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A Systematic Study on Syllidae (Annelida, Polychaeta) from the Yellow Sea of Korea

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한국 서해산 염주발갯지렁이과의 분류학적 연구

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적 요

본 연구는 1980년 7월 부터 1991년 11월 까지 서해안의 15개 지소에서 채집된 염주발갯지렁이과(Syllidae) 표본들을 동정 분류한 것으로써, 그 결과 5속 8종이 얻어졌다. 이들 중, *Exogone gemmifera*, *Syllis amica* 2종은 한국 미기록종이며, 이들에 관하여는 기재하고 그림을 그렸다.

Key words: taxonomy, Syllidae, Yellow Sea.

INTRODUCTION

Korean Syllidae was first reported with *Trypanosyllis zebra* from the intertidal zone of Ch'ungmu city by Paik (1975). Since then, Paik (1982, 1984, 1989) reported 17 species and Rho and Lee(1982, 1987, 1988) 10 species. As a result of these studies, total 19 species were known from Korea. In the Yellow Sea of Korea, only one species was reported by Rho and Lee(1982).

This paper is dedicated to Professor Hoon Soo Kim on the occasion of his 70th birthday.

The purpose of present work was to carry out systematic studies on Syllidae occurring in various habitats in the Yellow Sea. As a result, eight species were identified. Of these, two species, *Exogone gemmifera and Syllis amica,* were found to be new to Korea. These two species were described and illustrated in this paper.

