

# BIOGEOGRAPHIC AND TAXONOMIC NOTES ON SOME EASTERN ATLANTIC SPONGES

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## ABSTRACT

New records and revisory remarks are presented on the following Eastern Atlantic species: *Tedania anhelans* (new to the Atlantic coasts of France, with a review of North Atlantic *Tedania* species), *Iotroata spinosa* (new record, with a review of birotuliferous Poecilosclerids), *Spanioplion armaturum* (new for the Norwegian coast, with a review of its distribution), *Hymedesmia coriacea* (revision), *Ulosa stuposa* (revision), and *Halicnemis patera* (new to the Irish fauna, with a review of micracanthoxea-bearing Desmoxyids).

## INTRODUCTION

Sponges are among the few remaining animal groups which present problems in field recognition and identification, even in such well-researched areas as Western Europe. Recently efforts have been made to remedy this, and now there is cooperation between sponge taxonomists throughout Europe. This will result in taxonomic problems no longer being attacked on a regional basis, but in species and genera being studied throughout their ranges. The present paper is only a modest contribution in this direction. It concerns the presentation of a series of unrelated new records and observations on Eastern Atlantic species, a harvest of several trips in various parts of Europe. These data justify some revisory remarks on the genera concerned and discussions of some distribution patterns.

The material is preserved and incorporated in the collections of the Zoologisch Museum Amsterdam (ZMA). The following persons and institutions contributed to the results: Mr. Matt Murphy (Sherkin Marine Station), Miss S.M. Stone (British Museum (Natural History), London), Drs. W.H. de Weerd (Amsterdam), Dr. O.S. Tendal (Copenhagen), Dr. T. Brattegard (Bergen, Norway), Drs M. Wapstrapa (Amsterdam), Drs M. Reichert (Amsterdam), Drs M. - J. Leloup (Amsterdam), Dr. L. Cabioch (Roscoff) and Drs J.C. den Hartog (Rijksmuseum van Natuurlijke Historie at Leiden, RMNH).

1. *Tedania anhelans*, new to the Atlantic coasts of France.

Order Poecilosclerida

Family Myxillidae

Genus *Tedania* Gray, 1867

*Tedania anhelans* (Lieberkuhn, 1859). Pl. I Figs

1 - 4, Text-fig. 1.

Restricted synonymy:

*Tedania digitata* (Schmidt, 1862)

*Tedania nigrescens* (Schmidt, 1862)

*Tedania toxicalis* sensu Arroyo, et al., 1976 (not *T. toxicalis* De Laubenfels, 1930).

Material: ZMA POR. 4863, Chateau du Taurau, Baie de Morlaix, north coast of Brittany, France, dredged at 40m, 19 - IV - 1982.

Description: a massive specimen, 8cm long, 4cm wide and 6cm high, with conical oscular elevation; next to these there are several thinner, blind fistulae. Oscula 4mm in diameter. Surface smooth. Consistency soft, compressible, easily damaged. Colour: reddish brown. Ectosome: tangential bundles of ectosomal tyloles are strewn at random in the dermis. Choanosome: the skeleton consists of multispicular columns of styles; the reticulate plan is largely obscured, but next to numerous irregularly arranged styles, there are single styles making up a ladder-like reticulum in between primary skeletal columns. Spicules: ectosomal tyloles with microspined apices: 75 - 205 by 3.5 - 5µm; choanosomal styles: 215 - 230 by 7 - 9µm; onychaetes: 120 - 160 by 1µm. Distribution: Mediterranean, Portugal, Galicia, Canary Islands, West Africa, Azores.

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Discussion: the morphology and spiculation of the present specimen is in complete accordance with descriptions from the Mediterranean (e.g. Boury-Esnault, 1969, 1971; Pulitzer-Finali, 1978), and from Portugal and Northern Spain (e.g. Arndt, 1941 as *T. suctoria*; Solorzano & Babio, 1980), thus making it clear that the present record is more or less continuously linked with the distributio-

nal centre. Southwards the species has been reliably reported from the Cape Verde Islands (Topsent, 1928, as *T. digitata* and *T. suctorina*), Senegal (Lévi, 1952, 1960), and the Gulf of Guinea (Lévi, 1959). Westwards the species is reported from the Azores (Topsent, 1928). The Leiden Museum also holds specimens collected in the Azores area during the recent CAN-CAP-expeditions (Drs. J.C. den Hartog is thanked for the loan of this material).

Data on the spicules, geographical distribution and depth distribution of *T. anhelans* are presented in Table 1 and Fig. 1. Summarizing, it can be said that the species has a typical Mediterranean-Atlantic distribution occurring at depths between the intertidal and about 100m. In the North its distribution extends to Brittany and the Azores, in the South down to the Gulf of Guinea. Outside this area it has been reported from South Africa (Lévi, 1963) and from Brazil (Boury-Esnault, 1973), but in my opinion these records need critical reexamination.

Arroyo, *et al.* (1976) reported the Californian *Tedania toxicalis* from the Mediterranean, but failed to give sufficient evidence for this surprising record. The brief description and spicule drawings and sizes are clearly within the range of *T. anhelans*.

#### Other North Atlantic *Tedania* species:

Three other *Tedania* species are known from North Atlantic waters, one of which, *T. phacellina* Topsent, 1928 has been reported only once from deep water near the Azores. It is a distinct flabelliform species, apparently unrelated to other Atlantic *Tedania* species, although its status should be re-examined. The other species, *T. ignis* and *T. suctorina*, have been extensively reported and may be considered well-known:

*Tedania ignis* (Duchassaing & Michelotti, 1864). This West Indian species is very similar to *T. anhelans* and several authors, notably Burton (cf. Burton, 1932; Burton & Rao, 1932), considered both as synonyms. From a recent review of the species (Van Soest, 1984), it is clear that spicule sizes (tylotes: 180-250 by 2.5-4.5 $\mu$ m, styles: 200 - 280 by 4 - 9 $\mu$ m and onychaetes: 30-250  $\mu$ m) are indeed completely overlapping. However, in my experience there are subtle differences that seem to be consistent. *T. ignis* is a flaming red, or occasionally bright reddish orange colour in life, whereas *T. anhelans*, although variably coloured, is not red. The onychaetes of *T. ignis* tend to be in two size categories. Furthermore, the

skeletal plan in *T. ignis* seems to be much more isotropic, with less prominent multispicular primary tracts. These differences are sufficient to uphold both as different species, although they are obviously closely related.

