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TETRAPOCILLON ATLANTICUS N.SP. (PORIFERA, POECILOSCLERIDA) FROM THE CAPE VERDE ISLANDS

R. W. M. VAN SOEST

Institute of Taxonomic Zoology (Zoölogisch Museum), University of Amsterdam, P.O. Box 4766, 1009 AT Amsterdam, the Netherlands

ABSTRACT

A representative of the rare genus *Tetrapocillon* Brøndsted (1924) was found for the first time in the Atlantic Ocean, dredged at 70 m depth during the recent CANCAP VII Expedition to the Cape Verde Islands. The single specimen differed from the previously known Indo-Pacific specimens of the genus (*T. novaezealandiae* Brøndsted, 1924) in the life colour, the possession of thin strongyles (in stead of thicker styles) and the smaller size of the tetrapocilli. For these reasons and the geographic disjunction the Cape Verde specimen was assigned to a new species, *T. atlanticus* n.sp. The affinities of the genus *Tetrapocillon* and other genera, seemingly related on the basis of similarities in the microsclere complement are discussed; it is made apparent that it is closest to *Guitarra* and *Coelodischela*. In spite of the suggestion provided by the microsclere names *Tetrapocillon* and *Iophon* are not closely related.

INTRODUCTION

Recent collecting activities in the Cape Verde Archipelago by the CANCAP VII Expedition (organized by the Rijksmuseum van Natuurlijke Historie, Leiden, in cooperation with the Institute of Taxonomic Zoology of the University of Amsterdam, the Rijksherbarium of the State University of Leiden, and the Institute of Earth Sciences of the Free University of Amsterdam) yielded material of the rare and unusual sponge genus *Tetrapocillon*, so far known only from two widely disjunct Indo-Pacific records. The material described below is incorporated in the collection of the Zoological Museum of Amsterdam. Slide and SEM preparations were made in the same way as described in Buizer & Van Soest (1977). Mrs W. van Ginkel made the SEM photos. The scientific leader of the CANCAP VII expedition Dr J. van der Land is thanked for providing the author with the opportunity to join the expedition.

SYSTEMATIC DESCRIPTION

Order Poecilosclerida
Family ?Myxillidae
Genus *Tetrapocillon* Brøndsted, 1924; Lévi, 1963.
?Myxillidae with tetrapocillae for microscleres.

Tetrapocillon atlanticus n.sp.

Text-fig. 1, Pls. I-II, table I

Holotype: ZMA POR. 6226, CANCAP VII Expedition stat.081, Ilheu de Sal Rei, West of Boavista, Cape Verde Islands, 16°11' N

23°00' W, 28-08-1986, dredged with 1.2 m Agassiz trawl, 70 m depth.

DESCRIPTION

Shape, size and consistency: massively incrusting a calcareous nodule, size indefinite (several cm^2), thickness 2-4 mm; surface irregular, no apparent oscules; consistency fragile, soft, slimy.

Colour: alive pale yellow with brownish tinge; in spirit little changed.

Ectosome: no separable ectosomal skeleton; scattered tangential bundles of megascleres and numerous microscleres.

Choanosome: largely organic with ill-defined tracts of megascleres rising from the substrate to the surface; many interstitial microscleres. The skeletal structure reminds of that of genera like *Strongylacidon* and *Batzella*.

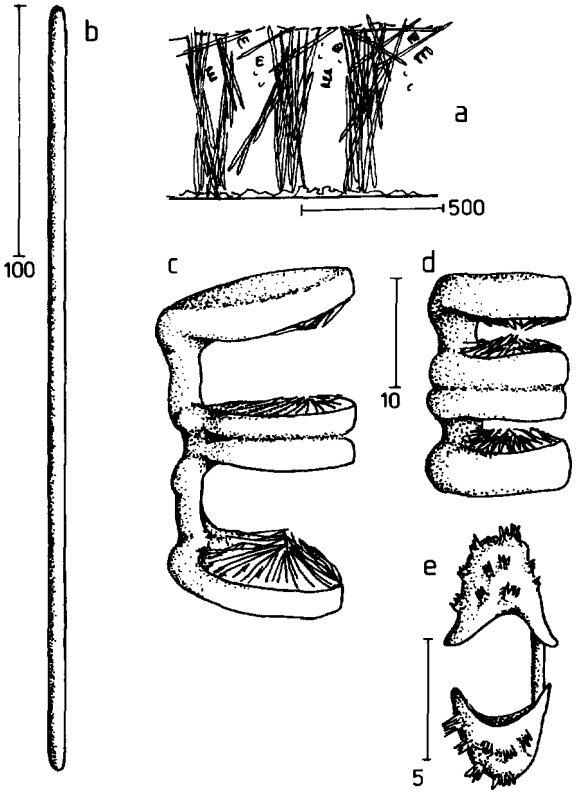

Figure 1: *Tetrapocillon atlanticus* n.sp., a cross section of choanosome; b. strongyle, c. larger tetrapocilla, d. smaller tetrapocilla, e. spined isochela (all scale in μm).

