

1. SUMMARY

This work deals with the deep-water (100-500 m) sponges off Namibia. Seventy-five species belonging to the classes Hexactinellida and Demospongiae are described and fully illustrated, and their geographic and bathymetric distribution and taxonomic features are set out.

This is the first record of forty-five species from the South African-Namibian region: 33 new in the South Atlantic and 26 new anywhere in the Atlantic Ocean. Nine new species (*Desmanthus macphersoni*, *Biemna rhabdostyla*, *Esperiopsis lesliei*, *Ectyonancora walvisensis*, *Clathria tortuosa*, *Echinoclathria isochelifera*, *Raspailia echinata*, *Haliclona submonilifera*, and *Anchinoe bardajii*) are described.

The main biogeographic affinities of this sponge fauna are discussed, based on data from the literature and the author's own interpretation of synonyms.

Resumen

Se estudian las esponjas profundas de Namibia (100-500 m) desde el punto faunístico. Se describen e ilustran 75 especies pertenecientes a las clases Hexactinellida y Demospongiae, anotando su distribución geográfica y batimétrica y se discuten algunos problemas sistemáticos.

Cuarenta y cinco especies de las estudiadas se citan por primera vez en la región de Namibia-Sudáfrica. De ellas, 33 son nuevas para el Atlántico Sur, 26 para el Atlántico en general y 9 (*Desmanthus macphersoni*, *Biemna rhabdostyla*, *Esperiopsis lesliei*, *Ectyonancora walvisensis*, *Clathria tortuosa*, *Echinoclathria isochelifera*, *Raspailia echinata*, *Haliclona submonilifera* y *Anchinoe bardajii*) se describen por primera vez.

De acuerdo con la bibliografía y haciendo una interpretación personal de las sinonimias, se apuntan las afinidades de esta fauna de esponjas con las de otras regiones biogeográficas.

2. INTRODUCTION

Until fairly recently (URIZ, 1984, 1985, in press, a), nothing was known about the species composition, abundance, diversity, and other features of the sponge fauna in the region of Namibia or, more generally, in the area between 04° and 29° South latitude off western Africa. The most recent and comprehensive works covering waters in the general vicinity of this region are those by LÉVI on the order *Poecilosclerida* (1963) and on the order *Astrophorida* (1967) and by BOROJEVIC (1967) on the class *Calcarea*, although they deal mainly with coastal species (from waters shallower than 100 m in depth) along the entire coast of South Africa from Saldanha Bay to Durban, and therefore many of the samples were in fact collected in the Indian Ocean. Still, in view of the geographic proximity of the waters considered in these works, they were taken as the initial point of reference for the study of the sponge fauna off Namibia, even though, in view of the colder waters in this region, it was unlikely that many affinities would be found.

It is difficult to predict the species composition of an animal group in a region like that off Namibia, which, by virtue of its geographic location, possesses major local currents coupled with complex hydrographic features. Although LÉVI (1963) cited Saldanha Bay, where the water temperature turns considerably colder, as the northernmost limit for coastal Indian Ocean species in Atlantic waters, at least in theory the presence of Indian Ocean fauna could, presumably, extend further northwards in deeper waters, where temperatures are more constant.

The present study is based on material collected during the Benguela V, VI, and VII surveys. No attempt to be exhaustive has been made, and certain taxonomic groups (the class *Calcarea*) will be dealt with in subsequent works. It is also likely that additional new species will be found during future surveys carried out in the region each year. Still, the species found up to now are felt to provide a fairly representative picture of the sponge fauna in the region.

A total of 32 species described in previous papers (URIZ, 1985, in press, a) have been included, but they have been redescribed only when new specimens were found, in order to provide information

on the range of variability in the features. In the descriptions of species with relatively few references in the literature, the spicule sizes in the specimens taken off Namibia have been compared with those reported by other authors for specimens from relatively nearby areas, such as South Africa, in order to produce a record of possible differences ascribable to environmental factors.

The holotypes of the new species are stored at the Centro de Estudios Avanzados de Blanes (Centre for Advances Study) in Blanes, Spain, under the reference number listed in each case.

Characteristics of the region

The study area was a coastal strip a little more than 80 m wide encompassing depths ranging from 60 to 500 m, between 23° South latitude, off Walvis Bay, and 29° South latitude, off the mouth of the Orange River.

The cold, subantarctic Benguela Current passes through the region from south to north, resulting in lower water temperatures than would otherwise be expected for those latitudes.

The surface temperature in the Namibian region ranges between 11 and 15° C in the Southern Hemisphere spring and tends to be colder at inshore sampling stations. Temperature gradually decreases with depth, fluctuating around 10 °C at 200 m, 9 °C at 300 m, 8 °C at 400 m, and so on, falling to 3 °C at 1.500 m and 2,5 °C at 3.000 m (Gutiérrez *et al.*, 1985, 1986).

At the oceanic stations the water temperature in the layer just below the surface, which may attain 18 °C in the autumn, is affected by the climate, yet such climatic factors bring about hardly any changes at all in temperature at inshore stations or in the depth strata below 100 m. It is therefore not unreasonable to surmise that the sponge fauna studied lives at a rather constant temperature of between 8 and 11 °C.

The bottoms are relatively uniform, mud or sand mixed with mud, with scattered, rocky bars (Figure 1) frequently colonized by banks of semifossil cor-

als. Animal biomass was found to be nil at some stations (6P-24, 6P-25, 6P-26), where conditions were anoxic, or to be greatly reduced at others, where the bottom mud was mixed with clay.

Soft bottoms were characterized by low diversity and a sizeable biomass of non-arthropod invertebrates. A sponge (*S. tylobtusa*), a gastropod (*Fusitriton magellanicus*), an *Actinauge*-like actinian, and a solitary ascidian were found to be extremely abundant in certain areas, constituting true, usually mutually exclusive facies. The actinian facies occurred in the 400-500 m stratum throughout the region (this type of actinian is also characteristic on the epibathyal mud bottoms in the Mediterranean). The decapod crustacean *Lithodes tropicalis* thrives in this same stratum in a small area at 26° South. Facies of *Fusitriton magellanicus* also occurred in the 400-500 m stratum in the area in which the silt washed to the sea by the Orange River is deposited.

S. tylobtusa does not appear to extend beyond 400 m in depth, with areas of maximum density between 100 and 400 m (URIZ, in press, b).

The warm Angola Current does not reach 23° South latitude, and for this reason penetration into the region by tropical Atlantic species is highly unlikely.

One of the characteristic upwelling centres in the region off southern Africa is located in the vicinity of Lüderitz between 24,5° and 28° South latitude, i.e., covering practically the entire study area.

To sum up, the area in question is highly productive, with relatively cold waters brought in by the Benguela Current, relatively uniform bottoms, and coastal upwelling phenomena contributing to a water temperature that remains relatively constant between the different levels in the water column.

3. ACKNOWLEDGEMENTS

Many people have helped me in the preparation of this work. My special thanks go to the crew of the «Chicha-Touza» and my colleagues, who shared both the successes and the difficulties of the Benguela VI and VII cruises (Dr. E. MACPHERSON, Ms. R. ALLUÉ, and Messrs. R. LESLIE and D. MASALLES took an active part in the collection of the sponge samples). The Sea Fisheries Research Institute of South Africa in Cape Town, Professor J. VACELET and Dr. N. BOURY-ESNAULT of the Station

Marine d'Endôume (Endôume Marine Research Station), and Ms. S. STONE of the British Museum of Natural History all made available a large part of the literature used.

Messrs. A. FAUQUET and J. BIOSCA took the photographs. My colleagues, Ms. M. V. BARDAJÍ, I. MARTÍNEZ, and C. AMAT, all put in many long hours typing and preparing the final manuscript.

4. MATERIAL AND METHODS

The material used in the present study came mostly from the Benguela VI and VII research cruises, carried out under the auspices of the Namibian Region Research Project. Some specimens collected on the Benguela V cruise and studied previously (URIZ, in press, a) have also been included.

In all, 178 stations of a semi-stratified sampling grid (MACPHERSON *et al.*, 1986) were occupied. The main features at the 47 stations that yielded sponges are set out below.

Samples were collected with a bottom trawl. The effective towing time for each trawl was $\frac{1}{2}$ hour at

a speed of 3 knots. The towing distance from start to finish was, therefore, approximately 1,5 miles.

This sampling system has a drawback, in that the area sampled may not always be uniform, with possible intermingling of components of different communities. On the other hand, for qualitative studies, it affords an advantage, in that a large area can be covered, and hence organisms with a low population density or limited distribution are more liable to be collected than during operations in which dredging gear is employed.

5. SAMPLING STATIONS YIELDING SPONGE FAUNA

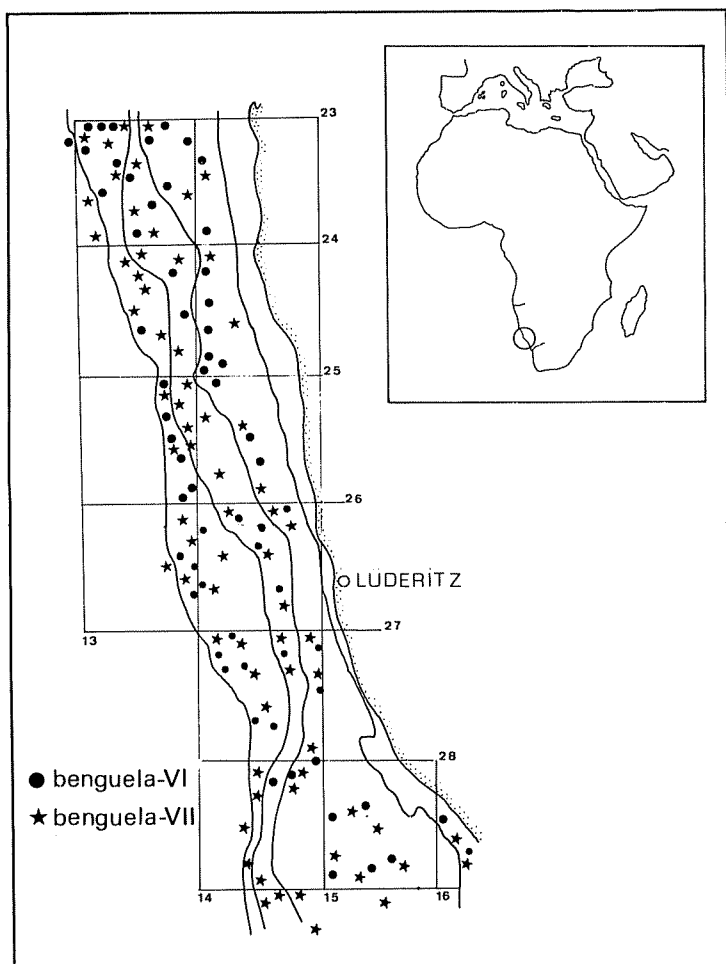


FIG. 1. Map of the study area showing sampling stations.

Benguela V Cruise

Station P-5

Location: 22° 18' S; 13° 07' E

Depth: 140 m

Bottom: sand and mud

Station P-55

Location: 29° 45.8' S; 14° 37.3' E

Depth: 467 m

Bottom: greenish-gray mud

Station P-58

Location: 29° 30.9' S; 14° 56.5' E

Depth: 260-269 m

Bottom: bank of semifossil madreporarians

Benguela VI Cruise

Station P-5

Location: 23° 43.8' S; 13° 43.4' E

Depth: 212 m

Bottom: sand and mud

Station P-6

Location: 23° 47' S; 13° 32.3' E

Depth: 205 m

Bottom: sand and mud

Station P-12

Location: 23° 08' S; 13° 04.6' E

Depth: 483 m

Bottom: fine gray mud

Station P-13

Location: 23° 02' S; 13° 04.6' E
 Depth: 384 m
 Bottom: fine gray mud

Station P-14

Location: 23° 02.4' S; 13° 13.3' E
 Depth: 359 m
 Bottom: fine gray mud

Station P-15

Location: 23° 04.7' S; 13° 19.1' E
 Depth: 359 m
 Bottom: fine gray mud

Station P-28

Location: 25° 00.6' S; 14° 05.6' E
 Depth: 175.6 m
 Bottom: level black rock

Station P-38

Location: 26° 57.6' S; 14° 28.4' E
 Depth: 189 m
 Bottom: sand and mud

Station P-39

Location: 26° 01.6' S; 14° 35.3' E
 Depth: 293 m
 Bottom: mud

Station P-43

Location: 27° 33.2' S; 14° 45.3' E
 Depth: 332 m
 Bottom: gray mud

Station P-44

Location: 27° 37' S; 14° 30' E
 Depth: 476 m
 Bottom: gray mud

Station P-53

Location: 29° 11.8' S; 14° 28.2' E
 Depth: 487 m
 Bottom: greenish mud

Station P-56

Location: 29° 16.1' S; 14° 50.4' E
 Depth: 209 m
 Bottom: mud and loose rock

Station P-57

Location: 29° 21.0' S; 14° 49' E
 Depth: 232 m
 Bottom: rocks and colonies of semifossil madreporarians

Station P-59

Location: 29° 31.6' S; 14° 33.1' E
 Depth: 476 m
 Bottom: greenish mud

Station P-60

Location: 29° 46.6' S; 14° 37' E
 Depth: 476 m
 Bottom: greenish mud

Station P-61

Location: 29° 36.4' S; 14° 39.0' E
 Depth: 403 m
 Bottom: greenish mud

Station P-72

Location: 28° 58.2' S; 14° 26.5' E
 Depth: 351 m
 Bottom: rock and abundant gorgonians

Station P-82

Location: 26° 27.9' S; 13° 58' E
 Depth: 395 m
 Bottom: gray mud

Station P-83

Location: 26° 23.5' S; 13° 48.9' E
 Depth: 399 m
 Bottom: gray mud

Station P-93

Location: 24° 48.5' S; 13° 47.5' E
 Depth: 293 m
 Bottom: gray mud

Station P-94

Location: 24° 36.7' S; 13° 37.9' E
 Depth: 274 m
 Bottom: mud

Station P-95

Location: 24° 28.7' S; 13° 36' E
 Depth: 344 m
 Bottom: mud

Station P-96

Location: 24° 18' S; 13° 28.21' E
 Depth: 322 m
 Bottom: bank of semifossil madreporarians

Benguela VII Cruise*Station P-2*

Location: 23° 04.3' S; 13° 38.7' E
 Depth: 152 m
 Bottom: sand and mud

Station P-3

Location: 23° 11' S; 13° 34.7' E
 Depth: 194 m
 Bottom: sand and mud

Station P-4

Location: 23° 20.5' S; 13° 31.9' E
 Depth: 212 m
 Bottom: mud

Station P-5

Location: 23° 25.2' S; 13° 24.5' E
 Depth: 256 m
 Bottom: mud

Station P-14

Location: 25° 28.7' S; 14° 07' E
 Depth: 218 m
 Bottom: black rock

Station P-19

Location: 26° 11' S; 14° 40.6' E

Depth: 165 m

Bottom: mud

Station P-20

Location: 26° 36.6' S; 14° 33.3' E

Depth: 263.5 m

Bottom: level black rock

Station P-22

Location: 26° 43.1' S; 14° 36' E

Depth: 250.6 m

Bottom: black rock

Station P-27

Location: 26° 50' S; 14° 13.3' E

Depth: 381 m

Bottom: gray mud

Station P-32

Location: 27° 18' S; 14° 41.4' E

Depth: 300 m

Bottom: gray mud

Station P-35

Location: 28° 10.8' S; 14° 48.2' E

Depth: 198 m

Bottom: mud

Station P-40

Location: 28° 38.5' S; 15° 30.5' E

Depth: 183 m

Bottom: sedimentary rock

Station P-42

Location: 28° 38.5' S; 15° 30.5' E

Depth: 183 m

Bottom: mud

Station P-48

Location: 29° 21.9' S; 14° 46.4' E

Depth: 245 m

Bottom: rock

Station P-55

Location: 28° 46.8' S; 14° 24.3' E

Depth: 390 m

Bottom: greenish mud

Station P-62

Location: 25° 18.4' S; 13° 52.5' E

Depth: 245 m

Bottom: black rock

Station P-79

Location: 23° 38.5' S; 13° 05' E

Depth: 414 m

Bottom: mud

6. RESULTS

6.1. Systematic species list

Class HEXACTINELLIDA

Subclass HEXASTEROPHORA Schulze, 1899

Family ROSELLIDAE Schulze, 1887

Genus *Rosella* Carter, 1872

Rosella antarctica Carter, 1872

Family ASCONEMATIDAE Gray, 1870

Genus *Sympagella* Schmidt 1870

Sympagella nux Schmidt, 1870

Class DEMOSPONGIAE

Order LITHISTIDA insertae sedis

Family DESMANTHIDAE Topsent, 1893

Genus *Desmanthus* Topsent 1893

Desmanthus macphersoni sp. nv.

Order ASTROPHORIDA Lévi, 1973

Family STELETTIDAE Carter, 1875

Genus *Penares* Gray, 1867

Penares sphaera (Lendenfeld, 1906)

Family PACHASTRELLIIDAE Carter, 1875

Genus *Pachastrella* Schmidt, 1868

Pachastrella monilifera Schmidt, 1868

Family GEODIIDAE Gray, 1867

Genus *Geodia* Lamarck, 1815

Geodia cf. *reniformis* Thiele, 1898

Order SPIROPHORIDA Lévi, 1973

Family TETILLIDAE Sollas, 1866

Genus *Craniella* Schmidt, 1870

Craniella cranium (Müller, 1776)

Genus *Tetilla* Schmidt, 1868

Tetilla capillosa Lévi, 1967

Order HADROMERIDA Topsent, 1898

Family SUBERITIDAE Schmidt, 1870

Genus *Suberites* Nardo, 1833

Suberites ficus (Linnaeus, 1767)

Suberites axiatus Ridley & Dendy, 1886

Suberites tylobtusa Lévi, 1958

Genus *Pseudosuberites* Topsent, 1896

Pseudosuberites antarcticus (Carter, 1876)

Pseudosuberites hyalinus (Ridley & Dendy, 1887)

Genus *Prosuberites* Topsent, 1893

Prosuberites epiphytum (Lamarck 1816)

Family POLYMASTIIDAE Gray, 1887

Genus *Sphaerotylus* Topsent, 1898

Sphaerotylus capitatus Vosmaer, 1885

- Genus *Polymastia* Bowerbank, 1864
Polymastia isidis Thiele, 1905
Polymastia infrapilosa Topsent 1977
Polymastia robusta (Bowerbank, 1861)
- Family SPIRASTRELLIDAE Ridley & Dendy, 1866
 Genus *Spirastrella* Schmidt, 1868
Spirastrella spinispirulifera (Carter, 1879)
- Family TIMEIDAE Topsent, 1928
 Genus *Timea* Gray, 1867
Timea hallezi Topsent, 1894
- Family LATRUNCULIIDAE Topsent, 1922
 Genus *Latrunculia* Bocage, 1869
Latrunculia brevis Ridley & Dendy, 1886
- Order AXINELLIDA Lévi, 1973
 Family DESMOXYDAE Hallam, 1917
 Genus *Higginsia* Higgin, 1877
Higginsia petrosiodes Dendy, 1921
- Family EURYPONIDAE Topsent, 1928
 Genus *Eurypon* Gray, 1867
Eurypon miniaceum Thiele, 1905
Eurypon rhophalophora Hentschel, 1912
Eurypon similis Thiele, 1895
- Family RASPAILIIDAE Hentschel, 1923
 Genus *Raspailia* Nardo, 1847
Raspailia echinata sp. nv.
Raspailia irregularis Hentschel, 1914
- Order POECILOSCLERIDA Topsent, 1928
 Family MYCALIDAE Lundbeck, 1905
 Genus *Mycale* Gray, 1867
Mycale anisochela Lévi, 1963
Mycale massa (Schmidt, 1870) var. *oceanica* Topsent, 1924
- Genus *Paresperella* Dendy, 1905
Paresperella atlantica Stephens, 1917
Paresperella sp.
- Family HAMACANTHIDAE Gray, 1872
 Genus *Hamacantha* Gray, 1867
Hamacantha esperioides Ridley & Dendy, 1888
- Family BIEMNIDAE Hentschel, 1923
 Genus *Biemna* Gray, 1867
Biemna megalosigma Hentschel, 1912
Biemna rhabdostyla sp. nv.
- Genus *Tylodesma* Thiele, 1903
Tylodesma vestibularis Wilson, 1904
- Family ESPERIOPSISIDAE Hentschel, 1923
 Genus *Desmacidon* Bowerbank, 1864
Desmacidon ramosus Ridley & Dendy, 1886
- Genus *Esperiopsis* Carter, 1882
Esperiopsis lesliei sp. nv.
Esperiopsis rugosus Thiele, 1905
- Genus *Isodictya* Bowerbank, 1864
Isodictya chichatouzae Uriz, 1984
- Genus *Crambe* Vosmaer, 1880
Crambe acuata (Lévi, 1960)
- Family MYXILLIDAE Topsent, 1928
 Genus *Burtonanchora* De Laubenfels, 1936
Burtonanchora sigmatifera Lévi, 1963

- Genus *Crellomyxilla* Dendy, 1924
Crellomyxilla chilensis (Thiele, 1905)
- Genus *Ectyonancora* Lévi, 1963
Ectyonancora walvisensis sp. nv.
- Genus *Myxilla* Schmidt, 1862
Myxilla simplex Baer, 1905
Myxilla rosacea (Lieberkuhn, 1859)
- Genus *Iophon* Gray, 1867
Iophon proximum (Ridley, 1881)
Iophon chelifera Ridley & Dendy, 1886
- Family HYMEDESMIIDAE Tossent, 1928
 Genus *Hymedesmia* Bowerbank, 1864
Hymedesmia mertoni Hentschel, 1912
Hymedesmia aurantiaca Lévi, 1963
- Family ANCHINOIDAE Tossent, 1928
 Genus *Pronax* Gray, 1867
Pronax benguelensis Uriz, 1984
 Genus *Anchinoe* Gray, 1867
Anchinoe bardajii sp. nv.
- Family COELOSPHARIDAE Hentschel, 1923
 Genus *Inflatella* Schmidt, 1875
Inflatella belli (Kirkpatrick, 1907)
- Family CLATHRIIDAE Hentschel, 1923
 Genus *Clathria* Schmidt, 1862
Clathria axociona Lévi, 1963
Clathria parva Lévi, 1963
Clathria tortuosa sp. nv.
 Genus *Microciona* Bowerbank, 1862
Microciona namibiensis Uriz, 1984
Microciona affinis Carter, 1880
Microciona cf. *spinarcus* Carter & Hope, 1889
- Genus *Echinoclathria* Carter, 1884
Echinoclathria isochelifera sp. nv.
- Genus *Plocamilla* Tossent, 1928
Plocamilla novizelanica (Ridley, 1881)
- Order HALICHONDRIDA Lévi, 1973
 Family HYMENIACIDONIDAE De Laubenfels, 1934
 Genus *Leucophloeus* Carter, 1883
Leucophloeus styliferus Stephens, 1915
Leucophloeus foetidus (Dendy, 1889)
- Order HAPLOSCLERIDA Tossent, 1928
 Family GELLIIDAE Ridley & Dendy, 1887
 Genus *Orina* Gray, 1867
Orina regia Brøndsted, 1924
 Genus *Gellius* Gray, 1867
Gellius flagellifer Ridley & Dendy, 1886
Gellius glacialis Ridley & Dendy, 1886
Gellius jorii Uriz, 1984
- Family HALICLONIDAE de Laubenfels, 1932
 Genus *Haliclona* Grant, 1841
Haliclona submonilifera sp. nv.
Haliclona cf. *delicata* (Sarà, 1978)
Haliclona topsenti (Thiele 1905)
- Family NIPHATIDAE van Soest, 1980
 Genus *Haliclonissa* Burton, 1932
Haliclonissa sacciformis Burton, 1932

Order PETROSIIDA van Soest, 1980
Family PETROSIIDAE van Soest, 1980
Genus *Petrosia* Vosmaer, 1885
Petrosia hispida Ridley & Dendy, 1886

Order DENDROCERATIDA Minchin, 1900
Family APLYSILLIDAE Vosmaer, 1896
Genus *Aplysilla* Schulze, 1878
Aplysilla sulphurea Schulze, 1878
Genus *Hexadella* Topsent, 1896
Hexadella kirkpatricki Burton, 1926
Family HALISARCIDAE Vosmaer, 1885
Genus *Halisarca* Johnston, 1842
Halisarca dujardini Johnston, 1885

Order DICTYOCERATIDA Minchin, 1900
Family DYSIDEIDAE Gray, 1867
Genus *Dysidea* Johnston, 1842
Dysidea fragilis (Montagu, 1918)

6.2. Descriptions

Class HEXACTINELLIDA

Subclass HEXASTEROPHORA Schulze, 1887

Family ROSELLIDAE Schulze, 1899

Genus *Rosella* Carter, 1872

Ovoid or semispherical Rosellidae with thick walls and, at the top, a circular osculum with a smooth rim opening into a deep, sac-like gastral cavity. A group of diactinal and pentactinal pleuralia projecting radially from each of the rounded, evenly distributed elevations on the surface. Short rays on the pentacts forming a sort of velum over the entire surface. A number of robust, solitary diacts projecting upwards near the rim of the osculum. Parenchyma containing oxyhexasters with very short, main rays and several types of discohexasters. Spicules in the dermal membrane almost exclusively pentacts (sensu Schulze, 1887).

Rosella antarctica Carter, 1872

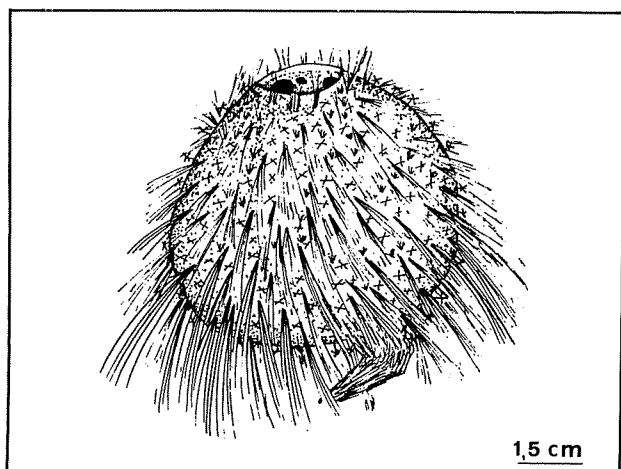


FIG. 2. *Rosella antarctica*: external appearance.

Material examined

Benguela VI, Station P-58, specimens n^{os}. 5B-105, 5B-106, and 5B-107; Benguela VII, Station P-48, numerous specimens.

Description (Figure 2; Plate 1)

Subglobose sponge up to 25 cm in diameter, entirely covered by brushes composed of diacts several centimeters long, more densely packed in the basal region, where they become entangled and enmeshed in a short stalk of attachment. Below the diacts, a sort of velum formed by the short rays on the dermal pentacts, which project out a few millimeters beyond the sponge surface.

Spicule complement (Figures 3, 4; Plates 28, 29a, 29b)

Diacts (pleuralia): robust, up to 12 cm long, longer in the lower third of the sponge, clusters of four-seven spicules piercing the surface, projecting upwards in the upper portion of the sponge, downwards in the basal portion, out to a distance of up to 10 cm.

Pentacts: slightly rough, bearing robust spines, hook-shaped towards the tip, the short rays positioned at right angles to the long ray, distributed hypodermally beneath the entire surface, forming the velum typical to the genus; short rays 3-10 μm long, long rays 4-19 μm .

Internal diacts (parenchymalia): long, curved, slender, ends slightly rough, rounded, and somewhat swollen, 1000-3500 $\mu\text{m} \times 10-20 \mu\text{m}$.

Robust diacts (parenchymalia): fusiform, ends slightly rough, 600-750 $\mu\text{m} \times 20-25 \mu\text{m}$.

Diacts completely spined, with blunt or even slightly swollen ends, with or without a central bulge, 200-320 $\mu\text{m} \times 10-15 \mu\text{m}$ (occasionally 20 μm).

Oxyhexasters: dichotomous, lightly spined rays, main rays very short, 140-160 μm in diameter.

Discohexasters: slightly rough, 120-180 μm in diameter.

Distribution

Antarctic: Carter (1872), Topsent (1901, 1910), Kirkpatrick (1907), Schulze and Kirkpatrick (1910), Burton (1929). First record in the Atlantic. Bathymetric distribution: 300-600 m.

Discussion

This species fully matches the description of *Rhabdocalyptus australis* (Topsent, 1901), which was placed in synonymy with *Rosella antarctica* Carter by Burton (1929). According to Burton (1929), the presence of a short stalk of attachment, sometimes nothing more than a protuberance, places the specimens from Namibia in the group *R. antarctica* subspecies *solida*. However, it should be noted that these specimens exhibit a robust hispidity which causes them to resemble externally *R. villosa* Burton. There are also important similarities between these Namibian specimens and *R. velata* Thompson which make these two closely related species seem even closer.

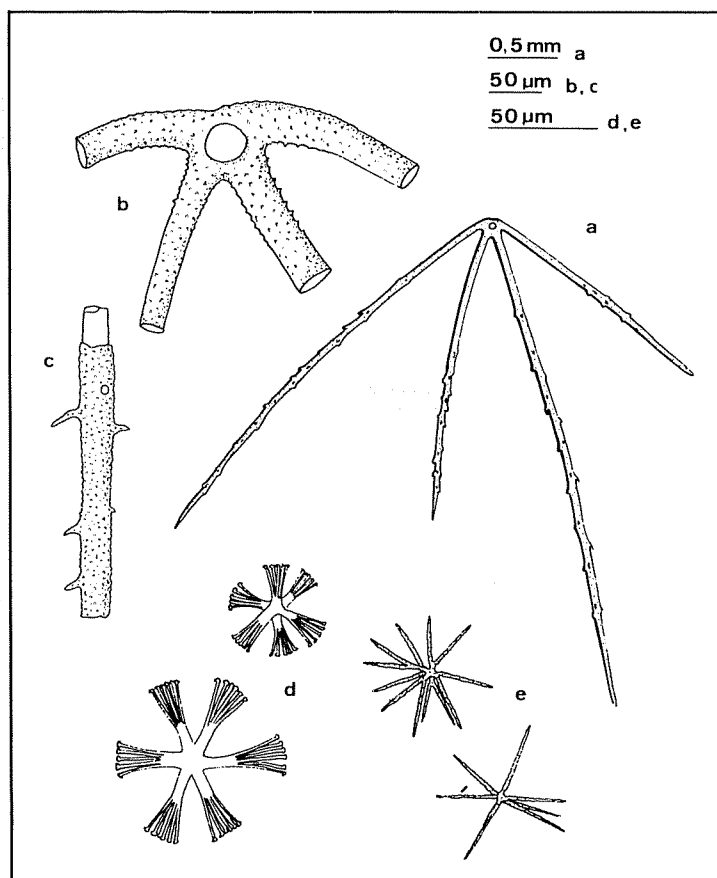


FIG. 3. *Rosella antarctica*: a) dermal pentact b) & c) details; d) discohexasters e) oxyhexasters.

