

# Siboga plexaurids (Coelenterata: Octocorallia) re-examined

L.P. van Ofwegen & M.I.Y.T. Hermanlimianto

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Key words: Alcyonacea; Plexauridae; Indonesia; type material; re-descriptions.

The type material of shallow-water plexaurid octocorals of the Siboga expedition has been re-examined. Sclerites of all available types have been depicted using Scanning Electron Microscopy (SEM). *Echinogorgia parareticulata* (Stiasny, 1942) is synonymized with *Echinogorgia clausa* (Nutting, 1910). No type specimens of *Echinogorgia thomsonideani* Stiasny, 1942, *Villogorgia aurivilliusi* Stiasny, 1942, and *Villogorgia spatulata* Nutting, 1910 were found.

## Introduction

With the merger of the Zoological Museum Amsterdam (ZMA) and Naturalis Biodiversity Center (NBC) all octocorals of the Siboga expedition were merged in the coelenterate collection of the NBC and therefore they became more easily accessible for research. With the re-examination of ZMA nephtheid types the first author (Ofwegen, 2005) noticed that several of these types showed disintegrated sclerites, probably caused by acidity of their storage medium. To check other available material and to make information accessible for Indonesian octocoral reef research, the Siboga plexaurid collection was checked for the genera expected to occur in shallow water, viz. *Echinogorgia*, *Echinomuricea*, *Menella*, *Paraplexaura*, and *Villogorgia*. The genera *Bebryce* and *Trimuricea* will be dealt with separately, respectively (Bayer & Ofwegen, submitted), (Samimi-Namin & Ofwegen, submitted).

## Methods

As a starting point we used microscope slides made by Stiasny (1942) for this re-examination of Siboga material. All *Echinomuricea* microscope slides and specimens showed broken sclerites. This genus can only be dealt with when the historical specimens can be compared with recently collected material. This also accounts for *Menella rubescens* Nutting, 1910 and *M. grayi* Nutting, 1910, both referred to *Echinomuricea* by Stiasny (1942), and confirmed by us. The sclerites of *Echinomuricea collaris* and *Placogorgia dentata* were so badly damaged that we could not even ascertain the genus. Genera and species names presented by Nutting (1910), together with previous and present re-examinations are summarized in table 1.

Table 1. Species dealt with in this report, according to Nutting's (1910) identification, the re-examination by Stiasny (1942), and the present identification. \*One specimen of *Bebryce* was found in the material of this species (see Bayer & Ofwegen, submitted).

	Nutting, 1910	Stiasny, 1942	Present work
<i>Acamptogorgia</i>	<i>A. spatulata</i>	<i>Villogorgia spatulata</i>	MISSING
<i>Echinogorgia</i>	<i>E. aurantiaca</i> (part)	<i>E. pseudo-aurantiaca</i> spec. nov.	<i>Menella pseudoaurantiaca</i>
	<i>E. aurantiaca</i> (part)	<i>E. thomsoni-deani</i> spec. nov.	<i>Echinogorgia</i> (MISSING)
	<i>E. ridley</i>	<i>E. ridley</i>	<i>Echinogorgia ridley</i>
	<i>E. flora</i>	<i>E. flora</i>	<i>Menella flora</i>
	<i>E. complexa</i>	<i>E. complexa</i>	<i>Echinogorgia complexa</i>
<i>Villogorgia</i>	<i>V. nigrescens</i>	<i>Villogorgia aurivilliusi</i> spec. nov.	MISSING
	<i>V. serrata</i>	MISSING	MISSING
	<i>V. timorensis</i>	<i>V. rubra</i> Hiles?	<i>Villogorgia timorensis</i>
	<i>V. flavescens</i>	incertae sedis	<i>Villogorgia flavescens</i>
	<i>V. inermis</i>	incertae sedis	<i>Trimuricea</i>
<i>Placogorgia</i>	<i>P. pulchra</i>	<i>Plexauropsis pulchra</i>	<i>Paraplexaura pulchra</i>
	<i>P. dendritica</i>	<i>Placogorgia dendritica</i>	partly <i>Bebryce</i> *
	<i>P. cryptotheca</i>	spec. incerta	<i>Paraplexaura cryptotheca</i>
	<i>P. reticuloides</i>	<i>Plexauroides</i>	<i>Paraplexaura reticuloides</i>
<i>Heterogorgia</i>	<i>H. clausa</i>	<i>Astromuricea clausa</i>	<i>Echinogorgia clausa</i>
	<i>H. humilis</i>	<i>Echinogorgia humilis</i>	<i>Echinogorgia humilis</i>
	<i>H. stellata</i>	<i>Echinomuricea stellata</i>	<i>Echinogorgia stellata</i>
	<i>H. magna</i>	<i>Echinomuricea magna</i>	<i>Trimuricea</i>
	<i>H. reticulata</i>	<i>Echinomuricea parareticulata</i>	<i>Echinogorgia clausa</i>
	<i>H. operculata</i>	<i>Astromuricea operculata</i>	<i>Echinogorgia operculata</i>

## Systematic part

### *Echinogorgia clausa* (Nutting, 1910) (figs 1-6)

*Heterogorgia clausa* Nutting, 1910: 90, pl. 15 figs. 4-4a; Kükenthal, 1924: 232; Van Soest, 1979: 89.

*Astromuricea clausa*; Stiasny, 1942: 197.

*Echinogorgia clausa*; Breedy & Guzman, 2011: 29.

*Heterogorgia reticulata* Nutting, 1910: 93, pl. 17 figs 2-2a, pl. 22 fig. 17; Van Soest, 1979: 89.

*Echinomuricea parareticulata* Stiasny, 1942: 197.

*Echinogorgia reticulata*; Breedy & Guzman, 2011: 29.

Material.— *Heterogorgia clausa*: ZMA COEL. 2663a, Siboga station 164, New Guinea, 32 m (two specimens); ZMA COEL. 2663b, Siboga station 80, Borneo bank, 40-50 m; ZMA COEL. 2663c, Siboga station 274, Aru islands, 57 m; *Echinomuricea parareticulata*: ZMA COEL. 1540, Ternate, no depth record; ZMA COEL. 2673, near Flores, no depth record.

Description.— The specimen from station 164 described and depicted by Nutting (1910) is shown in fig. 1, another specimen from station 164 in fig. 2.

Sclerites.— Points with bent spindles up to 0.30 mm long, with spiny distal end (fig. 4a). Collaret with bent spindles up to 0.40 mm long, with the middle part more tuberculate (fig. 4b); a few triradiate sclerites are also present (fig. 4c). Coenenchyme with thornscales up to 0.40 mm long (fig. 4d) and spindles up to 0.80 mm long, with simple or complex tubercles (fig. 5a). The thornscales have thorn-like projections. Further-



Fig. 1. *Echinogorgia clausa* (Nutting, 1910), ZMA COEL. 2663a. Specimen depicted by Nutting. Scale 1 cm.



Fig. 2. *Echinogorgia clausa* (Nutting, 1910), ZMA COEL. 2663a. Scale 1 cm.



Fig. 3. *Echinomuricea parareticulata* Stiasny, 1942, ZMA COEL. 2673. Scale 1 cm.

more, unilaterally spinose spindles are present (fig. 5b). Interior with small capstans about 0.05-0.10 mm long (fig. 5c).

All sclerites white.

Remarks.— Nutting (1910) mentioned a specimen from Siboga station 305, Solor Strait, 113 m. Van Soest (1979) did not mention it anymore and the ZMA database also has no data about that specimen. It also could not be found in the collection. Apparently, station 164 had three specimens, two are in the RMNH, and one was donated to the State University of Iowa, now deposited in the National Museum of Natural History (USNM 91921).

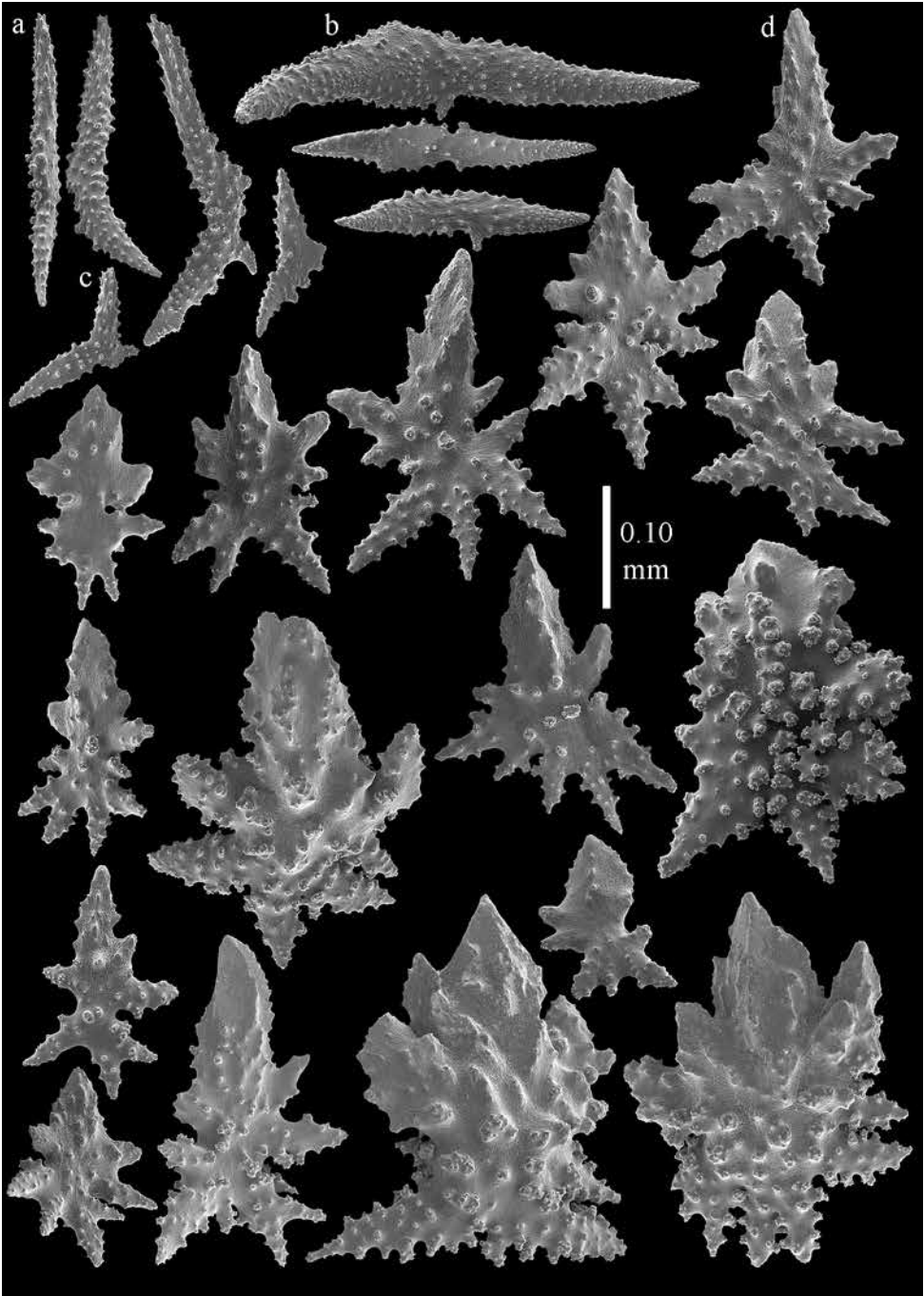


Fig. 4. *Echinogorgia clausa* (Nutting, 1910), ZMA COEL. 2663a; a, point spindles; b, collaret spindles; c, triradiate, d, thornscales. Scale 0.10 mm.

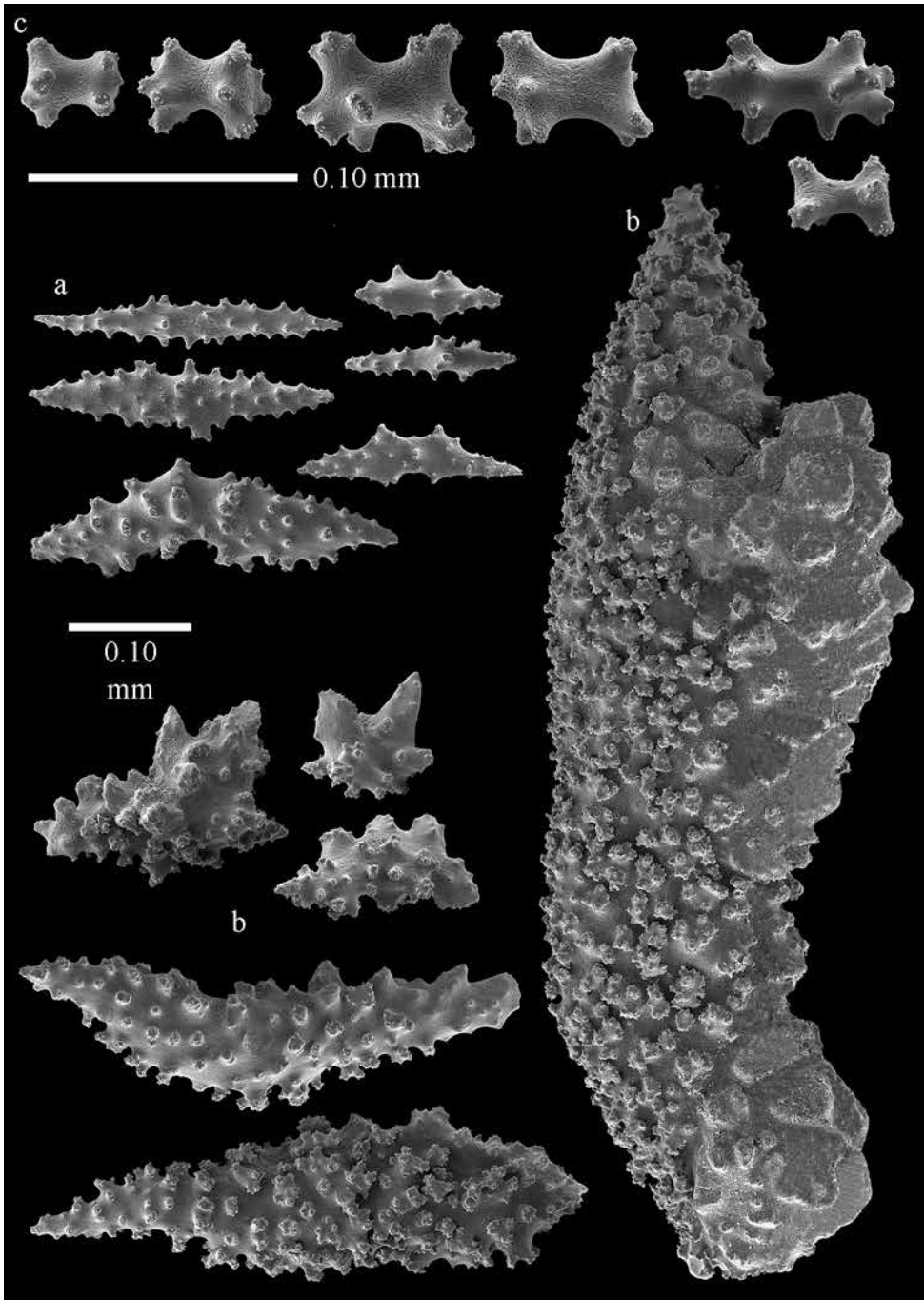


Fig. 5. *Echinogorgia clausa* (Nutting, 1910), ZMA COEL. 2663a; a, spindles; b, unilaterally spinose spindles; c, capstans. Scale at c only applies to c.

