

New species of the genus *Simularia* (Octocorallia: Alcyonacea) from Nha Trang Bay, South China Sea, Vietnam

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A total of eight *Simularia* species is described and depicted, all from Nha Trang Bay, Vietnam (South China Sea). Six are new to science: *S. capricornis*, *S. multiflora*, *S. pumila*, *S. sarmentosa*, *S. torta*, and *S. uva*. Two other ones represent just new records for Vietnam: *S. rigida* (Dana, 1846) and *S. crebra* Ofwegen, 2008.

Introduction

The *Simularia* fauna of the South China Sea is poorly known. Tixier-Durivault (1970) published an account on the octocoral fauna of Nha Trang Bay, Vietnam, and mentioned 38 *Simularia* species. Later on, the taxonomic status of six of these changed. *Simularia dumosa* Tixier-Durivault, 1970, and *S. ramulosa* Tixier-Durivault, 1970, were synonymised with *S. lochmodes* Kolonko, 1926 (Verseveldt, 1980). *Simularia dura* (Pratt, 1903) was synonymised with *S. brassica* May, 1898 (Benayahu et al., 1997), and *S. gyrosa* sensu Tixier-Durivault, 1970, is recognised as belonging to *S. gravis* (Vennam & Ofwegen, 1996). The identification of *S. fungoides* Thomson & Henderson, 1906, from Nha Trang Bay was supposed to be mistaken (Verseveldt, 1980). The validity of *S. mayi* Lüttschwager, 1914, and *S. verrucosa* Tixier-Durivault, 1970, is unclear, because of the unknown depositary of the holotypes (Verseveldt, 1980). Two additional species, *S. mammifera* Malyutin, 1990, and *S. laminilobata* Malyutin, 1990, were described from Condor Island, South of Vietnam (8°45'N 106°38'E). Recently, Dautova & Savinkin (2009) described *S. arctium* and recorded *S. manaarensis* Verseveldt, 1980, from Nha Trang Bay. So far, the published data on the *Simularia* fauna of Vietnam includes 37 nominal species. In the present study eight *Simularia* species are added; six are new to science and two are new records, all of which are described and depicted below.

The samples were collected during field expeditions in 2005 and 2006 of the Russian Academy of Sciences using SCUBA. Each encountered *Simularia* colony was photographed underwater. All specimens were fixed in 70% ethanol and deposited in the museum of the Institute of Marine Biology (IMB) FEB RAS, Vladivostok, Russia (MIMB) and in the Netherlands Centre for Biodiversity Naturalis, Leiden, The Netherlands (RMNH). In order to identify the material, sclerites from different parts of the colony (polyp, polyparium surface and interior, stalk surface and interior) were examined separately,

after dissolving tissue samples in sodium hypochlorite. Sclerite samples were studied from middle-level and lower stalk parts separately. Images of the sclerites were obtained using a JEOL 6480LV Scanning Electron Microscope at 10 kV. Specimen samples were sent to Dr C.S. McFadden (Harvey Mudd College, Claremont, USA) for molecular studies using the CO1 gene. Only for *S. capricornis* a sequence was obtained.

Systematic part

Family *Alcyoniidae* Lamouroux, 1812

Genus *Sinularia* May, 1898

Sinularia capricornis spec. nov.

(figs 1a, 2-5, 36a)

Material examined.— RMNH Coel. 39519, holotype and microscope slide, Vietnam, South China Sea, Nha Trang Bay, SW of Cau Island, 12°16.65'N 109°22.4'E; 11.xi.2005, depth 4-20 m.

Description.— The holotype was an encrusting colony, from which a fragment was collected with a maximum cross-section of 4 × 7 cm (fig. 1a). It has remote primary lobes, with secondary outgrowths which are knob-shaped to finger-like. The height of the primary lobes is up to 2.7 cm; the lobules are 5-6 mm wide. The polyps have a collaret and eight points; the tentacles contain flattened rods, up to 0.07 mm long (fig. 2a). The points with modified clubs, up to 0.23 mm long (fig. 2b). Collaret with bent flattened spindles, which are covered with cones or tubercles (fig. 2c-d); the longer ones are up to 0.58 mm long (fig. 2d). Surface layer of the lobules contains clubs, 0.10-0.18 mm long (fig. 3a). The smallest clubs feature a distinct central wart, which becomes less distinct in larger clubs. Additionally, warty club-like spindles and small tuberculate spindles are present, up to 0.40 mm long (fig. 3b). The clubs of the surface layer of the base of the colony have wider handles and more calcified heads than those of the lobules, a few resemble capstans (fig. 4a). The club-like spindles of the surface layer of the base are similar to those of the colony top surface (fig. 4b); the small spindles are wider than those of the polyparium (fig. 4c). The interior of the colony has unbranched spindles, up to 4 mm long (fig. 5a-c). The smallest are from the lobules interior, which may be bent or somewhat flattened (fig. 5a). The spindles from the base interior may be rather elongated (fig. 5b) or plump (fig. 5c). The colony interior spindles are covered by simple tubercles (fig. 5d) or by complex processes (fig. 5e); several spindles bear tall hillocks with tiny granules on the upper part (fig. 5f).

Colour.— When alive, the living colony had a white surface (fig. 36a); in preserved condition, the colony fragment (holotype) is brown.

Etymology.— The Latin 'capricornis', horned, refers to the lobes' shape of the living colony.

Remarks.— The species belongs to clade 2 of McFadden et al. (2009): polyps with a collaret and points, both having large sclerites; tentacle rods present; clubs with central wart indistinct (the central wart and the three warts below it are closely set). In this clade most species have a distinct stalk, the preserved colony fragment of *S. capricornis* suggests an encrusting growth form. However, the live colony (fig. 36a) could just as well be considered a stalked species. Due to this uncertainty, we have compared the

species with other stalked and encrusting species we consider to belong to clade 2. The only species in clade 2 with an encrusting colony shape and clubs of the surface layer of the polyparium longer than 0.10 mm are *S. barcaformis* Verseveldt & Benayahu, 1983, *S. muqebblae* Verseveldt & Benayahu, 1983, and *S. parva* Tixier-Durivault, 1970. The latter was also found in Vietnam. *Sinularia barcaformis* differs in having no lobes at all, whereas *S. muqebblae* and *S. parva* have a somewhat similar colony shape, but both have much longer clubs, up to 0.32 mm long in *S. muqebblae* and up to 0.40 mm in *S. parva*. All species in clade 2 with a stalked colony shape have distinctly longer clubs in the surface of the top of the lobules than those of *S. capricornis*.

Molecular study.— This was the only species of the Vietnam *Sinularia*'s of which a CO1 sequence was obtained, which placed *S. capricornis* close to a *Sinularia* species from Taiwan under description (Benayahu & Ofwegen, in prep).

Sinularia crebra Ofwegen, 2008
(figs 1b-c, 6-12, 36b-c)

Sinularia crebra Ofwegen, 2008b: 649, figs 12b, 13-15, 75f.

Material examined.— RMNH Coel. 39518, colony fragment and microscope slide, Vietnam, South China Sea, Nha Trang Bay, West side of Vung Island, 12°16.2'N 109°21.6'E; 16.xi.2005, depth 4-12 m; RMNH Coel. 39520, colony fragment and microscope slide, Vietnam, South China Sea, Nha Trang Bay, SW of Cau Island, 12°16.65'N 109°22.4'E; 11.xi.2005, depth 4-20 m.

Description.— RMNH Coel. 39518 and RMNH Coel. 39520 are fragments of encrusting colonies; RMNH Coel. 39518 has a maximum cross-section of 4 x 7 cm (fig. 1b), RMNH Coel. 39520 of 4 x 5 cm (fig. 1c). Both specimens have erect primary lobes which bear slightly flattened lobules. The lobules are crowded and have a rosette-like appearance. Both specimens have no sclerites in the polyps. The surface layer of the lobes contains clubs with a central wart (figs 6a, 7a, 10a); this wart and the three tubercles underneath can be foliaceous. These clubs are 0.08-0.20 mm long, with straight handles bearing scant tubercles. Furthermore, small spindles are present, up to 0.30 mm long, mostly with simple tubercles; sclerites intermediate between small spindles and clubs are also common (figs 6b, 7b, 10b). The clubs and spindles of the surface layer of the base of the colony resemble those of the lobes (fig. 8a-b), but in RMNH Coel. 39520 they are considerably wider (fig. 11). The interior of the top of the colony mostly has unbranched spindles (fig. 9a, 12a), up to 3 mm long, with simple or complex tubercles (fig. 9c-d, 12c-d). Some spindles in the lower part of the stalk, near the substratum, may have several side branches (fig. 9b, 12b).

Colour.— When alive, the type specimens had a brown surface with grey-white anthocodia (fig. 36b-c); in preserved condition they are cream-coloured.

Remarks.— The present material differs slightly from how *S. crebra* was originally described and therefore we describe and depict the present material. The holotype has several longer clubs in the surface layer of the top of the colony, up to 0.25 mm long, versus up to 0.20 mm for the present specimens, but most clubs are rather similar in shape (Ofwegen, 2008: figs 13-15). The colony shape of the holotype of *S. crebra* differs considerably from the present material. It shows compound lobes next to single knob-shaped lobes (Ofwegen, 2008b: fig. 75f) while the present specimens

have only compound lobes (fig. 36b-c). We assume the latter difference is caused by the holotype growing upwards against a stony coral.

Sinularia multiflora spec. nov.
(figs 1d, 13-15, 36d)

Material examined.— MIMB 16734, holotype, Vietnam, South China Sea, Nha Trang Bay, SE of Mot Island, 12°10.5'N 109°17.05'E; 10.iv.2006, depth 4-20 m.

Description.— The holotype was an encrusting colony, from which a fragment with a maximum cross-section of 6 × 6.5 cm and 6 cm height was collected (fig. 1d). The polyparium consists of a number of densely placed primary lobes; the lobes bear crowded lobules arranged rosette-like. Lobes and lobules vary in size and shape, from tiny knobs to small ridges. The polyps contain modified clubs up to 0.15 mm long (fig. 13a). The surface layer of the lobules contains clubs with a distinct central wart, which can be compact, but is mostly subdivided; the warts below the central one are mostly flattened and horizontally directed (fig. 13b). These clubs are 0.08-0.24 mm long, with bent or straight handles bearing tiny knobs. The clubs with poorly developed heads are transitional forms to club-like spindles and small spindles up to 0.32 mm long (fig. 13c). The clubs and spindles of the surface layer of the stalk are as long as those of the polyparium, but are wider (fig. 14a-b). The interior of the lobes and lobules has unbranched curved spindles, up to 3.5 mm long (fig. 15a). In the base of the colony they are straight, up to 3.2 mm long (fig. 15b), with tubercles similar to those of the spindles of the top of the colony (fig. 15c) or with granulated hillocks (fig. 15d).

Colour.— When alive the holotype had a grey surface (fig. 36d); in preserved condition, it is brown.

Etymology.— The Latin 'multiflora', bearing numerous flowers, refers to the colony shape of the species.

Remarks.— *Sinularia multiflora* belongs to clade 4B of McFadden et al. (2009): polyps with club-like point sclerites; clubs with distinct central wart, or clubs absent. Within this clade this species resembles *S. humilis* Ofwegen, 2008b. The preserved material of *S. multiflora* and *S. humilis* is very much alike (compare fig. 1d with Ofwegen 2008b, fig. 26d), the alive colonies however differ considerably (compare fig. 36d with Ofwegen 2008b, fig. 77c) with *S. humilis* not showing the rosette-like lobules arrangement. The clubs with horizontally directed tubercles below the central wart are lacking in *S. humilis*. Furthermore, *S. humilis* has longer point sclerites, up to 0.20 mm long, compared to 0.15 mm long for *S. multiflora*.

Sinularia pumila spec. nov.
(figs 1e, 16-19, 36e)

Material examined.— RMNH Coel. 39521, holotype and microscope slide, Vietnam, South China Sea, Nha Trang Bay, SE side of Vung Island, 12°15.9'N 109°21.7'E; 16.xi.2005, depth 4-20 m.

Description.— The short-stalked holotype has weakly branched lobes. The colony has a maximum cross-section of 4 × 4 cm and it is 3 cm high; the lobules are up to 3 mm

thick (fig. 1e). The polyps have a collaret and eight points. Points with modified clubs, up to 0.14 mm long, having poorly developed heads. Collaret with bent flattened spindles, up to 0.32 mm long (fig. 16a). Surface layer of the lobes has *leptoclados*-type clubs, the smallest are 0.07 mm long, most are around 0.10 mm, but a few even reach a length of 0.15 mm (fig. 16b). In addition, longer wart clubs are present, up to 0.26 mm long (fig. 16c); several, with poorly developed heads, merge into club-like spindles and small spindles, up to 0.6 mm long (figs 16d, 17a). The surface layer of the base contains numerous *leptoclados*-type clubs, mostly up to 0.1 mm long, with rather warty ornamentation; several are capstan-like (fig. 18a). Furthermore, wart clubs are present, up to 0.3 mm long (fig. 18b-c). The small spindles of the surface layer of the base are wider than those in the colony top surface (fig. 19a). The interior of the lobes has straight and slightly tapered spindles, up to 2.8 mm long, which are covered by simple warts (fig. 17b-c). The interior of the colony base has slightly curved spindles, up to 2.2 mm long; some spindles with one ramified end (fig. 19b). Most of them have simple (fig. 19c), or small complex tubercles (fig. 19d).

Colour.— When alive, the holotype had a bluish surface (fig. 36e); in preserved condition the specimen is creamy-grey.

Etymology.— The Latin ‘*pumilus*’, dwarf, refers to the tiny size of the holotype.

Remarks.— *S. pumila* belongs to clade 5C of McFadden et al. (2009): surface layer with *leptoclados*-type clubs. In this clade only *S. compacta* Tixier-Durivault, 1970, has similar looking large *leptoclados*-type clubs. *S. compacta* differs in having an encrusting colony shape; the clubs in the surface layer of the lobes have a much larger angle between head and handle and the head is more leafy (Ofwegen 2001: fig. 6).

Sinularia rigida (Dana, 1846)
(figs 1f, 20-22, 36f)

For references see Verseveldt, 1977: 32; Manuputty & Ofwegen, 2007: 192; Benayahu et al., 2004: 551.

Material examined.— RMNH Coel. 39517, colony fragment and microscope slide, Vietnam, South China Sea, Nha Trang Bay, South of Tre Island, 12°10.69'N 109°17.9'E; 13.iv.2006, depth 5-20 m.

Description.— The specimen is part of an encrusting colony, with a maximum cross-section of 6 × 8 cm (fig. 1f). The height of the primary lobes is up to 2.4 cm. The colony has remotely branched or simple lobes; the lobes vary from knob- to finger-shaped with tapered tips. There are no sclerites in the polyps. Surface layer of the lobes contains clubs with a central wart (fig. 20a), this wart and the three tubercles below it can be foliaceous. The clubs are mostly 0.1-0.19 mm long, sometimes up to 0.28 mm. Furthermore, small spindles are present, having the same length as the clubs, and mostly with prominent simple tubercles (fig. 20c). Sclerites intermediate between small spindles and clubs are also common (fig. 20b). The clubs of the surface layer of the base of the colony have wider handles and are shorter than those of the lobules (fig. 21a); a few approach capstan shape (fig. 21b). Small capstans are present too (fig. 21c). The small spindles and the sclerites intermediate between them and clubs of the surface layer of the base are also smaller and wider than those of the colony top (fig. 21d). The interior of the colony has unbranched and branched spindles up to 2.4 mm long (fig. 22a), with

simple or complex tubercles (fig. 22b-c). Some spindles are ornamented by granulated cone-shaped processes (fig. 22d). The irregular bodies are found in the lower part of the colony base (fig. 22e).

Colour.— When alive the holotype had a grey surface (fig. 36f); in preserved condition it is cream-white.

Remarks.— The depository of the type specimen of *S. rigida* is unknown and consequently it never has been re-examined, therefore we give a description of our material for comparison with that of Verseveldt (1977). We did not designate a neotype, because we prefer to use material from the type locality for that.

Simularia sarmentosa spec. nov.
(figs 1g, 23-26, 36g)

Material examined.— RMNH Coel. 39522, holotype and microscope slide, Vietnam, South China Sea, Nha Trang Bay, SE of Mot Island, 12°10.5'N 109°17.05'E; 7.vi.2006, depth 4-20 m.

Description.— The holotype is an arborescent colony 5 cm high (fig. 1g). The lobes are subdivided having small finger-like lobules; the latter are up to 5 mm wide and up to 1 cm long. The polyps have no sclerites. The surface layer of the lobules contains numerous capstan-like sclerites, up to 0.10 mm long (fig. 23a). The clubs of the surface layer of the lobules show much variation. There are clubs, mostly up to 0.17 mm long, with compact heads composed by upright blunt processes; a few have these processes rather crowded on the head and a girdle of processes below (fig. 23c). Other clubs are warty and with a distinct central wart, which can be compact but mostly is subdivided (figs 23d, 24a). The latter are 0.08-0.24 mm long, with straight handles bearing scant tubercles. Finally, there are clubs with ill-defined heads (fig. 23b). Furthermore, small spindles are present, up to 0.35 mm long (fig. 24b). The surface of the colony base contains numerous capstan-like sclerites up to 0.10 mm long (fig. 25a). The clubs and spindles of the surface layer of the stalk resemble those of the lobules but are shorter and wider; the clubs usually with more developed warty processes on the handles (fig. 25b, 26a). The interior of the lobes has spindles, up to 3.2 mm long; these spindles bear a side branch or have one end forked; a few multiradiate bodies are present too (fig. 24c). The spindles bear small warts (fig. 24d) or tiny cones with granulated tips (fig. 24e). The interior of the colony base has straight or slightly curved spindles, up to 2.5 mm long; they sometimes have a side branch or a forked end (fig. 26b). The spindles have simple warts similar to those on the spindles of the colony top (fig. 26c).

Colour.— When alive, the holotype had a yellowish-pale-coloured surface (fig. 36g); in preserved condition it is brown.

Etymology. — The Latin 'sarmentum', a branch of the tree, refers to the holotype shape.

Remarks.— The species belongs to clade 4A of McFadden et al. (2009): polyps without sclerites, clubs with central wart indistinct because of leaf-like processes, or clubs absent. In this clade it is the only species in which the leaf-like processes are rather indistinct.

Sinularia torta spec. nov.
(figs 1h, 27-30)

Material examined.— RMNH Coel. 39523, holotype and microscope slide, Vietnam, South China Sea, Nha Trang Bay, SW of Mun Island, 12°09.7'N 109°18.1'E; 31.v.2006, depth 4-18 m.

Description.— The holotype fragment has a maximum cross-section of 6 × 7 cm and a height of 2.5 cm (fig. 1h). The lobes vary in shape from knobs to sinuous ridges; they are 7-14 mm in thickness. The polyps have eight points with small rods, up to 0.15 mm long (fig. 27a). Surface layer of the lobes contains clubs, up to 0.20 mm long (fig. 27b). The clubs have a distinct central wart which is sometimes subdivided, but mostly compact with rather small warts below; in larger clubs a central wart becomes less distinct. In addition, small spindles, up to 0.35 mm long, with simple tubercles are present (fig. 28a). The clubs of the surface layer of the base of the colony are slightly wider than in the polyparium surface (fig. 29a). Some clubs have well developed processes on the handles and may look like capstans; the largest clubs are up to 0.4 mm long, and are transitional forms to interior spindles. The small spindles are thicker than those in the polyparium surface (fig. 29b). The interior of the lobes has spindles, up to 2.5 mm long (fig. 28b), some have a side branch, many are lozenge-shaped, the smallest have a poorly developed median waist. The spindles have rather large tubercles (fig. 28c) or smooth elevations with 1-3 summits (fig. 28d). The spindles in the interior of the base are up to 2.1 mm long (fig. 30a); with rather complex, large tubercles (fig. 30b) or simple tubercles (fig. 30c).

Colour.— The preserved specimen is greenish-brown. There is no information on the colour of living colonies.

Etymology.— The Latin 'tortus', curved, sinuous, tortuous, refers to the shape of the lobes.

Remarks.— *S. torta* belongs to clade 3 of Mcfadden et al. (2009): polyps with point-and-tentacle rods, and surface layer clubs having a small central wart giving the clubs a triangular form. In this clade there are two species with encrusting colony shape, lobes in the form of ridges, and absence of calyces: *S. foveolata* Verseveldt, 1974, and *S. megasclera* Alderslade, 1987. *S. foveolata* differs in the clubs having much stronger developed warts directly below the central one (Verseveldt 1974: fig. 7a-f), and longer interior spindles (up to 7 mm long). *S. megasclera* has surface layer clubs more alike those of *S. torta* but it differs in having extraordinary big interior sclerites (up to 12 mm long), which are often branched.

Sinularia uoa spec. nov.
(figs 1i, 31-35, 36h)

Material examined.— RMNH Coel. 39524, holotype and microscope slide, Vietnam, South China Sea, Nha Trang Bay, SE side of Vung Island, 12°15.9'N 109°21.7'E; 24.iv.2006, depth 4-20 m.

Description.— The holotype fragment is part of an encrusting colony, with a maximum cross-section of 7.5 × 10 cm (fig. 1i). The height of the fragment is 5.5 cm. The primary lobes, up to 2.5 cm high, bear rounded and knob- to ridge-shaped lobules, up to 1 cm high; several lobules are slightly flattened. The polyps have no sclerites.

