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Eight New Species of *Acanthomolgus* (Copepoda, Cyclopoida, Rhynchomolgidae) Associated with Octocorals from Korea

Jimin Lee[1], Taekjun Lee[2,3], Il-Hoi Kim[4,*]

[1]Ocean Climate Response · Ecosystem Research Department,
Korea Institute of Ocean Science & Technology, Busan 49111, Korea
[2]Department of Animal Resources Science, Sahmyook University, Seoul 01795, Korea
[3]Marine Biological Resource Institute, Sahmyook University, Seoul 01795, Korea
[4]Korea Institute of Coastal Ecology, Bucheon 14449, Korea

ABSTRACT

Eight new species of the genus *Acanthomolgus* are described as external associates of octocorallian corals from Korea. As diagnostic features of these new species, *A. taenichaetatus* n. sp. has ribbon-like distal caudal setae; *A. jei* n. sp. and *A. crassae* n. sp. have no inner proximal expansion on the exopodal segment of female leg 5, and the former species has only three setae on the maxillule (vs. four setae in other seven species). *Acanthomolgus notialis* n. sp. is similar to *A. oporinus* n. sp. in having a rounded inner proximal expansion on the exopodal segment of female leg 5, but the latter species is distinguished from the former by having longer caudal rami which are about 1.5 times longer than wide, by having a longer inner seta of the maxilla which is three quarters as long as distal lash, and by having unequal setae on the basis of maxilliped. *Acanthomolgus dokdoicus* n. sp., *A. rugosus* n. sp. and *A. triplus* n. sp. appear to be similar to one another in having an ear-like inner proximal expansion on the exopodal segment of female leg 5, but the genital double-somite of the female is distinctly longer than wide in *A. rugosus* n. sp. (wider than long in other two species), and the third endopodal segment of the antenna is distinctly shorter than the first endopodal segment in *A. triplus* n. sp. (vice versa in other two species). This is the first record on the genus *Acanthomolgus* in the temperate West Pacific.

Keywords: symbiotic copepods, octocorallian hosts, taxonomy

INTRODUCTION

The copepods of the family Rhynchomolgidae Humes and Stock, 1972 are mainly associated with cnidarians (Humes and Boxshall, 1996; Boxshall and Halsey, 2004). The genus *Acanthomolgus* Humes and Stock, 1972 belonging to the Rhynchomolgidae consists of 40 known species associated with octocorallian corals. All of these species were discovered in tropical waters in the Indo-West Pacific and the West Indies, except *Acanthomolgus eminulus* and *A. pollicaris* both of which were described by Humes and Lewbel (1977) from California, United States. The genus *Acanthomolgus* is distinguished from other genera in the family by the features that the antenna is 4-segmented, with two terminal claws, the mandible bears a long distal lash, and the endopod of leg 4 is 2-segmented, with an inner spine (short, non-flexible element) on the first segment and two distal spines on the second segment. In this paper eight new species of *Acanthomolgus* are described from Korean waters. This is the first record of the genus in the temperate West Pacific.

MATERIALS AND METHODS

The octocorallian hosts were collected by SCUBA diving. The collected hosts were agitated in the seawater contained in the plastic bag. Copepods were sorted out from detached material and have been preserved in 80% ethanol. The microscopic observations and measurements of copepods were done on specimens soaked in lactic acid for about 10 min,

*To whom correspondence should be addressed
Tel: 82-32-624-2030, Fax: 82-32-624-2039
E-mail: ihkim@gwnu.ac.kr

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using the reversed slide method of Humes and Gooding (1964). All figures were drawn with the aid of a drawing apparatus equipped on the light microscope. Lengths and widths of appendages were measured after dissections. The lengths of the appendage segments are given as the average of the longest and shortest margins. Morphological terminology mostly follows Huys and Boxshall (1991) and Humes and Boxshall (1996). Type specimens have been deposited in three institutes of Korea: Marine Biodiversity Institute of Korea (MABIK), Seocheon, National Institute of Biological Resources of Korea (NIBR), Incheon, and Honam National Institute of Biological Resources (HNIBR), Mokpo.

SYSTEMATIC ACCOUNTS

Order Cyclopoida Burmeister, 1834
Family Rhynchomolgidae Humes and Stock, 1972
Genus *Acanthomolgus* Humes and Stock, 1972

***Acanthomolgus jei* n. sp. (Figs. 1–3)**

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Type material. Holotype (intact ♀, MABIK CR00254752), paratypes (8 intact ♀♀, MABIK CR00254753), and dissected paratypes (1♀ and 1 damaged ♂) from washings of an unidentified horny coral, Beomseom, off Seogwipo, Jeju Island (approximately 33°12′55″N, 126°30′48″E), SCUBA, depth unknown, collected by J.-G. Je, 28 Nov 1999. Holotype and intact paratypes have been deposited in the MABIK, Seocheon. Dissected paratypes are kept in the collection of I.-H. Kim.

Etymology. The new species is named after Mr. Jong-Gil Je, the collector of the new species.

Female. Body (Fig. 1A) with broad prosome and narrow urosome. Body length 891 μm in dissected and figured paratype. Greatest width 473 μm across cephalothorax. Prosome oval, 600 μm long, occupying 67% of body length, consisting of cephalothorax and second to fourth pedigerous somites. Cephalothorax 375 μm long, with faint dorsal suture line between cephalosome and first pedigerous somite; posterolateral corners blunt. Urosome (Fig. 1B) 5-segmented. Fifth pedigerous somite (first urosomal somite) 105 μm wide. Genital double-somite about 1.2 times longer than wide (121 × 102 μm), consisting of broader anterior 80% and narrower posterior 20%; genital apertures large, positioned dorsolaterally at 56% region of double-somite length; broader anterior part with convex lateral margins. One beak-like, acutely pointed dorsal process present near genital aperture (Fig. 2G). Three free abdominal somites 28 × 55, 21 × 52, and 32 × 50 μm, respectively. Anal somite with denticles along posteroventral margin (Fig. 1C). Caudal ramus (Fig. 1C) 1.09 times longer than wide (24 × 22 μm), armed with 6 setae and ornamented with spinules along posteroventral margin; inner distal seta (seta VI) pinnate along inner margin, but other setae naked.

Rostrum (Fig. 1F) distinct, nearly spatulate, well-sclerotized. Antennule (Fig. 1D) slender, 340 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked; aesthetascs slender. Antenna (Fig. 1E) 4-segmented, consisting of coxobasis and 3-segmented endopod; coxobasis with 1 small inner seta distally; first endopodal segment 77 × 35 μm, with 1 subdistal inner seta and minute spinules along outer margin; second endopodal segment short, with 3 slender inner setae (lacking claw); third endopodal segment 4.05 times longer than wide (89 × 22 μm), with 5 small setae distally and 2 terminal claws; 2 terminal claws distinctly shorter than third endopodal segment, 58 and 55 μm long, respectively, shorter one slightly thicker than longer one; one of 5 distal setae positioned at base of longer claw.

Labrum (Fig. 1G) relatively long, with broad posterior lobes. Mandible (Fig. 1H) with deep inner proximal notch, broad, spinulose inner margin, elongate distal lash bearing spinules along both margins, fine denticles along outer margin of gnathobase, and row of small spinules along proximal outer margin (fused scale) of gnathobase. Maxillule (Fig. 1I) lobate, with 3 setae distally, lacking inner seta. Maxilla (Fig. 1J) 2-segmented, consisting of syncoxa and basis; syncoxa unarmed, smooth; basis with 3 setae and arched distal lash; inner seta (seta I) spiniform, one-third as long as distal lash, with about 10 spinules along outer margin and 7 spinules along inner margin; anterior seta (seta II) with fine spinules along inner margin; proximal seta (seta III) small, naked, distinct; distal lash serrate along outer margin with 30 unequal spinules. Maxilliped (Fig. 2A) 3-segmented; first segment (syncoxa) unarmed but ornamented with scattered rows of minute spinules; second segment (basis) shorter than first segment, armed with 2 unequal setae, longer seta 76 μm long, shorter seta 30 μm long; third segment (endopod) short, terminating in conical process bearing several spinules along both margins, with 1 spinulose spine and 1 minute seta.

Legs 1 (Fig. 2B), 2 (Fig. 2C), and 3 with 3-segmented exopod and endopod. Leg 3 similar to leg 2, except bearing 3 spines and 2 setae on third endopodal segment (Fig. 2D). Outer seta on basis of all swimming legs weakly pinnate. Leg 4 (Fig. 2E) with 3-segmented exopod and 2-segmented endopod; inner coxal seta rudimentary; inner distal margin of basis characteristically notched, as indicated by arrow in Fig. 2E; endopod with setules on outer margin but naked on

