

BULLETIN ZOOLOGISCH MUSEUM

 UNIVERSITEIT VAN AMSTERDAM

Vol. 10 No. 24 1986

A NEW SUBLITHISTID SPONGE
MONANTHUS CIOCALYPTOIDES N.SP. (PORIFERA, HALICHONDRIDA),
FROM THE WEST INDIAN REGION

R.W.M. van SOEST & S. ZEA

ABSTRACT

Monanthus ciocalyptoides n.sp. is described from two localities in the West Indian region, viz. the Saba Bank (17°25'N 63°33'W) and the Colombian Caribbean (11°20'N 74°09'W). The genus was hitherto known from South African waters only, by the type-species *M. plumosus* Kirkpatrick (1903). The systematic status of the new species and the genus as sublithistid members of the order Halichondrida is discussed.

INTRODUCTION

Sublithistids are "soft" sponges with desmata added to the spicule complement. They are generally considered members of predominantly non-lithistid orders, or simply classified as "incertae sedis". This seems unsatisfactory from a phylogenetic point of view because of the limited distribution of true desmata (mostly confined to Astrophorida and Spirophorida). The assignment of sublithistids to non-lithistid orders is of course based on the nature of their remaining spicules and the architecture of the skeleton. The new species described below belongs to a key genus in many respects: *Monanthus* Kirkpatrick, 1903, shows some similarities with true lithistids (*Aciculites*, *Siphonidium* and *Vetulina*) through its possession of strongly-

lote/stylote/oxeote spicules in the absence of triaene ectosomal spicules. On the other hand it is undeniably related to non-lithistid halichondrid genera like *Topsentia*, *Leucophloeus*, *Epipolasis* and *Ciocalypta*. The description of a second species of *Monanthus*, next to its type and only species, *M. plumosus*, thus represents an item of considerable interest. Also, through this description the distribution of the genus is considerably extended from the South African east coast to the tropical Atlantic.

MATERIAL AND METHODS

The type material is preserved in 70% ethanol; slide preparations have been made in the usual way (cf. Van Soest, 1977). Drs. J.C. den Hartog

(Rijksmuseum van Natuurlijke Historie, Leiden) is thanked for the loan of the holotype.

SYSTEMATIC DESCRIPTION

Order Halichondrida

Family Halichondriidae ?

Genus *Monanthus* Kirkpatrick, 1903

Monanthus ciocalyptooides n.sp.

Holotype: RMNH Por. 1309, HNI Ms. 'Luymes' Saba Bank Exped. stat. 136, 17°23'N 63°33'W, Central Saba Bank, divers, 34 m, bottom sand and shells, 13-VI-1972.

Paratypes: ZMA POR. 5837, in front of Playa Brava, 12 m, 20-IV-1982; ZMA POR. 5838, Piedra Ahogada, 20 m, 19-VIII-1981; both in Bahía de Nenguange, Santa Marta region, Colombia, 11°20'N 74°09'W, calcareous sand and rubble, coll. S. Z. (field numbers PSM 068a and PSM 175; a fragment of PSM 068a was donated to the USNM).

Description (figs. 1-6).-

Shape, size and consistency: Basal mass buried in the sand, with prominent tapering fistules; basal mass up to 1 cm in thickness; fistules up to 10 cm long, tapering from 9 mm diameter at the base to 3 mm at the apex; apices all closed; fistules thick-walled, but with a lumen twice the diameter of the wall; fistule walls strengthened by longitudinal thick spicule tracts visible through the semitransparent walls; fistules show a tendency to anastomose into flattened groups of 2 or 3; basal mass with distinct 'vein' patterns (subdermal canal system); consistency rather elastic, fairly soft, crumbly inside; surface slightly rough to the touch.

Colour: pale yellow-orange alive; white with semitransparent fistule parts in alcohol.

Ectosome: A confused, halichondroid tangential skeleton forms a distinct skin, which cannot, however, be separated from the underlying choanosome without taking some of it away; the skeleton consists exclusively of strongyloxea; most of them are arranged tangentially, but quite a few stick out beyond the dermis.

