

Five Species of Sabelliphilidae (Copepoda, Cyclopoida) from the Korea Strait

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ABSTRACT

Four new species of sabelliphilid copepods are described from the Korea Strait. *Acaenomolgus nesobius* n. sp. is characterized by several diagnostic features in the female: a short caudal ramus that is 1.2 times longer than wide; the second endopodal segment of the antenna, which bears only three setae and lacks a claw; and the third endopodal segment of the antenna, which bears two claws and five setae. In *Myxomolgus longicauda* n. sp., the female caudal ramus is 3.2 times longer than wide, the rostrum is elongated with a pointed distal apex, the third endopodal segment of the antenna bears four slender claws of subequal length, and the inner seta of the maxillary endopod is as long as the distal lash. *Myxomolgus longipes* n. sp. is characterized by the elongated exopodal segment of female leg 5, measuring 3.6 times longer than wide, a triangular rostrum that is wider than long, an inner seta of the maxillary basis that is distinctly longer than the distal lash, and a third endopodal segment of the antenna with three claws, the innermost of which is significantly longer than the other two. *Phoronicola setifer* n. sp. represents the second species of this genus, characterized by a mandible bearing a seta at its outer corner, which is a transformed scale, and a maxillule with three setae and one dentiform process. *Eupolymniphilus mediterraneus* Costanzo, Brugnano and Zagami, 2013, originally recorded from the Mediterranean Sea, is redescribed based on newly collected specimens from Korea.

Keywords: *Acaenomolgus*, *Myxomolgus*, *Phoronicola*, *Eupolymniphilus*, taxonomy

INTRODUCTION

More than 120 species of Copepoda, belonging to at least 21 families, have been documented as associates of annelids, primarily functioning as external or internal parasites of polychaetes (Conradi et al., 2015). Among these copepod families, Sabelliphilidae Gurney, 1927 includes 29 known species distributed across nine genera (WoRMS Editorial Board, 2025). One notable species, *Phoronicola spinulatus* Boxshall and Humes, 1988, is associated with a phoronid worm (Boxshall and Humes, 1988; Kim and Huys, 2012). The remaining species are recognized as associates of tubicolous polychaetes from the families Sabellidae Latreille, 1825, Serpulidae Rafinesque, 1815, and Terebellidae Johnston, 1846 (see Humes and Boxshall, 1996). Humes and Boxshall (1996) defined the Sabelliphilidae based on specific features of the antenna and mandible: one of the four elements on the second endopodal segment of the antenna is modified into a claw or claw-

like structure, and the gnathobase of the mandible is sharply tapered, with a well-defined outer scale at its outer corner.

In Korea, six species have been described as new: *Myxomolgus invulgas* and *Terebelliphilus simplex* by Kim (2001); *Eupolymniphilus orientalis* by Kim (2006); *E. foliatus* by Lee et al. (2022); *M. buanensis* and *M. dokdoicus* by Lee and Kim (2024). This paper described four additional new species from Korea. Notably, *Eupolymniphilus mediterraneus* Costanzo, Brugnano and Zagami, 2013, originally recorded in the Mediterranean Sea, is redescribed based on specimens collected from the Korea Strait.

MATERIALS AND METHODS

Copepod samples analyzed in this study were extracted from unidentified polychaetes or from washings of marine benthic invertebrates containing polychaetes collected from the Korea

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Strait. The extracted copepods were preserved in 80% ethanol. For microscopic observation, the copepods were immersed in lactic acid for at least 10 min before dissection. Dissection and observation of the appendages were conducted using the reverse slide method described by Humes and Gooding (1964). Drawings were prepared with the aid of a drawing apparatus attached to a microscope. The lengths of appendage segments were calculated as the average of the longest and shortest margins. The terminology used in this paper follows Huys and Boxshall (1991) and Humes and Boxshall (1996). Type and voucher specimens have been deposited in the Marine Biodiversity Institute of Korea (MABIK) in Seocheon, Korea.

SYSTEMATIC ACCOUNTS

Class Copepoda Milne Edwards, 1840

Order Cyclopoida Burmeister, 1834

Family Sabelliphilidae Gurney, 1927

Genus *Acaenomolgus* Humes and Stock, 1972

¹**Acaenomolgus nesobius* n. sp. (Figs. 1, 2)

Zoobank LSID: urn:lsid:zoobank.org:act:E0820031-5077-4A87-98E2-BCD5C76C856F.

Type material. Holotype (♀, dissected and mounted on a slide; MABIK CR00260947) from washings of invertebrates, Munseom, Seogwipo, Jeju Island (33°13'39.4"N, 126°33'48.2"E, depth 56 m, collected by T. Lee, 25 Apr 2023).

Etymology. The specific name *nesobius* is the combination of the Greek words *nes* (= an island) and *bio* (= life), referring to the discovery of the new species near an island.

Female. Body (Fig. 1A) consisting of expanded prosome and small urosome. Body length 652 µm. Prosome subcircular. Cephalothorax globular, wider than long, divided by dorsal suture line into cephalosome and first pedigerous somite. Urosome (Fig. 1B) 5-segmented. Fifth pedigerous somite 65 µm wide, with tapering process at dorsolateral corners (Fig. 2E). Genital double-somite 1.22 times longer than wide (100 × 82 µm), consisting of narrow anterior and posterior parts (both parts occupying about 25% of double-somite length) and roundly expanded middle part; genital apertures positioned laterally at posterior region of expanded middle part. Three free abdominal somites 18 × 38, 14 × 36, and 18 × 36 µm, respectively. Anal somite with smooth posterior margin. Caudal ramus (Fig. 1C) short, 1.21 times longer than wide (20 × 16 µm), armed with 6 naked setae and ornamented with fine spinules along posteroventral margin.

Rostrum (Fig. 1D) well sclerotized, semicircular. Antennule (Fig. 1E) slender, 254 µm long, 7-segmented; armature for-

mula 3, 12, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; terminal segment shortest; all setae naked; aesthetascs thin, setiform. Antenna (Fig. 1F) 4-segmented, consisting of coxobasis and 3-segmented endopod; armature formula 1, 1, 3, 5 + 2 claws; distalmost one of 3 setae on second endopodal segment short, spinule-like; third endopodal segment 2.83 times longer than wide (51 × 18 µm); 2 terminal claws 40 µm long (broader one) and 36 µm long (narrower one), both geniculated in middle.

Labrum (Fig. 1G) with elongated posterolateral lobes and deep median incision; each lobe with nearly parallel inner and outer margins, rounded distal margin, and narrow membranous fringe along inner and distal margins. Mandible (Fig. 1H) bent at right angle between proximal part and gnathobase; gnathobase tapering, continuing to slender, elongated distal lash; proximal part with narrow membranous fringe along outer margin; outer (convex) margin of gnathobase bearing 1 claw proximally followed by 4 or 5 spinules, several broad teeth, and several small teeth; inner margin of gnathobase with row of spinules of equal length. Maxillule (Fig. 1I) lobate, with 3 unequal, naked setae (inner, subdistal, and distal). Maxilla (Fig. 1J) 2-segmented; syncoxa (proximal segment) unarmed; basis (distal segment) bearing 3 setae (setae I–III) and terminating in short distal lash; distal lash with 5 or 6 large teeth along distal (convex) margin followed by 2 or 3 small spinules; seta I (inner seta) very long, about twice as long as distal lash, spinulose along both margins; seta II slender, bearing minute spinules along its inner margin; seta III small. Maxilliped (Fig. 1K) 3-segmented; syncoxa (first segment) slender, unarmed; basis (second segment) moderately inflated, with 2 equal, naked setae, distal one thicker than proximal one; endopod (third segment) elongated, as long as basis, with curved distal part, proximally bearing 2 setae, one of them minute.

Legs 1 (Fig. 2A), 2 (Fig. 2B), and 3 with 3-segmented rami. Leg 4 (Fig. 2D) with 3-segmented exopod and 2-segmented endopod. Leg 3 similar to leg 2, except for bearing 3 spines and 2 setae on third endopodal segment (Fig. 2C). Inner coxal seta of leg 4 small, naked. Spines on leg rami with serrate margins. Second endopodal segment of fourth leg 41 µm long, bearing pointed angle at middle of outer margin, followed by several minute spinules; inner and outer distal corners pointed; inner and outer distal spines 41 and 27 µm long, respectively. Armature formula for legs 1–4 as follows:

	Coxa	Basis	Exopod	Endopod
Leg 1	0-1	1-0	I-0; I-1; III, I, 4	0-1; 0-1; I, 1, 4
Leg 2	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 3
Leg 3	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 2
Leg 4	0-1	1-0	I-0; I-1; II, I, 5	0-1; 0, II, 0

Korean name: ¹*섬가시노벌레 (신칭)

