

Trichobranchidae (Polychaeta) Chiefly from the Sagami
and Suruga Bays, Collected by R/V *Tansei-Maru*
(Cruises KT-65~76)

By

Minoru IMAJIMA

Department of Zoology, National Science Museum, Tokyo

and

Susan J. WILLIAMS¹⁾

Allan Hancock Foundation, University of Southern California, Los Angeles

Abstract Specimens of the family Trichobranchidae from the Sagami and Suruga Bays and Sagami-Nada collected on cruises (KT-65~76) of the R/V *Tansei-Maru* of the Ocean Research Institute, University of Tokyo are examined. Two genera and 7 species are recognized, including 3 new species, *Terebellides brevis*, *T. lineata* and *T. horikoshii*.

Introduction

The trichobranchids are tube-dwelling surface deposit feeders that occur most frequently in fine sediments in subtidal to bathyal depths. The present specimens are largely from deep water (300 m⁺). This study is based on material collected on cruises of the Research Vessel *Tansei-Maru* (KT) of the Ocean Research Institute, University of Tokyo. Two genera and 7 species of Trichobranchidae are recognized, including 3 new species of *Terebellides*.

The bulk of the collection, including type-specimens, is deposited in the National Science Museum, Tokyo. Representative specimens are also deposited in the Allan Hancock Foundation, University of Southern California.

The authors wish to thank Dr. Kristian FAUCHALD of the Smithsonian Institution (USNM) and Mr. Alex MUIR of the British Museum (Natural History) for arranging loans of type material. Dr. Inger WINSNES of the Zoological Museum of Oslo, Norway kindly provided additional comparative material. Acknowledgement is made to the crew of *Tansei-Maru* for help with the collecting.

Systematic Account

Genus *Terebellides* SARS, 1835

The thorax has 18 setigers; abdominal segments vary from 20 to 50 or more. The anterior margin of the cephalic lobe is rounded and undulate; tentacles are numerous.

1) Contribution Number 407 of the Allan Hancock Foundation.

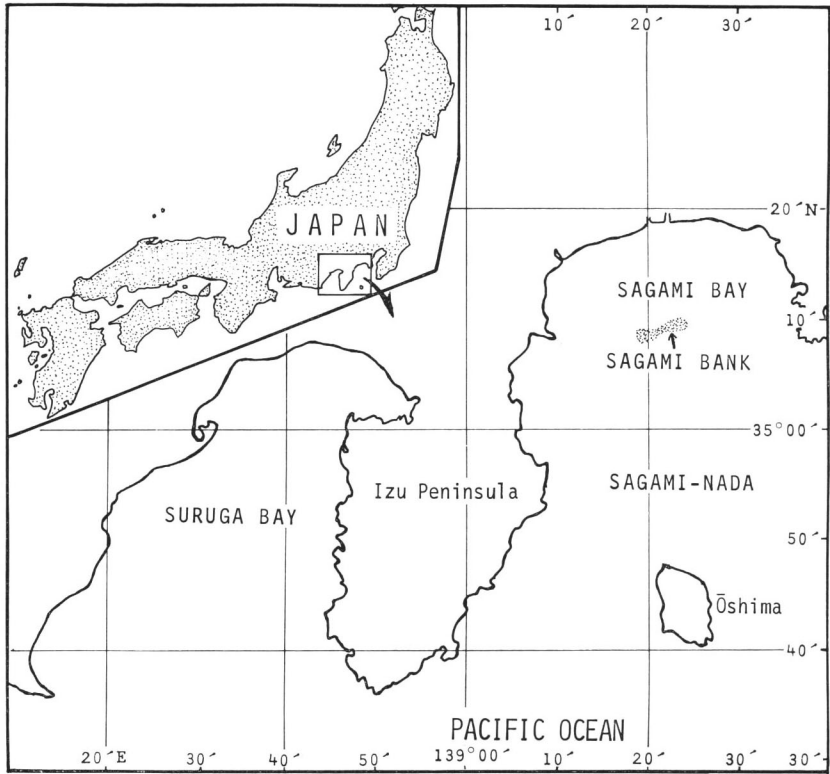


Fig. 1. Map of area around the Sagami and Suruga Bays.

A single branchia is inserted on the third segment; it has a thick trunk and is distally divided into 4 lamellar branches which may be either fused or free. Notosetae are first present from segment 3 and uncini from segment 8. Notosetae taper distally and are bilimbate, with narrow wings. Neurosetae of setiger 6 are long, acicular and distally bent; in a few species, these acicular setae also occur at setiger 7. Uncini of the remaining thoracic setigers are long handled hooks, terminating in a large fang surmounted by a crest of smaller teeth. Abdominal uncini are avicular, with small teeth in crescentic rows.

