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NEW POGONOPHORA FROM INDONESIA

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Figures 1–4

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SUMMARY

Seven species of Pogonophora were obtained from a depth of 525–570 m, at a station near Halmahera Island in the Molucca Group, by the *Te Vega* Expedition. New species of *Unibrachium, Siboglinum and Lamellisabella* are described.

INTRODUCTION

A small collection of Pogonophora made by the research vessel *Te Vega* in 1963 was deposited in the Australian Museum (AM) by Dr A. A. Racek of Sydney University, and has been sent to me for identification. It includes seven species, all from one locality in the outer part of Teluk Kau, a large bay on the oceanic side of Halmahera Island in the Molucca Group.

Nineteen species of Pogonophora are already known from the Indonesian region in general, collected by the *Siboga, Galathea* and *Vitiaz* (Kirkegaard, 1956; Ivanov, 1960, 1963; Southward, 1961). The nearest locality to the *Te Vega* station is a *Vitiaz* station off the north coast of Morotai, from which two species of *Siboglinum* were recorded (Ivanov, 1960, 1963).

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Three of the *Te Vega* species can confidently be described as new, while a fourth may possibly belong to one of the species found by Ivanov off Morotai. The other three species are represented by empty tubes. The terminology used in the descriptions follows that of earlier papers as far as possible (particularly Ivanov, 1963), but because of the renewed argument that pogonophores are not deuterostomes but protostomes (*see for example* Southward, 1971), Ivanov's terms *dorsal* and *ventral* have been replaced by the neutral *adneural* and *antineural* respectively. All material described in this paper is in the Australian Museum.

SYSTEMATIC ACCOUNT

Family **OLIGOBRACHIIDAE** Ivanov

Genus **UNIBRACHIUM** Southward

Unibrachium tenuifrenum sp. nov.

Holotype

Male from *Te Vega* station 58: 01° 31′ N, 128° 13′ E, depth 525–570 m, 27 Sept. 1963 (AM W. 6107).

Paratypes

Two immature specimens from the same station (AM W. 6108, 6114).

Description

The largest specimen is a male which is not fully mature and does not contain spermatophores; the other two are smaller and their sex cannot be determined. In each specimen the single tentacle is in rather poor condition; many long thin pinnules (about 170 x 7 μm) can be seen but their arrangement is not clear. The forepart of the body is cylindrical, about ten times as long as wide, and it has a small, rather rounded, cephalic lobe which is concave in front of the tentacle base (fig. 1, a, b). The sides of the cephalic lobe bulge a little, flanking the tentacle base. A complete groove separates the cephalic lobe from the rest of the forepart. Behind this there is a bulge on the antineural side (= ventral, Ivanov, 1963), crossed by several grooves (fig. 1, b). The smoother region that follows the bulge bears a very slight, colorless ridge of cuticle which is not at all easy to see (fig. 1, b, br,). The ridge must represent the bridle keels which are so obvious in most pogonophores. In this case the keels appear to be fused on the antineural side but separated by a wide gap on the adneural side. The remainder of the forepart is smoothly cylindrical and lacks white patches or other obvious granule-containing epidermal cells. A strong constriction separates the forepart and trunk (fig. 1, c). The anterior part of the trunk has a pair of fairly short lateral ridges containing pyriform glands in two to four irregular rows. There is a deep median groove between the ridges, on the antineural side, and a wide ciliated band on the adneural side, the same length as the ridges. This region of the trunk is equivalent to the metameric region of other pogonophores. Behind it the trunk becomes cylindrical and fairly smooth, with a few scattered papillae. The girdle region (fig. 1, d, e) is complete only in the two smaller specimens,

