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A systematic revision of the central West Atlantic Halichondrida (Demospongiae, Porifera). Part III: Description of valid species*

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SUMMARY: The Central West Atlantic Halichondrida were revised to produce a better-defined classification of the group. The revised extant species are described here. They include seven new species and fourteen common Central West Atlantic species (along with one new combination). A key to the genera and species of Central West Atlantic Halichondrida is also provided.

Key words: Taxonomy, Porifera, Halichondrida, systematic revision, Atlantic Ocean

INTRODUCTION

Demospongiae having a simple spicule complement of oxea and styles and a confused skeletal arrangement were recently grouped in the order Halichondrida (Porifera, Demospongiae) (HARTMAN, 1982; BERGQUIST, 1978; LÉVI, 1973). This classification has proved to be vague and unreliable, however, owing to the simple skeleton, variable morphology, and lack of validated taxonomic characters.

Halichondrida of the Central West Atlantic were recently revised to better define the classification of the group (DIAZ *et al.*, 1991; POMPONI *et al.*, 1991; VAN SOEST *et al.*, 1990). The geographic area considered in this revision extends from the coast of North Carolina in the north, to the Atlantic coasts of Venezuela and Colombia in the south, from Vera Cruz (Mexico) in the west to the Virgin Islands in the east.

VAN SOEST *et al.* (1990) proposed that all Halichondrida genera (sensu LÉVI, 1973) be grouped in the family Halichondriidae Vosmaer, 1887 (sensu VAN SOEST *et al.*, 1990) and included with a close morphological group of Axinellida families (sensu LÉVI, 1973) under the senior order name Halichondrida Vosmaer, 1885. Those families are Axinellidae Ridley and Dendy, 1887, Desmoxyidae Hallmann, 1914, and Dictyonellidae (VAN SOEST *et al.*, 1990).

The definition of the order was emended to include Demospongiae with a plumoreticulate to confused skeletal architecture, built of interchangeable styles, oxea, and intermediate spicules of varying sizes, and not functionally localized (VAN SOEST *et al.*, 1990).

With the definitions of genera and families emended, the family Halichondriidae includes all De-

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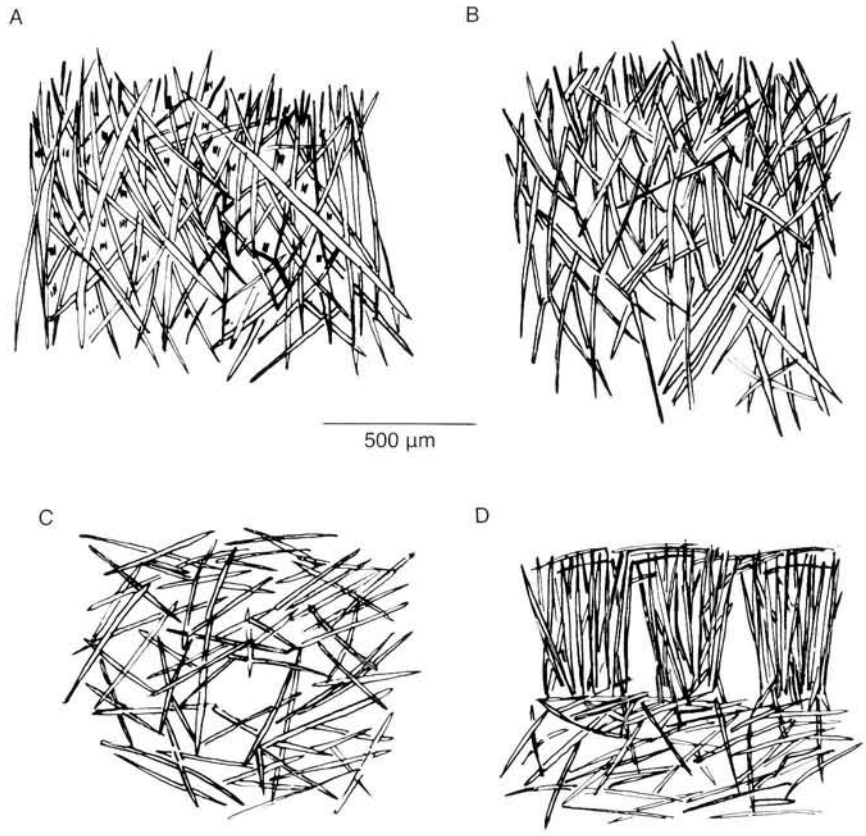

FIG. 1. — Schematic comparison of the skeletal architecture (perpendicular sections) of: A, *Topsentia*; B, *Epipolasis*; C, *Petromica* ,basal body; D, *Petromica*, fistule.

mospongiae having a choanosomal skeleton consisting of a high density of spicules occurring in vague, ill-defined, directionless tracts or in random array. Ten valid genera from the Central West Atlantic area were found after an analysis of 17 described genera; however, no specimens of *Ciocalypta* from the Central West Atlantic were examined. Genera are defined on the basis of a combination of morphological characters such as ectosomal skeleton, the lack of order in spicule arrangement, relative abundance and orientation of skeletal elements, and spicule type.

In the present work, we describe seven new species and redescribe 14 species. We also provide a diagnostic key for all genera and species considered in this revision, along with a diagnosis of all species reported in the area. Synonymy quotations are limited to those specimens we were able to reexamine. We have refrained from quoting other records because of the previously confused state of Halichondrid generic classification.

MATERIAL AND METHODS

Approximately 100 specimens of 35 nominal species initially belonging to 17 nominal genera were studied. These included museum specimens and material that we collected, primarily from the Central West Atlantic area. Material from the Bahamas, Gulf of Mexico, southeast Florida, and the Caribbean coasts of Colombia and Venezuela are part of the collection of the Division of Biomedical Marine Research, Harbor Branch Oceanographic Institution (HBOI), and are deposited in the Harbor Branch Oceanographic Museum (HBOM). Material from Barbados and Curaçao are part of the collections of the Institute of Taxonomic Zoology, University of Amsterdam (ZMA). Shallow-water samples (from depths less than 40 m) were collected by scuba diving and snorkeling. Deep-water samples (40-1,000 m) were collected by trawling or by the HBOI Johnson-Sea-Link manned submersibles.

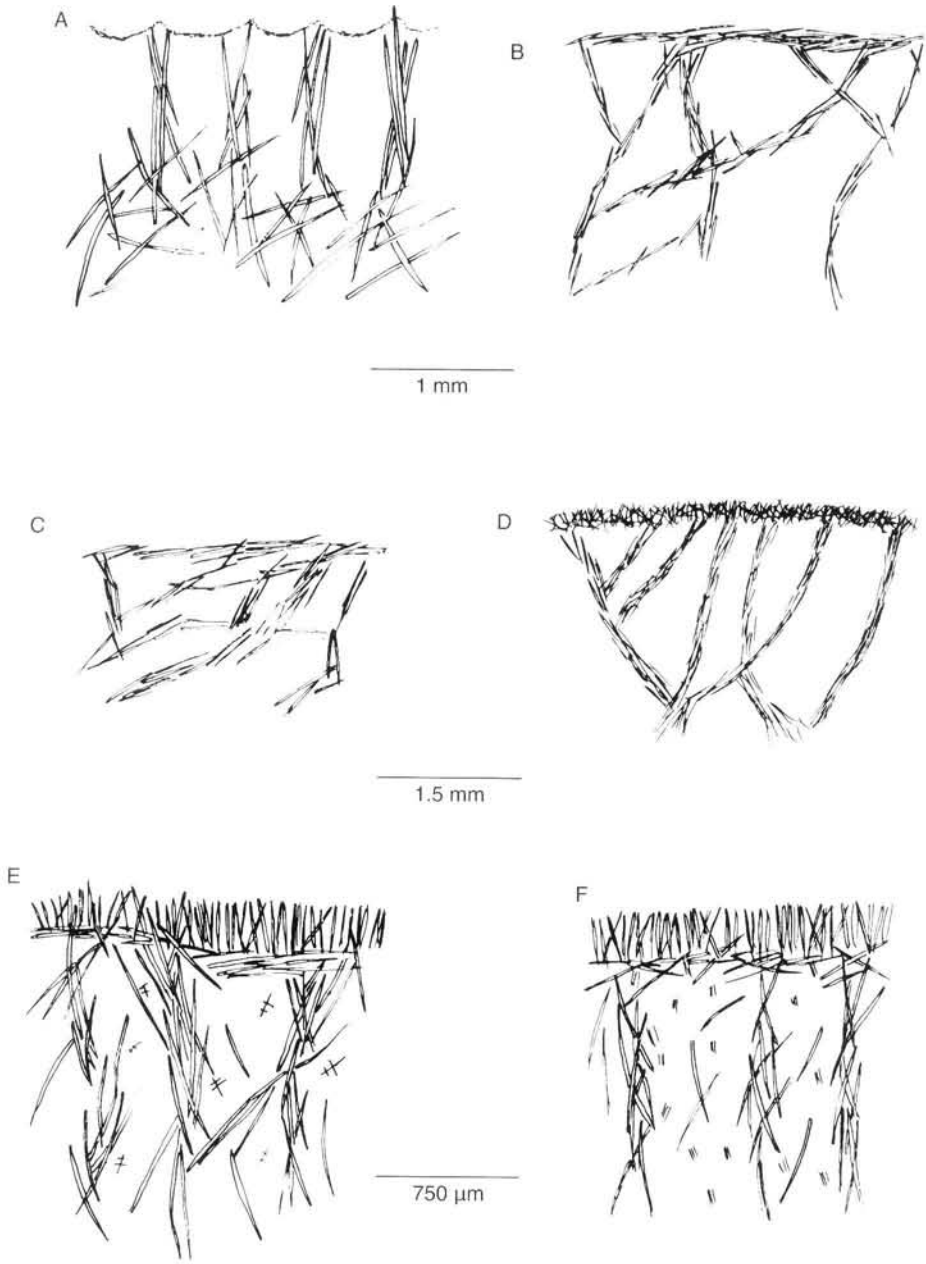

FIG. 2. — Schematic comparison of the skeletal architecture (perpendicular sections) of: A, *Axinyssa*; B, *Halichondria*; C, *Hymeniacidon*; D, *Spongosorites*; E, *Didiscus*; F, *Myrmekioderma*.

The museum material that we studied was from Zoologisch Museum, University of Amsterdam (ZMA); U.S. National Museum, Washington, D.C. (USNM); Yale Peabody Museum, Yale University (YPM); British Museum of Natural History, London (BMNH); Museum National d'Histoire Naturelle, Paris (MNHN); and Fundación Científica Los Roques, Caracas, Venezuela (FCLR).

Spicule preparations were made by dissolving small fragments of the sponges in concentrated nitric acid, rinsing with water, dehydrating in ethanol, and mounting with Permount. The spicule measurements given below are based on 25 examinations for each discrete category. For the most part, only the range is given; where necessary, the mean size is provided. Thick sections were made by hand or microtome of unembedded or paraffin-embedded samples to study skeletal architecture.

RESULTS

Seven new species, *Epipolasis profunda*, *Topsentia bahamensis*, *Topsentia pseudoporrecta*, *Halichon-*

dria corrugata, *Halichondria stylata*, *Spongosorites arenatus*, and *Spongosorites suberitoides* are described, and 14 additional species are redescribed (Table 1).

TABLE 1. — New and redescribed species of central West Atlantic Halichondrida

Epipolasis profunda n.sp.
Petromica ciocalyptoides (van Soest and Zea, 1986)
Axinyssa ambrosia (de Laubenfels, 1936)
Topsentia bahamensis n.sp.
Topsentia ophiraphidites (de Laubenfels, 1934)
Topsentia pseudoporrecta n.sp.
Halichondria corrugata n.sp.
Halichondria gibbsi (Wells et al., 1960), new combination
Halichondria lutea (Alcolado, 1984)
Halichondria magniconulosa Hechtel, 1969
Halichondria melanadocia de Laubenfels, 1936
Halichondria stylata n.sp.
Hymeniacidon caerulea Pulitzer-Finali, 1986
Hymeniacidon heliophila (Parker, 1910)
Spongosorites arenatus n.sp.
Spongosorites suberitoides n.sp.
Spongosorites siliquaria van Soest and Stentoft, 1988
Spongosorites ruetzleri (van Soest and Stentoft, 1988)
Myrmekioderma styx de Laubenfels, 1953
Myrmekioderma rea (de Laubenfels, 1934)
Didiscus oxeata Hechtel, 1983

Key to the Genera of Halichondriidae (*sensu* VAN SOEST*et al.*, 1990) from the Central West Atlantic

1a. Little or no spongin visible in the choanosome, forming confused skeleton where spicules predominate (Fig. 1) . . . . . (2)

b. Spongin evident in different degrees in the choanosome, forming loose spicule tracts or as a collagenous matrix (Fig. 2) . . . . . (4)

2a. Spicules consist of oxea only . . . . . *Topsentia*

b. Trichodragmata or desmas complement the main skeleton formed of oxea and/or strongyloxea(3)

3a. Skeleton radially arranged toward the surface; trichodragmata usually in high densities . . *Epipolasis*

b. Monocrepid desmas loose in the choanosome in low densities. . . . . *Petromica*

4a. Little or no developed ectosomal skeleton; spongin abundant in the choanosome as a collagen matrix. Spicules densely strewn in confusion in the interior but arranged in radial tracts, regularly spaced toward the exterior, forming conules at the surface . . . . . *Axinyssa*

b. Ectosomal skeleton present; spongin in the choanosome binds spicules in tracts . . . . . (5)

5a. Spicules tangentially oriented in the ectosome. . . . . (6)

b. Spicules paratangentially or perpendicularly oriented in the ectosome. . . . . (7)

6a. Spicules usually oxea, although oxea and styles are found together. Detachable ectosomal skeleton, with spicules strewn in confusion or arranged in bundles. . . . . *Halichondria*

b. Spicules exclusively styles; less developed tangential ectosome . . . . . *Hymeniacidon*

7a. Thick (200-500 μm) ectosomal crust of spicules oriented in all directions (paratangential) producing a smooth surface without obvious markings. . . . . *Spongosorites*

b. Ectosomal skeleton of smaller spicules oriented perpendicularly; surface usually provided with meandering grooves . . . . . (8)

8a. Discorhabds always present as microsclere . . . . . *Didiscus oxeata*

b. No discorhabds, microscleres usually trichodragmata of one or two size categories. . *Myrmekioderma*

Species Descriptions

Genus Epipolasis de Laubenfels, 1936

Massive-amorphous to flabellate with a confused choanosomal skeleton of oxea in a wide size range and an ectosomal perpendicular palisade of smaller spicules, tightly packed; trichodragmata usually present.