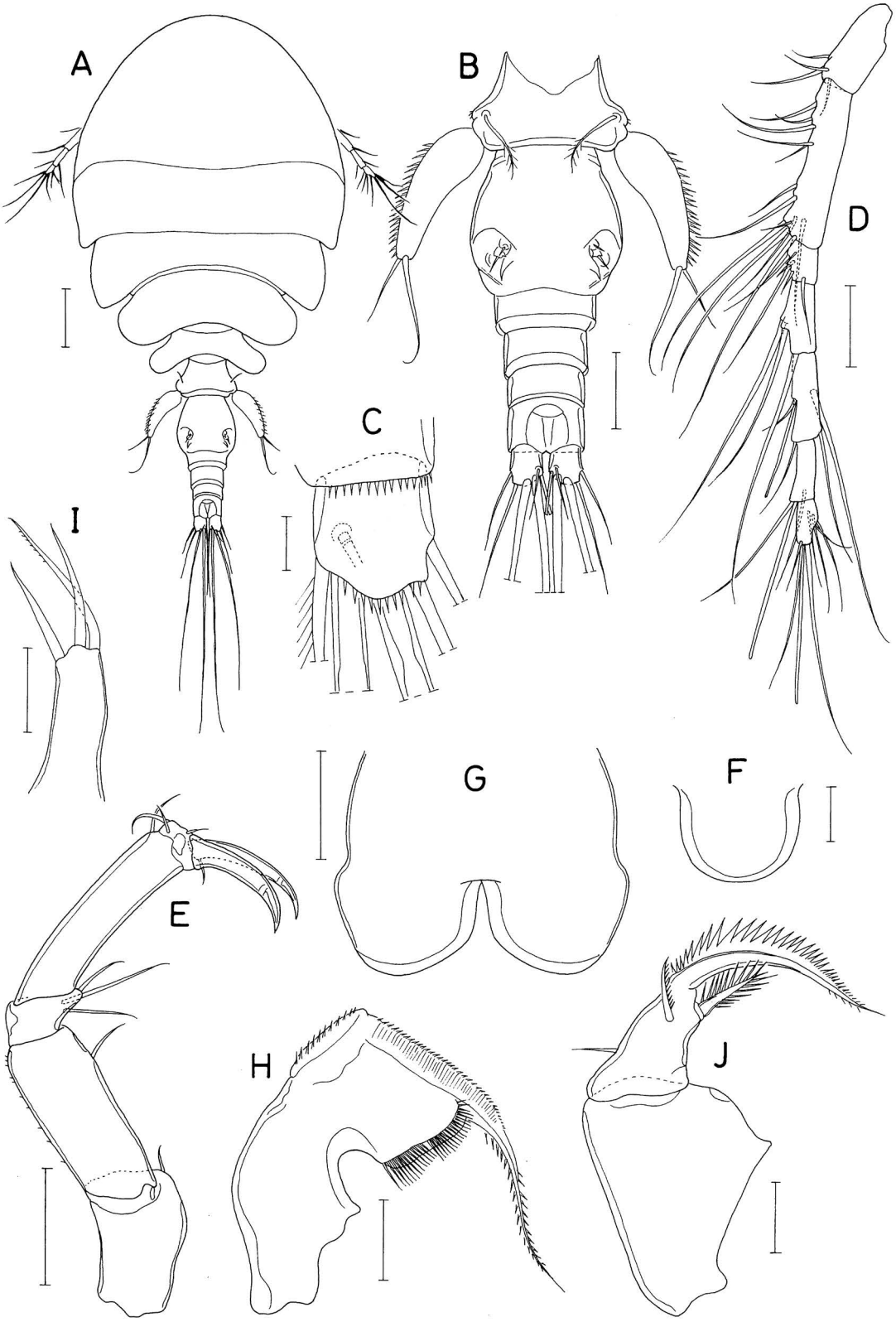

Fig. 1. *Acanthomolgus jei* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Left caudal ramus, ventral; D, Antennule; E, Antenna; F, Rostrum; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla. Scale bars: A=0.1 mm, B, D–G=0.05 mm, C=0.01 mm, H–J=0.02 mm.

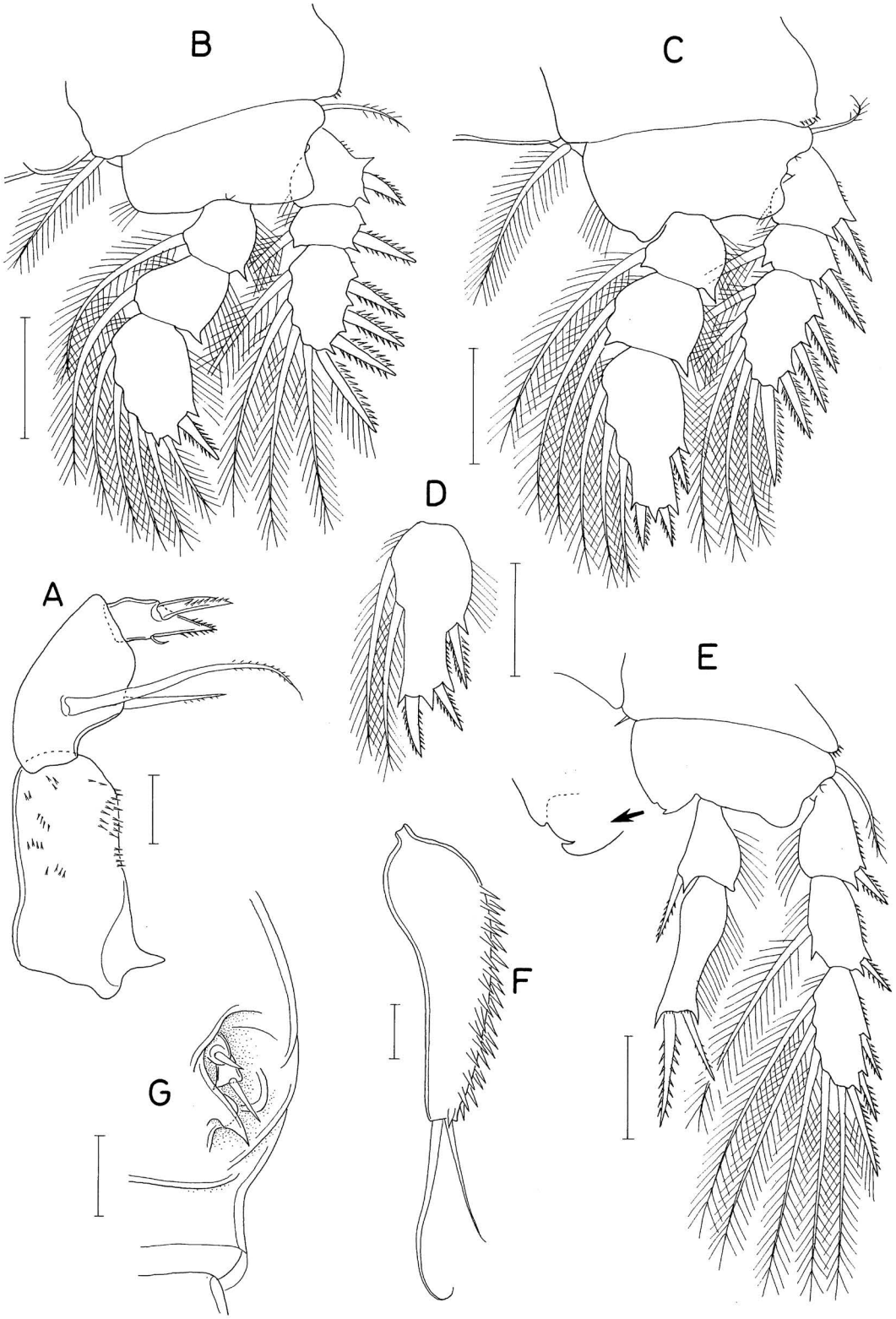

Fig. 2. *Acanthomolgus jei* n. sp., female. A, Maxilliped; B, Leg 1; C, Leg 2; D, Third endopodal segment of leg 3; E, Leg 4; F, Exopod of leg 5; G, Right genital aperture. Scale bars: A, F, G = 0.02 mm, B–E = 0.05 mm.

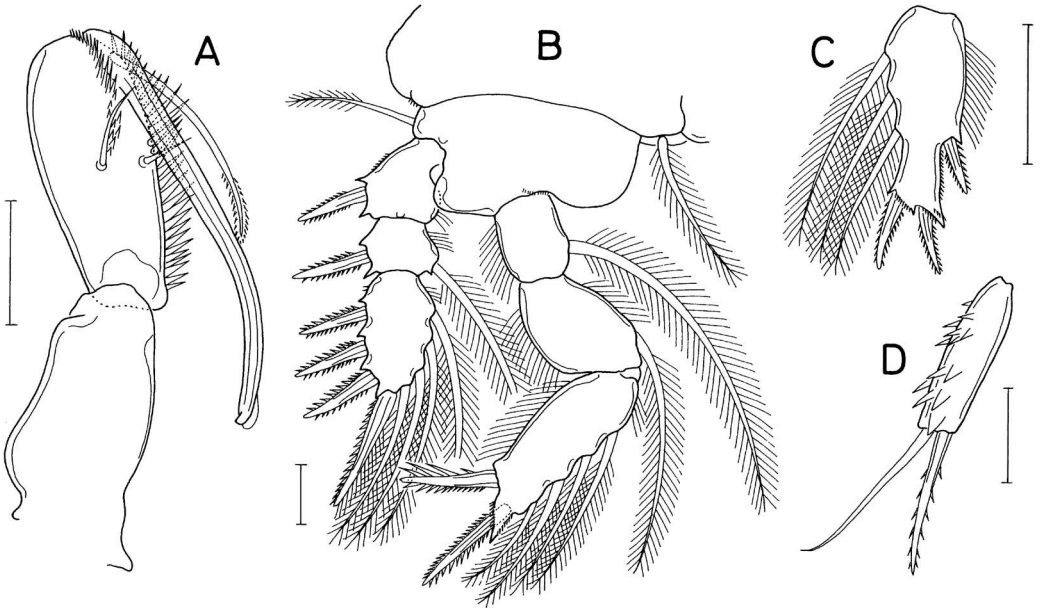

Fig. 3. *Acanthomolgus jei* n. sp., male. A, Maxilliped; B, Leg 1; C, Third endopodal segment of leg 2; D, Exopod of leg 5. Scale bars: A, C=0.05 mm, B, D=0.02 mm.

inner margin; inner spine on first endopodal segment 41 μm long, with minute spinules on margins; 2 distal spines on second endopodal segment 56 (inner) and 37 μm long (outer), 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-I; 0, II, 0

Leg 5 (Fig. 1B) consisting of pinnate dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 2F) 3.21 times longer than wide (109×34 μm), slightly curved in proximal region, gradually narrowing distally, densely ornamented with spinule-like scales on outer surface, distally armed with 2 naked setae; outer seta 46 μm long, inner seta 77 μm long; proximal region of exopodal segment broadened but lacking any inner swelling. Leg 6 (Fig. 2G) consisting of 2 small setae and 1 small, tooth-like process on genital operculum.

Male (damaged specimen). Rostrum as in female. Antennule with 3 additional aesthetascs, 2 on second segment and 1 on fourth segment. Antenna as in female, but first and second segments with additional, scale-like spinules on inner margin. Labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 3A) consisting of 3 segments and large terminal claw; first segment (syncoxa) unarmed and unornamented; second segment (basis) with 2 naked, subequal setae and 2 longitudinal rows of spinules, one of these rows along entire inner margin, the other row along distal half of segment; third segment (endopod) short and unarmed; terminal claw proximally with 1 large and 1 small seta.