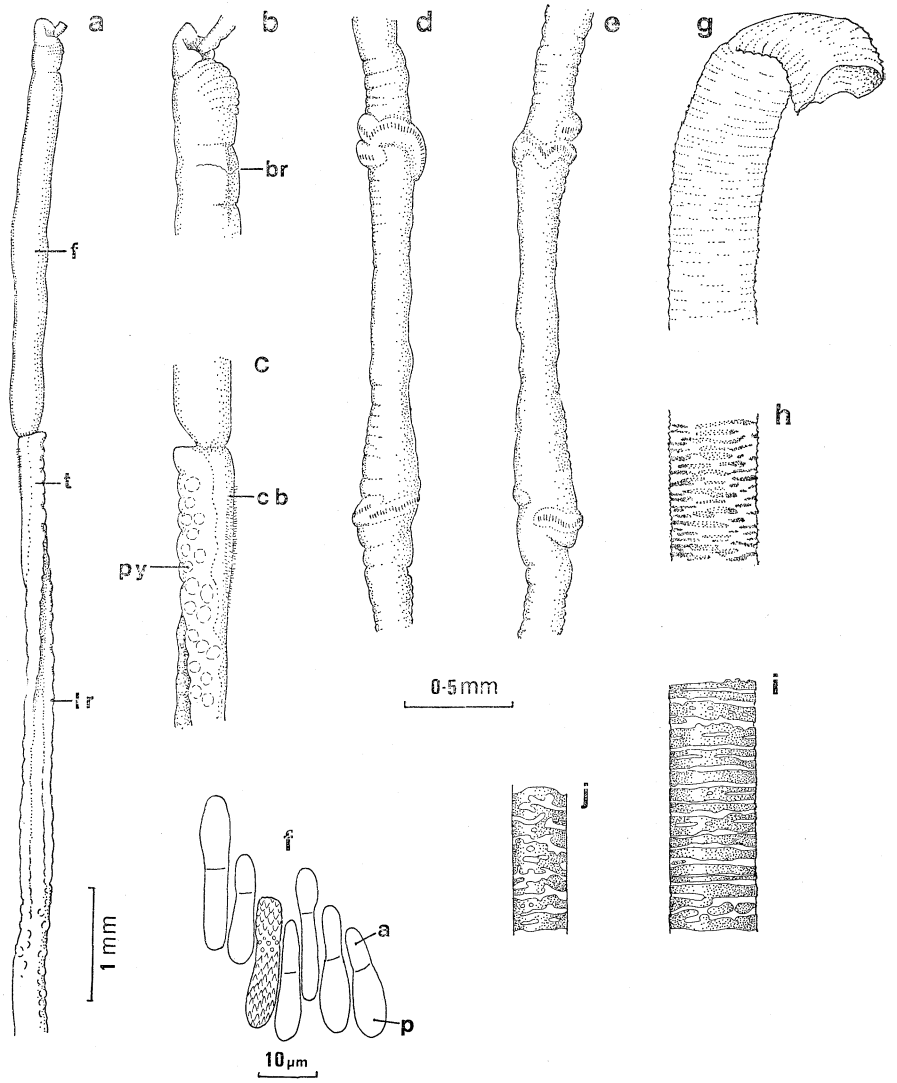

Figure 1.—*Unibrachium tenuifrenum* sp. nov. a, forepart and metameric region of trunk; b, anterior end, antineural side; c, junction between forepart and trunk, side view; d, e, two views of girdle region; f, toothed platelets, face view showing shape of head and arrangement of teeth; g, anterior tip of tube; h, brown streaks near anterior end of tube; i, middle of tube; j, tube near posterior end.

a, anterior teeth; br, bridle; cb, ciliated band; f, forepart; lr, lateral ridge; p, posterior teeth; py, pyriform gland; t, trunk.

where it consists of two girdles 1.6 to 1.9 mm apart. A larger specimen would probably have the girdles farther apart. The platelets (or toothed setae) are arranged in single rows, and their narrow heads range in length from 17 to 30 μm. There are two groups of teeth, the anterior group being slightly smaller than the posterior (fig. 1, f). There is a large papilla behind the second girdle (fig. 1, e) but the rest of the postannular region is in poor condition and the distribution of postannular papillae cannot be made out. The hind end, or opisthosoma, is missing.

The measurements of the animals are: forepart length 2.2 to 3.7 mm; forepart diameter 0.29 to 0.36 mm; length of metameric region 1.4 to 4.7 mm; length of preannular region 5.3 to 14 mm.

The tube is flexible and rather soft, brown in the middle but paling, through yellow, to colourless at either end. The thin-walled anterior tip is either collapsed or folded over (fig. 1, g). The wall is wrinkled in the anterior part of the tube and the brown colour starts as small dark flecks or streaks among the wrinkles (fig. 1, h). In the middle part there is a change to close-packed narrow brown rings (fig. 1, i) and towards the posterior end the rings become paler, less regular and more widely spaced (fig. 1, j). Finally there is a short colourless section. The largest tube (holotype) is 0.47 mm in diameter at the anterior end, 0.37 mm in the middle and 0.20 mm posteriorly, while the same measurements for the smallest tube are 0.33 mm, 0.29 mm and 0.23 mm.