Epipolasis profunda n.sp. (Figs. 3, 8)

Material: USNM 43137 (holotype, Fig. 3), Wood Cay, Grand Bahama Island, 370 m; HBOM 003: 00106, 003: 00107 (paratypes), Settlement Point, Grand Bahama Island, Bahamas, 400 and 507 m, respectively.

Morphology-Massive-amorphous, sometimes with chimney projections. Surface optically smooth; compressible and crumbly.

Color-White alive and spirit.

Ectosomal skeleton (Fig. 8A)-Spicules arranged radially; in one specimen (HBOM 003: 00106), smaller oxeas are perpendicular to the surface.

Choanosomal skeleton-Confused; spongin not visible; spicules predominate.

Spicules (Fig. 8B)-Wide size range of fusifom oxea (800-1,100-1,600 × 18-24-29 μm), from straight to slightly bent. Straight, compact trichodragmata (20-60 × 8-13 μm) distributed throughout the body.

Ecology-Only found in deep rocky or sandy bottoms in the Bahamas, 370-377 m.

Distribution-Only known from the Bahamas.

Remarks-*Epipolasis profunda* differs from the type species in habit and in possessing only one type of ectosomal skeleton. The holotype of *Epipolasis*, *E. suluensis* (WILSON, 1908) (USNM 21297) from the Sulu Archipelago, is a flabellate mass. It has a per-

FIG. 3. — *Epipolasis profunda* n.sp., fragmented holotype specimen USNM 43137. FIG. 4. — *Petromica ciocalyptoides* (Van Soest & Zea), photographed in situ in a Colombian Caribbean reef (scale 1 cm). FIG. 5. — *Axinyssa ambrosia* (De Laubenfels), specimen from the Bahamas, HBOM 003: 00071. FIG. 6. — *Topsentia ophiraphidites* (De Laubenfels), photographed in situ in a Venezuelan reef (scale 5 cm). FIG. 7. — *Topsentia pseudoporrecta* n.sp., paratypes from the Bahamas, HBOM 003: 00086.

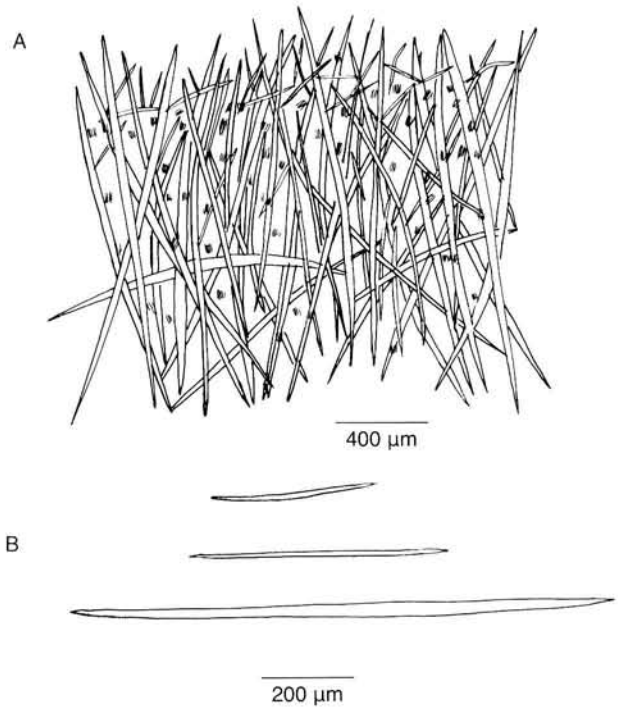

FIG. 8. — *Epipolasis profunda*: A, perpendicular section of peripheral skeleton; B, spicules.

pendicular ectosomal skeleton on the oscular side and a tangential spicule arrangement on the smooth ostial side of the body. The basic combination of characters for the genus (DIAZ *et al.*, 1991) is consistent among all specimens studied; however, until more specimens of other known species as well as the type species are studied, the validity of *Epipolasis* remains uncertain.

Genus *Petromica* Topsent, 1897

Massively encrusting to fistulose, with sublithistid spiculation of styles or oxeas and desmas; tangential ectosomal skeleton; confused choanosomal skeleton, which shows some radial orientation toward the surface.

Petromica ciocalyptoides (VAN SOEST and ZEA, 1986) (Fig. 4, 9)

Material: HBOM 003: 00069, HBOM 003: 00070, sandy-rubble bottom, Los Hermanos, La Blanquilla, Venezuela, 15-25 m. ZMA POR. 5837, 5838 (paratypes) north Colombia, 12 and 20 m, respectively.

Morphology (Fig. 4)-Massive-amorphous base, usually buried in the sand, from which fistulose projections arise. Smooth surface, compressible but slightly brittle.

Color-Yellow-orange alive, tan to white in spirit.

Ectosomal skeleton (Fig. 9D)-Not detachable; spicules tangentially arranged in a nearly isodictyal reticulation of tracts; in the fistules the ectosome is supported by columns of spicules that radiate from the confused ectosome (Fig. 9B).

Choanosomal skeleton (Fig. 9A) -confused, lacking spongin; spicules densely strewn, forming occasional loose bundles. Near the periphery the skeleton becomes radially oriented. In the fistules the choano-

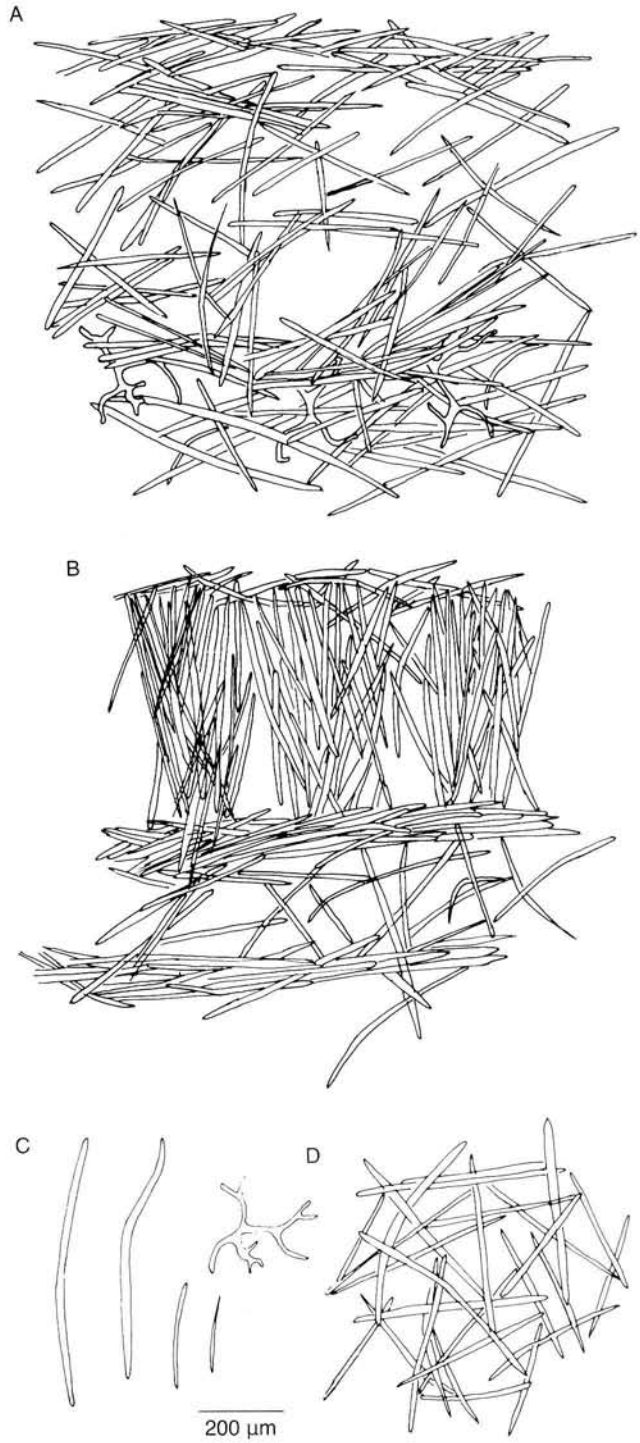

FIG. 9. — Petromica ciocalyptoides: A, perpendicular section of peripheral skeleton in the massive part of the sponge; B, perpendicular section of the fistule wall; C, spicules; D, tangential view of the ectosome.

some consists mainly of longitudinal spicule tracts, from which radially oriented tracts arise (one spicule length) (Fig. 9B). Desmas are found throughout the choanosome.

Spicules (Fig. 9C)-Robust oxea to strongyloxea in a wide size range (300-500-650 × 5-12-20 μm) and smooth dichotomous desmas (600-700 μm).

Ecology-Restricted to sandy or rubble bottoms at intermediate depths, 12-25 m.

Distribution-Venezuela, Caribbean Colombia.

Remarks-Only three species of the genus have been described: *Petromica plumosa* from South Africa, *P. grimaldi* from the Azores and *P. ciocalyptoides* from the West Indies. The material studied is consistent with the original description of the species (VAN SOEST and ZEA, 1986).

Genus *Axinyssa* von Lendenfeld, 1897

Massive-amorphous with spicules strewn in confusion or forming loose bundles in the choanosome; radial tracts of spicules separated at regular intervals give rise to conules at the surface. The ectosome is largely organic, but tough, with sparsely scattered spicules. Strongly collagenous mesohyl. Spicules are oxea, strongyloxea, or styles usually of one size class.

Axinyssa ambrosia (de Laubenfels, 1936) (Figs. 5, 10)

Synonymy: *Raphisia ambrosia* de Laubenfels, 1936; *Leucophloeus lewisi* van Soest and Stentoft, 1988; *Dictyonella yumae* Pulitzer-Finali, 1986.

Material: USNM 22452 (holotype), southeast of Loggerhead Key, Dry Tortugas, Florida; HBOM 003: 00071, Hawk's Nest, Berry Island, Bahamas, 176 m. ZMA: POR. 5401, Barbados, 100 m; POR. 5402, Barbados 100 m; POR. 3569, Puerto Rico, 72-90 m; POR. 6895, Curaçao, reefs, 10 m.

Morphology (Fig. 5)-Massive-amorphous with lobate protuberances; hard but compressible. Optically smooth surface, from finely to more obviously conulose; fleshy.

Color-Cream to yellow alive, tan in spirit. Ectosomal skeleton-Largely organic, with few spicules strewn tangentially.

Choanosomal skeleton (Fig. 10A)-Spicules densely strewn in the interior; toward the periphery radial tracts (2 to 3 spicule lengths) end as small conules on the surface.

Spicules (Fig. 10B)-Fusiform and hastate oxea with transitional styloids and strongyloxea (425-700-925 × 8-30 μm); stair-stepped endings common in some specimens.

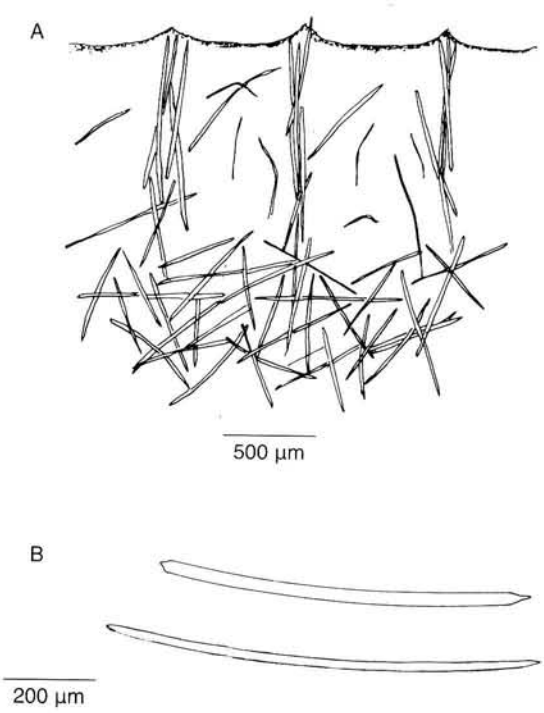

FIG. 10. — *Axinyssa ambrosia*: A, perpendicular section of peripheral skeleton; B, spicules.

Ecology-Found at depths of 10 to 176 m; common in deeper areas of reefs. Low abundance.

Distribution-Widespread in the Caribbean.

Remarks-The genus *Axinyssa* was redefined (VAN SOEST *et al.*, 1990; DIAZ *et al.*, 1991) to include a series of species (previously classified as *Axinyssa*, *Pseudaxinyssa*, *Leucophloeus*, and *Raphisia*) with massive-amorphous bodies, and a transitional skeletal arrangement between typical confused halichondrid to plumose axinellid skeletons. DE LAUBENFELS (1936) does not describe radial spicule tracts near the periphery; probably this was a consequence of the thinness of the holotype (2-4 mm). The rest of the characters in the studied material are consistent with the original description.

