

Demosponges of the red coral bottoms from the Alboran Sea

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This paper deals with a study of demosponge fauna inhabiting the red coral facies on the circalitoral bottoms surrounding the Alboran Island (Western Mediterranean, Alboran Sea). A total of 58 species were recognized, after examining a total of 107 sponges. Two of these species are new to science (*Plakinastrella mixta* sp. nov. and *Leptolabis megachela* sp. nov.) and another one (*Rhaphidectyon spinosum* Topsent) is recorded for the first time in the Mediterranean. Some other specimens collected belonging to poorly known species, such as *Erylus papulifer* Pulitzer-Finali, *Isops anceps* (Vosmaer), *Spongosorites flavens* Pulitzer-Finali and *Timea cumana* Pulitzer-Finali, are described briefly. Two controversial specimens, assigned to *Microciona spinarcus* and *Plocamilla* cf. *novizelanica*, are also described and discussed. A high degree of epibiosis and abundance of rare species were the major features characterizing the material studied.

KEYWORDS: Demospongiae, *Corallium rubrum*, systematics, Alboran Sea.

Introduction

The Alboran Sea is a very special Mediterranean basin, notable for its particular water circulation (Lacombe, 1971; Lanoix, 1974) and its geological history (Maldonado, 1978). Its condition of nexus between Mediterranean and Atlantic specially implicates it in the bidirectional biotic exchange through the Strait of Gibraltar. The zone of the Alboran Sea, located between the Alboran Island and the Algerian coast, is subjected to a notable influence of the Atlantic water (above a depth of 80–100 m), since about 65% of the entering Atlantic water at Gibraltar is recirculated within an anticyclonic gyre (Hopkins, 1978). Thus, favourable preconditions exist to allow the successful colonization by Atlantic immigrants. The Atlantic water presence confines the location of most immigrants to this Mediterranean zone, besides bringing about the absence of some typical Mediterranean endemics (Pérès and Picard, 1964). Consequently, interesting communities characterized by containing an admixture of Atlantic and Mediterranean species occur in this area (Pérès, 1985).

In spite of this faunistic uniqueness, current knowledge on the biota inhabiting most of these bottoms is very fragmentary. The sponge fauna of the Alboran Sea and Strait of Gibraltar was largely ignored until the recent extensive surveys started in the 1980s (i.e. research of the Spanish Institute of Oceanography on red coral fisheries in 1984, *Balgim* cruise in 1984, cruise of the Italian Research Vessel *Bannock* in 1985, *Fauna-I* cruise in 1989). Previously, only two collections have been reported from Algerian coasts (Schmidt, 1868; Topsent, 1901) and a single station was worked in the Alboran Sea by Topsent (1928), in spite of the numerous cruises conducted close by

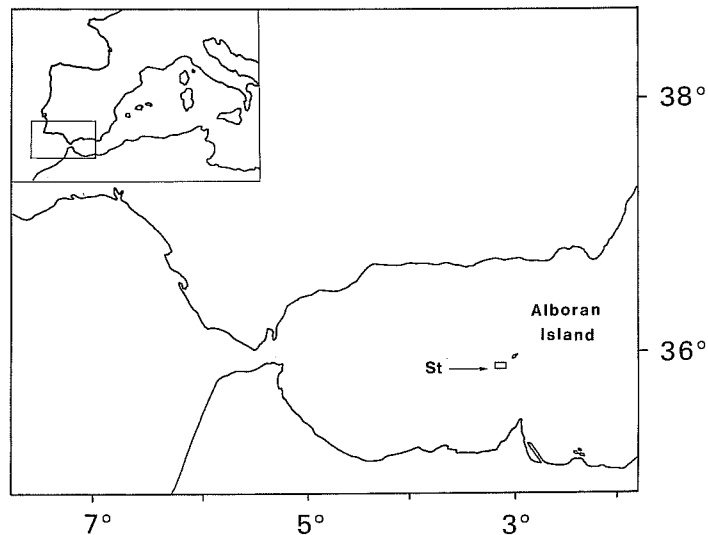


FIG. 1. Location of the sampling area.

during the 'Prince Albert I de Monaco' expeditions. An earlier survey was undertaken by the *Calypso* Expedition in 1958, but most of its results, at least as far as sponges are concerned, are still unpublished. Thus, the papers of Templado *et al.* (1986) and Pansini (1987), which emerged from these more recent surveys, are the only general contributions available on the sponge fauna of this area since those of Schmidt (1868) and Topsent (1901).

The poverty of faunistic information has prompted the present paper, in which systematic results are presented relating to a Mediterranean community of demosponges subjected to the influence of Atlantic water. This study also contributes to a better understanding of the sponge fauna inhabiting the red coral—*Corallium rubrum* (L.)—facies, which has been partially investigated in the Mediterranean (Laborel and Vacelet, 1961; Melone, 1965; Templado *et al.*, 1986).

Materials and methods

The material studied was collected during research on red coral fisheries undertaken by the Spanish Institute of Oceanography in 1984. The collection was accomplished using traditional trawls for fishing red coral (Ortiz *et al.*, 1986) on a coralligenous bottom located between 35°54'–35°52'N and 3°09'–3°05'W at depths of 70–120 m (Fig. 1). The sampling station is located at the interface separating the superficial Atlantic water and the underlying intermediate Mediterranean water (according to Cano, 1978).

Standard methodology was followed for the skeletal study (Rützler, 1978). The standard terminology proposed by Ackers *et al.* (1985) was used for morphological descriptions. Micrographs were obtained using a Hitachi S-2300 SEM.

The holotypes established in this paper were deposited in the Museo Nacional de Ciencias Naturales (MNCN) and labelled according to the code given in each description. The remaining material is preserved in the collections of the Centre d'Estudis Avançats of Blanes.

Results

A total of 107 sponges belonging to 58 species were examined (Table 1). Two of these species were new to science (see below) and one other (*Rhaphidectyon spinosum* Topsent 1928) was recorded for the first time in the Mediterranean.

A total of 15 species were Mediterranean endemics; that is 25.8% of the total contained in the collection. Several species assumed as rare, such as *Calthropella pathologica* (Schmidt 1868), *Ircinia pipetta* (Schmidt 1868), *Isops anceps* (Vosmaer 1894), *Spongosorites flavens* Pulitzer-Finali 1983 and *Timea cumana* Pulitzer-Finali 1977, were found in this community.

Table 1. Sponge species inhabiting the facies of *C. rubrum* from the Alboran Sea. Columns 'TS' and 'ES' refer to the total number of specimens and the number of epibiotic specimens, respectively. Asterisks in the column 'ES' indicate epibiosis on *C. rubrum* whereas asterisks beside specific names indicate Mediterranean endemic.

Sponge species	TS	ES
Subclass Homoscleromorpha		
Order Homosclerophorida		
Family Plakinidae		
1 <i>Plakina monolopha</i> Schulze 1880	1	1
2 <i>Plakina trilopha</i> Schulze 1880	1	0
*3 <i>Plakinastrella mixta</i> n.sp.	1	1
Subclass Tetractinomorpha		
Order Astrophorida		
Family Calthropellidae		
*4 <i>Calthropella pathologica</i> (Schmidt 1868)	2	1
Family Stelletidae		
5 <i>Stryphnus ponderosus</i> (Bowerbank 1866)	2	0
Family Geodiidae		
*6 <i>Erylus papulifer</i> Pulitzer-Finali 1983	2	2
7 <i>Isops anceps</i> (Vosmaer 1894)	6	3
*8 <i>Isops intuta</i> (Vosmaer 1894)	1	0
*9 <i>Caminus vulcani</i> Schmidt 1862	2	0
Family Pachastrellidae		
10 <i>Pachastrella monilifera</i> Schmidt 1868	6	0
11 <i>Poecillastra compressa</i> (Bowerbank 1866)	2	0
12 <i>Sphinctrella gracilis</i> Sollas 1888	1	0
Family Epipolasiidae		
13 <i>Jaspis incrustans</i> (Topsent 1890)	4	4
Order Hadromerida		
Family Suberitidae		
14 <i>Prosuberites rugosus</i> Topsent 1893	1	1
15 <i>Pseudosuberites hyalinus</i> (Ridley and Dendy 1867)	1	1
16 <i>Pseudosuberites sulphureus</i> (Bowerbank 1866)	1	1
17 <i>Suberites carnosus</i> (Johnston 1842)	2	1
Family Timeidae		
*18 <i>Timea cumana</i> Pulitzer-Finali 1977	1	1
19 <i>Timea unistellata</i> (Topsent 1892)	2	2
Family Spirastrellidae		
20 <i>Diplastrella bistellata</i> (Schmidt 1862)	1	1

Table 1 (Continued).

