# Octocorallia (Cnidaria: Anthozoa) from the Scotia Arc, South Atlantic Ocean. I. The genus *Alcyonium* Linnaeus, 1758

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Key words: Anthozoa; Octocorallia; *Alcyonium*; new species; Antarctica.
Three new species of *Alcyonium* collected by the Spanish Antarctic Expeditions "Antártida 8611" and "Bentart 95" are described and figured: *Alcyonium paucilobulatum*, *A. grandis* and *A. southgeorgiensis*. Another two species, *A. antarcticum* Wright & Studer, 1889, and *Alcyonium sollasi* Wright & Studer, 1889, were also collected in the same area.

## Introduction

During the Spanish Antarctic Expeditions "Antártida 8611" and "Bentart 95" a large collection of marine invertebrates was collected.

The "Antartida 8611" expedition was carried out on board of the fishing boats "Pescapuerta Cuatro" and "Nuevo Alcocero" during the austral summer 1986-87. Sampling took place on the shelf around the archipelagos in the Scotia Sea (fig. 1), in 63 to 643 m depth. The main objective of this survey was to determinate the general distribution of the species of crustaceans, molluscs and fish, and to estimate the abundance of species with commercial interest.

During the "Bentart 95" cruises, on board of the RV "Hesperides" during the austral summer 1994-95, macrozoobenthos was sampled from the North of Livingston Island (South Shetlands Islands) to the Antarctic Peninsula (fig. 1), in 40 to 850 m depth. This expedition was part of a study of the benthic fauna and flora of this region.

The examination of a part of the collection of Anthozoa has permitted us the identification of five *Alcyonium* species. Two of these species, *Alcyonium antarcticum* Wright & Studer, 1889, and *Alcyonium sollasi* Wright & Studer, 1889, are known from this area, the other three represent new species.

## Material and methods

The material collected during the "Antartida 8611" expedition was collected with a commercial bottom trawl, 12 m wide and 3.5 m high, with a mesh size of 68 mm. The trawling time for each haul was 30 minutes.

"Bentart 95" material was collected with a "rock dredge", 0.80 m wide and 0.26 m high, with a mesh size of 10 mm (Stns. B95 R22, B95 R23), and with an Agassiz trawl, 2.01 m wide and 1.12 m high, with a mesh size of 10 mm. The trawling time on the bottom for each haul was 15 minutes (rock dredge) and 5 minutes (Agassiz trawl).

The material on which the present study is based has been deposited in the collec-

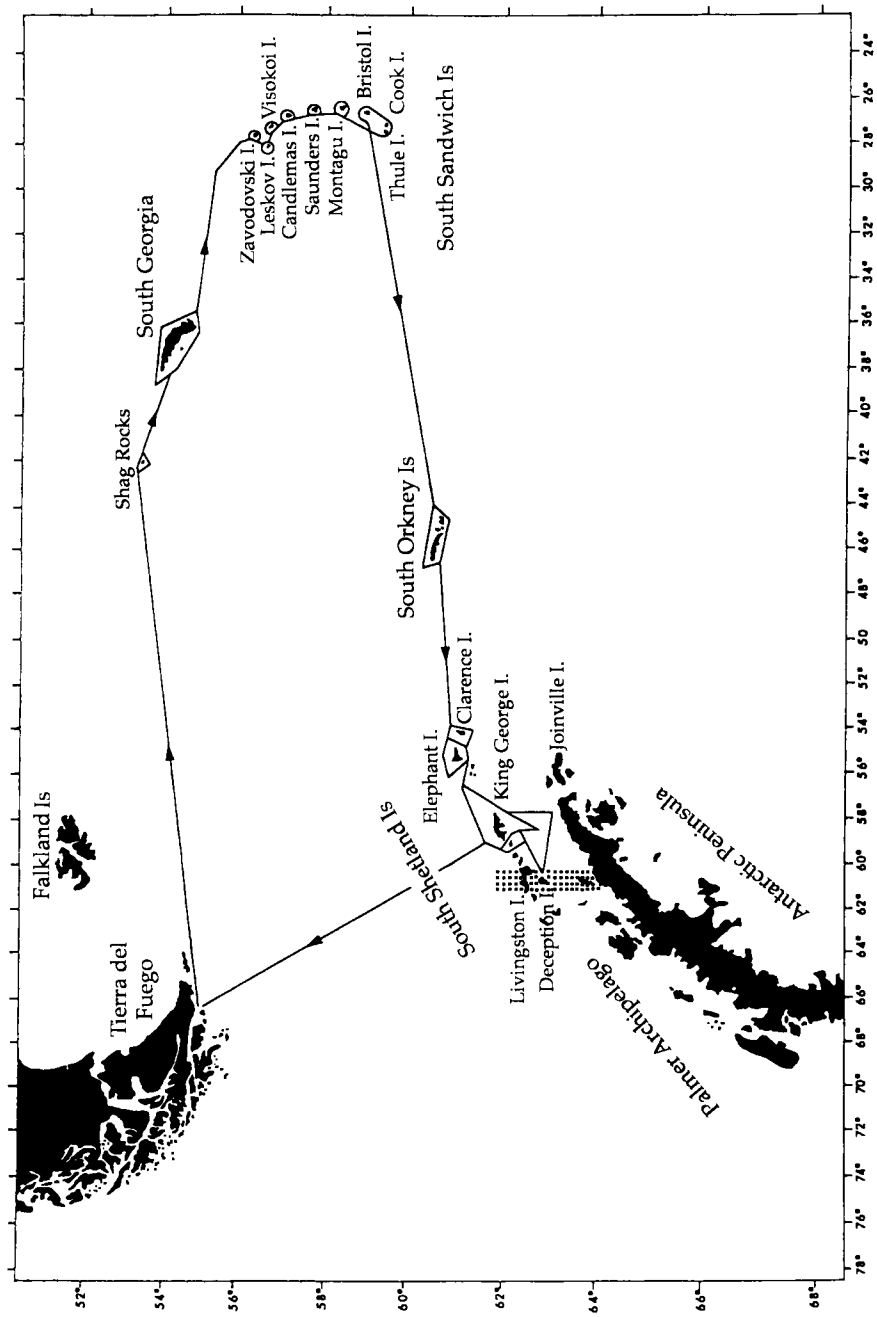


Fig. 1. Map of the study area; → = "Antártida 8611" expedition, ⁞⁞ = "Bentart 95" expedition.