In *Axinyssa ambrosia*, the strongyloxea or styloids (i.e., style-like spicules with tapering blunt ends) at times occur predominantly as transitional megascleres. The high variability of this character led us to include *Leucophloeus lewisi* van Soest and Stentoft, 1988, in the present species.

Genus *Topsentia* Berg, 1899

Massive-amorphous to lobate, brittle, with a skeleton apparently lacking spongin. As a consequence, spicules in confused, directionless arrangement, packed around canals and subdermal spaces. Smaller spicules usually arranged in compact, paratangential,

ectosomal layer, creating a microhispid surface. Spicules consist of oxeas in a wide size range, usually with two or three size classes. Twisted, bent, or double-bent spicules are sometimes present. No microscleres.

Key to the Central West Atlantic Species

1a. Ectosome with a thin layer of tangentially arranged spicules; massive basal body with few projecting tubes, up to 20 cm in length and 8 cm in diameter; surface of basal body has small blunt projections; whitish color ..... *Topsentia bahamensis*

b. Ectosomal skeleton paratangential or undeveloped ..... (2)

2a. Massive-amorphous to lobate; grey to purple-brown externally, tan internally alive. Oxea to strongyloxea in two or three size classes; strongly sinuous or bent spicules usually present in varying number. ..... *Topsentia ophiraphidites*

b. Subspherical in shape with a tubular oscular projection several centimeters long. Spicules include un usually thick, large oxea (up to 40 μm in width); deformed oxea absent or rare .. *Topsentia pseudoporrecta*

Topsentia bahamensis n.sp. (Figures 11, 14)

Material: USNM 43138 (holotype), Acklins Bight, Bahamas, 40 m; HBOM 003: 00072 (paratype), Andros Island, Bahamas, 160 m; HBOM 003: 00074 (paratype), Rum Cay, Bahamas, 40 m.

Morphology (Fig. 14)-Massive-amorphous body with solid fistular projections up to 20 cm long; blunt projections, regularly distributed, were observed in the base of one specimen. Hard crumbly consistency. Yellow zoanthids over the surface of some specimens.

Color-White alive and in spirit.

Ectosomal skeleton-Not detachable; in perpendicular sections, the radial arrangement of large spicules projecting from the surface is covered by an irregular layer of smaller, tangentially oriented oxea.

Choanosomal skeleton (Fig. 11A)-Confused internally, tending to a radial arrangement near the surface

Spicules (Fig. 11B)-Two size classes of fusiform oxea, 200-300-500 × 6-9-13 μm, usually bent, and 500-650-800 × 8-19-32 μm, usually doubly bent.

Ecology-Collected in deep waters growing on rocky slopes or sandy-rocky substrates.

Distribution-Only known from the Bahamas.

Remarks-The studied material coincides with the description of the genus (BERG, 1899; see DIAZ *et al.*, 1991). The particular shape, color, and slightly tangential ectosomal skeleton are consistent in the three specimens studied and separate them from the other species found.

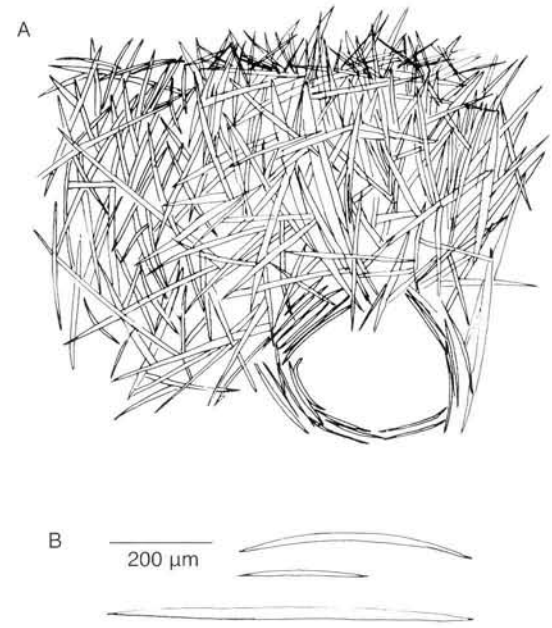

FIG. 11. — *Topsentia bahamensis:* A, perpendicular section of peripheral skeleton; B, spicules.

Topsentia ophiraphidites (de Laubenfels, 1934) (Figs.6, 12)

Synonymy: *Viles ophiraphidites* de Laubenfels, 1934; *Halichondria braziliensis* Hechtel, 1983; *Spongosorites sinuatus* Pulitzer-Finali, 1986; *Topsentia roquensis* Diaz, Alvarez, and van Soest, 1987.

Material: USNM 22334 (holotype), Puerto Rico, 40-80 m; Museum of Genoa 47691, Dominican Republic, Boca Chica, 2-3 m; YPM: 5709 (holotype of *Halichondria braziliensis*), Recife, Brazil, 29 m.; YPM 8988 (paratype), Recife, Brazil, 33 m; FCLR POR. 125 (holotype of *Topsentia roquensis*), Dos Mosquises Sur Cay, Archipiélago Los Roques, 28 m; ZMA POR. 5703, Curaçao, Blauwbai, 55 m; ZMA POR. 6899, Curaçao, Buoy 2, 20 m; ZMA POR. 6898, Curaçao, Awa Blancu, 10-20 m; ZMA POR. 6900; Curaçao; ZMA POR. 6149, Isla de Morro, Santa Marta, Colombia, 15 m; HBOM 003: 00079, 003: 00080, Crooked Island, Bahamas, 40 m.

Morphology (Fig. 6)-Massive-amorphous, sometimes subspherical to lobate. Some specimens have sharp projections 2-8 cm high. Surface usually uneven and lumpy.

Color-Gray, brown, pink or purple externally; tan internally. Tan in spirit.

Ectosomal skeleton-Not detachable; paratangential arrangement of spicules, with dense projections of large spicules from the surface; high concentration of smaller and deformed spicules at the surface.

Choanosomal skeleton (Fig. 12A)-Confused; some specimens have a vague radial arrangement of large spicules toward the surface.

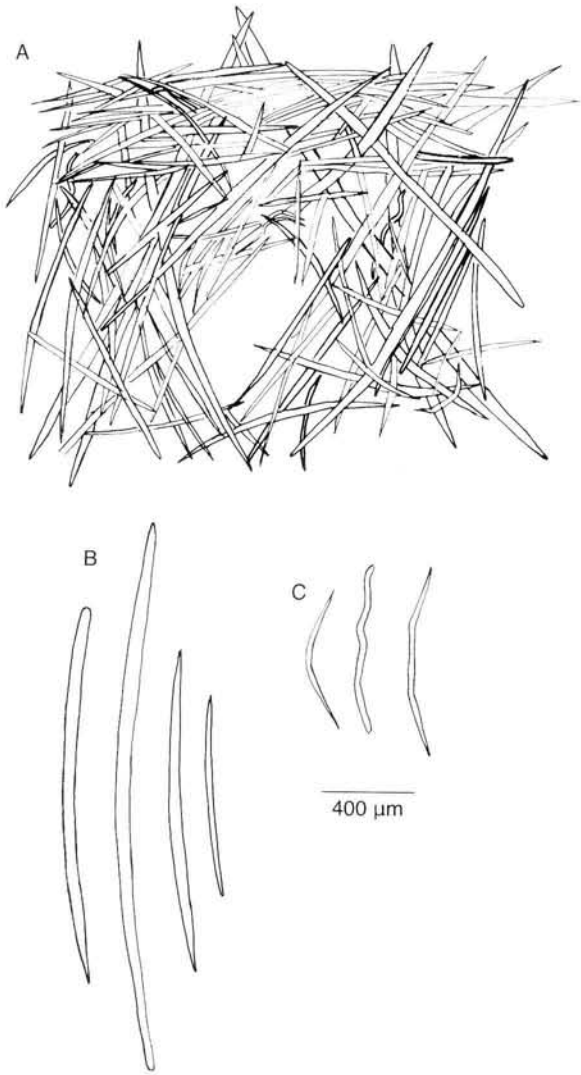

FIG. 12. — *Topsentia ophiraphidites*: A, perpendicular section of peripheral skeleton; B and C, spicules.

Spicules (Fig. 12 B, C)-Two to three sizes of fusiform oxea to strongyloxea (600-1,100 × 15-40 µm; 350-800 × 6-20 µm; 160-400 × 4-10 µm); bent or sinuous deformed spicules present in various amounts.

Ecology-More common in deep reef areas, 3-55 m.

Distribution-widespread in the Central West Atlantic.

Remarks-The synonymy of this species is based on reexamination of all quoted types.

Topsentia pseudoporrecta n.sp. (Figures 7, 13)

Synonymy: *Topsentia porrecta sensu* Van Soest and Stentoft, 1988.

Material: ZMA POR. 5410 (holotype), 5411, 5412 (paratypes), Barbados, 144-216 m; HBOM 003: 00086 (paratype), Settlement Point, Grand Bahama Island, 504 m.

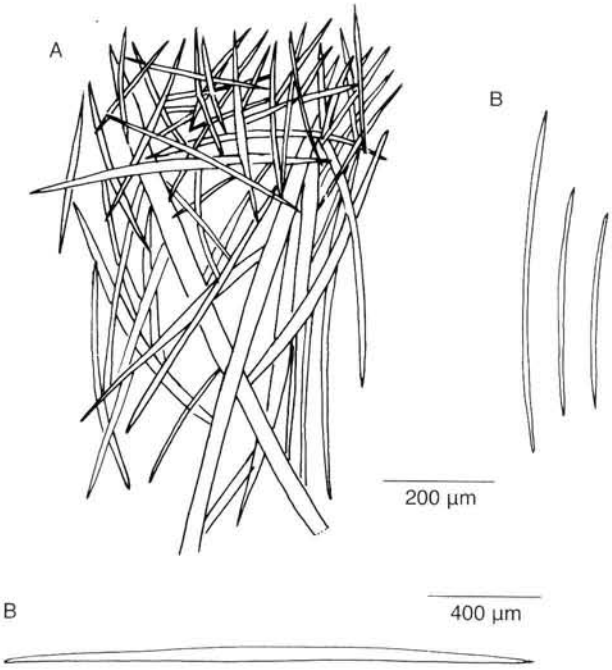

FIG. 13. — *Topsentia pseudoporrecta:* A, perpendicular section of peripheral skeleton; B, spicules.

Morphology (Fig. 7)-Subspherical base with a thin, hollow oscular projection, several centimeters long; hard in consistency; optically smooth; microhispid.

Color-Tan-white alive and in spirit.

Ectosomal skeleton-Paratangential arrangement, mainly of smaller spicules.

Choanosomal skeleton (Fig. 13A)-Confused in the base; longitudinal thick spicule tracts occur in the fistular projections.

Spicules (Fig. 13B)-Three size classes of fusiform oxea (1,000-1,800 × 25-60 µm; 475-900 × 10-25 µm; 260-480 × 7-12 µm); few deformed spicules of the smallest categories were observed.

Ecology-Common in deep waters, below 140 m.

Remarks-The species morphology resembles that of *Topsentia porrecta* (TOPSENT, 1928); however, specimens of *T. porrecta* are invariably bright yellow and spicules are always much smaller.

Genus *Halichondria* Fleming, 1828

Massive-amorphous with a basic skeleton formed by ill-defined, directionless spicule tracts, and a clearly detachable, tangential, ectosomal skeleton. The spicules, in a wide size range, are predominantly oxea, although styles or styloids (i.e., stylelike with tapering blunt ends) are sometimes present.

Key to the Central West Atlantic Species

1a. Massive sponges with fistules or regularly distributed, mound-shaped projections . . . . . (2)

