Bull. Natn. Sci. Mus., Tokyo, Ser. A, 13 (2), pp. 41–77, June 22, 1987

Nephtyidae (Polychaeta) from Japan

II. The Genera *Dentinephtys* and *Nephtys*

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Abstract Materials of two nephtyid genera, *Nephtys* and *Dentinephtys* from Japanese waters were examined. Twelve species of *Nephtys* including two new species, *Nephtys neopolybranchia* and *N. serrata*, and one species of *Dentinephtys* are recognized. *Dentinephtys* is proposed as a new genus, distinguished by having a pair of pharyngeal trepans.

Previously ten species or subspecies and one indeterminable species of three nephtyid genera, *Inermonephtys*, *Micronephthys* and *Aglaophamus*, were reported from Japanese waters (IMAJIMA & TAKEDA, 1985). This paper deals with 12 species including two new species of *Nephtys* and one species of *Dentinephtys*, which proposed as a new genus. *Dentinephtys* is characterized by having a pair of pharyngeal trepans.

Of the recognized species occurring in Japan, *Nephtys brachycephala* and *N. ciliata* are not included in our collection. Seven species, *Dentinephtys glabra* (HARTMAN, 1950), *Nephtys oligobranchia* SOUTHERN, 1921, *N. neopolybranchia* n. sp., *N. punctata* HARTMAN, 1938, *N. californiensis* HARTMAN, 1938, *N. discors* EHLERS, 1868 and *N. serrata* n. sp. are newly added to the Japanese fauna.

Materials examined were chiefly collected by the senior author; other materials were collected by the staff of the Kanagawa Fisheries Experimental Station, by Dr. I. HAYASHI of the Kyoto University, by Dr. T. MIURA of the Kagoshima University, by Mr. T. OKINO of the Nagasaki Fisheries Experimental Station and Mr. K. YOKOUCHI of the Hokkaido University.

The authors wish to express their thanks to Ms. Susan WILLIAMS of the Battelle Ocean Sciences, Ventura, California, for critically reading the manuscript and for loans of type material deposited in the Allan Hancock Foundation, University of Southern California, and Dr. I. HAYASHI for loans of some materials.

All specimens treated here have been deposited in the National Science Museum, Tokyo.

Key to Japanese Species of *Dentinephtys* and *Nephtys*

1. Proboscis with a pair of pharyngeal trepans ..... *Dentinephtys glabra*
1′. Proboscis without pharyngeal trepans 2
2. Interramal cirri small and foliaceous 3
2′. Interramal cirri large and sickle-shaped 7
3. Interramal cirri continue to setigers 20–27 ..... *Nephtys oligobranchia*

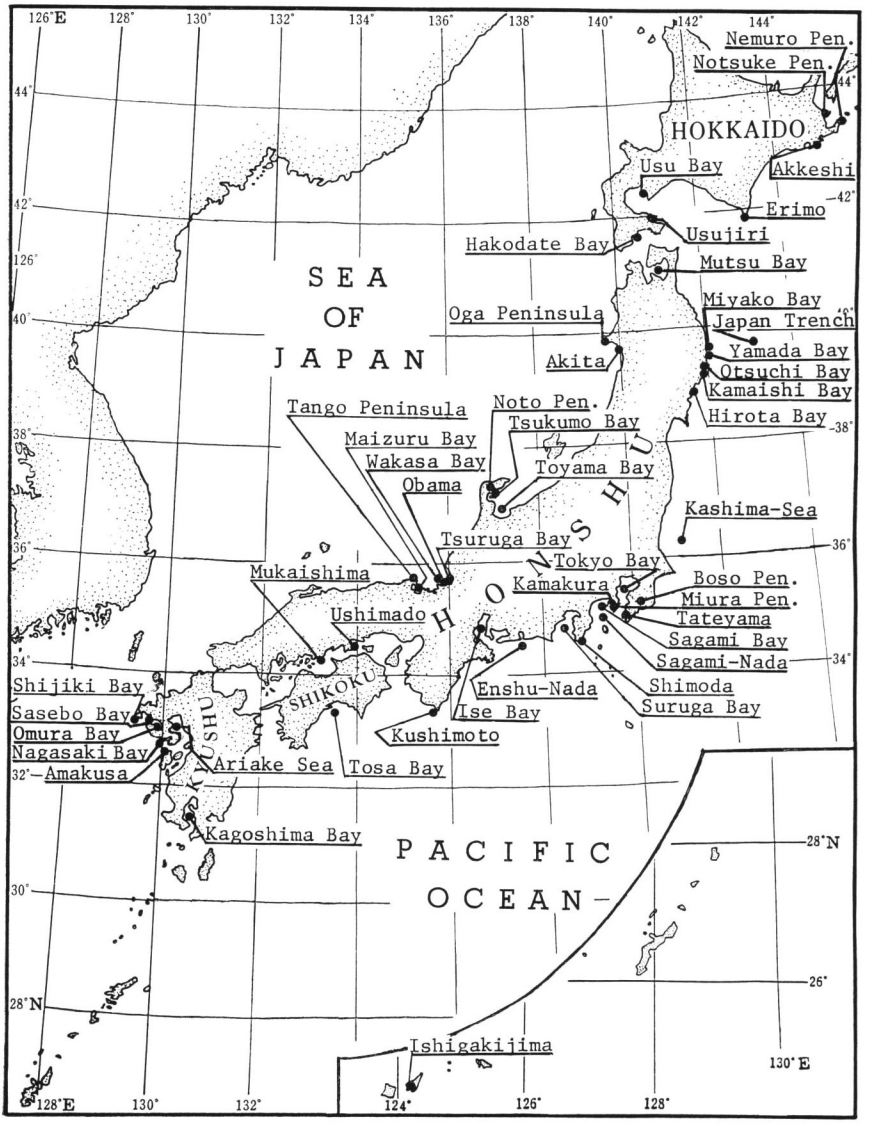


Fig. 1. Map of Japan, showing localities mentioned in the text.

3′. Interramal cirri continue to posterior end 4
4. Interramal cirri with two lateral foliaceous lobes 5
4′. Interramal cirri without such lateral lobes 6
5. Acicular lobe obliquely rounded; interramal cirri first present from 9th setiger.. ..... *N. paradoxa*
5′. Acicular lobe slightly bilobed; interramal cirri first from 5th setiger..... ..... *N. brachycephala*
6. Preacicular lamellae developed and rounded..... *N. polybranchia*
6′. Preacicular lamellae low..... *N. neopolybranchia*
7. Proboscis with a middorsal papilla 8
7′. Proboscis without a middorsal papilla 10
8. Proboscis with rough proximal surface..... *N. punctata*
8′. Proboscis with smooth proximal surface 9
9. With neuropodial postacicular lamellae well developed than acicular lobes..... ..... *N. longosetosa*
9′. With neuropodial postacicular lamellae as large as acicular lobes..... *N. ciliata*
10. Proboscis with rough proximal surface..... 11
10′. Proboscis with smooth proximal surface 12
11. Dorsal cirri with accessory cirri..... *N. serrata*
11′. Dorsal cirri without accessory cirri..... *N. caeca*
12. Median parapodia with postacicular lamellae as large as acicular lobes..... ..... *N. californiensis*
12′. Median parapodia with postacicular lamellae larger than acicular lobes..... ..... *N. discors*

Genus ***Dentinephtys*** gen. nov.

Type species. *Dentinephtys glabra* (HARTMAN, 1950).

Prostomium suboval with two pairs of antennae. Eyes are lacking. Proboscis with 22 terminal papillae and 22 subterminal rows of papillae with one to three in a row. A middorsal long papilla present. Proboscis also has a pair of jaws and paired lateral pharyngeal trepans, each consisting of eight teeth in a row. Pharyngeal teeth are horny and directed sharply backward. Interramal cirri clearly recurved. Lyrate setae are absent.

Dentinephthys is nearly related to the genus *Nephtys*. However, *Dentinephtys* is distinguishable from *Nephtys* in having a pair of pharyngeal trepans.

Dentinephtys glabra (HARTMAN, 1950), n. comb.

(Fig. 2 a–m; Fig. 3 a, b)

Nephtys glabra HARTMAN, 1950, pp. 109–110, pl. 13, figs. 1–9; 1968, pp. 585–586.

Material examined. Off Anacapa Island, California, 34°03.0′N, 119°27.2′W–

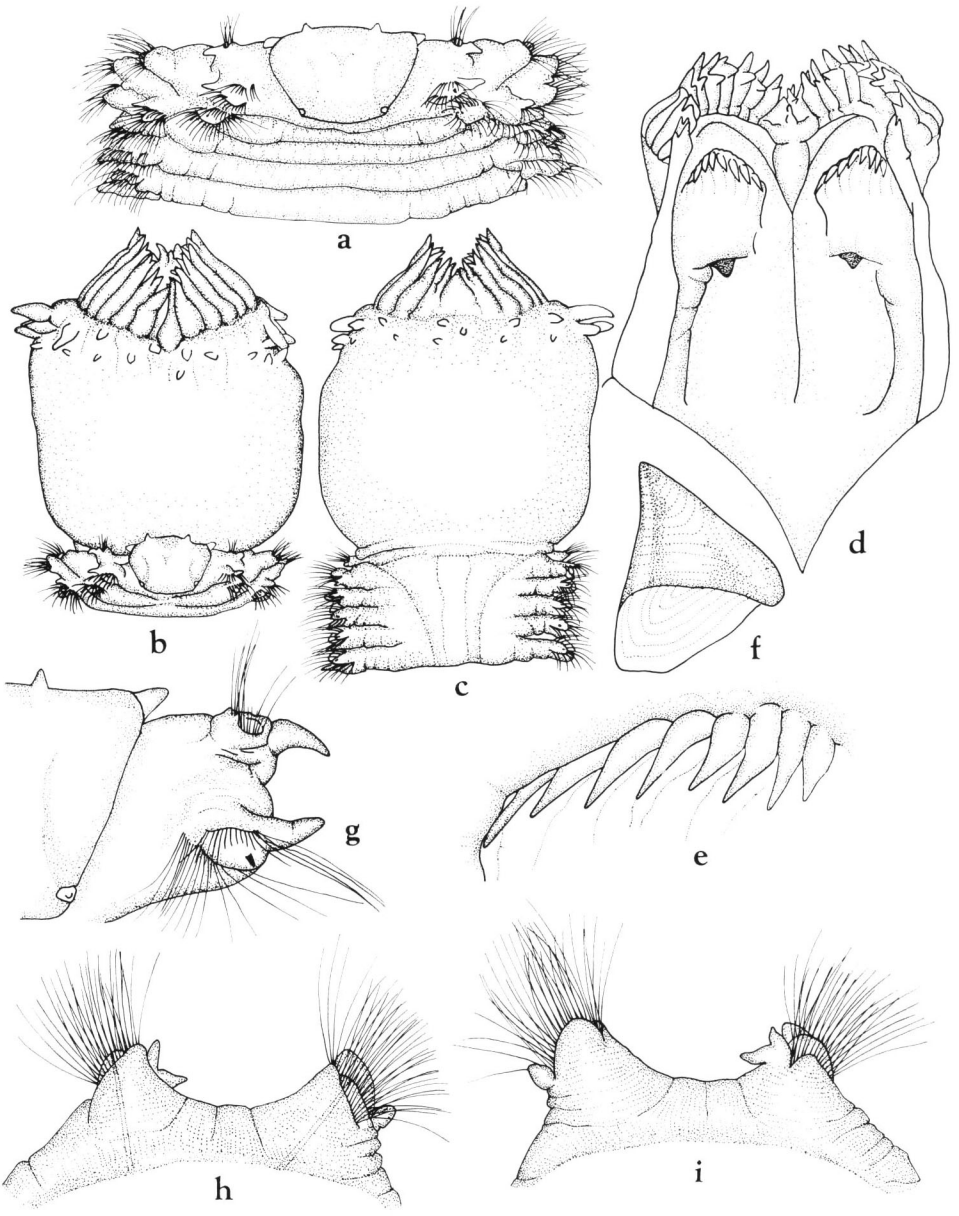


Fig. 2.

34°03.0′N, 119°23.5′W, in 48–51 fms. (HOLOTYPE, POLY 0793 from sta. 1268–41); southeast off Otsuchi, 39°19.3′N, 142°04.0′E–39°19.3′N, 142°04.3′E, in 149 m (1), KT-85-11; Otsuchi Bay, in 77–78 m (1), in 84–85 m (1), in 104–100 m (1), in 113–120 m

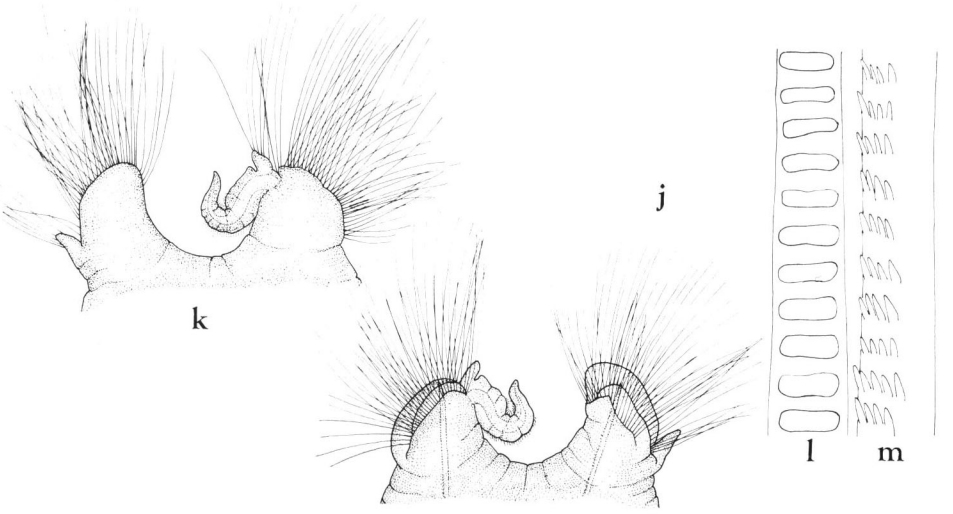


Fig. 2, on pp. 44–45. *Dentinephtys glabra* (HARTMAN). a, Anterior end, in dorsal view, ×11; b, proboscis, in dorsal view, ×6; c, the same, in ventral view, ×6; d, proboscis opened by dissection, showing pharyngeal trepans and jaws, ×7; e, pharyngeal trepan, ×32; f, jaw, in lateral view, ×56; g, first parapodium, in anterior view, ×32; h, sixth parapodium, in anterior view, ×18; i, the same, in posterior view, ×18; j, 32nd parapodium, in anterior view, ×13; k, the same, in posterior view, ×13; l, a part of barred seta in preacicular fascicle, ×765; m, a part of spinulose seta in postacicular fascicle, ×1145.

(1); off Oga, 39°53.6′N, 139°42.5′E–39°53.7′N, 139°43.2′E, in 75–68 m (1); Wakasa Bay, in 162 m (1), coll. I. HAYASHI.

Description. All of the specimens collected are anterior fragments. The largest specimen measures 49 mm in length including the everted proboscis and 8 mm in width including parapodia; it consists of 54 setigers.

