespecific to the material from "Islas del Rosario". Its spicules measure (combined dimensions of hastate oxeas to strongyloxeas and fusiform oxeas, developmental stages): 123.2-**172.9**-194.0 by 0.9-**6.3**-8.9 μm.

The interesting point about this additional registration is that during none of the many dives made by S. Z. in 1981 to depths of 35 m in the surroun-

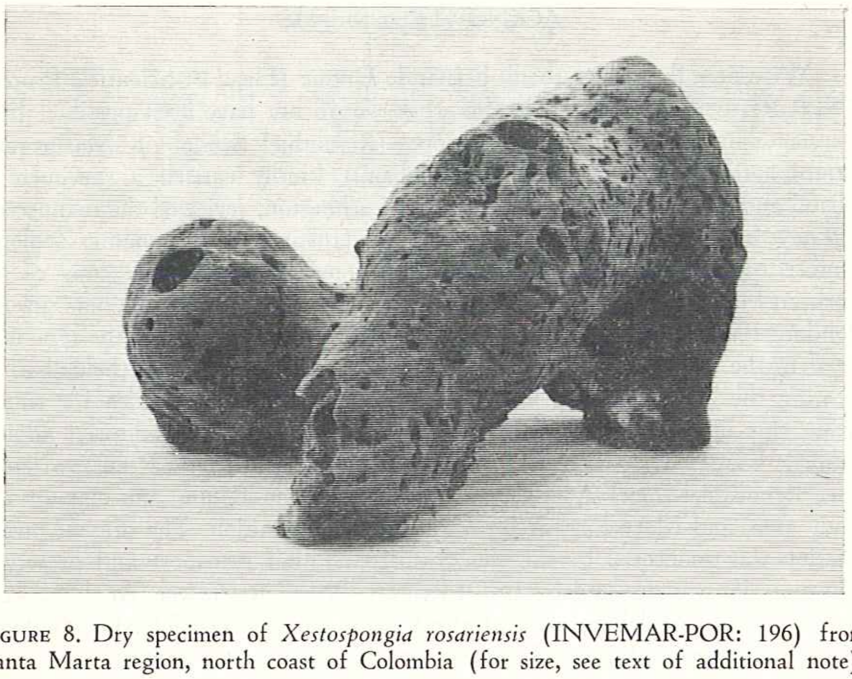

FIGURE 8. Dry specimen of *Xestospongia rosariensis* (INVEMAR-POR: 196) from Santa Marta region, north coast of Colombia (for size, see text of additional note).

dings of Santa Marta was this species detected. This finding can be considered exceptional as it is certain that this species is not found in association with the coral formations of the zone, as in the "Islas del Rosario". The specific ecological conditions (seasonal upwellings with temperatures falling to 23° C, as per data from INVEMAR) could be the reason for the almost total absence of this species in Santa Marta. Future observations to the north and south of studied sites would clarify the problem.

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TABLE I

MEASUREMENTS OF MATERIAL STUDIED[1]

Specimens	Nr.	*Tubes* lenght x diam. (cm)	*Basal mass* lenght x width x height (cm)	*Pseudoscula* diam. (cm)	*Tube wall* thickness (cm)	*Spicules*[2]			
							lenght	x	(μm)
ICN-MHN (Po) 001 (holotype)	1	44 x 4-4.5	~ 12 x 6 x 7	2.5-3	0.5	I	168.7-192.8-209.4	x	4.
						II	131.3-167.8-187.5	x	2.
						T	131.3-191.4-209.4	x	2.
ICN-MHN (Po) 002	1	78 x 4-5	~ 5 x 8 x 8	3	up to 1	I	168.7-190.9-203.1	x	7.
						II	121.9-161.9-181.2	x	1.
						T	121.9-179.7-203.1	x	1.
ICN-MHN (Po) 003	4 (1 coll.)	30 x 1.7-3.4	—	1.4	0.1-1.4	I	168.7-188.7-203.1	x	4.
						II	106.3-160.9-187.5	x	1.
						T	106.3-179.4-203.1	x	1.
ICN-MHN (Po) 004	1	12 x 2.5-6	—	2.4	0.1-1.7	I	179.0-190.6-217.4	x	7.
						II	153.1-170.3-200.0	x	3.
						T	153.1-187.5-212.4	x	3.
ICN-MHN (Po) 005	1	18 x 2-4	~ 10 x 4 x 4	1.4	0.1-1	I	168.7-187.5-203.1	x	9.
						II	137.5-165.6-168.7	x	2.
						T	137.5-185.6-203.1	x	2.
ICN-MHN ~~(holotype)~~ (Po) 006			~ 12 x 6 x 7	2.5-3	up to 6	I	178.1-193.7-209.4	x	8.
						II	134.4-176.5-190.6	x	1.
						T	134.4-189.7-209.4	x	1.
MM: 4689 POR: 100	1	22 x 1.4-3.3	~ 5 x 5 x 5	1.5	up to 1.5	I	100.0-171.5-200.0	x	6.
						II	103.1-163.4-165.6	x	1.
						T	100.0-162.1-200.0	x	1.
ICN-MHN (Po) 007	1	—	—	—	up to 1.2 or more	I	175.0-188.4-200.0	x	7.
						II	156.2-171.9-190.6	x	0.
						T	156.2-182.4-200.0	x	0.
USNM 30480	1	56 x 6	—	3	1.5	I	180.0-198.6-220.0	x	10.
						II	—		
						T	180.0-198.6-220.0	x	10.
USNM 30475	1	50 x 7	—	4	—		—		
MM: 1111 POR: 16 (USNM 30481)	5	32-67 x 4.5-8.5	—	—	1.5-2	I	153.1-190.0-209.4	x	5.
						II	—		
						T	153.1-190.0-209.4	x	5.
USNM 30479	8	30 x 50-13	—	—	1.5		—		