tions of Departamento de Ecología y Biología Animal, Universidad de Vigo, Spain and in the National Museum of Natural History (Nationaal Natuurhistorisch Museum, formely Rijksmuseum van Natuurlijke Historie (RMNH)), Leiden, The Netherlands.

## List of stations where *Alcyonium* species were collected

ANT 15: Shag Rocks, 53°23.33'S 42°07.42'W-53°23.06'S 42°10.62'W, 25.xi.1986, 199-272 m: *Alcyonium sollasi* Wright & Studer, 1889.
ANT 17: Shag Rocks, 53°18.70'S 42°27.50'W-53°18.42'S 42°23.20'W, 25.xi.1986, 366-423 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.
ANT 19: Shag Rocks, 53°43.70'S 41°45.20'W-53°43.40'S 41°49.50'W, 20.xi.1986, 177-164 m: *Alcyonium grandis* spec. nov.
ANT 32: Shag Rocks, 53°38.70'S 42°14.90'W-53°40.70'S 42°11.70'W, 28.xi.1986, 213-213 m: *Alcyonium paucilobulatum* spec. nov.
ANT 35: Shag Rocks, 53°43.20'S 41°56.50'W-53°43.80'S 41°53.90'W, 28.xi.1986, 196-198 m: *Alcyonium grandis* spec. nov.
ANT 36: Shag Rocks, 53°48.30'S 41°48.20'W-53°49.50'S 41°46.50'W, 28.xi.1986, 335-321 m: *Alcyonium grandis* spec. nov.
ANT 44: Shag Rocks, 53°50.50'S 41°45.00'W-53°51.00'S 41°43.10'W, 29.xi.1986, 350-348 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.
ANT 131: South Georgia, 54°56.60'S 35°16.90'W-54°58.60'S 35°10.00'W, 10.xii.1986, 108-115 m: *Alcyonium southgeorgiensis* spec. nov.
ANT 139: South Georgia, 55°05.60'S 36°35.20'W-55°04.30'S 36°38.10'W, 11.xii.1986, 300-309 m: *Alcyonium grandis* spec. nov.
ANT 166: South Georgia, 54°41.60'S 35°20.90'W-54°46.60'S 35°21.70'W, 16.xii.1986, 152-188 m: *Alcyonium grandis* spec. nov.
ANT 397: Elephant Island, 61°18.80'S 54°41.60'W-61°16.90'S 54°40.20'W, 16.i.1987, 209-235 m: *Alcyonium paucilobulatum* spec. nov.
ANT 407: Elephant Island, 61°30.60'S 55°37.20'W-61°30.40'S 55°33.50'W, 17.i.1987, 232-260 m: *Alcyonium paucilobulatum* spec. nov.
ANT 408: Elephant Island, 61°30.10'S 55°16.70'W-61°29.80'S 55°12.10'W, 17.i.1987, 438-471 m: *Alcyonium paucilobulatum* spec. nov.
ANT 434: Elephant Island, 60°55.60'S 55°29.30'W-60°55.60'S 55° 25.20'W, 20.i.1987, 111-136 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.
ANT 461: Elephant Island, 61°47.30'S 58°00.70'W-61°49.00'S 57°59.70'W, 23.i.1987, 196-232 m: *Alcyonium paucilobulatum* spec. nov.
ANT 536: South Shetland Islands, 62°28.90'S 62°02.90'W-62°29.20'S 62°05.70'W, 02.ii.1987, 330-344 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.
ANT 558: South Shetland Islands, 61°53.70'S 57°13.60'W-61°55.20'S 57°13.30'W, 05-ii-1987, 163-177 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.
B95 R22: South Shetland Islands (Livingston Island), 63°03.43'S-60°39.43'W, 29.i.1995, 248 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.
B95 R23: South Shetland Islands (Livingston Island), 63°57.24'S-60°58.09'W, 29.i.1995, 92 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.
B95 A23: South Shetland Islands (Livingston Island), 63°57.14'S-60°59.73'W, 29.i.1995, 141 m: *Alcyonium antarcticum* Wrigth & Studer, 1889.

## Systematic part

### *Alcyonium antarcticum* Wright & Studer, 1889

*Alcyonium antarcticum* Wright & Studer, 1889: 239-240, pl. 42 fig. 5; Molander, 1929a: 48-50, fig. 7, pl. 4 fig. 7; Thomson & Rennet, 1931: 9, pl. 11 fig. 1; Broch, 1965: 19; Verseveldt & van Ofwegen, 1992: 155-158, figs 1-3.

*Alcyonium Paessleri* May, 1899: 6-7, fig. 1.

*Alcyonium paessleri*; Hickson, 1902: 293; 1907: 3-4, pl. 2 figs 22-23; Molander, 1929a: 50-51, fig. 8, pl. 4 fig. 11; Verseveldt, 1967: 7-10, figs 3, 4, 7c-f.

