

Five species of the Genus *Prionospio* (Polychaeta: Spionidae) in Kwangyang Bay, Korea

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Specimens of the spionid polychaetes (Polychaeta: Spionidae) were collected and examined in the subtidal shallow waters of Kwangyang Bay, southern coast of Korea, from April 1990 to November 1994. Five species of the genus *Prionospio* are described and illustrated: *Prionospio* (*Minuspio*) *multibranchiata* Berkeley, 1927, *P.* (*Prionospio*) *saccifera* Mackie and Hartley, 1990, *P.* (*P.*) *bocki* Söderström, 1920, *P.* (*P.*) *membranacea* Imajima, 1990, and *P.* (*P.*) *paradisea* Imajima, 1990. These five species of spionid polychaetes are reported for the first time in Korean waters.

Key words: Polychaeta, Spionidae, *Prionospio*, Taxonomy, Kwangyang Bay, Korea.

Introduction

The family Spionidae (Annelida: Polychaeta) is one of the largest and most common polychaete families found in marine benthic infaunal communities. They occur in a wide variety of habitats from the intertidal to the deep sea. They are readily recognized by their anterior ends which carry a pair of long, prehensile, and very active palps. Spionids may form dense assemblages and have been considered selective surface deposit feeders, suspension feeders, or as both deposit and suspension feeders (Fauchald and Jumars, 1979; Taghon et al., 1980; Dauer et al., 1981; Dauer, 1983).

The genera and species that are collectively referred to as the *Prionospio* complex include a diverse assemblage of spionids that have (1) slender, cylindrical bodies, (2) branchiae of various forms (simple or with pinnules or flattened plates) first present from setiger 1~3 and limited to the anterior part of the body, (3) a prostomium that is relatively simple, without frontal horns and occipital antenna, and usually with red eyes, (4) bi- to multidentate hooded hooks in both noto-

and neuropodia, (5) well-developed anterior parapodial lamellae, and (6) hard membraned eggs. Within these rather general features there exists considerable variation (Blake, 1996).

The systematics of the *Prionospio* complex have been the subject of an extensive study during the past two decades. The genus *Prionospio* was defined in 1867 by Malmgren broadly as having branchiae present from either setiger 1 or 2. This definition allowed for inclusion of typical *Prionospio* with branchiae from setiger 2 and *P. pinnata* Ehlers, 1901, with branchiae from setiger 1, but Caullery (1914) established the genus *Paraprionospio* in 1914 for the latter species.

The first important revision of the *Prionospio* complex was by Foster (1971), who separated *Prionospio* species into distinct groups based on the type and arrangement of branchiae, and defined five genera *Prionospio* Malmgren, 1867, *Apoprionospio* Foster, 1969, *Paraprionospio* Caullery, 1914, *Aquilaspio* Foster, 1971, *Minuspio* Foster, 1971. Blake and Kudenov (1978) added *Streblospio* Webster, 1879, and established a new genus *Orthoprionospio*. The most recent revision of *Prionospio* complex was made by Maciolek (1985), in which the genera and all known species were reviewed. She splits the genus into two genera; *Prionospio* Malmgren, 1867, and *Apoprionospio* Foster, 1971, differing only in the form of branchial pinnules; the pinnules are platelike in *Apoprionospio*, whereas they are digitiform in

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Prionospio. She divided *Prionospio* into three subgenera; *Prionospio* for species with a combination of smooth and pinnate branchiae; *Minuspio* Foster, 1971 for species with apinnate branchiae only; and *Aquilaspio* Foster 1971 for species with pinnate branchiae only. The genus *Prionospio* includes about 80 described species so far, but the number will certainly increase as new areas are investigated, and old records are re-evaluated. We used here the generic and subgeneric categories of *Prionospio* initially established by Foster (1971) and subsequently modified by Maciolek (1985).

In Korean waters a total of 14 spionid species in eight genera have been recorded by Paik (1989). Among them, three species of *Prionospio* were described by Lee (1976) and Paik (1989), including *Prionospio pinnata* Ehlers, 1901, *P. krusadensis* Fauvel, 1929, and *Prionospio japonicus* Okuda, 1935. However, *Prionospio pinnata* Ehlers was transferred to another genus *Paraprionospio* Caullery, 1914, by Foster (1971) and Blake (1996). Therefore, only two species *Prionospio* (*Aquilaspio*) *krusadensis* and *Prionospio* (*Minuspio*) *japonica* have been known. We illustrate and redescribe here five additional species of *Prionospio* from Kwangyang Bay, Korea, and a key has been developed to distinguish between the known species of *Prionospio* in Korean waters.

Materials and Methods

The present study is based on collections made from April 1990 to November 1994 in the subtidal shallow waters of Kwangyang Bay, southern coast of Korea (Fig. 1).

Specimens were taken by a 0.1 m² van Veen grab. Samples were sieved through a 1.0 mm mesh and preserved in 10% formalin. Materials examined have been deposited in the Benthic Ecology Laboratory, Department of Oceanography, Inha University, Korea.

Systematic Account

Class Polychaeta Grube, 1850

Family Spionidae Grube, 1850

Genus *Prionospio* Malmgren, 1867

Prostomium anteriorly rounded or truncate, sometimes weakly incised, without frontal horns; subtriangular, rectangular or oval in shape,

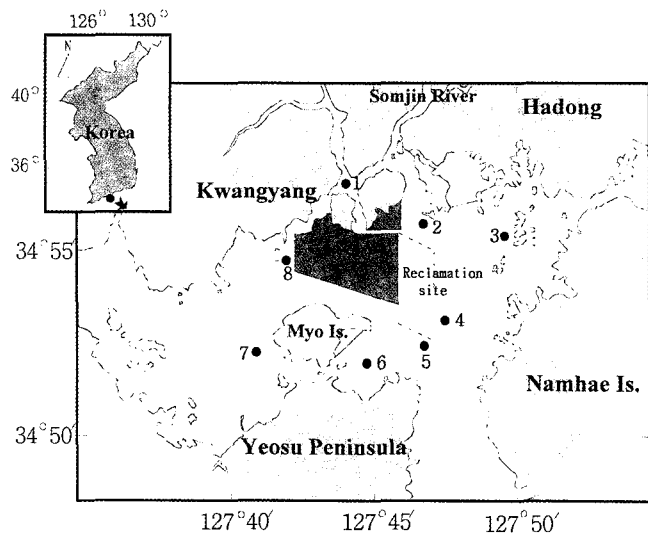


Fig. 1. Map of sampling stations where the specimens of *Prionospio* were collected in Kwangyang Bay, Korea

caruncle extending at least to setiger 1; eyes present or absent; occipital antenna absent. Peristomium at least partially fused with setiger 1, often surrounding prostomium with free, flattened lateral wings. Branchiae from setiger 2, limited to anterior setigers, 2~15 pairs, rarely more; branchiae apinnate, pinnate, or various combinations of both. Interparapodial pouches present or absent.