Leg 1 (Fig. 3B) with sexually dimorphic endopod; endopod geniculate between second and third segments; third endopodal segment elongated, armed with 2 spines and 4 setae (formula I, I, 4). Third endopodal segment (Fig. 3C) of leg 2 lacking mid-terminal process, but with finely spinulose distal margin.

Leg 5 exopodal segment (Fig. 3D) 3.27 times longer than wide (36×11 μm), straight, with parallel inner and outer margins, distally armed with 1 slender, spinulose spine (31 μm long) and 1 naked seta (37 μm long).

Remarks. In *Acanthomolgus jei* n. sp. (1) the maxillule bears three setae and (2) the two terminal claws of the antenna are subequal in length. The first feature is shared by 19 congeners (cf. the maxillule bears four setae in 21 congeners) and the second feature is shared by 29 congeners (cf. the claws are very unequal, i.e., the longer claw is at least 1.5 times longer than shorter claw in 11 congeners). But both of the two features of the new species are shared only by seven congeners, as follows: *A. bilobipes* Humes and Stock, 1973, *A. combinatus* Humes, 1974, *A. disparidactylus* Kim, 2007, *A. eminulus* Humes and Lewbel, 1977, *A. gorgoniae* Humes,

1973, *A. pollicaris* Humes and Lewbel, 1977, and *A. variostratus* (Humes and Ho, 1968). *Acanthomolgus jei* n. sp. can be differentiated from these seven congeners by the following features: (1) the genital double-somite of the female is longer than wide (vs. the double-somite is wider than long in *A. bilobipes* and *A. disparicactylus*); (2) the first endopodal segment (second segment) of the antenna is shorter than the third endopodal segment (fourth segment) (vs. the first endopodal segment is longer than the third endopodal segment in *A. bilobipes*, *A. combinatus*, and *A. gorgoniae*); (3) the terminal claws of the antenna are distinctly shorter than the third endopodal segment (vs. the claws are longer than or as long as the third endopodal segment in *A. eminulus* and *A. variostratus*); (4) the exopod segment of female leg 5 is evenly tapering (vs. the inner margin of the exopodal segment is bilobed in *A. bilobipes* or bears a large process in *A. pollicaris*); (5) the longer seta on the basis (second segment) of the female maxilliped is about 2.5 times longer than the shorter seta (vs. the longer seta is at least four times longer than the shorter seta in *A. bilobipes*, *A. combinatus*, *A. eminulus*, *A. pollicaris*, and *A. variostratus*).

It is remarkable that one typical feature of the new species is the presence of a small, characteristic notch on the inner distal margin of the basis of leg 4, as indicated by arrow in Fig. 2E.

Acanthomolgus oporinus n. sp. (Figs. 4, 5)

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Type material. Holotype (intact ♀, MABIK CR00254754), intact paratypes (2♀♀, MABIK CR00254755), and dissected paratype (1♀) from washings of an unidentified horny coral, Munseom, near Seogwipo, Jeju Island (approximately 33°13′27″N, 126°33′58″E), SCUBA, depth 25 m, collected by S. Kim, 13 Nov 2013. Holotype and intact paratypes have been deposited in the MABIK, Seocheon. Dissected paratype is kept in the collection of I.-H. Kim.

Etymology. The specific name of the new species is derived from Greek *opor* (= Autumn), referring to the discovery of it in autumn.

Female. Body (Fig. 4A) with broad prosome and narrow urosome. Body length 845 μm in dissected and figured paratype, and 812 μm (786–880 μm) in average of 5 specimens. Prosome 561 × 404 μm. Cephalothorax with dorsal suture line between cephalosome and first pedigerous somite. All pedigerous somite with round lateral corners. Urosome (Fig. 4B) 5-segmented. Fifth pedigerous somite 105 μm wide. Genital double-somite nearly as long as wide (108 × 105 μm) with roundly convex lateral margins; genital apertures positioned dorsolaterally in middle of double-somite length. Three free abdominal somites 31 × 54, 26 × 52, and 32 × 54 μm, respectively. Anal somite with row of minute spinules along posteroventral margin (Fig. 4C). Caudal ramus 1.52 times longer than wide (35 × 23 μm), armed with 6 setae and ornamented with spinules along posteroventral margin; setae III–VI pinnate, other 2 setae naked.

Rostrum (Fig. 4D) distinct, with round distal margin. Antennule (Fig. 4E) slender, 285 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked. Antenna (Fig. 4F) 4-segmented; armature formula 1, 1, 2 + claw, and 5 + 2 claws; first endopodal segment (second segment) longest, 66 × 28 μm; claw on second endopodal setiform, but geniculated; third endopodal segment 2.47 times longer than wide (47 × 19 μm), about 0.7 times as long as first endopodal segment; 2 terminal claws subequal in length, thicker claw 42 μm long, and slender claw 38 μm long; one of setae inserted into base of slender claw.

Labrum (Fig. 4G) broad. Paragnath (Fig. 4G) as setulose lobe. Mandible (Fig. 4H) with deep proximal notch, spinulose inner margin, finely denticulated outer margin of gnathobase, and row of minute spinules at base of gnathobase; distal lash slender, spinulose. Maxillule (Fig. 4I) with 4 setae, distal 3 of them finely spinulose; inner one of them not articulated at base. Maxilla (Fig. 4J) 2-segmented; proximal segment (syncoxa) unarmed; distal segment (basis) with arched distal lash and 3 unequal setae; inner seta (seta I) spiniform, about one-third as long as distal lash, with about 8 spinules along outer margin and 2 or 3 spinules along inner margin; anterior seta (seta II) finely spinulose along inner margin; proximal seta (seta III) vestigial; distal lash with about 25 spinules along concave outer margin and about 6 spinules along subdistal region of inner margin. Maxilliped (Fig. 4K) 3-segmented; first segment longest but unarmed and unornamented; second segment with 2 spinulose inner setae, longer one 22 μm long, and shorter one 12 μm long; third segment terminated in spiniform process (slightly expanded subdistally) bearing several spinules, with 1 spinulose spine and 1 small seta.

Legs 1 (Fig. 5A), 2 (Fig. 5B) and 3 with 3-segmented rami. Leg 4 (Fig. 5D) with 3-segmented exopod and 2-segmented endopod. Inner coxal seta well-developed, pinnate in legs 1–3, but minute, vestigial in leg 4. Outer seta on basis of these legs small and naked. Leg 3 similar to leg 2, except its third endopodal segment armed with 3 spines and 2 setae (Fig. 5C). Two distal spines on second endopodal segment of fourth leg 46 μm (inner) and 24 μm long (outer). Armature formula for legs 1–4 as in *A. jei* n. sp.

Leg 5 (Fig. 4B) consisting of small dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment

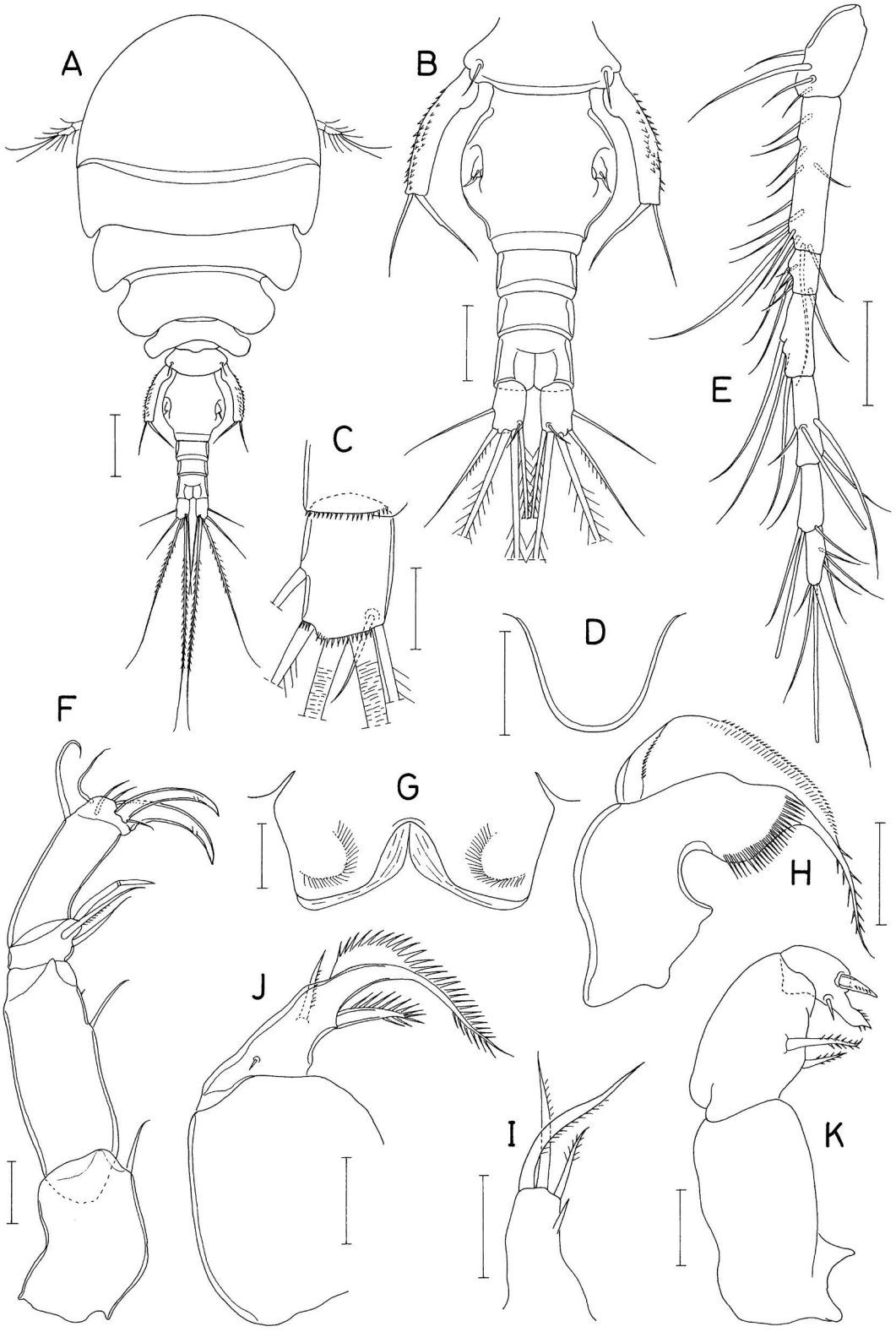

Fig. 4. *Acanthomolgus oporinus* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Right caudal ramus, ventral; D, Rostrum; E, Antennule; F, Antenna; G, Labrum and paragnaths; H, Mandible; I, Maxillule; J, Maxilla; K, Maxilliped. Scale bars: A = 0.1 mm, B, D, E = 0.05 mm, C, F–K = 0.02 mm.

