

Five new species of *Sarcophyton* (Coelenterata: Octocorallia) from the Fiji Islands

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Abstract

This paper describes five new species of the soft coral genus Sarcophyton which were identified by their morphological characters (colony form and sclerite shape). The five species have been named: S. aalbersbergi sp. nov., S. aldersladei sp. nov., S. alexanderi sp. nov., S. skeltoni sp. nov. and S. soapiae sp. nov. For the first time it is documented that there is a Sarcophyton species that does not have sclerites in the interior of the disc.

Keywords: Octocorallia, Sarcophyton, new species, Fiji

1. Introduction

Only limited taxonomic information is available about the benthic marine invertebrate fauna of Fiji. Marine invertebrates have recently come into focus during biodiversity studies (e.g. Kott, 1981; Newell *et al.*, 1996; Naqasima and Bandy, 2002; Clavier *et al.*, 1996; Feussner *et al.*, 2004), when researchers want to “harvest” the chemical potential of sponges, ascidians, cnidaria and other invertebrates (Folmer *et al.*, 2008; Folmer *et al.*, 2009), or for the aquarium and delicacy trades (e.g. spiny lobsters, bêche-de-mer and shrimps). Verseveldt (1982) recorded 35 valid *Sarcophyton* species world-wide and seven have been added since (Verseveldt and Benayahu, 1983; Li, 1984; Alderslade and Shirwaiker, 1991; Alderslade, 1993; Benayahu and Perkol-Finkel, 2004; Benayahu and van Ofwegen, 2009; Namin and van Ofwegen, 2009).

Sarcophyton species are widespread, from the Red Sea in the west to Polynesia in the east. They are found from the intertidal zone to depths up to 15 m. The genus *Sarcophyton* Lesson, 1834 is characterized by possessing dimorphic polyps called autozooids and siphonozooids. Autozooids are responsible for food capture and reproduction. When expanded, they are up to 2 cm long and can completely retract if disturbed. Siphonozooids are very numerous and appear as small openings between the autozooids. The primary function of siphonozooids is the supply of seawater for irrigation (Fabricius and Alderslade, 2001). Only three other shallow water central west Pacific Octocoral genera have dimorphic polyps: *Paraminabea*, *Heteroxenia* and *Lobophytum*. While *Paraminabea* and *Heteroxenia* can never be confused with *Sarcophyton*, some *Lobophytum* species easily are (Verseveldt, 1982; McFadden *et al.*, 2006). Microscopic examination of the CaCO₃ sclerites together with the shape of the colony is required to distinguish between the two genera.

Colonies of *Sarcophyton* are fleshy and soft, characteristically of mushroom shape with yellow, beige, brown or green color. Frequently vast areas are

covered by the same species. Most *Sarcophyton* species reproduce asexually by colony fission or budding of daughter colonies (Benayahu and Loya, 1986) and the clones, if given the right environmental conditions, form new colonies rapidly. Sexual reproduction has been reported from *Sarcophyton glaucum* from Natal (Schleyer *et al.*, 2004), the Red Sea (Benayahu and Loya, 1986) and Australia (Hellström *et al.*, 2010). The common symbionts of *Sarcophyton* colonies are zooxanthellae algae, located in the gastrovascular cavities. They use the algae to contribute to their energy needs by means of photosynthesis (Fabricius and Alderslade, 2001).

The terminology used for species descriptions is from Bayer *et al.* (1983). For *Sarcophyton* a set of characters needed to describe the genus and the various species are detailed below. The most common growth form is best described as mushroom shape made up of a stalk and a cap. The stalk attaches to the substrate and the cap is called the capitulum or disc. The capitulum is the part where the polyps (both autozooids and siphonozooids) are located. The interior of both the stalk and the capitulum is called the coenenchyme. In order to provide strength to the various parts of the animal, sclerites are found throughout the colony. Sclerites are made up of calcium carbonate and represent “the most important feature used in the identification of octocorals” (Fabricius and Alderslade, 2001). There are five regions from which the sclerites are sampled for the preparation. The most common sclerites that are found in the surface of the capitulum and the stalk are called clubs. They are monaxial sclerites, enlarged at one end, the head. The sclerites commonly found inside the capitulum are mainly slender spindles and those inside the stalk are thicker and larger spindles.

Where present, polyp sclerites are included in the species descriptions given below following the example of Alderslade and Shirwaiker (1991) for *S. spinospiculatum*. Prior to this paper the taxonomic value of polyp sclerites in the genus *Sarcophyton* had

been overlooked and more recently their importance was illustrated by McFadden (McFadden *et al.*, 2009). The presence or absence of polyp sclerites and the arrangement of the sclerites around the polyp can be used as a taxonomic tool. The most common arrangement in *Sarcophyton* species is in points or collaret and points. Collaret refers to the rod (stick-like) shaped sclerites that circle the polyp just below the rods that make up the points. These rods are found just below the base at each of the eight tentacles. The tentacles have small sclerites called platelets (small, flat and irregularly shaped sclerites).

2. Materials and Methods

Holotype specimens are stored in the Museum and Art Gallery of the Northern Territory (Conacher Street, Darwin NT 0820, Australia) and given reference numbers (e.g. NTM C15936) with paratype specimens kept at the Marine Reference collection of the University of the South Pacific (Suva, Fiji) and given reference numbers (e.g. USP 8571). For microscopic examination, small tissue samples were sliced from four different regions of each animal and placed on microscope slides.

Region one: Surface layer of the capitulum (disc). Region two: Interior of the capitulum. Region three: Surface layer of the stalk. Region four: Interior of the stalk.

A drop of sodium hypochlorite (10%) was pipetted onto the tissue to dissolve it, leaving only sclerites behind. A drop of water was added in case the sample dried up under the microscope to dissolve any forming salt crystals. A fifth tissue sample was taken by removing a polyp from the capitulum for sclerite inspection. For inspection of the sclerite arrangement the polyp was placed in 1% potassium hydroxide (KOH) for several days to clear the tissue, inspected under a dissecting microscope and photographed. In cases where the polyps were retracted, a tangential section was cut and the polyp isolated from the coenenchyme. Individual sclerites were examined under a compound microscope after dissolving the polyp in 10% sodium hypochlorite.

Infinity capture software was used to record the digital images. Depending on the thickness of the sclerites, averages of seven pictures were taken at various focal planes. The in focus parts of each picture were combined using Helicon Focus[®] software to produce the final extended focus images. The sclerite images were combined into figures using Photoshop[®] CS4 software.

3. Results

Cnidaria (Phylum) > Anthozoa (Class) > Octocorallia (Subclass) > Alcyonacea (Order) >

Alcyoniina (Suborder) > Alcyoniidae (Family) > Sarcophyton (Genus)

Sarcophyton Lesson, 1834

Sarcophyton aalbersbergi sp. nov.

(Figures 1-5)



Figure 1. *Sarcophyton aalbersbergi*, Fj01-063, holotype.

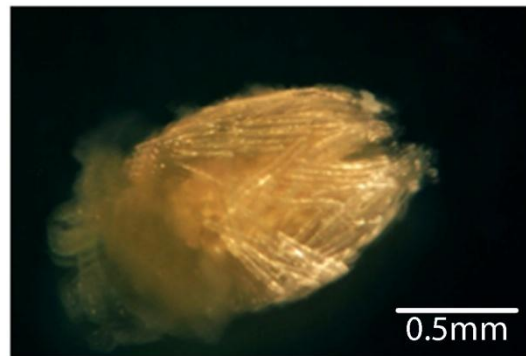


Figure 2. *Sarcophyton aalbersbergi*, Fj01-063, polyp.

Material examined:

Holotype – NTM C15936 (USP 8569) (=Fj01-063): Astrolabe reef, Kadavu Island, Fiji, 178°30.58'E, 18°36.78'S, depth 1.5 m, 18.1.2001, collector (coll.). W. Aalbersberg and Institute of Applied Sciences (IAS) bioprospecting team.

Description. The specimen is a single colony with a perfect (shiitake) mushroom shape. The capitulum is circular with a diameter of 30 mm and about 5 mm thick. The stalk is present, but broken and hollow, 7 mm long and 8 mm in diameter. The margin of the polypary is 3 mm thick and extends to about 11 mm beyond the stalk. The autozooids are up to 1.5 mm long and completely retracted with three to five

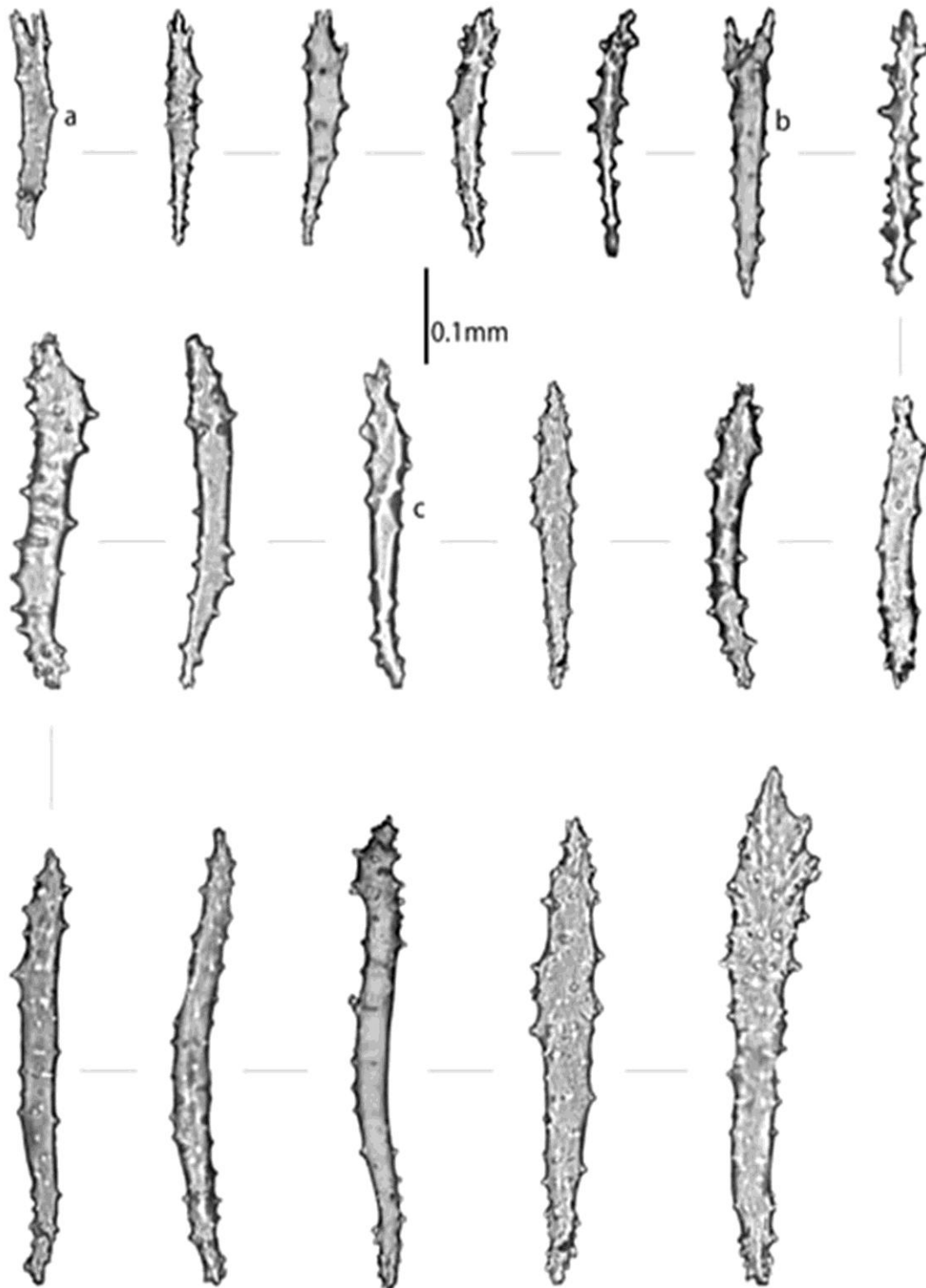


Figure 3. *Sarcophyton aalbersbergi*, Fj01-063, holotype, sclerites from the surface of the capitulum.

