

The genus *Sinularia* (Octocorallia: Alcyonacea) from Ambon and Seram (Moluccas, Indonesia)

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The *Sinularia* fauna of Ambon and Seram is presented. Five new species are described and figured: *S. acuta*, *S. corpulentissima*, *S. curvata*, *S. kotanianensis*, and *S. longula*. In addition, specimens of *S. humesi* Verseveldt, 1968, and *S. slieringsi* Ofwegen & Vennam, 1991, are discussed. In total, the *Sinularia* fauna of Ambon consists of 38 species, and that of Seram of 8 species.

Introduction

Although the shallow-water octocoral fauna of Indonesia still is poorly investigated the island of Ambon may be regarded as the best studied site of this island nation. Burchardt (1903) was the first to mention *Sinularia* species from Ambon. He described *S. leptoclados*, *S. polydactyla* and *S. rigida*. Lüttschwager (1914) described a new species, *S. mayi*, while mentioning that Burchardt's *S. polydactyla* 'low form', a specimen with a short stalk, belonged to this new species. Later on Thomson & Dean (1931), in their report on the Siboga octocorals, also mentioned *S. leptoclados* from Ambon. Finally, Ofwegen & Vennam (1994) listed 23 *Sinularia* species that were collected during the Rumphius Biohistorical Expedition 1990, including one species new to science, viz. *S. slieringsi*. As Ofwegen (2001) later on synonymized *S. intacta* Tixier-Durivault, 1970 with *S. molesta* Tixier-Durivault, 1970, which were both mentioned by Ofwegen & Vennam (1994), this species number should subsequently be corrected to 22.

Below we give the results of an examination of *Sinularia* specimens collected during the 1984 Indonesian-Dutch Snellius-II Expedition and the 1996 LIPI-NNM Fauna Malesiana Maluku Expedition. The first collection contained only six different species from Ambon, whereas the latter collection no less than 30 from Ambon and seven species from Seram. All together, 38 different *Sinularia* species are presently known from Ambon, and eight species from Seram, seven of these were collected during the 1996 LIPI-NNM Fauna Malesiana Maluku Expedition; *S. ceramensis*, described from Seram by Verseveldt (1977), has not been found again. Ambon and Seram together have 40 different *Sinularia* species, which makes it the richest *Sinularia* fauna of the Indo-Pacific (compare Ofwegen, 2002).

The locations with the most *Sinularia* species are the southwest coast of Leitimur (sta. MAL.09, ten species), southern side of Ambon Bay near Ambon City (sta. RUM.03, nine species), northern side of Ambon Bay, opposite Ambon City (sta. MAL.03, seven



Fig. 1. Map of Ambon Island with *Sinularia* collecting sites.

species), and the southeast coast of Leitimur (sta. MAL.06, also seven species). Research sites with six species records are west of Ambon City (sta. RUM.05 and sta. MAL.11), west Hitu (sta. RUM.39), and Kotania Bay, NW Seram (sta. MAL.28). Based on these findings it appears that Ambon Outer Bay, west of Ambon city, and the southwest coast of Leitimur are particularly rich in *Sinularia* species.

The most frequently found species are *Sinularia brassica* (eight stations); *S. polydactyla* and *S. slieringsi* (each at seven stations); *S. cruciata*, *S. heterospiculata*, *S. hirta*, *S. humesi*, and *S. leptoclados* (all recorded from six stations).

Two species, *S. mollis* and *S. venusta*, were only found during the 1984 Snellius-II Expedition. Six species, i.e., *S. cristata*, *S. granosa*, *S. kavarratiensis*, *S. muralis*, *S. ovispiculata*, and *S. variabilis* were all only sampled during the 1990 Rumphius Biohistorical Expedition; and 14 only during the 1996 LIPI-NNM Fauna Malesiana Maluku Expedition, i.e., *S. compacta*, *S. compressa*, *S. crassa*, *S. mammifera*, *S. numerosa*, *S. querciformis*, *S. ramosa*, *S. rigida*, *S. triangula*, and five new species. The seven species found at Seram are all new records for that island.

It is noteworthy that the four specimens collected during the 1996 Fauna Malesiana Maluku Expedition identified as *S. cruciata* differ slightly in colony form in comparison with those of the 1990 Rumphius Biohistorical Expedition. As the sclerites of all four specimens do not differ much from those of *S. cruciata*, we tentatively identified them as that species but we do not exclude the possibility that more material will reveal them to belong to a sibling species.

According to us it is doubtful whether *S. mayi* Lüttschwager, 1914, occurs on Ambon. Its original description is based on a specimen from an unknown locality present

in the Naturhistorische Museum Wien, Vienna, Austria. As far as we know Burchardt's material is stored in the Musée Zoologique de Strasbourg, France, and was not examined by Lüttchwager. However, he considered Burchardt's 'low form' of *S. polydactyla* from Ambon to be similar to his *S. mayi*. It is unknown to us where the type specimen of *S. mayi* is stored, but Verseveldt (1980) did not find it in Vienna during his study of *Simularia*. Until the material used by Burchardt and Lüttchwager will be re-examined, we assume that Burchardt was correct with his identifications and only *S. polydactyla* occurs at Ambon for sure.

Station lists

"Tyro" Indonesian-Dutch Snellius-II Expedition.

- Sta. S4.002: Ambon Bay, near Hative Besar; 3°41'S 128°8'E; broad sand flat merging into disturbed reef with dead corals, 0-5 m; 22.viii/06.ix.1984.
 Sta. S4.005: Ambon, North coast between Hita and Hila; 3°35'S 128°E; sandy reef flat with patch reef; 1-6 m; 26.viii.1984.
 Sta. S4.006: Ambon Bay, nr Eri, 3°45'S 128°8'E, sandy bay with patch reef, depth 0-10 m, snorkeling, scuba diving, 29.viii.84, 04 & 05.ix.84

Rumphius Biohistorical Expedition 1990.

- RUM.03: Leitimur, Ambon Bay, outer bay, Batumerah (near Ambon city); 7/9.xi.1990.
 RUM.05: Leitimur, Ambon Bay, outer bay, Tg. Benteng (= Galghoek); 8/9.xi & 2.xii.1990.
 RUM.11: Leitimur, Cape Nusaniwe; 12.xi.1990.
 RUM.15: Hitu, Baguala Bay, 0.5 km W of Tial; 13/14.xi.1990.
 RUM.16: W-side of Pombo Island; 15/17.xi.1990.
 RUM.21: Hitu, N coast, Mamala; 21.xi.1990.
 RUM.23: Hitu, N coast, Kaitetu (near Hila); 22/23.xi.1990.
 RUM.27: Leitimur, S coast, Hutumuri; 26/27.xi.1990.
 RUM.39: Hitu, W coast, S-side Larike, up to and including Batu Suangi ("Het Suikerbroodje"); 8, 9.xii.1990.

LIPI-NNM Fauna Malesiana Maluku Expedition, 1996.

- MAL.02: Outer bay, N coast near Rumah Tiga, 03°40'S 128°10'E; gradually sloping sandy bottom with coral heads; snorkeling and diving, depth 2-12 m; 5.xi.1996.
 MAL.03: Outer bay, N coast W of Sahuru, 03°40'S 128°09'E; gradually sloping sandy bottom with coral rubble and coral heads; snorkeling and diving, depth 2-12 m; 5.xi.1996.
 MAL.05: N coast, Manuala beach, W of Hila, 03°35'S 128°05'E; gradually sloping sandy bottom, with scattered coral heads; snorkeling and diving, depth 0-24 m; 7.xi.1996.
 MAL.06: SE coast, SW of Leahari, 03°43'S 128°16'E; shallow sublittoral with calcareous rock and stones, shallow slope with white sand, deeper slope with high coral cover, steep drop-off from 15 to 20 m; depth 2-20 m; 8.xi.1996.

- MAL.08: NE coast, Liang bay, 03°31'S 128°19'E; wide reef flat, slope down to 25 m, rocky intertidal, shallow sublittoral with sea grass, slope also with high coral cover, few soft corals; snorkeling and diving, depth 0-25 m; 9.xi.1996.
- MAL.09: SW coast, Latuhalat, 03°46'S 128°06'E; white sand beach, rocky sublittoral down to about 12 m, predominantly encrusting octocorals, drop off down to 24 m; snorkeling and diving, depth 2-30 m; 11.xi.1996.
- MAL.11: Ambon bay, S coast E of Erie, 03°45'S 128°08'E; sublittoral gradually sloping to 12 m, densely covered with mainly octocorals, steeper slope down to 30 m, also with dense coral growth; diving, depth 12-30 m; 12.xi.1996.
- MAL.12: N coast near Morela, 03°33'S 128°12'E; reef flat, small lagoon, seagrass, calcareous rock with many corals, steep slope with stony and soft corals; hand collecting, diving; 13/14.xi.1996.
- MAL.13: W coast near Larike, 03°45'S 127°56'E; gradually sloping sublittoral, large boulders and calcareous rock, large variety of corals and octocorals; light sand cover increasing downwards; diving, depth 1-26 m; 15.xi.1996.
- MAL.15: Ambon bay, S coast, cape W of Amahusu, 03°44'S 128°08'E; volcanic rocks and stones densely covered by a variety of corals and octocorals; gradually more sand down the steep slope; diving, depth 1-30 m; 16.xi.1996.
- MAL.16: Ambon bay, N coast near Tawiri, 03°42'S 128°06'E; intertidal with cobbles, shallow sublittoral with many sponges, upper slope with coral heads on sandy bottom; snorkeling and diving, depth 0 to 30 m; 18.xi.1996.
- MAL.18: Ambon bay, N coast next to airport, 03°43'S 128°04'E; intertidal with cobbles, shallow sublittoral sandy with some patch reefs, deeper high cover of octocorals; slope with few corals; diving, depth 2-30 m; 19.xi.1996.
- MAL.19: Ambon bay, N coast at Cape Batu Dua E of Hatu, 03°43'S 128°03'E; shore and intertidal with boulders, shallow sublittoral with high coral cover, octocorals dominating down the slope, coral heads and boulders; diving; 19.xi.1996.
- MAL.20: Ambon bay, N coast W of Lilibooi, 03°45'S 128°01'E; intertidal with volcanic cobbles, shallow sublittoral with calcareous rocks and volcanic cobbles, some sand, some corals, downslope sandy; diving, depth 2-30 m; 20.xi.1996.
- MAL.21: Ambon bay, N coast, Cape Hatupero E of Lilibooi, 03°44'S 128°02'E; rocky, shallow sublittoral, calcareous rocks and volcanic cobbles, octocorals, sandy slope; diving; 20.xi.1996.
- MAL.22: SW coast, E of Cape Nusanive, 03°48'S 128°06'E; shallow sublittoral with calcareous rocks and sand spurs, with few corals; from 5 m narrow zone with rather dense coral growth, mainly octocorals; diving, depth 1-12 m; 21.xi.1996.
- MAL.23: Ambon bay, S coast, close to Cape Nusanive, 03°47'S 128°05'E; rocky coast, shallow sublittoral with large boulders, from 5 m narrow zone with mainly octocorals, downslope sandy with scattered coral growth; diving; 21.xi.1996.
- MAL.24: S coast, Seri bay, 03°45'S 128°09'E; shallow sublittoral with calcareous rocks and boulders and volcanic cobbles and boulders, with few corals, slope sandy with coral patches; snorkeling and diving, depth 2-35 m; 22.xi.1996.

