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Zoological Studies

Soft Corals (Octocorallia: Alcyonacea) from Southern Taiwan. I. *Sarcophyton nanwanensis* sp. nov. (Octocorallia: Alcyonacea)

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(Accepted May 27, 2004)

Yehuda Benayahu and Shimrit Perkol-Finkel (2004) Soft corals (Octocorallia: Alcyonacea) from southern Taiwan. I. *Sarcophyton nanwanensis* sp. nov. (Octocorallia: Alcyonacea). *Zoological Studies* **43**(3): 537-547. A new species of *Sarcophyton* from southern Taiwan and Okinawa, Japan is described: *S. nanwanensis*. It has unique sclerites, almost oval without a distinct head, on the surface of the polyparium and stalk. A species with sclerites similar to those of *S. nanwanensis* is discussed. http://www.sinica.edu.tw/zool/zoolstud/43.3/537.pdf

Key words: Octocorallia, Taiwan, Coral reefs, New species, Taxonomy.

During a comprehensive soft coral survey conducted in southern Taiwan, a large number of octocorals were collected (Benayahu et al. 2004). In this collection, a new species of *Sarcophyton* Lesson, 1834 was found, which is described and depicted herein. This species belongs to Verseveldt's (1982) group I. At an advanced stage of preparation of this manuscript, Dr. Alderslade of the Museum and Art Gallery of Northern Territory, Darwin, Australia kindly informed us that he had received for identification 3 pieces of a *Sarcophyton* specimen that resembled our specimen from Taiwan. His material represents a sample that was collected for natural products research by Dr. Akemi Umeyama, Tokushima Bunri Univ., Japan. Unfortunately, only pieces of the original specimen remain, and therefore its precise colony shape is not known. Dr. Alderslade jointly with his co-worker Ms. Horner found the sclerites of the polypary and the surface of the base of the Okinawan material to be quite unusual and distinctive, easily serving to differentiate the species from all known taxa, despite its fragmentary nature, but he never published his findings. Dr. Alderslade and Ms. Horner generously made their findings available for our study. The new species presented here is unique in possessing small clubs with no distinct head and others with 2 lateral leaves.

MATERIALS AND METHODS

The holotype collected in Taiwan was preserved in 4% formalin in seawater, rinsed in fresh water after 24 h, and then transferred to 70% ethyl alcohol. Sclerites were obtained by dissolving the tissues in 10% sodium hypochlorite. Identification of the specimen was facilitated by comparison with permanent sclerite preparations from relevant type material kept at the Zoological Museum, Department of Zoology, Tel Aviv University, Israel (ZMTAU) and at the Nationaal Natuurhistorisch Museum, formerly Rijksmuseum van Natuurlijke Historie, Leiden, the Netherlands. The specimen is currently deposited in the Zoological Museum, Department of Zoology, Tel Aviv Univ., Israel.

RESULTS

Sarcophyton nanwanensis sp. nov.

(Figs. 1- 9)

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Material: ZMTAU Co 30253, holotype, Nanwan Bay, "Sea Mount" , southern Taiwan, (21°55'N; 120°45'E), 28~31 m, 22 Nov. 1998, coll. Y. Benayahu and S. Perkol-Finkel.

NTM C12146, paratype, Okinawa I., Japan, (26°30'N, 127°57'E), 3~4 m, June 1981, coll. A. Umeyama, June 1981.

Description: The holotype and the slices of the paratype are illustrated in Figs. 1 and 2, respectively. Holotype (ZMTAU Co 30253) 50 mm