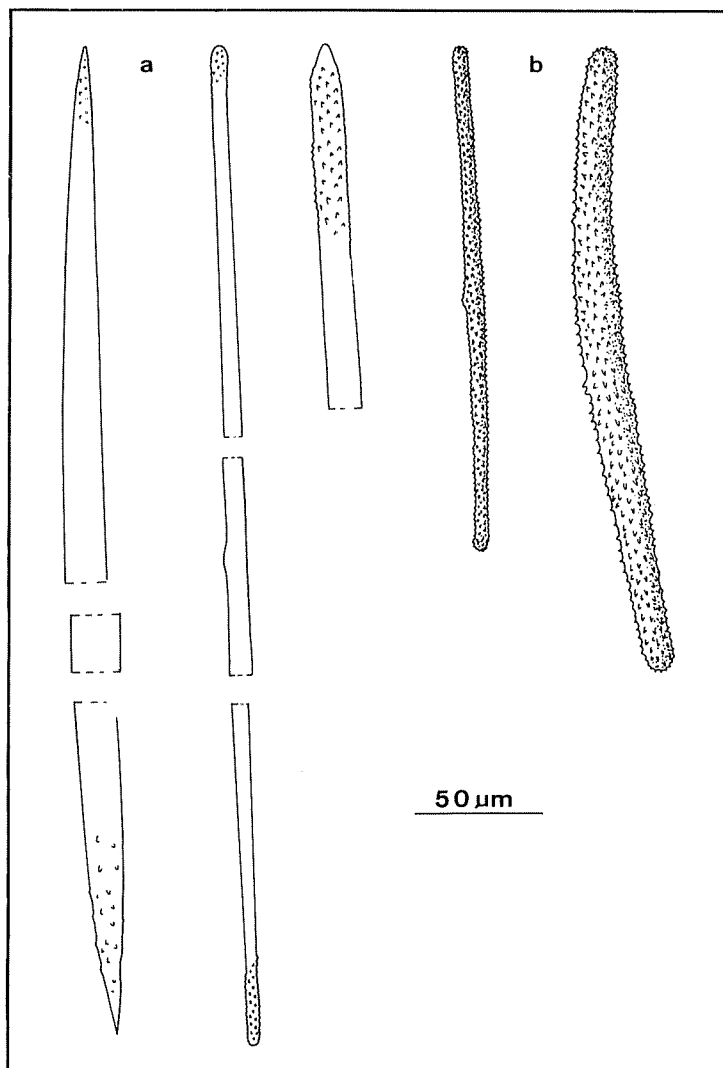


FIG. 4. *Rosella antarctica*: a) smooth diacts with spined ends; b) entirely spined diacts.

Family ASCONEMATIDAE Gray, 1870

Genus *Sympagella* Schmidt, 1870

Ovoid thick-walled, normally pedunculate Asconematidae with a fine, smooth upper margin. Small discohexasters and long diacts, between the main hexacts (sensu Ridley and Dendy, 1887).

Sympagella nux Schmidt, 1870

Material examined

Benguela VI, Station P-96, 95 specimens; Benguela VII, Station P-2, 18 specimens.

Description (Plates 2, 3)

Ramose sponge with a cylindrical, flattened, or uneven hollow stalk 5-12 mm in diameter branching repeatedly, each branch ending in a swelling or a globose, subspherical enlargement. Consistency

very stiff over most of the branch, soft and fragile at the terminal enlargement. Surface rough to the touch, stalk rough and very unevenly hispid under the binocular microscope, enlargements appearing smooth. Ectosome not easily detachable. A single osculum, 2-4 mm in diameter, located at the top of each enlargement. Incurrent openings 200 µm wide distributed evenly over the entire surface of the enlargement. Colour cream white in life and in alcohol. Colour gray in some specimens with incrustated mud.

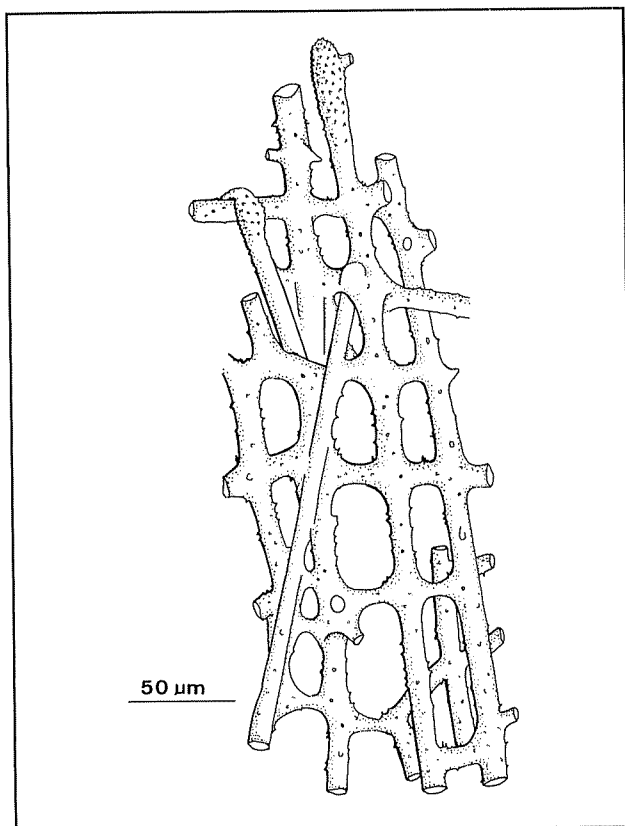


FIG. 5. *Sympagella nux*: detail of the skeleton in the stalk, consisting of fused diacts.

Spicule complement (Figures 5, 6, 7; Plates 29c, 29d, 30)

Principalia of the parenchymal skeleton:

Hexacts: smooth or bearing one or a few rudimentary spines on the ends, rays similar in size, 450-620 $\mu\text{m} \times 10-12 \mu\text{m}$.

Diacts: long, straight or curved, ends slightly rough, extremely abundant, making up the main part of the skeleton; parallel at the end of the stalk, diverging and becoming mixed with oblique and transverse diacts in the enlargements: sizes varying over a broad range.

Dermalia:

Hypodermal pentacts: smooth or bearing rudimentary spines, rays at right angles to each other, paired rays tangential to the sponge surface, unpaired ray pointing inwards, 140-170 $\mu\text{m} \times 10-12 \mu\text{m}$, decreasing in size and completely spined in the vicinity of the stalk.

Autodermal pentacts (plumules): paired rays sparsely spined and tangential to the sponge surface, unpaired ray plumose, pointing outwards, often a nub

of an atrophied sixth ray, forming a dense layer around the enlargements, then decreasing in frequency, practically vanishing in the branches; paired rays 45-55 $\mu\text{m} \times 4-5 \mu\text{m}$, unpaired ray 95-110 $\mu\text{m} \times 18-20 \mu\text{m}$.

Gastralia:

Hexacts: a thickly spined ray (plumulose but more slender than the one on the autodermal pentacts) perpendicular to the wall of the gastral cavity, rather longer (220-235 $\mu\text{m} \times 12-15 \mu\text{m}$) than the opposing ray (100-115 $\mu\text{m} \times 8-9 \mu\text{m}$), which is only slightly rough, the other four rays tangential to the gastral cavity wall.

Discohexasters: a moderate number of arms (sparsely spined in scanning electron microscope photomicrographs), each arm ending in a concave cap, 68-75 μm in diameter.

Reticulate skeleton: formed by spined or tuberculate trabeculae with broadly rectangular meshes 15-40 μm wide by up to 150 μm long.

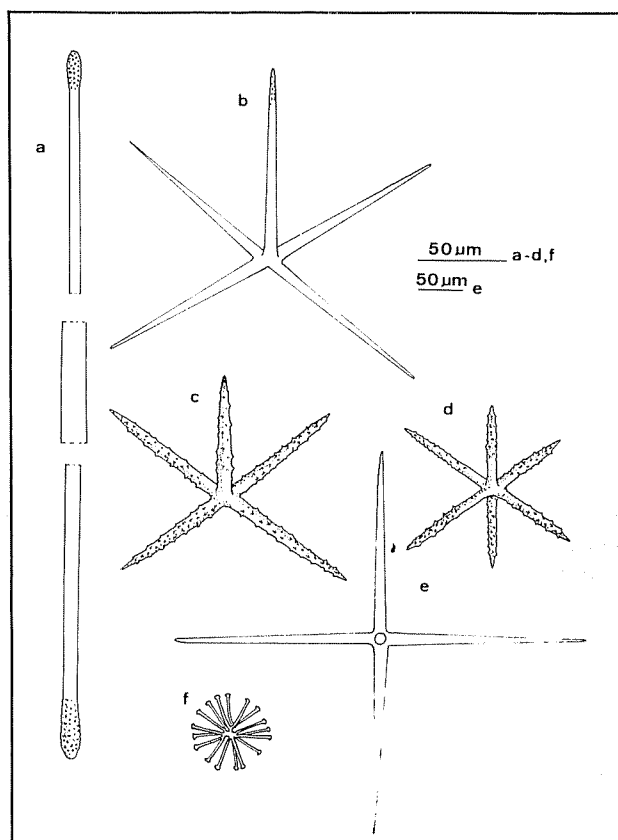
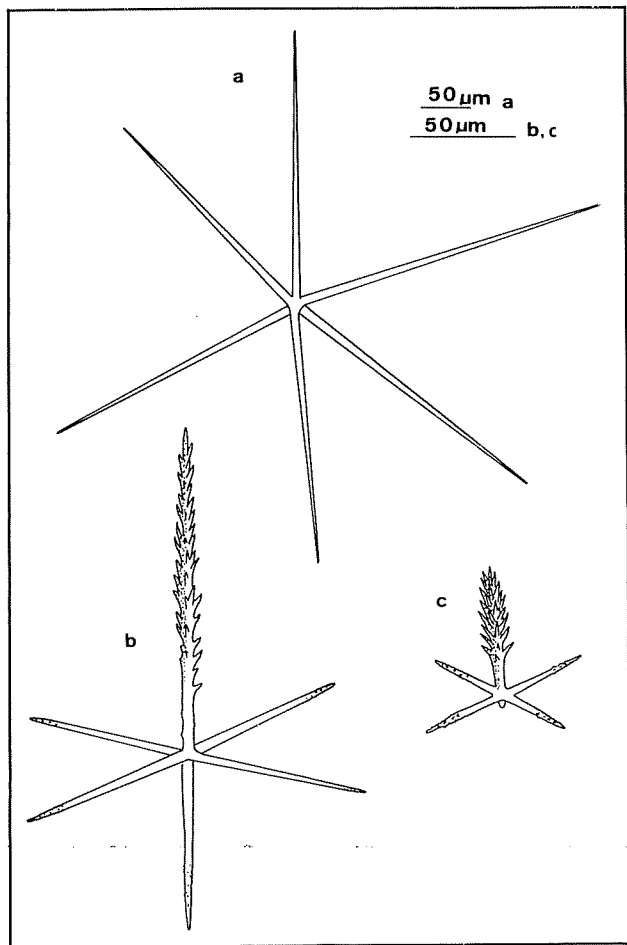


FIG. 6. *Sympagella nux*: a) parenchymal diact; b) dermal pentact (hypodermalia); c) & d) spined pentacts and hexacts; e) hexact (principalia); f) discohexaster.



Distribution

Atlantic: Cape Verde (Schulze, 1887); coasts of Spain and Portugal (Milne Edwards, 1881); Florida (Schmidt, 1870). First record in the South Atlantic. Bathymetric distribution: 152-330 m.

Discussion

The spicules in the specimens from Namibia exhibit certain differences with respect to the species description provided by Ridley and Dendy (1887) using specimens collected by Schmidt (1870), chiefly the rarity of the plumicoma, the consistent absence of the spicules termed «roller stars», and the shorter length of the spicules in the autogastralia.

FIG. 7. *Sympagella nux*: a) hexact (principalia) b) plumose hexact (gastralia); c) plumose pentact (autodermlia).

Class DEMOSPONGIAE

Order LITHISTIDA *insertae sedis*

Family DESMANTHIDAE Topsent, 1893

Genus *Desmanthus* Topsent, 1893

Lithistida (Triaenosa) with two types of highly tuberculate, tetracrepidal desmata. No microscleres. Accessory, monactinal megascleres (sensu Topsent, 1893).

N. B.: The definition of the genus given by Topsent (1893) described the presence of two types of tetracrepidal desmata, the desmata in the upper layers more slender and more tuberculate (Topsent, 1894). Subsequent authors (Vacelet *et al.*, 1976; Pulitzer-Finali, 1983) described the type species *Desmanthus incrustans* as having just one type of desma. However, at least for the present, the genus definition permits inclusion of the Namibian species, which has two clearly distinguishable types of tetracrepidal desmata.

***Desmanthus macphersoni* sp. nv.**

Material examined

Benguela VII, Station P-40, specimens n^{os}. 7B-28a, 7B-28b, 7B-28d, 7B-45a (holotype), 7B-45b, 7B-45c, and 7B-45d, all on sedimentary rock containing numerous fossil gastropod shells.

Description (Plate 4a)

Thinly or thickly incrusting sponge covering extensions of up to 25 cm² on rock and attaining thicknesses of up to 8 mm (holotype). Consistency stony due to a basal layer of desmata. Surface ex-

tremely hispid, traversed by grooves acting as surface current channels. Ectosome conspicuous, easily detachable where it lines the subectosomal aquiferous canals. Oscula 1-1.5 mm in diameter, usually located at the confluence of two subectosomal canals. Colour translucent grayish blue in life, cream in alcohol. Ectosome completely lost in some specimens, probably sponges that were already dead prior to collection.

Spicule complement (Figure 8; Plate 31)

Styles: very large, curved, some with a sharp bend near the head, apex acute, 440-2.750 μm \times 28-60 μm .

Basal desmata: tetracrepidal, with irregularly branching, not excessively tuberculate cladi and a short rhabdome; cladome 330-490 μm in diameter with cladi 160-200 μm \times 28-70 μm and a rhabdome 120-170 μm \times 35-45 μm .

Ectosomal desmata: highly tuberculate, tubercles lightly spined, 80-190 μm in diameter, rays measuring 15-90 μm \times 10-17 μm (average thickness not including tubercles), one of the rays often smoother, resembling a rhabdome.

Skeletal arrangement

Several overlapping layers of fused, tetracrepidal, basal desmata with the cladi pointing towards the substratum and the rhabdome pointing upwards. Styles with the head resting on the last layer of tetracrepidal desmata, piercing the ectosome perpendicularly, giving rise to the notable hispidity found in this sponge. Tangential, triactinal desmata densely packed in the ectosome.

Location

South Atlantic: Namibia, 28° 48' S, 15° 05' E, at a depth of 160 m on a rocky bottom (sedimentary rock containing abundant fossils).

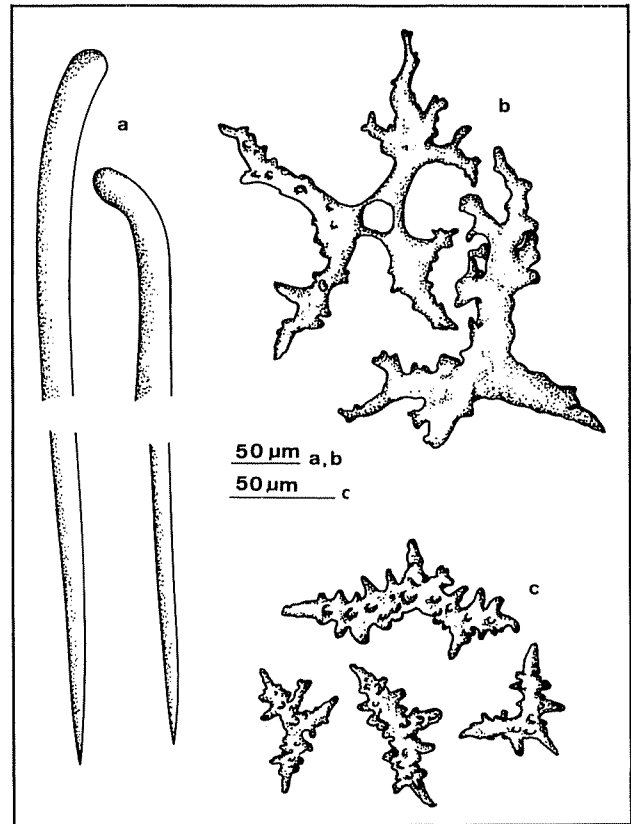


FIG. 8. *Desmanthus macphersoni* sp. nov.: a) styles; b) tetracrepidal, basal desmata; c) tetracrepidal, ectosomal desmata.

Discussion

Certain of the characters of this species resemble those of *D. incrustans*, e.g., the bluish colour and the morphology of the styles and basal desmata. The species differs in the greater thickness of the layer of basal desmata, the larger size of the styles, and the characteristic ectosomal desmata. It is dedicated to Dr. E. Macpherson, colleague and cruise leader of the Benguela cruise series, without whose enthusiastic support the study of this and other incrusting sponges dwelling on rocky bottoms would not have been possible.

Order ASTROPHORIDA Lévi, 1973

Genus *Penares* Carter, 1875

Stellettiidae with surface microxeas (sensu Lévi, 1973).

Family STELLETTIIDAE Carter, 1875

Penares sphaera (Lendenfeld, 1906)

Synonym

Papyrula sphaera Lendenfeld, 1906

Material examined

Benguela VI, Station P-57, specimen n.º 6B-78;
Benguela VII, Station P-48, specimen n.º 7B-25.

Description (Plate 5)

Specimen n.º 6B-78 thickly incrusting, n.º 7B-25 massive, growing in the branches of a *Lophoelia*. Consistency very firm, almost stony. Surface clean and uniform, rough to the touch. Ostioles distributed over the entire surface, clustered in places. An osculum 2-3 mm in diameter at the top. Aquiferous system well-developed. Cortex differentiated, 250 μm thick. Colour white in life and in alcohol.

Spicule complement (Figure 9)

Dichotriaenes: rhabdome short, deuterocladi longer than the protocladi (although in exceptional cases the converse may be true), rhabdome 300-470 μm \times 75-85 μm , deuterocladi 160-250 μm \times 30-40 μm , protocladi 80-120 μm \times 50-60 μm .

Oxeas: curved, robust, tips rather blunt, 920-1.380 μm \times 15-45 μm .

Microxeas: curved, varying in size (25-100 μm \times 3-7 μm), the smallest centrotylotes with pointed apices, the largest with thick tips, both ends curving towards the same side.

Skeletal arrangement

Dichotriaenes forming an envelope with the cladome on the surface of the sponge and the rhabdome facing inwards. Scattered oxeas in the choanosome. Microxeas densely packed in the cortex, scattered in the choanosome.

Distribution

South Atlantic: South Africa (Lendenfeld, 1906; Lévi, 1967), Namibia (Uriz, in press, a). Bathymetric distribution: 187-500 m.

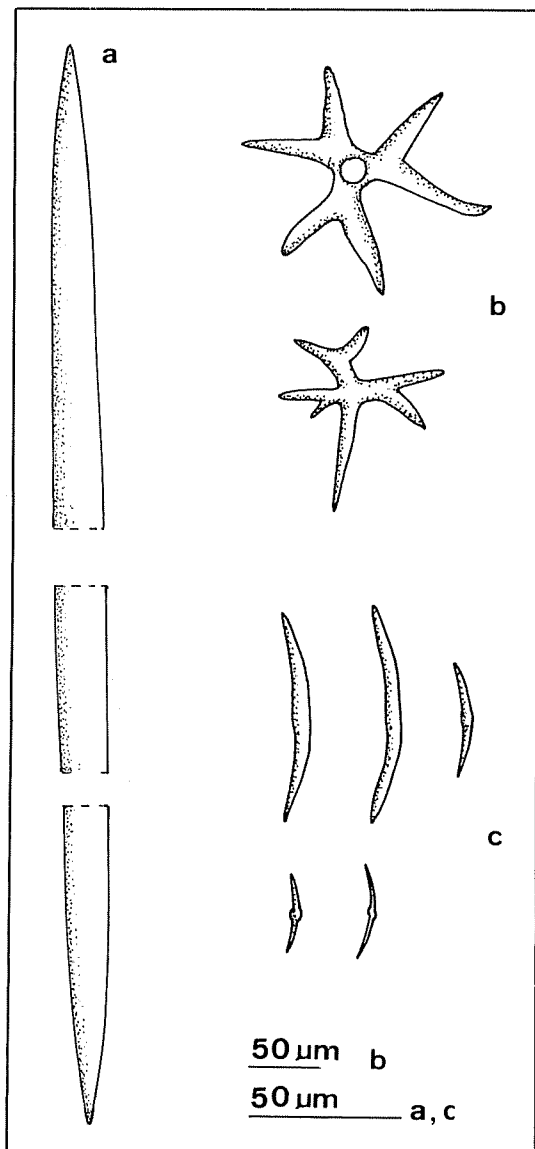


FIG. 9. *Penares sphaera*: a) oxeas; b) dichotriaenes; c) microxeas.

Family PACHASTRELLIDAE Carter, 1875

Genus *Pachastrella* Schmidt, 1868

Pachastrellidae with oxeas, plagiotriaenes with a short rhabdome and calthrops as megascleres, and spirasters and microstrongyles as microscleres (sensu Topsent, 1894).

Pachastrella monilifera Schmidt, 1868**Synonym**

Pachastrella abyssi Schmidt, 1868

Material examined

Benguela VII, Station P-48, specimen n.º 7B-110.

Description

Massive, flattened specimen 3 cm thick and 7 \times 5 cm in extension. Consistency hard and compact. Surface unevenly hispid, rough to the touch. Cortex not discernible. Oscula not discernible. Colour whitish in life and in alcohol.

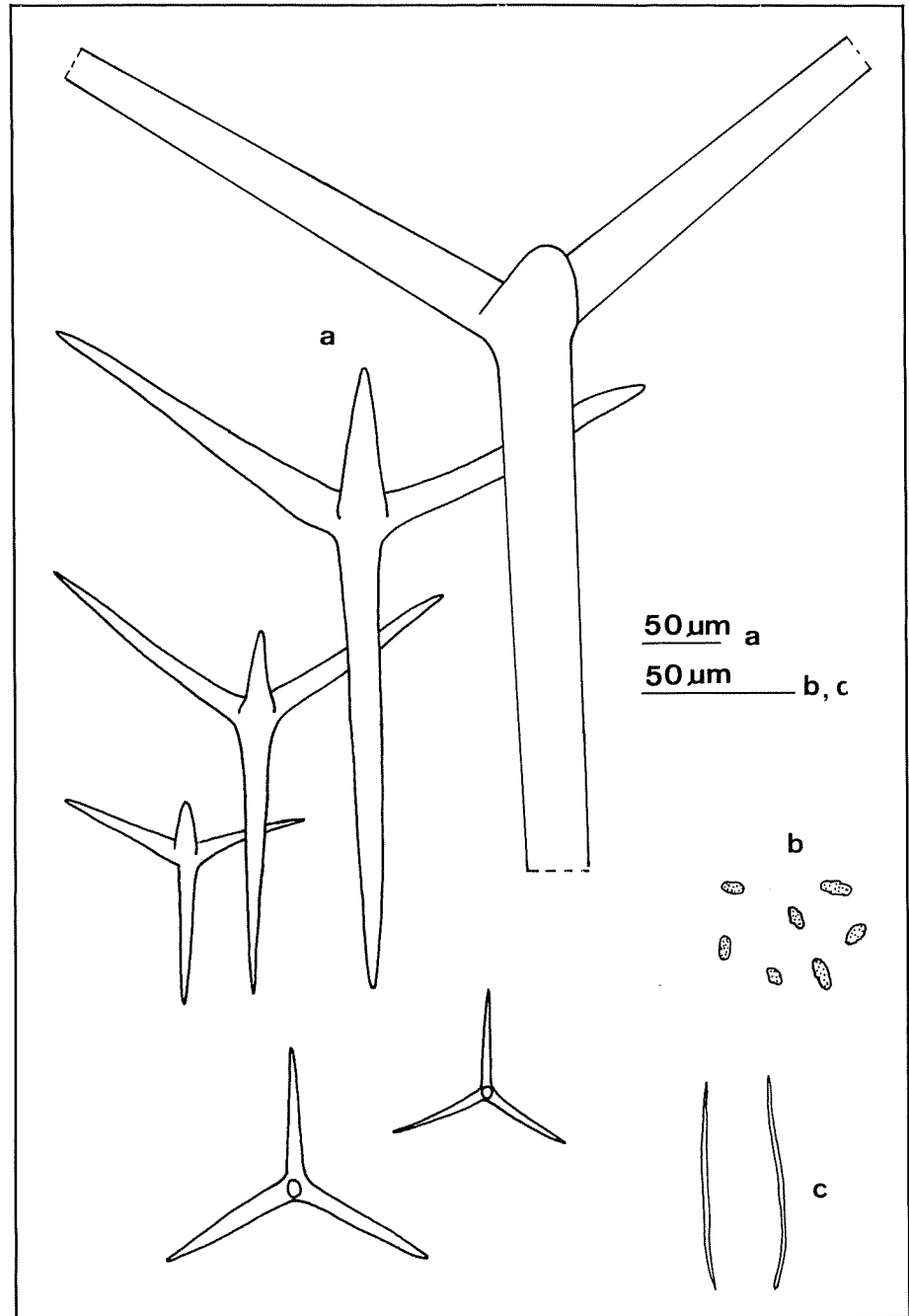


FIG. 10. *Pachastrella monilifera*: a) triaenes, the smallest resembling calthrops in appearance; b) spined microstrongyles; c) thin microstyloids.

Spicule complement (Figure 10)

Oxeas: long, relatively thin, usually curved, $3.200 \mu\text{m} \times 30 \mu\text{m}$ but often broken on slides, hence it is likely that some of the broken spicules may have been larger [up to $7.000 \mu\text{m}$ according to Koltun (1964)].

Triaenes: quite variable in size, the largest resembling plagiotriaenes, the smallest with four practically equal rays (calthrops), cladi $100\text{-}860 \mu\text{m} \times 8\text{-}70 \mu\text{m}$, rhabdome of largest up to $1.200 \mu\text{m} \times 89 \mu\text{m}$.

Spirasters: resembling amphiasters, maximum diameter $12\text{-}20 \mu\text{m}$.

Microrhabds: slightly rough, ovoid or slightly elongate, with a slight central swelling, $12\text{-}18 \mu\text{m} \times 5\text{-}6 \mu\text{m}$.

Rhabds: thin, curved or bent, slightly rough, in the form of styloids, oxeas, or strongyles, $110\text{-}120 \mu\text{m} \times 2 \mu\text{m}$, apparently corresponding to the «longer and rougher microrhabds» described by Koltun (1964). This type of spicule is not characteristic of this species, and a possible foreign origin should not be discounted.

Skeletal arrangement

Microstrongyles condensed on the periphery. Triaenes and oxeas densely packed throughout the sponge. Scattered spirasters.

Distribution

North and South Atlantic: numerous authors; Antarctic: Koltun (1964). Bathymetric distribution: 30-1.557 m.

Family GEODIIDAE Gray, 1867

Genus *Geodia* Lamarck, 1815

Geodiidae with euasters on the surface and a sieve area perforated by oscula (sensu Lévi, 1973).

Geodia cf. reniformis* Thiele, 1898*Material examined**

Benguela VII, Station P-40, specimen n.º 7B-25.

Description

Small specimen 0.5 cm in diameter and somewhat more than 1 mm thick, growing on rock, practically reduced to the cortex. Consistency hard. Surface rough to the touch. Aquiferous openings 0.5 mm in diameter, arranged in a regular pattern of clusters. Colour whitish in alcohol.

Spicule complement (Figure 11)

No megascleres, or even fragments of megascleres, in any of the slides prepared from this small specimen, which is probably part of a sieve area.

Microscleres:

Sterrasters: very abundant, ovoid, with rays ending in five-seven spines, 135-153 μm \times 100-110 μm .

Spherasters: rays more or less short, 13:18 μm in diameter.

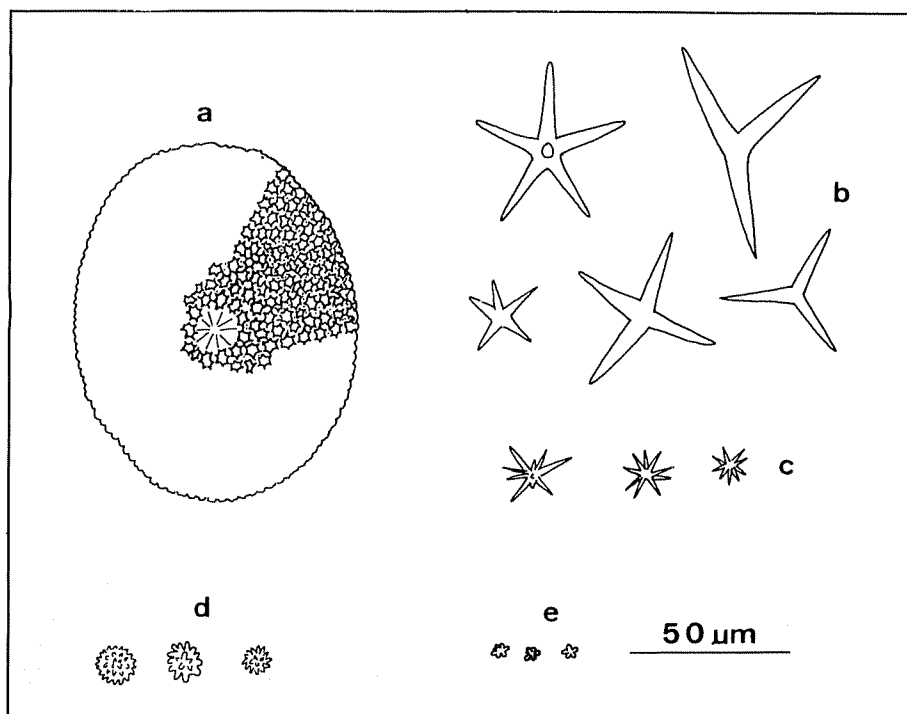
Type I oxyasters: rays variable in number, 30-70 μm in diameter.