Not *Alcyonium antarcticum*; Hickson, 1900: 73, pl. 4 figs A, A' [= *Alcyonium variabile* (Thomson, 1921)].

Not *Alcyonium paessleri*; Molander, 1929b: 4 [= *Alcyonium variabile* (Thomson, 1921)].

Material.— **ANT 17**: One colony 30 mm high, 10 mm wide.— **ANT 44**: One colony 50 mm high, 30 mm wide.— **ANT 434**: One colony 30 mm high, 25 mm wide.— **ANT 536**: One colony 70 mm high, 45 mm wide.— **ANT 558**: One colony 55 mm high, 55 mm wide (RMNH Coel 23942).— **B95 R22**: Four colonies 11-32 mm high, 10-20 mm wide (RMNH Coel. 23943, one colony).— **B95 R23**: Two colonies 20 × 26 mm (RMNH Coel 23944) and 50 × 35 mm.— **B95 A23**: Two colonies 16 × 15 mm and 26 × 17 mm.

Discussion.— *Alcyonium antarcticum* was recently redescribed by Verseveldt & van Ofwegen (1992), and they considered *Alcyonium paessleri* May 1899, as a synonym of this species.

We have little to add to the redescription of the species. The colour of the present specimens (preserved in alcohol) is yellow, and capstans and rods predominate in the surface layer, like in the holotype.

The material recorded by Hickson (1900) from Cape of Good Hope as *A. antarcticum* was referred by Williams (1986) to *Alcyonium variabile* (Thomson, 1921). This opinion was shared by Verseveldt & van Ofwegen (1992)

Molander (1929b) identified South African material as *A. paessleri*. Williams (1992) also referred these specimens to *A. variabile*.

Distribution.— *Alcyonium antarcticum* is widely distributed in antarctic and subantarctic areas in depths varying between 25 and 642 metres. This species is known from Heard Island (Wright & Studer, 1889), from several localities off Argentinia, between 38°58'S 55°17'W and 47°09'S 60°38'W (Verseveldt, 1967; as *Alcyonium paessleri*); Magellan region (May, 1899; as *A. paessleri*; Verseveldt, 1967; as *A. paessleri*); Burdwood Bank, on the South of the Falkland Islands (Molander, 1929; Broch, 1965); South Georgia (Verseveldt & van Ofwegen, 1992); South-east from Seymur Island (Antarctic Peninsula) (Molander, 1929; as *A. paessleri*); from Ross Island, Antarctica (Verseveldt & van Ofwegen, 1992) and Adelie Land, Antarctica (Thomson & Rennet, 1931).

### *Alcyonium sollasi* Wright & Studer, 1889

*Alcyonium sollasi* Wright & Studer, 1889: 240, pl. 42 fig. 4. May, 1899: 6; 1900: 402; Thomson, 1921: 157; Lüttschwager, 1926: 285; Macfadyen, 1936: 32; Verseveldt & van Ofwegen, 1992: 176-178, figs 22-24; Williams, 1992: 301.

Material.— **ANT 15**: Two colonies 50 × 30 mm (RMNH Coel. 23945) and 60 × 110 mm, the big one attached to a scleractinian coral.

Discussion.— Type material of *Alcyonium sollasi* was recently redescribed by Verseveldt & van Ofwegen (1992), and is characterized by the presence of thorn clubs and spindles in all parts of the colony. The specimens here examined are in agreement with the type material and need no further comment. Colour of colonies is yellowish white (preserved in alcohol).

Distribution.— *A. sollasi* is known from one locality in the mouth of the Strait of Magellan, at 100 m depth (Wright & Studer, 1889; May, 1899; Verseveldt & van Ofwegen, 1992).

The presence of *A. sollasi* off South Africa (Thomson, 1921) is doubtful (see Williams 1992).

## *Alcyonium paucilobulatum* spec. nov.
(figs 2-4)

Material.— **ANT 32**: one colony 40 × 40 mm.— **ANT 397**: Two colonies 20 × 30 mm and 40 × 30 mm (RMNH Coel. 23946).— **ANT 407**: One colony 70 × 70 mm (RMNH Coel 23947).— **ANT 408**: One colony 40 × 30 mm.— **ANT 461**: One colony 40 × 35 mm, the holotype.

Description.— Colonies simple, consisting of a single rounded lobe or three rounded lobes, as was the case in the colony from ANT 407 (fig. 2d).

The polyps are distributed over the whole surface of the colony, almost reaching the base. Most are retracted; calyces are not present. The diameter of the apertures of the polyps is 1-2.5 mm.

The anthocodial armature consists of a crown and eight points, composed of thorny spindles up to 0.60 mm long (fig. 3a). The tentacles contain thorny, slightly flattened rods, 0.21-0.31 mm long (fig. 3b). The neck region below the crown contains some scattered spindles and spherical sclerites.

The surface layer of the coenenchyme contains thorny capstans (fig. 4a-c, h) and spherical sclerites (fig. 4d-f), 0.08-0.17 mm long. Furthermore, a few clubs with a very prominent head are present (fig. 4g, i-j).

The interior has long thorny rods and spindles up to 0.76 mm long (fig. 4k-q).

