

THREE NEW SPECIES OF *LEIOPATHES* (CNIDARIA: ANTHOZOA: ANTIPATHARIA) FROM SOUTHERN AUSTRALIA

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Three new species of the antipatharian genus *Leiopathes* are described from the coastal waters of South and Western Australia and Tasmania. *Leiopathes secunda* sp. nov. is morphologically similar to *L. expansa* Johnson (1899) and *L. grimaldi* Roule (1905) but differs from those species in having larger and more numerous axial spines. *Leiopathes acanthophora* sp. nov. resembles *L. glaberrima* (Esper, 1788), but has larger spines which extend over a greater proportion of the corallum. *Leiopathes bullosa* sp. nov. is characterised by the distinctive hemispherical shape of its spines.

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INTRODUCTION

Very few studies have been conducted on the antipatharian fauna of Australia and Tasmania. In 1878 Studer reported on the antipatharians collected by the 'Gazelle' off West Australia and in the Mermaid Straits at depths of 45–50 fm. Two species were identified: *Antipathes foeniculum* Lamarck (= ?*A. foeniculacea* Pallas, 1766; according to Brook 1889) and *A. pinnatifida* Lamouroux, 1816. Brook (1889) suggested that *A. foeniculacea* might be related to *A. dichotoma* Pallas, 1766 and that *A. pinnatifida* might be identical with *A. ulex* Ellis and Solander, 1786. Both *A. foeniculum* and *A. pinnatifida* are poorly described and it is unlikely that either will ever be accurately identified.

Antipatharians are often inadvertently caught in the nets of fishermen. Such material is usually discarded; however, through the efforts of Karen Gowlett-Holmes and her associates, a large number of corals brought up by local fishermen trawling in the waters off the southern and western coasts of Australia and off Tasmania have been saved and carefully preserved. Among these corals were several specimens similar to species of *Leiopathes* found in the Atlantic and IndoPacific. Closer examination revealed species-specific differences in the morphology, size and density of the axial spines. Consequently, three new species are described. The holotypes and paratypes of the new species are deposited in the South Australian Museum (SAM), Adelaide, S.

Australia; schizotypes (pieces of the holotypes or paratypes) of the specimens are deposited in the U.S. National Museum of Natural History (USNM) in Washington, DC.

TAXONOMIC SECTION

Order Antipatharia Milne Edwards, 1857

Family LEIOPATHIDAE Haeckel, 1896 (emended)

Diagnosis

Polyps with six primary and six secondary mesenteries. Primary (pm) and secondary mesenteries (sm) complete, attached to both inner wall of oral cone and actinopharynx. Secondary mesenteries located between transverse primary mesenteries (tpm) and sagittal primary mesenteries (spm); two on one side and four on opposite side of transverse axis, with one-half of each complement occurring on each side of sagittal axis; clockwise pattern described by sequence tpm-sm-spm-spm-sm-tpm-sm-sm-spm-spm-sm-sm. New polyps developing from coenenchymal surface between older polyps, as well as at distal end of branchlets.

Discussion

In 1896 Schultze proposed a reclassification of the Antipatharia based on the number of

mesenteries in the polyps. In this scheme the family Antipathidae was divided into three subfamilies, the Dodekamerota with 12 mesenteries, the Dekamerota with 10 mesenteries, and the Hexamerota with six mesenteries (these are invalid names according to the International Code of Zoological Nomenclature, Article 12). The Dodekamerota contained the single genus *Leiopathes*. Haeckel (1896, as cited in Carlgren 1908:134) was the first naturalist to treat the Dodekamerota as a suborder of the Antipatharia and to place *Leiopathes* in a separate family, using the name 'Liopathida'. This taxon, with the correctly emended name Leiopathidae, was subsequently recognized by Bourne (1900, as cited in Carlgren 1908:138), Roule (1905), and Hickson (1906). However, in his study of the Antipatharia of the 'Siboga' Expedition van Pesch (1914) discovered a species of *Cirrhopathes* (i.e., *C. contorta*) whose polyps also possessed six secondary mesenteries. This led van Pesch to conclude that the number of secondary mesenteries was not as significant a taxonomic character as Schultze had assumed. He therefore created a new taxon, the 'Heterotaeniales' to contain both the Dekamerota and the Dodekamerota. The 'Heterotaeniales' was treated by van Pesch as a subtribe of the Antipathidae and included all species with primary and secondary mesenteries, regardless of the number. In the last major revision of the order, Pax (1918) renamed the Heterotaeniales the 'Pleiomerotha', and elevated the taxon to the rank of superfamily (the name was not based on a described genus). Within the Pleiomerotha, Pax placed the families Antipathidae and Schizopathidae; *Leiopathes* was included in the Antipathidae.

The submergence of the Dodekamerota by van Pesch (1914) was based solely on his finding that *C. contorta* had six secondary mesenteries. However, van Pesch (1914) stated that the additional fifth and sixth secondary mesenteries in *C. contorta* are incomplete, meaning that they extend from the body wall but do not reach to the actinopharynx. In contrast, in *Leiopathes* all the secondary mesenteries are complete. Furthermore, according to van Pesch, the two incomplete mesenteries in *C. contorta* do not reach to the upper end of the oral cone nor do they occupy the same relative position as those in *Leiopathes*. In *C. contorta* they are located between the anterior secondary mesenteries and the primary sagittal mesenteries (van Pesch 1914), whereas in *Leiopathes* they occur between the anterior secondaries and the primary transverse ones

(Brook 1889). These differences indicate that the two incomplete mesenteries in *C. contorta* are not homologous to those in *Leiopathes*. Consequently, *Leiopathes* can be viewed as a distinct and homogeneous group meriting recognition at a level above that of genus; therefore, the family Leiopathidae is reestablished here. Considering that the classification of the order has been substantially altered by the removal of the family *Dendrobrachiidae* to the Octocorallia (Opresko and Bayer 1991), the use of a distinct polyp-related character such as the number of mesenteries, seems appropriate for differentiating a family-level taxon. Further study may show that the Leiopathidae merits even higher taxonomic recognition.