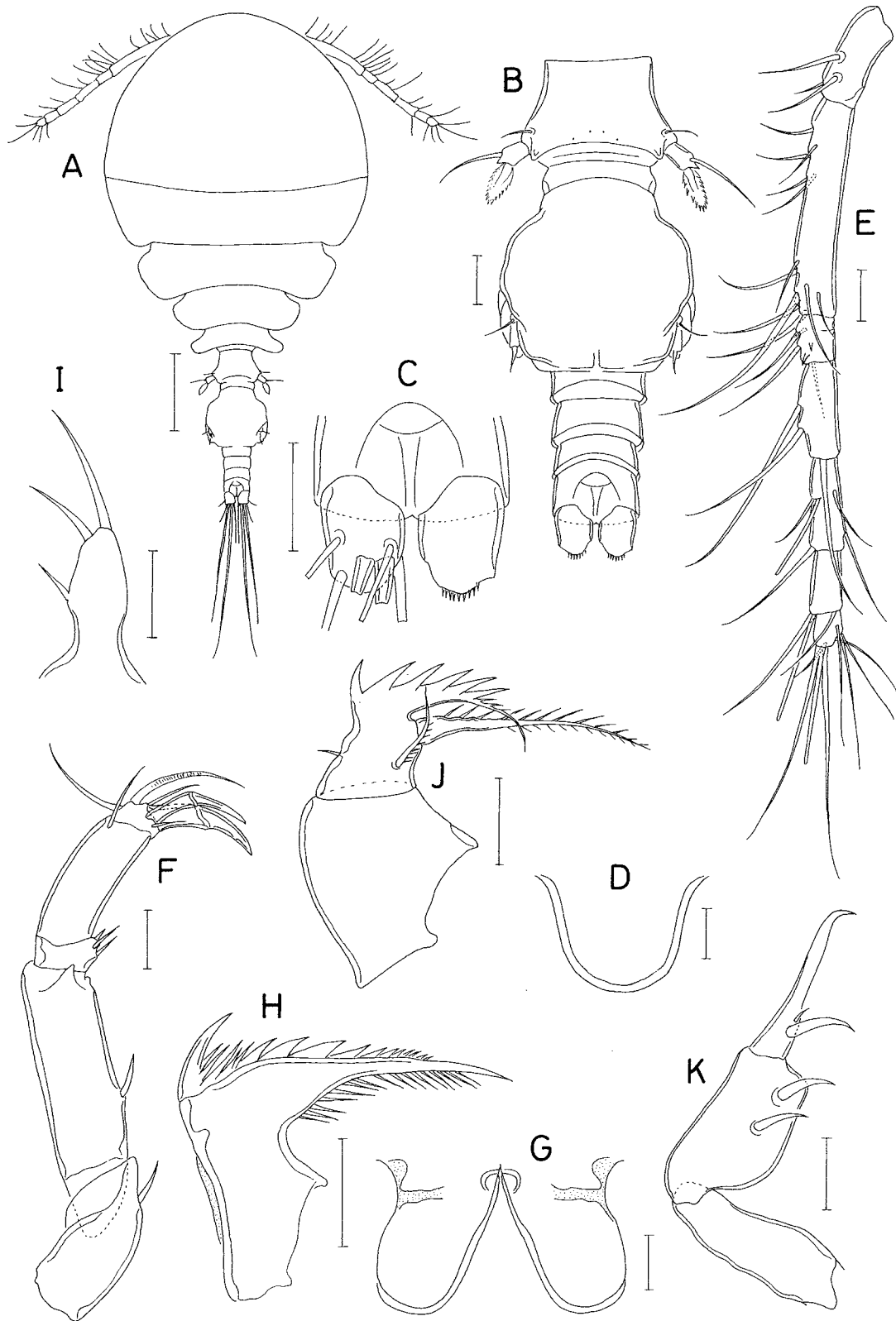


Fig. 1. *Acaenomolgus nesobius* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Caudal rami, dorsal; D, Rostrum; E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla; K, maxilliped. Scale bars: A=0.1 mm, B-K=0.02 mm.

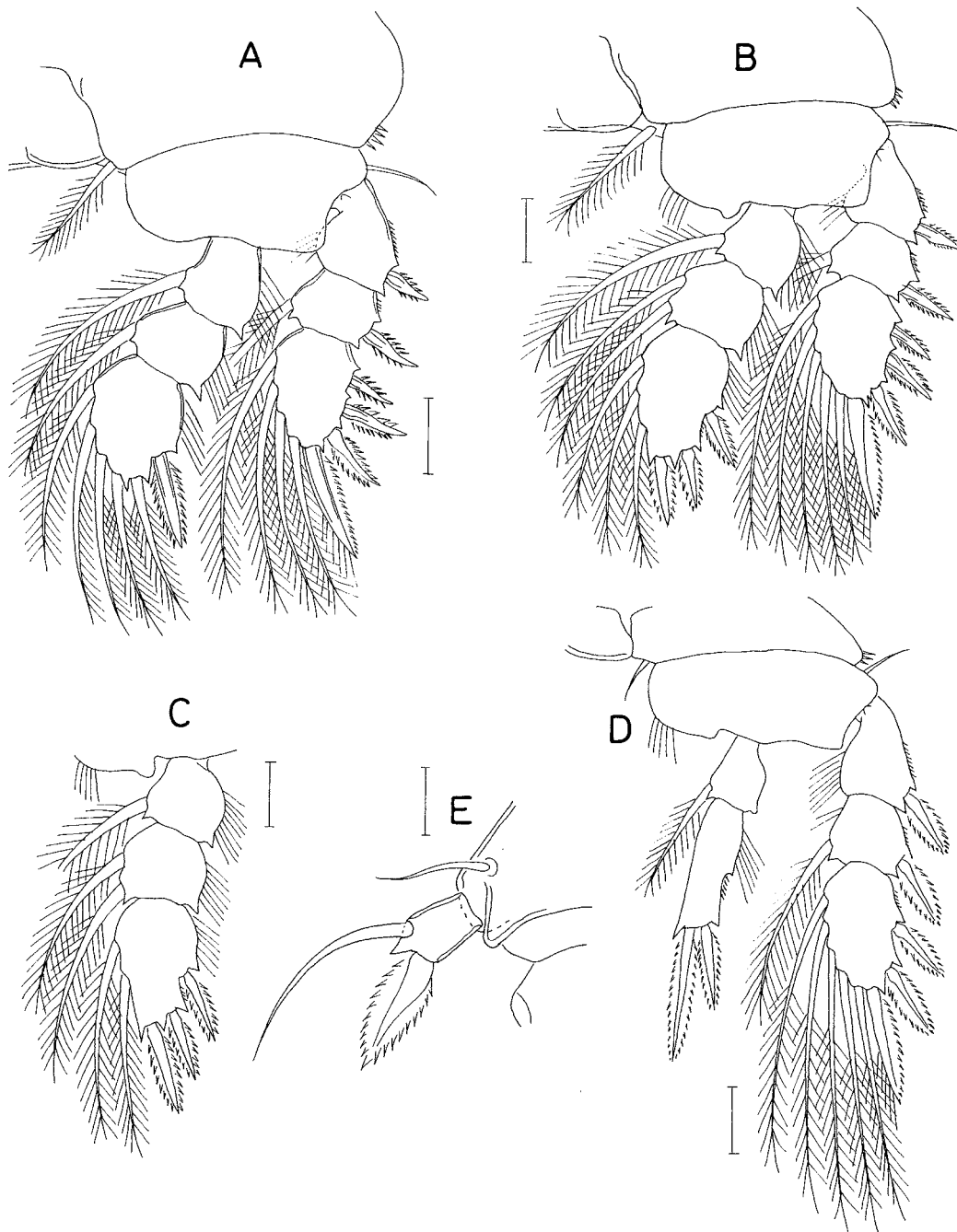


Fig. 2. *Acaenomolgus nesobius* n. sp., female. A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4; E, Leg 5, dorsal. Scale bars: A-D=0.02 mm, E=0.01 mm.

Leg 5 (Fig. 2E) consisting of 1 dorsolateral seta on fifth pedigerous somite and exopod; exopodal segment small, 1.75 times longer than wide ($14 \times 8 \mu\text{m}$), gradually broadened distally, terminated in tooth-like process, armed with 1 naked seta of $32 \mu\text{m}$ long and 1 broad serrated spine of $19 \mu\text{m}$ long. Legs 6 (Fig. 1B) represented by small setae on genital operculum.

Male. Unknown.

Remarks. The genus *Acaenomolgus* currently includes three species: *A. protulae* (Stock, 1959) and *A. serpulae* (Stock, 1960), both found in the Mediterranean Sea (Stock, 1959, 1960), and *A. gottoi* (Stock, 1995), which was discovered in the Indian Ocean (Stock, 1995). *Acaenomolgus nesobius* n.

sp. can be easily distinguished from these three species by the following characteristics: (1) a smaller body size of 0.65 mm in length for the female, compared to 0.94 mm in *A. gottoi*, the shortest recorded in the genus; (2) caudal rami short, 1.21 times longer than wide, in contrast to 3.5 times in *A. gottoi*, approximately 6.0 times in *A. protulae*, and 5.0 times in *A. serpulae*; (3) the absence of a claw on the second endopodal segment of the antenna, unlike the presence of a claw in the three congeners; (4) the presence of two claws on the third endopodal segment of the antenna, as opposed to three or four claws in the congeners; and (5) a short exopodal segment of female leg 5, which is 1.75 times longer than wide, compared to at least twice as long as wide in the congeners, as illustrated for *A. protulae* by Stock (1959).

Genus *Myxomolgus* Humes and Stock, 1972

***1*Myxomolgus longicauda* n. sp. (Figs. 3, 4)**

Zoobank LSID: urn:lsid:zoobank.org:act:3EF526E1-8D6F-4368-B2D6-EC5D03ADB844.