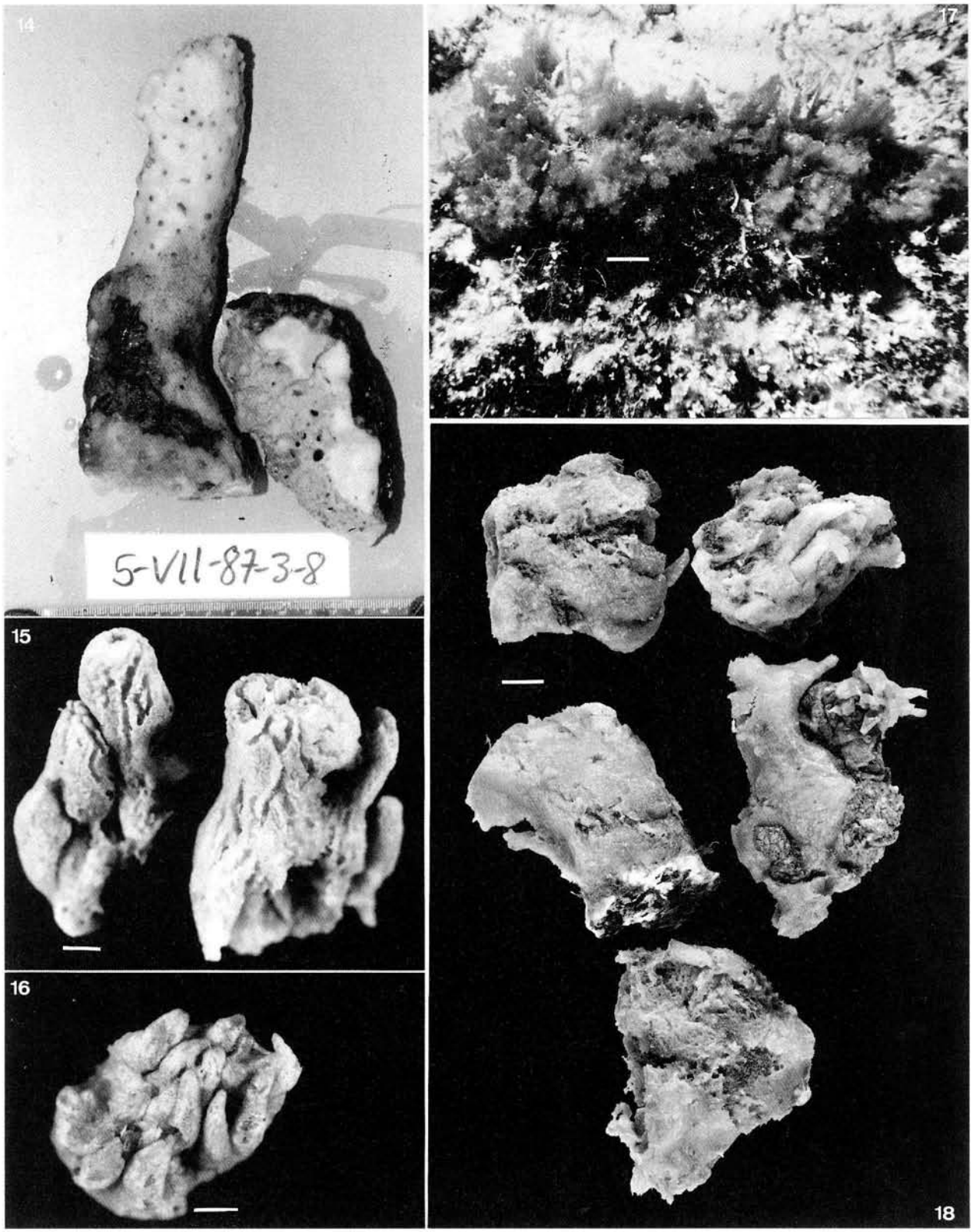

FIG. 14. — *Topsentia bahamensis* n.sp., fragmented holotype specimen USNM 43138. FIG. 15. — *Halichondria corrugata* n.sp. (= *Halichondria panicea* sensu Little, 1963), fragmented holotype specimen USNM 23566. FIG. 16. — *Halichondria gibbsi* (Wells et al.), holotype USNM 23666 (scale 1 cm). FIG. 17. — *Halichondria lutea* Alcolado, photographed in situ in a Venezuelan reef (scale 1 cm). Fig. 18. — *Halichondria magniconulosa* Hechtel, fragmented specimen from Curaçao (scale 1 cm).

b. Massive sponges without projections other than conules or irregular protrusions at the surface . . . (4)

2a. Sponges with grooved oscular chimneys up to 5 cm high and 2 cm wide . . . . *Halichondria corrugata*

b. Sponges with solid fistulose projections and a rugose to conulose surface . . . . . (3)

3a. Fistules up to 3 cm high and 1 cm arising arising from a massive body several several centimeters thick . . . . . *Halichondria gibbsi*

b. Massive encrusting body usually burrowing in the sand, from which sharp and corrugated projections arise (up to 2 cm high and 0.5 cm wide.). Fistules distributed densely over the surface, giving the sponge a hispid appearance. . . . . *Halichondria lutea*

4a. Black to gray sponge. . . . . (5)

b. Yellow masssive amorphous to lobate or subspherical; surface irregularly conulose . . . . . *Halichondria magniconulosa*

5a. Oxeas only; surface smooth to irregularly conulose; choanosome with green-yellow tinges. . . . . *Halichondria melanadocia*

b. Oxeas, styles and styloids; smooth and shiny surface; black externally and internally, both alive and in spirit . . . . . *Halichondria stylata*

Halichondria corrugata n.sp. (Figs. 15, 19)

Synonymy: *Halichondria panicea* (sensu Little, 1963).

Material: USNM 23566 (holotype). Gulf Coast of Florida, 3 m.

Morphology (Fig. 15)-Massive-lobate, with oscular chimneys up to 5 cm high, rising from a massive base 2 cm thick; whole specimen is 7 cm in diameter, but others may grow to 20 cm in diameter (Little, 1963); oscular chimneys (0.5-1.0 cm diameter) are characteristically grooved along the sides and on top.

Color-Light greenish-brown or pink.

Ectosomal skeleton (Fig. 19A)-Detachable "skin," consisting of intersecting tangential spicule tracts, 80-100 μm in diameter, leaving open pore fields of up to 200 μm in diameter.

Choanosomal skeleton (Fig. 19B)-The ectosomal crust, 50 μm in thickness, is supported by tracts 80-220 μm in diameter; between these tracts many spicules are strewn in confusion.

Spicules (Fig. 19C)-Oxea (130-370-520 × 5-9-12 μm), conspicuously curved and gradually pointed.

Ecology-Collected at 3-m depth on sand and grass flats.

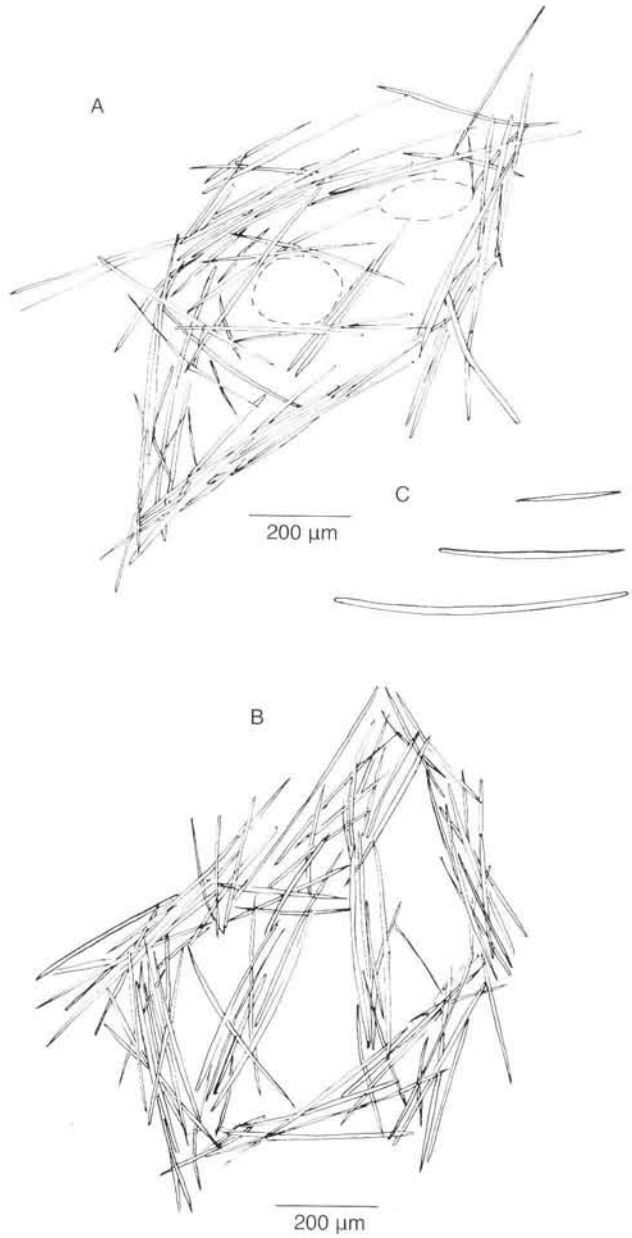

Fig. 19. — *Halichondria corrugata*: A, tangential view of the ectosome; B, perpendicular section of peripheral skeleton; C, spicules.

Distribution-Known only from the type locality.

Remarks-This species shows similarities with *Halichondria panicea* (Pallas, 1766) (coarse overall structure, oscular chimneys), but differs clearly in the characteristic grooved oscular chimneys.

Halichondria gibbsi (Wells et al., 1960) new combination (Figs. 16, 20)

Synonymy: *Ciocalapata gibbsi* Wells *et al.*, 1960

Material-USNM 23666 (holotype), North Carolina.

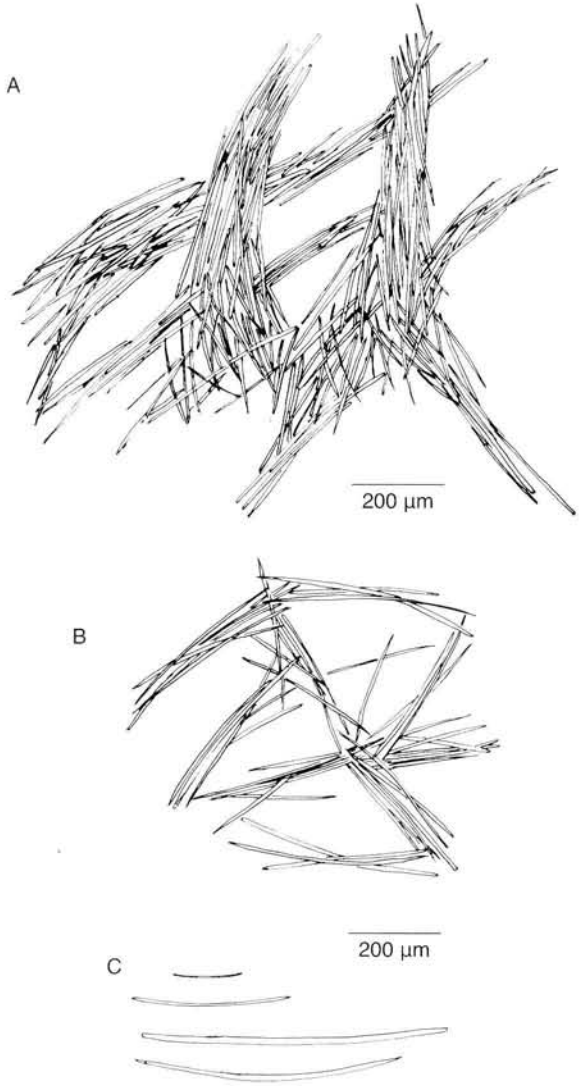

FIG. 20. — *Halichondria gibbsi*: A, perpendicular section of peripheral skeleton; B, tangential view of the ectosome; C, spicules.

Morphology (Fig. 16)-Fistules of up to 3 cm high rise from a massive base.

Color-In life unknown; tan in spirit.

Ectosomal skeleton (Fig. 20B)-Easily detachable, consisting of a reticulation of spicule tracts and single spicules.

Choanosomal skeleton (Fig. 20A) (of the fistules)- Supporting columns 80-100 µm in diameter fan out from a reticulated central mass. The skeleton of the base is the usual confused mass of spicules with some directionless tracts.

Spicules (Fig. 20C)-Two size categories of oxea (340-530-680 × 5-7-10 µm and 170-260-320 × 3-5 µm). Large category usually with one strongylote end.

Ecology-Occurs in sediment-rich environments; depth unknown.

Distribution-Known only from the type locality.

Remarks-The habit of this species approaches that of *Ciocalypta*, but the ectosomal and spicular characters make it a true *Halichondria*. The habit is considered an adaptation to life in sandy substrate.

Halichondria lutea, Alcolado 1984 (Figures 17, 21)

Material: USNM 39232 (holotype), Havana, Cuba, 50 m; HBOM 003: 00088, 003: 00088, 003: 00089, ZMA POR. 6896 (fragments), Los Roques, 30 m; FCLR. POR. 79, and POR. A-30, Los Roques, 30 and 24 m, respectively.

Morphology (Fig. 17)-Massive-encrusting with sharp, corrugated projections, up to 11 mm high and 1.5-5.5 mm apart. Compressible but fragile in consistency. Inconspicuous oscules present as apertures located on the projections, but only observed when specimen is fully expanded.

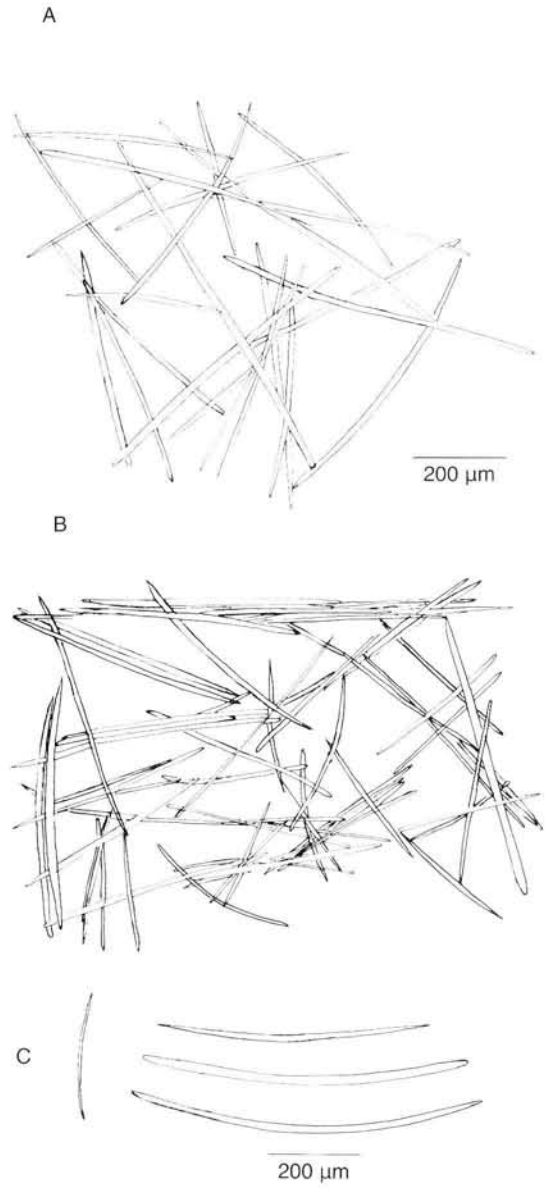

FIG. 21. — *Halichondria lutea*: A, tangential view of the ectosome; B, perpendicular section of peripheral skeleton; C, spicules.