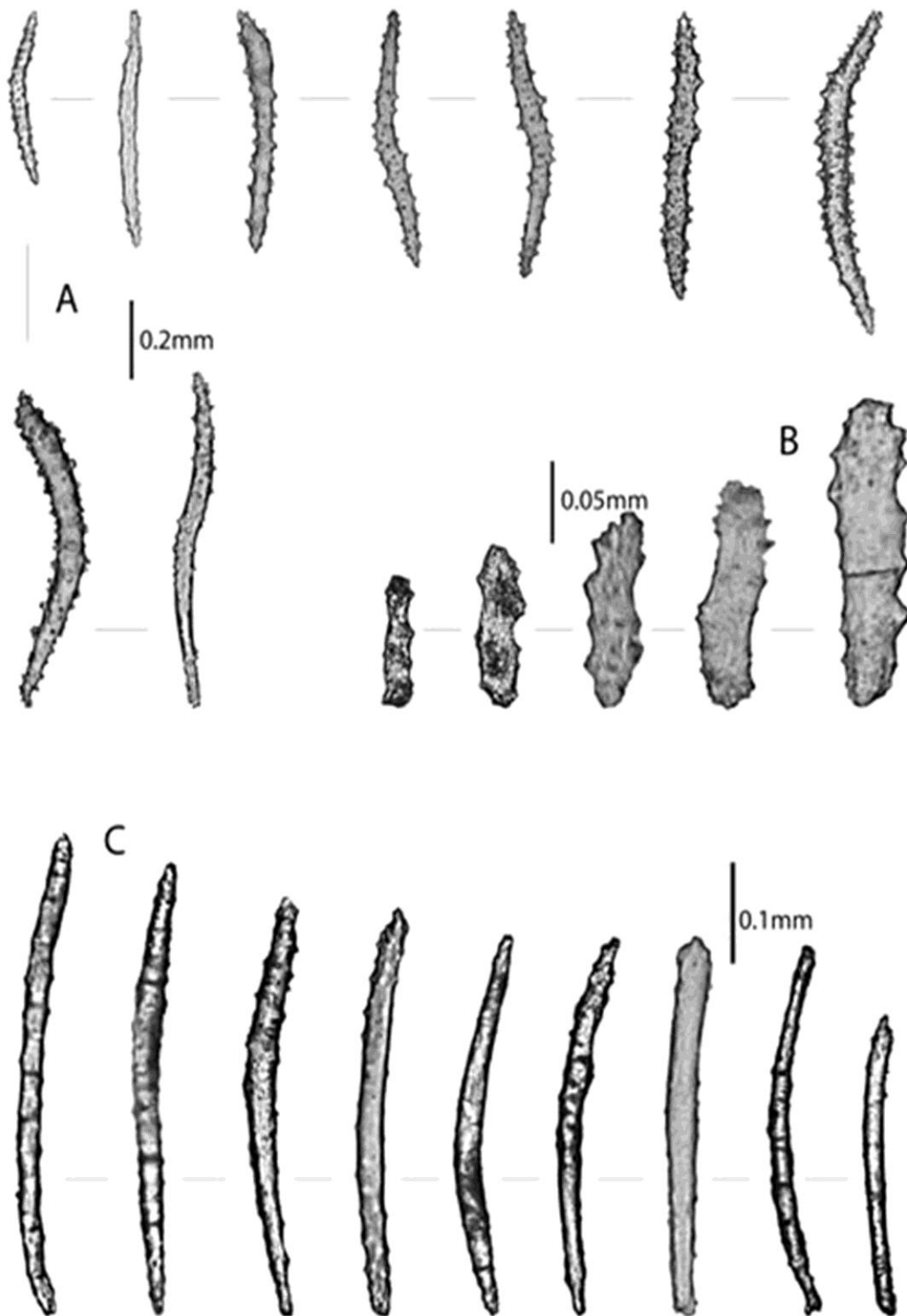


Figure 4. *Sarcophyton aalbersbergi*, Fj01-063, holotype, A, sclerites from the interior of the capitulum; B-C, sclerites from the polyp.

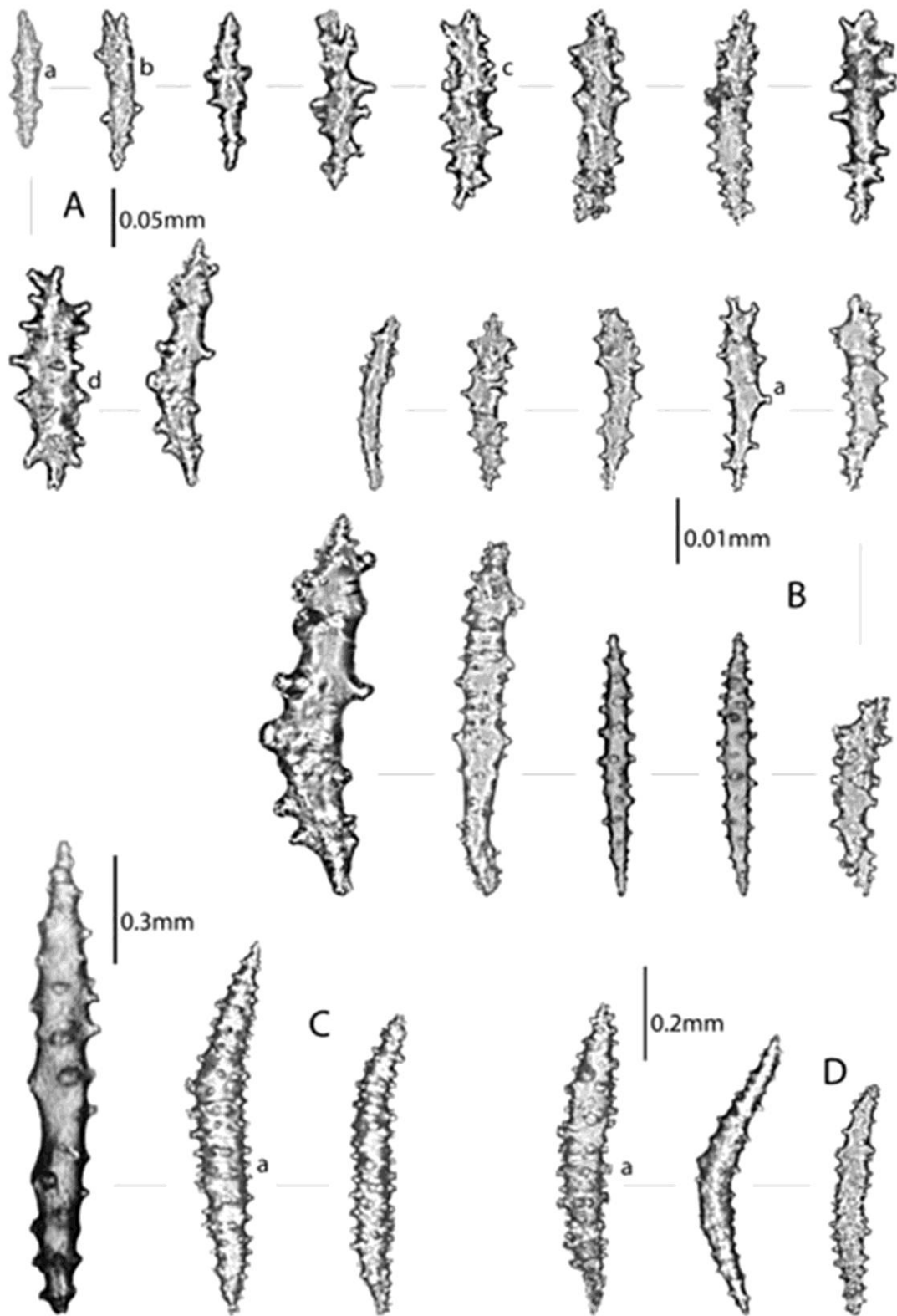


Figure 5. *Sarcophyton aalbersbergi*, Fj01-063, holotype, A-B, sclerites from the surface of the stalk; C-D, sclerites from the interior of the stalk.

siphonozooids, which are difficult to see, between the autozooids which are 1.5 to 2 mm apart. The distance between autozooids increases to 3 mm towards the center of the disk. A striking observation is that the centers of the autozooids are placed in an almost perfect equidistant manner thus giving an impression of the corners of a rectangle. The colony was dark green when collected in the field and has now turned off-white and is quite hard.

The surface of the capitulum contains clubs and spindles ranging from 0.24 to 0.54 mm long, mostly being thin and slender (Figure 3b-c). The ornamentation of the heads and the handles is poorly developed consisting mostly of blunt spines. A few bifurcated clubs (Figure 3a-c) are present. A notable feature is that the heads and tips of the handles are pointed.

The interior of the capitulum contains medium sized mostly slender, curved spindles, ornamented with warts or spines and ranging from 0.35 to 0.85 mm long (Figure 4A).

The surface of the stalk contains straight spindles and clubs from 0.11 to 0.53 mm long (Figure 5A-B). The shortest sclerites are relatively smooth and resemble shuttles (Figure 5Aa-b) while the majority bear conical processes. Again we have a few bifurcated sclerites (Figure 5A, b-d, Ba) and the notable feature of pointed heads and tips with handles for the clubs.

The interior of the stalk contains mainly straight spindles from 0.47 to 1.30 mm long (Figure 5C-D). Ornamentation varies from blunt spines to complex warts and all have pointed ends.

The polyp body sclerites are quite long and slender, smooth needles from 0.30 to 0.48 mm in length (Figure 4C) and are typically arranged en chevron (v-shaped arrangement of the sclerites along a central aisle) points (Figure 2). In the tentacles there are platelets ranging from 0.08 to 0.19 mm long (Figure 4B).

This species is difficult to be included within one of the four groups in Verseveldt, but possibly into group four.

Etymology. This species is named after Prof. William Aalbersberg, Director of the Institute of Applied Science and the collector of this specimen.

Remarks. This specimen (*Sarcophyton aalbersbergi*) has a very distinctive growth form described initially as “shitake mushrooms” by the collectors. The dark green color present when collected is rather unusual. Another striking observation is the equidistant placement of the autozooids. The sclerites in the surface of the capitulum and the surface of the stalk have some similarity with *S. acutum* Tixier-Durivault, 1970 (bifurcation, weak developed heads, pointed lower tips, distance of autozooids) but are shorter in *S. acutum*. The number of siphonozooids (three to five) between autozooids also differs from the one to three in the syntype of *S. acutum* inspected by Verseveldt (1982: 15).

***Sarcophyton aldersladei* sp. nov.**
(Figures 6-10)



Figure 6. *Sarcophyton aldersladei*, Fj01-121, holotype.

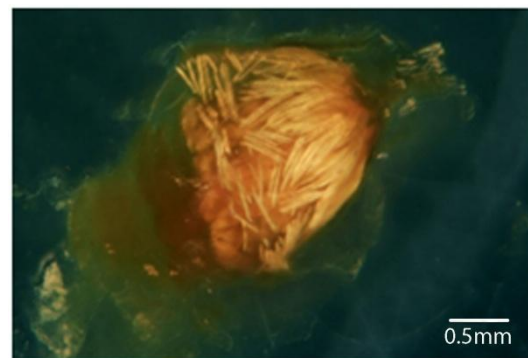


Figure 7. *Sarcophyton aldersladei*, Fj01-121, polyp.

Material examined:

Holotype – NTM C15937 (USP 8566) (=Fj01-121): Cagalai Island (south), Lomaiviti, Fiji, 178°44.1'E, 18°47.2'S, depth 1m, 20.8.2001, coll. K.-D. Feussner and IAS bioprospecting team.