A separate Bermudan species of *Tedania* was described by De Laubenfels (1950: *T. tora*), but I have already concluded (Van Soest, 1984), that very probably it is a somewhat abnormal specimen of *T. ignis*. Quite probably, too, Boury-Esnault's (1973) specimens of *T. anhelans* from Brazilian waters should also be attributed to *T. ignis*.

Californian waters hold at least one species of *Tedania* close to *T. ignis*, viz. a species variously known as *T. topsenti* de Laubenfels (1930), *T. toxicalis* de Laubenfels (1930) and *T. nigrescens* sensu Dickinson (1945). A critical comparison of fresh material is needed before conclusions can be drawn about its separate status and distinctness from the West Indian *T. ignis*.

The inferred distribution of *T. ignis* is given in Text-fig. 1. The species is a characteristic inhabitant of mangrove communities and other lagoon habitats; on coral reefs it is infrequent.

#### *Tedania suctorina* (Schmidt, 1870):

(Synonyms: *T. increscens* Schmidt, 1875, *T. conuligera* Topsent, 1892a, and *T. commixta* sensu Topsent, 1904, not Ridley & Dendy, 1887). This species differs in the tylote apices and in the generally much larger size of the spicules. Its distribution is Arctic-Boreal (cf. Fig. 1). It overlaps slightly with *T. anhelans* in the Azores area, but they are separated in depth distribution: *T. suctorina* shows typical boreal submergence, as towards the south of its distribution it is known only from depths exceeding 600m, while in the Arctic it is known from 14m downwards.

#### Remarks on phylogenetic relationships:

*T. anhelans* and *T. ignis* make up a twin species pair within a complex of closely related forms with a tropical-subtropical distribution which undoubtedly reflects a former Tethyan distribution pattern of their common ancestor. Other members of this group are *T. coralliophila*, *T. maeandrica* and *T. reticulata* (all three authored by Thiele, 1903), *T. dirhaphis* Hentschel, 1913 and forms variously known as "*T. digitata*", "*T. nigrescens*" and "*T. anhelans*" reported from Indo-Pacific waters. Burton (1932) considered all these forms to be a single species (along with *T. anhelans* and *T. ignis* from Atlantic waters), but conclusive evidence for this has not yet been presented. De Laubenfels (1950b) doubt-

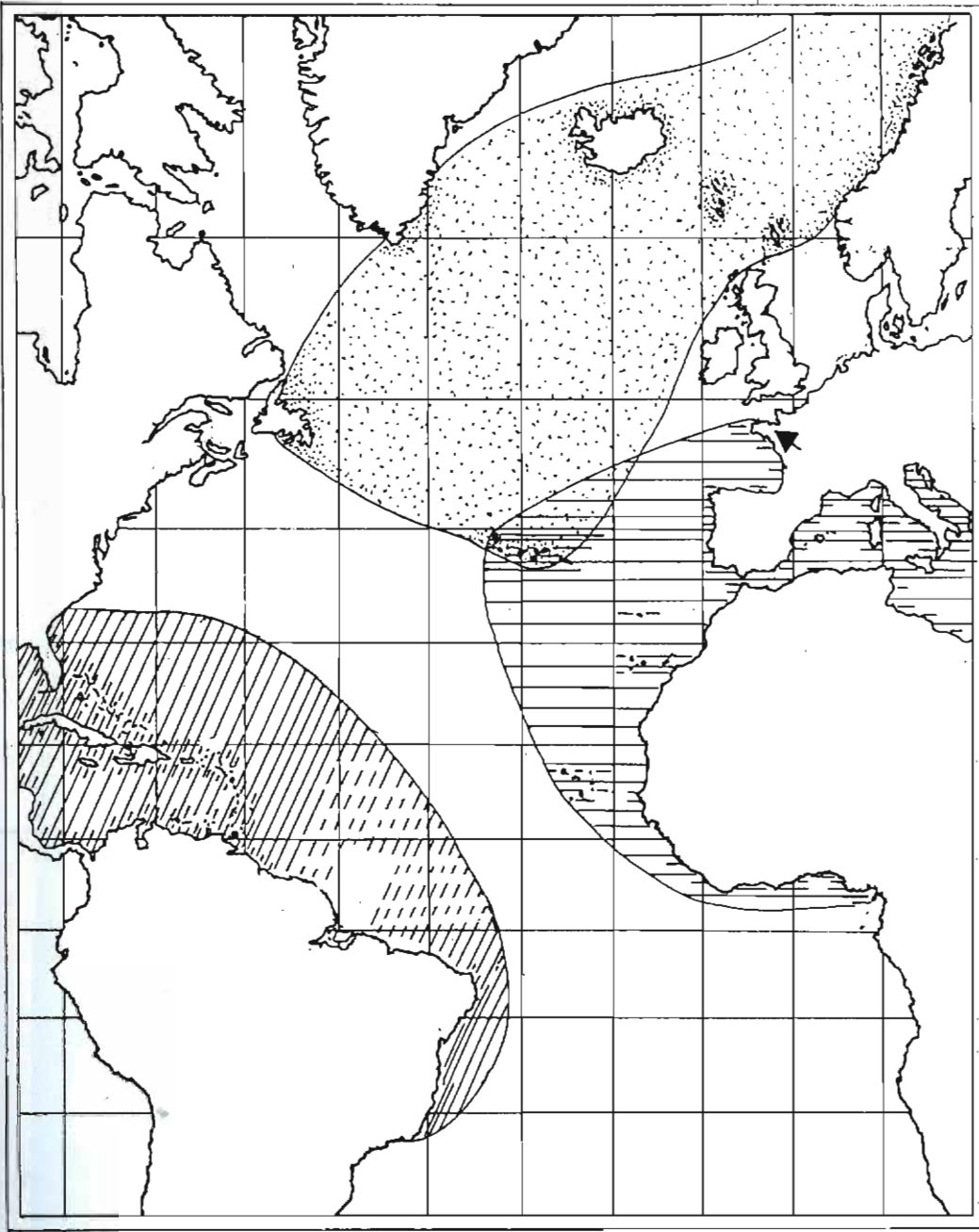


Fig. 1: Geographical distributions of North Atlantic *Tedania* spp.: *Tedania anhelans*, horizontal lines (arrow indicates new record); *T. suctoria*, dotted area; *T. ignis*, diagonal lines.