Discussion

The only other species of *Unibrachium* is *U. colombianum* Southward 1972, from the Caribbean. The genus was established because this unitentaculate species had several distinctive characters separating it from *Siboglinum,* notably the lateral ridges containing many pyriform glands instead of rows of separate papillae. This feature is shared by the genera *Nereilinum* and *Oligobrachia,* and so *Unibrachium* has been placed in the family Oligobrachiidae.

The new species is remarkably similar to *U. colombianum* in all the features thought to be of generic importance, and even the ornamentation of the tube is almost exactly the same. However, *U. tenuifrenum* can be distinguished by the almost invisible bridle, because in *U. colombianum* the bridle is clearly visible, though thin and rather wavy in form. The proportions of the forepart are also different: in *U. tenuifrenum* the ratio of length to breadth is 10:1 whereas in *U. colombianum* the ratio is 20:1.

The arrangement of the girdles may be important, because in *U. colombianum* the two girdles are close together, while in *U. tenuifrenum* they are some distance apart. In addition, *U. tenuifrenum* is smaller than *U. colombianum,* their maximum tube diameters being, respectively, 0.47 and 0.8 mm, but full grown examples of *S. tenuifrenum* may be somewhat larger than those described here.

The name *tenuifrenum* describes the weak bridle of the new species, and is derived from the Latin *tenuis,* weak, and *frenum,* bridle.

Family **SIBOGLINIDAE** Caullery

Genus **SIBOGLINUM** Caullery

Siboglinum polystichum sp. nov.

Holotype

Male from *Te Vega* station 58 (see p. 2). (AM W. 6109).

Description

This is an extremely small species of *Siboglinum*, with a brittle tube ornamented with elaborate brown rings. It has proved impossible to extract the animal from its tube, but enough details can be seen through the tube wall to show that it belongs to a new species.

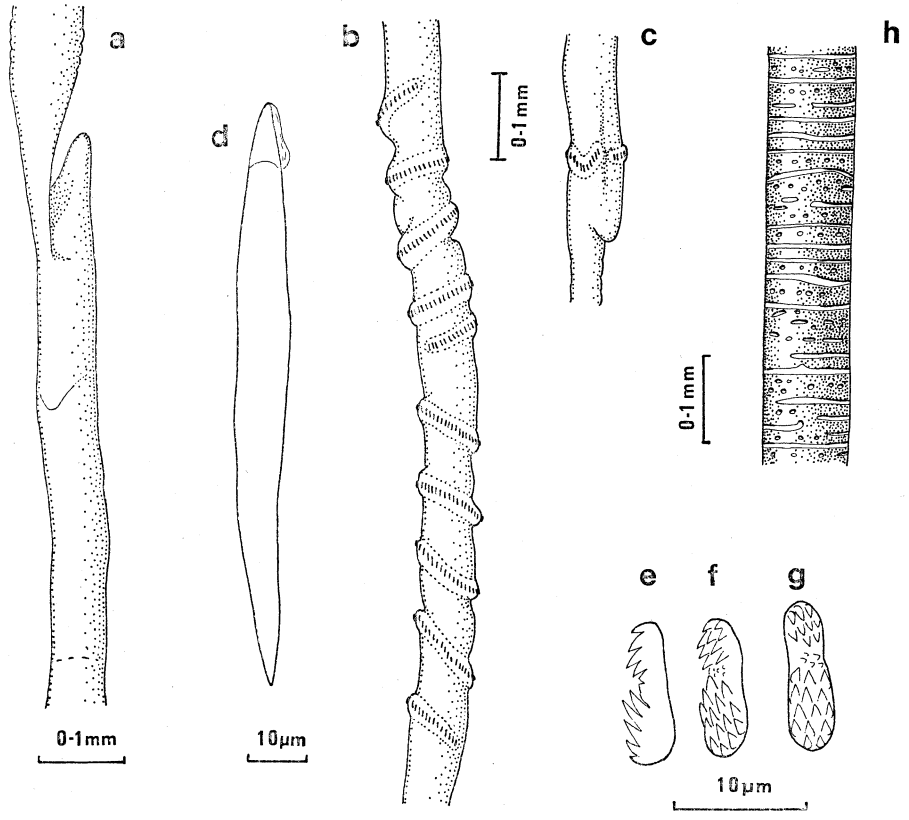

Figure 2.—*Siboglinum polystichum* sp. nov. a, forepart, antineural side, and proximal part of tentacle; b, first and second girdles; c, third girdle; d, spermatophore; e, f, g, toothed platelets, side and face views of heads; h, middle of tube.