Variation.— In the colony of station ANT 407 we have observed spherical sclerites

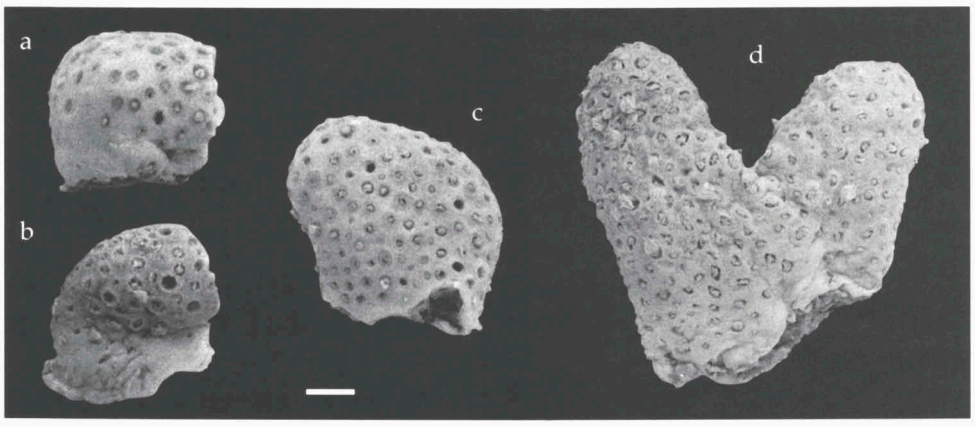


Fig. 2. *Alcyonium paucilobulatum* spec. nov.; a, c, ANT 397; b, ANT 461 (holotype); d, ANT 407. Scale 1 cm.

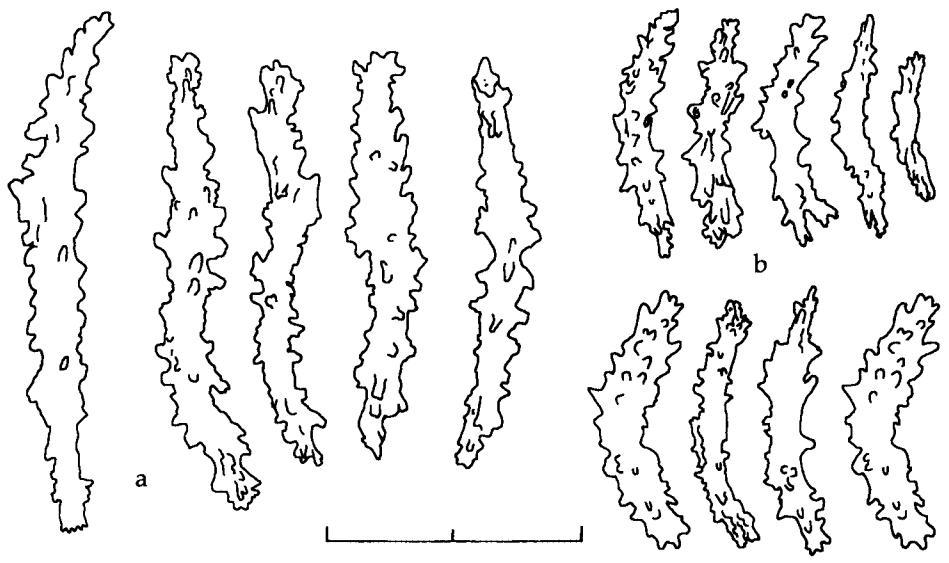


Fig. 3. *Alcyonium paucilobulatum* spec. nov.; sclerites of holotype; a, sclerites of crown and points; b, tentacular sclerites. Scale 0.2 mm.

in the polyps, very similar to the ones from the surface layer. The poor condition of preservation of the polyps made it impossible to establish with any certainty the exact location of these sclerites, probably they are from other parts of the colony.

Colour.— Cream (preserved in alcohol).

Etymology.— The specific name *paucilobulatum* from Latin *paucus* = few and *lobus* = rounded projection, refers to the colony form.

Discussion.— The presence of thorny spheres distinguishes our material from other species of *Alcyonium* described from the Antarctic region, like *Alcyonium antarcticum* Wright & Studer, 1889, *Alcyonium haddoni* Wright & Studer, 1889, and *Alcyonium sollasi* Wright & Studer, 1889. The presence of thorny spheres has been found in several other *Alcyonium* species (see Williams, 1992), but the colony form and sclerites are different in the present species.

Distribution.— This species has been collected at Shag Rocks, Elephant Island and the South Shetland Islands, between 196 and 471 m depth.

## *Alcyonium grandis* spec. nov.
(figs 5-7)

Material.— **ANT 19**: One colony 20 × 60 mm.— **ANT 35**: One colony 120 × 65 mm (RMNH Coel. 23948).— **ANT 36**: One colony 47 × 20 mm.— **ANT 139**: Two colonies 120 × 70 mm (RMNH Coel. 23949) and 150 × 120 mm.— **ANT 166**: One colony 165 × 105 mm, the holotype.

Description.— Compact colonies, with a short and smooth lower part without polyps, and a polyparium of numerous lobes, generally of small size (fig. 5).

