STUDY ON THE DISTRIBUTION OF BAIKALIAN SPONGES. *Memoirs of the Queensland Museum 44: 368. 1999*:- Freshwater sponges are classified into three families. Spongillidae, Potamolepidae and Lubomirskiidae. Spongillidae are cosmopolitan sponges and widely distributed throughout the world, Potamolepidae are found in lakes of Africa and South America, and Lubomirskiidae inhabit only Lake Baikal. One of the characteristics of Spongillidae is gemmule formation. Gemmules are asexual bodies with a structure in highly resistant resting stages. Most Japanese sponge species form gemmules, but a certain species which forms in the shallow zone of lakes, does not form gemmules in deeper zones. Therefore we have a great interest in the Lubomirskiidae of Lake Baikal which does not produce any gemmules. At present, the taxonomy of some Lubomirskiidae is in a chaotic state. Furthermore, the recent distribution of Baikalian sponges has not been recorded. We decided to collect as many Baikalian sponges as possible and to review their taxonomy and their distribution in Lake Baikal. About 700 specimens were collected, mainly from the entire littoral zone of Lake Baikal, but some specimens were collected from the Academishan ridge by a dredge survey, and others collected on diving surveys. Most of the specimens belonged to the family Lubomirskiidae, with a few belonging to the family Spongillidae. Lubomirskiidae were classified into three genera and eight species according to Rezvoy. Based on the results of our study, our Lubomirskiidae specimens were tentatively classified into 4 genera and 11 species. At the present, Lubomirskiidae are classified mainly by their spicules and skeletons, not by the form of the sponges (changeable due to substrate and water current), oscula or colour (thought to not contain pigment cells). The colour of green sponges is owing to symbionts, zoochlorellae.

The Lubomirskiidae species were distributed throughout the entire littoral zone of Lake Baikal, except where the substratum was sand, mud or pebbles. On the other hand, Spongillidae species (*Spongilla lacustris*, *Ephydatia muelleri* and *Eunapius* sp.) were collected from only four stations. Lake Baikal may be an in appropriate habitat for Spongillidae species. Spongillidae lack of presence throughout the entire littoral zone may be due to; the amount of nutrients, wave action and water temperature. Regarding nutrients, certainly Lake Baikal is characterised by oligotrophy when compared with other lakes where many Spongillidae species live, but the limits within which the Spongillidae species can not live is unknown. Lubomirskiidae may be accustomed to poor food. Due to the weak and fragile bodies of Spongillidae, they cannot live in an area of strong wave action. But the wave action in deeper zones is weaker than that in shallow zone. In Lake Biwa, in Japan, Spongillidae species can live at a depth of 30m, where the wave action is weak. In Lake Baikal, wave action is also weak at such a deeper zone. But we could not find Spongillidae even at a depth of 30m. We compared the maximum temperature in Lake Baikal and Lake Biwa during the year at a depth of 30m. In Baikal, the maximum temperature is about 6°C. On the other hand, in Lake Biwa, it is about 10°C. The maximum temperature may be an important factor for the survival of Spongillidae species. More detailed information on differences in the two family habitats is necessary to resolve this problem, which is important in the analysis of spicules in old sediment.

The spicules of freshwater sponges are very stable in old sediment because they consist of silica components, such as diatoms, and we are now studying the spicules of old sediment obtained from drilling cores. Some spicules from sediments, believed to have been deposited there 4,500,000 years ago, were found about 180m under Lake Baikal. If Spongillidae spicules are found, we might hypothesise the lake's conditions as being similar to the Little Sea near Olkhon Island at present. If we examine spicules along the drilling core from surface to bottom, we might find successive changes in the circumstances. Furthermore, if we should find new spicules not seen in recent sponges, the new finding would help us in drawing up the phylogenetic tree of freshwater sponges. ❐

Porifera, freshwater sponges, Lake Biwa, Lubomirskiidae, Spongillidae, taxonomy, distribution, environmental conditions, sediment studies.

Y. Masuda (email: masuda@med.kawasaki-m.ac.jp), Department of Biology, Kawaski Medical School, Okayama, 701-0192, Japan; V. B. Itskovich & E. V. Veinberg, Limnological Institute of the Siberian Division of Russian Academy Science, P. O. Box 4199, Irkutsk 664033, Russia; S. M. Efremova, Biological Institute, St. Petersburg State University, St. Petersburg 198904, Russia; 1 June 1998.

REVISION OF BRAZILIAN *ERYLUS* (PORIFERA: ASTROPHORIDA: DEMOSPONGIAE) WITH DESCRIPTION OF A NEW SPECIES

BEATRIZ MOTHES, CLÉA B. LERNER AND CARLA M. M. DA SILVA

Mothes, B., Lerner, C.B. & Silva, C.M.M. da 1999 06 30: Revision of Brazilian *Erylus* (Porifera: Astrophorida: Demospongiae) with description of a new species. *Memoirs of the Queensland Museum* **44**: 369-380. Brisbane. ISSN 0079-8835.

Prior to the present study only four species of *Erylus* were described for the Brazilian coast: *E. formosus* Sollas, 1886, *E. corneus* Boury-Esnault, 1973, *E. topsenti* Lendenfeld, 1903 and *E. oxyaster* Lendenfeld, 1910. Re-examination of these species, and additional material using scanning electron microscopy, detected new characters necessitating a revision of the genus in Brazilian waters. Collections were made by SCUBA or narghile (0-30m) or dredging (13-918m depth). Re-examination of material detected the presence of *E. alleni*, a Caribbean species with southern limit at the coast of Rio Grande do Sul state (31°20'S, 48° 40'W) and three new species, one described here, E. *diminutus* sp. nov., a sister-species of *E. oxyaster* (Galapagos), and two others still undescribed, one of which was previously misidentified as *E. topsenti* by Mothes-de-Moraes (1978) from the Brazilian coast. ❐

Porifera, Demospongiae, Astrophorida, Geodiidae, Erylus, revision, new species, taxonomy, Brazilian coast.

Beatriz Mothes (e-mail: bmothes@portoweb.com.br), Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande Sul, Av. Salvador França, 1427, CEP 90690-000, Porto Alegre, RS, Brazil; Cléa B. Lerner & Carla M.M. da Silva, Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande Sul, Porto Alegre, RS, Brazil & Universidade de São Paulo, SP, Brazil; 15 March 1999.