The tentacle is very wide, nearly as wide as the body, and a few pinnules can be seen, though their arrangement cannot be made out. The moderately long cephalic lobe has lateral bulges flanking the tentacle base (fig. 2, a). The whole forepart is about 0.5 mm long and 0.06 mm in diameter, so the ratio of length to breadth is 8:1. The thin bridle can be seen very indistinctly and the keels appear to be joined on the antineural side and separate on the adneural side. The pre-annular region of the trunk is 13 mm long and contains many spermatophores, which are fusiform, about 160 μm long and 12 μm wide (fig. 1, d). The girdle region is most unusual; at first sight it seems to have eleven separate girdles (fig. 2, b, c), but close inspection shows that there are only three. The first and second girdles are very long and spiral around the body 4½ to 5 times. There is then a gap of 1.4 mm followed by the normal kind of posterior girdle composed of two half-hoops of toothed platelets (fig. 2, c). The platelets are arranged in single rows in all three girdles, and are 9–10 μm long with two groups of teeth, the anterior group being slightly smaller than the posterior. Behind the third girdle is a single papilla but the rest of the postannular region is too indistinct to show the distribution of the other papillae, and the opisthosoma is missing.

The tube is broken and the anterior end is missing. The middle part is yellow-brown and the posterior end yellow. The ornamentation consists of closely packed and anastomosing rings, which are perforated by many small clear areas, looking like rows of holes (fig. 2, h). The diameter of the middle region is 0.10 mm and the posterior region is 0.08 mm.

Discussion

In spite of a rather incomplete description it is obvious that this species is unusual in having such long girdles, and such an elaborately "perforated" tube. It shares these characters with only one known species of *Siboglinum, S. callosum* Ivanov 1971, which occurs in the Caribbean. The anterior end of the tube of *S. callosum* is segmented (Southward, 1972), but that of the new species is unknown. The middle and posterior regions of the two species' tubes are very similar and they are about the same size. The shapes of the anterior ends of the two species seem to be similar but the bridle of the new species is less strongly developed. The chief difference lies in the number of spirals the girdles make around the body, since in *S. callosum* the first and second girdles make three spirals each, giving the appearance of six girdles, which are followed by a gap and then a small and normal posterior girdle. The greater number of spirals in the new species, considered with the great geographical separation, lead me to suppose that it is distinct from *S. callosum.*

The name *polystichum* describes the multi-annulate appearance of the girdle region and is derived from the Greek *poly,* many, and *stichos,* a line of soldiers or row of rod-like objects.

Siboglinum sp.

Material examined

Two fragments of tube, one containing a mature female, from *Te Vega* station 58 (*see* p. 2). (AM W. 6110).

Description

The two fragments seem to be the anterior and posterior halves of one tube. The animal is contained in the posterior half and can be seen fairly clearly through the tube wall. It has a fairly thick tentacle bearing two rows of pinnules. The forepart is 0.9 mm long and 0.1 mm in diameter. There is a spoon-shaped cephalic lobe followed by a narrower "neck" region (fig. 3, a, b). The yellowish bridle keels fuse on both sides of the body. The metameric region of the trunk has two rows of about 40 papillae, extending over 3.5 mm and the whole preannular region is 17 mm long. There are three girdles, the first two close together and the posterior one 1.3 mm farther back. The toothed platelets are about 17 μm long