Description. The mushroom-shaped holotype is cut into two fragments. Put together, the densely contracted, oval shaped capitulum of the colony is 45x19 mm. It is about 5 mm thick. The stalk is not present, just fragments of it where it is attached to the capitulum. The margin of the polypary is 5 mm thick and extends to about 15 mm beyond the stalk. All the autozooids are retracted with two to four siphonozooids between them, being 1 to 1.5 mm apart from each other. The polyps are 2.8 mm long. The colony was yellow when collected and has now turned dark brown in 70% ethanol and is quite hard.

The surface of the capitulum contains clubs ranging from 0.07 to 0.41 mm long (Figure 8). Few clubs have knobs (Figure 8Aa-b, Ba) or tiny spines on their heads. The majority of the clubs is about 0.20 mm long; their heads are ornamented with small warts together with rounded cones or spines infrequently extending to leaf-like prominences (Figure 8Bb-c). A few short sclerites with pointed tips have their cone-like prominences arranged in girdles.

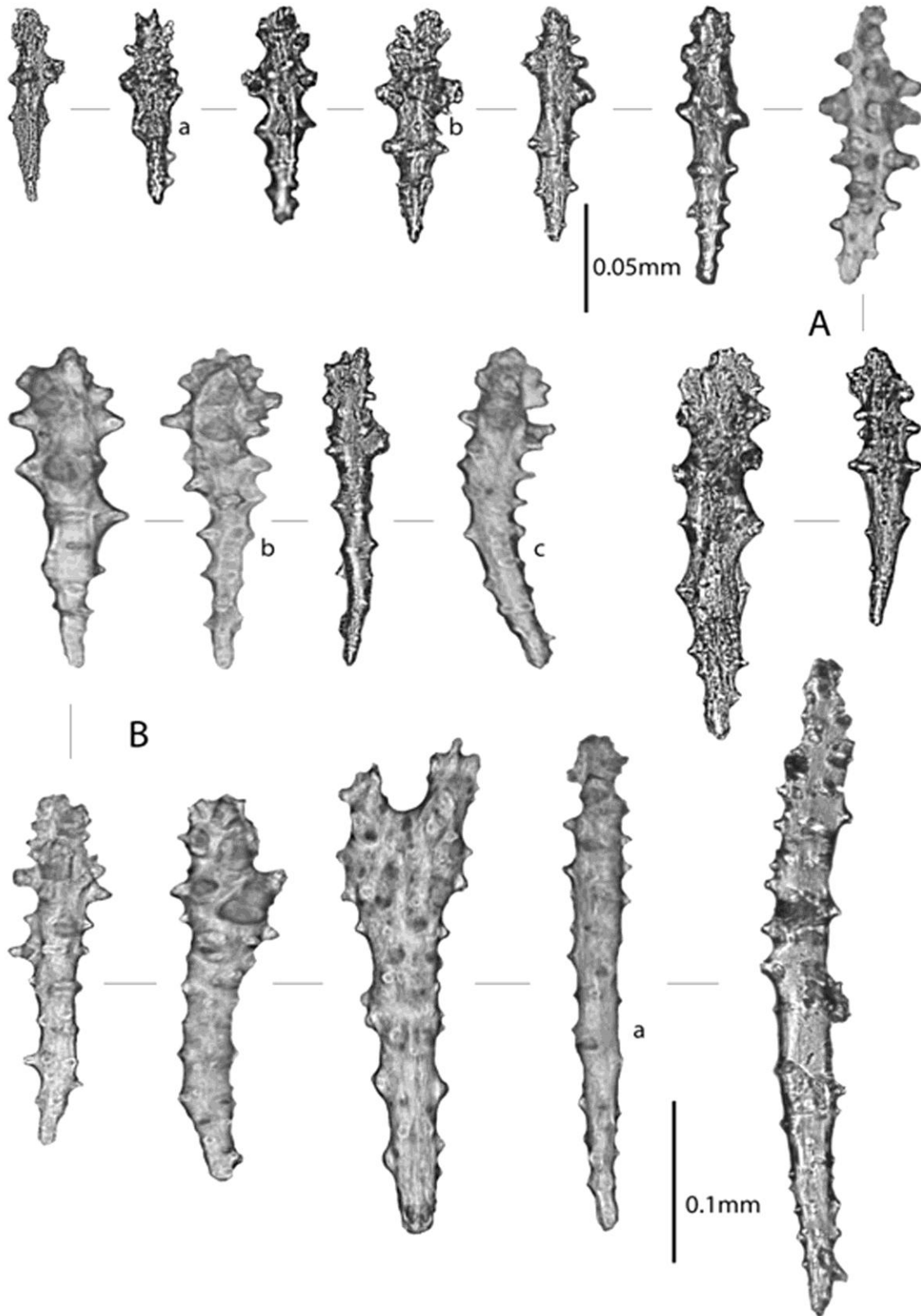


Figure 8. *Sarcophyton aldersladei*, Fj01-121, holotype, sclerites from the surface of the capitulum.

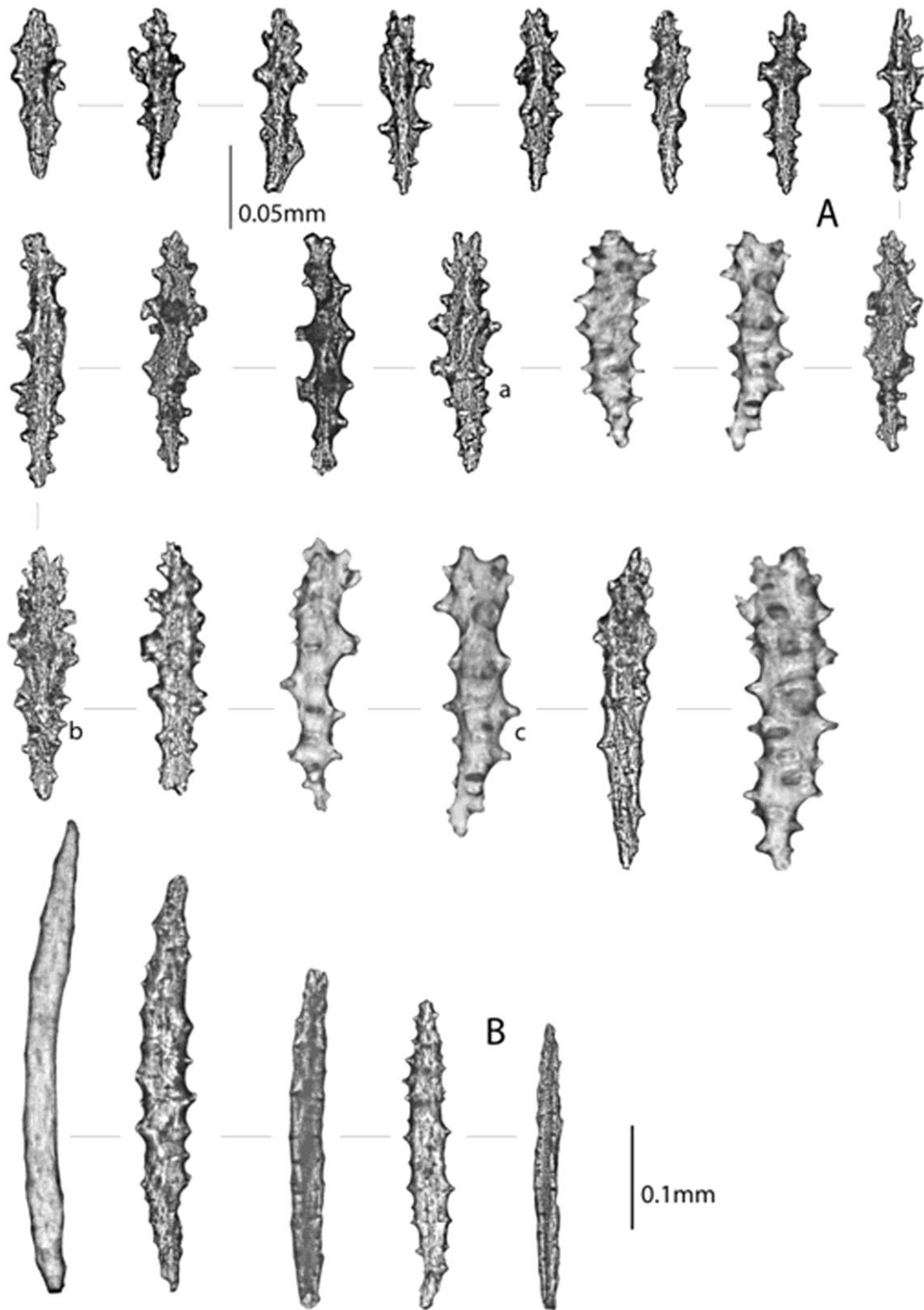


Figure 9. *Sarcophyton aldersladei*, Fj01-121, holotype, A, sclerites from the surface of the stalk; B, sclerites from the interior of the stalk.

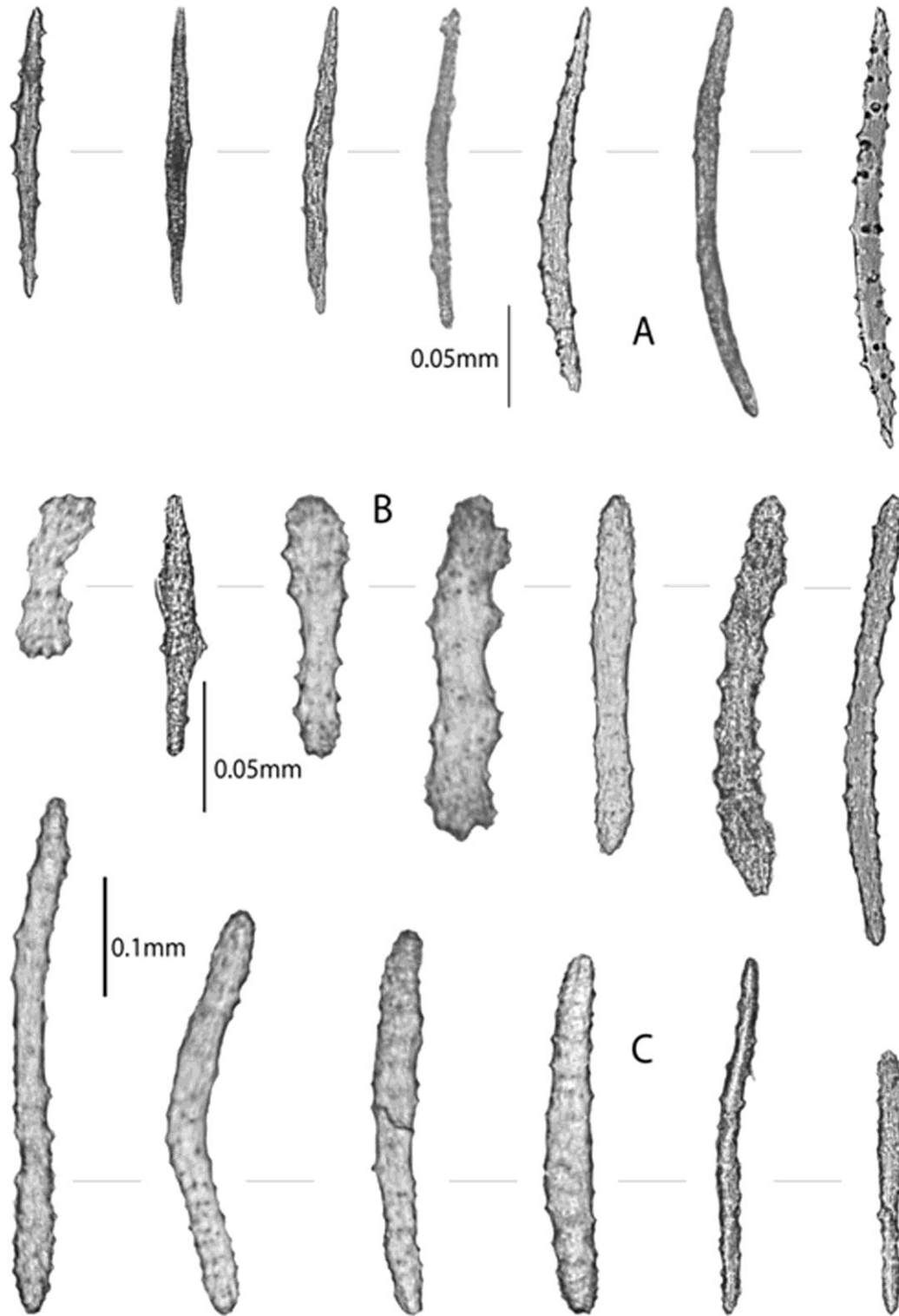


Figure 10. *Sarcophyton aldersladei*, Fj01-121, holotype, A, sclerites from the interior of the capitulum; B-C, sclerites from the polyp.