Type II oxyasters: with a larger number of rays (up to 12), 18-26 μm in diameter.

Chiasters: rays short, rounded or with a slight swelling at one end, 5-8 μm in diameter.

Skeletal arrangement

Typical for a *Geodia* cortex through a sieve region in which both the cladomes on triaenes and megascleres in general are absent.

**Distribution**

Pacific: Thiele (1898).

FIG. 11. *Geodia cf. reniformis*: a) sterraster; b) & c) oxyasters; d) spherasters; e) chiasters.

Order SPIROPHORIDA Lévi, 1973

Family TETILLIDAE Sollas, 1886

Genus *Craniella* Schmidt, 1870

Tetillidae with a conspicuous cortex reinforced by a palisade of oxeas (sensu Lévi, 1973).

Craniella cranium (Müller, 1776)

Synonyms

Alcyonium cranium Müller, 1776
Tetilla cranium (Müller) Arndt, 1934
 (see Topsent, 1984)

Material examined

Benguela VII, Station P-48, specimens n.º 7B-80a 7B-80b and 7B-80c.

Description (Plate 4b)

Apparently free-living, subspherical sponge 4.5 cm in diameter (specimen n.º 7B-80c) and two sponge fragments 6 and 6.5 cm in diameter. Consistency firm and compact. Surface covered with minute conules in places, quite hispid in others, with spicule bundles projecting outwards up to 4 mm. Cortex conspicuous, 1.5-2 mm thick. Oscula not discernible. Choanosome charged with gemmules 0.5-1 mm in diameter. Colour light brown (specimen n.º 7B-80c) and dark brown (specimens n.º 7B-80a and 7B-80b in alcohol).

Spicule complement (Figure 12)

Cortical oxeas: straight, fusiform, ends not very acute, 600-750 µm × 20-30 µm.

Choanosomal oxeas: straight with extremely pointed, asymmetrical apices, 2.600-3.100 µm × 30-40 µm.

Protriaenes: with straight cladi forming an acute angle and a more or less curved rhabdome 2.430-2.500 µm × 15-22 µm; cladi 50-180 µm × 10-20 µm.

Anatriaenes: with short, relatively robust cladi and a distinctive peak at the top of the cladome, shaft curved and narrowing such that it straightens out, rhabdome 1.800-2.500 µm, cladi 20-90 µm × 14-18 µm.

Sigmaspines: very thin, apparently smooth, 9-12 µm in diameter.

Skeletal arrangement

Markedly radial. Thick radial tracts of oxeas, protriaenes, and anatriaenes passing through a cortical palisade layer of ectosomal oxeas with outwardly projecting cladomes. Abundant sigmaspires throughout the fleshy portion, particularly in the outermost portion of the cortex.

Distribution

Arctic; North Atlantic; Mediterranean; South Atlantic to South Africa. Bathymetric distribution: littoral zone to 1.000 m. This species enjoys a wide Atlantic-Mediterranean distribution (see Topsent, 1894).

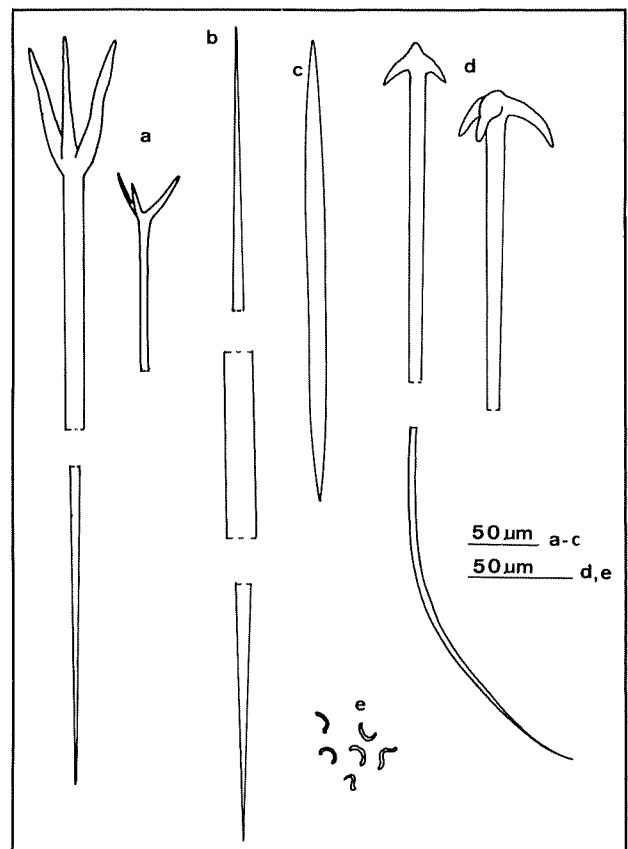


FIG. 12. *Craniella cranium*: a) protriaenes; b) choanosomal oxea; c) cortical oxea; d) anatriaenes; e) sigmaspires.

Genus *Tetilla* Schmidt, 1868

Tetillidae without a cortex and with a radial skeleton formed by main oxeas and protriaenes. Tracts interconnected by accessory oxeas (sensu Sollas, 1888).

Tetilla capillosa Lévi, 1967**Material examined**

Benguela VI, Station P-59, specimens n.ºs 6B-79a, 6B-79b, 6B-79c, and 6B-79d; Station P-61, specimen n.º 6B-70.

Description (Plate 6)

Subglobose, subspherical, or oblong specimens 3.5-6.5 cm in diameter. Consistency firm. Surface completely covered by spicule bundles arranged obliquely or tangentially to the surface and projecting outwards up to 4 mm. A single, circular osculum 4-6 mm in diameter located at one end in oblong individuals and at the top of subglobose individuals. Cortex not discernible. Colour whitish or grayish cream in life and in alcohol.

Spicule complement (Figure 13)

Protriaenes: (and *prodiaenes*): with straight cladi pointing upwards and a rhabdome initially straight, then curved and marrow; rhabdome up to $3.800 \mu\text{m} \times 15-17 \mu\text{m}$, cladi $130-250 \mu\text{m} \times 16-22 \mu\text{m}$ (total length may in fact be longer, since most appeared broken).

Anatriaenes: rhabdome straight or somewhat curved towards the end, up to $5.900 \mu\text{m} \times 16-22 \mu\text{m}$, cladi $100-150 \mu\text{m} \times 12-20 \mu\text{m}$ (thickness measured at the widest point).

Oxeas: straight, markedly asymmetrical, $1.850-3.500 \mu\text{m} \times 30-45 \mu\text{m}$.

Sigmaspines: very thin, slightly rough, maximum diameter $10-15 \mu\text{m}$.

Skeletal arrangement

Radial, spiral: radial tracts of oxeas, protriaenes, and anatriaenes piercing the ectosome, oblique or occasionally tangential, to the surface. Scattered

oxeas among the radial tracts. Abundant sigmaspines throughout the sponge. Cortex undifferentiated.

Distribution

South Atlantic: South Africa (Lévi, 1967), Namibia (Uriz, in press, a). Bathymetric distribution: 227-474 m.

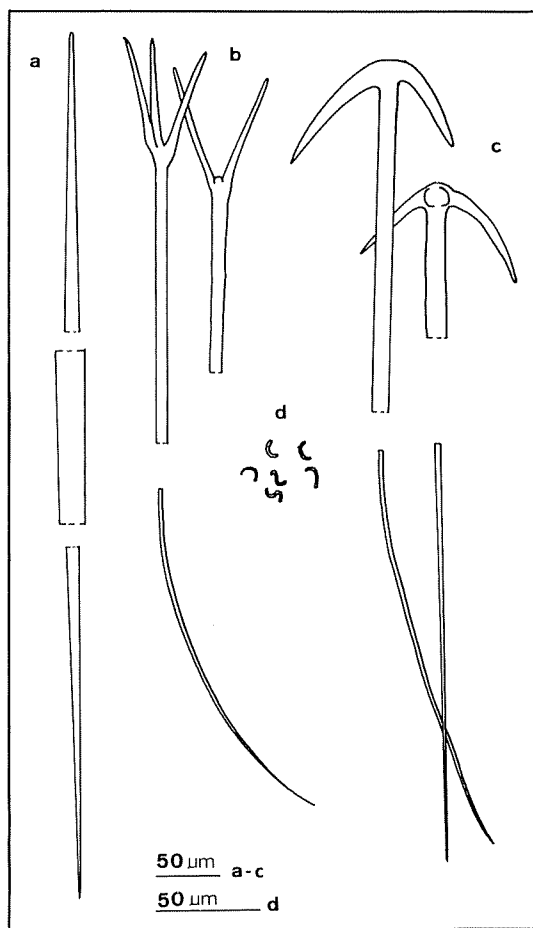


FIG. 13. *Tetilla capillosa*: a) oxea; b) protriaene and prodiaene; c) anatriaenes; d) sigmaspines.

Order HADROMERIDA Topsent, 1898

Family SUBERITIDAE Schmidt, 1870

Genus *Suberites* Nardo, 1833

Suberitidae with a confused skeleton and no proper ecotosomal skeleton, although towards the periphery the spicules decrease in size and take on an upright, palisade arrangement (sensu Topsent, 1900).

Suberites ficus (Linnaeus 1767)

Synonyms

Alcyonium ficus Linnaeus, 1767
Alcyonium bulbosum Esper, 1806
Ficulina ficus (Linnaeus, 1767)
 (see Topsent, 1900)

Distribution

North Atlantic to Senegal; Mediterranean; Pacific (numerous authors); South Atlantic: Namibia (Uriz, in press, a).

Material examined

Benguela V, Station P-5, one massive, flattened specimen carried on an *Exodromidia spinosa*, colour orange in alcohol.

Suberites axiatus Ridley & Dendy, 1886

Material examined

Benguela VI, Station P-2, specimens n.^{os} 6BE-2a, 6BE-2b, 6B-2c, and 6B-2d, together with other specimens for which no spicule measurements have been made.

Description (Plate 7a)

Erect or rampant sponge consisting of a stalk extending laterally or terminally to form elongate bulbs. Consistency of stalk firm and rigid, of bulbs softer and more flexible. Surface profusely hispid, velvety to the touch. Ectosome not discernible. Solitary oscula located at the end of small, conical protuberances on the apical portion of the bulbs, inconspicuous in contracted specimens. Colour pale yellow on the stalk, grayish on the bulbs, in alcohol.

Spicule complement (Figure 14)

Tylostyles broadly separable into two size categories:

Large tylostyles: straight, head no very well-defined, rounded or slightly trilobate, apex acute, 1.410-2.000 μm \times 18-29 μm .

Small tylostyles: somewhat fusiform, head more well-defined and tip more abrupt than in the large tylostyles, 310-890 μm \times 10-12 μm .

Skeletal arrangement

Axial concentration of tylostyles along the entire stalk and in the central region of the bulbs, oblique tracts branching outwards towards the surface, terminating in divergent spicule brushes forming a dense peripheral layer that gives rise to the external hispidity. According to Ridley and Dendy (1887), such axial concentration of tylostyles is the most characteristic feature of this species.

Distribution

South Atlantic: Plate River (Ridley and Dendy, 1887). Bathymetric distribution: 165-1.080 m.

Discussion

The Namibian specimens are morphologically similar to *Pseudosuberites mollis* as depicted in the drawing presented by Koltun (1964). However, they lack the ectosome with a tangential skeleton, instead presenting the typical appearance of the genus *Suberites*, with an outer palisade layer of tylostyles. The arrangement of the spicules in this species, axial after a fashion, and the bulbs branching out from the central stalk bring to mind the species of the genus *Rhizaxinella*.

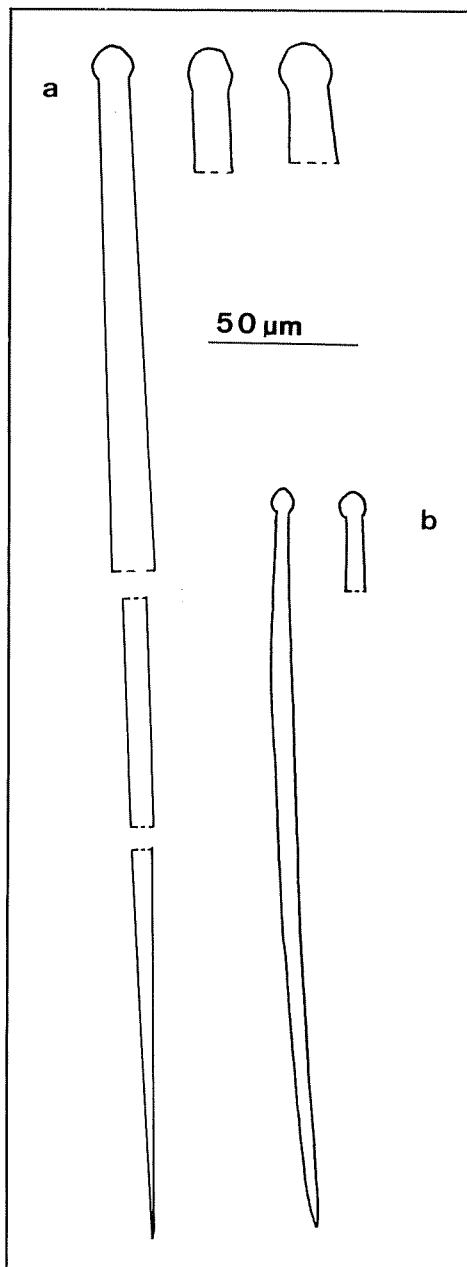


FIG. 14. *Suberites axiatus*: a) large tylostyles; b) small tylostyles.

Suberites tylobtusa Lévi, 1958

Material examined

Benguela VI, and Benguela VII; numerous specimens at almost all stations with soft bottoms (see Uriz, in press, b).

Description (Plate 8)

Massive sponge with rounded lobules and apical oscula. Surface velvety to the touch. Consistency compact or spongy, depending on the degree of contraction. Ectosome not discernible. Colour straw yellow in life, light brown in alcohol. This

species found growing on rock or gastropod shells and often free-living on the bottom.

Spicule complement (Figure 15; Plate 32a)

Type I tylostyles: straight or curved, with a sharp, gradually tapering apex, 280-620 µm × 8-15 µm.

Type II tylostyles: more robust, somewhat curved, head well-defined and rounded, tip thick, 290-420 µm × 15-23 µm.

Tylostrongyles: thick, variable in size, head poorly defined, tip rounded, often somewhat wider than the head, 105-320 $\mu\text{m} \times 18-25 \mu\text{m}$.

Microstrongyles: slightly rough centrotylotes, 10-15 $\mu\text{m} \times 1.5-2 \mu\text{m}$.

Skeletal arrangement

Characteristic of the genus *Suberites*, confused arrangement of spicules in the choanosome, forming a palisade-like structure with the spicules perpendicular to the surface at the periphery of the sponge. Scattered microstrongyles.

Distribution

Red Sea: Lévi (1958); South Atlantic: South Africa and Namibia (Uriz, in press, b); Southern Indian Ocean: South Africa (Uriz, in press, b). Bathymetric distribution: littoral zone (Red Sea), 100-500 m (South Atlantic).

Discussion

This species's affinity with other species of the genus, in particular *Suberites ficus*, have been dealt with in a recent study (Uriz, in press, b). The tylostyles also remain those of *S. puncturatus* Thiele 1905.

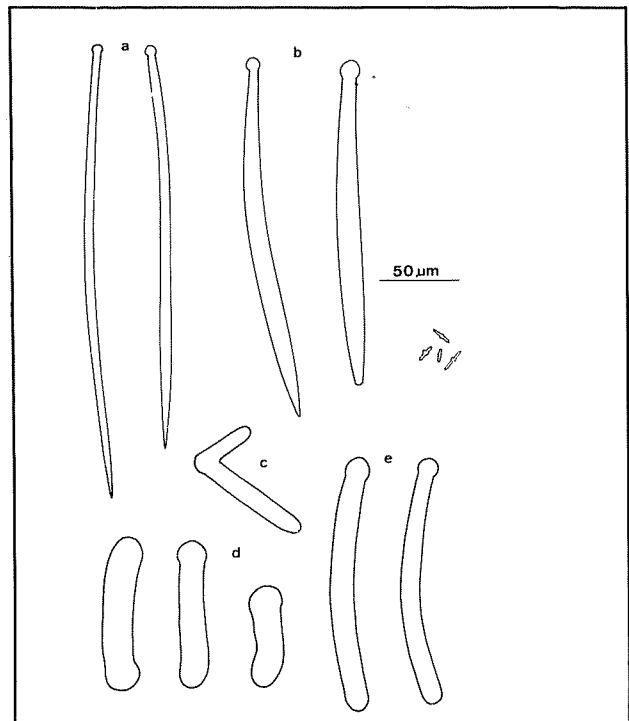


FIG. 15. *Suberites tylobtusa*: a) normal tylostyles; b) fusiform tylostyles; c) teratological form; d) & e) tylostrongyles; f) centrotylote microstrongyles.

Genus *Pseudosuberites* Topsent, 1896

Massive, smooth Suberitidae with the ectosome differentiated into a spiculiferous membrane covering large aquiferous cavities and with a halichondroid choanosome (sensu Topsent, 1900).

Pseudosuberites antarcticus (Carter, 1876)

Synonyms

Suberites antarcticus: Carter, 1876

Suberites antarcticus: Carter (Ridley and Dendy, 1887)

Material examined

Benguela VII, Station P-2, specimens n.^{os} 7 BE-1a, 7BE-1b, 7B-1c, 7BE-1d, 7BE-1e, and 7BE-1f, together with many more specimens for which no spicule measurements have been made.

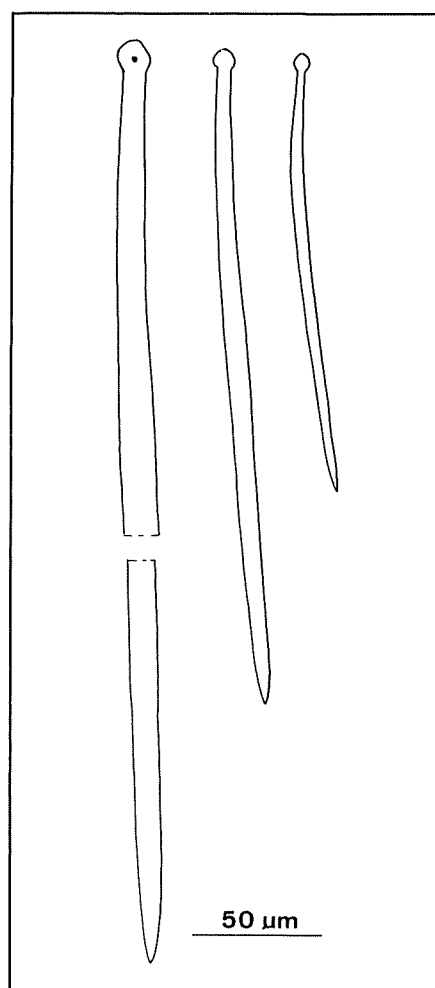
Description (Plate 7b)

Fragments 4-18 cm long of a ramose sponge with cylindrical or slightly flattened branches 3-8 mm in

diameter, tapering towards the tip, in most cases subdivided terminally into two smaller, parallel branches. Frequent lateral anastomoses. Consistency firm. Surface glabrous, rough to the touch. Ectosome conspicuous, especially where it lines the subectosomal aquiferous cavities, detachable from the choanosome, pulling choanosomal spicule bundles out with it. Oscula not discernible. Colour yellowish white in alcohol, gray in specimens containing incrustated mud.

Spicule complement (Figure 16)

Tylostyles: straight or somewhat curved (particularly the smallest ones), head well-defined, slightly heart-shaped, tip thick, 215-870 $\mu\text{m} \times 6-8 \mu\text{m}$; only one category distinguishable.



Skeletal arrangement

Ascending, reticulate bundles of tylostyles in the central region of the sponge, with oblique spicule brushes fanning out from them and supporting the ectosome without piercing it. Tangential tylostyles scattered throughout the ectosome.

Distribution

This species enjoys a broad range throughout the Antarctic (Carter, 1876; Topsent, 1902; Koltun, 1964; etc.) and subantarctic region: Kerguelen area (Ridley and Dendy, 1887; Boury-Esnault and van Beveren, 1982). First record in the South Atlantic. Bathymetric distribution: 43-450 m.

FIG. 16. *Pseudosuberites antarcticus*: tylostyles.

Pseudosuberites hyalinus Ridley & Dendy, 1887

Synonym

Hymeniacidon ? hyalina Ridley and Dendy, 1887

Material examined

Benguela VII, Station P-40, specimens n.ºs 7B-35 and 7B-39.

Description

Two thickly incrusting specimens approximately 1 cm × 1 cm each, one growing directly on rock and the other on a brachiopod. Consistency rather hard but brittle. Surface glabrous, rough to the touch. Ectosome conspicuous, easily detachable from the choanosome. A single osculum at the end of a short chimney in specimen n.º 7B-39. Colour a somewhat translucent bluish gray in alcohol.

Spicule complement (Figure 17)

Tylostyles: fusiform, slightly curved, head well-defined and rounded, tip thick, 220-2.030 μm × 10-35 μm, considerably larger than in an earlier specimen from Namibia (Uriz, in press); despite the extremely broad size range, tylostyles not separable into two size classes, the smaller ones concentrated mainly in the peripheral region of the sponge.

Skeletal arrangement

Irregularly reticulate tylostyle bundles supporting the ectosome at the periphery. Tangential tylostyles, scattered or in bundles, in the ectosome.

Distribution

This species enjoys a wide Atlantic and Antarctic distribution. North Atlantic and Mediterranean (numerous authors); South Atlantic: Patagonia (Ridley and Dendy, 1887); Namibia (Uriz, in press, a); Antarctic: circumpolar (Kirkpatrick, 1908; Hentschel, 1914; Topsent, 1917; Burton, 1929; Koltun, 1964). Bathymetric distribution: 30-900 m.

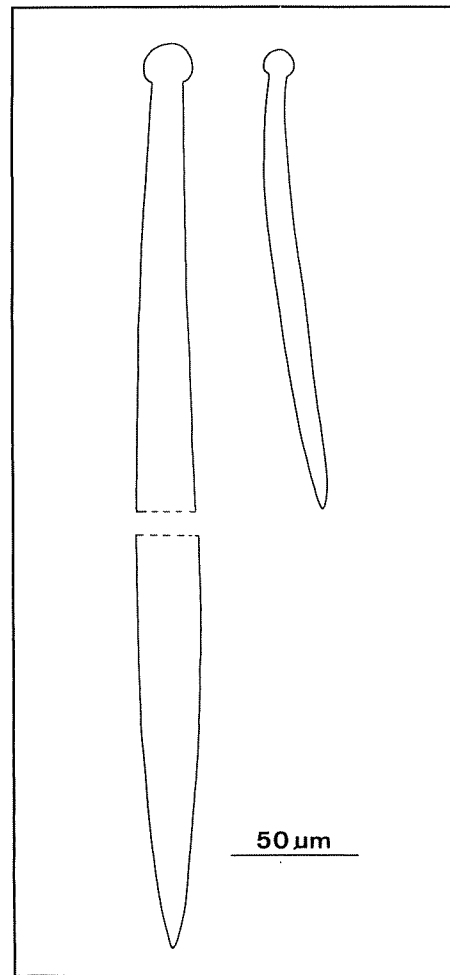


FIG. 17. *Pseudosuberites hyalinus*: tylostyles.

Genus *Prosuberites* Topsent, 1893

Incrusting Suberitidae with a single layer of upright spicules on the substratum (sensu Lévi, 1973).

Prosuberites epiphytum (Lamarck, 1816)

Synonyms

Alcyonium epiphytum Lamarck, 1816
Suberites sulphurea Gray, Topsent, 1889

Material examined

Benguela V, Station P-58, one specimen, (Uriz, in press, a).

Description

Incrusting specimen 2 cm in diameter, easily detachable from the substratum, hispid, consistency firm, colour cream, yellowish in alcohol, with neither ectosome nor oscula discernible.

Spicule complement (Figure 18)

Tylostyles: characteristic in shape, separable into two size classes $100-170 \mu\text{m} \times 2-5 \mu\text{m}$ and $350-440 \mu\text{m} \times 7-10 \mu\text{m}$.

Distribution

North Atlantic and Mediterranean: (numerous authors); Central Atlantic: Gulf of Mexico; (Topsent 1889) Indo-Pacific: eastern coast of Australia. (Ridley 1884)

FIG. 18. *Prosuberites epiphytum*: tylostyles.

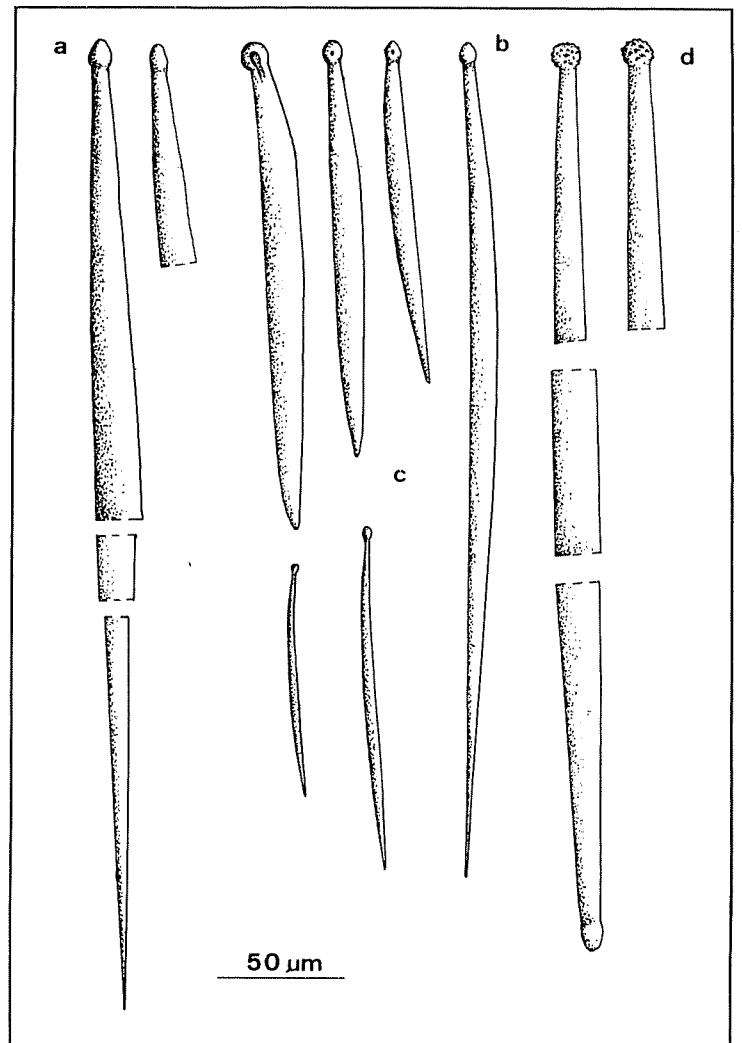
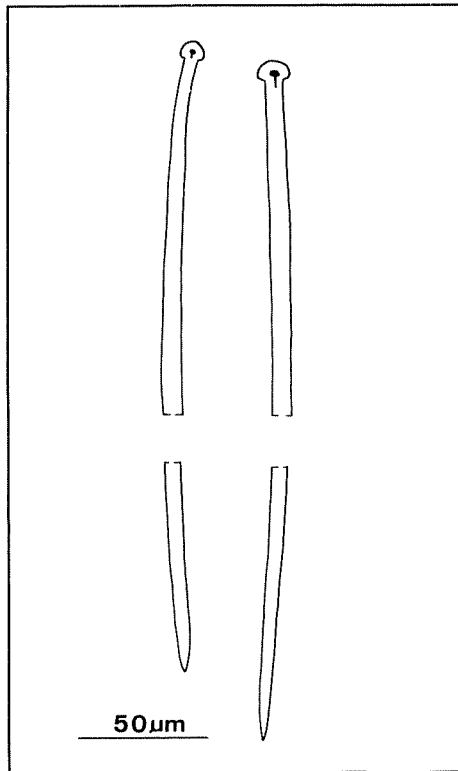


FIG. 19. *Sphaerotylus capitatus*: a) main tylostyles; b) intermediate tylostyles; c) cortical tylostyles; d) spherotylostyles.

Family POLYMASTIIDAE Gray, 1887

Genus *Sphaerostylus* Topsent, 1898

Massive Polymastiidae with tylostyles and exostyles in the form of spherotylostyles or spherostyles (sensu Kirkpatrick, 1908).

Sphaerostylus capitatus Vosmaer, 1885**Synonyms**

Radiella schoenus Sollas, 1882 (nomen nudum)
Polymastia capitata Vosmaer, 1885
Polymastia schoenus (Sollas) Ridley and Dendy 1886)
Polymastia capitatus (Vosmaer) Topsent, 1898
Sphaerostylus schoenus (Sollas) Topsent, 1913

rather blunt, 150-230 $\mu\text{m} \times 8-17 \mu\text{m}$ (some young cortical tylostyles only 4-5 μm thick, others linear).

Exostyles (spherotylostyles): straight, fusiform, apical swelling completely rounded and rough, head like that on the main tylostyles, 789-920 $\mu\text{m} \times 19-26 \mu\text{m}$.

Material examined

Benguela VI, Station P-61, specimen n.º 6B-80;
 Benguela VII, Station P-57, specimen n.º 7B-81.

Description (Plate 9)

One hemispherical and one subglobose specimen 1 cm and 2.5 cm in diameter, respectively, with long, solid inhalant papillae and void exhalant papillae. Consistency firm. Choanosome dense. Surface hispid and charged with mud, except for the papillae, which are clean and glabrous. Cortex 1-1.5 mm thick, discernible but difficult to detach from the choanosome. Aquiferous openings at the ends of the papillae. Colour whitish (papillae) and grayish brown (rest) in alcohol.