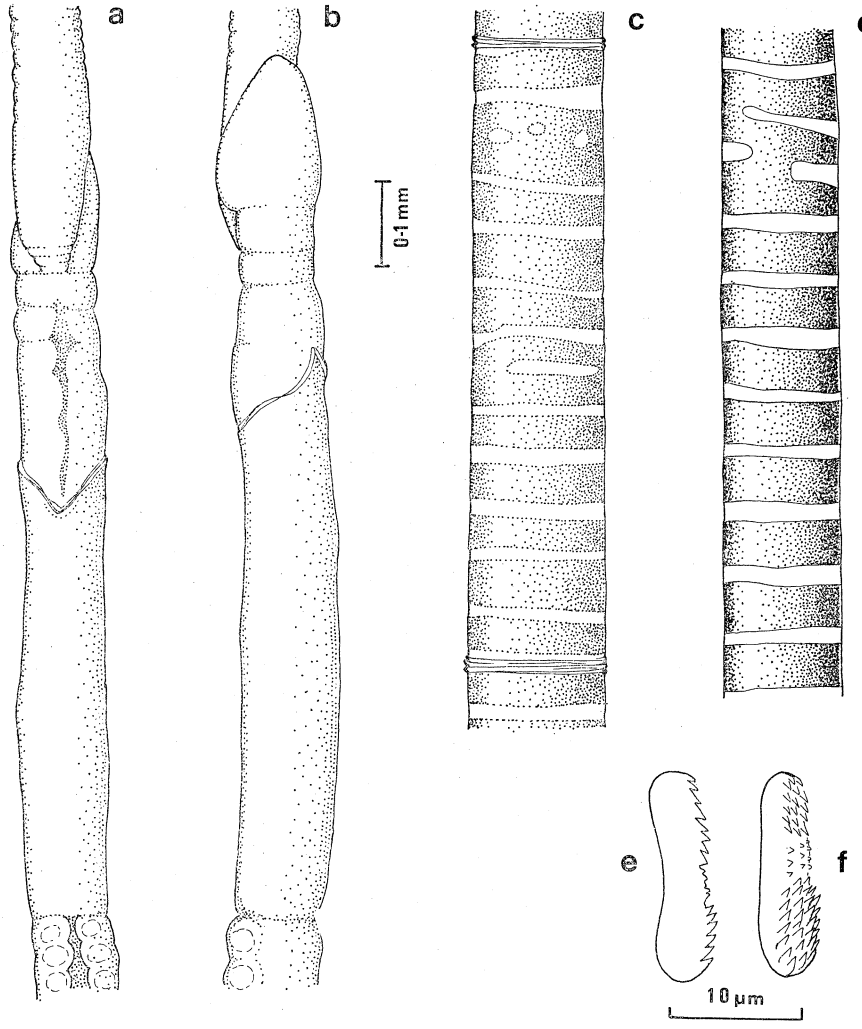

Figure 3.—*Siboglinum* sp. (*pinnulatum* ?). a, forepart, antineural side, and proximal part of tentacle; b, forepart, neural side; c, segment with rings, near anterior end of tube; d, middle of tube; e, f, toothed platelets, side and face views of head.

and are arranged in irregular single or semi-double rows. Their anterior and posterior groups of teeth are almost equal (fig. 3, e, f). The postannular region is in poor condition and the opisthosoma is missing.

The tube has a short unringed smooth-walled anterior portion, followed by red-brown rings which are regularly arranged, with straight borders, fairly close together (fig. 3, c, d). The anterior end of the tube is segmented, and where rings are present there are 10 to 13 per segment (usually 11). The segments range in length from 0.65 to 0.72 mm, while the diameter of the tube is 0.145 mm for most of its length, tapering to 0.130 mm near the posterior end.

Discussion

Segmented tubes of about this size are characteristic of several *Siboglinum* species from various parts of the world, and four are already known from the Indonesian region. Of the Indonesian species, *S. variabile* Ivanov 1960 can be excluded because it has no pinnules on the tentacle; *S. macrobrachium* Southward 1961 has the tube rings very obviously split into "doublets" and also has a smaller cephalic lobe and smaller toothed platelets; *S. sumatrense* Ivanov 1963 has the bridle keels separate on both sides of the body, and shorter tube segments. *S. pinnulatum* Ivanov 1960 seems closest to the species described above, but has the bridle keels separate on the adneural ("dorsal") side and has only eight rings per tube segment. Apart from these details the animals are very similar and, since *S. pinnulatum* was found off the north coast of Morotai in 260 m depth, not far from *Te Vega* station 58, there is a good chance they might be the same species. The description of *S. pinnulatum* was based on one specimen, so the range of variability of the species is unknown, and it is impossible to decide definitely whether or not the *Te Vega* specimen belongs to the same species until more material is found.

Siboglinum spp.

Material examined

Seven empty tubes from *Te Vega* station 58 (*see* p. 2) (AM W. 6111, 6116, 6117).