The prostomium is approximately rectangular, slightly wider than long. Of the two pairs of antennae, the first antennae are small and inserted on the frontal margin of the prostomium; the second antennae are inserted at the anterior corners of the prostomium and are somewhat larger than the first one. There are no visible eyespots. Nuchal organs occur at the posterior corners of the prostomium (Fig. 2 a).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae; each row has one to three papillae. The terminal papillae are much larger than the subterminal papillae. The subterminal papillae on the lateral side of the proboscis are larger than those of the dorsal and ventral surfaces. There is a long and conspicuous middorsal papilla (Fig. 2 b, c).

Internally, the proboscis has a pair of jaws and pharyngeal trepans. Each jaw is triangular, with a pointed curved tip; there are many annular rings on the surface (Fig. 2 f; Fig. 3 a). The pharyngeal trepan has eight teeth arranged in one row; each

tooth is directed sharply backward. Teeth are basally connected each other and decrease in size laterally (Fig. 2 d, e; Fig. 3 b).

The first parapodia are biramous and rather flat. The neuropodium is nearly as large as the notopodium. The acicular lobes of both rami are surrounded by low, rounded pre- and postacicular lamellae; the notopodial acicular lobe is larger than the neuropodial one. The dorsal and ventral cirri are comparatively developed and about equal in size (Fig. 2 g).

In the sixth parapodia the noto- and neuropodia are widely separated, with neither being well-developed. Both postacicular lamellae are reduced; especially those of the notopodia. The dorsal cirrus is basally foliaceous. The interramal cirri are small and slightly recurved. The ventral cirrus is conical (Fig. 2 h, i).

In the typical parapodium of the 32nd setigerous segment, both acicular lobes are broadly rounded with acicula projecting slightly. Preacicular lamellae are short and broad. Notopodial postacicular lamellae are slightly longer but broad; the neuropodial postacicular lamellae are ligulate, and are larger than the acicular lobes. The dorsal cirrus is small and digitiform. The interramal cirri are well developed and recurved; they are basally broad, and become slender distally (Fig. 2 j, k).

Setae are of two kinds: the preacicular fascicle has barred setae (Fig. 2 l), and the postacicular fascicle has long, spinulose setae with the denticles at the cutting edge (Fig. 2 m).

Remarks. By courtesy of Ms. S. WILLIAMS the holotype of *Nephtys glabra* was re-examined. The holotype has a pair of pharyngeal trepans inside the proboscis, each trepan with eight teeth. Pharyngeal trepans were not described by HARTMAN (1950), due to being overlooked.

Nephtys glabra is transferred to *Dentinephtys* because of having this remarkable character of the pharyngeal trepan.

The species is new to the Japanese fauna.

Distribution. Central and southern California; Japan.

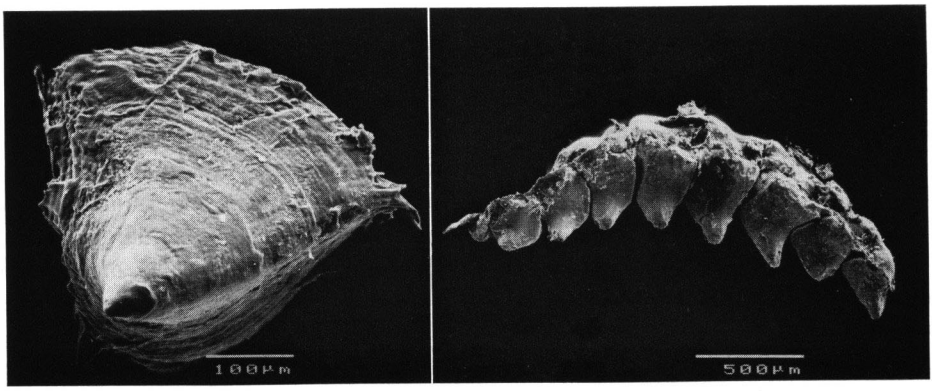


Fig. 3. *Dentinephtys glabra* (HARTMAN). a, Jaw, in frontal view, ×150; b, pharyngeal trepan, ×38 (all by SEM).

Genus *Nephtys* CUVIER, 1817

Proboscis has 22 terminal papillae and 22 subterminal rows of papillae with few to many in a row. Interramal cirri are recurved. Acicular lobes tend to be conical and gently rounded at the distal edge. Lyrate setae are absent.

Nephtys oligobranchia SOUTHERN, 1921

(Fig. 4 a–l; Fig. 6)

Nephtys oligobranchia SOUTHERN, 1921, pp. 610–611, pl. 24, fig. 12 A–C; FAUVEL, 1932, p. 119; OKUDA, 1943, pp. 100–102, figs. 1–3; USCHAKOV & WU, 1962, pp. 25–26, pl. 3, I; 1979, pp. 55–57, fig. 17, I; LEE & JAE, 1983, pp. 23–24, fig. 2, pl. II, E–H.

Material examined. Off Akita, in 20–80 m (53), 39°47′N, 139°48′E, in 80 m (8), 39°47′N, 139°50′E, in 70 m (16), 39°47′N, 139°51.5′E, in 60 m (4); off Oga Peninsula, in 39–184 m (1807); Miyako Bay, 39°39.2′N, 141°59.8′E, in 49 m (1), 39°38.7′N, 141°59.9′E, in 38 m (1), 39°38.4′N, 141°59.6′E, in 28 m (156), 39°37.9′N, 141°59.9′E, in 20 m (3); southeast off Otsuchi, 39°16.4′N, 142°09.2′E, in 297 m (7), 39°16.2′N, 142°08.8′E, in 288 m (2), 39°14.9′N, 142°10.9′E, in 395 m (4), 39°13.7′N, 142°13.8′E, in 467 m (3), 39°13.4′N, 142°13.9′E, in 468 m (2), KT-85-11; Otsuchi Bay, 39°20.5′N, 141°57.2′E–39°20.6′N, 141°57.4′E, in 43–45 m (39); Kamaishi Bay, in 19–58 m (24); Yamada Bay, in 14–39 m (34); off Boso Peninsula, 34°53.8′N, 140°00.5′E–34°53.3′N, 139°59.9′E, in 180–160 m (1), 35°01.0′N, 140°04.6′E–35°01.3′N, 140°05.1′E, in 77–83 m (1), KT-76-16; off Banzu, Chiba Pref., in 1–6 m (7); Tokyo Bay, 35°20′N, 139°40′E, in 20 m (1), 35°20′N, 139°48′E, in 18 m (5), 35°23′N, 139°45′E, in 20 m (3), KT-71-19; off Zushi, Miura Peninsula, 35°15.8′N, 139°32.7′E, in 45 m (3); off Mitohama, Miura Peninsula, 35°10.1′N, 139°34.8′E, in 87 m (1); off Hiratsuka, Kanagawa Pref., in 47–116 m (5); Sagami Bay, 35°18.1′N, 139°22.0′E, in 13 m (2), 35°17.5′N, 139°32.5′E, in 6 m (30), 35°17.4′N, 139°26.0′E, in 19 m (2), 35°17.4′N, 139°22.0′E, in 62 m (1), 35°16.4′N, 139°20.0′E, in 360 m (1), 35°13.4′N, 139°34.0′E, in 63 m (2), 35°13.4′N, 139°30.0′E, in 140 m (1), 35°12.4′N, 139°36.3′E, in 8 m (1), 35°09.4′N, 139°30.0′E, in 620 m (1), 35°07.4′N, 139°34.0′E, in 98 m (1), 35°07.4′N, 139°24.0′E, in 850 m (3), for survey Kanagawa Fish. Exper. Sta.; off Shimoda, 34°37.4′N, 138°54.8′E–34°37.2′N, 138°58.9′E, in 111–123 m (1), 34°39.7′N, 138°57.0′E–34°39.6′N, 138°56.9′E, in 17–28 m (8), 34°44.9′N, 139°02.2′E–34°44.9′N, 139°02.1′E, in 85–57 m (1), 34°45.0′N, 139°02.1′E–34°45.1′N, 139°02.1′E, in 80–51 m (2); off Koyahata, Kanagawa Pref., in 25–80 m (2); Suruga Bay, 34°54.8′N, 138°45.2′E–34°54.4′N, 138°45.3′E, in 162–180 m (1), KT-76-3; Maizuru Bay, in 7–25 m (77), coll. I. HAYASHI; Tsuruga Bay, in 20–38 m (2), coll. I. HAYASHI; Kohama Bay, in 25 m (3), coll. I. HAYASHI; Wakasa Bay, in 93–98 m (9), coll. I. HAYASHI; Sijiki Bay, in 80 m (7), coll. I. HAYASHI; Ise Bay, in 3–29 m (22); off Ushimado Peninsula, the Inland Sea, in 10 m (1); Tosa Bay, 33°23.1′N, 133°37.4′E, in 80 m (22), 33°24.8′N, 133°36.3′E, in 65 m (3); Sasebo Bay, in 5–20 m (17); Omura Bay, in 5–25 m (46), coll. T. OKINO; Tsukumo Bay, in 10–20 m (3); Amakusa, intertidal zone (4); Nagasaki Bay, in 40 m (1); Ariake

Sea, in 10 m (3); Kagoshima Bay, 31°33.8′N, 130°33.8′E, in 50 m (1).

Description. A complete specimen measures 15 mm in length and 2 mm in width, including parapodia, for 46 segments. One anterior fragment from Yamada Bay is 19 mm in length and 3 mm in width, including parapodia, for 40 segments. The present species is generally small in size, and the body becomes slender from between the 15th and 20th setiger (Fig. 4 a).

The prostomium is rounded pentagonal; the posterior end is drawn out to a triangular depression due to muscular contraction; it is longer than wide with a almost straight frontal edge. There are two pairs of antennae. The first antennae are slightly longer than the second ones; they are digitiform and are directed forward. The second antennae are inserted on the ventral side of the prostomium and somewhat shorter than the first ones. Nuchal organs are present at the posterior corner of the prostomium. A pair of eye-spots is present on the second setiger (Fig. 4 b, c).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae with 6 to 9 papillae in each row. The papillae in each row gradually diminish in size posteriorly. A slender middorsal papilla is present. The proximal surface is smooth (Fig. 4 d). The horny jaws are pyramidal in shape, with numerous rings around the entire circumference (Fig. 4 e).

The first parapodia are biramous and are directed forward. Noto- and neuropodial lobes are acutely pointed. Both pre- and postacicular lamellae are low and almost truncated distally. The dorsal and ventral cirri are poorly developed (Fig. 4 f).

Interramal cirri are first present from the fifth to eighth setigers; most commonly from the seventh setiger. They are gradually reduced from the 15th setiger and absent by the 20th to 27th setigers. Each is foliate with annulated margin.

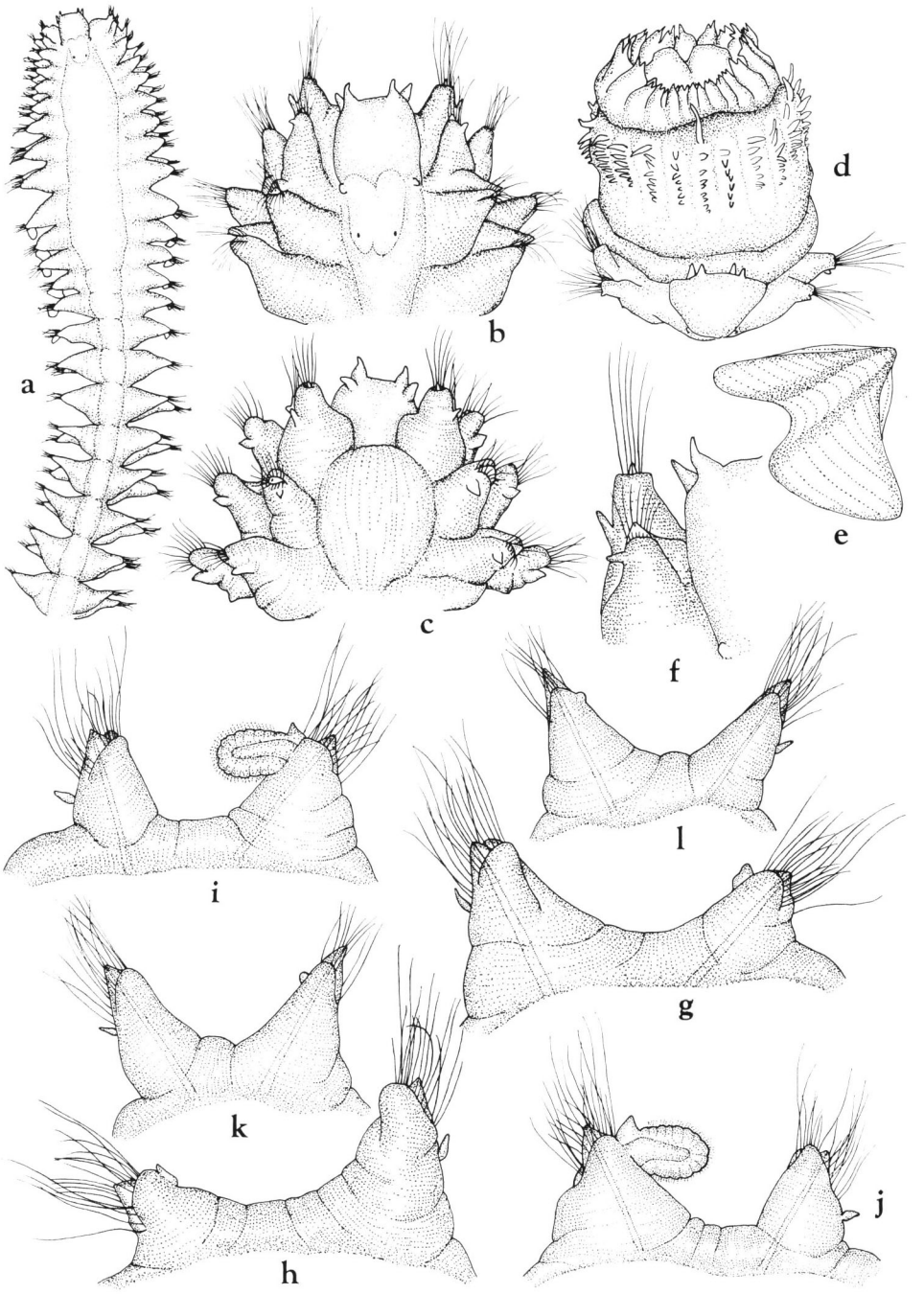
In the anterior setigers the parapodial rami are widely separated from each other. The notopodial acicular lobe is conical, whereas the neuropodial acicular lobe is triangular, and extends beyond the tips of the rounded pre- and postacicular lamellae. The dorsal and ventral cirri are small and digitate (Fig. 4 g, h).

In the typical parapodium of the 13th segment both acicular lobes are triangular, and extend distally beyond the pre- and postacicular lamellae. The pre- and postacicular lamellae are rounded. The interramal cirrus is foliate and well developed. The dorsal cirrus is flat and triangular. The ventral cirrus is digitate and is similar to that of the sixth setiger (Fig. 4 i, j).

In the posterior parapodia the acicular lobes are conical and distally pointed, and the pre- and postacicular lamellae are low and rounded (Fig. 4 k, l).