Color-Orange to yellow alive, tan in spirit.

Ectosomal skeleton (Fig. 21A)-Thin, detachable membrane with spicules mainly strewn in confusion. Abundant, presumably exhalant openings, 1-2 mm in diameter between the projections.

Choanosomal skeleton (Fig. 21B)-Spicules strewn in confusion; few loose tracts differentiated in the internal body; compact, longitudinal, spongin-enforced tracts occur in the projections.

Spicules (Fig. 21C)-Fusiform oxea, strongyloxea and styloids with stair-stepped ends, in a wide size range (350-1,200 × 3-15 μm). Some spicules bent.

Ecology-The sponge grows typically in deep areas of reefs, 25-50 m, over sandy or sandy-rubble bottom. It is usually covered by sand

Distribution-Cuba, Venezuela.

Remarks-The subspherical shape reported by (1984), in the original description of the species was never observed in the studied specimens. All other morphological characters of the holotype are similar to massive-encrusting specimens. The particular ectosome, habit, and ecology of this species make it easily differentiable from the other species.

Halichondria magniconulosa Hechtel, 1969 (Figures 18, 22)

Material: YPM 5039 (holotype), Rasta's wreck, on wood pilings, Port Royal, Jamaica; HBOM 003: 00109, Bahamas, 177 m; ZMA POR. 3887, 3910, 4022, 5906, mangroves, Piscadera Bay, Curaçao; ZMA POR. 4013, mangroves near La Parguera, Puerto Rico; ZMA POR. 4066, 4035, 5912, mangroves, Margarita, Venezuela; ZMA POR. 4072, mangroves, Key Biscayne; ZMA POR. 4077, Los Gallos Point, Trinidad.

Morphology (Fig. 18)-Massive-amorphous to lobate; compressible; irregular surface with fistule-like elevations. Oscules not apparent.

Color-Yellow internally and externally alive, brown in spirit.

Ectosomal skeleton (Fig. 22A)-Detachable but with difficulty.

Spicules between ostia can be scattered or form loose bundles.

Choanosomal skeleton (Fig. 22B)-Spicules strewn in confusion or arranged in loose tracts (30-100 μm in diameter). Well-developed radial tracts end in dermal tufts. Large spicules predominate.

Spicules (Fig. 22C)-Oxea in two or three size classes (200-500 × 5-10 μm; 100-250 × 2-5 μm; and 40-110 × 2-4 μm).

Ecology-Mangrove areas.

Distribution-Widespread in the Caribbean.

Remarks-The smallest category of spicules (found only in the deep-water material, HBOM 003: 00109) is not reported in the original description (Hechtel 1965, p. 53); however, taking the rest of the characters into account, this difference is considered to be an intraspecific variation.

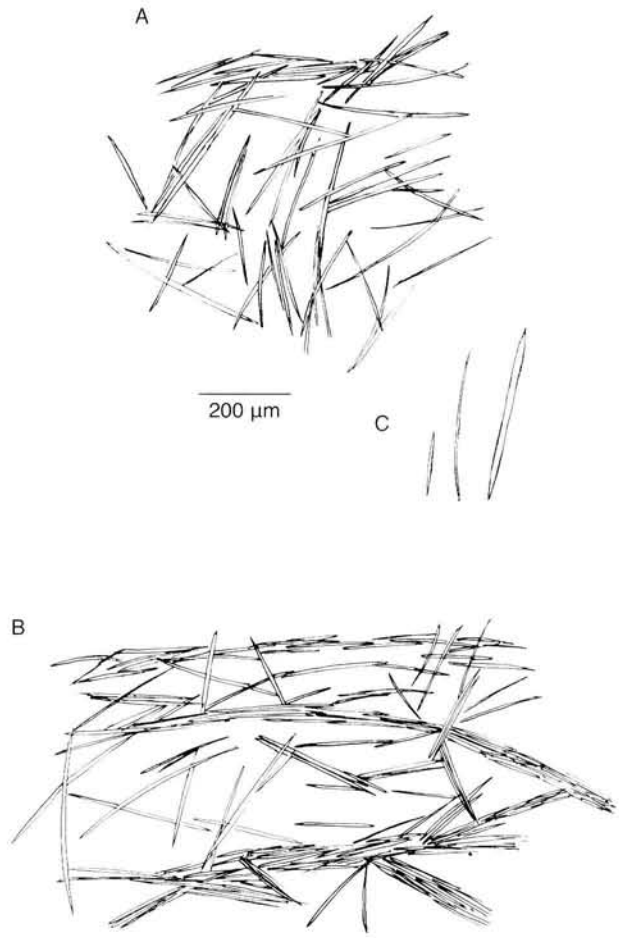

FIG. 22. — *Halichondria magniconulosa*: A, tangential view of the ectosome; B, perpendicular section of peripheral skeleton; C, spicules.

Halichondria melanadocia de Laubenfels, 1936 (Figs. 23, 29)

Material-USNM 22463 (holotype), Dry Tortugas, Fort Jefferson; USNM 30247, northeast Andros Island, Fish Creek; HBOM 003: 00111, Punta Tigrillo, Mochima, Venezuela, 5 m; HBOM 003: 00110, mangroves, Isla Grande, Colombia, 1 m.

Morphology (Fig. 23)-Encrusting to massive, sometimes lobate to ramose; oscules raised above the body, regularly distributed; compressible; surface varying from smooth to irregularly tuberculate or conulose.

Color-Alive, black-gray externally, drab with green-yellowish tinges internally; black-gray in spirit, with drab interior.

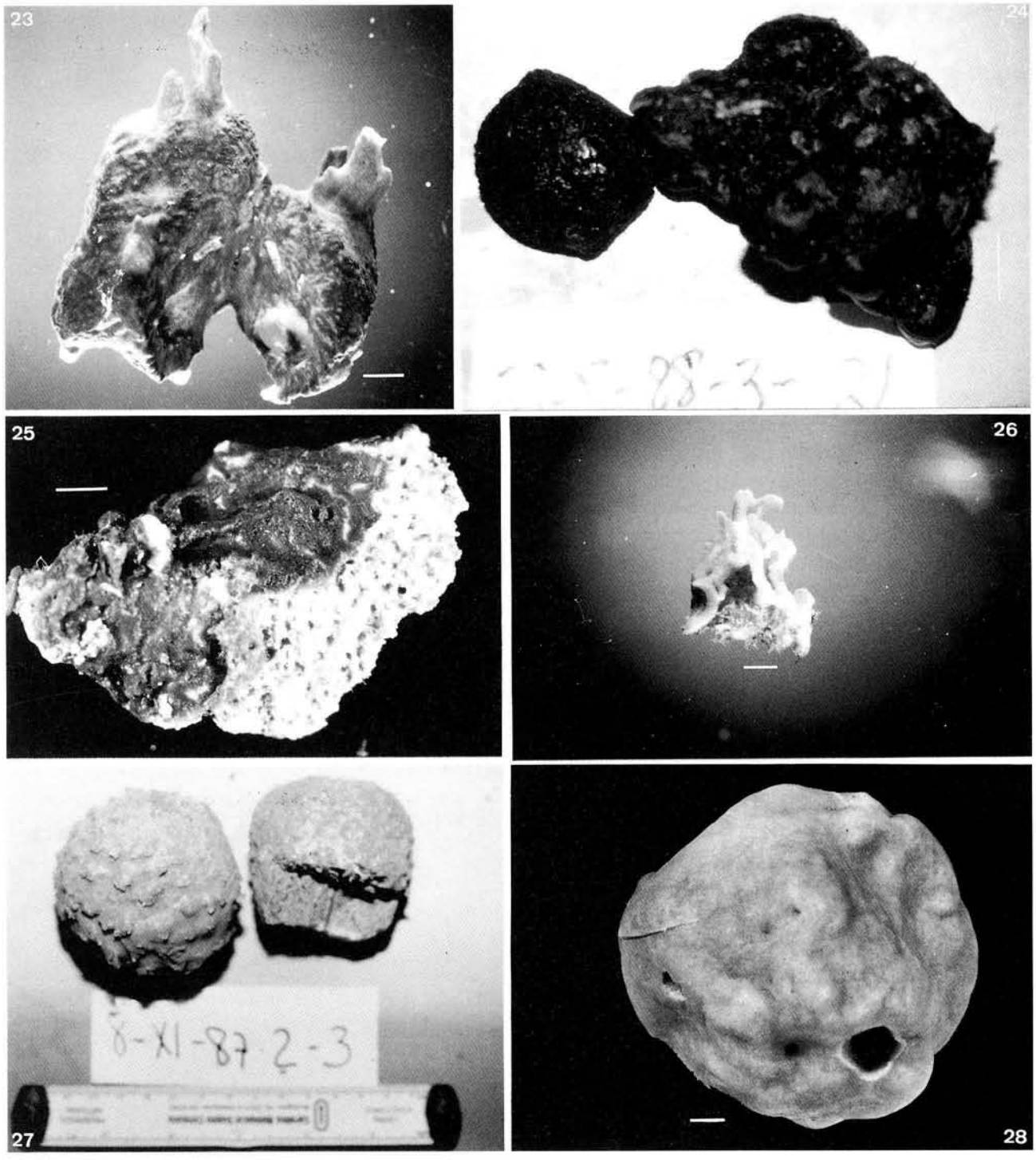

FIG. 23. — *Halichondria melanodocia* De Laubenfels, specimen from the Florida Keys (photo Tom Snoyer) (scale 1 cm). FIG. 24. — *Halichondria stylata* n.sp., holotype, USNM 43139 (scale 1 cm). FIG. 25. — *Hymeniacidon caerulea* Pulitzer-Finali, specimen from Curaçao (scale 0.5 cm). FIG. 26. — *Hymeniacidon heliophila* (Parker), specimen from Florida (scale 1 cm). FIG. 27. — *Spongosorites arenatus* n.sp., specimens from the Bahamas. FIG. 28. — *Spongosorites suberitoides* n.sp., holotype USNM 32441, holotype ZMA POR. 5233(s.

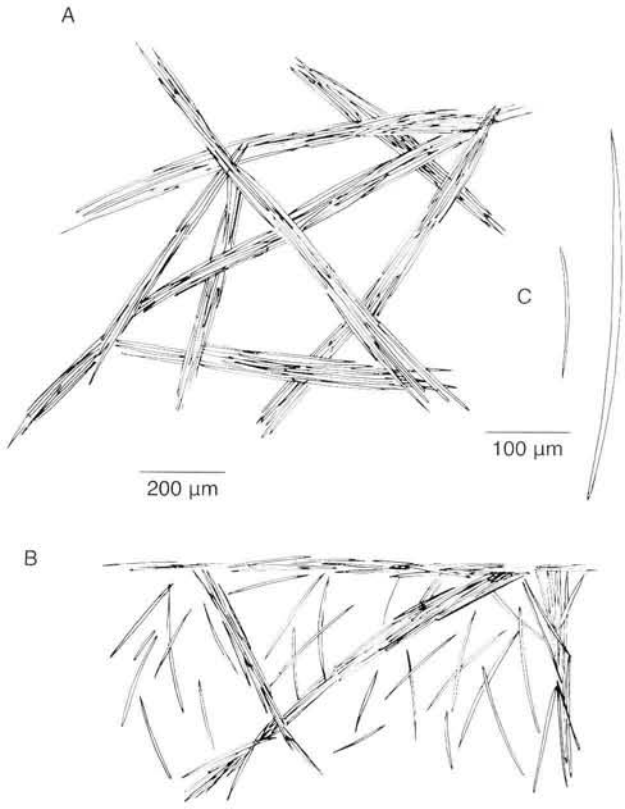

FIG. 29. — *Halichondria melanadocia*: A, tangential view of the ectosome; B, perpendicular section of peripheral skeleton; C, spicules.

Ectosomal skeleton (Fig. 29A)-Detachable layer 30-50 µm in thickness; tangential reticulation of compact spicule bundles 35-130 µm in diameter.

Choanosomal skeleton (Fig. 29B)-Spicules strewn in confusion or grouped in directionless loose tracts (30-100 µm in width).

Spicules (Fig. 29C)— Fusiform oxea in a wide size range (100-450 × 2-10 µm).

Ecology-shallow coastal environments, e.g., mangroves and grass flats.

Distribution-widespread in the Caribbean.

Remarks-All specimens fit the original description (DE LAUBENFELS, 1936), however, no fetid odor was noticed. Specimen HBOM 003: 00110 had two size classes of oxea and a more compact skeleton. Variation in the abundance and density of spicule tracts in the ectosome was common.

Halichondria stylata n.sp. (Figs. 24, 30)

Material: USNM 43139 (holotype), HBOM 003: 00090, 003: 00092 (paratypes), mangrove lagoon, East Boca Cote, Los Roques, Venezuela.

Morphology (Fig. 24)-Massive-amorphous to lobate or thickly encrusting; compressible, cheeselike; smooth, shiny surface.

Color-Black externally and internally, alive and in spirit.

Ectosomal skeleton (Fig. 30A)-Detachable, thick layer; spicules in compact bundles tangentially organized between pores (100-200 µm).

Choanosomal skeleton (Fig. 30B)-Spicules mainly in loose bundles parallel to obliquely oriented; skeletal elements are weakly developed.

Spicules (Fig. 30C)-Oxea, styles, and styloids (100-250-300 × 3-5 µm).

Ecology-These specimens were found in a mangrove lagoon, growing on the hanging roots of *Rhizophora mangle*, at 0.5-1.0 m in depth.

Distribution-known only from the type locality.

Remarks-The species is similar to *Halichondria melanadocia* in morphology and skeletal architecture; however, the distinct color, surface, consistency, and the possession of styles separate it from previously known species.