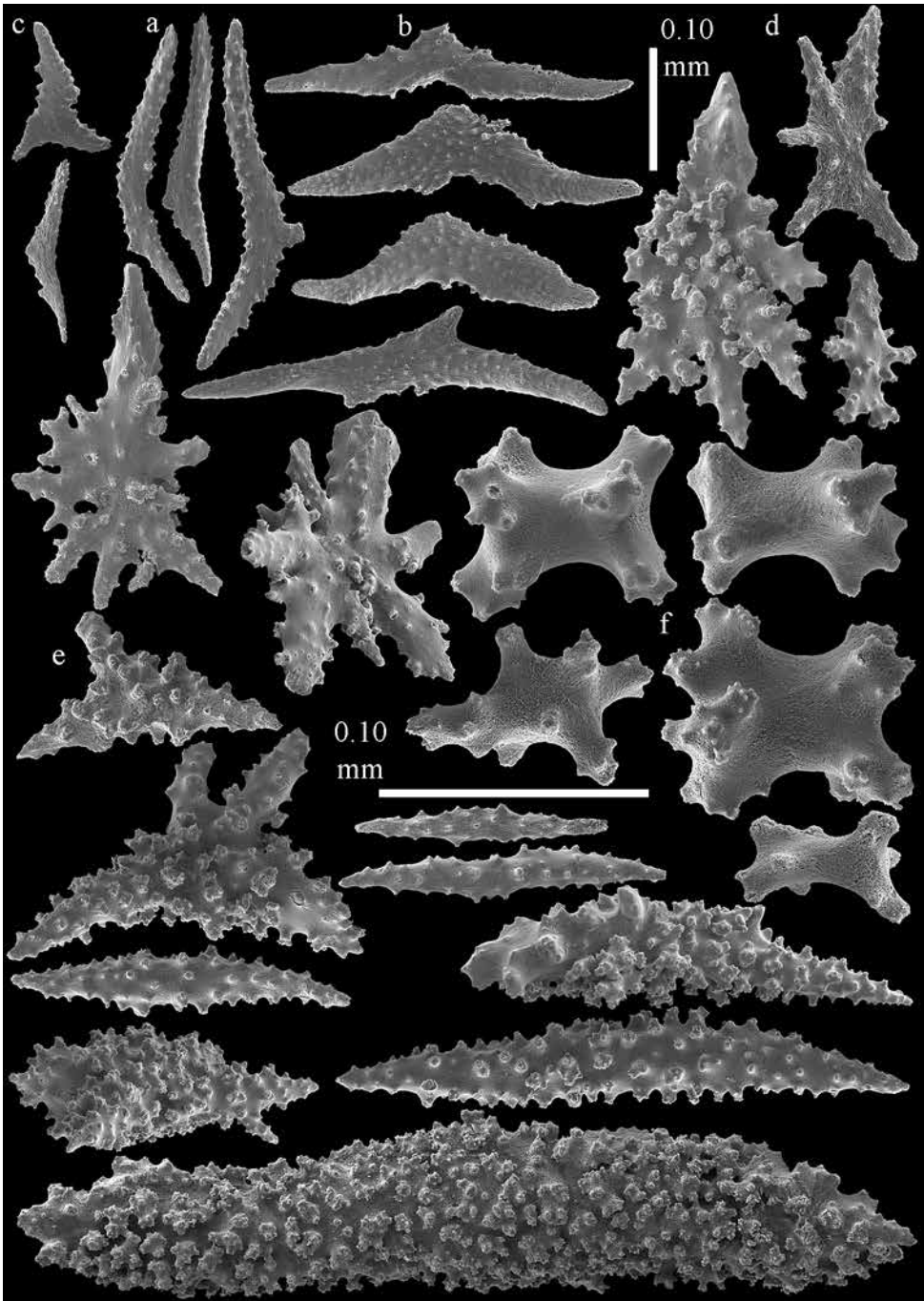


Fig. 6. *Echinomuricea parareticulata* Stiasny, 1942, ZMA COEL. 2673a, a, point spindles; b, collaret spindles; c, triradiate; d, thornscales; e, spindles and unilaterally spinose spindles; f, capstans. Scale at f only applies to f.

Based on the colony shape (fig. 3) and sclerites (fig. 6) it is obvious that *H. reticulata* and *H. clausa* represent one and the same species.

Nutting described and depicted ZMA COEL. 1540 for his *H. reticulata*, a dry specimen. Here we depict ZMA COEL. 2673 and its sclerites.

*Echinogorgia complexa* Nutting, 1910  
(figs 7-8)

*Echinogorgia complexa* Nutting, 1910: 67, pl. 11 figs. 2-2a, pl. 21 fig. 11; Kükenthal, 1924: 200; Dean, 1932: 19; Thomson & Dean, 1931: 204, pl. 24 fig. 1; Stiasny 1942: 197; Van Soest, 1979: 87.

Material.— ZMA COEL. 2503-2506, Siboga station 310, Flores, 72 m; ZMA COEL. 2507, Siboga station 164, near New Guinea, 32 m depth.

Description.— Two of the four specimens of ZMA COEL. 2507 are shown (fig. 7).

Sclerites.— Points with bent spindles up to 0.30 mm long, with spiny distal end (fig. 8a). Collaret with bent spindles up to 0.30 mm long, with the middle part more tuberculate (fig. 8b); a few triradiate sclerites are also present (fig. 8c). Coenenchyme with thornscales up to 0.30 mm long (fig. 8d) and small spindles up to 0.45 mm long (fig. 8e), with simple tubercles. The thornscales have blade-like projections. Interior with small capstans about 0.05 mm long (fig. 8f).

All sclerites white.



Fig. 7. *Echinogorgia complexa*, Nutting, 1910, ZMA COEL. 2507, two specimens. Scale 1 cm.

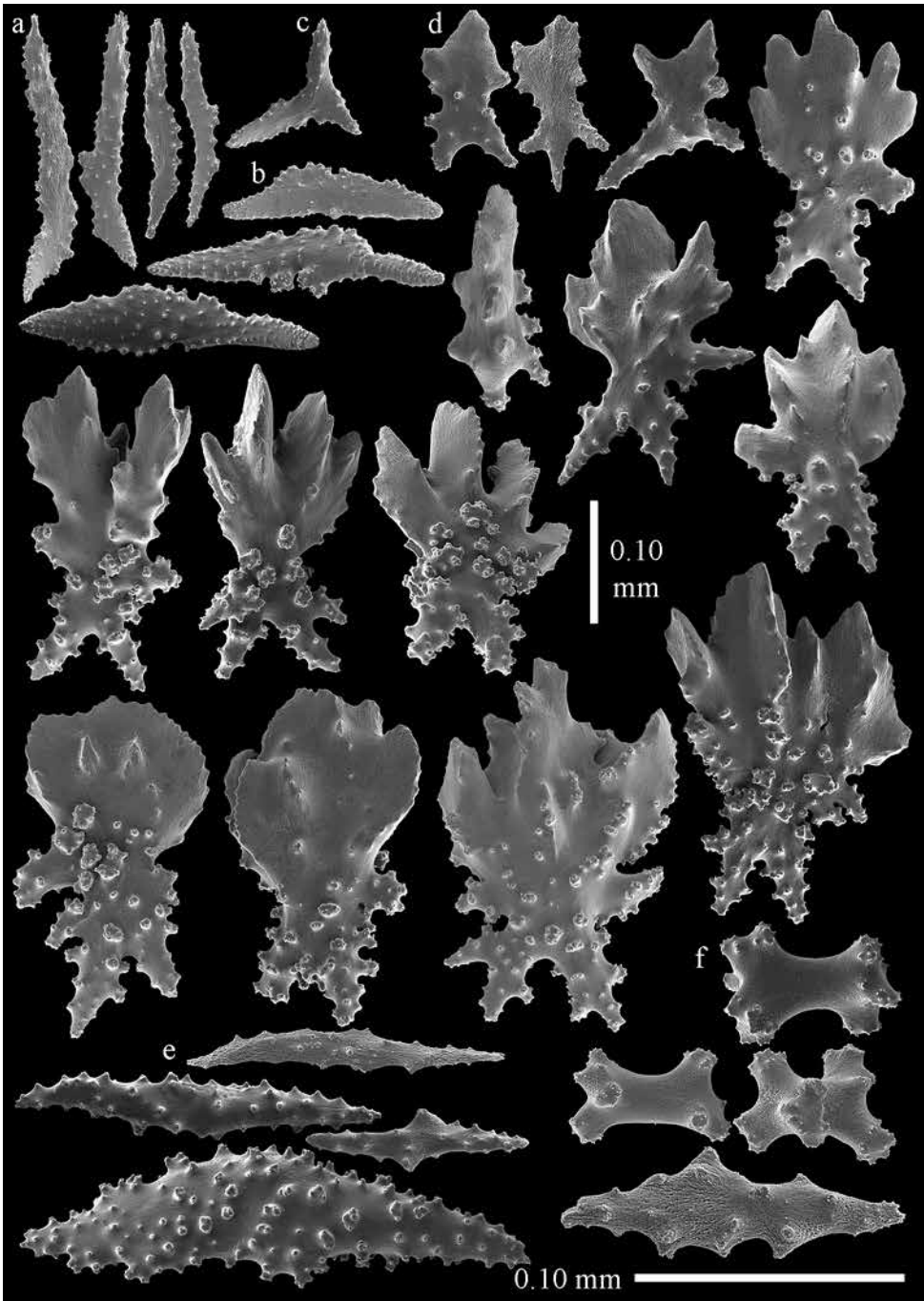


Fig. 8. *Echinogorgia complexa*, Nutting, 1910, ZMA COEL. 2507; a, point spindles; b, collaret spindles; c, triradiate; d, rooted leaves; e, spindles; f, capstans. Scale at f only applies to f.



Remarks.— The ZMA database has five collection numbers for this species, four jars for station 310 (2503-06), one for station 164 (2507). Van Soest only included ZMA COEL 2506 and 2507 as syntypes. One specimen of station 164 has been donated to Iowa State University (Van Soest, 1979), now deposited in the National Museum of Natural History under two collection numbers (USNM 91914, 91923).

*Echinogorgia humilis* (Nutting, 1910)  
(figs 9-10)

*Heterogorgia humilis* Nutting, 1910: 91, pl. 17 figs 1-1a, pl. 22 fig. 14; Kükenthal, 1924: 233; Van Soest, 1979: 89.

*Echinogorgia humilis*; Stiasny, 1942: 197; Breedy & Guzman, 2011: 29.

Material.— ZMA COEL. 2664a, b, Siboga station 310, Flores, 72 m, two specimens.

Description.— The two colonies of ZMA COEL. 2664 are shown in fig. 9. Nutting used ZMA COEL. 2664a for his description, we used ZMA COEL. 2664b.

Sclerites.— Points with bent spindles up to 0.30 mm long, with spiny distal end (fig. 10a). Collaret with bent spindles up to 0.30 mm long, with the middle part more tuberculate (fig. 10b). Coenenchyme with thornscales up to 0.30 mm long (fig 10c) and small spindles up to 0.30 mm long, with simple or slightly complex tubercles (fig. 10d). The thornscales have blade-like projections. Furthermore unilaterally leafy bodies are present, up to 0.40 mm long, with complex tubercles (fig. 10e). Interior with small capstans up to 0.10 mm long (fig. 10f).

All sclerites white.

Remarks.— ZMA COEL. 2664a has a label mentioning Siboga station 305 (fig. 9), probably an error as Nutting only mentioned station 310. The ZMA database mentions

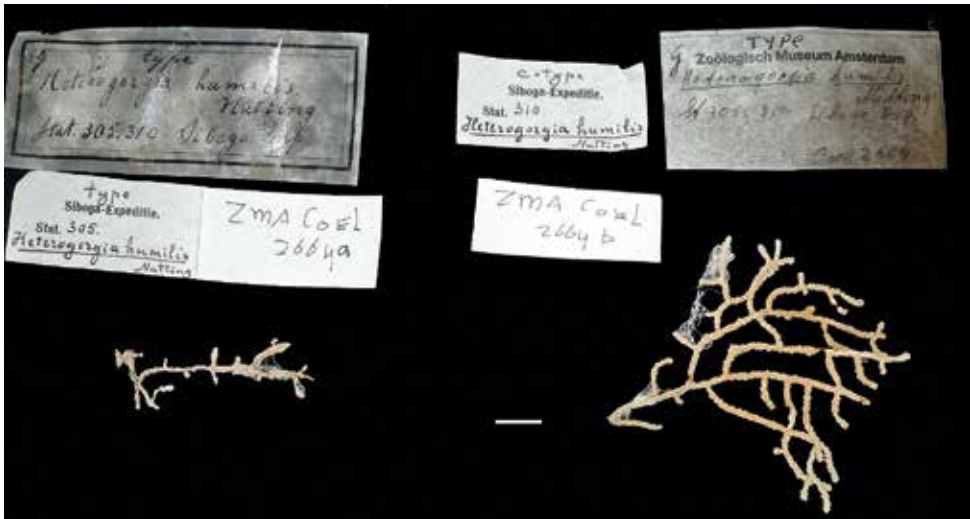


Fig. 9. *Echinogorgia humilis* (Nutting, 1910), ZMA COEL. 2664a, b. Scale 1 cm.

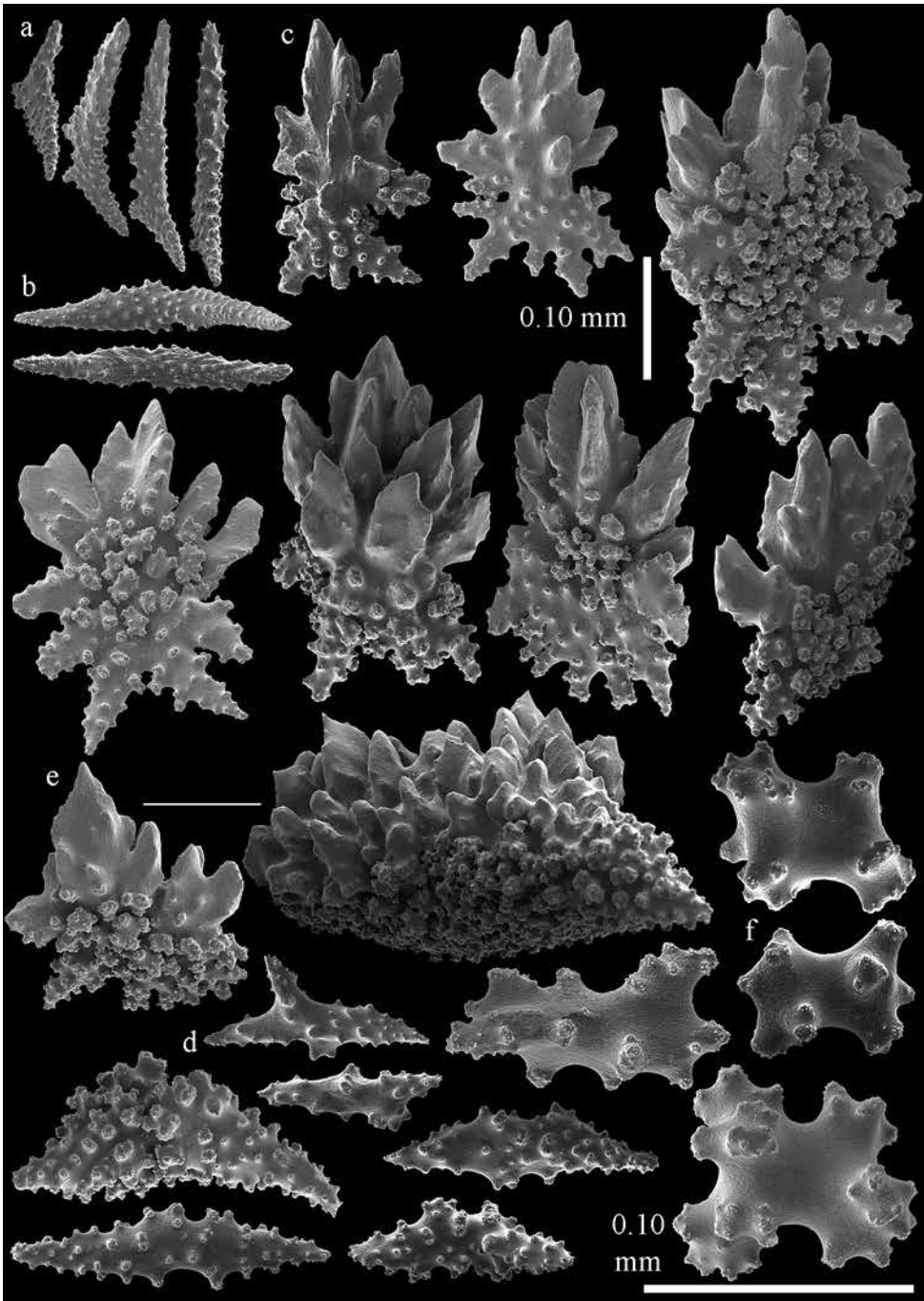


Fig. 10. *Echinogorgia humilis* (Nutting, 1910), ZMA COEL. 2664b; a, point spindles; b, collaret spindles; c, rooted leaves; d, spindles; e, unilaterally leafy bodies; f, capstans. Scale at f only applies to f.