Setae are of two kinds: barred setae in the preacicular fascicles and spinulose

Fig. 4. *Nephtys oligobranchia* SOUTHERN. a, Anterior half of body, in dorsal view, ×16; b, anterior end, in dorsal view, ×32; c, the same, in posterior view, ×32; d, proboscis, in dorsal view, ×32; e, jaw, in lateral view, ×165; f, first parapodium, in dorsal view, ×63; g, sixth parapodium, in anterior view, ×67; h, the same, in posterior view, ×67; i, 13rd parapodium, in anterior view, ×50; j, the same, in posterior view, ×50; k, posterior parapodium, in anterior view, ×50; l, the same, in posterior view, ×50.


a
b
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setae in the postacicular fascicles. There are no lyrate setae.

Japanese specimens agree well with the original description by SOUTHERN (1921) from India.

Distribution. India; China; Yellow Sea; Japan.

Nephtys paradoxa MALM, 1874

(Fig. 5 a–i; Fig. 6)

Nephthys paradoxa: FAUVEL, 1914, p. 199; 1923, p. 375, fig. 146 f–i; PAXTON, 1974, p. 204.
Nephtys phyllobranchia MCINTOSH, 1885, p. 164, pl. 26, fig. 10; pl. 27, fig. 3; pl. 14 A, figs. 12, 13.
Nephtys paradoxa: HARTMAN, 1944, pp. 335, 339, pl. 15, fig. 6; 1950, p. 111; PETTIBONE, 1954, pp. 271–272, fig. 30 j, k; 1963, pp. 200–202, fig. 47 d; FAUCHALD, 1963, pp. 13–15, figs. 1A, 2B, 3C; IMAJIMA & TAKEDA, 1975, p. 357.
Nephtys pansa: EHLERS, 1875, p. 40, pl. III, fig. 1–2.
?*Nephtys schmitti* HARTMAN, 1938, pp. 152–153, fig. 65.

Material examined. Southeast off Otsuchi, 39°13.7′N, 142°13.8′E, in 467 m (1), 38°43.8′N, 143°09.2′E, in 1960 m (1), 38°33.1′N, 143°28.3′E, in 2616 m (1), KT-85-11; Japan Trench, 38°49.0′N, 143°03.2′E–38°49.3′N, 143°01.0′E, in 1585–1625 m (1), KH-67-02; Toyama Bay, 36°49.6′N, 137°10.6′E, in 615 m (1), 36°54.5′N, 137°17.0′E, in 960 m (3), 37°00.1′N, 137°13.4′E, in 980–1010 m (6), 37°00.2′N, 137°00.1′E, in 1100–1110 m (5), 37°08.9′N, 137°17.8′E, in 1145–1160 m (4), 36°52.3′N, 137°22.8′E, in 570 m (1), 36°58.4′N, 137°07.3′E, in 550–575 m (2), KT-75-6; Kashima Sea, 36°09.8′N, 141°01.5′E–36°08.5′N, 141°02.5′E, in 280–295 m (1), 36°09.8′N, 141°01.5′E–36°08.5′N, 141°02.5′E, in 498–517 m (1), KT-79-13; Sagami Bay, 35°07.4′N, 139°20.0′E, in 600 m (1), 35°13.4′N, 139°11.0′E, in 370 m (1), 35°13.4′N, 139°23.0′E, in 590 m (1); Sagami-Nada, 35°09.4′N, 139°23.3′E, in 480 m (1), KT-66-23; Suruga Bay, 34°54.0′N, 138°43.4′E, in 430 m (1); off Tango Peninsula, in 257 m (1), coll. I. HAYASHI.

Description. The largest, posteriorly incomplete specimen measures 99 mm in length and 6 mm in width including parapodia; it consists of 70 segments. A complete specimen measures 62 mm in length and 4 mm in width including parapodia for 77 segments.

The prostomium is wider than long, and it is stiff because the muscles are developed. Antennae are small and digitate; the second antennae are somewhat larger than the first pair. Eye-spots are not visible. A pair of nuchal organs is located at the posterior margin of the prostomium (Fig. 5 a).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae with 4 to 6 papillae in each row; there is no middorsal papilla. The proximal surface is smooth but has many wrinkles (Fig. 5 b). Jaws are comparatively large in size; they are broadly triangular with a distally curved tip (Fig. 5 c).

The first parapodia are thick, and are directed forward. The notopodial acicular lobe is broad and low, whereas the neuropodial acicular lobe is conical. The dorsal and ventral cirri are short, thick and digitate (Fig. 5 d).

Interramal cirri are first present from the ninth setiger as a minute lobe; they

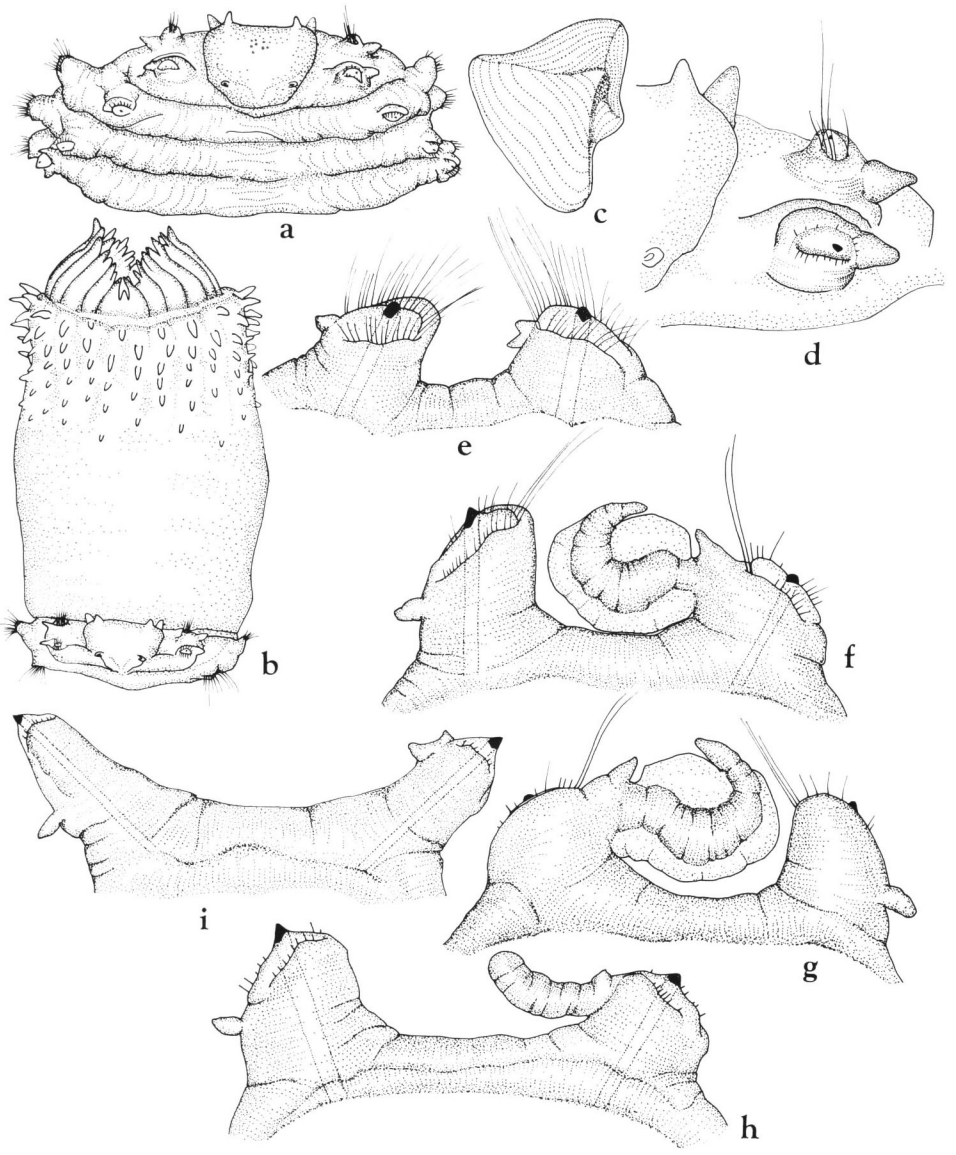


Fig. 5. *Nephtys paradoxa* MALM. a, Anterior end, in dorsal view, ×11; b, proboscis, in dorsal view, ×6; c, jaw, in front-lateral view, ×32; d, first parapodium, in dorsal view, ×32; e, ninth parapodium, in anterior view, ×23; f, 31st parapodium, in anterior view, ×23; g, the same, in posterior view, ×23; h, 37th parapodium, in anterior view, ×23; i, posterior parapodium, in anterior view, ×23.

gradually increase in size with the accompanying foliaceous lobes. In the anterior parapodia both acicular lobes are broad and rounded. The pre- and postacicular lamellae are low. Both the dorsal and ventral cirri are short and thick (Fig. 5 e).

In the fully developed parapodia of the 30th setiger, parapodial rami are widely separated. The noto- and neuropodial acicular lobes are entire and rounded, with slightly projecting acicula. The presetal lamellae are broadly rounded. The postacicular lamellae are about as long as or slightly shorter than the acicular lobes. The interramal cirri have lateral foliaceous lobes with irregular margins; the foliaceous lobes fringe the interramal cirri completely for the whole length or only basally except for the distal part. Many specimens have the foliaceous lobes of the latter type (Fig. 5 f, g). From the 35th or 36th parapodium the interramal cirri are rapidly reduced to digitate processes (Fig. 5 h), and disappear by about 10 setigers from the end of the body (Fig. 5 i). The ventral cirrus is short and conical.

The parapodial rami in the posterior parapodia are markedly separated each other; both acicular lobes are triangular and the postacicular lamellae are not distinguishable.

Setae are of two kinds. Barred setae are restricted to the preacicular position. Capillary setae with minute serrations along the cutting edge occur at the postacicular positions of the both rami.

Remarks. *Nephtys paradoxa* is similar to *N. brachycephala* MOORE, 1903 from Sagami Bay, in 320–347 m. However, in *N. paradoxa* the acicular lobes are obliquely rounded throughout parapodia, and the interramal cirri are first present from the ninth setiger; however, in *N. brachycephala* the acicular lobes are slightly bilobed, and the interramal cirri are first present from the fifth setiger.

Nephtys schmitti HARTMAN, 1938 from Alaska is questionably referred to a synonym of *N. paradoxa*, because we have not had the opportunity to study the types of *N. schmitti*.

Distribution. Ireland; North Atlantic Ocean; Bering Strait; Sweden; Greenland; Iceland; Japan; Bering Sea; Okhotsk.

Nephtys brachycephala MOORE, 1903

Nephthys brachycephala MOORE, 1903, pp. 431–432; IZUKA, 1912, pp. 217–218.
Nephtys brachycephala: IMAJIMA & HARTMAN, 1964, p. 156.

Type specimens were collected from Sagami Bay, in 320–347 m, Albatross sta. 3695, 4 May 1900. The holotype (USNM 15722) is an anterior fragment of 60 segments, 64 mm long and width at the tenth segment is 4 mm including parapodia. According to LOI (1980), the holotype has been dry and the depositions of the paratypes are unknown.

The prostomium is about twice as wide as long and deeply depressed into the peristomium; there are no eyes. The interramal cirri are first present from the fifth setiger; they are large, wrinkled and leaflike with a thick, tapering midrib. Noto-

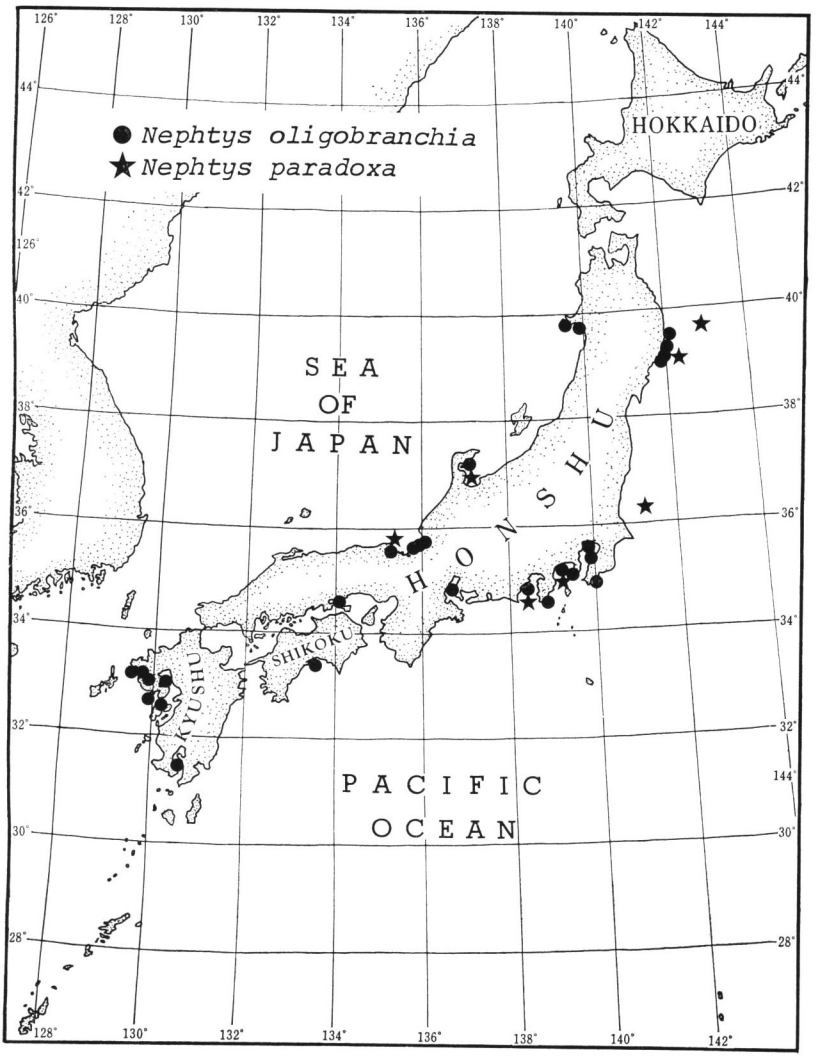


Fig. 6. Distribution of *Nephtys oligobranchia* and *N. paradoxa*.

and neuropodial acicular lobes are distally incised.

Nephtys brachycephala was questionably referred to *N. paradoxa* MALMGREN, 1874 by PETTIBONE (1954, p. 271). However, the species may be distinguished in the features of the acicular lobe and the setiger at which the interramal cirri fist occur.

This species is not included in our collection.

Distribution. Japan.

Nephtys polybranchia SOUTHERN, 1921

(Fig. 7 a–j; Fig. 8)

Nephtys polybranchia SOUTHERN, 1921, pp. 607–609, pl. 24, fig. 11 A–G, text-fig. 11 a–b; FAUVEL, 1932, pp. 118–119; OKUDA, 1940, pp. 14–15, fig. 7; USCHAKOV & WU, 1962, pp. 24–25, pl. 3 E–H; 1979, pp. 54–55, fig. 17 E–H; LEE & JAE, 1983, p. 20.