Choanosome: In the basal mass the skeleton is halichondroid-confused, with indistinct

'tracts' of a few strongyloxea each, making up a subdermal isotropic reticulation; at about 1 mm beneath the ectosome a loose network of desmata is added or superimposed on the oxeote reticulation; the desmata do not exhibit zygo-sis; further into the interior the reticulate structure disappears to be replaced by a confused mixture of strongyloxea and desmata; the fistule wall skeleton consists of a subdermal supporting, vague reticulation of short irregular tracts quite comparable to that of the main body, but in addition longitudinal thick spicule tracts traverse the length of the fistule; the desmata are absent from the fistules.

Spicules: strongyloxea, with oxeote growth stages, occasionally modified to styles: 378 - 592 by 5 - 22 μ m (n=25) (many thinner growth stages not included); desmata, smooth with relatively long clads, and a distinct monocrepid 'pith': total size 600 - 700 μ m, clads up to 300 μ m, epihabd 180 - 300 by 10 - 28 μ m (n=25).

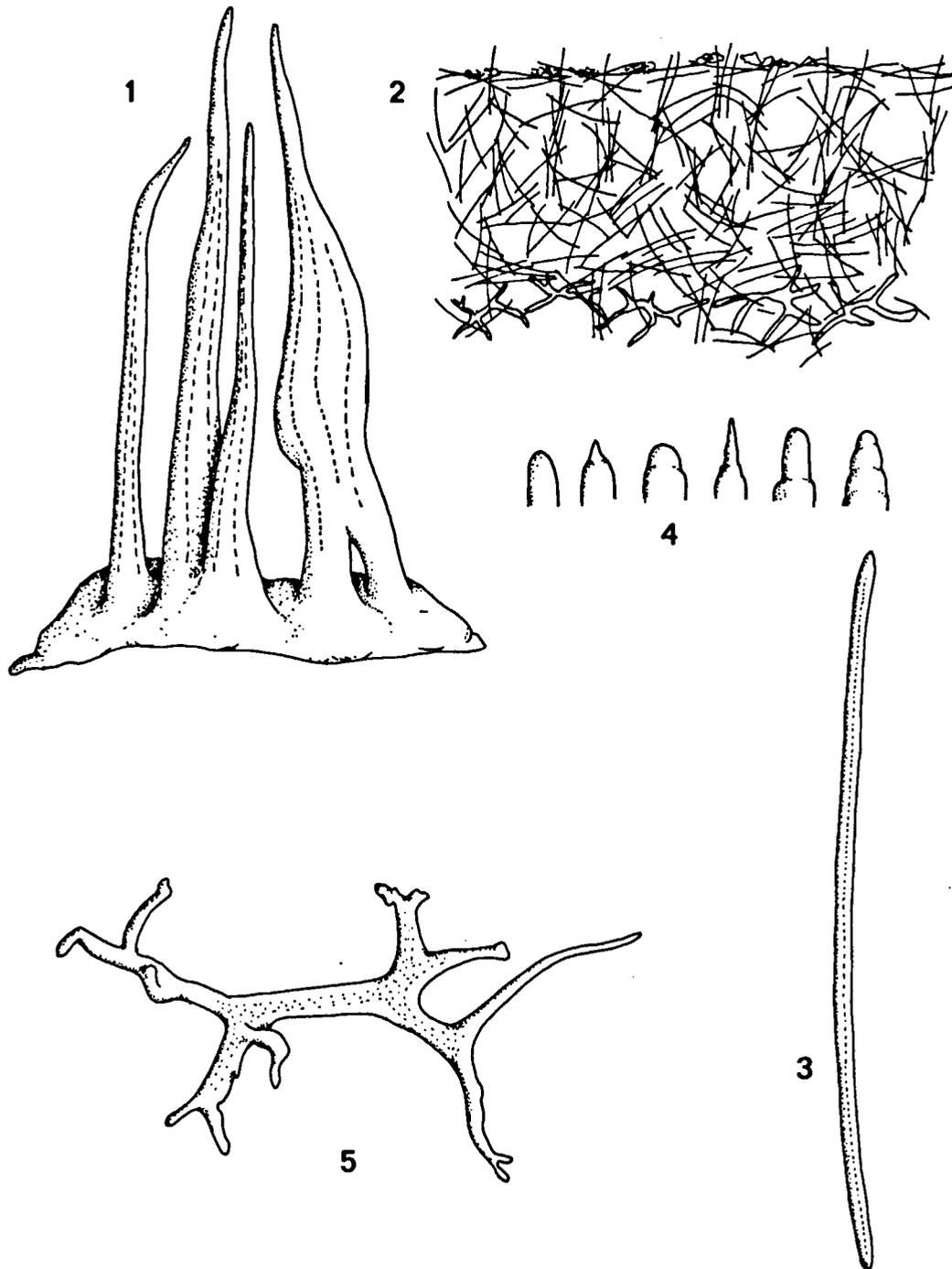
Habitat. This species grows in sand bottoms beyond the coral formations, and in the rubble flats in wave exposed parts of the bays in the Santa Marta region, from 10 - 25 m in depth. It was found on sand and shell bottom at 34 m depth on the Saba bank. Its buried mass agglutinates calcareous sand and rubble, compacting the otherwise loose substrate.