Species of *Terebellides* can be difficult to distinguish. However, the following characters have been found to be very useful in separating species: structure of the lateral lappets, number of thoracic uncini per neuropodium, number of abdominal setigers, degree of development of the first notosetae, morphology of the acicular setae, and branchial structure.

Key to Japanese Species of *Terebellides*

1. Branchial lobes free 2
- 1'. Branchial lobes fused 3

2. Acicular uncini present on setigers 6 and 7; thoracic uncini numerous, forming dense patches *T. intoshi*
- 2'. Acicular uncini on setiger 6 only; thoracic uncini few *T. lineata*
3. Acicular uncini with mucrons; abdomen with 20–25 setigers *T. brevis*
- 3'. Acicular uncini without mucrons; abdomen with more than 30 setigers 4
4. Setiger 3 with conspicuous projection at the level of the notopodia *T. kobei*
- 4'. Without such a projection on setiger 3 5
5. Acicular uncini with sheath covering tip; 45–50 abdominal setigers... *T. japonica*
- 5'. Acicular uncini without sheath; 30–35 abdominal setigers *T. horikoshii*

Terebellides intoshi CAULLERY, 1915

(Fig. 2, a–c)

Terebellides intoshi CAULLERY, 1915, p. 111, figs. 1, 2; 1944, p. 186, fig. 149; HESSLE, 1917, p. 142.

Material examined. Suruga Bay: KT-73-15, St. D, 34°46.0'N, 138°42.3'E–34°46.5'N, 138°42.4'E, 314 m (45), St. H, 34°55.1'N, 138°44.1'E–34°54.2'N, 138°44.1'E, 304–313 m (35); KT-76-3, St. 004, 34°55.6'N, 138°40.3'E–34°55.3'N, 138°40.3'E, 1008–1050 m (16), St. 006, 34°46.1'N, 138°42.7'E–34°45.8'N, 138°42.8'E, 262–290 m (3).

Diagnosis. Complete specimens measure up to 42 mm in length and 3 mm in width; the body tapers posteriorly. The branchial lobes are free and subequal in size, with the anterior lobes larger than the posterior pair. Lateral lappets of setigers 1, 2 and especially 3 have a rounded projection at the level of the notosetae. Light glandular areas are also evident on the lappets of those setigers. The lappets of setiger 4 are almost as large as those on the preceding segments, while being smaller on setiger 5 (Fig. 2, a).

The first notosetae are fine and the fascicle slightly reduced in size compared to those following. The acicular uncini are unusual in shape, the distal end being short and curved downwards (Fig. 2, b). In contrast to the usual arrangement in *Terebellides*, these setae occur at setigers 6 and 7. CAULLERY (1915, 1944) makes no mention of acicular setae on setiger 7; however, the present specimens otherwise fit the original description. The remaining thoracic uncini are conventional in morphology (Fig. 2, c) and form dense patches of 50 or more in the posterior thorax. Abdominal setigers number about 35.

Remarks. *Terebellides intoshi* resembles *T. ehlersi* MCINTOSH, 1885 in the structure of the branchia and acicular setae. However, comparison with the holotype of *T. ehlersi* (BMNH ZK 1885. 12.1.383) showed differences in lappet structure and number of thoracic uncini. In *T. ehlersi*, the lappets of setiger 1 are largest and those of 2, 3, 4, and 5 are smaller. In addition, there are no projections, as in *T. intoshi*. Thoracic uncini per neuropodium number about 50 in *T. intoshi* and 15 in *T. ehlersi*.

This species is new to the Japanese fauna.

Distribution. East Indies; Japan.