Genus *Leiopathes* Haime, 1849

Leiopathes Gray, 1840:76 (nomen nudum); Gray, 1842:135 (nomen nudum); Haime, 1849:224 (type species *Antipathes glaberrima* Esper, 1792:160, pl. 9); Gray, 1857a:113; Gray, 1857b:273; Brook, 1889:95; Roule, 1905:73; Gravier, 1918:225. *Antipathes* (in part), van Pesch, 1914:76; Pax, 1918:470.

Diagnosis

Corallum irregularly sympodial; branching multi-directional or flabellate. Branchlets arranged irregularly; loosely bilateral or uniserial; pinnules not present. Spines poorly developed; small, simple, smooth surfaced; conical, deltoid, or hemispherical in shape; reduced in size or absent on larger branches and stem. Polyps very variable in size and spacing; equally wide in sagittal and transverse diameters, or slightly longer along sagittal axis; uniserially arranged on smallest branches, irregularly distributed on all sides of axis on larger branches and stem.

Discussion

The type species of the genus is *Leiopathes glaberrima* (Esper, 1792). Esper's original specimen still exists in the Erlangen Museum in Germany, but was not available for study.

The genus name *Leiopathes* was first used by Gray in 1840 in a listing of the collections of the British Museum; however, the name was not accompanied by a description, illustration, or reference to a previously described species; therefore, it must be considered a nomen nudum. The name appears in subsequent editions of the Synopsis of the British Museum, but also without

a designated type species (Gray 1842). There is no evidence that Gray published a detailed description of *Leiopathes* until 1857. However, in 1849, in a publication describing a species he identified as *Leiopathes lamarcki*, Haime specifically stated that the type of *Leiopathes* was Esper's species *Antipathes glaberrima*. Even though he himself referred to *Leiopathes* as Gray's genus, Haime has to be considered the author of the genus.

In 1857 Gray reported that the species he had previously described in 1832 (as *Antipathes dichotoma*, Pallas) 'has been separated from others in the genus because the surface of the axis is smooth and not covered with a number of minute, uniform cylindrical spines like the true *Antipathes*' (Gray 1857a). In another paper appearing in the same year, Gray (1857b) defines the genus as follows: 'Axis smooth, polished, branched, forked. Bark soft, deciduous, deliquescent, sometimes forming (when dry) smooth, transparent masses at the fork of the branches'. It is in this second publication that Gray placed *Antipathes glaberrima* Esper in the genus *Leiopathes*, and he also indicated (in the synonymy) that *Antipathes dichotoma* Pallas was possibly identical to *L. glaberrima*. According to Brook, Lacaze Duthiers (1864, 1865) was the first investigator to observe that *L. glaberrima* possessed axial spines, and even though these spines are noticeable only on the smallest branches and branchlets, their presence essentially eliminated the primary character used by Gray. In 1889 Brook reported that the polyps of *L. glaberrima* possessed 12 complete mesenteries, not ten as in other species of the genus *Antipathes*, and for this reason he advocated that the genus be maintained. Therefore, *Leiopathes* is currently recognized not by the diagnostic characters given by Gray, but by the secondary description given by Brook. The illustration of *A. glaberrima* given by Esper (1792) indicates that the type is devoid of polyp tissue; therefore, it lacks the key diagnostic feature of the genus. Under such circumstances it would be appropriate to treat Brook's specimen as a substitute type specimen.

1. *Leiopathes secunda* sp. nov.
(Figs 1–3)

Diagnosis

Corallum branched irregularly, sympodial and flabellate to varying degrees; height 25 cm or more, with 30 or more orders of branching. Stem

appearing crooked or sinuous. Smallest branchlets 5–10 mm long; commonly arranged uniserially, mostly 2–4 mm apart, on convex side of curved lower order branches; usually curved upward toward distal part of branch from which they arise. Groups of small branches and branchlets arranged in unilateral scorpioid cymes.

Spines simple, smooth, and conical with rounded or slightly acute apex; subequal or slightly unequal around axis circumference; typically 0.06–0.08 mm, but up to 0.12 mm, from midpoint of base to apex; and arranged in axial rows, generally with 5–6 spines per millimetre in each row. Spines present on stem; 0.06 mm tall.

Polyps very variable in size, up to 1 mm in transverse diameter (from proximal side of proximal lateral tentacles to distal side of distal lateral tentacles) and spaced up to 0.8 mm apart. Polyps on smallest branchlets arranged uniserially, usually with 6–8 polyps per centimetre.

Description of Holotype

The holotype (SAM H-756) is approximately 26 cm high and about 20 cm wide (Fig. 1), and the diameter of stem just above the basal end is 2.5 x 4.0 mm. The corallum is branched to the 30th order or more, with the higher order branches often becoming more developed than the branch from which they originate. As a result of this laxly sympodial branching, the stem and major branches have a crooked or sinuous appearance. Very few of the branches are longer than 5 cm and these often have 3–4 higher orders of branches. The branchlets (Fig. 2a) are often arranged uniserially, with up to 9 or more along a section of branch about 3 cm long. They usually occur on the convex side of the lower order branches; generally spaced 2–4 mm apart, with 3–4 branchlets per centimetre. The distal angle of the branchlets ranges from 60 to 90°, but most are close to 90°. Although a few of the branchlets are straight, most are curved toward the distal part of the branch from which they arise. Most of the largest unbranched branchlets on the corallum are 5–7 mm in length and 0.14–0.16 mm in diameter near their base (excluding spines); a few are as long 1.0 cm.

The spines on the branchlets (Fig. 3b) are generally 0.06–0.08 mm tall, as measured from middle of base to apex; a few are as large as 0.1 mm. They are simple, smooth and conical, and have a rounded or acute apex. The spines are equal or slightly unequal in size around the circumference of the axis. They are arranged in axial rows, 3–4 of which can be seen from one



FIGURE 1. *Leiopathes secunda* sp. nov., holotype, SAM H-756, entire corallum, height about 26 cm.

aspect (includes only those rows in which the base of the spines are visible), and within each row they are spaced 0.18–0.30 mm apart, resulting in 5–6 spines per millimetre in each row. At the tips of the branchlets the spines are relatively narrow with a more rounded apex, and the branchlet itself may be flanged with the spines occurring along ridges separated by shallow grooves (Fig. 3a). Spines are also present on the larger branches (Fig. 3c) and stem where they reach a maximum size of about 0.06 mm.