Genus Hymeniacidon Bowerbank, 1862

Encrusting to fistulose with a skeletal plan similar

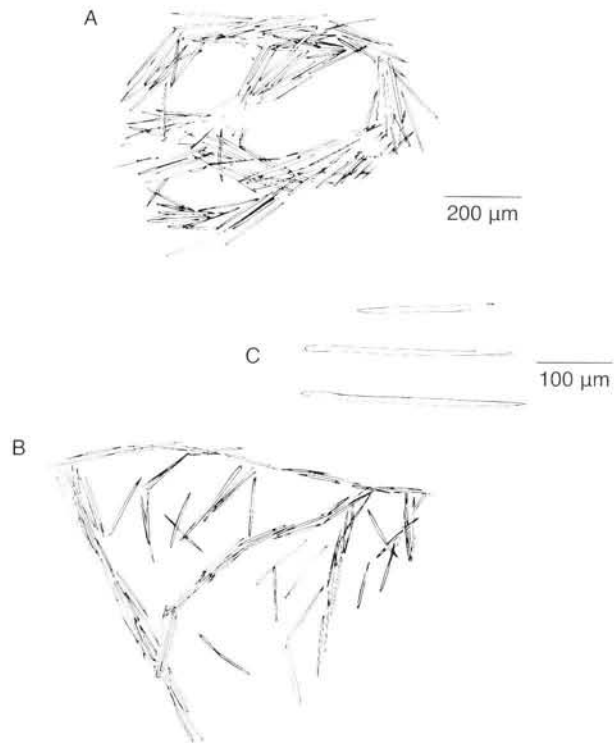

FIG. 30. — *Halichondria stylata*: A, tangential view of the ectosome; B, perpendicular section of peripheral skeleton; C, spicules.

to that of *Halichondria*. The main difference is that oxeote spicules have been lost, but it retains styles and stylotes (i.e., styles with rounded ends).

Key to the Central West Atlantic Species

a. Blue encrusting sponge . *Hymeniacidon caerulea*

b. Yellow to orange alive, white in spirit; amorphous to lobate, with many fistules and irregular digitations ..... *Hymeniacidon heliophila*

Hymeniacidon caerulea Pulitzer-Finali, 1986 (Figs. 25, 31)

Material: ZMA POR. 6263, Belize, mangroves; ZMA POR. 6903, Curaçao, Buoy O, 6-12 m.

Morphology (Fig. 25)-Thin encrusting.

Color-A distinctive bright, dark blue, both alive and in spirit.

Ectosomal skeleton (Fig. 31A)-A tangential cover of ill-defined spicule tracts.

Choanosomal skeleton (Fig. 31B)-A tight-meshed reticulation of ill-defined directionless spicule tracts, each about 30-50 μm in diameter.

Spicules (Fig. 31C)-Robust, straight styles (420-530 × 7-12 μm); many thinner growth stages.

Ecology-On coral rubble and mangroves.

Distribution-Hispaniola, Puerto Rico, Belize and Curaçao.

Remarks-The distinctive color separates this species from all other species of the genus.

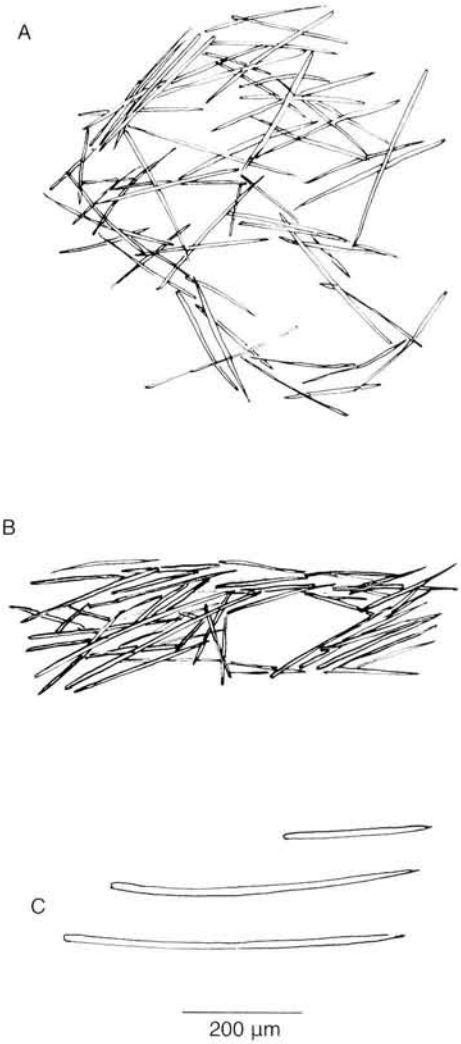

FIG. 31. — *Hymeniacidon caerulea*: A, tangential view of the ectosome; B, perpendicular section of peripheral skeleton; C, spicules.

Hymeniacidon heliophila (Parker, 1910) (Figs. 26, 32)

Material: HBOM 003: 00068, Indian River, southeast Florida, 0.5 m; USNM 23341; Northhampton County, Virginia on exposed flats; ZMA POR. 39, Bogue Sound, North Carolina; ZMA POR. 4595, Curaçao, under coral rubble, 1 m.

Morphology (Fig. 26)-Encrusting, uneven surface but smooth; compressible and fleshy consistency.

Color-Light to deep orange alive, tan in spirit.

Ectosomal skeleton (Fig. 32A)-Detachable but with difficulty; strewn spicules and some tangentially oriented tracts.

Choanosomal skeleton (Fig. 32B)-Spicules strewn and arranged in directionless tracts as in *Halichondria* spp., although the skeleton is apparently more disorganized. In the fistulose projections, the tracts are obvious and usually longitudinal.

Spicules (Fig. 32C)-Transitional styles to subtylostyles (130-450 × 3-10 μm).

Ecology-Usually found in shallow coastal environments (e.g., mangrove roots or rocky shores).

Distribution-Widespread in the Caribbean.

Remarks-There is a strong morphological similarity between *Halichondria* and *Hymeniacidon* species, the basic difference being the complete absence of oxea in *Hymeniacidon* specimens. *Hymeniacidon heliophila* is a very stable species with respect to its morphological characters (WILSON, 1911). *Hymeniacidon amphilecta* de Laubenfels 1936 is not a *Hymeniacidon* species, but probably a senior synonym of *Scopalina tubulosa* Alcolado and Gotera, 1986, which is here considered a *Ectyoplasia*.

Genus *Spongosorites* Topsent, 1896

Massive-amorphous to subspherical with a smooth, thick, ectosomal crust (200-500 μm) of relatively thin spicules, paratangentially arranged. The

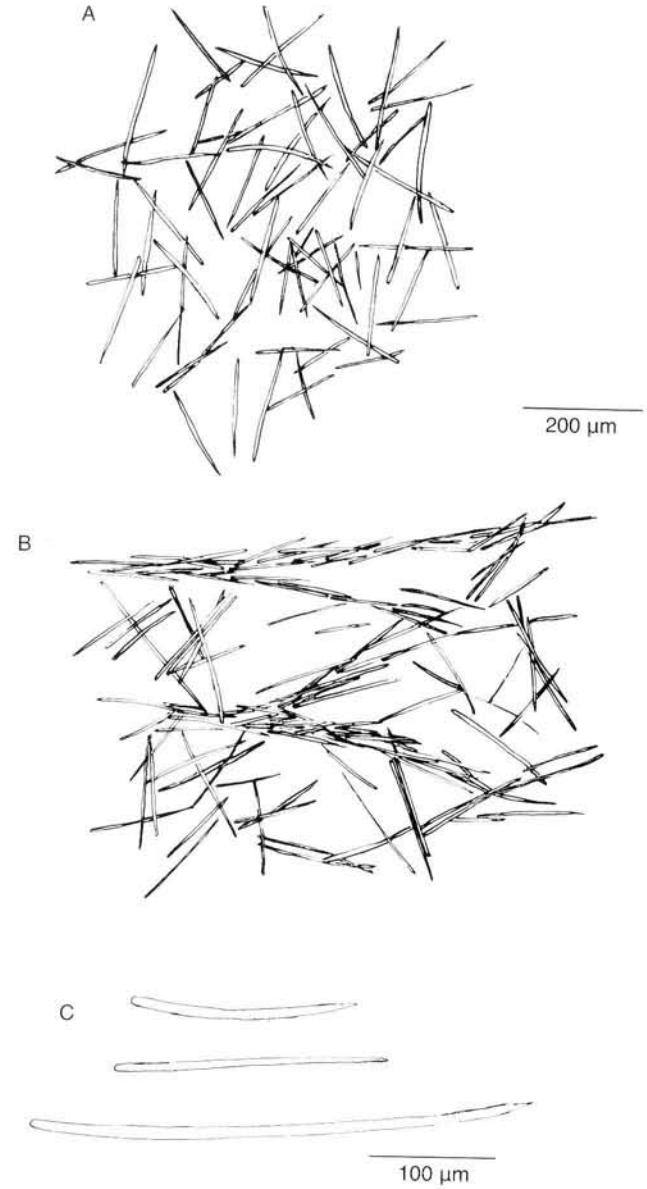

FIG. 32. — *Hymeniacidon heliophila*: A, tangential view of the ectosome; B, perpendicular section of peripheral skeleton; C, spicules.

choanosomal skeleton consists of spicules strewn in confusion and occasionally grouped in spongin-enforced tracts, directed mainly parallel and oblique to the surface.

Key to the Central West Atlantic Species

1a. Spherical to subspherical with papillate oscules regularly distributed on the surface; sand grains and foreign material incorporated in the tracts ..... *Spongosorites arenatus* n.sp.

b. No foreign material regularly incorporated in the choanosomal skeleton..... (2)

2a. Small subspherical, smooth, invariably growing over a hermit crab.... *Spongosorites suberitoides*

b. Subspherical to amorphous, usually with the vermetid *Siliquaria* incorporated in the sponge... (3)

3a. Spicules invariably sharply bent and centrotylote ..... *Spongosorites siliquaria*

b. Spicules from fusiform oxea to styloids and strongyloxea; some specimens with double bent spicules..... *Spongosorites ruetzleri*

Spongosorites arenatus n.sp. (Figs. 27, 33)

Material: USNM 43140 (holotype), west of Settlement Point, Bahamas, 525 m. HBOM 003: 00093 (paratype), Chub Cay, Bahamas, 344 m; HBOM 003: 00095 (paratype), Freeport, Bahamas, 250 m.

Morphology (Fig. 27)-Massive-subspherical; surface with regularly distributed papillae, each with an apical oscule; compressible but crumbly.

Color-Dark yellow alive, dark brown in spirit.

Ectosomal skeleton-Detachable; typical of the genus.

Choanosomal skeleton (Fig. 33B)-The tracts (30-100 µm in width) are more obvious and developed than in *S. ruetzleri*; usually sand grains and foreign material are found embedded in the tracts.

Spicules (Fig. 33A)-Three size classes of oxea, slightly bent (250-720 × 5-24 µm; 100-250 × 2-10 µm; 40-90 × 2-8 µm); smallest category usually crooked.

Ecology-Found only in deep water environments between 250 and 525 m.

Distribution-Bahamas.

Remarks-The incorporation of sand grains and other foreign material in the skeleton differentiates this species from the other species found in the Central West Atlantic.

Spongosorites suberitoides n.sp. (Figs. 28, 34)

Material: USNM 32441 (holotype), 33426 (paratype) North Carolina, latitude 33°N, longitude 77°W, 32 m; ZMA POR. 5762 (paratype), North Margarita, Venezuela, 56 m.

Morphology (Fig. 28)-Smooth, round sponges providing a shelter for an unidentified hermit crab, size up to 5 × 4 × 4 cm. No visible oscules. Originally, the hermit crab lived in an empty gastropod shell, but this has been eroded away and all that remains is the encrusting sponge. The association resembles the well-known *Suberites domuncula*-hermit crab association of Eastern Atlantic waters.

Color-In life unknown; pale beige in spirit.

Ectosomal skeleton-An optically smooth but microscopically hispid, paratangential crust, with many spicules in an erect, palisade-like arrangement; between spicule brushes there are more or less rounded

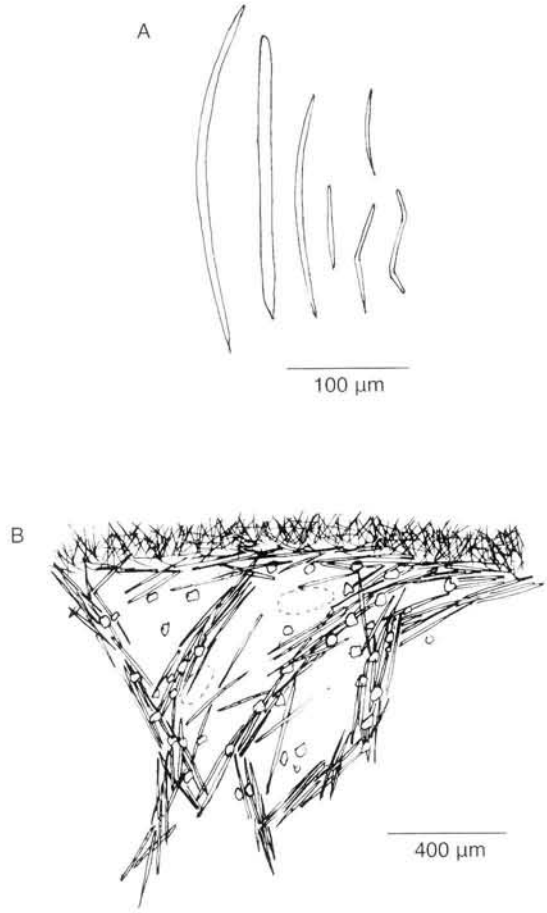

FIG. 33. — *Spongosorites arenatus*: A, spicules; B, perpendicular section of peripheral skeleton.