The surface of the stalk contains only short clubs from 0.09 to 0.20 mm long (Figure 9A), some of them with knobby heads as seen in the capitulum, the spines being replaced by rounded cones (Figure 9Aa-c). Again, some of the cones are arranged in girdles. The majority of the clubs have pointed tips.

The interior of the capitulum contains sclerites ranging from 0.28 to 0.44 mm in length (Figure 10A) which are quite short, straight to slightly curved spindles. Some have short cones or spines, while others are relatively smooth.

The interior of the stalk contains short spindles about 0.28 to 0.49 mm long (Figure 9B) with rounded tips. They have little or no ornamentation.

The majority of the polyp sclerites are rods 0.20 to 0.43 mm long (Figure 10B-C), the remainder being intermediate forms between rods and platelets, 0.06 to 0.13 mm long. The sclerites are arranged in collaret and points.

This species could be included within Verseveldt's group one.

Etymology: This species is named after Dr Phil Alderslade in recognition of the guidance offered to complete this study.

Remarks. This specimen (*Sarcophyton aldersladei*) has some similarities with *Sarcophyton skeltoni* (shapes and lengths of surface sclerites, number of siphonozooids between autozooids). It differs from *Sarcophyton skeltoni* in having much shorter and thinner spindles in the interior of the stalk (Figure 9B) and the capitulum (Figure 10A). The bifurcation that is present in *Sarcophyton skeltoni*, is not present in this specimen. No similarities with other described

species have been noticed. The voucher specimen *Sarcophyton aldersladei* is now quite hard whereas *Sarcophyton skeltoni* is soft, both in ethanol.

***Sarcophyton alexanderi* sp. nov.**

(Figures 11-16)

Material examined:

Holotype – NTM C15938 (USP 8567) (=Fj04-097): Naigani Island, Lomaiviti, Fiji, 178°29.74'E, 16°51.56'S, depth 10 m, 19.1.2004, coll. K.-D. Feussner and IAS bioprospecting team.

Paratype – USP 8571 (Fj05-188): Vatunukuita Reef, Vanua Levu, Fiji, 179°09.21'E, 16°22.51'S, depth 8-12 m, 14.12.04, coll. K.-D. Feussner and IAS bioprospecting team.

Description of the holotype. The holotype is an incomplete colony with approximately 25% of the capitulum left. The length from the edge of the capitulum to the center is about 45 mm and is up to 7 mm thick. The stalk has some parts of its surface layer cut off. It is 20 mm in diameter over the whole length of 55 mm from where it was broken from the substrate, little of which is still attached at the bottom of the specimen. It is smooth over the whole length. The margin of the polypary is 5 mm thick and extends to about 45 mm beyond the stalk. Most of the autozooids are not retracted and are up to 2.0 mm long, with four to seven siphonozooids between them. The colony was brown when collected and has not changed its color and remained soft in ethanol.



Figure 11. *Sarcophyton alexanderi*, Fj04-097, holotype

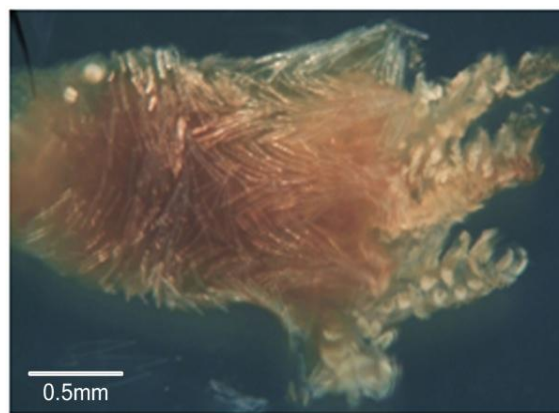


Figure 12. *Sarcophyton alexanderi*, Fj04-097, polyp

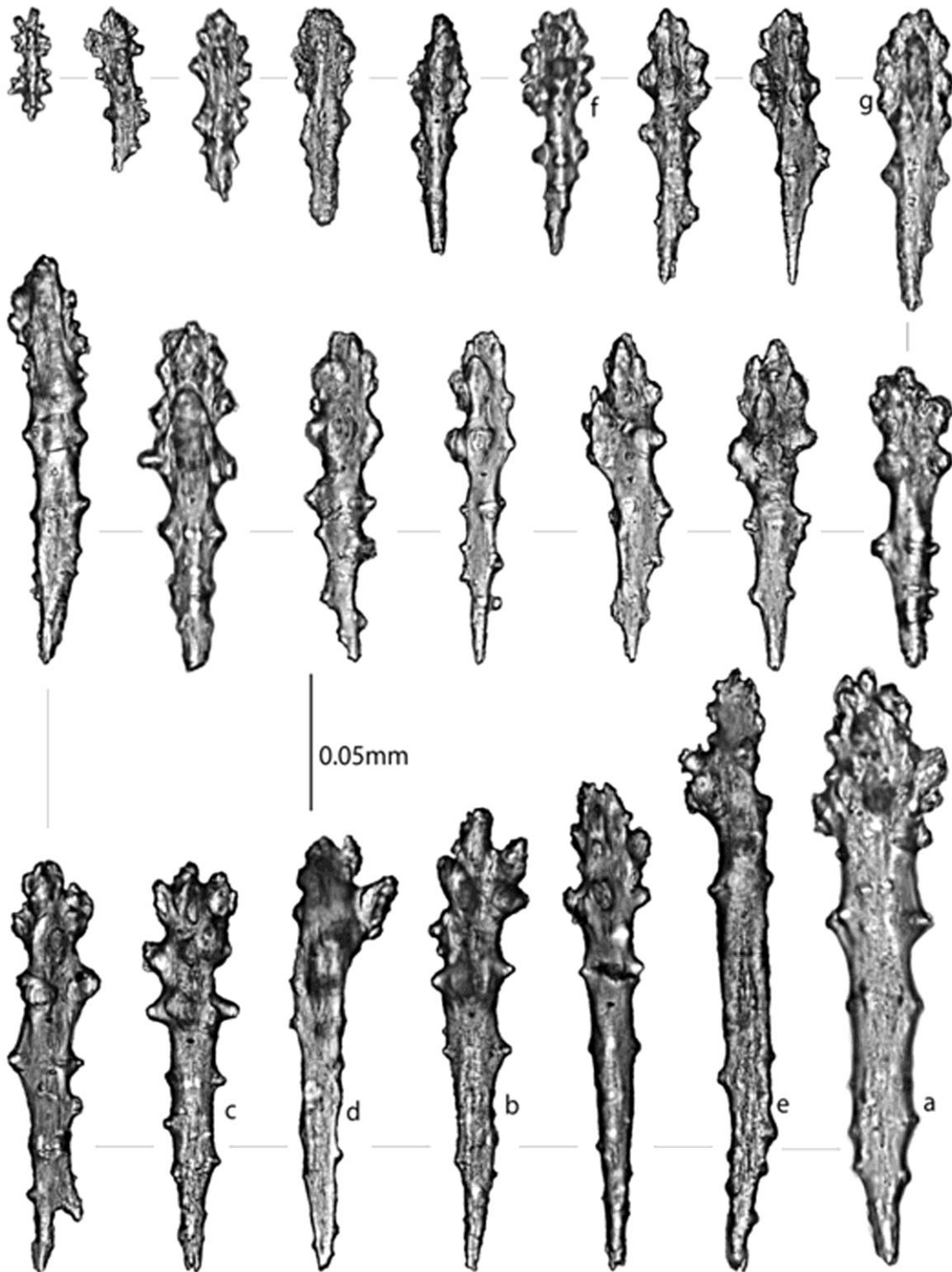


Figure 13. *Sarcophyton alexanderi*, Fj04-097, holotype, sclerites from the surface of the capitulum.

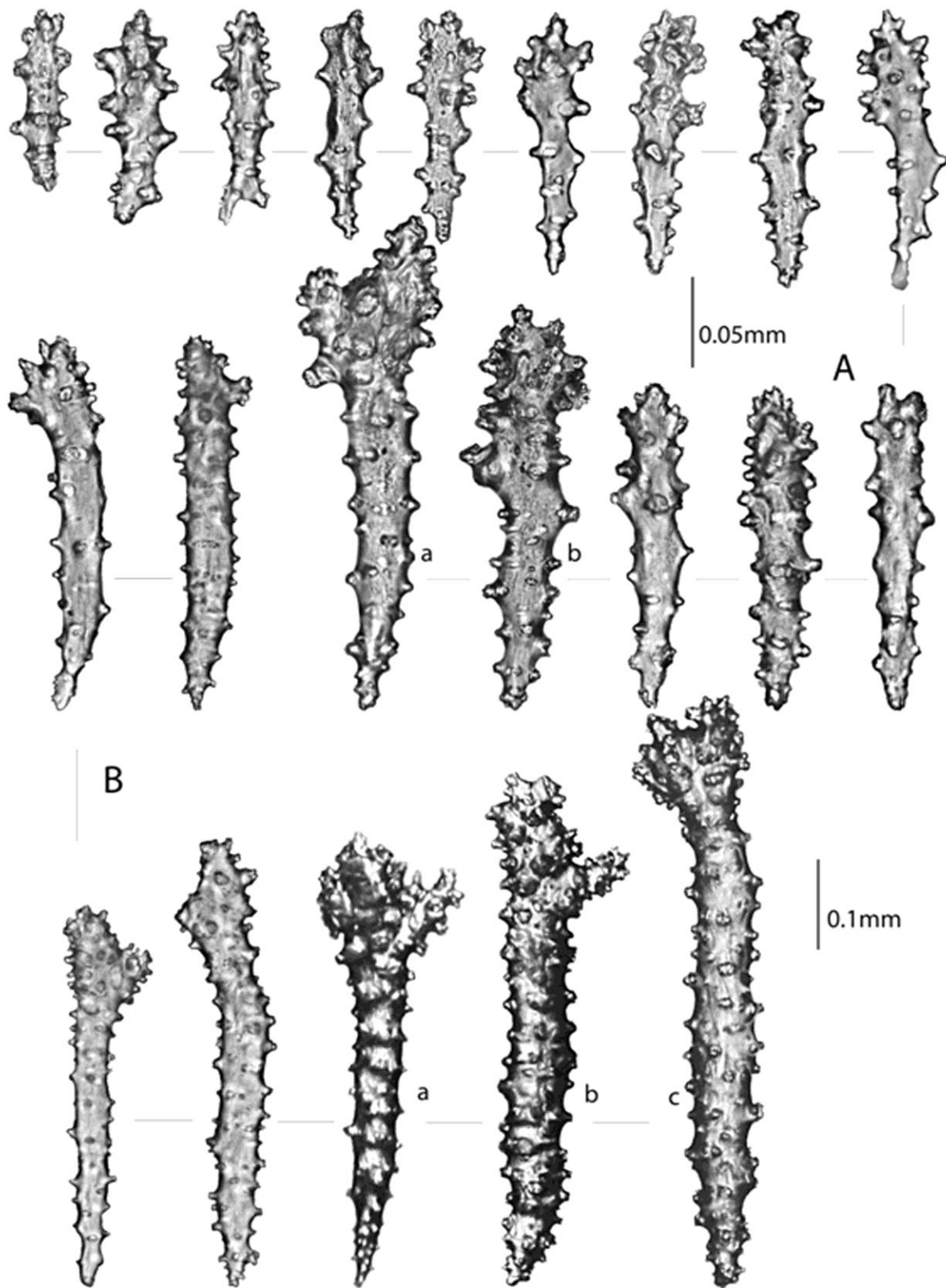


Figure 14. *Sarcophyton alexanderi*, Fj04-097, holotype, sclerites from the surface of the stalk.