Surface layer of the lobes contains rod-like sclerites which sometimes look like capstans (fig. 31a) and clubs, up to 0.28 mm long, mostly with a central wart (figs 31b, 32). The heads of the clubs show much variation, the central wart and warts below it can be simple and horizontally oriented or subdivided; many of the clubs bear some foliaceous processes on the heads. The longer clubs have well developed warts and indistinct central wart (fig. 32). In addition, the surface layer of the lobes has club-like spindles and small spindles, up to 0.35 mm long, with simple tubercles (fig. 33a). The surface layer of the base contains clubs, which resemble those of the lobes but are wider (fig. 34). Some of the clubs with prominent processes on their handles may look like capstans. The small spindles present in the surface of the base do not differ much from those of the top of the colony (fig. 35a). The interior of the lobes has unbranched bent spindles, sometimes with asymmetrical ends (fig. 33b), up to 3 mm long, with simple tubercles or volcano-shaped processes (fig. 33c-d). In the interior of the base of the colony spindles up to 3.8 mm long occur (fig. 35b); they are curved, with simple or complex tubercles (fig. 35c).

Colour.— When alive, the holotype was brown with the tips of lobules light brown (fig. 36h); in preserved condition it is cream-coloured.

Etymology.— The Latin 'uva', grape, bunch of grapes, refers to the shape of the lobules.

Remarks.— Together with *S. sarmentosa* this species falls in clade 4A of McFadden et al. (2009): polyps without sclerites, clubs with central wart indistinct because of leaf-like processes, or clubs absent. In this clade it differs from all other species in having an encrusting colony shape.

Discussion

This publication is part of a series dealing with the diversity of the Vietnam octocoral fauna and its affinities with nearby regions. Indonesia and Taiwan together only have 10 *Sinularia* species in common with Vietnam. The latter has more species in common with Indonesia (Ofwegen, 2002; Manuputty & Ofwegen, 2007: 18 species) than with Taiwan (Benayahu et al. 2004: 12 species). Regarding the about 160 nominal species of *Sinularia* these numbers are very low. Ongoing research on *Sinularia* from Indonesia (Ofwegen, in prep) and Taiwan (Benayahu & Ofwegen, in prep) probably will raise these numbers.

The nearby Philippines are not sufficiently examined to make reliable comparisons (Ofwegen, 2002).

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References

- Benayahu, Y., 1997. A review of three alcyonacean families (Octocorallia) from Guam.— *Micronesia* 30: 207-244.
- Benayahu, Y., M.-S. Jeng, S. Perkol-Finkel & C.-F. Dai, 2004. Soft corals (Octocorallia: Alcyonacea) from southern Taiwan. II. Species diversity and distributional patterns.— *Zoological Studies* 43: 548-560.
- Benayahu, Y., L.P. van Ofwegen & P. Alderslade, 1997. A case study of variation in two nominal species of *Sinularia* (Coelenterata: Octocorallia), *S. brassica* May, 1898, and *S. dura* (Pratt, 1903), with a proposal for their synonymy.— *Zoologische Verhandelingen Leiden* 323: 277-309.
- Dautova, T.N. & O.V. Savinkin, 2009. New data on soft corals (Cnidaria: Octocorallia: Alcyonacea) from Nha Trang Bay, South China Sea.— *Zootaxa* 2027: 1-27.
- Malyutin, A.N., 1990. Two new species of *Sinularia* (Octocorallia: Alcyonacea) from South Vietnam.— *Asian Marine Biology* 7: 9-14.
- Manuputty, A.E.W. & L.P. van Ofwegen, 2007. The genus *Sinularia* (Octocorallia: Alcyonacea) from Ambon and Seram (Moluccas, Indonesia).— *Zoologische Mededelingen Leiden* 81: 187-216.
- McFadden, C.S., L.P. van Ofwegen, E.J. Beckman, Y. Benayahu & P. Alderslade, 2009. Molecular systematics of the speciose Indo-Pacific soft coral genus, *Sinularia*.— *Invertebrate Biology* 128: 303-323.
- Ofwegen, L.P. van, 2001. *Sinularia vanderlandi* spec. nov. (Octocorallia: Alcyonacea) from the Seychelles.— *Zoologische Verhandelingen Leiden* 334: 103-114.
- Ofwegen, L.P. van, 2002. Status of knowledge of the Indo-Pacific soft coral genus *Sinularia* May, 1898 (Anthozoa: Octocorallia).— *Proceedings 9th international Coral Reef Symposium, Bali, 2000*, 1: 167-171.
- Ofwegen, L.P. van, 2008a. The genus *Sinularia* (Octocorallia: Alcyonacea) from Bremer and West Woody islands (Gulf of Carpentaria, Australia).— *Zoologische Mededelingen Leiden* 82: 131-165.
- Ofwegen, L.P. van, 2008b. The genus *Sinularia* (Octocorallia: Alcyonacea) at Palau, Micronesia.— *Zoologische Mededelingen Leiden* 82: 631-735.
- Ofwegen, L.P. van & Y. Benayahu, 1992. Notes on Alcyonacea (Octocorallia) from Tanzania.— *Zoologische Mededelingen Leiden* 66: 139-154.
- Ofwegen, L.P. van & J. Vennam, 1991. Notes on Octocorallia from the Laccadives (SW India).— *Zoologische Mededelingen Leiden* 65: 143-154.
- Tixier-Durivault, A., 1970. Les octocoralliaires de Nha-Trang (Viet-Nam).— *Cahiers du Pacifique* 14: 115-236.
- Vennam, J. & L.P. van Ofwegen, 1996. Soft corals (Coelenterata: Octocorallia: Alcyonacea) from the Laccadives (SW India), with a re-examination of *Sinularia gravis* Tixier-Durivault, 1970.— *Zoologische Mededelingen Leiden* 70: 437-452.
- Verseveldt, J., 1974. Octocorallia from New Caledonia.— *Zoologische Mededelingen Leiden* 48: 95-122.
- Verseveldt, J., 1977. Octocorallia from various localities in the Pacific Ocean.— *Zoologische Verhandelingen Leiden* 150: 1-42.
- Verseveldt, J., 1980. A revision of the genus *Sinularia* May (Octocorallia, Alcyonacea).— *Zoologische Verhandelingen Leiden* 179: 1-128.
- Verseveldt, J. & Y. Benayahu, 1983. On two old and fourteen new species of Alcyonacea (Coelenterata, Octocorallia) from the Red Sea.— *Zoologische Verhandelingen Leiden* 208: 1-33.

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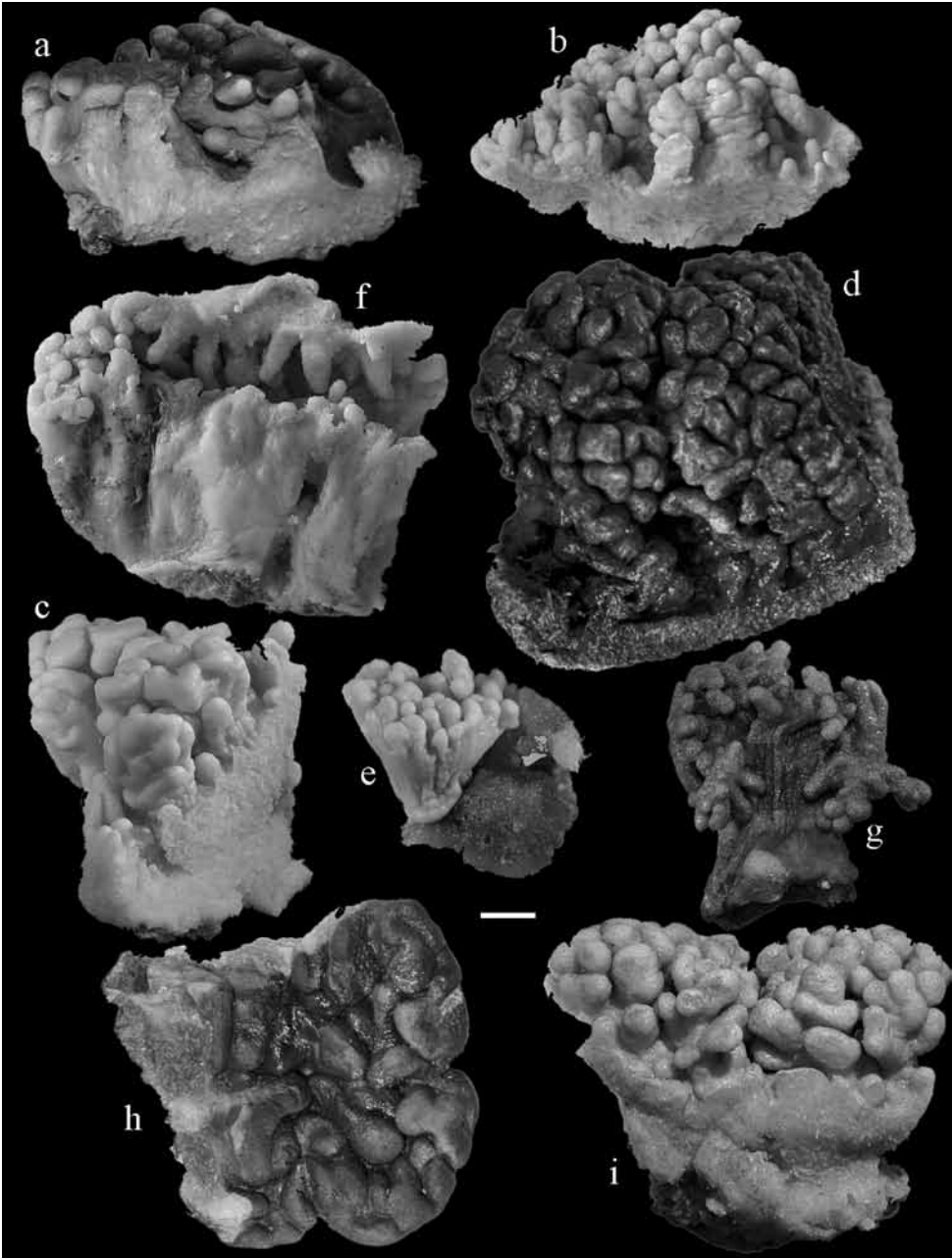


Fig. 1a. *S. capricornis* spec. nov., holotype RMNH Coel. 39519, lateral view; b-c, *S. crebra* Ofwegen, 2008, lateral views; b, RMNH Coel. 39518; c, RMNH Coel. 39520; d, *S. multiflora* spec. nov., holotype MIMB 16734, lateral view; e, *S. pumila* spec. nov., holotype RMNH Coel. 39521, lateral view; f, *S. rigida* (Dana, 1846) RMNH Coel. 39517; g, *S. sarmentosa* spec. nov., holotype RMNH Coel. 39522, lateral view; h, *Simularia torta* spec. nov., RMNH Coel. 39523, view from above; i, *S. uva* spec. nov., holotype RMNH Coel. 39524, lateral view. Scale 1 cm.

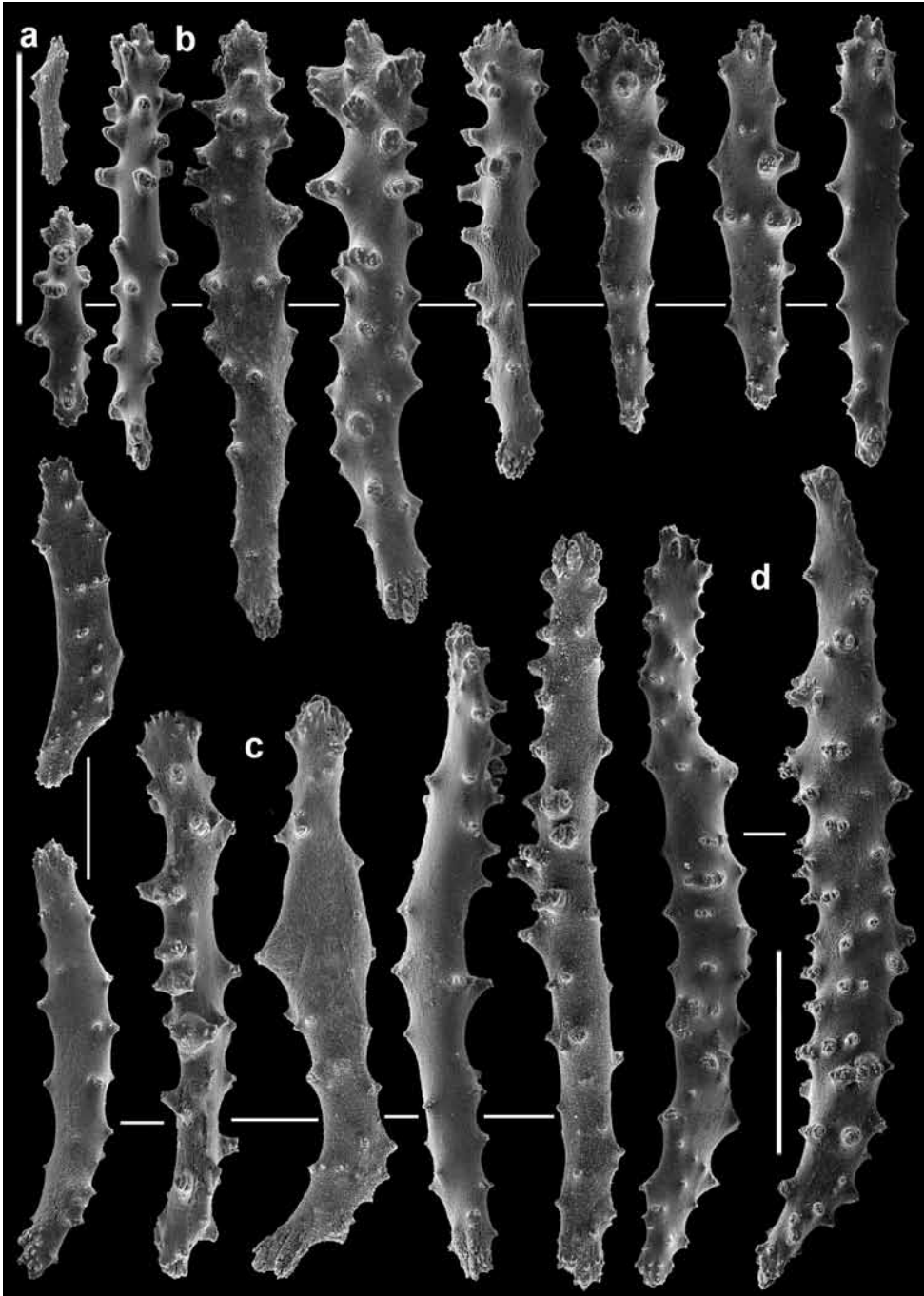


Fig. 2. *Sinularia capricornis* spec. nov., holotype RMNH Coel. 39519; sclerites of polyp; a, tentacle rod; b, point clubs; c-d, collaret spindles. Scales 0.10 mm.

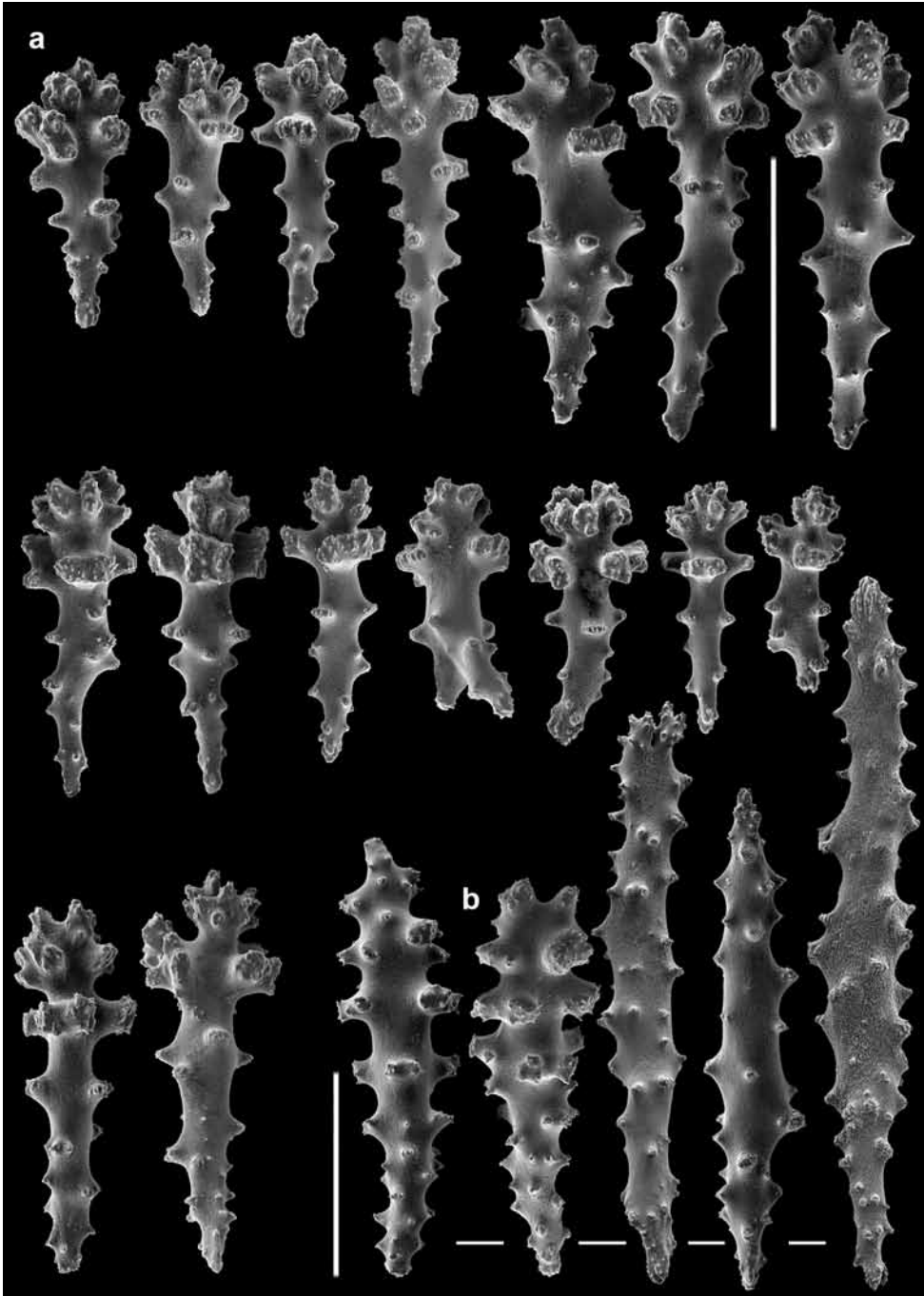


Fig. 3. *Simularia capricornis* spec. nov., holotype RMNH Coel. 39519; sclerites of the surface layer of colony top; a, clubs; b, spindles. Scales 0.10 mm.

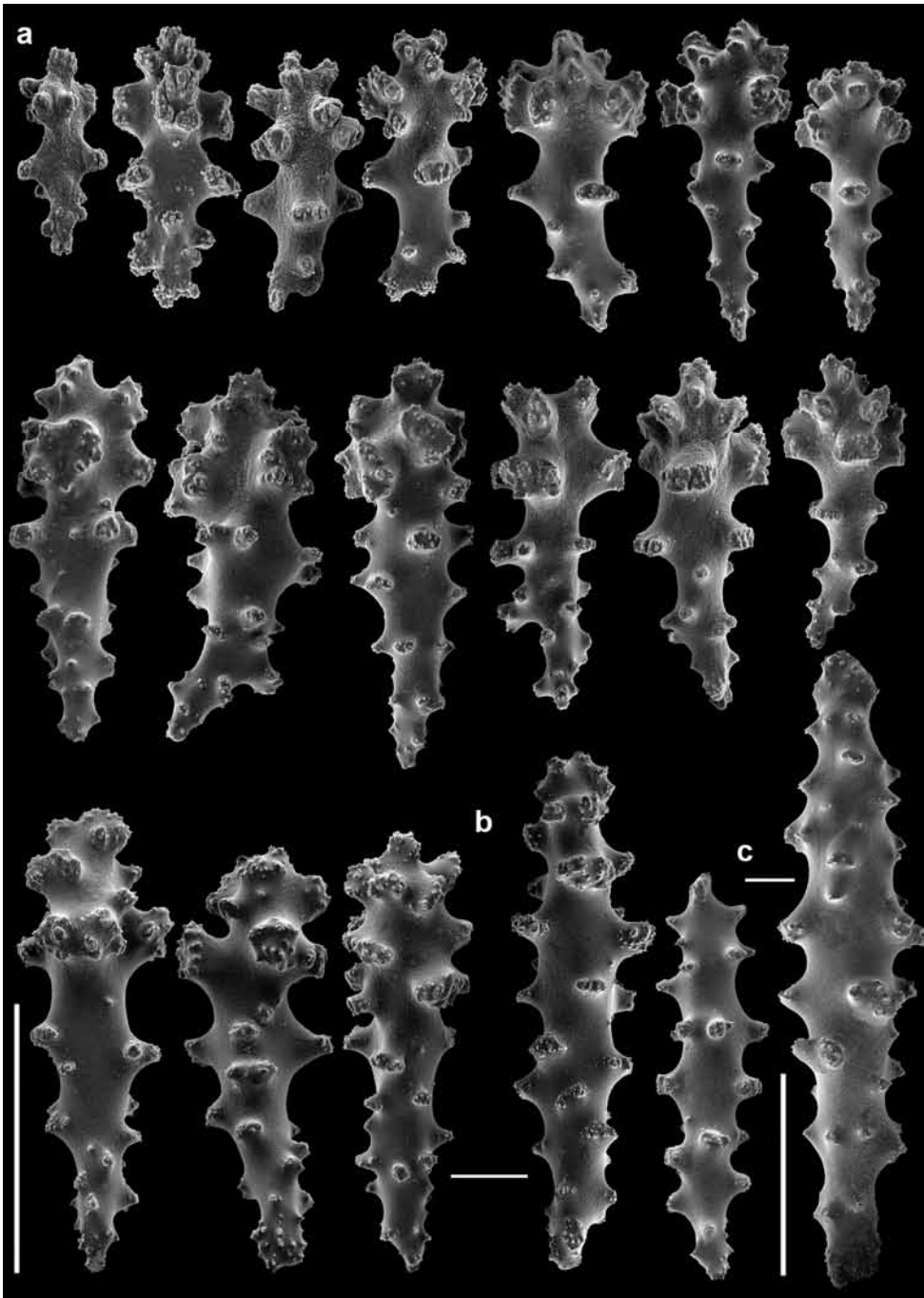


Fig. 4. *Sinularia capricornis* spec. nov., holotype RMNH Coel. 39519; sclerites of the surface layer of the colony base; a, clubs; b, club-like spindles; c, spindles. Scales 0.10 mm.