Spicules (Text-fig. 1, Pls. I-II): megascleres are exclusively thin strongyles, again reminding of those of *Strongylacidon/Batzella*, although a few seem to be inequiended; size: 209-242 by 2-4 μm (n = 25). Spined isochelae, of a peculiar form technically probably to be considered as palmate: 7-10 μm (n = 25); they resemble closely those recently described in *Guitarra abbotti* Lee, 1987. Tetrapocillae, in two size classes: 34-36 by 20-24 μm (n = 25) (see Pl. I figs. 1-6, Pl. II figs. 2 and 4) and 18-26 by 10-12 μm (n = 25) (Pl. I fig. 1, Pl. II figs. 1 and 3); they differ slightly in form, the smaller one being more compact with relatively thick plates.

ECOLOGY

Dredged up from 70 m, bottom calcareous nodules (dead Corallinaceae), which is a common type of bottom on the upper slopes of the Cape Verde Islands.

DISCUSSION

Table I lists the known records of the genus *Tetrapocillon*. From this it can be concluded that the Atlantic material differs from both other specimens (assigned to the single species *T. novaezealandiae*: one from New Zealand (Brøndsted, 1924) and one from the south coast of South Africa (Lévi, 1963)) in the slime production (not reported for *T. novaezealandiae*), the colour (black in *T. novaezealandiae*), the nature and size of the megascleres, and the size of the microscleres. Brøndsted and Lévi did not describe spined isochelae, but it is assumed the spines have been overlooked since they cannot be detected in light-microscope preparations.

AFFINITIES OF THE GENUS *TETRAPOCILLON*

If we only observe the skeletal architecture and the nature of the megascleres, the genus *Tetrapocillon* would very probably fall to the group of genera like *Strongylacidon* and *Batzella*, assigned to the family Esperiopsidae (= Desmacididae) by Van Soest (1984), but

Table I. Comparison of recorded specimens of *Tetrapocillon*.

Character	*T. novaezealandiae* Brøndsted, 1924 New Zealand	*T. novaezealandiae*, Lévi, 1963 South Africa	*T. atlanticus* n.sp. present paper Cape Verde Isl.
Habit	incrusting, cake-like	massive, cake-like	massive
Size	3 × 2.5 × 0.3 cm	5.3 × 1.7 cm	several cm^2
Consistency	felt-like	soft, friable	soft, fragile
Surface	granular	'craquelée'	smooth, slimy
Colour	black	blackish	brownish yellow
Ect.skeleton	no special skeleton	no special skeleton	clusters of tangential megascleres
Choan. skeleton	scattered monactines here and there forming distinct fibres of 60μm	numerous multispicular tracts of styles	ill-defined columns of megascleres, not dominating the organic parts
Megascleres	styles/subtylostyles 260-325/10 μm	flexuous styles 275-325/5-7μm	strongyles (sometimes slightly inequiended) 209-242/2-4 μm
Isochelae ('pocillé')	15 μm	7-10 μm	7-10 μm
Tetrapocillae	40-80 μm	1) 38-52 μm 2) 21-24 μm	1) 34-36 μm 2) 18-26 μm

recently isolated in the separate subfamily Stylotellinae by Wiedenmayer (1987). This group is characterized by the weak development of the skeletal tracts (which are sometimes replaced by sand grains), absence of ectosomal specialization, and generally weak development of the spicules: megascleres are thin, microscleres are often partly or wholly lost.

However, the abundant microscleres of *Tetrapocillon* point to similarities with genera, which have been assigned to other families of the Poecilosclerida on account of their skeletal architecture and/or megasclere morphology.