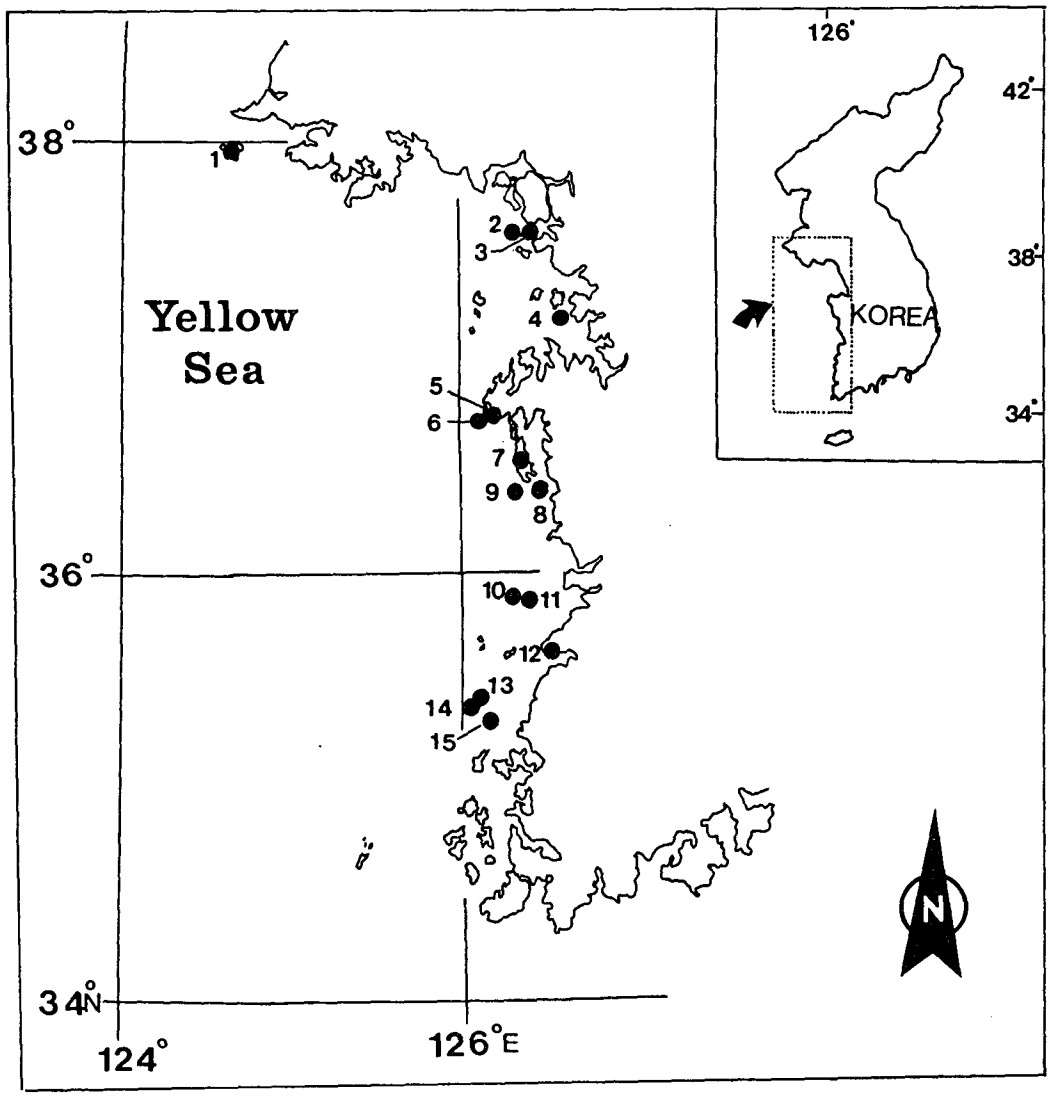

Fig. 1. The map showing the localities where the materials were collected.
1, Paengnyŏngdo(백령도) ; 2, Changbongdo(장봉도) ; 3, Chagyakto (작약도) ; 4, Chebudo(제부도) ; 5, Anhŭng(안흥) ; 6, Shinjindo(신진도) ; 7, Pangp'o (방포) ; 8, Wolto(월도) ; 9, Sapsido(삽시도) ; 10, Malto(말도) ; 11, Pangch'ukto (방축도) ; 12, Pyŏnsan(변산) ; 13, Anmado(안마도) ; 14, Odo(오도) ; 15, Song-ido(송이도).

MATERIALS AND METHODS

The present study was based on specimens collected from July 1980 to November 1991, at 15 localities in coastal areas and islands of the Yellow Sea of Korea(Fig. 1.). Specimens were collected by hands at the intertidal zone during low-tide and at the subtidal zone by scuba diving. Syllidae was sorted out under a stereomicroscope from seaweed, silt, ascidians, and then other invertebrates and preserved in 5% formalin. The classification was based on the systems of Imajima (1966 a-c). All the specimens examined are deposited in the Department of Biology, Ewha Womans University.

SYSTEMATIC ACCOUNT

Class Polychaeta Grube, 1850 다모 강
Order Errantia Audouin & Milne- Edwards, 1832 유영 목
Family Syllidae Grube, 1850 염주발갯지렁이 과
Subfamily Exogoninae Rioja, 1925 민염주발갯지렁이 아과
Genus Brania Quatrefages, 1865 곤봉발갯지렁이 속

1. *Brania clavata* (Claparède, 1863) 곤봉발갯지렁이

Syllis clavata Claparède, 1863 (p.41, pl.13, fig.29) (cited from Imajima, 1966a).

Grubea clavata: Fauvel, 1923 (pp.296-298, fig.a-e); Uschakov, 1955 (p.189, fig.56).

Brania clavata: Uschakov and Wu, 1962(p.89); Pettibone, 1963 (pp.133-134, fig.35b); Imajima, 1966a(pp.393-395, text-fig.1); 1981(pp.272-273, fig.13 a-d); Rho and Lee, 1988(pp.126-127,fig.3).

Material examined: one specimen, Anhung, 1987, (C.H.Jung); four specimens, among seaweed, Pangp'o, Anmyŏndo, May 14, 1988(B.J.Rho) ; two specimens, among tubes of polychaetes, Sapsido, July 21, 1989 (J.W.Lee).

Seize: Number of segment 25 to 33, length of body 2.02 to 3.52mm, width 0.24 to 0.26mm.

Distribution: France, England Channel, Ireland, Mediterrannean , Caribbean Sea, Mexico, Massachusetts, Bering Sea, Ohkotsk Sea, northern Japan Sea, Yellow Sea, Japan, Korea.

Genus *Exogone* Oersted, 1845 달걀발갯지렁이 속

2. *Exogone gemmifera* Pagenstecher, 1862 민염주발갯지렁이 (Fig. 2.)