Type material. Holotype (♀, dissected and mounted on a slide; MABIK CR00260948) from washings of dredged invertebrates, east of Jeju Island, Korea Strait (33°20'30"N, 127°40'00"E), depth 123 m, collected by J. Lee, 17 Mar 2024.

Etymology. The specific name is derived from the Latin words *long* (= long) and *caud* (= tail), referring to the elongated caudal rami of the new species.

Female. Body (Fig. 3A) moderately narrow. Body length 913 µm. Prosome 574 × 370 µm. Cephalothorax as long as wide, with dorsal suture line between cephalosome and first pedigerous somite. Urosome (Fig. 3B) 5-segmented. Fifth pedigerous somite 74 µm wide, with acutely pointed dorsolateral corners (Fig. 4E). Genital double-somite 1.25 times longer than wide, with laterally expanded middle half; genital apertures positioned dorsolaterally at posterior region of expanded part. Three free abdominal somites 30 × 43, 20 × 39, and 40 × 38 µm, respectively. Anal somite distinctly longer than pre-anal somites, with large anal aperture. Caudal ramus (Fig. 3C) 3.23 times longer than wide (55 × 17 µm), about 1.4 times longer than anal somite, armed with 6 naked setae; lateral seta (seta II) positioned at 56% of ramus length.

Rostrum (Fig. 3D) elongated, about 1.8 times longer than wide, with pointed distal apex. Antennule (Fig. 3E) 7-segmented; armature formula 3, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked; aesthetascs thin, setiform. Antenna (Fig. 3F) 4-segmented; armature formula 1, 1, 3 + claw, and 3 + 4 claws; claws thin, setiform, geniculated in middle; setae much shorter than claws; third endopodal segment (terminal segment) 1.95 times longer than wide (41 × 21

µm), its outermost subdistal seta slightly winding, with blunt tip.

Labrum (Fig. 3G) with broad, roundly expanded proximal region and long posterolateral lobes bearing parallel lateral margins; median incision deep; distal margin of lobes rounded. Mandible (Fig. 3H) strongly recurved; with 1 tapering lamelli-form scale at outer corner; gnathobase tapering, with numerous fine denticles along convex outer margin and fine spinules along inner margin. Maxillule (Fig. 3I) as tapered lobe bearing 1 small seta on medial margin and 2 equally large distal setae; all setae naked. Maxilla (Fig. 3J) with unarmed syncoxa; basis bearing 3 setae and short distal lash; seta I large, slightly longer than distal lash, with minute spinules all over; seta II slender, bearing several spinules along its inner margin; seta III rudimentary; distal lash bearing 4 strong spines followed by 3 small spinules. Maxilliped (Fig. 3K) 3-segmented; syncoxa slender, unarmed; basis slightly inflated medially, with 2 unequal, spiniform setae bearing few spinules on margins; endopod 0.75 times as long as basis, terminated in spear-shaped process, with 1 seta and 1 spinulose spine.

Legs 1 (Fig. 4A), 2 (Fig. 4B), 3, and 4 (Fig. 4D) with 3-segmented rami. Coxa of leg 1 with semicircular protuberance on outer margin. Inner coxal seta well-developed in legs 1–3 but rudimentary in leg 4. Outer seta of legs 2–4 small. Third exopodal segment of leg 2 with bicuspid distal process. Leg 3 similar to leg 2, except for bearing 3 spines and 2 setae on third endopodal segment (Fig. 4C). Two distal spines on third endopodal segment of leg 4 unequal, inner one 1.75 times longer than outer one. Armature formula for legs 1–4 as follows:

	Coxa	Basis	Exopod	Endopod
Leg 1	0-1	1-0	I-0; I-1; III, I, 4	0-1; 0-1; I, I, 4
Leg 2	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 3
Leg 3	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 2
Leg 4	0-1	1-0	I-0; I-1; II, I, 5	0-1; 0-1; 0, II, 0

Leg 5 (Fig. 4E) consisting of dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment 1.33 times longer than wide (16 × 12 µm), with pointed distal apex, and armed with 1 serrated spine measuring 29 µm long and 1 naked seta measuring 33 µm long. Leg 6 (Fig. 4E) represented by 2 naked setae on genital operculum, each seta inserted into papilla-like protuberance.

Male. Unknown.

Remarks. Within the genus *Myxomolgus*, the female's caudal ramus measures at most 2.52 times longer than wide, as recorded for *M. proximus* Humes and Stock, 1973 (see Humes and Stock, 1973). In contrast, the caudal ramus of *M. longicauda* n. sp. is elongated, 3.23 times longer than wide, distin-

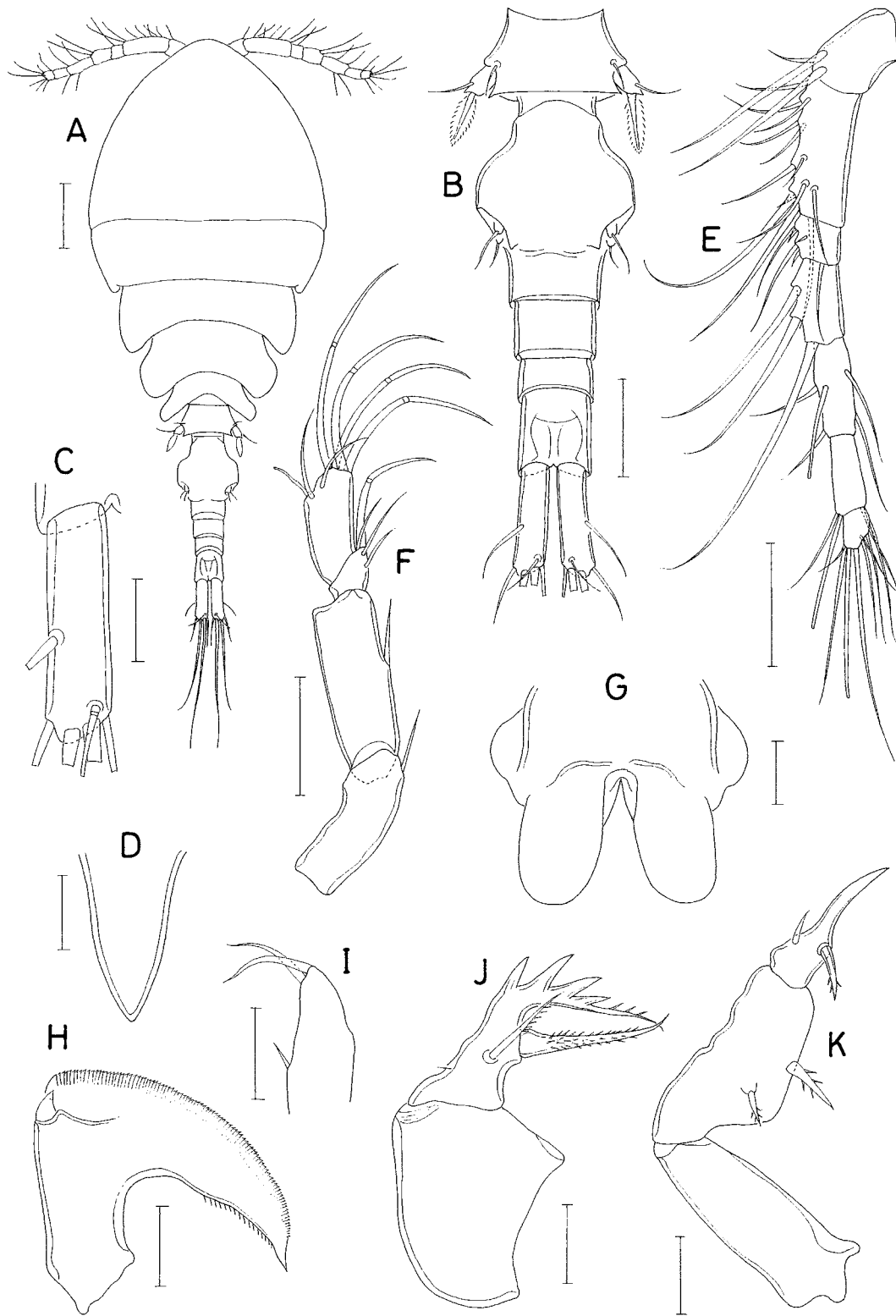


Fig. 3. *Myxomolgus longicauda* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Left caudal ramus, dorsal; D, Rostrum; E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla; K, Maxilliped. Scale bars: A=0.1 mm, B, E, F=0.05 mm, C, D, G-K=0.02 mm.