Table 1

Spicule sizes ( $\mu\text{m}$ ) and other characteristics of specimens of *Tedania anhelans*. from different parts of its range.

Locality	Tylotes	Styles	Onychaetes	Colour	Authority
Roscoff 40m	175 - 205/ 3.5 - 5	215 - 230/ 7 - 9	120 - 160/1	brown	present paper
Naples	185 - 270/ 2 - 7	205 - 280/ 5 - 11	60 - 190/1	orange-green, brown, reddish brown, blue	Pulitzer-Finali 1978, 1983
Northwest Spain littoral	203 - 210/ 3 - 4	173 - 207/ 5 - 6	111 - 148/ 1 - 2		Solorzano & Babio, 1980
South Portugal	200 - 302/ ?	210 - 264/ ?	87 - 200/ ?	—	Arndt, 1941
Azores 5 - 100m	180/2.5	220/5.6	150/0.5	—	CANCAP material unpubl.
Senegal	140 - 230/ 3 - 4	170 - 260/ 7 - 9	75 - 220/1	"variable"	Levi, 1952
Gulf of Guinea Guinea	200/2 - 4	200/5 - 7	40 - 170/?	—	Levi, 1959

Plate I, Fig. 1: Spiculation of *Tedania anhelans* found near Roscoff, including styles, tylotes and onychaetes.

Fig. 2: Detail on onychaete of *T. anhelans*.

Fig. 3: Detail of acanthose apex of tylote of *T. anhelans*.

Fig. 4: Habit of the Roscoff specimen of *T. anhelans*, ZMA POR. 4863. ( $\times \frac{1}{2}$ )

Fig. 5: Fragments of *Iotroata spinosa* from  $66^{\circ}$  N  $2^{\circ}$  E, ZMA POR. 4708. ( $\times \frac{1}{2}$ ) (left: inner-side; right: outer surface)

Fig. 6: Two categories of birotulates of *Iotroata spinosa*.

Fig. 7: Acanthostyle of *Spanioplion armaturum* from Norway, ZMA POR. 5023.

Fig. 8: Ramose specimen of *Ulosa stupeosa* from the Banyuls area, ZMA POR. 2592 ( $\times \frac{1}{2}$ )

Fig. 9: Massive specimen of *Ulosa stupeosa* from Roscoff, ZMA POR. 5119 ( $\times \frac{1}{2}$ )

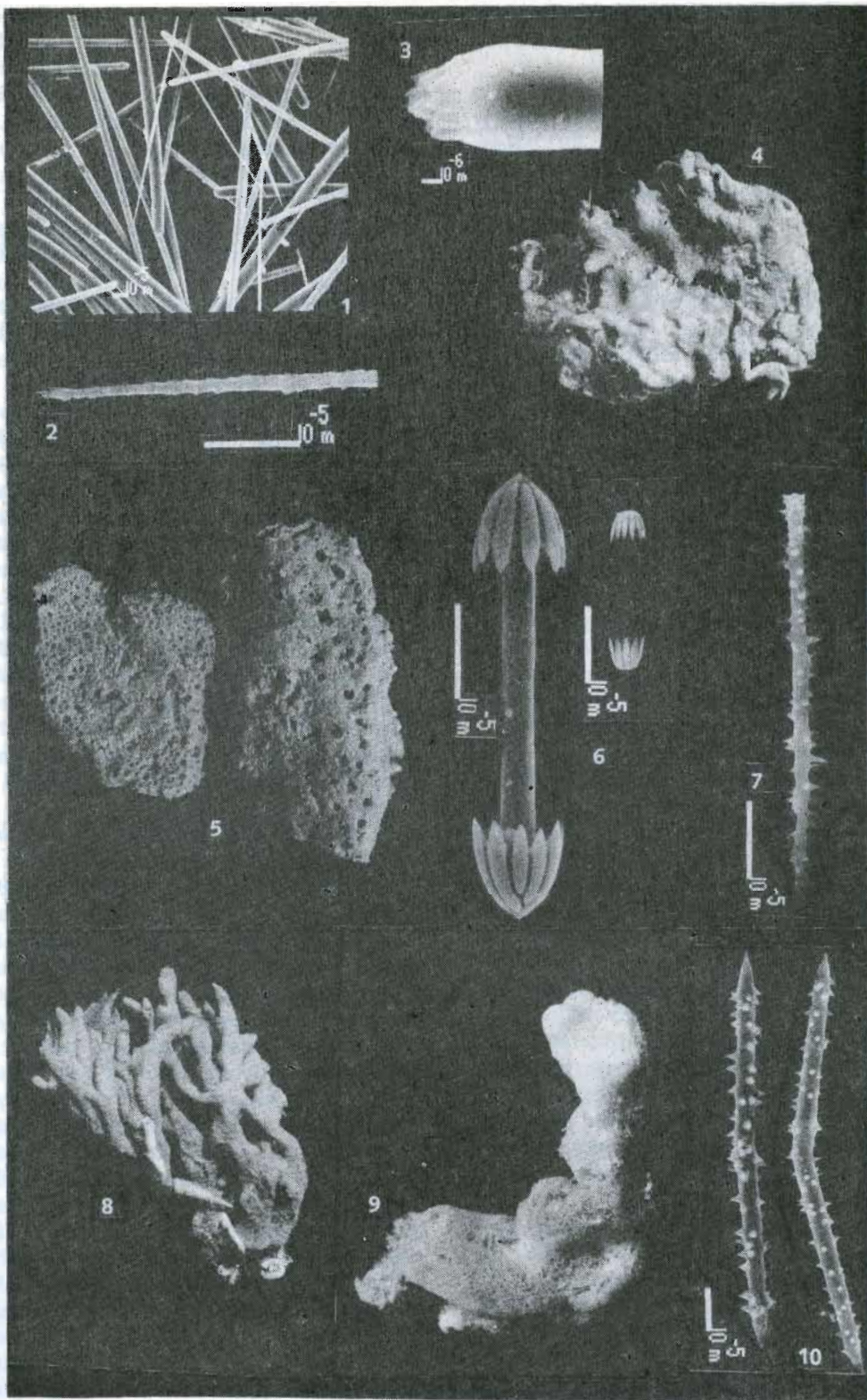
Fig. 10: Acanthoxea of *Halicnemia patera* from Roaringwater Bay, ZMA POR. 5322.