Material examined. Hakodate Bay, in 9–12 m (8); Usu Bay, in 0.5–1.5 m (4); Mutsu Bay, in 5 m (1); off Akita, 39°47′N, 140°00.8′E, in 20 m (6), 39°47′N, 140°02.4′E, in 10 m (2); Miyako Bay, 39°38.4′N, 141°59.6′E, in 28 m (18); Otsuchi Bay, 39°20.5′N, 141°57.2′E–39°20.6′N, 141°57.4′E, in 43–45 m (3); 39°21.7′N, 141°59.8′E–39°21.5′N, 141°59.6′E, in 79–74 m (2), 39°20.4′N, 141°55.8′E, in 10 m (1); Kamaishi Bay, in 19 m (3); Hirota Bay, in 4–8 m (9); Urayasu, Chiba Pref., intertidal zone (18); off Tateyama, 35°01.6′N, 139°47.0′E, in 89 m (1); Tokyo Bay, 35°14.0′N, 139°46.1′E, in 47 m (2), 35°24.0′N, 139°42.0′E, in 39 m (1), 35°38.0′N, 140°00.0′E, in 7 m (6), 35°38.0′N, 139°58.0′E,in 2 m (4), 35°36.0′N, 140°02.0′E, in 10 m (3), 35°36.0′N, 139°58.0′ E, in 11 m (2), 35°36.0′N, 139°54.0′E, in 9 m (6), 35°36.0′N, 139°50.0′E, in 12 m (2), 35°30.0′N, 140°00.0′E, in 16 m (5); Banzu, Chiba Pref., (10); off Hiratsuka, 35°17.5′N, 139°18.5′E, in 14 m (2), 35°18.4′N, 139°21.0′E, in 10 m (5), 35°18.0′N, 139°21.6′E, in 28 m (3), for survey in Kanagawa Fish. Exper. Sta.; off Aburatsubo, Miura Peninsula, in 10 m (27); off Hayama, 35°16.3′N, 139°33.1′E, in 20 m (2), for survey in Kanagawa Fish. Exper. Sta.; off Enoshima, 35°16.4′N, 139°27.0′E, in 57 m (3), 35°16.4′N, 139°30.0′E, in 28 m (1), 35°17.0′N, 139°34.0′E, in 6 m (1), for survey in Kanagawa Fish. Exper. Sat.; Odawa Bay, 35°12.4′N, 139°36.3′E, in 8 m (2), 35°13.4′N, 139°34.0′E, in 63 m (3); off Chigasaki, 35°18.1′N, 139°23.0′E, in 13 m (2); Koajiro Bay, 35°09.4′N, 139°37.0′E, in 11 m (1), 35°09.4′N, 139°32.0′E, in 330 m (4); off Kamakura, 35°15.2′N, 139°33.6′E, in 21 m (2), 35°16.1′N, 139°32.0′E, in 20 m (3), 35°16.2′N, 139°33.5′E, in 14 m (6), 35°16.2′N, 139°34.1′E, in 5 m (3), 35°16.3′N, 139°33.2′E, in 21 m (1), 35°16.5′N, 139°30.2′E, in 28 m (1), 35°16.5′N, 139°33.4′E, in 12 m (11), 35°17.1′N, 139°34.1′E, in 6 m (21), 35°17.2′N, 139°32.2′E, in 14 m (5), 35°17.4′N, 139°32.3′E, in 10 m (12), 35°17.6′N, 139°30.3′E, in 7 m (9), 35°17.6′N, 139°32.4′E, in 5 m (6), for survey in Kanagawa Fish. Exper. Sta.; Enshu-Nada, in 15–40 m (2); Ise Bay, 34°58.7′N, 136°45.0′E, in 10 m (1); Kushimoto, in 45–50 m (17); Mukaishima, the Inland Sea, in 10 m (1); Tsuruga Bay, in 9 m (2), coll. I. HAYASHI; Kohama Bay, in 5 m (1), coll. I. HAYASHI; Maizuru Bay, in 20 m (1), coll. I. HAYASHI; Tosa Bay, 33°28.3′N, 133°33.7′E, in 23 m (9), 33°23.1′N, 133°37.4′E, in 80 m (1); Shijiki Bay, in 6 m (20), coll. I. HAYASHI; Amakusa, Kyushu, in 10 m (8); Kabira Bay, Ishigaki-jima, in 2 m (1).

Description. The largest complete specimen measures 17 mm in length and 1 mm in width, including parapodia, for 50 segments. One anterior fragment from Otsuchi Bay, in 43–45 m depth, is 2 mm in width including parapodia for 6 mm in length.

The prostomium is approximately rectangular, longer than wide; it extends posteriorly to the anterior part of the third setiger. Two pairs of antennae are inserted on the anterior part of the prostomium, with the second antennae being slightly on the

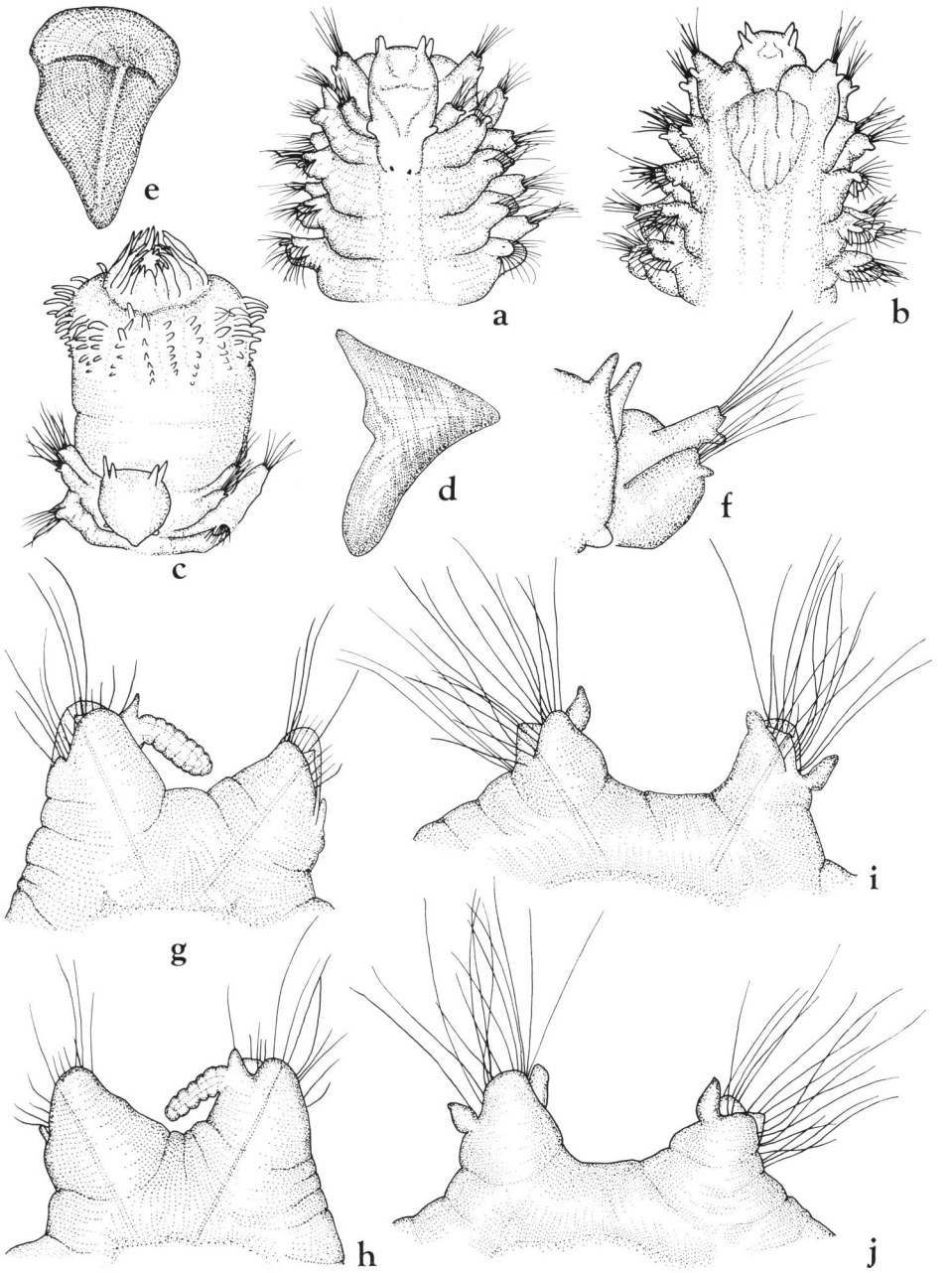


Fig. 7. *Nephtys polybranchia* SOUTHERN. a, Anterior end, in dorsal view, ×35; b, the same, in ventral view, ×35; c, proboscis, in dorsal view, ×40; d,e, jaws, in lateral view (d) and in frontal view (e), ×238; f, first parapodium, in dorsal view, ×80; g, 27th parapodium, in anterior view, ×73; h, the same, in posterior view, ×73; i, posterior parapodium, in anterior view, ×116; j, the same, in posterior view, ×116.

ventral side; these antennae are small and approximately equal in size. There is a pair of eye-spots at the posterior corner of the prostomium. A pair of remarkable nuchal organs is present at the level of the first setiger (Fig. 7 a, b).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae with 6 to 7 papillae in each row; there is no middorsal papilla. The proximal surface is smooth (Fig. 7 c). Jaws are triangular with many rings around the entire circumference (Fig. 7 d, e).

The first parapodia are directed obliquely. Both acicular lobes are conical, and

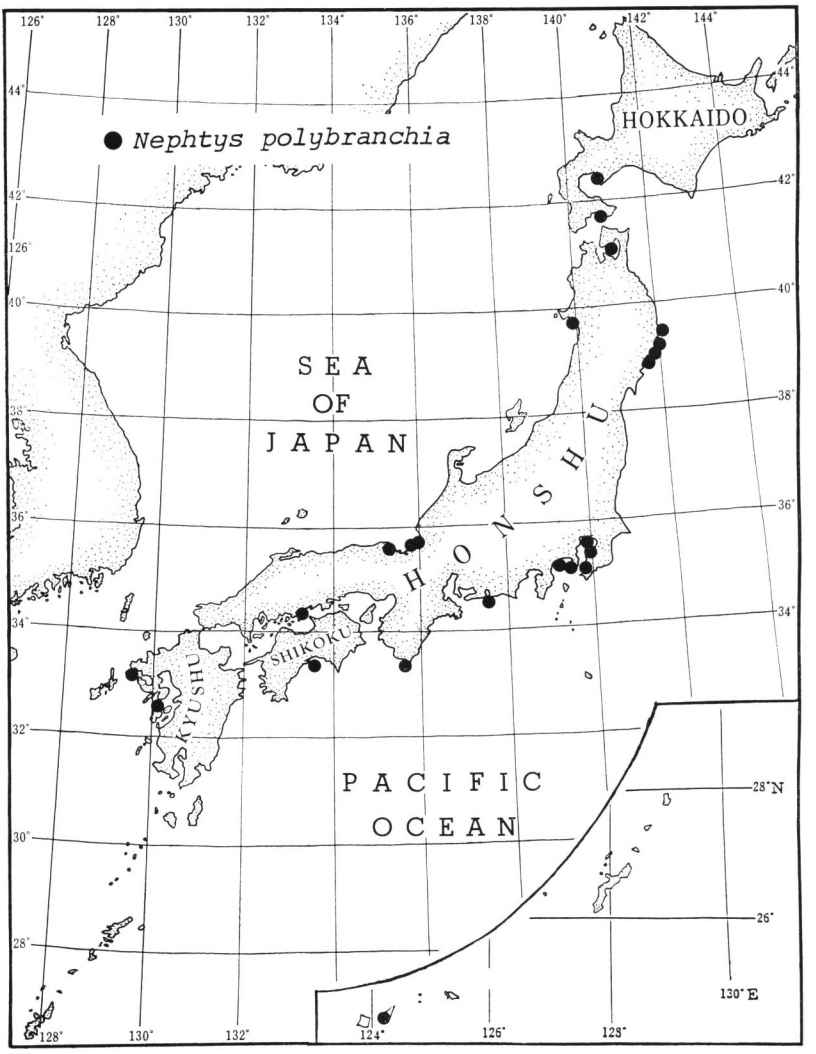


Fig. 8. Distribution of *Nephtys polybranchia*.

the dorsal and ventral cirri are small (Fig. 7 f).

In the typical parapodium of the 27th setiger the noto- and neuropodial acicular lobes are triangular; acicula appear at the tips of the lobes. The preacicular lamellae are rounded. The postacicular lamellae are longer than the acicular lobes. The ventral cirrus is small. The dorsal cirrus is conical and foliate. The interramal cirri are first present from the fifth setiger and continue to near the posterior end. Each is digitate and flattened (Fig. 7 g, h).

In the posterior parapodia the both rami are widely separated from each other. Noto- and neuropodial acicular lobes are triangular. The preacicular lamellae are as long as the acicular lobes or extend slightly beyond. The notopodial postacicular lamellae are smaller than the acicular lobes, and the neuropodial postacicular lamellae are slightly longer than the acicular lobe. The dorsal cirrus is foliate and the ventral cirrus is digitiform. There are no interramal cirri (Fig. 7 i, j).

The setae are of two kinds. Barred setae are restricted to the preacicular position. The long capillary setae with minute serrations along the cutting edge occur at the postacicular positions in both rami.

Remarks. The interramal cirri are first present from the fourth (FAUCHALD, 1968), or from the fifth setiger (SOUTHERN, 1921; USCHAKOV & WU, 1962; LEE & JAE, 1983). Interramal cirri are first present from the fifth setiger in all specimens in this collection.

Distribution. Chilka Lake; Madras; Gulf of Siam; Yellow Sea; Japan.

Nephtys neopolybranchia n. sp.

(Fig. 9 a–k)

Material examined. Usujiri Bay, Hokkaido, in 5–25 m (holotype and 13 paratypes), coll. K. YOKOUCHI; Kamaishi Bay, in 22 m (1).

Description. The holotype measures 20 mm in length and about 1 mm in width including parapodia; it consists of 61 setigers.

The prostomium is rectangular with a straight anterior margin and about twice as long as wide. There is no distinct border between the prostomium and the first setiger on the dorsal side. A subdermal longitudinal muscular band extends through the fifth setiger. A dark pigmented pattern is present on the median part of the prostomium. Nuchal organs are not visible. Of the two pairs of antennae, the first antennae are continuous with the frontal margin of the prostomium and are directed laterally to obliquely. The second antennae are inserted on ventral side of the prostomium and are somewhat shorter than the first one. A pair of eye-spots is located at the posterior corners of the second setiger (Fig. 9 a, b).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae with 5 to 7 papillae in each row; these papillae are very small and present on the distal half of the proboscis. A middorsal papilla is absent. The proximal surface is rough and covered with minute warts (Fig. 9 c).

Jaws are roughly triangular, with a pointed end; there are many annular rings around the circumference (Fig. 9 d).

The first parapodia are rather small and the noto- and neuropodial acicular lobes are reduced. Dorsal and ventral cirri are well developed, digitate, and subequal in length (Fig. 9 e). The interramal cirri are first present from the third setiger and continue to near the posterior end; each is short and flattened.

In the third parapodium, the notopodial acicular lobe is triangular and the neuropodial one is rounded. The preacicular lamella is low in the notopodium and is truncated in the neuropodium. The neuropodial postacicular lamella is ligulate and elongated beyond the tip of the acicular lobe, whereas the notopodial one is small and ovate. The dorsal and ventral cirri are comparatively short (Fig. 9 f, g).

In the typical parapodium of the 26th setiger the noto- and neuropodium are situated far apart from each other. The notopodial acicular lobe is rounded, whereas the neuropodial one is subtriangular. The neuropodial postacicular lamella is elongated, oval, and extends beyond the tip of the acicular lobe. The notopodial postacicular lamella is ovate and is located superior to the acicular lobe. The dorsal cirrus is conical and the ventral cirrus is digitiform (Fig. 9 h, i).