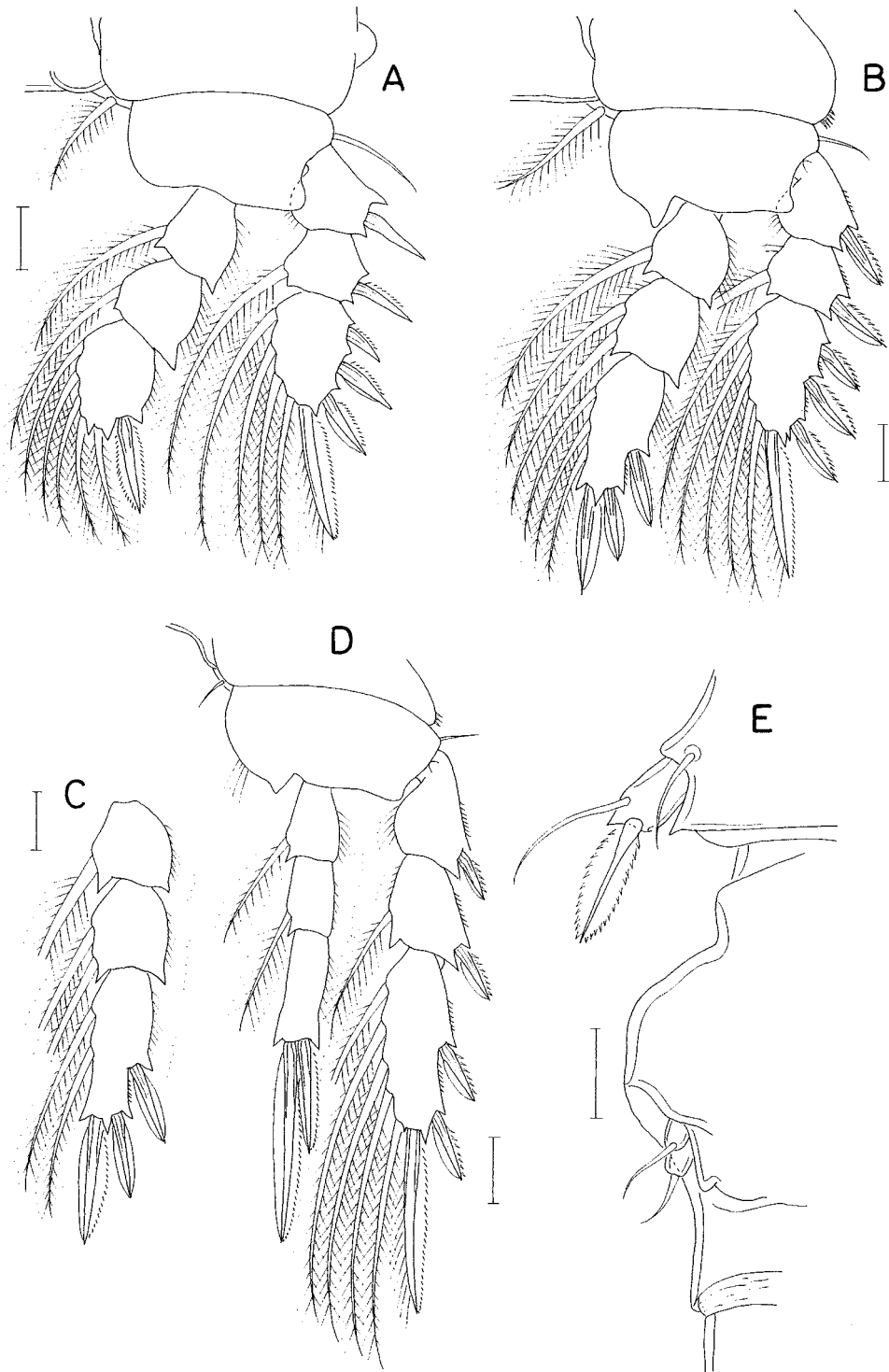


Fig. 4. *Myxomolgus longicauda* n. sp., female. A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4; E, Left leg 5 and genital aperture, dorsal. Scale bars: A-E=0.02 mm.

guishing this new species from its congeners. Additional distinguishing features of the new species include an elongated rostrum, approximately 1.8 times longer than wide; the third

endopodal segment of the antenna bearing four subequal, slender claws; and a nearly straight distal process of the endopod of the female maxilliped. Furthermore, the inner seta (seta I) of

the maxilla is as long as the distal lash. These characteristics also aid in identifying *M. longicauda* n. sp.

¹**Myxomolgus longipes* n. sp. (Figs. 5, 6)

Zoobank LSID: urn:lsid:zoobank.org:act:CE4D4386-E4B6-4F7A-833A-D59CA226C7EF.

Type material. Holotype (♀, dissected and mounted on a slide; MABIK CR00260949) from washings of dredged invertebrates, east of Jeju Island, Korea Strait (33°20'30"N, 127°40'00"E), depth 123 m, collected by J. Lee, 17 Mar 2024.

Etymology. The name is derived from the Latin words *long* (= long) and *pes* (= a foot), alluding to the elongated exopodal segment of leg 5.

Female. Body (Fig. 5A) narrow. Body length 800 µm. Prosome 519 × 320 µm. Cephalothorax longer than wide, with dorsal suture line between cephalosome and first pedigerous somite. Urosome (Fig. 5B) 5-segmented. Fifth pedigerous somite 92 µm wide, wider than genital double-somite. Genital double-somite 1.37 times longer than wide (115 × 84 µm), consisting of broader anterior two-thirds and narrower posterior third; broader anterior part gradually broadened posteriorly; genital apertures positioned dorsolaterally at posterior region of anterior part. Three free abdominal somites measuring 27 × 51, 20 × 49, and 27 × 49 µm, respectively. Anal somite with fine spinules along posteroventral margin. Caudal ramus (Fig. 5C) rectangular, 2.56 times longer than wide (50 × 19.5 µm), armed with 6 setae; lateral seta (seta II) positioned at middle of ramus length; proximal part of setae II and III spiniform, distally bifurcated; posteroventral margin of caudal ramus with fine spinules.

Rostrum (Fig. 5D) triangular, evenly tapering, with pointed distal apex. Antennule (Fig. 5E) short, 145 µm long, 7-segmented; armature formula 3, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked; aesthetascs thin, setiform. Antenna (Fig. 5F) 4-segmented; armature formula 1, 1, 2 + claw, and 4 + 3 claws; first endopodal segment longest, bearing spinules along outer margin and distal half of inner margin; third endopodal segment 2.07 times longer than wide (29 × 14 µm), with 2 outer setae blunt at tip and 3 spines consisting of longer innermost one and shorter second and third inner ones.

Labrum (Fig. 5G) with slightly divergent posterolateral lobes; each lobe longer than wide, slightly narrowing distally, with rounded distal margin. Mandible (Fig. 5H) strongly reflexed, with 1 claw-like scale at outer corner; gnathobase tapering, with serrate outer margin, spinulose inner margin, and terminated in smooth lash. Maxillule (Fig. 5I) as elongated lobe bearing 3 setae (1 distal and 2 on inner margin) separated from

one another at equal intervals; distal seta spiniform, bearing spinules on margins; first inner seta mounted on protuberance; second inner seta curved and proximally swollen. Maxilla (Fig. 5J) with unarmed syncoxa; basis bearing 3 setae and 3 large spines at base of distal lash; seta I large, longer than distal lash, spinulose along both margins; seta II naked; seta III rudimentary; distal lash bearing 3 spinules on outer margin and minute spinules along inner margin. Maxilliped (Fig. 5K) 3-segmented; syncoxa unarmed; basis slightly inflated medially, with 1 spine (distal element) and 1 small seta (proximal element); endopod about 0.65 times as long as basis, with claw-like curved distal process and proximally with 1 small tooth and 1 small seta.

Legs 1 (Fig. 6A), 2 (Fig. 6B), 3, and 4 (Fig. 6D) with 3-segmented rami; coxa with several spinules at outer distal corner and pinnate inner seta; inner coxal seta of leg 1 large. Inner distal margin of basis of leg 2 bearing nipple-shaped process and 1 denticle (indicated by arrowhead in Fig. 6B) near process. Leg 3 similar to leg 2, except for bearing 3 spines and 2 setae on third endopodal segment (Fig. 6C). Spines on rami of swimming legs fringed with membrane (not serrated) along margins. Third exopodal segment of swimming legs with bicuspid distal process. Third endopodal segment of leg 4 bearing pointed outer and inner distal corners, its 2 distal spines 52 µm long (inner spine) and 31 µm long (outer spine). Armature formula for legs 1–4 as in *M. longicauda* n. sp.

Leg 5 (Fig. 5B) consisting of 1 small dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 6E) elongated, 3.57 times longer than wide (50 × 14 µm) with small semicircular medial tubercle proximally and 1 pointed process distally, armed with 1 pinnate seta and 1 serrated spine (length of spine not measured due to breakage of spine in leg pair). Leg 6 (Fig. 6F) represented by 2 setae and 1 dentiform process on genital operculum, both setae proximally expanded.

Male. Unknown.