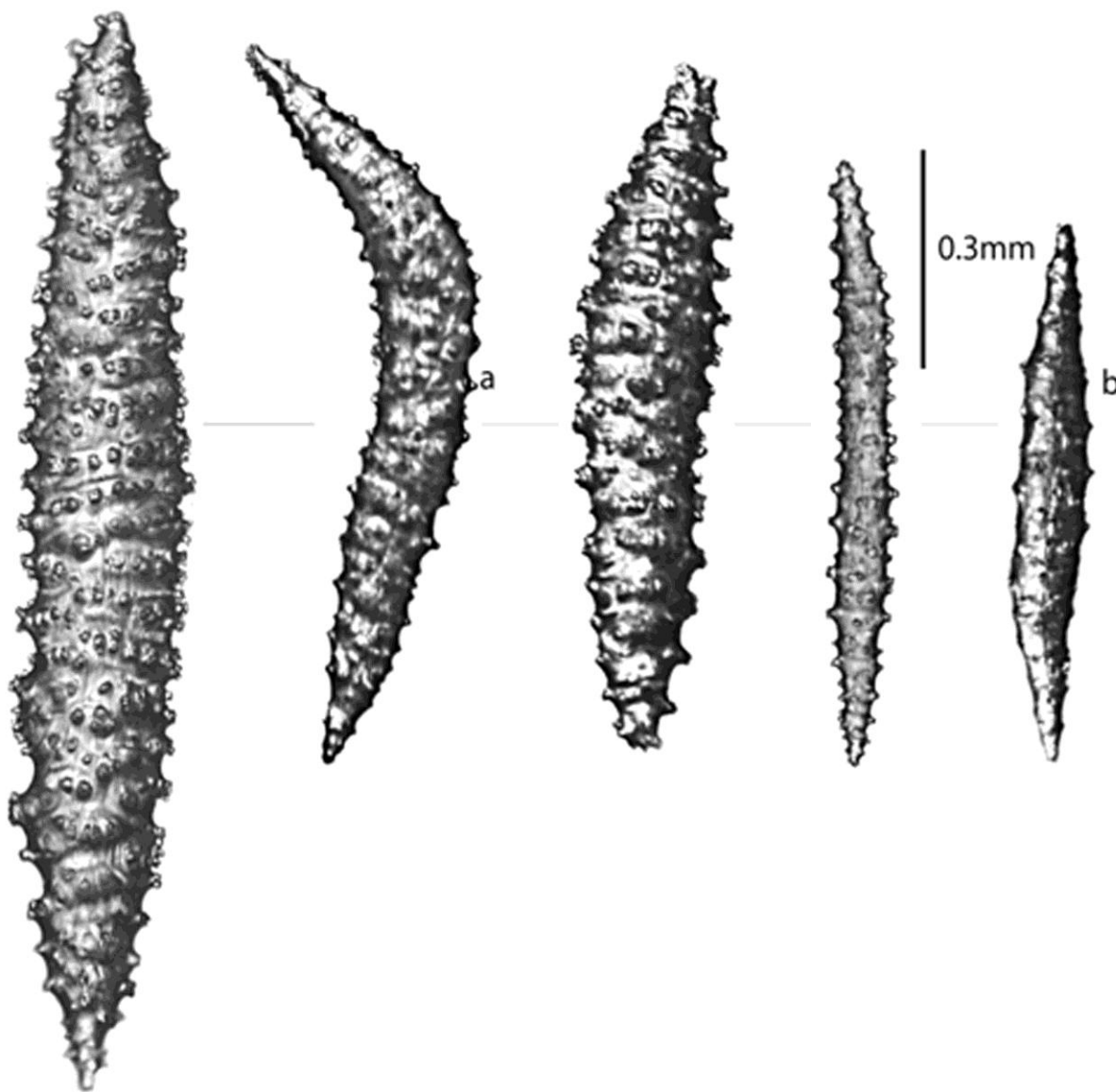


Figure 15. *Sarcophyton alexanderi*, Fj04-097, holotype, sclerites from the interior of the stalk.

The surface of the capitulum contains cuneiform clubs which can be separated into two distinct group lengths (Figure 13). In one group they are 0.15 to 0.22 mm long. Most handles are quite smooth with a pair of rounded warts in the upper half (Figure 13a-c) but some have prominent handles (Figure 13a, d-e). Their heads have rounded warts and cones. The other group has shorter clubs from 0.07 to 0.12 mm long, with a pair of

rounded warts or cones in the middle of the handles. Their heads bear rounded spines or cones giving them a leaf-like appearance (Figure 13f-g). In addition some short sclerites 0.04 mm long with spiny ornamentation are present. Most sclerites have pointed tips.

No sclerites have been located in the interior of the capitulum.



Figure 16. *Sarcophyton alexanderi*, Fj04-097, holotype, sclerites from the polyp.

Two distinct group lengths of clubs are also present in the surface of the stalk. Most of these sclerites have pointed tips (Figure 14). The longer clubs (Figure 14Aa-b and B) range from 0.23 to 0.63 mm long and have a very spiny, spindle like body and very richly ornamented heads (Figure 14Aa-c, Bd-f). Handles are ornamented with spines. The shorter clubs are 0.10 to 0.17 mm long and are also spiny with the heads ornamented with spines, warts and cones.

The interior of the stalk contains mainly straight spindles with complex huge tubercles from 1.00 to 1.51 mm long (Figure 15). A few are curved (Figure 15a). Some spindles with blunt spines (Figure 15b) are also present. With lengths of about 0.75 mm they are significantly shorter than the others.

The polyps have exceptionally long sclerites which are straight to slightly bent, slender rods up to 0.55 mm long (Figure 16A-B) and platelets of just around 0.05 mm long (Figure 16A). Their sclerite arrangement is in collaret and points (Figure 12).

As there are no sclerites in the capitulum it is difficult to follow Verseveldt's key. Otherwise this species could be included within his group four.

Etymology: This species is named after my eldest son Alexander Feussner in recognition of his passion for marine invertebrate biology.

Remarks. This specimen (*Sarcophyton alexanderi*) is another animal that does not have sclerites in the interior of the capitulum like *S. digitatum* from which it differs in the set of long clubs with richly ornamented heads (Figure 14Aa-b and B) that are not present in *S. digitatum*. This specimen is designated as the holotype as it is the most intact. The paratype (Fj-05-188) but has

somewhat less richly ornamented heads. Many of the sclerites have a "*S. glaucum*-shape."

***Sarcophyton skeltoni* sp. nov.**
(Figures 17-22)

Material examined:

Holotype – NTM C15939 (USP 8560) (=Fj05-067): Raviravi passage, Vanua Levu Island, Fiji, 178°55.38'E, 16°19.49'S, depth 7-11 m, 7.12.2004, coll. K.-D. Feussner and IAS bioprospecting team.

Description. The holotype's capitulum is about 95 mm in diameter and 30 mm thick. The stalk is 12 mm in diameter and is 18 mm high but might not have been cut at the base. The margin of the polypary is about 15 mm thick and extends about 15 mm beyond the stalk. Most of the 2.5 mm long autozooids are partly retracted with two to three siphonozooids between them. The colony is light yellowish-brown (mocha) and soft in ethanol.

The surface of the capitulum contains clubs and slender sclerites (Figure 19). They range from 0.05 to 0.58 mm long displaying a large variety of shapes including clubs with handles of various lengths (Figure 3.49Ab-c, Be). Many of the sclerites look like transitional forms with warts on one end. The smallest clubs have quite profound ornamentation from cones and spines.

The interior of the capitulum contains straight and curved slender needles which are slightly warty, 0.54 to 0.88 mm long (Figure 22B). A few non-slender needles (Figure 22Ba-c) both slightly curved and bent are present as well.



Figure 17. *Sarcophyton skeltoni*, Fj05-067, holotype.

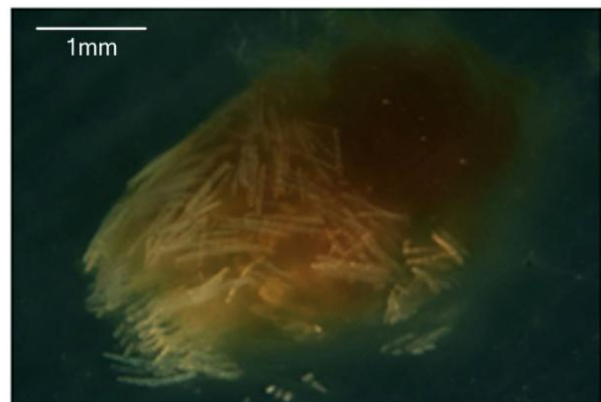


Figure 18. *Sarcophyton skeltoni*, Fj05-067, polyp.

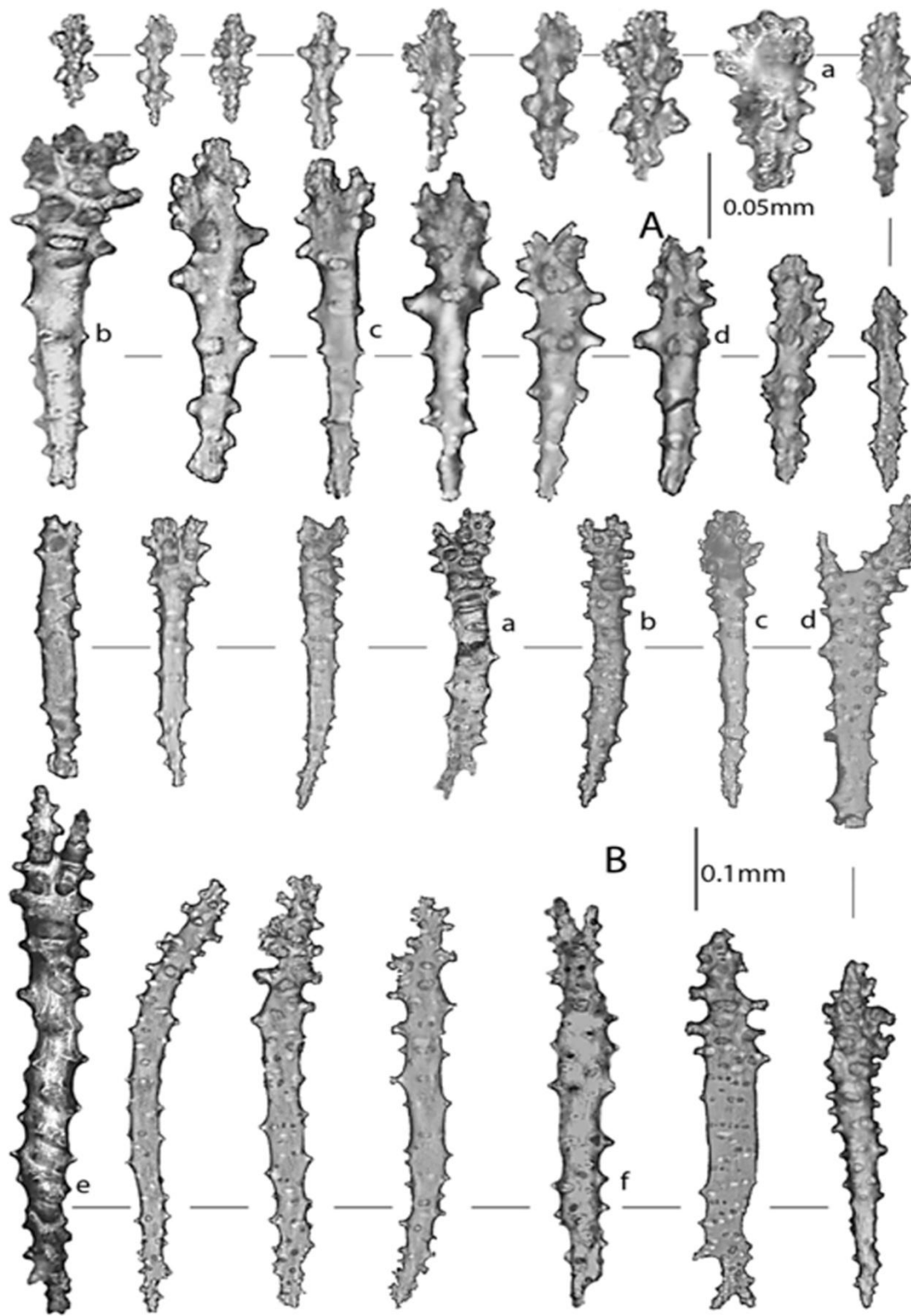


Figure 19. *Sarcophyton skeltoni*, Fj05-067, holotype, sclerites from the surface of the capitulum.