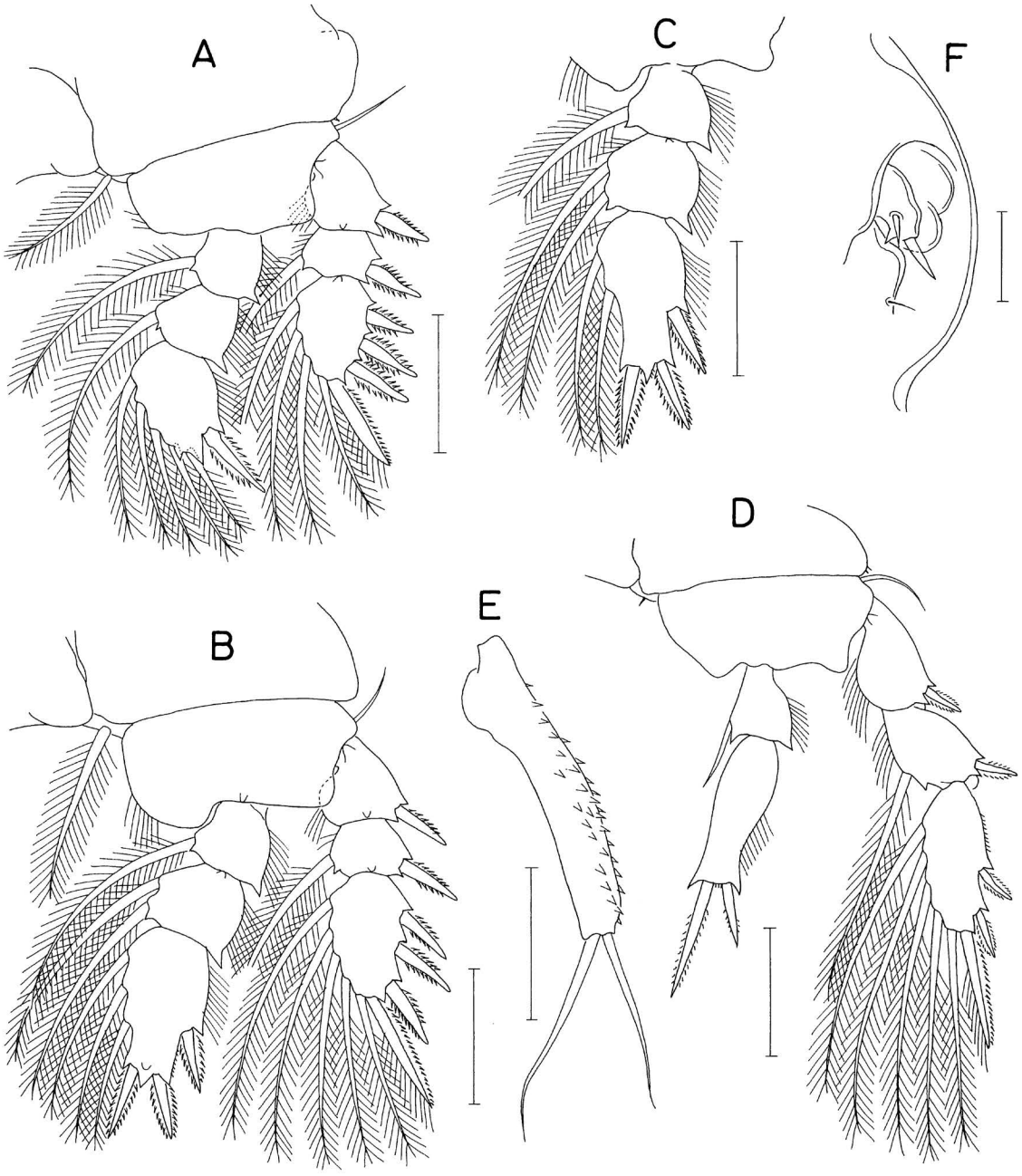

Fig. 5. *Acanthomolgus oporinus* n. sp., female. A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4; E, Exopod of leg 5; F, Right genital aperture. Scale bars: A–E = 0.05 mm, F = 0.02 mm.

(Fig. 5E) 4.62 times longer than wide, 106 μm long, with proximal inner expansion (23 μm wide at this region), but with parallel margins distal to proximal expanded region (17 μm wide in parallel region), distally armed with 2 naked setae (74 and 59 μm long, respectively) and ornamented with scales on outer surface. Leg 6 (Fig. 5F) represented by 2 spinule-like setae and 1 small denticle on genital operculum.

Male. Unknown.

Remarks. The caudal rami in *Acanthomolgus* is generally short, at most 2.27 times longer than wide, as recorded in *A. bayeri* Humes, 1973 (Humes, 1973). In *A. oporinus* n. sp., the ramus is 1.52 times longer than wide and a similar dimension of the ramus is represented in 15 congeners where the ramus is distinctly longer than wide but not more than twice as long (a range of length/width ratio 1.0 to 2.0). Five of these 15 are comparable with the new species, since they

have four setae on the maxillule as in the new species: *A. exilipes* (Humes and Ho, 1968), *A. hales* Humes and Stock, 1973, *A. plantei* Humes and Stock, 1973. *A. telestophilus* (Humes and Ho, 1968), and *A. tenuispinatus* Kim, 2009. In the antenna of *A. oporinus* n. sp., the third endopodal segment is distinctly shorter than the first endopodal segment, thus the new species is distinguished from *A. exilipes*, *A. plantei*, and *A. tenuispinatus* in which the third endopodal segment of the antenna is distinctly longer than the first endopodal segment. *Acanthomolgus oporinus* n. sp. differs also from *A. hales* and *A. telestophilus* in having the two setae on the basis of the female maxilliped that are 22 and 12 μm long, respectively, i.e., the longer seta is only twice longer than the shorter seta, in contrast to the extremely unequal lengths of these setae (the longer seta is at least five times longer than the shorter) in *A. hales* and *A. telestophilus*, according to the illustrations in the original descriptions of these species (Humes and Ho, 1968; Humes and Stock, 1973).

Acanthomolgus triplus n. sp. (Figs. 6–8)

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Type material. Holotype (intact ♀, MABIK CR00254756), intact paratypes (6♀♀, 6♂♂, MABIK CR00254757), and dissected paratypes (1♀, 1♂) from washings of an unidentified horny coral, Munseom, near Seogwipo, Jeju Island (approximately 33°13′27″N, 126°33′58″E), SCUBA, depth 30 m, collected by S. Kim, 13 Nov 2013. Holotype and intact paratypes have been deposited in the MABIK, Seocheon. Dissected paratype is kept in the collection of I.-H. Kim.

Etymology. The specific name is derived from Latin *tripl* (= three-fold), alluding to the dimension of the fourth segment of the antenna which is about three times longer than wide.

Female. Body (Fig. 6A) as in *A. jei* n. sp. and *A. oporinus* n. sp. Body length of dissected and figured paratype 827 μm. Prosome 623 × 492 μm. Cephalothorax 370 μm long, with dorsal suture line between cephalosome and first pedigerous somite. Third pedigerous somite bearing large dorsal tubercle (Fig. 6A). Urosome (Fig. 6B) 5-segmented. Fifth pedigerous somite 115 μm wide. Genital double-somite wider than long (105 × 122 μm), consisting of roundly expanded anterior part and short, narrower posterior part; genital apertures positioned dorsolaterally near middle of double-somite length; one small, pointed process present on dorsal surface near genital aperture (Fig. 7H). Three free abdominal somites 19 × 68, 11 × 66, and 25 × 62 μm, respectively. Anal somite (Fig. 6C) with large anal opening and ornamented with fine spinules along posteroventral margin. Caudal ramus slightly wider than long (25 × 27 μm), with 6 setae and ornamented with fine spinules along posteroventral margin. Egg sac (Fig. 6D) 477 × 172 μm; eggs small, 40 μm in diameter.

Rostrum (Fig. 6E) distinct, semicircular. Antennule (Fig. 6F) slender, 365 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked; aesthetascs slender, setiform. Antenna (Fig. 6G) 4-segmented; armature formula 1, 1, 2 + claw, and 5 + 2 claws; first endopodal segment (second segment) 2.19 times longer than wide (81 × 37 μm), with several minute spinules on outer margin; claw of second endopodal segment geniculated; third endopodal segment 3.05 times longer than wide (67 × 22 μm), shorter than first endopodal segment, with several minute spinules on distal part of inner margin; 2 terminal claws consisting of longer but slender one (55 μm long) and thicker but shorter one (44 μm long), both distinctly shorter than third endopodal segment.

Labrum (Fig. 6H) with broad posterior lobes; paragnath (Fig. 6H) as setulose lobe. Mandible (Fig. 7A) with deep inner proximal notch, densely spinulose inner margin, finely denticulated outer margin, and row of spinules at base of gnathobase; distal lash elongated, spinulose. Maxillule (Fig. 6I) with 4 setae; smaller inner one of 3 distal setae finely spinulose, other setae naked. Maxilla (Fig. 7B) with unarmed first segment; distal segment terminated in arched distal lash, with 3 unequal setae; inner seta (seta I) with 8 or 9 spinules along outer margin and 1 spinule at subdistal region of inner margin; anterior seta (seta II) spinulose along inner margin; proximal seta (seta III) vestigial; distal lash spinulose along entire outer margin and distal part of concave inner margin. Maxilliped (Fig. 7C) 3-segmented; first segment with patch of 6 spinules on posterior surface and few minute spinules on inner margin; second segment with 2 setae, spinulose longer seta 35 μm long, and naked smaller seta 18 μm long; third segment with 2 spinulose spines and 1 minute seta.