Erylus Gray is a genus with Tethyan distribution restricted to tropical and subtropical areas (Van Soest, 1994). Gray (1867) originally described this genus: as "Sponge expanded, mammillated, ending in an oscule. Spicules of three kinds: 1.stellate; 2.ternate, rays forked; 3.subcylindrical, waved. With oblong ovisacs, formed of claviform spines". Subsequent authors enlarged the definition. Ridley (1884): "Comprising Choristid Tetractinellid with the surface covered by a layer of detached discoid trichite globate, and having besides a zone – zone spicule and small stellates with slender few rays. Form lobate. Vents single or multiple"; Sollas (1888): "The sterraster is seldom spherical; the somal microsclere is a centrotylote microrhabd. The incurrent chones are uniporal; and the oscule is the patent opening of a cloaca"; Topsent (1894): 'Sterrasters rarely spherical. Somal microsclere is a microxea usually centrotylote. Poral cone typical uniporal; larger oscule'; Lendenfeld (1903, 1907): "Geodiidae with tetractines megascleres (triaene and derivates) radially arranged; disc-shaped sterrasters at the surface covered by microrhabds"; Lendenfeld (1910): "With uniporal afferents and uniporal efferents or larger oscules. Without ana- or protriaenes"; Dendy (1916) defined genus as family Erylidae, with diagnosis: "Astrotetraxonida with a cortex containing aspidasters. The typical megascleres are triaenes and oxea (or strongyla). The microscleres include microrhabs and choanosomal euasters"; Wilson (1925): "The afferent orifices are uniporal apertures into chone canals efferent orifices also the uniporal openings of chone canals, or in other cases larger oscula. The megasclere-complex includes orthotriaenes and rhabds; anatriaenes and protriaenes absent. The sterraster is more or less flattened, often so flattened as to be a thin plate. Microrhabds (here spicules of good size, reaching a length of 70μ), typically centrotylote, form a dermal layer. Euasters also occur, but not at the surface"; de Laubenfels (1936): "*Erylus* Gray is a very different sort of sponge entirely, with the sterrasters derived in a different way from peculiar disc-shaped beginnings. Even when fully developed they are much more disc-shaped than are those in *Geodia*"; Van Soest & Stentoft (1988): "Geodiidae with flattened or disc-shaped sterrasters and ectosomal microrhabds"; Desqueyroux-Faundez & Van Soest, (1997): "Geodiidae with uniporal afferent and efferent surfaces or larger oscules. Triaenes short-shafted ortho- or plagiotriaenes; no ana- or protriaenes. Sterrasters usually flattened into aspidasters".

The foregoing shows the gradual evolution of a definition for *Erylus*, and the different interpretations made by various authors on importance of certain characters over others.

The present study revises the species of *Erylus* from the Brazilian coast (Fig.1), based on re-examination of existing and new material, using scanning electron microscopy (SEM). Prior to this study only four species were recorded for the region: *E. formosus* Sollas, 1886, *E. corneus* Boury-Esnault, 1973, *E. topsenti* Lendenfeld, 1903 and *E. oxyaster* Lendenfeld, 1910.

MATERIALS AND METHODS

Two specimens were collected by SCUBA or Narghilé (0-30m). Most material examined was dredged from 13-918m depth, carried out under the auspices of Diretoria de Hidrografia e Navegação da Marinha (DHNM); Departamento de Recursos Pesqueiros da Superintendência de Desenvolvimento do Nordeste (SUDENE); Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS); Projeto Recursos Vivos da Zona Econômica Exclusiva (REVIZEE) score Norte II supported by Universidade Federal do Maranhão (UFMA), and score Nordeste supported by Universidade Federal de Pernambuco (UFPE); Superintendência do Desenvolvimento da Pesca (SUDEPE), Ministério da Agricultura, Brasília; "Programa Rio Grande do Sul-I" (PRGS-I), supported by Universidade de São Paulo and Governo do Estado do Rio Grande do Sul; Projeto Talude, Fundação Universidade do Rio Grande (FURG), Brazil; Britannic Expedition H.M.S. 'Challenger'; and French Expedition 'Calypso'.

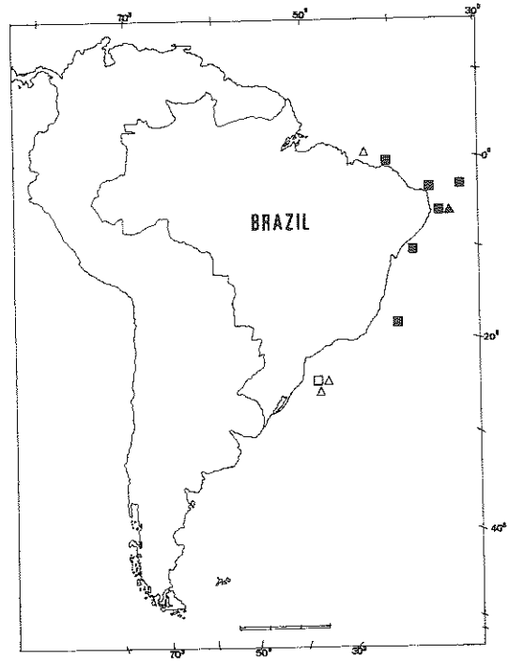

FIG.1. Map showing known distribution of *Erylus* species along the Brazilian coastline: ❐ *E. diminutus sp.n*, Δ *E. alleni*, ■ *E. formosus*, ▲ *E. corneus*. Scale bar 1200km.

Dissociated spicule mounts, thick sections and preparations for SEM study were made according methods described by Mothes (1996). Spicule measurements are given as minimum-mean-maximum, N=20 (except for the new species with N=50), and mean measurements are not supplied when N was smaller than 20. Spicule measurements are given in µm.

Abbreviations cited in the text: BMNH, The Natural History Museum, London; FZB, Fundação Zoobotânica do Rio Grande do Sul, Brazil; MCN, Museu de Ciências Naturais of FZB, Brazil; MCNPOR, MCN Porifera collection; MHNG, Muséum d'Histoire Naturelle, Genéve; MNHN, Muséum National d'Histoire Naturelle, Laboratoire de Biologie des Invertébrés Marins et Malacologie, Paris (DNBE, Boury-Esnault collections); USNM, National Museum of Natural History, Smithsonian Institution, Washington DC; ZMA, Zoölogisch Museum, Universiteit van Amsterdam, Amsterdam; ZMB, Museum für Naturkunde an der Humboldt-Universität zu Berlin, Berlin.

SYSTEMATICS

Class **Demospongiae** Sollas, 1885
Order **Astrophorida** Lévi, 1973

DEFINITION. Sponges with astrose microscleres sometimes accompanied by microxeas or rod-shaped spicules. The megascleres are tetractines, frequently triaenes, often occurring together with oxeas. The skeletal framework is radially arranged at least peripherally, but spicules may occur in confusion in the interior. Either tetractinal megascleres or microscleres or both may be lost to give genera having oxeas and astrose microscleres or only oxeas for spicules. A radial skeletal architecture and generally coarse texture permit recognition of these forms as astrophorids (Hartman, 1982).

Family **Geodiidae** Gray, 1867

DEFINITION. Sponges with either long (or short-shafted) triaenes and oxeas or strongyles as megascleres. Microscleres always include sterrasters (these are modified aspidasters in *Erylus*)] which form closely packed cortical armour at the surface. Other microscleres that may be present are euasters, microrhabs, and spherules. The shape varies from thickly encrusting to massive to shallow-bowl-shaped (Hartman, 1982).

Genus **Erylus** Gray, 1867

Erylus Gray, 1867; Wiedenmayer, 1977; Van Soest & Stentoft, 1988; Desqueyroux-Faundez & Van Soest, 1997. Type species: *Stelletta mammillaris* O. Schmidt, 1862 by monotypy. Fragments of type material examined: BMNH 1867.3.11.32, Adriatic; BMNH 1868.3.2.42, Algiers.