Key to Korean species of *Prionospio*

- 1a. Branchiae apinnate ... (subgenus *Minuspio*) 2a
- 1b. Branchiae apinnate and pinnate 3a
- 2a. With four pairs of branchiae *Prionospio* (*Minuspio*) *japonica*
- 2b. With more than four pairs of branchiae *P. (M.) multibranchiata*
- 3a. With three pairs of branchiae (subgenus *Aquilaspio*) *P. (Aquilaspio) krusadensis*
- 3b. With four pairs of branchiae (subgenus *Prionospio*) ... 4a
- 4a. First pair of branchiae pinnate, second, third and fourth pair of branchiae apinnate *P. (Prionospio) saccifera*
- 4b. First and fourth pair of branchiae pinnate, second and third apinnate 5a
- 5a. With interparapodial pouch ... *P. (P.) bocki*
- 5b. Without interparapodial pouch 6a
- 6a. Caruncle extending to base of setiger 1 *P. (P.) membranacea*

- 6b. Caruncle extending to base of setiger 2
 *P. (P.) paradisea*

Subgenus *Minuspio* Foster, 1971

Prostomium subtriangular, anteriorly rounded, blunt or inflated. Branchiae present from setiger 2 to about setiger 40, all apinnate. Anterior setae all

capillaries in both rami; posterior end hooded hooks in both rami.

Prionospio (Minuspio) multibranchiata Berkeley, 1927 (Fig. 2)

Prionospio multibranchiata Berkeley, 1927, p. 414, pl. 1, Fig. 1.

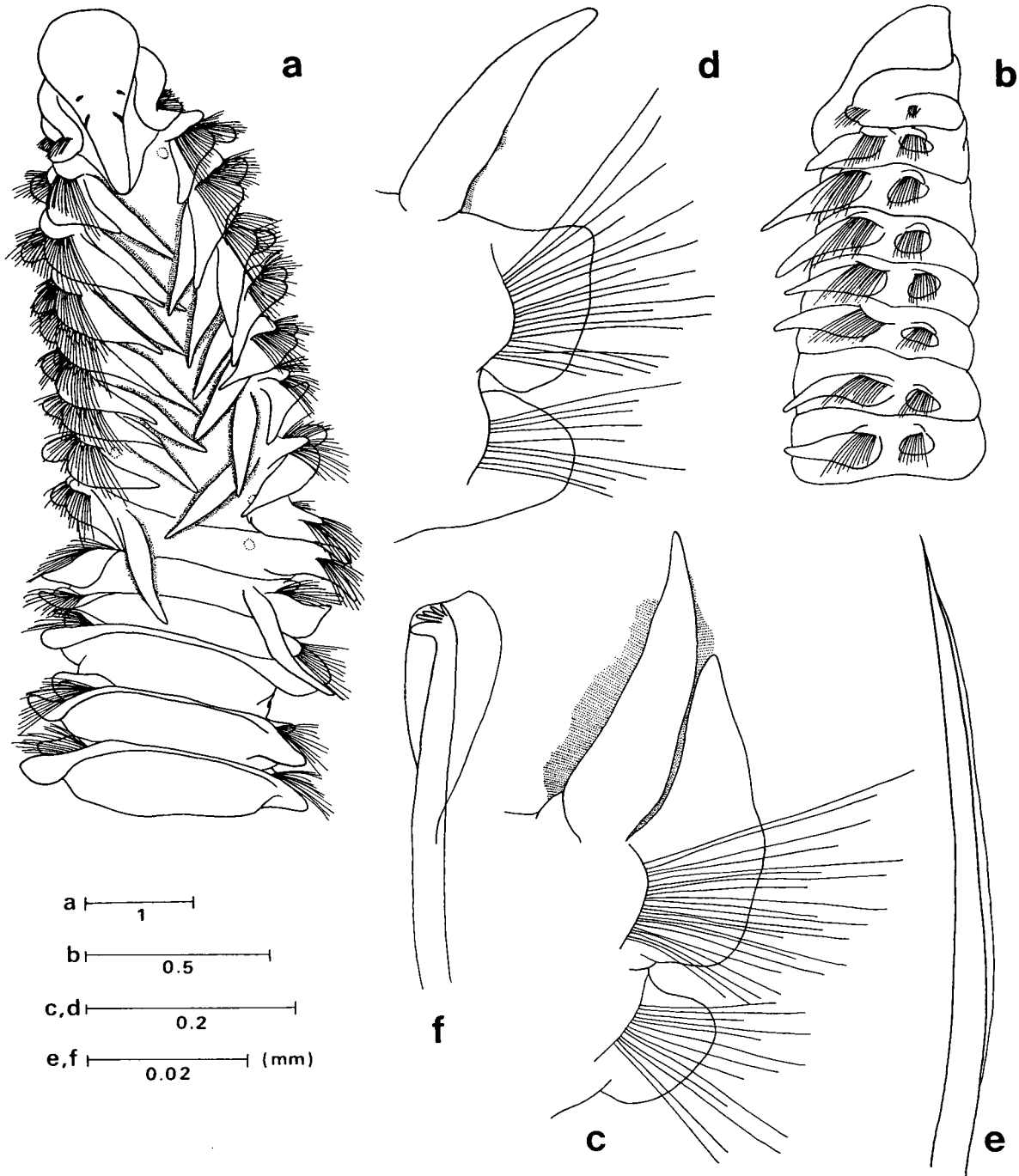


Fig. 2. *Prionospio (M.) multibranchiata* Berkeley: a, anterior end, dorsal view; b, anterior end, lateral view; c, anterior end, dorsal view, showing prostomium; d, second parapodium with branchia (first branchial segment), anterior view; e, third parapodium with branchia (second branchial segment); f, posterior end; g, ventral sabre seta; h, notopodial hooded hook.

Prionospio (Minuspio) multibranchiata: Maciolek, 1985, pp. 365~367, Fig. 15; Imajima, 1990, 130~134, Figs. (14a~d, 15a~i).