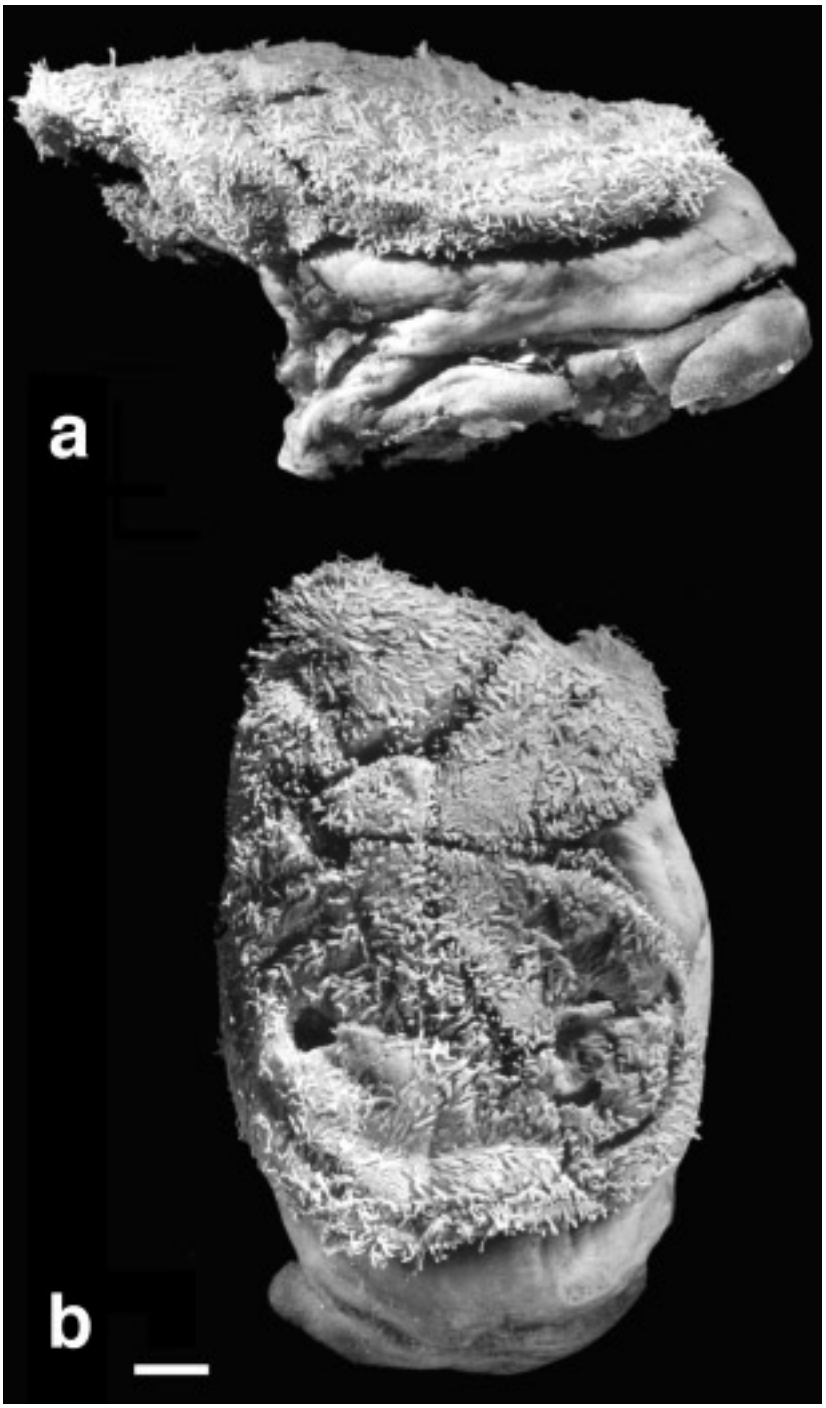

Fig. 1. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): side view and view from above. Scale bar, 10 mm.

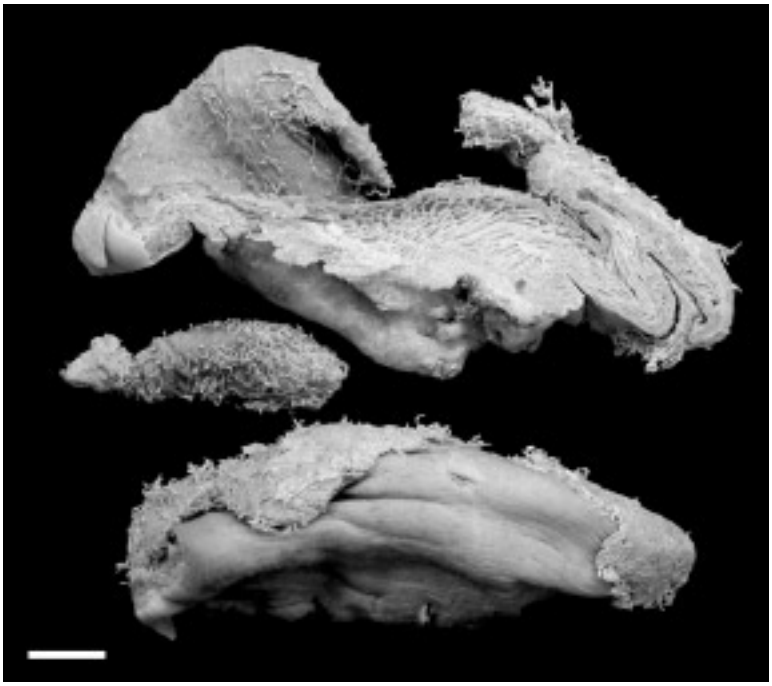

Fig. 2. *Sarcophyton nanwanensis* sp. nov. paratype fragments. Scale bar, 10 mm.

tall, and polypary about 95 x 60 mm across. Stalk wide and bearing some transverse groove-like wrinkles. The irregular polypary flattened, rather weak, and projecting beyond sides of stalk. Autozooids expanded, up to 6 mm long. Sclerites absent from polyps. Siphonozooids distinct, 2 to 5 in number between 2 adjacent autozooids.

Surface layer of the polypary of the holotype containing various club-like sclerites (Figs. 3-5). Smaller ones, 0.04~0.08 mm long, almost oval with no distinct head, while others with lateral leaves, or with only slightly developed head and small leaves (Fig. 3). Larger ones, up to 0.18 mm long, with more-developed heads (Figs. 4, 5). Handle covered with prominences, some arranged in whorls, and the handle end sometimes jagged. Interior of polypary with spindles, up to 0.28 mm long (Fig. 6). Most with toothed ends, and a few slightly curved. Surface layer of stalk with oval bodies, 0.03~0.08 mm long, similar in shape to the club-like sclerites of polypary (Fig. 7). Others intermediate in form between oval bodies and more-typical clubs. Clubs possessing large heads covered with prominences, and some with lateral leaves. Handle short, sometimes pointed. Some clubs resembling an arrowhead. The interior of the stalk with barrel-shaped sclerites and capstans, up to 0.30 mm long, mostly with 2 girdles of warts and 2 terminal compound ends (Figs. 8, 9).