The polyps on the branchlets and higher-order branches are arranged somewhat uniserially, often on the convex or lateral side of the branchlets (Fig. 2b). In general, they tend to face out of one side of the corallum. Polyp size is very variable, but the largest polyps are usually not more than 0.8 mm in transverse diameter as measured from proximal side of proximal lateral tentacles to distal side of distal lateral tentacles. The interpolypar space is variable in width, up to about 0.8 mm. On average, there are 6–8 polyps per centimetre.

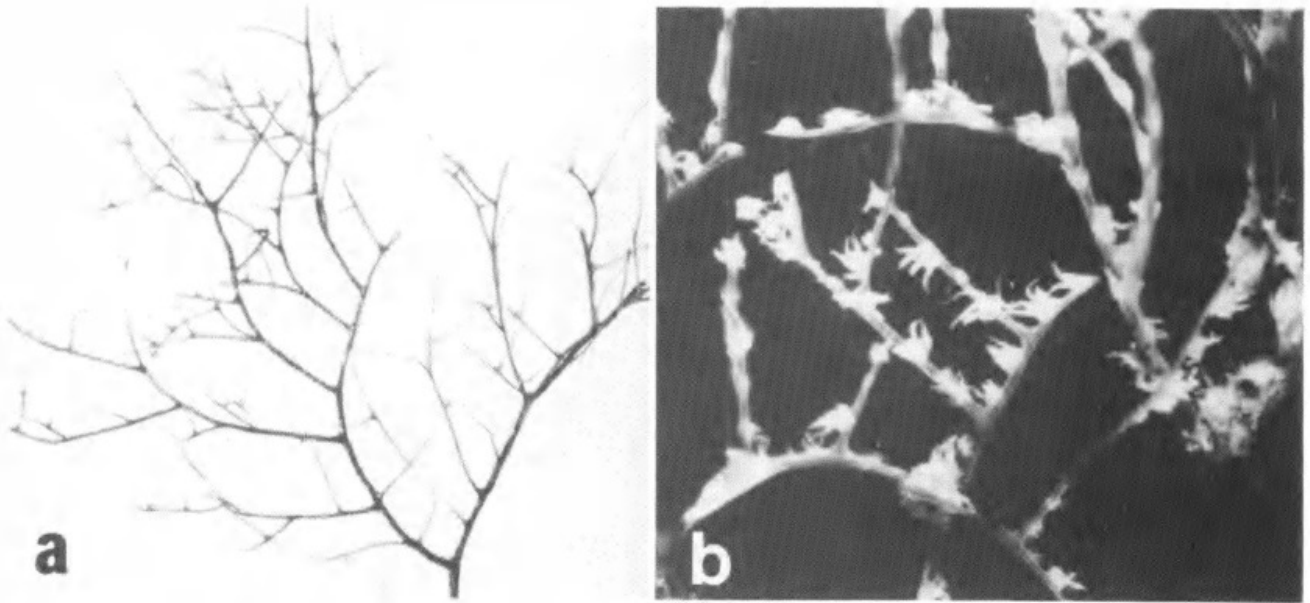


FIGURE 2. *Leiopathes secunda* sp. nov., holotype, SAM H-756; (a) outer edge of corallum showing the arrangement of the branchlets; (b) branchlets with polyps, approx. x 4.

Although the larger branches and stem are mostly denuded of soft tissues, where they are present, the polyps appear to be distributed on all sides of the axis.

Discussion

The paratypes are all small colonies; however,

they each exhibit in varying degrees the distinctive uniserial branching pattern seen in the holotype. As in the holotype, the ultimate branchlets in these colonies are closely spaced and usually not more than 1 cm long. In one of the paratypes (SAM H-757) the spines on the branchlets attain a maximum size of 0.12 mm; in the others the