Materials examined. Kwangyang Bay, Korea: station 2 (127°47'E, 34°56'N), 10 m, sandy mud (May 22, 1993, 1 specimen); station 4 (127°47'30"E, 34°53'N), 2 m, sand (Aug. 14, 1990, 1 specimen; May 22, 1993, 1 specimen; Nov. 13, 1993, 1 specimen; Feb. 5, 1994, 3 specimens; July 21, 1994, 1 specimen); station 5 (127°47'E, 34°52'30"N), 10 m, muddy sand (Nov. 3, 1990, 2 specimens; July 21, 1994, 1 specimen; Sept. 6, 1994); station 7 (127°41'E, 34°52'20"N), 3 m, mud (Apr. 21, 1990, 1 specimen; May 22, 1993, 1 specimen); station 8 (127°42'51"E, 34°55'N), 3 m, muddy sand (Jan. 28, 1991, 1 specimen; Dec. 13, 1991; May 22, 1993, 1 specimen; Aug. 21, 1993, 2 specimens; Apr. 28, 1994, 1 specimen; July 21, 1994, 2 specimens; Sept. 6, 1994, 2 specimens; Nov. 12, 1994, 1 specimen)

Description. A moderately-sized species, up to 8 mm long for 39 setigers; greatest width of 0.3 mm. Body slender, widest in branchial region, generally opaque white in alcohol.

Prostomium broadly rounded on anterior margin; caruncle continuing to base of setiger 1, surrounded by nuchal organ. Two pairs of eyes, anterior pair small or inconspicuous, posterior pair large, crescentic, consisting of several individual ocelli fused together (Fig. 2. a). Peristomium dorsally fused and ventrally separated from setiger 1, with moderate peristomial wing, slightly curved back (Fig. 2. b).

Branchiae apinnate, cirriform, ciliated, present from setiger 2, usually 10~11 pairs; each branchia extending two setigers (Fig. 2. a).

Notopodial lamellae lacking on setiger 1, fused edge of peristomium (Fig. 2. b); notopodial lamella largest in branchial region, subtriangular in anterior part of branchial region (Fig. 2. c); lamella in posterior part of branchial region rectangular (Fig. 2. d); posterior lamellae rounded, forming dorsal crest on several post-branchial setigers (Fig. 2. a). Neuro-podial lamellae small and rounded on setiger 1, well developed, rectangular on setiger 2, rounded thereafter, becoming smaller in posterior setiger (Fig. 2. a). Interparapodial pouches absent.

Anterior setae all moderately granulated capillaries with distinct sheath; setae arranged in two rows from setiger 2, shorter in anterior row, longer in posterior rows from setiger 2. Ventral sabre setae from neuropodial setiger 12~13, moderately granulated, numbering 1~2 per fascicle (Fig. 2. e). Neuropodial

hooded hooks from setiger 16~17, numbering up to 10 per fascicle; hooks accompanied by capillaries throughout; hooks with four pairs of small teeth above main fang, secondary hood small (Fig. 2. f).

Remarks. *Prionospio (M.) multibranchiata* was synonymized with *P. (Minuspio) cirrifera* by Foster (1971) and Blake & Kudenov (1978), but it was recently recognized as a valid species by Maciolek (1985) and Imajima (1990).

Our specimens agree quite well with the recent description from Japan by Imajima (1990).

Distribution. Kwangyang Bay, Korea, at depths of 2~10 m in sand, muddy sand, sandy mud and mud bottoms; Japan at depths of 8~100 m; Vancouver Island, Canada; Gulf of Mexico; Florida.

Subgenus *Prionospio* Malmgren 1867

Prostomium anteriorly blunt, subtriangular or oval in shape. Peristomium fused with or separated from setiger 1, often forming lateral wings. Branchiae from setiger 2, some pairs apinnate, some pairs with digitiform pinnules.

Prionospio (Prionospio) saccifera Mackie and Hartley, 1990 (Fig. 3)

Prionospio saccifera Mackie and Hartley, 1990, 366~373. Figs. 2~4; Table 1

Prionospio (Prionospio) ehlersi: Imajima, 1990, 106~111, Figs. 2a~e, 3a~1

Materials examined. Kwangyang Bay, Korea: station 2 (127°47'E, 34°56'N), 10 m, sandy mud (May 22, 1993, 1 specimen); station 3 (127°49'30"E, 34°55'40"N), 20 m, mud (July 5, 1991, 1 specimen; May 22, 1993, 1 specimen, Nov. 13, 1993, 2 specimens; Feb. 5, 1994, 2 specimens; Apr. 28, 1994, 1 specimen); station 4 (127°47'30"E, 34°53'N), 2 m, sand (Apr. 21, 1990, 27 specimens; Feb. 13, 1991, 4 specimens); Station 5 (127°47'E, 34°52'30"N), 10 m, muddy sand (Apr. 21, 1990, 21 specimens; Jan. 28, 1991, 4 specimens; Mar. 30, 1991, 3 specimens; July 5, 1991, 4 specimens; Dec. 13, 1991, 1 specimen; May 22, 1993, 4 specimens; Nov. 13, 1993, 5 specimens; Feb. 5, 1994, 3 specimens; Apr. 28, 1994, 4 specimens; July 21, 1994, 1 specimen; Sept. 6, 1994, 4 specimens, Nov. 12, 1994); station 6 (127°44'40"E, 34°52'N), 3 m, mud (Aug. 14, 1990, 1 specimen; Nov. 13, 1993, 1 specimen; Feb. 5, 1994, 1 specimen; Apr. 28, 1994, 2 specimens; July 21, 1994, 1 specimen; Nov. 12, 1994, 3 specimens); station 7 (127°41'00"E, 34°52'20"N), 3 m, mud (Apr. 21, 1990, 10 specimens).