DIAGNOSIS. Geodiidae with ectosomal microrhabds and aspidasters or sterrasters with the following forms: elliptical to disc-shaped, flattened to globose, irregular (with lobes) or regular outline and microspined to smooth surface. Incurrent channels are uniporal; oscules are large.

KEY TO BRAZILIAN *ERYLUS*

1. Orthotriaenes present 2
   Dichotriaenes present with short rhabd (cladome 285.0-418.0/ 38.0-57.0µm; rhabd 256.5-304.0/ 38.0-57.0µm) 4
2. Digitiform aspidasters present (95.0-305/ 11.5-52.2µm) and smooth centrotylote microstrongyles . *E. formosus*
   Elliptical aspidasters and smooth centrotylote microxeas present 3
3. One category of oxyaster present (9.2-23µm) . *E. corneus*
   Two categories of oxyasters present (oxyaster I 23.0-57.5/ oxyaster II 8.1-27.6µm) . . . . . *E. alleni*
4. Strongyles present varying to strongyloxeas (460-920/ 9.5-23.8µm); aspidasters with slightly irregular outline (159-228.8/ 105.8-151.8µm) . . . *E. diminutus* sp.nov.

Erylus diminutus sp. nov.
(Figs 2A-B, 3A-H)

MATERIAL. HOLOTYPE: MCNPOR 347: Rio Grande do Sul, Brazil, 30°50'S, 49°13'W, 183m depth, x.1968, coll. N/Oc. Prof. W. Besnard. SCHIZOHOLOTYPE: ZMA (microscope slides).

ETYMOLOGY. Named for the presence of dichotriaenes and microrhabds smaller than those described in *E. oxyaster*.

DESCRIPTION. *Shape*. Irregular to sublobate fragment, massive sponge with 3.4cm length, 2.3 cm width and 1.9 cm height.

Colour. Gray-white in alcohol.

Oscules. Small, not conspicuous.

Texture and surface characteristics. Fragile consistency with a slight hardening only in the cortex. Smooth surface. Small openings uniformly distributed.

Ectosome. Centrotylote microstrongyles are slightly tangential to the surface and become obliquely oriented internally in the interstices between the aspidasters. Aspidasters have a compact and irregular regional distribution in the inner cortex.

Choanosome. Dichotriaenes with cladome oriented tangentially to cortex. Strongyles, in bundles of 2-12, bundles 76-190µm wide, scattered among the dichotriaenes. Oxyasters, centrotylote microstrongyles and sterrasters in several stages of development are randomly distributed throughout the choanosome.

Megascleres. Strongyles, sometimes varying to strongyloxeas, thick, straight to slightly curved, sometimes mucronate at one side or with unilateral expansion near their extremity, axial canal visible (460.0-732.6-920.0/ 9.5-18.0-23.8µm). Dichotriaenes are strong with short, straight and gradually pointed rhabd; deuteroclad with variable extremities: from acerate to blunt, curved or sometimes bifurcate; Cladome 684.0-855.0µm, rhabd 256.5-304.0/38.0-57.0µm, clads 285.0-418.0µm, deuteroclad 213.8-289.8µm, protoclad 118.8-171.0µm.

Microscleres. Centrotylote microstrongyles smooth, straight or slightly curved, extremity blunt or rarely mucronate, rare microxeas. Central swelling very distinct (39.1-48.0-59.8/ 3.5-5.3-6.9µm). Elliptical aspidasters, rarely disc-shaped, generally with distinct hilum. In the young stage spicules are radially striated discs. Their outline presents discrete lobose marginal protuberances. Adult spicules present serrated margins because microspine density increases towards the edges. Sometimes spicules have only few spines. The outline of aspidasters is irregular with slight digitiform or lobulate expansions. Surface with stellate microspination, divided by 2 striae producing 4 lateral bifurcate projections, totalling 8 conical microspines (159.0-203.9-228.8/ 105.8-128.7-151.8/ 14.0µm). Oxyasters with gradually pointed rays and conical microspines in the middle; centre with 6-8 rays 11.5-15.6 –23.0µm, diameter of centre 2.3-2.9-4.6µm.

Ecology. Associated with polychaete tubes, bryozoan colonies and colonial foraminiferans.

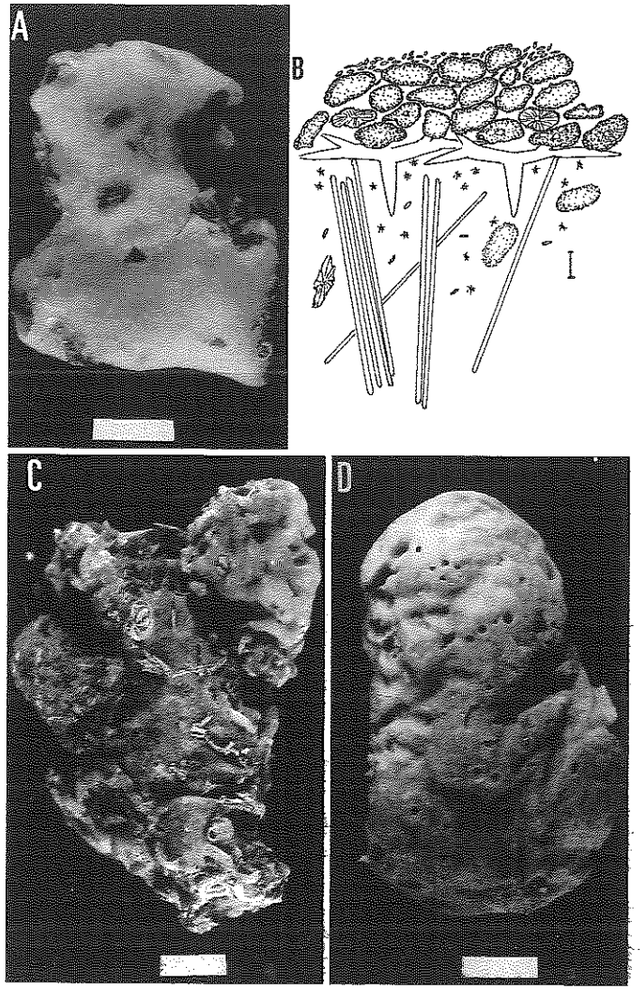

FIG. 2. Photographs of preserved material. A-B, *Erylus diminutus* sp. nov.: A, Holotype MCNPOR 347. Scale bar 5mm. B, Schematic representation of the skeleton arquitecture. Scale bar 0.1mm. C, *Erylus alleni*: MCNPOR 193. Scale bar 5mm. D, *Erylus formosus*: MCNPOR 2439. Scale bar 10mm.