ZMA COEL. 2664a as syntype with station 305, and ZMA COEL. 2664b without type status with station 310. Van Soest only mentioned two syntypes from station 310.

*Echinogorgia operculata* (Nutting, 1910)  
(figs 11-12)

*Heterogorgia operculata* Nutting, 1910: 94, pl. 18 figs 1-1a; Kükenthal, 1924: 234; Van Soest, 1979: 89.  
*Astromuricea operculata*; Stiasny, 1942: 197.  
*Echinogorgia operculata*; Breedy & Guzman, 2011: 29.

Material.— ZMA COEL. 2669, holotype, Siboga station 117, N Sulawesi, 80 m depth.

Description.— The holotype is shown in fig. 11.

Sclerites.— Points with bent spindles up to 0.35 mm long, distal part spiny (fig. 12a); a few triradiate sclerites also present. Collaret with bent spindles up to 0.45 mm long, with the middle part more tuberculate (fig. 12b). Tentacles with scales and rods, up to 0.10 mm long. Coenenchyme with thornscales, up to 0.25 mm long, with a central spiny processus (fig 12c), and spindles up to 0.35 mm long, with simple tubercles (fig. 12d). Interior with capstans about 0.05 mm long (fig. 12e).

Colony dull orange, smaller tentacle sclerites white, all others ochreous.

Remarks.— The spiny processus of the thornscales makes this species unique among the Siboga *Echinogorgia* species.



Fig. 11. *Echinogorgia operculata* (Nutting, 1910), ZMA COEL. 2669. Scale 1 cm.

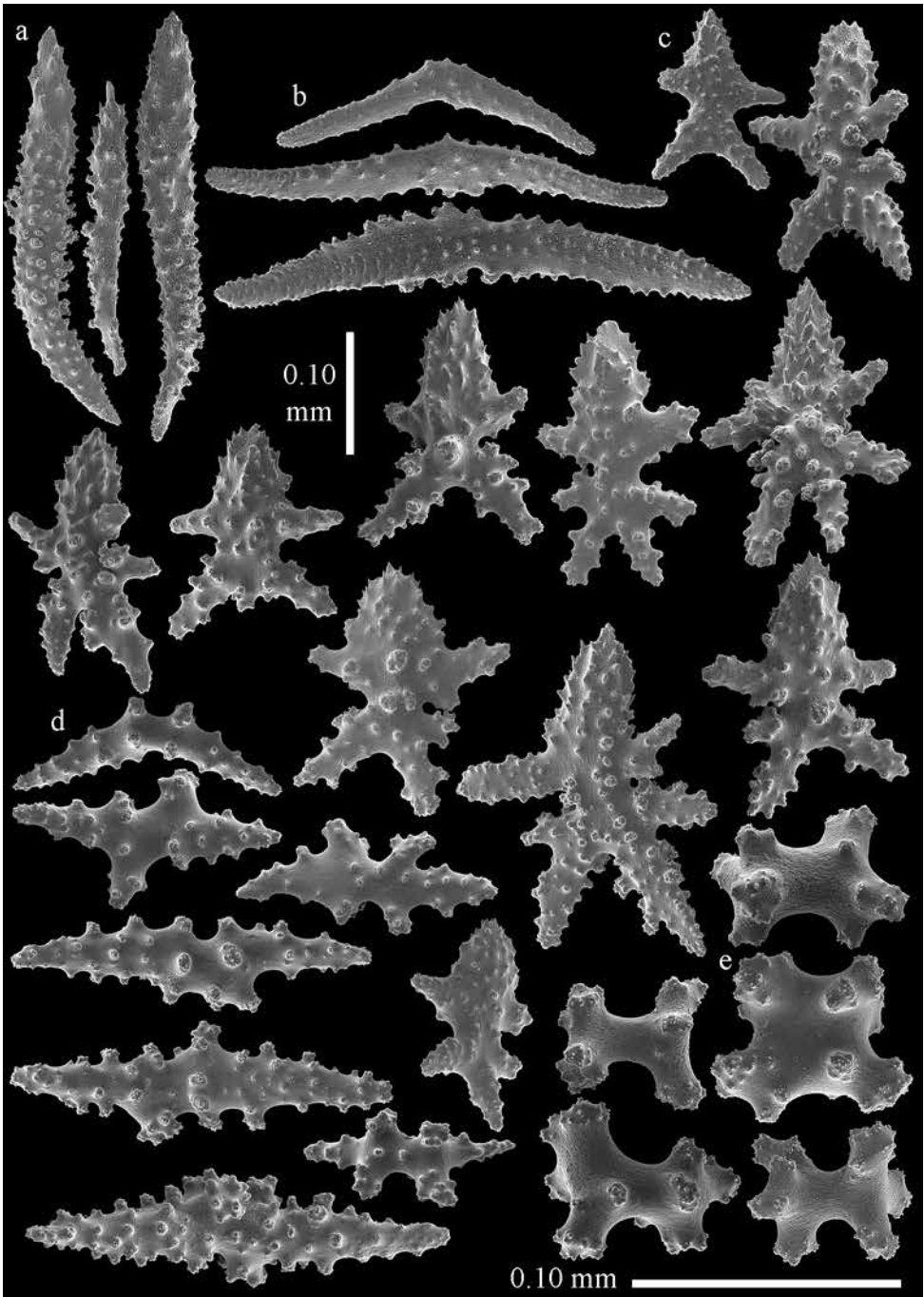


Fig. 12. *Echinogorgia operculata* (Nutting, 1910), ZMA COEL. 2669; a, point spindles; b, collaret spindles; c, thornscales; d, spindles; e, capstans. Scale at e only applies to e.

*Echinogorgia ridleyi* Nutting, 1910  
(figs 13-14)

*Echinogorgia ridleyi* Nutting, 1910: 65, pl. 10 figs 4-4a, pl. 21 fig. 9; Kükenthal, 1924: 201; Stiasny, 1942: 197; Van Soest, 1979: 87.

Material.— ZMA COEL. 2512, holotype, Siboga station 164, near New Guinea, 32 m depth.

Description.— The holotype is shown in fig. 13.

Sclerites.— Points with bent spindles up to 0.25 mm long, distal part spiny (fig. 14a); a few triradiate sclerites also present (fig. 14c). Collaret with bent spindles up to 0.25 mm long, with the middle part more tuberculate (fig. 14b). Coenenchyme with thornscales up to 0.30 mm long (fig. 14d) and small spindles up to 0.30 mm long, with simple or slightly complex tubercles (fig. 14e). Some thornscales have blade-like projections. Furthermore, unilaterally leafy bodies are present, up to 0.40 mm long, with complex tubercles (not depicted, all broken on SEM stub). Interior with small capstans up to 0.10 mm long (fig. 14f).

Sclerites light pink coloured.

Remarks.— The species is similar to *E. humilis* regarding its sclerites, but differs in colony colour, which is dull red instead of whitish for *E. humilis*, and the somewhat more spiny appearance of its sclerites.

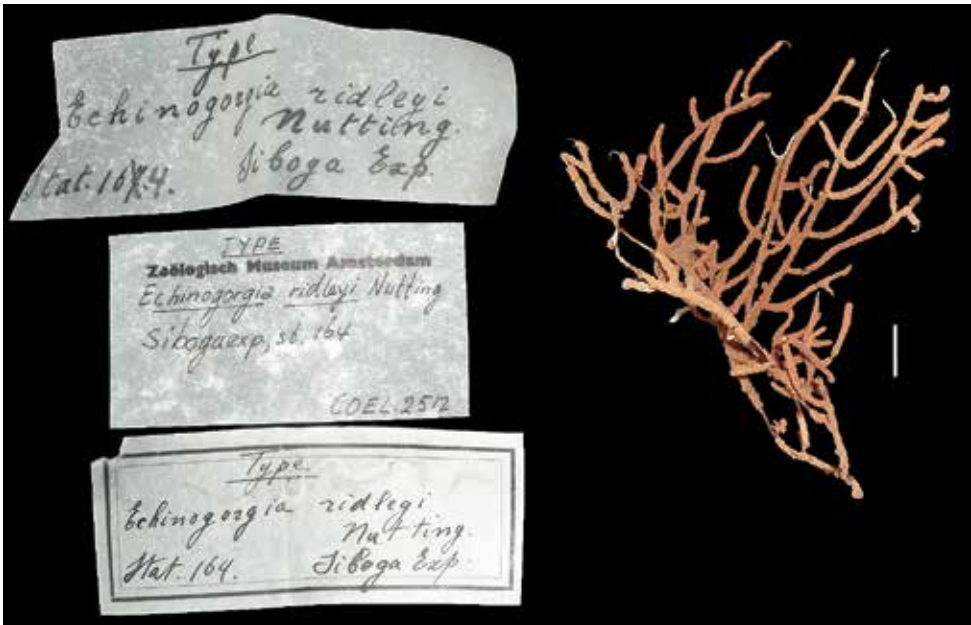


Fig. 13. *Echinogorgia ridleyi* Nutting, 1910, ZMA COEL. 2512. Scale 1 cm.

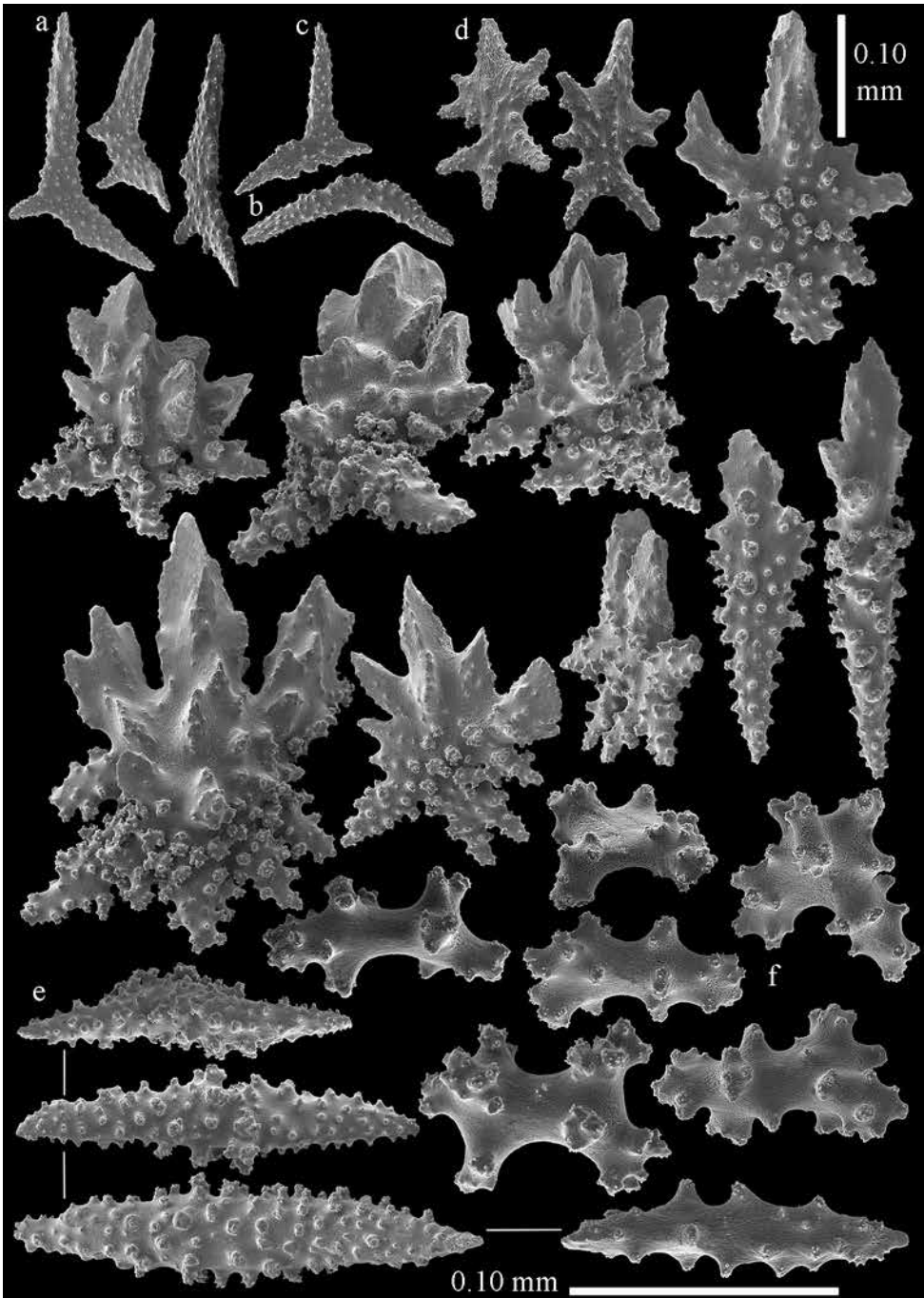


Fig. 14. *Echinogorgia ridley* Nutting, 1910, ZMA COEL. 2512; a, point spindles; b, collaret spindle; c, triradiate, d, thornscales; e, spindles; f, capstans. Scale at f applies to f and right most sclerites of e.

*Echinogorgia stellata* (Nutting, 1910)  
(figs 15-17)

*Heterogorgia stellata* Nutting, 1910: 91, pl. 15 figs 5-5a, pl. 22 fig. 16; Kükenthal, 1924: 231; Van Soest, 1979: 89.

*Echinomuricea stellata*; Stiasny, 1942: 197.

*Echinogorgia stellata*; Breedy & Guzman, 2011: 29.

Material.— ZMA COEL. 2674, holotype, Siboga station 60, Timor, depth 23 m.

Description.— The holotype is shown in fig. 15.

Sclerites.— Points with bent spindles up to 0.25 mm long, distal part spiny (fig. 16a); a few triradiate sclerites also present. Collaret with bent spindles up to 0.30 mm long, with the middle part more tuberculate (fig. 16b). Coenenchyme with thornscales up to 0.30 mm long (fig. 16c), spindles and unilaterally spinose spindles, up to 1.00 mm long, with simple or complex tubercles (fig. 17). Interior with small capstans about 0.05 mm long (fig. 16d).

All sclerites colourless.

Remarks. The species is similar to *E. clausa* regarding colony, colour, and sclerites, but has much more unilaterally spinose spindles (fig. 17).

*Echinogorgia thomsonideani* Stiasny, 1942

NOT *Echinogorgia aurantiaca* Verrill, 1868: 557 (Peru).

*Echinogorgia aurantiaca*; Thomson & Dean, 1931: 203, pl. 22 fig. 1.

*Echinogorgia thomsonideani* Stiasny, 1942: 195.

Material.— Siboga station 164, one microscope slide, near New Guinea, 32 m depth.

Description.— Points with bent spindles up to 0.20 mm long, distal part spiny. Collaret with bent spindles up to 0.30 mm long, with the middle part more tuberculate. Coenenchyme with thornscales up to 0.30 mm long, and spindles up to 0.30 mm long, with simple or complex tubercles. The thornscales have blade-like projections. Furthermore, unilaterally leafy bodies are present, up to 0.40 mm long, with complex tubercles. Interior with small capstans up to 0.10 mm long.

Polyp sclerites colourless, all others faint yellow.

Remarks.— Only a microscope slide of Stiasny was examined. The presence of a



Fig. 15. *Echinogorgia stellata* (Nutting, 1910), ZMA COEL. 2674. Scale 1 cm.