Exogone gemmifera: McIntosh, 1908 (pp. 151-154, pl.59, fig. 5-6); Fauvel, 1923 (pp. 305-306, fig. 117 a-d); Berkely and Berkely, 1948 (pp. 79-80, fig. 118); Uschakov, 1955 (p. 192, fig. 56 b-g); Uschakov and Wu, 1962(pp. 89); Imajima, 1966a(pp. 397-398, text-fig. 3); 1981 (p.272, fig. 13 e-i); Day, 1967 (pp. 274-275, fig. 12.10 p-u).

Material examined: one specimen, in silt, Chebudo, April 16, 1988 (B.J.Rho); one specimen, among tubes of polychaetes, Pangp'o beach, Anmyŏndo, May 14, 1988 (J.W.Lee).

Description: Largest specimen with 38 segments, 5.85mm long and 0.21mm wide excluding parapodia. Body color preserved in formalin whitish yellow. Prostomium subrectangular, broader than long (width 1.63 to 1.68 times as long as length) and with two pairs of eyes whose anterior pair slightly larger than posterior

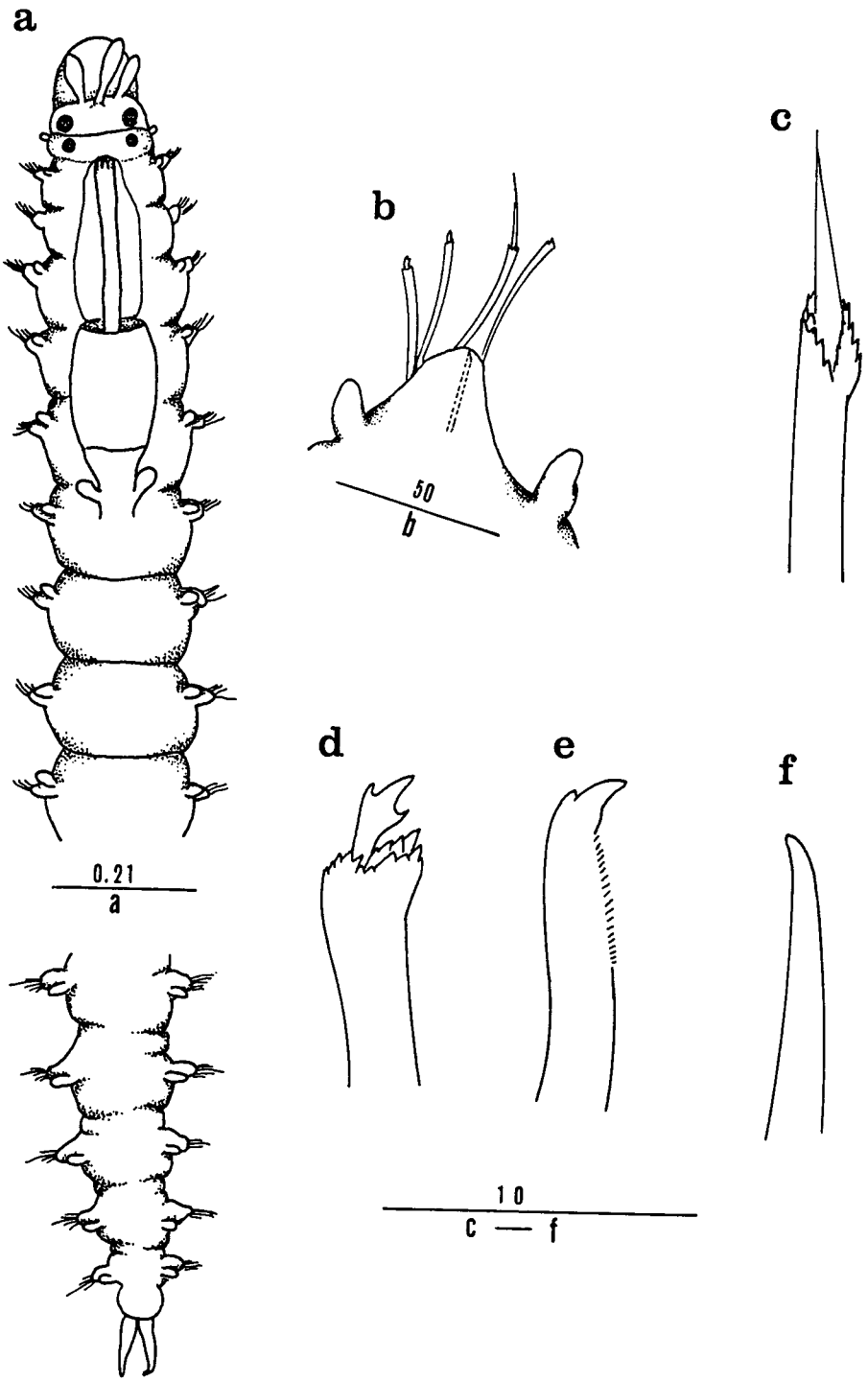

Fig. 2. *Exogone gemofera* Pagenstecher, 1862. a, anterior and posterior ends, dorsal view; b, median parapodium; C, compound seta with slender, awl-shaped appendage; d, compound seta with short appendage of posterior parapodium; e, superior simple seta; f, aciculum from median parapodium. Unit of scale; a, mm; b-f, um.

one. Antenna club-shaped; median one originating from posterior area of bases of laterial antennae; lateral ones originating on anterolateral margin of prostomium. Median antenna approximately 1.4 times as long as lateral one (Median antenna 71.7-80.4um long, laterial antenna 49.5-50.2um long). Palps appearing completely fused; anterior tips usually bent ventrally.

Tentacular segment covering posterior prostomium and with a pair of small ovoid tentacular cirri. Pharynx with anterior middorsal tooth redish brown. Proventriculus consisting of two parts, former one cylindrical in shape and occupying one and half segments, latter one conical, occupying one segment and gradually narrowing to the posterior direction.

Dorsal cirri somewhat oval in shape, usually shorter than parapodial lobes and located on each segment except for second setigerous one.