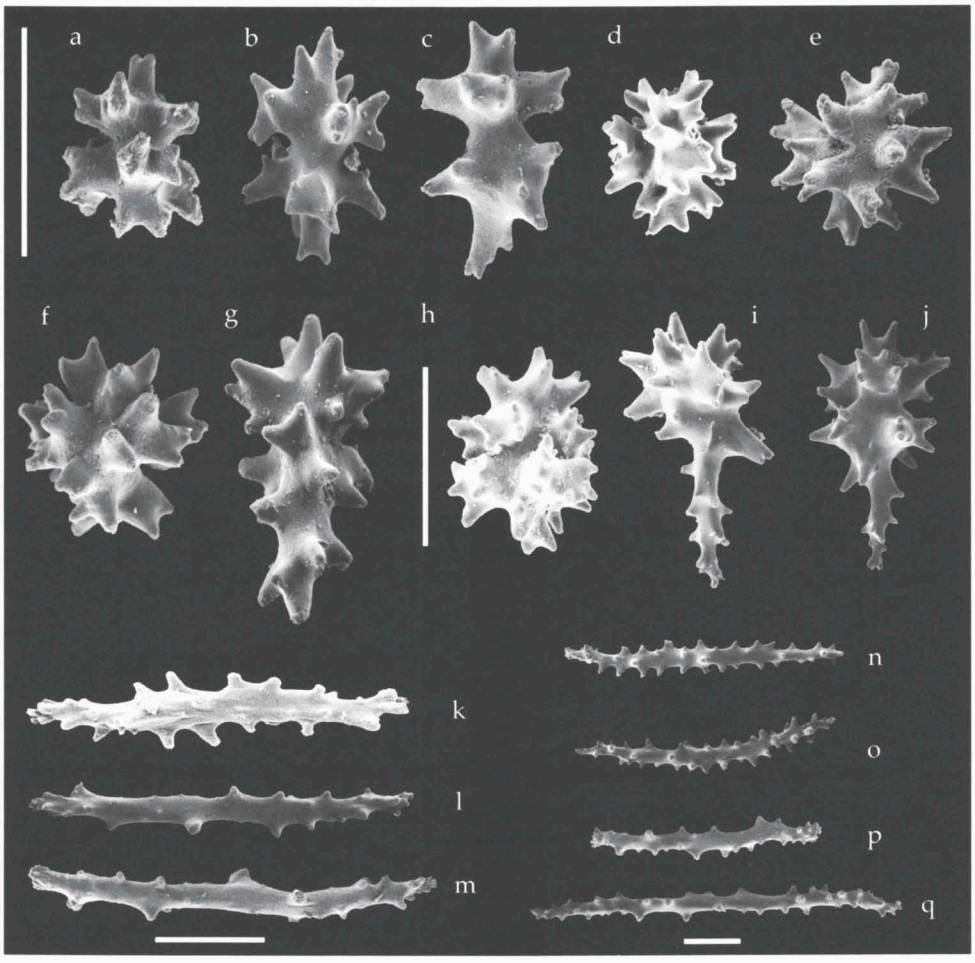


Fig. 4. *Alcyonium paucilobulatum* spec. nov.; sclerites of holotype; a-c, h, capstans of surface layer; d-f, spherical sclerites of surface layer; g, i-j, clubs of surface layer; k-q, rods and spindles of interior. Scales 0.10 mm; scale at 4a applies to 4a-g; scale at 4h to 4h-k; scale at 4m to 4l-m; scale at 4q to 4n-q.

The polyps are entirely withdrawn into the coenenchyme or they extend 2-3 mm. Calyces are absent, but expanded polyps show eight small elevations at their base.

The anthocodial armature consists of thorny spindles, 0.26-0.45 mm long, arranged in eight points (fig. 6a). The crown is weakly developed. The tentacles contain warty rods up to 0.24 mm long (fig. 6b). The neck zone of the polyps is devoid of sclerites.

The surface layer of the coenenchyme is closely packed with small thorny capstans, 0.08-0.15 mm long (fig. 7a-j).

The interior shows some scattered sclerites. Thorny rods, 0.15-0.45 mm long, predominate (fig. 7k-l, p-s). Furthermore, a few club-like sclerites, 0.16-0.20 mm long, are present (fig. 7m-o).

Variation.— In the specimens collected at station ANT 139 some crosses were observed in the interior (fig. 7t-v).

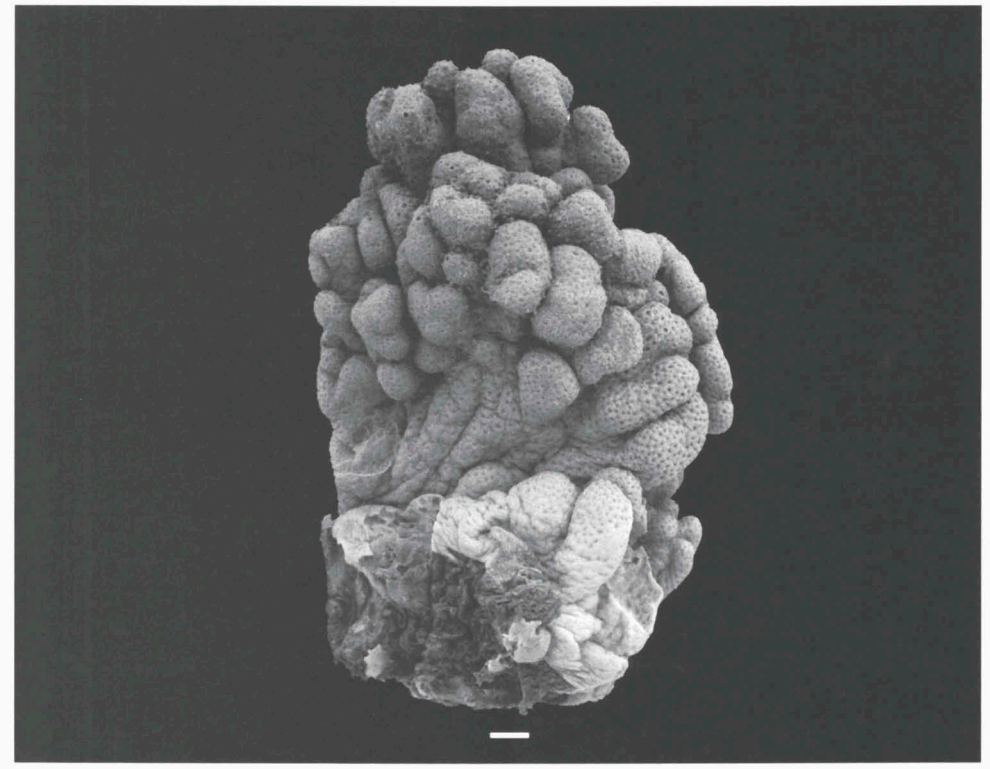

Fig. 5. *Alcyonium grandis* spec. nov. holotype. Scale 1 cm.