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fully reported *T. ignis* from Hawaii; his discussion of the tropical *Tedania* problem is largely supported here.

*T. suctorica* appears to be closely related to other Arctic species (cf. Koltun, 1959), but possibly also to Antarctic species (cf. Burton, 1932; Sará, 1978; Boury-Esnault & Van Beveren, 1982), which also penetrate into antiboreal waters by submergence.

II. *Iotroata spinosa*; with a comparison of birotulate-bearing Poecilosclerids.

Genus *Iotroata* De Laubenfels, 1936

*Iotroata spinosa* (Lundbeck, 1905) Pl. I figs. 5 - 6.

Synonym: *Iotrochota spinosa* Lundbeck, 1905: 195, pl. VI 8, pl. XIX 1.

Material: ZMA POR. 4708, Cirrus Exped., stat. M, 66°N 02°E, 1 - II - 1965.

Description: fragments of a probably flabellate or cup-shaped sponge of considerable size: fragments are up to 8 by 10 by 2cm with distinct oscular and poral surfaces on opposite sides. Surface smooth with detachable skin. Consistency, crumbly, soft. Colour in spirit, grey-brown.

Ectosomal skeleton a tangential crust of loose megascleres (both tylotes and acanthostyles). Choanosomal skeleton an irregular isotropic reticulation of 1 - 5 spicules each side. Spicules: ectosomal tylotes, smooth with distinct tyles: 260 - 340 by 2 - 4µm; acanthostyles spined all over: 450 - 580 by 6 - 10µm; birotulates in two distinct size categories: 19 - 22µm and 26 - 41µm. A single unguiferate chela of 30µm was found but it is uncertain whether it is proper to the species.

Distribution: Subarctic North Atlantic (69° - 66° 07' W - 02° E), deep water.

Discussion: This species is close to *I. acanthostylifera* Stephens, 1916, from Irish waters, but differs in the virtual absence of unguiferate chelae and the presence of the larger category of birotulates. It is quite possible that these features are subject to variation, since a single unguiferate chela was found in the present specimen; the lack of comparative material prevents a definite conclusion.

Eight genera are known to possess birotulate microscleres and these are assigned to various families of the Poecilosclerida by De Laubenfels (1936, 1950b, 1954), indicating the probable primitive nature of this spicule type.

*Iotrochota* Ridley (1884), with its type species *Halichondria birotulata* Higgin, 1877 (objective senior synonym *Hyrtios musciformis* Duchassaing & Michelotti, 1864, cf. Van Soest,

et al., 1983), is assigned to the family Esperiosidae by Van Soest (1984), on account of its reticulate skeleton of spongin-enforced, thick spicule tracts, absence of ectosomal skeleton, and mixture of styles and strongyles. As far as is known at present the genus is quite probably confined to the tropics, although an exception may turn out to be *Iotrochota magna* Lambe, 1894 from the North Pacific. The description of Lambe, however, mentions an ectosomal skeleton indicating that it may be an *Iotroata* after all. There seem to be no generic differences between *Iotrochota* and a series of genera created by De Laubenfels, namely *Hiattrochota* (type species the Hawaiian *H. protea* De Laubenfels, 1950b), *Iotrochostyla* (type species the Pacific *I. iota* De Laubenfels, 1954) and *Iotrochopsamma* (type species *Iotrochota arbuscula* Whitelegge, 1906, cf. De Laubenfels, 1954). Such features as the localization of strongyles, or replacement of megasclere tracts by sand grains, distinguish these genera. The differences are here considered to be of specific but not generic value.

*Hymetrochota* (with type species *H. rotula* Topsent, 1904) is clearly a Hymedesmiid genus, with acanthostyles erect on the substrate and ectosomal anisotornotes. A possible synonym is *Hymenotrocha* (with type species *H. topsenti* Burton, 1930a), which has in addition to the above-mentioned spicules also smooth styles and arcuate chelae.

*Iotroata*, erected for the species *Iotrochota acanthostylifera* Stephens, 1916, is a typical Myxillid genus, with isotropic skeleton of (acantho-) styles, ectosomal tylotes, and unguiferate isochelae. The present species, although it lacks the isochelae, fits perfectly into this genus. It is here proposed to include in *Iotroata* all the North Atlantic species cited under *Iotrochota* by Lundbeck (1905). These species are: *I. varidens* (smooth styles), *I. oxeata* (smooth oxea instead of styles), *I. dubia* (close to *I. acanthostylifera*), *I. intermedia* (smooth styles), *I. rotulancora* (with peculiar unguiferate chelae resembling birotulates), *I. polydentata* (smooth styles, no unguiferates) and *I. affinis* (with acanthose birotulates). *Halichondria abyssii* Carter (1874), also from the North Atlantic, was made the type of the genus *Iotaota* De Laubenfels (1936), on account of the alleged absence of unguiferates and the possession of smooth styles (*I. polydentata* would fit this "genus", too). However, Lundbeck (1905) claims to have found unguiferates in Carter's type. Aside from this, I do not think the loss of unguiferates is sufficient evidence of