Legs 1 (Fig. 7D), 2 (Fig. 7E) and 3 with 3-segmented rami. Leg 4 (Fig. 7F) with 3-segmented exopod and 2-segmented endopod. Inner coxal seta well-developed, pinnate in legs 1–3, but vestigial in leg 4. Outer seta on basis of legs 1–4 naked. Leg 3 similar to leg 2, except bearing 3 spines and 2 setae on third endopodal segment. Inner spine on first endopodal segment of fourth leg 30 μm long; second endopodal segment 82 × 19 μm, its 2 distal spines 68 μm (inner) and 27 μm long (outer). Armature formula for legs 1–4 as in *A. jei* n. sp.

Leg 5 (Fig. 6B) consisting of dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 7G) 137 μm long, with ear-like proximal expansion (31 μm wide across this region), small point at proximal third of

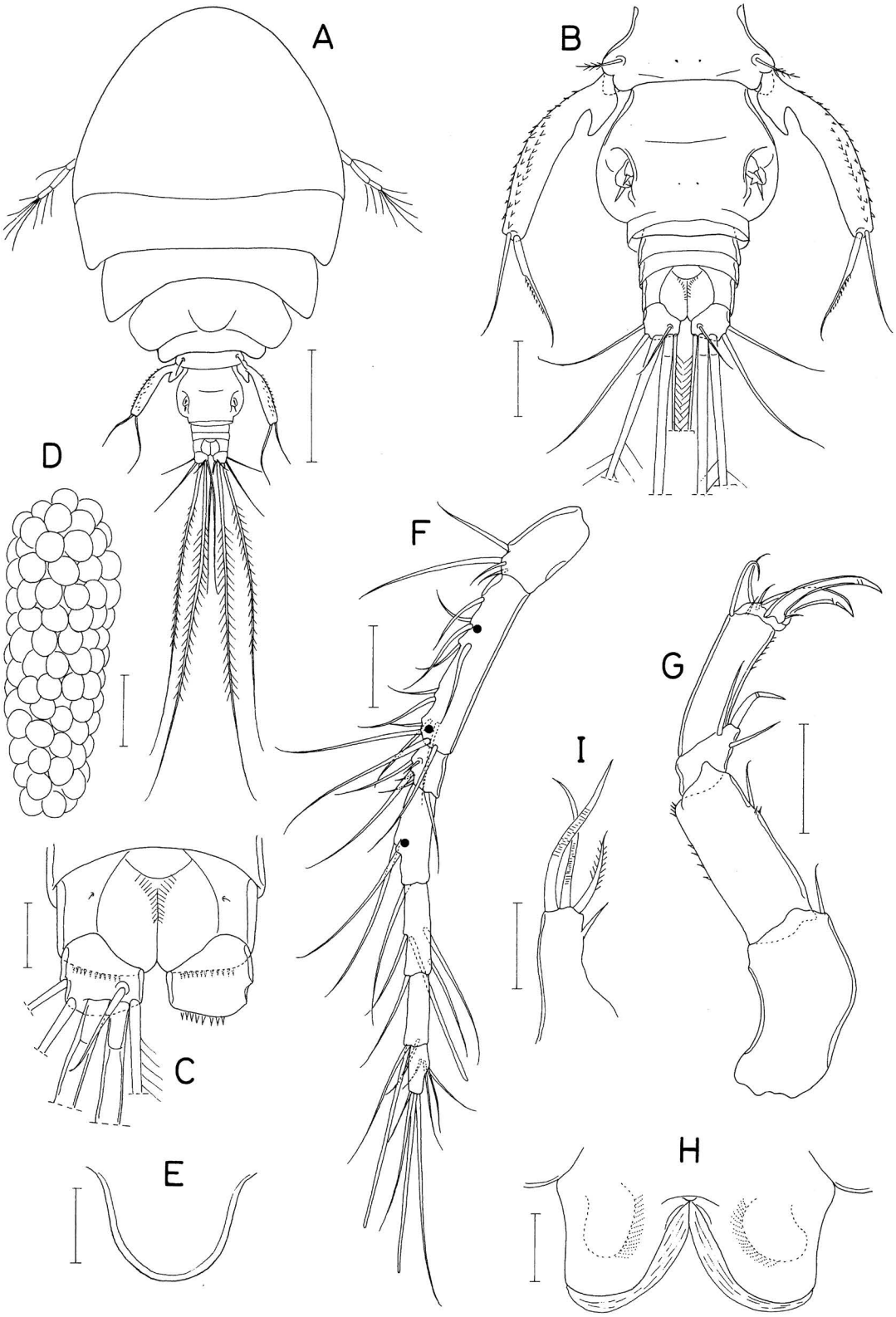

Fig. 6. *Acanthomolgus triplus* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Anal somite and caudal rami, dorsal; D, Egg sac; E, Rostrum; F, Antennule; G, Antenna; H, Labrum; I, Maxillule. Scale bars: A=0.2 mm, B, E–G=0.05 mm, C, H, I=0.02 mm, D=0.1 mm.

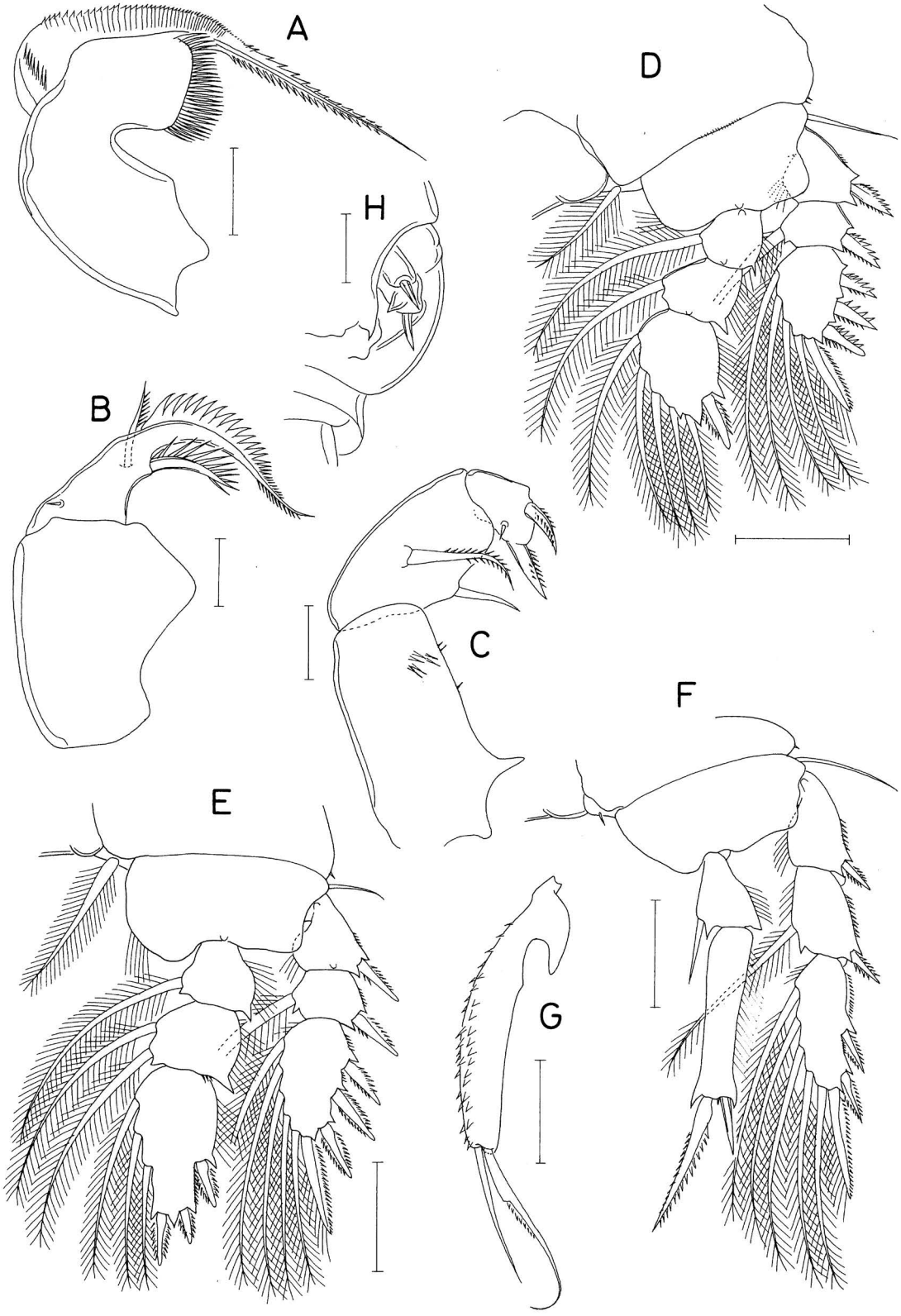

Fig. 7. *Acanthomolgus triplus* n. sp., female. A, Mandible; B, Maxilla; C, Maxilliped; D, Leg 1; E, Leg 2; F, Leg 4; G, Exopod of leg 5; H, Right genital aperture. Scale bars: A–C, H = 0.02 mm, D–G = 0.05 mm.