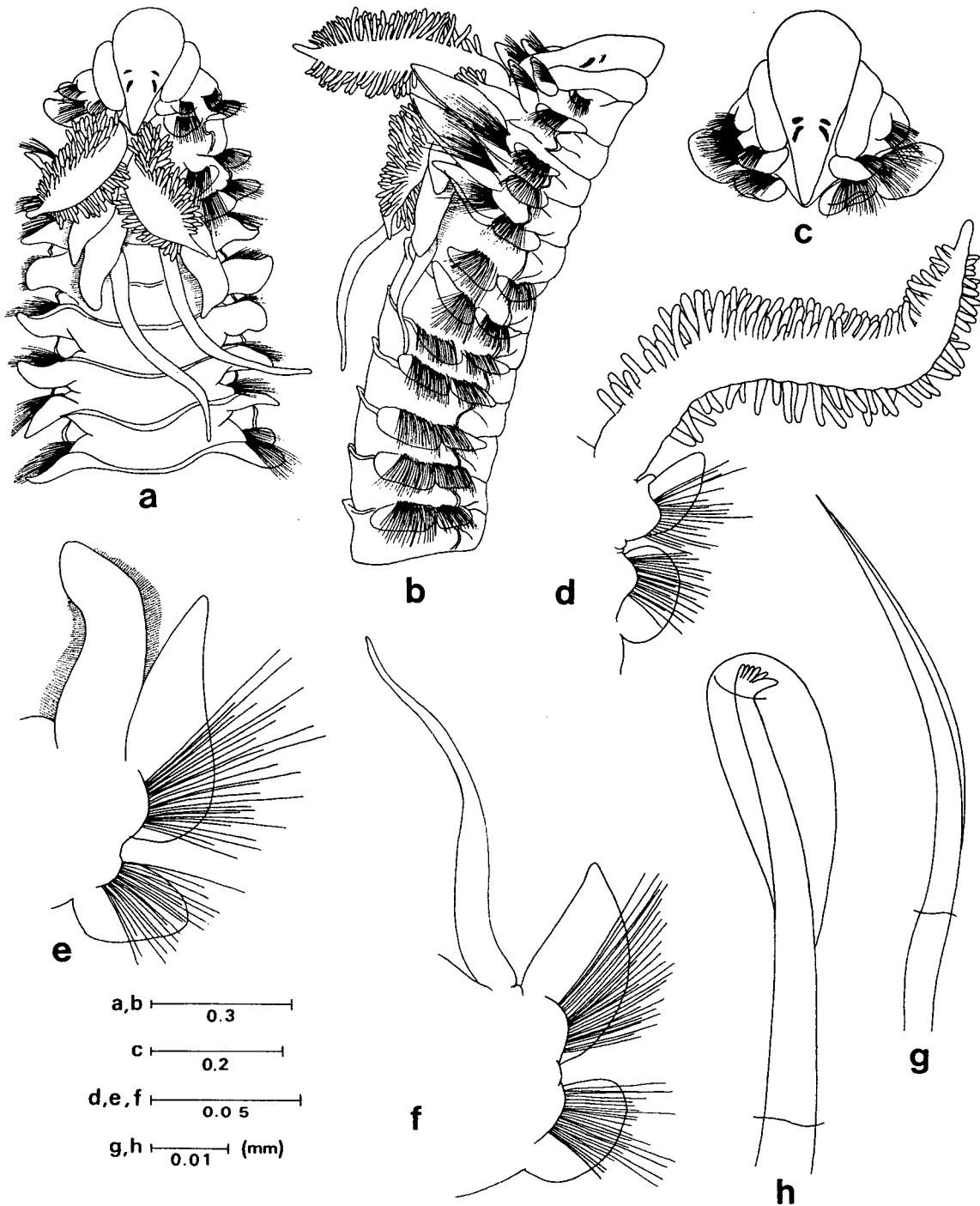


Fig. 3. *Prionospio (P.) saccifera* Mackie and Hartley: a, anterior end, dorsal view; b, anterior end, lateral view; c, anterior end showing prostomium, dorsal view; d, second parapodium with branchia (first branchial segment), anterior view; e, third parapodium with branchia (second branchial segment); f, fifth parapodium with branchia (fourth branchial segment); g, ventral sabre seta; h, notopodial hooded hook.

Description. Anterior fragment of largest specimen about 40 setigers, 1.5 mm long with greatest width of 1.3 mm. Color in formalin opaque white.

Prostomium rounded on anterior margin, with narrow caruncle reaching to base of setiger 1; caruncle surrounded by nuchal organ. Two pairs of eyes, posterior pair larger, crescentic (Fig. 3. a, c).

Peristomium dorsally fused to setiger 1, forming lateral wings (Fig. 3. b).

Branchiae present on setiger 2~5; first pair pinnate, with numerous long, thin pinnules, distal tips naked (Fig. 3. a, b, d); second and third pairs apinnate, heavily ciliated, subequal in length, slightly longer than lamella (Fig. 3. a, b, e); fourth pair apinnate, not ciliated, elongate, narrower than second and third pairs, extending to tenth setiger (Fig. 3. a, b, f).

Notopodial postsetal lamellae of setiger 1 subtriangular, smaller than subsequent parapodia, but well developed, with broad setal fascicle. Notopodial postsetal lamellae of setigers 3~7 enlarged subtriangular, largest on setiger 3 and 4, progressively decreasing in size over setigers 5~7, becoming more rounded (Fig. 3. b). Notopodial lamellae fused on setiger 6, forming low dorsal crest, continuing to setiger 22~24. Neuropodial postsetal lamella of setiger 1 small, rounded (Fig. 3. a, b). On setiger 3 and 4 neuropodial lamellae slightly large, triangular. On following setigers lamellae gradually decrease in size, becoming more rounded and flattened. Interparapodial pouches beginning between setiger 2 and 3, continuing to middle body segments (Fig. 3. a, b).

Anterior noto- and neuropodial setae thin, granulated sheathed capillaries; arranged in double rows in neuropodial and triple rows in notopodia. Neuropodial sabre setae from 19~20, 1~2 per fascicle, short, stout, curved, with sheath (Fig. 3. g). Neuropodial hooded hooks from setiger 20~21, up to 14 per fascicle; notopodial hooded hooks from setiger 42~50, up to 8 per fascicle; hooded hooks with 5 pairs of apical teeth above main fang (Fig. 3. h).

Remarks. Our specimens agree well with the description of *P. saccifera* Mackie and Hartley, 1990, who described *P. saccifera* from Hong Kong and Red Sea. They reported that *Prionospio saccifera* is most closely related to *P. ehlersi* Fauvel, 1928 in having similar branchiae, interparapodial pouch and setae. *P. saccifera*, however, differ in a number of important features: the first pair of branchiae are basally united; interparapodial pouches are present from setiger 2; notopodial lamellae around setiger 20 are evenly rounded and they do not become angular inferiorly; several long capillaries are present inferiorly for 6 or 7 setigers from setiger 16 or 17.

Distribution. Kwangyang Bay, Korea, at depths

of 2~20 m in sand, muddy sand and sandy mud bottoms; shallow waters in Japan; Hong Kong at depths of 11~21 m in muddy sediments; Red Sea at depths of 43~49 m in muddy bottom.

Prionospio (*Prionospio*) *bocki* Söderström, 1920 (Fig. 4)

Prionospio bocki; Day, 1967, p. 490; Maciolek, 1985, p. 336.

Prionospio (*Prionospio*) *bocki*; Imajima, 1990, p. 122~124, Figs. (10a~c, 11a~j).

Materials examined. Kwangyang Bay, Korea: station 3 (127°49'30"E, 34°55'40"N), 20 m, mud (Oct. 17, 1992, 1 specimen); station 5 (127°47'E, 34°52'30"N), 10 m, muddy sand (Feb. 5, 1994, 3 specimens)

Description. A moderately-sized species, up to 9 mm long for 18 setigers; greatest width of 1.8 mm. Body thin, widest in branchial region, generally opaque white in alcohol.