A great morphological similarity is found between the tetrapocillae and the dischelae of the Myxillid/Coelosphaerid genus *Coelodischela* Vacelet, Vasseur & Lévi, 1976. The two species of this remarkable genus are fistulote, have an ectosomal skeleton of tylotes and strongyles, and little or no choanosomal megascleres, reasons for the authors to assign them to the family Coelosphaeridae. I have argued several times already (Van Soest 1984; Zea & Van Soest, 1986) that the family Coelosphaeridae is entirely based on habit and growth form, and as such probably artificial. *Coelodischela* fits perfectly in the Myxillidae as a genus characterized by the possession of the peculiar microscleres. From SEM photos made from a spicule mount of the type specimen of *C. massa* Lévi & Lévi (1983) kindly procured by Prof. Lévi it is quite clear that these dischelae resem-

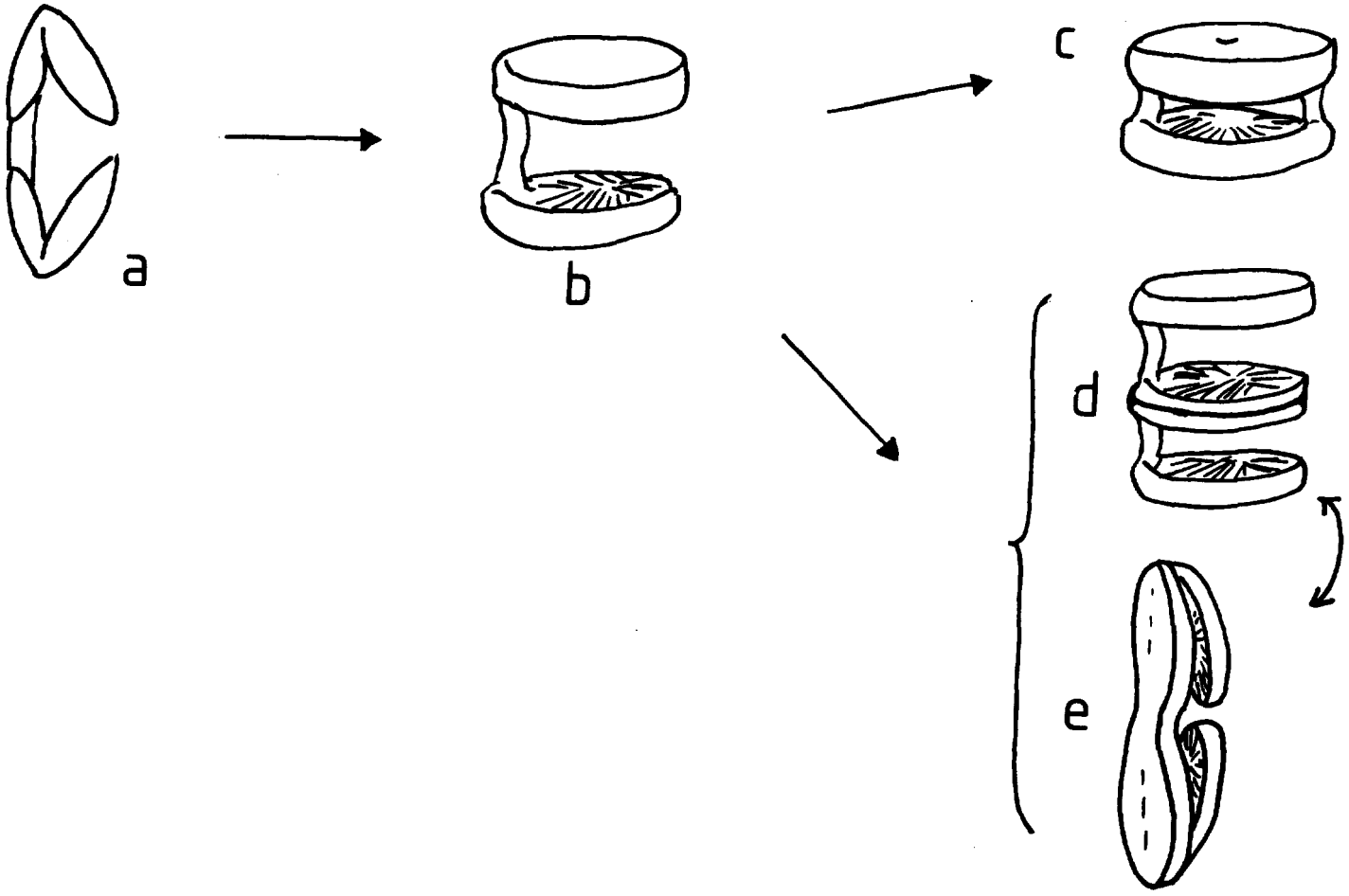

Figure 2. Schematic hypothesized model for derivation of tetrapocillae and related spicule types, a. generalized isochela (non-extant reconstruction), b. biplacochela (as found in some *Guitarra* species), c. coelodischela (of *Coelodischela*), d. tetrapocillon (of *Tetrapocillon*), e. placochela (of *Guitarra*).