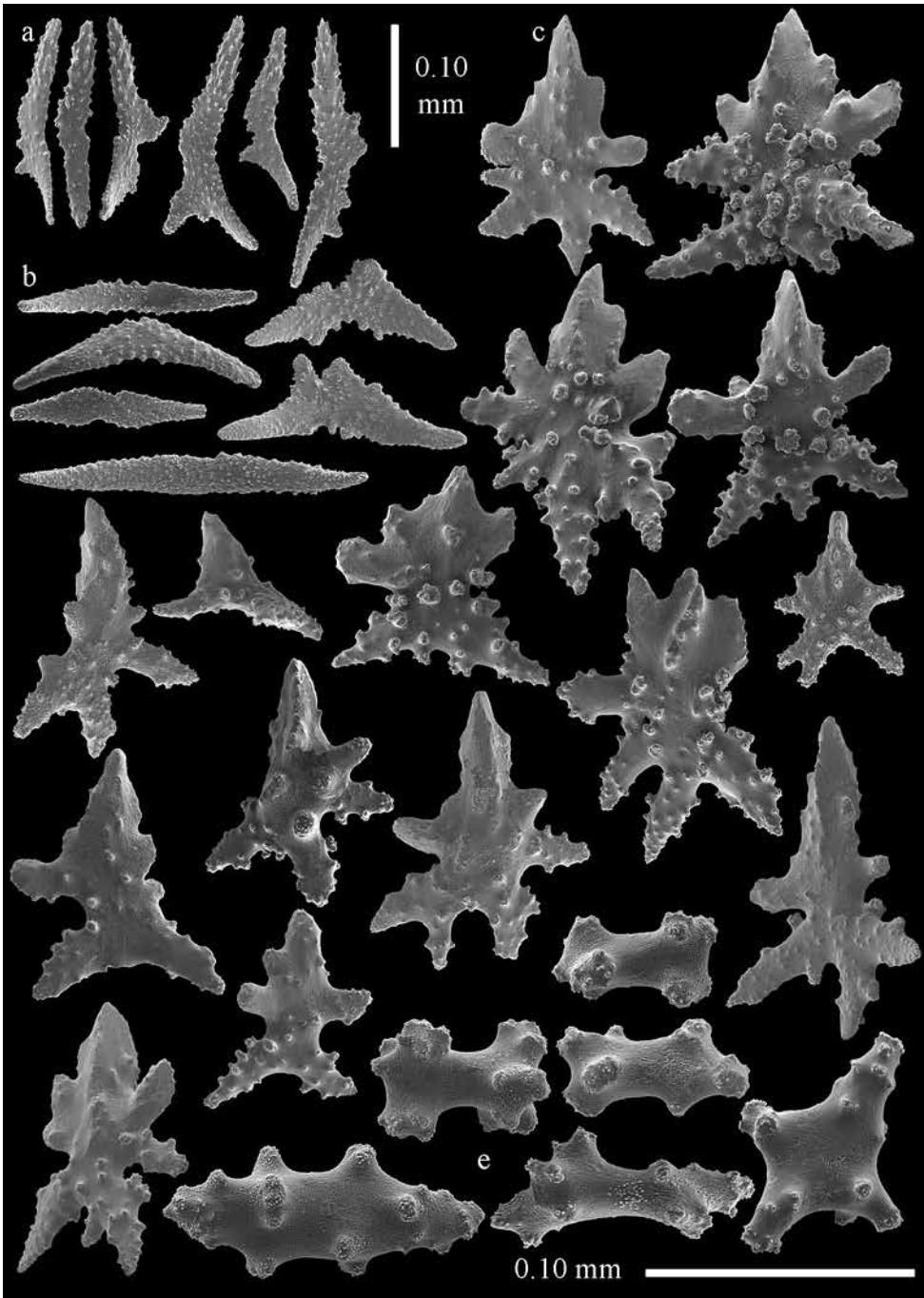


Fig. 16. *Echinogorgia stellata* (Nutting, 1910), ZMA COEL. 2674; a, point spindles; b, collaret spindles; c, thornscales; d, capstans. Scale at d only applies to d.



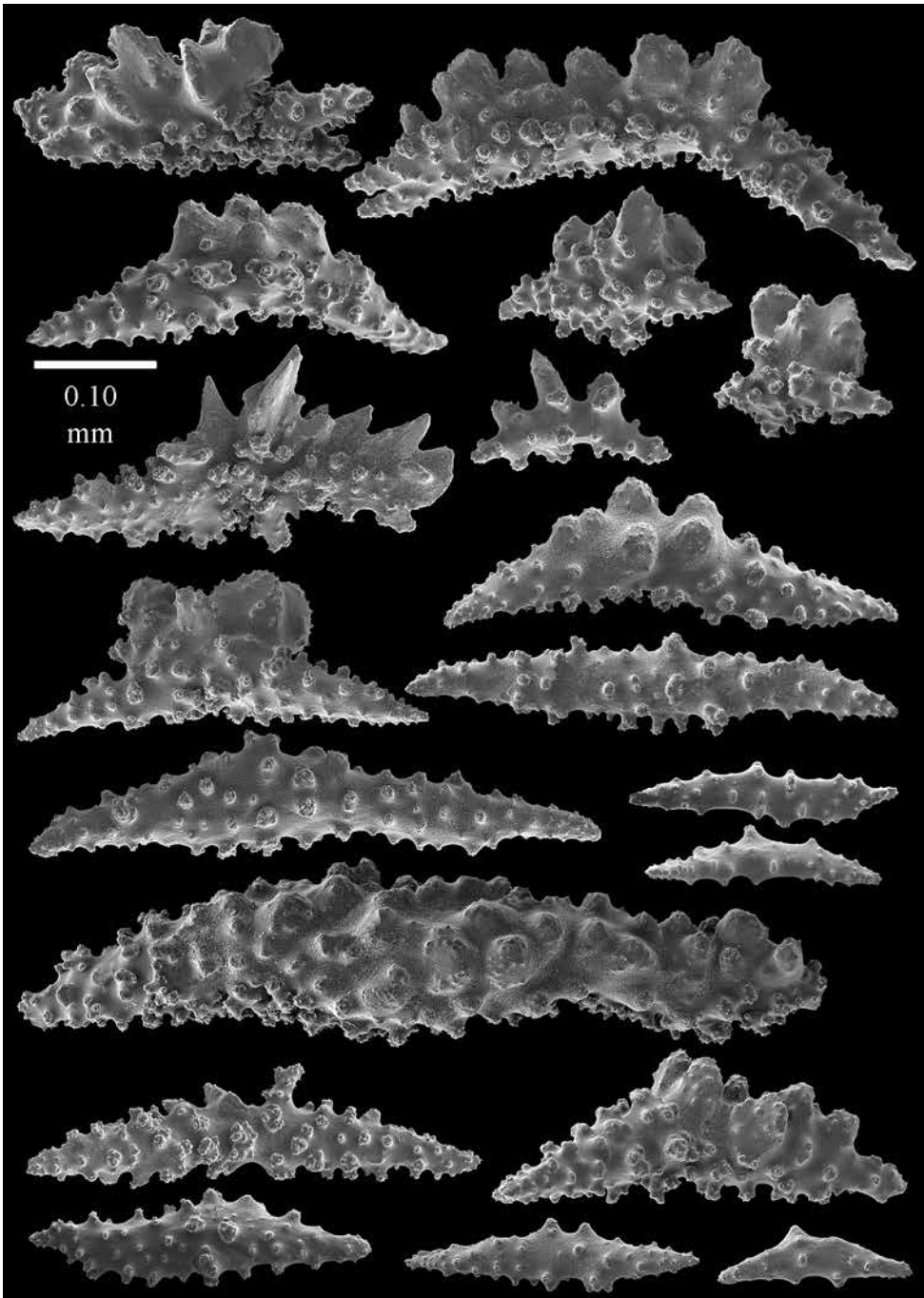


Fig. 17. *Echinogorgia stellata* (Nutting, 1910), ZMA COEL. 2674 spindles and unilaterally spinose spindles.

complete specimen is not mentioned by Van Soest and the Coelenterate database of the ZMA and it was also not found in the collection.

The species is similar to *E. humilis* and *E. ridleyi* but has yellow sclerites.

*Menella flora* (Nutting, 1910) comb. nov.  
(figs 18-20)

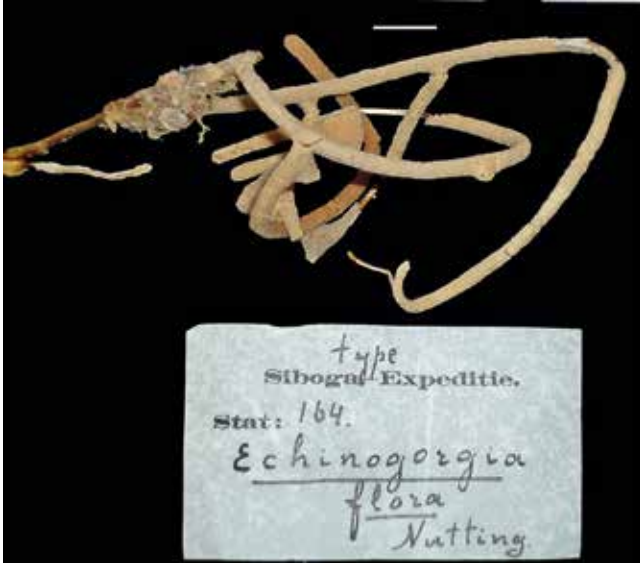


Fig. 18. *Menella flora* (Nutting, 1910), ZMA COEL. 2508. Scale 1 cm.

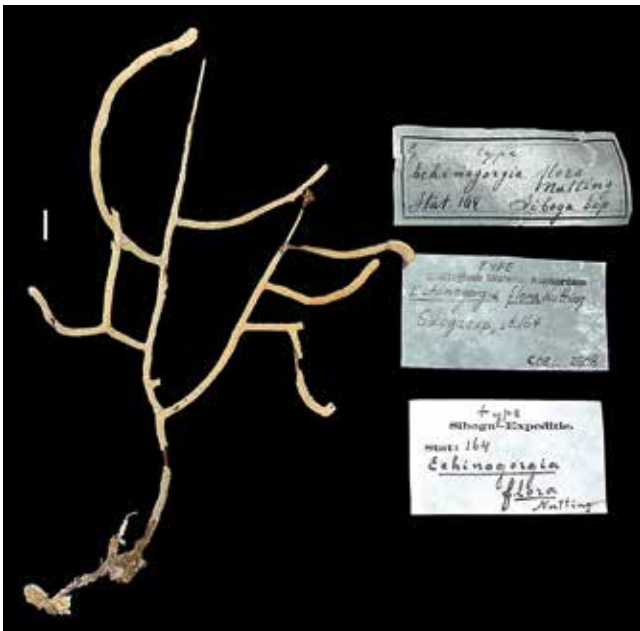


Fig. 19. *Menella flora* (Nutting, 1910), ZMA COEL. 2508 Scale 1 cm.

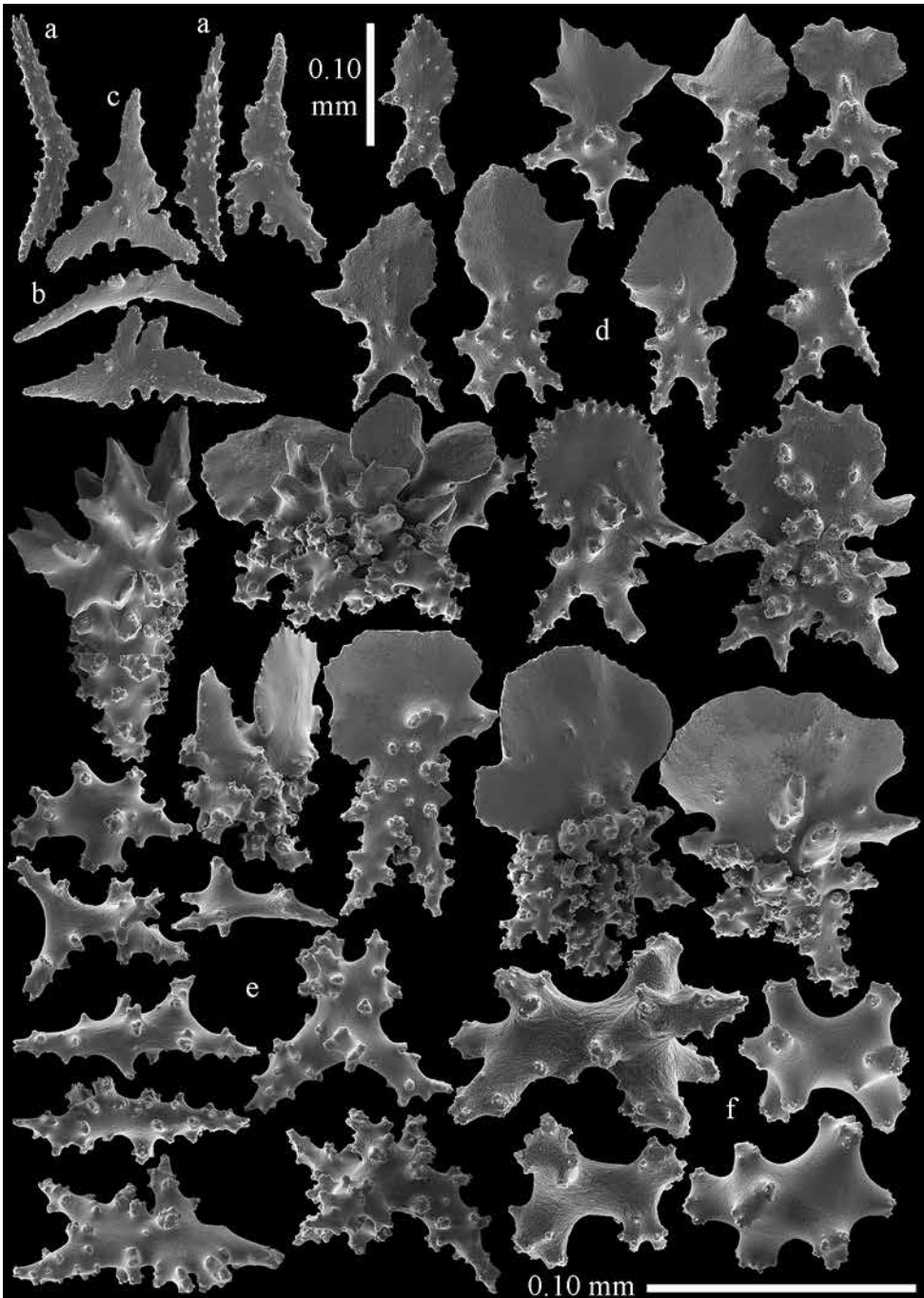


Fig. 20. *Menella flora* (Nutting, 1910), ZMA COEL. 2508; a, point spindles; b, collaret spindles; c, triradiate; d, rooted leaves; e, spindles and branched spindles; f, capstans. Scale at f only applies to f.

*Echinogorgia flora* Nutting, 1910: 66, pl. 1 figs. 2-2a, pl. 21 fig. 10; Kükenthal, 1924: 200; Stiasny, 1938: 363; 1942: 197; Van Soest, 1979: 87.

Material.— ZMA COEL. 2508, holotype, Siboga sta. 164, near New Guinea, 32 m depth.

Description.— The holotype is depicted in fig. 18, a second specimen in fig. 19.

Sclerites.— Points with bent spindles up to 0.30 mm long, distal part spiny (fig. 20a). Collaret with bent spindles up to 0.20 mm long, with the middle part more tuberculate (fig. 20b). Coenenchyme with rooted leaves up to 0.30 mm long (fig. 20c), with round leaf with smooth edge. Interior with capstans, spindles, branched spindles, and crosses (fig. 20d-e), 0.05-0.30 mm long, with simple tubercles.

All sclerites white.

Remarks.— Nutting (1910) and Van Soest both only mentioned a holotype, but an additional specimen was found (figs 18-19). Both have the same sclerites, those of the holotype are depicted in fig. 20.

*Menella pseudoaurantiaca* (Stiasny, 1942) comb. nov.  
(figs 21-28)

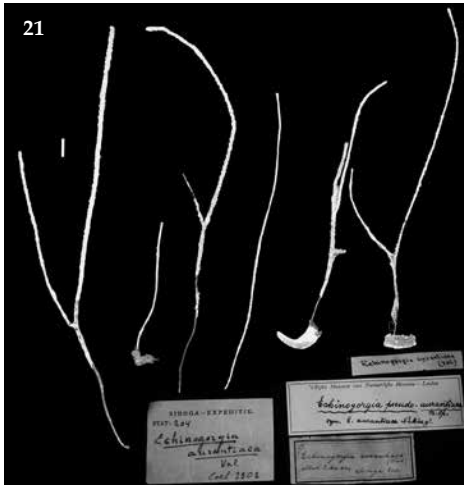


Fig. 21. *Menella pseudoaurantiaca* (Stiasny, 1942), ZMA COEL. 2502b. Scale 1 cm.



Fig. 22. *Menella* sp., ZMA COEL. 2502a. Scale 1 cm.

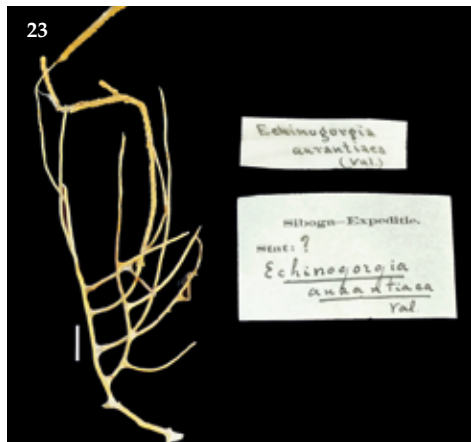


Fig. 23. *Menella* sp., no catalogue number. Scale 1 cm.