Remarks. In previously known species of *Myxomolgus*, the exopodal segment of the female fifth leg is either short or stout, measuring at most 2.20 times longer than wide, as recorded in *M. myxicolae* (Bocquet and Stock, 1958). In contrast, the elongated exopodal segment of the female fifth leg in *Myxomolgus longipes* n. sp. measures 3.57 times longer than wide, which is a key characteristic that distinguishes this new species from all congeners. This difference is further supported by a combination of additional features of the new species, including: (1) a triangular rostrum wider than long, with a pointed distal apex; (2) an endopod of the female maxilliped markedly shorter than the basis; (3) an inner seta (seta I) of the maxilla that is distinctly longer than the distal lash; (4) the third endo-

Korean name: ¹*긴다리갯지렁이집벌레 (신칭)

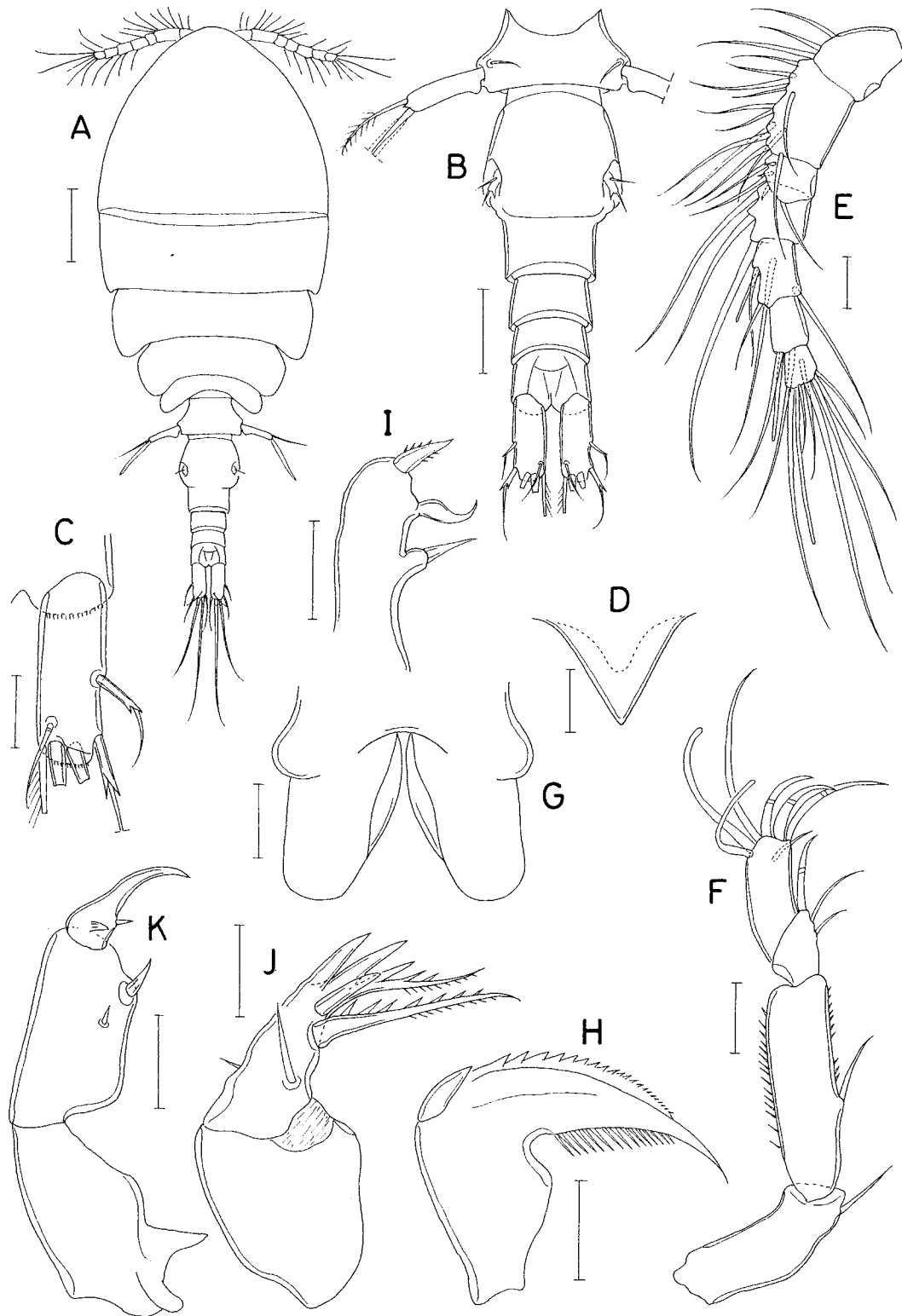


Fig. 5. *Myxomolgus longipes* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Right caudal ramus, dorsal; D, Rostrum; E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla; K, Maxilliped. Scale bars: A=0.1 mm, B=0.05 mm, C-K=0.02 mm.

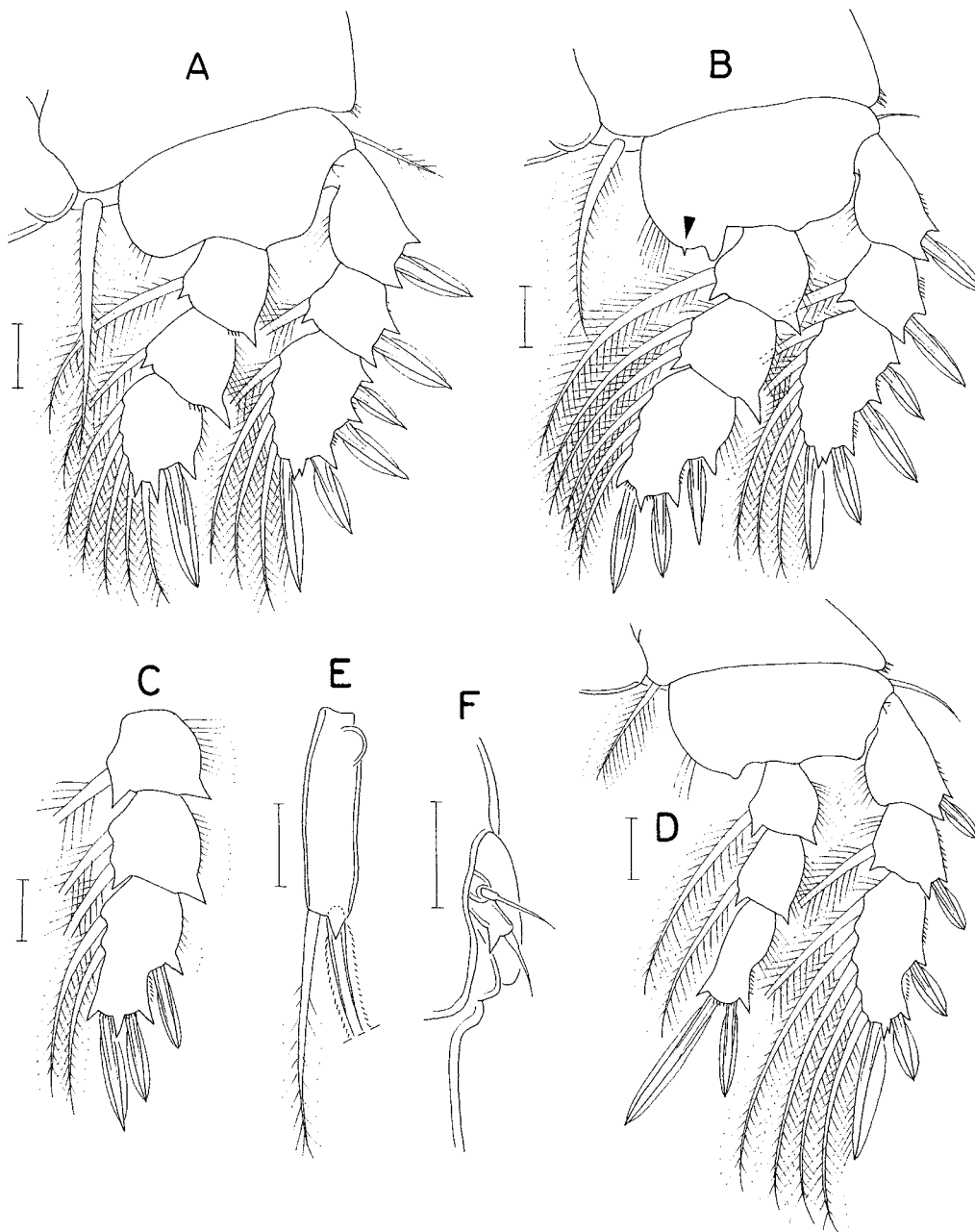


Fig. 6. *Myxomolgus longipes* n. sp., female. A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4; E, Exopod of leg 5; F, Right genital aperture, dorsal. Scale bars: A-F=0.02 mm.

podal segment of the antenna bearing three claws, with the innermost claw noticeably longer than the other two; (5) the first endopodal segment of the antenna is ornamented with spinules along both inner and outer margins; (6) an inner coxal seta of leg 1 that is considerably larger than the corresponding setae of the other swimming legs; and (7) a small denticle on the inner distal margin of the basis of legs 2 and 3.

Genus *Phoronicola* Boxshall and Humes, 1988

¹**Phoronicola setifer* n. sp. (Figs. 7, 8)

Zoobank LSID: urn:lsid:zoobank.org:act:E3ECE4B7-C978-4B6C-9FB6-0935A0CA3039.

Type material. Holotype (intact ♀; MABIK CR00260950)

Korean name: ¹*추형동물노벌레 (신칭)

and paratype (♀, dissected) from washings of dredged invertebrates, east of Jeju Island, Korea Strait (33°20'30"N, 127°40'00"E), depth 123 m, collected by J. Lee, 17 Mar 2024. Holotype has been deposited in the MABIK, Seocheon, Korea. Dissected paratype is kept in the collection of I.-H. Kim.

Etymology. The name is derived from the Latin words *saeta* (= seta) and *-fero* (= bearing), alluding to the seta at the outer corner of the mandible.