Spicule complement (Figure 19)

Main tylostyles: straight, shaft markedly fusiform, head poorly defined, elongate, slightly trilobate (subtylostyles), apex acute, 700-1.120 $\mu\text{m} \times 18-20 \mu\text{m}$.

Intermediate tylostyles: straight or slightly curved, fusiform, apex acute, 400-600 $\mu\text{m} \times 15-18 \mu\text{m}$.

Cortical tylostyles: very robust, fusiform, head rounded, neck narrow and slightly curved, tip

Skeletal arrangement

Radial, polyspicular bundles of large tylostyles reaching but not piercing the cortex and scattered tylostyles of varying size in the choanosome. In the cortex, a confused, tangential layer of crisscrossing, intermediate tylostyles supporting a palisade of small, cortical tylostyles, occasionally pierced by exostyles.

Distribution

Antarctic: Winter Quarters (Kirkpatrick, 1908); subantarctic region: Kerguelen area (Boury-Esnault and van Beveren, 1982); Arctic: 72° 14' 08" N, 22° 30' 09" E (Vosmaer, 1885); North Atlantic: Azores (Topsent, 1898), Norway (Topsent, 1913). First record in the South Atlantic. Bathymetric distribution: 18-440 m.

Discussion

In general, the spiculation in these Namibian specimens is similar to that in the Antarctic specimens (Kirkpatrick, 1908), except that the spherotylostyles are thinner and the cortical tylostyles appreciably thicker.

Genus *Polymastia* Bowerbank, 1864

Massive, sessile Polymastiidae with papillae varying in both size and number. Tylostyles and styles as megascleres. Skeleton composed of tracts radiating out to the surface. Ectosome in the form of a cortex of small, upright spicules (sensu Topsent, 1900).

Polymastia isidis Thiele, 1905**Material examined**

Benguela VII, Station P-40, specimen n.º 7B-82.

Description (Plate 11b)

Thickly incrusting, hemispherical specimen 1 cm in diameter attached by its underside to a stony substratum. Papillae long (3-11 mm × 1.5-3 mm), cylindroconical, the largest terminating in an osculum. Surface hispid, with mud entrapped in short bristles. Papillae clean, uniformly hispid.

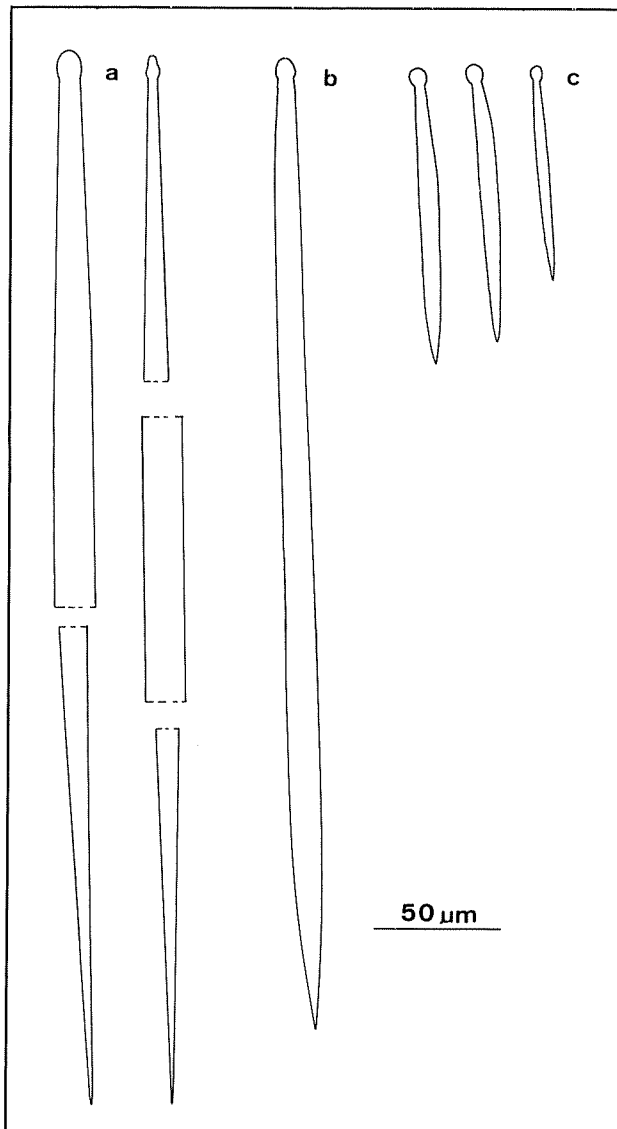


FIG. 20. *Polymastia isidis*: a) main tylostyles; b) intermediate tylostyle; c) cortical tylostyles.

Cortex 500-750 μm thick. Consistency firm, somewhat leathery. Colour grayish brown, papillae lighter, in alcohol.

Spicule complement (Figure 20)

Cortical tylostyles: slightly curved, fusiform, head well-defined and rounded, tip not very acute, 120-160 μm × 14 μm .

Main subtylostyles: straight, fusiform, head normally poorly defined, variable in shape (trilobate, elongate, rounded), apex often acute, 620-1.110 μm × 20-25 μm .

Accessory subtylostyles: straight or slightly curved, morphologically similar to the main subtylostyles, but with the head more well-defined, 420-680 μm × 12-15 μm ; difficult to distinguish from the main subtylostyles.

Skeletal arrangement

Typical of the genus: radial tracts of thick, clearly differentiated main subtylostyles fanning out towards the surface, piercing the cortex and giving rise to the external hispidity. Tangential subcortical layer of accessory tylostyles with a large subcortical space. A cortical palisade layer of small tylostyles.

Distribution

Antarctic: Burton (1932); Koltun (1964); subantarctic region: Tierra del Fuego (Thiele, 1905), Falkland Islands (Burton, 1932), Kerguelen area (Boury-Esnault and van Beveren, 1982). Bathymetric distribution: 19-790 m.

Discussion

This species presents great spicule variability. The specimen from Namibia has no polytylote subtylostyles like those in the specimens from the Kerguelen area (Boury-Esnault and van Beveren, 1982) or in some specimens from the Falkland Islands (Burton, 1932), but, as Koltun (1964) pointed out, this would not seem to be a constant character. The cortical tylostyles in the specimen from Namibia are much more robust than the ones in the holotype (Thiele, 1905), resembling those in the Antarctic specimens (Koltun, 1964).

Polymastia infrapilosa Topsent, 1927**Material examined**

Benguela VII, Station P-40, specimen n.º 52; Station P-96, specimen n.º 7B-12.

Description

Small, thickly incrusting specimens 8 and 5 mm in diameter growing on a rock and on a madreporarian. A single, fleshy, conical, central papilla. Surface smooth on the papilla and upper portion, quite hispid on the outer basal portion. Consistency firm. Choanosome fleshy. Cortex 200-450 µm thick. Colour whitish in life and in alcohol.

Spicule complement (Figure 21)

Main tylostyles: straight, fusiform, head poorly defined and ovoid, apex acute, 950-1.470 µm × 15-22 µm (1.700-1.900 µm × 23 µm in the North Atlantic specimens), intermediate tylostyles hard to distinguish from the main tylostyles, 340-540 µm × 13-17 µm.

Cortical tylostyles: head well-defined and rounded, neck slightly curved, shaft markedly fusiform, often presenting a secondary swelling, 130-215 µm × 7-4 µm (150-240 µm × 7-8 µm in the specimens from the North Atlantic).

Skeletal arrangement

Similar to the other species of this genus already described. Main tylostyles of the radial tracts piercing the ectosome only at the bottom of the sponge, giving rise to the basal hispidity.

Distribution

North Atlantic: southeast of Halifax (Topsent, 1928). First record in the South Atlantic. Bathymetric distribution: 75-322 m.

Discussion

The external morphology of this species is highly characteristic. The large spicule sizes are also differentiating characters, with the ectosomal tylostyles more robust in the specimen from Namibia.

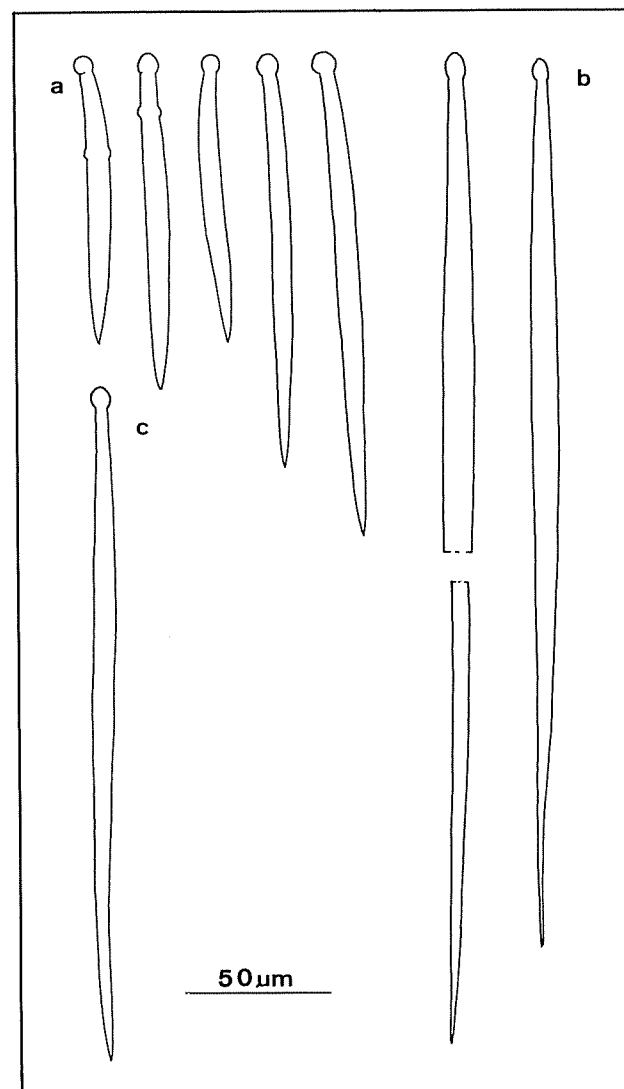


FIG. 21. *Polymastia infrapilosa*: a) cortical tylostyles; b) main tylostyles; c) intermediate tylostyles.

Polymastia robusta (Bowerbank, 1861)**Synonyms**

Euplectella robusta Bowerbank, 1861
Alcyoncellum robusta Bowerbank, 1862
Polymastia ornata Bowerbank, 1866
Polymastia bulbosa Bowerbank, 1866

Material examined

Benguela VI, Station P-44, specimens n.ºs 6B-83a and 6B-83b; Benguela VII, Station P-19, specimen n.º 7B-108.

Description (Plates 10, 11a)

Thickly incrusting specimens in the form of bulbous strips on the gastropod *Fusitriton magellanicum*, measuring $7 \times 4 \times 2$ cm, $2.5 \times 2.5 \times 0.5$ cm, and $4 \times 2.5 \times 0.5$ cm, respectively. Consistency firm, somewhat leathery. Surface clean, uniform, non-hispid, covered with numerous, thick, glabrous, cylindroconical papillae of different sizes (from 2×1 mm to 15×7 mm), the largest terminating in an osculum. Choanosome dense. Cortex conspicuous, 500-700 μ m thick. Colour on both papillae and the rest of the surface straw yellow (more vivid in the choanosome) in life, yellowish cream in alcohol.

Spicule complement (Figure 22)

Main tylostyles: straight, fusiform, head poorly defined or indistinguishable, apex acute, 450-1.300 μ m \times 12-30 μ m.

Cortical tylostyles: slightly curved, head well-defined, ovoid or rounded, shaft fusiform, tip thick, 180-220 μ m \times 10-12 μ m.

Skeletal arrangement

Radial tracts of main tylostyles reaching but not piercing the periphery. Ectosomal layer with small tylostyles arranged in a palisade. Subectosomal layer with large and intermediate tangential tylostyles. Small tylostyles scattered or clustered in the choanosome.

Distribution

Arctic, Mediterranean, North Atlantic (numerous authors). First record in the South Atlantic. Bathymetric distribution: 18-476 m.

Discussion

These specimens would appear to belong to the species *Polymastia robusta*, in spite of their thicker spicules, and they resemble this species more close-

ly than any other *Polymastia* species from the Southern Hemisphere. Their fleshy appearance, smooth surface, and thick papillae are characteristic of the species. The pale yellow colour of these specimens was described by Topsent (1900) as occasionally occurring in this species.

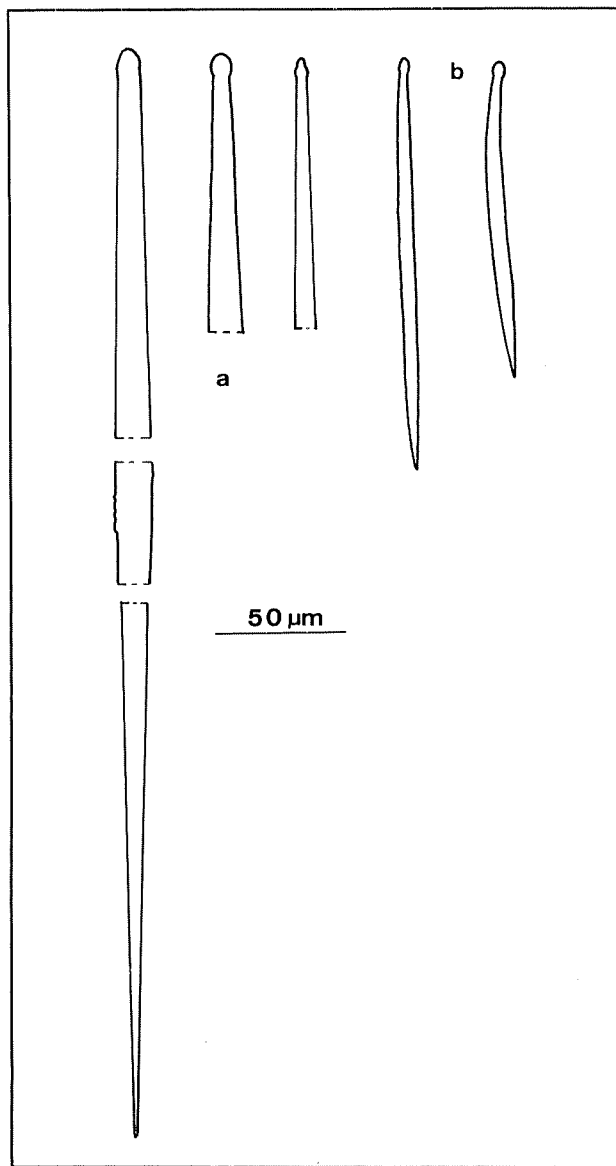


FIG. 22. *Polymastia robusta*: a) main subtylostyles; b) cortical tylostyles.

Family SPIRASTRELLIDAE Ridley & Dendy, 1886

Genus *Spirastrella* Schmidt, 1868

Massive or thickly incrusting Spirastrellidae. Magascleres chiefly monactinal (tylostyles). Spined, spirulate, microscleres, mainly in an ectosomal layer (sensu Ridley and Dendy, 1887, partially modified).

Spirastrella spinispirulifera (Carter, 1879)**Synonyms**

Suberites spinispirulifer Carter, 1879
Spirastrella dilatata Kieschnick, 1896
Anthosigmella spinispirulifera Topsent, 1918
Spirastrella dilatata Thiele, 1900
Cerbaris spinispirulifera de Laubenfels, 1936
Spirastrella spinispirulifer Burton, 1957

Material examined

Benguela VII, Station P-48, specimens n.^{os} 7B-23a and 7B-23b; Benguela Station P-72, specimens n.^{os} 6B-101a, 6B-101b, 6B-101c, and 6B-101d.

Description

Incrusting specimens covering extensions of up to 20 cm² on various fragments of sedimentary rock. Surface rough to the touch (granulose under the binocular microscope) with lax hispidity unevenly distributed over the surface. Ectosome detachable, with microscleres densely packed. Aquiferous openings not discernible. Colour whitish in alcohol.

Spicule complement (Figure 23; Plate 32b)

Tylostyles: long, relatively thin, somewhat curved, head irregularly swollen, 1.100-1.790 µm × 12-19 µm.

Spinispires: characteristic, mainly C-shaped, curvature closed, ends twisted into a different plane from the rest of the spicule, entirely spined on the convex surface, smooth on the concave surface, electron microscope photomicrographs showing a very tenuous, secondary spination, 15-17 µm in diameter, 4-6 µm wide.

Skeletal arrangement

Scattered tylostyles with the heads on the substratum and the tips piercing the sponge surface. A dense ectosomal layer of spinispires, others scattered in the choanosome.

Distribution

Indo-Pacific: South Africa (Carter, 1879), Australia (Dendy, 1897), Ternate (Thiele, 1900),

Zanzibar (Burton, 1959), New Zealand (Bergquist, 1968); South Atlantic: Vema Seamount (Lévi, 1969). Bathymetric distribution: 11-351 µm.

Discussion

The tylostyles in the Namibian specimens are much larger than those in the holotype (Carter, 1879) yet smaller than those in the specimens from New Zealand (Bergquist, 1968).

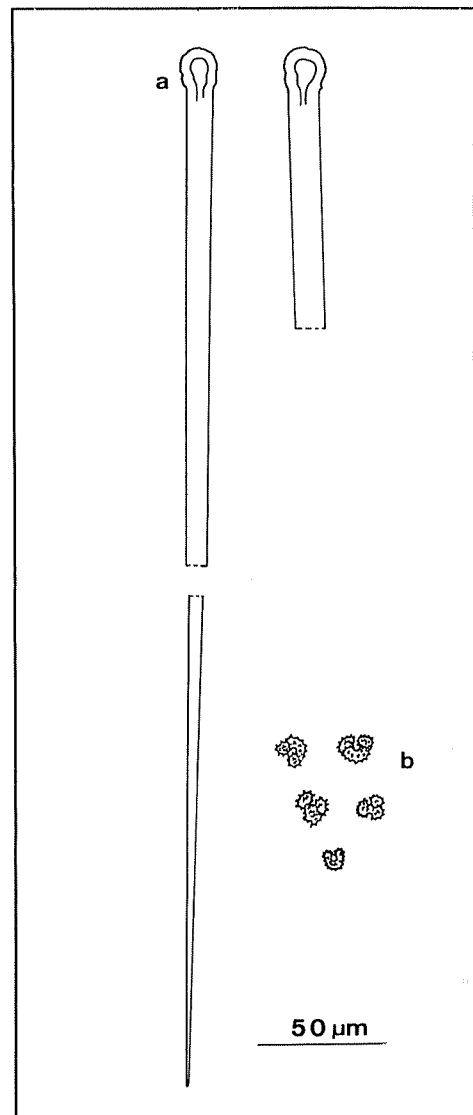


FIG. 23. *Spirastrella spinispirulifera*: a) tylostyles; b) spirasters.

Family TIMEIDAE Topsent, 1928

Genus *Timea* Gray, 1867

Thinly incrusting Timeidae with megascleres consisting of tylostyles perpendicular to the substratum and euasters as microscleres, mainly in an ectosomal layer (sensu Topsent, 1900, as *Hymedesmia*).

Timea hallezi (Topsent, 1894)**Material examined**

Benguela VII, Station P-40, specimen n.º 7B-53.

Description

Incrustation measuring 1.5×2 cm in area. Consistency soft. Surface uneven and granulose under the binocular microscope, occasionally pierced by the tips of the tylostyles. Ectosome thick, with numerous asters, detachable from the choanosome, pulling out choanosomal spicules with it. Aquiferous openings not discernible. Colour greenish brown in alcohol.

Spicule complement (Figure 24)

Tylostyles: straight, thin, head rounded, ovoid, or a subterminal swelling, $240\text{--}650 \mu\text{m} \times 4\text{--}7 \mu\text{m}$.

Spherasters: variable in shape, rays conical, rounded, or slightly tylote, $5\text{--}12 \mu\text{m}$ in diameter.

Skeletal arrangement

Tylostyles arranged perpendicularly or obliquely to the substratum in the choanosome. Dense ectosomal layer of spherasters.

Distribution

North Atlantic: off the coasts of France and Belgium (Topsent, 1900); South Atlantic: Vema Seamount (Lévi, 1969); Mediterranean: Iberian Peninsula (personal observations).

Discussion

This Namibian specimen conforms quite well to the species description given by Topsent (1894), al-

though the tylostyles are somewhat less robust. In any event, this species is very close to *Timea aurantiaca* Bergquist, 1968, in which the spherasters are slightly longer, often with tylote rays (spherotyloasters).

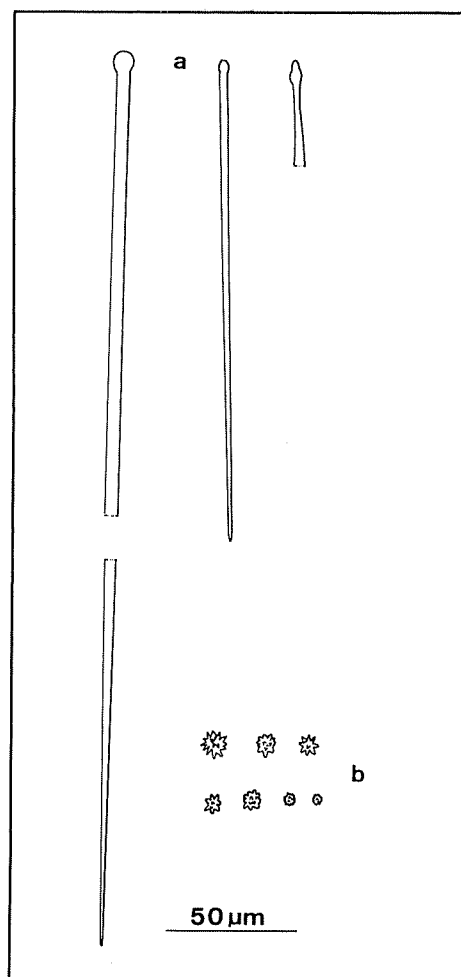


FIG. 24. *Timea hallezi*: a) tylostyles; b) spherasters.

Family LATRUNCULIIDAE Topsent, 1922

Genus *Latrunculia* Bocage, 1869

Massive, sessile Latrunculiidae, usually with a cortex. Upper surface normally covered with mammiform processes. Megascleres consisting of smooth styles (or oxeas?). Discohexasters (discorhabds) as microscleres, characteristic of this genus, forming a dense dermal covering (sensu Ridley and Dendy, 1887).

Latrunculia brevis Ridley & Dendy, 1886**Synonyms**

Latrunculia bocagei Ridley and Dendy, 1886
Latrunculia bocagei Ridley and Dendy, 1887
Latrunculia lendensfeldi Hentschel, 1914
Latrunculia spinispiraefera Brøndsted, 1924
Latrunculia spinispiraefera Bergquist, 1961

Material examined

Benguela VII, Station P-40, specimens n.^{os} 7B-43a, 7B-43b, and 7B-43c, on rock.

Description (Plate 12a)

Massive, subglobose, sessile specimens measuring $1.8 \times 1.2 \times 0.9$ cm, $1 \times 1.1 \times 0.5$ cm, and $1.7 \times 1.7 \times 0.7$ cm, respectively, attached by the underside to rock. Numerous, conical papillae of up to 3 mm in height, each ending in an osculum; other, less numerous, cylindrical, smaller and broader (up to 4 mm in diameter at the base) papillae acting as incurrent processes. Surface clean and glabrous, somewhat rough to the touch. Ectosome relatively thick, acting as a cortex, detachable from the choanosome. Colour of choanosome dark reddish brown, of ectosome more grayish, in life and in alcohol.

Spicule complement (Figure 25; Plates 32c, 32d)

Styles: highly fusiform, irregularly curved, head rather narrow (resembling stronglyloxeas in appearance), in no case polytylote, $380\text{--}430 \mu\text{m} \times 9\text{--}11 \mu\text{m}$.

Discorhabds: shaft thick, with two spined verticils facing towards the tip, another medially, and a double crown at the base, frequently presenting a short acicula in the centre of either the basal and/or the proximal verticil, $48\text{--}58 \mu\text{m} \times 10\text{--}12 \mu\text{m}$ (shaft thickness), the spines on the verticils appearing slightly rough in scanning electron microscope photomicrographs.

Skeletal arrangement

Dense layer of discorhabds arranged perpendicularly to the surface in the outer portion of the ectosome. A layer of tangential style bundles in the inner portion of the ectosome. Irregularly reticulate style tracts and scattered discorhabds in the choanosome.

Distribution

Antarctic: Burdwood Bank (Topsent, 1915); subantarctic region: Kerguelen area (Boury-Esnault

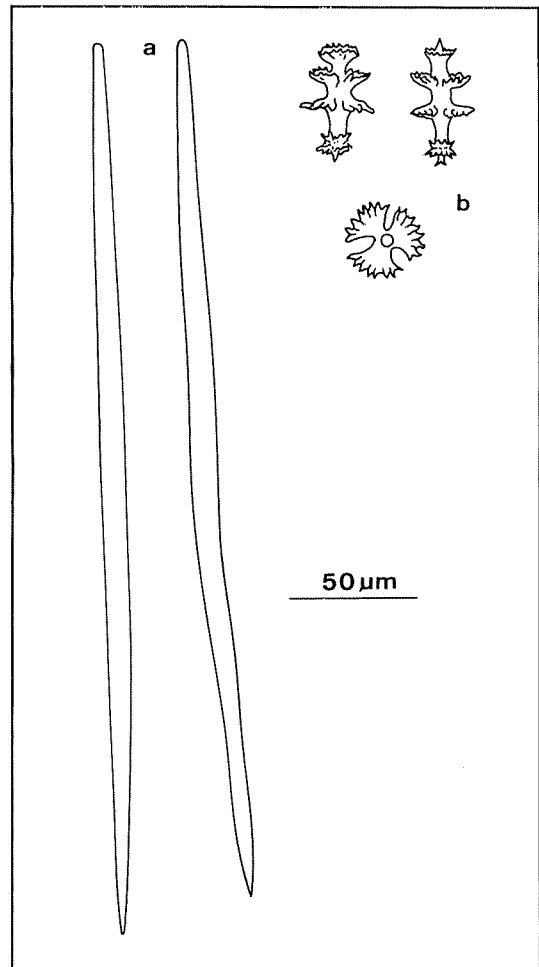


FIG. 25. *Latrunculina brevis*: a) fusiform styles; b) discorhabds.

and van Beveren, 1982); Indo-Pacific: New Zealand (Bergquist, 1968) South Atlantic: Plate River estuary (Ridley and Dendy, 1887). First record in the Southeast Atlantic. Bathymetric distribution: 104-1.100 m.

Discussion

The considerable morphological variability of the discorhabds between any two specimens of a given *Latrunculia* species, and even within the

same individual, has led to the description of a large number of species, some of which are clearly synonymous, as is the case of *L. brevis* (Bergquist, 1968). This becomes very clear once a certain number of specimens has been examined. The presence of a short acicula on some of the discorhabds from the Namibian specimens of *L. brevis*, also described by Topsent (1915) in specimens from the Antarctic, together with the apparent variability of the long acicula on the discorhabds in *L. apicalis* as described by Koltun (1964), suggests that these two species may in fact be conspecific.

Order AXINELLIDA Lévi, 1973

Family DESMOXYIDAE Hallman, 1917

Genus *Higginsia* Higgins, 1877

Desmoxyidae in various habits. Smooth oxeas (sometimes styles) and acanthoxeas as megascleres. No microscleres (sensu Dendy, 1921).

Higginsia petrosioides (Dendy, 1921)

Material examined

Benguela VII, Station P-40, specimen n.º 7B-30, on sedimentary rock.

Description

Specimen apparently reduced to a concave, translucent membrane lining a depression approximately 3 cm in diameter in rock, with an oscular chimney measuring 0.8×0.3 cm, in the centre. Choanosome retracted at the bottom of the depression. Surface smooth or somewhat rough, but non-hispid. Ectosome readily detachable from the choanosome. Colour translucent white in alcohol.

Spicule complement (Figure 26)

Type I oxeas: robust, slightly bent towards the middle, tip not very acute, $380-800 \mu\text{m} \times 11-20 \mu\text{m}$.

Type II oxeas: slender, $240-420 \mu\text{m} \times 7-8 \mu\text{m}$, not abundant, morphologically similar to and difficult to distinguish from the type I oxeas.

Acanthoxeas: slightly curved, bearing rudimentary spines along the full length of the spicule. $70-150 \mu\text{m} \times 4-6 \mu\text{m}$ (occasionally larger, spined only on the ends).

Skeletal arrangement

A confused arrangement of bundles of oxeas with scattered acanthoxeas in the choanosome. A dense layer of oxeas of all sizes and tangential acanthoxeas in the ectosome.

Distribution

Indian Ocean: Seychelles (Dendy, 1921), off the southern coast of Arabia (Burton, 1959), Madagascar (Vacelet and Vasseur, 1965, 1971; Vacelet *et al.*, 1976). First record in the Atlantic. Bathymetric distribution: littoral zone to 183 m.

Discussion

The conules reported by various authors for this species (Dendy, 1921; Vacelet and Vasseur, 1965) were not discernible in this Namibian specimen. However, the habit resembles that of the holotype, cushion-like with a convex upper portion and an apical zone in the centre bearing the osculum (Dendy, 1921). Burton (1959) also described papilliform processes.

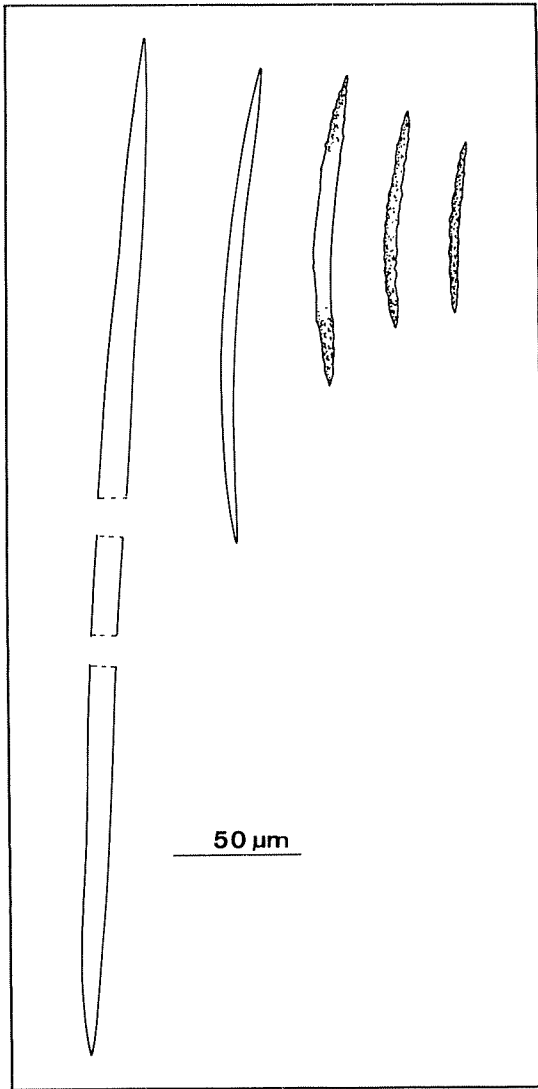


FIG. 26. *Higginsia petrosioides*: a) type I oxeas; b) type II oxeas; c) acanthoxeas.