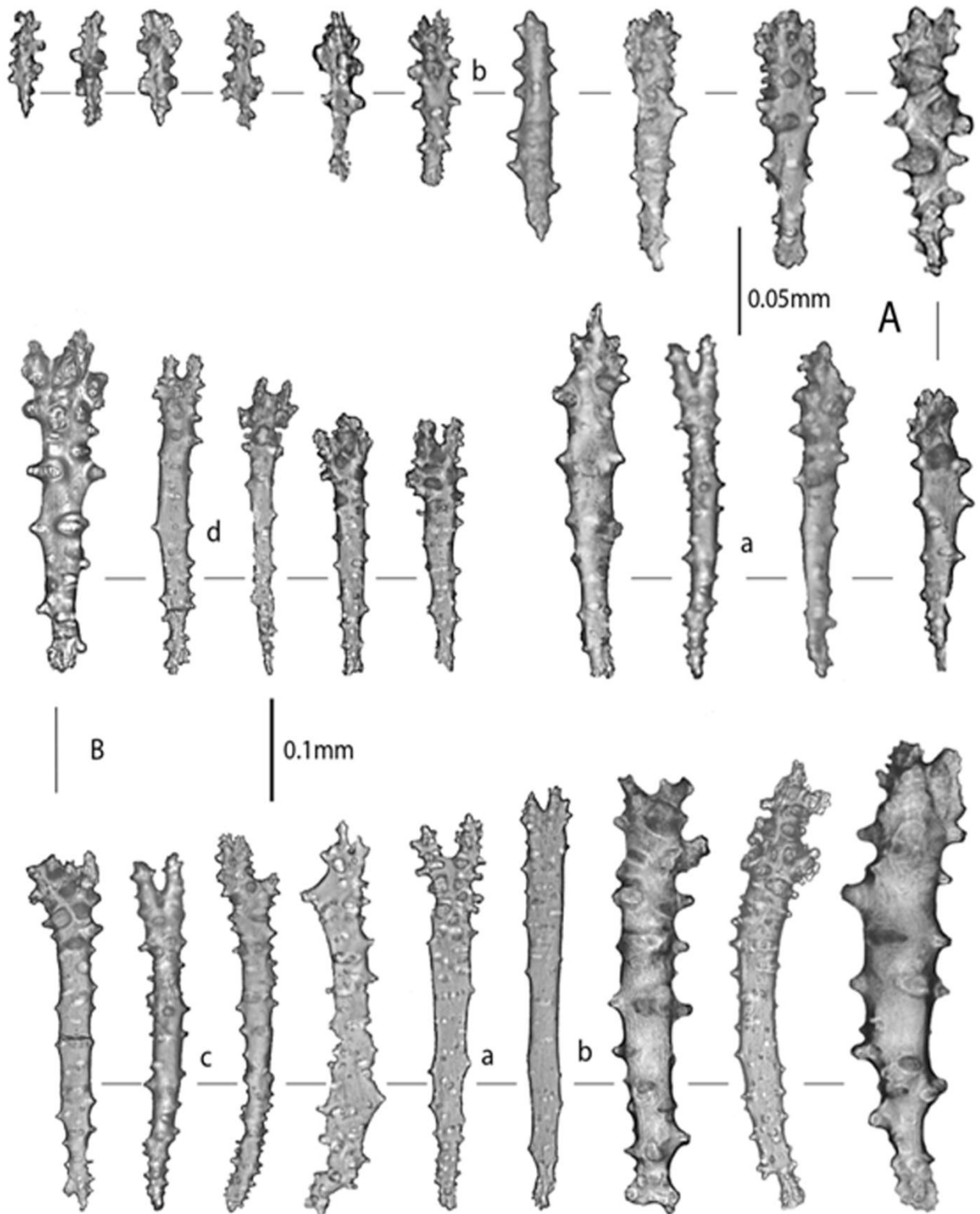


Figure 20. *Sarcophyton skeltoni*, Fj05-067, holotype, sclerites from the surface of the stalk.

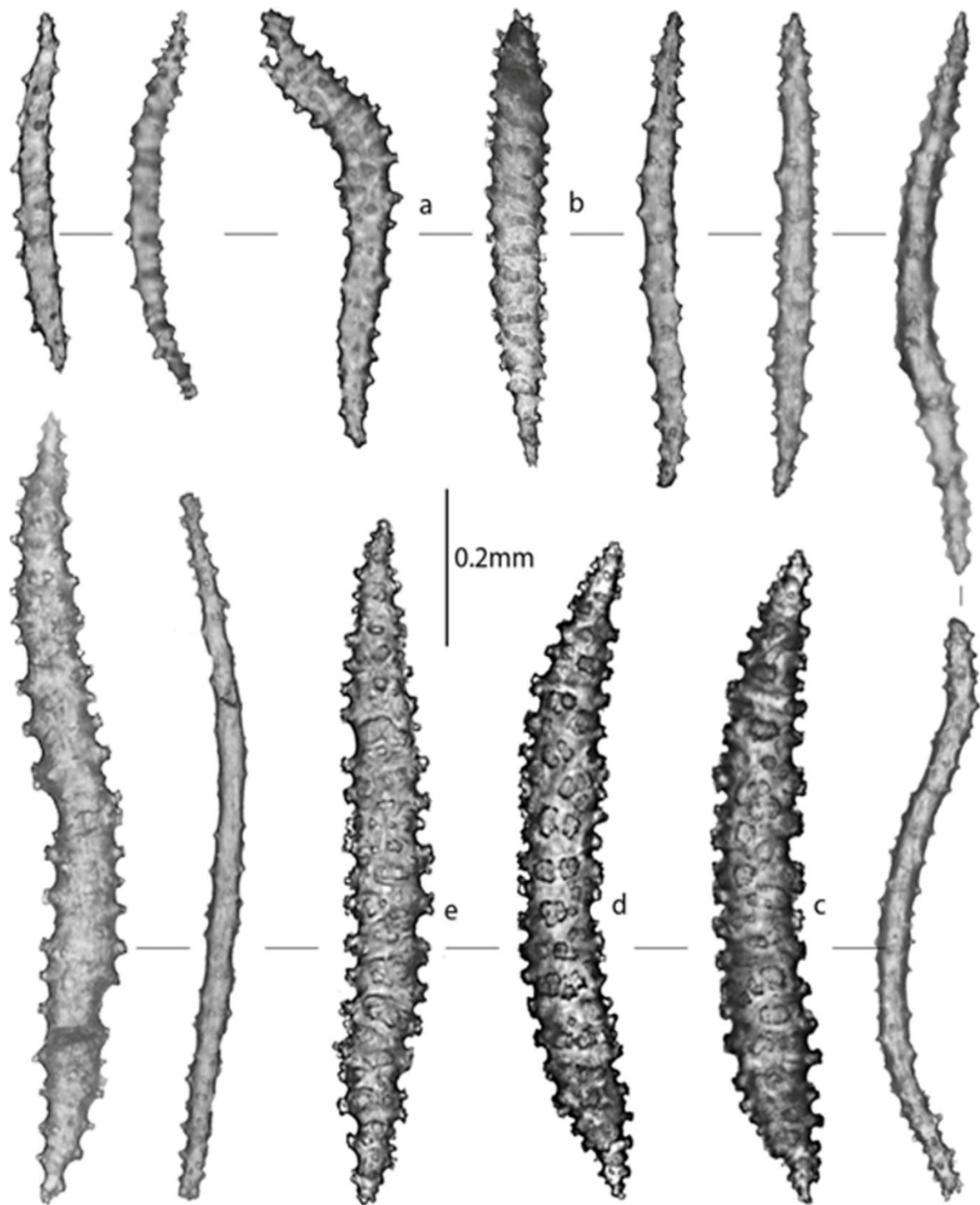


Figure 21. *Sarcophyton skeltoni*, Fj05-067, holotype, sclerites from the interior of the stalk.

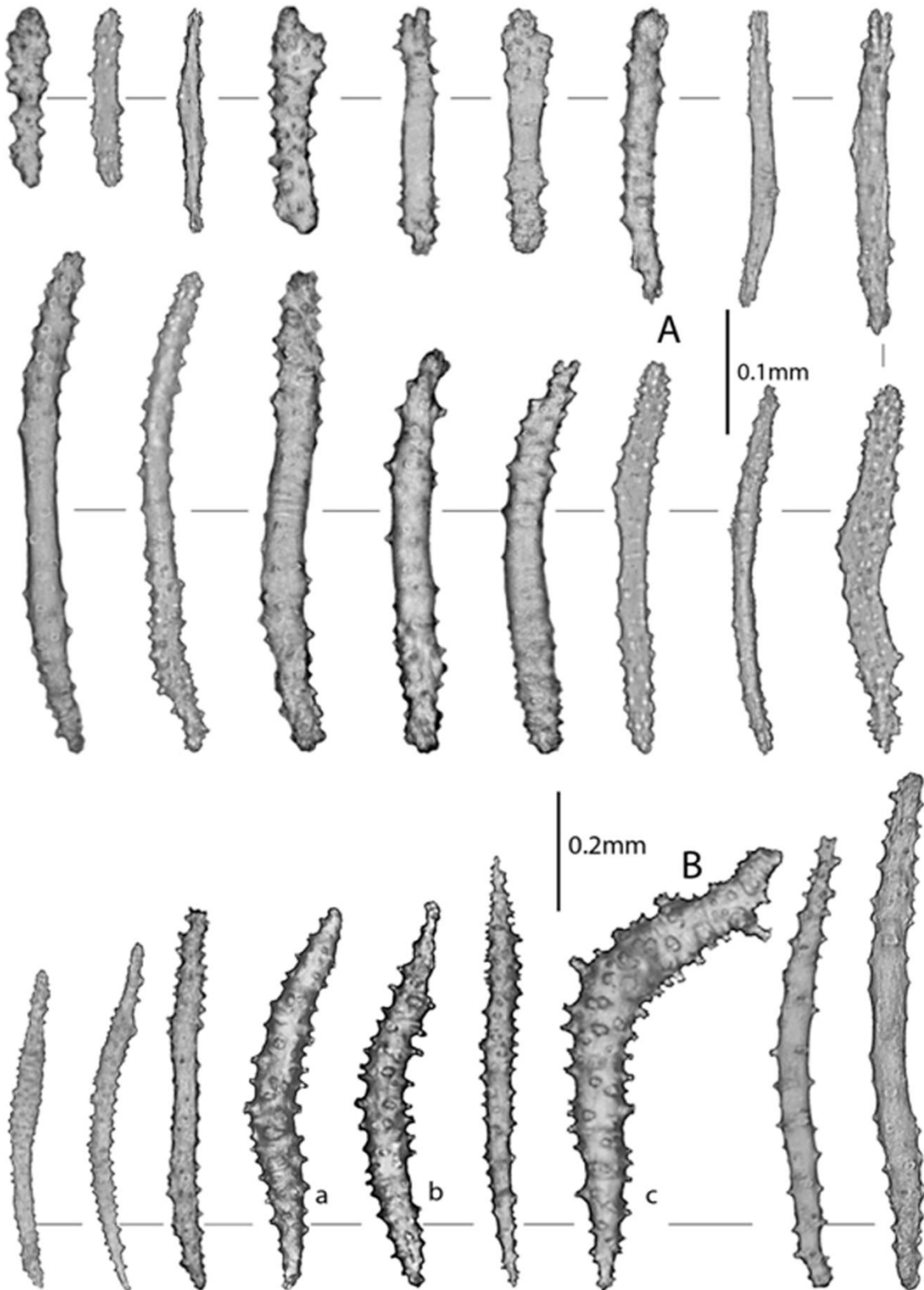


Figure 22. *Sarcophyton skeltoni*, Fj05-067, holotype, A, sclerites from the polyp; B, sclerites from the interior of the capitulum.