Superior simple seta(fig.2 e) on a parapodium solitary, with acute tips and appearing from first parapodium. A compound seta with a distally slender awl-shaped appendage (fig.2 c) appearing first from fourth or fifth parapodium. More inferior seta bearing small appendage with a subdistal tooth larger than distal one (fig.2 d). Posterior parapodia havinge one additional simple seta in inferior part of it.

Ventral surface of female having two eggs at each segment from one-third to three-fourths of entire length. Male with natatory seta beginning on ninth or tenth segment from anterior and continuing to third from pigidium regardless number of segment. one aciculum present in posterior parapodium.

Distributioon: France, Atlantic Ocean, Mediterrannean, Arctic region, north-west of Japan Sea, Okhotsk Sea, Yellow Sea, Japan, Korea.

Genus *Sphaerosyllis* Claparède, 1863 배발갯지렁이 속

3. *Sphaerosyllis piriferopsis* Perkins, 1981 배발갯지렁이

Sphaerosyllis piriferopsis Perkins, 1981 (pp.1133-1136, fig.23, 24).

Sphaerosyllis histrix: Rho and Lee, 1988 (pp.127-129, fig.4).

Material examined: one specimen, among seaweed, Chunghwadong, Paengnyŏngdo, Oct. 25, 1986 (J.W.Lee); three specimens, crevice in a rock, Anhŭng, 1987 (C.H.Jung); 32 specimens, among tubes of polychaetes, Pangp'o beach, Anmyŏndo, May 14, 1988 (J.W.Lee); 12 specimens, in silt, Chagyakto, April 8, 1989 (J.W.Lee); four specimens, among seaweed, Sapsido, July 21, 1989 (J.W.Lee); three specimens, among tubes of polychaetes, Pyŏnsan beach, July 22, 1989(J.W.Lee).

Remarks: Present species is very similar to *Sphaerosyllis pirifera* in many characters. However, it differs from *S. pirifera* in following characteristics: (1) Prostomium and tentacualr segment in this species not completely fused, but those of *S. pirifera* completely fused. (2) This species without yellowish glands in first setigerous segment, whereas, *S. pirifera* with. (3) Numbers of compound seta in this species are three to seven, while numbers of those seta in *S. pirifera* range from six to eight.