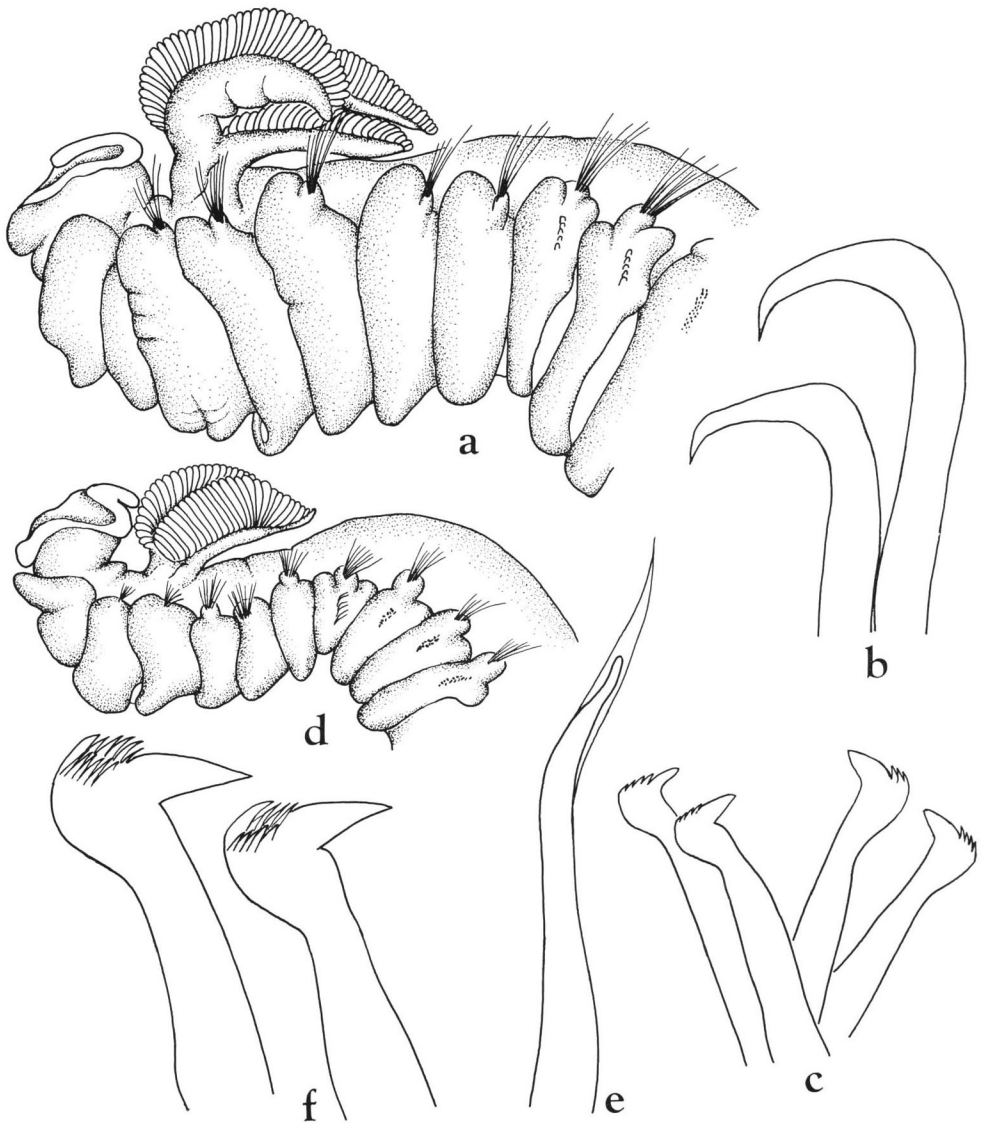


Fig. 2. *Terebellides intoshi* CAULLERY. a, anterior end, lateral view, 14 \times ; b, acicular setae, 225 \times ; c, thoracic uncini, 225 \times .

Terebellides japonica MOORE. d, anterior end, lateral view, 7 \times ; e, acicular seta, 140 \times ; f, thoracic uncini, 560 \times .

***Terebellides japonica* MOORE, 1903 stat. nov.**

(Fig. 2, d-f)

Terebellides stroemi var. *japonica* MOORE, 1903, p. 478; HESSLE, 1917, p. 142.

Material examined. TYPES, USNM 15741, off Honshu, 110–259 fm.

Sagami Bay: KT-76-3, St. BS-1, 35°09.1'N, 139°23.3'E-35°09.1'N, 139°23.9'E, 478-490 m (4).

Sagami-Nada: KT-65-34, St. 20, 34°44.6'N, 139°13.0'E-34°44.0'N, 139°13.6'E, 580 m (2); KT-66-12, St. 4, 35°00.7'N, 139°11.9'E-35°01.0'N, 139°11.6'E, 500 m (1).

Suruga Bay: KT-73-15, St. A, 35°01.7'N, 138°51.1'E-35°02.5'N, 138°50.6'E, 88-90 m (3), St. H, 34°55.1'N, 138°44.1'E-34°54.2'N, 138°44.1'E, 304-313 m (15); KT-76-3, St. 001, 34°54.8'N, 138°45.2'E-34°54.4'N, 138°45.3'E, 162-180 m (1), St. 005, 34°54.6'N, 138°39.0'E-34°55.8'N, 138°38.9'E, 1,460-1,530 m (1).

Diagnosis. The types measure up to 60 mm long and 3 mm wide in the thorax. The branchial lobes are fused, with the dorsal lobes much larger than the ventral ones. Lappets of setigers 1 and 2 are large and broadly rounded; in addition, there is a small projection on setiger 2 at the level of the notosetae. Lappets decrease gradually in size, with those of setigers 3 and 4 equal and those of setiger 5 the smallest (Fig. 2, d). On the types, setiger 2 is clearly the largest anterior segment, especially when viewed from the ventrum.

First notosetae are fine and the fascicle is somewhat reduced in size compared to those following. Under the dissection microscope the acicular setae of setiger 6 appear long and gently curved. Higher magnification reveals a pointed sheath covering a bluntly rounded core (Fig. 2, e). The remaining thoracic neuropodia have the usual long-handled hooks (Fig. 2, f); these number 40 or more per torus.