- MAL.28: NW Seram, Kotania bay, SW of Pulau Marsegu, 03°01'S 128°03'E; reef flat 0-3 m with predominant hard and soft corals, steep drop off to 30 m; snorkeling and diving, depth 0-30 m; 11.xi.1996.
- MAL.29: NW Seram, Kotania bay, NE of Pulau Marsegu, 03°00'S 128°03'E; reef flat 0-3 m, mainly sand and soft corals, steep drop off to 30 m with debris slides, rich coral growth, many hydroids and tunicates; depth 0-30 m; 11.xi.1996.
- MAL.31: NE coast, close to Batudua, 03°32'S 128°21'E; sandy shore, shallow sublittoral with sand and coral rubble, slope with scattered coral growth; snorkeling and diving, depth 0-30 m; 23.xi.1996.

Species list

Family Alcyoniidae Lamouroux, 1812

Genus *Sinularia* May, 1898

01. *S. acuta* spec. nov.: MAL.12 (RMNH Coel. 38432)
02. *S. brassica* May, 1898: RUM.03 (RMNH Coel. 19536); MAL.06 (RMNH Coel. 34996); MAL.09 (RMNH Coel. 34997); MAL.15 (RMNH Coel. 34998-99); MAL.18 (RMNH Coel. 35000); MAL.19 (RMNH Coel. 38369); MAL.20 (RMNH Coel. 38370); MAL.24 (RMNH Coel. 38371)
03. *S. capitalis* (Pratt, 1903): RUM.03 (RMNH Coel. 19537); MAL.03 (RMNH Coel. 38410)
04. *S. compacta* Tixier-Durivault, 1970: MAL.09 (RMNH Coel. 38433)
05. *S. compressa* Tixier-Durivault, 1945: MAL.18 (RMNH Coel. 38420)
06. *S. corpulentissima* spec. nov.: MAL.03 (RMNH Coel. 38435); MAL.09 (RMNH Coel. 38434)
07. *S. crassa* Tixier-Durivault, 1945: MAL.02 (RMNH Coel. 38430)
08. *S. cristata* Tixier-Durivault, 1969: RUM.21 (RMNH Coel. 19571)
09. *S. cruciata* Tixier-Durivault, 1970: RUM.03 (RMNH Coel. 19538); RUM.39 (RMNH Coel. 19539); MAL.02 (RMNH Coel. 38417); MAL.06 (RMNH Coel. 38427); MAL.16 (RMNH Coel. 38397); MAL.19 (RMNH Coel. 38416)
10. *S. curvata* spec. nov.: MAL.03 (RMNH Coel. 38436)
11. *S. depressa* Tixier-Durivault, 1970: RUM.21 (RMNH Coel. 19540); RUM.27 (RMNH Coel. 19541); MAL.09 (RMNH Coel. 38428).
12. *S. flexibilis* (Quoy & Gaimard, 1833): RUM.03 (RMNH Coel. 19542); RUM.05 (RMNH Coel. 19543); MAL.09 (RMNH Coel. 38378); MAL.12 (RMNH Coel. 38379); MAL.28 (RMNH Coel. 38380)
13. *S. granosa* Tixier-Durivault, 1970: RUM.05 (RMNH Coel. 19544); RUM.16 (RMNH Coel. 19545); RUM.27 (RMNH Coel. 19546); RUM.39 (RMNH Coel. 19547)
14. *S. heterospiculata* Verseveldt, 1970: RUM.11 (RMNH Coel. 19548); MAL.03 (RMNH Coel. 38381); MAL.08 (RMNH Coel. 38382; A); MAL.11 (RMNH Coel. 38383); MAL.13 (RMNH Coel. 38409); MAL.24 (RMNH Coel. 38384)
15. *S. hirta* (Pratt, 1903): RUM.03 (RMNH Coel. 19549); RUM.15 (RMNH Coel. 19550); RUM.16 (RMNH Coel. 19551); MAL.05 (RMNH Coel. 38399); MAL.08 (RMNH Coel. 38400); MAL.28 (RMNH Coel. 38401)

16. *S. humesi* Verseveldt, 1968: RUM.03 (RMNH Coel. 19573); RUM.15 (RMNH Coel. 19574); MAL.06 (RMNH Coel. 38421); MAL.08 (RMNH Coel. 38422); MAL.09 (RMNH Coel. 38418); MAL.16 (RMNH Coel. 38423)
17. *S. kavarttiensis* Alderslade & Shirwaiker, 1991: RUM.05 (RMNH Coel. 19553); RUM.39 (RMNH Coel. 19554)
18. *S. kotanianensis* spec. nov.: MAL.28 (RMNH Coel. 38437)
19. *S. leptocladus* (Ehrenberg, 1834): RUM.05 (RMNH Coel. 19555); RUM.39 (RMNH Coel. 19556); MAL.02 (RMNH Coel. 38424); MAL.03 (RMNH Coel. 38425); MAL.06 (RMNH Coel. 38426); MAL.23 (RMNH Coel. 38438)
20. *S. lochmodes* Kolonko, 1926: Sta. S4.006 (RMNH Coel. 19509); RUM.03 (RMNH Coel. 19557); RUM.15 (RMNH Coel. 19558); MAL.11 (RMNH Coel. 38404); MAL.19 (RMNH Coel. 38405)
21. *S. longula* spec. nov.: MAL.24 (RMNH Coel. 38439)
22. *S. mammifera* Malyutin, 1990: MAL.20 (RMNH Coel. 38372); MAL.22 (RMNH Coel. 38377)
23. *S. molesta* Tixier-Durivault, 1970: RUM.11 (RMNH Coel. 19559); RUM.15 (RMNH Coel. 19552), identified as *S. intacta* Tixier-Durivault, 1970, but synonymized with *S. molesta* by Ofwegen (2001); MAL.22 (RMNH Coel. 38440)
24. *S. mollis* Kolonko, 1926: Sta. S4.005 (RMNH Coel. 19512)
25. *S. muralis* May, 1899: RUM.39 (RMNH Coel. 19560)
26. *S. nanolobata* Verseveldt, 1977: RUM.05 (RMNH Coel. 19561); RUM.11 (RMNH Coel. 19562); MAL.12 (RMNH Coel. 38441); MAL.29 (RMNH Coel. 38419)
27. *S. notanda* Tixier-Durivault, 1966: Sta. S4.005: (RMNH Coel. 19513) RUM.03 (RMNH Coel. 19563); RUM.23 (RMNH Coel. 19564); MAL.11 (RMNH Coel. 38385)
28. *S. numerosa* Tixier-Durivault, 1970: MAL.24 (RMNH Coel. 38429)
29. *S. ovispiculata* Tixier-Durivault, 1970: RUM.39 (RMNH Coel. 19565)
30. *S. polydactyla* (Ehrenberg, 1834): Sta. S4.002 (RMNH Coel. 19516); RUM.03 (RMNH Coel. 19566); RUM.5 (RMNH Coel. 19567); RUM.15 (RMNH Coel. 19568); RUM.23 (RMNH Coel. 19569); MAL.05 (RMNH Coel. 38398); MAL.11 (RMNH Coel. 38442)
31. *S. procera* Verseveldt, 1977: RUM.16 (RMNH Coel. 19570); MAL.03 (RMNH Coel. 38386)
32. *S. querciformis* (Pratt, 1903): MAL.03 (RMNH Coel. 38406); MAL.09 (RMNH Coel. 38407); MAL.18 (RMNH Coel. 38408)
33. *S. ramosa* Tixier-Durivault, 1945: MAL.06 (RMNH Coel. 38402); MAL.19 (RMNH Coel. 38403)
34. *S. rigida* (Dana, 1846): MAL.02 (RMNH Coel. 38411); MAL.06 (RMNH Coel. 38412); MAL.09 (RMNH Coel. 38413); MAL.11 (RMNH Coel. 38414) MAL.28 (RMNH Coel. 38415)
35. *S. sandensis* Verseveldt, 1977: Sta. S4.002 (RMNH Coel. 19522); MAL.11 (RMNH Coel. 38387); MAL.28 (RMNH Coel. 38388)
36. *S. slieringsi* Ofwegen & Vennam, 1994: RUM.11 (RMNH Coel. 19534, 19535); MAL.06 (RMNH Coel. 38389); MAL.09 (RMNH Coel. 32540, 38390); MAL.19 (RMNH Coel. 38391); MAL.23 (RMNH Coel. 38392); MAL.28 (RMNH Coel. 38393); MAL.31 (RMNH Coel. 38394)
37. *S. triangula* Tixier-Durivault, 1970: MAL.09 (RMNH Coel. 38373); MAL.15 (RMNH Coel. 38374); MAL.21 (RMNH Coel. 38375); MAL.24 (RMNH Coel. 38376)

38. *S. variabilis* Tixier-Durivault, 1945: RUM.16 (RMNH Coel. 19565)

39. *S. venusta* Tixier-Durivault, 1970: Sta. S4.002 (RMNH Coel. 19526)

Descriptive part

Simularia acuta spec. nov.

(figs 2a, 3-4)

Material examined.— RMNH Coel. 38432, holotype and 2 microscope slides, MAL.12.

Description.— The holotype is an arborescent colony, 7 cm high and wide (fig. 2a). The stalk varies 1-4 cm in height. A number of primary lobes branch off once or twice. Lobes and lobules are stout with tapering ends.

The polyps have a crown and eight points. Crown with bent spindles, up to 0.25 mm long, points with poorly developed clubs, up to 0.14 mm long (fig. 3a).

The surface layer of the lobules has *leptoclados*-type clubs, the smallest are 0.05 mm long, most are < 0.10 mm, but some reach even a length of 0.20 mm; in addition longer wart clubs are present, up to 0.25 mm long (fig. 3b). Furthermore, the surface layer of the lobules has spindles, up to 0.35 mm long, with few simple tubercles (fig. 3c).

The clubs of the surface layer of the base of the colony resemble those of the lobules but are less *leptoclados*-like, wider, and more tuberculate (fig. 4a). The small spindles present here are wider and shorter than those of the lobules (fig. 4b).

The interior of the colony has unbranched spindles with complex tubercles (fig. 4d); these spindles are up to 4 mm long in the lobules, up to 3.5 mm long in the stalk (fig. 4c). A few of the smaller spindles have simple tubercles.

Colour.— The preserved specimen is brown.