Sponge species	TS	ES
Family Clionidae		
21 <i>Alectona millari</i> Carter 1879	1	1
22 <i>Cliona vastifica</i> Hancock 1849	2	2*
Family Latrunculiidae		
*23 <i>Latrunculia citharistae</i> Vacelet 1969	2	2
24 <i>Latrunculia insignis</i> Topsent 1892	1	1
25 <i>Podosongia lovenii</i> Bocage 1870	1	1*
Order Axinellida		
Family Hemiasterellidae		
26 <i>Paratimea constellata</i> (Topsent 1893)	1	1*
Family Axinellidae		
27 <i>Axinella verrucosa</i> (Esper 1794)	1	0
28 <i>Phakellia robusta</i> (Bowerbank 1866)	2	0
29 <i>Phakellia ventilabrum</i> (Linné 1777)	3	0
Family Euryponidae		
30 <i>Eurypon coronula</i> (Bowerbank 1874)	1	1
Subclass Ceractinomorpha		
Order Halichondrida		
Family Halichondriidae		
31 <i>Batzella inops</i> (Topsent 1891)	1	1
32 <i>Spongisorites flavens</i> Pulitzer-Finali 1983	1	1
Order Poecilosclerida		
Family Raspailidae		
33 <i>Rhaphidectyon spinosum</i> Topsent 1928	1	0
Family Hamacanthidae		
34 <i>Hamacantha falcula</i> (Bowerbank 1874)	1	1
Family Biemnidae		
*35 <i>Biemna partenopea</i> Pulitzer-Finali 1977	2	2
36 <i>Biemna variantia</i> (Topsent 1927)	1	1
37 <i>Desmacella inornata</i> Bowerbank 1866	5	0
38 <i>Sigmatoxella annexa</i> (Schmidt 1870)	2	2
Family Esperlopsidae		
39 <i>Desmacidon fruticosa</i> (Montague 1818)	1	0
Family Crellidae		
40 <i>Crella pulvinar</i> (Schmidt 1868)	3	3
41 <i>Pytheas rosea</i> (Topsent 1892)	2	2*
Family Myxllidae		
42 <i>Myxilla rosacea</i> (Lieberkühn 1859)	2	1
Family Hymedesmiidae		
43 <i>Hymedesmia baculifera</i> (Topsent 1901)	1	1
44 <i>Hymedesmia peachi</i> Bowerbank 1882	4	1
45 <i>Leptolabis megachela</i> n.sp.	1	1
Family Crambidae		
*46 <i>Crambe tuberosa</i> Maldonado and Benito 1991	1	1
Family Anchinoidea		
47 <i>Anchinoe paupertas</i> (Bowerbank 1866)	4	4
*48 <i>Pronax fibulatum</i> (Topsent 1893)	1	1

Table 1 (Continued).

Sponge species	TS	ES
Family Microcionidae		
49 <i>Microciona gradalis</i> (Topsent 1925)	1	1
50 <i>Microciona spinarcus</i> Carter & Hope 1889	1	1
51 <i>Plocamilla</i> cf. <i>novizelanic</i> (Ridley 1881)	1	1
Order Haplosclerida		
Family Chanilidae		
52 <i>Haliclona aqueductus</i> (Schmidt 1862)	2	1
53 <i>Haliclona fulva</i> (Topsent 1893)	1	1
54 <i>Haliclona lacazei</i> (Topsent 1893)	1	0
Order Dictyoceratida		
Family Spongiidae		
55 <i>Spongia officinalis</i> Linné 1759	2	0
56 <i>Spongia virgultosa</i> (Schmidt 1868)	2	0
Family Theorectidae		
*57 <i>Ircinia pipetta</i> (Schmidt 1868)	6	0
58 <i>Ircinia spinosula</i> (Schmidt 1862)	1	1*

Epibiotic sponge accounted for 54% of the collected material. The main hosts were anthozoans, such as *Corallium rubrum* and *Dendrophyllia cornigera* (Lamarck), as well as some massive demosponges, specially *Ircinia pipetta* and diverse astrophorids. A total of 13 epibiotic sponge specimens belonging to nine species were observed directly attached to *C. rubrum* (Table 1).

Systematic descriptions

Subclass **HOMOSCLEROPHORA**
 Family **PLAKINIDAE** Schulze 1880
 Genus **PLAKINASTRELLA** Schulze 1880

Dercitopsis Dendy, 1905: 65.

Diagnosis

Plakinidae having microtetractines, microtriactines and microdiactines, in several size categories. Ectosome with abundant microdiactines arranged either in a tangential pattern or in palisade (*sensu* Lévi, 1953).

Plakinastrella mixta sp. nov.

HOLOTYPE: MNCN-01.01/1 (two slides).

Morphology

Small cushion-shaped sponge (0.2 × 0.2 × 0.3 cm) attached to the sponge *Ircinia pipetta* (Schmidt). Surface was rough to touch and finely hirsute under magnification. Uniporal ostia were circumscribed to a concave basal area (hypophare). A single, apical oscule (about 400 µm in diameter) was present on the opposite face. The colour was white in alcohol. The only specimen collected was used for spicule preparations.

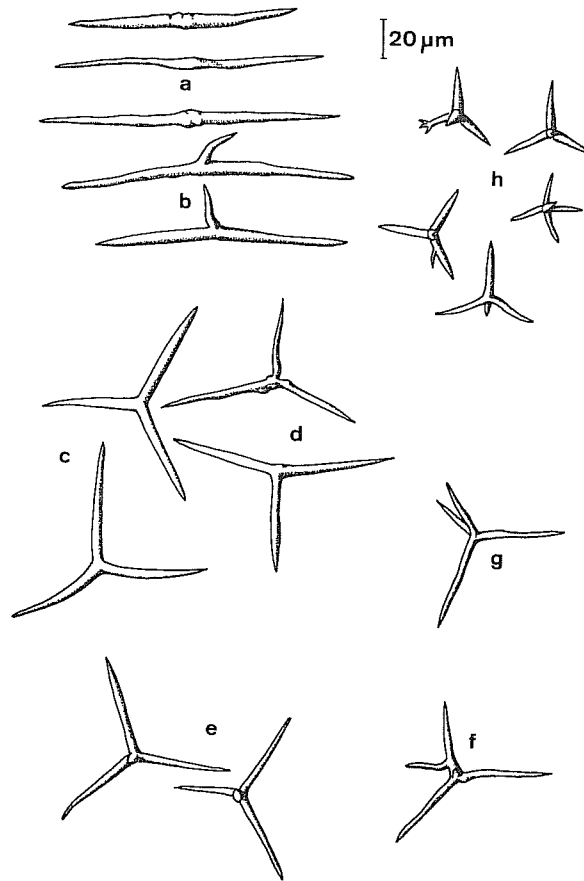


FIG. 2. *Plakinastrella mixta*: (a) oxeas, (b) oxeas with supplementary actine, (c) equiangular triactines, (d) inequiangular triactines, (e, f) tetractines II showing an undeveloped clad, (g) well-developed tetractine II, (h) tetractine I.

Spicules (Fig. 2)

1. *Microdiactines*: irregular in shape, with a central swelling sometimes developed as a rudimentary actine (Figs 2a, b). They were $62\text{--}105\ \mu\text{m} \times 3\text{--}4\ \mu\text{m}$ in size.
2. *Microtriactines*: displaying two morphologies. (a) Forms having equal actines arranged at equal angles (Fig. 2c). Actines were $27\text{--}35\ \mu\text{m} \times 3\text{--}4\ \mu\text{m}$; (b) forms having unequal actines arranged at unequal angles (Fig. 2d). Actines were $30\text{--}45\ \mu\text{m} \times 4\text{--}5\ \mu\text{m}$ in size.
3. *Microtetractines I*: with four straight actines, rarely forming incipient lophoactines or accessory branches (Fig. 2h). Actines were $11\text{--}20\ \mu\text{m} \times 2\text{--}3\ \mu\text{m}$ in size.
4. *Microtetractines II*: displaying three-rayed forms, since one actine was often under-developed like a small knob (Fig. 2e). Regular forms with four developed actines were also present (Fig. 2g), although they were less abundant than the anomalous ones. Supplementary branches were rarely present (Fig. 2f). Regular

and rudimentary actines were $28\text{--}35\ \mu\text{m} \times 3\text{--}4\ \mu\text{m}$ and $2\text{--}3\ \mu\text{m}$ in length, respectively.

Skeletal arrangement

The arrangement of the spicules was at random, except in the subectosomal zone, where the diactines were mainly placed in palisade pattern at right angles from the surface. The accurate arrangement of the microtetractines and microtriactines was unclear.

Discussion

The occurrence of three-rayed tetractines comes close to the condition of the North-Atlantic *Plakinastrella trunculifera* Topsent 1927, whose tetractines are completely replaced by triactine-like forms. However, the new species is devoided of the large-sized spicule category described in *P. trunculifera* (Table 2); that is, microdiactines measuring $350 \times 23\ \mu\text{m}$ or even $455 \times 15\ \mu\text{m}$ and three-rayed tetractines whose actines measure $455 \times 15\ \mu\text{m}$ (according to Topsent, 1928). Added to this, the small regular microtetractines I and the regular forms of microtetractines II of *P. mixta* are lacking in *P. trunculifera*.

As for the skeletal differences between the new species and the Mediterranean *Plakinastrella copiosa* Schulze 1880, one may observe that they mainly consist of the number of microdiactine and tetractine categories, the size of tetractines II and the presence/absence of reduced actines in tetractines I (Table 2).

Table 2. Skeletal data of *Plakinastrella mixta* n. sp., *Plakinastrella trunculifera* (holotype), and *Plakinastrella copiosa* (specimen of Topsent, 1895). Sizes (in μm) refer to overall length in microdiactines and actinal length in microtriactines and microtetractines. Values marked with asterisk correspond to measurements estimated from plates, since the original descriptions presented no morphometric range for such spicule categories.

Spicules	<i>P. mixta</i> n. sp.	<i>P. copiosa</i> Topsent 1895	<i>P. trunculifera</i> Topsent 1927
Microdiactines I	62–105 × 3–4	25–40 × 1–2	120–220 × 3–5
Microdiactines II	—	70–100 × 4–9*	Transitional sizes
Microdiactines III	—	600–700 × 30–35	350–455 × 15–23
Microtriactines I	27–45 × 3–4	8–12 × ?–?	60–90 × 3–5*
Microtriactines II	—	70–100 × 4–9*	—
Microtriactines III	—	320 × 30–35	—
Microtetractines I	11–20 × 2–3	8–12 × ?–?	40–70 × 2–4
reduced actines	often	never	always
Microtetractines II	28–35 × 3–4	320 × 30–35	190 × 23
reduced actines	never	never	always
Ectosomal skeleton	In palisade	In palisade	Tangential

Subclass **TETRACTINOMORPHA**

Order **ASTROPHORIDA**

Family **GEODIIDAE** Gray 1867

Genus **ERYLUS** Gray 1867

Diagnosis

Geodiidae whose cortex is formed by an outer layer of aspidasters and an inner one of microrhabds (*sensu* Topsent, 1894).

Erylus papulifer Pulitzer-Finali 1983

Material examined. Specimens CEAB-ALB-36-D, CEAB-ALB-36-H and those belonging to the collection described in Templado *et al.* (1986).