Etymology. The specific name refers to its resemblance to European *Ciocalypta penicillus* Bowerbank, 1862.

DISCUSSION

In habit the species reminds strongly of *Ciocalypta penicillus* Bowerbank, 1862, from western Europe. Life colour and skeletal architecture are also similar, but the size range of the spicules exceeds that of our new species (90 - 1400 by 4 - 55 μ m); normally there is also a large proportion of styles among them.

Likewise, the new species resembles *Coelocalypta porrecta* Topsent, 1928, described from West Africa but recently also found near Barbados (Van Soest et al., unpublished, in prep.). Points of difference are again the greater size range of the spicules (300 - 1500 by 7 - 65



Figs. 1-5. *Monanthus ciocalyptoides* n.sp. 1, habit of holotype, RMNH reg.no. 1309; 2, cross section of basal mass, showing confused-reticulate skeleton of monaxone megascleres and subectosomal desmata; 3, strongyle; 4, variability of strongyle apices; 5, subectosomal desma.



Fig. 6. *Monanthus ciocalyptoides* n.sp., photographed alive in situ at 20 m beyond the Colombian coral reefs (photo S. Z.).

μm), which are also in three distinct size categories, and the turnip-shaped main body. Through its possession of spicule categories *C. porrecta* falls to the genus *Topsentia* Berg, 1891.

The type species of *Monanthus*, i.e. *M. plumosus* Kirkpatrick, 1903, is an incrusting form, which may, however, form tubular or digitate extensions. These growth forms have been given varietal status (viz. *M. plumosus* typical var., *M. p.* var. *digitatus* Burton, 1929), but they probably all belong to one and the same polymorphic species. Differences between material described by Kirkpatrick (1903) and Burton (1929) are compared with our material in table I. From this, it is clear that considerable differences exist between the two species in the nature and the thickness of the oxeotes, and in the habit.

From the genuine similarities between non-lithistid *Ciocalypta* and (sub-)lithistid *Monanthus*, described above, it can only be concluded that the possession of genuine desmata is a polyphyletic character, not confined to Tetractinellids. Burton (1929) and De Laubenfels

(1936) explained the possession of desmata as a convergent or parallel development. They assumed that the desma has been derived from monaxone spicules several times independently during the history of sponge evolution. This assumption is not shared by us. In view of the extensive fossil record of lithistids reaching as far back as Cambrian times, it is thought more likely, that sublithistids such as the present new form represent relicts from a time in which the lithistid skeleton was wide-spread among various orders of sponges. Of necessity, this implies that non-lithistid sponge genera which show obvious similarities with the sublithistids such as the present new form are descendants of true lithistids. They are here assumed to have lost their lithistid skeleton because of its obvious low competition value. True lithistids are almost exclusively found in sciaphilous habitats, such as deep water beyond coral reefs or caves. Those few true lithistids, that have managed to survive in high competition habitats such as coral reefs, tend to have a poorly developed desma reticulum (cf. Van Soest, unpub-

Table I.