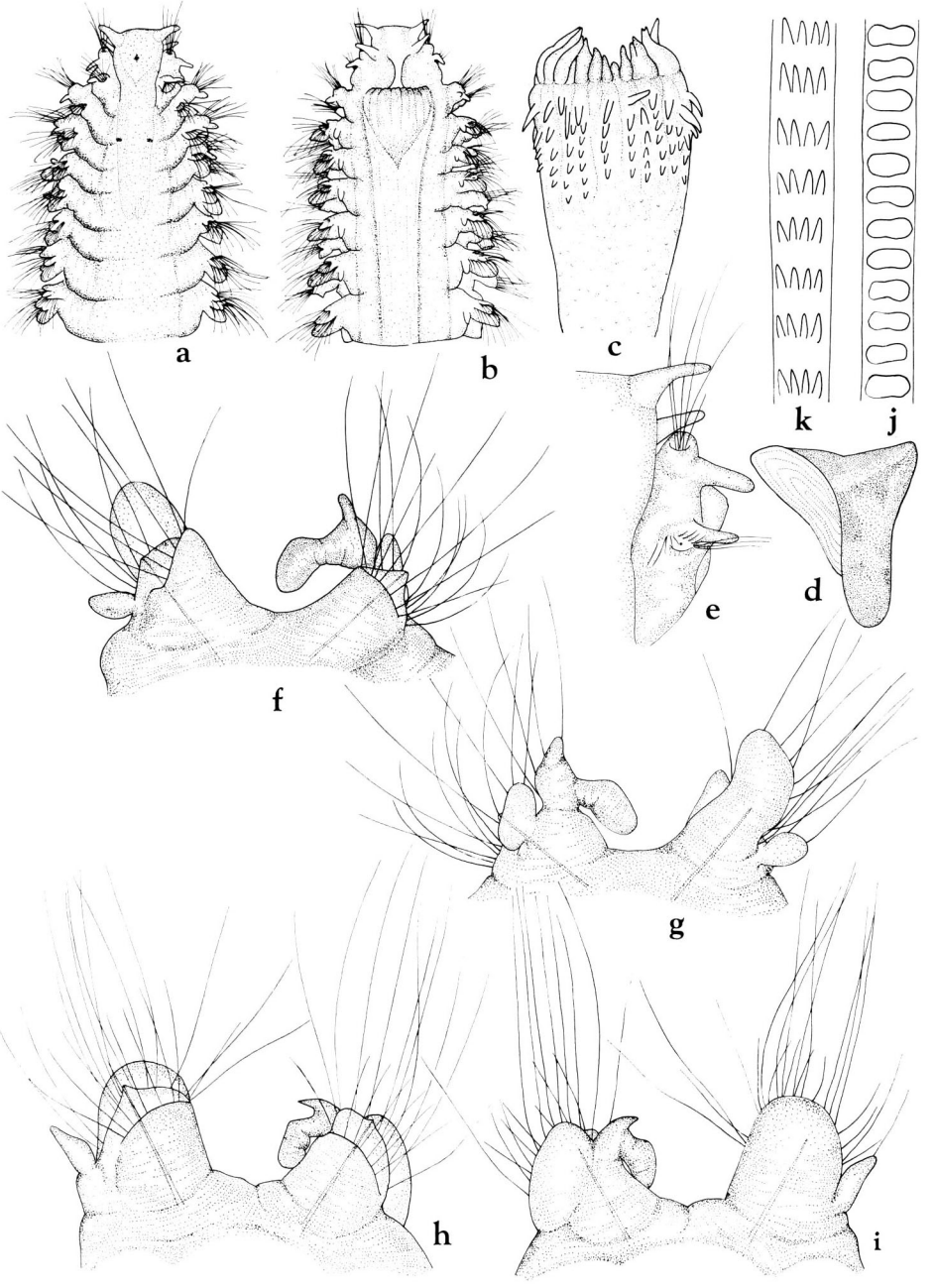
Setae are of two kinds. Preacicular setae have a barred structure and postacicular setae are spinulous; there are no lyrate setae (Fig. 9 j, k).

Remarks. *Nephtys neopolybranchia* resembles *N. polybranchia* SOUTHERN, 1921 from Chilka Lake. However, the two species can be distinguished as follows:

	N. polybranchia SOUTHERN	*N. neopolybranchia* n. sp.
Antennae	Directed forward	Directed obliquely or lateral
Nuchal organs	Distinct	Indistinct
First parapodia	Acicular lobes elongate; with tiny dorsal and ventral cirri	Acicular lobes rudimentary; with long dorsal and ventral cirri
Interramal cirri	Present from fifth setiger; 165μ long in median parapodium	Present from third setiger; 90μ long in median parapodium
Preacicular lamellae	Developed and rounded	Low
Postacicular lamellae	Located behind acicular lobe	Located superior to acicular lobe
Length of postacicular setae of median parapodia	360~400μ	230~290μ

Type series. Holotype, NSMT-Pol. H 237; 13 paratypes, NSMT-Pol. P. 238.
Distribution. Japan.

Fig. 9. *Nephtys neopolybranchia* n. sp. a, Anterior end, in dorsal view, ×27; b, the same, in ventral view, ×27; c, proboscis, in dorsal view, ×27; d, jaw, in lateral view, ×140; e, first parapodium, in dorsal view, ×94; f, third parapodium, in anterior view, ×140; g, the same, in posterior view, ×140; h, 26th parapodium, in anterior view, ×90; i, the same, in posterior view, ×90; j, a part of barred seta in preacicular fascicle, ×1380; k, a part of spinulose seta in postacicular fascicle, ×1380.


a
b
c
k
j
e
d
f
g
h
i

Nephtys longosetosa OERSTED, 1843

(Fig. 10 a–i; Fig. 14)

Nephthys longisetosa: VERRILL, 1881, pp. 295, 319; OKUDA, 1939, pp. 231–232.

Nephthys longosetosa: FAUVEL, 1923, p. 367, fig. 143 f–h; USCHAKOV, 1955, p. 219, fig. 68 C–E; SOUTHWARD, 1956, p. 264; CLARK, 1960, p. 20.

Nephtys longosetosa: HARTMAN, 1944, p. 339, pl. 15, fig. 7; IMAJIMA, 1961, pp. 87–88, fig. 3; PETTIBONE, 1954, p. 268, fig. 301; 1956, p. 558; 1963, pp. 204–205, fig. 47 a; FAUCHALD, 1963, pp. 8–11, figs. 1 C, 3 F; IMAJIMA & HARTMAN, 1964, p. 157; PAIK, 1973, p. 125, pl. 1, figs. E, F.

Material examined. Off Akita, in 20 m (1); southeast off Otsuchi, 39°17.3′N,

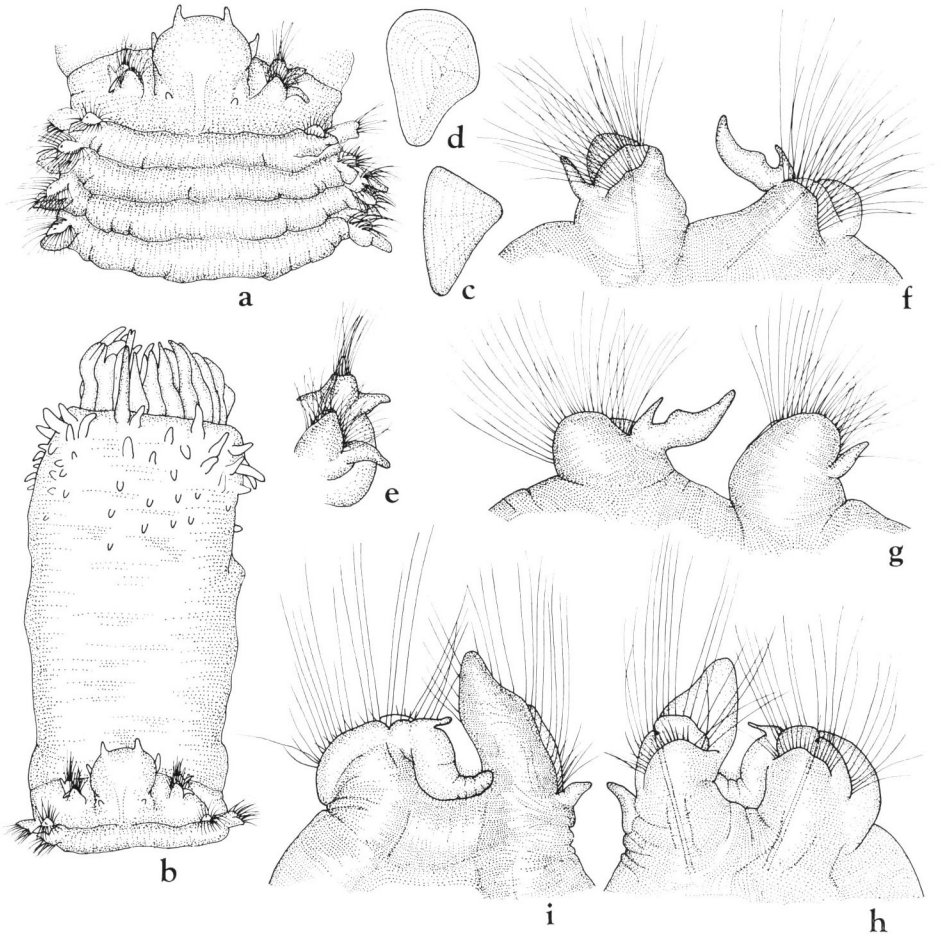


Fig. 10. *Nephtys longosetosa* OERSTED. a, Anterior end, in dorsal view, ×16; b, proboscis, in dorsal view, ×11; c, d, jaws, in lateral view (c) and in frontal view (d), ×32; e, first parapodium, in dorsal view, ×32; f, third parapodium, in anterior view, ×44; g, the same, in posterior view, ×44; h, 27th parapodium, in anterior view, ×18; i, the same, in posterior view, ×18.

142°06.0′E–39°17.1′N, 142°06.6′E, in 204–205 m (8), 39°16.4′N, 142°09.2′E, in 297 m (1), KT-85-11; Sagami Bay, 34°54.5′N, 139°19.7′E–34°54.5′N, 139°20.0′E, in 1450–1600 m (2).

Description. All of the specimens collected are anterior fragments. The largest one measures 31 mm in length including everted proboscis and 4 mm in width including parapodia; it consists of 39 setigers.

The prostomium is rounded, pentagonal, with a convex front. The first antennae are inserted at the frontal edge of the prostomium; the second antennae are somewhat shorter than the first ones, and are inserted on the ventral side of the prostomium. A pair of nuchal organs is present at the posterior corners. There are no visible eyespots (Fig. 10 a).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae with 4 to 7 papillae in each row. The subterminal papillae increase in size distally; there is a slender middorsal papilla, situated near the bases of the terminal papillae. The proximal surface is smooth (Fig. 10 b). Jaws have a triangular base; there are many annular rings on the surface (Fig. 10 c, d).

The first parapodia are biramous and are directed anteriorly. The neuropodial acicular lobes are conical but the notopodial acicular lobes are rounded. Pre- and postacicular lamellae are rudimentary in both rami. The dorsal and ventral cirri are digitiform; the dorsal cirrus is somewhat longer than the ventral one. Setae in both rami are similarly developed (Fig. 10 e).

Interramal cirri are first present from the third parapodia and continue to the posterior end of the body; they are well developed and flat, with the tips directed upwards. The noto- and neuropodial acicular lobes are evenly rounded with distal ends of the acicular. The dorsal cirrus is well developed and digitate. The preacicular lamellae are flattened in the neuropodium and are rounded in the notopodium. Noto- and neuropodial postacicular lamellae are semicircular in shape (Fig. 10 f, g).

By the 27th setiger the parapodia are fully developed, with bilobed noto- and neuropodial acicular lobes. The notopodial postacicular lamellae are rounded and as large as the acicular lobes. The neuropodial postacicular lamellae are well developed and nearly twice as long as the acicular lobe. The interramal cirri are recurved and strong. The dorsal cirrus is small and digitiform. The ventral cirrus is digitate; it is less developed than the anterior ones (Fig. 10 h, i).

Setae are of two types: barred setae in preacicular fascicle, and spinulose setae in posterior fascicle.

Distribution. Atlantic Ocean; northern Atlantic Ocean; northern Pacific Ocean (Alaska to California); Bering Sea; Okhotsk Sea; Japan; Yellow Sea; the Strait of Magellan.

Nephtys punctata HARTMAN, 1938

(Fig. 11 a–m; Fig. 14)

Nephtys punctata HARTMAN, 1938, pp. 155–156, fig. 67; 1950, p. 97; 1968, pp. 591–592, figs. 1–4;

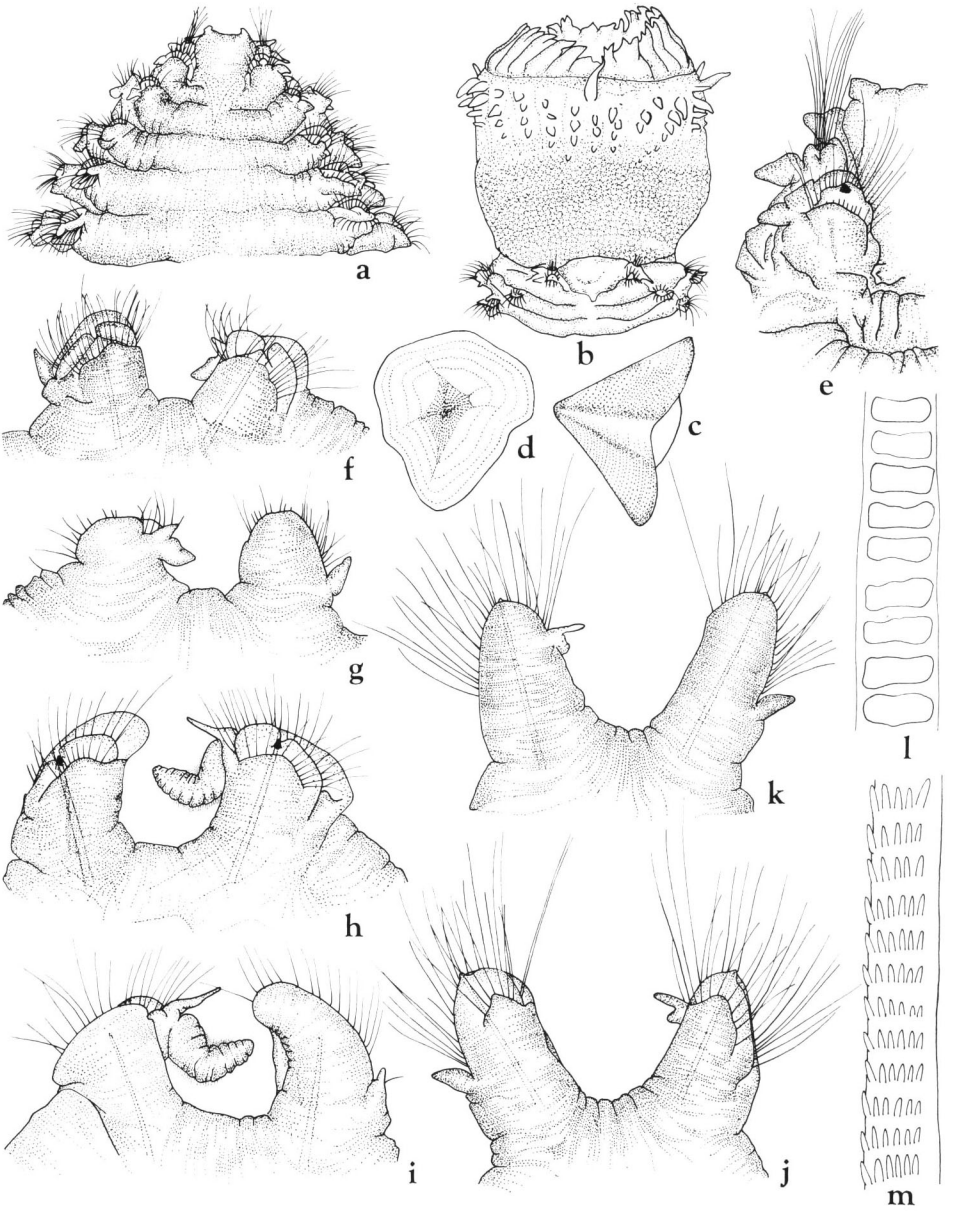


Fig. 11. *Nephtys punctata* HARTMAN. a, Anterior end, in dorsal view, ×11; b, proboscis, in dorsal view, ×6; c, d, jaws, in lateral view (c) and in frontal view (d), ×32; e, first parapodium, in dorsal view, ×32; f, ninth parapodium, in anterior view, ×23; g, the same, in posterior view, ×23; h, 29th parapodium, in anterior view, ×23; i, the same, in posterior view, ×23; j, posterior parapodium, in anterior view, ×30; k, the same, in posterior view, ×30; l, a part of barred seta in preacicular fascicle, ×1100; m, a part of spinulose seta in postacicular fascicle, ×1650.