The surface of the stalk contains clubs ranging from 0.05 to 0.46 mm long (Figure 20). The heads of most clubs are bifurcated (Figure 20Aa-b, Ba-d) and are made up of spines and simple warts. The majority of the smaller clubs have narrow heads and rather prominent handles.

The interior of the stalk contains mostly slender spiny and warty spindles both curved and straight ranging from 0.43 to 1.00 mm long (Figure 21). Several thick, slightly curved spindles are present (Figure 21a-e) with mostly well developed warts.

The majority of the polyp sclerites (Figure 22A) are straight rods with a few bent ones from 0.14 to 0.40 mm. Sclerite arrangement is in collaret and points (Figure 18).

This species could possibly be included within Verseveldt's group number two.

Etymology: This species is named after Dr Posa Skelton acknowledging our friendship and his continuous encouragement in taxonomic work.

Remarks. This specimen (*Sarcophyton skeltoni*) has a distinct bifurcated sclerite type, an intermediate form between club and spindle in the surface of the disc (Figure 19Be-f) and in the stalk (Figure 20). It resembles to some extent the bifurcated sclerites known from the surface of the disc in *S. turschi* Verseveldt, 1976 or the coenenchymal disc sclerites of *S. regulare* from which *Sarcophyton skeltoni* differs in the very spiky make-up of the sclerites.

***Sarcophyton soapiae* sp. nov.**



Figure 23. *Sarcophyton soapiae*, Fj01-122, holotype.

(Figures 23-28)

Material examined:

Holotype – NTM C15940 (USP 8562) (=Fj01-122): Cagalai Island (south), Lomaiviti, Fiji, 178°44.1'E, 18°47.2'S, depth 2 m, 20.8.2001, coll. K.-D. Feussner and IAS bioprospecting team.

Description. The holotype is a fragment (25%) of a mushroom-shaped colony of initially 10 cm diameter and is 10 mm thick. Only fragments of the stalk are present. The margin of the polypary is 8 mm thick. The majority of the autozooids have not retracted, leaving the colony covered with polyps of 4 to 5 mm long, with three to six siphonozooids between them. The colony was yellow when collected and has turned light brown and is quite soft in ethanol.

The surface of the capitulum contains clubs and few spindles (Figure 25Ba) 0.09 to 0.43 mm long (Figure 25), which are typically very thin and slender with only little ornamentation from spines. The heads show little development consisting of rounded points or warty prominences. Smaller clubs have more ornamentation from high cones arranged in two girdles (Figure 25Aa). Larger clubs have frequently rounded heads (Figure 25Bb-c) but pointed heads are also present. The majority of sclerites have pointed tips while a few have rounded tips.

The interior of the capitulum contains slender, straight, both smooth and spiny spindles, ranging from 0.47 to 1.08 mm long (Figure 26B).

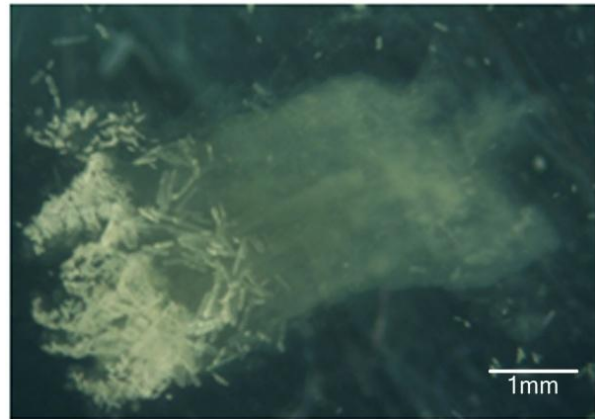


Figure 24. *Sarcophyton soapiae* v. 5, Fj01-122, polyp.

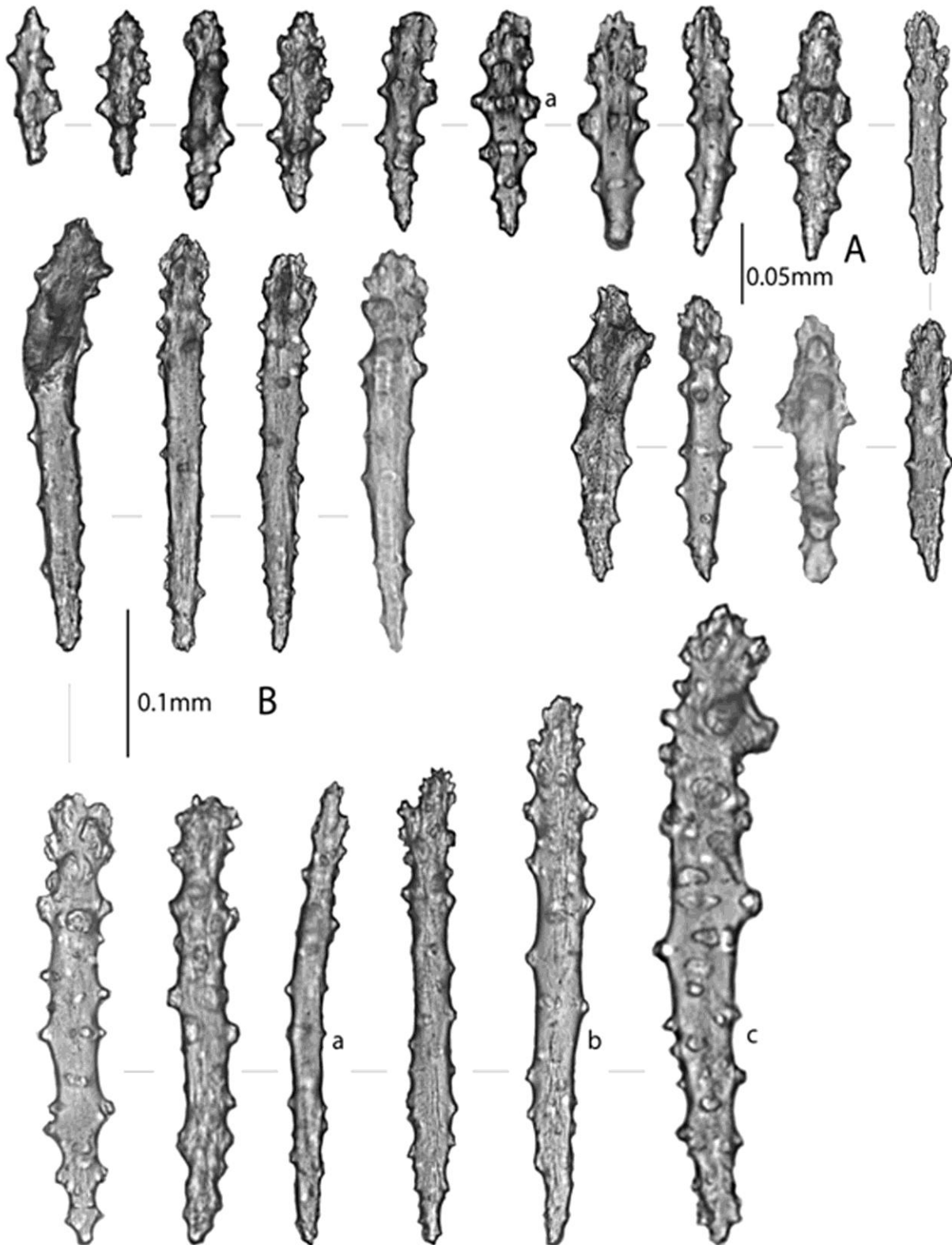


Figure 25. *Sarcophyton soapiae*, Fj01-122, holotype, sclerites from the surface of the capitulum.

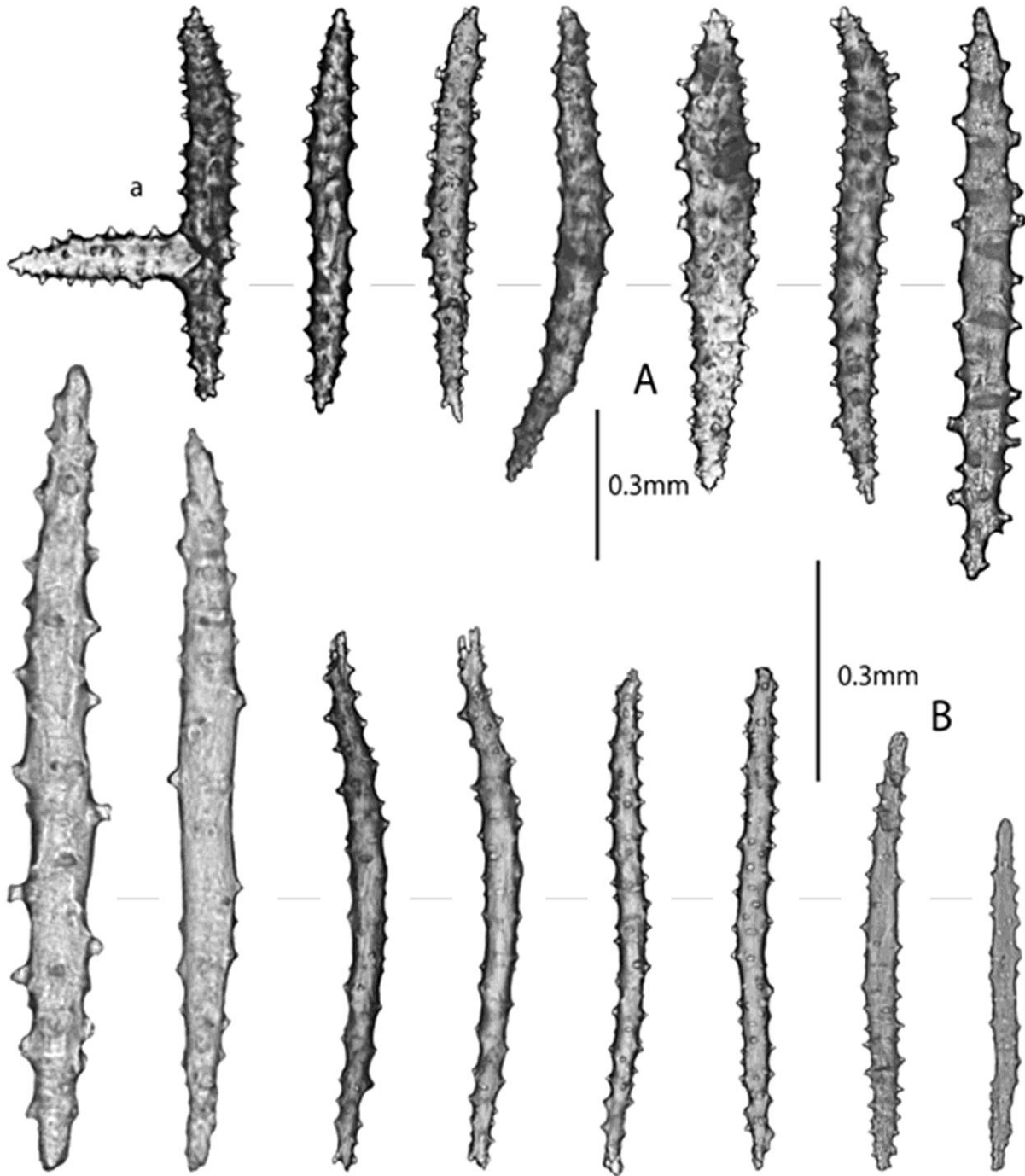


Figure 26. *Sarcophyton soapiae*, Fj01-122, holotype, A, sclerites from the interior of the stalk; B, sclerites from the interior of the capitulum.