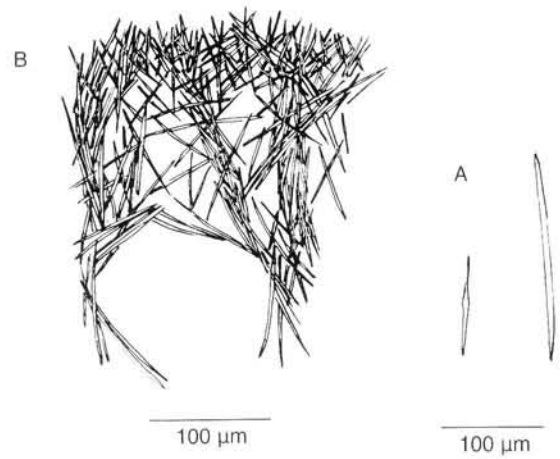

FIG. 34. — *Spongosorites suberitoides*: A, spicules; B, perpendicular section of peripheral skeleton.

pore-fields of 80-130 µm in diameter, regularly distributed.

Choanosomal skeleton (Fig. 34B)-Peripherally somewhat contracted; more interiorly, there is an irregular system of vague spicule bundles surrounding canals and open spaces; spongin not visible.

Spicules (Fig. 34A)-Two size classes of oxea (150-250 × 2-7 µm; 80-130 × 3-6 µm); some specimens with stylote and strongylote modifications.

Ecology-Apparently living attached to hermit crabs at depths of 32-56 m.

Distribution-Widespread in the Central West Atlantic.

Remarks-This is a very interesting convergence with *Suberites domuncula* and *Suberites ficus*-hermit crab associations, with similarities not only in the erosion of the gastropod shell but also in the general morphology of the sponge. So far, similar convergent forms have not been reported from the Atlantic.

Spongosorites siliquaria van Soest and Stentoft, 1988 (Figs. 35, 42)

Material: ZMA POR. 5233 (holotype), Paynes Bay, Barbados, 108-170 m; ZMA POR. 5234 (paratype), Paynes Bay, Barbados, 108-170 m (3 specimens); ZMA POR. 6902 (paratype), Calamar Stat. 476, Jamaica.

Morphology (Fig. 35)-Flattened rounded masses, riddled with tubes of the vermetid gastropod *Siliquaria*; tough and hard in consistency.

Color-Pale green-yellow alive, brown to black when dry.

Ectosome-Typical crust.

Choanosome-Irregularly cavernous, holes 50-100 µm in diameter; typical of genus.

Spicules (Fig. 42)-Angularly bent, centrotylote oxea in three size classes (290-540 × 12-20 µm; 130-280 × 7-10 µm; 30-110 × 3-7 µm), occasionally verging toward triactines; straight oxea also found.

Ecology-Deep water, 108-170 m, beyond reefs.

Distribution-Barbados, Jamaica.

Remarks-Spicule modifications and consistency separate *S. siliquaria* from *S. ruetzleri*.

Spongosorites ruetzleri (van Soest and Stentoft, 1988) (Figs. 36, 37, 43)

Material: ZMA POR. 5320 (holotype)(Fig. 36), off Paynes Bay, Barbados, 108-153 m; HBOM 003: 00112, Nassau Harbor, 50 m; HBOM 003: 00113, 003: 00116, Goulding Cay, 400 m; HBOM 003: 00114, Freeport Harbor, 238 m; HBOM 003: 00115, Sweetings Cay, 171 m; , HBOM 003: 00117, Chub Cay Harbor, 25 m; HBOM 003: 00118, Lucaya, Grand Bahama Island, 162 m; HBOM 003: 00119, Andros Island, 173 m; all from Bahamas.

Morphology (Fig. 36, 37)-Massive-amorphous to cake-shaped; the largest specimen is 1 m in diameter. Smooth surface, usually obscured by shells of verme-

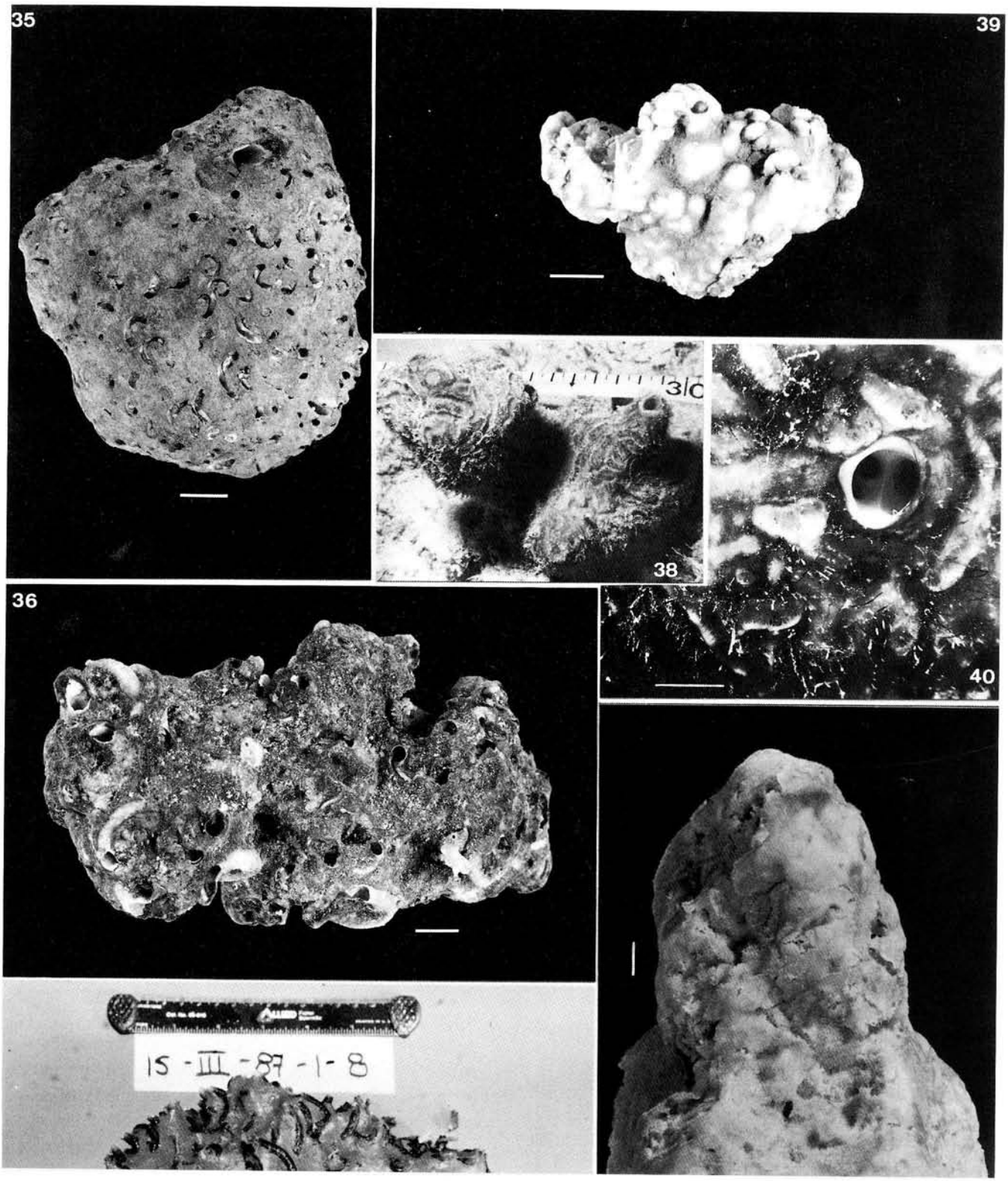

FIG. 35. — *Spongosorites siliquaria* Van Soest & Stentoft, holotype ZMA POR. 5233(scale 1 cm). FIG. 36. — *Spongosorites ruetzleri* (Van Soest & Stentoft), holotype ZMA POR. 5320, from Barbados (scale 1 cm). FIG. 37. — *Spongosorites ruetzleri* (Van Soest & Stentoft), specimen from the Bahamas, HBOM 003: 00112. FIG. 38. — *Myrmekioderma styx* (De Laubenfels), photographed in situ in a Venezuelan reef. FIG. 39. — *Myrmekioderma rea* (De Laubenfels), holotype USNM 22301 (scale 1 cm). FIG. 40. — *Didiscus oxeata* Hechtel, detail of surface of a living specimen in the Curaçao reefs (scale 0.5 cm). FIG. 41. — *Didiscus oxeata* Hechtel, specimen from Curaçao (scale 1 cm)

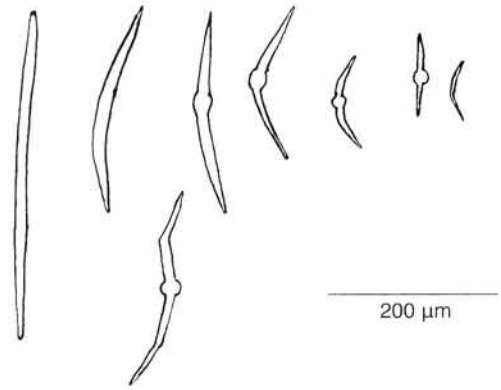

FIG. 42. — *Spongosorites siliquaria*: spicules.

tids that grow inside and over the sponge. Small oscules distributed regularly over the surface. Crumbly in consistency.

Color-Bright yellow alive, black to brown in spirit. A correlation was found between the presence of vermetids and the change in color from yellow to black in alcohol (POMPONI *et al.*, 1991). When preserved separately, the vermetids do not turn black, so we assume that the color change is a reaction of the sponge to the presence of the vermetid. No color change was observed for specimens without vermetids.

Ectosomal skeleton-Thick paratangential crust, consisting of mainly smaller spicules arranged in many directions; when detached, usually brings part of choanosome with it.

Choanosomal skeleton (Fig. 43B)-Spicules strewn in confusion and arranged in bundles (30-100 µm wide) that run parallel or oblique to the surface.

Spicules (Fig. 43A)-Some specimens with exclusively fusiform oxea; others with styloids, strongyloxea and crooked oxea. Usually two to three size classes (200-600 × 5-20 µm; 80-360 × 3-12 µm; 40-180 × 2-8 µm).

Ecology-Found mainly in deep water, 25-173 m, on rocky or sandy bottoms.

Distribution-Barbados, Bahamas.

Remarks-The studied material from the Bahamas is consistent with the original description of the Barbados material (VAN SOEST and STENTOFT, 1988). Intraspecific variation in the color in spirit and the form of spicules was found; however, the morphology, skeleton, and the presence of the compound bromotopsentin (BARTIK *et al.*, 1987; POMPONI *et al.* 1991), regardless of their color and their spicule modifications, formed the basis for grouping the specimens in a single species.

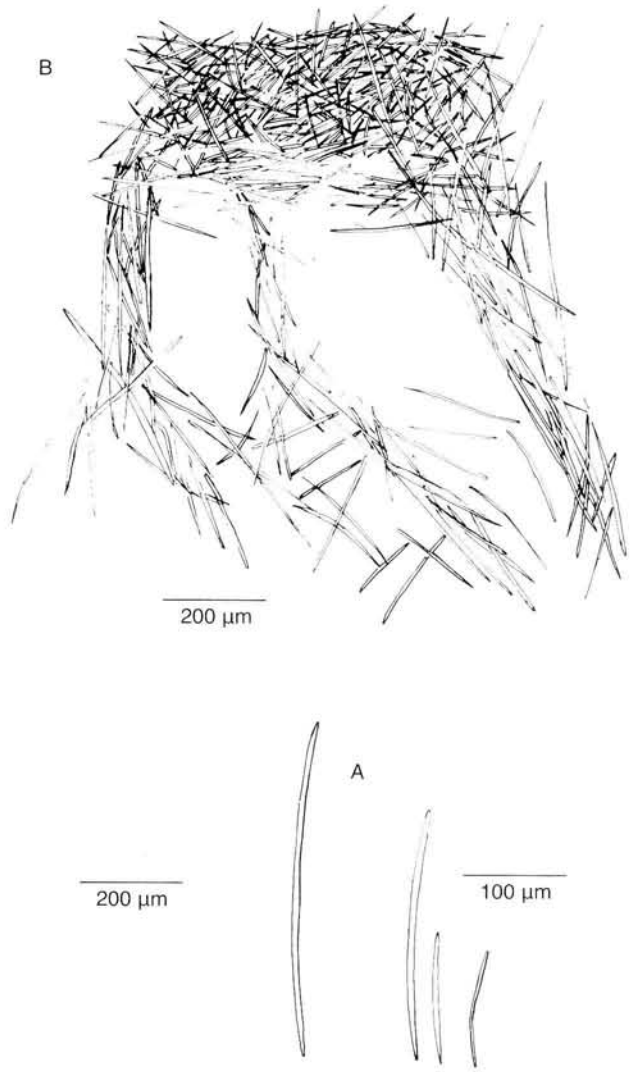

FIG. 43. — *Spongosorites ruetzleri*: A, spicules; B, perpendicular section of peripheral skeleton.

Genus Myrmekioderma Ehlers, 1870

Massive-amorphous to lobate with spicules strewn in confusion or grouped in spongin-enforced plumose tracts, running radially and oblique to the surface. A palisade, vertically packed arrangement of small spicules form the ectosome, usually continued internally by a paratangential-tangential arrangement of spicules. Two size categories of oxea and one or two categories of trichodragmata are present. Most species have a pattern of deep, sinuous grooves on the surface.