Etymology.— The Latin “*acuta*”, pointed/tapering, refers to the tapering lobes and lobules.

Remarks.— The holotype colony form resembles that of specimens of *S. leptoclados* (Ehrenberg, 1834) but differs in having stouter lobes with tapering ends. Moreover, the clubs of the surface layer of the lobules are quite different: in *S. leptoclados* the angle between the head and handle of the clubs is about 90 degrees in most clubs, whereas in *S. acuta* this angle is much larger. For comparison we also present a colony and lobule sclerites of a specimen identified as *S. leptoclados* (figs 2b, 5).

Simularia corpulentissima spec. nov.

(figs 2c-d, 6-8)

Material examined.— RMNH Coel. 38434, holotype and 2 microscope slides, MAL.09; RMNH Coel. 38435, paratype and two microscope slides, MAL.03.

Description.— The holotype is part of an arborescent colony, 12 cm high and wide (fig. 2c). The stalk varies 6-8 cm in height. A number of primary lobes branch off once or twice. Lobes and lobules are stout, the latter at least 0.5 cm wide.

The polyps have a crown and eight points. Crown with bent spindles, up to 0.20 mm long, points with poorly developed clubs, up to 0.15 mm long (fig. 6a).



Fig. 2a, *Sinularia acuta* spec. nov., holotype RMNH Coel. 38432; b, *S. leptoclados* (Ehrenberg, 1834), RMNH Coel. 38426; c-d, *S. corpulentissima* spec. nov., c, holotype RMNH Coel. 38434, d, paratype RMNH Coel. 38435. Scale 1 cm.



Fig. 3. *Simularia acuta* spec. nov., holotype RMNH Coel. 38432; a, clubs and spindles of polyps; b, clubs of surface layer of top of colony; c, spindles of surface layer of top of colony. Scales 0.10 mm, that at c only applies to c.

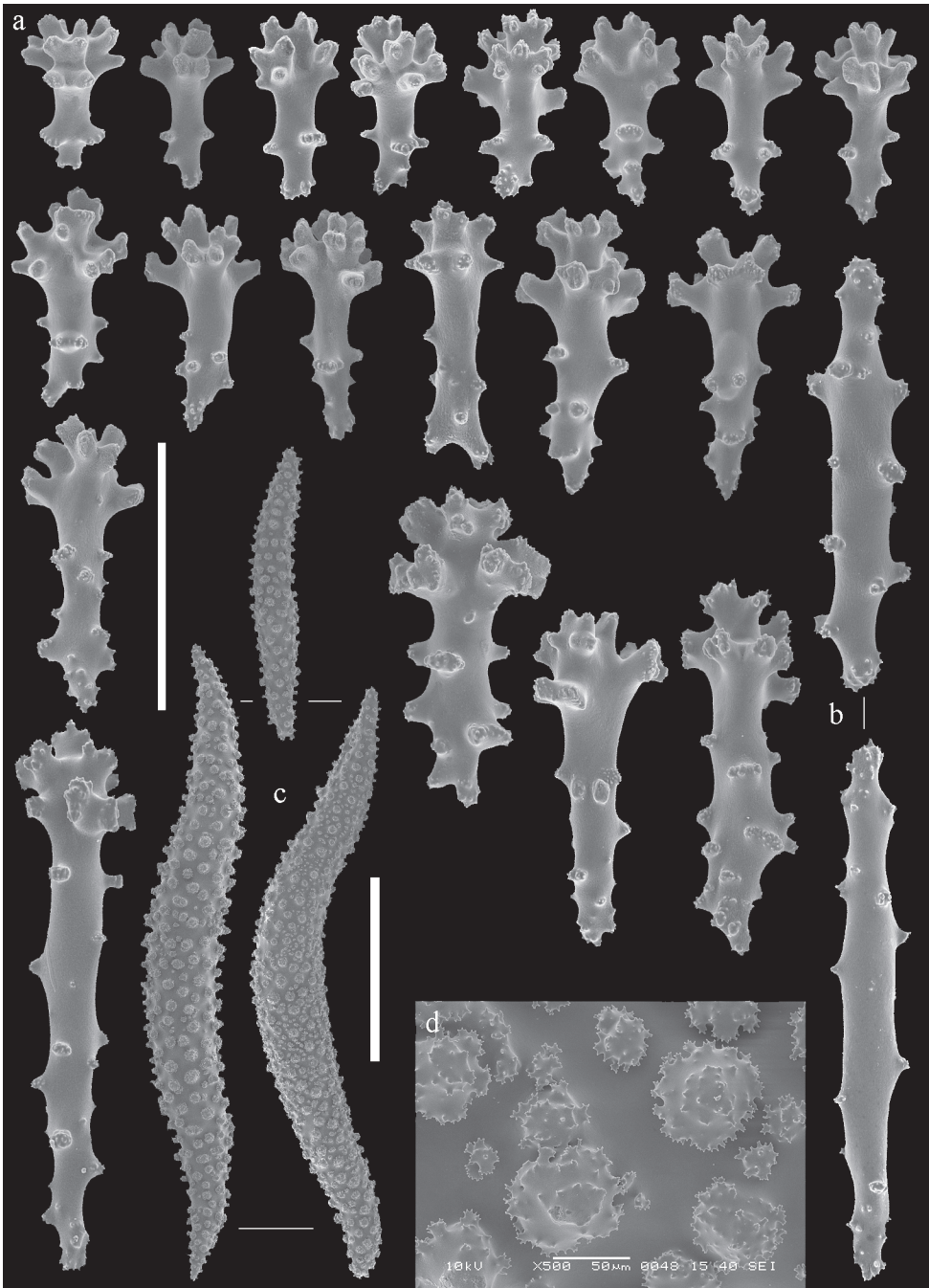


Fig. 4. *Sinularia acuta* spec. nov., holotype RMNH Coel. 38432; sclerites of base of stalk; a, clubs of surface layer; b, spindles of surface layer; c, spindles of interior; d, detail of tubercles on interior spindle. Scale at a 0.10 mm, applies to a-b; scale at c 1 mm, only applies to c.



Fig. 5. *S. leptoclados* (Ehrenberg, 1834), RMNH Coel. 38426; a, clubs and spindles of polyps; b, clubs of surface layer of top of colony; c, spindles of surface layer of top of colony. Scales 0.10 mm, that at c only applies to the last spindle.

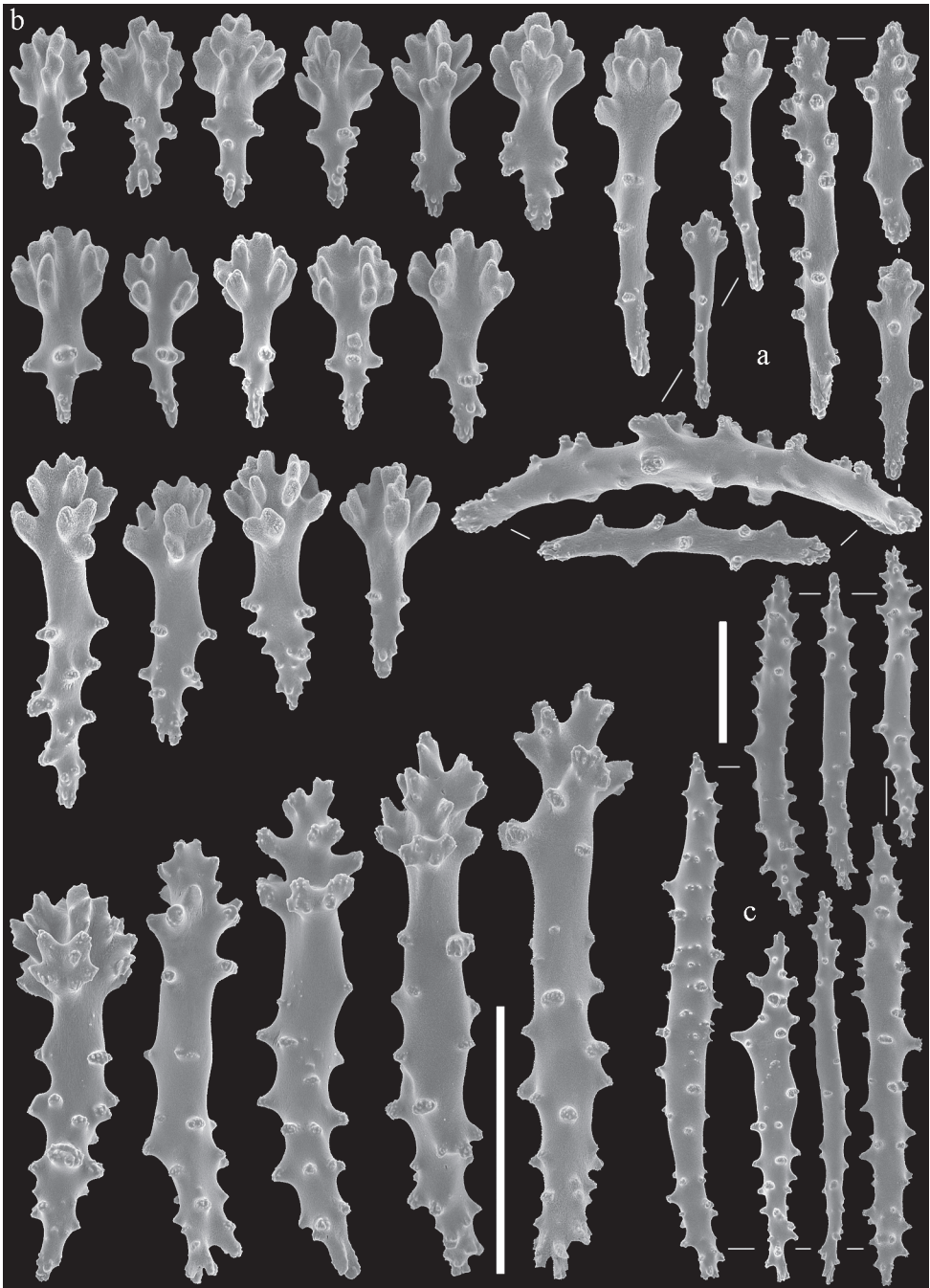


Fig. 6. *Sinularia corpulentissima* spec. nov., holotype RMNH Coel. 38434; a, clubs and spindles of polyps; b, clubs of surface layer of top of colony; c, spindles of surface layer of top of colony. Scales 0.10 mm, that at c only applies to c.



Fig. 7. *Simularia corpulentissima* spec. nov., holotype RMNH Coel. 38434; sclerites of base of stalk; a, clubs of surface layer; b, spindles of surface layer; c, spindles of interior; d, detail tubercles on interior spindle. Scale at b 0.10 mm, applies to a-b; scale at c 1 mm, only applies to c.