ble 'halved' tetrapocillae (compare pls. I figs. 1-6, II figs. 1-4 with pl. III figs. 1-4); a difference is found in the observed two pillars carrying the plates (pl. III figs. 2 and 4) against one pillar in *Tetrapocillon.*

Recent descriptions of two new Californian species of *Guitarra* by Lee (1987) revealed an even closer morphological similarity in microscleres. *Guitarra abbotti* Lee, 1987 possesses next to the spicules characteristic for the genus (placochelae) also 'biplacochelae', which are even more resembling 'halved' tetrapocillae because the plates in this type of microsclere are carried by a single pillar, and small spined isochelae virtually identical to those of *Tetrapocillon atlanticus* n.sp. A second new species described by Lee, viz. *Guitarra isabellae* Lee, 1987, possesses 'biplacochelae' but not spined isochelae, in stead of which sigmata are present.

I examined Indonesian material of a third species of *Guitarra*, viz. *G. indica* Dendy, 1916 (pl. III figs. 5-6, pl. IV figs. 1-2), but found no 'biplacochelae' or spined isochelae in it (nor were these spicule types described in the type specimen). Interestingly, however, a peculiar so far undescribed microsclere in the form of a spined four-legged 'spider' (pl. IV figs. 1-2) was found in this material, thus adding to the quite varied package of microscleres described in the various species of the genus *Guitarra.* The characteristic microscleres of the genus are the placochelae (although these have also been described in the genus *Eucheliplurna* Topsent, 1929). From SEM photos by Lee (l.c.) and those of *Guitarra indica* it can be seen that the placochela is related to the tetrapocillon: it is easily envisioned that a placochela is changed into a tetrapocillon by infolding of the 'interplate area' (terminology in Lee, 1987) and

subsequent fusion of the then touching plates, or reversely a tetrapocillon is changed into a placochela by stretching out of the two centre plates and subsequent infolding of the end-plates.

The absence of a special ectosomal skeleton, a confusedly reticulate choanosomal architecture, and oxea and stylotes for megascleres in *Guitarra* associate this genus with the 'dustbin' family Desmacididae.

Some structural resemblance may prove to exist between the *Tetrapocillon* and *Guitarra* microscleres and the melonchelas of the genus *Melonanchora*, but this will have to be studied more carefully.

The term 'pocilla' or 'bipocilla' was first used to describe the characteristic microscleres of the genus *Iophon* Gray (1867:543) and related forms. This genus (with synonyms *Menyllus* Gray (1867:533!), *Alebion* Gray (1867:534), *Ingallia* Gray (1867:537), *Pocillon* Topsent (1893), *Burtonella* De Laubenfels, 1936) has an ectosomal skeleton consisting of single or bundled strongyles/tylotes, a choanosomal skeleton consisting of a reticulation of single or bundled (acantho-)styles echinated by smaller acanthostyles; microscleres bipocillae (pl. IV figs. 4-6) (may be rare or absent) and spurred anisochelae (Pl. IV fig. 3). *Iophonopsis* Dendy (1924:348): differs from *Iophon* in the absence of echinating small acanthostyles. Since this is probably a simple case of independent loss of these spicules (e.g. in *I. nigricans* (Bowerbank, 1866) and *I. piceus* Vosmaer, 1885) this 'genus' is also considered a synonym of *Iophon*.

Iophonota De Laubenfels (1936:63) (type *Iophon aceratus* Hentschel, 1914) is another close relative, differing from *Iophon* in the oxeote nature of the choanosomal megascleres. In view of the fact that in other Myxillid genera, e.g. *Lissodendoryx* Topsent (1892), the choanosomal megascleres, normally smooth or spined styles, in isolated cases may be strongyles or oxea (see Van Soest, 1984; Zea & Van Soest, 1986), it is thought to be unlikely that *Iophonota* is a valid genus. It is proposed here to synonymize it with *Iophon*.

The genus *Iophon* is a clear myxillid in spite of the anisochelae, which it shares with mycalids and cladorhizids. It is here assumed that these are independently derived; this is corroborated by the divergent spurred shape. *Iophon* shows superficial similarity with *Tetrapocillon* through the microscleres of the latter which could be explained as double pocillae. However, from pl. IV figs. 4-6 it can be seen that the *Iophon* — bipocillae are asymmetrical and thus very probably derived from anisochelae, while no such indication is apparent in the tetrapocillae. These combined differences lead to the conclusion that bipocillae and tetrapocillae have been independently developed in two different groups.