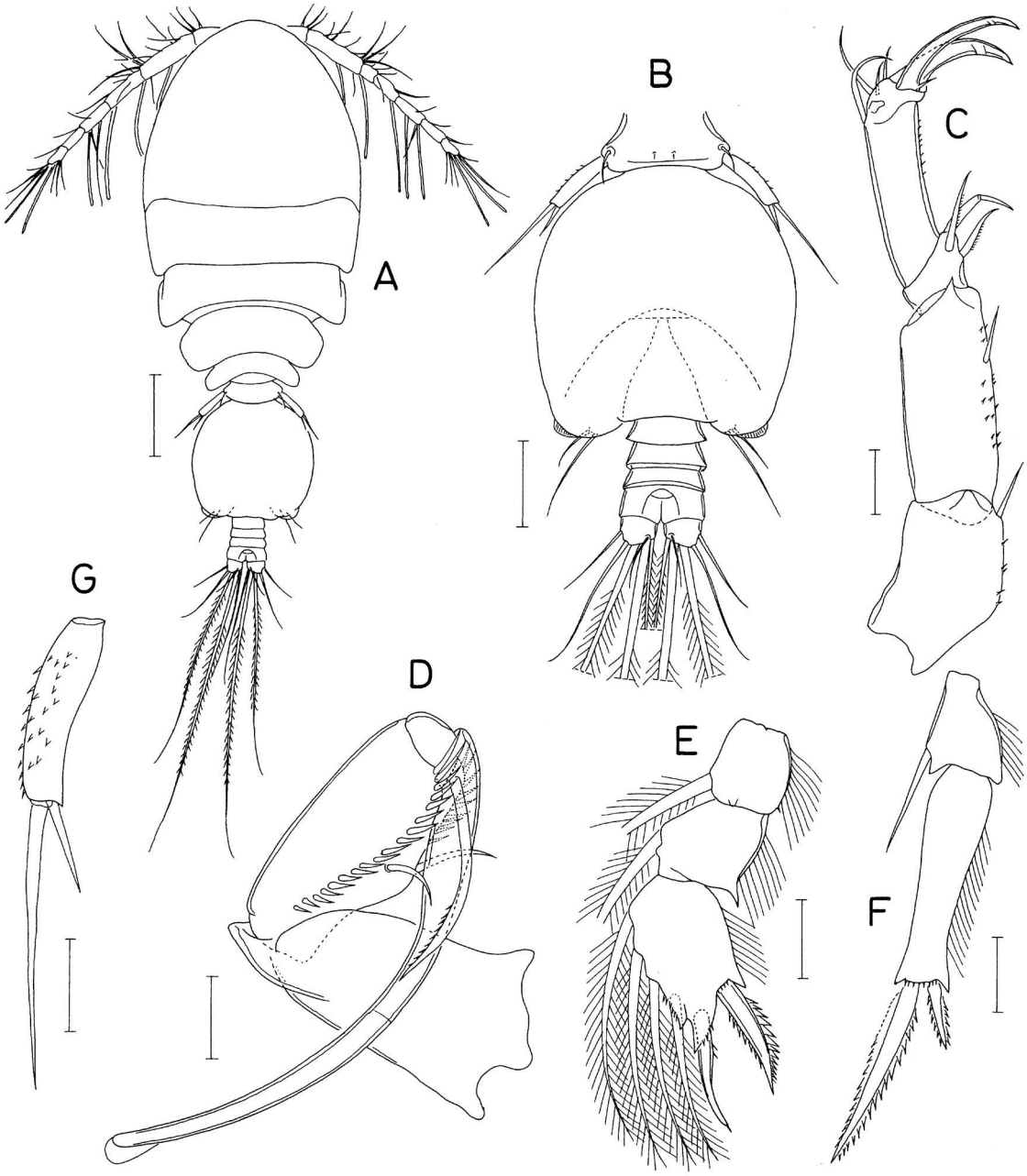

Fig. 8. *Acanthomolgus triplus* n. sp., male. A, Habitus, dorsal; B, Urosome, dorsal; C, Antenna; D, Maxilliped; E, Endopod of leg 1; F, Endopod of leg 4; G, Exopod of leg 5. Scale bars: A = 0.1 mm, B = 0.05 mm, C–G = 0.02 mm.

inner margin (23 μm wide at this region), scattered scales on outer surface, and 2 setae on distal margin, longer inner one of latters with row of fine spinules along sub-proximal region. Leg 6 (Fig. 7H) represented by 2 spiniform elements and 1 denticle on genital operculum.

Male. Body (Fig. 8A) narrower than that of female. Body length of dissected specimen 692 μm. Prosome 455 × 271 μm. Urosome (Fig. 8B) 6-segmented. Fifth pedigerous somite 66 μm wide, much narrower than genital somite. Genital somite large, as long as wide (146 × 146 μm), bearing short membranous fringe at posterolateral corners. Abdomen small, shorter than genital somite. Four abdominal somites 15 × 45, 15 × 46, 12 × 46, and 18 × 48 μm, respectively. Caudal ramus 0.77 times longer than wide (17 × 22 μm).

Rostrum as in female. Antennule with 3 additional aesthetascs, 2 on second segment and 1 on fourth segment at plac-

es of dark spots in Fig. 6F. Antenna (Fig. 8C) as in female, but coxobasis and first endopodal segment ornamented with minute spinules on inner surface; fourth segment 3.41 times longer than wide (58 × 17 μm).

Labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 8D) consisting of 3 segments and terminal claw; first segment unarmed; second segment with 2 equal, naked setae and 2 longitudinal rows of spinules; short third segment unarmed; terminal claw arched, elongated, 148 μm long, slightly longer than combined first and second segments, tipped with short membranous fringe, proximally with 1 large and 1 small seta.

Leg 1 endopod (Fig. 8E) with 2 spines and 4 setae on third segment, distal one of these spines slightly curved, slender, with few spinules proximally. Leg 4 endopod (Fig. 8F) shaped as that of female; distal segment 59 × 16 μm; 2 distal spines 53 and 19 μm long, respectively.

Exopodal segment of leg 5 (Fig. 8G) 3.73 times longer than wide (41 × 11 μm), with scales on outer surface; 2 distal setae naked, 61 and 21 μm long, respectively. Leg 6 (Fig. 8B) represented by 2 unequal setae on distal margin of genital operculum.

Remarks. The most prominent morphological features of *A. triplus* n. sp. are the presences of the distally directed ear-like (beak-like) inner proximal expansion on the exopodal segment of female leg 5 and a dorsal tubercle on the third pedigerous somite of the female. The first feature has been reported in five species in the genus (Humes, 1974; Kim, 2009): *A. arctatipes* Humes, 1974, *A. astrictus* Humes and Stock, 1973, *A. cuneipes* (Humes and Ho, 1968), *A. longispinifer* (Humes and Ho, 1968), and *A. tenuispinatus*. The new species is easily distinguished from those five congeners, since in the five congeners, the genital double-somite of the female is as long as wide or slightly longer than wide (wider than long in the new species). In the new species the third endopodal segment of the antenna is shorter than the first endopodal segment (the third endopodal segment is longer than or as long as the first endopodal segment in *A. astrictus*, *A. longispinifer*, and *A. tenuispinatus*), the terminal claws of the antenna are shorter than the third endopodal segment (longer one of the claws nearly as long as the fourth segment in *A. astrictus*, *A. cuneipes*, *A. longispinifer*, and *A. tenuispinatus*), and the exopod of the male leg 5 is armed distally with two setae (armed with one spine and one seta in *A. arctatipes* and *A. cuneipes*). While describing *A. brevifurca*, Humes (1990) did not point out the dorsal tubercle on the third pedigerous somite of the female but clearly figured it. The latter species is, however, not confusable with the new species in having a different form of the exopodal segment of female leg 5 and other significantly different features.

***Acanthomolgus dokdoicus* n. sp. (Figs. 9, 10)**

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Type material. Holotype (intact ♀, NIBRIV0000901210) from washings of an unidentified horny coral, Dokdo Island (approximately 37°14′22″N, 131°51′49″E), SCUBA, depth 15 m, collected by T. Lee, 23 Aug 2022. Paratype (♀, dissected and figured) from washings of an unidentified horny coral, Dokdo Island (approximately 37°14′44″N, 131°51′53″E), SCUBA, depth 28 m, collected by T. Lee, 22 Aug 2022. Holotype has been deposited in the National Institute of Biological Resources (NIBR), Incheon. Dissected paratype is kept in the collection of I.-H. Kim.

Etymology. The new species is named after the type locality, Dokdo Island.

Female. Body (Fig. 9A) similar to that of *A. triplus* n. sp. Body length of dissected paratype 890 μm. Prosome 610 × 429 μm. Cephalothorax 400 μm long. All prosomal somites with rounded posterolateral corners. Third pedigerous somite bearing 1 tubercle dorsally. Urosome (Fig. 9B) 5-segmented. Fifth pedigerous somite 129 μm wide. Genital double-somite wider than long (114 × 126 μm), widest at about 60% region of double-somite length, with narrower posterior one-fifth; genital apertures large, positioned dorsolaterally; lateral margins of genital region fringed with transparent membrane. Three free abdominal somites 32 × 74, 23 × 70, and 27 × 64 μm, respectively. Anal somite with spinule row along posteroventral margin (Fig. 9C). Caudal ramus (Fig. 9C) wider than long (22 × 26 μm), armed with 6 setae and ornamented with spinules along posteroventral margin.

Rostrum (Fig. 9D) distinct, semicircular, with rounded distal margin. Antennule (Fig. 9E) slender, 364 μm long, 7-segmented; armature formula 4, 12, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all seta naked; aesthetascs thin, setiform. Antenna (Fig. 9F) 4-segmented; armature formula 1, 1, 3, and 5 + 2 claws; first endopodal segment 76 × 41 μm, ornamented with small spinules on inner and outer margins; second endopodal segment lacking claw (all elements non-geniculated); third endopodal segment 4.61 times longer than wide (106 × 23 μm), about 1.4 times longer than first endopodal segment, ornamented with few spinules on distal part of inner margin; lengths of 2 terminal claws 94 μm (slender one) and 70 μm (thicker one); one of distal setae inserted on basal part of longer spine.

Labrum (Fig. 9G) broad, formed as in *A. triplus* n. sp. Mandible (Fig. 9H) similar to that of *A. triplus* n. sp.; distal lash longer than length of gnathobase, spinulose along both margins. Maxillule (Fig. 9I) with 4 setae, apical 3 of them obscurely pinnate. Maxilla (Fig. 9J) similar to that of *A. triplus* n.