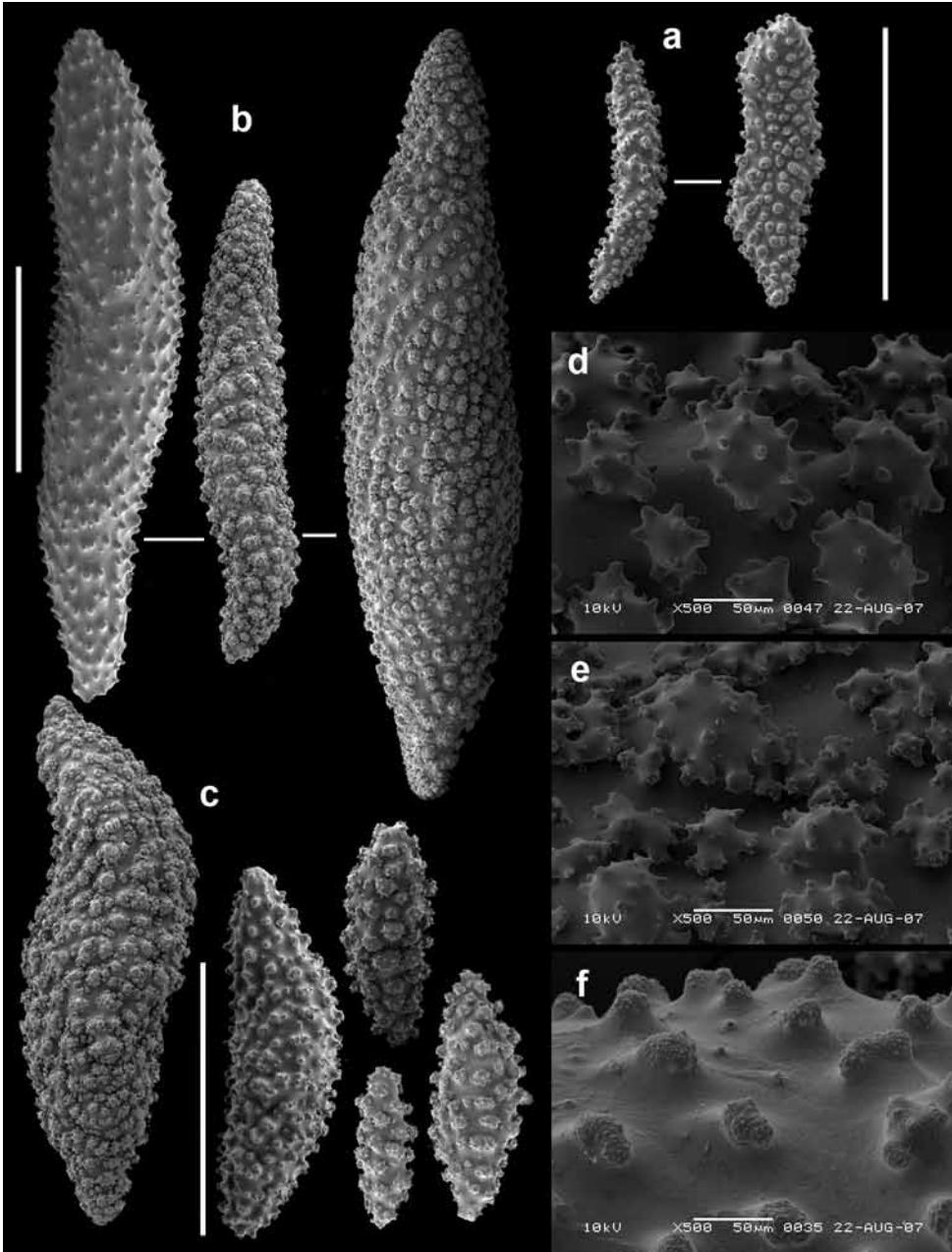


Fig. 5. *Simularia capricornis* spec. nov., holotype RMNH Coel. 39519; sclerites of the interior of the colony; a, spindles of the lobes; b-c, spindles of the colony base; d-f, tubercles on spindles. Scales 1 mm.

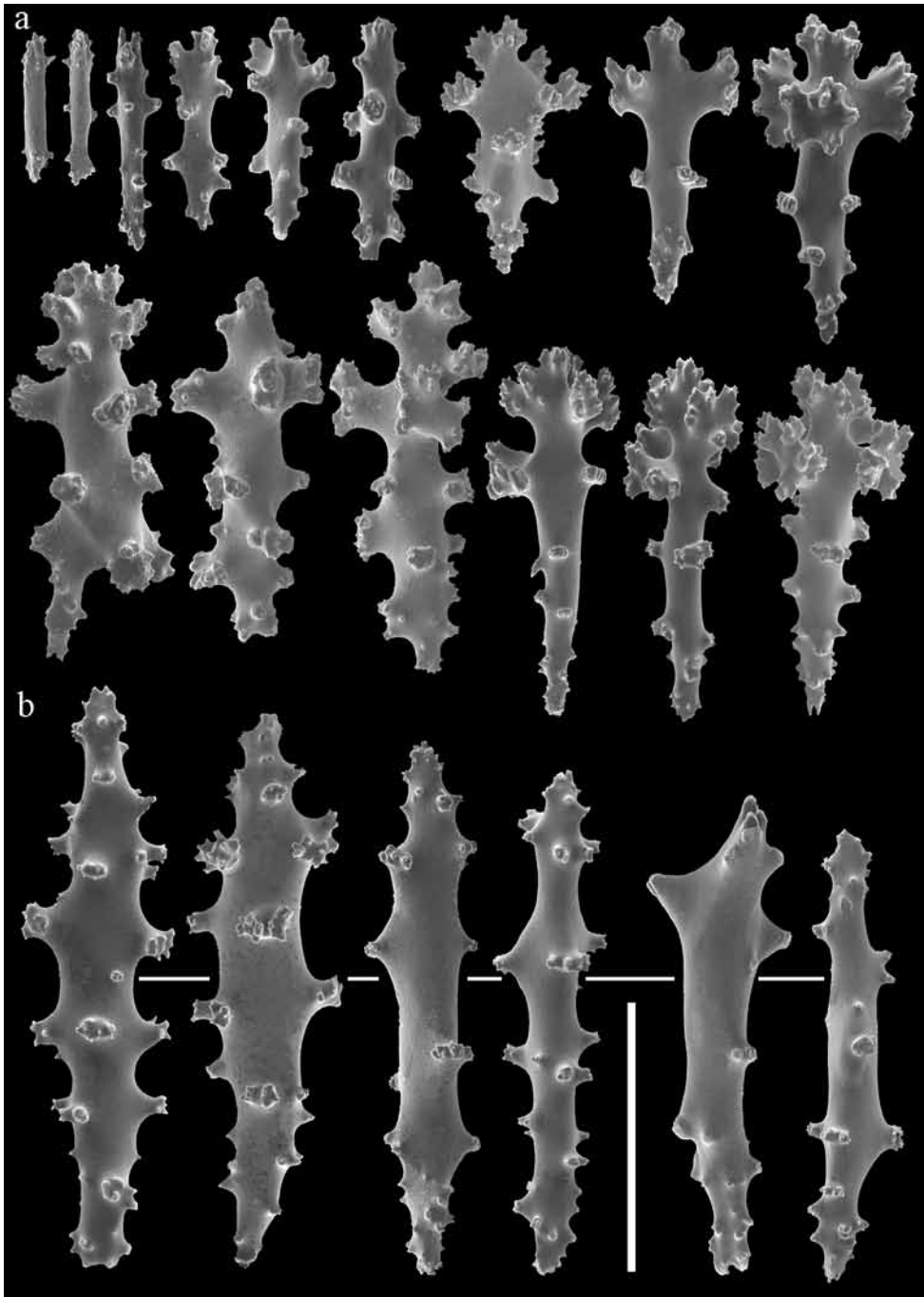


Fig. 6. *Sinularia crebra* Ofwegen, 2008 RMNH Coel. 39518; sclerites of surface layer of the top of the colony; a, clubs; b, spindles. Scale 0.10 mm.

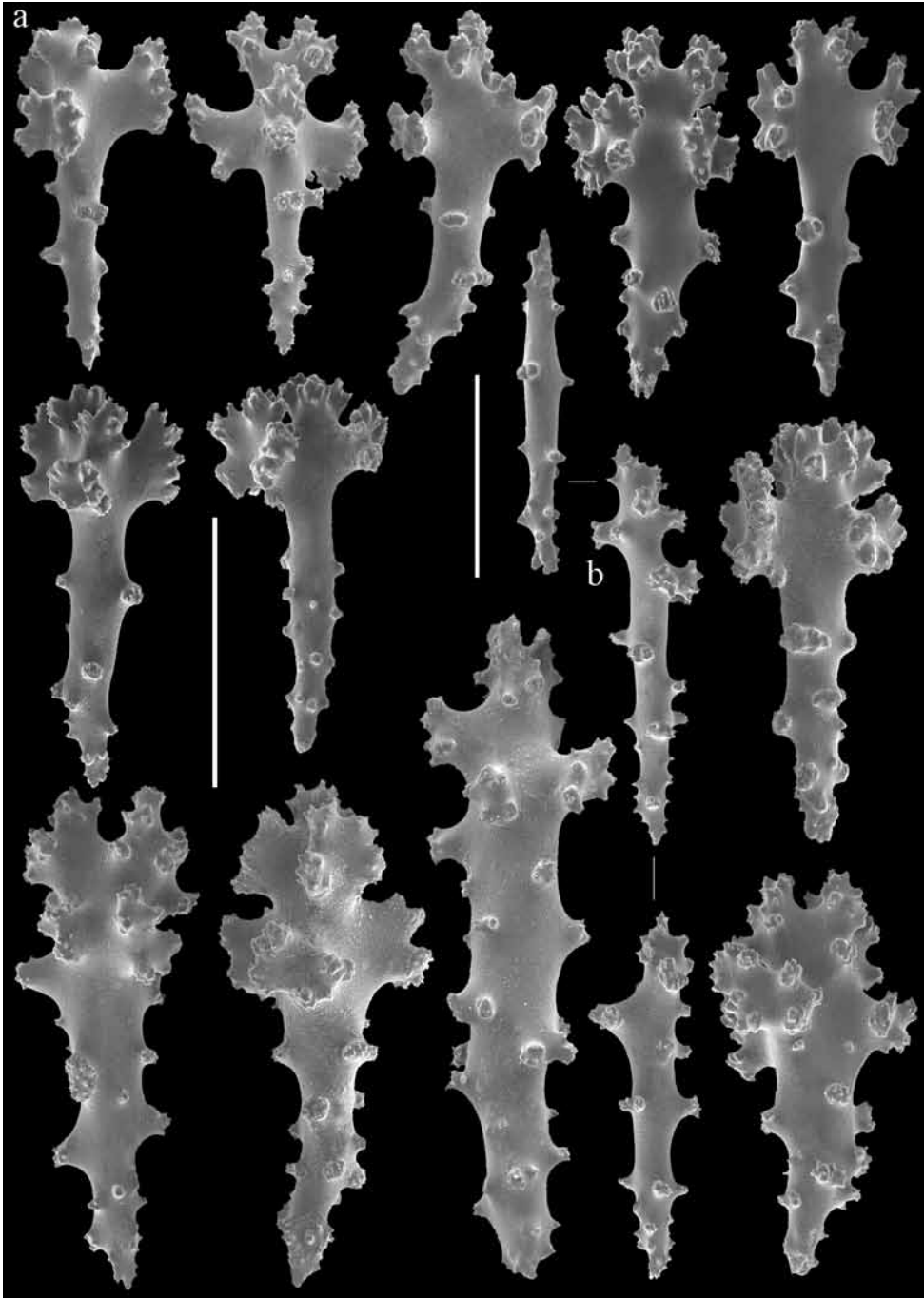


Fig. 7. *Simularia crebra* Ofwegen, 2008 RMNH Coel. 39518; sclerites of surface layer of the top of the colony; a, clubs; b, spindles. Scales 0.10 mm.

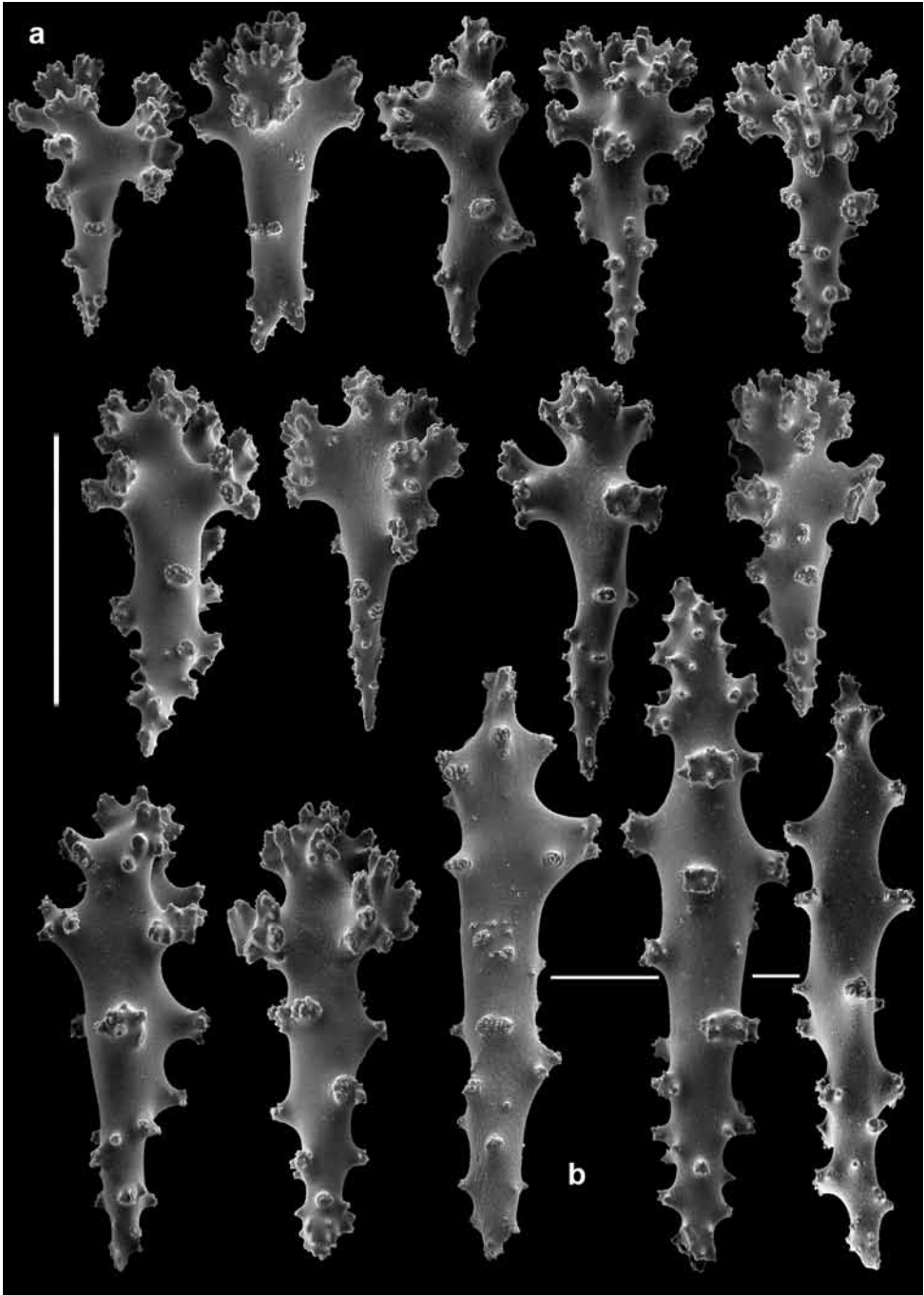


Fig. 8. *Sinularia crebra* Ofwegen, 2008 RMNH Coel. 39518; sclerites of surface layer of the base of the colony; a, clubs; b, spindles. Scale 0.10 mm.

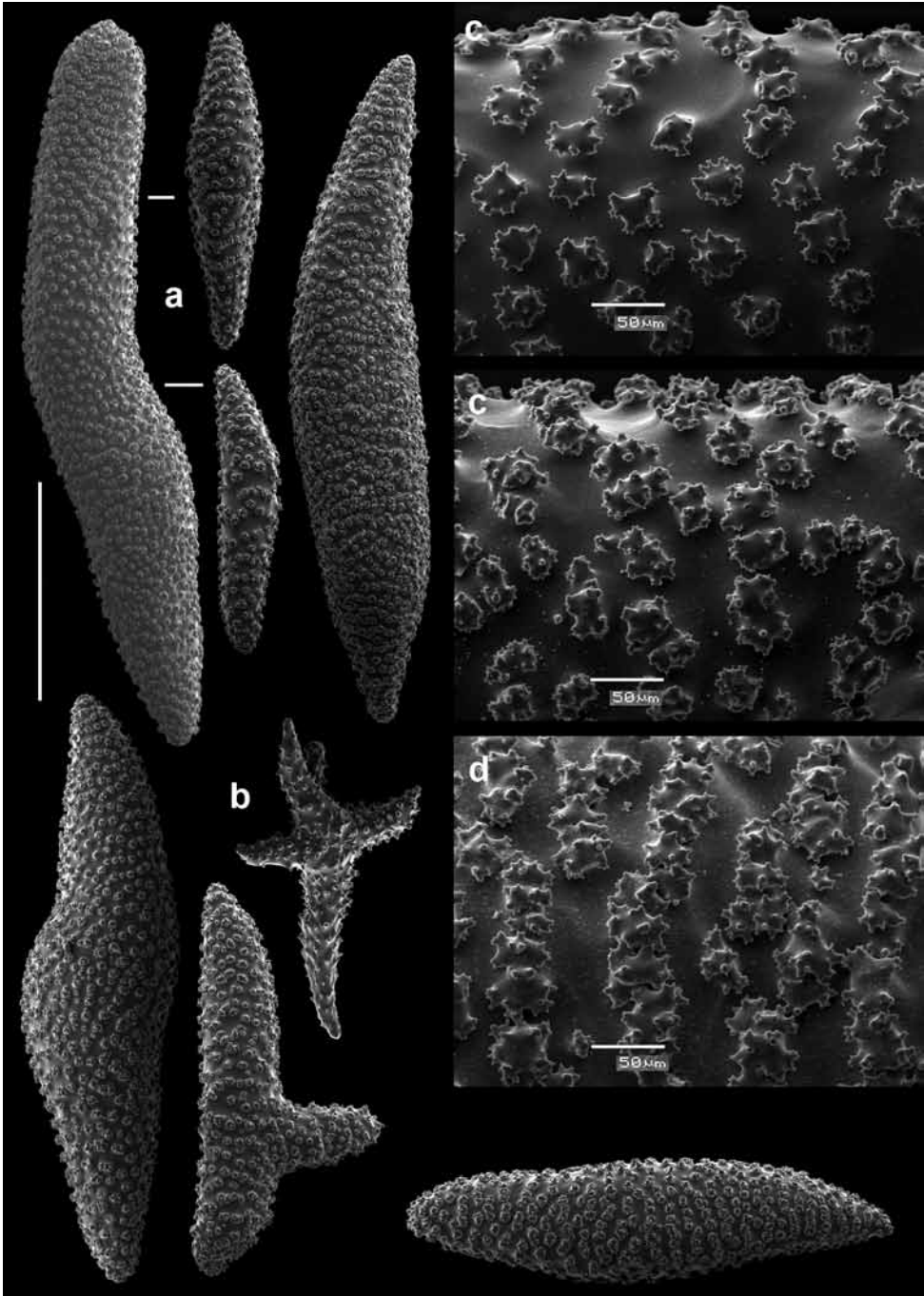


Fig. 9. *Simularia crebra* Ofwegen, 2008 RMNH Coel. 39518; sclerites of interior of colony; a, spindles of the lobes; b, spindles of the colony base; c-d, tubercles on spindles. Scale 1 mm.