However, the similarities of *Tetrapocillon* with the other treated genera (*Guitarra* and *Coelodischela*) are so striking that independent development of these unusual microscleres is judged to be unlikely. It seems inescapable that we have to assign the genus *Tetrapocillon* to the myxillids (close to *Coelodischela*), but also that *Guitarra* with its typical Desmacididae architecture and megascleres, belongs in this group. This points to familial close relationship of Myxillidae s.l. and Desmacididae. The latter family, already qualified as a 'dustbin' family (Van Soest, 1984), must perhaps be abandoned since a positively discriminating definition can now no longer be given for it. All this also means that the typical myxillid characters (special ectosomal megascleres and reticulate architecture) must be assumed to have been lost in *Tetrapocillon*. A reevaluation of the systematic assignment of such reduced groups as Stylotellinae and *Iotrochota* is necessary, as recent conclusions on this (Van Soest, 1984; Wiedenmayer, 1988) may prove to be wrong.

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Institute of Taxonomic Zoology (Zoölogisch Museum), University of Amsterdam,
P.O.Box 4766, 1009 AT Amsterdam, the Netherlands.

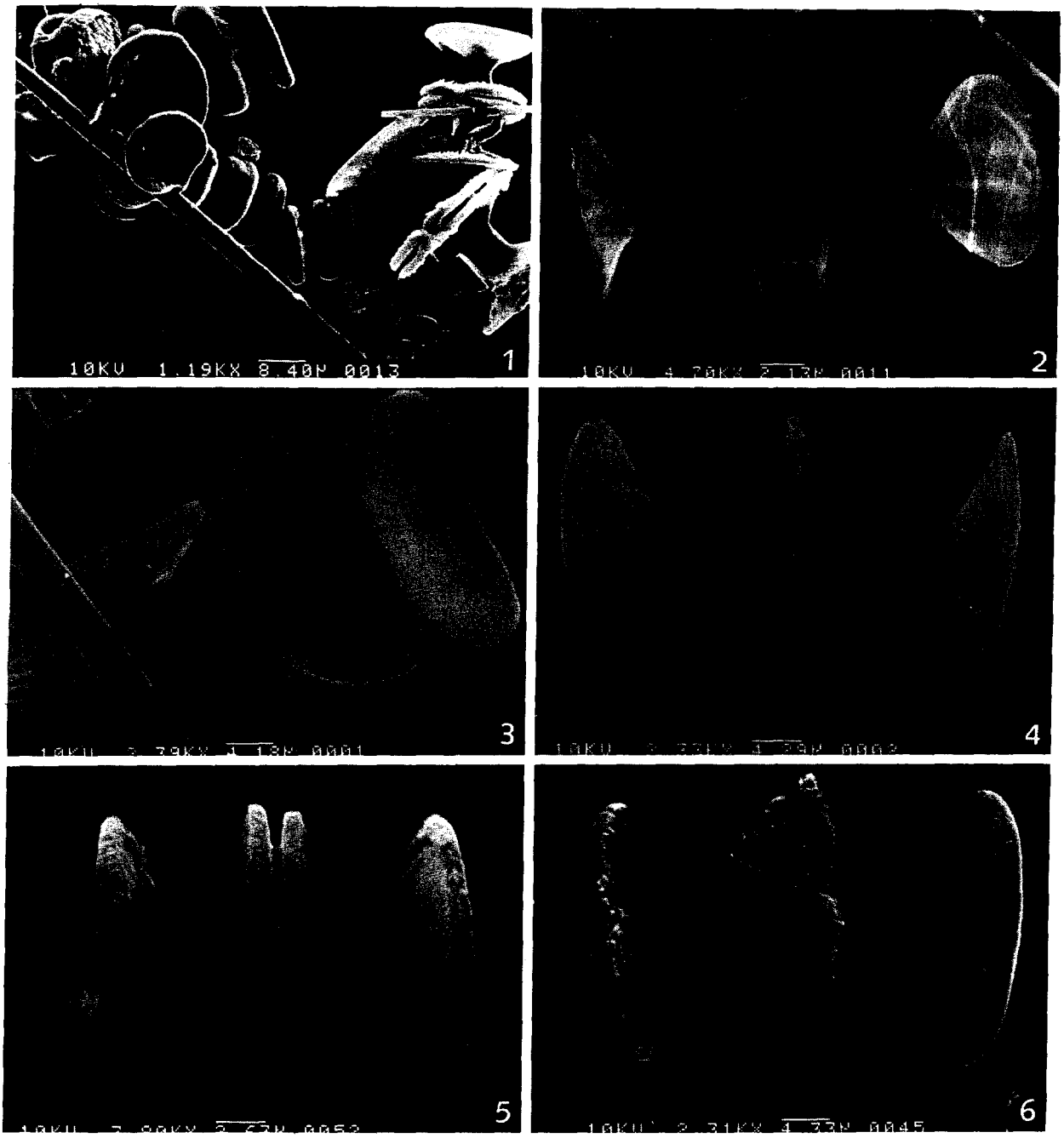

Plate 1, Figs. 1-6: *Tetrapocillon atlanticus* n.sp., 1. general view of spicule complement, 2-6. different-angled views of successive growth stages of the larger tetrapocillon, to show the development from thin-bladed smooth stage to thickened, internally fringed adult spicules.

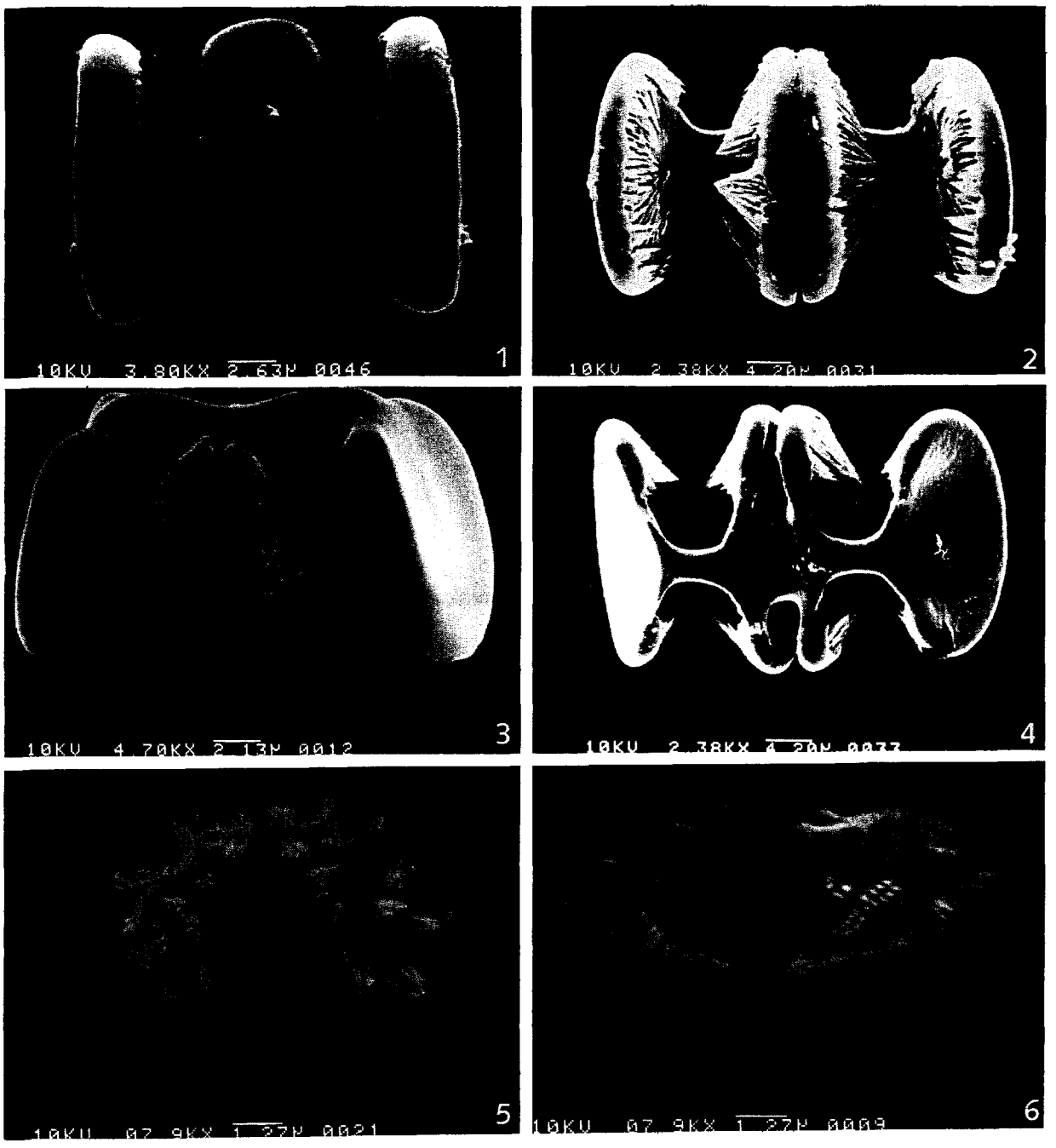

Plate 2, Figs. 1-6. *Tetrapocillon atlanticus* n.sp., 1. and 3. mature smaller tetrapocillae, 2 and 4. mature larger tetrapocillae, 5-6. spined isochelae.