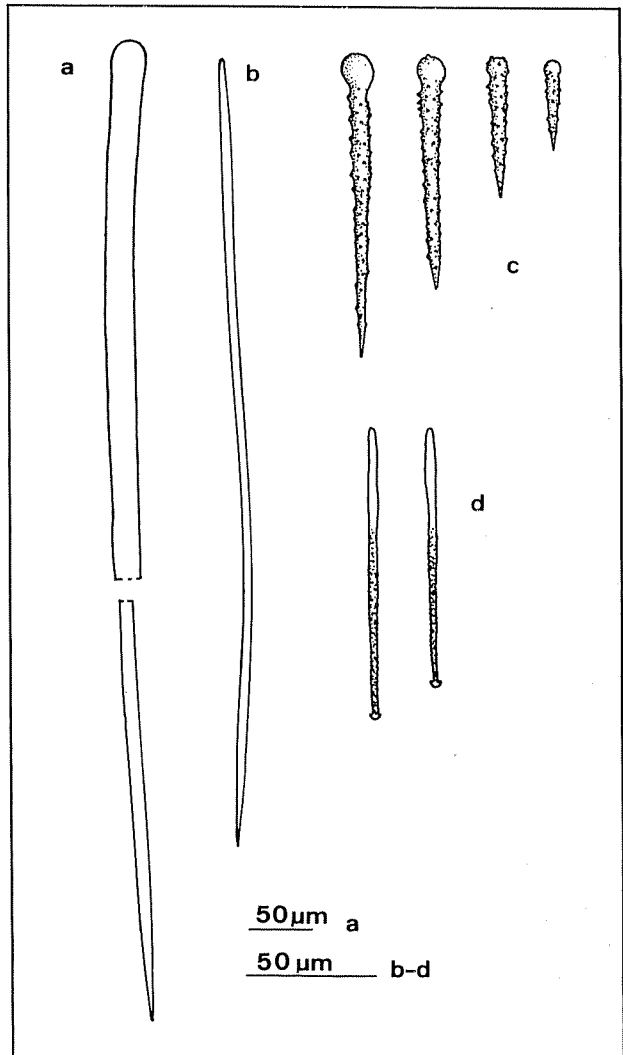


FIG. 27. *Eurypon miniaceum*: a) subtylostyle; b) ectosomal style; c) basal acanthotylostyles; d) ectosomal cladoacanthostyles.

Family EURYPONIDAE Topsent, 1928

Genus *Eurypon* Gray, 1867

Incrusting Euryponidae with styles or tylostyles as main megascleres and acanthostyles as secondary megascleres, both in a hymedesmoid arrangement. Thin oxeas, styles, or ectosomal styloxeas in bundles around the main megascleres (sensu Lévi, 1973).

Eurypon miniaceum Thiele, 1905**Material examined**

Benguela VII, Station P-40, specimen n.º 7B-38, on rock.

Description (Plate 12b)

Incrusting specimen 2 cm × 1 cm surrounding the calcareous tube of a polychaete. Consistency soft. Surface hispidity lax and profuse (spicules protruding up to 3 mm). Ectosome and oscula not discernible. Colour whitish in alcohol.

Spicule complement (Figure 27; Plate 33)

Main styles: slightly curved, extremely large, head occasionally somewhat swollen (subtylostyles), 2.400-3.160 µm × 26-40 µm.

Secondary acanthostyles: conical, head well-defined, subspherical, and completely smooth, shaft covered with small spines, 80-250 µm × 8-12 µm.

Ectosomal styles: curved, thin, not numerous, 400-460 µm × 4-6 µm.

Ectosomal acanthostyles: straight, slightly fusiform, basal third smooth, remaining two-thirds spined, tip anchorate, 125-140 µm × 3-4 µm (maximum thickness).

Skeletal arrangement

A layer of upright, secondary acanthostyles with the heads on the substratum, sometimes broken by a main style surrounded by a brush composed of ectosomal styles. A peripheral layer of brushes consisting of divergent, ectosomal acanthostyles protruding very slightly beyond the ectosome. Styles or main subtylostyles, together with the ectosomal styles, giving rise to the profuse external hispidity.

Distribution

Pacific: Chile (Thiele, 1905); Antarctic (?): Koltun (1976). First record in the Atlantic. Bathymetric distribution: 35-160 m.

Discussion

Burton (1932) and Koltun (1964, 1976) placed *E. miniaceum* Thiele and *Raspailia irregularis* Hentschel in synonymy. However, the presence in the former of the odd ectosomal acanthostyles and, what is more, their arrangement into brushes separate from the ectosomal styles constitute, in themselves, characters sufficient to differentiate the two. As Boury-Esnault and van Beveren (1982) pointed out, only one of the specimens collected by Koltun (1976) would actually appear to belong to this species.

Eurypon rhopalophora Hentschel, 1912**Material examined**

Benguela VII, Station P-48, specimen n.º 7B-24.

Description

Thinly incrusting specimen covering an area of 2.8 cm × 1.7 cm on a stone. Consistency soft and fragile. Surface extremely hispid. Ectosome difficult to detach from the choanosome. Aquiferous openings not discernible. Colour grayish brown.

Spicule complement (Figure 28)

Tylostyles: straight or slightly curved, neck not well-defined (maximum shaft diameter under the head), tip blunt, 2.750-4.300 µm × 30-38 µm.

Acanthostyles: straight, completely spined, head rounded and very well-defined, 80-135 µm × 8-10 µm.

Dermal styles: curved or flexuous, 650-910 µm × 4-7 µm.

Skeletal arrangement

Similar to that in the other species in this genus.

Distribution

Indo-Pacific: Arafura Sea, Aru Island (Hentschel, 1912).

Discussion

Spicule size in the specimen from Namibia is considerably larger than that in the Indo-Pacific specimens (Hentschel, 1912).

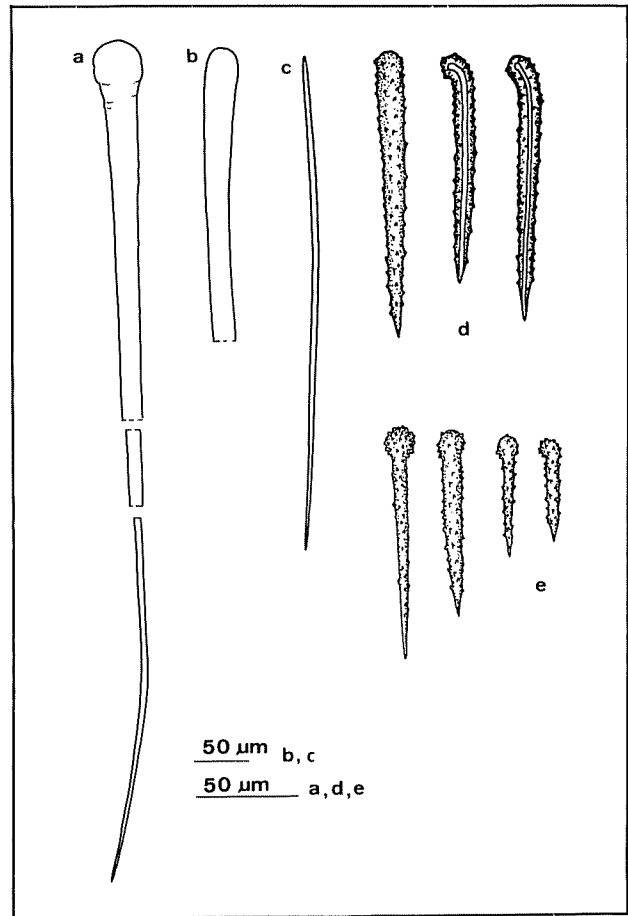


FIG. 28. *Eurypon rhopalophora*: a) tylostyles; b) subcanthostyle; c) dermal style; d) acanthostyles; e) acanthotylostyles.

Eurypon similis Thiele, 1895

Material examined

Benguela VII, Station P-19, specimens n.^{os} 7B-58, 7B-59, and 7B-61.

Description

Thinly incrusting sponges covering an area of a few cm² on a rocky substratum. Consistency soft. Surface profusely hispid (spicules protruding up to 3 mm). Ectosome not detachable from the choanosome. Oscula not discernible. Colour brown-ochre in alcohol.

Spicule complement (Figure 29)

Tylostyles or subtylostyles: head bulbous, irregular, or slightly swollen, shaft gently curved, tip extremely long, size varying among the specimens: 2.400-2.950 µm × 20-26 µm in specimen n.^o 7B-59 and up to 3.150 µm × 35 µm in specimen n.^o 7B-58.

Acanthostyles: completely spined, robust, straight or having the head more or less at an angle, axial groove often visible, 125-175 µm × 9-12 µm.

Acanthotylostyles: normally straight, completely spined, spination more dense on the head, which is rounded and rather globose, 60-120 µm × 5-7 µm (across the shaft).

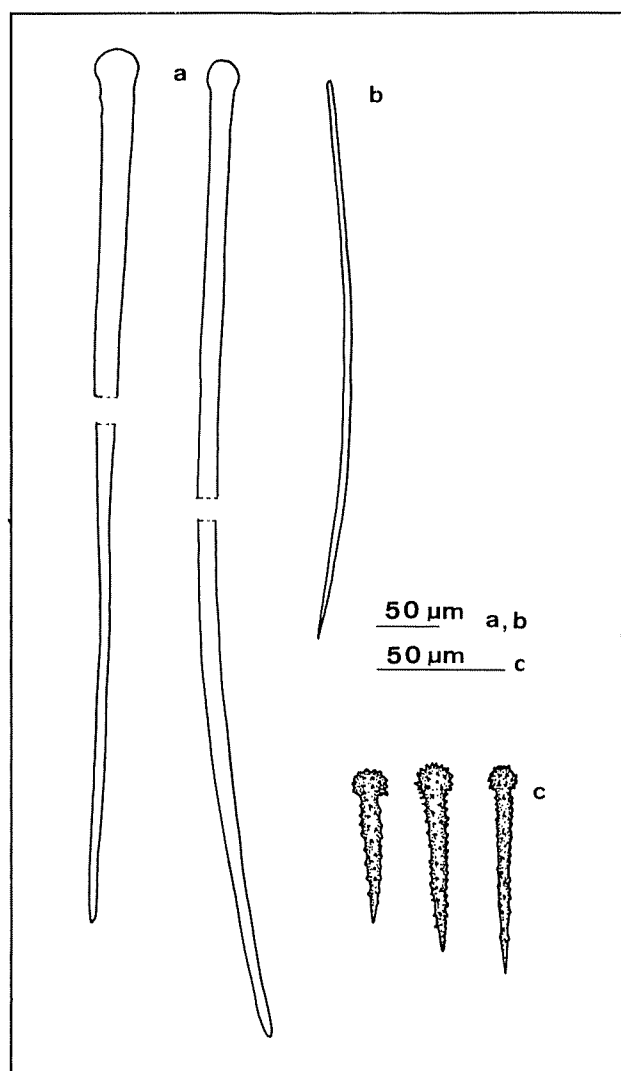
Ectosomal oxeas: very thin, more or less curved, one end more acute than the other, 240-350 µm × 2-4 µm.

Skeletal arrangement

Very dense basal layer of upright acanthostyles, sometimes alternating with tylostyles surrounded by brushes composed of divergent, ectosomal oxeas.

Distribution

Indo-Pacific: Arafura Sea, Molucca Islands (Thiele, 1898), Aru Island (Hentschel, 1912).



Discussion

The tylostyles in the Namibian specimens are much larger than those in the other known *Eurypon* species. *Eurypon rhopalophora* is the closest species, and the specimens from Namibia have been assigned to it in view of the variability in spicule size in the species in this genus.

FIG. 29. *Eurypon similis*: a) tylostyles; b) dermal style; c) acanthostyles.

Family RASPALIIDAE Hentschel, 1923

Genus *Raspalia* Nardo, 1847

Elongate, ramose Raspaliidae. Skeleton formed by a dense, central axis of spicule fibres containing large amounts of spongin, with radial spicule brushes fanning out to the surface. Monactinal (sometimes diactinal) megascleres and (usually) hispidity-producing acanthostyles. Microscleres absent (sensu Dendy, 1905).

Raspalia echinata sp. nv.

Material examined

Benguela VII, Station P-48, specimen n.º 7B-8, holotype.

Description (Plate 13a)

Erect, ramose sponge with irregular branches projecting out from a short stalk, subdividing and

anastomosing confusedly. Spread 13 × 6 cm, branch diameter 0.4-0.7 cm. Consistency of stalk hard and firm, of branches fragile and easily torn. Cell density in the choanosome low. Ectosome detachable in some places. Surface hispidity lax but profuse (spicules protruding up to 4 mm). Scattered oscula 1 mm in diameter. Colour cream white in life and in alcohol.

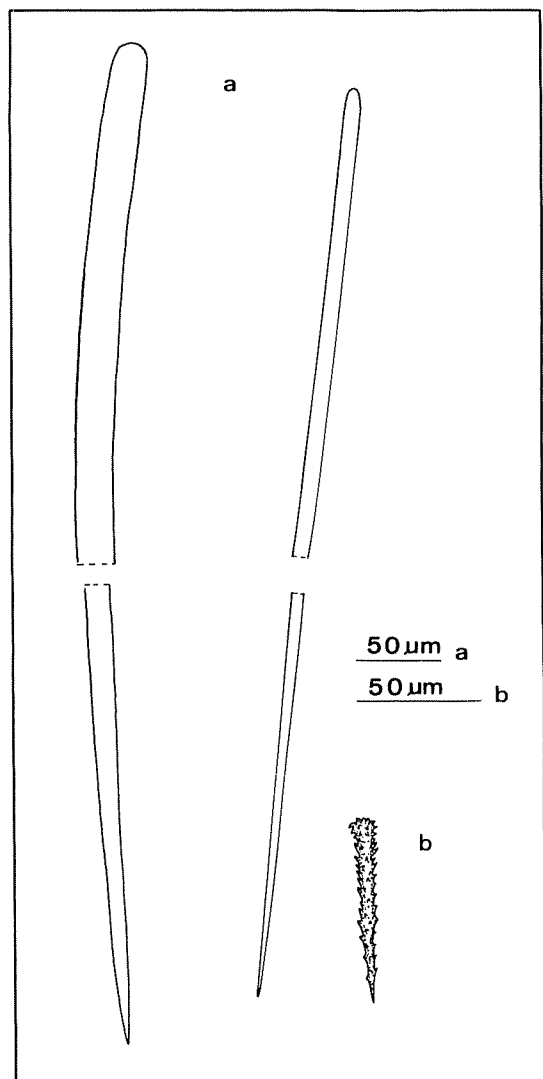


FIG. 30. *Raspailia echinata* sp. nv.: a) styles; b) acanthostyle.

Spicule complement (Figure 30)

Styles: normally somewhat curved, apex very long and narrow, $1.720\text{--}4.100\ \mu\text{m} \times 17\text{--}75\ \mu\text{m}$.

Acanthostyles: straight, conical, completely spined, the spines on the head pointing towards the tip, those on the shaft pointing towards the head, $75\text{--}110\ \mu\text{m} \times 8\text{--}10\ \mu\text{m}$; much larger ($250\ \mu\text{m} \times 12\ \mu\text{m}$), much more sparsely spined acanthostyles not numerous but also present on all the microscope slides prepared.

Skeletal arrangement (Figure 31)

Confused reticulation of styles bound or interwoven by abundant spongin, particularly in the central portion. Brushes of two-four styles perpendicular to the surface at the periphery, giving rise to the external hispidity.

Location: $29^\circ 21.9' \text{ S}$, $14^\circ 46.3' \text{ E}$, 245 m, on rock.

Discussion

This species is characterized by the absence of the thin, dermal styles typical of the genus and usually by scant development of the extra-axial zone as well. These two characters are typical of the genus *Echinoxia* Hallmann, 1917, which has been considered by some authors (Dendy, 1924; Bergquist, 1970) to be congeneric with *Raspailia*. The extra-axial skeleton in this species is practically reduced to the long, perpendicular styles and rudimentary, hispidity-producing acanthostyles. The exceptional size of the styles and the relatively low spicule density in the central axis are two additional characters distancing it, to a certain extent, from the typical *Raspailia* species.

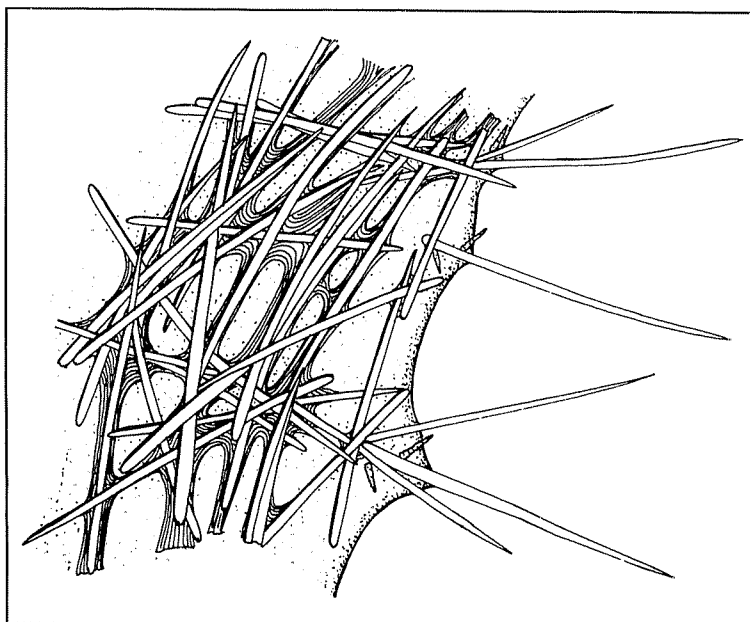


FIG. 31. *Raspailia echinata*: spicule arrangement ($\times 50$).

Raspailia irregularis Hentschel, 1914**Material examined**

Benguela VII, Station P-20, specimens n.ºs 7B-62a, 7B-62b, 7B-62c, and 7B-62d.

Description

Incrusting sponges several cm² in diameter occupying depressions in a rocky substratum. Surface loose, profusely hispid. Ectosome thin, detachable in certain places. Aquiferous openings not discernible. Colour greenish gray in alcohol:

Spicule complement (Figure 32)

Styles: straight or strongly curved, somewhat broader towards the head, 2.240-2.450 µm × 25-45 µm.

Dermal styles: curved or flexuous, 380-560 µm × 6-7 µm.

Acanthostyles: straight, head well-defined, shaft completely spined, upper portion unspined, 90-120 µm × 9-11 µm.

Skeletal arrangement

More typical of the genus *Eurypon* than of the genus *Raspailia*: a basal layer of acanthostyles with their heads on the substratum, occasionally broken by a large style surrounded by a brush consisting of dermal styles.

Distribution

Antarctic: Gauss Station (Hentschel, 1914); subantarctic region: Kerguelen area (Boury-Esnault and van Beveren, 1982); South Atlantic (?): South Africa [probably one specimen cited by Burton (1932)]. Bathymetric distribution: 263-385 m.

Discussion

Although the skeletal structure and habit of these specimens are typical of the genus *Eurypon*, their

spiculation corresponds to that of the species *R. irregularis*. They could be juveniles of a truly erect species shaped like a spike of grain, such as that described by Boury-Esnault and van Beveren (1982). The incrusting habit of the holotype of this species (Hentschel, 1914) is no probably why Burton (1932) and Koltun (1964) placed *R. irregularis* and *Eurypon miniaceum* in synonymy.

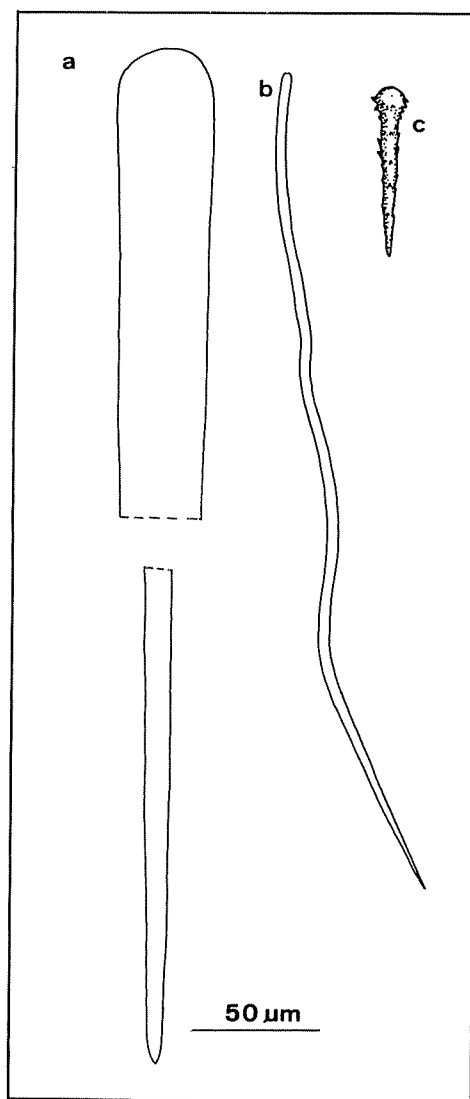


FIG. 32. *Raspailia irregularis*: a) main style; b) dermal style; c) acanthostyle.

Order POECILOSCLERIDA Topsent, 1928

Family MYCALIDAE Lundbeck, 1905

Genus *Mycale* Gray, 1867

Mycalidae with a main skeleton consisting of a network of polyspicular, discrete or anastomosed strands. A single type of megasclere, usually monactinal. Characteristic microscleres: three sizes of anisochelae, the largest size frequently forming rosettes, nearly always accompanied by sigmata, toxas, or raphides, or a combination of the three (sensu Topsent, 1924).

Mycale anisochela Lévi, 1963**Material examined**

Benguela VI, Station P-72, specimens n.^{os} 6B-84a, 6B-84b, 6B-84c, 6B-84d, and 6B-84e; Benguela VII, Station P-48, specimens n.^{os} 7B-70a, 7B-70b, 7B-70c, 7B-70d, 7B-70e, 7B-70f, and 7B-70g.

Type I sigmata: uniformly curved into a C shape, 50-55 μm \times 2.5-4 μm .

Type II sigmata: morphologically similar to the former but somewhat more asymmetrical, 15-18 μm \times 1.5 μm .

Description

Massive subglobose, erect sponge, slightly elongate or ovoid, attached by its base to a rocky substratum and reaching sizes of up to 20 cm in height by 12 cm in diameter. Consistency fibrous, rather flexible on account of large, internal, aquiferous cavities and its fibrous skeleton. Ectosome conspicuous, separated from the choanosome by subectosomal aquiferous canals, almost always divided into more or less regular polygonal areas, conferring on the sponge its characteristic appearance. Between three and six oscula of up to 1.5 cm in diameter located in the upper portion. Colour whitish in life and in alcohol, although many specimens, charged with mud, appear grayish.

Spicule complement (Figure 33; Plates 34a, 34b, 34c)

Styles: fusiform, straight or only slightly curved, narrowing towards the base, practically turning into stronglyloxeas, 590-1.140 μm \times 19-28 μm (thickness measured at the middle of the spicule).

Type I anisochelae: characteristic, very robust, frequently with a bifid, upper medial blade and two ear-like processes on the bottom of the shaft, 190-230 μm long, shaft thickness 20 μm (smaller, morphologically similar anisochelae sometimes also present).

Type II anisochelae: upper blades often irregular, lower blades relatively short, 50-70 long, shaft diameter 5-8 μm .

Type III anisochelae: shaft extremely thin, the lower end produced into a spur-like projection, 24-32 μm long, shaft 1.5 μm thick.

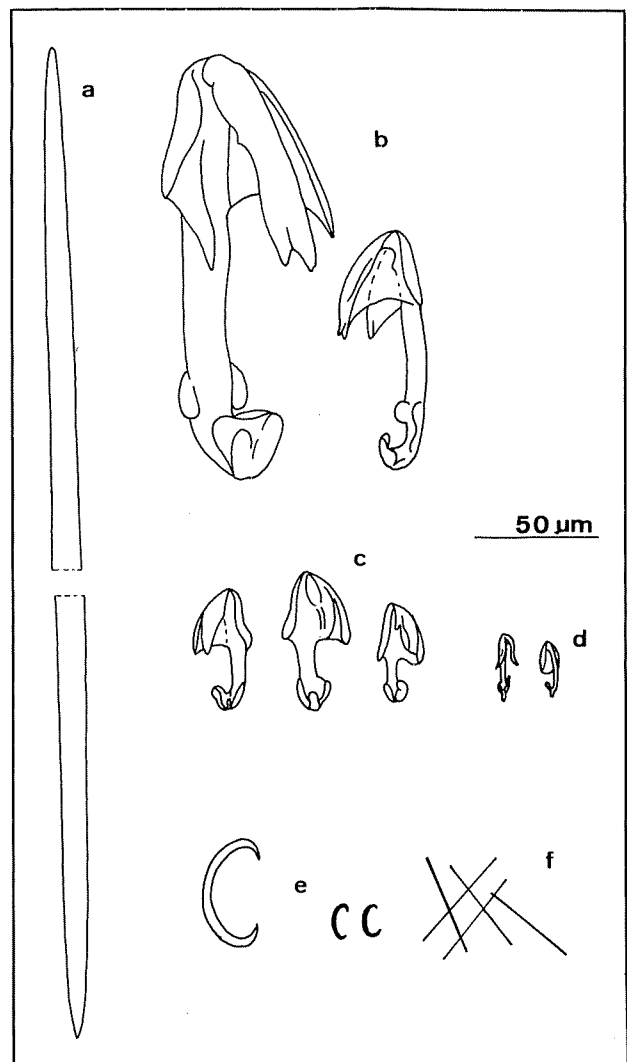


FIG. 33. *Mycale anisochela*: a) fusiform styles; b) type I anisochelae; c) type II anisochelae; d) type III anisochelae; e) sigmata; f) raphides.

Rhaphides: straight, linear, 40-60 μm long.

Spicule sizes in the Namibian specimens agree closely with those in the holotype from South Africa.

Skeletal arrangement

Polyspicular strands of styles rising from the substratum in a thick, central bundle up to several centimeters in diameter, subdividing and anastomosing to form an irregular, reticulate network that becomes progressively thinner out to the ectosome, which it supports without piercing. Skeleton of tangential styles, scattered or in bundles, in the ectosome. Scattered microscleres in both the ectosome and the choanosome. Isochelae not forming rosettes.

Distribution

Southeast Atlantic: South Africa (Lévi, 1963). Bathymetric distribution: 75-317 m.

Discussion

One of the most abundant sponges in rocky areas of the continental shelf off Namibia, with more than 200 specimens collected, of which only 14 have been examined. Previously only the holotype was known. This species is quite similar to *Mycale massa* var. *oceanica*, the main differences with respect to this South African species being: the size and particular shape of the type I isochelae, the progressive narrowing of the base of the styles, turning them into stronglyloxeas, and the typical appearance of the ectosome, subdivided into polygonal areas.

Mycale massa (Schmidt, 1870) var. *oceanica* Topsent, 1924

Material examined

Benguela VII, Station P-48, specimen n.º 7B-10.

Description (Plate 14 a)

Massive sponge $5 \times 4.5 \times 2$ cm with two rounded lobes. Consistency fragile, fibrous. Surface clean, rough to the touch, hispid in places. Ectosome discernible but hard to detach from the choanosome. Two oscula, 2 and 3 mm in diameter, respectively, one at the end of each lobe. Colour cream white in alcohol.

Spicule complement (Figure 34)

Subtylostyles: fusiform, neck thin, head poorly defined, some turning into asymmetrical oxeas, $540-1.200 \mu\text{m} \times 10-22 \mu\text{m}$.

Type I anisochelae: 100-115 μm long, shaft up to 15 μm thick.

Type II anisochelae: 35-42 μm long, shaft 5-6 μm thick.

Type III anisochelae: very thin, no spur-like prominence on the basal end, 20-25 μm long.

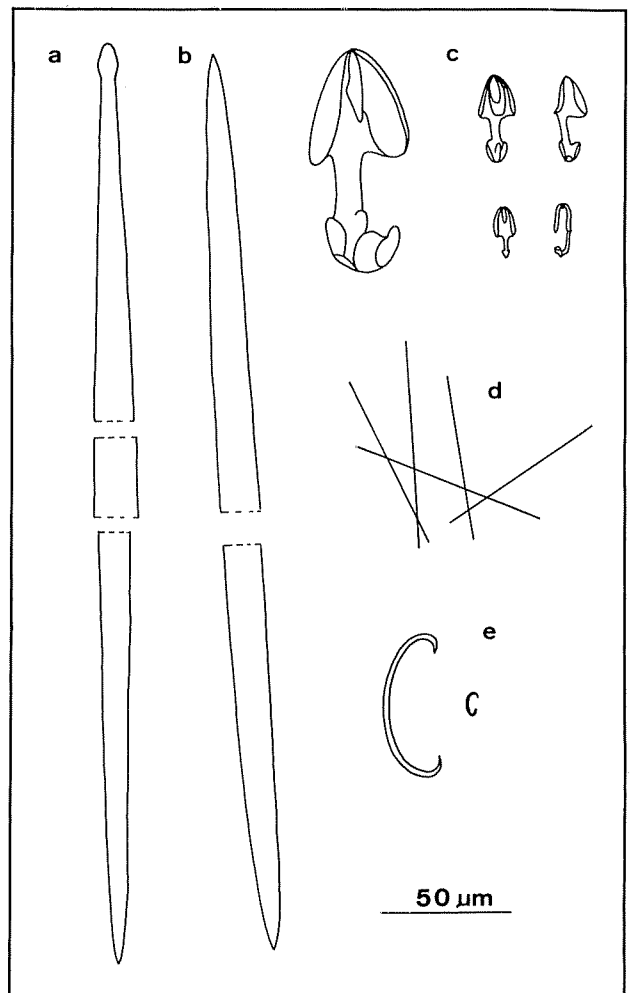


FIG. 34. *Mycale massa oceanica*: a) subtylostyle; b) oxea; c) types I, II, and III anisochelae; d) rhaphides; e) sigmata.