BERKELEY & BERKELEY, 1942, p. 193; IMAJIMA, 1961, p. 89.

Material examined. Southeast off Otsuchi, 39°16.4′N, 142°09.2′E, in 297 m (1), 39°16.2′N, 142°08.8′E, in 288 m (1), 39°14.9′N, 142°10.9′E, in 395 m (3), 39°13.4′N, 142°13.9′E, in 468 m (1), 39°10.4′N, 142°18.9′E, in 776 m (1), 39°07.8′N, 142°25.1′E, in 993 m (1), 38°39.1′N, 143°02.9′E, in 1759 m (1), KT-85-11; Kashima Sea, 36°12.7′N, 141°18.1′E–36°15.0′N, 141°18.7′E, in 975–1020 m (5), 36°25.8′N, 141°18.3′E–36°23.0′N, 141°18.2′E, in 1005–1050 m (8), KT-79-13.

Description. The largest specimen measures 23 mm in length and 4 mm in width, including parapodia, for 46 segments.

The prostomium is approximately rectangular, longer than wide. Antennae are short and small; the second antennae are slightly larger than the first. A pair of small nuchal organs is located at the posterior corners of the prostomium. There are no visible eye-spots (Fig. 11 a).

The proboscis has 22 terminal bifurcated papillae and 22 rows of subterminal papillae. The subterminal papillae number 4 to 5 in a row; they are reduced in size proximally. A conspicuous middorsal papilla is present. The proximal surface of the proboscis is rough and covered with minute warts (Fig. 11 b). Jaws are pyramidal in shape, with many rings around the entire circumference (Fig. 11 c, d).

The first parapodia are biramous and thick; the notopodial acicular lobes are well developed with acicula projecting slightly. Both pre- and postacicular lamellae are rudimentary. The dorsal and ventral cirri are small and digitate (Fig. 11 e).

Interramal cirri are first present from the ninth parapodia; they are small and increase in size posteriorly. The noto- and neuropodia are fleshy and the acicular lobes are deeply incised in front. The noto- and neuropodial postacicular lamellae are rounded and are slightly larger than the acicular lobes (Fig. 11 f, g).

In the typical parapodium the noto- and neuropodial acicular lobes are deeply incised in front, with the tips of the acicula projecting slightly. The interramal cirrus is sickle-shaped and fleshy. The notopodial postacicular lamella is about as large as the acicular lobe. The neuropodial postacicular lamella is lingulate, projects distally, and extends beyond the tip of the acicular lobe. The dorsal cirrus tapers distally; the ventral cirrus is short and digitiform (Fig. 11 h, i).

In the posterior parapodia both rami are conical and prolonged; interramal distance is wide. The acicular lobes are rounded and as large as the postacicular lamellae; the preacicular lamellae are triangular. The interramal cirri are reduced to a small tubercle (Fig. 11 j, k).

Setae are of two kinds: the preacicular fascicle has barred setae (Fig. 11 l), and the postacicular fascicle has long spinulose setae (Fig. 11 m).

Distribution. Alaska to California; Kamchatka; Japan.

Nephtys caeca (FABRICIUS, 1780)

(Fig. 12 a–m; Fig. 14)

Nephtys caeca: VERRILL, 1881, pp. 294–296, 307, 314; WEBSTER & BENEDICT, 1887, p. 709; WHITEAVES,

1901, p. 82; FAUVEL, 1923, p. 365, fig. 142 a–l; 1933, p. 39; BERKELEY & BERKELEY, 1948, p. 54, figs. 80–81; USCHAKOV, 1955, p. 217, fig. 68; IMAJIMA, 1961, pp. 88–89, fig. 4; USCHAKOV & WU, 1962, p. 131; PETTIBONE, 1963, pp. 203–204, fig. 51 b; FAUCHALD, 1963, pp. 11–13, figs. 10, 3 D; IMAJIMA & HARTMAN, 1964, pp. 156–157; PAIK, 1973, pp. 124–125, pl. 1, figs. B–D; LEE & JAE, 1983, p. 24, fig. 2.

Nephthys caeca: IZUKA, 1912, pp. 213–215; OKUDA, 1938, pp. 123–124; OKUDA & YAMADA, 1954, pp. 186–187, text-fig. 4.

Nephtys coeca GORBUNOV, 1946, p. 38; THORSON, 1946, p. 71, fig. 34; WESENBERG-LUND, 1950 a, p. 20; 1950 b, p. 57; 1951, p. 43.

Material examined. Akkeshi, Hokkaido, in 10 m (1), intertidal zone (4); off Notsuke Peninsula, Hokkaido, in 10 m (2), coll. T. MIURA; Erimo, Hokkaido, intertidal zone (1); off Usujiri, Hokkaido, in 5–25 m (6); Mawaki, Noto Peninsula, intertidal zone (1); off Akita, 39°47′N, 140°01.8′E, in 10 m (1), 39°47′N, 140°00.8′E, in 20 m (12), 39°47′N, 139°58′E, in 30 m (2); off Oga Peninsula, 39°49.3′N, 139°52.8′E–39°49.2′N, 139°52.3′E, in 39–42 m (1); Hirota Bay, 39°36.4′N, 141°58.4′E, in 7 m (2).

Description. The largest specimen measures 230 mm in length and 9.4 mm in width including parapodia; it consists of 145 segments.

The prostomium is approximately rectangular, the length as long as the width, with two pairs of antennae. The first antennae are continuous with the frontal margin, and the second antennae are inserted on the ventral side of the prostomium; they are subequal in length. A pair of small nuchal organs is located at the posterior corners of the prostomium. A pair of eye-spots is present in the second setiger, but these are obscured by the muscles and are sometimes overlooked (Fig. 12 a, b).

The probosics has 22 rows of bifid terminal papillae, and 22 rows of subterminal papillae with 5 to 6 papillae in each row. The subterminal papillae decrease in size proximally; there is no middorsal papilla. The proximal surface of the proboscis is covered with low warts (Fig. 12 c). Jaws are angular elliptical cones with a pointed end; they have a subtriangular base (Fig. 12 d, e).

The first parapodia are directed forward. The dorsal cirrus is digitiform, and longer than the ventral cirrus. The noto- and neuropodial acicular lobes are developed, and the neuropodial acicular lobe is smaller than the notopodial one (Fig. 12 f).

The interramal cirri are first present from the fourth setiger and continue to near the end of the body; the first interramal cirri are slightly recurved distally. Noto- and neuropodial acicular lobes of the fourth setiger are distinctly incised by a deep notch, so that the tips of the acicula are exposed. The notopodial postacicular lamellae are rounded and the neuropodial ones are subtriangular; both lamellae extend beyond the acicular lobes (Fig. 12 g, h).

In the typical parapodium of the 29th setiger the interramal cirrus is well developed and completely recurved; it has a minute accessory cirrus near its base. The dorsal cirrus is short and slender. The noto- and neuropodial acicular lobes are distinctly bilobed, with a deep incision. The notopodial postacicular lamella is subtriangular and foliaceous. The neuropodial postacicular lamella is distinctly triangular and foliate; it is longer than the notopodial one. The ventral cirrus is digitate (Fig. 12 i, j).

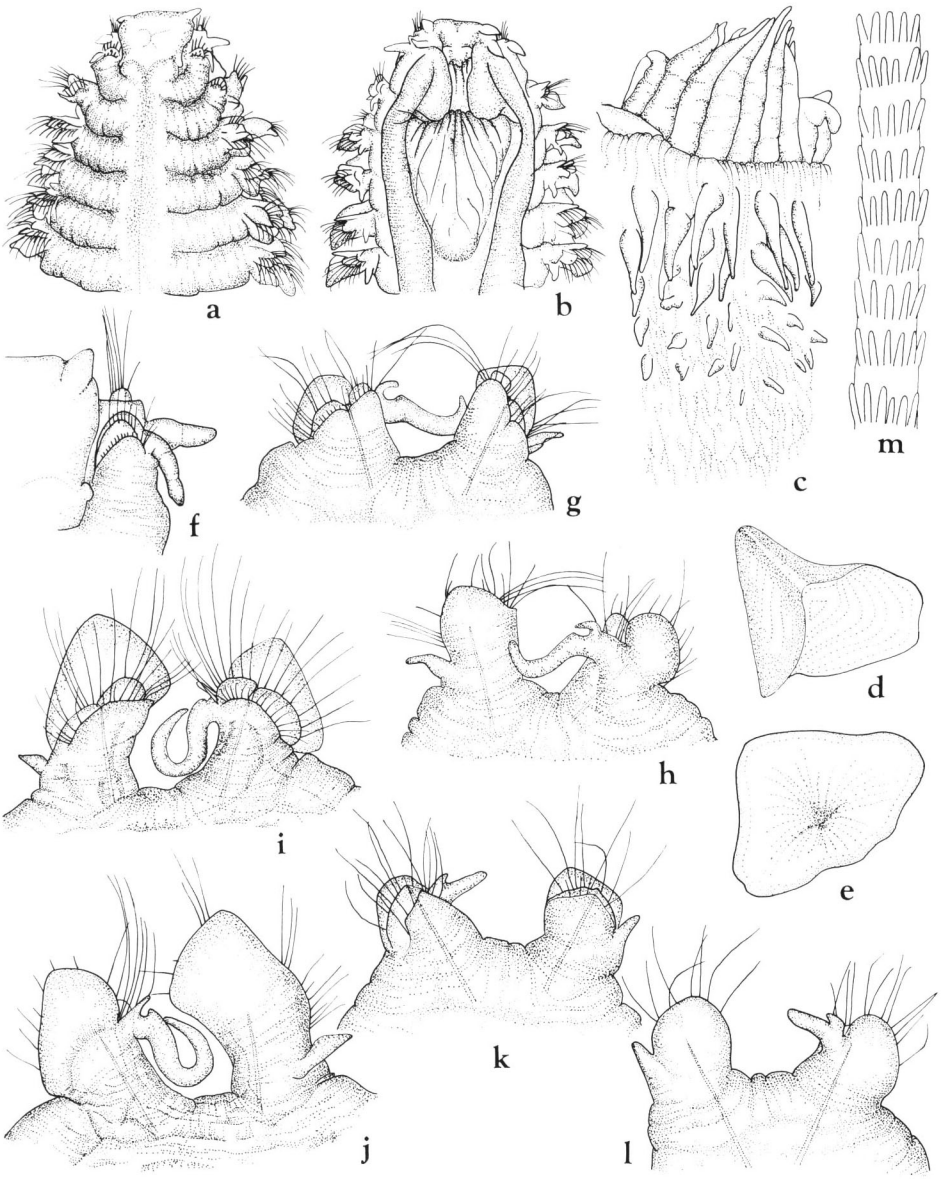


Fig. 12. *Nephtys caeca* (FABRICIUS). a, Anterior end, in dorsal view, ×11; b, the same, in ventral view, ×11; c, a part of proboscis, in dorsal view, ×22; d, e, jaws, in post-lateral view (d) and seen from free edge (e), ×32; f, first parapodium, in dorsal view, ×32; g, fourth parapodium, in anterior view, ×30; h, the same, in posterior view, ×30; i, 29th parapodium, in anterior view, ×22; j, the same, in posterior view, ×22; k, posterior parapodium, in anterior view, ×43; l, the same, in posterior view, ×43; m, a part of spinulose seta in postacicular fascicle, ×1620.

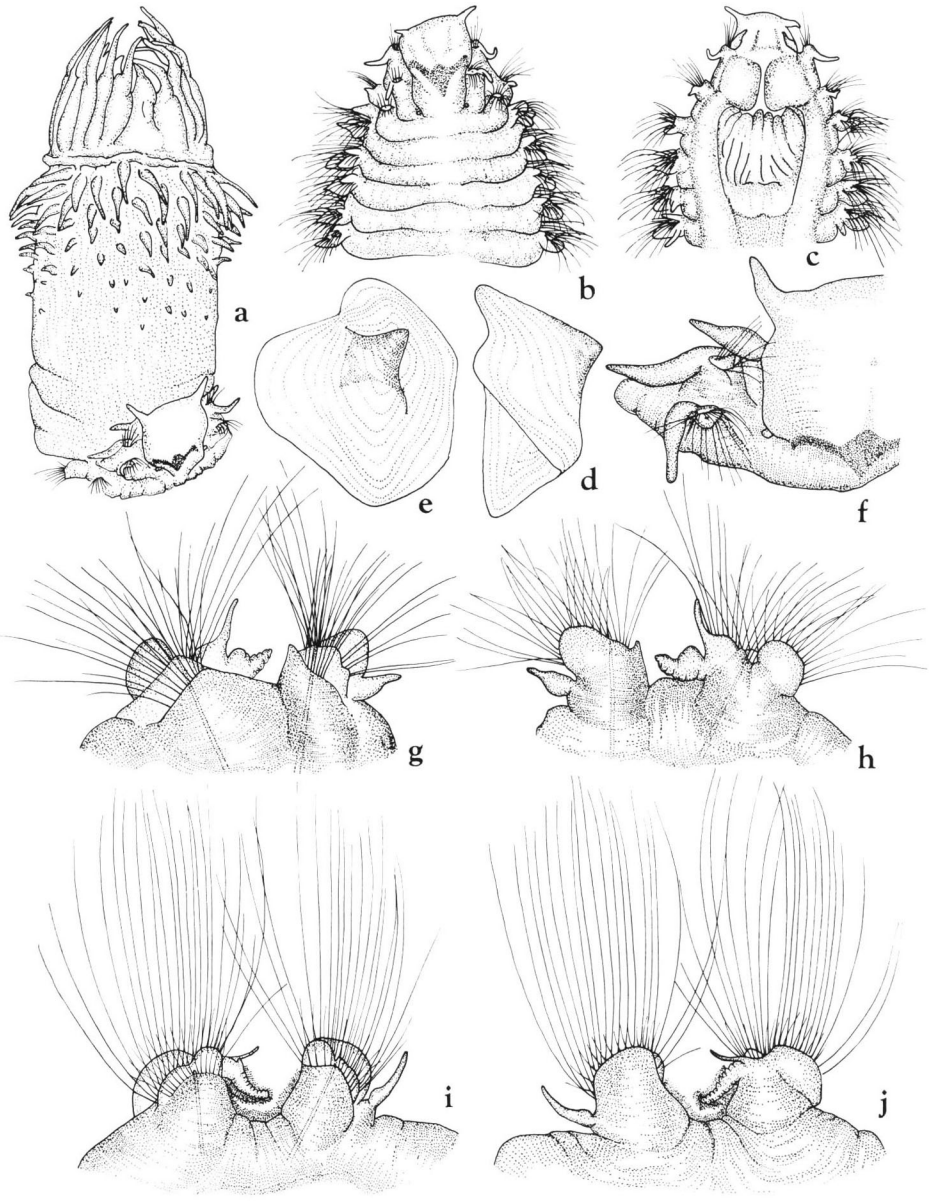


Fig. 13

In the posterior parapodia the interramal cirri decrease, becoming short and digitiform. The noto- and neuropodial postacicular lamellae become gradually smaller, but they extend beyond the acicular lobes. Both acicular lobes are subtriangular with entire margins. The ventral cirrus is short and digitate (Fig. 12 k, l).