Color : In alcohol, the specimen is beige.

Etymology : The species is named after the type locality, Nanwan Bay, southern Taiwan, a site rich in soft corals.

Variability : The paratype (NTM C12146, Fig. 2) consists of 2 vertical slices and a small fragment from the original specimen (the portions were dry when received, and were subsequently rehydrated for safer preservation). One slice, 75 x 25 mm and 20 mm thick, is from the colony edge and consists of material from both the side of the stalk and the polypary. The other slice, removed from deeper in the colony, is about 83 mm long and 12 mm thick. It also consists of both the polypary and basal material and indicates the width and thickness of the colony at the sampled area. The pieces suggest that the original colony was a thinly encrusting

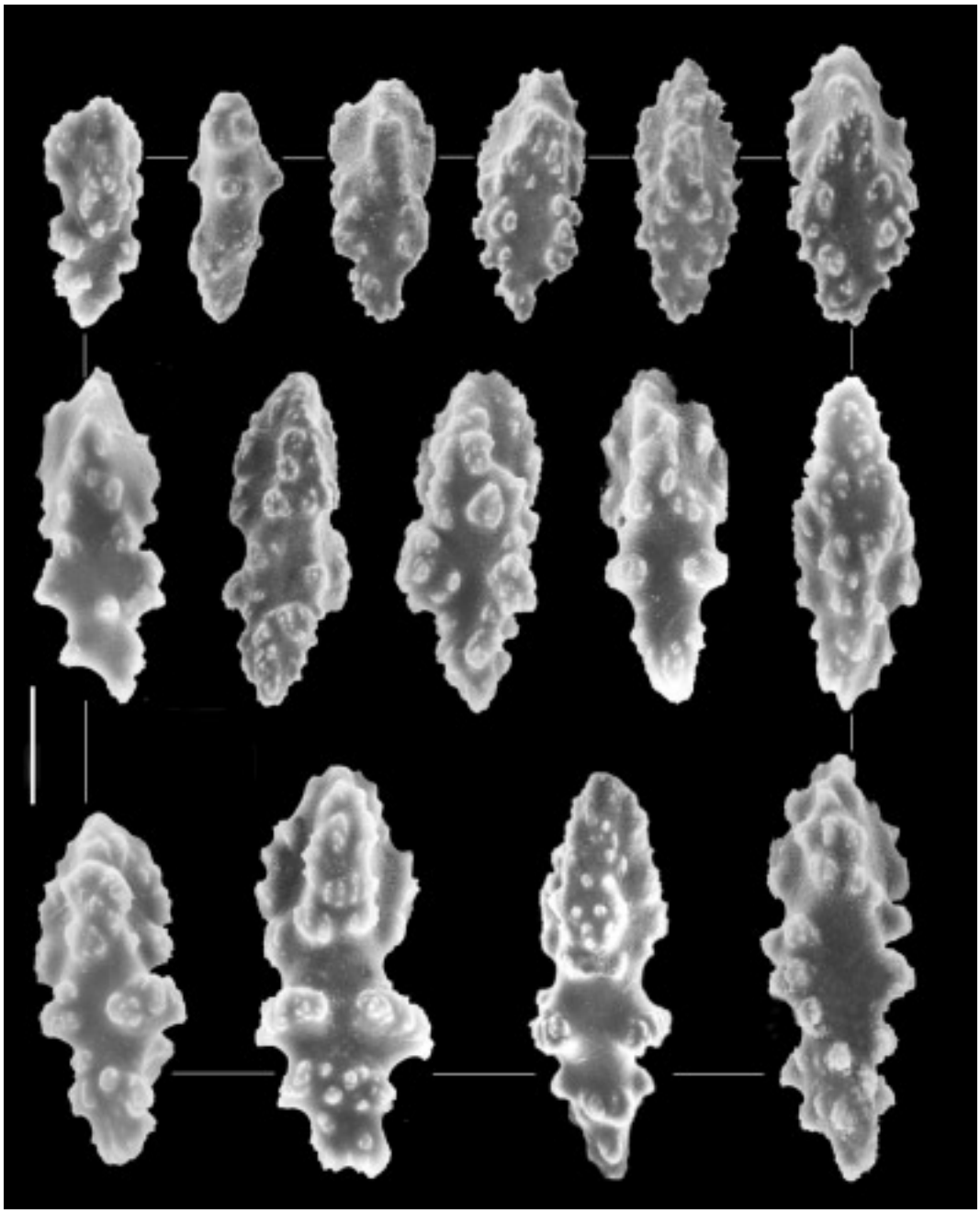

Fig. 3. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): clubs of surface layer of polypary. Scale bar, 0.02 mm.

specimen with a low, wide stalk. The center of the polypary is not obscured, as the disc is folded only at the edges.

The autozooids are exert, but only the polyp bodies remain, with the tentacles possibly having autolysed after collection. At the edge of the polypary, the autozooids are 0.8~1.2 mm apart with 1 or 2 siphonozooids between them. Further towards the center, they are 1.6~3.2 mm apart with 3-5 siphonozooids separating them.