Sigmata: C-shaped, two different sizes, 68-74 μm and 13-15 μm .

Rhaphides: straight, linear, 70-130 μm long.

Skeletal arrangement

Typical of the genus: a reticulation of polyspicular strands, situated perpendicularly to the surface at the periphery, the strands piercing the ectosome in some places, giving rise to external hispidity. Tangential subtylostyles in the ectosome. Scattered microscleres.

Distribution

Atlantic: Azores and Cape Blanc (Topsent, 1924), Namibia (Uriz, 1985). Bathymetric distribution: 245-360 m.

Discussion

This variety of *Mycale massa* exhibits numerous similarities with the preceding species. However, the fact that they coexist in the same area would seem to indicate that the interspecific differences are not ascribable to environmental factors alone.

Genus *Paresperella* Dendy, 1905

Massive or incrusting Mycalidae with tylostyles or styles as megascleres, palmate anisochelae and non-serrate sigmata, along with others (such as toxas), as microscleres (sensu Dendy, 1905).

Paresperella atlantica Stephens, 1917

Material examined

Benguela VII, Station P-40, specimen n.º 7B-46.

Description

Incrusting specimen reduced to a thin (5 \times 7 mm) film growing on specimen n.º 7B-45 of *Desmanthus macphersoni*. Ectosome detachable, with a tangential skeleton. Surface smooth. Consistency soft. Colour whitish on the outside, choanosome somewhat browner, in alcohol.

Spicule complement (Figure 35)

Subtylostyles: straight or sometimes irregularly curved, fusiform, head slightly swollen, tip abrupt, 300-360 μm \times 8-10 μm .

Sigmata: outer edge serrate, one end normally curved, the other bent sharply and twisted 90° with respect to the main plane of the spicule, 75-135 μm \times 3-5 μm .

Type I isochelae: with the characteristic shape for this genus, forming rosettes in the ectosome, 30-33 μm long.

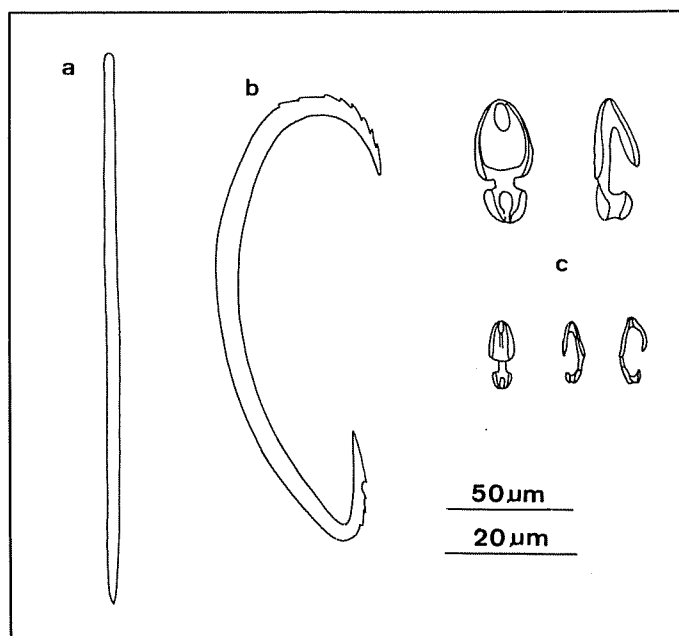


FIG. 35. *Paresperella atlantica*: a) subtylostyle; b) sigma; c) types I and II anisochelae.

Type II isochelae: shaft somewhat longer than in the type I isochelae, 15-18 μm long.

Toxas: only one observed, linear, barely curved, 92 μm long.

Skeletal arrangement

Irregular reticulate tracts of subtylostyles in the choanosome. Tangential subtylostyles arranged in reticulate or discrete bundles in the ectosome. Microscleres scattered, except for the type I isochelae, which form rosettes in the ectosome.

Distribution

North Atlantic: Ireland (Stephens, 1917); South Atlantic: Namibia (Uriz, in press, a). Bathymetric distribution: 183-242 m.

Discussion

The spicule sizes in this specimen were quite similar to those observed previously in this same geographic region (Uriz, in press, a).

Paresperella sp.

Synonyms

Paresperella atlantica Lévi, 1963
(non *P. atlantica* Stephens, 1917)

Anisochelae: 23-29 μm long.

Sigmata: 85-100 $\mu\text{m} \times 4-6 \mu\text{m}$ (across the shaft).

Material examined

Benguela V, Walvis Bay, specimens n.^{os} B-50a and B-50b.

Skeletal arrangement

Typical of this genus.

Description

Sponges several cm^2 in area and 3 mm thick, fragile, easily detachable from the substratum. Neither ectosome nor oscula discernible. Colour pale orange in alcohol.

Remarks

This species was called *P. atlantica* by Lévi (1963), but this name has been used before (Stephens, 1917) to designate a north Atlantic species. Therefore, a new name should be proposed (Uriz, in pres a).

Spicule complement

Subtylostyles: separable into two size classes, 300-400 $\mu\text{m} \times 9-12 \mu\text{m}$ and 165-220 $\mu\text{m} \times 4-6 \mu\text{m}$.

Distribution

South Atlantic: Atlantic coasts (Lévi, 1963), Namibia (Uriz, in press, a).

Family HAMACANTHIDAE Gray, 1872

Genus *Hamacantha* Gray, 1867

Hamacanthidae with diancistras (sensu Lévi, 1973).

Hamacantha esperioides (Ridley & Dendy, 1886)

Synonym

Vomerula esperioides Ridley and Dendy, 1886

Description (Plate 14b)

Massive specimen 17 cm high and 10 cm wide, with two thick lobes and additional, smaller lobes. Consistency resilient. Aquiferous system well-developed. Surface glabrous, rough to the touch. Ectosome translucent, conspicuous, easily detachable,

Material examined

Benguela VI, Station P-56, specimen n.^o 6B-92.

lining the subectosomal aquiferous cavities. Oscula difficult to distinguish because of the poor condition of the ectosome. Choanosome fibrous, not dense. Colour light brown in alcohol.

Spicule complement (Figure 36; Plates 34d, 35a, 35b)

Styles: straight or only slightly curved, fusiform, base narrower than the tip, 520-610 μm \times 12-18 μm (thickness measured at the widest point).

Type I diancistras: typical in shape, shaft straight or slightly curved, 115-150 μm \times 11-17 μm .

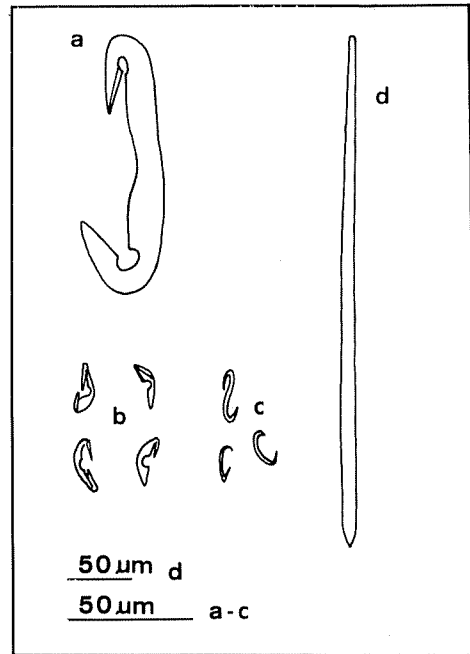
Type II diancistras: shaft curved or with a bend towards the middle, 20-30 μm \times 2-3 μm .

Sigmata: C- or S-shaped, with one end more sharply bent than the other, 20-28 μm \times 1.5-2 μm .

Skeletal arrangement

Reticulate, with styles forming polyspicular fibres reaching to the surface, running tangentially in the ectosome and branching to form narrower fibres. Polyspicular bundles echinated by type I diancistras.

FIG. 36. *Hamacantha esperioides*: a) type I diancistra; b) type II diancistra; c) sigmata; d) style.



Type II diancistras and sigmata scattered throughout the sponge.

Distribution

South Atlantic: Plate River, Agulhas Bank (Ridley and Dendy, 1887), South Africa (Lévi, 1963), Namibia (Uriz, in press, a). Bathymetric distribution: 201-1.110 m.

Family BIEMNIDAE Hentschel, 1923

Genus *Biemna* Gray, 1867

Biemnidae with a plumose or plumoreticulate skeleton and with sigmata and raphides as microscleres, which may or may not be arranged in trichodragmata (sensu Hallman, 1916).

Biemna megalosigma Hentschel, 1912

Material examined

Benguela VII, Station P-40, specimens n.^{os} 7B-37a, 7B-37b, 7B-49a, and 7B-49b, on rock.

Description

An incrusting base with an erect, flattened branch 1-1.5 cm high and 0.5-0.8 cm wide, with broad conules terminating in brushes of two-three spicules. Consistency soft and easily torn (the flesh rather easily detachable from the skeleton). Ectosome conspic-

uous, detachable from the choanosome, with microscleres abundantly included. Oscula not discernible. Colour yellow ochre in life, somewhat masked by abundant greenish mud, same colour in alcohol.

Spicule complement (Figure 37)

Styles: robust, curved or even somewhat flexuous, 880-1.250 μm \times 19-25 μm (650-800 μm \times 15-30 μm in the specimens from South Africa) (Lévi, 1963).

Type I sigmata: C-shaped, rather open, ends bent sharply inwards, extremely robust, $270\text{--}312\ \mu\text{m} \times 10\text{--}14\ \mu\text{m}$ ($200\text{--}210\ \mu\text{m} \times 8\ \mu\text{m}$ in the specimens from South Africa).

Type II sigmata: morphologically similar to the type I sigmata, $90\text{--}160\ \mu\text{m} \times 6\text{--}8\ \mu\text{m}$ ($30\text{--}85\ \mu\text{m} \times 2\text{--}5\ \mu\text{m}$ in the specimens from South Africa).

Type III sigmata: somewhat more curved than the preceding two types, $40\text{--}65\ \mu\text{m} \times 3\text{--}4\ \mu\text{m}$ ($10\text{--}11\ \mu\text{m}$ in the specimens from South Africa).

Type IV sigmata: $20\text{--}29\ \mu\text{m} \times 2\text{--}5\ \mu\text{m}$.

Rhaphides: straight, smooth, relatively thick (similar to microxeas in appearance), $140\text{--}170\ \mu\text{m} \times 2.5\text{--}3\ \mu\text{m}$ ($110\text{--}120\ \mu\text{m}$ in the specimens from South Africa).

Microxeas: straight, fusiform, $40\text{--}63\ \mu\text{m} \times 1.5\ \mu\text{m}$ ($30\ \mu\text{m} \times 1\ \mu\text{m}$ in the specimens from South Africa).

Skeletal arrangement

Plumoreticulate bundles of styles spreading out progressively from a common base as the branch widens, terminating in brushes of three-four spicules. Tangential styles and abundant microscleres in the ectosome. Sigmata and rhaphides not forming trichodragmata except in specimen n.º 7B-49, which might correspond to the sigmodragma variety (Lévi, 1963), although this character does not appear to be constant.

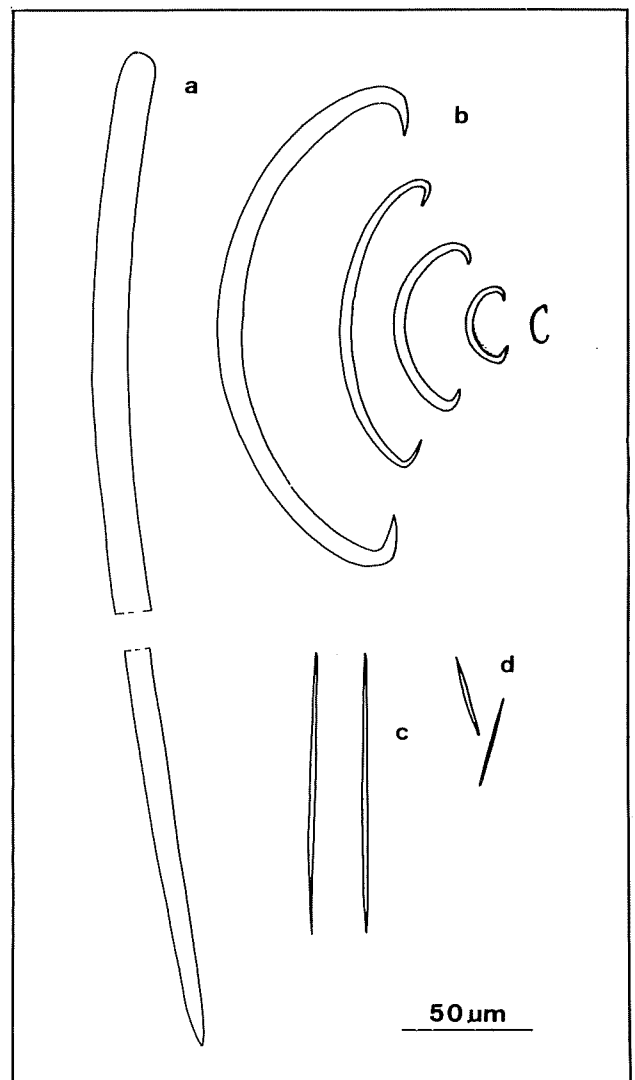
Distribution

Indian Ocean: Aru Island (Hentschel, 1912); South Atlantic: South Africa (Lévi, 1963). Bathymetric distribution: 27.5-183 m.

FIG. 37. *Biemna megalosigma*: a) style; b) sigmata; c) rhaphides; d) microxeas.

Discussion

The specimens from off Namibia, with sigmata of over $300\ \mu\text{m}$ in diameter, are typical representatives of this species, characterized by extremely large sigmata. Four size classes of sigmata are clearly distinguishable in these specimens, instead of the three typical in *B. megalosigma* from South Africa. This feature is undoubtedly variable, and no great importance should be attached to it, since the four types of sigmata are morphologically quite similar.



Biemna rhabdostyla sp. nv.

Material examined

Benguela VII, Station P-48, specimen n.º 7B-31, Station P-40, specimen n.º 7B-102 (holotype).

Description

Thickly incrusting specimens 0.5-0.8 cm thick, $4 \times 5\ \text{cm}$ and $2 \times 1.5\ \text{cm}$ in extension, with upright, plumose projections up to 1 cm in height. Consistency fragile, easily torn. Surface glabrous, with

some conules terminating in spicule brushes. Ectosome conspicuous, readily detachable from the choanosome, with its own tangential skeleton and abundant mud inclusions. Oscula not discernible. Colour dirty brown in alcohol.

Spicule complement (Figure 38)

Styles: head slightly curved, $800\text{--}1.210\ \mu\text{m} \times 13\text{--}27\ \mu\text{m}$.

Rhabdostyles: strongly curved near the base, sometimes also curved towards the middle of the shaft, $130\text{--}215\ \mu\text{m} \times 8\text{--}11\ \mu\text{m}$.

Sigmata: usually thin, separable into three size classes of $53\text{--}112\ \mu\text{m} \times 3\text{--}4.5\ \mu\text{m}$, $30\text{--}45\ \mu\text{m} \times 2\text{--}4\ \mu\text{m}$, and $13\text{--}22\ \mu\text{m} \times 1.5\ \mu\text{m}$, the first two classes practically overlapping.

Microxeas: very thin, $40\text{--}54\ \mu\text{m} \times 1.5\ \mu\text{m}$.

Rhaphides: straight, extremely thin, $123\text{--}160\ \mu\text{m}$ long, practically linear in appearance.

Skeletal arrangement

A base of mixed rhabdostyles and large styles forming plumose bundles in the choanosome, together with abundant microscleres. Ectosomal skeleton composed of sigmata, microxeas, and rhaphides, these last two joining to form trichodragmata.

Location

$29^{\circ} 21.0' \text{ S}$, $14^{\circ} 49' \text{ E}$, 232 m, bottom of rock with banks of semifossil coral; $28^{\circ} 10.8' \text{ S}$, $14^{\circ} 48.2' \text{ E}$, 198 m, muddy bottom.

Discussion

The odd combination of rhabdostyles with the typical *Biemna* spicules initially suggested two species growing in such intimate association as to be impossible to differentiate. The subsequent finding of a second individual with these same characteristics at a different sampling station led to their de-

scription as a new species. The spiculation tends to resemble that of *B. megalosigma*, although the type I sigmata do not attain the same large size. *B. rhabderemioides* Bergquist has styles with a sharp bend on the proximal third, but it does not have the two types of styles (normal and rhabdostyles) found in the new species from Namibia. *B. stylum* (Brøndsted) possesses two types of styles but no rhabdostyles, and its spicules are generally different in size.

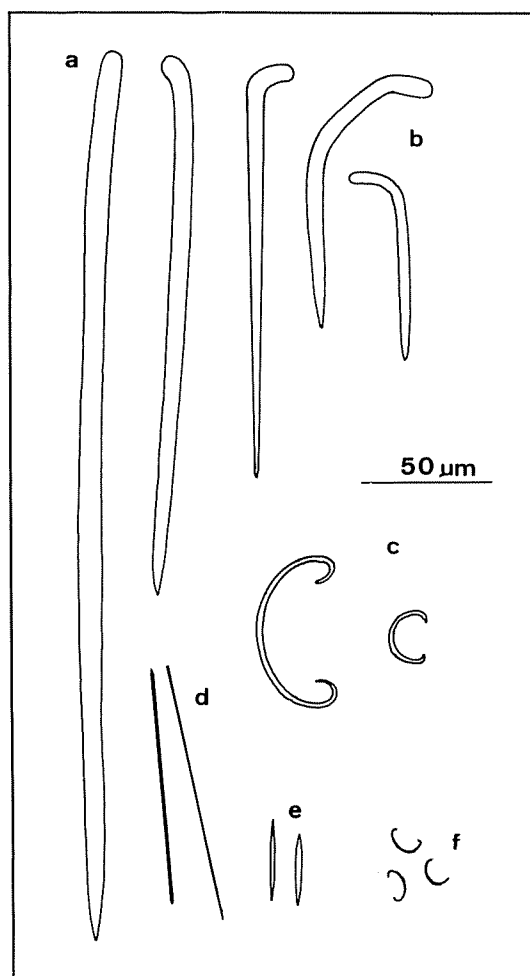


FIG. 38. *Biemna rhabdostyla*: a) style; b) rhabdostyles; c) sigmata; d) rhaphides; e) microxeas.

Genus *Tyloidesma* Thiele, 1903

Biemnidae with a plumoreticulate skeleton of tylostyles. Sigmata and/or toxas as microscleres (sensu Lévi, 1973).

Tyloidesma vestibularis Wilson, 1904**Synonym**

Desmacella vestibularis (Wilson) Dendy, 1924; Burton, 1929; Koltun, 1964

Material examined

Benguela VI, Station P-57, specimen n.º 6B-85.

Description

Massive specimen, partially covering the corneous tube of a polychaete, 8 × 3 cm in extension, lobate or even bearing short, rounded branches, maximum size of lobes 2.5 × 1 cm. Consistency compact yet fragile. Oscula 1.5-2 mm in diameter,

located at the ends of the lobes. Small, subectosomal aquiferous cavities. Surface velvety to the touch, evenly hispid under the binocular microscope. Ectosome detachable where it lines the subectosomal aquiferous cavities. Colour grayish brown in alcohol due to mud inclusions, whitish in regions covered by an epibiont.

Spicule complement (Figure 39)

Tylostyles: slightly curved, fusiform (particularly the larger ones), quite variable in size, 340-1.100 μm × 7-20 μm , not separable into two size categories [240-630 μm × 8-16 μm in the holotype (Wilson, 1904)].

Sigmata: C- or S-shaped, one end more sharply bent than the other, 13-40 μm × 1.5-2.5 μm (10-45 μm in the holotype).

Skeletal arrangement

Tylostyles loose or in bundles, irregularly reticulate, opening out into polyspicular brushes at the periphery, piercing the ectosome and giving rise to short, profuse, external hispidity. Scattered, tangential tylostyles in the ectosome. Sigmata very abundant throughout the sponge.

Distribution

Pacific: Galapagos Islands (Wilson, 1904); Indo-Pacific: New Zealand (Dendy, 1924); South Atlantic: South Africa (Burton, 1929); Antarctic: Victoria Land (Koltun, 1964). Bathymetric distribution: 20-252 m.

Discussion

This Namibian specimen is readily classifiable as belonging to the species *T. vestibularis* on the basis of its spiculation and skeletal arrangement, though it should be pointed out that the subectosomal aquiferous cavities are not as abundant as those described in the holotype by Wilson (1904).

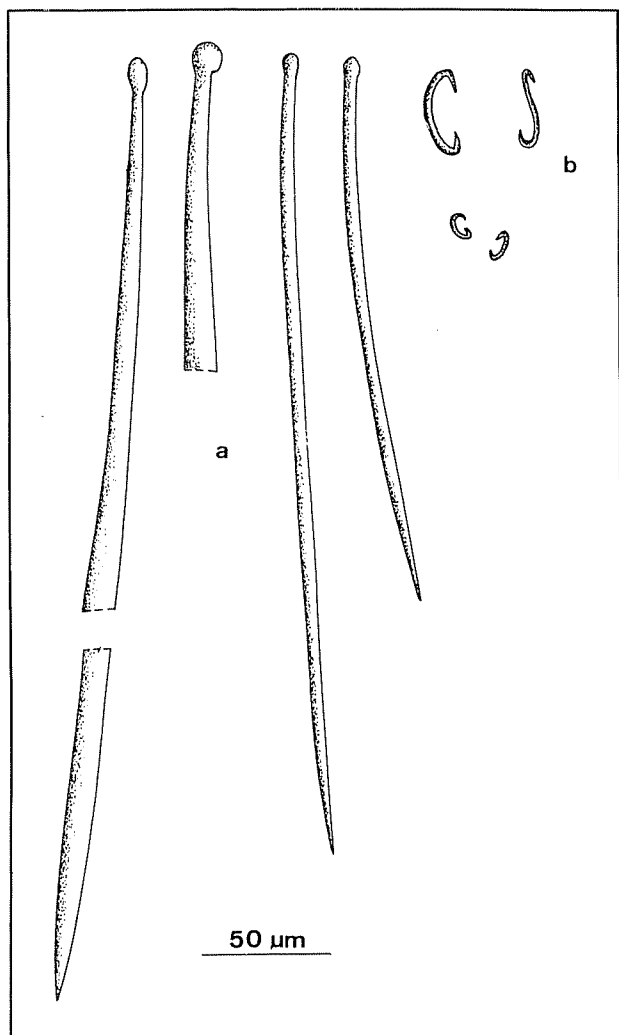


FIG. 39. *Tyloidesma vestibularis*: a) tylostyles; b) sigmata.

Family ESPERIOPSIDAE Hentschel, 1923

Genus *Desmacidon* Bowerbank, 1864

Esperiopsidae with a reticulate skeleton composed of oxeas or strongyles, with arcuate isochelae and sometimes sigmata as microscleres (sensu Lévi, 1973).

Desmacidon ramosus Ridley & Dendy, 1886**Material examined**

Benguela VI, Station P-57, specimen n.º 6B-87; Benguela VII, Station P-48, specimens n.ºs. 7B-94a, 7B-94b, 7B-94c, and 7B-94d, Station P-40, specimens n.ºs. 7B-65 and 7B-96.

Description (Plate 15)

Thickly incrusting specimens growing on the corneous tubes of polychaetes or issuing sometimes flattened, sometimes subcylindrical, curved or twisted branches. Attaining up to 10 cm² in area, with branches from 0.3 to 1.8 cm in diameter. Consistency firm and leathery. Surface clean and even, very rough to the touch, with some small protuberances. Ectosome clearly discernible, 150-200 µm thick, forming a cortex difficult to detach from the choanosome. Oscula scattered over the branches at the apices of small, highly characteristic protuberances. Ostia not discernible because of the con-

tracted state in which all the specimens were found. Colour whitish or more or less dark brown in alcohol.

Spicule complement (Figure 40)

Oxeas: straight, fusiform, robust, ends rather blunt, 290-420 µm × 10-20 µm (the thickest spicules also the shortest).

Isochelae: arcuate, tridentate, teeth very short, 11-14 µm long.

Skeletal arrangement

Ramose-reticulate tracts of oxeas terminating in densely packed brushes which do not pierce the ectosome but do give the sponge its rough appearance. Scattered isochelae.

Distribution

South Atlantic: South Africa (Ridley and Dendy, 1887; Lévi, 1963), Namibia (Uriz, in press, a).

Discussion

Spicule size in these specimens is smaller than that in a specimen examined previously (Uriz, in press, a).

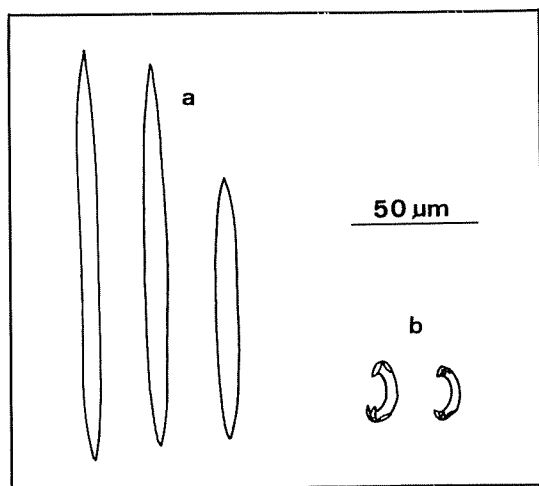


FIG. 40. *Desmacidon ramosus*: a) oxeas; b) arcuate isochelae.

Genus *Esperiopsis* Carter, 1882

Esperiopsidae with monactinal megascleres and palmate isochelae as microscleres (sensu Lévi, 1973).

Esperiopsis lesliei sp. nv.**Material examined**

Benguela VI, Station P-96, specimens n.^{os} 6B-17a (holotype), 6B-17b, and 6B-112.

Description

Small, erect specimens comprising two thin-walled, flattened, tubular branches measuring 2.5×0.4 cm and 2.4×0.6 cm, respectively, emerging from a short, common stalk 4×1.5 mm in size. Surface rough to the touch, conulose under the binocular microscope. Consistency loose, soft, easily torn. Ectosome not detachable from the choanosome. Surface perforated by many small openings not definitely classifiable as oscula or ostia.

Spicule complement (Figure 41; Plates 35c, 35d)

Strongyles: one end usually more rounded than the other, such that a monactinal origin can be postulated, slightly curved or even undulated, some thinner, definitely styles, the distal end apparently growing more rounded as spicule thickness increases; $270\text{--}330 \mu\text{m} \times 10\text{--}16 \mu\text{m}$ (styles $5\text{--}7 \mu\text{m}$).

Styloids: nearly straight, strongly curved, or flexuous, $220\text{--}280 \mu\text{m}$ long, probably young spicules.

Isochelae: very abundant, palmate, the blades flaring outwards from the shaft in lateral view, $34\text{--}53 \mu\text{m} \times 1.5\text{--}2.5 \mu\text{m}$ (shaft thickness).

Skeletal arrangement (Figure 42)

Clearly reticulate, somewhat scalariform, with paucispicular (two-six spicules), more or less ascending strands with diversions perpendicular to the surface interconnected by other, transverse, uni- or paucispicular strands. The strands perpendicular to the surface passing through the ectosome to form conules terminating in two-three spicules. No ectosomal skeleton discernible. Practically devoid of spongin.

Location

$24^{\circ} 18' \text{ S}$, $13^{\circ} 28.21' \text{ E}$, 322 m, on a bank of dead madreporarians.

Discussion

These specimens were assigned to the genus *Esperiopsis* because the dissimilar ends of the strongyles would seem to suggest that these spicules are monactinal in origin. The megascleres in the species

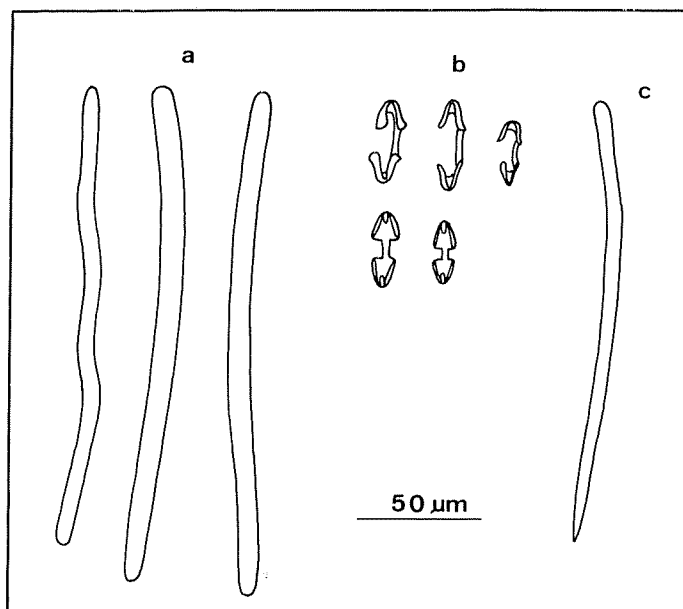


FIG. 41. *Esperiopsis lesliei*: a) strongyles; b) palmate isochelae; c) style.

Amphilectus strongylatus Alander, 1942, from Sweden, are similar though somewhat less robust.

This species is dedicated to Dr. Robin Leslie of the Sea Fisheries Research Institute of South Africa, in appreciation for his assistance and companionship during the collection of the sponge samples.