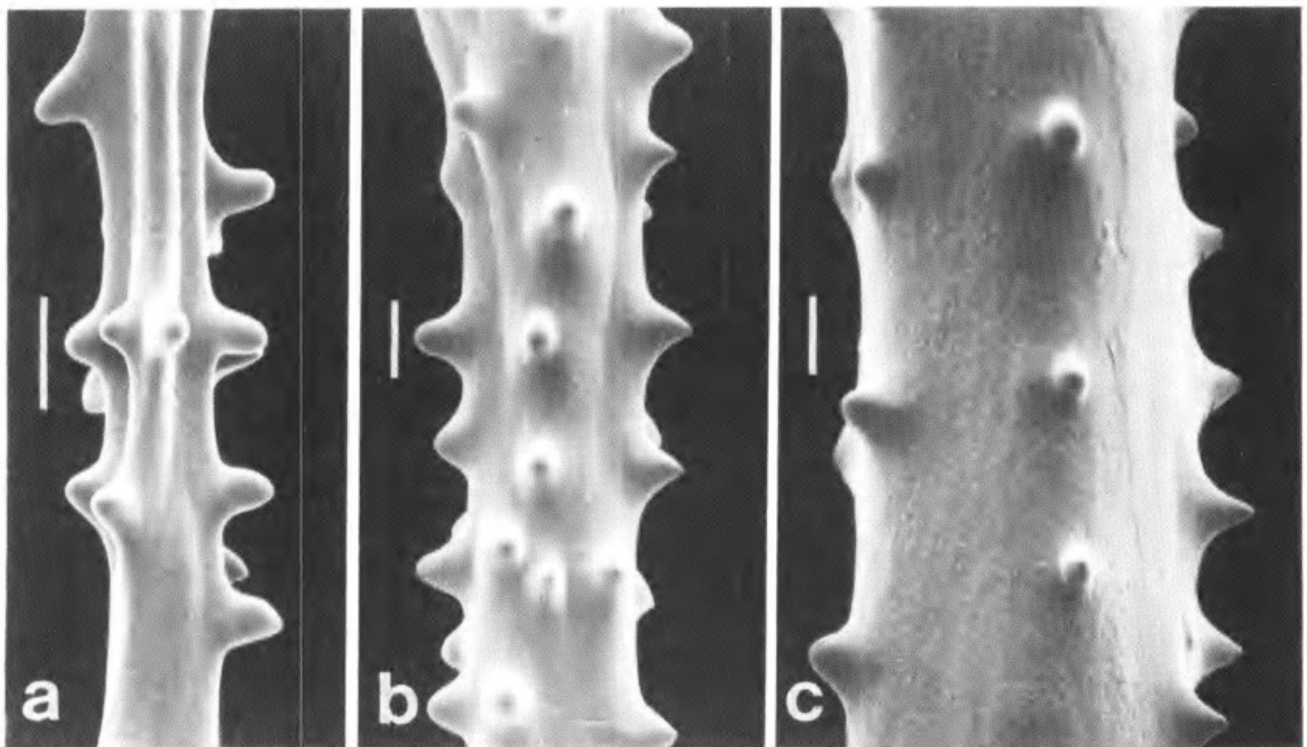


FIGURE 3. *Leiopathes secunda* sp. nov., holotype, SAM H-756; (a) Spines near tip of branchlet, (b) spines on branchlet 0.25 mm in diameter, (c) spines on branch 0.45 mm in diameter. Scale bars 0.1 mm.

largest spines are 0.06–0.08 mm. Slight variations occur among the specimens in the density and number of rows of spines (e.g., 3.5–7 spines per millimetre and 2–5 rows visible from one aspect), but such variability is likely to be observed even in a single specimen. Polyps in these specimens are usually 1 mm or less in transverse diameter. Although the interpolypar space is quite variable, there are generally 6–8 polyps per centimetre, as in the holotype.

Comparisons

In general appearance *Leiopathes secunda* sp. nov. resembles *L. expansa* Johnson, 1899 and *L. grimaldii* Roule, 1905. In both *L. expansa* and *L. grimaldii* the higher order branchlets are arranged uniseriably on the convex side of the curved lower order branches, as in *L. secunda*. However, in *L. secunda* the branching is not as distinctly flabellate as in the other two species. Furthermore, the spines of *L. secunda* are slightly larger and more crowded than those of the other two species. Johnson (1899) described the spines of *L. expansa* as being minute, upright conico-subdeltoid, and irregularly scattered on the ultimate branchlets but absent on other parts of the corallum. As estimated from the illustration, the spines of *L. expansa* appear to be 0.05–0.06 mm tall and 0.5–0.6 mm apart on a branchlet 0.23 mm in diameter. In contrast, the spines of *L. secunda* are consistently 0.06–0.08 mm tall, with some reaching a size of 0.12 mm, and they are typically 0.14–0.30 mm apart. In addition, in *L. secunda* spines are also found on the largest branches and on the stem, whereas this is not the case in *L. expansa*. Roule (1905) does not mention the size of the spines of *L. grimaldii*, nor are any illustrations provided; however, he does note that they are only present on the smallest branchlets, i.e., branchlets measuring 0.2–0.3 mm in diameter.

Roule (1905) reported that the polyps of *L. grimaldii* are 0.5–1.0 mm in diameter and spaced 0.8–1.6 mm apart. The size and spacing of the polyps of *L. secunda* are similar. The polyps of *L. expansa* were not described by Johnson (1899) except for the statement that the specimen was a light red in color. Roule reported that the polyps and coenosarc of *L. grimaldii* were red-yellow. The color of *L. secunda* was not recorded.

Etymology

From the Latin '*secunda*' (in a row) in reference to the uniserial arrangement of the branchlets.

Material Examined

Holotype. **Tasmania:** Cascade Plateau, about 160 nautical miles east of South East Cape, 44°00'S, 150°28'E, 760–910 m, F/V 'Labrador', 10 February 1990, K. Gowlett-Holmes (SAM H 756; schizoholotype, USNM 99407).

Paratypes. **Tasmania:** Cascade Plateau, about 160 nautical miles east of South East Cape, 43°58'S, 150°22'E, 890–900 m, F/V 'Labrador', 11 February 1990, K. Gowlett-Holmes (SAM H 757; schizoparatype, USNM 99404).—Cascade Plateau, about 155 Nm east of South East Cape, 43°58'S, 150°22'E, 1000 m, F/V 'Labrador', 9 February 1990, K. Gowlett-Holmes (SAM H 755; schizoparatype, USNM 99406).—Cascade Plateau, about 165 Nm east of South East Cape, 44°03'S, 150°26'E, 1100 m, F/V 'Labrador', 16 February 1990, K. Gowlett-Holmes (SAM H 758; schizoparatype, USNM 99398).

Distribution

Known only from the waters off Tasmania at depths of 760–1100 m.

2. *Leiopathes acanthophora* sp. nov. (Figs 4–6)

Diagnosis

Corallum branched irregularly, but with some branches and branchlets uniplanar. Branchlets arising from all sides of lower order branches, but occasionally uniserial over short distances. Highest order, unbranched branchlets typically 1.5–2.5 cm long, 0.2–0.3 mm in diameter and spaced 5–7 mm apart.

Spines conical, acute, smooth, and subequal or slightly unequal. Spines on branchlets typically 0.10–0.14 mm from midpoint of base to apex. Spines on branchlets spaced 0.4–0.9 mm apart (2–3 per millimetre) and arranged in axial rows, 3–4 of which seen from one aspect. Spines present on larger branches and stem.

Polyps variable in size, 0.6–2.0 mm in transverse diameter and spaced 0.4–1.8 mm apart. Polyps on smallest branchlets arranged uniserially, with 4–6 polyps per centimetre. Polyps on larger branches occurring irregularly on all sides of axis.

Description of Holotype

The holotype (SAM H 906) consists of numerous broken pieces, one of which is about 30 cm tall (Fig. 4) and has a basal 'stem' diameter of about 5 mm. The largest simple branchlets (those on the outer edges of the corallum, Fig. 5a) are



FIGURE 4. *Leiopathes acanthophora* sp. nov., holotype, SAM H-906, entire corallum, height about 30 cm.

usually 1.5–2.5 cm long although some are as much as 4 cm long and 0.3 mm in diameter at their base. Branchlets are placed at very varying intervals, most commonly they are 5–7 mm apart, with 2–3 branchlets per centimetre. The distal branch angle is usually 90° or slightly less, and the terminal branchlets are straight or slightly curved.