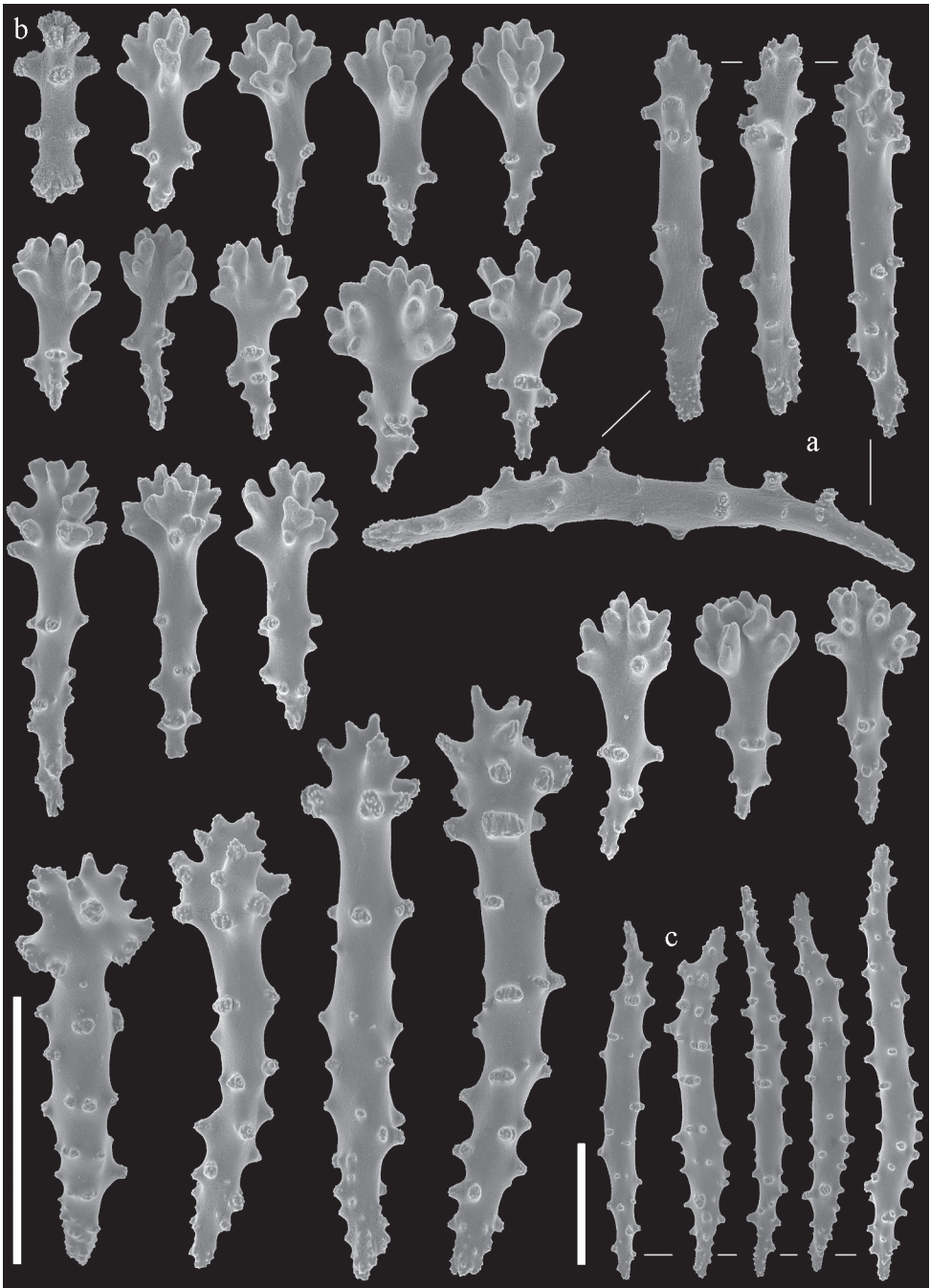


Fig. 8. *Sinularia corpulentissima* spec. nov., paratype RMNH Coel. 38435; a, clubs and spindles of polyps; b, clubs of surface layer of top of colony; c, spindles of surface layer of top of colony. Scales 0.10 mm, that at c only applies to c.

The surface layer of the lobules has *leptoclados*-type clubs, 0.03-0.13 mm long, and wart clubs, 0.15-0.25 mm long (fig. 6b). Furthermore, spindles are present, up to 0.40 mm long, with simple tubercles (fig. 6c).

The clubs and spindles of the surface layer of the base of the colony resemble those of the lobules but are shorter and wider (fig. 7a-b).

The interior of the colony has unbranched spindles with complex tubercles (fig. 7d); these spindles are up to 2.5 mm long in both the lobules and the stalk (fig. 7c).

Colour.— The preserved specimen is brown.

Etymology.— The Latin “corpulentissima”, fat, stout, refers to the stout lobes and lobules.

Remarks.— The paratype (fig. 2d) is much smaller than the holotype but also shows the stout lobes and lobules. For comparison, sclerites of the surface layer of its lobules are presented as well (fig. 8).

The colony form of both holotype and paratype of *Sinularia corpulentissima* resembles that of specimens of *S. leptoclados* (Ehrenberg, 1834) but differs in having stouter lobes (see fig. 2). The clubs of *S. corpulentissima* also differ from those of *S. leptoclados*. In the latter, the angle between head and handle of the clubs is about 90 degrees (fig. 5), in *S. corpulentissima* it is much larger. *S. corpulentissima* is also similar to *S. acuta*, but it does not have the characteristic tapering lobes of the latter species. The clubs and spindles of the surface layer of the lobules also differ: in *S. corpulentissima* the clubs have a much wider handle, and the spindles are wider and have more tubercles.

Sinularia curvata spec. nov.

(figs 9a, 10-12)

Material examined.— RMNH Coel. 38436, holotype and 2 microscope slides, MAL.03.

Description.— The holotype is an arborescent colony, 14 cm high, with a 5 cm long stalk (fig. 9a). A number of primary lobes branch off repeatedly. The lobules are up to about 1 cm long and a few mm wide.

The surface layer of the lobules has several small capstans, up to 0.10 mm long (fig. 10a), but most common are clubs, 0.08-0.25 mm long, almost all with a central wart, and quite some with a bent handle (fig. 10b). Furthermore, small spindles are present, up to 0.35 mm long, with simple tubercles (fig. 10c).

The surface layer of the base of the stalk has sclerites similar to those of the lobules but they are wider and more tuberculate (fig. 11).

The interior of the colony has unbranched spindles with complex tubercles (fig. 12c-d); these spindles are up to 3.5 mm long in the lobules (fig. 12a), and up to 3 mm long in the stalk (fig. 12b).

The polyps do not have any sclerites.

Colour.— The preserved specimen is dark brown, the middle part of the colony has a light brown colour.

Etymology.— The Latin “curvata”, curved, bent, refers to the bent handles of the clubs of the surface layer.

Remarks.— The colony form of the holotype is very similar to that of specimens of *S. sobolifera* Verseveldt & Tursch, 1979. Both species also have clubs with a central wart.

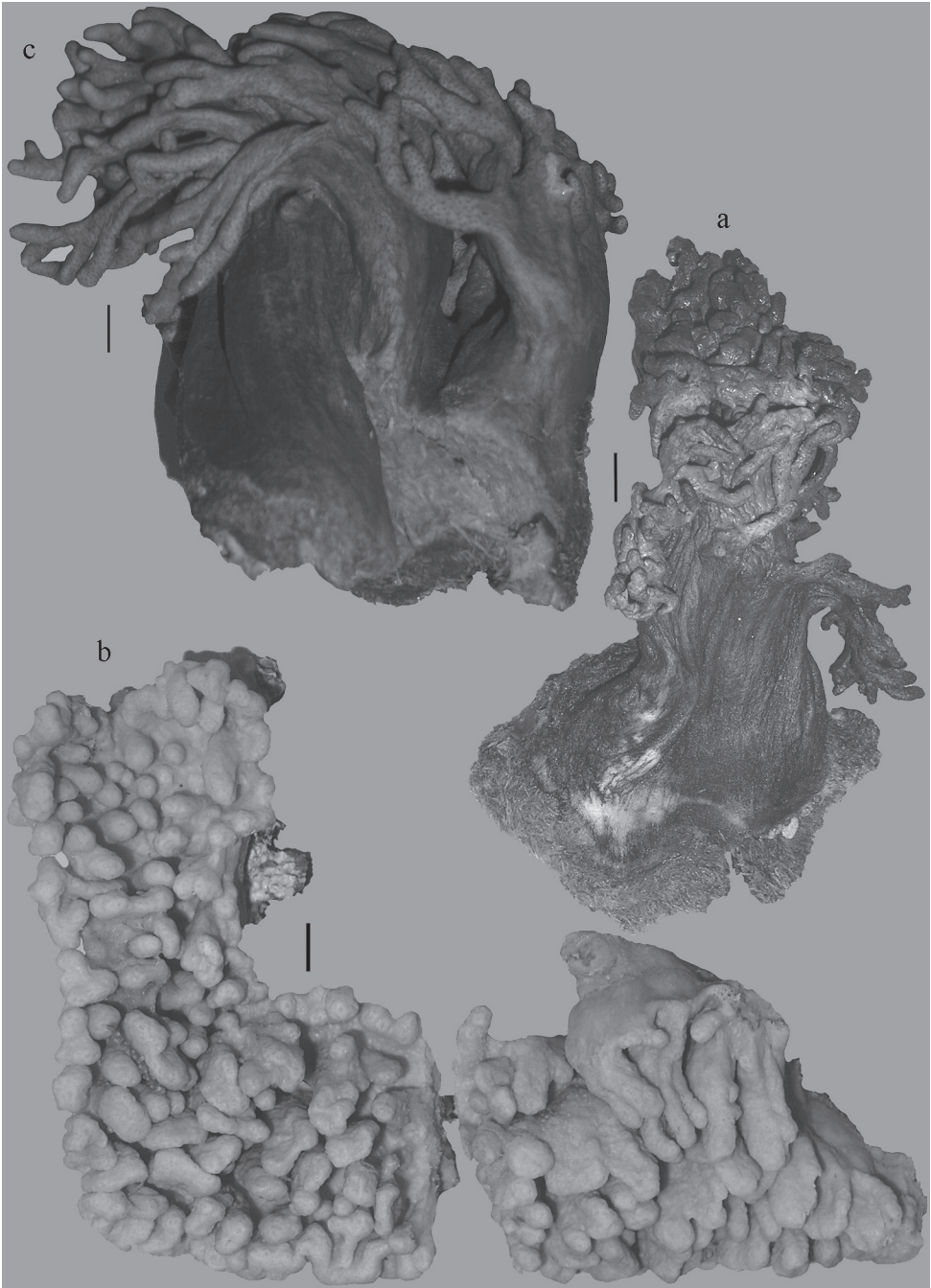


Fig. 9a. *Sinularia curvata* spec. nov., holotype RMNH Coel. 38436; b, *S. humesi* Verseveldt, 1968, RMNH Coel. 38421; c, *S. longula* spec. nov., RMNH Coel. 38439. Scales 1 cm.