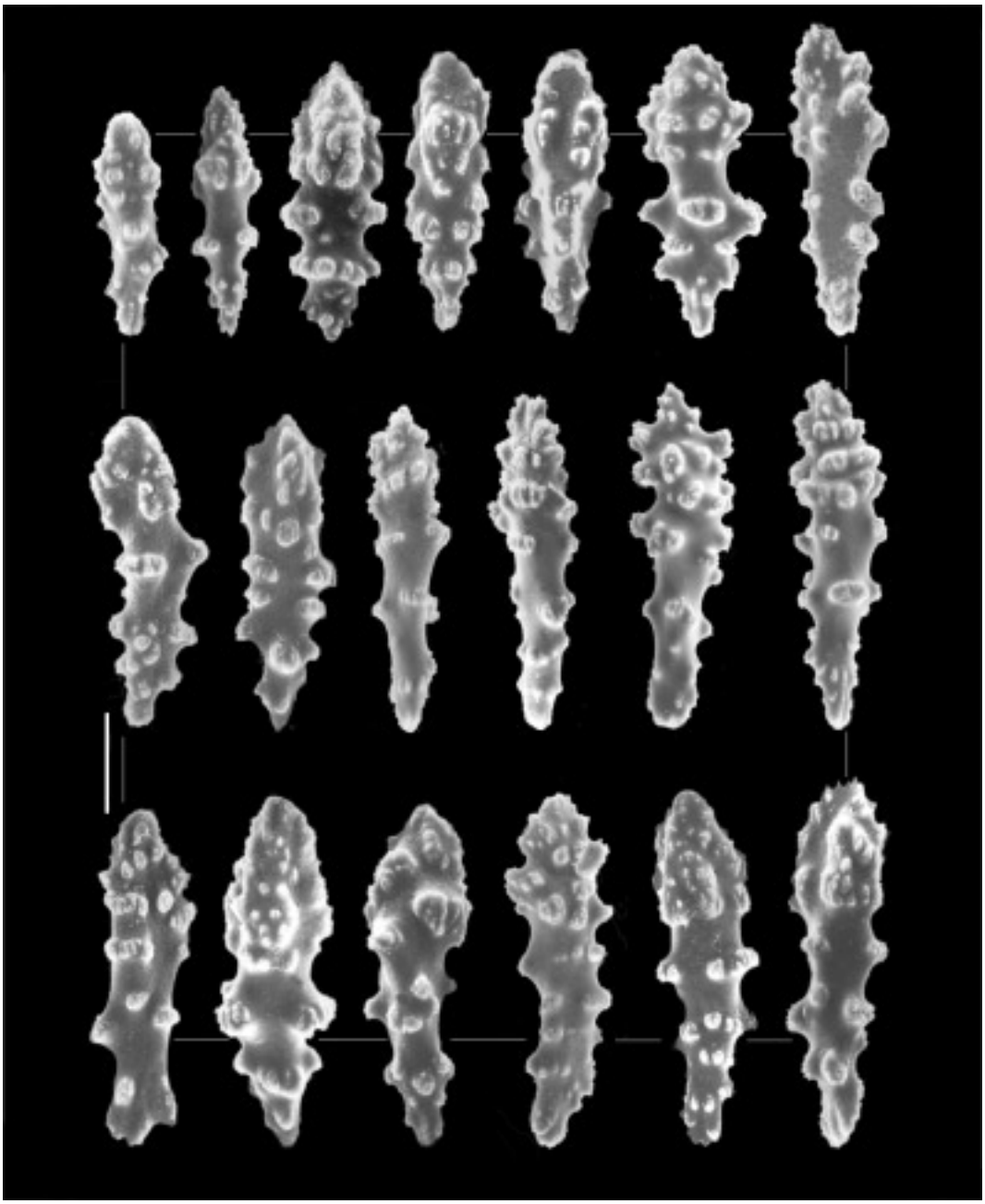

Fig. 4. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): clubs of surface layer of polypary. Scale bar, 0.04 mm.

The paratype possesses the same style of sclerites as the holotype.

Remarks: Since Verseveldt's (1982) revision of the genus *Sarcophyton*, only 2 additional species have been assigned to it, i.e., *S. agaricum* (Stimpson, 1885) (see Alderslade 1993) and *S. spinospiculatum* (Alderslade and Shirwaiker 1991). The smallest sclerites of the surface of the polypary and the base are the most-distinctive characteristic of *S. nanwanensis* (Figs. 3, 8). The only