The axial spines are 0.10–0.14 mm, as measured from the middle of the base to apex. They are simple, smooth, and conical, with a

slightly rounded to acute apex. Those on the smallest branchlets (Fig. 6a) are relatively narrow with a rounded apex. On the larger branchlets they become more conical or deltoid (Fig. 6b). They measure 0.12 mm on a branch 0.8 mm in diameter (Fig. 6c), and 0.1 mm on a stem-like branch 4 mm in diameter. In places the size of the spines varies slightly (0.001–0.003 mm) around the circumference of the axis; however, the largest spines are not always associated with the polyp side of the axis. On the branchlets the spines are

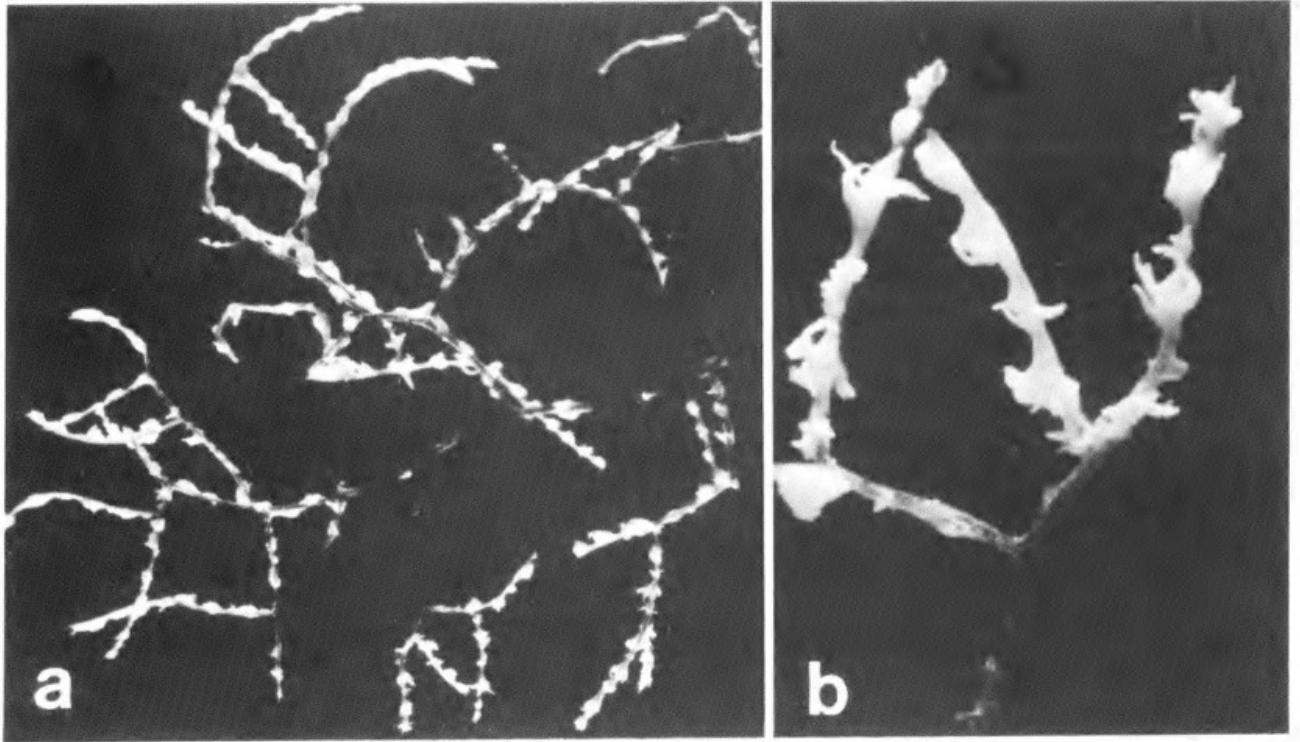


FIGURE 5. *Leiopathes acanthophora* sp. nov., holotype, SAM H-906; (a) outer edge of corallum showing arrangement of branchlets, (b) branchlets with polyps, approx. x 4.