The present specimens differ from Perkins' original description in the following characteristics : (1) The numbers of compound seta in a parapodium in our specimen are three to seven, but the numbers are three to five in original description. (2) The longest blade of the compound seta in our specimen is 20 to 25um, but that of original description is 17um. We think these differences as variations.

Distribution: Florida, Bahama, Korea.

Subfamily Syllinae Rioja, 1925 참염주발갯지렁이 아과

Genus Syllis Savigny, 1818 큰염주발갯지렁이 속

4. *Syllis amica* Quatrefages, 1865 단강모염주발갯지렁이 (Fig. 3)

Syllis amica Quatrefages 1865 (p.20, pl.v, fig.16-22) (cited from Fauvel, 1923); Fauvel, 1923 (pp.258-259, fig.95 e-n); Imajima, 1966b (pp.246-248, text-fig.48); 1983c (p.218, fig.34 a-i).

Syllis (Syllis) amica: Day, 1967 (p.243, fig.12.2. a-e).

Material examined: one specimen, among tubes of polychaetes, Pangp'o, Anmyŏndo, May 14, 1988(B.J.Rho); four specimens, among tubes of polychaes, Sapsido, July 21, 1988 (J.W.Lee).

Description: Body colour preserved in formalin whitish yellow. Prostomium subglobular, broader than long, with four reddish eyes in trapezoidal arrangement. Anterior eyes larger than posterior eyes, and widely seperated each other. Some of specimens having additional eye spots on front margin. A median antenna with 23 to 30 annulations, and placed between posterior eyes. A pair of lateral antenna located laterally, in front of the median one, with 14 to 18 annulations. Paired palpi subtriangular and fused only at base. Pharynx red and extending from second to eighht or fourth to eleventh setigerous segment and bearing a large anterior tooth. Peristomium with a pair of tentacular cirri consisting of the dorsal tentacula cirri with 19 to 25 annulations and the ventral tentcula cirri with length of two-thirds or a half of the dorsal one. First dorsal cirri with 29 to 35 annulations, second with 17 to 20, third with 22 to 27, fourth with 26 to 34, fifth with 19 to 25, sixt with 26 to 31, seventh with 20 to 24 respectively. In a median region, long dorsal cirri with 20 to 25 annulations alternate to short ones with 16 to 20 annulations. Compound falcigerous seta in shape with bidentate appendages; appendage of superior seta(19.8um) within a compound seta longer than those of inferior one(10.9um). Setal appendages (fig.3 g) in median parapodia thicker than those in anterior and posterior parapodia. In median region, setal appendage of compound seta approximately 17.8um long. Superiormost simple seta(fig.h) approximately twice thicker than compound seta in median parapodia. This seta appearing on 29th to 33th setigerous segment and continuous to four-fifth of body length. Posterior parapodia with additional superior(fig.3 j) and inferior (fig.k) simple seta; former with blunt tip and latter with weak secondary tooth and sharp tip. Anterior parapodium bearing three acicula and posterior one with aciculum.

Distribution: Ireland, England Channel, Madeira, France, Atlantic Ocean, Mediterrannean, Japan, Korea.

Genus *Typosyllis* Langerhans, 1879 참염주발갯지렁이 속

5. *Tyoisyllis nippnica* Imajima, 1966 녹색염주발갯지렁이

Typosyllis nipponica Imajima, 1966c (pp.266-268, text-fig.55 a-o); 1983b (p.377, fig.38 a-o); Paik, 1982 (p.777, pl.9 i-j); Rho and Lee, 1987 (p.77); 1988 (p.120).

Material examined: two specimens, from ascidians, Pyonsan beach, July 22, 1988 (J.W.Lee); two specimens, among seaweed, Wolto, Sep. 15, 1992 (J.H.Won).

Distribution: Northern to southern Japan, Korea.

6. *Typosyllis aciculata orientalis* Imajima & Hartman, 1964 족자염주발갯지렁이

Typosyllis aciculata orientalis Imajima & Hartman, 1964 (pp.130-132, pl.31, figs. e-f, pl.32, figs.a-t); Imajima 1966c (pp.275-276); 1983c (p.454, fig.41 a-m); Rho and Lee, 1987 (p.82, fig.4); 1988 (p.129).