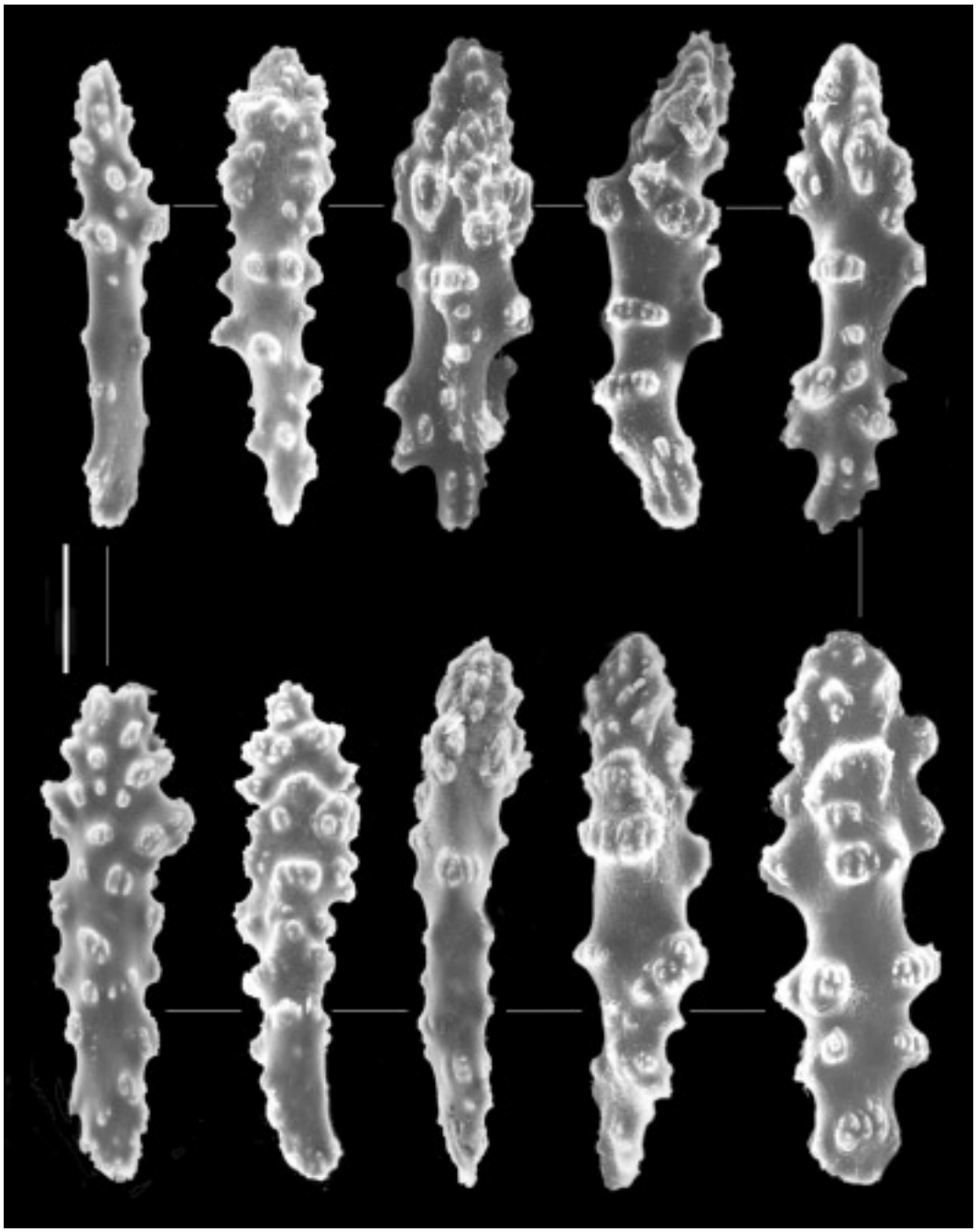

Fig. 5. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): clubs of surface layer of polypary. Scale bar, 0.04 mm.

Sarcophyton species with clubs similar to those of *S. nanwanensis* sp. nov. is *S. solidum* Tixier Durivault, 1958. The surface of the polypary and the stalk of the latter species according to Verseveldt (1982: 73) have "numerous remarkable sclerites: small bodies, more or less oval in outline and sculptured with many rounded projections." Sclerites of this type are indeed also found in *S.*