Table II

Records and spicule sizes of *Spanioplion armaturum*

Locality	Ectosomal subtylotes	Choanosomal styles	Acanthostyles	Authority
Norway ZMA 5023	171-225/2 - 3.5	204-244/3.5-5.5	42-64/1.5-2.5	present paper
Lough Ine Ireland, ZMA 4385 4812	196-220/3-3.5	246-308/5-6	58-96/1.5-2.5	present paper
Roscoff, France ZMA 4815	188-205/2-4.5	248-264/6.5-7.5	48-77/1.5-2.5	present paper
Strangford Lough Ireland	220/3	240/4	66	Bowerbank (1866)
Plymouth, England (as <i>Hymedesmia stephensi</i> )	165/3	225/7	48/2	Burton (1930b)
Calais, France	—	—	—	Topsent (1894)
Luc. Normandy	—	—	—	Topsent (1890)
Toulon, S. France	150-240/1.5-2.5	220-260/2.5-3.5	40-60/1-2	Topsent (1928)

generic distinctness in view of the above-presented variation in these closely related forms. Summarizing, it seems that the best course is to emend the definition of *Iotroata* in the following sense:

Myxillidae with ectosomal smooth tylotes and a choanosomal skeleton consisting of an irregular isotropic reticulation of styles and/or acanthostyles, rarely oxeotes, arranged singly or in short polyspicular bundles: microscleres include normally birotulates and unguiferate isochelae, which may occasionally be absent.

### III New Norwegian record of *Spanioplion armaturum*

Family Hymedesmiidae

Genus *Spanioplion* Topsent, 1894

*Spanioplion armaturum* (Bowerbank, 1866) Pl. I Fig 7

Material: ZMA POR. 5023, Ystaskjerboen, Korsfjorden, near Bergen, Norway, on rocks at 4m, coll. W.H. de Weerd & M. Wapstra, 6 - VIII - 1982  
Description: thin, dark brownish-purple crust with micro-areolate surface. Choanosomal skeleton consisting of bundles of smooth styles bound by spongin, intermingled towards the surface with ectosomal tornotes, which fan out and become disposed tangentially at the surface. Both ectosome and choanosome contain a moderate amount of accessory spicules. Spicule sizes: ectosomal smooth anisotylotornotes, rounded at one end and mostly mucronate at the opposite end: 171-225 by 2 - 3.5 $\mu$ m; choanosomal (sub-)(tylo-) styles, often slightly acanthose at the heads, 204 - 244 by 3.5 - 5.5 $\mu$ m; accessory acanthostyles, heavily and entirely spined (cf. Pl. I, fig. 7) : 42 - 64 by 1.5 - 2.5 $\mu$ m.

Discussion: by this new record the range of *S. armaturum* is considerably extended northwards. In Table II a comparison of spicule sizes of specimens in the ZMA collections and of literature reports is assembled to show the essential uniformity of the data throughout the range of the species. *S. armaturum* is apparently distributed from Norwegian waters southwards along the coasts of Britain and France and into the western Mediterranean. Its distributional centre seems to be in the English Channel, where it is quite common.

*Spanioplion osculosum* (Topsent, 1925) from the Mediterranean (cf. Topsent, 1936) is a doubtful *Spanioplion* as it possesses chelae; the same applies to *S. cheliferum* Hentschel (1912) from the tropical Pacific. A true species of *Spanioplion* is found in the southern ocean, viz. *S. werthi* (Hentschel, 1911), cf. redescription by Boury-

Esnault & Van Bevern, 1982). It is a twin species, differing from *S. armaturum* in the more heavily acanthose condition of the choanosomal megascleres and the presence of acanthoxea as accessory spicules.

### IV. Revision of *Hymedesmia coriacea*

Genus *Hymedesmia* Bowerbank, 1862

*Hymedesmia coriacea* (Fristedt, 1885)

*Hymeniacion dujardini*; Bowerbank, 1866.

*Stylopus coriaceus* Fristedt, 1885

*Stylopus dujardini*; Topsent, 1925

*Hymedesmia brondstedti* Burton, 1930

*Anchinoe coriacea*; Topsent, 1936

Description: based on material from various parts of the range, listed in table III: thin incrustations, with a smooth surface, which is microscopically very lightly conulose. Colour apparently variable, but normally light brown or yellow to orange-brown tinges predominate (possibly the substrate colour influences the observed colours). Skin rather tough, only slightly transparent, showing subdermal holes underneath pore-fields. Ectosomal skeleton: the organic skin is strengthened by tangential subtylotes and carried by skeletal columns or brushes of subtylotes. Choanosomal skeleton: basally there is a spongin membrane in which single acanthostyles are embedded with points erect. Next to these, there are bundles of subtylotes, 2 - 20 spicules per cross-section, at intervals of 150 - 250 $\mu$ m, which rise up from the level of the points of the acanthostyles towards the ectosome. There they fan out to form the ectosomal skeleton. Spicules: ectosomal smooth subtylotes, sometimes faintly polytylote, sometimes strongylote, sometimes anisotornote (when one end is tylote, the other mucronate), rather uniform in size in the studied material: 156 - 240 by 2 - 3 $\mu$ m; acanthostyles, quite variable in size with a tendency to occur in two overlapping size categories: 40 - 312 by 3.5 - 8 $\mu$ m. Data on the sizes of spicules in various parts of the range are given in Table III.

Distribution: apparently occurring from the low arctic into North African waters, including the Mediterranean, from the littoral down to 1287m (the latter record is from Lundbeck, 1910).