Material examined: one specimen, Pangch'ukto, July 25, 1980 (B.J.Rho); one specimen, 17m deep, from bryozoans, Malto, July 10, 1986(S.J.Yoon); four specimens, among tubes of polychaetes, Pangp'o

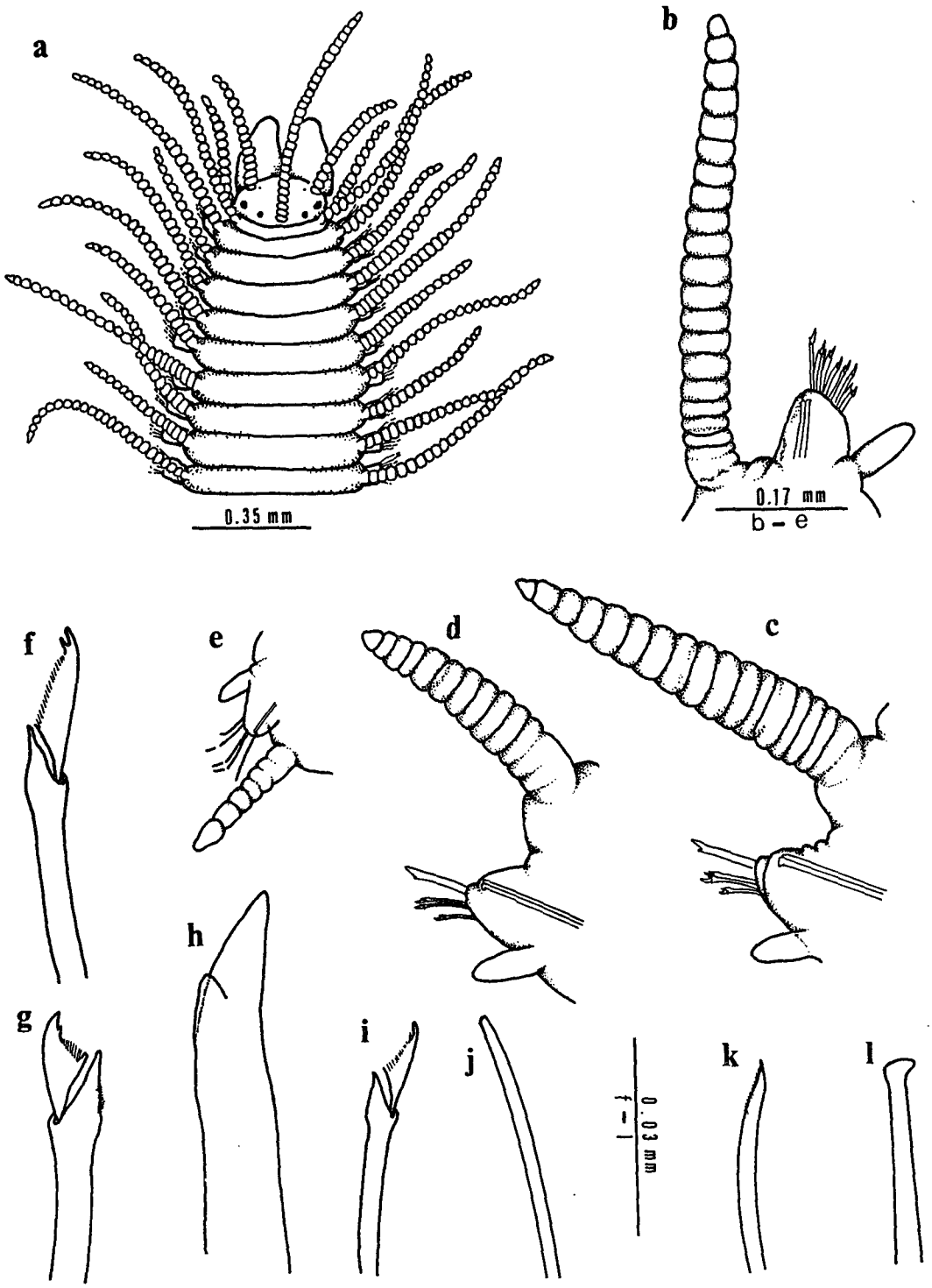

Fig. 3. *Syllis amica* Quatrefages, 1865. a, anterior end, in dorsal view; b, first parapodium; c, median parapodium with long dorsal cirrus; d, median parapodium with short dorsal cirrus; e, posterior parapodium; f, superior compound seta of anterior parapodium; g, superior compound seta of median parapodium; h, superior thick simple seta of median parapodium; i, superior compound seta of posterior parapodium; j, superior simple seta of same parapodium; k, inferior simple seta of same parapodium; l, aciculum. Unit of scale is mm.

beach, Anmyŏndo, May 14, 1988(B.J.Rho); one specimen, among seaweed, Wolto, Sep. 15, 1991(J.H.Won); 13 specimens, among tubes of polychaetes, Shinjindo, July 20, 1989(J.W.Lee); five specimens, from oyster(3), ascidians(1) and tubes of polychaetes(1), Pyŏnsan beach, July 22, 1989; five specimens, from bryozoans(1) and oyster(4), Anmado, Aug. 19, 1989(B.L.Choe).

Distribution: Northern to southern Japan, Algerie, Korea.

7. Typoisyllis adamenteus kurilensis Imajima & Hartaman, 1964 쿠릴염주발갯지렁이

Typosyllis adamenteus kurilensis Imajima & Hartman, 1964 (pp.134-135, pl.33, figs.a-i); 1966c (p.277); 1983c (p.454, fig.41 s-z); Rho and Lee, 1982 (p.38, pl.2, figs. 1-2); Paik, 1982(p.38, pl.2, figs.1-2).

Material examined: three specimens, from the shell of oyster, Yong-am, changbongdo, Aug. 6, 1986(J.W.Lee);one specimen, among seaweed Chunghwadong, Paengnyŏngdo, Oct. 25, 1986(J.W.Lee);one specimen, among seaweed, Sapsido, 21, 1989(J.W.Lee); one specimen, in coarse sands(scuba), Song-ido, Aug. 15, 1989; 17 specimens, from oyster, Chagyakto, Sep. 28, 1991(J.W.Lee)