Moreover, although not depicted by Verseveldt & Tursch, *S. sobolifera* also shows clubs with a bent handle, but not as many as in the present material. *S. sobolifera* differs in having much longer interior spindles (up to 6.5 mm long) and differently shaped clubs. In *S. sobolifera* the tubercles of the whorl below the central wart are mostly very simple while in *S. curvata* these tubercles are mostly quite complex. Moreover, although not mentioned by Verseveldt & Tursch, the polyps of *S. sobolifera* have clubs and the tentacles have small rods, while in *S. curvata* the polyps have no sclerites at all. The clubs with bent spindles of this species resemble some present in *S. hirta* (Pratt, 1903), but the latter species has a slightly different colony form and many polyp sclerites.

Sinularia humesi Verseveldt, 1968
(figs 9b, 13)

Sinularia humesi Verseveldt, 1968: 54; Verseveldt 1971: 38, figs 22-24, pl. 9 fig. 1; Benayahu 1997: 224, figs 9-14.

Remarks.— The specimens from stations MAL.06, MAL.08, and MAL.16 have more strongly tuberculated sclerites in the top of the colony than those described previously (compare fig. 13 with Verseveldt's (1971) fig. 22 and Benayahu's (1997) figs 10-13), however, the colony form (fig. 9b) does not seem to differ much and therefore we included these specimens in *S. humesi*.

Sinularia kotanianensis spec. nov.
(figs 14a, 15-18)

Material examined.— RMNH Coel. 38437, holotype, MAL.28.

Description.— The holotype is part of an encrusting colony with a maximal cross-section of 6 × 8 cm (fig. 14a). The central part of the capitulum shows some low ridges and finger-like lobes of about 1 cm high. Towards the edge of the capitulum the primary lobes are larger, up to 3 cm high, and bear small lobules, which are up to 0.5 cm in height.

The polyps have no sclerites.

The surface layer of the lobules has clubs, 0.10-0.20 mm long. Most have a definite central wart, and long, rather smooth handles with pointed ends (fig. 15). Spindles are present, up to 0.30 mm long, with simple tubercles (fig. 16a).

The clubs of the surface layer of the base of the colony resemble those of the lobules but are wider and more tuberculate (fig. 17). The spindles of the surface layer of the base (fig. 18a) do not differ from those of the lobules.

The interior of the colony has unbranched spindles, in the lobules they are rather short, up to 1.5 mm long (fig. 16b), in the base they are up to 2 mm long (fig. 18b-c). Most interior spindles have complex tubercles (figs 16c, 18d).

Colour.— The preserved specimen is cream-coloured.

Etymology.— Named after the type locality, Kotania Bay, Seram.

Remarks.— The clubs with central wart and long, rather smooth handles, resemble those of *S. mammifera* Malyutin, 1990, and *S. laminilobata* Malyutin, 1990. However, these

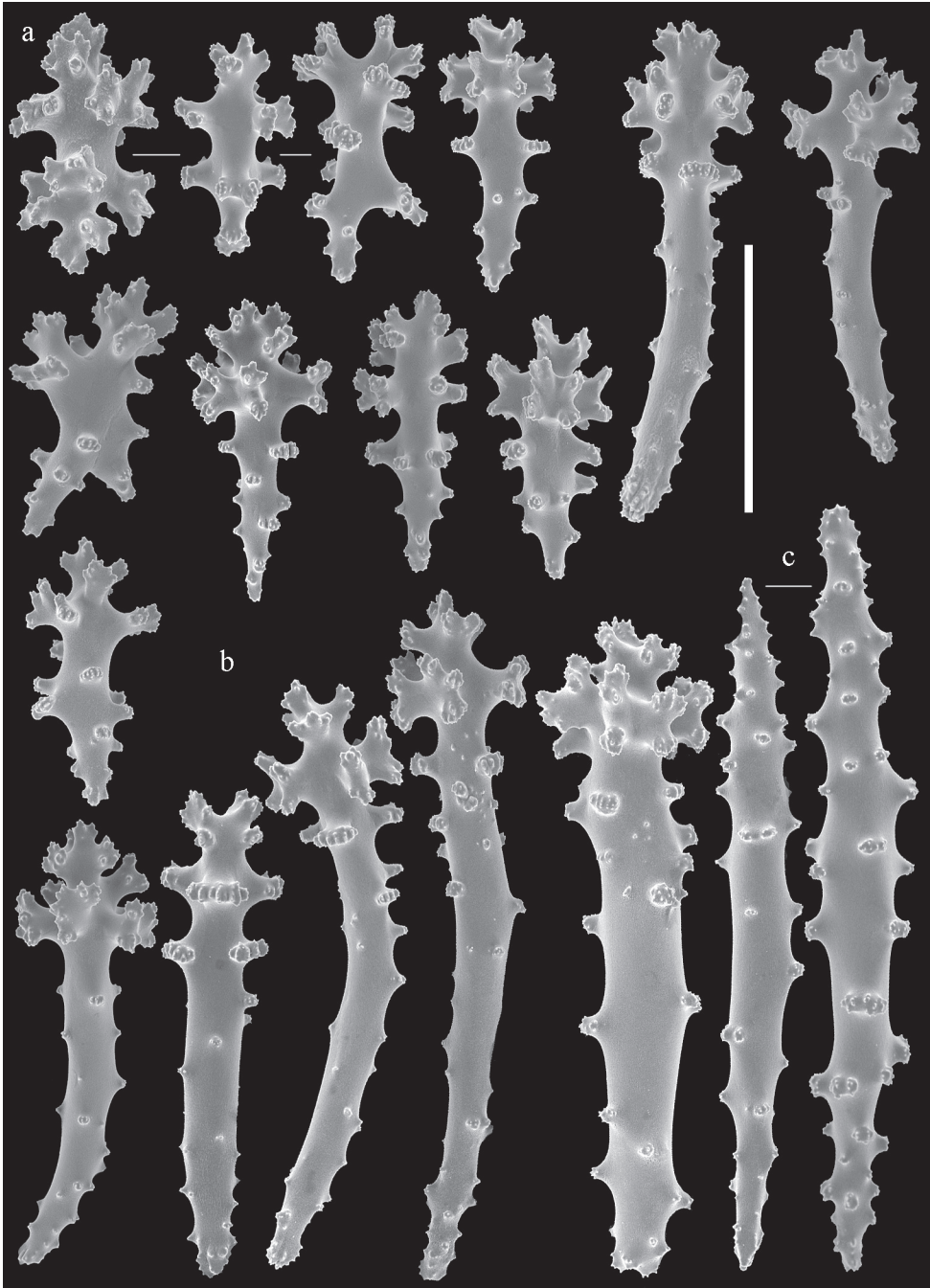


Fig. 10. *Simularia curvata* spec. nov., holotype RMNH Coel. 38436; sclerites of surface layer of lobule; a, capstans; b, clubs; c, spindles. Scale 0.10 mm.

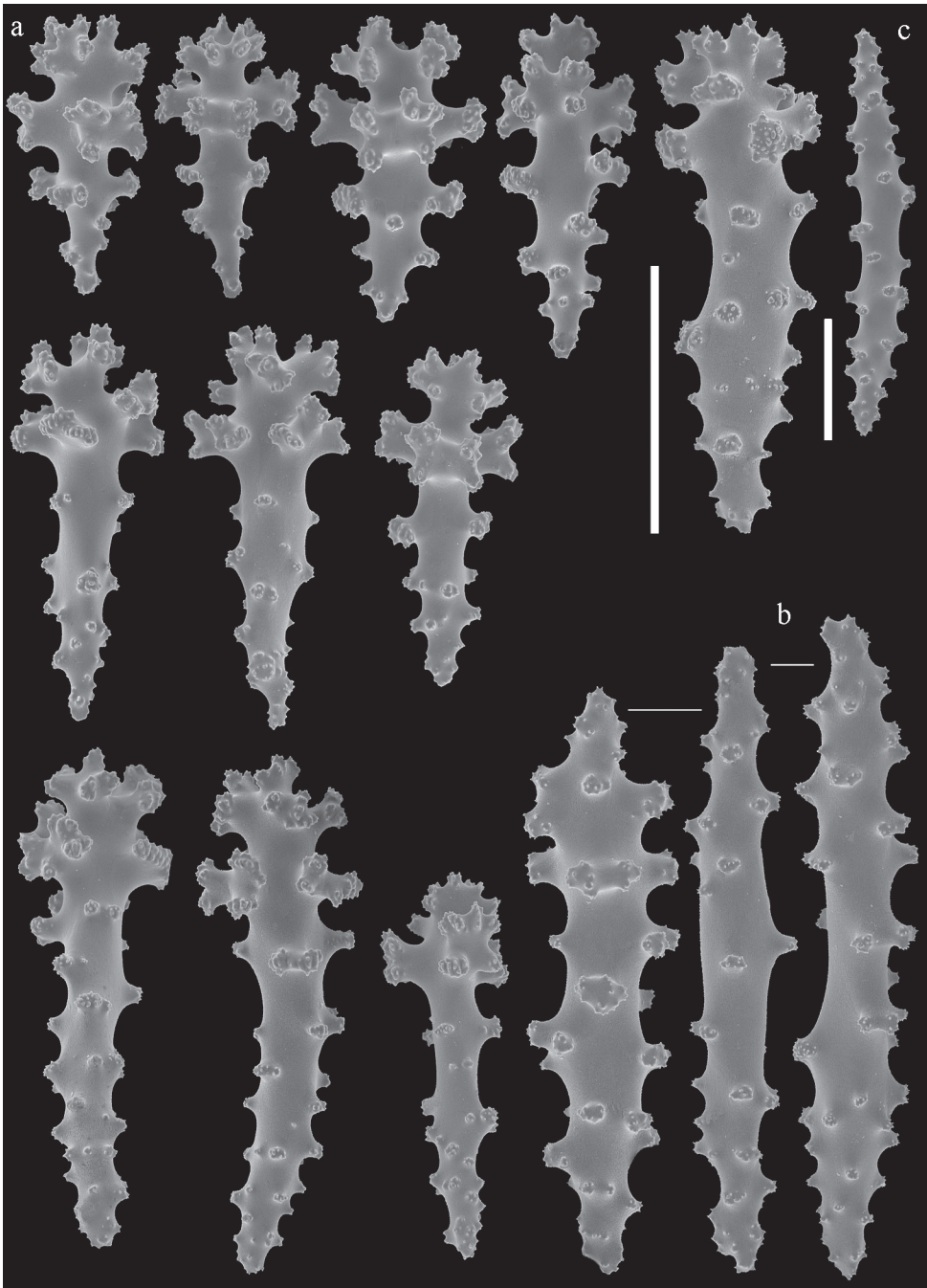


Fig. 11. *Simularia curvata* spec. nov.; holotype RMNH Coel. 38436; sclerites of surface layer of base of stalk; a, clubs; b-c, spindles. Scales 0.10 mm, that at c only applies to c.