Female. Body (Fig. 7A) moderately narrow. Body length 807 µm in dissected and described specimen (780 µm in holotype). Prosoma 530 × 345 µm, fusiform. Urosome (Fig. 7B) 4-segmented, consisting of fifth pedigerous somite, genital double-somite, and 2-segmented abdomen. Fifth pedigerous somite 90 µm wide. Genital double-somite 1.41 times longer than wide (130 × 92 µm), widest across 42% region of double-somite length, consisting of expanded anterior two-thirds and narrower third; expanded anterior part with roundly convex lateral margins; genital apertures positioned dorsolaterally at midway point of double-somite length. Two free abdominal somites 30 × 45 and 48 × 41 µm, respectively. Caudal rami very close to each other, rectangular; each ramus (Fig. 7C) 2.61 times longer than wide (47 × 18 µm), with 6 naked setae; seta II positioned dorsally at 55% of ramus length.

Rostrum (Fig. 7D) elongated, beak-like, much longer than wide. Antennule (Fig. 7E) 229 µm long, 7-segmented; armature formula 3, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked; aesthetascs thin, setiform. Antenna (Fig. 7F) 4-segmented; armature formula 1, 1, 3 + claw; and 3 + 4 claws; first endopodal segment longest, with pointed outer distal corner; third endopodal segment 1.62 times longer than wide (34 × 21 µm), its four distal claws much longer than segment, and outermost one of 3 setae winding, with blunt tip.

Labrum (Fig. 7G) with broadened proximal part and divergent posterolateral lobes; each lobe longer than wide, with rounded distal margin. Mandible (Fig. 7H) recurved, with 1 small, pinnate seta (instead of scale) at outer corner; gnathobase tapering, with finely serrate outer margin, spinulose inner margin, attenuated distal lash. Maxillule (Fig. 7I) bearing 1 naked seta on inner margin, 2 weakly pinnate setae and 1 dentiform process on distal margin. Maxilla (Fig. 7J) with unarmed syncoxa; basis bearing 3 setae and elongated distal lash; distal lash bearing about 10 spinules of unequal sizes along outer margin, minute spinules along distal half of inner margin, and 1 cusp laterally at proximal quarter of lash; seta I about 0.7 times as long as distal lash, bipinnate; seta II pinnate along inner margin; seta III small, naked. Maxilliped (Fig. 7K) 3-segmented, with unarmed syncoxa; basis inflated medially, with concave inner margin, armed with 1 pinnate seta and 1 spinulose spine; endopod as long as basis bearing 1 naked seta at proximal third; distal two-thirds of endopod spiniform, only slightly curved, with fine spinules along distal half

of both margins.

Legs 1 (Fig. 8A), 2 (Fig. 8B), and 3 with 3-segmented rami. Leg 4 (Fig. 8D) with 3-segmented exopod and 1-segmented endopod. Leg 3 exopod with 3 spines and 5 setae on third segment; endopod (Fig. 8C) with 3 spines and 2 setae on third segment. Inner coxal seta well-developed in legs 1–3, but absent in leg 4. Coxa of leg 1 with large tubercle on outer margin. Outer seta on basis of legs 1–4 naked. Third exopodal segment of legs 2–4 with bicuspid distal process. Endopodal segment of leg 4 small, 2.14 times longer than wide (30 × 14 µm), with pointed inner distal corner; its distal spine 46 µm long, about 1.5 times longer than endopodal segment, with serrated margins. Armature formula for legs 1–4 as follows:

	Coxa	Basis	Exopod	Endopod
Leg 1	0-1	1-0	I-0; I-1; III, I, 4	0-1; 0-1; I, 1, 4
Leg 2	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 3
Leg 3	0-1	1-0	I-0; I-1; II, I, 5	0-1; 0-2; I, II, 2
Leg 4	0-0	1-0	I-0; I-1; I, I, 5	0, I, 0

Leg 5 (Fig. 8E) consisting of 1 dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment small, 1.36 times longer than wide (15 × 11 µm) with pointed outer distal corner, and armed with 1 serrate spine 31 µm long and 1 naked seta 37 µm long. Leg 6 (Fig. 8E) represented by 2 small, naked setae of subequal lengths on genital operculum.

Male. Unknown.

Remarks. The genus *Phoronicola* is currently recognized as monotypic, represented solely by *P. spinulatus* Boxshall and Humes, 1988, which was described as an associate of a phoronid worm in Hong Kong (Boxshall and Humes, 1988). This species was subsequently redescribed by Kim and Huys (2012) based on newly collected specimens from New Caledonia. The morphological differences between *Phoronicola setifer* n. sp. and *P. spinulatus* are minimal; however, these differences are significant and can be outlined as follows: (1) the body length of the female *P. setifer* n. sp. is 0.81 mm, in contrast to 1.17 mm reported by Boxshall and Humes (1988) and 1.28 mm by Kim and Huys (2012) for *P. spinulatus*; (2) the posterolateral lobes of the labrum in *P. spinulatus* are distinctly narrower than those in *P. setifer* n. sp.; (3) the element at the outer corner of the mandible is an acutely pointed hyaline lamella in *P. spinulatus*, whereas it is a pinnate seta in *P. setifer* n. sp.; (4) the maxillule of *P. spinulatus* is armed with four setae, while *P. setifer* n. sp. has three setae and one dentiform process; (5) the endopod of the female maxilliped in *P. spinulatus* is distinctly shorter than the basis and bears a curved, claw-like distal part, whereas the endopod of *P. setifer* n. sp. is as long as the basis and has a spiniform distal part; and (6) female leg 6 of *P. spinulatus* bears two unequal setae (one longer pinnate and one shorter naked), while that of *P. setifer* n. sp. bears two sub-

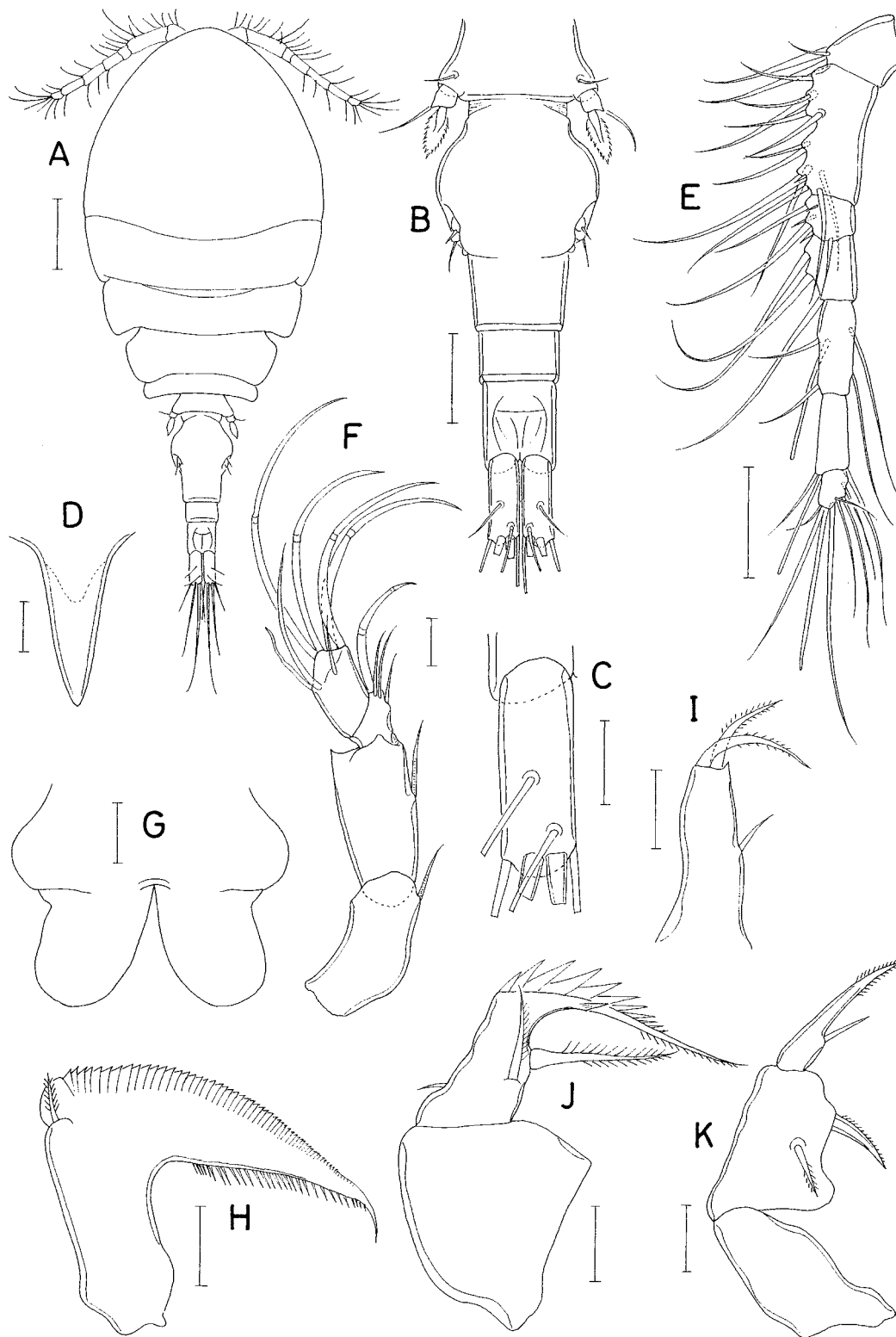


Fig. 7. *Phoronicola setifer* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Left caudal ramus, dorsal; D, Rostrum; E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla; K, Maxilliped. Scale bars: A=0.1 mm, B, E=0.05 mm, C, D, F-K=0.02 mm.