Prostomium broad, slightly incised, broadly flared on anterior margin; caruncle continuing to base of setiger 2, surrounded by nuchal organ. Two pairs of eyes, anterior pair small or inconspicuous, posterior pair large, crescentic, consisting of several individual ocelli fused together (Fig. 4. a). Peristomium separated from setiger 1, lacking peristomial wing (Fig. 4. b).

Four pairs of branchiae on setiger 2~5. First and fourth pairs pinnate, with dense digitiform pinnules and naked distal tips (Fig. 4. a, e); first pair slightly longer than fourth pair. Second and third pairs apinnate, ciliated, subtriangular with sharply pointed tips, slightly lower than notopodial lamellae (Fig. 4. a, d).

Notopodial postsetal lamellae of setiger 1 triangular, smaller than subsequent parapodia, but well developed (Fig. 4. a, b). Notopodial lamellae enlarged, triangular, largest on branchial setigers, thereafter, progressively decreasing in size. Notopodial lamellae fused on setiger 10, forming dorsal crest, continuing to setiger 25 (Fig. 4. a). Neuropodial postsetal lamella of setiger 1 small, rounded. Neuropodial lamellae largest on branchial setiger; on following setigers lamellae gradually decrease in size, rectangular with rounded edges (Fig. 4. a, b). Interparapodial pouches beginning between setiger 2 and 3, continuing to 12~15 (Fig. 4. b).

Anterior setae all slightly striated and moderately granulated capillaries, with sheath, arranged in three rows in anterior notopodia, in two rows

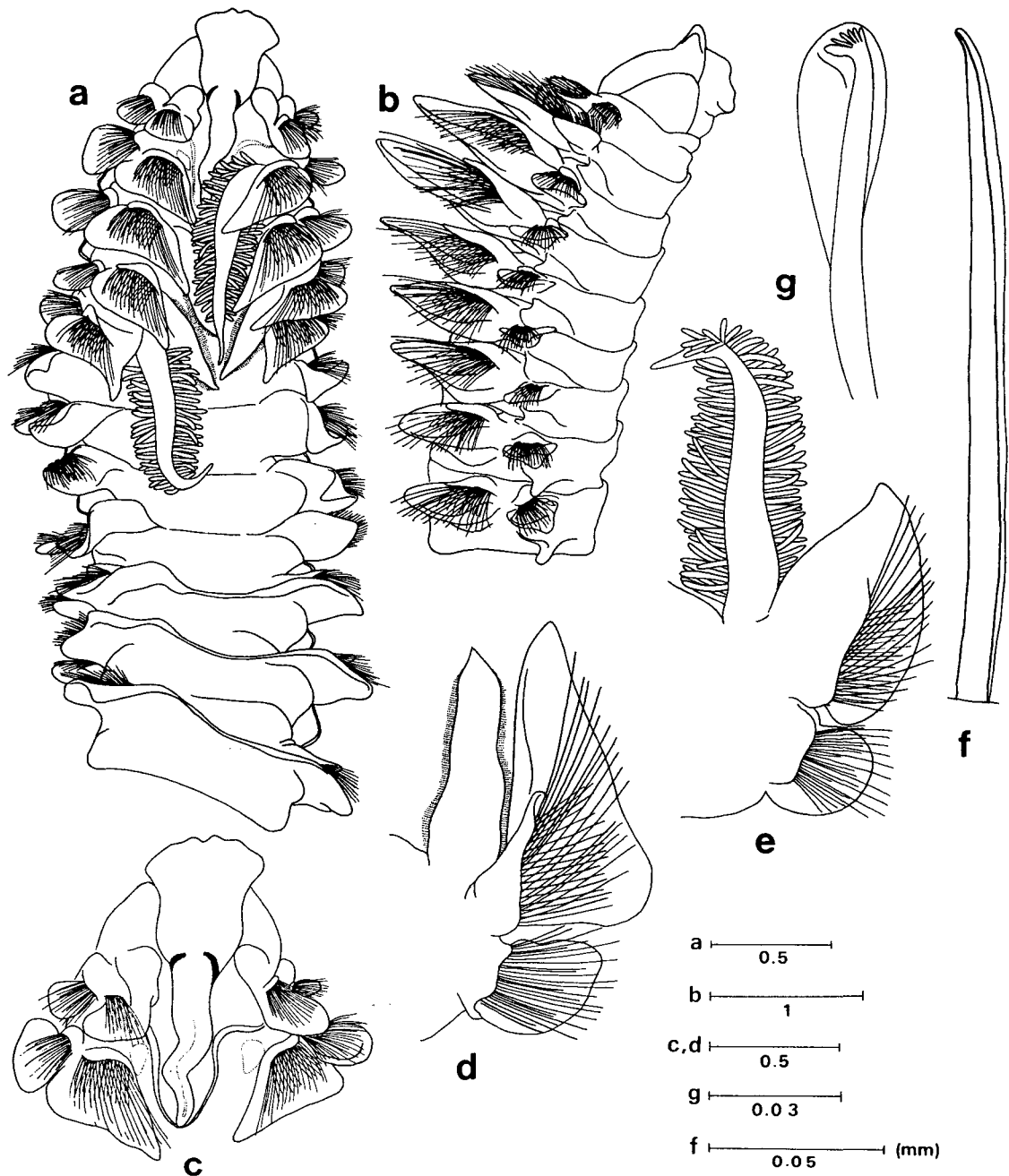


Fig. 4. *Prionospio (P.) bocki* Söderström: a, anterior end, dorsal view; b, anterior end, lateral view; c, anterior end showing prostomium, dorsal view; d, fourth parapodium with branchia (third branchial segment), anterior view; e, fifth parapodium with branchia (fourth branchial segment); f, ventral sabre seta; g, neuropodial hooded hook.

in anterior neuropodia. Neuropodial sabre setae form setiger 10, moderately granulated, 1~2 per fascicle (Fig. 4. f). Neuropodial hooded hooks from setiger 15, about 11 per fascicle; hooks with 5~6 pairs of small teeth above main fang (Fig. 4. g).

Remarks. Our specimens agree well with the recent description by Imajima (1990) who recorded and figured *Prionospio (Prionospio) bocki* from Japanese waters. This species is characterized by

having the first and last of four pairs of pinnate branchiae, but differs from all other species in this group in having lateral pouches from setiger 2~3.

Imajima and Hartman (1964) synonymized *P. bocki* with *P. malmgreni*, and Foster (1971) considered *P. bocki* synonymous with *P. steenstrupi*. But, Maciolek (1985) in her recent review of the genus *Prionospio* recognized *P. bocki* as a valid species.