REMARKS. The new species was identified by Mothes-de-Moraes (1978) as *Erylus oxyaster* Lendenfeld, 1910. This material was re-examined using SEM, and a comparative material was also studied: *Erylus oxyaster* Lendenfeld described by Weltner, 1927 (ZMB 6636), and *Erylus* cf. *oxyaster* sensu Desqueyroux-Faúndez & Van Soest, 1997 (MHNG Ga III 8 from Coast James Is of the Galapagos, 00°37'S-90°51'W, 78m depth). These studies revealed that our material was closely allied to, but clearly different from the Galapagos species, and new to science. *Erylus oxyaster* differs from the present species in the possession of much larger dichotriaenes and larger categories of oxyasters and microrhabs. It is, nevertheless, a sister species of *E. oxyaster*.

Erylus alleni de Laubenfels, 1934
(Figs 2C, 4A-G, Table 1)

Erylus alleni de Laubenfels, 1934: 7.

MATERIAL. HOLOTYPE: USNM 22268: Porto Rico, West Indies, 18°29'40"N, 66°08'30"W - 18°31'N, 66°10'15"W, 69.5-173.7m depth, coll. First Johnson-Smithsonian Deep-Sea Expedition. SCHIZOHOLOTYPE: MCNPOR 3449: (slides). OTHER MATERIAL. MCNPOR 1824: Maranhão, Brazil, 00°22'00"S, 44°12'00"W, 43m depth, iii.1973, coll. Barco Pesqueiro IV (SUDENE). MCNPOR 193: Rio Grande do Sul, 30°25'S, 48°48'W, 165m depth, 25.xi.1971, coll. N.P. Mestre Jerônimo (SUDEPE). MCNPOR 2202: Rio Grande do Sul, 31°20'S, 48°40'W, 150m depth, coll. N. Oc. Atlântico Sul (FURG).

DESCRIPTION. Adequate description is provided by de Laubenfels (1934), and expanded here.

Megascleres (refer to Table 1 for dimensions). Oxeas with hastate to acerate ends, few blunt, usually slightly curved, sometimes straight. Orthotriaenes: rhabd and clads with blunt ends.

Microscleres (refer to Table 1 for dimensions). Centrotylote microxeas, smooth, usually slightly curved with pointed ends, seldom with blunt ends. Aspidasters disc-shaped or elliptical, nearly regular outline; surface microspines stellate-shaped with conical points; developmental forms are visible. Oxyasters I with 6-7 slightly microspined rays, bigger spines are located close to the distal ends. Oxyasters II with 12-16 microspined rays, spines more concentrated at the distal extremities.

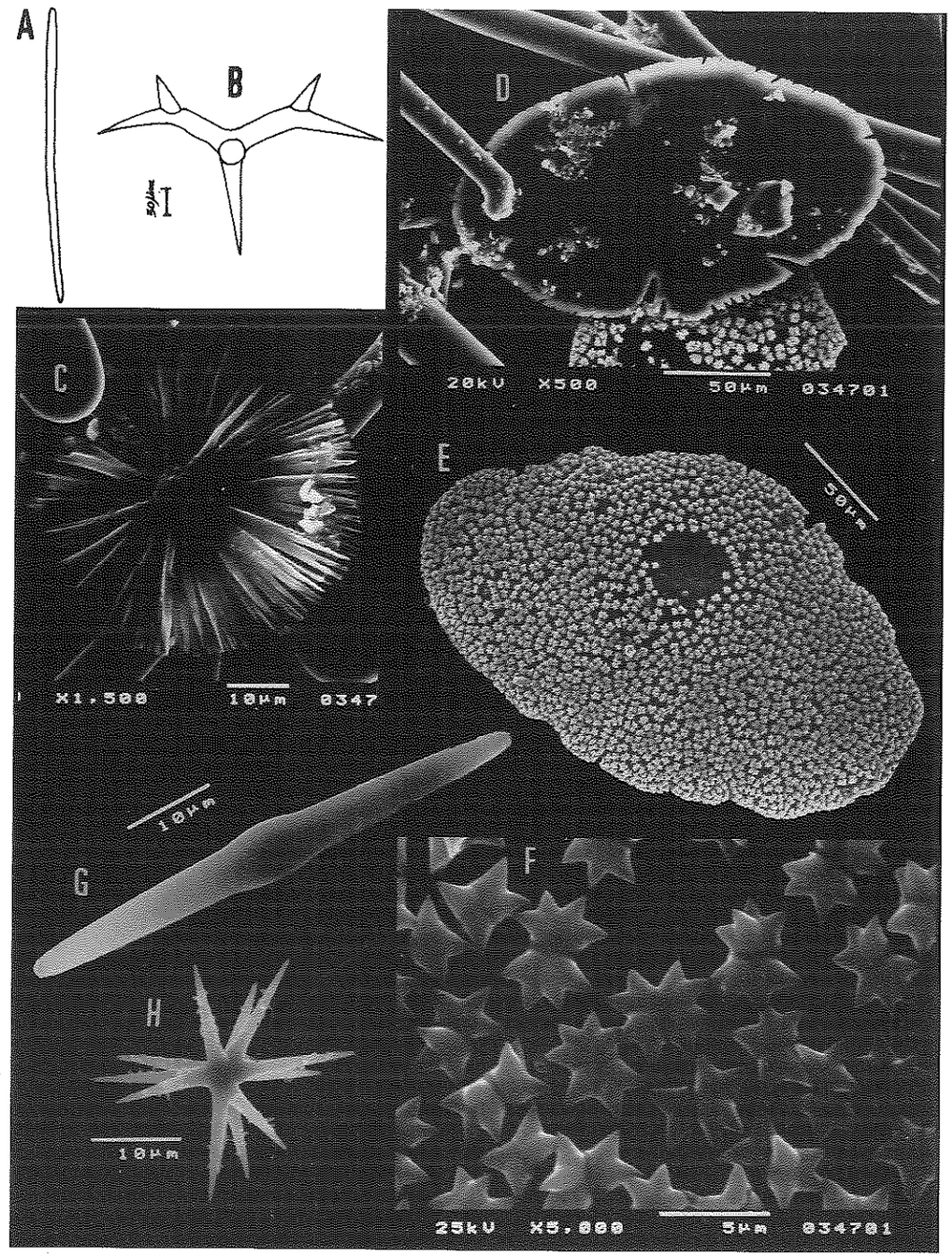

FIG. 3. *Erylus diminutus* sp. nov. (Holotype MCNPOR 347). A, strongyle. B, dichotriaene. C-D, aspidaster developmental stages. E, adult aspidaster. F, aspidaster surface. G, microstrongyle. H, oxyaster.