A most striking feature of this species is the length of the abdomen, being almost 2/3 the length of the entire animal. Abdominal setigers number 45-50 in the type material, with the first 20 or so segments elongated and the remainder crowded.

Remarks. MOORE's material was compared to SARS' specimens of *Terebellides stroemi* from Christianafjord, Norway. Sufficient differences in setal, lappet and abdominal morphology exist between the Japanese specimens and the stem species to justify raising MOORE's variety to species rank.

Distribution. Japan.

Terebellides kobei HESSLE, 1917

(Fig. 3, a-c)

Terebellides kobei HESSLE, 1917, p. 140, pl. 1, fig. 9, textfig. 32; IMAJIMA and HARTMAN, 1964, p. 352.

Material examined. Sagami Bay: KT-66-12, St. 1, 35°09.2'N, 139°30.4'E-35°08.9'N, 139°29.5'E, 590 m (2), St. 2, 35°09.2'N, 139°22.4'E-35°09.7'N, 139°22.4'E, 530 m (1); KT-67-22, off Jogashima, 35°08.2'N, 139°28.4'E, 860 m (2), off Ōiso, 35°13'N, 139°20.8'E, 930 m (7); KT-70-4, St. 1, 35°12.2'N, 139°12.6'E-35°12'N, 139°12.9'E, 825 m (4), St. 3, 35°11.4'N, 139°28.7'E-35°14.9'N, 139°37.4'E, 110-140 m (4); KT-76-3, St. BS1-1, 35°09.1'N, 139°23.3'E-35°09.1'N, 139°23.9'E, 478-490 m (60), St. BS1-2, 35°09.2'N, 139°23.6'E-35°08.8'N, 139°23.8'E, 480-550 m (3).

Sagami Bank: KT-66-23, St. 9, 35°09.4'N, 139°22.9'E, 480 m (1), St. 10, 35°09.4'N, 139°23.3'E, 480 m (1), St. 16, 35°10.6'N, 139°24.5'E, 704 m (1).