Morphology

Small cushion-shaped specimens measuring $1\text{ cm}^2 \times 2\text{--}3\text{ mm}$ thick. The surface was glabrous, with ectosomal aspidasters observable under binocular microscope. Ostia and oscules were not in evidence. The colour in alcohol was white.

Spicules (Figs 3, 4)

1. *Oxeas*: fairly curved, with blunt ends, measuring $528\text{--}1450\ \mu\text{m} \times 16\text{--}18\ \mu\text{m}$ (Figs 3a, b).
2. *Dichotriaenes*: with short rhabdome and variable length for deuteroclads and protoclads (Figs 3d,e). Malformations were frequent in clads (Fig. 3d). Some spicules resembled orthotriaenes when deuteroclads were undeveloped, but an axial vesicle located in the middle of the clads always demonstrated the occurrence of a morphological regressive process (Figs 3c, f). Rhabdomes, protoclads and deuteroclads were $80\text{--}200\ \mu\text{m} \times 15\ \mu\text{m}$, $56\text{--}254\ \mu\text{m} \times 12\text{--}18\ \mu\text{m}$ and $66\text{--}216\ \mu\text{m} \times 11\text{--}16\ \mu\text{m}$ in size, respectively.
3. *Aspidasters*: with elliptical shape and occasionally with a small central tubercle (Figs 3g, 4e, f). The longest and shortest diameters were $128\text{--}186\ \mu\text{m}$ and $102\text{--}146\ \mu\text{m}$, respectively. The thickness was about $3\ \mu\text{m}$.
4. *Microstrongyles*: slightly curved, habitually centrotylote and $42\text{--}91\ \mu\text{m} \times 4\text{--}6\ \mu\text{m}$ in size (Figs 3l, 4b).
5. *Oxyasters*: showing triactinal, diactinal (toxiform) and monactinal (rhabdiform) forms (Figs 3h, i, j, 4a, c). Irregular tetractinal forms were also occasionally observed (Fig. 3k). A faint swelling was always present, indicating the location of a vestigial centrum. Actines were $51\text{--}104\ \mu\text{m}$ in size.

Skeletal arrangement

A crust of aspidasters arranged tangentially at the surface formed the outer layer of the cortex. The inner cortical layer was formed by microstrongyles and clads of dichotriaenes, whose rhabdomes were orientated towards the inner choanosome. Oxeas, in loose bundles, showed a radial pattern, which was more evident in the peripheral choanosome. Oxyasters were scattered in the overall choanosome.

Distribution

Rare western Mediterranean species reported in coralligenous and detrital bottoms at depths of between 70 and 300 m (Pulitzer-Finali, 1983; Templado *et al.*, 1986).

Discussion

Erylus papulifer is currently viewed as a species very close to *E. expletus* Topsent, 1927 (Pulitzer-Finali, 1983). The specimens above described fit *Erylus papulifer* better than *Erylus expletus* by presence of dichotriaenes and similarity in the size of the aspidasters. However, a careful revision based on the whole of the available material would be advisable to check reliable differences between both assumed species, since, in my opinion, the very slight differences in size and shape of the aspidasters claimed

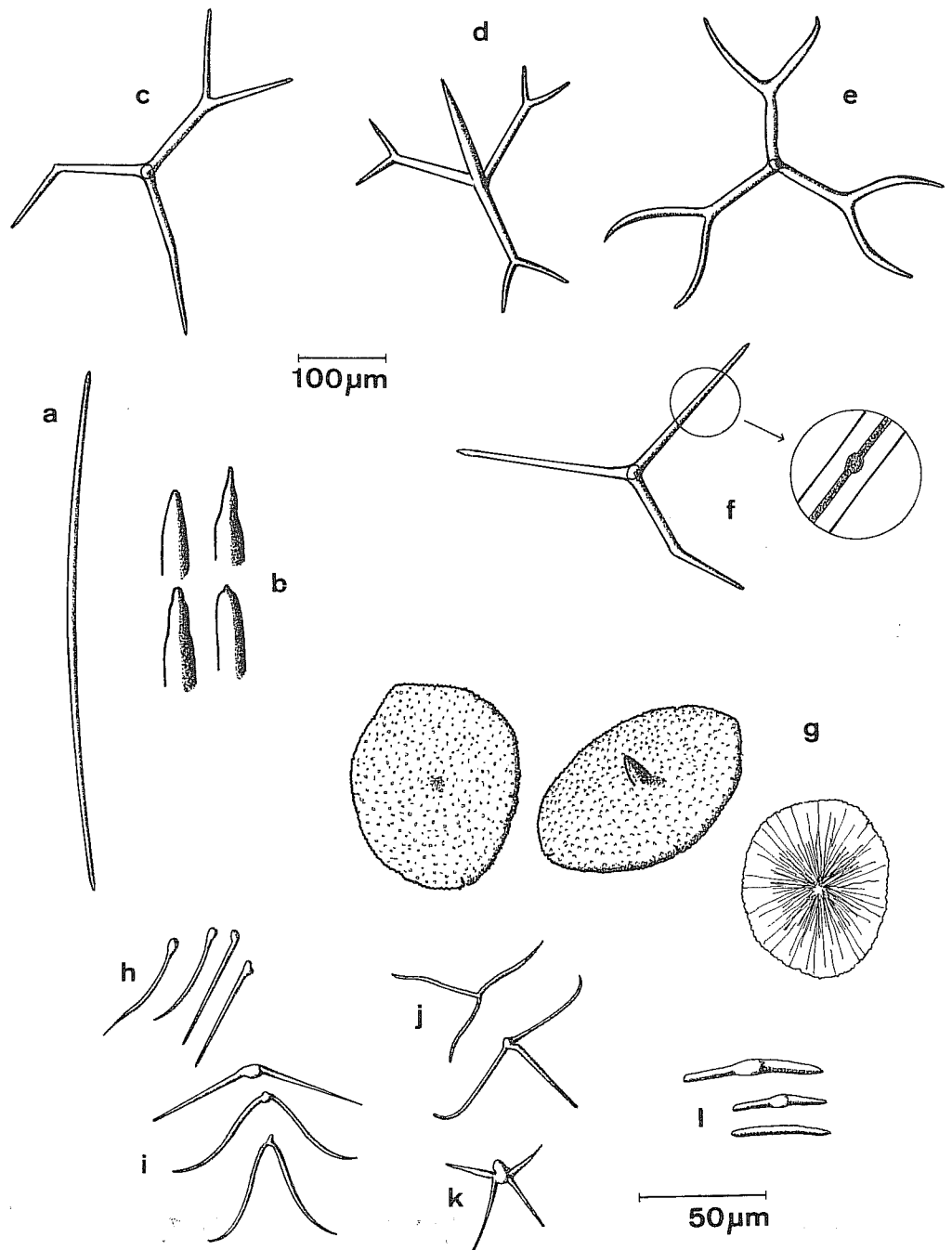


FIG. 3. *Erylus papulifer*: (a) oxea, (b) ends of oxeas, (c) cladome of dichotriaene, (d) dichotriaene, (e) cladome of dichotriaene, (f) axial vesicle indicating undeveloped deuteroclads, (g) mature and immature aspidasters, (h) monactinal asters, (i) diactinal asters, (j) triactinal asters, (k) tetractinal asters, (l) microstrongyles.

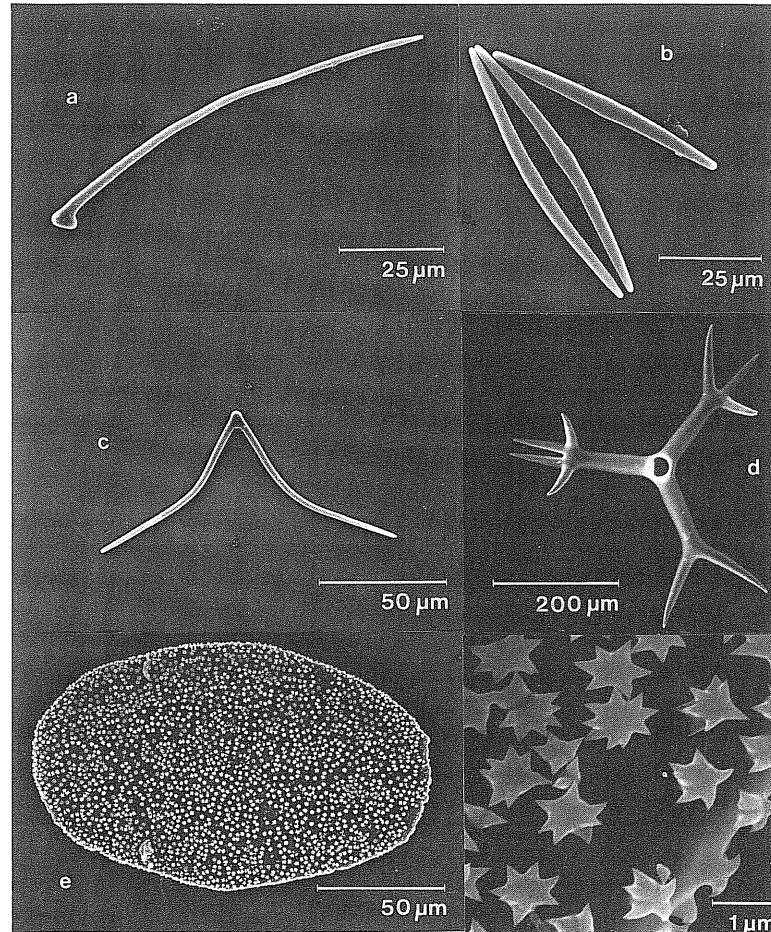


FIG. 4. *Erylus papulifer*: (a) monactinal aster, (b) microstrongyles, (c) diactinal aster, (d) anomalous cladome of dichotriaene, (e) mature aspidaster, (f) detail of aspidaster.

in my opinion, the very slight differences in size and shape of the aspidasters claimed by Pulitzer-Finali do not appear evidence enough to merit specific separation (Table 3).