Description

These empty pogonophore tubes can be separated into three distinct types:

(1) Segmented anterior end, regular brown rings; diameter 0.17 mm.

(2) No segmentation, wrinkled surface, narrow brown rings; diameter 0.115 mm (ant) tapering to 0.072 mm (post).

(3) No segmentation, wrinkled surface, rings smooth and colourless; diameter 0.14–0.17 mm.

Three species are represented and it is probable that they all belong to the genus *Siboglinum,* but they cannot be identified further without the animals

Family **LAMELLISABELLIDAE** Ushakov

Genus **LAMELLISABELLA** Ushakov

Lamellisabella pallida sp. nov.

Holotype

Male from *Te Vega* station 58 (see p. 2) (AM W. 6112).

Paratypes

Two immature specimens from the same station (AM W. 6113, 6115).

Description

None of the three specimens is fully mature, but the largest, a male containing a few spermatophores, is probably approaching the full-grown size for the species. A mature specimen might be expected to be slightly larger and might have more tentacles.

The tentacles are arranged side by side to form a cylinder with their pinnules inside. There are 16 tentacles in the largest specimen and 14 in one of the smaller ones. The flattened cephalic lobe is pointed at the tip (fig. 4, a, b). Behind the base of the tentacle crown the forepart is slightly flattened and there is a median groove along the antineural side, as far as the bridle. The bridle has thick, dark brown keels which are fused on the antineural side but well separate on the adneural side (fig. 4, a, b). The ratio of length to breadth for the forepart is about 5:1. The diaphragm between forepart and trunk can be seen by transparency, but there is no external demarcating groove. In the anterior part of the trunk low metameric papillae are rather widely spaced on paired lateral ridges, separated by a median groove (fig. 4, a). Each papilla is crowned by a cuticular plaque, the anterior border of which is a brown bar with inwardly projecting apodemes (fig. 4, de, e). The holotype has twelve pairs of these plaques, while the smaller specimens have six and nine pairs. Most of the plaques are about 55 μm in diameter and the range of size found is 45 to 60 μm. Behind the metameric region of the trunk is a non-metameric region with scattered small papillae, tipped by curved bars. There are two girdles, close together, with semidouble or double rows of platelets (fig. 1, c). The platelets are about 17 μm long (range 14–19 μm) with the anterior group of teeth smaller than the posterior group. The postannular region is not well preserved but can be seen to bear groups of at least two papillae at intervals, tipped by plaques about 45 μm in diameter. The opisthosoma is missing.