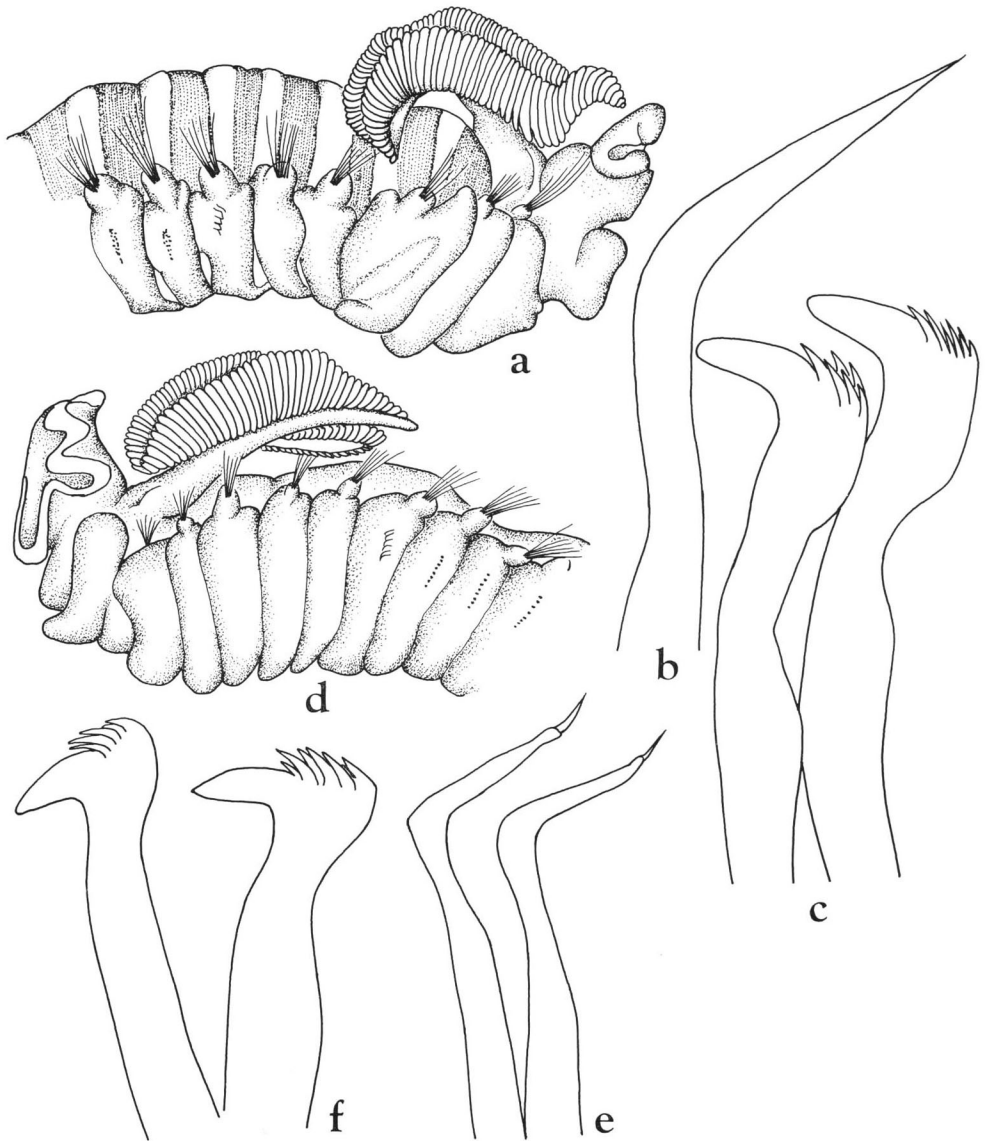


Fig. 3. *Terebellides kobei* HESSLE. a, anterior end, lateral view, 7 \times ; b, acicular seta, 140 \times ; c, thoracic uncini, 225 \times .

Terebellides brevis n. sp. d, anterior end, lateral view, 14 \times ; e, acicular setae, 225 \times ; f, thoracic uncini, 560 \times .

Sagami-Nada: KT-65-34, St. 11, 34 $^{\circ}$ 20.2'N, 138 $^{\circ}$ 48.8'E-34 $^{\circ}$ 20.6'N, 138 $^{\circ}$ 49.5'E, 1450 m (1); KT-66-12, St. 6, 35 $^{\circ}$ 01.2'N, 139 $^{\circ}$ 28.1'E-35 $^{\circ}$ 01.2'N, 139 $^{\circ}$ 29.0'E, 840 m (25), St. 8, 35 $^{\circ}$ 00.6'N, 139 $^{\circ}$ 44.1'E-35 $^{\circ}$ 00.3'N, 139 $^{\circ}$ 44.4'E, 500 m (3), St. 10, 34 $^{\circ}$ 54.3'N,

139°44.5'E–34°54.0'N, 139°44.6'E, 870 m (6), St. 13, 34°54.5'N, 139°19.7'E–34°54.5'N, 139°20.0'E, 1450–1650 m (2); KT-76-3, St. BS-4, 35°04.1'N, 139°31.5'E–35°04.2'N, 139°32.1'E, 750–870 m (1).

Suruga Bay: KT-65-12, St. 2, 34°49.4'N, 138°43.8'E, 310 m (1); KT-73-15, St. A, 35°01.7'N, 138°51.1'E–35°02.5'N, 138°50.6'E, 88–90 m (7), St. B, 35°04.0'N, 138°47.4'E–35°04.0'N, 138°47.5'E, 252–270 m (1), St. D, 34°46.0'N, 138°42.3'E–34°46.5'N, 138°42.4'E, 314 m (2), St. H, 34°55.1'N, 138°44.1'E–34°54.2'N, 138°44.1'E, 304–313 m (30); KT-76-3, St. 006, 34°46.1'N, 138°42.7'E–34°45.8'N, 138°42.8'E, 262–290 m (16).

Diagnosis. Complete specimens measure up to 55 mm long and 5 mm wide in the thorax. Branchial lobes are loosely fused, with the dorsal lobes much larger than the ventral ones. There is an anterior extension of the dorsal lobes, which varies from slight to very pronounced in some specimens. Lappets of setiger 3 are the largest, with a conspicuous projection at the level of the notosetae (Fig. 3, a) and a characteristic swollen glandular area.

The first notosetae are fine and slightly prolonged. The acicular setae are bent at a sharp angle and the distal end is comparatively short (Fig. 3, b). Thoracic uncini (Fig. 3, c) number 15–25 per neuropodium. The abdomen has about 30–35 setigers.

Remarks. *Terebellides intoshi* also has a projection on the lappet of setiger 3 but may be distinguished from *T. kobei* by the free branchial lobes, acicular setae, and more numerous thoracic uncini.

Distribution. Japan.

Terebellides brevis n. sp.

(Fig. 3, d–f)

Material examined. Sagami Bay: KT-70-4, St. 3, 35°11.4'N, 139°28.7'E–35°14.9'N, 139°37.4'E, 110–140 m (4).

Suruga Bay: KT-73-15, St. A, 35°01.7'N, 138°51.1'E–35°02.5'N, 138°50.6'E, 88–90 m (1), St. D, 34°46.0'N, 138°42.3'E–34°46.5'N, 138°42.4'E, 314 m (5, TYPES).

Diagnosis. A smaller species, with ovigerous specimens measuring 13 mm in length and 3 mm in width in the thorax. The body abruptly tapers to a short abdomen. The branchial lobes are fused, with the dorsal lobes larger than the ventral ones. Lappets of setiger 3 are the largest, with a swollen, light glandular patch. Setigers 1 and 2 have lappets of about the same size, while those of setiger 4 are the smallest (Fig. 3, d).