Size: Largest specimen collected from Chagyakto 36.3mm long and 1.8mm wide with 35 setigerous segments.

Distribution: Kuril Islands; north Japan; Korea.

8. Typosyllis variegata (Grube, 1860) 참염주발갯지렁이

Syllis (Typosyllis) variegata: Fauvel, 1923 (p.262, fig.97 h-n); 1953, (p.148,fig.97 h-n); Okuda, 1939 (p.183, fig.1); Okuda & Yamada, 1954 (p.182); Day, 1967 (p.248, fig.12.3 j-l); Knox, 1960 (p.99).

Typosyllis variegata: Hartman, 1961 (p.17); 1964 (p.96, pl.29, figs.8, 9); 1968 (p.495, figs. 1-5); Imajima & Hartman, 1964 (pp.137-138, pl.34, figs.a-i); Imajima, 1966c (p.292); 1984,(p.54, fig.44 u-z); Rho and Lee, 1987 (pp.82-84, fig.5); 1988 (p.129).

Syllis variegata: Uschakov and Wu, 1962 (p.59); Banse and Hodson, 1968 (p.65).

Typosyllis (Typosyllis) variegata: Hartman-Schröder, 1971 (pp.148-149).

Material examined: one specimen, from oyster Anmado, Aug. 19, 1989 (B.L.Choe).

Size: Largest specimen with 48 setigerous segments, 10mm long and 1mm wide.

Distribution: Western and southern Europe, Mediterrannen, Australia, Indo-Pacific area, Southern California, Bering Sea, Japan, Korea.

ABSTRACT

This study on Syllidae was based on the specimens collected from July 1980 to November 1991, at 15 localities in the Yellow Sea of Korea. As a result, eight species of five genera were identified. Of these, two species (*Exogone gemmifera* and *Syllis amica*) are newly known from Korean waters. These two species are described with figures.

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