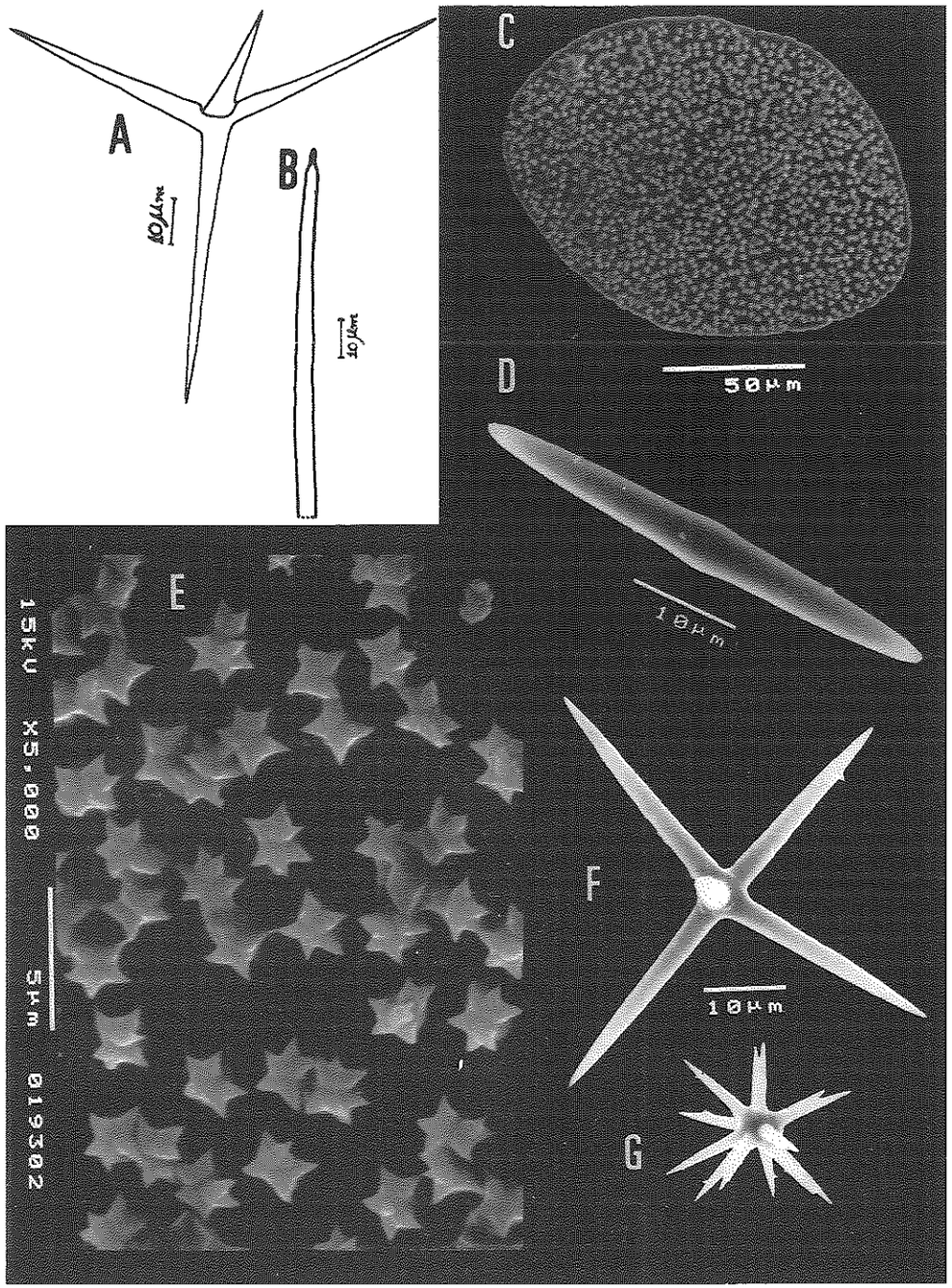

FIG. 4. *Erylus alleni* de Laubenfels (MCNPOR 1824). A, orthotriaene. B, oxea extremity. C, aspidaster. D, microxea. E, aspidaster surface. F, oxyaster I. G, oxyaster II.

TABLE 1. Comparative data on the spicule measurements of *Erylus alleni* de Laubenfels, 1934, holotype and additional material. Orthotriaene measurements refer to shaft length/width, cladome length/ width. Measurements given in µm. Key to material of *E. alleni*: 1, Holotype USNM 22268 (data from the author); 2, Schizoholotype MCNPOR 3449 [slides]; 3, MCNPOR 1824; 4, MCNPOR 193; 5, MCNPOR 2202.

Material	Orthotriaenes	Oxeas	Aspidasters	Microxeas	Oxyasters I	Oxyasters II
1	250-300/ 13 200-300/ 13	660/12	35/70/5	37/1	30	7
2	171-465.5/ 6.9-20.7 256.5-484.5/ 9.2-18.4	465.5-608.4-684/ 4.6-9.1-13.8	69.0-108.2-126.5/ 50.6-70.8-80.5	29.9-42.2-48.3/ 2.3-2.6-3.5	25.3-38.0-48.3	8.1-11.3-16.1
3	211.6-240.0/4.6 119.6-195.0/4.6	617.5-670.9-788.5 / 6.9-11.9-16.1	92.0-105.8-133.4/ 52.9- 87.4-96.6	41.4-50.6-71.3/ 1.1-4.1-4.6	23.0-32.2-39.1	9.2-11.5-16.1
4	323.0-464.3-589.0/ 18.4-33.7-50.6 266.0-418.9-570.0/ 16.1-29.9-48.3	437.0-564.6-807.5 / 4.6- 9.9-20.7	112.7-134.5-144.9/ 66.7- 92.2 -105.8	39.1-45.6-59.8/ 4.6	46.9-34.5-59.8	11.5-18.3-27.6
5	437.0-577.6-665.0/ 27.6-37.8-46.0 408.5-505.4-617.5/ 27.6-33.1-41.4	598.5-775.2-950.0 / 9.2-15.9-20.7	85.5-117.3-142.5/ 57.0-90.3-114.0	34.5-43.2-52.9/ 4.6-5.8-6.9	25.3-39.6-57.5	9.2-13.2-16.1

REMARKS. The specimens examined above from Brazil appear to be conspecific with *E.alleni* de Laubenfels, 1934. Van Soest & Stentoft (1988) suggested this species was a synonym of *E.transiens* (Weltner, 1882), whereas we suggest that *E. alleni* differs from *E. transiens* in having two distinct size categories of oxyasters, the usual small ones and a larger one with fewer rays. *Erylus alleni* is closely related to *E. transiens.*

DISTRIBUTION. Caribbean: Porto Rico (de Laubenfels, 1934); Brazil: Maranhão and Rio Grande do Sul (present study).

Erylus formosus Sollas, 1886
(Figs 2D, 5A-I, Table 2)

Erylus formosus Sollas, 1886: 195; 1888: 209, pl.28; Wiedenmayer, 1977: 181 (full synonymy); Boury-Esnault, 1973: 267, fig. 3, pls I-II; Solé-Cava, Kelecom & Kannengiesser, 1981: 125, fig. 1; Mothes & Bastian, 1993: 18, figs 7-12, 38.

MATERIAL. HOLOTYPE: BMNH 1889.1.1.77: Bahia, Brazil, 12.8-36.6m depth, ix.1973, coll. H.M.S. 'Challenger' Expedition. SCHIZOHOLOTYPE: MCNPOR 3769: Curaçao, 5-15m depth, 1.ii.1981 (slides ZMA POR 4587, MCNPOR 2586). OTHER MATERIAL. MCNPOR 2439: Fernando de Noronha, Baía do Sueste, Brazil, 03°50'S, 32°25'W, <30m depth (Mothes & Bastian, 1993). MCNPOR 3807: Off Maranhão State, 02°07'35"S, 41°55'46"W, 72m depth. MCNPOR 3379: Rio Grande do Norte, 03°54'S, 37°38'W, 43.6m depth. MNHN: Paraíba, 07°29'S, 34°30'W, 45m depth (Boury-Esnault, 1973). MCN: Espírito Santo, Três Ilhas (near Guarapari), 20°36'S, 40°23'W, 3-12m depth (Solé-Cava et al., 1981).