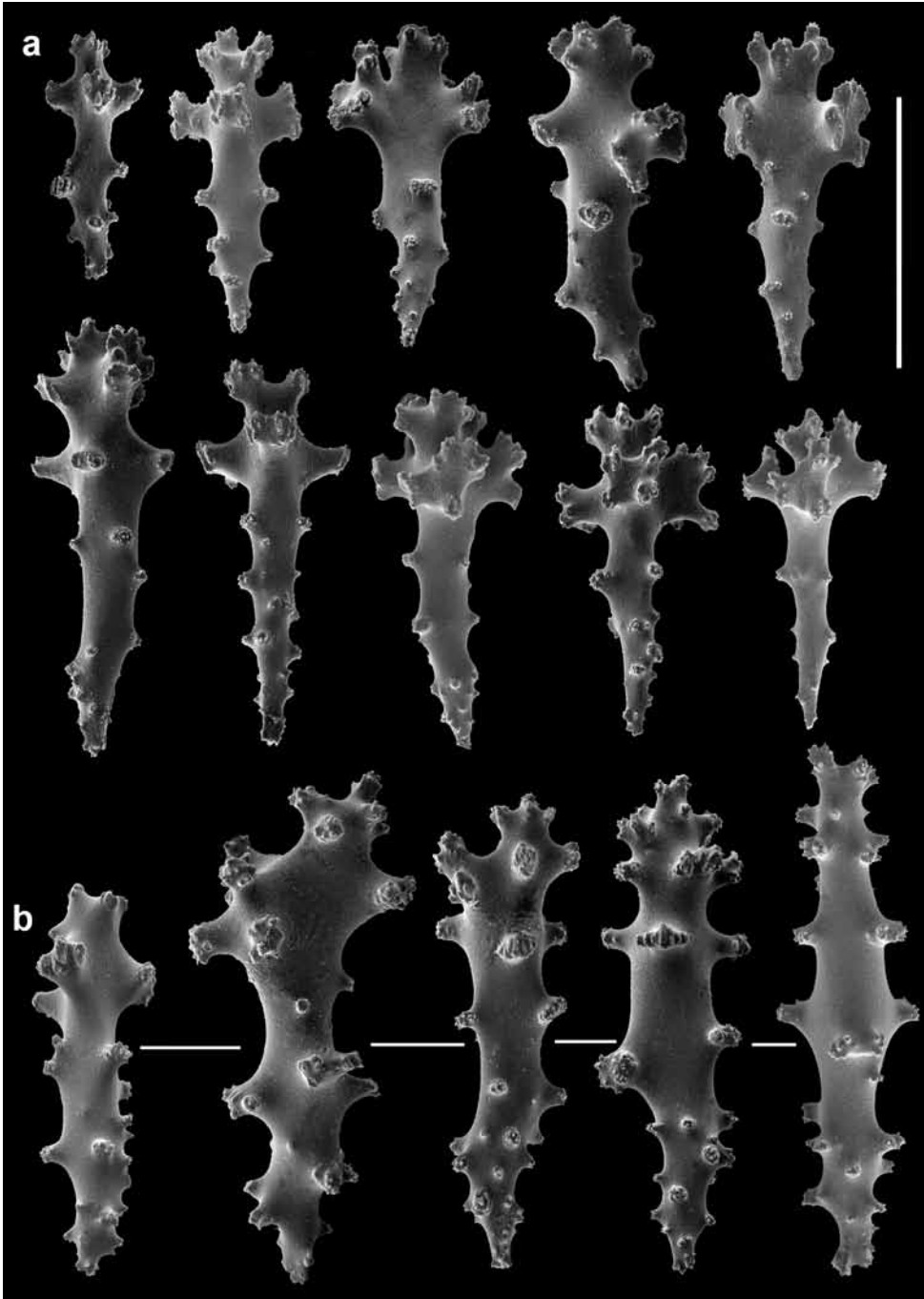


Fig. 10. *Sinularia crebra* Ofwegen, 2008 RMNH Coel, 39520; sclerites of the surface layer of the colony top; a, clubs; b, spindles. Scale 0.10 mm.

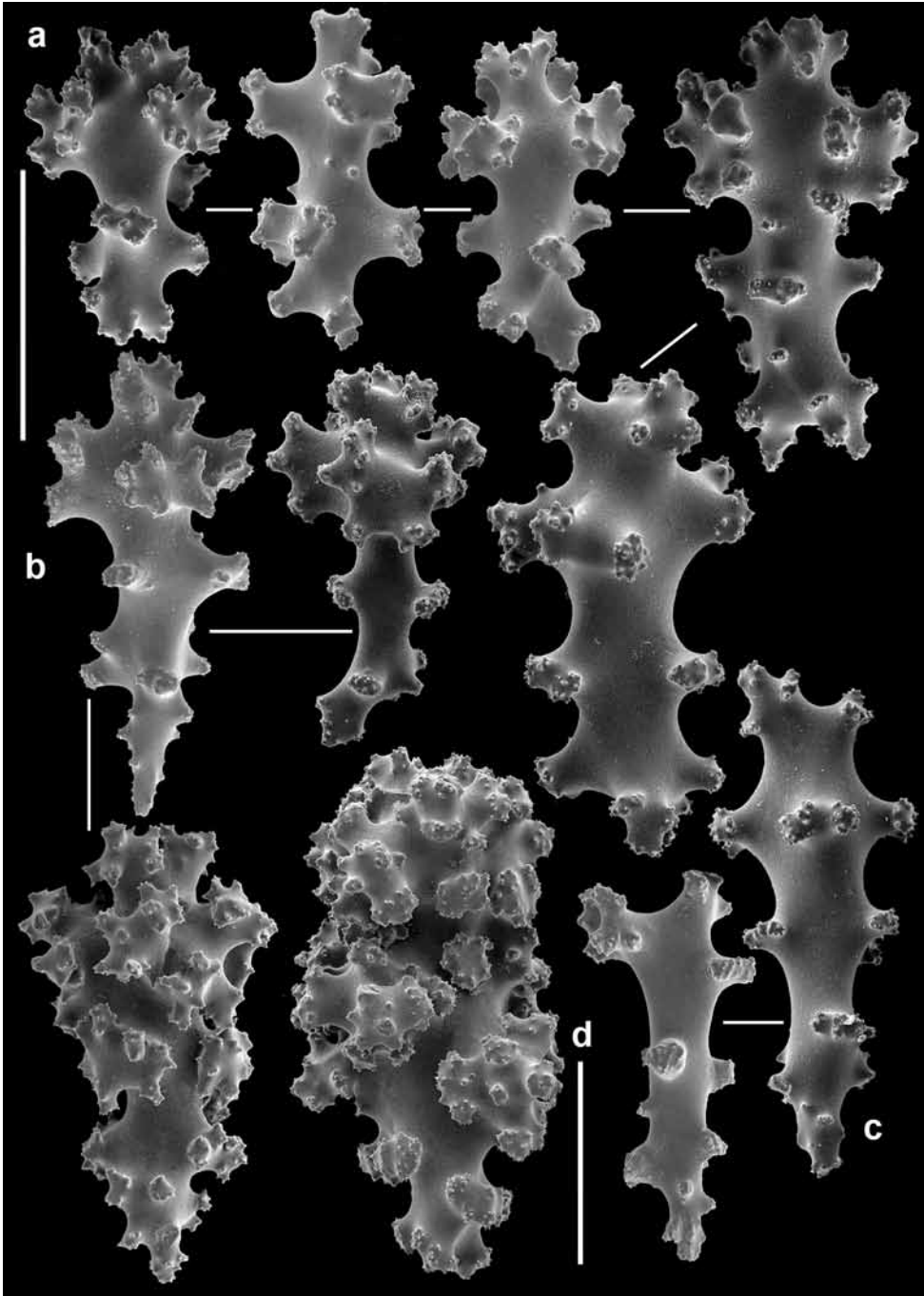


Fig. 11. *Simularia crebra* Ofwegen, 2008 RMNH Coel. 39520; sclerites of the surface of the colony base; a, capstans; b-d, clubs; c, spindles. Scales 0.10 mm, that at d applies only to d.

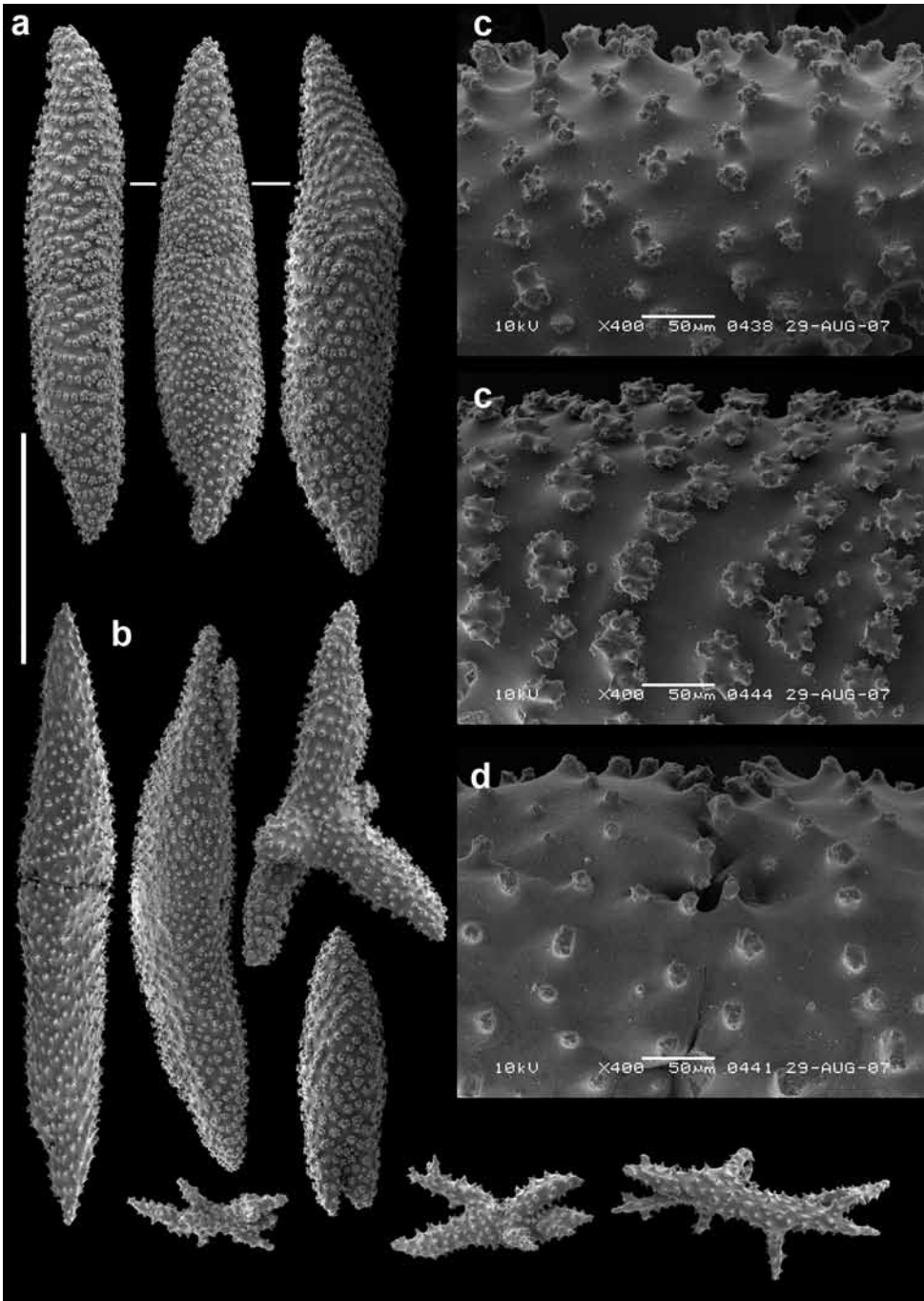


Fig. 12. *Sinularia crebra* Ofwegen, 2008 RMNH Coel. 39520; sclerites of the interior of the colony; a, spindles of the colony top; b, sclerites of the colony base; c-d, tubercles on spindles. Scale 1 mm.

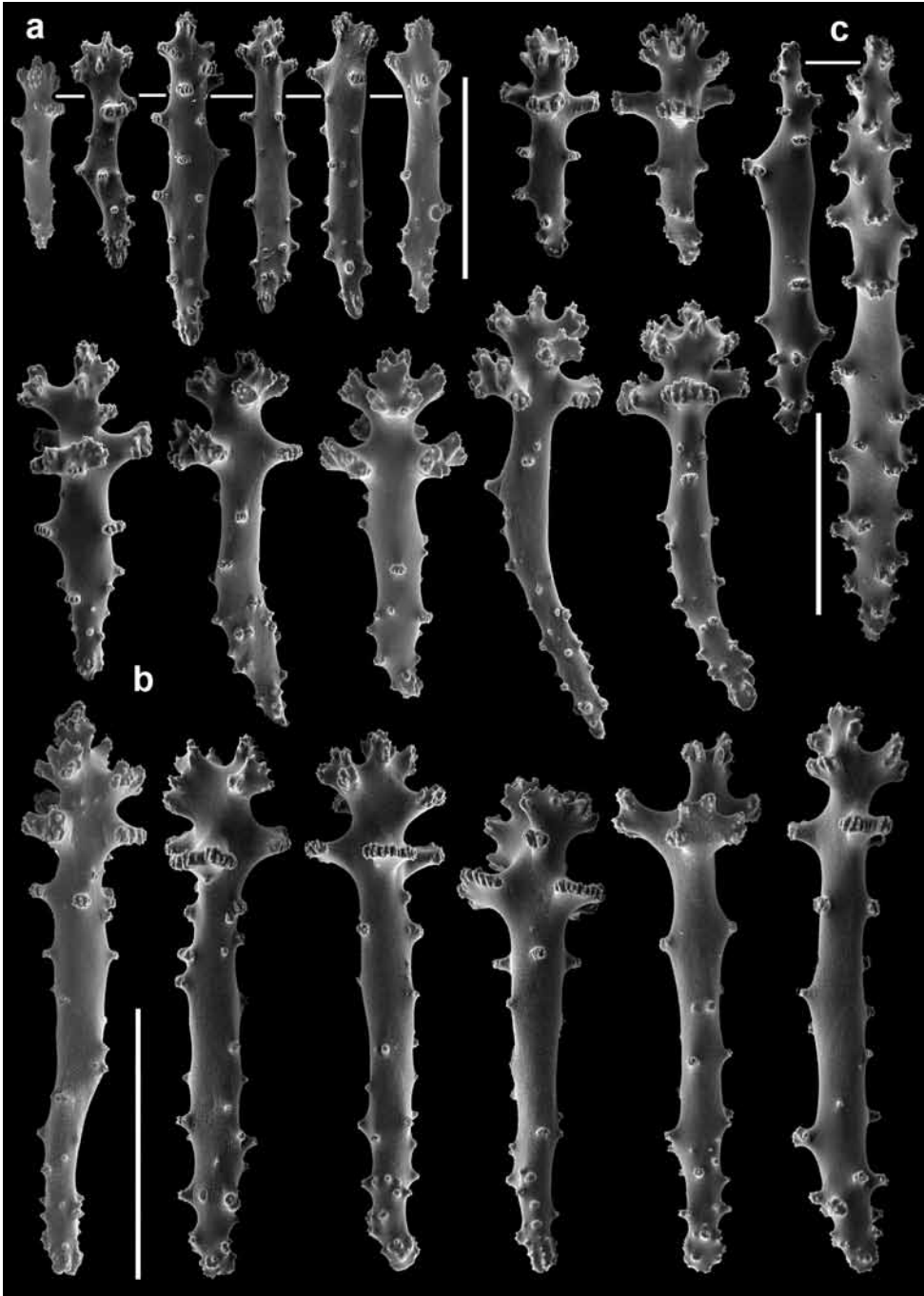


Fig. 13. *Simularia multiflora* spec. nov., holotype MIMB 16734; sclerites of the surface layer of the colony top; a, sclerites of the polyps; b, clubs; c, spindles. Scales 0.10 mm.

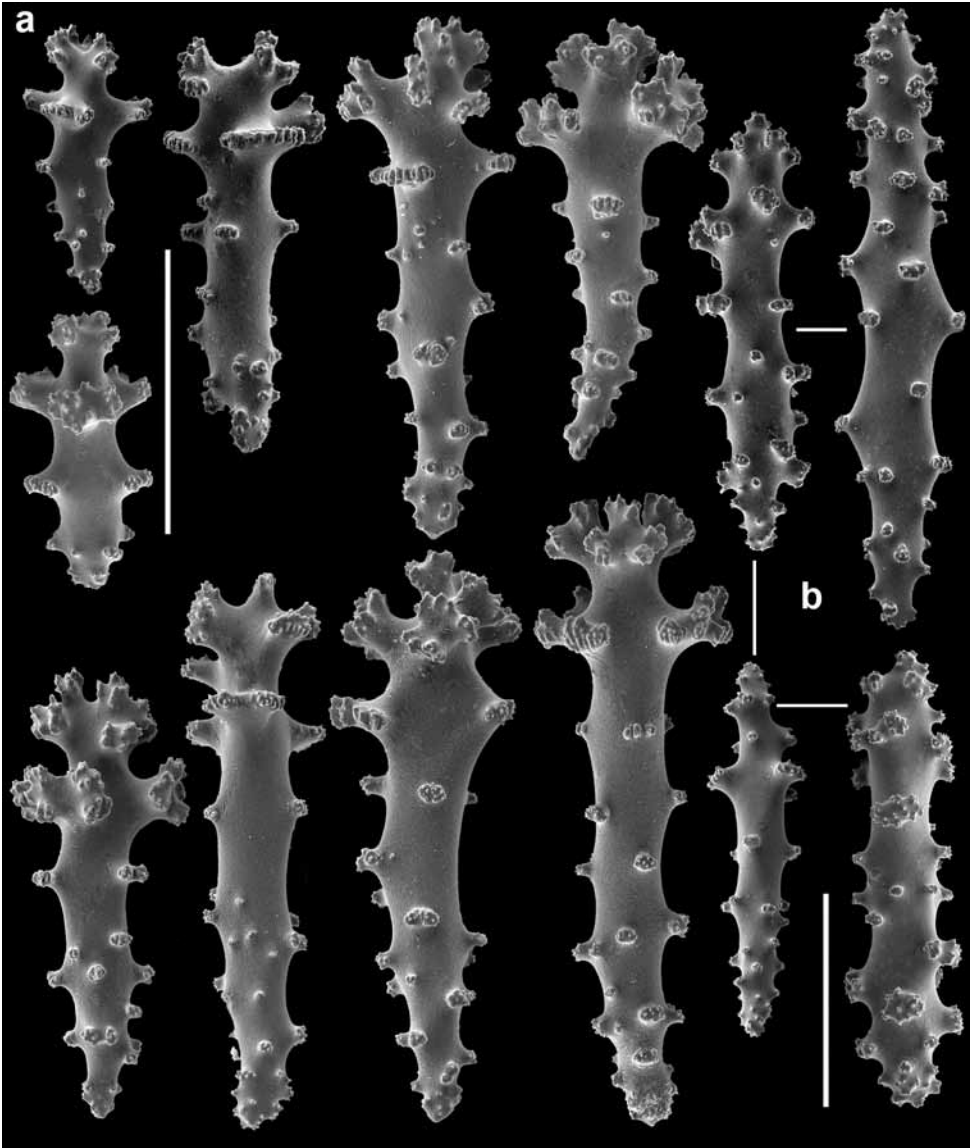


Fig. 14. *Sinularia multiflora* spec. nov., holotype MIMB 16734; sclerites of the surface of the colony base; a, clubs; b, spindles. Scales 0.10 mm.