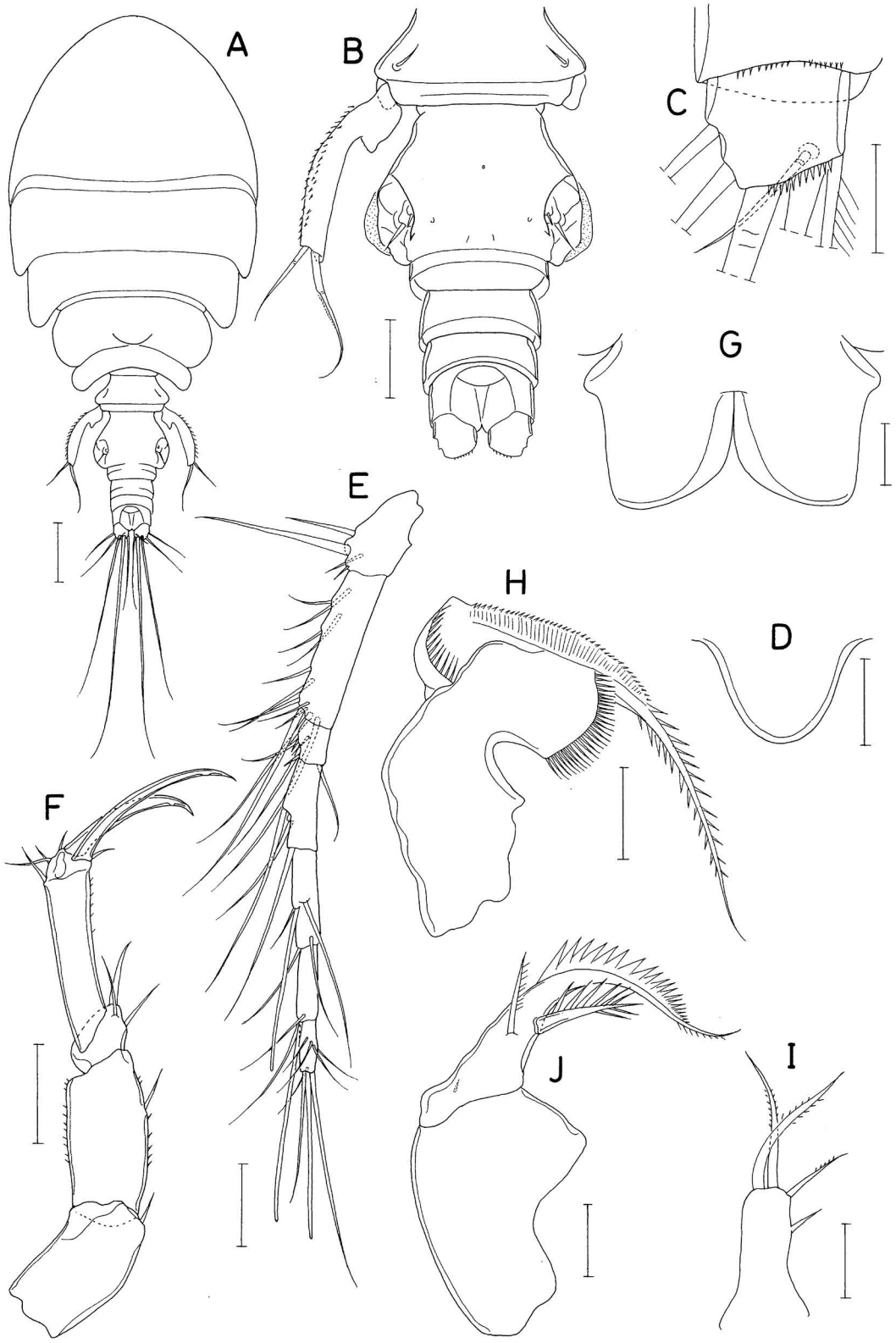

Fig. 9. *Acanthomolgus dokdoicus* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Right caudal ramus, ventral; D, Rostrum; E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla. Scale bars: A=0.1 mm, B, D–F=0.05 mm, C, G–J=0.02 mm.

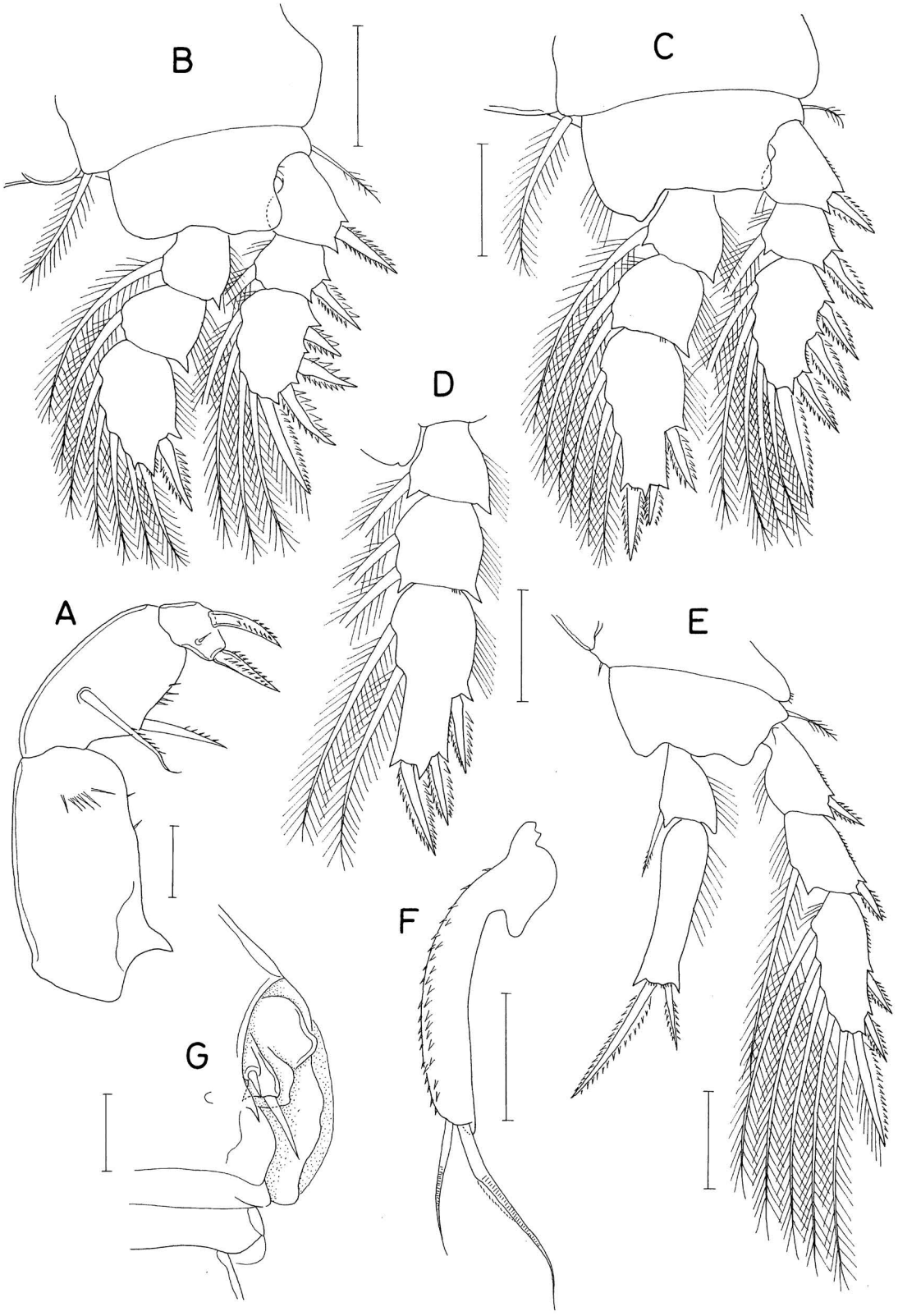

Fig. 10. *Acanthomolgus dokdoicus* n. sp., female. A, Maxilliped; B, Leg 1; C, Leg 2; D, Endopod of leg 3; E, Leg 4; F, Exopod of leg 5; G, Right genital aperture. Scale bars: A, G=0.02 mm, B–F=0.05 mm.

Table 1. Differences between three species of *Acanthomolgus*

Characters	*A. triplus* n. sp.	*A. dokdoicus* n. sp.	*A. rugosus* n. sp.
Genital double-somite (♀)	Wider than long	Wider than long	Longer than wide
Dorsal surface of genital double-somite (♀)	Smooth	Smooth	Rugose
Lateral membranous fringe on genital double-somite (♀)	Absent	Present	Absent
Third endopodal segment of antenna	Shorter than first endopodal segment	Longer than first endopodal segment	Longer than first endopodal segment
Inner spine on distal segment of leg 4	About 2.5 times longer than outer spine	About 2.0 times longer than outer spine	About 2.5 times longer than outer spine
Armature of ♂ leg 4 exopod	2 setae	Unknown	1 spine+1 seta

sp.; inner seta with 6 or 7 spinules along outer margin and 2 spinules at distal part of inner margin. Maxilliped (Fig. 10A) similar to that of *A. triplus* n. sp.; first segment bearing patch of 6 spinules on subdistal posterior surface as in *A. triplus* n. sp.; 2 setae on second segment 36 and 24 μm, respectively.

Swimming legs (Fig. 10B–E) segmented and armed as in *A. triplus* n. sp. Outer seta on basis small but pinnate. Leg 4 with vestigial inner seta on coxa; inner spine on first endopodal segment 36 μm long, with several minute spinules on distal part; second endopodal segment 88 × 24 μm; distal spines 73 (inner) and 36 μm (outer) long.

Exopodal segment of leg 5 (Fig. 10F) arched, 127 μm long, with ear-like inner proximal expansion (24 μm across this region), 18 μm wide across mid-region, distally bearing 1 small lobe, armed distally with 2 setae (83 and 53 μm long, respectively), and ornamented with many scales on convex outer surface. Leg 6 (Fig. 10G) represented by 2 unequal setae and 1 cusp on genital operculum; one pointed process present near genital aperture (Fig. 10G).

Male. Unknown.

Remarks. *Acanthomolgus dokdoicus* n. sp. is comparable with *A. triplus* n. sp. described above and *A. rugosus* n. sp. described below, since they share two rare and significant features, i.e., the presence of the ear-like inner proximal expansion on the exopodal segment of female leg 5 and the dorsal tubercle on the third pedigerous somite. *Acanthomolgus dokdoicus* n. sp. more similar to *A. triplus* n. sp. than to *A. rugosus* n. sp. in many morphological respects. As major differences between the two species, the third endopodal segment of the antenna is longer than the first endopodal segment in *A. dokdoicus* n. sp. but vice versa in *A. triplus* n. sp. and the lateral margins of the female genital double-somite are fringed with transparent membrane in *A. dokdoicus* n. sp. but lacking any membranous fringe in *A. triplus* n. sp. *Acanthomolgus dokdoicus* n. sp. is readily distinguishable from *A. rugosus* n. sp., since the genital double-somite of the latter species is elongate, distinctly longer than wide. These and other differences between the three species are explained in Table 1.