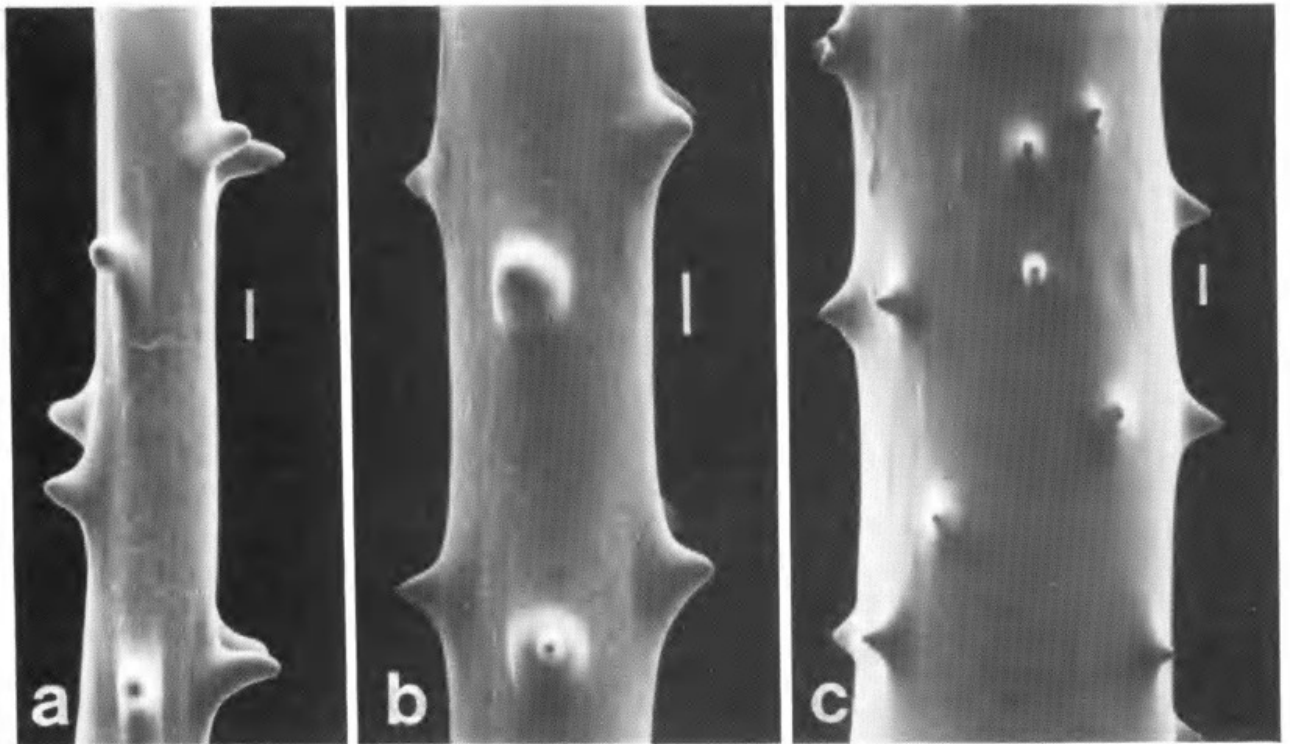


FIGURE 6. *Leiopathes acanthophora* sp. nov., holotype, SAM H-906; (a) Spines near tip of branchlet, 0.25 mm in diameter, (b) spines on branchlet 0.35 mm in diameter, (c) spines on branch 0.84 mm in diameter. Scale bars 0.1 mm.

arranged in axial rows, 3–4 of which can be seen from one aspect (includes only those rows in which the bases of the spines are visible); and within each row they are spaced 0.4–0.9 mm apart, resulting in 2–3 spines per millimetre. On the largest branches the spines tend to become flared out distally and proximally, and they are less regularly arranged in axial rows.

In general, the polyps are arranged uniserially (Figs 5a,b), although on the larger branches they occur irregularly on all sides of the axis. The size of individual polyps is quite variable, and small polyps are often present between the largest ones. In terms of transverse diameter, polyp size ranges from 0.6 to 2.0 mm (measured from proximal side of proximal lateral tentacles to the distal side of distal lateral tentacles). The interpolyp space is also quite variable, ranging from 0.4 to 1.8 mm; consequently, there can be as few as 4 to as many as 6 polyps per centimetre. In the alcohol-preserved material, the polyp tentacles measure 1.6–2.8 mm.

Comparisons

The branching pattern of *Leiopathes acanthophora* sp. nov. is similar to that of *L. glaberrima* (Esper, 1792). Both species have relatively long irregularly arranged branchlets. Based on descriptions given in the literature, it appears that the branchlets in *L. glaberrima* are thicker than those in *L. acanthophora*. Brook (1889) reported that the terminal branchlets in *L. glaberrima* were 0.5–0.7 mm in diameter, while those in *L. acanthophora* are only 0.2–0.3 mm. In addition, the spines of *L. acanthophora* are considerably larger than those in *L. glaberrima*. Based on the illustration given by Brook (1889), the spines in *L. glaberrima* measure 0.04–0.06 mm. In comparison, those in *L. acanthophora* are usually 0.10–0.14 mm. Furthermore, in *L. glaberrima* the largest branches are devoid of spines, but this is not the case in *L. acanthophora*. Brook (1889) also reported that the polyps in his specimen of *L. glaberrima* were about 1.0 mm in diameter. Although the polyps in *L. acanthophora* are quite variable in size, some are as much as 2 mm in diameter. These differences are sufficient to adequately differentiate the two species.

Etymology

From the Latin '*acantho*' (spine) and '*phora*' (bearing) in reference to the fact that this species has larger and more numerous spines than the closely related *L. glaberrima*.

Material Examined

Holotype. **Indian Ocean**: about 125 Nm east of Cape Arid, W. Australia, 34°03'S, 125°31'E, 1011–1020 m, F/V 'Adelaide-Pearle', 31 July 1988, K. Gowlett-Holmes, K. Olsson and M. Cameron (SAM H 906; schizoholotype, USNM 99402).

Distribution

Known only from off the coast of Western Australia, at a depth of 1011–1020 m.

3. *Leiopathes bullosa* sp. nov.

(Figs 7–9)

Diagnosis

Corallum branched irregularly, but with groups of branchlets tending to be uniplanar. Highest order, unbranched branchlets straight or curved slightly; up to 2 cm long, 0.2 mm in diameter and spaced 0.5–1.5 cm apart; with 1–3 branchlets per centimetre.

Spines typically hemispherical, blister-like; up to 0.14 mm from midpoint of base to apex, subequal or slightly unequal in size around the axis. Spines arranged in rows, commonly spaced 0.4–0.6 mm apart in each row, with 2.5–3.5 spines per millimetre. Spines absent on larger branches and stem.

Polyps 0.7–2.0 mm in transverse diameter, spaced 0.6–2.5 mm apart, with 3–5 per centimetre.

Description of Holotype

The holotype (SAM H-754) consists of a number of broken branches. One such piece is shown in Figure 7. The branching pattern is rather loose and open and generally does not follow any specific pattern, although on several branches the branchlets tend to be unilateral or bilateral, and the branching tends to be spread out in a single plane. The largest simple branchlets (those without secondary branching and usually located on the outer edges of the larger branches) are mostly 0.5–1.5 cm long and 0.10–0.15 mm in basal diameter (excluding spines); however, a few are as long as 2 cm and 0.2 mm thick. Branchlets are placed at very varying intervals, mostly 5–7 mm apart but up to 1.5 cm apart, usually with 2–3 branchlets per centimetre, but sometimes with only 1 per centimetre. The branchlets are inserted mostly at right angles (distal angle ~90°); they are usually straight or only slightly curved or sinuous (Fig. 8a).