The notosetae of setiger 1 are very fine and easily overlooked. The acicular setae of setiger 6 are short, bent at practically a 90° angle, rounded at the distal end, and have mucronate tips (Fig. 3, e). The thoracic uncini (Fig. 3, f) number approximately 15 per torus. The abdomen is very short, with 20–25 setigers.

Type series. Holotype, NSMT-Pol. H 178; paratypes, NSMT-Pol. P 179.

Distribution. Japan.

Terebellides lineata n. sp.

(Fig. 4, a-c)

Material examined. Sagami-Nada: KT-66-12, St. 6, 35°01.2'N, 139°28.1'E-35°01.2'N, 139°29.0'E, 840 m (1), St. 13, 34°54.5'N, 139°19.7'E-34°54.5'N, 139°20.0'E, 1,450-1,650 m (3, TYPE).

Suruga Bay: KT-73-15, St. D, 34°46.0'N, 138°42.3'E-34°46.5'N, 138°42.4'E, 314 m (3).

Diagnosis. A very linear species, with complete specimens measuring 30 mm in length and 1.5 mm in width in the thorax. The tentacular lobe is rounded and rela-

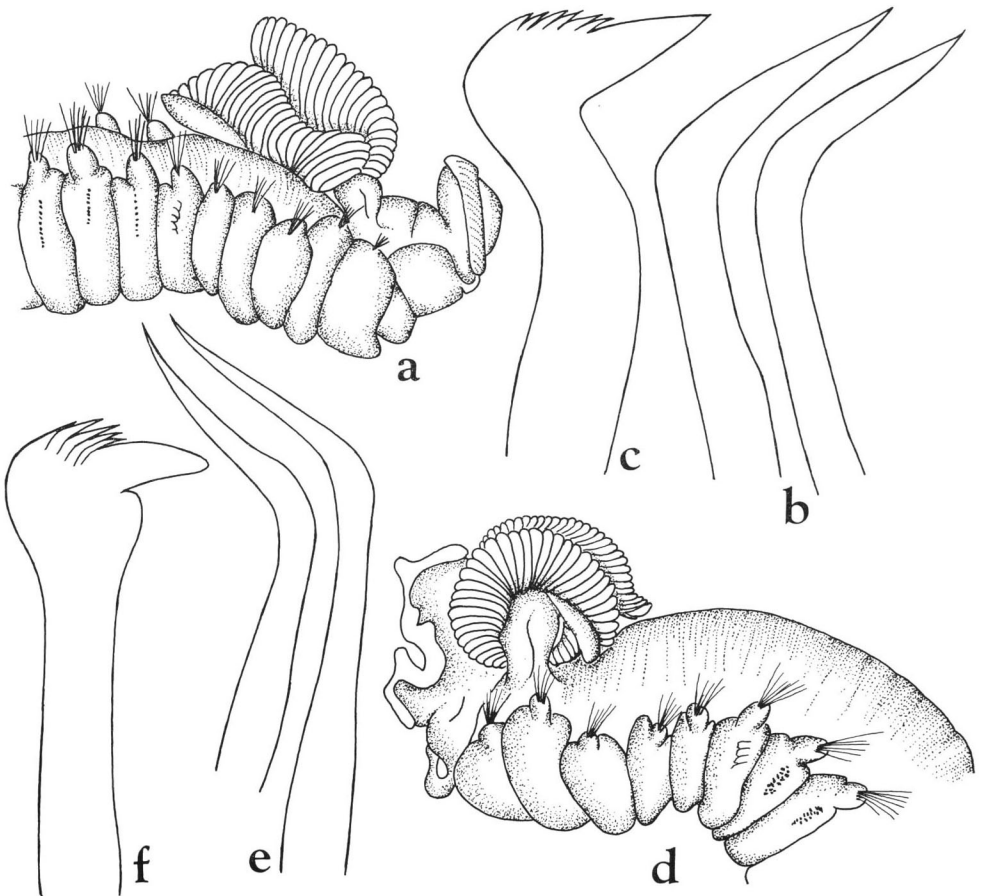


Fig. 4. *Terebellides lineata* n. sp. a, anterior end, lateral view, 16 \times ; b, acicular setae, 260 \times ; c, thoracic uncinus, 640 \times .

Terebellides horikoshii n. sp. d, anterior end, lateral view, 8 \times ; e, acicular setae, 160 \times ; f, thoracic uncinus, 640 \times .

tively small compared to the other species of *Terebellides* in the collection. The four branchial lobes are free and subequal in size. Lappets are largest on setiger 1 and those of setigers 2, 3, 4, and 5 are approximately equal in size; there are no projections at the level of the notosetae (Fig. 4, a). The ventrum of setiger 4 forms a light band.