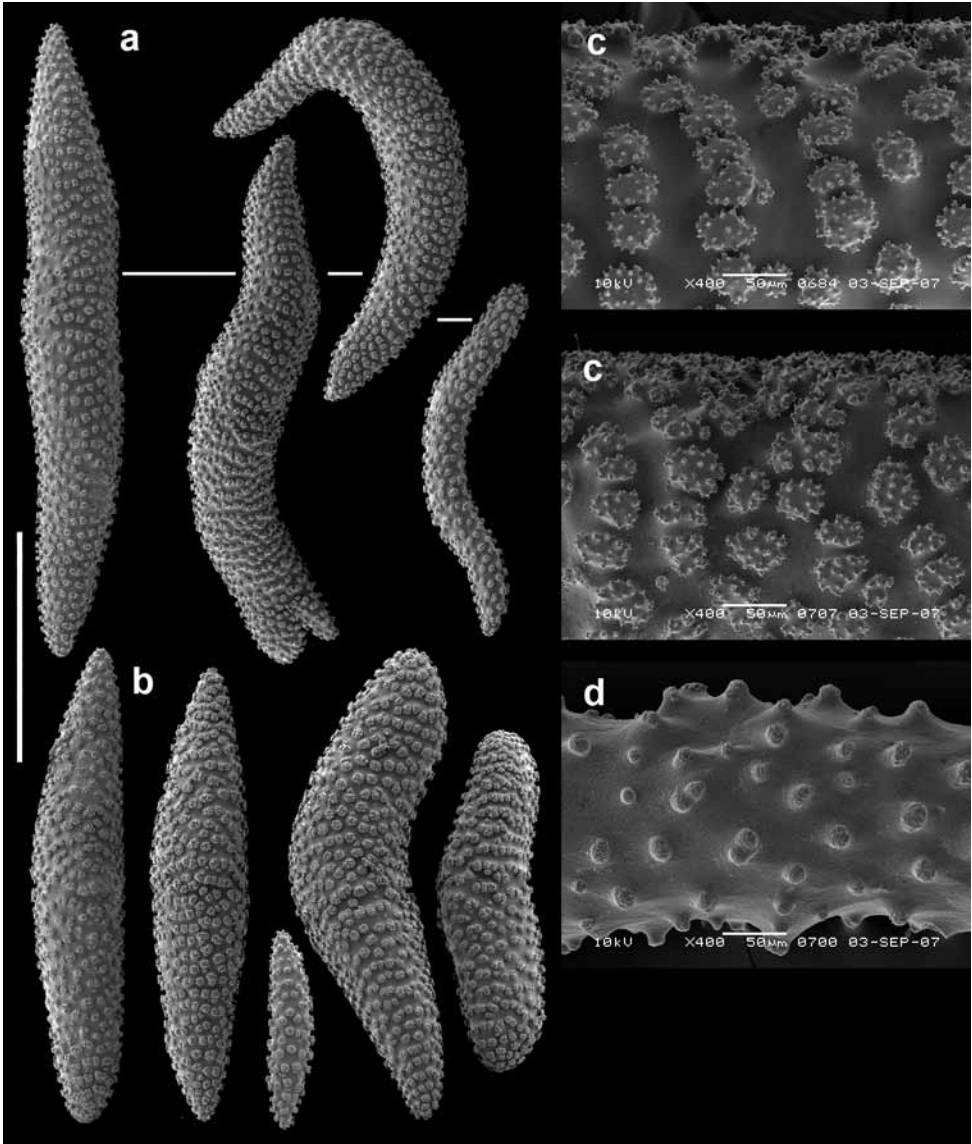


Fig. 15. *Simularia multiflora* spec. nov., holotype MIMB 16734; sclerites of the interior of the colony base; a, spindles of the lobes; b, spindles of the colony base; c-d, tubercles on spindles. Scale 1 mm.

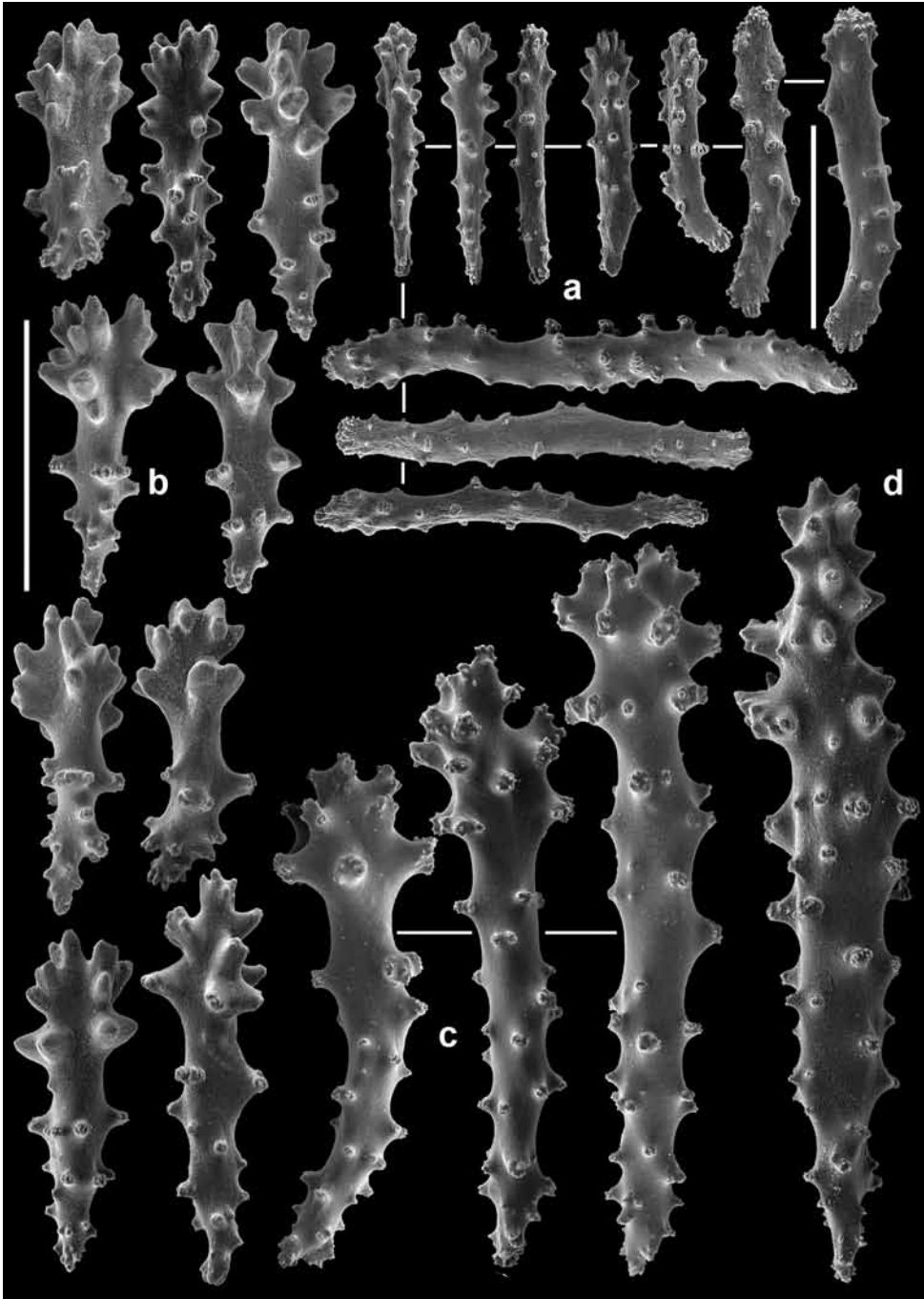


Fig. 16. *Sinularia pumila* spec. nov., holotype RMNH Coel, 39521; sclerites of the colony top; a, sclerites of the polyps; b-c, clubs of the surface layer of the colony top; d, club-like spindle of the surface layer of the colony top. Scales 0.10 mm.

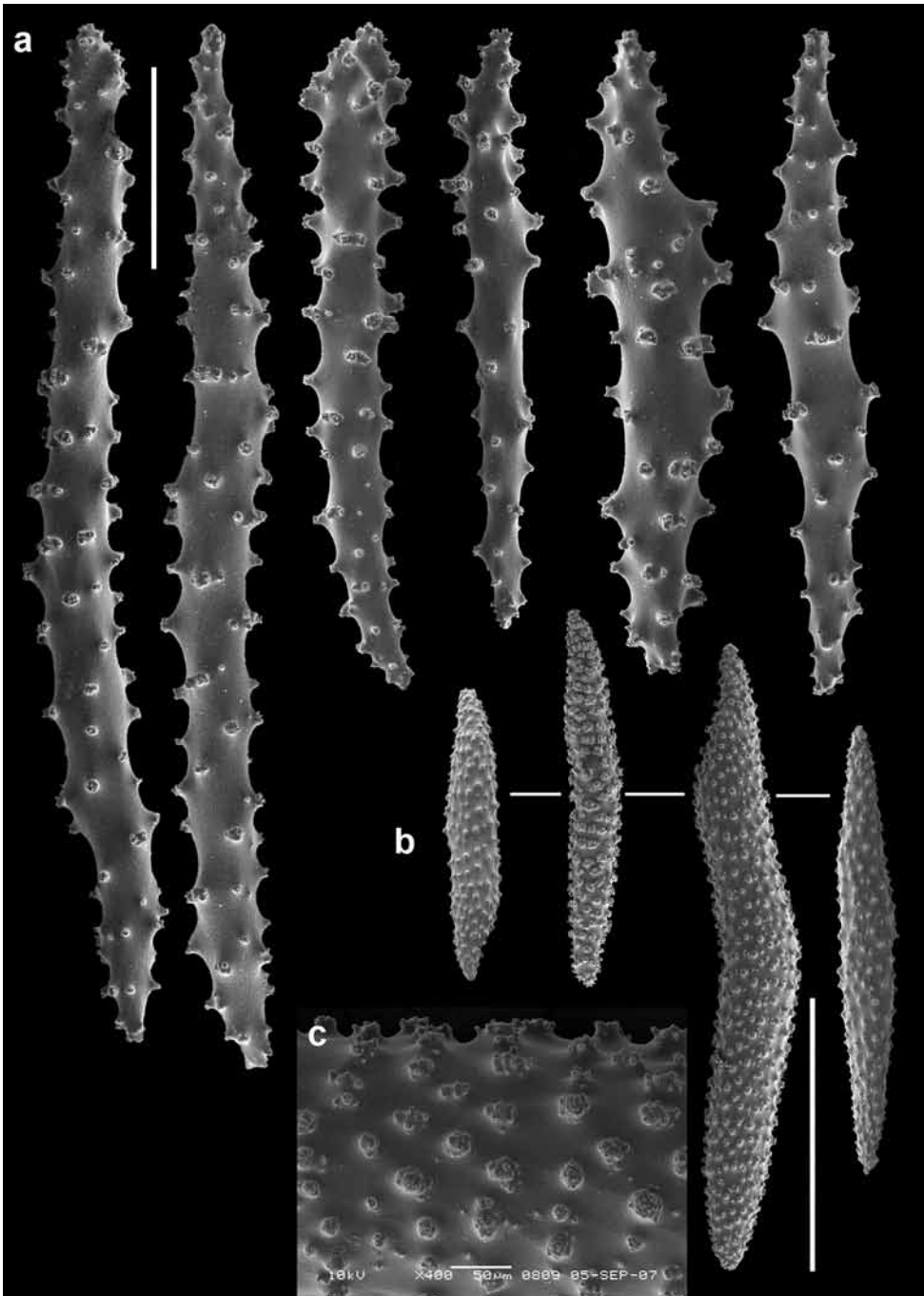


Fig. 17. *Simularia pumila* spec. nov., holotype RMNH Coel, 39521; sclerites of the colony top; a, spindles of the surface layer of the colony top; b, spindles of the interior of the lobes; c, tubercles on spindle. Scale at a 0.10 mm, scale at b 1 mm.

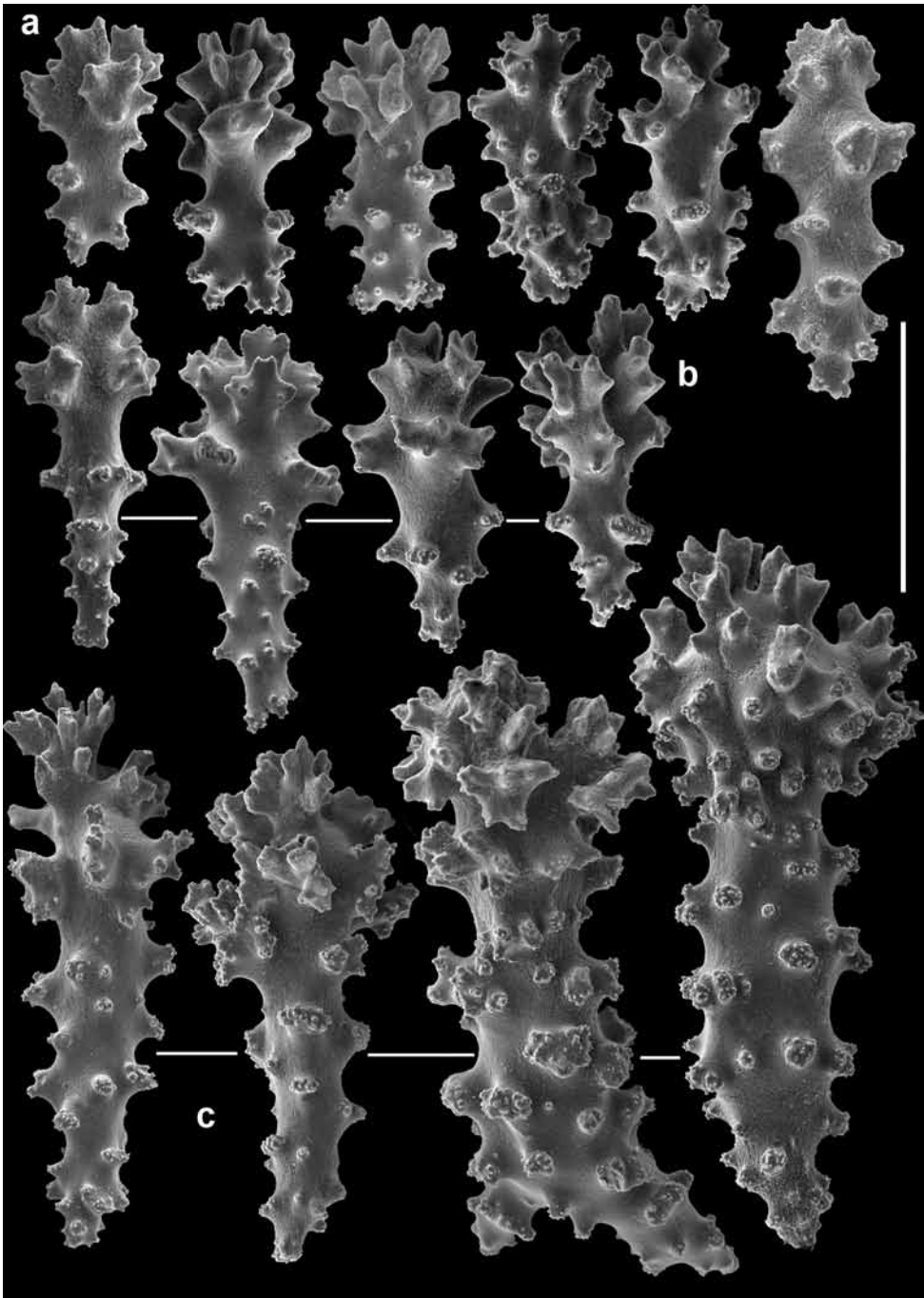


Fig. 18. *Sinularia pumila* spec. nov., holotype RMNH Coel. 39521; sclerites of the surface of the colony base; a, capstans; b-c, clubs. Scale 0.10 mm.

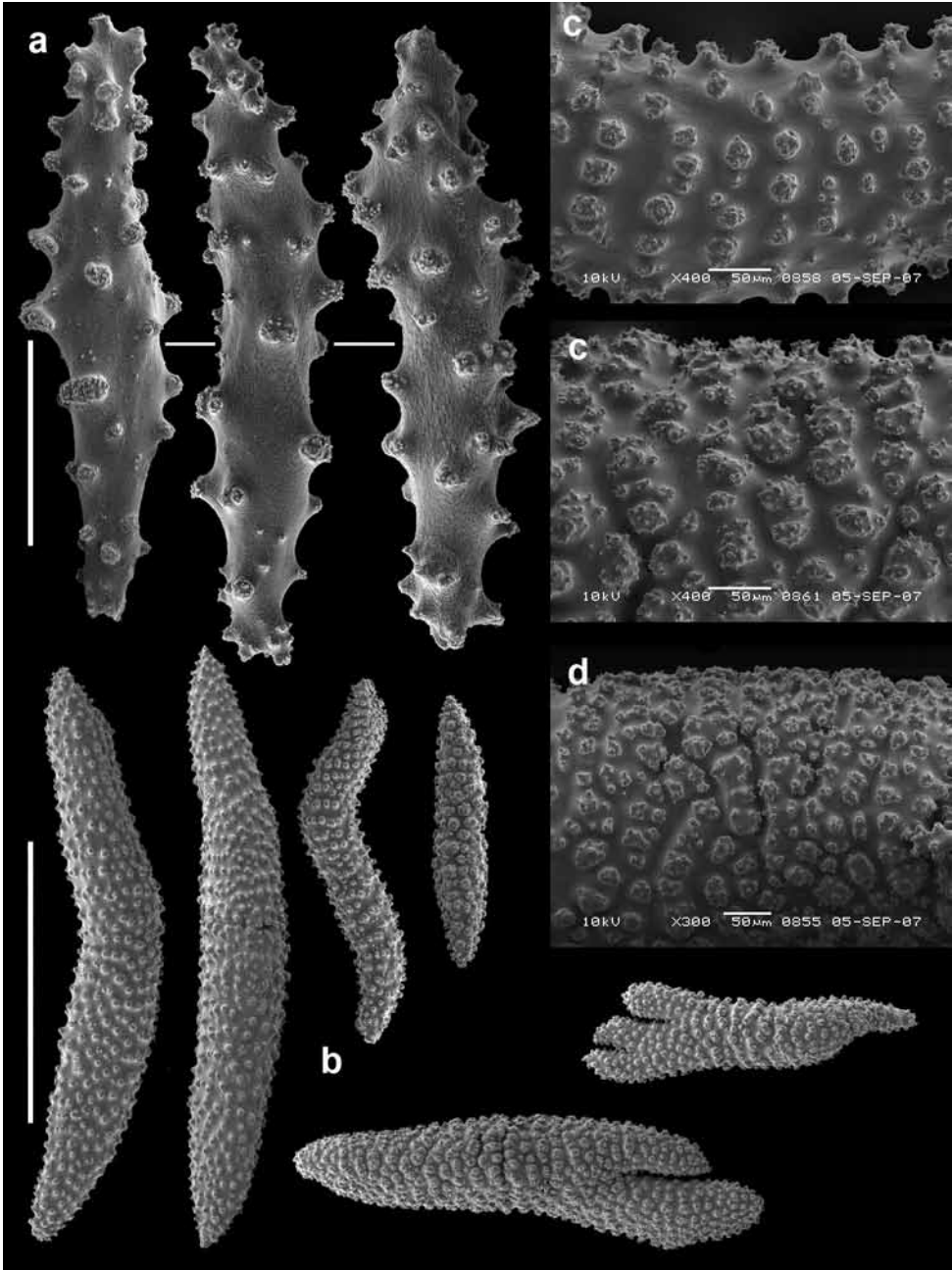


Fig. 19. *Simularia pumila* spec. nov., holotype RMNH Coel, 39521; sclerites of the colony base; a, spindles of the surface layer of the colony base; b, spindles of the interior of the colony base; c-d, tubercles on spindles. Scale at a 0.10 mm, scale at b 1 mm.

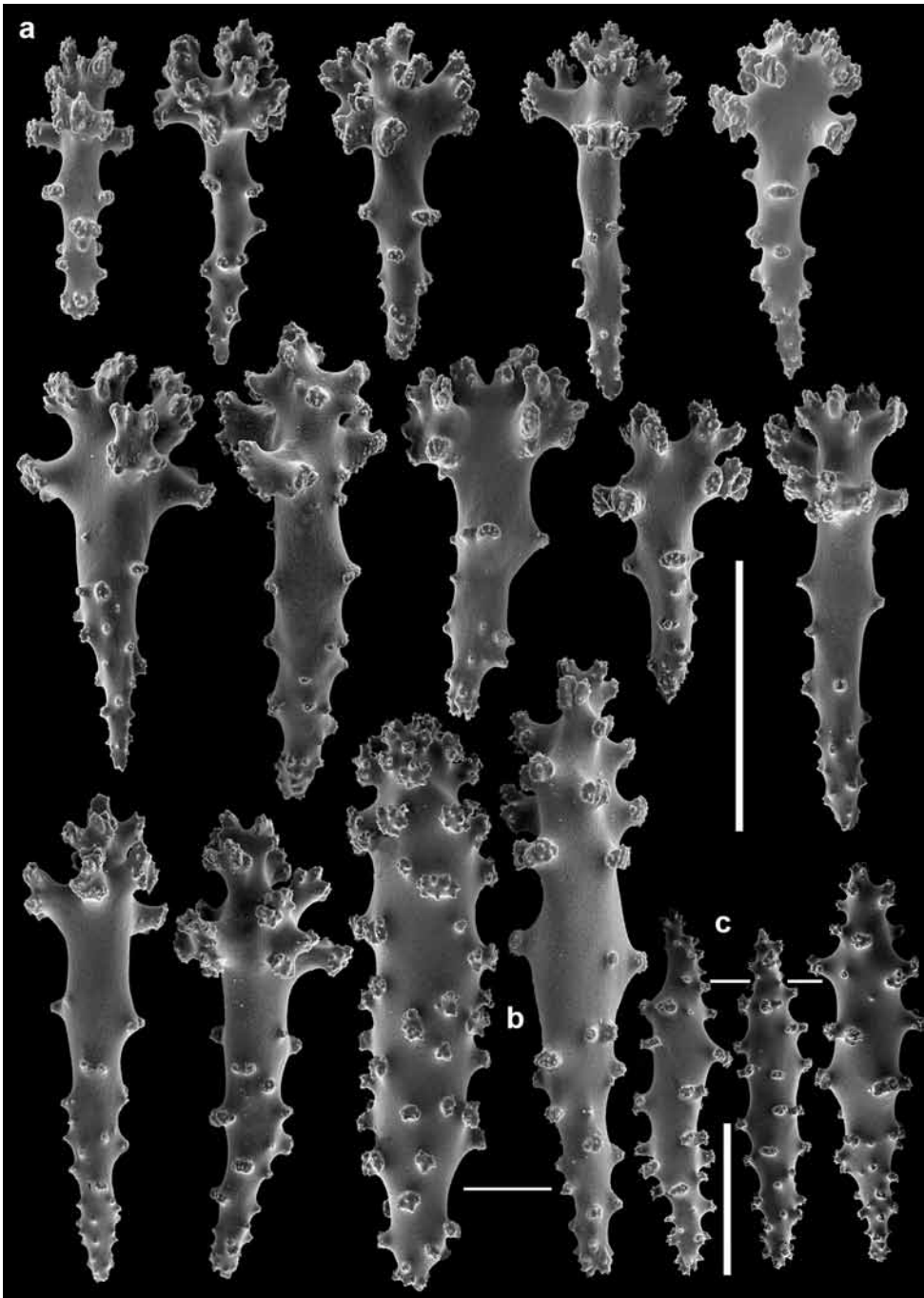


Fig. 20. *Sinularia rigida* (Dana, 1846) RMNH Coel. 39517; sclerites of surface layer of the top of the colony; a, clubs; b, club-like spindles; c, spindles. Scales 0.10 mm.