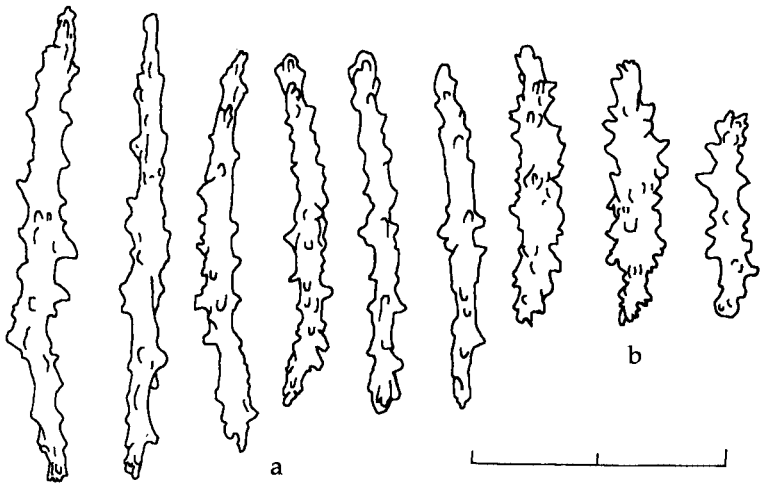


Fig. 6. *Alcyonium grandis* spec. nov.; sclerites of holotype; a, sclerites of crown and points; b, tentacular sclerites. Scale 0.2 mm.

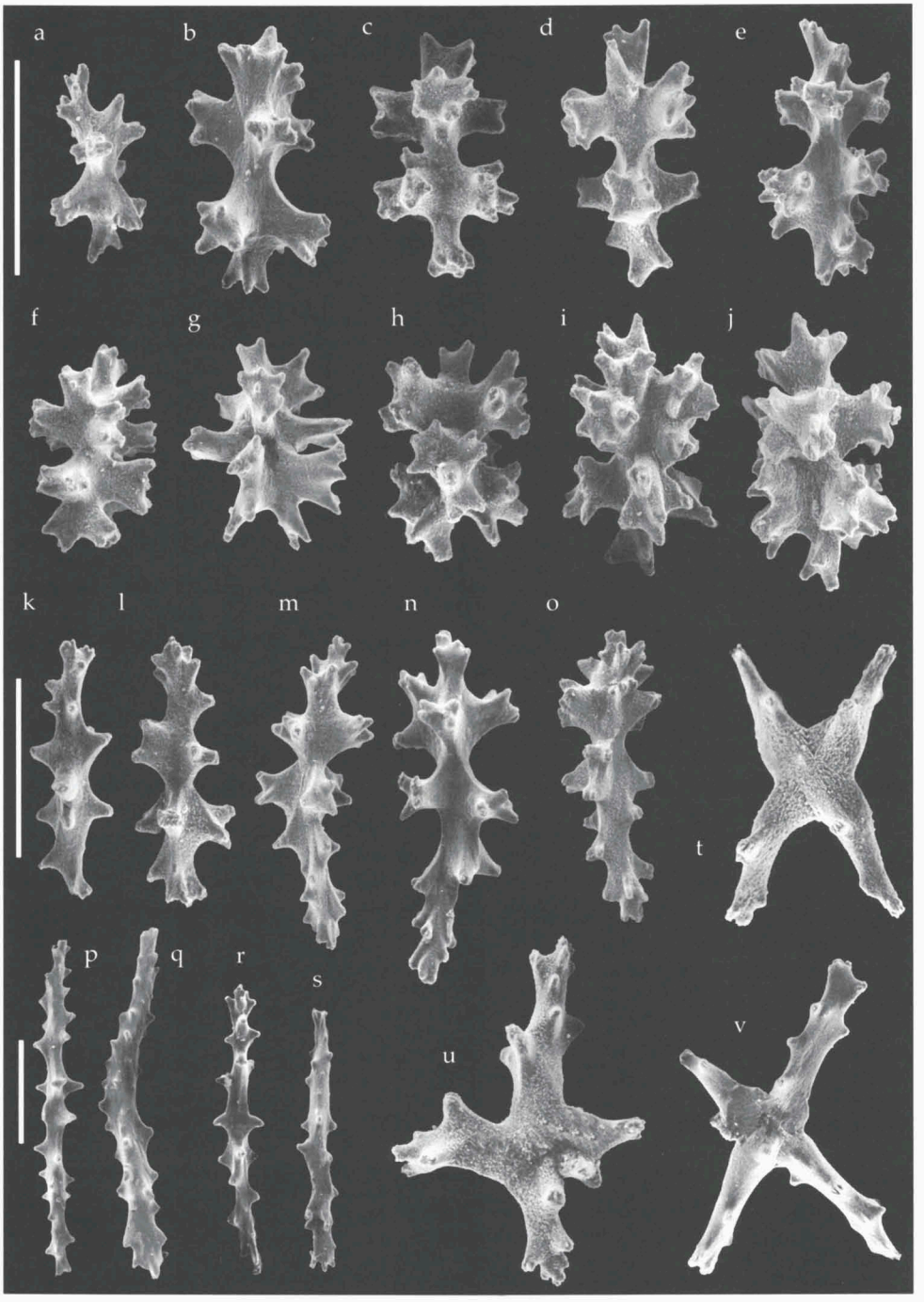


Fig. 7. *Alcyonium grandis* spec. nov.; sclerites of holotype (a-s) and paratype of ANT 139 (t-v); a-j, capstans of surface layer; k-l, p-s, rods of interior; m-o, clubs of interior; t-v, crosses of interior. Scales 0.10 mm; scale at 7a applies to 7a-j, t-u; scale at 7k to 7k-o, v; scale at 7p to 7p-s.