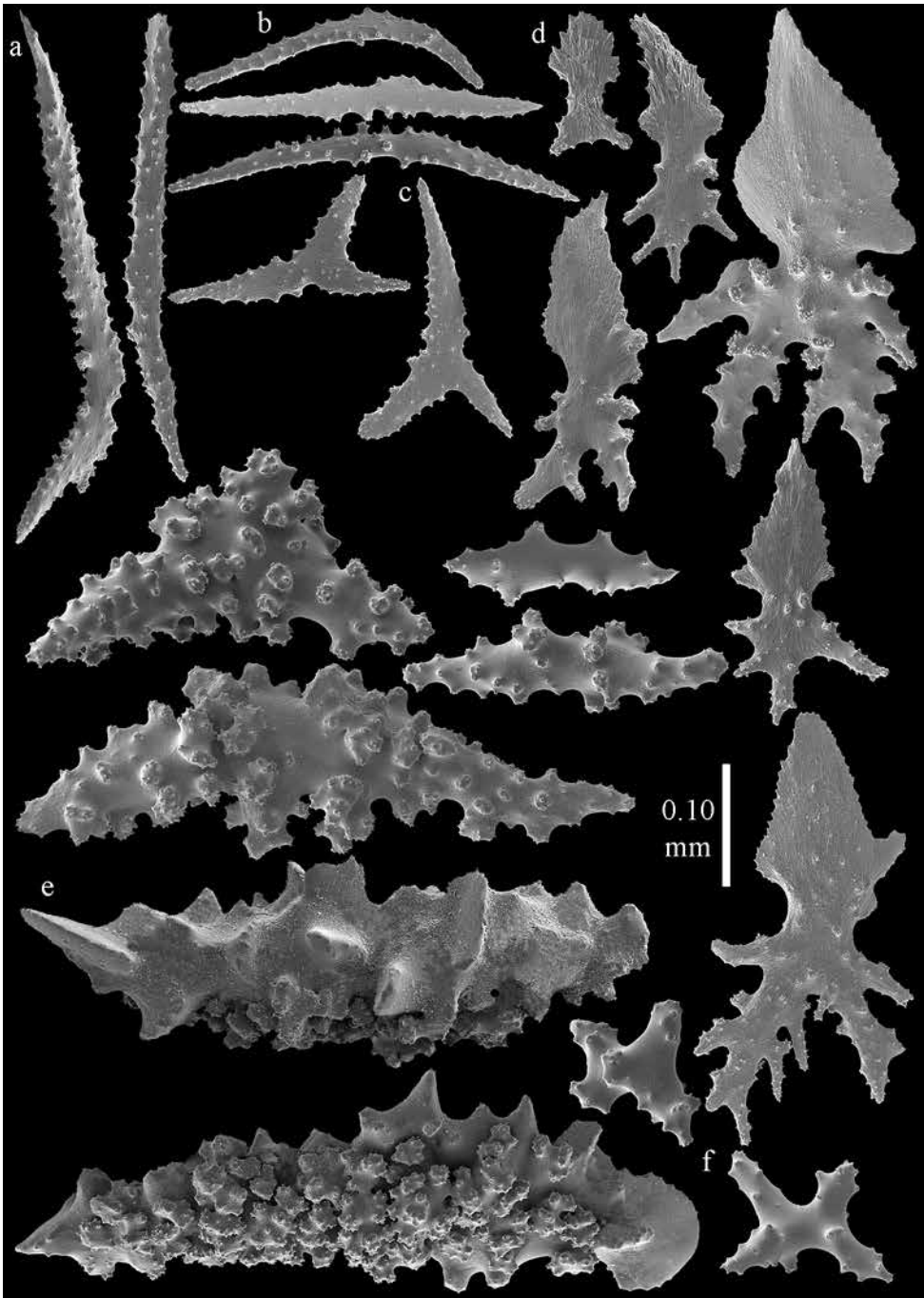


Fig. 24. *Menella pseudoaurantiaca* (Stiasny, 1942), ZMA COEL. 2502b; a, point spindles; b, collaret spindles; c, triradiate; d, rooted leaves; e, spindles and unilaterally spinose spindles; f, crosses.

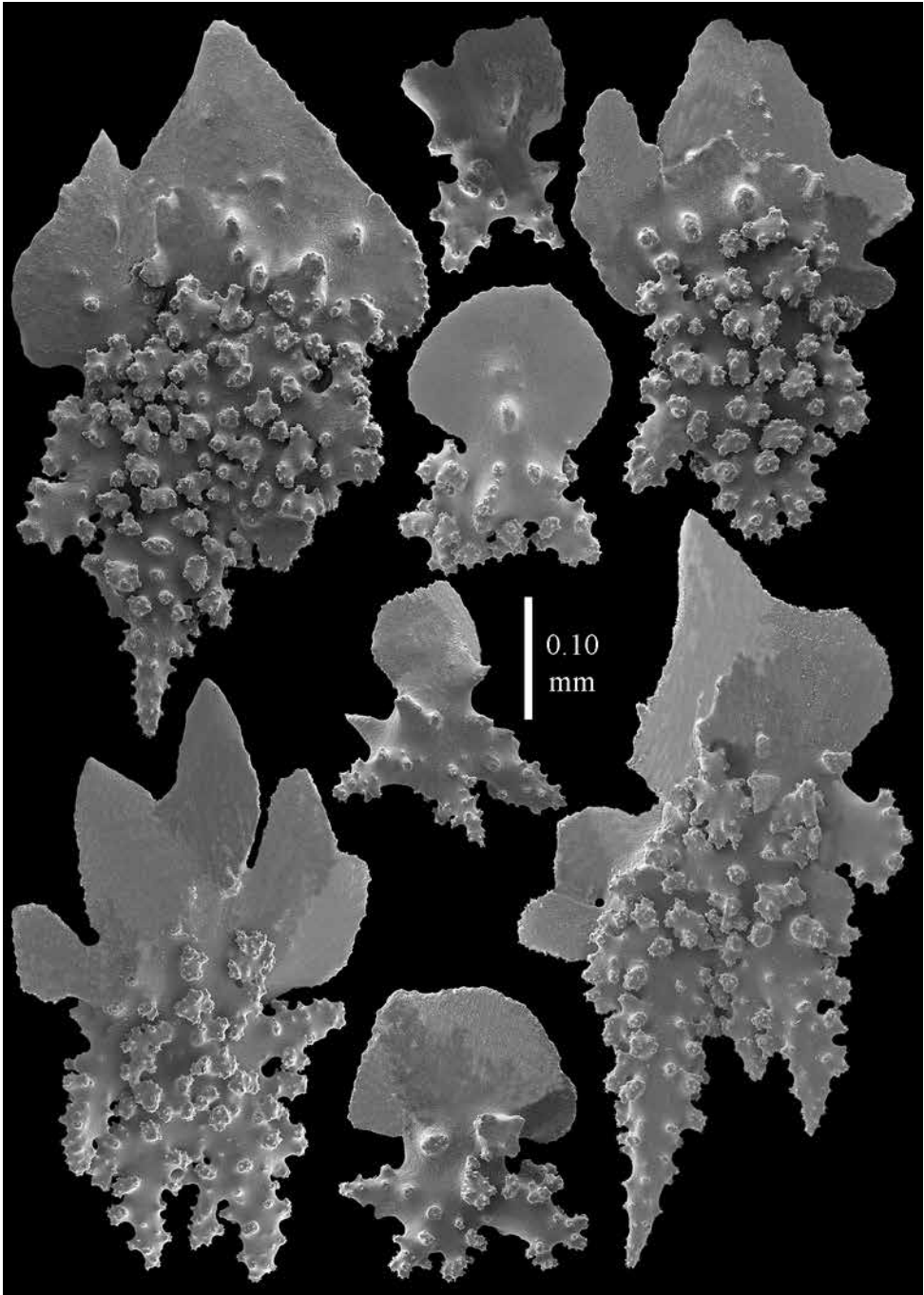


Fig. 25. *Menella pseudoaurantiaca* (Stiasny, 1942), ZMA COEL. 2502b; rooted leaves.

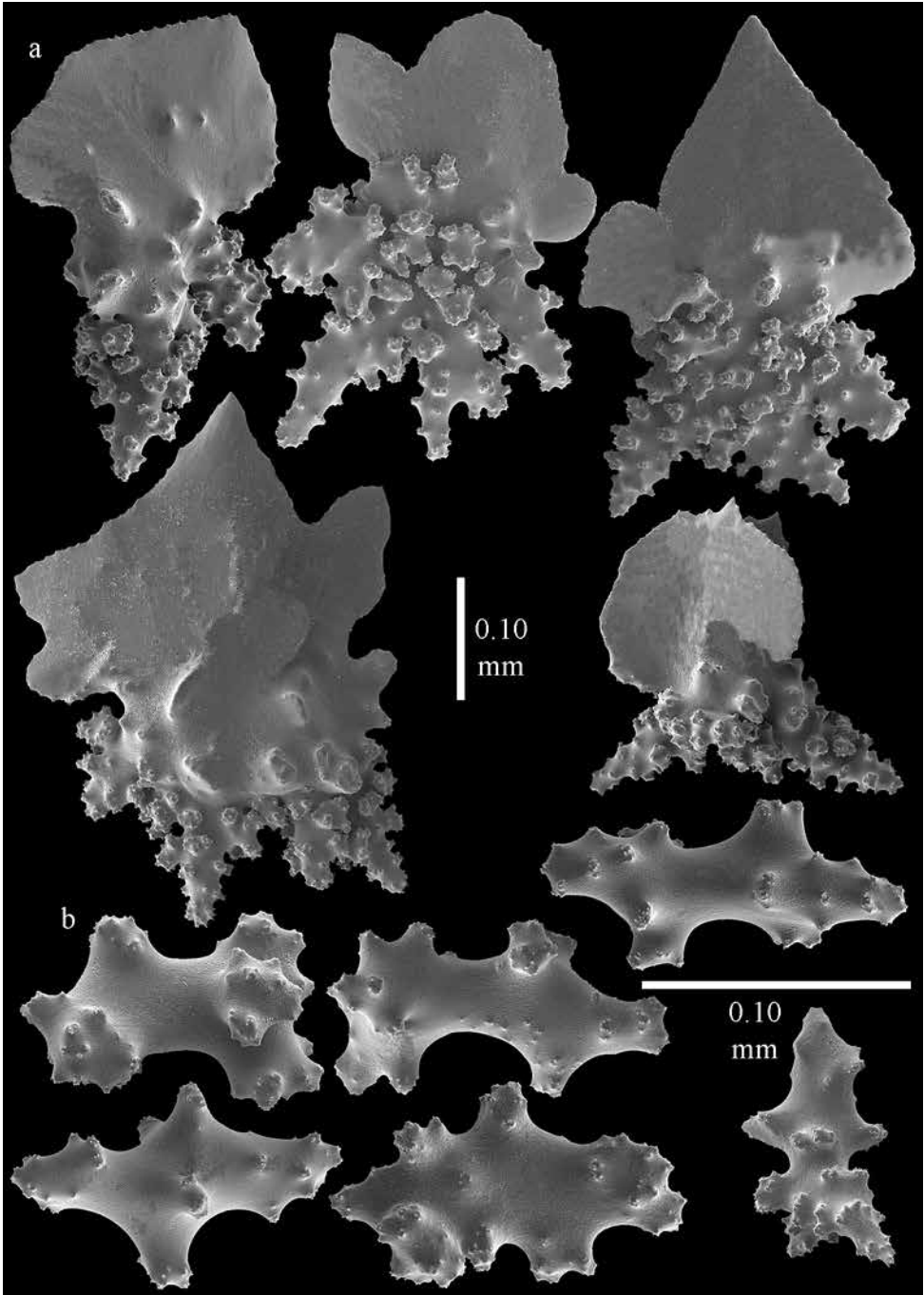


Fig. 26. *Menella pseudoaurantiaca* (Stiasny, 1942), ZMA COEL. 2502b; a, rooted leaves; b, capstans. Scale at b only applies to b.

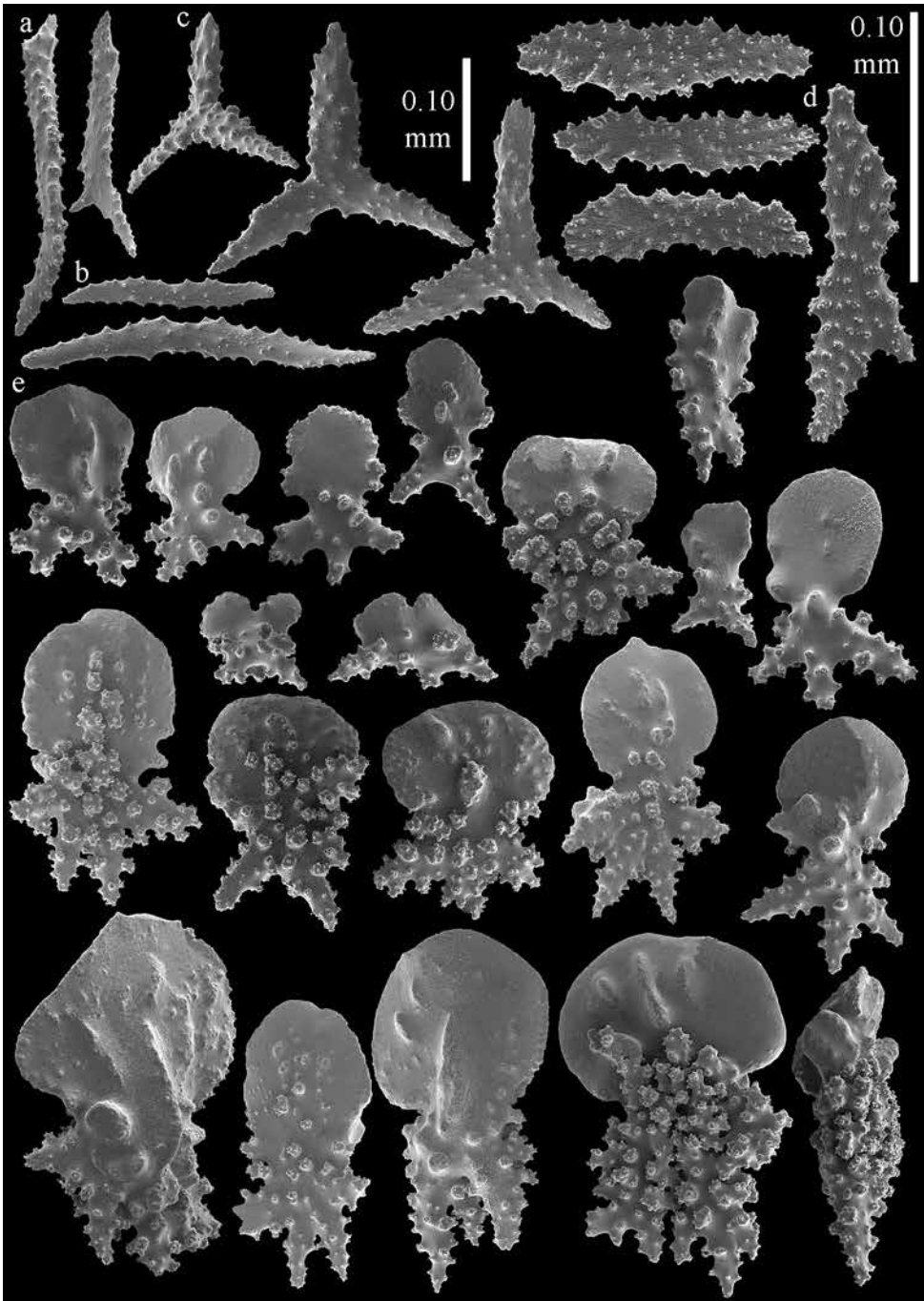


Fig. 27. *Menella* sp., ZMA COEL. 2502a; a, point spindles; b, collaret spindles; c, triradiates; d, tentacle rods; e, rooted leaves. Scale at d only applies to d.