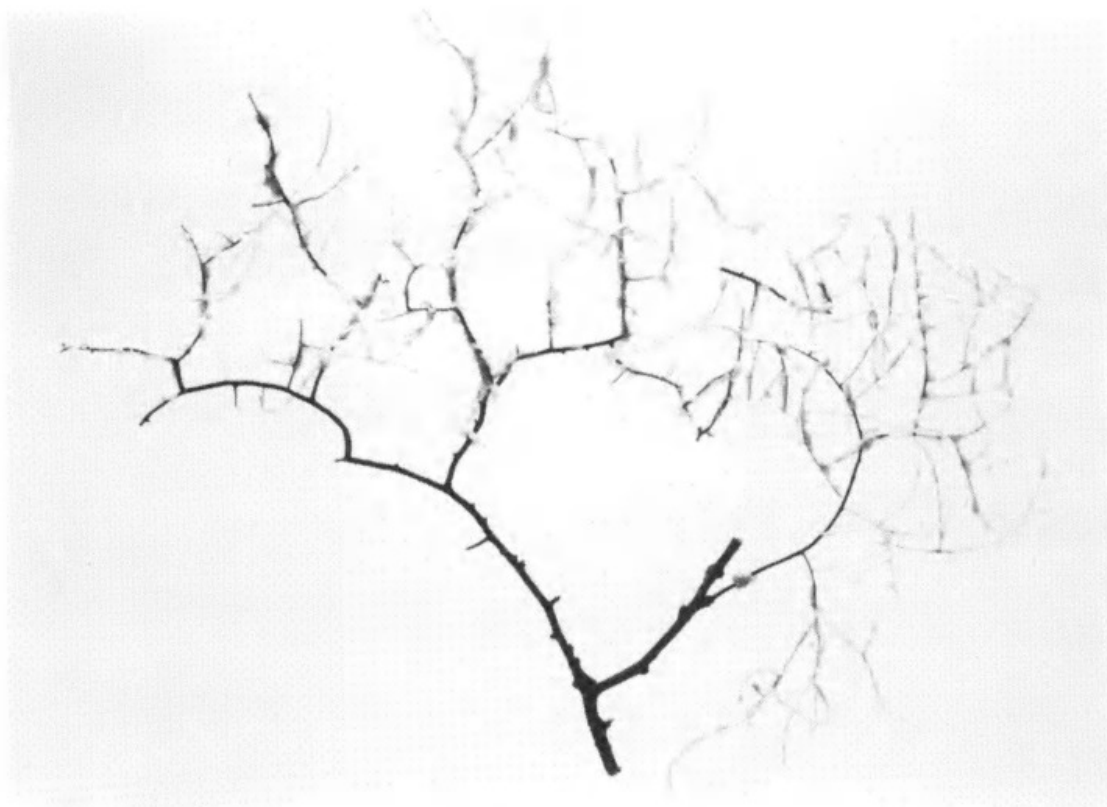


FIGURE 7. *Leiopathes bullosa* sp. nov., piece of holotype, SAM H-754.

The spines are typically hemispherical and blister-like (Figs. 9c–d); although on the smaller branchlets they are more knob-like (Fig. 9b) and the axis can be fluted with the spines occurring along the edges of the ridges (Fig. 9a). The branchlet spines are very variable in size, 0.07–0.14 mm, as measured from middle of base to apex. They are subequal or slightly unequal in size

with up to a 0.04 mm difference on opposite sides of the axis; the largest spines, however, are not consistently associated with the polyp side of the axis. The spines are arranged in axial rows, 3–4 of which can be seen from one aspect (includes only those rows in which the base of the spines are visible), and within each row they are spaced 0.2–0.7 mm apart (usually 0.4–0.6 mm). On average,

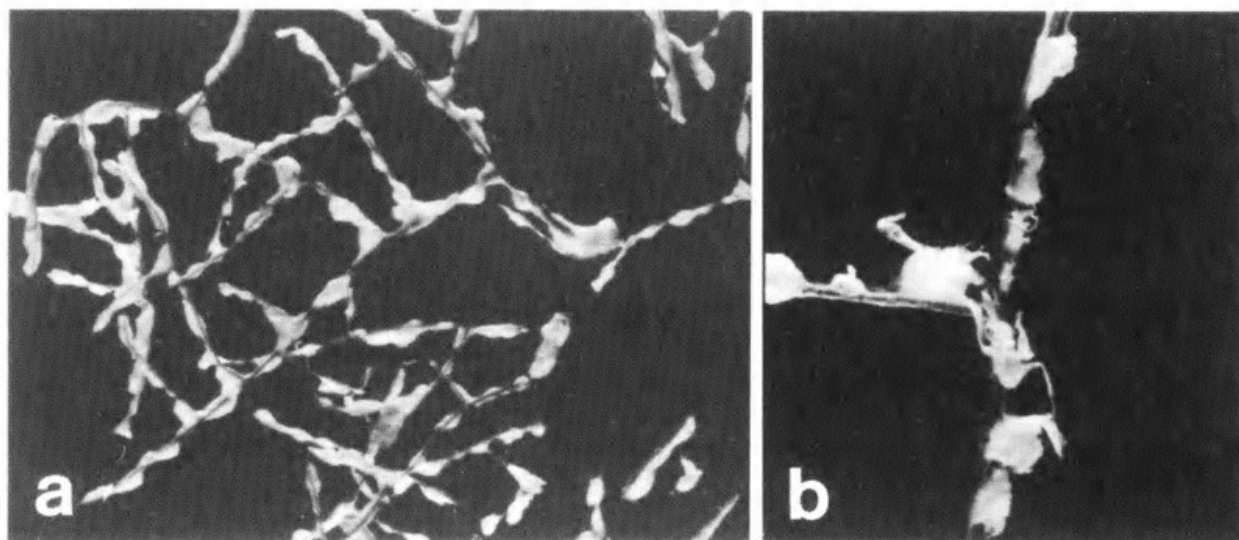


FIGURE 8. *Leiopathes bullosa* sp. nov., holotype, SAM H-754; (a) outer edge of corallum showing arrangement of branchlets, (b) branchlet with polyps, approx. $\times 3.5$.