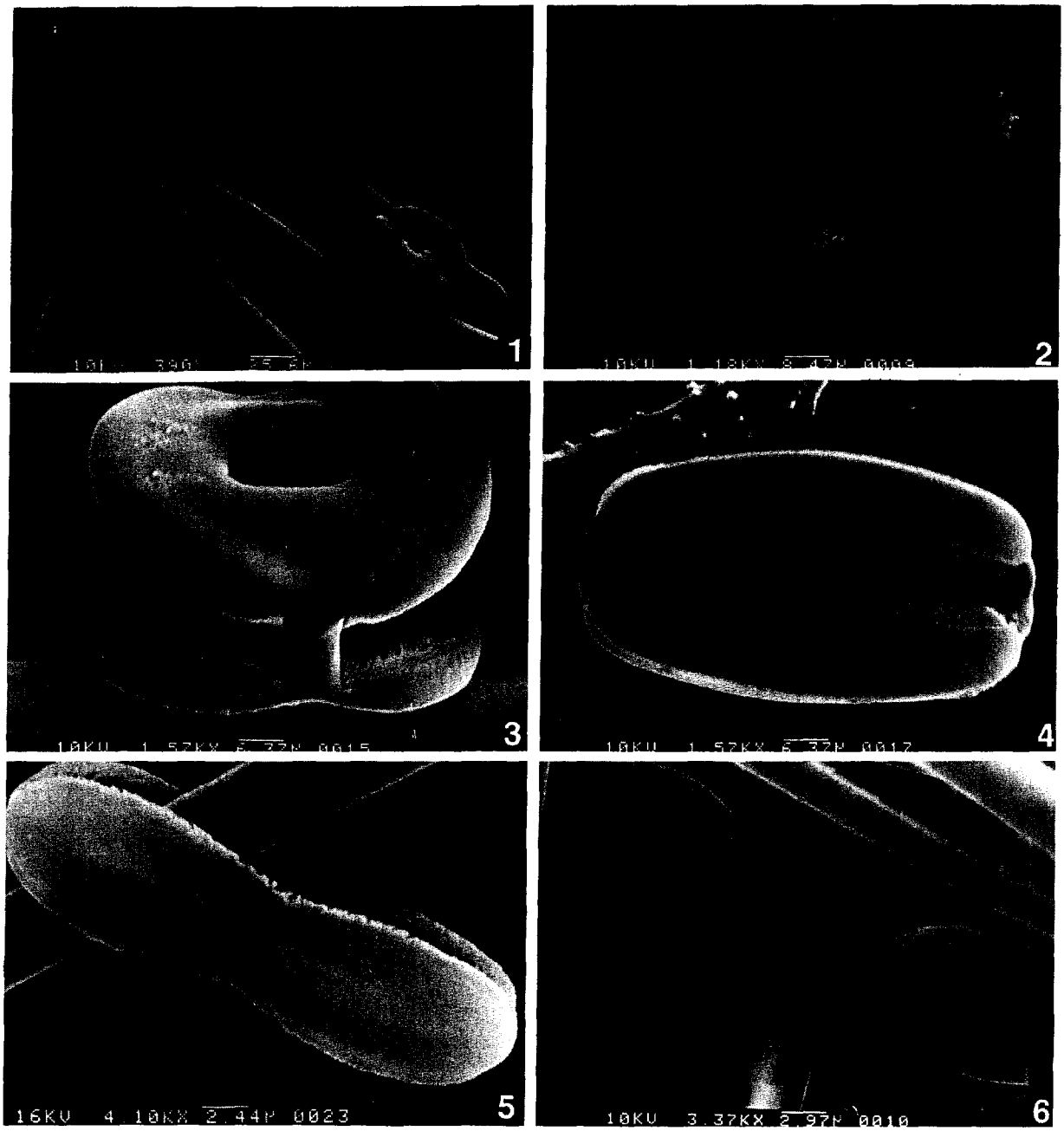

Plate 3, Figs. 1-4. *Coelodischela massa* Lévi & Lévi, 1983 (from paratype), 1. general view of megascleres and coelodischela, 2. inside view of coelodischela to show the two pillars and fringe, 3-4, different-angled views of coelodischelae. Figs. 5-6. *Guitarra indica* Dendy, 1916, Indonesian material collected by the Siboga Expedition, different-angled views of placochelae.