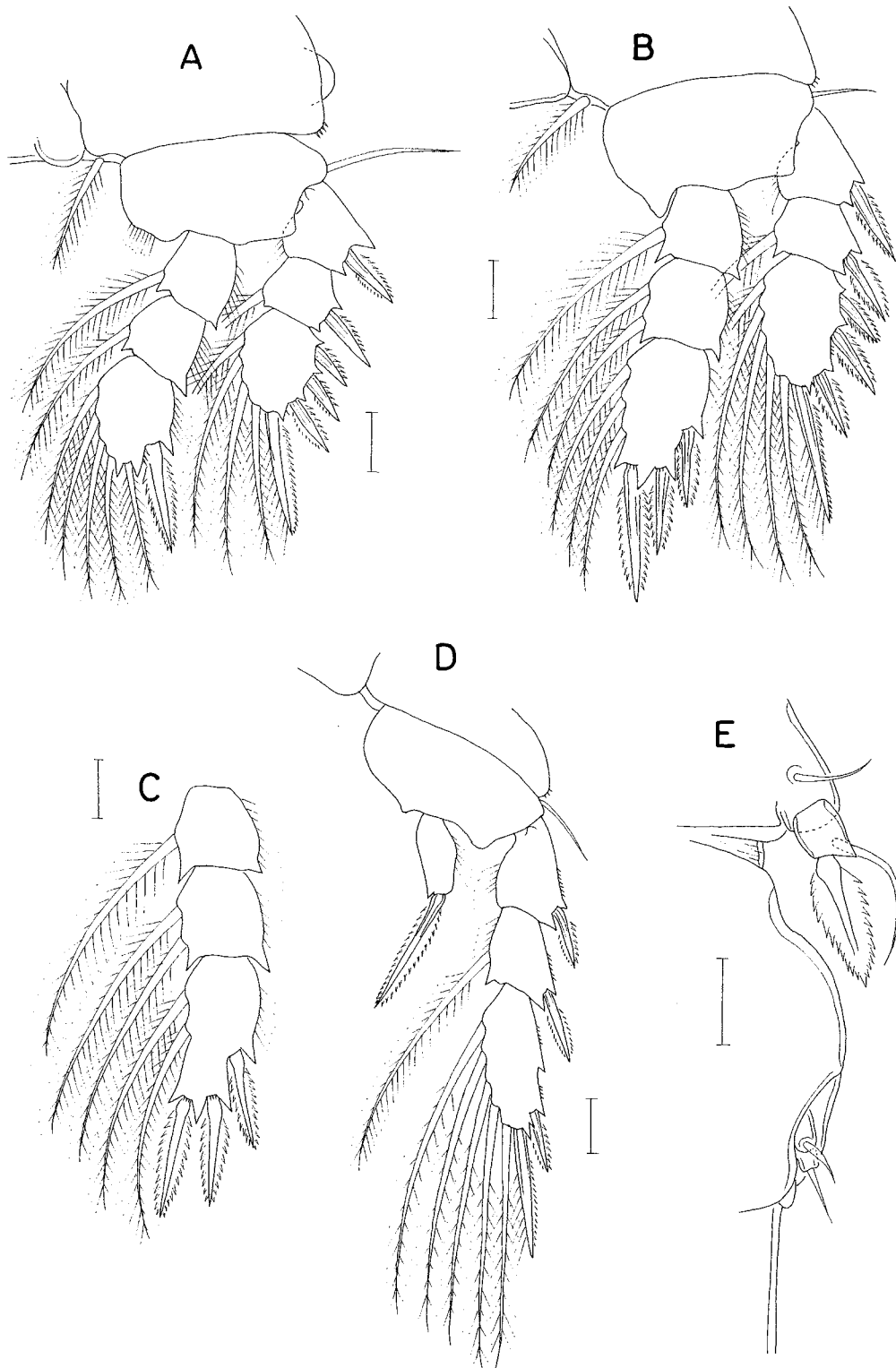


Fig. 8. *Phoronicola setifer* n. sp., female. A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4; E, Right leg 5 and genital aperture, dorsal. Scale bars: A-E=0.02 mm.

equal, naked setae. These differences, particularly character (3), appear to be sufficient to distinguish the two as distinct species.

Genus *Eupolymniphilus* Humes and Boxshall, 1996

¹**Eupolymniphilus mediterraneus*

Costanzo, Brugnano and Zagami, 2013 (Figs. 9, 10)

Type material. Two damaged ♀♀ from washings of dredged invertebrates, east of Jeju Island, Korea Strait (33°20'30"N, 127°40'00"E), depth 123 m, collected by J. Lee, 17 Mar 2024. One undissected ♀ (MABIK CR00260951; legs 2–4 damaged) has been deposited in the MABIK, Seochon, Korea. Dissected paratype is kept in the collection of I.-H. Kim.

Redescription of female. Body (Fig. 9A) narrow, with relatively large prosome and small urosome. Body length 930 µm. Prosome fusiform, 610 × 367 µm. Cephalothorax longer than wide, with faint dorsal suture line. Prosomal somites with angular posterolateral corners. Urosome (Fig. 9B) 5-segmented. Fifth pedigerous somite 134 µm wide, laterally bearing elongated, spear-shaped posterior process (this process longer than exopodal segment of leg 5) and small, dentiform anterior process (Fig. 10E). Genital double-somite 1.25 times longer than wide, consisting of broader anterior three-quarters and narrower posterior quarter, with acutely pointed dentiform dorsal process near genital aperture; genital apertures positioned laterally at widest region of double-somite. Three free abdominal somites 27 × 64, 18 × 60, and 64 × 56 µm, respectively. Anal somite with row of fine spinules along posteroventral margin. Caudal ramus (Fig. 9C) 2.70 times longer than wide (62 × 23 µm), slightly broadened at distal region, armed with 6 setae; seta II (Fig. 9D) located dorsally at 55% of double-somite length, modified, its proximal part expanded, tape-like, with bicuspid distally and tipped with long, slender part.

Rostrum (Fig. 9E) rather elongated, tapering, with rounded distal apex. Antennule (Fig. 9F) 264 µm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; setae naked, thin, mostly elongated; aesthetascs thin, setiform. Antenna (Fig. 9G) 4-segmented; armature formula 1, 1, 3 + claw, and 4 + 3 claws (one of elements on third endopodal segment omitted in Fig. 9G); 3 proximal segments bearing minute spinules along inner margin; first endopodal segment longest, with acutely pointed outer distal corner; third endopodal segment 2.21 times longer than wide (42 × 19 µm); claws slender, setiform, with annulation.

Labrum (Fig. 9H) with pointed lateral apex on broader proximal part; posterolateral lobes tapering, longer than wide, with rounded distal apex and convex inner margin. Mandible (Fig.

9I) recurved, with 1 dentiform outer scale at outer side near base of gnathobase; gnathobase elongated, arched, terminating in attenuated lash, with delicately serrate outer margin and row of about 15 large spinules along inner margin. Maxillule (Fig. 9J) as slender lobe bearing 3 setae apically and 1 seta on inner margin. Maxilla (Fig. 9K) with unarmed syncoxa; basis bearing long lash and 3 setae; seta I large, about 70% as long as distal lash, bearing patch of 4 large spinules proximally followed by row of minute spinules; seta II naked, straight; seta III vestigial; distal lash bearing curved row of about 10 large spinules proximally, followed by row of small spinules. Maxilliped (Fig. 9L) 3-segmented; syncoxa unarmed, slightly shorter than basis; basis inflated along proximal two-thirds, bearing 2 naked setae, proximal one of them strongly curved; endopod small, straight, evenly narrowing distally, with vestige of articulation at proximal one-fifth (proximal part from this region brownish) and 1 small seta on outer margin.

Legs 1 (Fig. 10A), 2 (Fig. 10B), 3, and 4 with 3-segmented rami; inner coxal seta pinnate in legs 1–3, but naked and small in leg 4 (Fig. 10D). Leg 3 similar to leg 2, except for bearing 4 spines and 2 setae on third endopodal segment (Fig. 10C). Third endopodal segment of leg 4 bearing 5 spines, lacking seta. Armature formula for legs 1–4 as follows:

	Coxa	Basis	Exopod	Endopod
Leg 1	0-1	1-0	I-0; I-1; III, I, 4	0-1; 0-1; I, 1, 4
Leg 2	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 3
Leg 3	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, I + 2
Leg 4	0-1	1-0	(not observed)	0-1; 0-1; I, II, II

Leg 5 (Fig. 10E) consisting of protopod and exopod; protopod completely fused to somite, bearing 1 dorsolateral pinnate seta, 1 small pointed process at anterodistal corner, and 1 large spear-shaped process at posterodistal corner; exopodal segment about 1.8 times longer than wide, with few minute spinules on inner margin and serrated membranous extension on distal margin; distal armature not observed due to its detachment. Leg 6 (Fig. 10E) represented by 2 naked setae and 1 denticle on genital operculum, each seta mounted on broadened proximal pedestal.