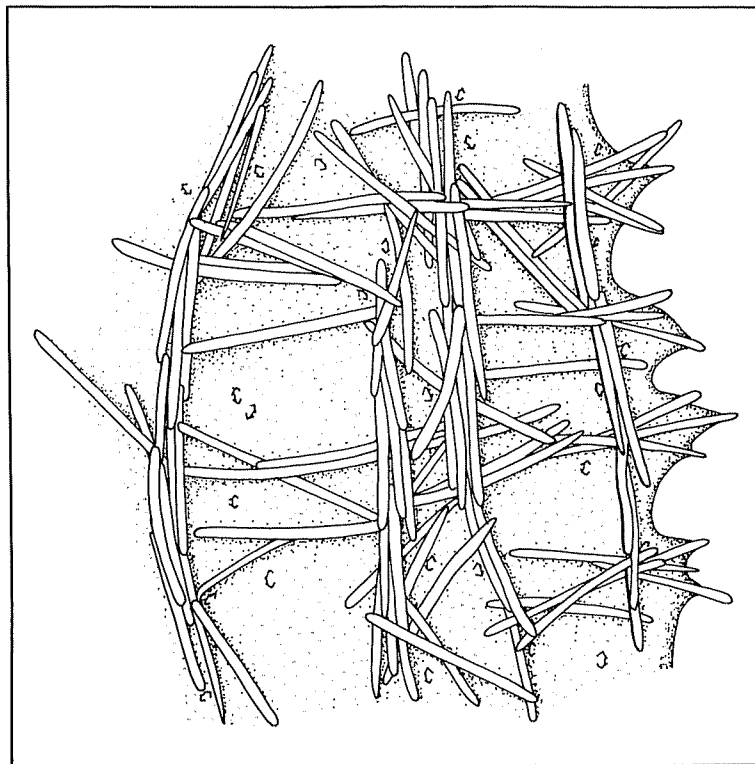


FIG. 42. *Esperiospis lesliei*: spicule arrangement.

Esperiospis rugosa Thiele, 1905

Synonyms

Amphilectus rugosus (Thiele) Burton, 1932
Amphilectus rugosus (Thiele) Koltun, 1964

Material examined

Benguela VII, Station P-96, specimen n.º 7B-112.

Description

Thickly incrusting specimen $6 \times 0.3-0.4$ cm in extension covering and enveloping a branch of a hydroid together with *Esperiospis lesliei* (specimen n.º 7B-111). Consistency soft and fragile. Surface uneven, somewhat hispid. Ectosome discernible, translucent, difficult to detach from the choanosome. Aquiferous openings not discernible. Colour cream white in alcohol.

Skeletal arrangement

Reticulate, main strands consisting of five-eight spicules, not well-differentiated from the secondary, paucispicular strands, confused, generally renieroid in appearance (with loose spicules).

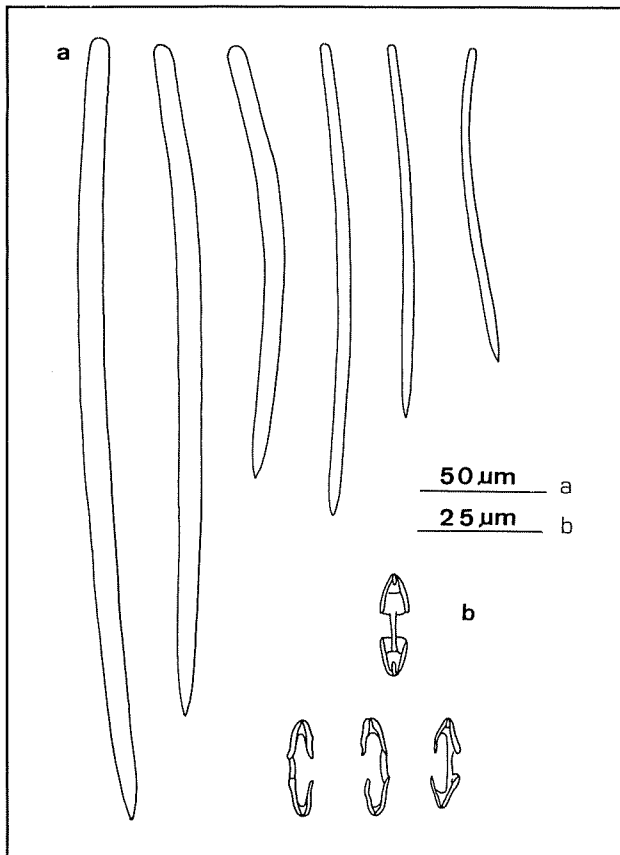
Distribution

Antarctic: Burton (1929), Koltun (1964); subantarctic region: Chile (Thiele, 1905), Falkland Islands and Tristan da Cunha (Burton, 1932), Kerguelen area (Boury-Esnault and van Beveren, 1982). Bathymetric distribution: 79-385 m.

Spicule complement (Figure 43)

Styles: usually slightly curved, tip rather blunt, quite variable in size, $210-526 \mu\text{m} \times 7-18 \mu\text{m}$.

Isochelae: palmate, 21-25 μm long.



Discussion

This specimen conforms closely to the species described by Thiele (1900), although the isochelae are slightly smaller and the styles somewhat more robust. However, the substantially larger megascleres in the Antarctic specimens would seem to suggest that there is considerable variability in spicule size in this species. *Esperioopsis informis* Stephens, 1915, from South Africa, is undoubtedly a closely related species, but its styles are appreciably smaller.

FIG. 43. *Esperioopsis rugosa*: a) styles; b) palmate isochelae.

Genus *Isodictya* Bowerbank, 1864

Esperioopsidae with an irregular, reticulate skeleton in which the megascleres are always diactinal. Palmate isochelae, sometimes together with raphides as microscleres (sensu Dendy, 1924).

Isodictya chichatouzae Uriz, 1984

Material examined

Benguela VII, Station P-48, specimens n.^{os} 7B-95a, 7B-95b, 7B-95c, 7B-95d, 7B-95e, and 7B-95f.

Description (Plate 16)

Sponge habit invariable, erect, attached to a rocky substratum by the ramifications of a short, solid stalk spreading out to form a thin-walled, cup-shaped structure, subsequently on a cylindrical shape. Specimens between 10 and 54 cm in length and 1.5-6 cm in diameter, with stalks 0.4-2 cm thick. Wall thickness decreasing from the base to the upper portion, where it does not exceed 2 mm. Consistency of stalk firm, rest rather flexible. Surface hispid, conulose, perforated by numerous openings and a characteristic pattern of grooves. Stalk, upper portion, and juveniles generally smoother. Ectosome not discernible. Oscula difficult to

distinguish from the many non-functional openings in the sponge walls; probably scattered on both the inner and outer surfaces. Colour cream yellow in life and in alcohol.

Spicule complement (Figure 44)

Oxeas: uniformly curved, separable into two size classes, 390-530 µm × 15-20 µm and 160-210 µm × 20-26 µm.

Isochelae: palmate, 20-26 µm long.

Skeletal arrangement:

Scalariform reticulation, ascending in the thinnest regions, ascending and perpendicular to the surface in the thicker regions. Scattered isochelae.

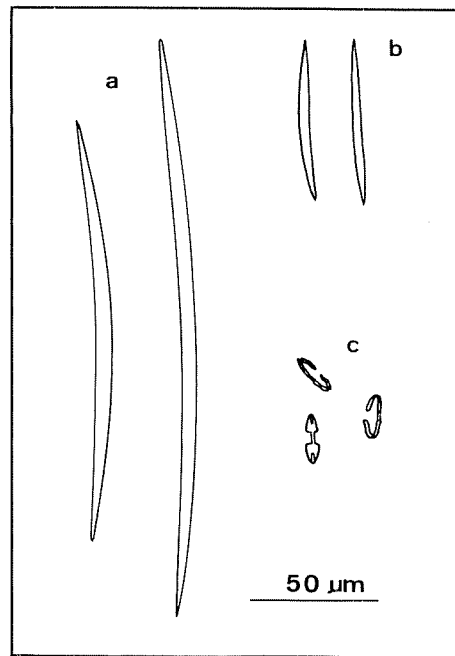
Distribution

South Atlantic: Namibia (Uriz, 1984). Bathymetric distribution: 245-269 m.

Discussion

All the specimens morphologically similar to the holotype, though spicule size is smaller in the present specimens. The species resembles *T. cavicornuta* Dendy, from which it is differentiated by its smaller spicule size and by the shape of the smaller oxeas, which in the species described by Dendy are more like *toxas*.

FIG. 44. *Isodictya chichatouzae*: a) type I oxeas; b) type II oxeas; c) palmate isochelae.



Genus *Crambe* Vosmaer, 1880

Esperiopsidae with a plumose arrangement of monactinal megascleres, isochelae, and asteroid desmata, these last two spicule types sometimes absent (sensu Topsent, 1925).

Crambe acuata (Lévi, 1960)

Synonyms

Folistipa acuata Lévi, 1960
Crambe chelastra Lévi, 1963

Material examined

Benguela VII, Station P-40, specimens n.ºs 7B-36a and 7B-36b, on rock.

Description

Thin incrustations measuring 3.5 x 2 cm and 2.5 x 1.5 cm, respectively, on colonies of incrusting bryozoans. Consistency firm. Surface slightly conulose, somewhat hispid under the binocular microscope. Ectosome translucent, detachable from the choanosome in some places. Sieve areas ovoid, 0.5 mm in diameter, distributed over the entire surface. Colour bright orange in life, reddish cream in alcohol.

Spicule complement (Figure 45; Plates 37, 38a)

The five characteristic spicule types in this species are present in abundance in the Namibian specimens.

Choanosomal subtylostyles: very robust, the basal third, which is usually the thickest part, somewhat curved, head rounded, more or less well-defined, tip rather blunt, 400-750 μm x 28-48 μm [300-650 μm x 16-18 μm in the specimens from South Africa (Lévi, 1963)].

Ectosomal subtylostyles: slightly fusiform, the basal third somewhat narrowed, head very slightly swollen, 280-335 μm x 11-15 μm (200-300 μm x 6-7 μm in the specimens from South Africa).

Desmata: asteroid, both the number of arms (up to seven counted) and the amount of silica variable, 40-170 μm in diameter, with arms to 20 μm thick (up to 110 μm in diameter in the specimens from South Africa).

Isochelae: arcuate, ovoid, shaft thick, with three short teeth, 33-40 μm x 5-7 μm (30-35 μm in the specimens from South Africa). The teeth on the isochelae can be smaller and the apices more acute, according to the drawings provided by Lévi (1963) for specimens from South Africa and Vacelet *et al.* (1976) for specimens from Madagascar.

Rhaphides: very thin, straight, appearing rough under the light microscope, clearly spined in electron microscope photomicrographs, 35-48 μm x 1.5 μm (32-38 μm long in the specimens from South Africa).

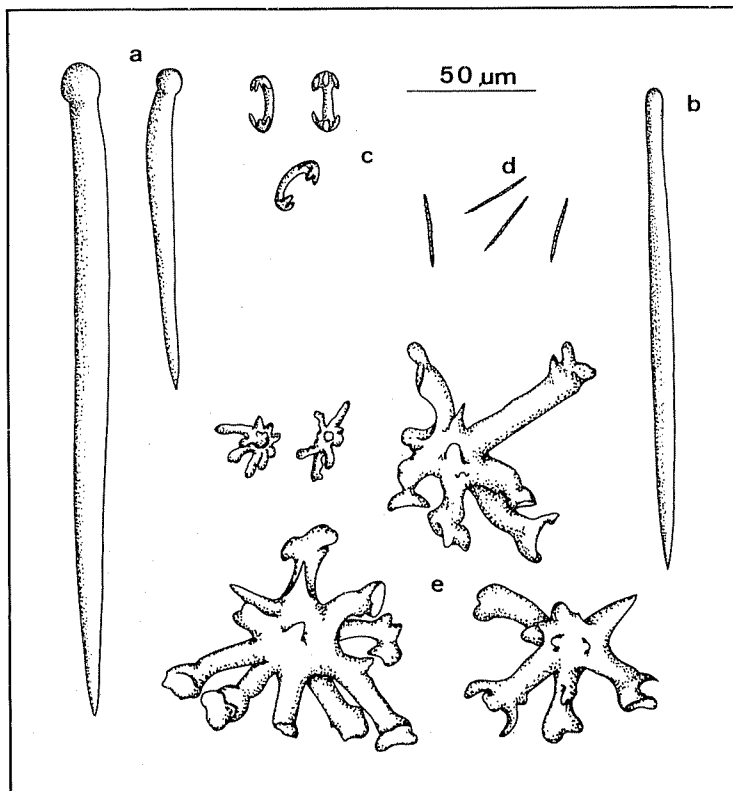


FIG. 45. *Crambe acuata*: a) choanosomal tylostyles; b) ectosomal subtylostyles; c) arcuate isochelae; d) rugose raphides; e) desmata.

Skeletal arrangement

Several layers of desmata with arms fused on a thin, basal sheet of spongin. Plumose bundles of choanosomal subtylostyles with the heads on the layer of desmata and the tips pointing upwards. Tangential subtylostyles in the ectosome. Microscleres scattered throughout the sponge.

Distribution

Indian Ocean: Aldabra Islands (Lévi, 1961). Madagascar (Vacelet *et al.*, 1976); South Atlantic: South Africa (Lévi, 1963). Bathymetric distribution: littoral zone to 182 m.

Discussion

There are certain differences between these Namibian specimens collected from relatively deep waters and the littoral specimens collected off South Africa, particularly the colour and the larger spicule size (some spicules up to five times thicker) in the Namibian specimens. The variability in the abundance of desmata, typical of the genus *Crambe*, is, in the case of the species *C. acuata*, apparently linked to certain environmental factors, particularly water temperature, affecting the deposition of silica. In warmer seas the desmata become difficult to find (Lévi, 1958, 1961; Vacelet *et al.*, 1976), while in the colder waters in the Saldanha Bay area, the desmata make up a thin basal layer (Lévi, 1963). In the always cold waters off southern Namibia, the desmata are arranged in several dense layers. The size of the other spicule types in this species also appears to be related to water temperature.

Family MYXILLIDAE Topsent, 1928

Genus *Burtonanchora* de Laubenfels, 1936

Myxillidae with ectosomal diacts and smooth styles as main megascleres. Isoanchorae and sigmata as microscleres (sensu de Laubenfels, 1936).

Burtonanchora sigmatifera Lévi, 1963**Material examined**

Benguela VI, Station P-57, specimens n.^{os} 6B-86a and 6B-86b, enveloping skeletons of bryozoans, hydroids, and polychaetes; Benguela VII, Station P-48, specimens n.^{os} 7B-3 and 7B-5,

Description (Plate 17a)

Massive or thickly incrusting sponge with folds, small protuberances, and openings, giving it an irregular appearance. Largest specimen measuring 10 × 4.5 cm. Consistency fragile, crumbly. Ectosome conspicuous, detachable in places. Surface apparently smooth but rough to the touch, with crests and sinuous grooves. Oscula of up to 0.5 cm in diameter, clustered in the upper portion. Numerous openings spread over the entire surface, some of which may be inhalant vents. Colour cream in alcohol.

Spicule complement (Figure 46)

Choanosomal styles: smooth, slightly curved, tip blunt, 340-400 μm × 12-20 μm (325-375 μm × 13 μm in the holotype from South Africa).

Ectosomal tornotes: straight, somewhat anisodiametric, tips abrupt, 230-270 μm × 7-10 μm (180-230 μm × 8 μm in the holotype).

Type I isoanchorae: resembling arcuate isochelae in appearance because the teeth are few and only slightly separated from the shaft, 28-40 μm in length, 3-5 μm thick across the shaft (30-36 μm long in the holotype).

Type II isoanchorae: similar to the type I isoanchorae morphologically, teeth so small as to be barely discernible, 12-17 μm long (18 μm in the holotype).

Type I sigmata: not numerous, one of the ends bent more sharply than the other, 53-60 μm × 3-5 μm (40-50 μm in the holotype).

Type II sigmata: abundant, morphologically similar to the type I sigmata, 11-15 μm long and a mere 1.5 μm thick (13 μm long in the holotype).

As indicated above, spicule sizes in the specimens from Namibia are larger than in the holotype from South Africa (Lévi, 1963).

Skeletal arrangement

In the choanosome, an isodictyal network of styles one, two, or three spicules to a side, echina-

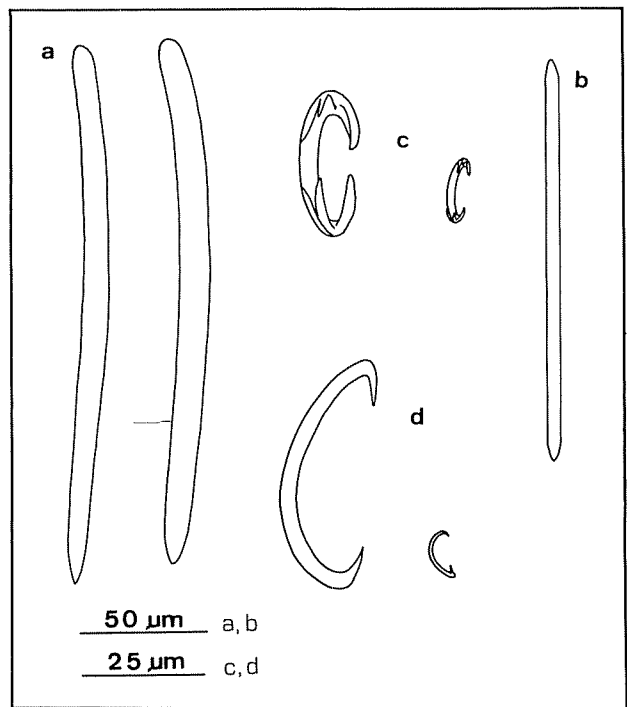


FIG. 46. *Burtonanchora sigmatifera*: a) styles; b) ectosomal tornote; c) isoanchorae; d) sigmata.

ted by loose styles at the nodes of the meshes. Tangential tornotes in the ectosome. Scattered microcleres in both the ectosome and the choanosome.

Distribution

South Atlantic: South Africa (Lévi, 1963). Bathymetric distribution: 58-277 m.

Discussion

This species closely resembles *B. myxilloides* Lévi, 1960, from off central western Africa (Senegal and Mauritania), from which it is differentiated only by the smaller size of all the spicule types. As already pointed out in the section dealing with the spiculation, the spicules in these Namibian specimens of *B. sigmatifera* are larger than those in the specimens from South Africa. Since to date only a few specimens of these species have been examined, and therefore the variability in spicule size is not definitely known, the possibility that these two species may be conspecific should not be overlooked.

Genus *Crellomyxilla* Dendy, 1924

Myxillidae with a main skeleton consisting of an isodictyal or subisodictyal reticulation of acanthostyles, that do not form discrete strands. Ectosomal skeleton of smaller, tangential acanthostyles or acanthoxeas, more or less supported by brushes composed of subectosomal tornotes. Tridentate isochelae; sometimes also sigmata, as microscleres (sensu Dendy, 1924, as modified sensu Boury-Esnault and van Beveren, 1982).

Crellomyxilla chilensis (Thiele, 1905)**Synonyms**

Myxilla chilensis Thiele, 1905
Ectyomyxilla chilensis (Thiele) Lévi, 1956
Ectyomyxilla kerguelensis Hentschel (Boury Esnault, 1973)

Material examined

Benguela VI, Station P-57, specimen n.º 6B-88.

Description

Small specimen in a thinly incrusting habit covering an extension of 1 cm² on the corneous tube of a polychaete. Consistency very soft. Surface smooth. Ectosome readily detachable from the choanosome, with a proper skeleton. Aquiferous openings not discernible. Colour white in alcohol.

Spicule complement (Figure 47)

Choanosomal acanthostyles: straight or very slightly curved, entirely spined, 165-210 µm × 8-11 µm.

Ectosomal acanthostyles: slightly curved, entirely spined, proximal portion somewhat narrowed, tip abrupt, 100-120 µm × 5-7 µm.

Tornotes: straight, ends lanceolate, one more swollen than the other, 190-210 µm × 6-7 µm.

Sigmata: C- or S-shaped, one end sharply bent and often twisted at an angle of 90° with respect to the main spicule plane, 25-32 µm.

Isochelae: tridentate, shaft arcuate, clearly separable into two size classes of 30-32 µm and 12-15 µm in length, resembling isoanchorae somewhat in appearance and considered such by Koltun (1964).

Skeletal arrangement

Myxilloid network of main acanthostyles in the choanosome. A dense layer of tangential, ectosomal acanthostyles supported by divergent bundles of

tornotes in the ectosome. Microscleres scattered throughout the sponge.

Distribution

Pacific: Chile (Thiele, 1905); Indo-Pacific: New Zealand (Dendy, 1924); subantarctic region: Kerguelen area (Lévi, 1956; Bourly-Esnault and van Beveren, 1982). Falkland Islands (Burton, 1932); Atlantic: Brazil (Boury-Esnault, 1973), Namibia (Uriz, in press, a). Bathymetric distribution: 97-250 m.

Discussion

Spicule size in this specimen tends to be smaller than that in an earlier specimen collected off Namibia (Uriz, in press, a) but, even so, the spiculation conforms fully to that in the species *C. chilensis*. Differentiation of this species from *C. kerguelensis*, which would appear to be quite straightforward on the basis of the spicule drawings provided by Boury-Esnault and van Beveren (1982), is not as clear-cut when the illustrations of other authors (Dendy, 1924; Lévi, 1963) are used, suggesting that these two species may sometimes have been confused.

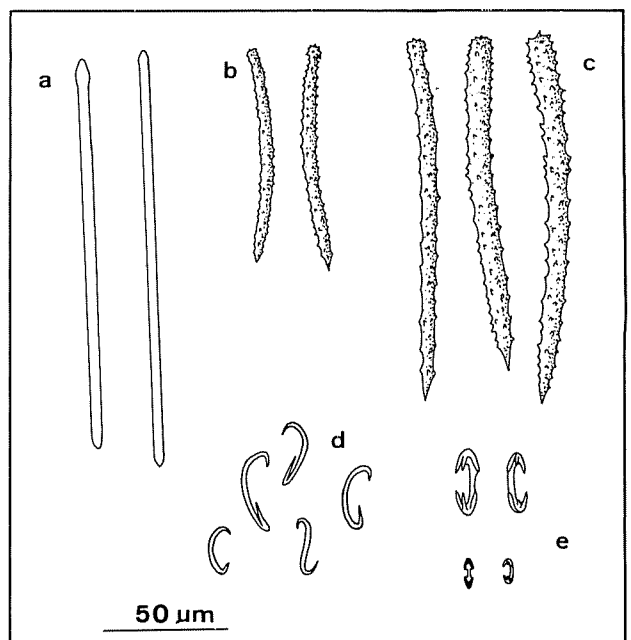


FIG. 47. *Crellomyxilla chilensis*: a) tornotes; b) ectosomal acanthostyles; c) choanosomal acanthostyles; d) sigmata; e) isochelae.

Genus *Ectyonancora* Lévi, 1963

Myxillidae with a reticulate skeleton of acanthostrongyles echinated by acanthostyles. Dermal tornotes. Isoanchorae (sensu Lévi, 1963).

Ectyonancora walvisensis sp. nv.**Synonym**

Plocamiancora denticulata Topsent (Uriz, 1985)

Material examined

Benguela V, Station P-58, specimens n.^{os} B-17 and B-18; Benguela VI, Station P-57, specimen n.^o 6B-90; Benguela VII, Station P-48, specimens n.^{os} 7B-4, 7B-9, and 7B-18 (holotype).

Description (Plate 17)

Thinly (juvenile stages) or thickly incrusting or massive sponge, in this last habit with irregular or subcylindrical branches, often anastomosed. Consistency firm but fragile. Surface irregular, hispid (more so in incrusting habits). Ectosome not detachable from the choanosome. Oscula not discernible. Colour light or dark brown in alcohol. The holotype (incrusting specimen n.^o 7B-18) consisting of a thin, plate-like base 3 mm thick measuring 5.5 cm × 1.5 cm, from which there issue two subcylindrical branches 0.4 and 0.5 cm in diameter (at the base). An axial concentration of spicules running lengthwise through the branches.

Spicule complement (Figure 48; Plates 38b, 38c)

Acanthostrongyles: slightly curved, very robust, entirely spined, spines more densely packed near the ends, 135-245 µm × 18-25 µm (135-245 µm × 20-24 µm in the holotype).

Acanthostyles: coniform, the basal third slightly curved, generally spined only on the base, spination extending in no case beyond the midpoint, 310-710 µm × 20-40 µm (430-620 µm × 20-38 µm in the holotype).

Ectosomal tornotes: straight, narrow, the ends slightly but unequally swollen, 220-340 µm × 3-5 µm (290-315 µm × 4-5 µm in the holotype).

Type I isoanchorae: shaft curved, teeth long, the teeth on opposite ends nearly touching in some instances; seven teeth consistently visible in scanning electron microscope photomicrographs, five to seven appearing under the light microscope, depending upon spicule position, 40-70 µm long (42-65 µm in the holotype).

Type II isoanchorae: morphologically similar to the type I isoanchorae, 28-35 µm long (29-35 µm in the holotype). It was difficult to distinguish between the two types of isoanchorae in all the specimens examined, with intermediate forms not uncommon. Smaller isoanchorae measuring 22-25 µm, with very short teeth, are no doubt spicules still in the growth stages.

Skeletal arrangement (Figure 49)

Isodictyal network of acanthostrongyles one to three spicules to a side, echinated at the nodes by acanthostyles. Acanthostyles particularly promi-

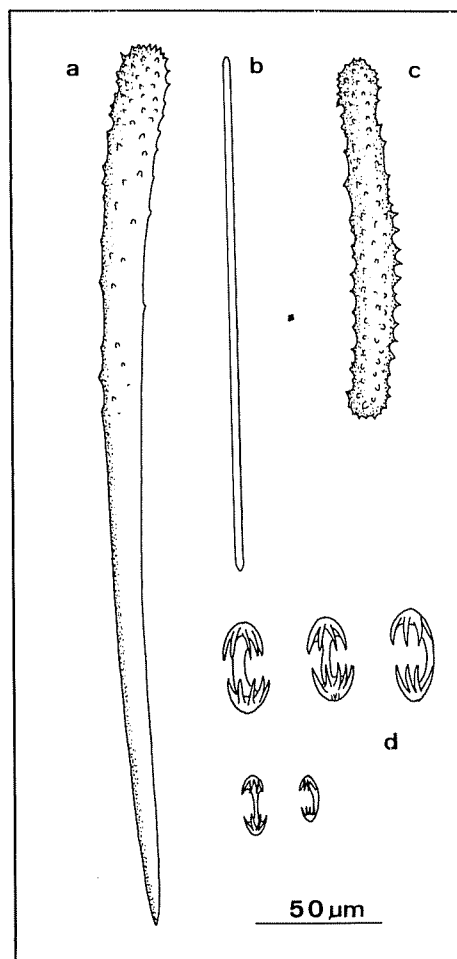


FIG. 48. *Ectyonancora walvisensis*: a) hispidity-producing acanthostyle; b) ectosomal tornote; c) acanthostrongyle; d) types I and II isoanchorae.

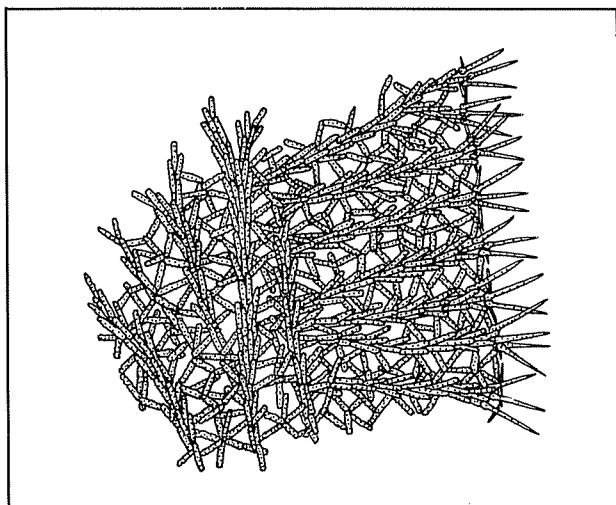


FIG. 49. *Ectyonancora walvisensis*: spicule arrangement ($\times 50$).

ment at the periphery of the sponge, where they pierce the ectosome, giving rise to pronounced external hispidity. In addition to this isodictyal network, thick, longitudinal sections show a central region with longitudinal rows of spicules and a peripheral region in which the rows are perpendicular to the surface, i.e., in a generally axial arrangement. Tangential tornotes and densely packed isoanchorae in the ectosome. Isoanchorae also scattered in the choanosome.

Location

Common in the study area ($29^{\circ} 21.9' S$, $14^{\circ} 46.4' E$), 245 m, bottom rocky.

Discussion

The spiculation and spicule size in the massive specimens of this species collected during the latest cruises in the Benguela series concur fully with those in the incrusting specimens collected previously (Uriz, in press, a), which were assigned to the genus *Plocamiancora* Topsent because of their habit. It is now clear that these were early growth stages of a massive, branching sponge which thus belongs in the genus *Ectyonancora* Lévi. However, the Namibian specimens differ from the other known species of the genus, particularly from the closest, *E. pluridentata* Lévi, in the uni-trispicular structure of the skeletal meshes, the acanthostrongyles, which are considerably shorter but as thick (and consequently more robust), the larger acanthostyles, and the types of isoanchorae, patently smaller and consistently bearing seven teeth. The low variability in these characters among all the specimens examined is suggestive of a new species. The distinction between the genera *Plocamiancora* and *Ectyonancora* is, in any event, open to question in view of the fact that the spicule arrangement is also myxilloid in the incrusting habit.

Genus *Myxilla* Schmidt, 1862

Myxillidae with monactinal megascleres and diactinal ectosomal spicules. Isoanchorae and sigmata as microscleres (sensu Topsent, 1928).

Myxilla simplex Baer, 1905

Material examined

Benguela VI, Station P-57, specimen n.º 6B-69.

Description

Thickly incrusting specimen 1.5 cm in diameter growing on the corneous tube of a polychaete. Consistency soft and crumbly. Surface somewhat uneven, slightly hispid under the binocular microscope. Ectosome detachable from the choanosome in some places. Aquiferous openings not discernible. Colour whitish in alcohol.

Spicule complement (Figure 50)

Ectosomal tornotes: straight, fusiform, ends rounded on thickest ones, $150-180 \mu\text{m} \times 5-19 \mu\text{m}$.

Acanthostyles: entirely spined, slightly curved, tip abrupt, $190-230 \mu\text{m} \times 10-16 \mu\text{m}$.

Sigmata: C- or S-shaped, only slightly curved, separable into two distinct size classes, $35-40 \mu\text{m} \times 2.5 \mu\text{m}$ and $10-13 \mu\text{m} \times 1.4 \mu\text{m}$.