[1]) (—) = no data.

[2]) I = hastate oxeas, styles and strongyloxeas; II = fusiform oxeas (developmental stages); T = total; I and II co

TABLE I

MEASUREMENTS OF MATERIAL STUDIED [1]

Tubes enght x diam. (cm)	*Basal mass* lenght x width x height (cm)	*Pseudoscula* diam. (cm)	*Tube wall* thickness (cm)	*Spicules* [2]	lenght	x (μm)	width
4 x 4-4.5	~ 12 x 6 x 7	2.5-3	0.5	I	168.7-**192.8**-209.4	x	4.7- **9.7**-11.7
				II	131.3-**167.8**-187.5	x	2.3- **4.1**-5.5
				T	131.3-**191.4**-209.4	x	2.3- **9.4**-11.7
3 x 4-5	~ 5 x 8 x 8	3	up to 1	I	168.7-**190.9**-203.1	x	7.8- **7.5**-12.5
				II	121.9-**161.9**-181.2	x	1.5- **3.7**-6.2
				T	121.9-**179.7**-203.1	x	1.5- **8.5**-12.5
0 x 1.7-3.4	—	1.4	0.1-1.4	I	168.7-**188.7**-203.1	x	4.7- **8.7**-11.7
				II	106.3-**160.9**-187.5	x	1.6- **3.4**-4.7
				T	106.3-**179.4**-203.1	x	1.6- **7.1**-11.7
2 x 2.5-6	—	2.4	0.1-1.7	I	179.0-**190.6**-217.4	x	7.8- **9.4**-14.7
				II	153.1-**170.3**-200.0	x	3.1- **5.0**-6.2
				T	153.1-**187.5**-212.4	x	3.1-**11.0**-14.7
x 2-4	~ 10 x 4 x 4	1.4	0.1-1	I	168.7-**187.5**-203.1	x	9.4-**11.6**-15.6
				II	137.5-**165.6**-168.7	x	2.2- **3.4**-6.2
				T	137.5-**185.6**-203.1	x	2.2-**11.0**-15.6
	~ 12 x 6 x 7	2.5-3	up to 6	I	178.1-**193.7**-209.4	x	8.6-**11.6**-14.0
				II	134.4-**176.5**-190.6	x	1.5- **4.4**-6.2
				T	134.4-**189.7**-209.4	x	1.5- **9.7**-14.0
x 1.4-3.3	~ 5 x 5 x 5	1.5	up to 1.5	I	100.0-**171.5**-200.0	x	6.2-**10.0**-12.5
				II	103.1-**163.4**-165.6	x	1.5- **3.6**-4.7
				T	100.0-**162.1**-200.0	x	1.5- **9.8**-12.5
—	—	—	up to 1.2	I	175.0-**188.4**-200.0	x	7.1- **8.8**-9.4
			or more	II	156.2-**171.9**-190.6	x	0.8- **3.7**-5.4
				T	156.2-**182.4**-200.0	x	0.8- **6.9**-9.4
5 x 6	—	3	1.5	I	180.0-**198.6**-220.0	x	10.0-**11.7**-12.5
				II	—		—
				T	180.0-**198.6**-220.0	x	10.0-**11.7**-12.5
0 x 7	—	4	—		—		—
x 4.5-8.5	—	—	1.5-2	I	153.1-**190.0**-209.4	x	5.4-**10.9**-14.4
				II	—		—
				T	153.1-**190.0**-209.4	x	5.4-**10.9**-14.4
x 50-13	—	—	1.5		—		—

es and strongyloxeas; II = fusiform oxeas (developmental stages); T = total; I and II combined.