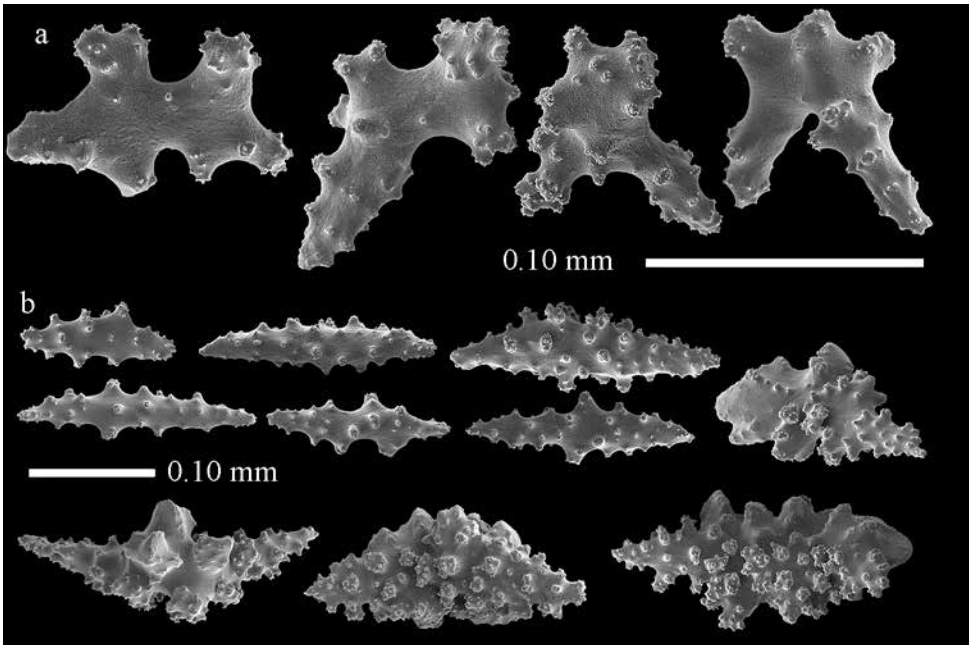


Fig. 28. *Menella* sp., ZMA COEL. 2502a; a, capstans; b, spindles. Scale at a only applies to a.

NOT *Echinogorgia aurantiaca* Verrill, 1868: 557 (Peru).

*Echinogorgia aurantiaca* (part); Nutting, 1910: 63.

*Echinogorgia pseudo-aurantiaca* Stiasny, 1942: 195.

Material. ZMA COEL. 2501, Siboga station 164, New Guinea, 32 m; ZMA COEL. 2502a, Siboga station 60, Timor, 23 m; ZMA COEL. 2502b, Siboga station 204, Buton island, 73-94 m.

Description.— The syntypes are shown in fig. 21.

Sclerites.— Points with bent spindles up to 0.45 mm long, distal part spiny (fig. 24a). Collaret with bent spindles up to 0.40 mm long, with the middle part more tuberculate (fig. 24b) a few triradiate sclerites also present (fig. 24c). Coenenchyme with rooted leaves up to 0.50 mm long (figs 24d, 25, 26a), with one to three pointed leaves, Interior with capstans, spindles, branched spindles, unilaterally spinose spindles and crosses (figs 24e-f, 26b), 0.05-0.60 mm long, with simple tubercles.

All sclerites yellowish.

Remarks.— Stiasny (1942) re-examined the specimens described by Nutting as *Echinogorgia aurantiaca*, considered them wrongly identified, and renamed them *E. pseudo-aurantiaca*. Four specimens are present in the collection, ZMA COEL. 2501 is just a piece of axis without sclerites. ZMA COEL. 2502 is a jar with the specimens shown in fig. 21 and two vials, with specimens shown in figs 22-23. Specimens shown in fig 21 (ZMA COEL. 2502b) match the description of Nutting and slides of Stiasny, ZMA COEL. 2502a (fig. 22) is another species of *Menella*. One of the labels of this specimen mentions “probably *Echinogorgia thomsonideani*”. This is very unlikely as *E. thomsonideani* was de-

scribed from station 164 while this one is from station 60. Moreover, the slides of Stiasny do not include this specimen. The sclerites of this *Menella* species are shown in figs 27-28. The ZMA COEL. 2502 jar also contains a third specimen (fig. 23), from unknown locality, which is the same as ZMA COEL. 2502a.

*Paraplexaura cryptotheca* (Nutting, 1910) comb. nov.  
(figs 29-30)

*Placogorgia cryptotheca* Nutting, 1910: 80, pl. 12 figs. 3-3a, pl. 22 fig. 5; Van Soest, 1979: 92.  
Spec. inc. (Plexauroidea?); Kükenthal, 1924: 211.  
Spec. inc.; Stiasny, 1942: 197.

Material.— ZMA COEL. 3044, five syntypes, Siboga station 117, N Sulawesi, 80 m depth; station 164, near New Guinea, 32 m; station 260, Kei island, 90 m; station 273, Aru islands, 13 m; station 274, Aru islands, 57 m.

Description.— The specimen from station 164 is shown in figure 29.

Sclerites.— Polyps with slightly bent spindles (fig. 30a), up to 0.15 mm long, with simple tubercles. Calyx with thornscales (fig. 30b), up to 0.20 mm long, with complex tubercles. Surface of coenenchyme with irregularly shaped sclerites (fig. 30c), up to 0.50 mm long, outer surface with projections, inner surface with complex tubercles. Interior with spindles (fig. 30d), up to 0.30 mm long, with simple or complex tubercles. Furthermore, capstans are present (fig. 30e), up to 0.10 mm long.

All sclerites white.

Remarks.— The specimen from sta. 273 has been donated to the Iowa State University, now deposited in the National Museum of Natural History (USNM 43084).



Fig. 29. *Paraplexaura cryptotheca* (Nutting, 1910), ZMA COEL. 3044. Scale 1 cm.

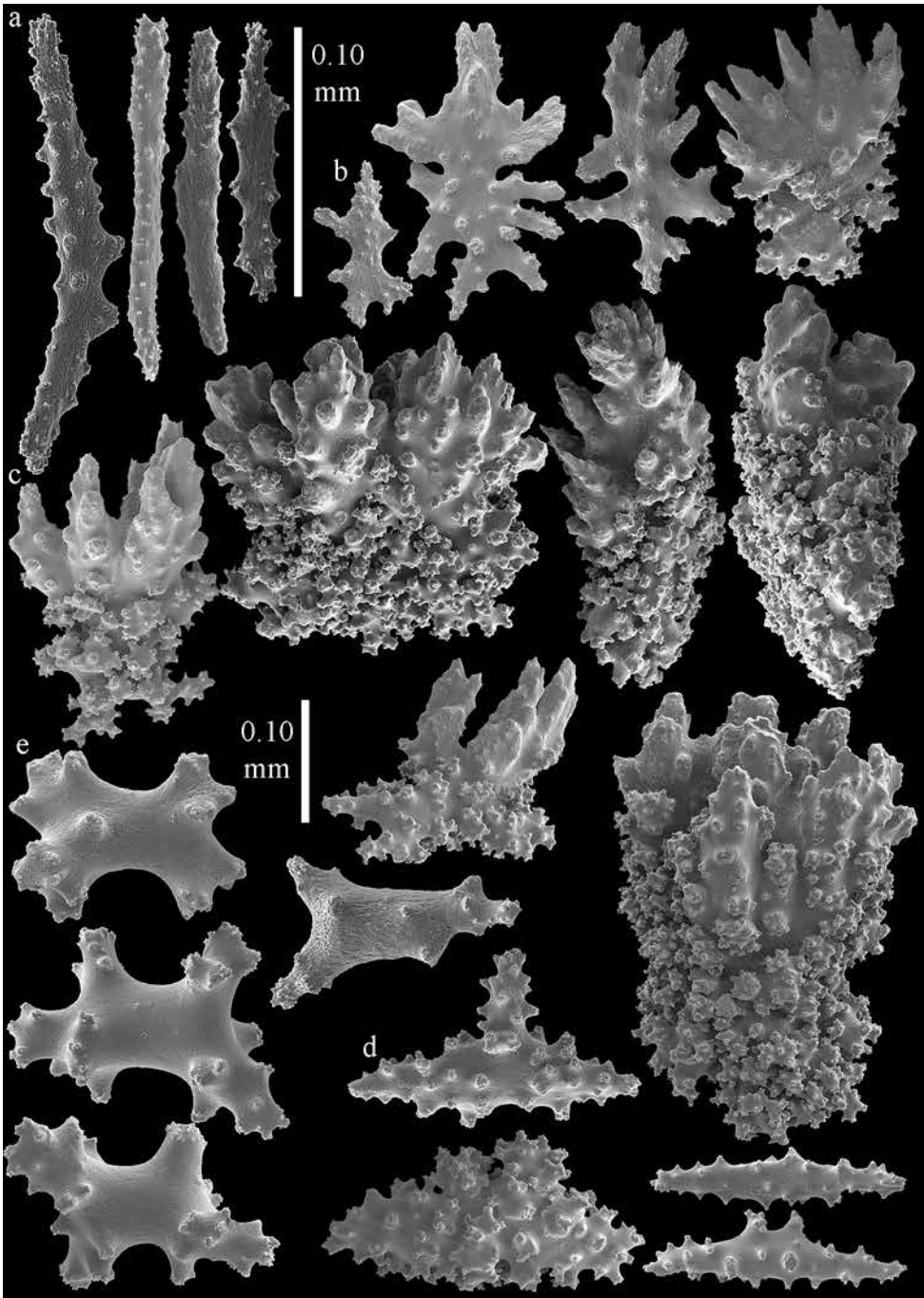


Fig. 30. *Paraplexaura cryptotheca* (Nutting, 1910), ZMA COEL. 3044; a, polyp spindles; b, thornscales; c, irregularly shaped bodies; d, spindles; e, capstans. Scale at a also applies to e.

The specimen from station 164 has been used for SEM, the other four specimens are merely fragments.

*Paraplexaura pulchra* (Nutting, 1910) comb. nov.  
(figs 31-32)

*Placogorgia pulchra* Nutting, 1910: 78, pl. 11 figs 4-4a, pl. 22 fig. 4; Van Soest, 1979: 93.

*Discogorgia pulchra*; Kükenthal, 1924: 114.

?*Plexauropsis pulchra*; Stiasny, 1942: 197.

Material.— ZMA COEL. 3049, holotype, Siboga station 258, Kei islands, 22 m depth.

Description.— The holotype is shown in fig. 31.

Sclerites.— Polyps with very few sclerites. Calyx with thornscales (fig. 32a), up to 0.20 mm long, with simple tubercles. Surface of coenenchyme with irregularly shaped sclerites (fig. 32b), up to 0.40 mm long, outer surface with spines, inner surface with complex tubercles. Interior with spindles (fig. 32c), up to 0.30 mm long, with simple or complex tubercles. Furthermore, capstans are present (fig. 32d), up to 0.10 mm long.

All sclerites pink.

Remarks.— The microscope slide of Stiasny showed two polyp sclerites. With the SEM work we observed only one broken polyp sclerite (not photographed).

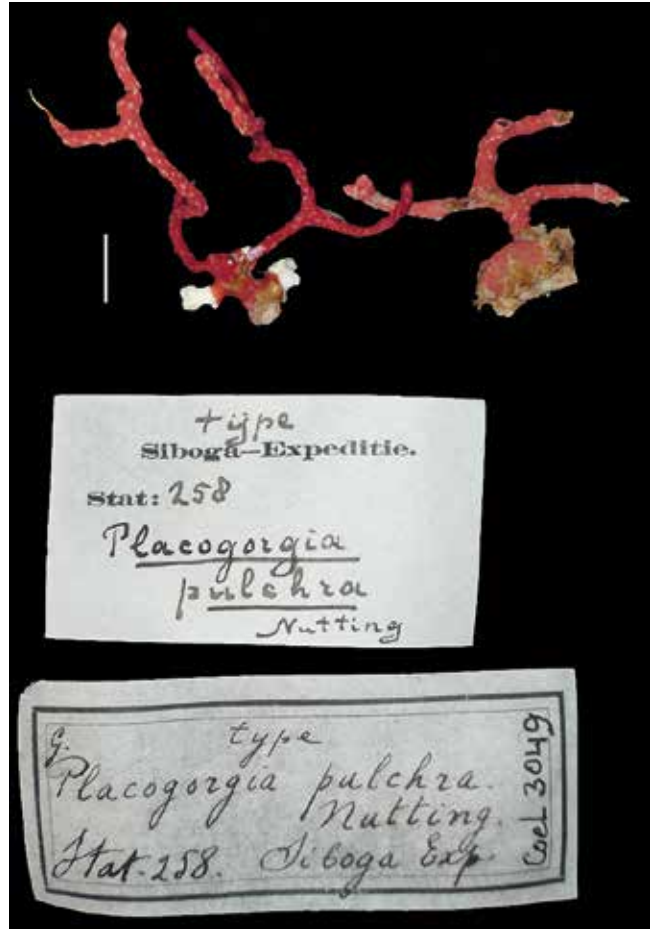


Fig. 31. *Paraplexaura pulchra* (Nutting, 1910), ZMA COEL. 3049. Scale 1 cm.

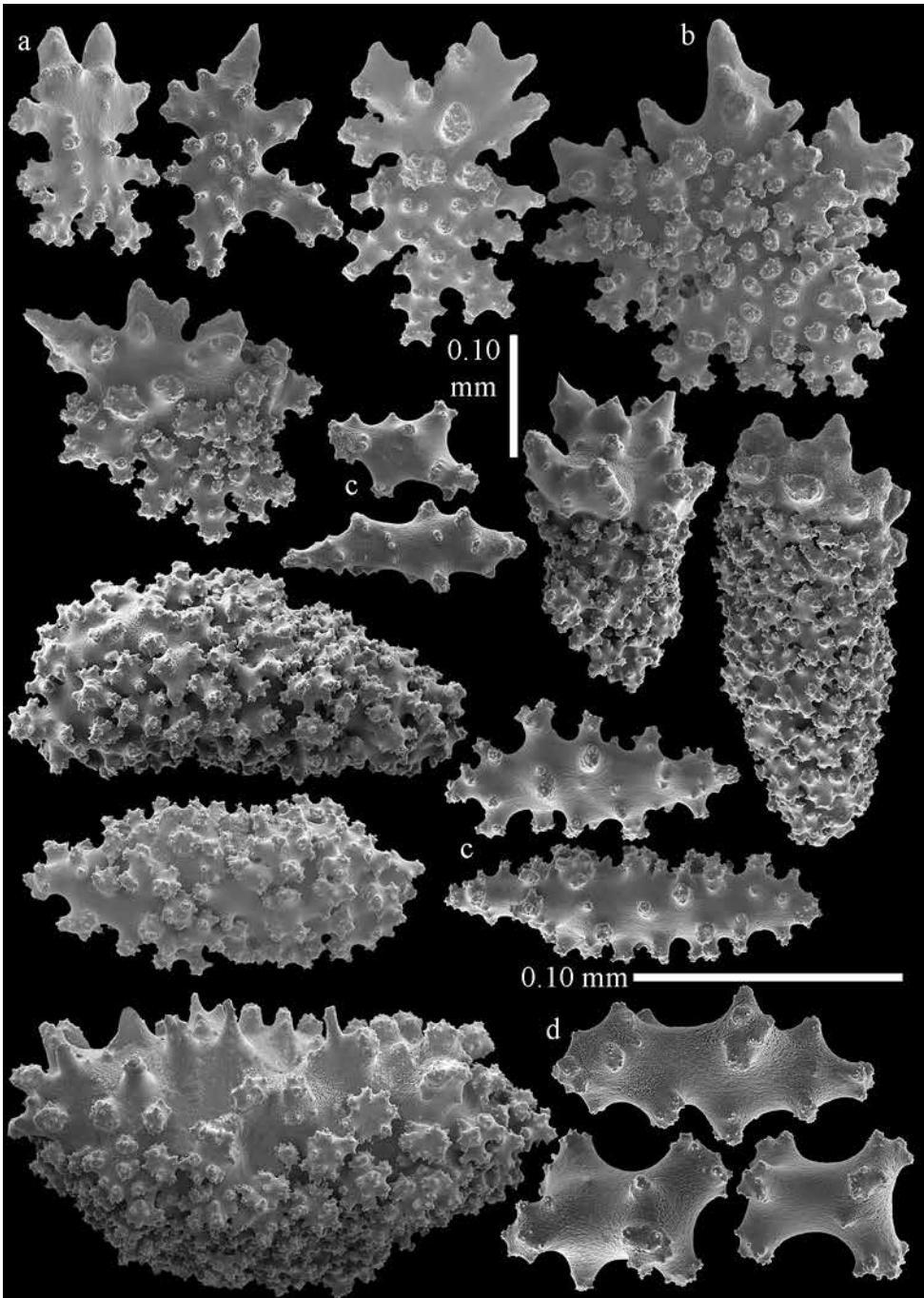


Fig. 32. *Paraplexaura pulchra* (Nutting, 1910), ZMA COEL. 3049; a, thornscales; b, irregularly shaped bodies; c, spindles; d, capstans. Scale at d only applies to d.