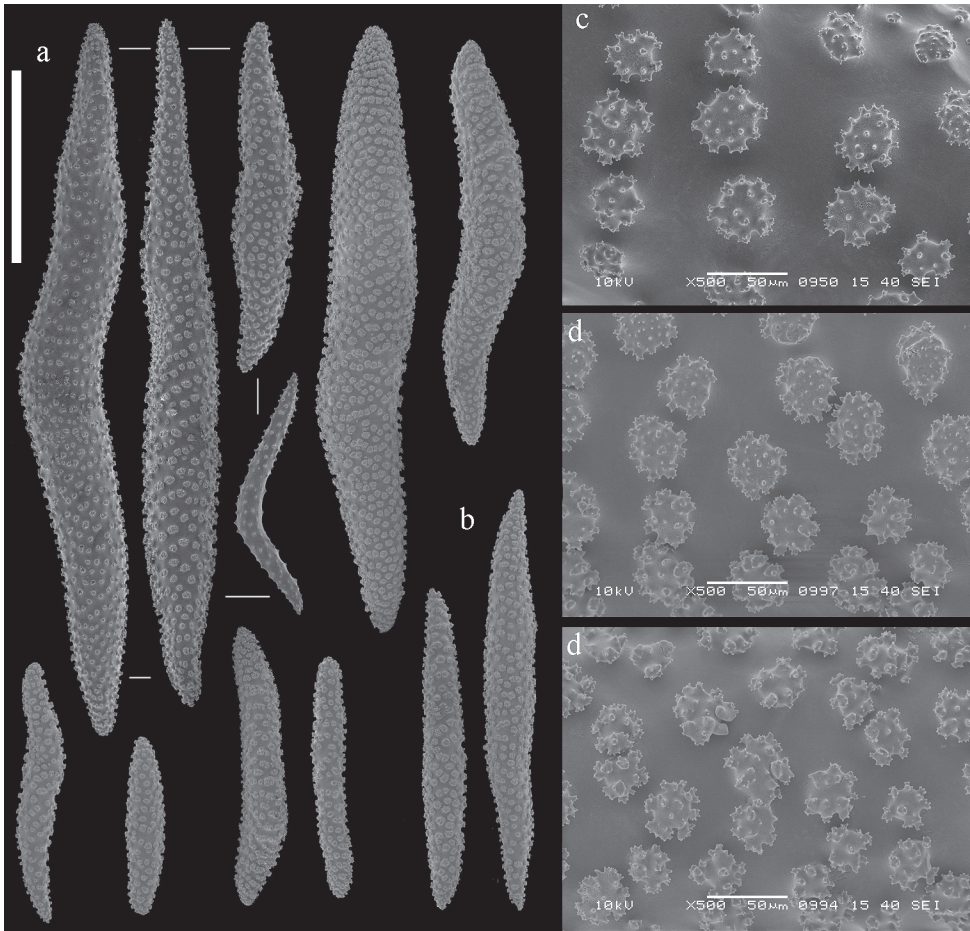


Fig. 12. *Sinularia curvata* spec. nov.; holotype RMNH Coel. 38436; spindles of interior of colony; a, lobule; b, base stalk; c, tubercles on spindle of lobule; d, tubercles on spindle of base stalk. Scale at a 1 mm, also applies to b.

species have no primary lobes with lobules, *S. mammifera* has nipple-shaped, remote lobes, and *S. laminilobata* has crests. Moreover, these two species have more tuberculate clubs with somewhat wider handles in the top of the colony.

Sinularia longula spec. nov.
(figs 9c, 19-21)

Material examined.— RMNH Coel. 38439, holotype, MAL.24.

Description.— The holotype is an arborescent colony, 10 cm high and wide (fig. 9c). The stalk varies in height from 3-7 cm. A number of primary lobes branch off repeatedly. The lobules are slender, up to a few cm long and only a few mm wide.



Fig. 13. *Simularia humesi* Verseveldt, 1968, RMNH Coel. 38421; a, clubs and rods of polyps; b, clubs of surface layer of top of colony; c, spindles of surface layer of top of colony. Scales 0.10 mm, that at c only applies to c.

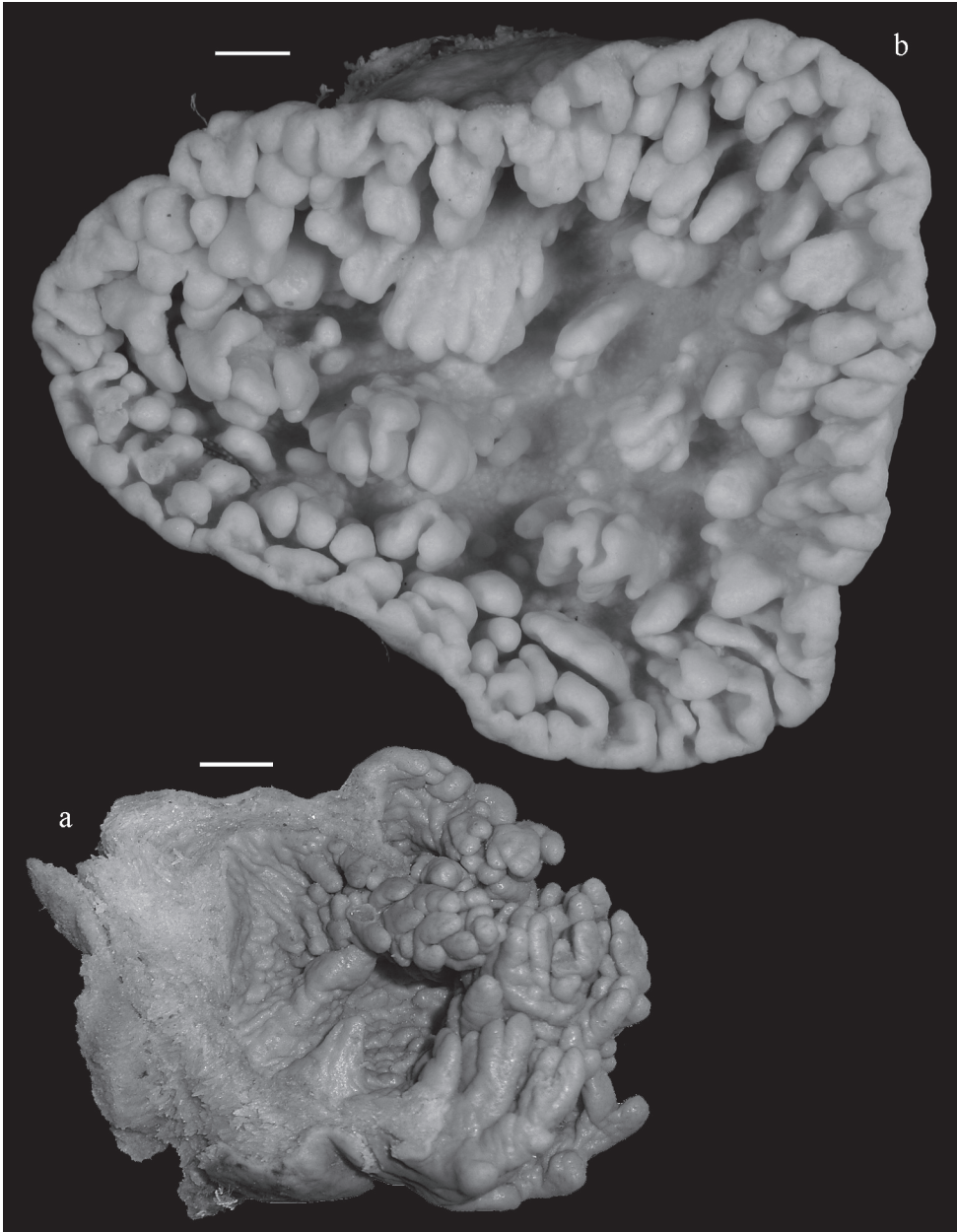


Fig. 14a, *Sinularia kotanianensis* spec. nov., holotype RMNH Coel. 38437; b, *S. slieringsi* Ofwegen & Vennam, 1994, RMNH Coel. 32540. Scales 1 cm.

The polyps have a crown and eight points. Crown with bent spindles, up to 0.40 mm long, and points with poorly developed clubs, up to 0.20 mm long (fig. 19a).

The surface layer of the lobules has *leptocladus*-type clubs, 0.05-0.15 mm long, and wart clubs, up to 0.25 mm long (fig. 19b). Furthermore, spindles are present, up to