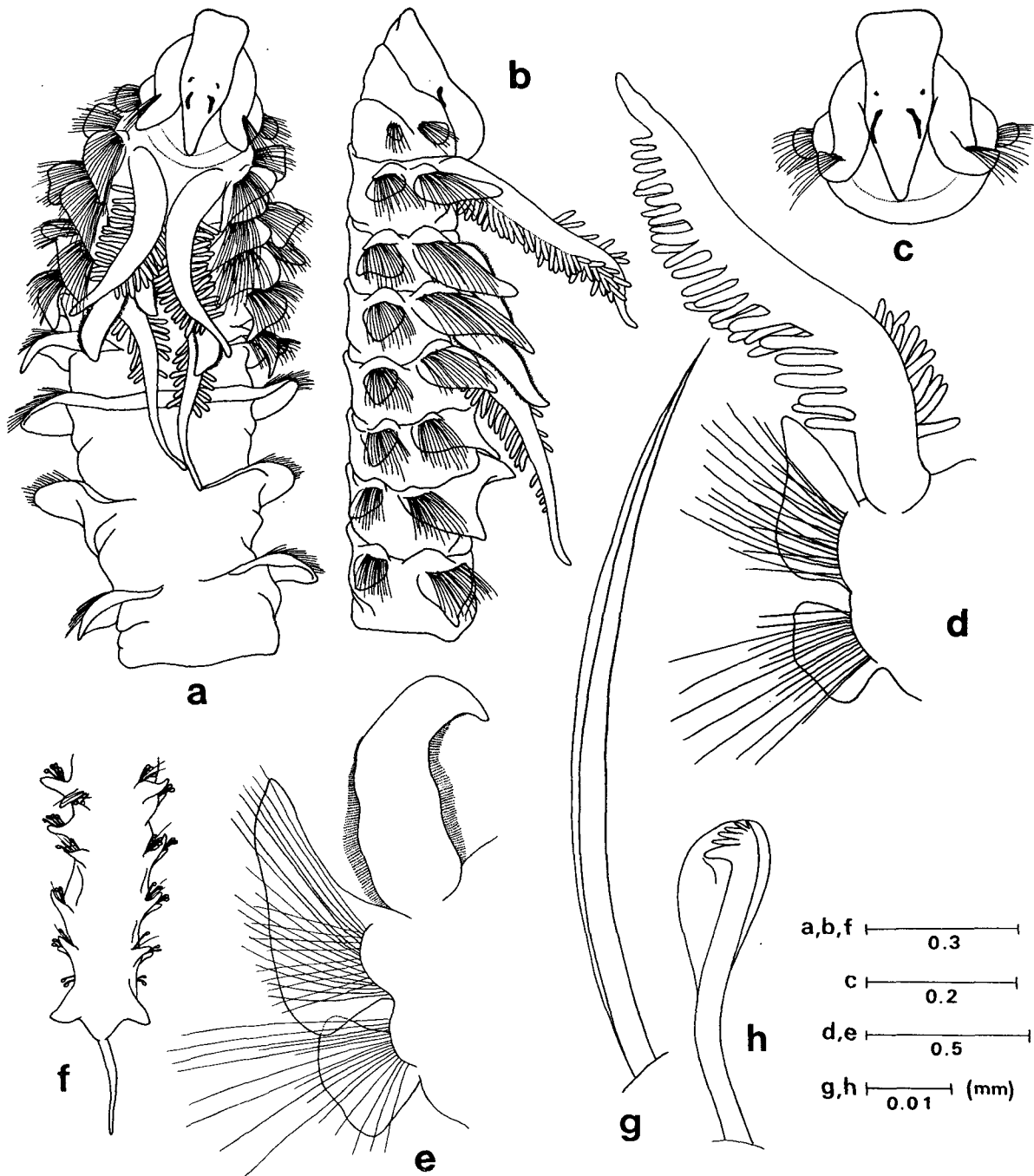


Fig. 5. *Prionospio* (*P.*) *membranacea* Imajima: a, anterior end, dorsal view; b, anterior end, lateral view; c, anterior end showing prostomium, dorsal view; d, second parapodium with branchia (first branchial segment), anterior view; e, third parapodium with branchia (second branchial segment); f, posterior end; g, ventral sabre seta; h, notopodial hooded hook.

Distribution. Kwangyang Bay at depths of 10~20 m in muddy sands and muds; Japanese waters at depths of 50~94 m; Madagascar.

Prionospio (*Prionospio*) *membranacea* Imajima, 1990 (Fig. 5)

Prionospio (*Prionospio*) *membranacea* Imajima, 1990, 130~134, Figs. (14a~d, 15a~i)

Materials examined. Kwangyang Bay, Korea: station 1 (127°44'E, 34°57'N), 4 m, mud (Dec. 13, 1991, 1 specimen; Oct. 17, 1992, 3 specimens; May 22, 1993, 12 specimens; Aug. 21, 1993, 16 specimens;

Nov. 13, 1993; Feb. 5, 1994, 1 specimen; Apr. 28, 1994, 4 specimens; July 21, 1994, 12 specimens; Sept. 6, 1994, 2 specimens; Nov. 12, 1994, 25 specimens); station 2 (127°47'E, 34°56'N), 10 m, sandy mud (Nov. 13, 1993, 1 specimen); station 4 (127°47'30"E, 34°53'N), 2 m, sand (Apr. 28, 1994, 2 specimens; Nov. 12, 1994, 1 specimen); station 6 (127°44'40"E, 34°52'N), 3 m, mud (May 22, 1993, 1 specimen; Nov. 13, 1993, 4 specimens; Feb. 5, 1994, 5 specimens; July 21, 1994, 2 specimens; Sept. 6, 1994, 1 specimen); station 7 (127°41'E, 34°52'30"N), 3 m, mud (Aug. 14, 1990, 6 specimens; Jan. 28, 1991, 2 specimens; Mar. 14, 1992, 6 specimens; May 22, 1993, 4 specimens; Nov. 13, 1993, 25 specimens; Feb. 5, 1994, 68 specimens; Apr. 28, 1994, 4 specimens; July 21, 1994, 2 specimens; Sept. 6, 1994, 2 specimens; Nov. 12, 1994, 130 specimens); station 8 (127°42'51"E, 34°55'N), 3 m, muddy sand (Sept. 15, 1991, 1 specimen; Mar. 14, 1992, 2 specimens; May 22, 1993, 5 specimens; Aug. 21, 1993, 3 specimens; Nov. 13, 1993, 34 specimens; Feb. 5, 1994, 12 specimens; Sept. 6, 1994, 14 specimens; Nov. 12, 1994, 254 specimens).

Description. Largest complete individual, 23 mm long, 0.3 mm wide, for 128 setigers. Body thin, subcylindrical. Color in formalin yellow white.

Prostomium bottle-shaped; anterior part squarish with straight frontal margin, lateral margin often slightly concave; caruncle continuing to base of setiger 1, surrounded by nuchal organ. Two pairs of eyes, anterior pair small, posterior pair large, crescentic (Fig. 5. a, c). Peristomium ventrally separated and dorsally fused to setiger 1, forming moderate lateral wings (Fig. 5. b).