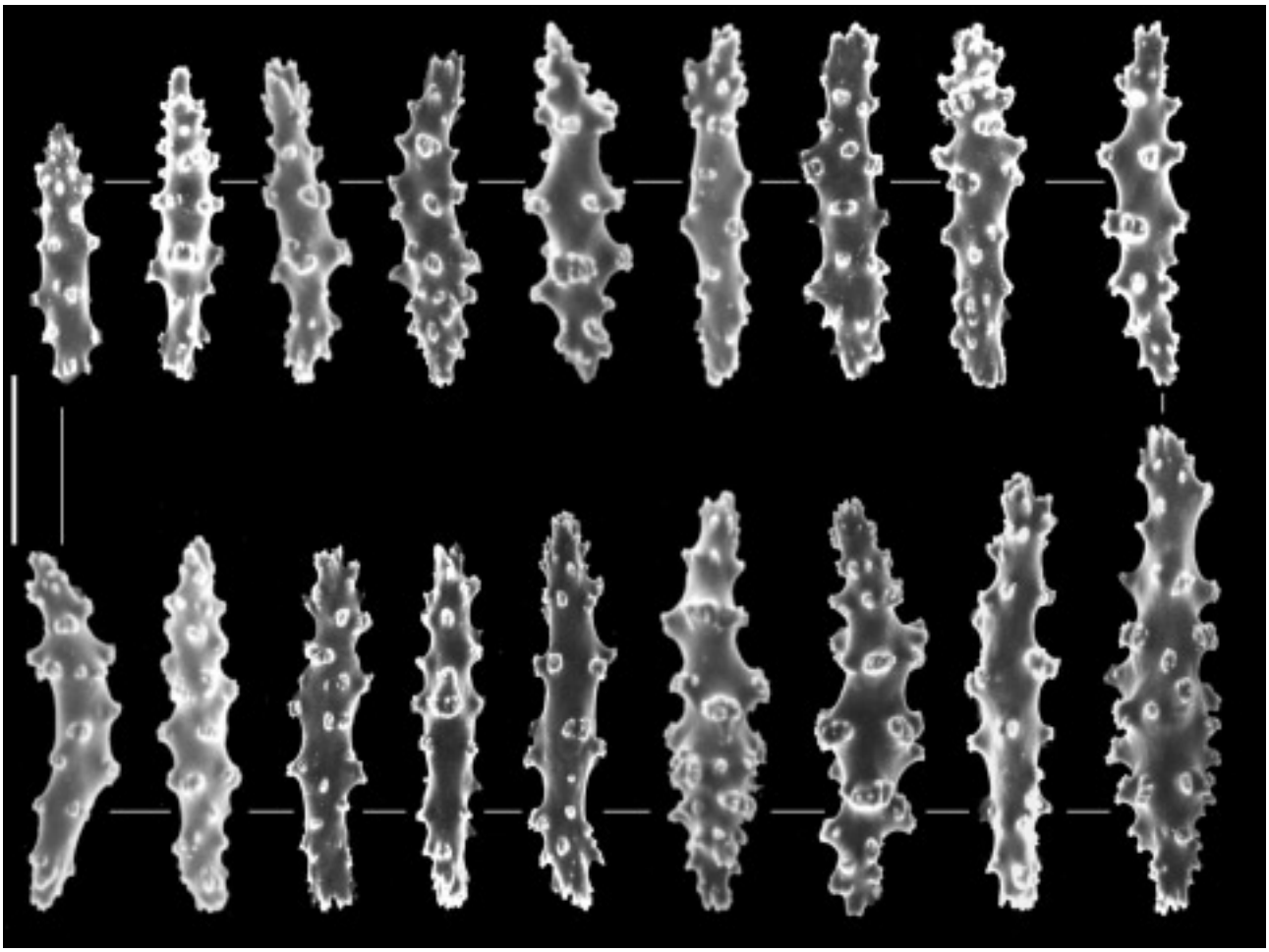

Fig. 6. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): spindles of interior polypary. Scale bar, 0.10 mm.

nanwanensis. Careful examination of the holotype of *S. solidum* indicates that these are true clubs, with many having a median constriction, as already indicated and depicted by Verseveldt (1982: Fig. 30c, j-m). Notably, in Fig. 30l of Verseveldt, the club is presented wrongly, as it is upside down. The larger clubs of the surface of the polypary differ between the 2 species, being up to 0.35 mm and more in *S. solidum* and only up to 0.18 mm in *S. nanwanensis*. A further difference is between the sclerites of the interior of the capitulum, being short spindles up to 0.28 mm long in *S. nanwanensis*, and thin needles and rods up to 0.75 mm in *S. solidum*. Additionally, *S. nanwanensis* has mainly barrel-shaped sclerites in the interior of the stalk, while in *S. solidum* they are long spindles. Based on the above comparison, therefore, it is clear that the examined specimen has unique sclerites and differs from all previously described species.

Acknowledgments: This study was made possible thanks to a grant from the National Science Council, R.O.C. that allowed Y.B. to visit Taiwan. We are grateful to C.-F. Dai who initiated the current soft coral survey. We would like to express our gratitude for the enthusiastic assistance and kind hospitality of M.-S. Jeng during our visit to Taiwan. We are extremely grateful to P. Alderslade, Museum and Art Gallery of Northern Territory, Darwin, Australia, for his kind offer to include his findings in this publication. The