Genus *ISOPS* Sollas 1880

Diagnosis

Geodiidae with uniporal oscules and ostia (*sensu* Sollas, 1888).

Isops anceps (Vosmaer 1894)

Synops anceps Vosmaer, 1894.

Material examined. Specimens CEAB-ALB-11-C3, CEAB-ALB-20-E, CEAB-ALB-28, CEAB-ALB 28A, CEAB-ALB-34A and CEAB-ALB-60Q.

Morphology

Globose or cushion-shaped specimens measuring between 1.5 and 4 cm in overall diameter. All specimens were attached either to *Dendrophyllia cornigera* or *Corallium*

Table 3. Comparative skeletal data (in μm) of specimens assigned to *Erylus expletus* and *Erylus papulifer*.

Spicules	<i>E. expletus</i> Topsent 1928	<i>E. expletus</i> , Pouliquen 1971	<i>E. papulifer</i> Pulitzer 1983	<i>E. papulifer</i> , CEAB-ALB-36-D	<i>E. papulifer</i> , CEAB-ALB-36-H
Oxeas	700-1700 \times 18	350-900 \times 10-12	600-1400 \times 18.5	528-1200 \times 16-18	700-1400 \times 16-18
Orthotriaenes: (cladome length)	Frequent 385-525 \times ?	Frequent 320 \times 12	Very rare 200-450	Absent	Absent
Dichotriaenes: (protoclads)	Absent	Frequent 100-120	Frequent 225-550	Frequent 56-80	Frequent 198-254
(deuteroclads)	—	130-150 \times 12	225-550 \times ?	66-122	188-216
Aspidasters	245-295/147-205	90-160/?-?	178-200/156-?	128-135/102-110	140-186/116-146
Triactinal asters (actinal length)	Not measured	Not described	41-87	46-70	50-67
Diactinal asters	180-230	120-180	45-124	51-95	80-104
Monactinal asters	Not described	Not described	90-160	74-90	80-104
Microstrongyles	80-90 \times ?-?	30-80 \times 3-5	50-80 \times 3-5	53-91 \times 4-6	41-72 \times 4-6

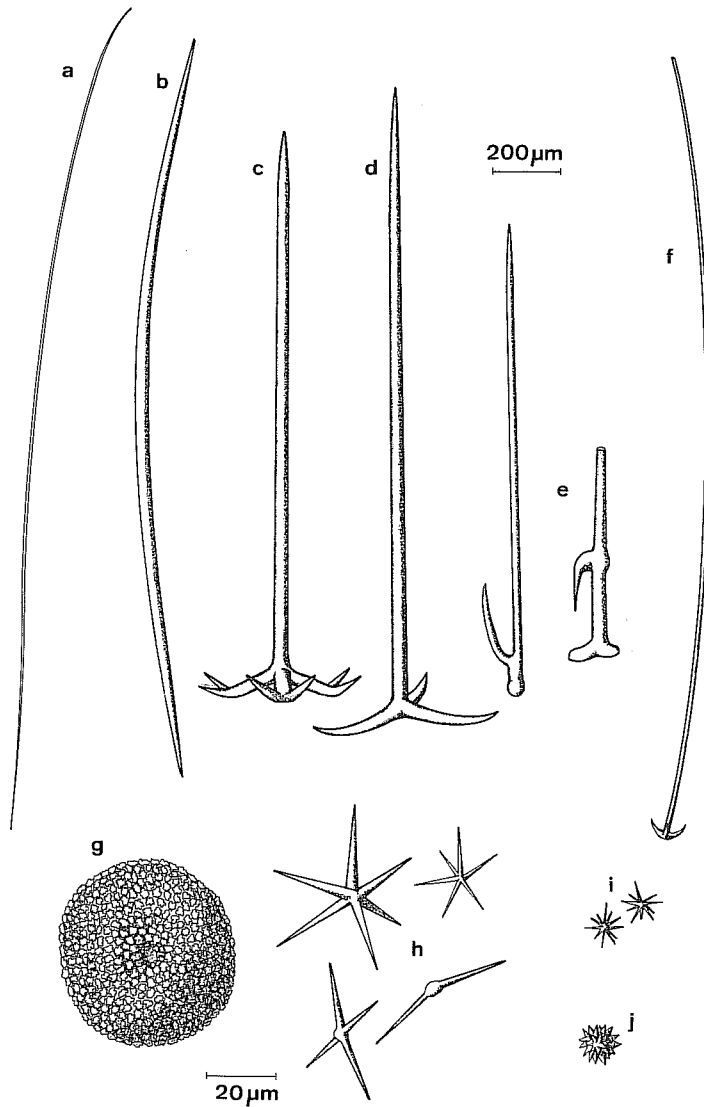


FIG. 5. *Isops anceps*: (a) flexuous oxea, (b) curved oxea, (c) dichotriaene, (d) ortotriaene, (e) anomalous triaenes, (f) anatriaene, (g) sterrater, (h) oxyasters I, (i) oxyasters II, (j) oxyspheraster.

rubrum. The surface was smooth. The cladomes of the anatriaenes protruded from the surface. Oscules, measuring between 100 and 500 μm in diameter, were scarce in number (1 to 5) whereas abundant ostia were located in depressed areas or were simply scattered on the surface. The colour was sepia-brown in alcohol.

Spicules (Figs 5, 6)

1. *Oxeas*: slightly curved, with blunt ends, measuring 1085–3000 $\mu\text{m} \times 15\text{--}30 \mu\text{m}$ (Fig. 5a). In specimen CEAB-ALB-11-C3, thin and flexuous oxeas measuring 600–1812 $\mu\text{m} \times 2\text{--}4 \mu\text{m}$ were found, apart from the above-mentioned oxeas (Fig. 5b).

2. *Orthotriaenes-plagiotriaenes*: with clads faintly curved (Fig. 5d), occasionally malformed (Fig. 5e) and $80\text{--}273\ \mu\text{m} \times 15\text{--}25\ \mu\text{m}$ in size. The angle between cladomes and rhabdome ranged from typical values of orthotriaenes to those of plagiotriaenes. The rhabdome was stout, straight, pointed and $433\text{--}1700\ \mu\text{m} \times 15\text{--}26\ \mu\text{m}$ in size.
3. *Dichotriaenes*: with rhabdome as in orthotriaenes (Fig. 5c), measuring $700\text{--}1400\ \mu\text{m} \times 15\text{--}24\ \mu\text{m}$. Protoclads usually longer than deuteroclads, measuring $140\text{--}160\ \mu\text{m}$ and $113\text{--}170\ \mu\text{m}$ in length, respectively. They were present in variable abundance, even missing in some specimens.
4. *Anatriaenes*: with short and strongly curved clads, measuring $15\text{--}25\ \mu\text{m}$ (Figs 5f, 6a). Malformations were occasionally present in clads (Figs 6b, c). Rhabdome slightly curved, with pointed or blunt end and measuring $961\text{--}200\ \mu\text{m} \times 4\text{--}10\ \mu\text{m}$ in size (Fig. 5f).
5. *Sterrasters*: with subspherical shape and $44\text{--}68\ \mu\text{m}$ in diameter (Fig. 5g).
6. *Oxyasters I*: with scarce, long and smooth actines. These asters are sometimes simplified to diactinal forms resembling centrotylote microxeas (Figs 5h, 6d, g). Actines were $30\text{--}46\ \mu\text{m}$ in length.
7. *Oxyasters II*: always having more than five smooth actines and $17\text{--}27\ \mu\text{m}$ in overall diameter (Figs 5i, 6e).
8. *Oxyspherasters*: with numerous smooth actines, developed centrum and $12\text{--}25\ \mu\text{m}$ in overall diameter. The length of each actine was always similar to the diameter of the centrum (Figs 5j, 6f, g).

Skeletal arrangement

The cortex was $500\text{--}700\ \mu\text{m}$ thick. It was filled with an outer layer of oxyspherasters and an inner multilayer of sterrasters. Clads of triaenes were reinforcing the inner cortical layer whereas rhabdomes were orientated radially towards the inner choanosome. Clads of anatriaenes occasionally protruded the sponge surface. Oxeas along with rhabdomes of triaenes formed loose bundles clearly arranged in a radial pattern close under cortex, but such disposition was less evident in the inner choanosome. Oxyasters were scattered everywhere in the choanosome.

Distribution

Rare western Mediterranean species. Before this third record it was only reported from the Bay of Naples (Vosmaer, 1894, 1933; Pulitzer-Finali, 1970) at $120\text{--}200\ \text{m}$ depth.

Order **HADROMERIDA**

Family **TIMEIDAE** Topsent 1928

Genus **TIMEA** Gray 1867

Diagnosis

Thinly encrusting Timeidae with megascleres consisting of tylostyles perpendicular to the substratum. Microscleras are one or several kinds of euasters, mainly arranged in an ectosomal layer (*sensu* Topsent, 1900, as *Hymedesmia*).

Timea cumana Pulitzer-Finali 1977

Material examined. CEAB-ALB-44e.