Four pairs of branchiae on setiger 2~5 (Fig. 5. a). First and fourth pairs pinnate, with dense digitiform pinnules and naked distal tips, of equal size, 1.5~2 times length of other pairs (Fig. 5. a, d). Second and third pairs apinnate, ciliated, subtriangular, slightly longer than notopodial lamellae (Fig. 5. a, e).

Notopodial postsetal lamellae foliaceous, largest on branchial region, thereafter, progressively decreasing in size (Fig. 5. b). Notopodial lamellae united across dorsum of setiger 7, forming high dorsal crest; dorsal lamellae of succeeding setigers low, merging with dorsum, not forming crest (Fig. 5. a). Neuropodial postsetal lamella of setiger 1 small, rounded; neuropodial lamella of setiger 2 and 3 subrectangular; thereafter, lamellae gradually decreasing in size, rectangular with rounded edges

(Fig. 5. b). Interparapodial pouches absent.

Pygidium with one long dorsomedial and two shorter ventrolateral cirri (Fig. 5. f).

Anterior noto- and neuropodial setae thin, capillaries arranged in double rows in neuropodial and triple rows in notopodia. Neuropodial sabre setae from 10, 1 per fascicle, short, stout, curved, with sheath (Fig. 5. g). Neuropodial hooded hooks from setiger 13, up to 8 per fascicle; notopodial hooded hooks from setiger 26, up to 5 per fascicle; hooded hooks with 5 pairs of apical teeth above main fang (Fig. 5. h).

Remarks. This species is closely related to *P. (P.) paradisea* so that the taxonomic differences between them will be discussed in the remarks of that species. *P. (P.) membranacea* is most common out of the five species described here and prefers muddy sediments in subtidal shallow waters in Kwangyang Bay.

Distribution. Kwangyang Bay, Korea, at depths of 2~10 m in sands, muddy sands, sandy muds and muds; Japanese waters from intertidal zone to a depth of 90 m.

Prionospio (Prionospio) paradisea Imajima, 1990 (Fig. 6)

Prionospio (Prionospio) paradisea Imajima, 1990, 130~134, Figs. (16a~e, 17a~m)

Materials examined. Kwangyang Bay, Korea: station 3 (127°49'30"E, 34°55'40"N), 20 m, mud (Apr. 21, 1990, 2 specimens; Sept. 15, 1991, 1 specimen); station 5 (127°47'E, 34°52'30"N), 10m, muddy sand (Sept. 15, 1991, 2 specimens; Sept. 6, 1994, 1 specimen);

Description. Anterior fragment of largest specimen about 62 setigers, 24 mm long with greatest width of 1.1 mm. Body thin, widest in branchial region; postbranchial segments subcylindrical. Color in formalin opaque white.

Prostomium triangular, broadly flared anteriorly, with slight medial indentation, with narrow caruncle extending to base of setiger 2; caruncle surrounded by nuchal organ. Two pairs of eyes, anterior pair rounded, posterior pair irregularly shaped, both pairs about equal in size. Peristomium collar-like, clearly separated from setiger 1 (Fig. 6. a, c).

Four pairs of branchiae in setiger 2~5; pairs 1 and 4 pinnate, pairs 2 and 3 apinnate (Fig. 6. a); pairs 1 and 4 longer than pairs 2 and 3, nearly equal in length, with digitiform pinnules extending almost to tip of branchia (Fig. 6. a, e);