Colour.— Cream (preserved in alcohol).

Etymology.— The specific name *grandis* (Latin) = large, refers to the size of the colonies.

Discussion.— *Alcyonium grandis* spec. nov. is characterized by its massive growth form and the presence of numerous small lobes. The small capstans in the surface layer and the thorny rods in the interior are typical for *A. grandis*.

The sclerites of this species resemble those of *Alcyonium antarcticum* Wright & Studer, 1889, but in the latter the clubs are clearly derivations of the capstans while in *A. grandis* the clubs mostly seem to be derivations of the internal rods. Moreover, the capstans in *A. antarcticum* are less spiny (see Verseveldt & van Ofwegen, 1992: fig. 3) and are distinctly smaller (less than 0.10 mm long).

This species shows a resemblance in external morphology with *Alcyonium southgeorgiensis* spec. nov. The differences are discussed under *A. southgeorgiensis*.

Distribution.— This species was collected off Shag Rocks and the South Shetlands Islands, at 152-335 m depth.

## *Alcyonium southgeorgiensis* spec. nov.
## (figs 8-10)

Material.— **ANT 131**: one colony 110 × 155 mm, the holotype.

Description.— Compact colony, soft to the touch. Basal part without polyps and much contracted; polyparium with numerous, irregularly placed lobes (fig. 8). The polyps are entirely withdrawn into the coenenchyme or they may be extending up to

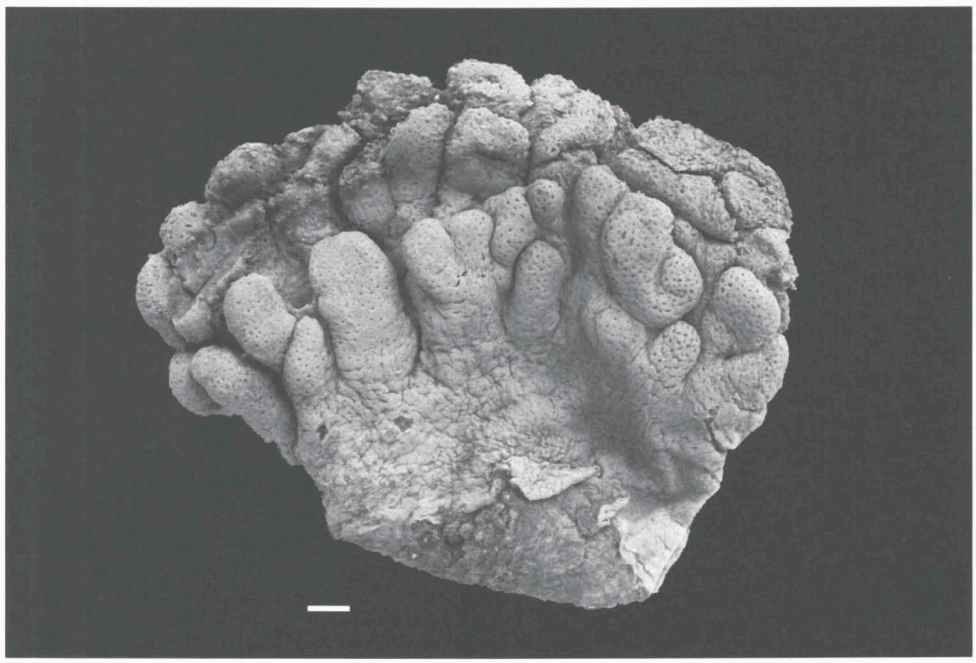

Fig. 8. *Alcyonium southgeorgiensis* spec. nov. holotype. Scale 1 cm.

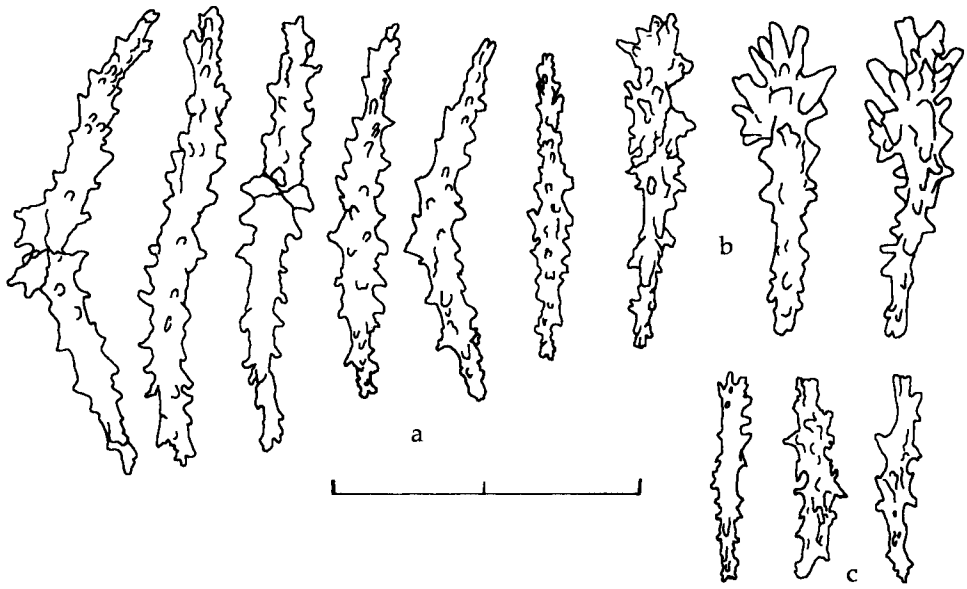


Fig. 9. *Alcyonium southgeorgiensis* spec. nov.; sclerites of holotype; a, spindles of crown and points; b, clubs of points; c, tentacular sclerites. Scale 0.2 mm.