The first notosetal fascicle is reduced in size compared to those following. The acicular setae of setiger 6 are short and sharply bent distally (Fig. 4, b). Thoracic uncini (Fig. 4, c) are few, numbering only about 10 per torus. The abdomen is fairly long, with 45 or more setigers.

Type series. Holotype, NSMT-Pol. H 180; paratypes, NSMT-Pol. P 181.

Distribution. Japan.

Terebellides horikoshii n. sp.

(Fig. 4, d–f)

Terebellides stroemi: IMAJIMA, 1961, pp. 96–98 (not Sars, 1835)

Material examined. Off Kamchatka: 51°30'N, 156°05.0'E, 105 m (1).

Sagami Bay: KT-66-12, St. 1, 35°09.2'N, 139°30.4'E–35°08.9'N, 139°29.5'E, 590 m (1); KT-67-22, off Jogashima, 35°08.2'N, 139°28.4'E, 860 m (1), off Ōiso, 35°13'N, 139°20.8'E, 930 m (1).

Sagami Bank: KT-66-23, St. 16, 35°10.6'N, 139°24.5'E, 704 m (1).

Sagami-Nada: KT-65-34, St. 4, 34°45.0'N, 139°38.0'E–34°44.5'N, 139°37.8'E, 1,500 m (1), St. 18, 34°56.2'N, 139°15.0'E–34°56.9'N, 139°15.2'E, 1,310 m (40), St. 22, 35°02.4'N, 139°14.6'E–35°03.2'N, 139°14.4'E, 1,340 m (4); KT-66-12, St. 4, 35°00.7'N, 139°11.9'E–35°01.0'N, 139°11.6'E, 500 m (3), St. 8, 35°00.6'N, 139°44.1'E–35°00.3'N, 139°44.4'E, 500 m (1), St. 13, 34°54.5'N, 139°19.7'E–34°54.5'N, 139°20.0'E, 1,450–1,650 m (1); KT-76-3, St. BS-4, 35°04.1'N, 139°31.5'E–35°04.2'N, 139°32.1'E, 750–870 m (3).

Suruga Bay: KT-76-3, St. A, 35°01.7'N, 138°51.1'E–35°02.5'N, 138°50.6'E, 88–99 m (2), St. D, 34°46.0'N, 138°42.3'E–34°46.5'N, 138°42.4'E, 314 m (3), St. H, 34°55.1'N, 138°44.1'E–34°54.2'N, 138°44.1'E, 304–313 m (6), St. 003, 34°55.8'N, 138°43.8'E–34°56.4'N, 138°43.8'E, 365–380 m (1), St. 004, 34°55.6'N, 138°40.3'E–34°55.3'N, 138°40.0'E, 1,008–1,050 m (6, TYPES), St. 005, 34°54.6'N, 138°39.0'E–34°55.8'N, 138°38.9'E, 1,460–1,530 m (1), St. B-2, 35°04.6'N, 138°47.7'E–35°04.7'N, 138°47.7'E, 345–375 m (2).

Diagnosis. Complete specimens measure 42 mm long and 3.5 mm wide in the mid-thorax. Branchial lobes are fused, the dorsal pair being much larger than the ventral lobes. Lappets of setiger 1 are large, broadly rounded, and slope downward at the anterior margin. Those of setiger 2 are relatively tall and approximately equal in size to the lappets of setiger 3. The lappets on setigers 4 and 5 are equal and smaller than those on preceding segments (Fig. 4, d).

First notosetae are fine and somewhat prolonged, although they may be easily broken. In the majority of specimens, setiger 2 is elevated, with a well-developed,

obvious notopodium. The acicular setae of setiger 6 are gently curved, tapering to a fine point (Fig. 4, e). The thoracic uncini (Fig. 4, f) number more than 40 per neuropodium. The abdomen is of moderate length, with about 30–35 setigers.

The new species is named after Dr. M. HORIKOSHI of the Ocean Research Institute of the University of Tokyo.

Remarks. *Terebellides horikoshii* is very similar to *T. japonica*. However, the two species can be separated by the structure of the acicular setae and the number of abdominal setigers: 30–35 in *T. horikoshii* and 45–50 in *T. japonica*.

Type series. Holotype, NSMT-Pol. H 182; paratypes, NSMT-Pol. P 183.

Distribution. Japan; Kurile Islands.

Genus *Trichobranchus* MALMGREN, 1865

Thorax with 15 setigers; abdominal segments numerous. Prostomium forms a hood over the mouth; oral tentacles numerous and of 2 kinds. A frontal rugose proboscis-like organ is present. A pair of peristomial lateral lobes form conspicuous wings. Branchiae 2–3 pair, simple. Notosetae begin on segment 6 and are narrowly bilimbate. Uncini also begin on segment 6 and are long shafted hooks with a large fang surmounted by a crest of smaller teeth. Abdominal uncini are short, avicular and densely crested.