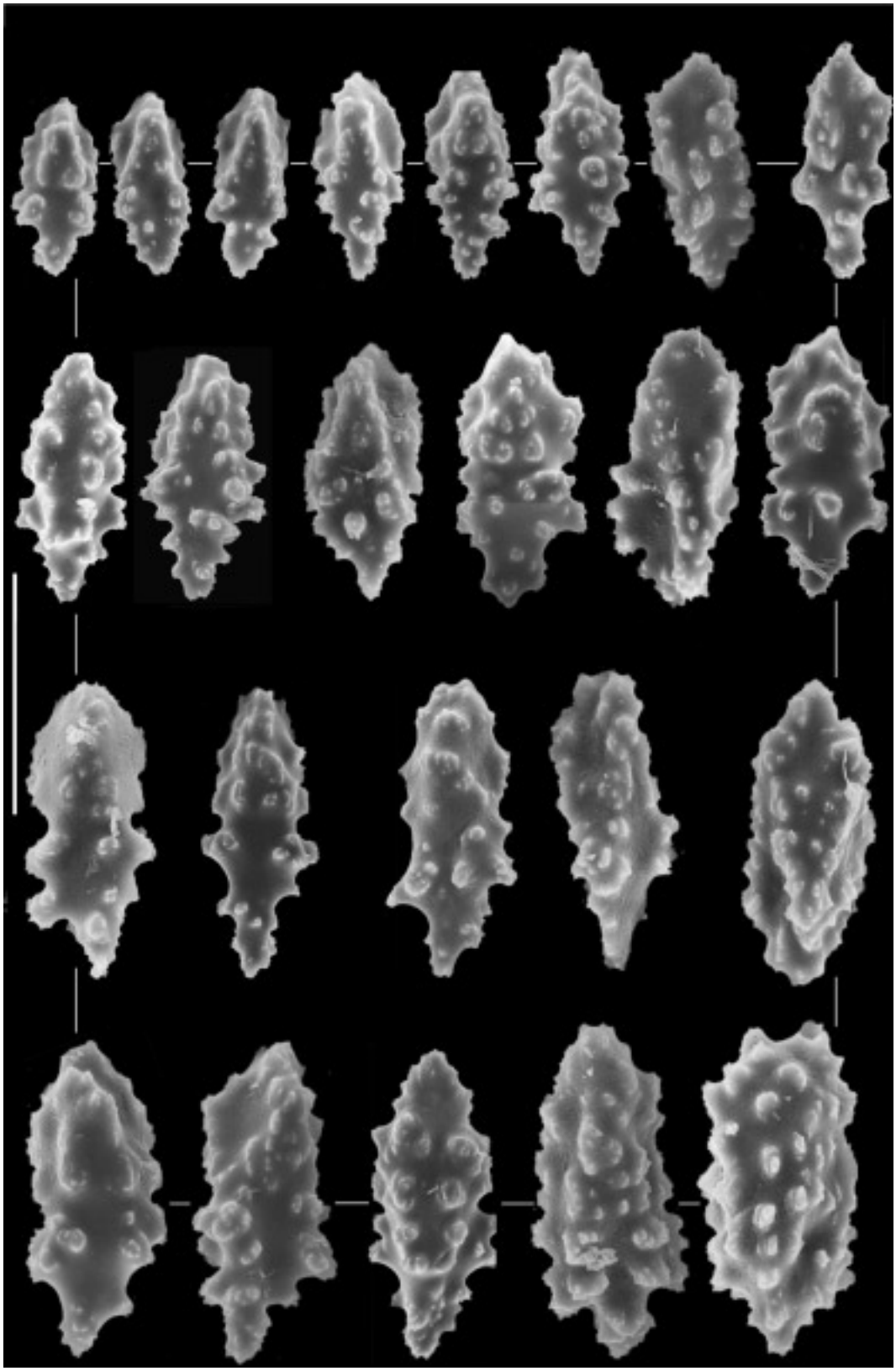

Fig. 7. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): clubs of surface layer of base. Scale bar, 0.10 mm.