2 mm. The polyps are situated close to each other, and when they are retracted their positions are indicated by small circular spots. In the distal part of polyparium short calyces are present, with a margin of eigth small elevations.

The anthocodial armature consists of a crown and eight points. The sclerites are thorny spindles up to 0.29 mm long (fig. 9a), and some clubs with a very thorny head (fig. 9b). The tentacles contain a few flattened rods, 0.21-0.25 mm long (fig. 9c).

The surface layer of the coenenchyme contains numerous thorny capstans (fig. 10a-d) and spherical sclerites (fig. 10e), up to 0.20 mm in diameter. In addition some clubs are present (fig. 10f-h).

The interior contains thorny rods, 0.16-0.35 mm long (fig. 10i-p).

Colour.— Cream (preserved in alcohol).

Etymology.— the specific name *southgeorgiensis* refers to South Georgia, where the type was collected.

Discussion.— The colony form of *Alcyonium southgeorgiensis* spec. nov. resembles that of *Alcyonium grandis* spec. nov., but the species differs by the presence of calyces in the distal part of the polyparium and by its sclerites. In *A. southgeorgiensis* the anthocodiae as well as the surface layer of the coenenchyme contain clubs and the surface layer has spherical sclerites, both absent in *A. grandis*.

The sclerites of *A. southgeorgiensis* spec. nov. resemble those of *A. paucilobulatum* spec. nov., but the latter species has much longer sclerites in the interior (up to 0.76 mm long versus 0.35 mm long) and polyps (up to 0.60 mm long versus 0.29 mm long). Moreover, the colony form is quite different.

Distribution.— The species was exclusively collected off South Georgia, between 108-115 m depth.

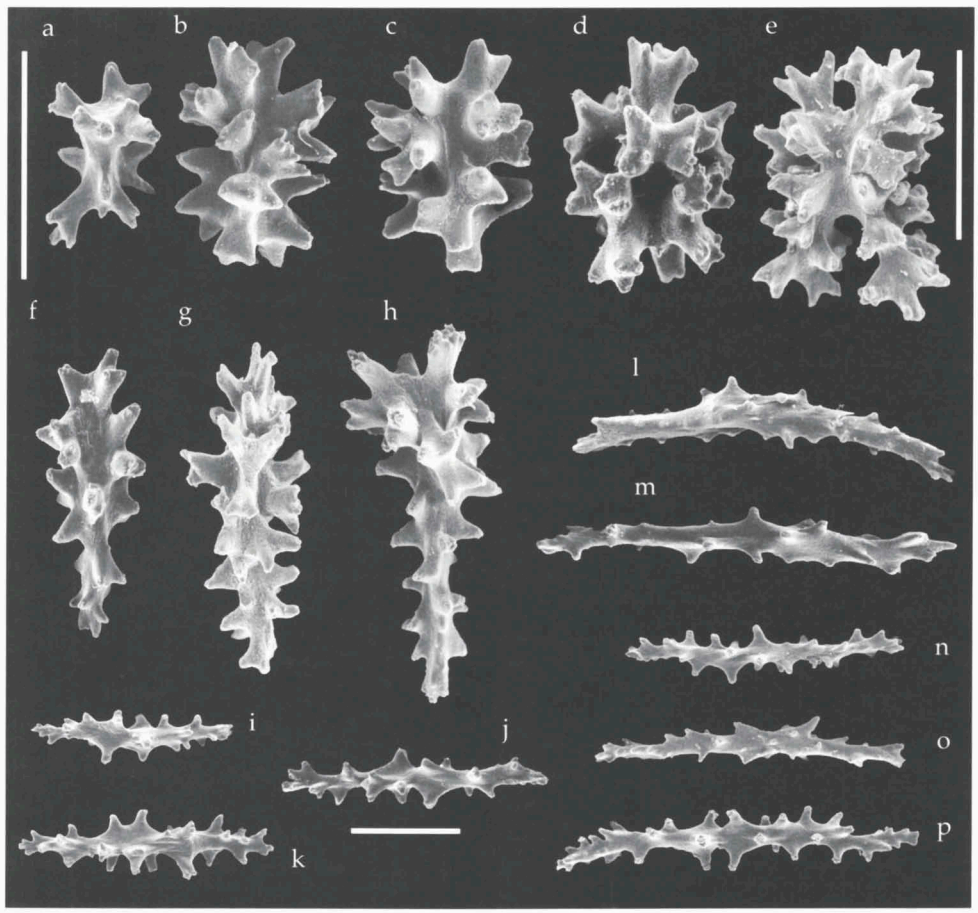


Fig. 10. *Alcyonium southgeorgiensis* spec. nov.; sclerites of holotype; a-d, capstans of surface layer, e, spherical sclerite of surface layer; f-h, clubs of surface layer; i-p, rods of interior. Scales 0.10 mm; scale at 10a applies to 10a-d; at 10e to 10e-h, l-m; at 10j to 10i-k, n-p.

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