Characteristics of *Monanthus* spp. (sizes of spicules in μm).

Species/form	oxeotes/stylotes	desmata	habit	locality
<i>M. plumosus</i> Kirkpatrick, 1903	oxea 480/25 styles 600/28	rhabd 140/40 flattened branches	incrusting white	Natal coast, 60-150 m
<i>M. p. tubulatus</i> Kirkpatrick, 1903	oxea 900 styles do.	do.	fistulose white	Natal coast.
<i>M. p. digitata</i> Burton, 1929	oxea 720-1080/36	rhabd 200-360/72	digitate, with incrusting base, white	Natal coast.
<i>M. ciocalyptoides</i> new species	strongyloxea (occasionally oxea and styles) 378-592/5-22	rhabd 300/28 clads 300 (600-700 total size) smooth, long clads, monocrepid 'pith'	digitate, with incrusting base, yellow	Saba Bk. and Colombia, 10-34 m

lished, in prep.). An interesting parallel seems to exist with the polyphyletic sclerosponges, which are also best explained as relict forms of a former ancestral sponge fauna, which includes the ancestry of many non-sclerosponge groups (cf. Vacelet, 1985, Van Soest, 1984). Just as with lithistids, the sclerosponges occupy sciaphilous habitats, and just as with sub-lithistids there is a tendency observed to 'loose' the hard skeleton. So far, it is unclear whether sclerosponges and lithistids show intergrading in their ancestry. This field will be further explored in the near future (Van Soest, unpublished, in prep.).

REFERENCES

BURTON, M., 1929. Descriptions of South African sponges collected in the South African Marine Survey, 2. The 'Lithistidae' with a critical survey of the desma-forming

sponges.- Fish. mar. biol. Survey Rept., 7: 1-12.

KIRKPATRICK, R., 1903. Descriptions of South African sponges, 2.- Mar. Invest. S. A., 11: 171-180.

LAUBENFELS, M.W. DE, 1936. A discussion of the sponge fauna of the Dry Tortugas in particular, and the West Indies in general, with materials for a revision of the families and orders of the Porifera.- Pap. Tortugas Lab., 30: i-iii, 1-225, 22 pls.

SOEST, R.W.M. VAN, 1977. A revision of the megacanthoxea-bearing Tetillids (Porifera, Spirophorida), with a description of a new species.- Stud. Fauna Curaçao Caribb. Isl., 53: 1-14.

-----, 1984. Deficient *Merlia normani* Kirkpatrick, 1908, from the Curacao reefs, with a discussion of the phylogenetic interpretation of sclerosponges.- Bijdr. Dierk., 54 (2): 211-219.

TOPSENT, E., 1928. Spongiaires de l'Atlantique et de la Méditerranée, provenants des croisières du Prince Albert 1er de Monaco.- Rés. Camp. sci. Albert 1er, 74: 1-376, 11 pls.

VACELET, J., 1985. Coralline sponges and the evolution of the Porifera.- In: S. Conway Morris, J.D. George, R. Gibson & H.M. Platt, eds. The origin and relationships of lower invertebrates. The Systematics Association, Special Volume 28, London:1-13.

R.W.M. van Soest,
Institute of Taxonomic Zoology
(Zoölogisch Museum),
University of Amsterdam,
P.O. Box 20125,
1000 HC Amsterdam,
The Netherlands.

S. Zea,
Division of Biological Sciences,
University of Texas at Austin,
PAI 1-22, Austin TX 78712,
U.S.A.

Received : 26.VI.1985

Distributed : 18.IV.1986