The surface of the stalk contains mostly clubs and some spindles (Figure 27Ba-c) from 0.10 to 0.48 mm long, the majority of them being slender (Figure 27). The heads are both pointed or rounded. Smaller clubs

again have ornamentation from high spines arranged in one or two girdles. The lower tips are dominantly pointed but a few rounded ones are also present.

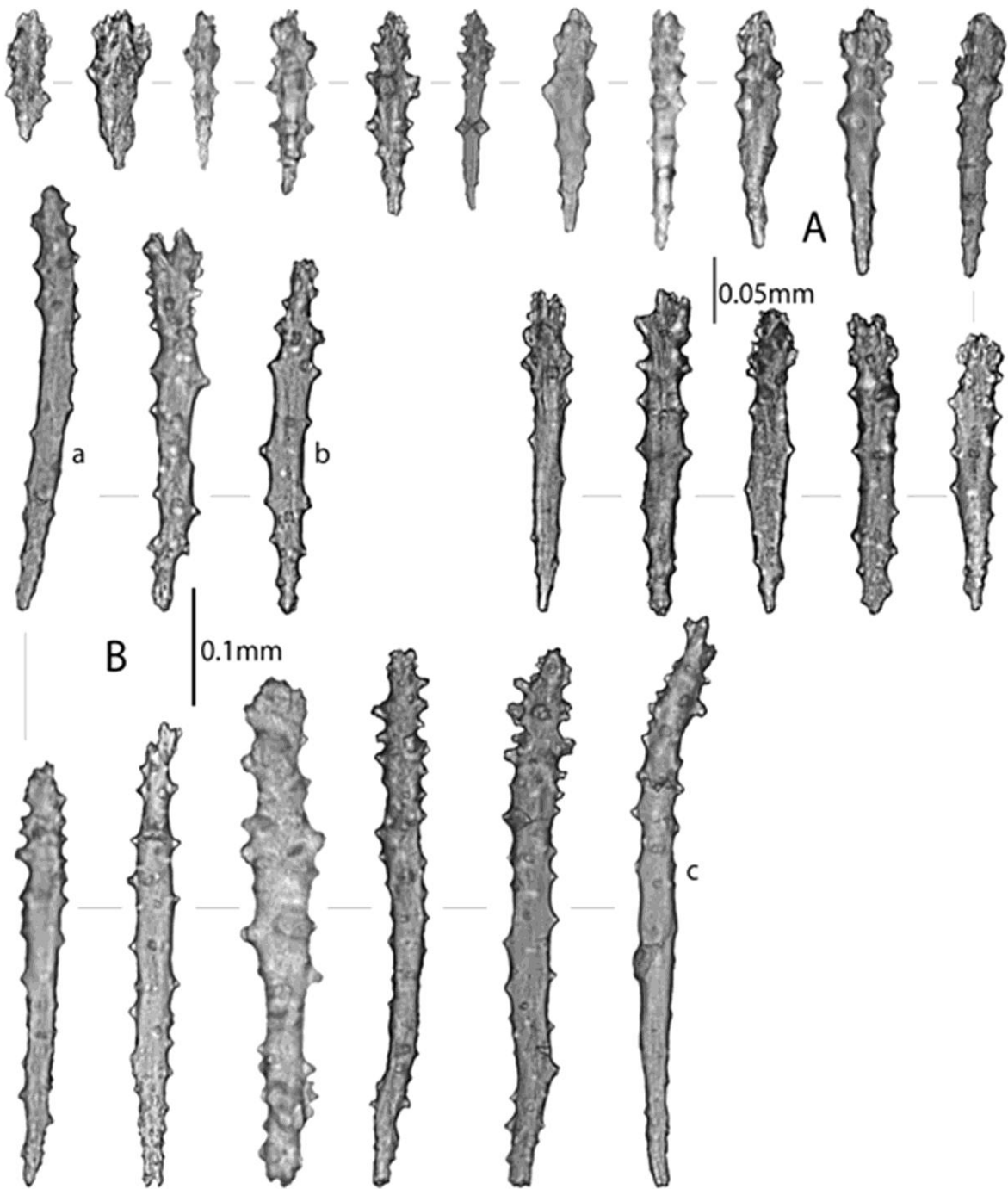


Figure 27. *Sarcophyton soapiae*, Fj01-122, holotype, sclerites from the surface of the stalk.

The interior of the stalk contains straight to slightly curved, mostly slender spindles from 0.78 to 1.13 mm long with spines (Figure 26A). A sclerite with a side branch is present (Figure 26Aa). The polyp sclerites are from 0.05 to 0.27 mm long (Figure 28). Some sclerites

are cross-shaped, possibly fused platelets (Figure 28a-c) from the tentacles. Sclerite arrangement is in collaret and points (Figure 24).

This species could possibly be included within Verseveldt's group number four.

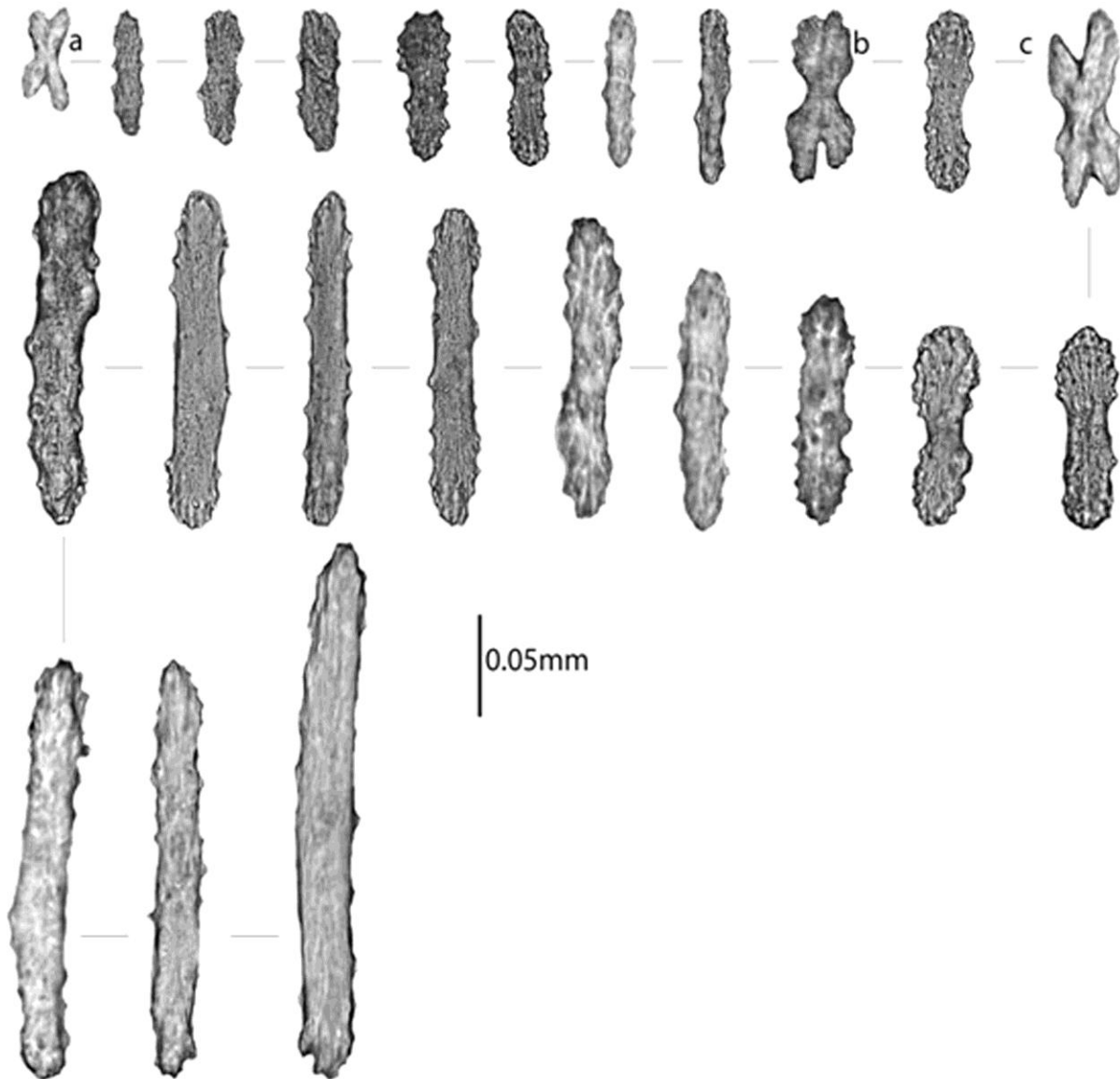


Figure 28. *Sarcophyton soapiae*, Fj01-122, holotype, sclerites from the polyp.

Etymology: This species is named after Dr Katy Soapi in recognition of the many collections we did together for the Center of Drug Discovery and Conservation (CDDC) at IAS.

Remarks. This specimen (*Sarcophyton soapiae*) has similarities in the spiculation with *S. subviride* Tixier-Durivault, 1958 (length and shape of the clubs in the capitulum and stalk; slender spindles in the capitulum). However, the length of the spindles is very different: up

to 0.30 mm long in *S. subviride* and between 0.80 and 1.10 mm long in this specimen. The sclerites in the stalk are also slender (and are from 0.5 to 1.1 mm long) as compared to irregular cylinders, ovals and spindles (up to 0.6 mm long) in *S. subviride*. The length of the autozooids is not given in Verseveldt (1982: 78) but the number of siphonozooids between autozooids is two to three at the margin of the capitulum and seven to eight in the center of the disc with the present specimen having three to six at the margin of the capitulum.

4. Summary

A total of 34 *Sarcophyton* specimens were collected between 2001 and 2005 from Fiji waters. A total of 28 were described species known as *S. cinereum* Tixier-Durivault, 1946, *S. digitatum* Moser, 1919, *S. ehrenbergi* Von Marenzeller, 1886, *S. glaucum* Quoy & Gaimard, 1833, *S. regulare* Tixier-Durivault, 1946, *S. tortuosum* Tixier-Durivault, 1946 and *S. trocheliophorum* Von Marenzeller, 1886. The remaining six samples were morphologically identified as being new to science. They are deposited in the Museum and Art Gallery of the Northern Territory, Darwin (holotypes) and the marine reference collection of USP (paratypes).

5. Discussion

It has been pointed out by McFadden *et al.* (2006) that, when matching sets of sclerites, identification becomes a subjective process. The authors actually compared Verseveldt's sclerite slides with slides they have prepared from the same original type material only to find out that Verseveldt's preparation techniques have resulted in the loss of smaller sclerites combined with wrong illustrations and/or omissions. This at the same time points to the fact that much more work is needed in this field of science.

From the morphological analysis it was concluded that a total of five were undescribed. A total of 42 species are currently considered valid. The inclusion of another five species ($\approx 12.5\%$) will take the total number to 47. One of the species is unique and clearly identifiable as "new" (e.g. *Sarcophyton aldersladei*) while the others shared a few or several characteristics with descriptions published by Verseveldt, notably similarities with other species of *S. glaucum* and to some extent *S. trocheliophorum*, *S. digitatum*, *S. acutum* and *S. crassum*. For the first time in the *Sarcophyton* related literature it is documented here that there is a species that does not have sclerites in the interior of the disc (*S. Alexanderi*), thus making this specimens' consistency quite soft (spongy), a fact that they however share with other species of *Sarcophyton* that do have sclerites in the interior of the disc. To compensate for this the polyp sclerites are very long, possibly giving them additional support when retracting into the coenenchyme.

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