Key to the Central West Atlantic Species

a. Abundant sinuous grooves in the surface, up to 1 cm wide. Size range of sinuous trichodragmata varies greatly . . . . . *Myrmekioderma styx*

b. Tuberculate and occasionally grooved surface. Usually one size class of trichodragma . . . . . *Myrmekioderma rea*

Myrmekioderma styx de Laubenfels, 1953 (Figures 38, 44)

Synonymy: *Topsentia gyroderma* Alcolado, 1984, *Epipolasis reiswigi* Diaz et al., 1987.

Material: HBOM 003: 00067, Fernandez Bay, San Salvador, 23 m; HBOM 003: 00096; New Providence, Bahamas, 20 m; HBOM 003: 00097, Chub Cay, Bahamas, 32 m; HBOM 003: 00098, Bird Cay, Bahamas, 102 m; YPM 7701, 4727, Runaway Bay, Jamaica, 30 and 40 m, respectively; ZMA POR. 5368, Paynes Bay, Barbados, 144-153 m; ZMA POR. 5369, Holetown, Barbados, 100 m.

Morphology (Fig. 38)-Massive-amorphous to lobate; oscules usually on top of lobes; sinuous grooves of various shapes and lengths over the entire surface; firm in consistency but tending to fall apart when lifted from water; mucous exudate.

Color-Orange externally, yellow internally alive; gray-tan in spirit.

Ectosomal skeleton-Detachable, thick layer up to 2 mm in width; perpendicular and compact arrangement of smaller spicules (palisade) over a layer of spicules of different sizes, without any particular direction (paratangential).

Choanosomal skeleton (Fig. 44A)-Spicules strewn in confusion or arranged in loose spongin-enforced tracts that tend to exhibit radial orientation toward the surface. Large spicules predominate. Trichodragmata abundant.

Spicules (Fig. 44B, C)-Oxea in two size classes (210-500 × 4-13 μm; 570-1,125 × 8-45 μm); small category can be microspined or smooth; trichodragmata in a wide size range (78-160 × 8-32 μm), the larger usually curly or sinuous.

Ecology-Common in deep areas of coral reefs (20-80 m), in sand-rubble substrate and coral crevices.

Distribution-Widespread in the Caribbean.

Remarks-The original description (DE LAUBENFELS, 1953) is consistent with the external characters and skeletal arrangement of all studied specimens; however, the variability in microspined or smooth condition of the smaller oxeas was previously unknown. After studying several specimens from the Bahamas and the Caribbean, we concluded that this character was obviously invalid as diagnostic for *Myrmekioderma* (DIAZ *et al.* 1991). This resulted in the synonymyzation of *Epipolasis reiswigi,* Diaz et al., 1987 and *Topsentia gyroderma,* Alcolado, 1984, with *M. styx* de Laubenfels, 1953. It is very probable that trichodragmata were overlooked or rare in the material examined by Alcolado.

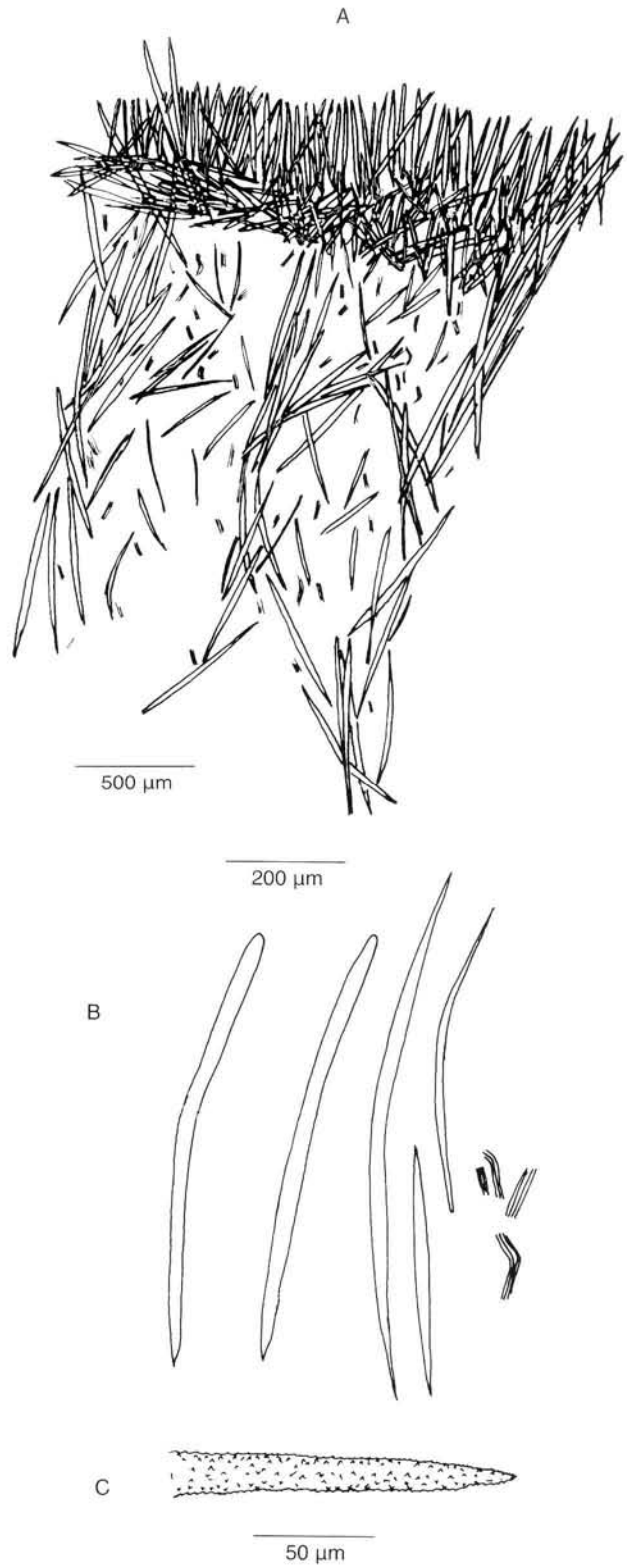

FIG. 44. — *Myrmekioderma styx*: A, perpendicular section of peripheral skeleton; B and C, spicules.

Myrmekioderma rea (de Laubenfels, 1934) (Figs. 39, 45)
Synonymy: *Anacanthea rea* de Laubenfels, 1934; *Epipolasis rea* sensu van Soest and Stentoft, 1988; *Viles strongyloxea*, Alcolado and Gotera, 1986.

Material: USNM 22301, Puerto Rico, 54-72 m; HBOM 003: 00101, La Blanquilla, Venezuela, 46 m; HBOM 003: 00102, Freeport Harbor, Bahamas, 83 m; 003: 00103, Sweetings Cay, Bahamas, 72 m; ZMA POR. 5400, Barbados.

Morphology (Fig. 39)-From thick encrusting to massive-amorphous body, with thin hillocks and grooves on the smooth surface, often tuberculate; fleshy. Large subdermal spaces.

Color-Orange or yellow alive; pink-drab to tan in spirit.

Ectosomal skeleton-Tight palisade of small spicules; sometimes incorporating sand.

Choanosomal skeleton (Fig. 45C)-Spicules strewn in confusion and sporadically grouped in tracts up to 170 μm wide, mainly obliquely oriented.

Spicules (Fig. 45A, B)-Two size classes of oxea, strongyloxea and styloids (260-600-800 × 5-11-20 μm; 170-300-500 × 5-8-15 μm); smaller size class sometimes microspined; trichodragmata usually in one size class (13-26 × 3-10 μm).

Ecology-Found on exposed sand and rubble flats or on rocky walls in deeper water, 46-83 m.

Distribution-Puerto Rico, Venezuela, Bahamas, Barbados.

Remarks-The reallocation of *M. rea* is the result of an examination and comparison of the holotype (USNM 22301) with other material from the Central West Atlantic. Details of external morphology and skeletal characteristics place this species within the genus *Myrmekioderma* (EHLERS, 1870; see DIAZ *et al.*, 1991).

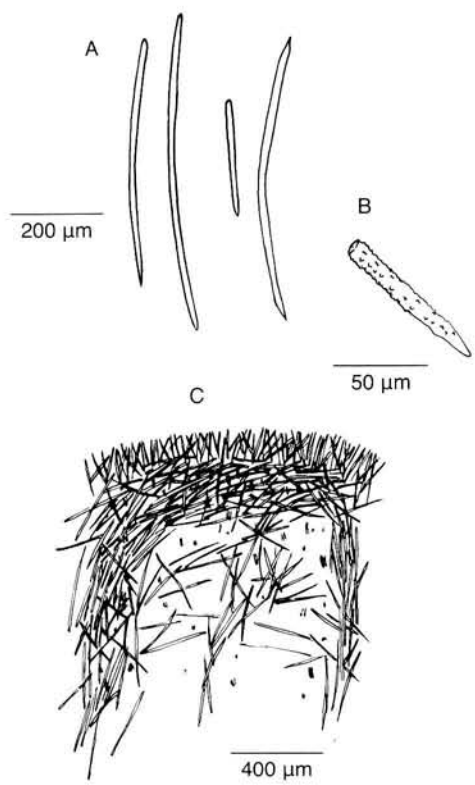

FIG. 45. — *Myrmekioderma rea*: A and B, spicules; C, perpendicular section of peripheral skeleton.

Genus *Didiscus* Dendy, 1922

Massive-amorphous to lobate with spicules strewn in confusion and sporadically grouped in spongin-reinforced, directionless tracts. The ectosome is a gradation from a perpendicular palisade to a tangential or paratangential arrangement of spicules. The skeleton is very similar to Myrmekioderma, except for the presence of discorhabds, which are concentrated in the ectosome and scattered throughout the choanosome. The surface is usually grooved.

Didiscus oxeata Hechtel, 1983 (Figs. 40, 41, 46)

Synonymy: *Didiscus habana*, Alcolado, 1984; *Didiscus flavus*, van Soest, 1984.

Material: YPM 8968 (holotype), San Antonio Bank, Bahia, Brazil; YPM 4874, 5327, 4631, Runaway Bay, Jamaica, 25-39 m. ZMA: POR. 4892 (holotype of *D. flavus*), Curaçao, reefs, 33 m; POR. 4890, 4891 (paratypes), Curaçao, reefs, 10-16 m.

Morphology (Fig. 40, 41)-Massive-amorphous; sinuous grooves present in live specimens (Fig 40); microhispid surface; compressible but brittle.

Color-Gray-orange externally alive, tan in spirit.

Ectosomal skeleton-Thick crust, not easily detachable; palisade of smaller spicules over a paratangential arrangement of all spicules. Discorhabds, sometimes perpendicularly arranged in the ectosome. In certain areas only a paratangential layer of oxeas forms the ectosome.

Choanosomal skeleton (Fig. 46A)-All spicules strewn in confusion, forming tracts sporadically.

Spicules (Fig. 46B)-Oxeas in two size classes (500-800-1400 × 10-15-26 μm and 200-300-400 × 8-10-16 μm); discorhabds with strongylote, microspined ends (55-80 × 4-6 μm) and two discs of different diameters (15-20 and 6-12 μm).

Distribution-Widespread in the Caribbean.

Ecology-The species has been collected from deeper areas (20-40 m) of coral reefs. Alive, it is indistinguishable from *Myrmekioderma styx*, although it is usually less common than *M. styx* in the studied areas.

Remarks-Although HECHTEL (1983) did not report two size categories of oxea, it was a consistent character among the specimens studied. The condition of the ectosomal skeleton (palisade of small ox-

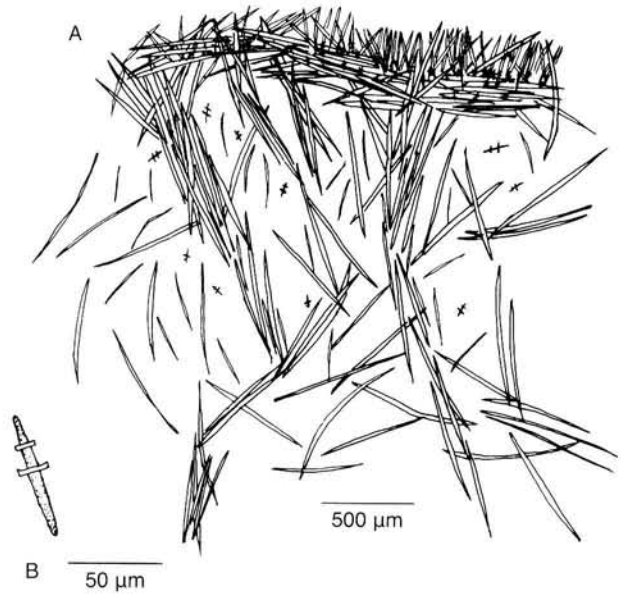

FIG. 46. — *Didiscus oxeata*: A, perpendicular section of peripheral skeleton; B, discorhabd.

ea, tangential arrangement of larger oxea, perpendicular location of discorhabds) also varies in the same specimen.

DISCUSSION

The revision of the genera and species of Central West Atlantic Halichondrida was based on an evaluation of the validity of the main taxonomic characters used to classify and relate this group of Demospongiae (DIAZ *et al.* 1991).

Ectosomal and choanosomal skeletal details (relative abundance of skeletal elements, orientation of spicules, and their tendency to be arranged in tracts or strewn in confusion) are the main characters that distinguish the genera studied. Differences in shape, color, and spicule sizes were also used for some species diagnoses, although we recognize that these characters are known to have a high degree of variability.

Most species described herein are easily recognizable by consistent taxonomic characters; however, for some species with few records and/or very simple skeletal features (as some *Topsentia*), the validity of the species recognized in the present work remains uncertain. Data from more specimens are needed to reinforce the specific differences found in the specimens studied.

Finally, we recognize that Halichondrid species from other geographical areas need to be examined to reinforce the validity of the taxonomic characters and the revision proposed for the Halichondrids from the Central West Atlantic.

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