*Paraplexaura reticuloides* (Nutting, 1910) comb. nov.  
(figs 33-34)

*Placogorgia reticuloides* Nutting, 1910: 84, pl. 18 figs 2-2a; Van Soest, 1979: 93.

*Discogorgia reticuloides*; Kükenthal, 1924: 214.

*Plexauroides reticuloides*; Stiasny, 1942: 197.

Material.— ZMA COEL. 3050, Siboga station 273, Aru islands, reef; ZMA COEL. 3051, Siboga station 310, Flores Sea, 73 m depth.

Description.— The specimen from station 310 (ZMA COEL. 3051) is shown in figure 33.

Sclerites.— Polyps without sclerites. Calyx with thornscales (fig. 34a-b), up to 0.20 mm long, with simple tubercles. Surface of coenenchyme with irregularly shaped sclerites (fig. 34c), up to 0.40 mm long, outer surface with small smooth elevations, inner surface with complex tubercles. Interior with spindles (fig. 34d), up to 0.30 mm long, with simple or complex tubercles. Furthermore, capstans are present (fig. 34e), up to 0.10 mm long.

Colony pink with white polyps; sclerites pink.

Remarks.— The specimen from station 273 is missing (Van Soest, 1979). The specimen from station 310 is a single branch (fig. 33), which according to Van Soest is from station 305.

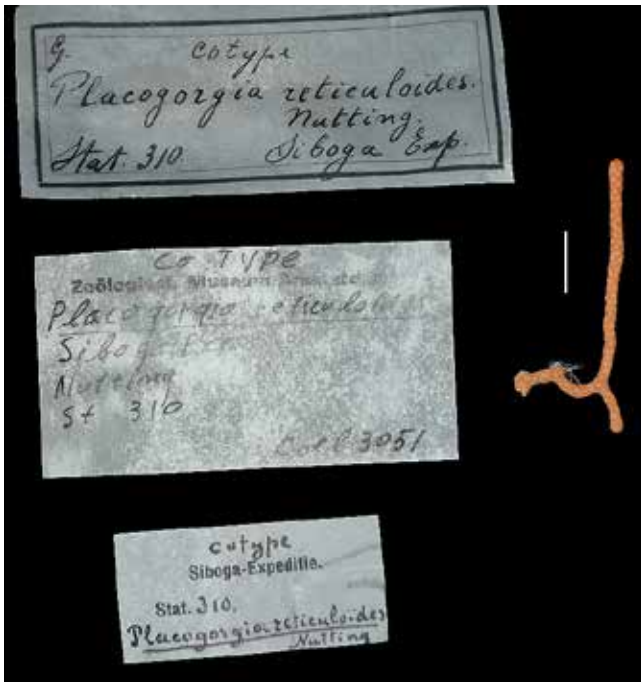


Fig. 33. *Paraplexaura reticuloides* (Nutting, 1910), ZMA COEL. 3051. Scale 1 cm.

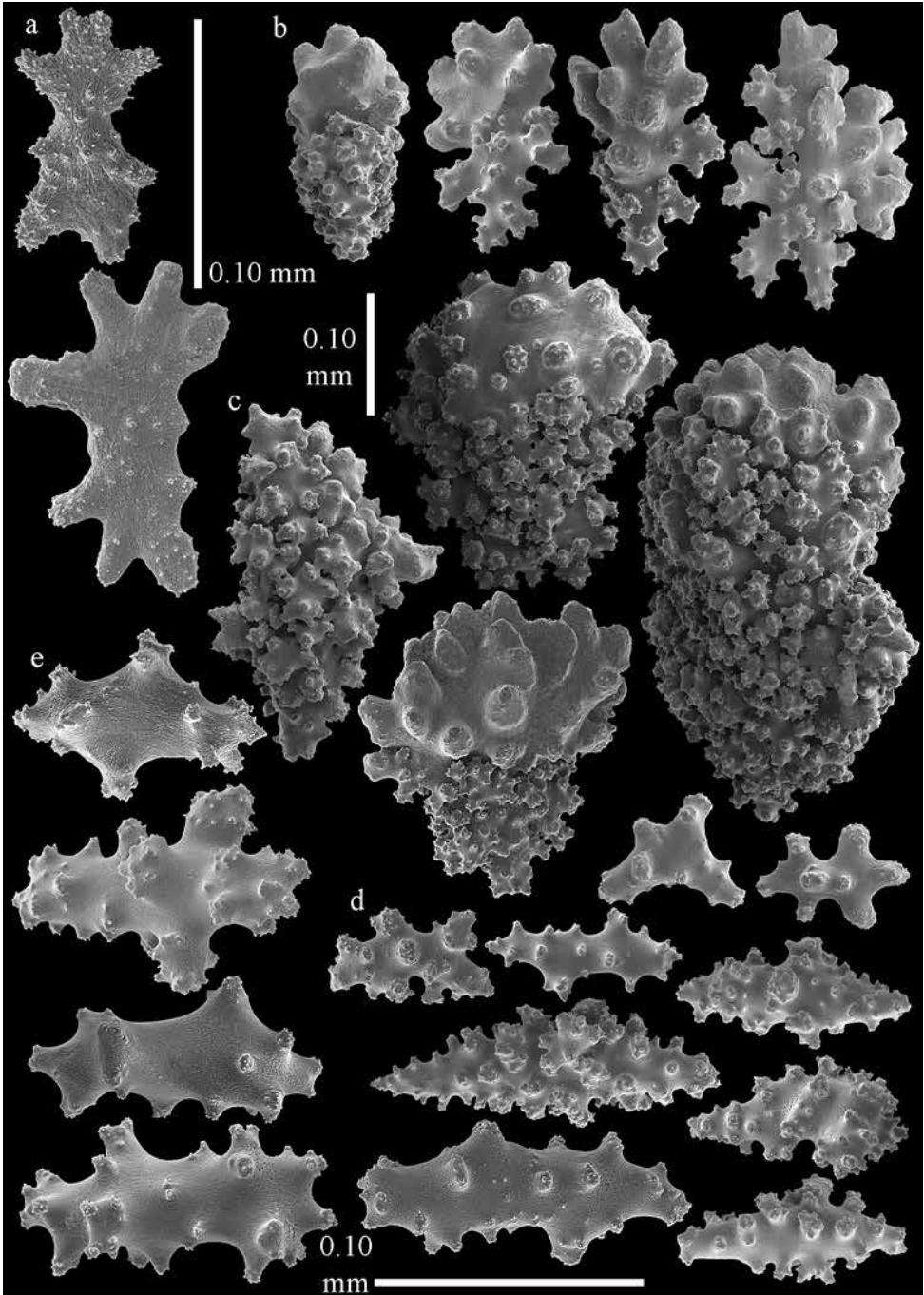


Fig. 34. *Paraplexaura reticuloides* (Nutting, 1910), ZMA COEL. 3051; a-b, thorn scales; c, irregularly shaped bodies; d, spindles; e, capstans. Scale at a also applies to e.

*Villogorgia aurivilliusi* Stiasny, 1942

*Villogorgia nigrescens* Nutting, 1910: 70.

*Villogorgia aurivilliusi* Stiasny, 1942: 195.

Material.— ZMA COEL. 3638, holotype, Siboga station 154, Bougainville Strait (Papua New Guinea), 83 m depth.

Description.— Point spindles up to 0.30 mm long, distal end spiny. Collaret with bent spindles up to 0.35 mm long, with the middle part more tuberculate. Tentacles with dragon wings, up to 0.15 mm long. Calyces with thornscales, up to 0.35 mm long, with leaves. Coenenchyme with thornstars, up to 0.15 mm long, with leaves. Tentacle sclerites colourless, all others pink.

Remarks.— The type is mentioned in the database but not by Van Soest (1979). It was not found in the collection. Only two slides of Stiasny are present, which were used for the description. The species resembles *V. timorensis*.

*Villogorgia flavescens* Nutting, 1910  
(figs 35-37)

*Villogorgia flavescens* Nutting, 1910: 75, pl. 14 figs. 1-1a, pl. 22 fig. 1; Van Soest, 1979: 94.

*Brandella flavescens*; Kükenthal, 1924: 219.

*incertae sedis* Stiasny 1942: 140.

Material.— ZMA COEL. 3632, Siboga station 117, N Sulawesi, 80 m; ZMA COEL. 3633, Siboga station 38, Paternoster islands, 521 m depth; Siboga station 256, Kei islands, 397 m depth).

Description.— The specimen from station 117 (ZMA COEL. 3632) is shown in fig. 35; those of station 38 (ZMA COEL. 3633) in fig. 36.

Sclerites.— Point spindles up to 0.25 mm long, with spiny distal end (fig. 37a). Collaret with bent spindles up to 0.35 mm long, middle part with spines (fig. 37b). Tentacles with rods and dragon-wings (fig. 37c-d), up to 0.15 mm long. Calyces with thornscales (fig. 37e), up to 0.30 mm long, with a short spine. Coenenchyme with thornstars (fig. 37f), up to 0.20 mm long.

All sclerites colourless.

Remarks.— The specimen from station 256 is missing; fragments of station 38 have been donated to the NBC (RMNH Coel. 5833). SEM images concern ZMA COEL. 3633. Most of the coenenchyme of ZMA COEL. 3633 is missing.





Fig. 35. *Villogorgia flavescens* Nutting, 1910, ZMA COEL. 3632. Scale 1 cm.



Fig. 36. *Villogorgia flavescens* Nutting, 1910, ZMA COEL. 3633. Scale 1 cm.

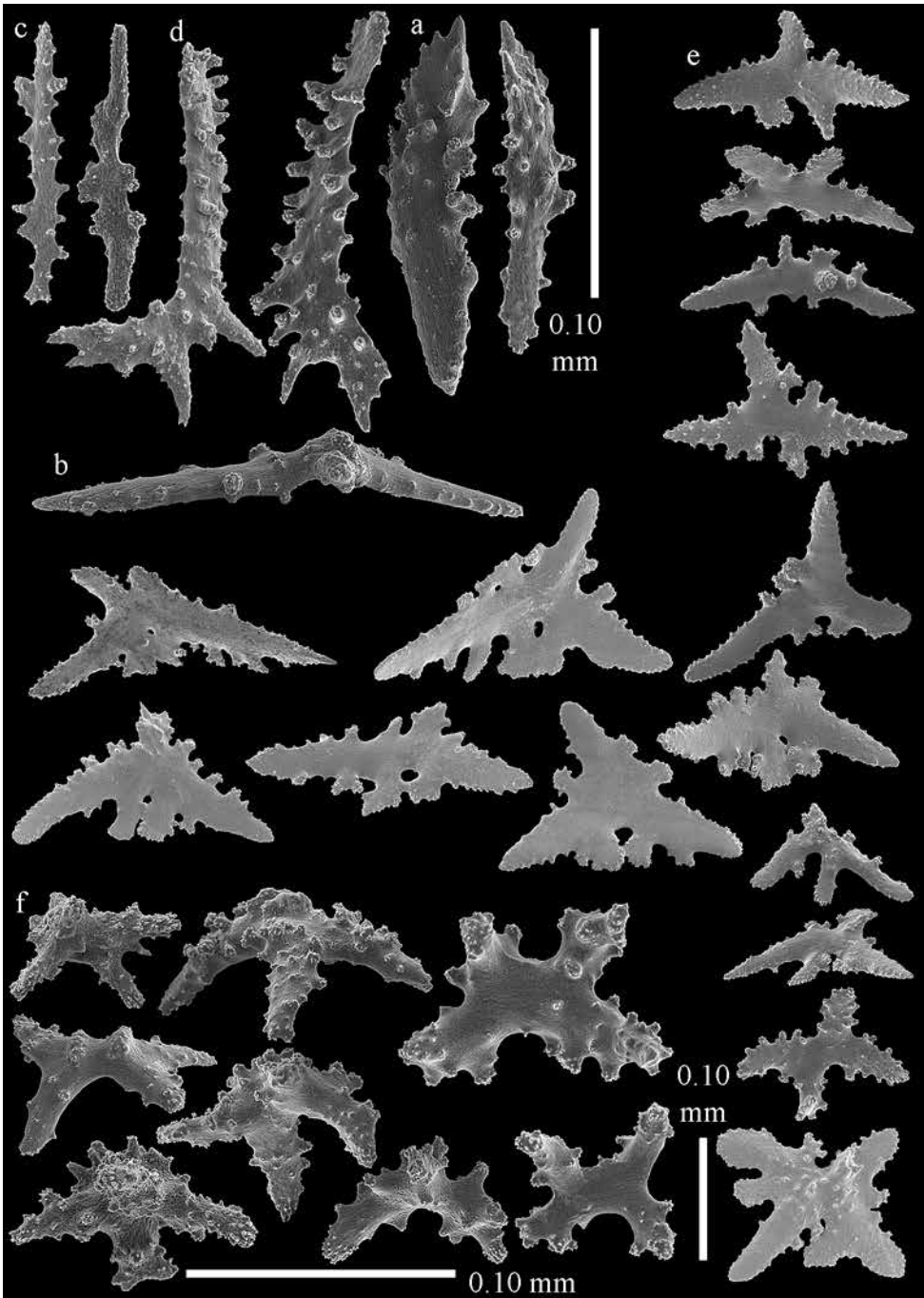


Fig. 37. *Villogorgia flavescens* Nutting, 1910, ZMA COEL. 3633; a, point spindles (broken); b, collaret spindle; c, rods; d, dragon wings; e, thornscales; f, thornstars. Scale at e only applies to e.

*Villogorgia spatulata* (Nutting, 1910)  
(figs 38-41)

*Acamptogorgia spatulata* Nutting, 1910: 68, pl. 14 figs. 2-2a, pl. 21 fig. 12.

*Echinogorgia furfuracea*; Nutting, 1910: 63.

*Perisceles spatulata*; Kükenthal, 1924: 194.

*Villogorgia spatulata*; Stiasny, 1942: 197.

Material.— Siboga station 117, N Sulawesi, 80 m depth; Siboga station 166, New Guinea, 118 m depth; Siboga station 289, Timor Sea, 112 m depth; *Echinomuricea furfuracea* ZMA COEL. 2509, Siboga station 310, Flores Sea, 73 m depth.

Description.— ZMA COEL. 2509 is shown in figs 38-39.

Sclerites.— Point spindles up to 0.30 mm long (fig. 40a), with a spiny distal end. Collaret with bent spindles up to 0.40 mm long (fig. 40b), middle part more tuberculate. Tentacles with dragon wings (fig. 40c). Calyces with thornscales (figs 40d, 41), up to 0.50 mm long, with leaves. Coenenchyme with thornstars (fig. 40e), up to 0.30 mm long, with leaves.

All sclerites colourless.

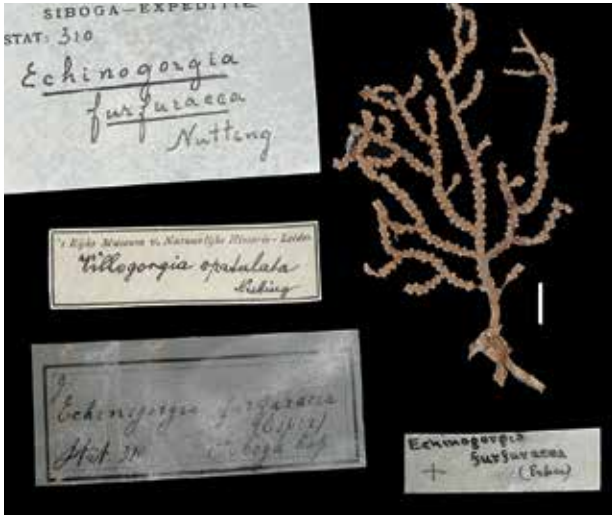


Fig. 38. *Villogorgia spatulata* Nutting, 1910, ZMA COEL. 2509 (*Echinomuricea furfuracea*). Scale 1 cm.



Fig. 39. *Villogorgia spatulata* Nutting, 1910, ZMA COEL. 2509 (*Echinomuricea furfuracea*). Scale 1 cm.