DESCRIPTION. Adequate descriptions are provided by Sollas (1888), Boury-Esnault (1973), Solé-Cava et al. (1981) and Mothes & Bastian (1993), and expanded here.

Megascleres (refer to Table 2 for dimensions). Oxeas with acerate to hastate ends, usually slightly curved. Orthotriaenes: rhabd conical, clads and rhabd with slightly blunt ends.

Microscleres (refer to Table 2 for dimensions). Centrotylote microstrongyles, smooth, usually slightly curved. Aspidasters usually digitiform, regular to very irregular outline; surface microspines rosette-shaped with conical points; developmental forms are visible. Oxyasters with 4-7 microspined rays, bigger spines are located close to the distal ends. Strongylaster / tylaster with 4-16 usually microspined rays.

REMARKS. This species differs from other Brazilian *Erylus* in having aspidasters usually digitiform and proportionally 1:7. Two specimens were first collected at 02°07'35"S, 41°55'46"W and 03°54'S, 37°38'W, expanding the distribution of this species along the Brazilian coast.

Erylus corneus Boury-Esnault, 1973
(Fig. 6A-F, Table 3)

Erylus corneus Boury-Esnault, 1973: 268, fig. 4.

MATERIAL. HOLOTYPE: MNHN-NBE 973: Paraíba, Brazil, 07°29'S, 34°30'W, 45m depth, 1961-1962, coll. 'Calypso' Expedition. SCHIZOHOLOTYPE: MCNPOR 2505: (slide).

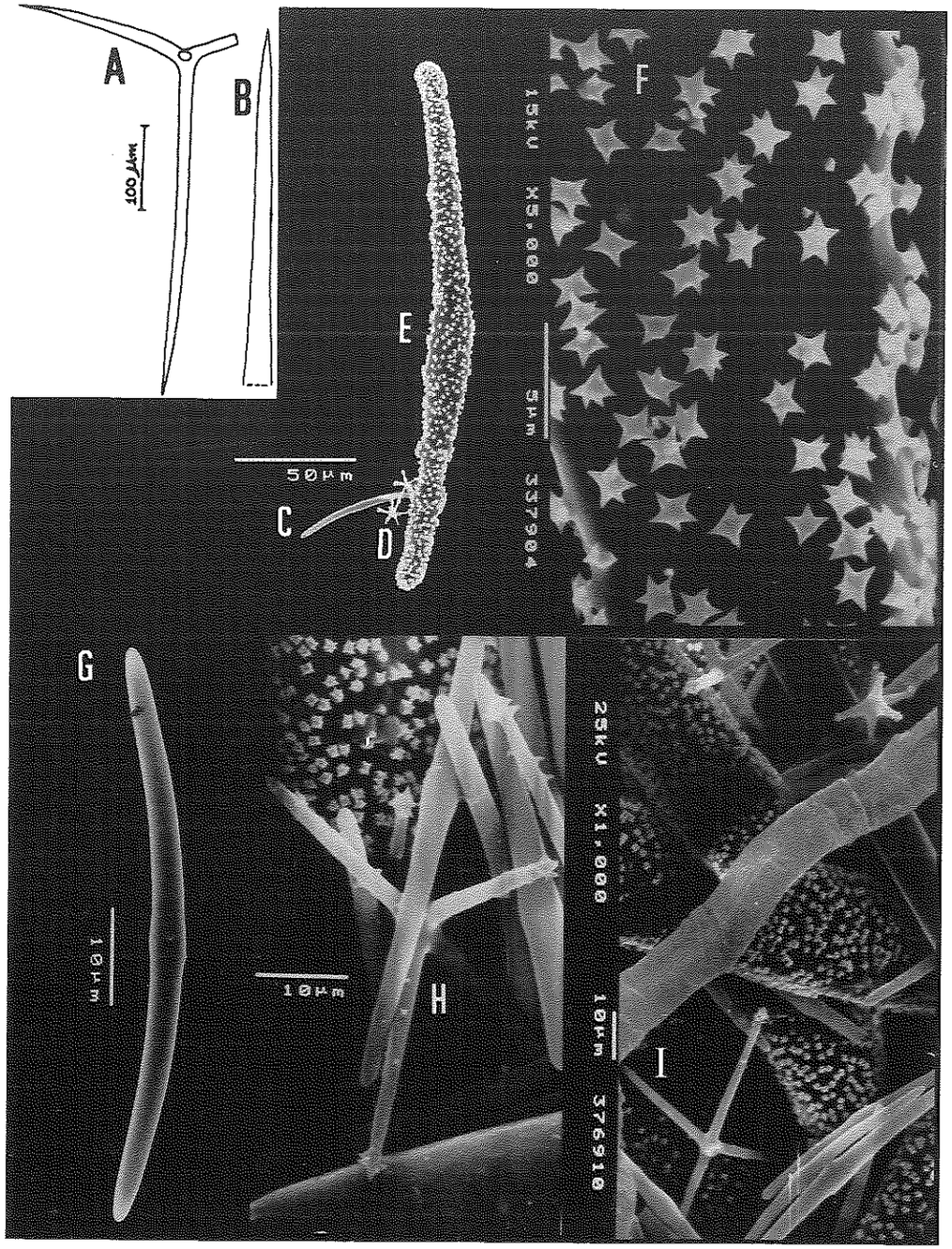

FIG. 5. *Erylus formosus* Sollas (MCNPOR 3379). A, orthotriaene. B, oxea extremity. C, microstrongyle. D, tylaster. E, aspidaster. F, aspidaster surface. G, microstrongyle. H, oxyaster. I, tylaster.

TABLE 2. Comparative data on spicule measurements of *Erylus formosus* Sollas, 1886, holotype and additional material. Orthotriaene measurements refer to shaft length/width, cladome length/ width. Measurements given in µm. Key to material of *E. formosus*: 1, Holotype – BMNH 1889.1.1.77 [data from the author]; 2, Schizoholotype MCNPOR 3769 [slides]; 3, MCNPOR 3807; 4, MCNPOR 2439 (Mothes & Bastian, 1993); 5, MCNPOR 3379; 6, Boury-Esnault (1973) [data from the author]; 7, Solé-Cava et al. (1981) [data from the author]; 8, ZMA POR 4587 [MCN POR 2586 slides]. ?=dimensions unknown, not cited by original author).