Discussion: the reasons for preferring the name *coriacea* over *dujardini* or *brndstedti* were given by Alander (1942): Bowerbank (1866) mistook *Halisarca dujardini* Johnston, 1842 for the present species and used it for the combination *Hymeniacion dujardini*. Burton (1930b) con-

Table III Records and spicule sizes of <i>Hymedesmia coriacea</i>	Authority		Acanthostyles ( $\mu$ m)
	Locality	Subtylotes ( $\mu$ m)	



Table III

Records and spicule sizes of *Hymedesmia coriacea*

Locality	Authority	Subtylotes ( $\mu\text{m}$ )	Acanthostyles ( $\mu\text{m}$ ) (1) or (2) categories
60° - 65°N 08° - 55° W	Lundbeck (1910) as <i>H. dujardini</i>	149 - 280	83 - 220 (1)
Bergen, Norway	present paper	206 - 240/2 - 2.5	108 - 312/5 - 8(2)
ZMA POR. 4946, 4950 - 52	Fristedt (1885) as <i>Stylopus</i>	200	120 - 180 (1)
Gullmarsfjord, Sweden	Bowerbank (1866) as <i>Hymediacion dujardini</i>	200/3 - 4	90 (1)
Scarborough, E. England	present paper	190 - 202/2.5 - 3	72 - 168/4.5 - 8 (1)
Lough Ine, S.W. Ireland	present paper	156 - 192/2.5 - 3	72 - 170/3.5 - (2)
ZMA POR. 4659, 4676	present paper	170 - 190/2 - 2.5	40 - 80/3.5 - 6 (1)
Roscoff, W.-France	present paper	115 - 240/3 - 4	88 - 178/2 - 6 (1)
ZMA POR. 4834-44, 4868	Arroyo, et al. (1976) as <i>H. dujardini</i>	140 - 238	61 - 317 (1)
Azores (material RMNH)	Boury-Esnault (1971) as <i>H. bronstedti</i>	151 - 284	76 - 274 (1)
NE Spain	Boury-Esnault (1971) as <i>Achinoe</i>	190 - 215/2 - 3	70 - 200 (1)
Banyuls, S-France	Topsent (1936) as <i>H. dujardini</i>	190 - 215/2 - 3	85 - 225/5 - 7 (1)
Banyuls, S-France	Topsent (1925) as <i>stylopus dujardini</i>	100 - 227/1 - 2.8	77 - 115/1.7 - 3.5 (1)
Monaco	Sara & Siribelli (1960) as <i>H. dujardini</i>	170 - 220/2.5	75 - 180/4.5 - 5 (2)
Naples, Italy	Pulitzer-Finali (1978) as <i>Stylopus dujardini</i>	170 - 196/2 - 2.5	70 - 133/3.5 - 6.6 (1)
Naples, Italy	present paper	172 - 240	56 - 152 (2)
Naples, Italy	Cruz, unpublished, as <i>H. dujardini</i>		
Tenerife, ZMA POR. 5161			
Tenerife			

Other records of this species, which do not provide spicule size data, are: Greenland (Bronsted, 1914, as *H. dujardini*), SW Sweden (Alander, 1942, as *Stylopus*), W-coast Ireland (Könnecker, 1973 as *H. dujardini*), S-coast Ireland (Stephens, 1920, as *H. dujardini*), Plymouth, S-England (Burton, 1930b, as *H. bronstedti*), Roscoff (Topsent, 1891, as *Hymerhaphia echinata*, and Borojevic, et al., 1968, as *H. bronstedti*), Iles de Glénan, S-Brittany (Descatoire, 1969, as *H. dujardini*), Golfe de Gascogne (Topsent, 1892, as *H. dujardini*), Banyuls (Vacelet, 1969, as *Stylopus dujardini*), and Marseille (Vacelet, 1976, as *H. dujardini*).

cluded that a new name was required and proposed *brøndstedi*. He overlooked, however, that *Stylopus coriaceus* Fristedt, 1985, described from Swedish waters, is a clear synonym.

Two features of this common sponge are apparently subject to considerable variation, viz. life-colour and acanthostyle sizes. Colours, according to the respective authors, may include brown-red to green (Fristedt), ochre-yellow to deep amber (Bowerbank), yellow or grey (Topsent), light brown (Pulitzer-Finali, and present material), and rosy (Cruz, pers. comm.).

Acanthostyles in two size categories: 108 - 120 and 280 - 312 (Norway, present material), 70 - 96 and 150 - 170 (Brittany, present paper), 85 - 110 and 160 - 225 (Naples, Topsent, 1925), 56 - 96 and 120 - 152 (Tenerife, Cruz, pers. comm.). Acanthostyles in a single size category: 84 - 130 (Brittany present material), 48 - 168 (Ireland, present material), 40 - 80 (Azores, present material), 96 - 144 (Tenerife, present material), 120-180 (Sweden, Fristedt, 1885), 83 - 220 (Greenland, Iceland, Lundbeck, 1910). It is concluded here, that these observations are best explained as a random individual variation.

Topsent (1936), in dealing with Mediterranean sponges, distinguished both *dujardini* (as *Hymedesmia*) and *coriacea* (as *Anchinoe*), arguing that both differ in the roughness of the skin; also *coriacea* would pass from a *Hymedesmia* stage to an *Anchinoe*-stage during growth. Boury-Esnault (1969, 1971) kept the same view, though she used the name *brøndstedi* instead of *dujardini*. I do not know whether the *Hymedesmia-Anchinoe* transformation during growth was observed on the same species (it seems quite plausible), but I doubt whether this material was conspecific with *Hymedesmia coriacea*, since the *Anchinoe* architecture is not found in northern specimens. It is quite possible that Topsent's and Boury-Esnault's *Anchinoe coriacea* is an unnamed form, or, as Topsent himself intimated, a lipochelous form of *Anchinoe tenacior* Topsent 1925.

*Hymedesmia pulposa* Topsent, 1925, is a red species, possibly closely related to *H. coriacea*.

The present species is the type of the genus *Stylopus* Fristedt (1885), which is employed for species of *Hymedesmia*-architecture and -spiculation, but lacking the chelae. There is no clear indication for the assumption that *Hymedesmia* species lacking chelae are a monophyletic group. Indeed, when the variability of ectosomal megascleres of e.g. Alander's (1942) *Stylopus* species

is taken into account, it is even quite unlikely. For that reason, it is here proposed to abandon the use of *Stylopus* and of course also of *Ectyostylopus* Topsent (1928) (erected for *Stylopus* species possessing clearly two size categories of acanthostyles).

This generic question also raises the more general problem of the relationship of *Hymedesmia* with *Phorbas* (= *Anchinoe*), and also with *Pronax* (= *Stylostichon*); genera which differ only in architecture. It seems inevitable that any intended revision of *Hymedesmia* should take these groups into account also.