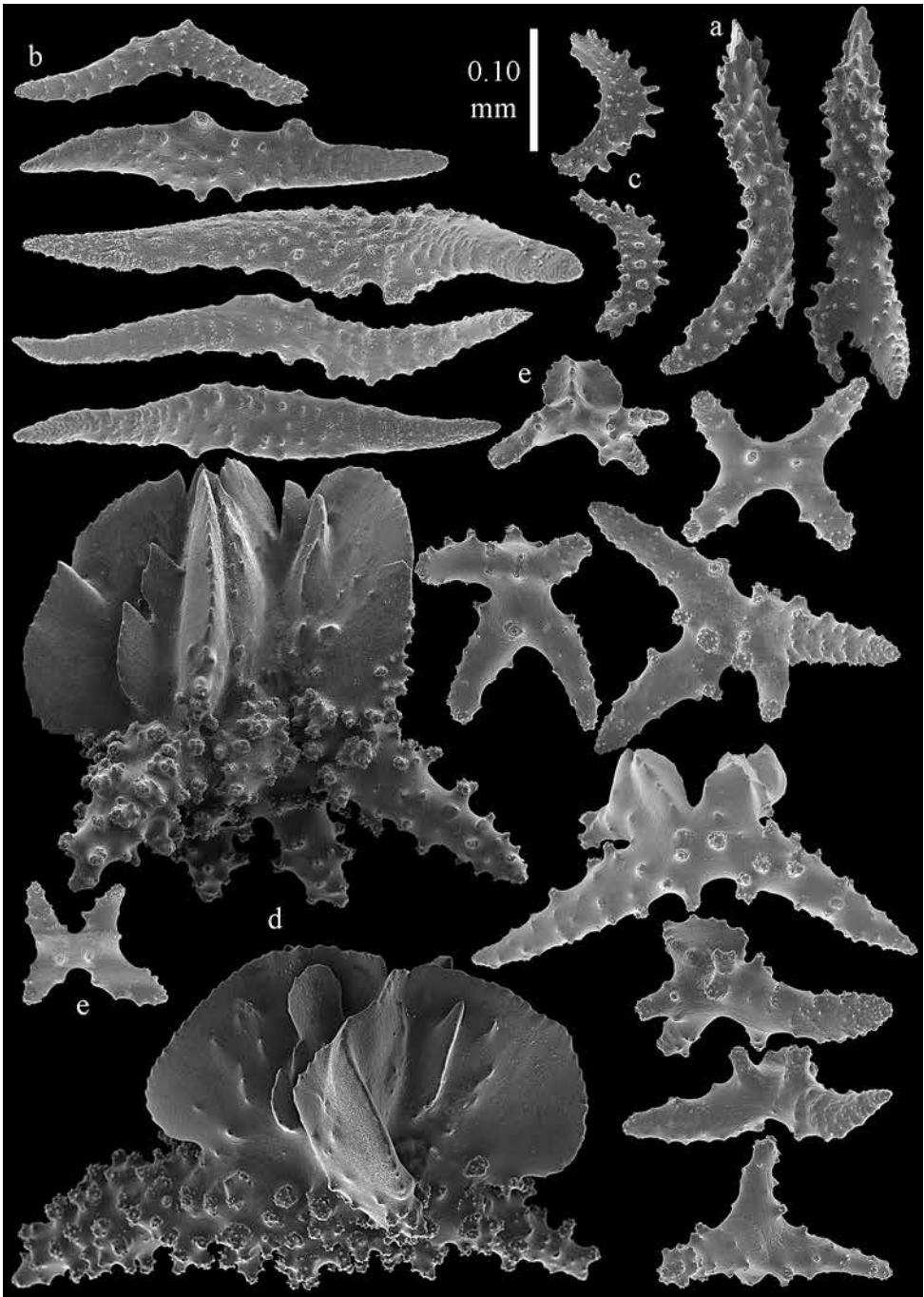


Fig. 40. *Villogorgia spatulata* Nutting, 1910, ZMA COEL. 2509 (*Echinomuricea furfuracea*); a, point spindles; b, collaret spindles; c, dragon wings; d, thornscales; e, thornstars.

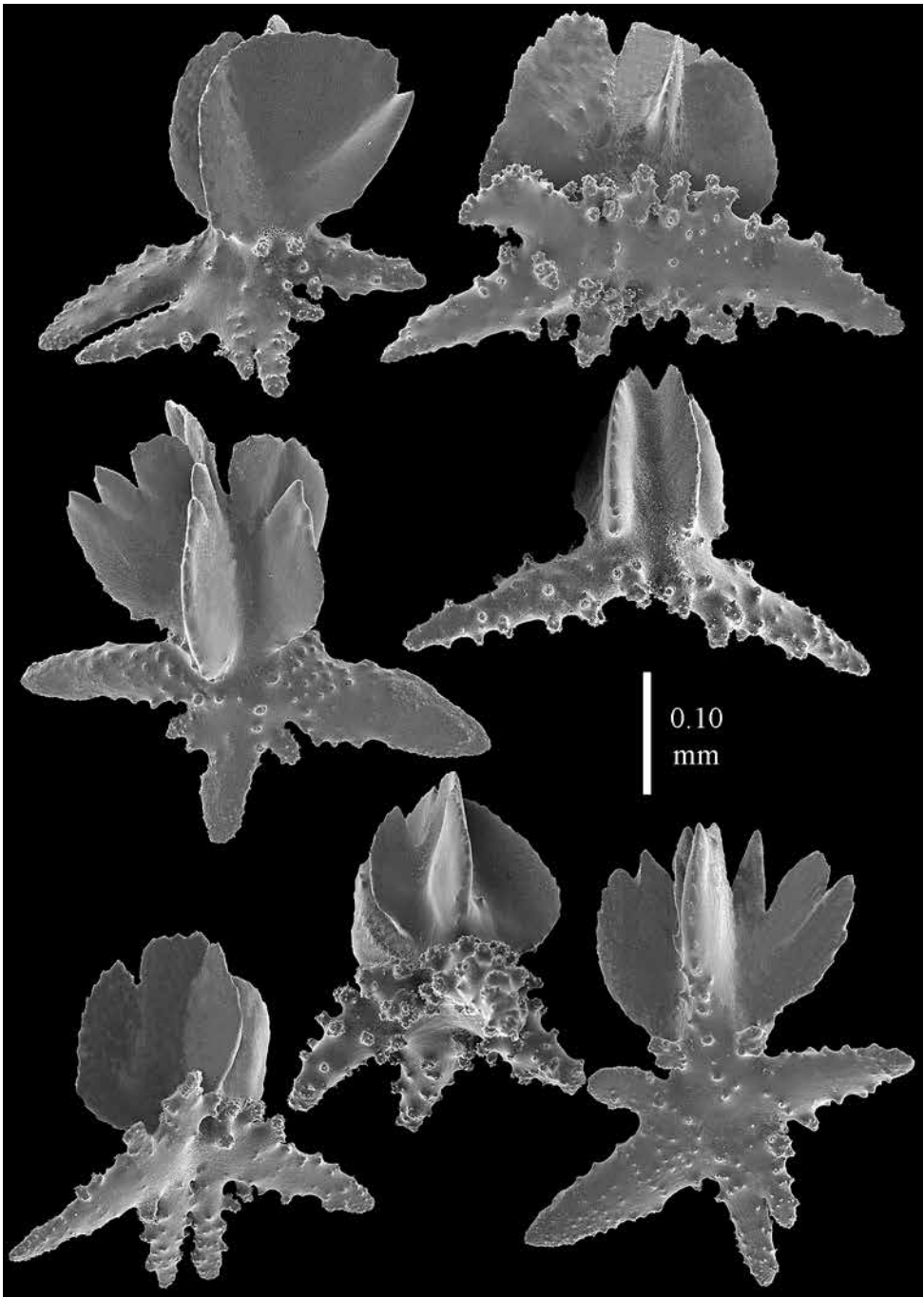


Fig. 41. *Villogorgia spatulata* Nutting, 1910, ZMA COEL. 2509 (*Echinomuricea furfuracea*); thornscales.

Remarks.— Van Soest, 1979 did not mention this species and we could not find any material in the collection. However, we did find ZMA COEL.2509 (Siboga sta. 310, Flores Sea, 73 m depth) *Echinomuricea furfuracea*, re-identified by Stiasny as *Villogorgia spatulata* and used that for the SEM images.

*Villogorgia timorensis* Nutting, 1910  
(figs 42-43)

*Villogorgia timorensis* Nutting, 1910: 74, pl. 14 figs 3-3a, pl. 22 fig. 3; Van Soest, 1979: 94.  
*Brandella timorensis*; Kükenthal, 1924: 216.  
*Villogorgia rubra*; Stiasny 1942: 197.

Material.— Siboga station 166, New Guinea, 118 m depth; ZMA COEL. 3641a, Siboga station 260, Kei islands, 90 m depth; ZMA COEL. 3641b, Siboga station 289, Timor Sea, 112 m depth.

Description.— ZMA COEL. 3641a-b are shown in fig. 42.

Sclerites.— Point spindles up to 0.35 mm long (fig. 43a), with a spiny distal end. Collaret with bent spindles up to 0.35 mm long (fig. 43b). Tentacles with dragon wings (fig. 43c). Calyces with thornscales (fig. 43d), up to 0.35 mm long, with leaves. Coenenchyme with thornstars (fig. 43e), up to 0.15 mm long.

All sclerites pink.

Remarks.— The specimen from Station 166 is missing (Van Soest, 1979). SEM images concern ZMA COEL. 3641b.

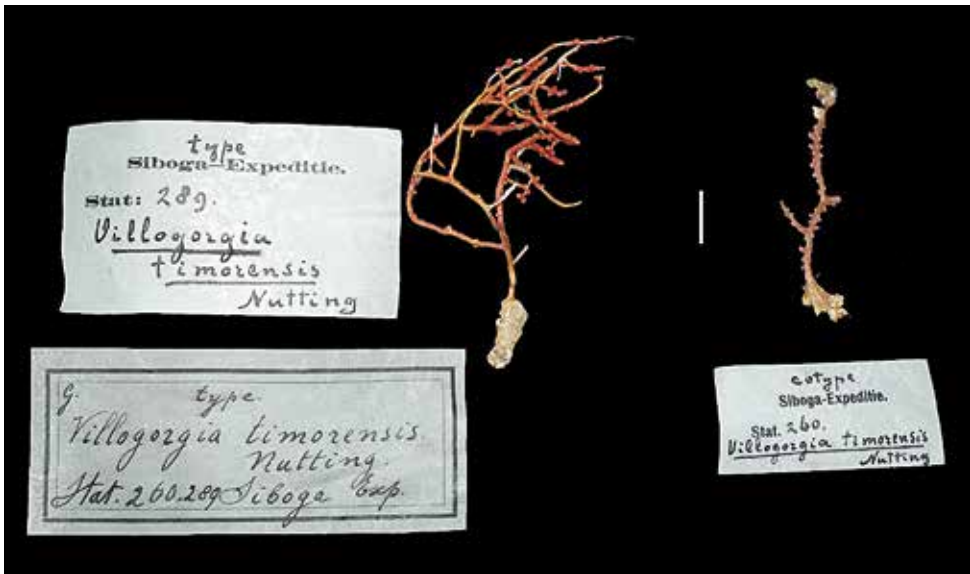


Fig. 42. *Villogorgia timorensis* Nutting, 1910, ZMA COEL. 3641a, b. Scale 1 cm.

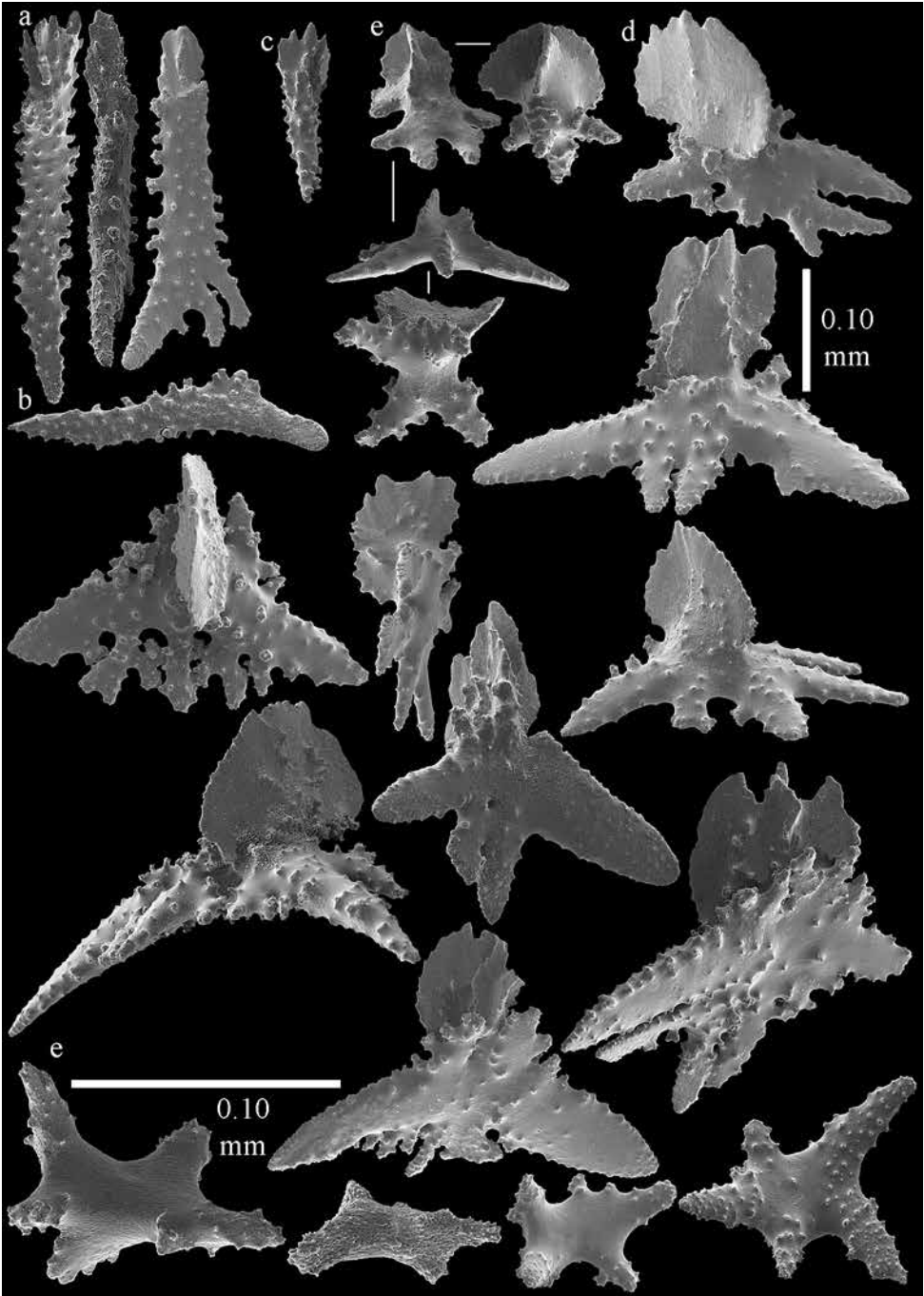


Fig. 43. *Villogorgia timorensis* Nutting, 1910, ZMA COEL. 3641b; a, point spindles; b, collarlet spindle; c, dragon wing; d, thornscales; e, thornstars. Scale at e only applies to e.

## Discussion

Research on the phylogeny and natural products of octocorals is considerably hampered by the impossibility to identify most octocoral specimens. This is partly caused by inadequate species descriptions by last-century octocoral taxonomists who only described the colony shape and ignored the sclerites. Re-examination and re-description of older material is often not possible anymore because of lack of manpower and fragmentary and/or badly preserved specimens. The latter is demonstrated here by the impossibility to make proper SEM images of the sclerites of the *Echinomuricea* species. The slender shape of branches in colonies of this genus makes them extra vulnerable to acid conditions, probably caused by a long initial storage of specimens in formalin and their belated transfer to alcohol. This problem does not only concern the ZMA collection, since the first author also noticed this in material in other European museums.

The missing of type specimens as noted by us in the present study could be caused by misplacement in the collection, unreturned loans, or disappearance by accidental destruction. We could not find data to support any of these possibilities. In these cases new sampling at the type localities may help to solve taxonomical problems. It may also indicate whether species found more than a century ago are still present in the same area or may have become locally lost (Hoeksema et al. 2011).

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