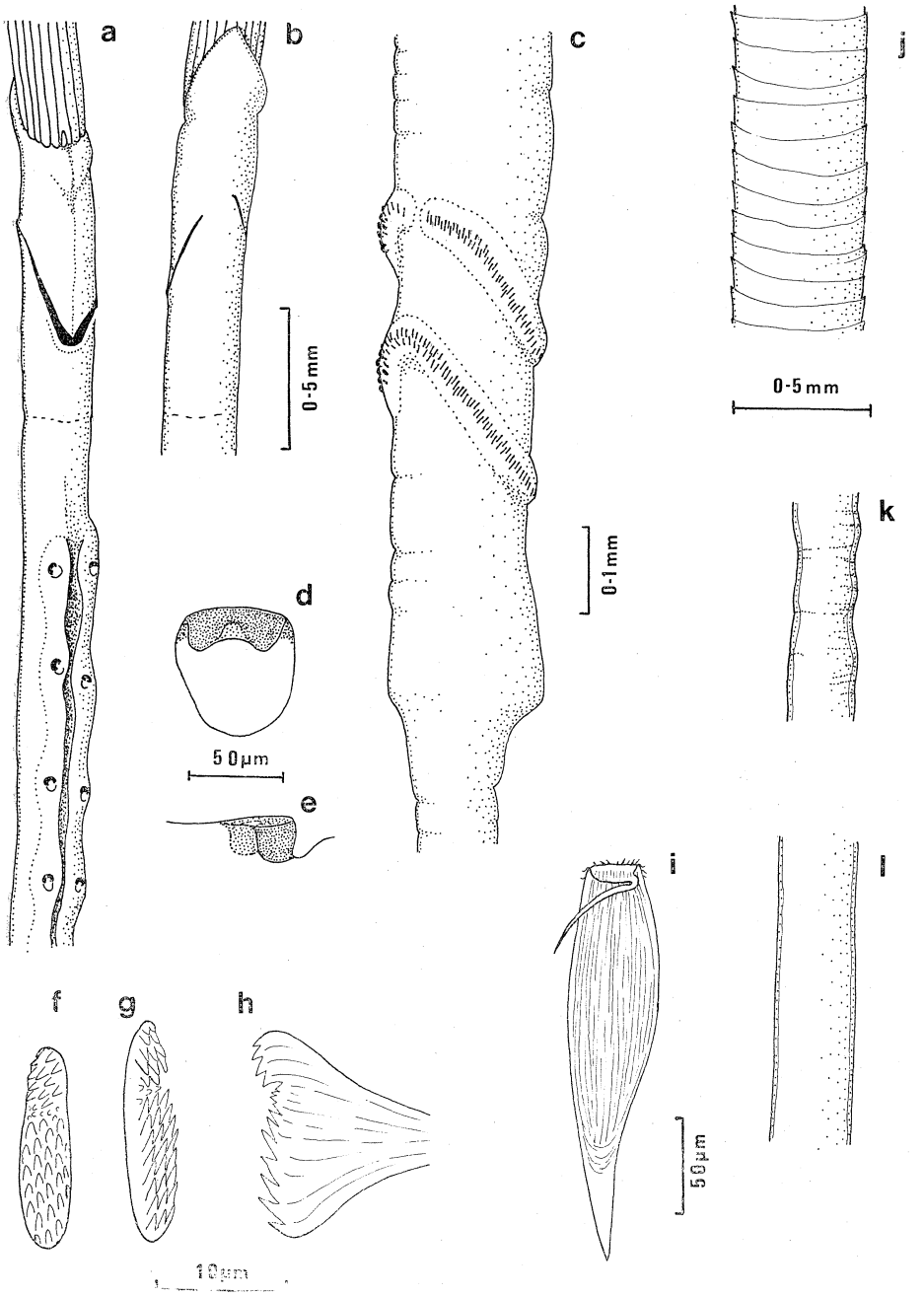

Figure 4.—*Lamellisabella pallida* sp. nov. a, forepart and anterior metameric region of trunk, antineural side; b, forepart, adneural side; c, girdle region; d, metameric plaque, face view; e, metameric plaque, side view; f, g, h, toothed platelets, face and side views; i, spermatophore; j, anterior part of tube; k, middle of tube; l, near posterior end of tube.

Spermatophores are present in the anterior parts of the sperm ducts, in the metameric region of the trunk. They are extremely thin plates, pointed at one end and with the filament base folded over at the other (fig. 4, i). The spermatozoa are arranged lengthwise and roughly parallel to one another. The length of spermatophore is 190 to 205 μm and the width is 48 μm.

The measurements of the animals are: length of tentacles 1.6 to 3.6 mm; length of forepart 0.85 to 1.4 mm; forepart diameter 0.16 to 0.30 mm; length of metameric region 1.0 to 5.0 mm; length of preannular region 4.7 mm in immature specimen but over 41 mm in holotype male.

The tubes are all pale yellow in the middle and colourless at the ends. All three have reformed the anterior end after being damaged. The anterior end is made up of very short, slightly overlapping segments, with thin colourless walls (fig. 4, j). The middle part has thicker, yellowish walls, which are rather corrugated and wrinkled but show no sign of rings or segments (fig. 4, k). The posterior end is wider than the middle and has smooth, colourless walls. The largest tube has an anterior diameter of 0.46 mm, middle diameter 0.23 mm and posterior diameter 0.32 mm; in the smallest tube these measurements are 0.32, 0.23 and 0.23 mm respectively.

Discussion

This new species of *Lamellisabella* is distinguished particularly by its small size, pale tube and small number of metameric plaques. *Lamellisabella johanssoni* Ivanov 1957 has about the same number of tentacles (18) but is considerably larger and has a dark brown to black tube with a funnel or funnels at the anterior end. *L. minuta* Ivanov 1963 has 10 tentacles and is about the same size as the new species but has at least 20 metameric plaques, of a smaller size (34 μm) and its bridle keels are not fused. In addition, *L. minuta* has a tube which is brown at the anterior end with well-marked overlapping funnels.

The name *pallida* denotes the pale colour of the tube and is derived from the Latin *pallidus* meaning pale or pale yellow.

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