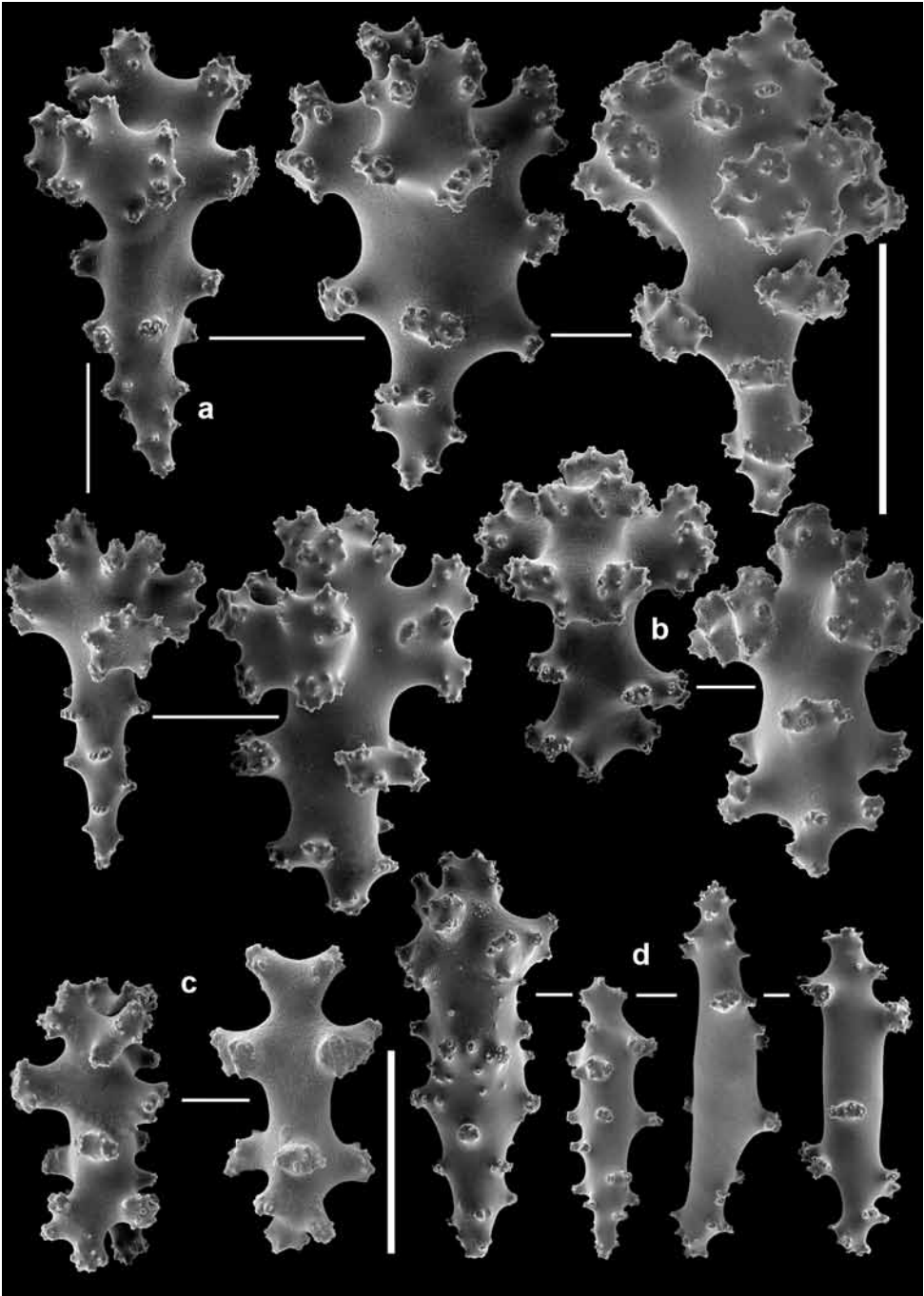


Fig. 21. *Simularia rigida* (Dana, 1846) RMNH Coel. 39517; sclerites of surface layer of base of the colony; a-b, clubs; c, capstans; d, spindles. Scales 0.10 mm.

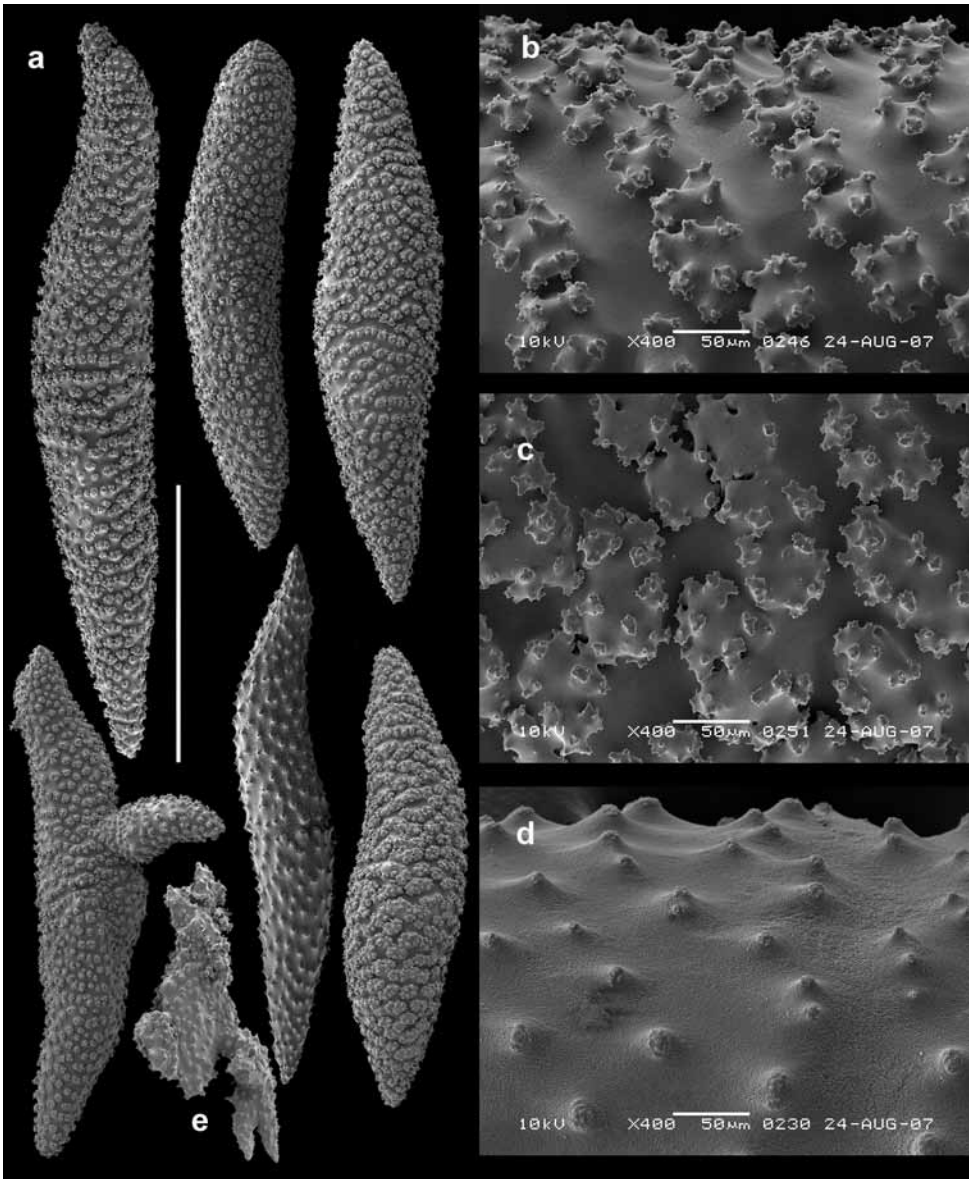


Fig. 22. *Sinularia rigida* (Dana, 1846) RMNH Coel. 39517; sclerites of interior of colony a, spindles; b-d, tubercles on spindles; e, irregular sclerite. Scale 1 mm.

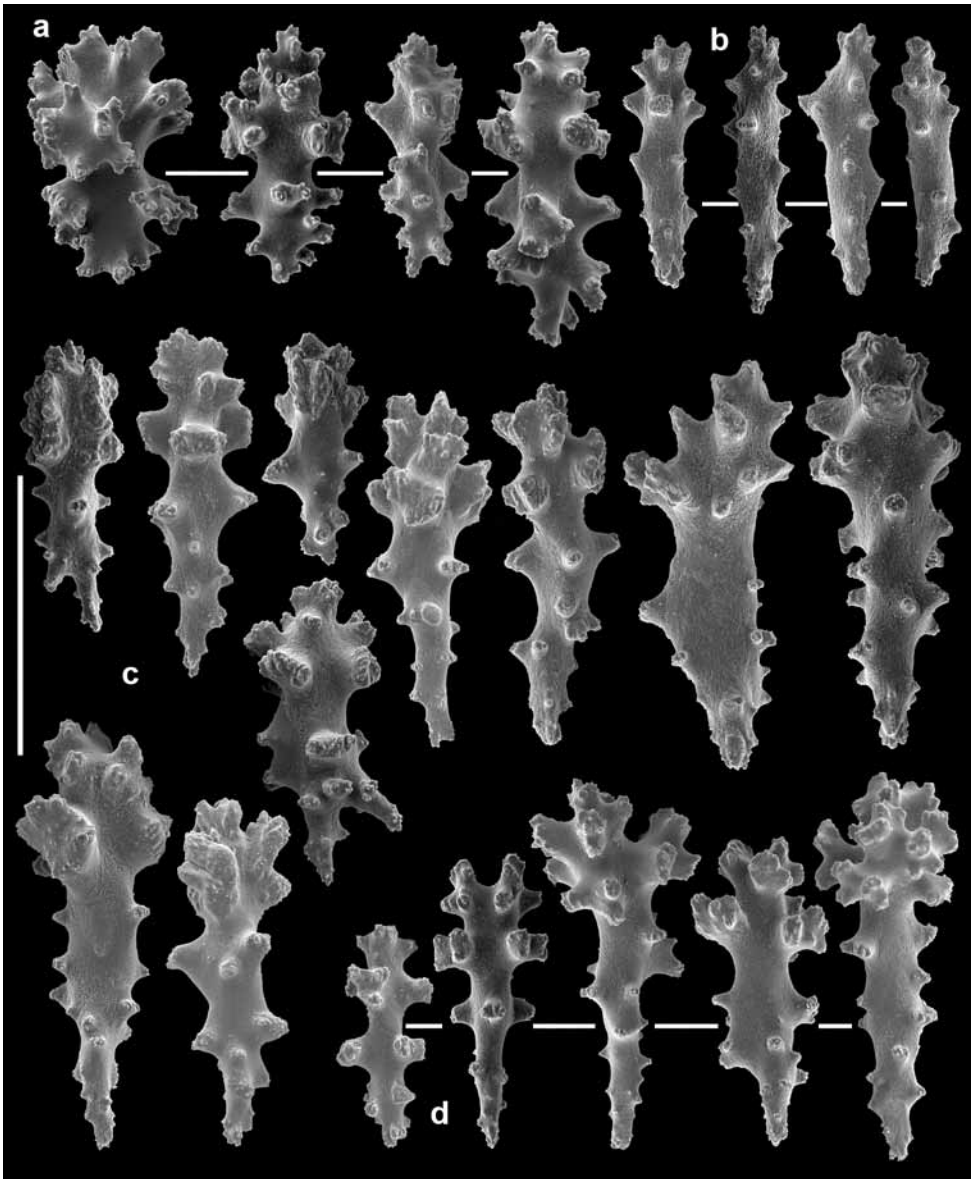


Fig. 23. *Simularia sarmentosa* spec. nov., holotype RMNH Coel, 39522; sclerites of the surface of the colony top; a, capstans; b-d, clubs. Scale 0.10 mm.

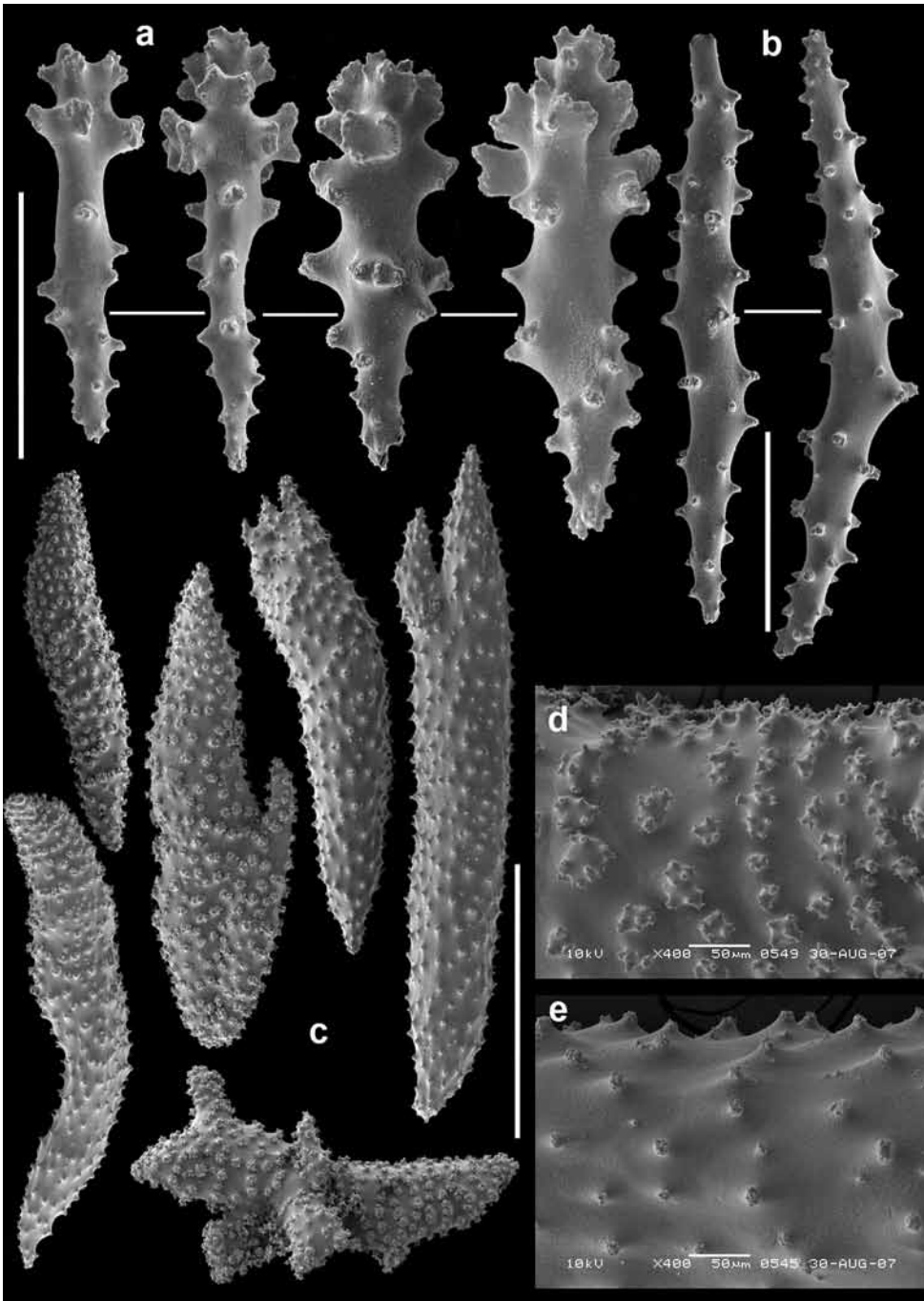


Fig. 24. *Sinularia sarmentosa* spec. nov., holotype RMNH Coel, 39522; sclerites of the colony top; a, clubs of the surface layer; b, spindles of the surface layer; c, spindles of the lobes interior; d-e, tubercles on spindles. Scale at a and b 0.10 mm, scale at c 1 mm.

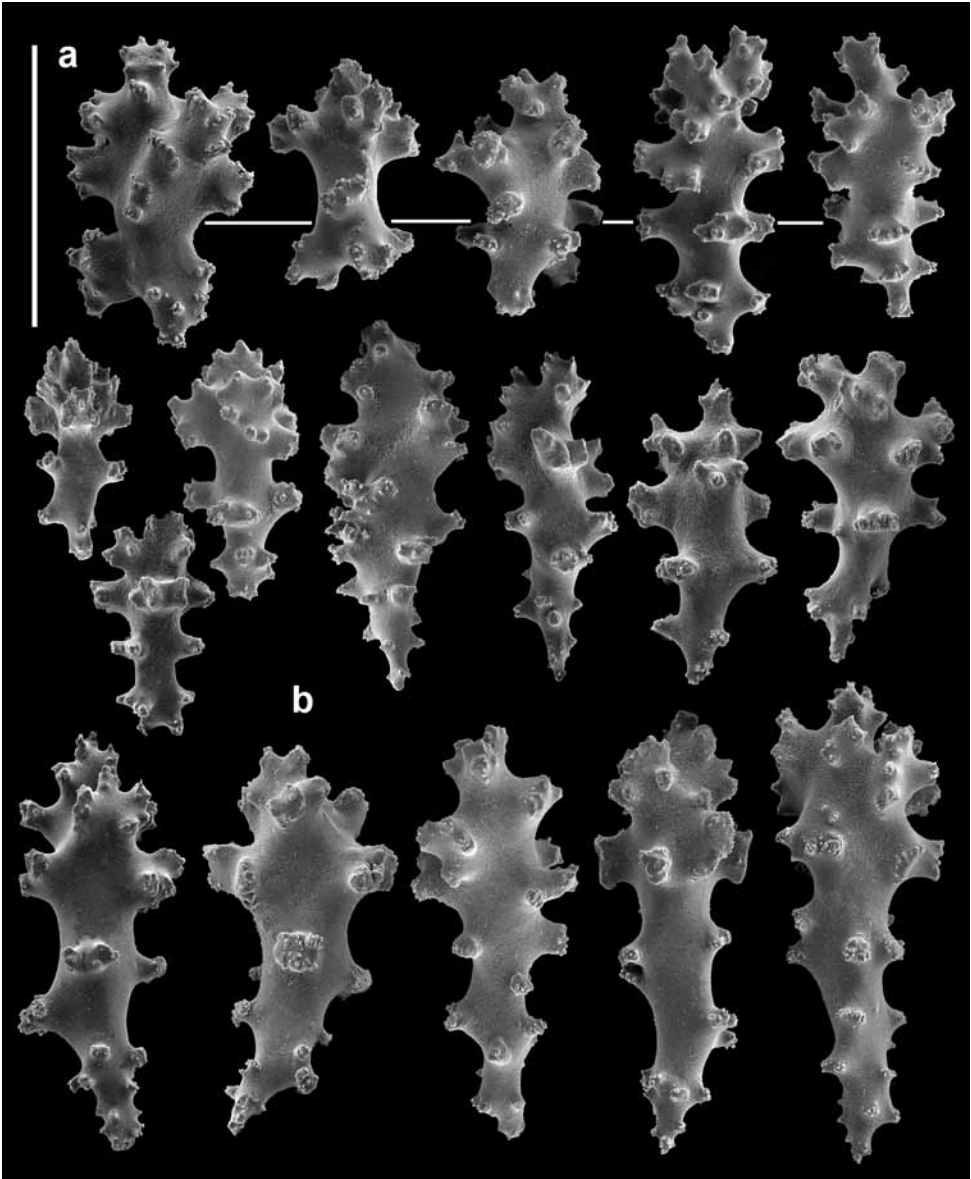


Fig. 25. *Simularia sarmentosa* spec. nov., holotype RMNH Coel. 39522; sclerites of the surface of the colony base; a, capstans; b-c, clubs. Scale 0.10 mm.