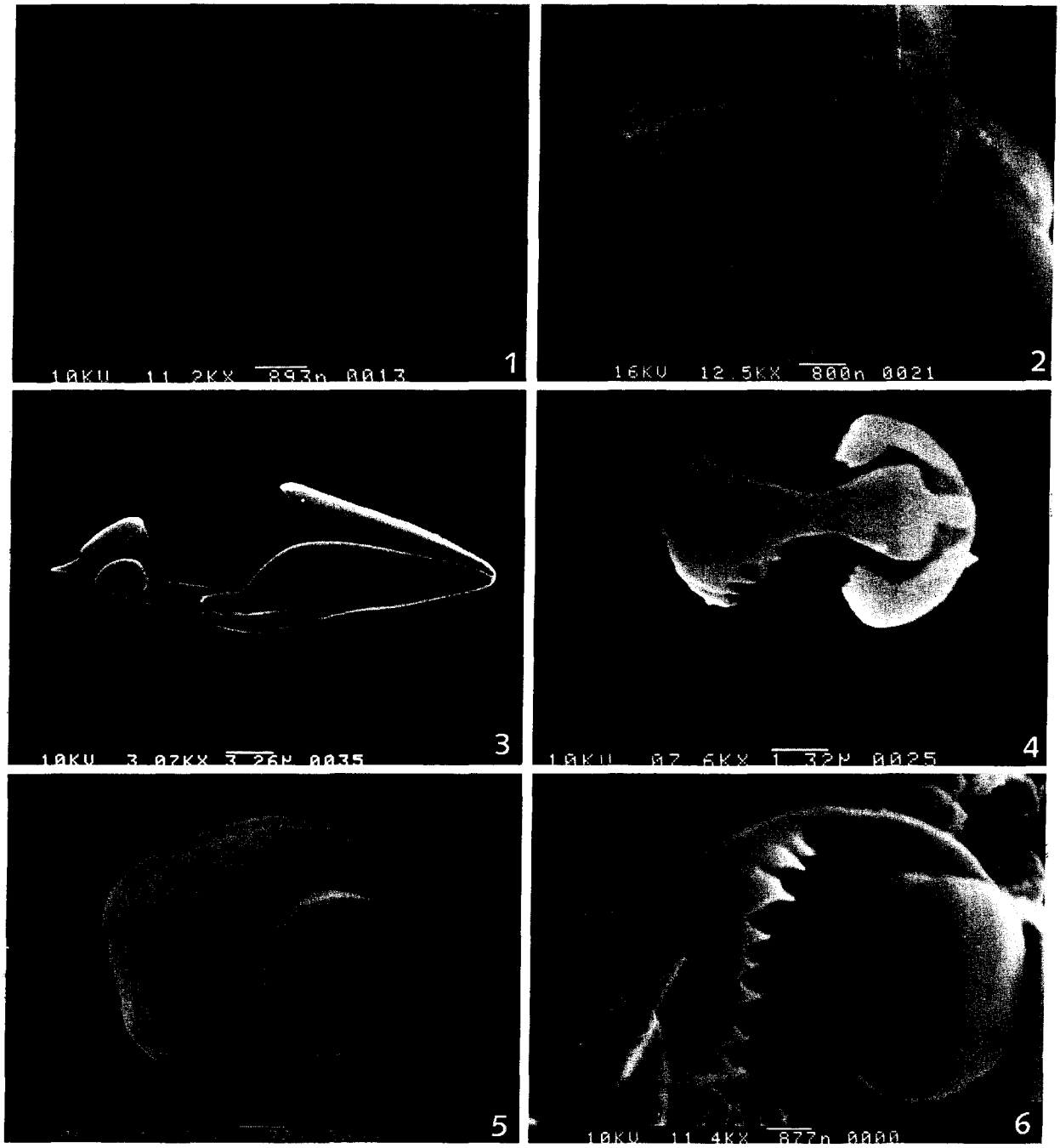

Plate 4, Figs. 1-2. *Guitarra indica* Dendy, 1916, Indonesian material collected by the Siboga Expedition, different-angled views of undescribed spined four-legged microsclere. Figs. 3-6. *Iophon hyndmani* (Bowerbank, 1866), material from SW Ireland, 3. spurred anisochela, 4-6. different-angled views of bipocillae.