Male. Not collected.

Remarks. *Eupolymniphilus mediterraneus* was first described by Costanzo et al. (2013) as a planktonic species from the Mediterranean Sea. A comparison of the Korean specimens with the original description revealed no significant differences. The female urosome displays the characteristic features of this species: the fifth pedigerous somite has a large, spear-shaped dorsolateral process, and the genital double-somite contains a tooth-like dorsal process near the genital aperture. These

Korean name: ¹*지중해갯지렁이살이 (신칭)

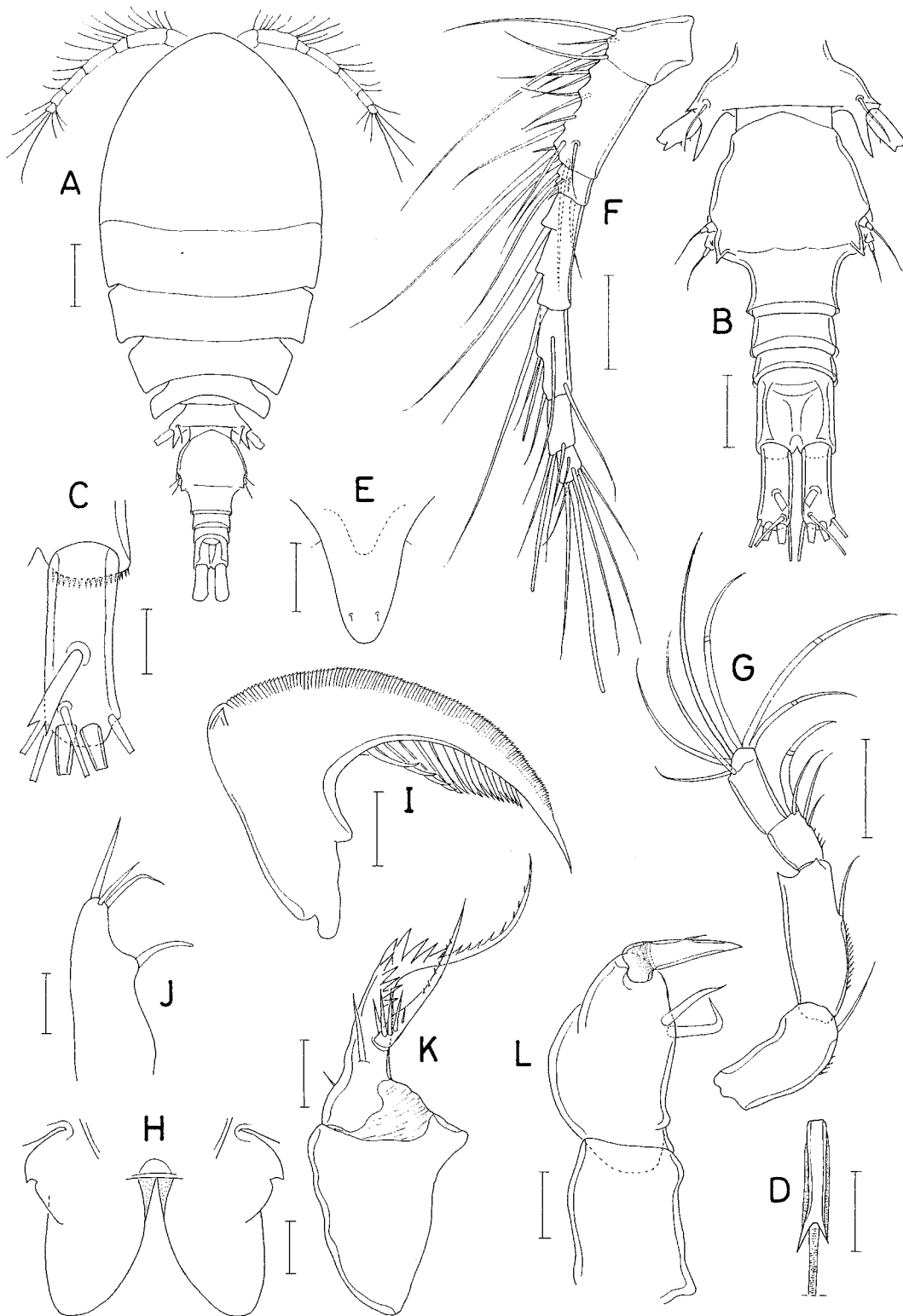


Fig. 9. *Eupolymniphilus mediterraneus* Costanzo, Brugnano and Zagami, 2013, female. A, Habitus, dorsal; B, Urosome, dorsal; C, Right caudal ramus, dorsal; D, Dorsal seta of caudal ramus; E, Rostrum; F, Antennule; G, Antenna; H, Labrum; I, Mandible; J, Maxillule; K, Maxilla; L, Maxilliped. Scale bars: A=0.1 mm, B, E-G=0.05 mm, C, D, H-L=0.02 mm.

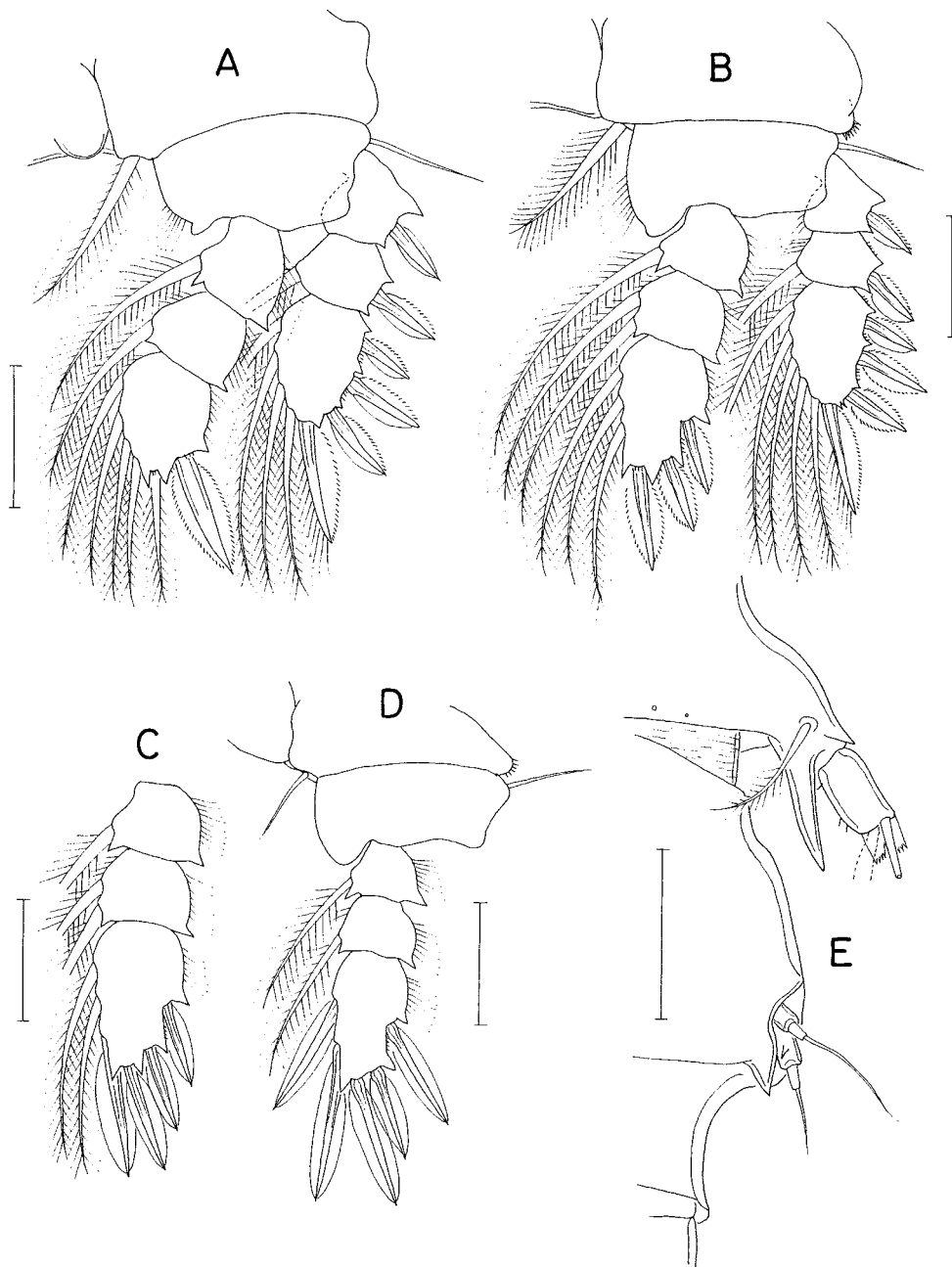


Fig. 10. *Eupolymniphilus mediterraneus* Costanzo, Brugnano and Zagami, 2013, female. A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4 (exopod missing); E, Right leg 5 and genital aperture, dorsal. Scale bars: A-E=0.05 mm.

traits, along with the identical shape of the double-somite, are present in both the Korean specimens and the type material, supporting their conspecificity despite their occurrence in zoogeographically distinct regions.

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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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