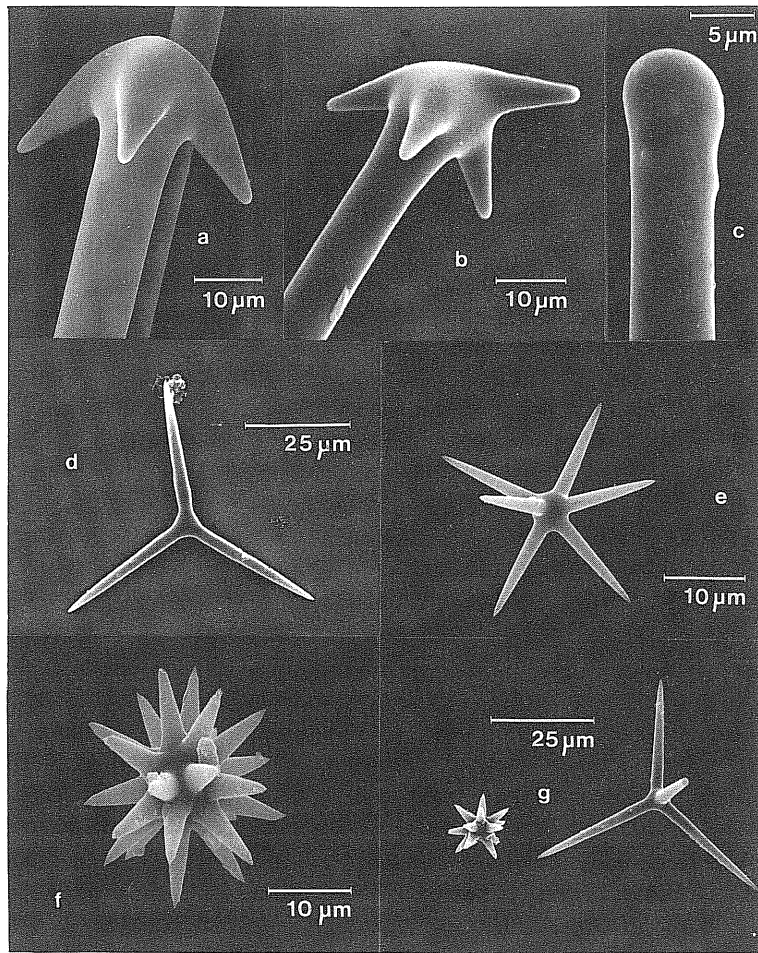


FIG. 6. *Isops anceps*: (a) cladome of anatriaene, (b) anatriaene with a supplementary clad, (c) anatriaene with undeveloped cladome, (d) oxyaster I, (e) oxyaster II, (f) oxyspheraster, (g) comparative size between oxyaster I and oxyspheraster.

Morphology

A single specimen measuring about 2 cm² in area and 3 mm thick, attached to the sponge *Ircinia pipetta* (Schmidt). Surface was smooth, showing irregular hispidation. Oscules and ostia were indistinct. The consistency was coriaceous and the colour was greenish cream in alcohol.

Spicules (Figs 7, 8)

1. *Tylostyles*: gently curved or notably flexuous (Figs 7a, b). The tyles were sub-spherical and well developed (Fig. 7c). They were 187–1237 µm × 11 µm in size.
2. *Spheroxyasters*: with a well-developed centrum and conical, pointed actines between 10 and 15 in number (Figs 7e, 8h). Actines were sparsely covered with feeble microspines. The spicules were 11–17 µm in overall diameter. They were abundant.

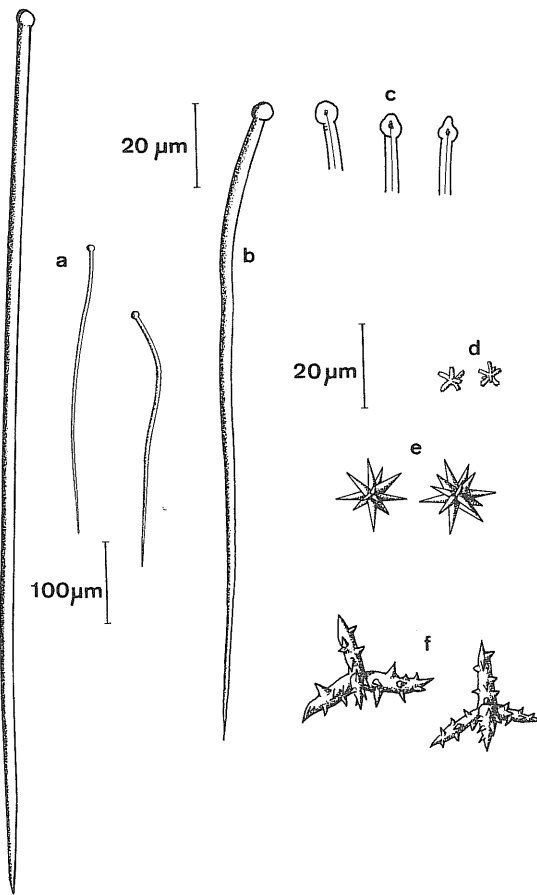


FIG. 7. *Timea cumana*: (a) tylostyles, (b) flexuous, small tylostyle, (c) tyles in detail, (d) anthasters, (e) oxyasters, (f) calthrop-like asters.

3. *Anthasters*: with 6–10 truncated actines showing ends strongly spiny (Figs 7d, 8d). Spicules were 5–7 μm in overall diameter.
4. *Calthrops-like asters*: having typically four actines, and only occasionally three (Figs 7, 8a, c). Actines were stout, conical, undivided, entirely covered with strong conical spines and 10–18 μm in length. The whole spicules were 20–36 μm in overall diameter.

Skeletal arrangement

Tylostyles were arranged perpendicularly at the substratum in light bundles piercing the ectosome in some areas. Euasters were homogeneously scattered in the choanosome, except in the subectosomal zones, where they formed a dense coating.

Distribution

This is the second record for the species. It was previously reported from Ischia Island (Tyrrhenian Sea) at 120–135 m depth (Pulitzer-Finali, 1977).

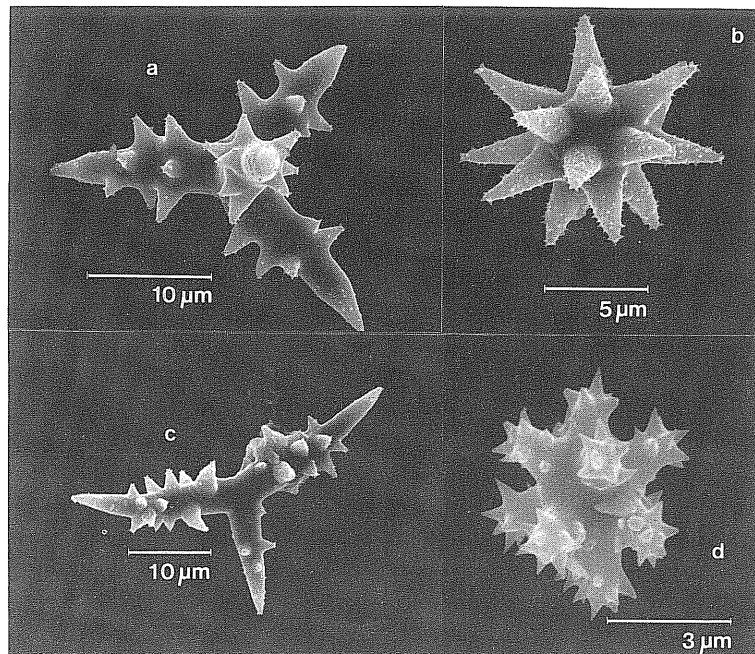


FIG. 8. *Timea cumana*: (a) tetractinal calthrop-like aster, (b) oxyaster, (c) triactinal calthrop-like aster, (d) anthaster.

Discussion

The specimen described here fits the holotype of this species, excepting the twisting of the spheroxyaster actines mentioned in the original description.

With regard to the existence of calthrop-like asters, *T. cumana* is closely related to the Mediterranean *T. stellifasciata* Sarà and Siribelli 1960 and the Indonesian *Timea tetractis* Hentschel 1912.

After checking specimens of *T. stellifasciata* (material quoted in Templado *et al.*, 1986) against *T. cumana*, the main distinctive features found were the size, shape and number of actines of the calthroplike asters. Not only do these spicules display 5–7 actines in *T. stellifasciata*, but they also have shorter, thinner and often irregularly branched actines.

As far as *T. tetractis* is concerned, the absence of the spheroxyasters described in *T. cumana* is the chief difference between both species.

Subclass CERACTINOMORPHA

Order HALICHONDRIDA

Family HALICHONDRIIDAE Vosmaer 1887

Genus SPONGOSORITES Topsent 1896

Diagnosis

Halichondriidae with a smooth, flaky crust of paratangential arranged, relatively thin spicules and a choanosomal utterly confused skeleton which is traversed by spongin-enforced tracts running more or less parallel to the surface. Most species show an aerophobic colour-change from yellow to greyish black or brown (*sensu* van Soest *et al.*, 1990).

Spongisorites flavens Pulitzer-Finali 1983

Material examined. Specimen MNCN-01.01/3 and specimens designated as *Spongisorites* sp. in Templado *et al.* (1986).

Morphology

A globose massive specimen attached to a branch of *C. rubrum*. The overall size was 5 × 6 × 4 cm. The surface was glabrous and the ectosome was evident, but without spiculate skeleton and non-separable. The oscules, measuring 0.5–2 mm in diameter, were grouped into concave areas often covered by epibiotic sponges belonging to the species *Sigmattoxella annexa* (Schmidt, 1870) and an unidentified species of genus *Reniera*. The ostia were scattered on the whole sponge surface. The specimen was fleshy and difficult to tear. The colour in alcohol was blackish green, probably as a result of a postmortem oxidation process.

Spicules (Figs 9a–d)

1. *Oxeas*: slightly curved, with faint pointed ends and occasionally centrotylote (Fig. 9c). Polyaxial malformations were usually observed near the ends (Fig. 9d). The spicules ranged between 75 × 2 μm and 540 × 12 μm in size.
2. *Styles and strongyles*: usually with irregular swellings at the blunt ends, 300–400 μm × 7–9 μm and 242–430 μm × 6–12 μm in size (Figs 9a, c). These spicules were assumed to be the result of malformations in oxeas.

Skeletal arrangement

The overall structure was diffuse. A faint tangential arrangement might be ascertained for those isolated spicules located just under the ectosome. The inner skeleton was a confused mixture of isolated spicules and short, vague multispicular tracts with scarce spongin, whose spatial pattern was indistinguishable.

Distribution

Poorly known western Mediterranean species, which has been only recorded in superficial caves (Pulitzer-Finali, 1983) and circalitoral coralligenous bottoms (Templado *et al.*, 1986 as *Spongisorites* sp.).