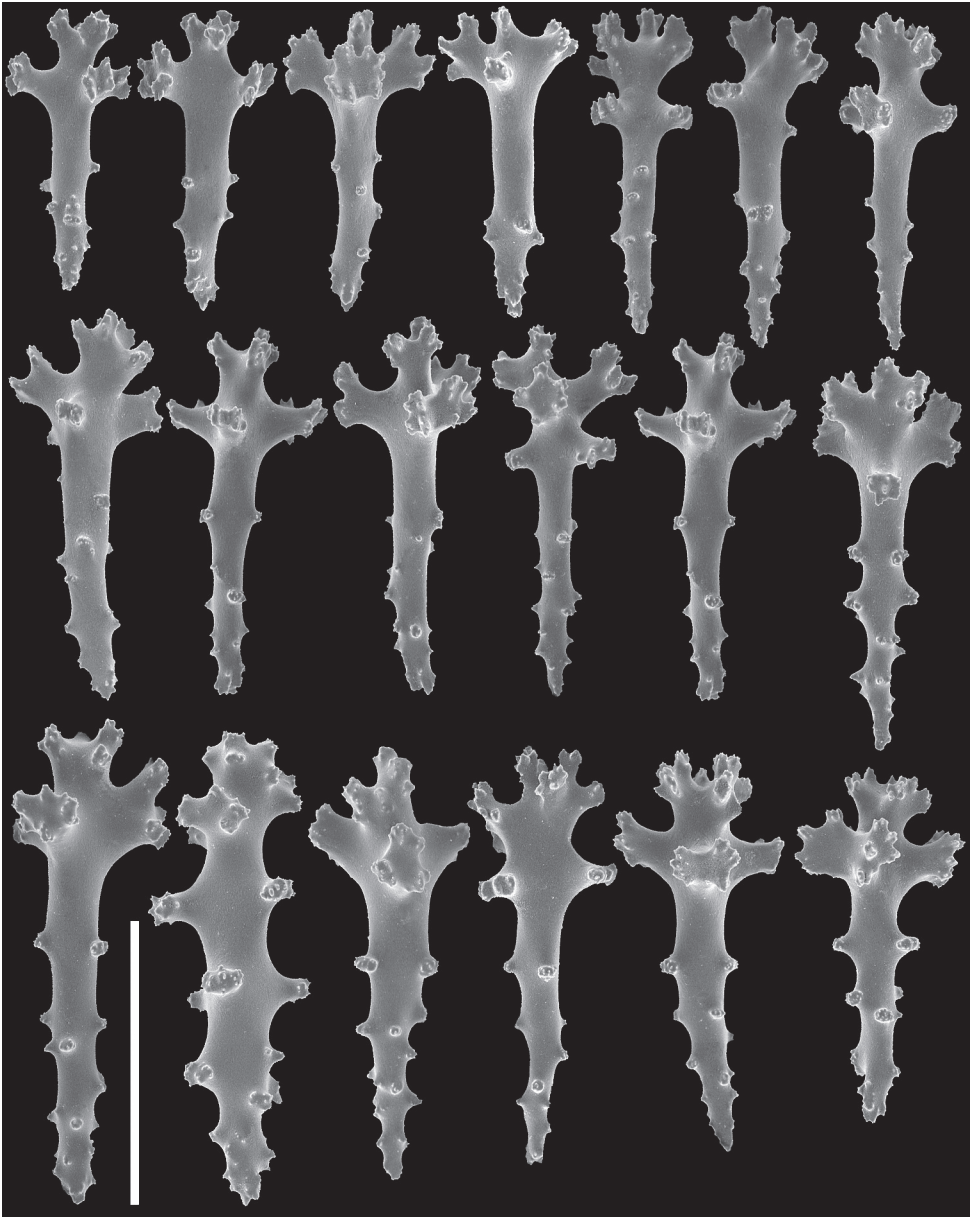


Fig. 15. *Simularia kotanianensis* spec. nov., holotype RMNH Coel. 38437; clubs of surface layer of lobule. Scale 0.10 mm.

0.30 mm long, with simple tubercles (fig. 19c).

The clubs and spindles of the surface layer of the base of the colony resemble those of the lobules but are shorter and wider (fig. 20).

The interior of the colony has unbranched spindles with simple or complex tubercles

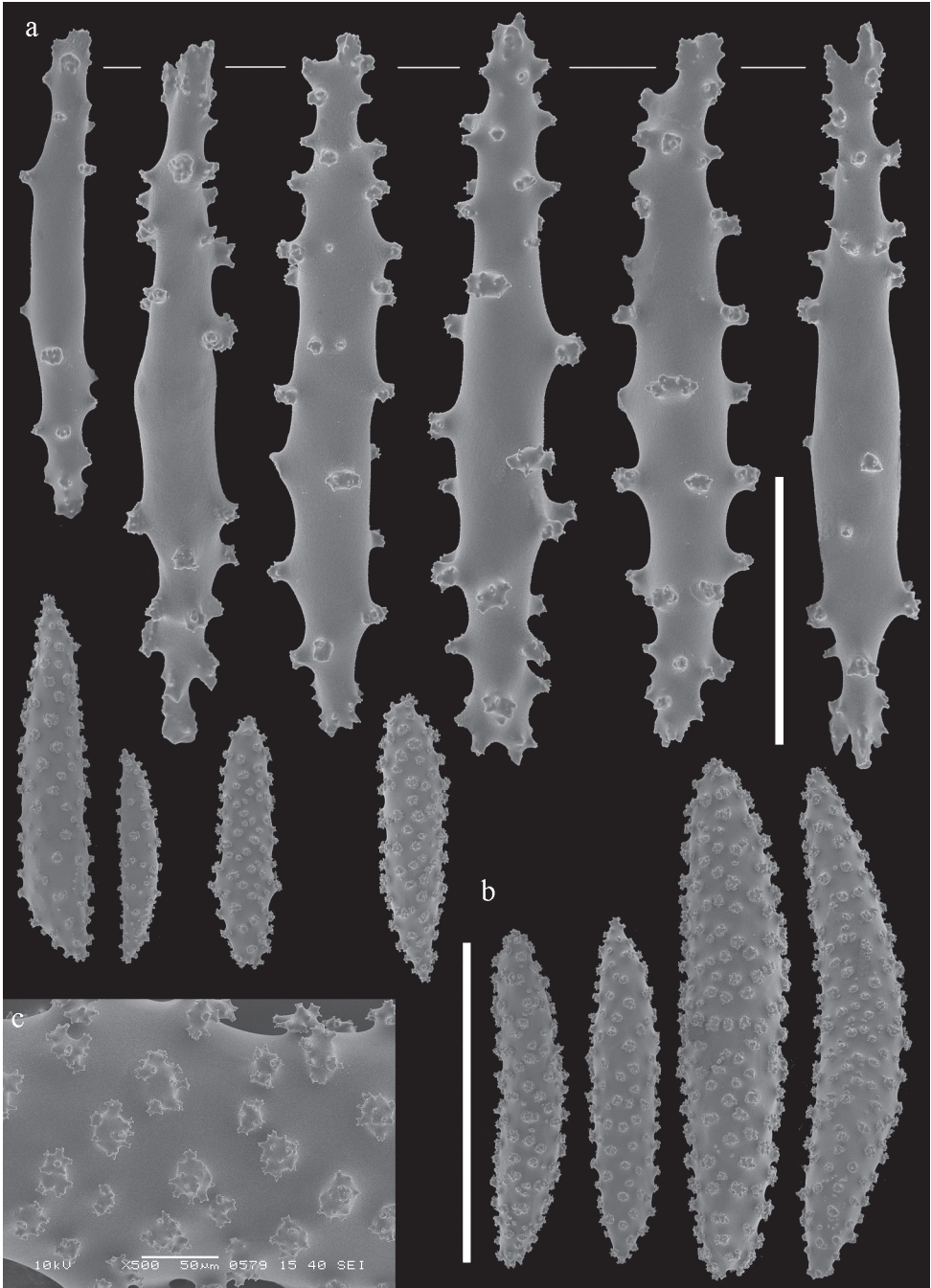


Fig. 16. *Simularia kotanianensis* spec. nov., holotype RMNH Coel. 38437; a, spindles of surface layer of lobule; b, spindles from interior of lobule; c, tubercles on lobule spindle. Scale at a 0.10 mm, at b 1 mm.

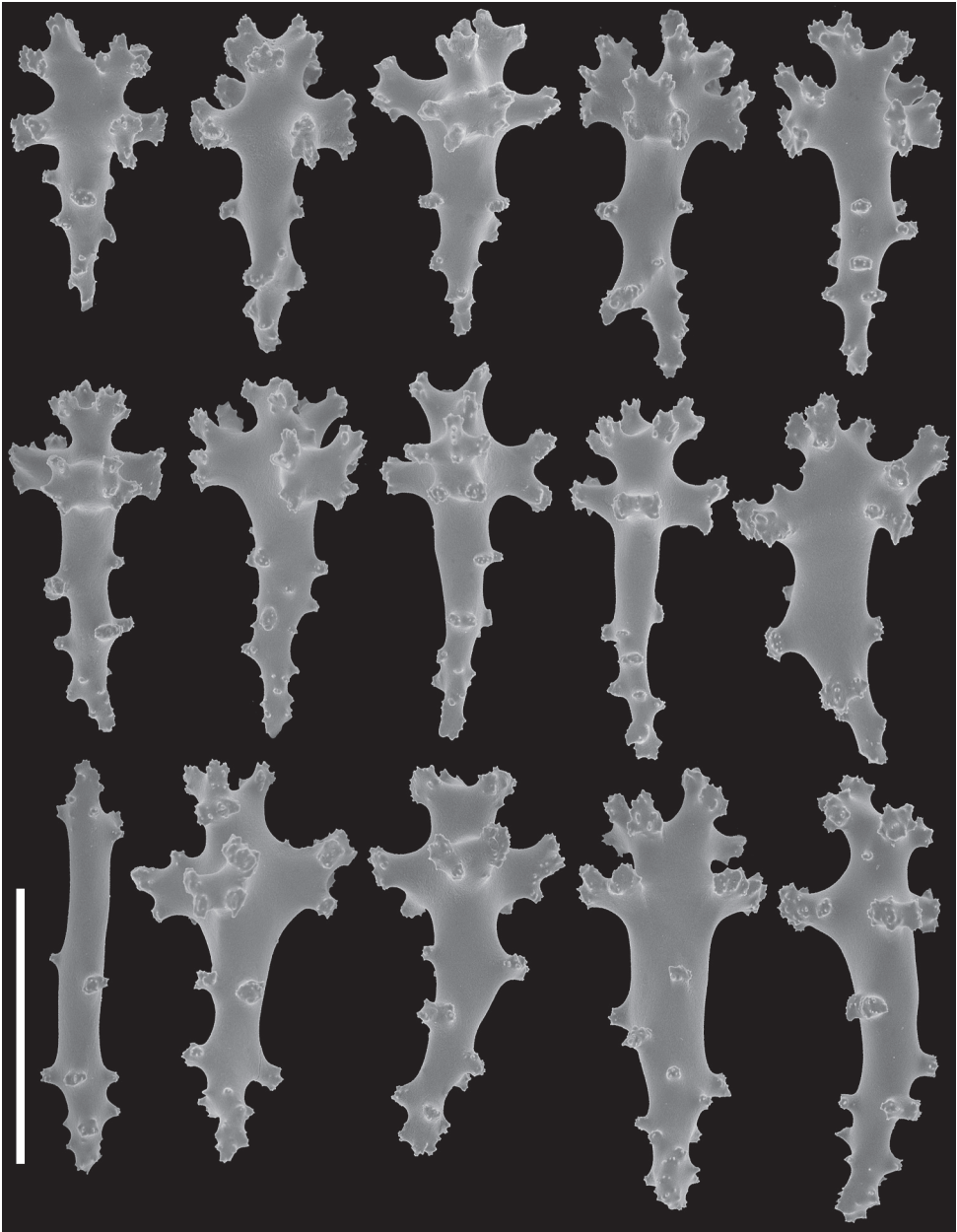


Fig. 17. *Simularia kotanianensis* spec. nov., holotype RMNH Coel. 38437; spindle and clubs of surface layer of base of colony. Scale 0.10 mm.