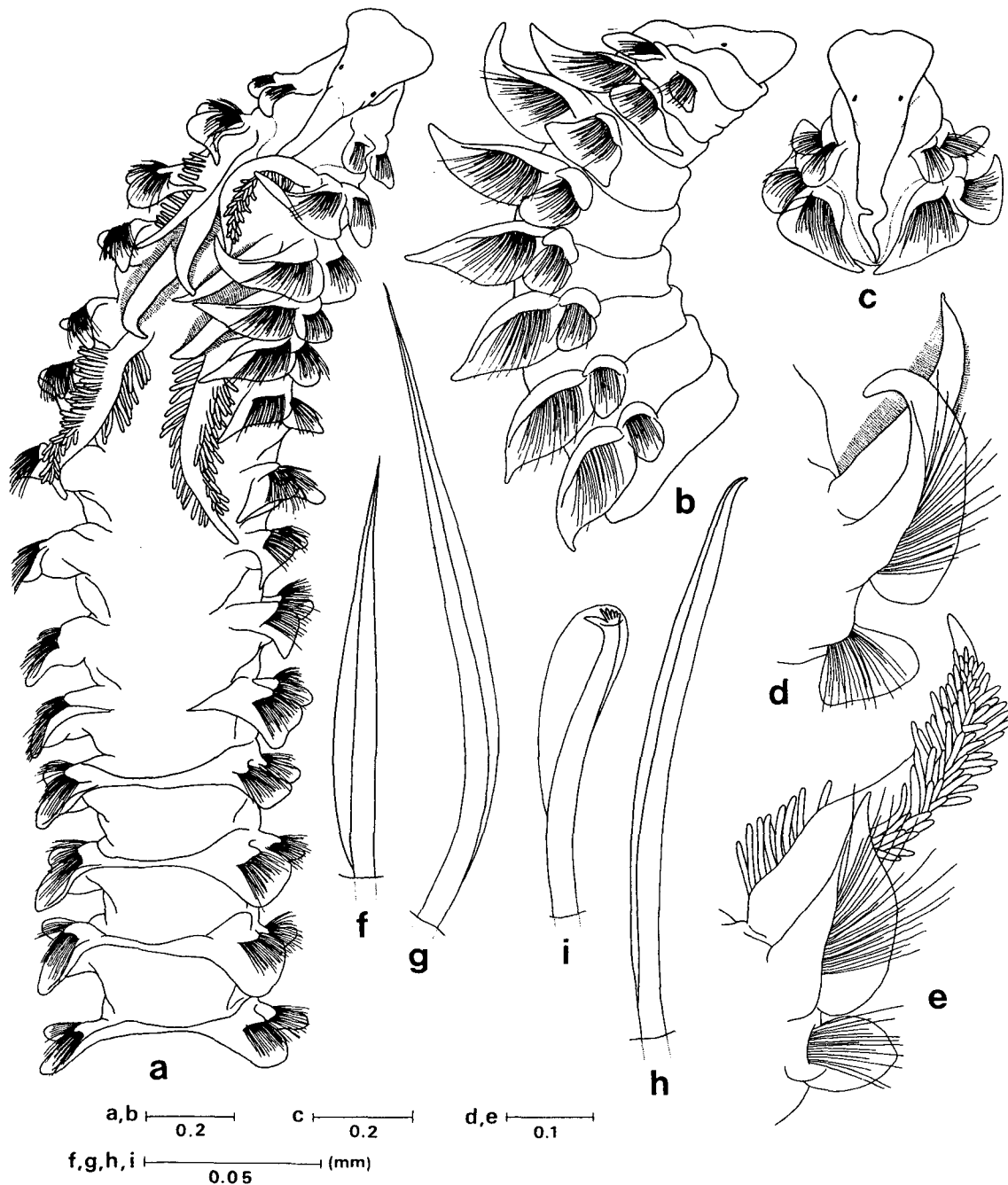


Fig. 6. *Prionospio (P.) paradisea* Imajima: a, anterior end, dorsal view; b, anterior end, lateral view; c, anterior end showing prostomium, dorsal view; d, fourth parapodium with branchia (third branchial segment), anterior view; e, fifth parapodium with branchia (fourth branchial segment); f, g, capillary setae; h, ventral sabre seta; i, notopodial hooded hook.

pairs 2 and 3 subtriangular, heavily ciliated (Fig. 6. a, d).

Notopodial postsetal lamellae foliaceous on setiger 1, well developed; largest on branchial region, subtriangular; progressively decreasing in size over setiger 6~9, becoming more rounded (Fig. 6. b). Notopodial lamellae united across dorsum

of setiger 10, forming well developed dorsal crest, continuing through middle body segments (Fig. 6. a). Neuropodial postsetal lamella of setiger 1 small, rounded, well developed, thereafter, becoming rounded, triangular posteriorly (Fig. 6. b). On anterior parapodia pre- and postsetal notopodial lamellae dorsally fused with each other, forming

an envelope surrounding notosetae (Fig. 6. b).

Capillary setae of anterior region moderately granulated, with sheaths (Fig. 6. f, g). Sabre setae from neuropodial setiger 10, 1 per fascicle, with sheaths (Fig. 6. h). Neuropodial hooded hooks from setiger 14~15, up to 11 per fascicle; notopodial hooded hooks from setiger 45, up to 5 per fascicle; hooded hooks with 5 pairs of apical teeth above main fang (Fig. 6. h).

Remarks. As already mentioned before, *Prionospio* (*Prionospio*) *paradisea* is similar to *P. (P.) membranacea* Imajima, 1990 from Japanese waters in having the first and last pairs of pinnate branchiae. The two species differ in the length of caruncle. In *P. (P.) paradisea*, the caruncle extends to the base of setiger 2, whereas in *P. (P.) membranacea* it extends to the base of setiger 1. These two species also differ in the first occurrence of dorsal crest. The dorsal crest of *P. (P.) paradisea* appears in setiger 10, whereas that of *P. (P.) membranacea* in setiger 7.

Distribution. Kwangyang Bay, Korea, at depths of 10~20 m in muddy sands and muds; Japanese waters at depths between 5 and 730 m.

References

- Berkeley, E. 1927. Polychaetous annelids from the Nanaimo district. 3. Leodicidae to Spionidae. *Contr. Can. Biol. Fish.*, n. s., 3, 407~422.
- Blake, J. A. 1996. 4. Family Spionidae Grube, 1850: Including a review of the genera and species from California and a revision of the genus *Polydora* Bosc, 1902. In *Taxonomic atlas of the benthic fauna of the Santa Maria Basin and the Western Santa Barbara Channel*. Vol. 6. The Annelida part 3. Polychaeta: Orbiniidae to Cossuridae, J. A. Blake, B. Hilbig and P. H. Scott, ed. Santa Barbara Museum of Natural History, Santa Barbara, California, pp. 81~223.
- Blake, J. A. and J. D. Kudenov. 1978. The Spionidae (Polychaeta) from southeastern Australia and adjacent areas, with a revision of genera. *Mem. Natn. Mus. Vict.*, 39, 171~280.
- Caullery, M. 1914. Sur les polychètes du genre *Prionospio* Mgn. *Bulletin de la Société Zoologique de France*, 39, 355~361.
- Day, J. H. 1967. A monograph on the Polychaeta of Southern Africa. Part 2. Sedentaria. *Brit. Mus. (N.H.) Publ. No.*, 656, 459~878.
- Dauer, D. M. 1983. Functional morphology and feeding behavior of *Scoletepis squamata* (Polychaeta: Spionidae). *Mar. Biol.*, 77, 279~285.
- Dauer, D. M., C. A. Maybury and R. M. Ewing. 1981. Feeding behavior and general ecology of several spionid polychaetes from the Chesapeake Bay. *J. Exp. Mar. Biol. Ecol.*, 54, 21~38.
- Fauchald, K. and P. A. Jumars. 1979. The diet of worms: A study of polychaete feeding guilds. *Oceanogr. Mar. Biol. Ann. Rev.*, 17, 193~284.
- Foster, N. M. 1971. Spionidae (Polychaeta) of the Gulf of Mexico and the Caribbean Sea. *Stud. Fauna Curaçao*, 36, 1~183.
- Imajima, M. 1990. Spionidae (Annelida, Polychaeta) from Japan IV. The Genus *Prionospio* (*Prionospio*). *Bull. Natn. Sci. Mus., Tokyo, Ser. A*, 16 (3), 105~140.
- Lee, J. H. 1976. A study on the benthic fauna along the Busan coast, Korea. *Publ. Inst. Mar. Sci., National Fisheries University of Busan*, 9, 49~70.
- Maciolek, N. J. 1985. A revision of the genus *Prionospio* Malmgren, with special emphasis on species from the Atlantic Ocean, and new records of species belonging to the genera *Apoprionospio* Foster and *Paraprionospio* Caullery (Polychaeta, Annelida, Spionidae). *Zool. J. Linn. Soc.*, 84, 325~383.
- Mackie, A. S. Y. and J. P. Hartley. 1990. *Prionospio saccifera* sp. nov. (Polychaeta: Spionidae) from Hong Kong and the Red Sea, with a redescription of *Prionospio ehlersi* Fauvel, 1928. In *The Marine Flora and Fauna of Hong Kong and Southern China II*. Volume 1. Introduction and Taxonomy, Proceedings of the Second International Marine Biological Workshop, Hong Kong. 1986, B. Morton, ed. Hong Kong University Press, Hong Kong, pp. 363~375.
- Paik, E. I., 1989. Illustrated Encyclopedia of Fauna and Flora of Korea. Vol. 31. Polychaeta, Ministry of Education, 452~468.
- Taghon, G. L., A. R. M. Nowell and P. A. Jumars. 1980. Introduction of suspension feeding in spionid polychaetes by high particle flux. *Science*, 210, 562~564.