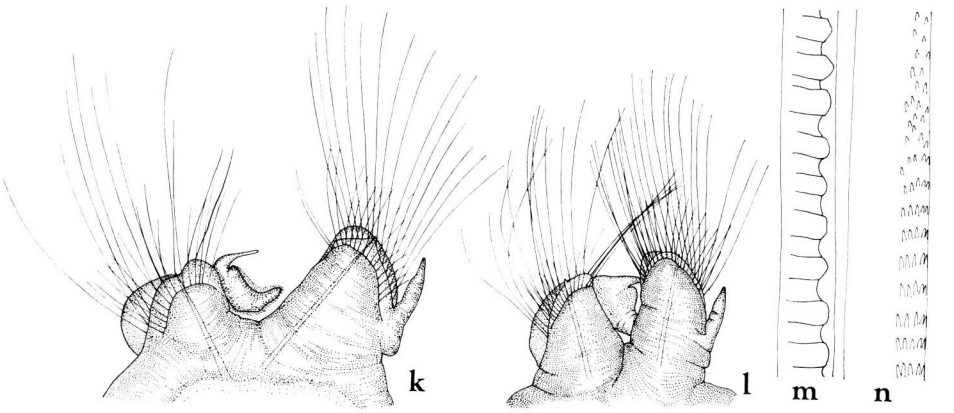


Fig. 13, on pp. 66–67. *Nephtys californiensis* HARTMAN. a, Proboscis, in dorso-lateral view, ×11; b, prostomium, in dorsal view, ×16; c, the same, in ventral view, ×16; d, e, jaws, in lateral view (d) and in front-lateral view (e), ×106; f, first parapodium, in anterior view, ×32; g, third parapodium, in anterior view, ×43; h, the same, in posterior view, ×43; i, 28th parapodium, in anterior view, ×30; j, the same, in posterior view, ×30; k, 60th parapodium, in anterior view, ×34; l, 92nd parapodium, in anterior view, ×34; m, a part of barred seta in preacicular fascicle, ×1275; n, a part of spinulose seta in postacicular fascicle, ×855.

Setae are of two types. Barred setae are restricted to the preacicular position. The postacicular fascicle has long, spinulose setae with slender denticles arranged in transverse rows (Fig. 12 m). The pygidium has a long anal cirrus.

Distribution. Greenland; North Atlantic, Pacific and Arctic Oceans; California; Japan; Yellow Sea.

Nephtys ciliata (MÜLLER, 1776)

Nephthys ciliata: MOORE, 1903, p. 433; IZUKA, 1912, pp. 215–217; TAKAHASHI, 1938, p. 204.
Nephtys ciliata: IMAJIMA & HARTMAN, 1964, p. 157.

Diagnosis. The body measures 140–185 mm in length and 5.5 mm in width, for 90 to 135 segments. The prostomium is longer than wide, with two pairs of short antennae. The proboscis has 22 rows of subterminal papillae with 5 to 7 papillae in each row; there is a middorsal papilla. The interramal cirri are first present from setiger 5 to 7; they are conspicuous on the last 20 to 30 parapodia. Noto- and neuropodial acicular lobes are deeply incised distally. The dorsal cirrus is long and slender. Neuropodial postacicular lamellae are slightly larger than those of notopodia, but are not as conspicuous as the acicular lobes.

This species is not included in our collection.

Distribution. Denmark; north Atlantic and Pacific Oceans; Alaska; Bering Sea; Japan.

Nephtys californiensis HARTMAN, 1938

(Fig. 13 a–n; Fig. 14)

Nephtys californiensis HARTMAN, 1938, pp. 150–151, fig. 64; 1940, p. 240; 1950, p. 130; BERKELEY & BERKELEY, 1948, pp. 53–54, figs. 78, 79; USCHAKOV & WU, 1962, pp. 8–9, fig. 3 A–D; 1979, pp. 53–54, fig. 17 A–D.

Nephthys caeca var. *ciliata*: OKUDA, 1939, p. 231, fig. 6.

Material examined. Otsuchi Bay, in 12 m (10); off Akita, 39°47′N, 140°02.4′E, in 5 m (3), 39°47′N, 140°01.8′E, in 10 m (2), 39°47′N, 140°00.8′E, in 20 m (3); Tokyo Bay, 35°30.0′N, 140°00.0′E, in 16 m (1), 35°30.0′N, 139°50.0′E, in 24 m (1), for survey in Kanagawa Fish. Exper. Sta.; off Morito, Miura Peninsula, in 68 m (2); Enoshima, intertidal zone (4); off Enshu-Nada, in 20 m (2).

Description. The largest specimen measures 49 mm in length including everted proboscis and 4 mm in width including parapodia; it consists of 86 setigers.

The prostomium is rectangular with a pair of small lateral notches. Of the two pairs of antennae, the first antennae are continuous with the frontal margin; the second antennae are inserted on the ventral side of the prostomium. The prostomium has a characteristic pigment pattern of a spread eagle on the posterior part and a small dark spot in the central part. A pair of eye-spots is not visible. Nuchal organs are situated at the posterior corners of the prostomium; they are small and difficult to discern (Fig. 13 a–c).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae with 6 to 7 papillae in each row. The terminal papillae are slender and more conspicuous than the subterminal papillae. The subterminal papillae decrease in size toward the basal part. There is no middorsal papilla. The proximal surface of the proboscis is smooth (Fig. 13 a).

Jaws are bluntly triangular and light-brown; there are distinct rings along the outer margin (Fig. 13 d, e).

The first parapodia are biramous and directed forward; both acicular lobes are small conical in shape. The pre- and postacicular lamellae are rudimentary. The dorsal and ventral cirri are slender and digitate; the ventral cirrus is larger than the dorsal one (Fig. 13 f).

The interramal cirri are first present from the third setiger, and continue back to near the posterior end. In the third parapodia both rami are already developed. The notopodial acicular lobe is low and triangular, whereas the neuropodial acicular lobe is evenly rounded. Both postacicular lamellae are foliaceous; the neuropodial lamella is larger than the notopodial one. The dorsal cirrus is slender, whereas the ventral cirrus is spindle-shaped (Fig. 13 g, h).

In the 28th parapodium the noto- and neuropodial preacicular lamellae are rounded. Noto- and neuropodial acicular lobes are distinctly bilobed; however, the bilobation of the acicular lobes appears from the 20th to 25th parapodia. The noto- and neuropodial postacicular lamellae are rounded and about as large as the acicular lobes. The dorsal cirrus becomes more slender. The ventral cirrus is slender and

extends to the distal end of the neuropodial postacicular lamellae (Fig. 13 i, j).

The bilobation of the neuropodial acicular lobes disappears from about the 60th setiger; thereafter these acicular lobes become triangular. Nevertheless, the notopodial acicular lobes are distinctly bilobed. The ventral cirrus is well developed and digitate (Fig. 13 k). In the more posterior parapodia both noto- and neuropodial acicular lobes become oblong with the tip of the aciculum projecting (Fig. 13 l).

Setae are of two types. The preacicular setae are short, and barred. Nevertheless, the postacicular setae are very long, about three times as long as the acicular lobe; they are spinulose with denticles arranged regularly in its basal part and with

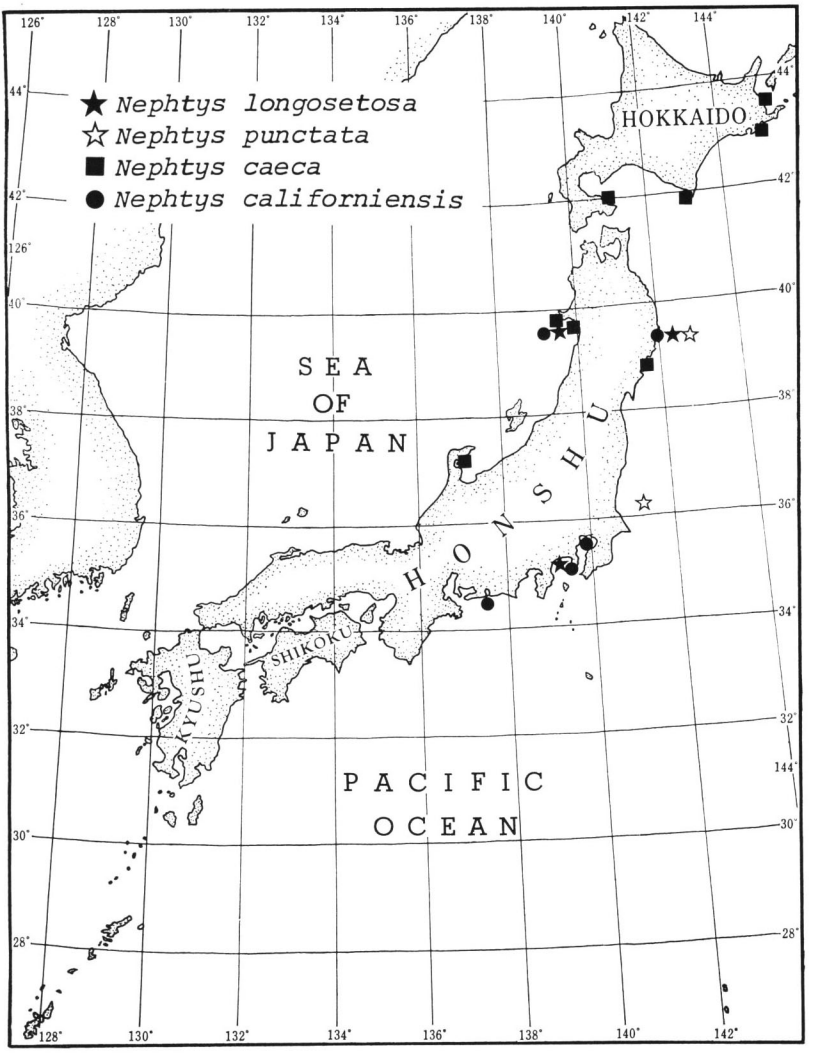


Fig. 14. Distribution of *Nephtys longosetosa*, *N. punctata*, *N. caeca* and *N. californiensis*.

scattered minute denticles in distal part (Fig. 13 m, n).

Nephthys caeca var. *ciliata* reported by OKUDA (1939) from Onagawa Bay is referred to this species by the features of the parapodia.

Distribution. California; the Gulf of Mexico; Yellow Sea; Japan.

Nephtys discors EHLERS, 1868

(Fig. 15 a–i)

Nephthys discors EHLERS, 1868, pp. 626–629, pl. 23, figs. 39–40.
Nephtys discors: HARTMAN, 1938, p. 9, pl. 1, figs. 2, 3; 1950, p. 96; PETTIBONE, 1954, pp. 270–271, fig. 30 m; 1963, p. 203, fig. 51 e, f; IMAJIMA, 1961, pp. 89–90, fig. 6 a–d.
Nephtys rickettsi HARTMAN, 1938, p. 153; 1950, p. 97.

Material examined. Off Notsuke Peninsula, Hokkaido, in 10 m (1), coll. T. MIURA.

Description. The specimen measures 313 mm in length including everted proboscis and 17 mm in width including parapodia; it consists of 132 setigers.

The prostomium is elongated, rectangular. The two pairs of antennae are short and small; in particular, the second antennae are scarcely visible behind the prostomium. There are a pair of subdermal eye-spots which may be clearly seen if forceps are used to push the muscles. A pair of nuchal organs is located at the posterior margin of the prostomium (Fig. 15 a, b).

The proboscis is very large and thick. It has 22 rows of terminal papillae and 22 rows of subterminal papillae with 4 to 6 papillae in each row. The subterminal papillae decrease in size going basally; there is no middorsal papilla. The proximal surface of the proboscis is smooth, but there are many longitudinal wrinkles (Fig. 15 c).

Jaws are somewhat angular elliptical cones with a pointed end (Fig. 15 d).

The first parapodia are fleshy and the notopodium is more developed than the neuropodium. The notopodial acicular lobes are conical and are remarkably larger than the neuropodial one. The dorsal and ventral cirri are digitate (Fig. 15 e).

The interramal cirri are first present from the sixth setiger and are continued back to near the end of the body.

In the typical parapodium of the 24th setiger, the notopodial acicular lobes are deeply incised distally, and the neuropodial acicular lobes are obliquely rounded. Both preacicular lamellae are very low and rounded. The postacicular lamellae are foliaceous, extending well beyond the acicular lobes; they are subequal in each other. The dorsal cirrus is flattened and triangular, and the ventral cirrus is short and foliated (Fig. 15 f, g).

In the posterior parapodia the noto- and neuropodia become cylindrically prolonged; the neuropodia are larger than the notopodia. The notopodial acicular lobes are distally rounded with an exposed acicular end. The neuropodial acicular lobe is triangular. Both acicular lobes extend distally beyond the postacicular lamellae.