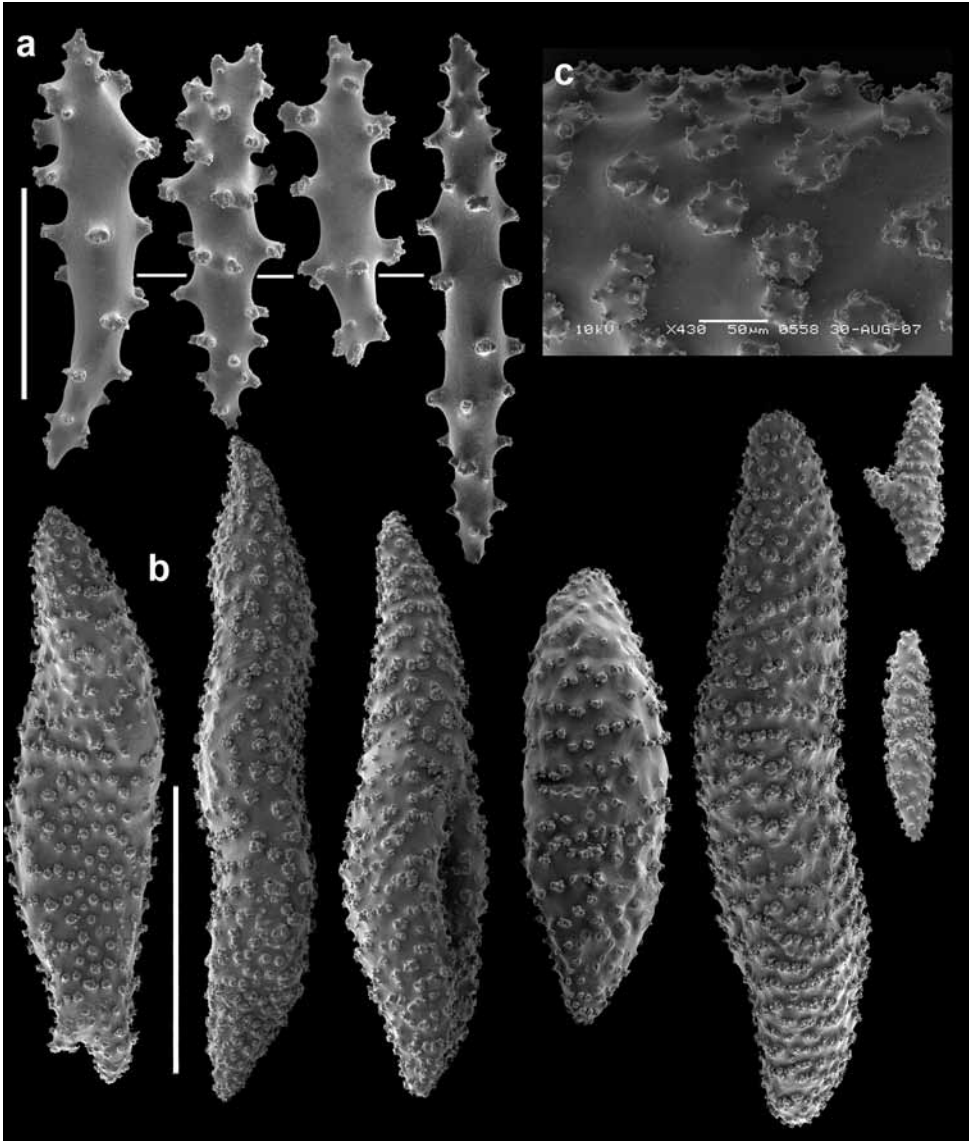


Fig. 26. *Sinularia sarmentosa* spec. nov., holotype RMNH Coel, 39522; sclerites of the colony base; a, spindles of the surface layer of the colony base; b, spindles of the interior of the colony base; c, tubercles on spindle. Scale at a 0.10 mm, scale at b 1 mm.

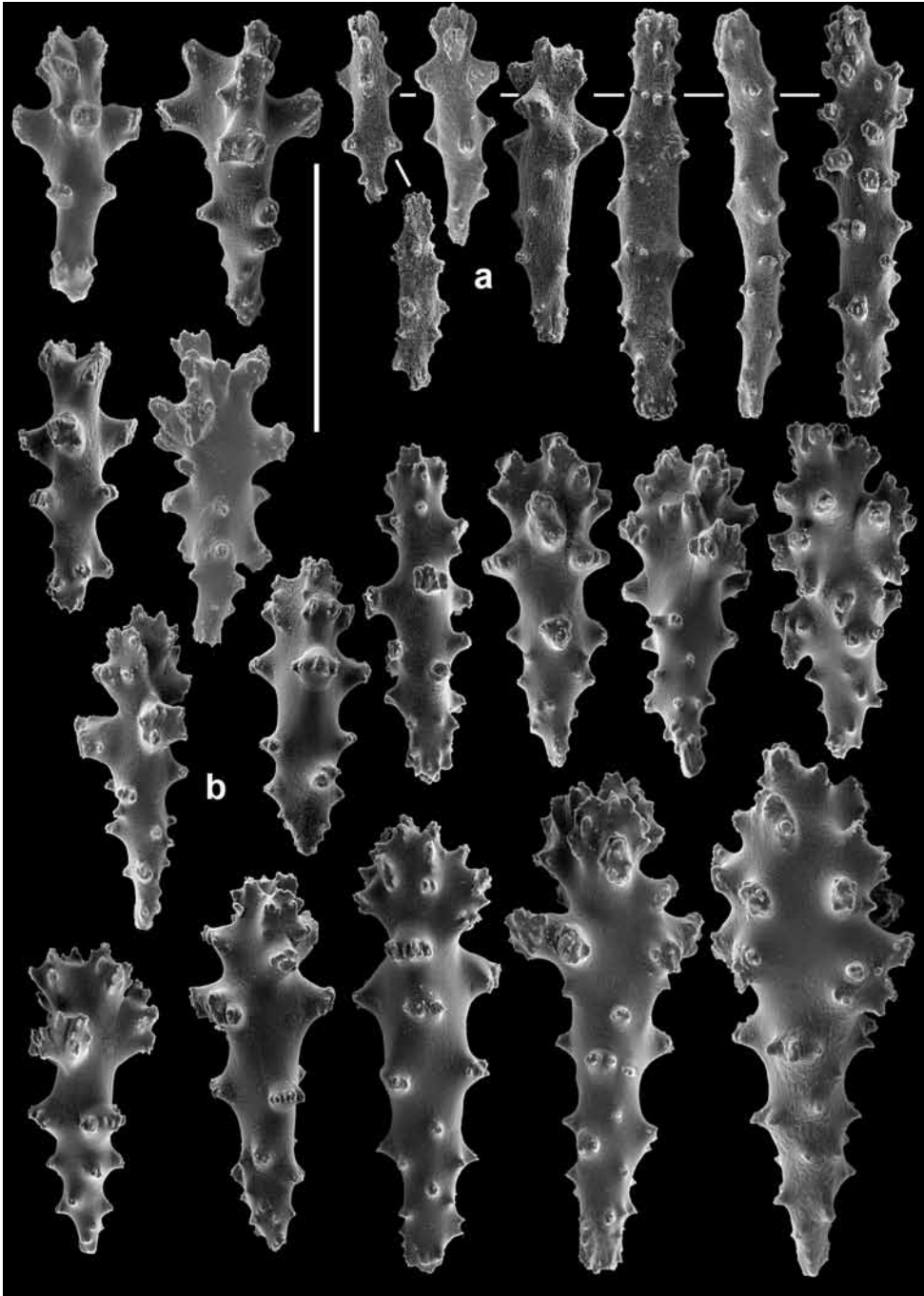


Fig. 27. *Simularia torta* spec. nov., holotype RMNH Coel, 39523; sclerites of the colony top; a, sclerites of the polyps; b, clubs of the surface layer. Scale 0.10 mm.

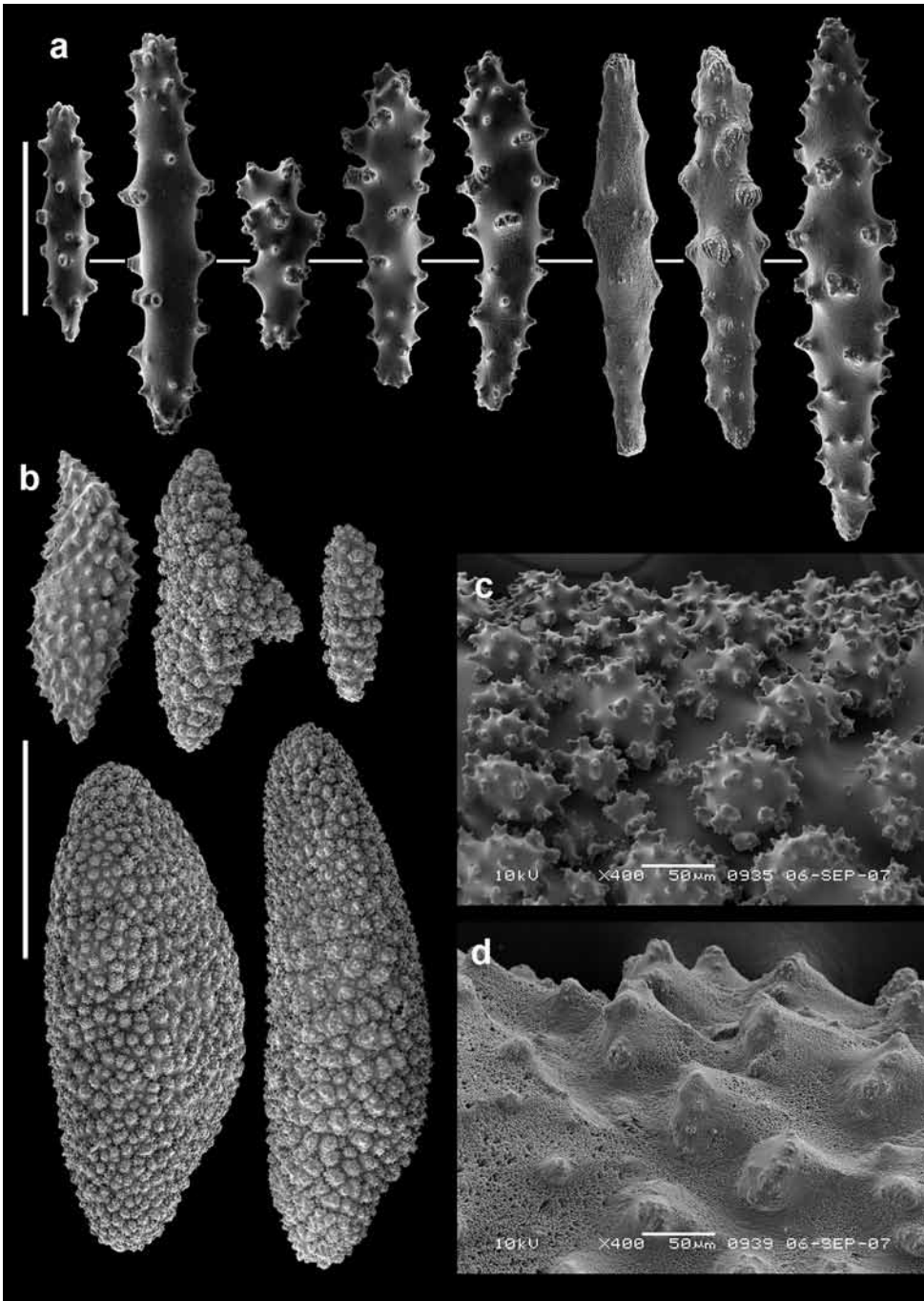


Fig. 28. *Sinularia torta* spec. nov., holotype RMNH Coel, 39523; sclerites of the colony top; a, spindles of the surface layer; b, spindles of the lobes interior; c-d, tubercles on spindles. Scale at a 0.10 mm, scale at b 1 mm.

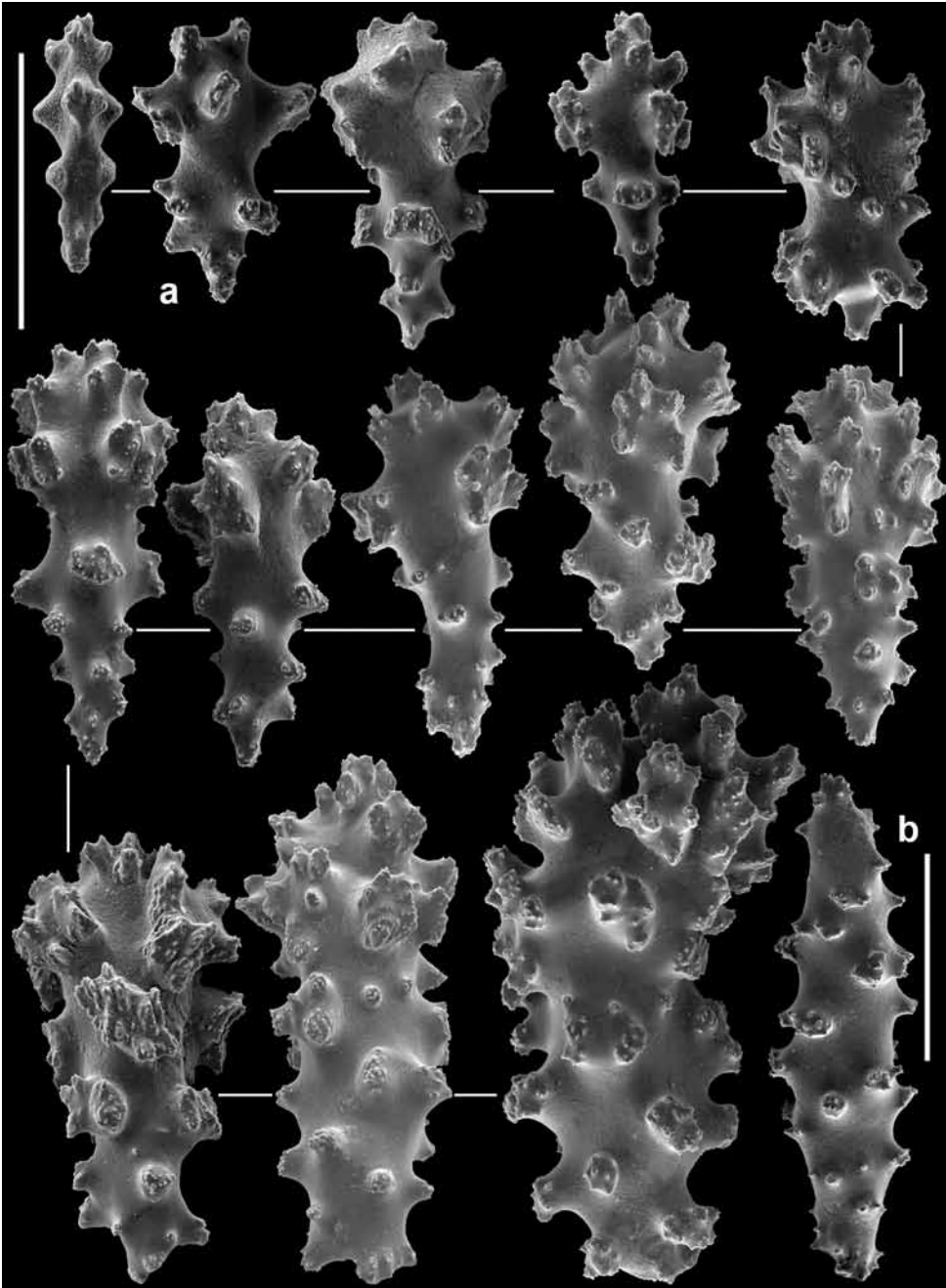


Fig. 29. *Simularia torta* spec. nov., holotype RMNH Coel, 39523; sclerites of the surface of the colony base; a, clubs; b, spindle. Scale 0.10 mm.

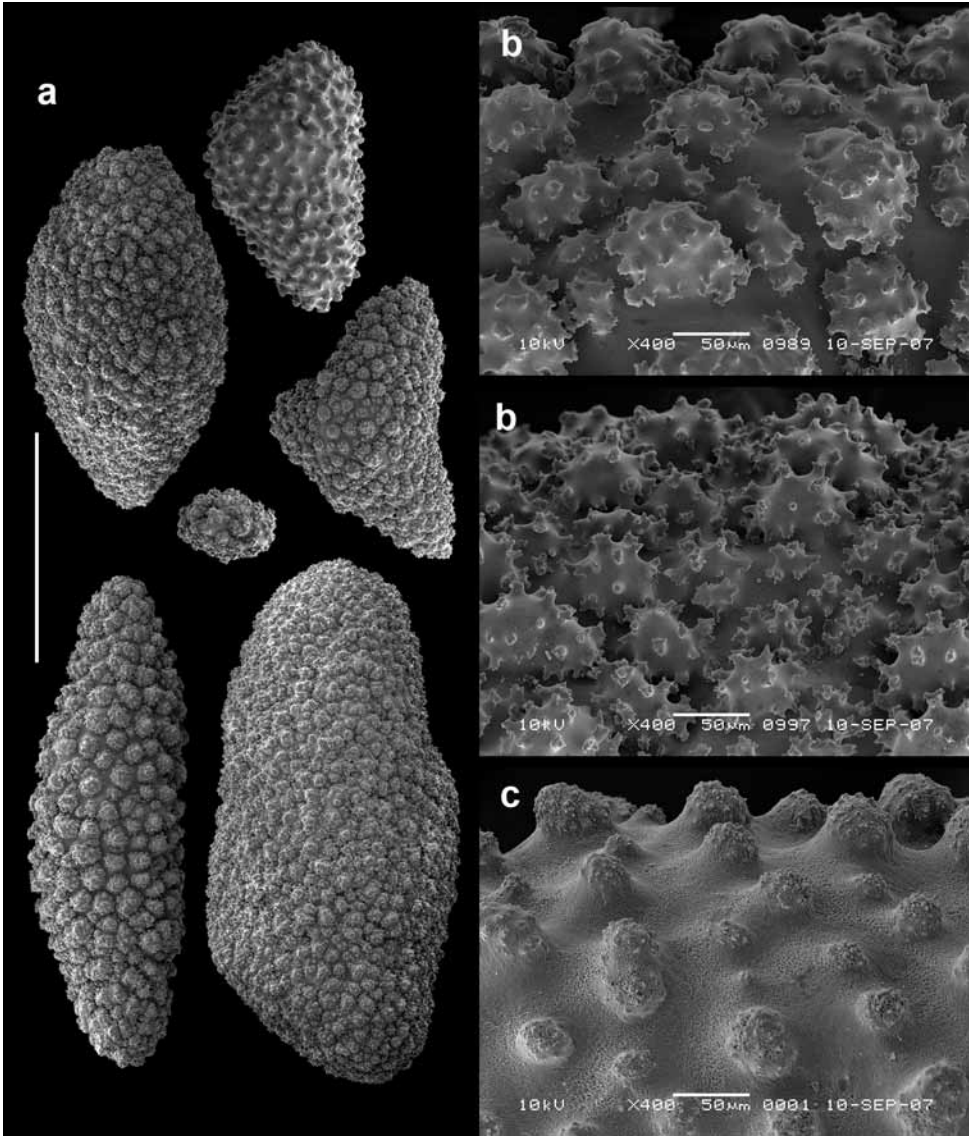


Fig. 30. *Sinularia torta* spec. nov., holotype RMNH Coel, 39523; sclerites of the interior of the colony base; a, spindles; b-c, tubercles on spindles. Scale 1 mm.

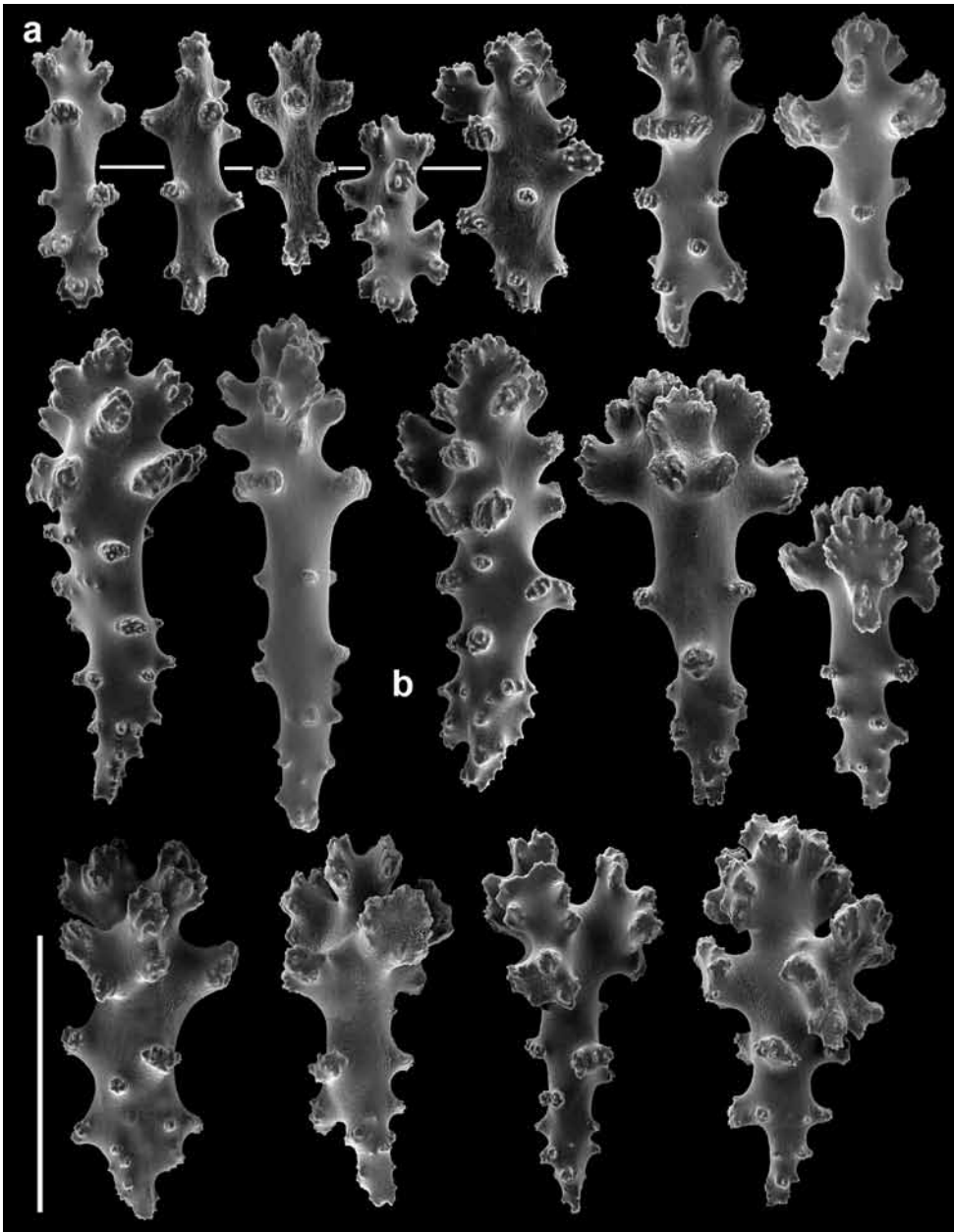


Fig. 31. *Simularia uva* spec. nov., holotype RMNH Coel, 39524; sclerites of the surface of the colony top; a, capstan-like sclerites; b, clubs. Scale 0.10 mm.