Discussion

After re-examination it was concluded that the specimen designated as *Spongisorites* sp. in Templado *et al.* (1986) is conspecific with the present material. It is worth mentioning that the strongyles here described were actually belonging to the specimens. They clearly differed in size and shape from the typical strongyles of *Reniera cratera* Schmidt 1862, which were present as foreign spicules in the choanosome of the holotype of *S. flavens* (Pulitzer-Finali, 1983). On the other hand, the polyaxone malformations and the irregular blunt ends observed in the spicules of this specimen especially resembled those reported in the enigmatic *Callites lacazii* by Schmidt (1868) and Van Soest *et al.* (1990).

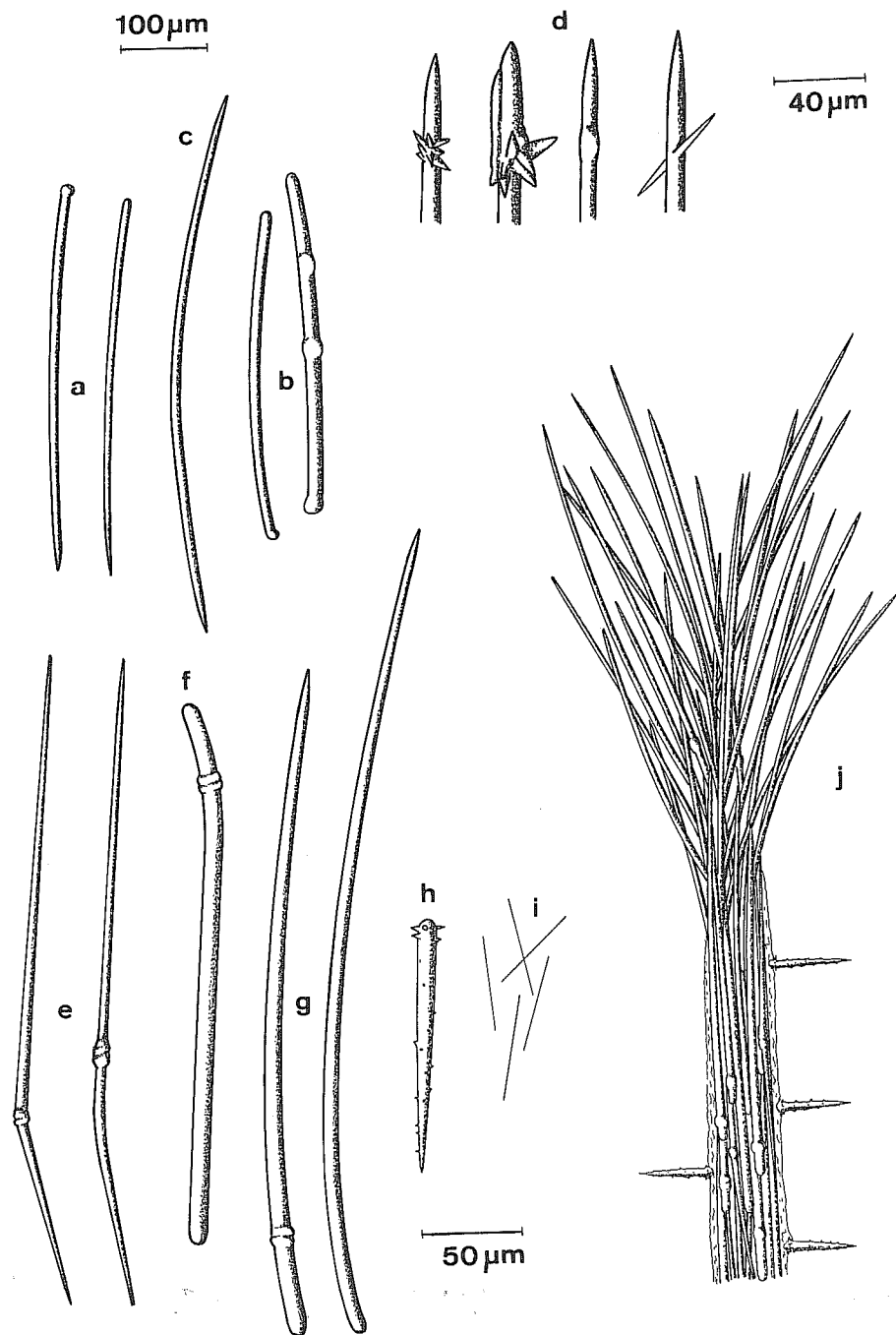


FIG. 9. *Spongosorites flavens*: (a) styles, (b) strongyles, (c) oxea, (d) ends of oxeas in detail. *Aulospongus spinosum*: (e) oxeas, (f) strongyles, (g) styles, (h) acanthostyles, (i) raphides, (j) skeletal arrangement.

Order **POECILOSCLERIDA**
Family **RASPAILIIDAE** Hentschel 1923
Genus **AULOSPONGUS** Norman 1878

Heterectya Hallmann, 1917.
Rhaphidectyon Topsent, 1927.
Aulospongiella Burton, 1956.
Hemectyonilla Burton, 1959.

Diagnosis

Raspailiidae with surface more-or-less hispid and microconulose, produced by protruding ends of the spongin-fibre bundles. Choanosomal skeleton greatly reduced or lacking any axial condensation. In central axis choanosomal megascleres aggregated into longitudinal plumose columns, loose bundles of axial fibres, or branching microcionid-like plumose fibres. Extra-axial skeletal columns echinated by heavy plumose tracts of acanthorhabdostyles or acanthostyles. Ectosomal spiculation, when present, consists of brushes of very long, slender oxeas arising from ends of extra-axial spicule columns. Structural megascleres include smooth rhabdostyles, styles, or subtylostyles of a single category, with or without auxiliary ectosomal oxeas, anisoxeas or more rarely styles. Microscleres absent, or may include bundles of raphides (*sensu* Hooper, 1991).

Aulospongius spinosum (Topsent 1927)

Rhaphidectyon spinosum Topsent, 1927.

Material examined. Specimen CEAB-ALB-16.

Morphology

Massive specimen measuring 6 cm in height and 1 cm in diameter. Surface was conulose and hispid. Scattered oscules as minute openings (500 μm), usually located in the surface depressions among conules. Otia were not apparent. Consistency was soft and the colour was orange-brown in alcohol.

Spicules (Figs 9e-j)

1. *Styles*: straight or slightly curved. A ringed swelling located near the blunt end was present in many spicules (Fig. 9g). Angulated centrotylote oxas having sharp-pointed ends and centrotylote strongyles were also occasionally observed (Figs 9e, f). Spicules were 400–1018 $\mu\text{m} \times 9$ –22 μm in size.
2. *Acanthostyles*: straight, conical and entirely spiny. Spines were small and regularly scattered, but a subterminal verticil was typically distinguished (Fig. 9h). Spicules were 81–144 $\mu\text{m} \times 7$ –10 μm .
3. *Raphides*: straight, 45–54 $\mu\text{m} \times 1.5$ –2 μm (Fig. 9i) in size.

Skeletal arrangement

Raphides seem to be located reinforcing the pinacoderms, separately arranged or in loose bundles, somewhat less dense than a typical trichodragmata. The choanosomal skeleton consisted of pluriaxial spongin fibres containing dense styles and echinated by small acanthostyles. The fibres took the form of hispidating tufts at the ectosome (Fig. 9j).

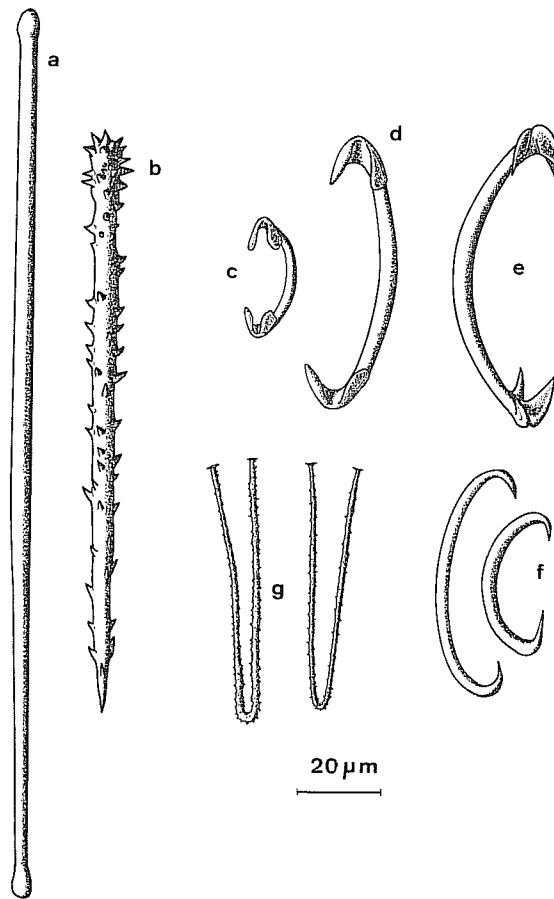


FIG. 10. *Leptolabis megachela*: (a) subtylote, (b) acanthostyle, (c) anchorate isochela II, (d) anchorate isochela I, (e) unguiferate isochela, (f) sigmas, (g) labis.

Distribution

This species was reported only in the Cabo Verde Archipelago (Topsent, 1927, 1928; Lévi, 1960b) at depths of between 50 and 200 m. This is the first Mediterranean record.

Family **HYMEDESMIIDAE** Topsent 1904

Genus **LEPTOLABIS** Topsent 1904

Clinolabis Topsent, 1927: 14.

Diagnosis

Encrusting or cushion-shaped sponges. Ectosomal megascleres are diactines (usually tylotes) in light tangential tracts. Choanosomal megascleres are acanthostyles in hymedesmoid arrangement. Microscleres are labis, anchorate isochelae and sigmas (*sensu* Topsent, 1904).