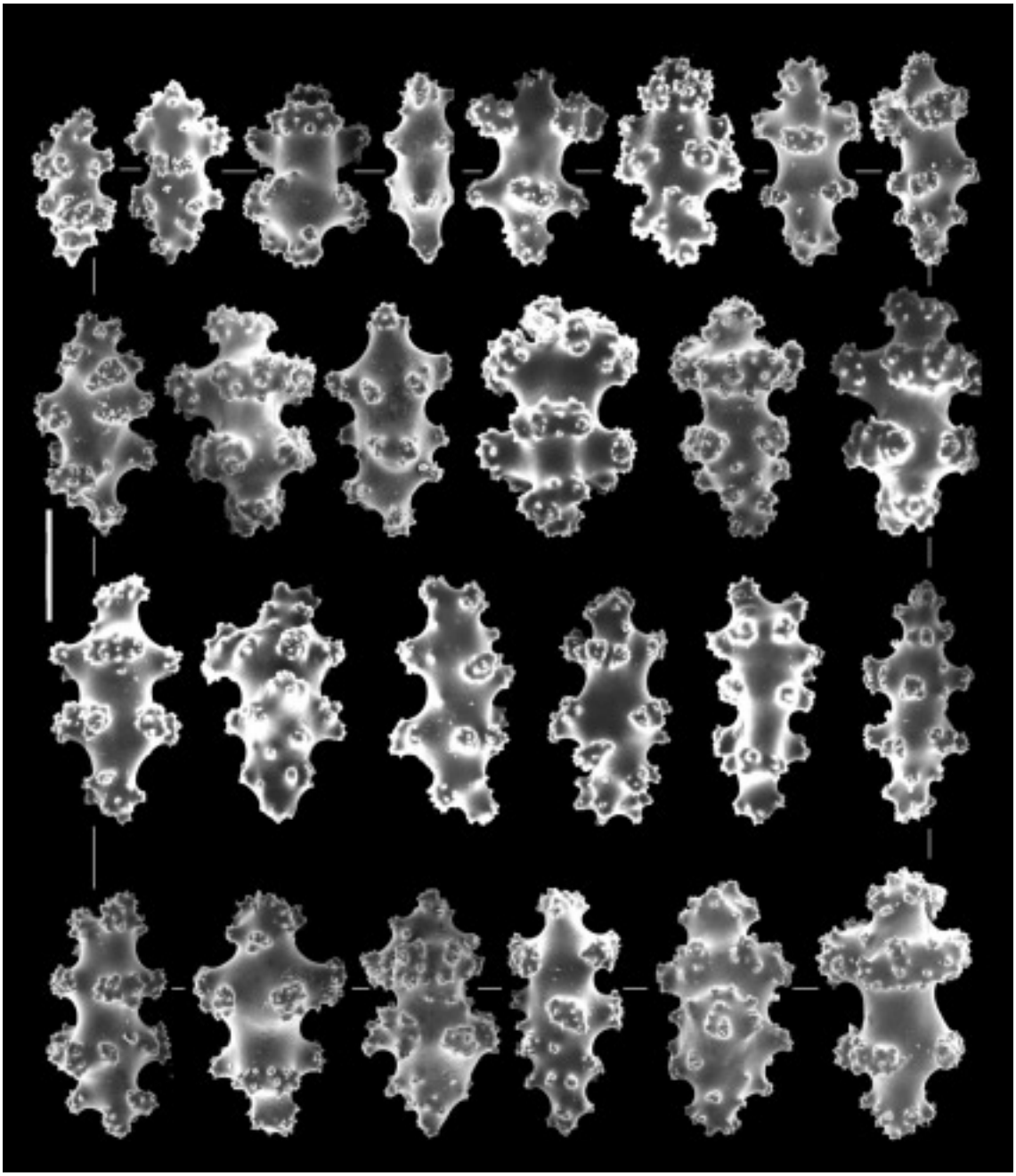

Fig. 8. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): capstans of interior of base. Scale bar, 0.10 mm.

manuscript benefited from the highly constructive critical comments of L. P. van Ofwegen, National Museum of Natural History, Leiden, the Netherlands. We wish to thank F. Scanerani for valuable assistance with the scanning microscopy, A. Shoob for photography, V. Wexsler for graphic assistance, and A. Shlagman for curatorial skills. N. Paz is acknowledged for her skillful editorial assistance.

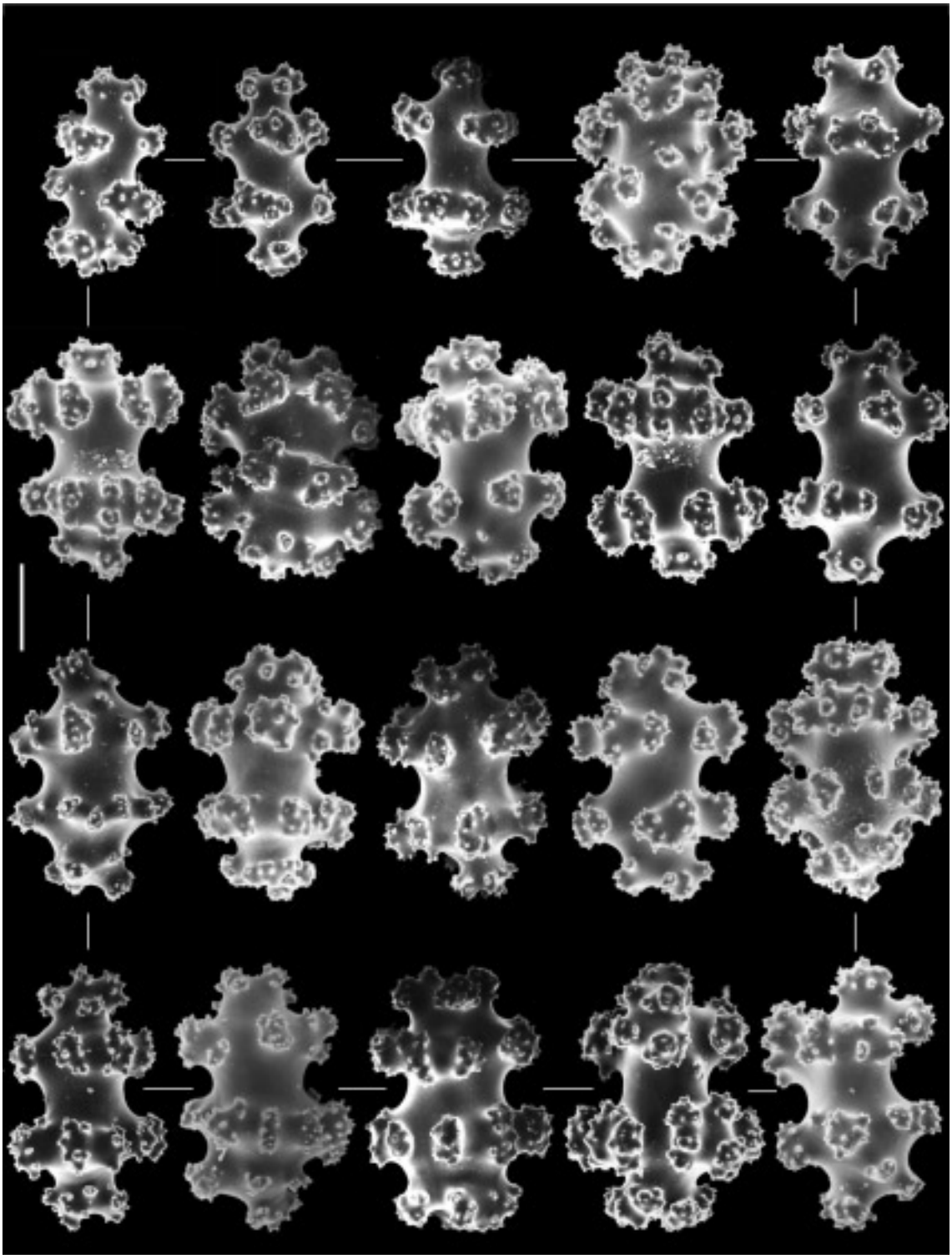

Fig. 9. *Sarcophyton nanwanensis* sp. nov. holotype (ZMTAU Co 30253): capstans of interior of base. Scale bar, 0.10 mm.

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