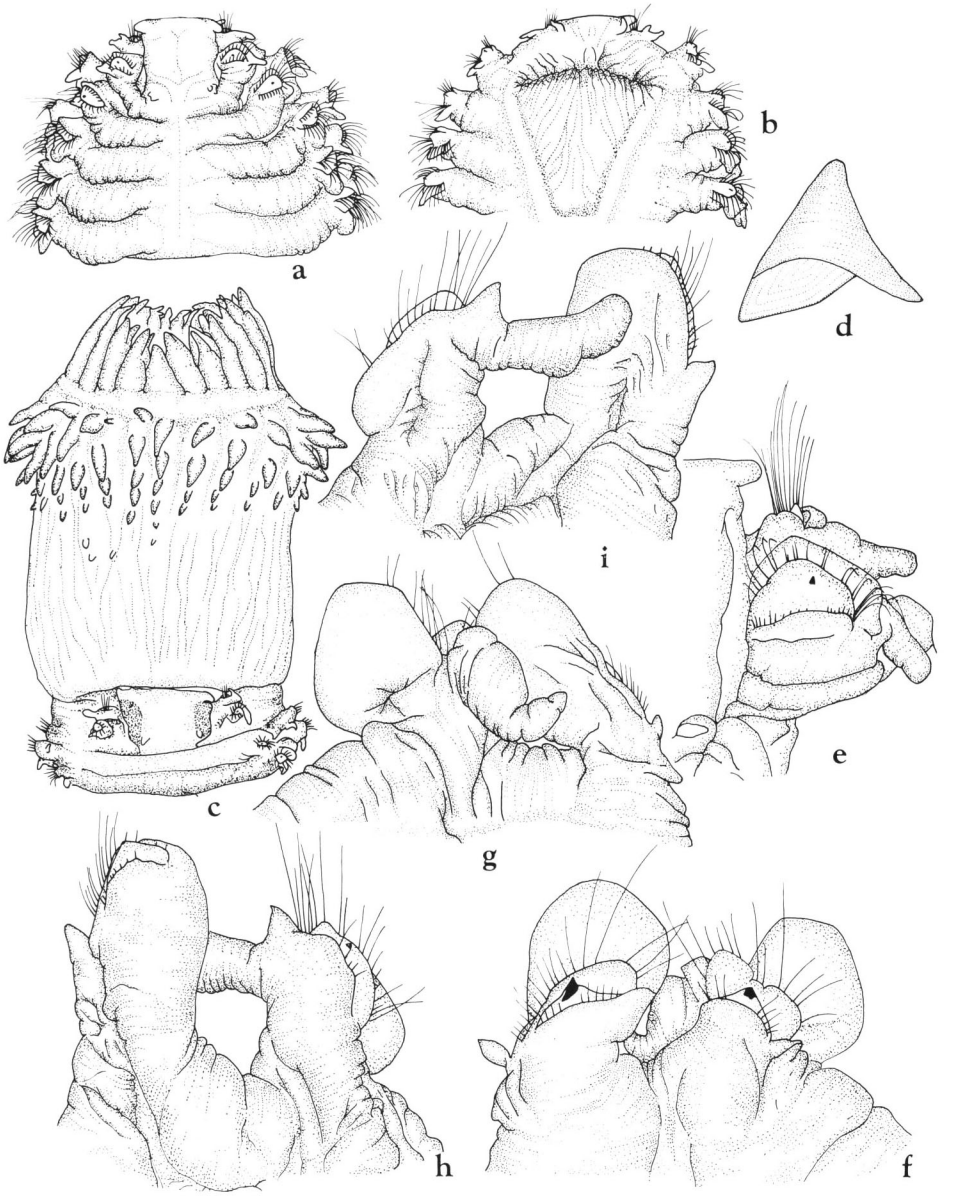
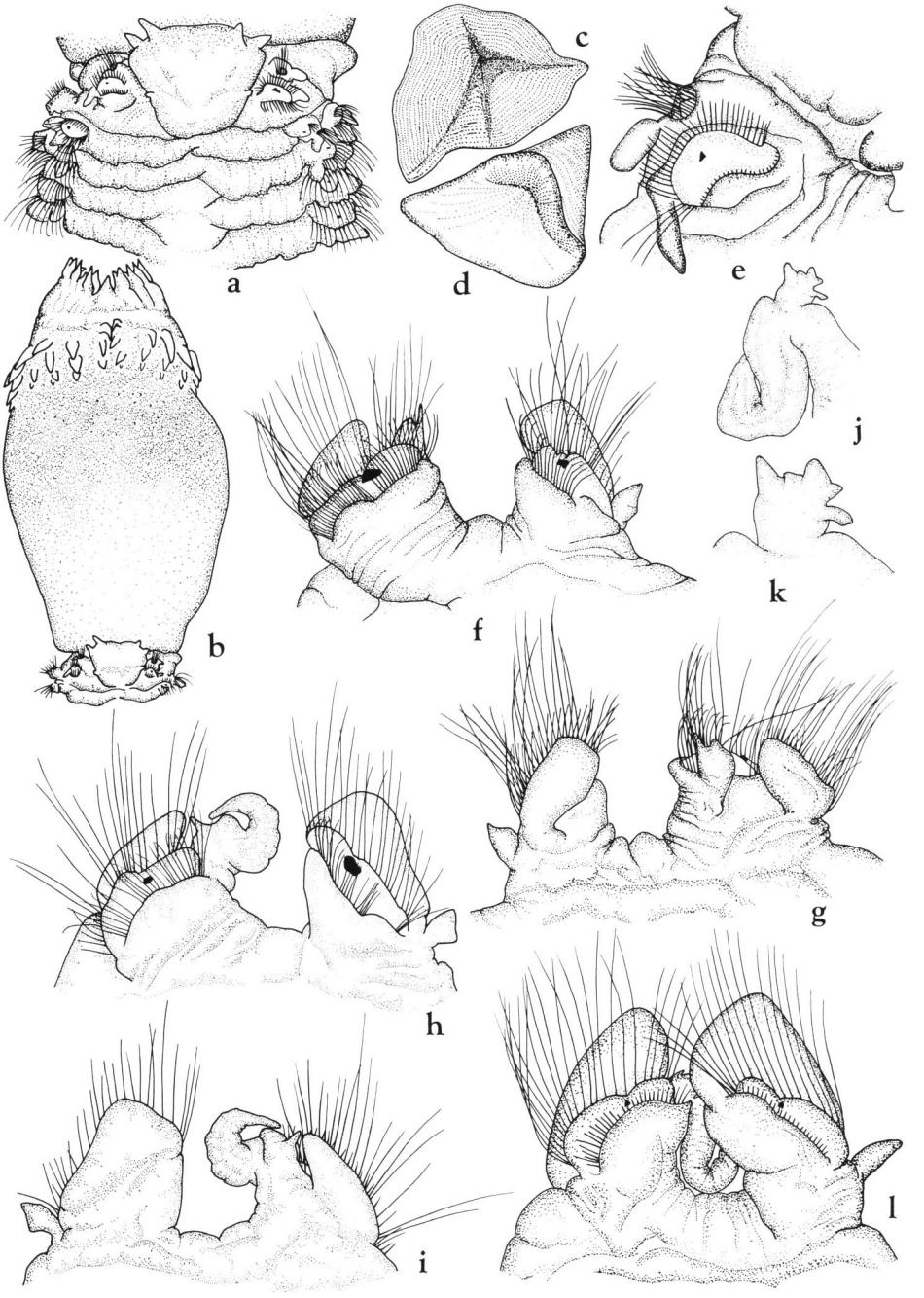


Fig. 15. *Nephtys discors* EHLERS. a, Anterior end, in dorsal view, ×5; b, the same, in ventral view, ×5; c, proboscis, in dorsal view, ×1.8; d, jaw, in lateral view, ×17; e, first parapodium, in dorsal view, ×30; f, 24th parapodium, in anterior view, ×15; g, the same, in posterior view, ×15; h, posterior parapodium, in anterior view, ×11; i, the same, in posterior view, ×11.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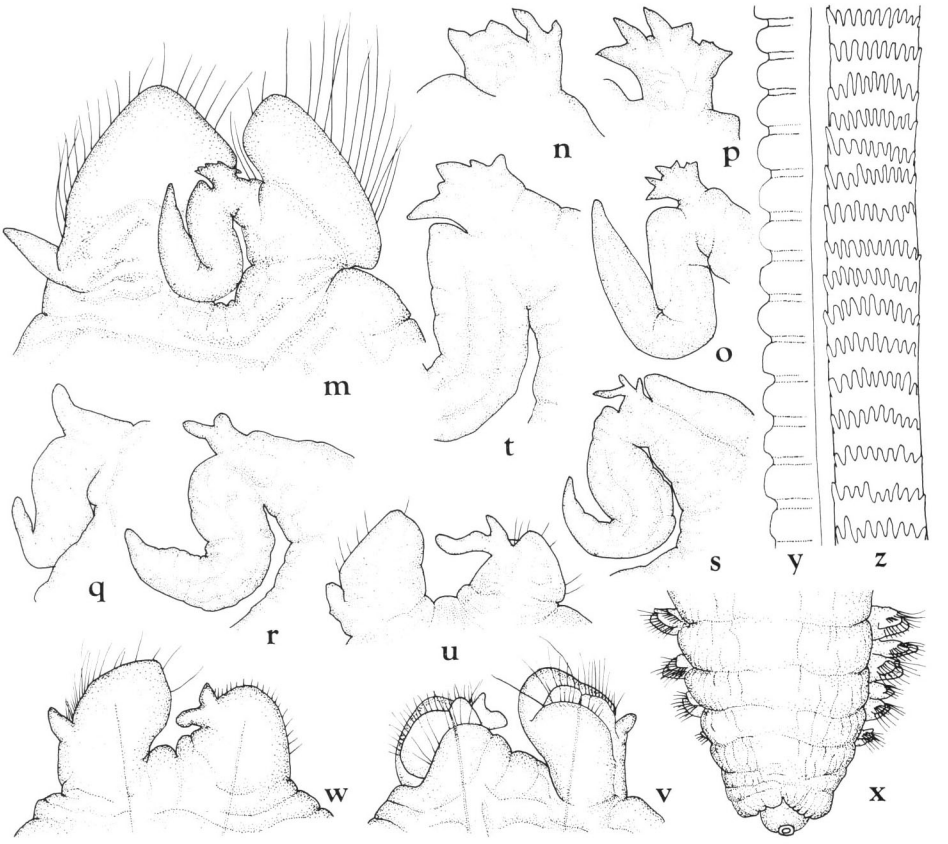

Fig. 16, on pp. 72–73. *Nephtys serrata* n. sp. a, Anterior end, in dorsal view, ×5; b, proboscis, in dorsal view, ×3; c, d, jaws, in frontal view (c) and from free edge (d), ×23; e, first parapodium, in dorsal view, ×18; f, fourth parapodium, in anterior view, ×16; g, the same, in posterior view, ×16; h, fifth parapodium, in anterior view, ×16; i, the same, in posterior view, ×16; j, dorsal cirrus and interramal cirrus of sixth parapodium, in posterior view, ×16; k, same dorsal cirrus, ×33; l, 25th parapodium, in anterior view, ×12; m, the same, in posterior view, ×12; n, dorsal cirrus of 26th parapodium, in posterior view, ×33; o, dorsal and interramal cirri of 58th parapodium, in posterior view, ×16; p, same dorsal cirrus, ×33; q, dorsal and interramal cirri of fourth parapodium in paratype, in posterior view, ×33; r, dorsal and interramal cirri of fifth parapodium in paratype, in posterior view, ×23; s, dorsal and interramal cirri of 10th parapodium in paratype, in posterior view, ×16; t, dorsal cirrus and basal part of interramal cirrus of 34th parapodium in paratype, in posterior view, ×33; u, 10th parapodium from the end of the body, in posterior view, ×33; v, fifth parapodium from last, in anterior view, ×23; w, the same, in posterior view, ×23; x, posterior end, in dorsal view, ×8; y, a part of barred seta in preacicular fascicle, ×1120; z, a part of spinulose seta in postacicular fascicle, ×1120.

The interramal cirri are thick and digitiform, and are slightly curved. The dorsal cirrus is triangular and the ventral cirrus is digitate (Fig. 15 h, i).

Setae are of two types. Preacicular setae are short and barred; however, most are broken in this material. Postacicular setae are long and minutely denticulated.

The species is new to the Japanese fauna.

Distribution. Alaskan Arctic to southern California; Gulf of St. Lawrence to Maine; Sea of Okhotsk; Japan.

Nephtys serrata n. sp.

(Fig. 16 a–z)

Material examined. Off Honbekkai, Nemuro Peninsula, in 3 m (holotype and two paratypes), coll. T. MIURA.

Description. The holotype is the largest specimen and measures 325 mm in length, including everted proboscis, and 11.5 mm in width, including parapodia; it consists of 190 setigers.

The prostomium is trapezoidal and narrowed posteriorly. Nuchal organs are represented by a pair of short eversible digitiform papillae, and are situated in a median position on the lateral sides of the prostomium. The two pairs of antennae are short and conical; the second antennae are somewhat flattened. There are no eye-spots (Fig. 16 a).

The proboscis has 22 rows of terminal papillae and 22 rows of subterminal papillae with 3 to 4 papillae in each row; the subterminal papillae are located at the upper part of the proboscis. A middorsal papilla is absent. The proximal surface is covered with many low warts (Fig. 16 b). The horny jaws are conical with a pointed end; each has a roughly triangular base (Fig. 16 c, d).

The first parapodia are biramous and not erect. The notopodium has a well developed, conical acicular lobe; the pre- and postacicular lamellae are low. The dorsal cirrus is long and digitate. The neuropodial acicular lobe is conical but low. The ventral cirrus is digitiform (Fig. 16 e).

In the fourth parapodia the notopodium is better developed than the neuropodium. Noto- and neuropodial acicular lobes are slightly incised distally. Both preacicular lamellae are almost flattened, and postacicular lamellae are triangular and foliaceous. The dorsal cirrus is a short digitiform process with a widely flattened base (Fig. 16 f, g). The interramal cirrus appears from the fifth parapodium and continues posteriorly to near the end of the body; they are rather well developed with basal swelling and the tips are directed upward. The neuropodial postacicular lamella is larger than the notopodial one (Fig. 16 h, i). From the sixth parapodium, the base of the dorsal cirrus becomes foliate and has four accessory distal cirri; these cirri are irregular in form or size (Fig. 16 j, k).

In the typical parapodium of the 25th setiger the noto- and neuropodial acicular

lobes are distinctly bilobed distally; each superior part of the acicular lobes is smaller than the inferior parts. The preacicular lobes are low and rounded. Both postacicular lamellae are large, triangular and foliaceous; the neuropodial lamella is larger than the notopodial one. The base of the dorsal cirrus is foliaceous, and has three irregular accessory cirri. The interramal cirrus is well developed and involute (Fig. 16 l–n).

The dorsal cirrus is also well developed at the 58th parapodium, in the median part of the body; it has three large and one short accessory cirri (Fig. 16 o, p).

In a paratype specimen the interramal cirrus appears first from the fourth parapodium, and the dorsal cirrus is a short digitate process in the same parapodium (Fig. 16 q). The dorsal cirrus has an accessory cirrus in the fifth parapodium (Fig. 16 r) and two accessory cirri in the tenth parapodium (Fig. 16 s). In the 34th parapodium the dorsal cirrus has four accessory cirri in various sizes (Fig. 16 t). These accessory cirri decrease gradually to the end of the body, and they disappear in about last ten segments (Fig. 16 u).

In the posterior parapodia the noto- and neuropodial acicular lobes are distinctly bilobed distally. The postacicular lamellae are not as developed as those in front, but extend far beyond the acicular lobes. The interramal, dorsal and ventral cirri are tiny (Fig. 16 v, w).

The pygidium has a remarkable anal pore (Fig. 16 x).

Setae are of two kinds: barred setae in the preacicular fascicles (Fig. 16 y), and long spinulose setae with denticles in transverse rows at the basal part in the postacicular fascicles (Fig. 16 z).

Remarks. *Nephtys serrata* is characterized by the fact that the dorsal cirrus is basally wide and has some accessory cirri along the distal margin.

Type series. Holotype, NSMT-Pol. H 239; 2 paratypes, NSMT-Pol. P 240.

Distribution. Northern Japan.

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