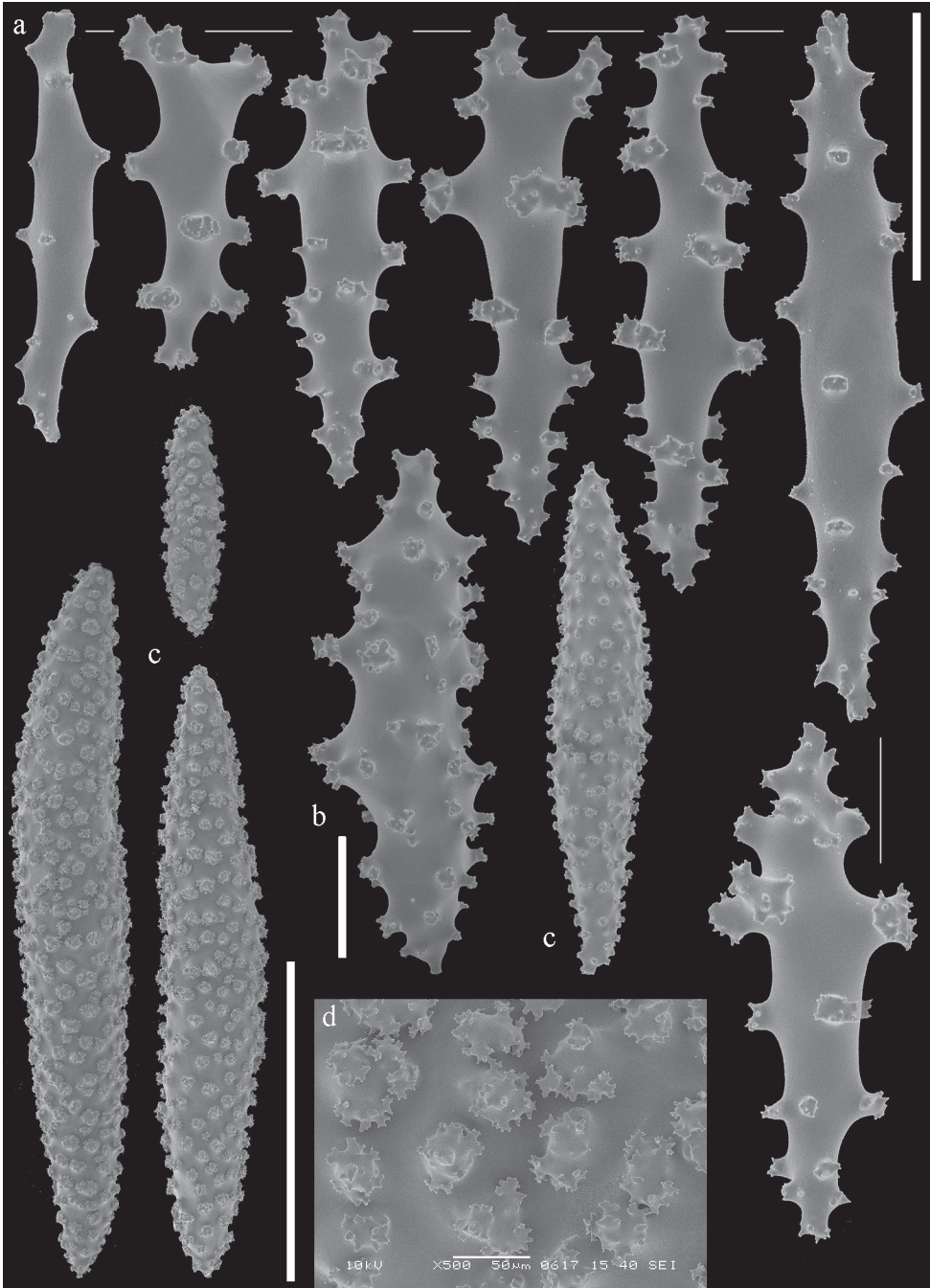


Fig. 18. *Simularia kotanianensis* spec. nov., holotype RMNH Coel. 38437; a, spindles of surface layer of base of colony; b-c, spindles from interior of base of colony; d, tubercles on base spindle. Scale at a-b 0.10 mm, at c 1 mm.



Fig. 19. *Simularia longula* spec. nov., holotype RMNH Coel. 38439; a, clubs and spindles of polyps; b, clubs of surface layer of top of colony; c, spindles of surface layer of top of colony. Scale 0.10 mm.

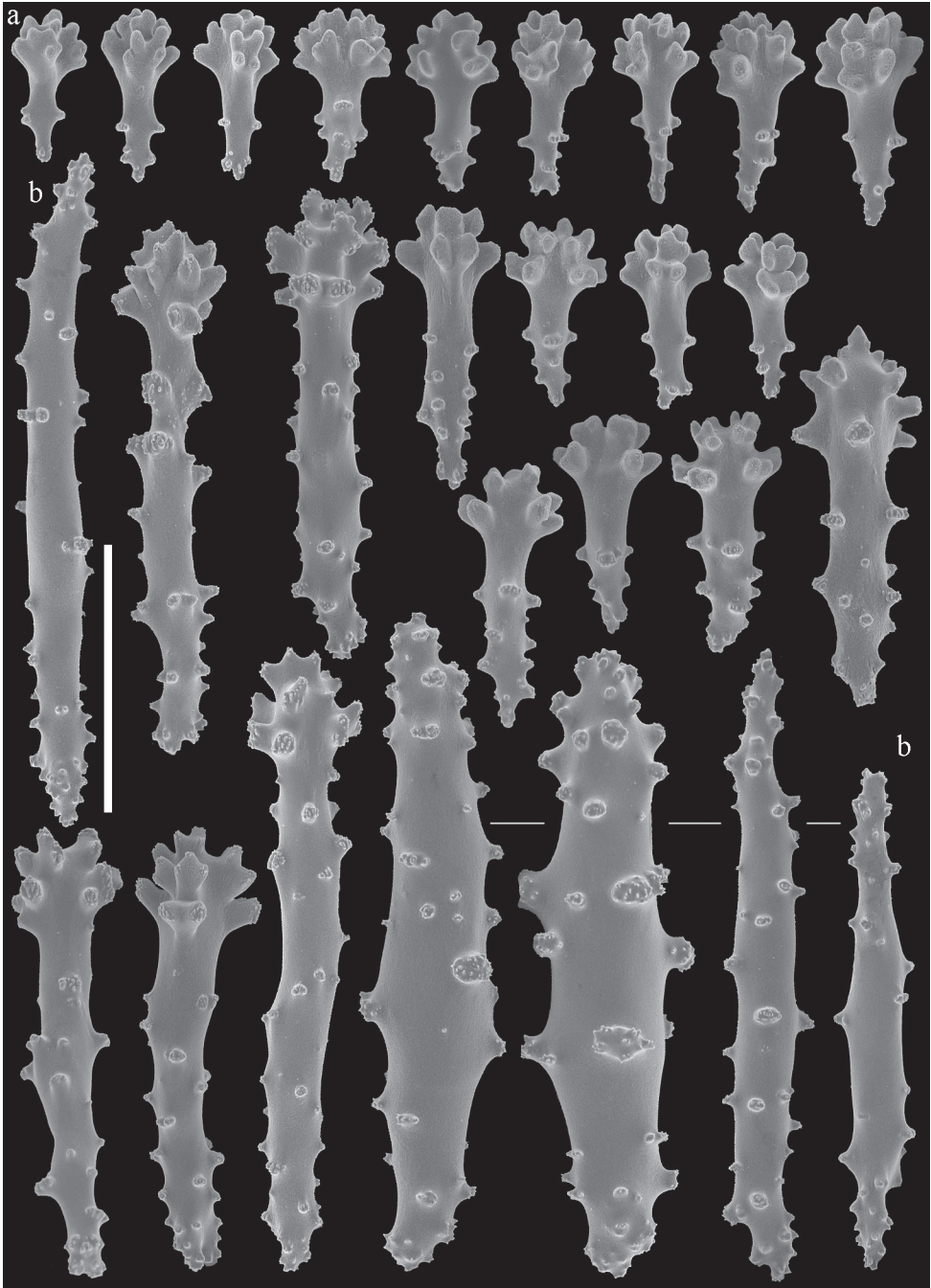


Fig. 20. *Simularia longula* spec. nov., holotype RMNH Coel. 38439; sclerites of surface layer of base of stalk; a, clubs; b, spindles Scale 0.10 mm.

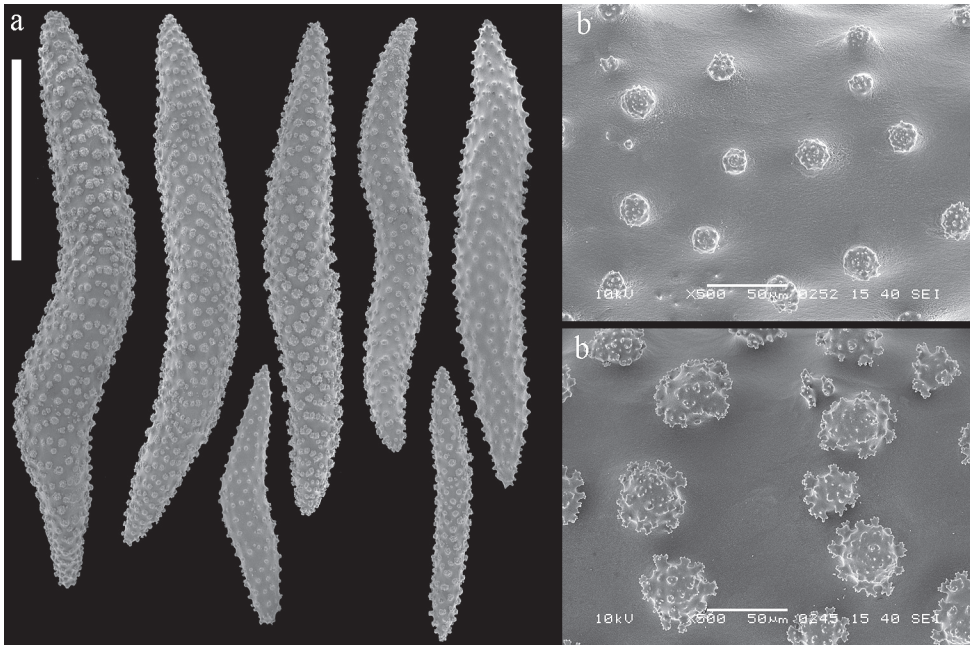


Fig. 21. *Sinularia longula* spec. nov., holotype RMNH Coel. 38439; a, spindles of interior of base of colony; b, tubercles on spindles of base of colony. Scale at a 1 mm.

(fig. 21b); these spindles are up to 3 mm long in both lobules and stalk (fig. 21a).

Colour.— The preserved specimen is brown.

Etymology.— The Latin “longula”, rather long, refers to the long lobules.

Remarks.— The colony form of the holotype of *S. longula* spec. nov. is similar to those of colonies of *S. leptocladus*, *S. acuta*, and *S. corpulentissima*. The species differs in having longer, more slender lobules. The clubs of *S. longula* mostly resemble those of *S. acuta*, but in the latter species the *leptocladus*-type clubs have clearly longer handles.

S. slieringsi Ofwegen & Vennam, 1994
(fig. 14b)

Sinularia slieringsi Ofwegen & Vennam, 1994: 152, figs 15-19.

Remarks.— During the Fauna Malesiana Maluku Expedition, 1996, seven additional specimens were collected of this recently described species (see species list), which allows us to show a larger specimen (fig. 14b) than the types (Ofwegen & Vennam, 1994, fig. 15).

Although in the original description it was mentioned that crown sclerites are lacking in the type specimens, we did find some in the newly collected material.

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