Material	Orthotriaenes	Oxeas	Aspidasters	Microstrongyles	Oxyasters	Strongylasters/ Tylaster
1	393/23.7 (21cladi)	892/23.7	14/32–175/26, 197/23.6, 122/47.4 (8-1 thickness)	70/6	63	12-16
2	180.5-304.0/ 9.2-16.1, 266.0-446.5/ 13.8-19.6	644-824.6-989.0/ 9.5-15.0-19.0	128.3-177.2-204.3 / 12.7-21.0-31.1	40.3-53.4-66.7/ 2.3-3.7-4.6	34.5-46.0-62.1	9.2-13.9-18.4
3	Not observed (Rare or Absent)	475.0-681.7-950.0 / 15.0-21.1-27.6	95.0-227.1-285.0/ 25.3-45.1-55.2	55.2-63.3-71.3/ 2.3-3.6-4.6	25.3-39.4-50.6	9.2-14.4-23.0
4	285.0-351.5/ 6.9-9.2, 171.0-247.0/ 6.9	522.5-581.8-665.0 / 6.9-11.2-13.8	133.0-153.4-171.0 / 28.5-38.9-47.5	41.4-53.8-69.0/ 2.3	23.0-28.4-39.1	6.9-13.0-18.4
5	332.5-475.0 / 9.2-11.5, 237.5-332.5/9.2	598.5-711.6-817.0 / 9.2-12.4-16.1	114.0-172.4-218.5 / 11.5-14.8-20.7	46.0-53.2-69.0/ <2.3	16.1-23.5-34.5	9.2-12.7-18.4
6	450.0-550.0/ ?, 250.0-350.0/ ?	600.0-900.0/ 9.4-12.5	188.0-256.0/ 12.5-19.0	45.0-80.0/ ?	37.0-41.0	9.4-12.5
7	313.0-504.0-625.0/ ?, 250.0-363.0-625.0/ ?	597.0-761.0-955.0 / 7.5-16.4-21.3	171.0-210.0-305.0 / ?	45.0-61.0-83.0/ ?	27.0-47.0-64.0	8.5-12.5-16.0
8	361.0-522.5/ 9.2-13.8, 256.5-418.0/ 9.2-16.1	674.5-781.3-931.0 / 9.2-12.6-18.4	103.5-170.5-253.0 / 27.6-41.7-52.9	39.1-48.6-66.7/ 2.3-3.5-4.6	29.9-44.3-59.8	6.9-10.8-13.8

DESCRIPTION. A complete description is provided by Boury-Esnault (1973), and expanded here.

Megascleres (refer to Table 3 for dimensions). Orthotriaenes with short rhabd-like calthrops; rhabd hastate and mucronate on one side; cladome with clads slightly curved. Oxeas hastate or mucronate, slightly curved, sometimes straight or strongly curved; axial canal visible.

Microscleres (refer to Table 3 for dimensions). Centrotylote microxeas smooth and slightly curved with acerate ends. Aspidasters elliptical-shaped, nearly regular outline, surface microspines stellate-shaped with 6-10 slightly conical points; developmental forms are visible with serrated margins because of stria that radiate from its central point; small hilum. Oxyasters with 10-14 microspined rays, spines more concentrated at the distal extremities.

REMARKS ON CARIBBEAN *ERYLUS*

The Brazilian coast is a continuity of the Caribbean biogeographic Province. Warm and shallow-water species have their southernmost limits along the coast of Santa Catarina State (27°S) (Fig.1), and some species extend up to the subtropical region of the coast of Rio Grande do Sul State (30°S) (Fig.1) and neighbouring areas (Mothes, 1996), such as *E. alleni*. Nine species of *Erylus* were listed in the Caribbean fauna by Pulitzer-Finali (1986). 1) *E. goffrileri* Wiedenmayer, 1977. 2) *E. amphiastera* Wintermann-Kilian & Kilian, 1984. 3) *E. ministrongylus* Hechtel, 1965. 4) *E.alleni* de Laubenfels, 1934, considered by Van Soest & Stentoft (1988) to be synonymous with *E. transiens* (Weltner, 1882), but reinstated here, for reasons described above, as a distinct species and sister species of *E. transiens*. 5) *E. clavatus* Pulitzer-Finali, 1986, also considered by Van Soest & Stentoft (1988) as a probable synonym of *E. transiens*, apparently differing only in the narrower width of the aspidasters; *E. clavatus* could also be considered as a synonym of *E. formosus*, however it has aspidasters (with proportion 1:3), which are not comparable with those of the latter species. 6) *E. formosus* Sollas, 1886. 7) *E. trisphaera* (de Laubenfels, 1953) (originally described in *Unimia*), and 8) *E. bahamensis* Pulitzer-Finali, 1986, both have much narrower aspidasters (with proportion 1:9) than other Caribbean species, however, *E. formosus* and *E. trisphaera* differ by the presence of oxyasters, and *E. trisphaera* has trilobate aspidasters. 9) *E. discophorus* (Schmidt, 1862) and *E. euastrum* (Schmidt, 1868), both originally described in *Stelletta* from the Adriatic, are certainly not conspecific with Caribbean species given their disjunct distributions. *Stellettinopsis*