Discussion

The genus *Clinolabis* Topsent was erected for the species *Clinolabis dentifera* Topsent, 1927, whose tridentate isochelae exhibited unguiferate morphology. So *Clinolabis* was originally defined as a genus in which the anchorate isochelae of *Leptolabis* are replaced by unguiferate forms. However, anchorate and unguiferate isochelae are simultaneously present in the specimen described below as *Leptolabis megachela* sp. nov. It was noted that such unguiferate isochelae, very similar to those originally assumed as diagnostic criteria to warrant the genus *Clinolabis*, may actually result from occasional malformations in the teeth of the anchorate isochelae. Moreover, it is doubtful whether the small shape differences between teeth figured by Topsent (1928) in the 'isoanchora' of *Clinolabis dentifera* and those of the 'tridentate isochelae' of *Leptolabis forcipula* Topsent 1904 are of generic level. Otherwise many poecilosclerids genera (e.g. *Crambe* Vosmaer) ought to be subdivided, since they usually contain both species having unguiferate isochelae and species having arcuate isochelae.

From all the evidence it is clear that *Clinolabis* is a superfluous genus, indistinguishable from *Leptolabis*.

Leptolabis megachela sp. nov.

Holotype. MNCN-01.01/4.

Morphology

Encrusting specimens measuring 2 cm² in area, attached to a living branch of *Corallium rubrum*. Surface was glabrous. Oscules and ostia were not apparent under binocular microscope. Colour was white in alcohol. The specimen collected was entirely used for a skeletal slide.

Spicules (Fig. 10)

1. *Subtylotes*: straight, faintly polytylote and 103–200 $\mu\text{m} \times 4\text{--}6 \mu\text{m}$ in size (Fig. 10a).
2. *Acanthostyles*: straight, densely spiny and 103–246 $\mu\text{m} \times 6\text{--}9 \mu\text{m}$ in size (Fig. 10b).
3. *Anchorate and unguiferate isochelae I*: with forms having both underdeveloped unguiferate teeth and regular ones (Figs 10d,e). They were 55–77 μm in total length.
4. *Anchorate isochelae II*: with three well-developed teeth, measuring 13–25 μm in overall length (Fig. 10c).
5. *Sigmas*: they were abundant, measuring 34–41 $\mu\text{m} \times 3\text{--}4.5 \mu\text{m}$ (Fig. 10f).
6. *Labis*: long and narrow, with a deep flexion median and entirely microspiny. Small discs were observed on their ends (Fig. 10g). They were 58–68 μm in length and 1.5–2 μm wide.

Skeletal arrangement

The tangential ectosomal subtylostyles were either isolated or in light bundles. Choanosomal acanthostyles were in hymedesmoid arrangement. Microscleres were scattered both in the ectosome and the choanosome.

Discussion

The features of the spicules complement (a single category of acanthostyles a single category of labis and two categories of isochelae) clearly distinguish *L. megachela* from the remaining Atlantic-Mediterranean species of *Leptolabis*, although some relationship is noted with the Atlantic species *Leptolabis forcipula* Topsent 1904, *Leptolabis convergens* Topsent, 1928 and *Clinolabis dentifera* Topsent 1928, mainly regarding the shape and size of the large labis (Table 4).

Table 4. Comparative skeletal data (in μm) of the *Leptolabis megachela* n.sp. and some related species.

Spicules	<i>C. dentifera</i> Topsent 1928	<i>L. forcipula</i> Topsent 1904	<i>L. convergens</i> Topsent 1928	<i>L. megachela</i> n.sp.
Tylotes	300–455 \times 6–7	430 \times 7	270–280 \times 5.5–6	103–200 \times 4–6
Acanthostyles I	320–370 \times 20–24	490–525 \times ?–13	250–330 \times ?–?	102–246 \times 6–9
Acanthostyles II	140–160 \times 14–15	250–295 \times ?–?	110–120 \times ?–?	—
Labis I	65–75	85–100	60	58–68
Labis II	Symmetrical 23–28	Asymmetrical 16–17/6–7	Symmetrical ≤ 10	—
Isochelae I	Unguiferate 30–46	Anchorate 30–50	Anchorate 23–27	Both kinds 57–77
Isochelae II	—	—	—	13–25
Sigmas	95–175 \times 8–11	87–95 \times 6–7	100–110 \times 7	34–41 \times 3–4.5

Family MICROCIONIDAE Carter 1886

Genus MICROCIONA Bowerbank 1862

Clathriidae in an encrusting or cushion-like habit. The ectosomal skeleton consists of dispersed monactinal spicules which form a surface layer aligned vertically, tangentially, or strewn without order. The choanosomal skeleton consists of a basal plate from which short, plumose columns of principal monactines arise. Ascendant spiculate columns may be reinforced with spongin and echinated by acanthostyles. Microscleres are typically palmate isochelae and toxas (*sensu* Bergquist and Fromont, 1988).

Microciona spinarcus Carter and Hope 1889

Clathria assimilis Topsent, 1925

Microciona assimilis (Topsent), Lévi, 1960a.

Material examined. Specimen CEAB-ALB-60-C.

Morphology

Encrusting specimen measuring 3 cm² in area, attached to a branch of *Dendrophyllia cornigera*. Surface was strongly hispid. Oscula and ostia were not apparent. Colour was whitish in alcohol.

Spicules

1. *Subtylostyles*: slender, straight or flexuous, with a gently globose blunt end showing a few spines at the tip. They measured 230–356 $\mu\text{m} \times 3$ –6 μm .
2. *Main acanthostyles*: stout, curved, with somewhat rounded spines scattered on the blunt end, and 326–600 $\mu\text{m} \times 10$ –16 μm in size.

3. *Auxiliary acanthostyles*: straight or gently curved, conical, entirely spiny, and with a faintly globose blunt end. They were 81–167 μm \times 6–10 μm in size.
4. *Isochelae*: palmate, 9–12 μm in size. They were frequent on the slides.
5. *Toxas*: with a deep, well-rounded central flexion and gently reflexed ends, which are spiny in the largest spicules. They measured 28–180 μm \times 1.5–3 μm .

Skeletal arrangement

Ectosomal skeleton consisted of a tangential layer of subtylostyles arranged in loose bundles. The choanosomal skeleton is formed by a basal layer of spongin supporting ascendant plumose columns of main acanthostyles, echinated by auxiliary acanthostyles. Upper acanthostyles of the columns were responsible for the hispidation. Microcleres were scattered everywhere in the choanosome.

Distribution

Common species in the northeastern and southeastern Atlantic and the Mediterranean (as *M. assimilis*).

Discussion

The conspecificity of the Atlantic species *M. spinarcus* and the Mediterranean *Microciona assimilis* (Topsent 1925) is currently accepted by most authors (e.g. Descatoire, 1969; Boury-Esnault, 1971; Boury-Esnault and Lopes, 1985; Uriz, 1987; Solórzano, 1991), but a few authors still regard them as different (i.e. Pansini, 1987). The isochela size (always shorter than 9 μm in the *M. assimilis*-type) is the only difference available to discriminate between both assumed species. In my opinion, this feature is certainly unreliable to warrant by itself a specific separation, at least in this family (e.g. Lévi, 1960a; Uriz, 1987). Otherwise, the species *Antho involvens* (Schmidt 1864), as well as some other microcionids (Topsent, 1928: 304), ought to be subdivided, since the isochela size (and even their presence) is subject to great variation (e.g. Lévi, 1960a).

Added to that, the biogeographical (Atlantic/Mediterranean) separation traditionally assumed for both species does not actually exist, since the specimen here described fully fits the *M. spinarcus*-type in spite of its Mediterranean location, whereas the specimen from Açores described by Boury-Esnault and Lopes (1985) exhibits the typical features of the *M. assimilis*-type, in spite of its Atlantic location. Thus, if they are regarded as two different species, their biogeographical areas will overlap from Açores to the Alboran Island. It must be acknowledged that when morphometric discrimination between two species is unclear and, moreover, their hypothetical biogeographical areas overlap, conspecificity is more than probable.

Genus *PLOCAMILLA* Topsent 1928

Plocamia Schmidt, 1870: 62.

Dirrhopalum Ridley, 1881: 485.

Holoplocamia de Laubenfels, 1936: 75.

Diagnosis

Clathriidae with megascleres arranged in a plumo-reticulate pattern. The acanthose stylote or strongylote megascleres are arranged in isodictyal choanosomal reticulation, at the nodes of which brushes or tracts of principal monactines radiate. The auxiliary monactines are located on the peripheral nodes forming hispid tufts to support the

ectosome. Microscleres usually present, being toxas and/or palmate isochelae (*sensu* Lévi, 1960a).

Discussion

The presence of auxiliary echinating acanthostyles suggests the location of this species in the genus *Plocamilla* instead of the genus *Antho* Gray, 1867, although in the opinion of Van Soest and Stone (1986), the presence/absence of echinating acanthostyles is not evidence enough to merit generic distinction.

Plocamilla cf. *novizelanica* (Ridley 1881)

Dirrhopalum novizelanicum Ridley, 1881.

Artemisina mediterranea Babic, 1921?

Material examined. Specimen CEAB-ALB-13a, specimen CEAB-7B-33 from Namibia described by Uriz (1988).

Morphology

A single encrusting specimen measuring 2 cm² in area and 1.5 mm in thickness, attached to the sponge *Pachastrella monilifera* Schmidt. Surface was strongly hispid. Both oscules and ostia were not apparent, even under examination by binocular microscope. Colour was dark orange in alcohol.

Spicules (Fig. 11)

1. *Ectosomal subtylostyles*: straight, conical and sharp-pointed (Fig. 11a). Microspines were observed on the end of the tyle (Fig. 11b). Spicules were 186–540 μm \times 3–5 μm in size.
2. *Main acanthostyles*: smooth, straight or gently curved at the first third of their length, where they were typically thick (Fig. 11c). Spines were fully absent. They were 424–1009 μm \times 9–20 μm in size; that is, notably longer than those of all the other remaining close species.
3. *Echinating acanthostyles*: curved, with a slightly marked neck and some proximal spines (Fig. 11d). They were 214–377 μm \times 8–10 μm in size and were scarce.
4. *Acanthostyles and acanthostrongyles*: gently curved and entirely covered by small spines (Figs 11e,f). Acanthostyles and acanthostrongyles were 100–170 μm \times 8–10.5 μm and 85–120 μm \times 7–10 μm in size, respectively.
5. *Toxas*: with an even and deep median flexion (Fig. 11g) and spiny ends in the largest. They were 36–220 μm in chord and 1–3 μm in thickness.