Trichobranchus bibranchiatus MOORE, 1903

(Fig. 5, a–h)

Trichobranchus bibranchiatus MOORE, 1903, pp. 477–478, pl. 27, figs. 83–85; HESSLE, 1917, p. 134.

Material examined. HOLOTYPE, USNM 15740 (station not given on label).

Sagami Bay: KT-76-3, St. BS-1, 35°09.1'N, 139°23.3'E–35°09.1'N, 139°23.9'E, 478–490 m (4).

Suruga Bay: KT-73-15, St. A, 35°01.7'N, 138°51.1'E–35°02.5'N, 138°50.6'E, 88–99 m (1), St. D, 34°46.0'N, 138°42.3'E–34°46.5'N, 138°42.4'E, 314 m (7), St. H, 34°55.1'N, 138°44.1'E–34°54.2'N, 138°44.1'E, 304–313 m (1); KT-76-3, St. 004, 34°55.6'N, 138°40.3'E–34°55.3'N, 138°40.0'E, 1,008–1,050 m (1).

Diagnosis. Complete specimens measure up to 25 mm long and 3 mm wide. The deeply grooved proboscis-like organ is extended on the holotype and contracted on the remaining material (Fig. 5, a, b). Two pair of simple branchiae are inserted on segments 2 and 3. Notosetae are bilimbate with very narrow borders (Fig. 5, c,d); thoracic uncini (Fig. 5, e, f) number 30–35 per neuropodium. There are approximately 40 abdominal setigers; abdominal uncini are avicular, with a crest of many teeth (Fig. 5, g, h).

Remarks. *Trichobranchus bibranchiatus* may be separated from *T. glacialis* by the number of branchiae: 2 pair in *T. bibranchiatus* and 3 pair in *T. glacialis*.

Distribution. Japan.

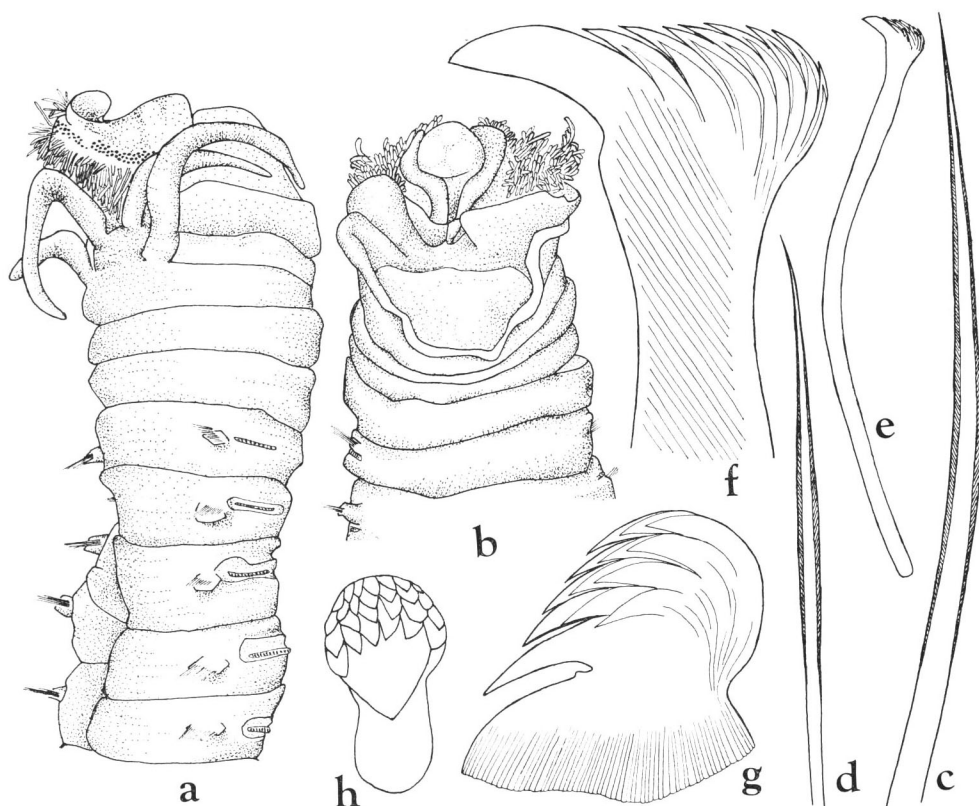


Fig. 5. *Trichobranchus bibranchiatus* MOORE. a, anterior end, antero-lateral view, $18\times$; b, the same, ventral view, $18\times$; c, d, notosetae, $400\times$; e, f, thoracic uncini, e, entire, $400\times$, f, distal end, $2100\times$; g, h, abdominal uncini, g, lateral, h, frontal, $2100\times$.

Comments

The fairly wide depth ranges of some of the listed species may be accounted for by the steep bathymetry of Sagami and Suruga Bays.

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