The large distribution of *Hymedesmia coriacea* from the Arctic to the Canary Islands and into the (Western) Mediterranean, is rather unusual in sponges. The range possibly even exceeds that of *Halichondria panicea* in its southern limits (cf. Vethaak, et al. 1982). In contrast with this species, *H. coriacea* is not known from the east coast of North America.

#### V. On *Ulosa stuposa*, with remarks on the genera *Ulosa*, *Dictyonella* and *Rhaphidostyla*.

Family Esperiopsidae

Genus *Ulosa* De Laubenfels, 1936

*Ulosa stuposa* (Esper, 1794) Pl. I, figs. 8 - 9

*Spongia stuposa* Esper, 1794 (Not: Montagu, 1818 = *Stelligera* s.)

*Chalina inornata* Bowerbank, 1874

*Desmacidon pannosus* Bowerbank, 1874

*Halichondria inornata*; Topsent, 1899

*Stylotella inornata*; Lévi, 1950a

*Ulosa digitata*; Burton, 1956

*Stylaxinella stuposa*; Vacelet, 1960

*Ulosa stuposa*; Pulitzer-Finali, 1983

Material: ZMA POR. 241, Brittany, France, 20 - 25m, 7-VII-1964, coll. G. Kleeton.

242, do., 15-25m, 18 VII-1964

3442, St. Cyprien, S-France, 55m, 9-IX-1965, coll. J.H. Stock

2592, do., 30-40m, 4-VIII-1965 5119, Roscoff,

France, 2m, 13-VIII-1981, coll. W.H. de Weerd

5120, do., dredged at 20m, 11-VIII-1981

5121, do., dredged at 28m, 14-VIII-1981.

Description: digitate cushions to ramose forms (up to 8cm thick, branches up to 17 cm long with diameter up to 1.5cm. Surface finely conulose in places honey-combed. Consistency softly spongy, compressible, easily torn or damaged.

Colour: orange in life, pale yellow in spirit.

Ectosome: the organic dermis is carried by the fibre endings, there being no special dermal skeleton.

Choanosome: an irregular rectangular fibre system with relatively few soft parts and large open spaces; frequently digitations and branches are partly hollow. Fibre system consisting of barely distinguishable main and secondary fibres, which connect at right angles. Fibres heavily cored, but spongin-coat normally well-developed. Meshes of the system vary in size between 100 and 1000  $\mu\text{m}$ ; fibre diameter in the different specimens varies between 15 and 70  $\mu\text{m}$ , coring extent is between 3 and 20 spicules per cross section. Spicules: predominantly styles, but oxeote and strongylote modifications are common. Size rather variable, especially the thickness, both within a single specimen and in different specimens: 125 - 170 by 2 - 8  $\mu\text{m}$ .

Distribution: from Ireland down to West Africa and into the (Western) Mediterranean,

Discussion: in the present collection both cushion-shaped and digitate ramose specimens were represented and there appears to be no correspondence between habit and skeletal characters. Moreover, the specimens show a neat gradient between cushion-shapes and long-ramose forms, which inevitably leads to the conclusion that all belong to one and the same Mediterranean-Atlantic species. Apart from the above-given references, those of Arndt (1941, S. coast of Portugal), Burton (1957, Plymouth), Könnecker (1973, W. coast of Ireland), Borojevic, et al. (1968, Roscoff), and Pulitzer-Finali (1978, Naples) also testify to this uninterrupted distribution.

Related forms (*U. tenellula* and *U. tubulosa*) have been recently described from the Mediterranean by Pulitzer-Finali (1983). The first of these two seems hardly distinct from *U. stiposa*; more evidence is needed for its specific identity.

The genus *Ulosa* erected by De Laubenfels (1936) for the species *Spongia angulosa* Lamarck, 1814 (re-described by Topsent (1930) as *Cacochalina angulosa*) is used for quite different sponges in recent West Indian literature. Particularly, the extremely common reef form "*Ulosa*" *ruetzleri* Wiedenmayer, 1977, seems to be widely divergent from *U. angulosa* and *U. stiposa*. Material of "*U.*" *ruetzleri* is amply available in the ZMA collection, while a specimen of *U. angulosa*, identified (correctly in my opinion) by Burton was collected by the Siboga Expedition in Indonesian waters (ZMA 3042). *U. angulosa* is an upright-lobate sponge with finely conulose surface, spongy

compressible consistency, a rectangularly meshed reticulum of spongin fibres thickly cored with short, blunt-ending styles and strongyles of 125 - 180 by 5  $\mu\text{m}$  (Topsent, 1930) or 130 - 150 by 7 - 9  $\mu\text{m}$  (ZMA 3042). It has a convincing overall similarity with *U. stiposa*. "*U.*" *ruetzleri* is an incrusting sponge, fleshy-conulose, with a high content of organic material and a very loose system of irregularly anastomosing spongin-fibres cored by rather few, long, sharply pointed styles. It conforms quite well with certain low-growing specimens of the Mediterranean *Dictyonella obtusa* (Schmidt, 1862) or *D. pelligera* (Schmidt, 1864). It is here proposed to assign "*Ulosa*" *ruetzleri* to *Dictyonella* Schmidt, 1868 (sensu Topsent, 1938). This species is predominantly reported from the West Indies, but recent collecting by the Rijksmuseum van Natuurlijke Historie at Leiden (RMNH) in the Cape Verde Archipelago (CANCAP 6 Expedition) yielded a specimen of *Dictyonella ruetzleri* from that area. Whether other West Indian species assigned to *Ulosa* (i.e. *U. hispida* Hechtel (1965), *U. funicularis* Rützler (1981), and *U. arenosa* Rützler (1981)) are also *Dictyonella* species remains to be decided, since the spicule sizes of the latter two are considerably smaller than normally found in *Dictyonella*.