Isoanchorae: $24-32 \mu\text{m}$ long.

Skeletal arrangement

Myxilloid network of acanthostyles, more or less well-defined, depending on the region. Meshes

uni-, bi-, or polyspicular in the choanosome. Scattered isoanchorae and sigmata. Tangential tornotes, sigmata, and isoanchorae scattered in the ectosome.

Distribution

Indian Ocean: Zanzibar (Baer, 1906); South Atlantic: South Africa (Stephens, 1915; Lévi, 1963, 1969), Namibia (Uriz, in press, a). Bathymetric distribution: littoral zone to 232 m.

Discussion

The megascleres in this specimen are somewhat more robust than those in specimens from Namibia examined previously (Uriz, in press, a). The megascleres in deep-water specimens of this species appear to be definitely larger than those in specimens collected inshore (Lévi, 1963, 1969).

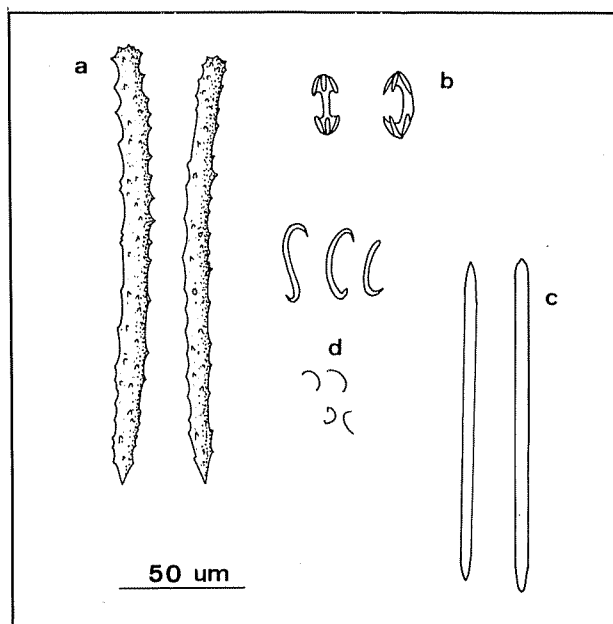


FIG. 50. *Myxilla simplex*: a) choanosomal acanthostyles; b) isoanchorae; c) ectosomal tornotes; d) sigmata.

Myxilla rosacea (Lieberkühn, 1859)

Synonym

Halichondria rosacea Lieberkühn, 1859

Material examined

Benguela VII, Station P-79, specimen n.º 7B-13.

Description

Massive specimen, with large, finger-like processes up to 7 cm in length by 0.5-1.5 cm in thickness. Consistency soft. Surface glabrous, rough to the touch. Ectosome detachable from the choanosome. Scattered oscula, around 1 mm in diameter. Colour whitish in alcohol.

Spicule complement (Figure 51)

Shape and size similar to those in the Northern Hemisphere (Arndt, 1934), somewhat more robust than in a specimen collected off Namibia earlier (Uriz, in press, a).

Ectosomal tornotes: fusiform, truncate, spined on both ends, 160-210 µm × 5-10 µm.

Acanthostyles: tip abrupt, unevenly spined, spination more abundant on the head an tip, 240-265 µm × 10-13 µm.

Sigmata: C- and S-shaped, one end more sharply bent than the other, 15-42 µm × 1-2 µm.

Isoanchorae: separable into two size classes, 15-22 µm × 1.5-2 µm and 30-40 µm × 4-6 µm.

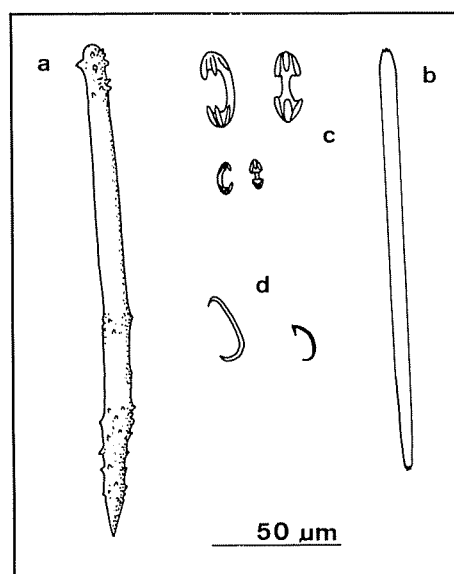


FIG. 51. *Myxilla rosacea*: a) acanthostyle; b) ectosomal tornote; c) types I and II isoanchorae; d) sigmata.

Skeletal arrangement

Isodictyal network of bi- or trispicular meshes of acanthostyles in the choanosome. Tangential tornotes in the ectosome. Scattered sigmata and isoanchorae.

Distribution

North Atlantic, Mediterranean, and Arctic (numerous authors); South Atlantic: Namibia (Uriz, in press, a).

Genus *Iophon* Gray, 1867

Myxillidae with bipocilla associated with a characteristic type of anisochela as microscleres (sensu Dendy, 1905).

Iophon proximum* (Ridley, 1881)*Synonyms**

Alebion proximum Ridley, 1881
Pocillon hyndmani (Bowerbank) Stephens, 1915

Material examined

Benguela VI, Station P-57, specimen n.º 6B-104; Station P-96, specimen n.º 7B-15. Benguela VII, Station P-48, specimen n.º 7B-103.

Bipocilla: conventionally shaped, shaft broad, 10-14 µm.

Specimens 6B-103 and 7B-104

Acanthostyles: straight, robust, completely spined, tip abrupt, 290-350 µm × 15-20 µm.

Acanthotylotes: ends swollen, rounded, and spined, shaft straight, 200-280 µm × 7-10 µm.

Description (Plate 18a)

Irregular, massive or thickly incrusting sponge. Consistency fragile, soft and crumbly. Surface uneven but not hispid, with calcareous inclusions. Ectosome detachable in places. Aquiferous openings not discernible. Colour dark brown with a certain reddish or grayish tinge in alcohol. Specimen n.º 7B-15, in the incrusting habit, whitish beige in alcohol.

Spicule complement (Figures 52, 53; Plates 39b, 39c, 40, 41)

Specimen n.º 7B-15

Type I acanthostyles: slightly curved, profusely spined on the head, spination thinning out along the shaft and disappearing on the apical third, 200-250 µm × 8-12 µm.

Type II acanthostyles: straight, completely spined, 90-110 µm × 4-8 µm.

Acanthotylotes: straight, ends slightly swollen and truncated, bearing rudimentary spines, 175-200 µm × 2-4 µm.

Anisochelae: characteristic, upper blade long, lower blade very short, bearing a medial spur, 12-14 µm and 19-25 µm long but difficult to separate into two distinct size classes.

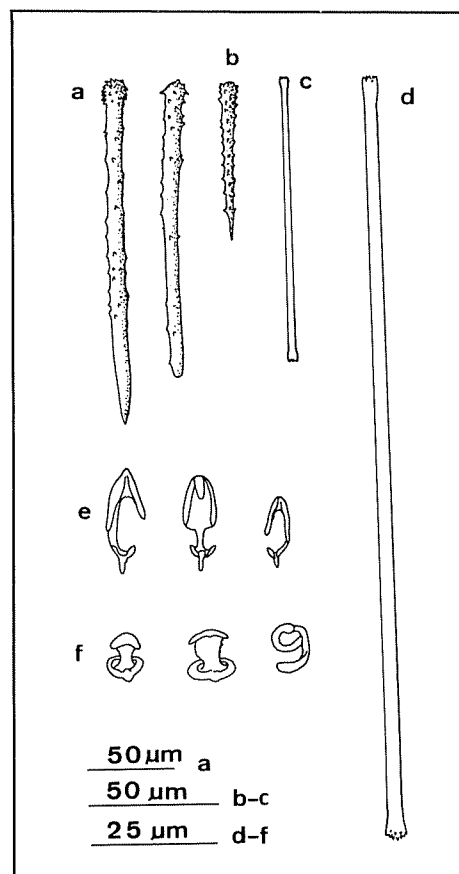


FIG. 52. *Iophon proximum* (specimen no. 7B-15): a) type I acanthostyles; b) type II acanthostyle; c) acanthotylote; d) acanthotylote; e) anisochelae; f) bipocilla.

Anisochelae: similar in shape to those in the preceding specimen but clearly separable into two different size classes, 12-14 μm and 19-25 μm , the larger ones forming rosettes.

Bipocilla: conventional in shape, small, 8-13 μm .

Skeletal arrangement

Isodictyal, uni- or paucispicular network of acanthostyles in the choanosome (somewhat irregular in certain areas), sometimes echinated by secondary acanthostyles. Tangential acanthotyloles, scattered or in reticulate bundles, in the ectosome. Scattered microscleres in abundance, type I isochelae forming rosettes.

Distribution

Antarctic: Koltun (1964); subantarctic region: Kerguelen area (Boury-Esnault and van Beveren, 1982); Pacific: Galapagos Islands (Burton, 1932); South Atlantic: South Africa (Stephens, 1915; Burton, 1936; Lévi, 1963), Namibia (Uriz, in press, a).

Discussion

Comparing the spicule types in specimen n.º 7B-15 and in the other two specimens from the same general area, it is hard to regard them as

conspecific. However, the first specimen conforms to the species descriptions made by Lévi (1963) and Koltun (1964), whereas the other two coincide exactly with the description given by Bourly-Esnault and van Beveren (1982). Burton (1932) referred to the broad range of variability in this species.

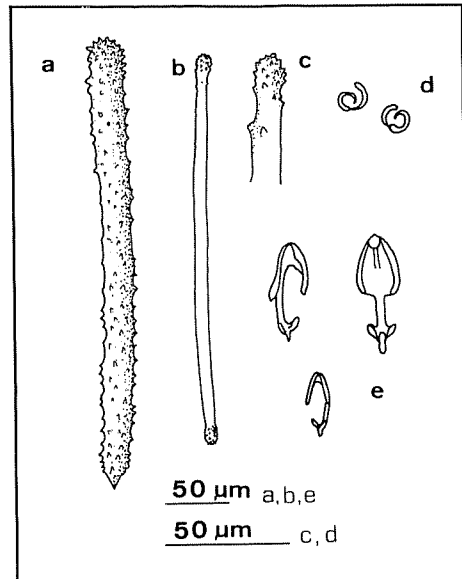


FIG. 53. *Iophon proximum* (specimen no. 6B-103); a) acanthostyle; b) acanthotylole; c) acanthotylole; d) bipocilla; e) anisochelae.

Iophon chelifer Ridley & Dendy, 1886

Material examined

Benguela V, Station P-58, specimen n.º B-33.

Description

Specimen enveloping the branches of a hydroid. Surface irregularly hispid. Ectosome detachable only in certain places. Colour tan in alcohol.

Spicule complement

Acanthostyles: 260-320 μm \times 15-20 μm .

Acanthotyloles: 205-270 μm \times 6-8 μm .

Anisochelae: 24-33 μm \times 11-15 μm .

Normal bipocilla: 10-12 μm .

Clover-leaf bipocilla: 14-18 μm .

Distribution

Subantarctic region: Kerguelen area (Boury-Esnault and van Beveren, 1982); South Atlantic: Cape of Good Hope (Ridley and Dendy, 1887) Namibia (Uriz, in press, a).

Family HYMEDESMIIDAE Topsent, 1928

Genus *Hymedesmia* Bowerbank, 1864

Hymedesmiidae with basal acanthostyles with the heads frequently anchored on a sheet of spongin and an ectosomal skeleton composed of tornotes, tylotes, or thin styles. Arcuate isochelae and sometimes some sigmata as microscleres (sensu Boury-Esnault and van Beveren, 1982).

Hymedesmia mertoni Hentschel, 1912**Material examined**

Benguela VII, Station P-40, specimens n.^{os} 7B-55, 7B-57, and 7B-77, on rock.

Description

Incrusting specimens covering areas of 1 cm², 7 cm², and 20 cm², respectively. Surface glabrous to the eye, microhispid under the binocular microscope. Ectosome translucent, detachable from the choanosome. Aquiferous openings not discernible. Colour whitish, somewhat translucent because of the extreme thinness of this sponge, in alcohol.

Spicule complement (Figure 54)

Acanthostyles: straight, coniform, entirely spined, the spines on the distal half pointing towards the head, separable into two size classes, 150-180 µm and 65-85 µm × 6-8 µm.

Ectosomal tornostromyles: straight, extremely thin, ends slightly subequal, 150-162 µm × 1-1.5 µm.

Type I isochelae: arcuate, teeth short, often irregular, shaft thick, 38-55 µm long × 5-9 µm thick through the shaft.

Type II isochelae: shaft curved, medial teeth on the upper and lower blades aligned and rather closely spaced (in lateral view), 22-24 µm long × 2 µm thick across the shaft.

Sigmata: one end more sharply curved than the other, separable into two distinct size classes, 82-90 µm × 2-3 µm and 24-35 µm × 1.5 µm.

Skeletal arrangement

Typically hymedesmoid: a layer of large and small acanthostyles with the heads on the substratum. Tangential tornostromyles in the ectosome. Sigmata and isochelae throughout the sponge, particularly abundant in the ectosome.

Distribution

Indian Ocean: Arafura Sea (Hentschel, 1912), Gulf of Mannar (Thomas, 1969), Great Barrier Reef (Burton, 1934), Madagascar (Vacelet *et al.*, 1976); North Atlantic: Azores (Boury-Esnault and Lopes, 1985). First record in the South Atlantic. Bathymetric distribution: littoral zone to 160 m.

Discussion

The spicule types and appearance in these Namibian specimens show good agreement with those in this Indian Ocean species, recently recorded in the North Atlantic (Boury-Esnault and Lopes, 1985). However, microsclere size is larger in the Namibian specimens, which makes species identification more difficult, even though larger spicule sizes are not uncommon in this area. The shape of the type I isochelae in the Namibian specimens more closely resembles that in the specimens from the Azores (Boury-Esnault and Lopes, 1985) than that in the specimens from Madagascar (Vacelet *et al.*, 1976).

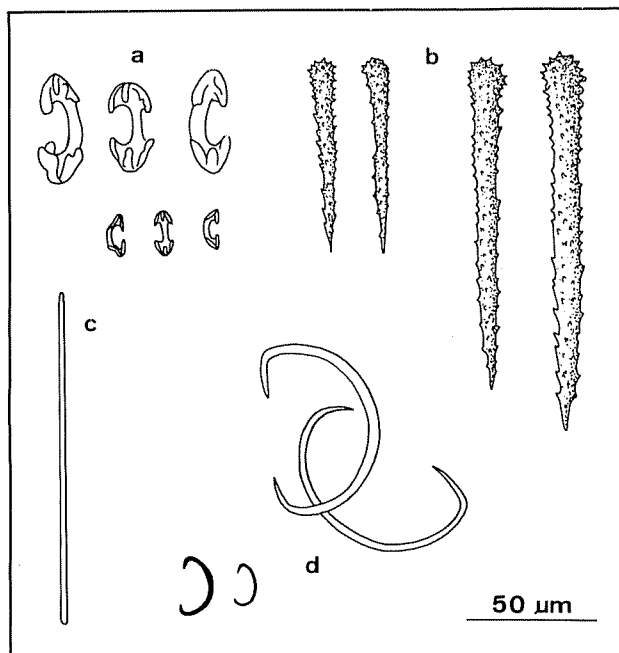


FIG. 54. *Hymedesmia mertoni*: a) two sizes of isochelae; b) two classes of acanthostyles; c) tornostromyle; d) two classes of sigmata.

Hymedesmia aurantiaca Lévi, 1963**Material examined**

Benguela VII, Station P-40, specimens n.^{os} 7B-27, 7B-48, and 7B-71, on rock.

Description

Extremely thin incrusting specimens less than 0.5 mm thick covering several cm² of rock surface. Ectosome conspicuous, detachable from the choanosome in strips. Surface slightly hispid. Oscula not discernible. Colour reddish orange in life and in alcohol. Ectosome thinner in these specimens than in the other specimens from the region examined previously (Uriz, in press, a).

Spicule complement (Figure 55)

Main acanthostyles: head somewhat swollen, covered with strong, blunt or rounded spines, shaft slightly curved, spined only on the proximal half or third, 380-410 μm \times 15-20 μm .

Accessory acanthostyles: straight, head well-developed, completely spined, 90-110 μm \times 8-10 μm .

Ectosomal tornotes: straight, borders undulated, tips abrupt, 250-310 μm \times 5-8 μm .

Isochelae: markedly arcuate, tridentate, teeth very short, cord length 32-40 μm , shaft diameter 3-4 μm , and radius of curvature 15-20 μm .

Skeletal arrangement

A thin layer of main and accessory acanthostyles within a basal sheet of spongin. Main acanthostyles just barely protruding through the ectosome, giving rise to a slight hispidity in places. Ectosomal skele-

ton composed of tangential tornotes, loose or in confused bundles, with an abundance of isochelae.

Distribution

South Atlantic: South Africa (Lévi, 1963), Namibia (Uriz, in press, a). Bathymetric distribution: littoral zone to 183 m.

Discussion

The main difference between the spicules in these specimens and those in earlier specimens collected from the same general area is the undulation of the tornotes.

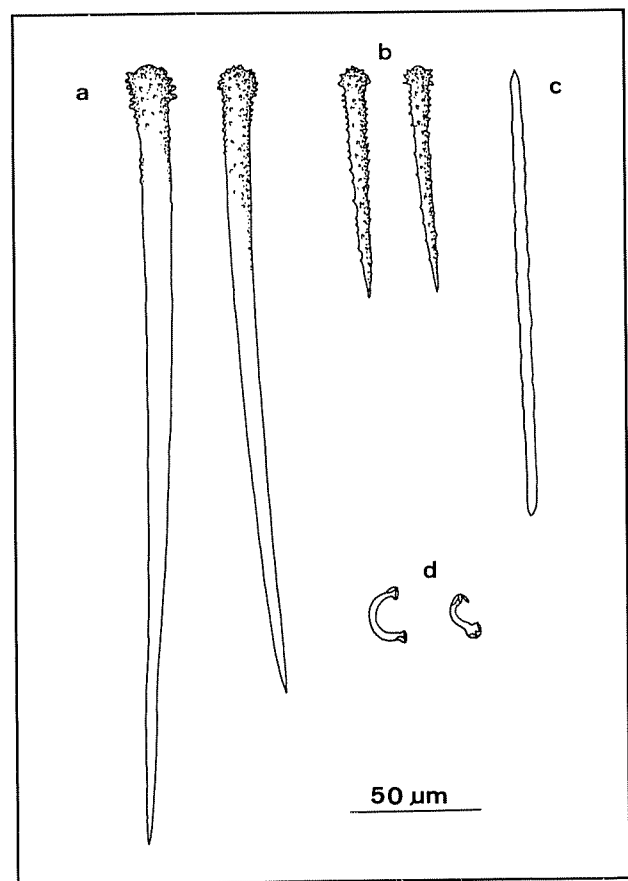


FIG. 55. *Hymedesmia aurantiaca*: a) main acanthostyles; b) accessory acanthostyles; c) ectosomal tornote; d) arcuate isochelae.

Family ANCHINOIDAE Topsent, 1928

Genus *Pronax* Gray, 1867

Anchinoidea with a choanosomal skeleton formed by bundles of main acanthostyles echinated by accessory acanthostyles. Ectosomal skeleton made up of tangential tornotes. Isochelae, sometimes also sigmata, as microscleres (sensu Lévi, 1973).

Pronax benguelensis Uriz 1984**Material examined**

Benguela V, Station P-58, specimen n.º B-31;
Benguela VI, Station P-96, specimen n.º 6B-117.

Description

Thinly incrusting specimens occupying areas of less than 1 cm² on brachiopod shells. Consistency soft. Ectosome conspicuous, translucent, detachable from the choanosome only in a few places. Aquiferous openings not discernible. Colour yellowish white or cream in alcohol.

Spicule complement (Figure 56)

Main acanthostyles: slightly curved, spined only on the basal third or halfway down the shaft, spination denser on the smaller ones, 290-530 µm × 10-15 µm [220-600 µm × 11-17 µm in the holotype (Uriz, 1984)].

Accessory acanthostyles: straight, completely spined, head more or less well-developed, 95-130 µm × 5-8 µm (90-135 µm × 5-9 µm in the holotype).

Ectosomal tornotes: straight, slightly fusiform, tip abrupt, 180-193 µm × 4-5 µm (175-190 µm × 4-5 µm in the holotype).

Isochelae: markedly arcuate, blades short, shaft broad, 15-35 µm × 3-4 µm (shaft diameter), two size classes suspected but not definitely distinguishable (13-19 µm × 3-4 µm and 29-37 µm × 3-4 µm in the holotype).

Skeletal arrangement

Plumose bundles of main acanthostyles echinated by accessory acanthostyles. Tangential tornotes in the ectosome, and scattered isochelae in both the ectosome and the choanosome.

Distribution

South Atlantic: Namibia (Uriz, 1984).
Bathymetric distribution: 260-322 m.

Discussion

These newly collected specimens closely resemble the holotype, except for the somewhat smaller size of the acanthostyles.

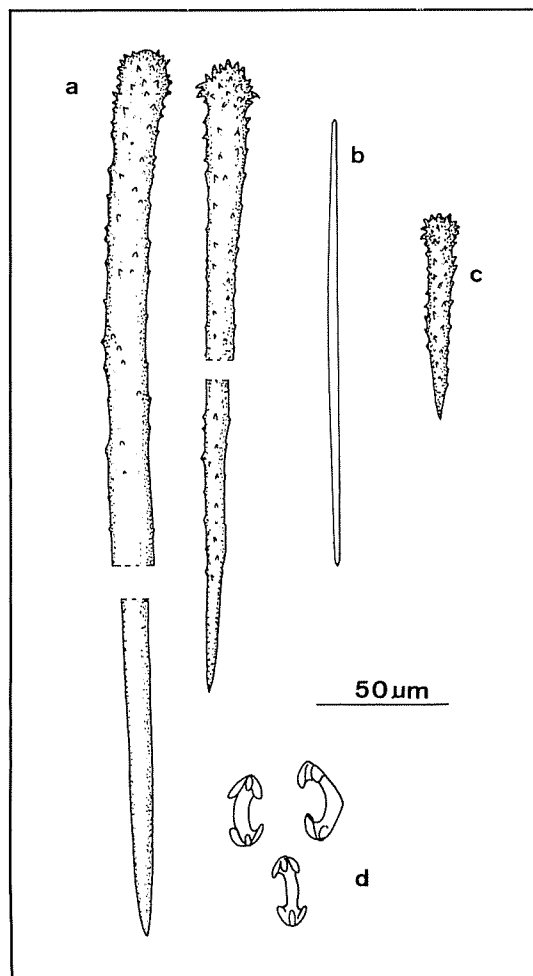


FIG. 56. *Pronax benguelensis*: a) ectosomal style; b) main acanthostyle; c) accessory acanthostyle; d) isochelae.

Genus *Anchinoe* Gray, 1862

Anchinoidea with a skeleton composed of polyspicular bundles of acanthostyles echinated by ectosomal diacts. Ectosomal skeleton composed of diacts. Arcuate isochelae and sigmata as microscleres (sensu Lévi, 1973).

Anchinoe bardajii sp. nv.**Material examined**

Benguela VI, Station P-57, specimen n.º 6B-66. (holotype).

Description (Plate 18b)

Massive specimen, elongate, in the form of a somewhat flattened, finger-like projection, 8 cm × 1.5-1.8 cm. Ectosome relatively thick, in places separated from the choanosome by aquiferous cavities. Numerous coniform protuberances 1-1.5 mm in diameter, inhalant vents in sieve areas contracted. Consistency rather loose, somewhat tough, easily torn, especially lengthwise. Surface non-hispid but rough to the touch. Colour light brown in alcohol.

Spicule complement (Figure 57)

Main acanthostyles: slightly curved, head slightly swollen, spined on the basal half or two-thirds, 650-840 µm × 19-22 µm.

Accessory acanthostyles: straight, coniform, head slightly swollen, entirely spined, 155-185 µm × 10-13 µm.

Stylotornotes: straight, one end rounded, the other terminating in an abrupt, poorly defined point, 380-420 µm × 7-10 µm.

Isochelae: arcuate, blades short, 40-50 µm × 5-7 µm (shaft thickness).

Skeletal arrangement

Reticulate skeleton of main acanthostyles echinated by accessory acanthostyles and stylotornotes, the latter more or less abundant, depending on the area. Tangential stylotornotes in the ectosome, scattered, in bundles, or forming a circular palisade holding erect the ectosomal ridge

circumvallating the sieve areas. Isochelae distributed throughout the sponge, but especially concentrated in the ectosome.

Location

29° 21' S, 14° 14' E, depth 232 m, bottom rock with semifossil madreporarians.

Discussion

The skeletal arrangement of this specimen definitely places it in the genus *Anchinoe*. It is differentiable from the other known species of this genus in the Southern Hemisphere by the large size

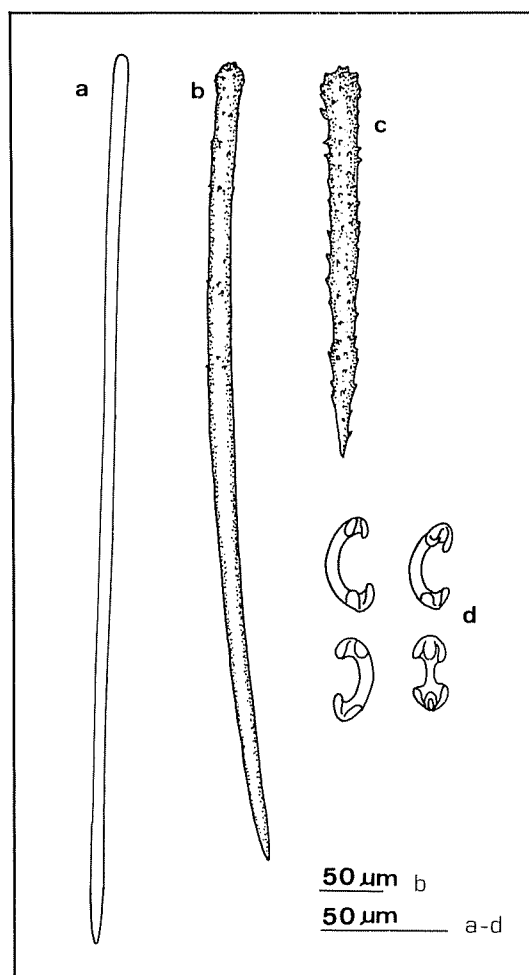


FIG. 57. *Anchinoe bardajii*: sp. nv.: a) ectosomal style; b) main acanthostyle; c) accessory acanthostyle; d) arcuate isochelae.

of its type I acanthostyles and isochelae and by the presence of ectosomal stylotornotes rather than tornotes.

This species is dedicated to Ms. M.V. Bardají, in appreciation for her invaluable assistance in completing the present work.

Family COELOSPHAERIDAE Hentschel, 1923

Genus *Inflatella* Schmidt, 1875

Coelospheeridae with a single type of diactinal megascleres and no microscleres (sensu Lévi, 1973).

Inflatella belli (Kirkpatrick, 1907)

Synonyms

Joyeuxia belli Kirkpatrick, 1907
Joyeuxia tubulosa Hentschel, 1914
Inflatella sphaerica Dendy, 1924
Joyeuxia fistulosa Dendy, 1924

Material examined

Benguela VI, Station P-96, specimen n.º 6B-3, on rock; Station P-57, specimen n.º 6B-19, carried by the crustacean *Exodromidia spinosa*; Benguela VII, Station P-48, specimen n.º 7B-20, on rock.

Description (Plate 19)

Subglobose, slightly elongate specimens between 2 cm and 5 cm in diameter, covered with papillae, mostly broken. None of the caliciform inhalant formations described by Kirkpatrick (1907) observable, however, truncate, inhalant papillae 2 mm wide discernible. Papillae thus appreciably smaller than those described in other specimens (Dendy, 1924). Tough, leathery cortical zone 0.3-0.6 mm thick clearly differentiable from the amorphous, soft, pulpy choanosome, leaving subcortical cavities. Consistency of cortex leathery, of choanosome soft and delicate. Colour of ectosome greenish brown in life, yellowish brown in alcohol; choanosome darker. Specimen n.º 6B-3, collected in January (summer in the Southern Hemisphere), with embryos 300-500 µm in diameter in the choanosome proximate to the cortex.

Spicule complement (Figure 58)

Oxeas: anisodiametric, straight or slightly curved, one end lanceolate, the other slightly rounded, 550-850 µm × 8-20 µm.

Skeletal arrangement

Tangential spicules forming several overlapping layers in the cortex. Dense layer of upright spicules in the papillae. Irregularly reticulate or confused bundles in the choanosome.

Distribution

This species's distribution range appears to be restricted to the Southern Hemisphere, where it is particularly abundant in the Antarctic and subantarctic region. Indo-Pacific: New Zealand (Dendy, 1924); Antarctic: circumpolar (Kirkpatrick, 1907, 1908; Hentschel, 1914; Koltun, 1964, 1976);

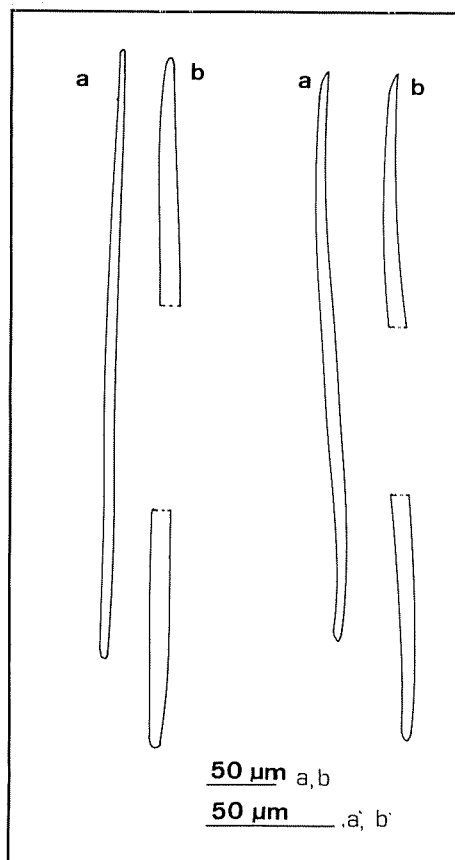


FIG. 58. *Inflatella belli*: anisodiametric oxeas.