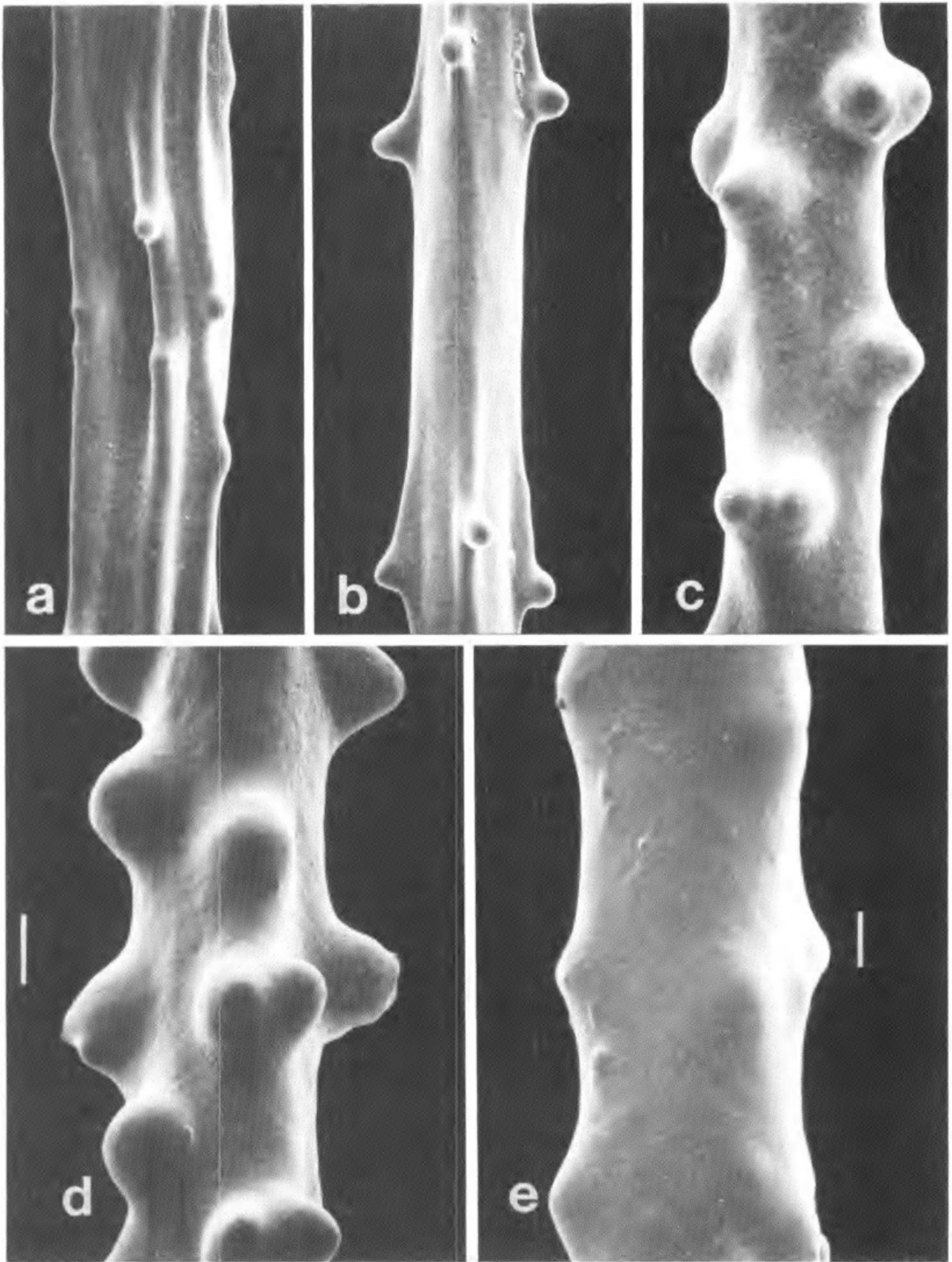


FIGURE 9. *Leiopathes bullosa* sp. nov., holotype, SAM H-754; (a) Spines on branchlet 0.2 mm in diameter, (b) spines near distal end of branchlet 0.15 mm in diameter, (c) spines on branchlet 0.28 mm in diameter, (d) spines on branchlet 0.27 mm in diameter, (e) branch 0.4 mm in diameter. Scale bars 0.1 mm; magnification in a and b as in d; in c as in e.

there are 2.5–3.5 spines per millimetre in each row. In places the spines can be seen to be undergoing longitudinal fission. On the larger branchlets and smallest branches the spines become wide and flattened, and on branches larger than 0.4–0.5 mm in diameter they are absent. However, the transition from hemispherical spines to no spines occurs in a very narrow and overlapping range of branch diameters, and sometimes smaller diameter branches may be smooth and larger ones spinous.

The polyps on the holotype are in a poor state of preservation (Fig. 8). They appear to be arranged uniserially on the branchlets and very irregularly on the largest branches. They are mostly 1.6–2.0 mm in transverse diameter as measured from proximal side of proximal lateral tentacles to distal side of distal lateral tentacles, but some are as small as 0.07 mm. The width of the interpolyp space is also variable, ranging from 0.6 to 2.5 mm. There appears to be 3–5 polyps per centimetre on the branchlets. The maximum length of the tentacles in the alcohol-preserved material is about 2.5 mm. The polyps were reported to be red in color when the specimen was collected.

Discussion

Leiopathes bullosa is unique among species of *Leiopathes*, as well as among other known species of antipatharians, in having hemispherical, blister-shaped spines. The development of a grooved and ridged axis on some of the smallest branchlets, which is also seen occasionally in *L. secunda* is an unusual feature resembling a similar structure present on the stems of certain species of *Bathypathes*.

Comparisons

In basic pattern of branching *Leiopathes bullosa* resembles *L. acanthophora* sp. nov. and

L. glaberrima (Esper, 1792); however, the species can be differentiated by the size and shape of the spines which are very distinctly hemispherical in *L. bullosa* but deltoid in *L. glaberrima* and *L. acanthophora*. Although poorly preserved, the polyps on the type specimen of *L. bullosa* appear to be as large as those in *L. acanthophora*.

Etymology

From the Latin '*bullosa*' (covered with swellings) in reference to general appearance of the axis caused by the blister-like spines.

Material Examined

Holotype. **South Australia:** Great Australian Bight, about 120 Nm southwest of Cape Adieu, 33°29'S, 130°33'E, 520–560 m, F/V 'Longva', 14 April 1990, K. Gowlett-Holmes (SAM H-754; schizoholotype, USNM 99409).

Distribution

Only known from the Great Australian Bight, from a depth of 522–560 m.

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