A genus associated with *Dictyonella* is *Rhaphidostyla* Burton (1935). After describing the type species, *R. kitchingi* from Scotland, Burton also assigned *Phakellia incisa* Schmidt, 1862 (= *Dictyonella incisa* according to Topsent (1938) and Pulitzer-Finali (1978)), *Phakellia plicata* Schmidt, 1862 (= *Dictyonella plicata*), *Clathria pelligera* Schmidt, 1862 (= *Dictyonella pelligera*), and *Stylotella marsilii* Topsent, 1925 (= *Dictyonella marsilii*). From this, it would seem that *Rhaphidostyla* is a junior synonym of *Dictyonella*, were it not for the fact that the type species *R. kitchingi* is not at all like *Dictyonella* spp. It is close to the genus *Hymeniacion* Bowerbank, 1866. In his description of *R. kitchingi* Burton emphasized the "telescoped" endings of its spicules. This feature, however, is of wide occurrence in many different demosponges. I fail to see the difference between *Rhaphidostyla kitchingi* and members of the genus *Hymeniacion*. It is very similar to *H. perlevis* (Montagu, 1818), which occurs sympatrically, but may be distinguished on life-colour (pale yellow in *kitchingi*) and smaller and thinner spicules. Until Western European *Hymeniacion* have been revised, it seems wise to recognize this doubtful species as *Hymeniacion kitchingi*.



*Rhaphidostyla incisa* was reported recently from Ireland (Van Soest & Weinberg, 1980; Van Soest, Guiterman & Sayer, 1983). Hiscock, et al. (1984) suggested that this record probably concerns *Tethyspira spinosa* (Bowerbank, 1866), and I am forced to agree with this. The specimen is hardly a *Dictyonella* (no spongin), nor a *Hymeniacidon* (spicules too long, no ectosomal tangential skeleton). In view of the rarity of acanthostyles in certain specimens of *Tethyspira*, and in view of the fact that it is known from the same locality, it is proposed to assign the specimen to *Tethyspira spinosa*.

The genus *Stylaxinella* Vacelet, 1960 is a junior synonym of *Ulosa* because the present species was named as the type. *Stylaxinella* was recently used by Hechtel (1983) for two new Brazilian species, which may possibly be members of either *Ulosa* or *Dictyonella*.

**VI. *Halicnemias patera***, new to the fauna of Ireland  
Order Axinellida

Family Desmoxyidae

Genus *Halicnemias* Bowerbank, 1866

*Halicnemias patera* Bowerbank, 1866 Pl. I fig 10

*Bubaris gallica* Topsent, 1892b

Material: ZMA POR. 5322, N of Sandy Island, Roaringwater Bay, SW Ireland, on rocks at 11m depth, coll. M.J. Leloup & M. Reichert, 21-VII-1981 (other specimens have been identified in the same area).

Description: bright orange-brown, rounded patches of about 2.5cm in diameter and up to 0.5mm thick. Surface smooth, with low elevations. Consistency soft. Spicules include ectosomal acanthoxea, bent in the middle, up to 150 by 6µm, centrotylote smooth oxea up to 2000 by 10µm, and radiating single tylostyles of up to 2000 by 22µm which are sheathed in bundles of the centrotylotes (cf. descriptions of Topsent (1897) and Descatoire (1966)).

Discussion: this new record for the species is hardly surprising, since it fills the gap in the known distribution from the Shetlands down to the Mediterranean. Also, from the casual way in which the material was picked up (as part of a general survey of the sublittoral flora and fauna of Roaringwater Bay, and not as part of a special sponge survey), it may be safely concluded that it is not a rare species in those parts.

Topsent (1897) has already pointed out the great resemblance in spiculation that exists between *Halicnemias patera* and *Higginsia* Higgin, 1977. Topsent emphasized the radiate architecture,

the incrusting habit and the presence of tylostyles as the principal choanosomal spicules in *Halicnemias*, in contrast to the reticulate architecture with central spicular axis, the upright habit and the styles in *Higginsia*. In view of all the forms with bent acanthoxea and styles/tylostyles at present known to science, these clear-cut differences are untenable.

The incrusting *Higginsia thielei* Topsent 1904, reported from deep water off the Azores and also off the west coast of Ireland (Stephens, 1920) and off Iceland (Burton, 1959, as *H. strigilata*, material checked by me in the Copenhagen Museum), is reticulate and has styles as the only megascleres. West African *Higginsia tethyoides* Lévi, (1950b) is globular, with a radiate architecture and styles and oxea as megascleres. *Higginsia mediterranea* Pulitzer-Finali, 1983 is erect, of unknown architecture, and its oxea and styles have tylole swellings reminding one of *Halicnemias*. *Higginsia coralloides* var. *arcuata* Higgin (1877) is intriguing, because it was found so close to the present locality (Higgin's material came from Bantry Bay) and also is described as incrusting. It is not impossible that it will eventually be found to be identical to *H. patera*, but Higgin's explicit remark "... acerate spicules extending vertically from the base and connected by secondary lines. ..." precludes such synonymization at this moment.

Although all the above-presented data would seem to indicate that *Higginsia* and *Halicnemias* are intergrading, it is considered premature to unite the genera. For the moment it seems useful to keep reticulate and radiate species separate (disregarding the shape of the megascleres), which results in the following list of micracanthoxea-bearing Desmoxyids of the North Atlantic:—Valid species:

*Halicnemias patera* Bowerbank, 1866: from the Shetlands down into the Gulf of Naples.

*Halicnemias verticillata* (Bowerbank, 1866): Arctic to Mediterranean.

*Halicnemias tethyoides* (Lévi, 1950b), new combination: West Africa.

*Higginsia strigilata* (Lamarck, 1814): West Indies cf. Wiedenmayer, 1977).

*Higginsia liberiensis* Higgin, 1877: West Africa

*Higginsia thielei* Topsent, 1904: Iceland-Ireland-Azores.

Species inquirenda (more data needed):

*Halicnemias geniculata* Sará. 1958: Naples, differing from *H. patera* only in spicule size; in view of its habitat (caves) it might well be only an ecomorph.

"*Higginsia*" *arcuata* Higgin, 1877: SW Ireland (possibly *H. patera*).  
*Higginsia*" *mediterranea* Pulitzer-Finali, 1893  
Naples (possibly *H. patera*).

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