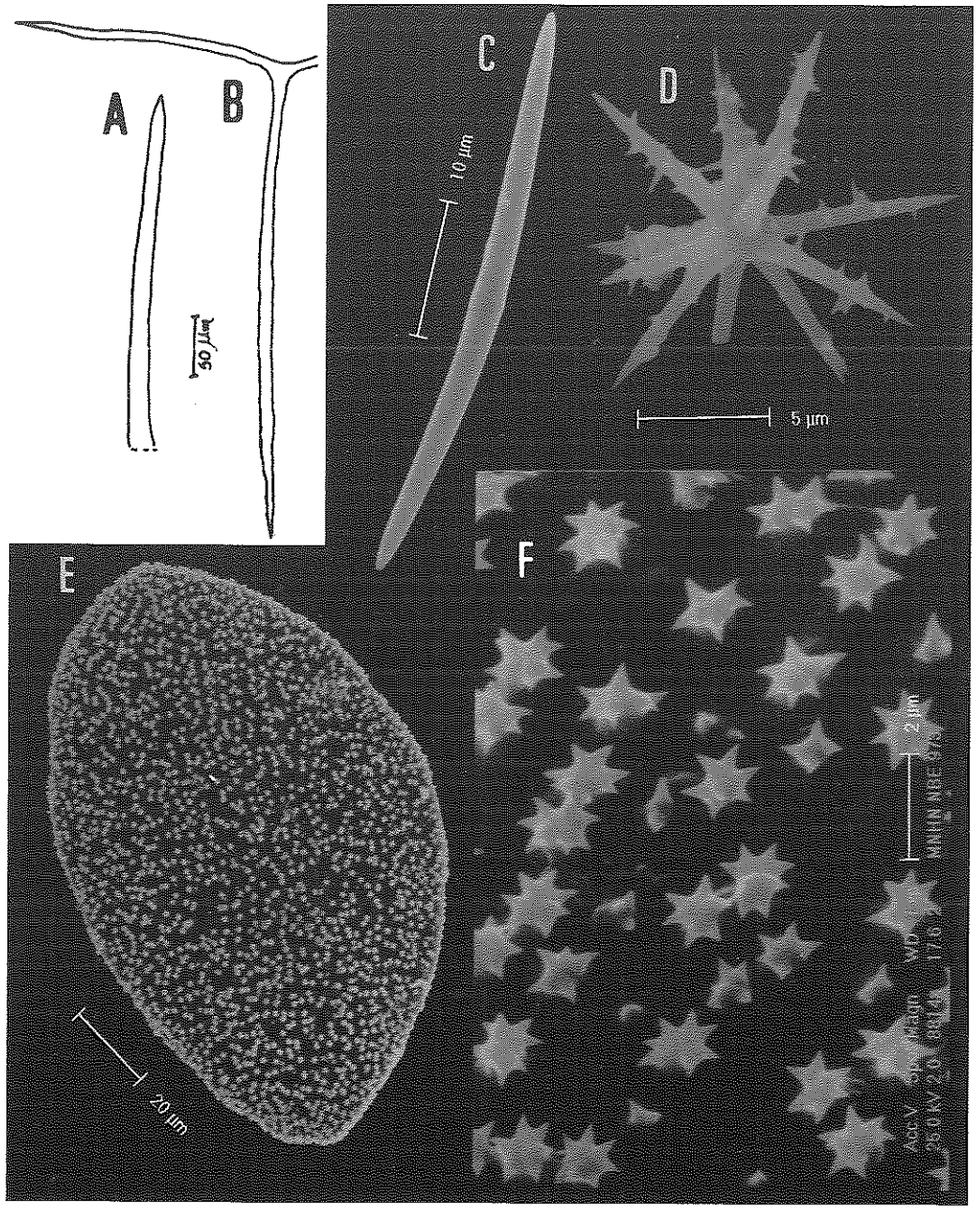

FIG. 6. *Erylus corneus* Boury-Esnault (Schizoholotype MCNPOR 2505). A, oxea extremity. B, orthotriaene. C, microxea. D, oxyaster. E, aspidaster. F, aspidaster surface.

euastrum Schmidt, 1880 was cited from Grenada by Van Soest & Stentoft (1988), but this specimen may belong to *E. transiens*. Of all these species *E. diminutus* sp. nov. is closest to *E. ministrongylus* in having strongyles, dichotriaenes and elliptical aspidasters (with proportion 1:2), although differing by the presence of microstrongyles and a single

TABLE 3. Data on spicule micrometries of *Erylus corneus* Boury-Esnault, 1973. Holotype and Schizoholotype. Measurements given in µm. Key to material of *E. corneus*: 1, Holotype - MNHN-NBE 973 [data from the author]; 2, Schizoholotype – MCNPOR 2505 [slides].

Material	Orthotriaenes	Oxeas	Aspidasters	Microxeas	Oxyasters
1	56.0-125.0 actines	546.0-673.0 / 9.0 –19.0	125.0-153.0 / 69.0-84.0	37.0-56.0 / 1.0-3.0	12.5-22.0
2	126.5-380.0/ 11.5 , Clads 119.6-213.7 / 5.7-9.2	494.0–680.0/ 8.0–19.5	119.6-147.2/ 72.4-87.4	27.6-57.5/ <2.3-3.5	9.2-23.0

category of oxyasters. A taxonomic revision of these Caribbean species is currently in progress.

DISCUSSION

Lendenfeld (1910) introduced the term 'aspidaster' for the special spicules of *Erylus*, being smooth in the young stages, shield-like shape (flattened) and oval, rarely round or irregular discs. However, some species have globiform, either circular or ellipsoidal aspidaster spicules, identical to sterrasters of *Geodia*. Consequently, we propose to enlarge the definition of the genus here, given that both sterrasters and aspidasters may be found in some species of *Erylus* (i.e. *E. polyaster*, *E. geodioides* and *E. topsenti*). The proposition to enlarge the scope of the genus to include additional forms of spicules is based only on adult spicules described here, and from species previously recorded in the literature.

In the present revision, a 'provisionally endemic' new species is described; the distribution of *E. formosus* is enlarged; the presence of *E. alleni* is recorded for the first time for the Brazilian coast; and zoogeographical data on marine demosponges from Brazil, recorded by Hechtel (1976) and Mothes (1996), are expanded.

ACKNOWLEDGEMENTS

We are particularly grateful to Rob van Soest (ZMA) for donation of Caribbean samples and for confirmation of identifications made here. Our thanks also go to Klaus Rützler (USNM), Clare Valentine (BMNH) and Peter Bartsch (ZMB) for lending type material; to Arno A. Lise (PUCRS), Ricardo R. Capitoli (FURG), Maria Marlúcia Ferreira Correia (UFMA) and José Audísio C. Luna (UFPE), for donating Brazilian samples; to Francisco Kiss (Universidade Federal do Rio Grande do Sul -UFRGS) and technician (MCN/FZB) who provided the scanning electron micrographs; to Lisandra de Moura Umpierre and Lia Gonçalves Possuelo (MCN and Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul-FAPERGS) for slides of spicular dissociation, thick sections and preparations for SEM study; to Luciano de Azevedo Moura for the finishing of the drawings.

Most of the material examined here was dredged under the auspices of: Diretoria de Hidrografia e Navegação da Marinha (DHNM); Departamento de Recursos Pesqueiros da Superintendência de Desenvolvimento do Nordeste (SUDENE); Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS); Projeto dos Recursos Vivos da Zona Econômica Exclusiva (REVIZEE/N and REVIZEE/NE), supported respectively by Universidade Federal do Maranhão and Universidade Federal de Pernambuco; Projeto dos Recursos Vivos da Zona Econômica Exclusiva (REVIZEE/SUL), supported by Fundação Universidade do Rio Grande (FURG); 'Programa Rio Grande do Sul-I' (PRGS-I), supported by Universidade de São Paulo e Governo do Estado do Rio Grande do Sul; Projeto Talude, Fundação Universidade do Rio Grande (FURG), Brazil; Britannic Expedition H.M.S. 'Challenger'; and French Expedition 'Calypso'.

LITERATURE CITED

BOURY-ESNAULT, N. 1973. Campagne de la 'Calypso' au large des côtes atlantiques de l'Amérique du Sud (1961-1962). I, 29. Spongiaires. Annales de l'Institut Océanographique, Paris 49 (Supplement): 263-295.

DENDY, A. 1916. Report on the Homosclerophora and Astrotetraxonida collected by H.M.S. 'Sealark' in the Indian Ocean. In Reports of the Percy Sladen Trust Expedition to the Indian Ocean in 1905. Vol. 6. Transactions of the Linnean Society of London, Zoology 17: 225-271.

DESQUEYROUX-FAÚNDEZ, R. & SOEST, R.W.M. VAN 1997. Shallow waters Demosponges of the Galápagos Islands. Revue Suisse de Zoologie 194(2): 379-467.

GRAY, J.E. 1867. Notes on the arrangement of sponges, with the description of some new genera. Proceedings of the Zoological Society of London (1867): 492-558.

HECHTEL, G.J. 1965. A systematic study of the Demospongiae of Port Royal, Jamaica. Bulletin of the Peabody Museum of Natural History 20: 1-103.