Skeletal arrangement

The acanthostyles and the acanthostrongyles were arranged in a choanosomal isodictyal network, joined with a variable quantity of spongin at the nodes (Fig. 12). The peripheral nodes supported echinating acanthostyles and fans of auxiliary subtylostyles piercing the ectosome. Main subtylostyles were supported at the deep nodes and on the basal spongin plate. Toxas were scattered in the choanosome.

Distribution

Pacific Ocean: New Zealand (Ridley, 1881; Bergquist and Fromont, 1988),

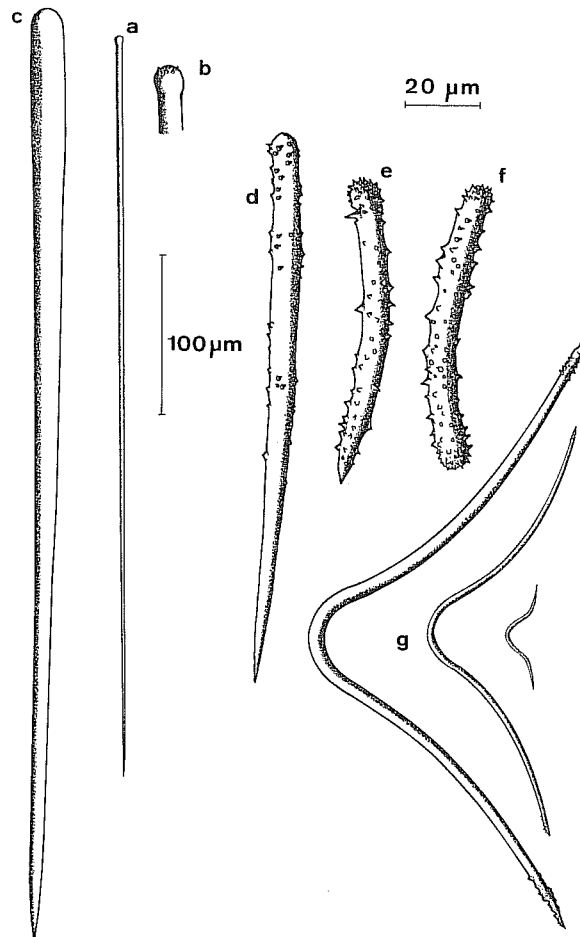


FIG. 11. *Plocamilla* cf. *novizelanica*: (a) auxiliary subtylostyle, (b) detail of auxiliary subtylostyle, (c) main subtylostyles, (d) echinating acanthostyle, (e) basal acanthostyle, (f) toxas.

New Caledonia (Lévi and Lévi, 1983). Atlantic Ocean: Namibia (Uriz, 1988). Mediterranean ? (Babic, 1921 as *Artemisina mediterranea*).

Discussion

This specimen is distinctively characterized by the great size of its principal monactines and the lack of isochelae; however, such features are considered as unreliable skeletal characters, not sufficient to warrant a new species in Microcionidae. The spicule types found in this specimen were morphologically very similar to those of both *Plocamilla coriacea* (Bowerbank 1874) and *Plocamilla novizelanica* (Ridley 1881), but spicule sizes are closer to those of *P. novizelanica* (Table 5), especially regarding the Atlantic specimen described by Uriz (1988). As far as spicule sizes exclusively are concerned, a similarity was observed between the present specimen and that described as *Artemisina mediterranea* Babic 1921 (synonymized to *Antho involves* by Lévi in 1960a). However, the echinating acanthostyles traditionally characterizing the genus *Plocamilla* (versus *Antho*) were not mentioned in Babic's

Table 5. Comparative skeletal data (in μm) of *Plocamilla novizelanica* and controversial related specimens.

Specimens	Locality	Ectosomal subtylostyles	Main acanthostyles	Echinating acanthostyles	Spicules of the network	Palmate isochelae	Toxas
<i>Dirrhopalum novizelanicum</i> Ridley 1881	Pacific: New Zealand	190-360 x 2-5	272-500 x 17-25	Present but not measured	Acanthostrogyles 177 x 16	19	63 x 2
<i>Plocamilla novizelanica</i> Bergquist and Fromont 1988	Pacific: New Zealand	210-295 x 3-4	200-365 x 12.5-17	Present but not measured	Acanthostrogyles 145-182 x 10-17	16-19	35-72 x ?
<i>Plocamilla novizelanica</i> Bergquist and Fromont 1988	Pacific: New Zealand	248-330 x 4-6	280-500 x 11.5-25	Present but not measured	Acanthostrogyles 160-220 x 16-23	16-19	30-75 x ?
<i>Plocamilla novizelanica</i> Lévi and Lévi 1983	Pacific: New Caledonia	320-370 x 2-5	220-700 x 8-20	Present but not measured	Acanthostyles 130-140 x 10	20	50-60 x ?
<i>Plocamilla novizelanica</i> Uriz 1988	Atlantic: Namibia	340-400 x 2-5	375-720 x 20-30	225-270 x 16-20	Both kinds 145-180 x 15-25	15-21	60-175 x 1.5-2
<i>Artemisina mediterranea</i> Babic 1921	Mediterranean: Adriatic Sea	185-480 x 2-4	185-721 x 6-12	?	Both kinds 107-174 x 5-9	13.5-21	26-181 x 1.3-2
<i>Plocamilla cf. novizelanica</i> CEAB-13a	Mediterranean: Alboran Sea	186-540 x 3-5	424-1009 x 9.7-20	214-377 x 8-10	Both kinds 85-170 x 7-10.5	—	36-220 x 1-3

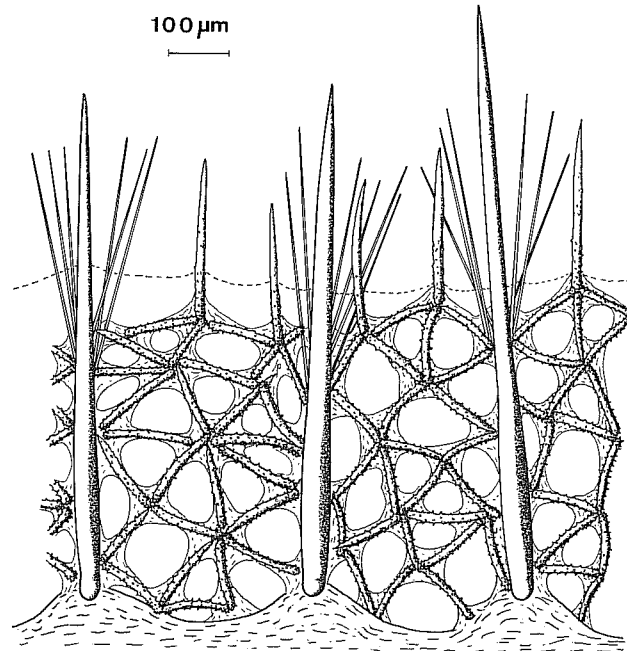


FIG. 12. *Plocamilla* cf. *novizelanica*: skeletal arrangement.

material (Babic, 1921; Lévi, 1960a). However, they might actually exist, since the size range described ($185\text{--}721\ \mu\text{m} \times 6\text{--}12\ \mu\text{m}$) is suspiciously large to deal with a single spicule category (Table 5).

The assignment of the present Mediterranean specimen to *P. novizelanica* has been made with some reservation, because of the skeletal particularities mentioned above. In my opinion, the notable geographical separation and the differences in toxa size between Pacific and Atlantic–Mediterranean specimens (Table 5) do not rule out the possibility that both sets of specimens belong to close, but different, species.

General discussion and conclusions

This collection of demosponges is of particular interest for its faunistic and systematic significance, since two new species have been described to science (*Crambe tuberosa* Maldonado and Benito 1991, also belonging to this collection, has been described in a different paper) and several rare species have been reported.

Endemic species accounted for 25.8% of the total collected, but this is probably an overestimated value of the Mediterranean endemics, since it has been calculated including the controversial *Erylus papulifer*, and the three new species found in this community (which are obviously regarded as endemic, while awaiting results of further surveys in Atlantic areas close by). This value is far lower than the 44.6% reported by Vacelet (1980) for the Mediterranean demosponges, but it is slightly higher than the 17.2% noted by Pansini (1987) for demosponges of communities from the Alboran Sea and the Strait of Sicily, which are also subject to the Atlantic influx. The abundance of Mediterranean endemics is expected to be lower in those benthic western-Mediterranean communities established below the Atlantic–Mediterranean interface, because of the reduction in Atlantic water influence. Thus, the bathymetrical

location of the coral red community, just into the Atlantic–Mediterranean interface, might be the factor responsible for the slight difference *vis-à-vis* Pansini's material. However, the Senegalese species *Aulospongius spinosum*, recorded in the Mediterranean for the first time, points to the existence of an Atlantic faunistic influence in the benthic community studied. It appears that a better knowledge of the Mauritanian and Senegalese regions, as suggested by de Weerd and van Soest (1986) and Pansini (1987), might reveal a more uniform distribution pattern of the benthic Atlantic–Mediterranean species.

As far as the high degree of epibiosis is concerned, it may be assumed that this is a response brought about by a shortage of available surfaces for settlement, which usually characterizes the Mediterranean coralligenous communities (Aristegui *et al.*, 1987; Zabala and Ballesteros, 1989). Regarding epibiosis on *Corallium rubrum*, it is worth mentioning that no demosponge species recorded in the lists of Laborel and Vacelet (1961) or Melone (1965) was found in this study.

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