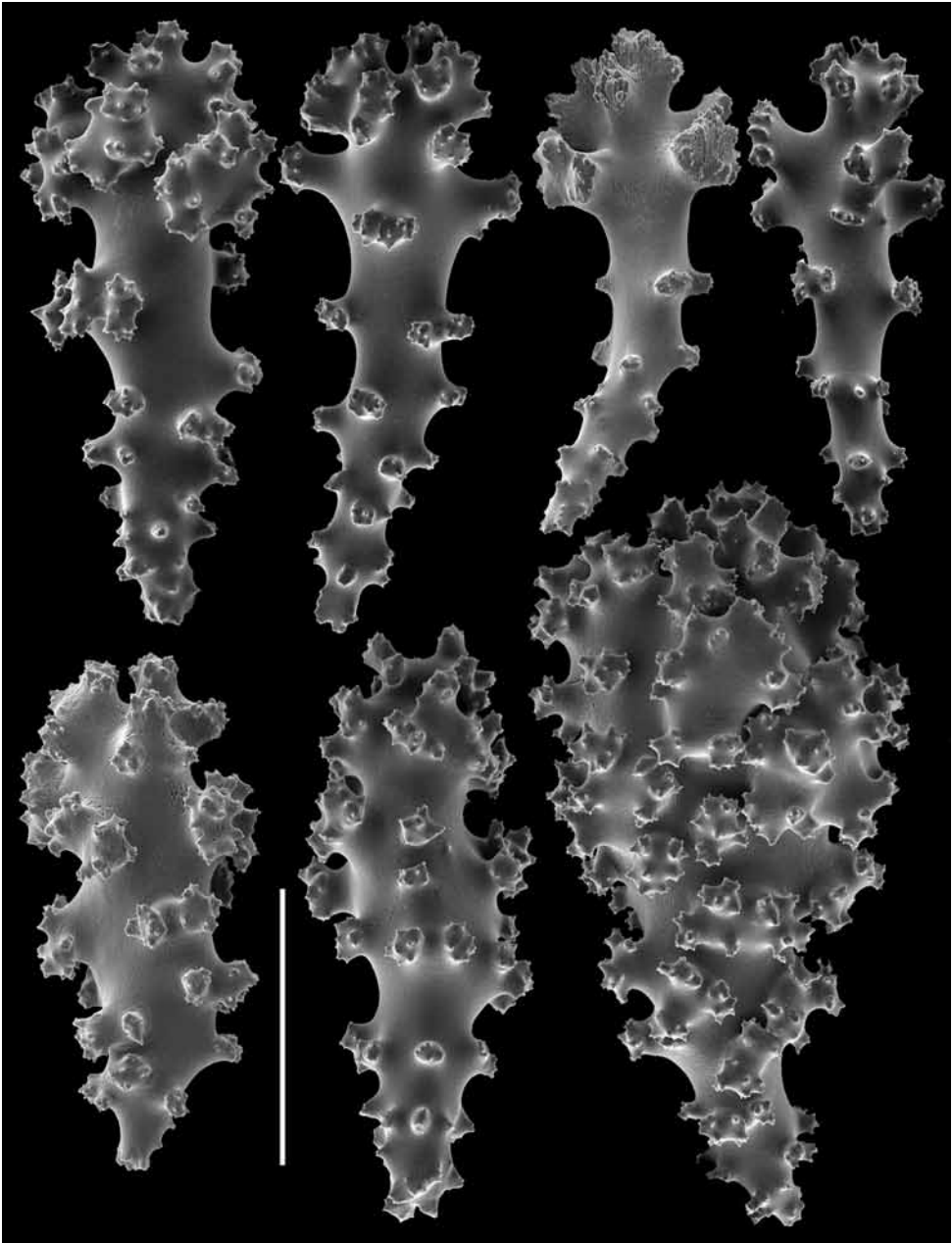


Fig. 32. *Sinularia uva* spec. nov., holotype RMNH Coel, 39524; clubs of the surface of the colony top. Scale 0.10 mm.

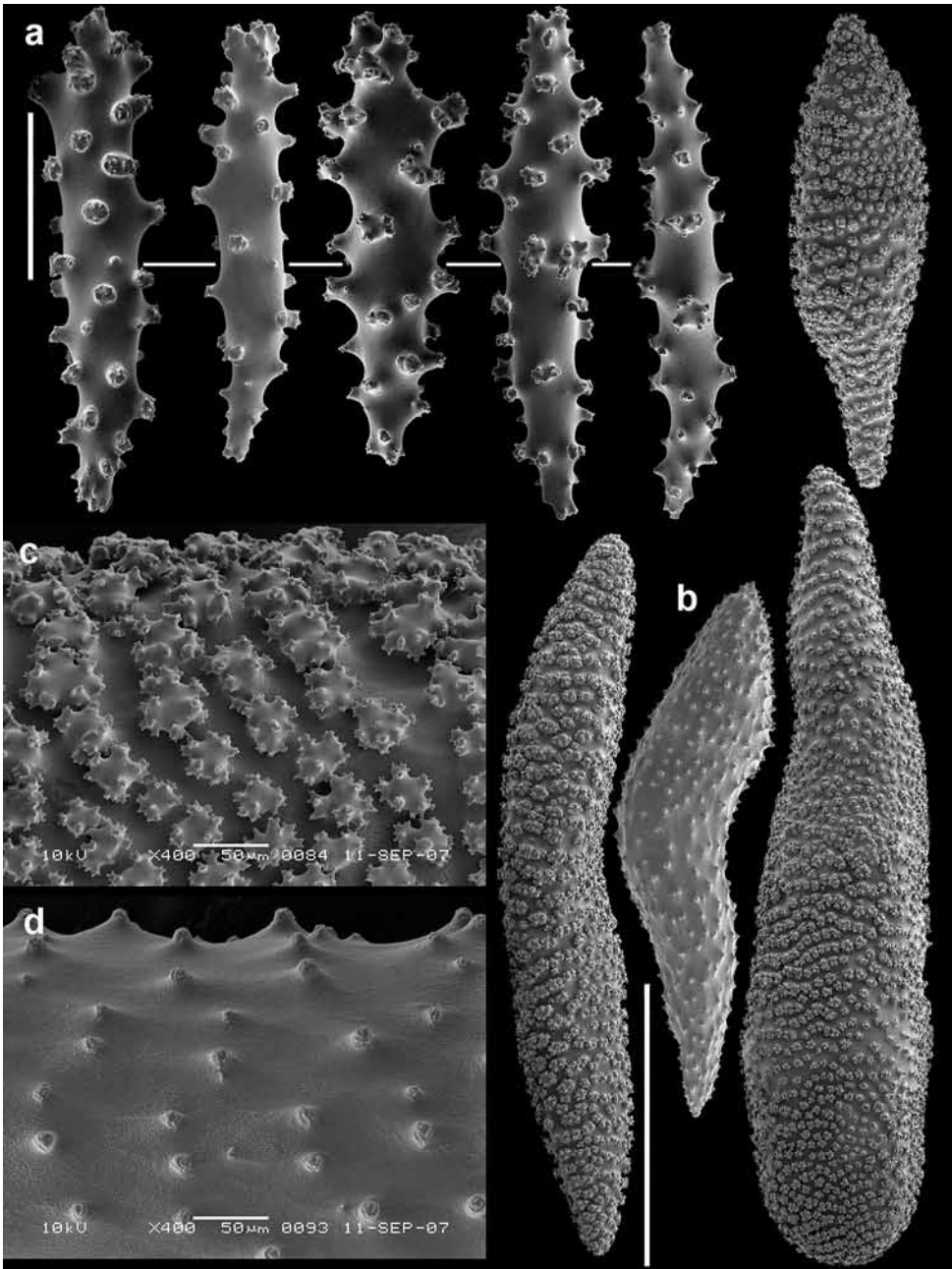


Fig. 33. *Simularia uva* spec. nov., holotype RMNH Coel, 39524; sclerites of the colony top; a, spindle of the surface layer; b, spindle of the lobes interior; c-d, tubercles on spindles. Scale at a 0.10 mm, scale at b 1 mm.

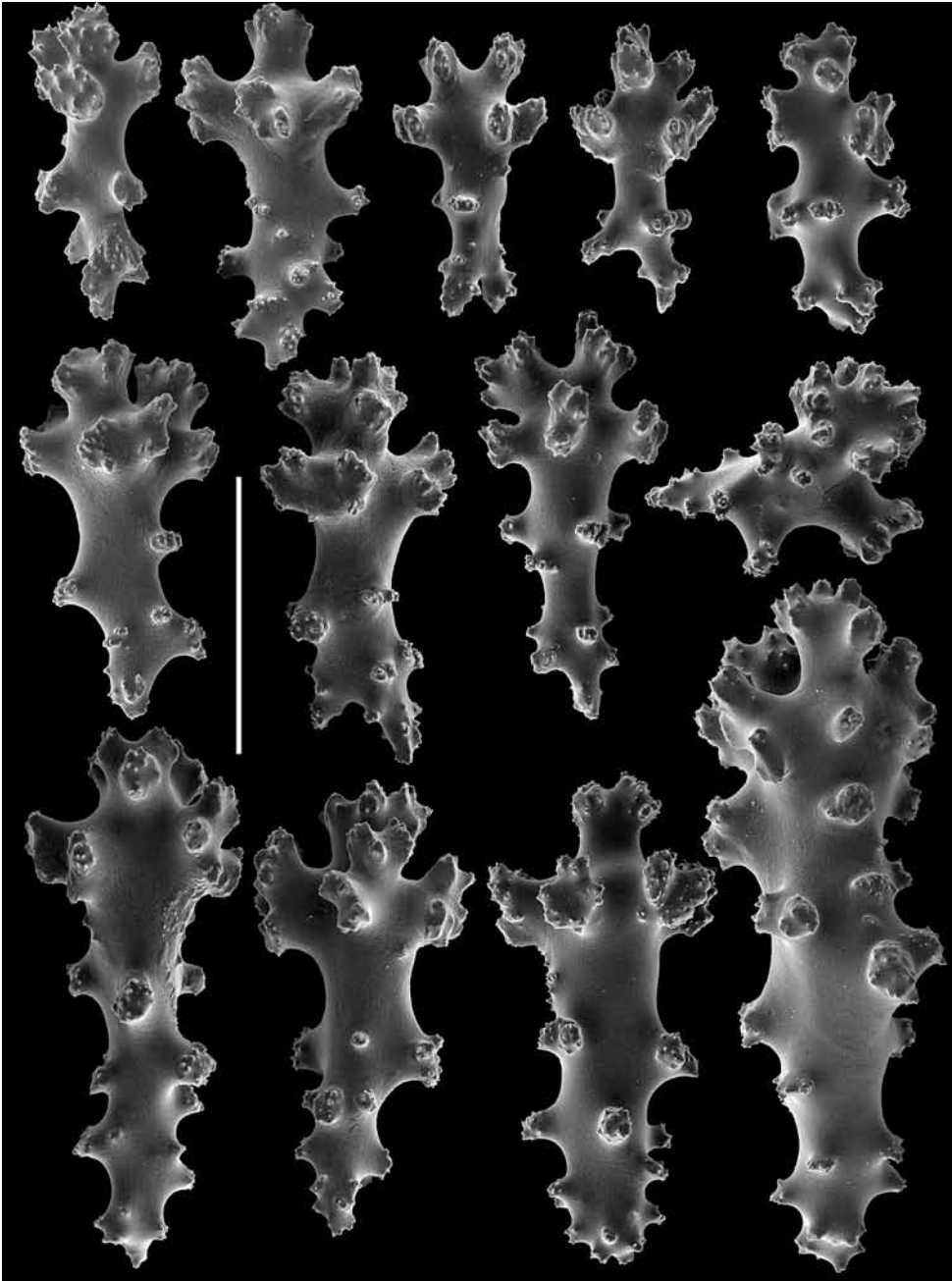


Fig. 34. *Sinularia uva* spec. nov., holotype RMNH Coel, 39524; clubs of the surface of the colony base. Scale 0.10 mm.

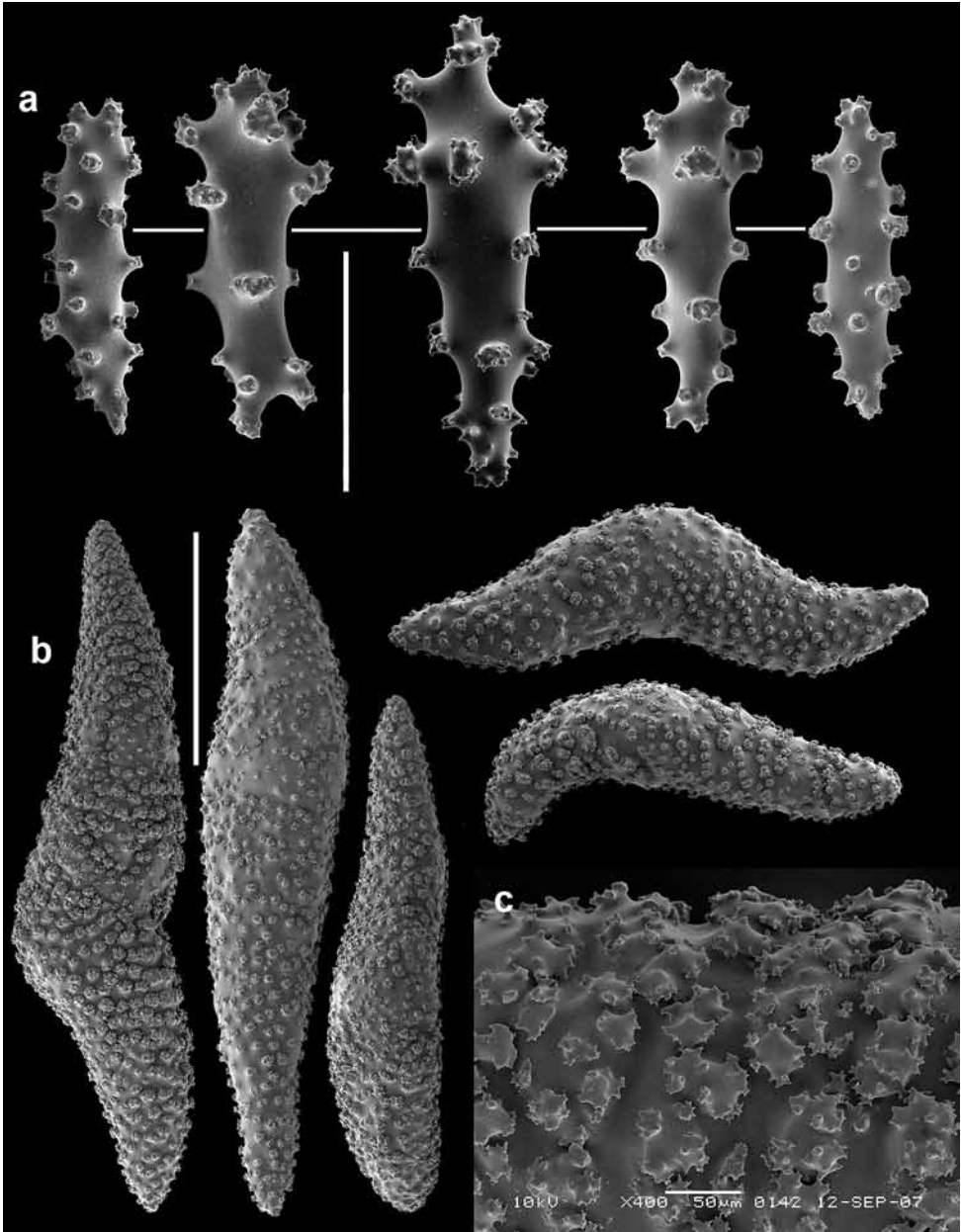


Fig. 35. *Simularia uva* spec. nov., holotype RMNH Coel, 39524; sclerites of the colony base; a, spindles of the surface layer of the colony base; b, spindles of the interior of the colony base; c, tubercles on spindle. Scale at a 0.10 mm, scale at b 1 mm.

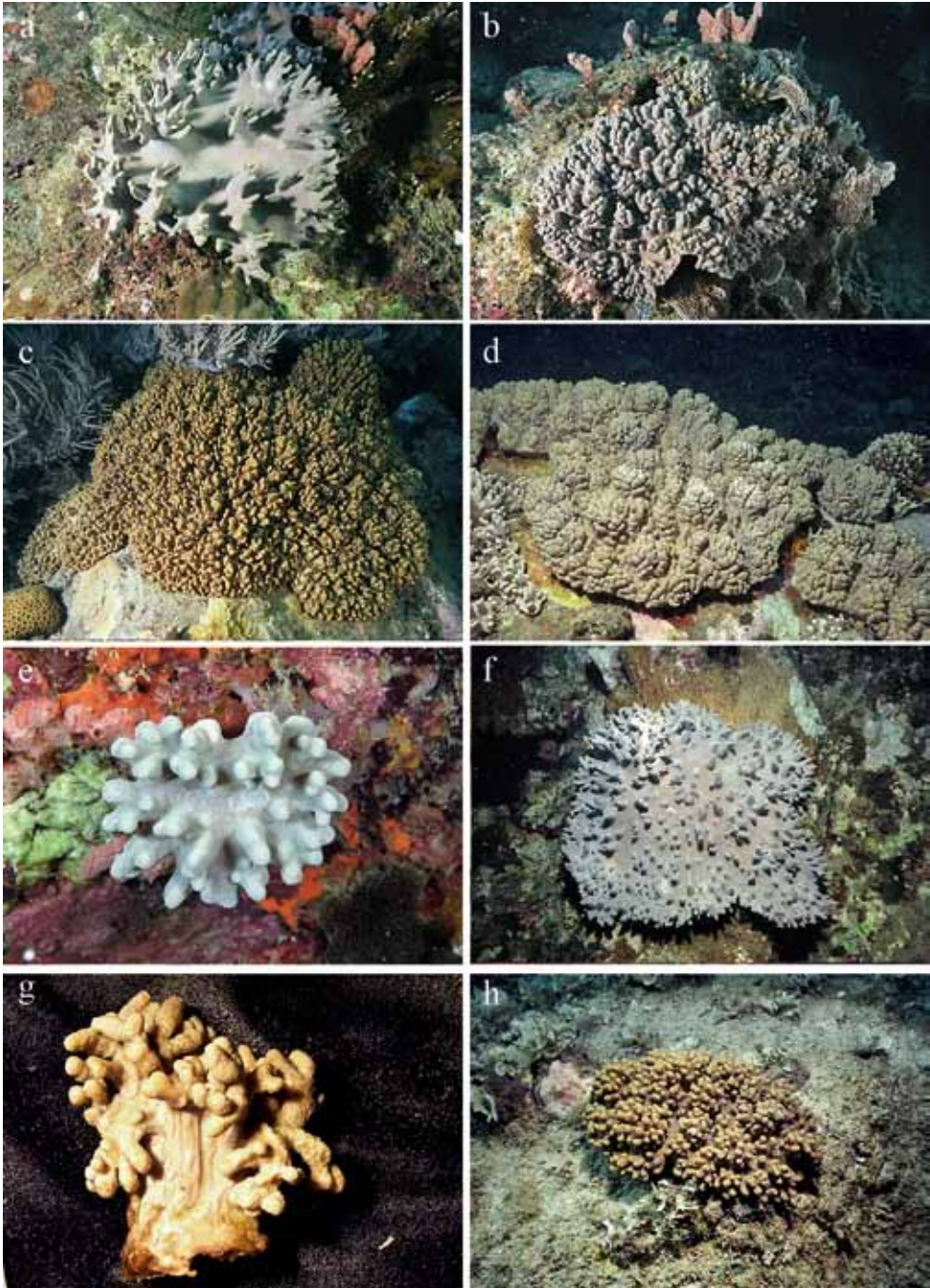


Fig. 36. Living colonies (except 36g); a, *S. capricornis* spec. nov., RMNH Coel. 39519; b, *S. crebra* spec. nov., RMNH Coel. 39518; c, *S. crebra* spec. nov., RMNH Coel. 39520; d, *S. multiflora* spec. nov., MIMB 16734; e, *S. pumila* spec. nov., RMNH Coel. 39521, view from above; f, *S. rigida*, RMNH Coel. 39517; g, *S. sarmen-tosa* spec. nov., RMNH Coel. 39522, fresh collected specimen; h, *S. uva* spec. nov., RMNH Coel. 39524.