Acanthomolgus rugosus n. sp. (Figs. 11–13)

lsid:zoobank.org:act:5AF7AD51-752A-4B43-9723-B6801C1BB4DE

Type material. Holotype (intact ♀, NIBRIV0000901211), intact paratype (♀, NIBRIV0000901212), and dissected paratype (figured) from washings of an unidentified horny coral, Dokdo Island (approximately 37°14′44″N, 131°51′53″E), SCUBA, depth 28 m, collected by T. Lee, 22 Aug 2022. Holotype and intact paratype have been deposited in the NIBR, Incheon. Dissected paratypes are kept in the collection of I.-H. Kim.

Additional specimens. 1♀, 1♂ (both dissected) from washings of invertebrates, depth unknown, at the type locality, collected by J. Lee, 23 Apr 2015.

Etymology. The specific name alludes to the rugose dorsal surface of the female genital double-somite of the new species.

Female. Body (Fig. 11A) with broad prosome. Body length of dissected and figured paratype 910 μm. Prosome 625 × 455 μm. Cephalothorax 440 μm long, with dorsal suture line between cephalosome and first pedigerous somite. Third pedigerous somite with dorsal tubercle. All prosomal somites with round posterolateral corners. Urosome (Fig. 1B) 5-segmented, curved dorsally. Fifth pedigerous somite 127 μm wide. Genital double-somite 1.31 times longer than wide (144 × 110 μm), longer ventrally but shorter dorsally, with slightly convex lateral margins, various wrinkles on dorsal surface (Fig. 12G); genital apertures positioned dorsally at midway of double-somite; one acutely pointed process and 1 small spinule present on dorsal surface of genital double-somite near genital operculum (Fig. 12G). Three free abdominal somites 38 × 70, 23 × 68, and 35 × 68 μm,

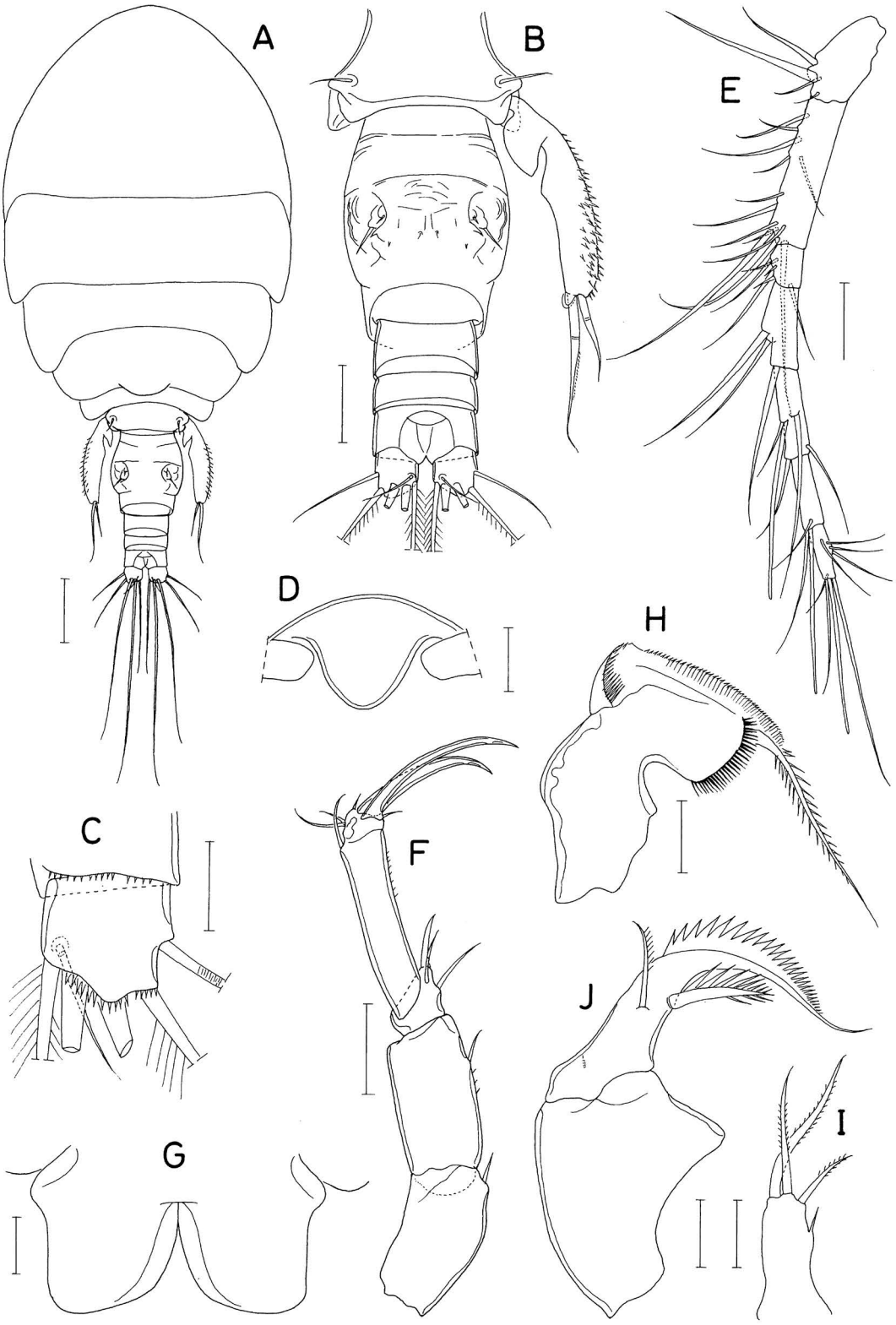

Fig. 11. *Acanthomolgus rugosus* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Left caudal ramus, ventral; D, Rostrum; E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla. Scale bars: A=0.1 mm, B, D–F=0.05 mm, C, G–J=0.02 mm.

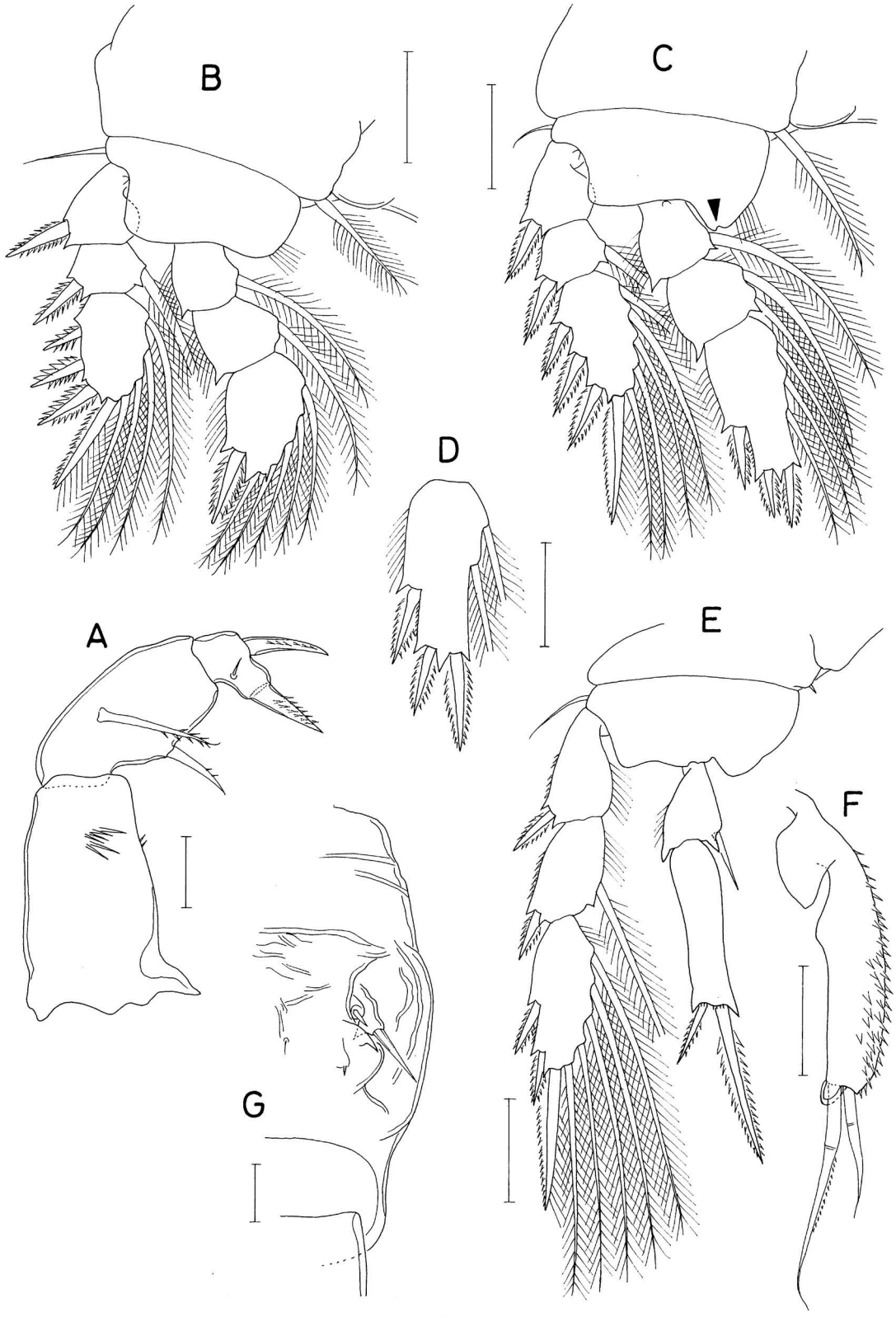

Fig. 12. *Acanthomolgus rugosus* n. sp., female. A, Maxilliped; B, Leg 1; C, Leg 2; D, Third endopodal segment of leg 3; E, Leg 4; F, Exopod of leg 5; G, Right genital aperture. Scale bars: A, G = 0.02 mm, B–F = 0.05 mm.

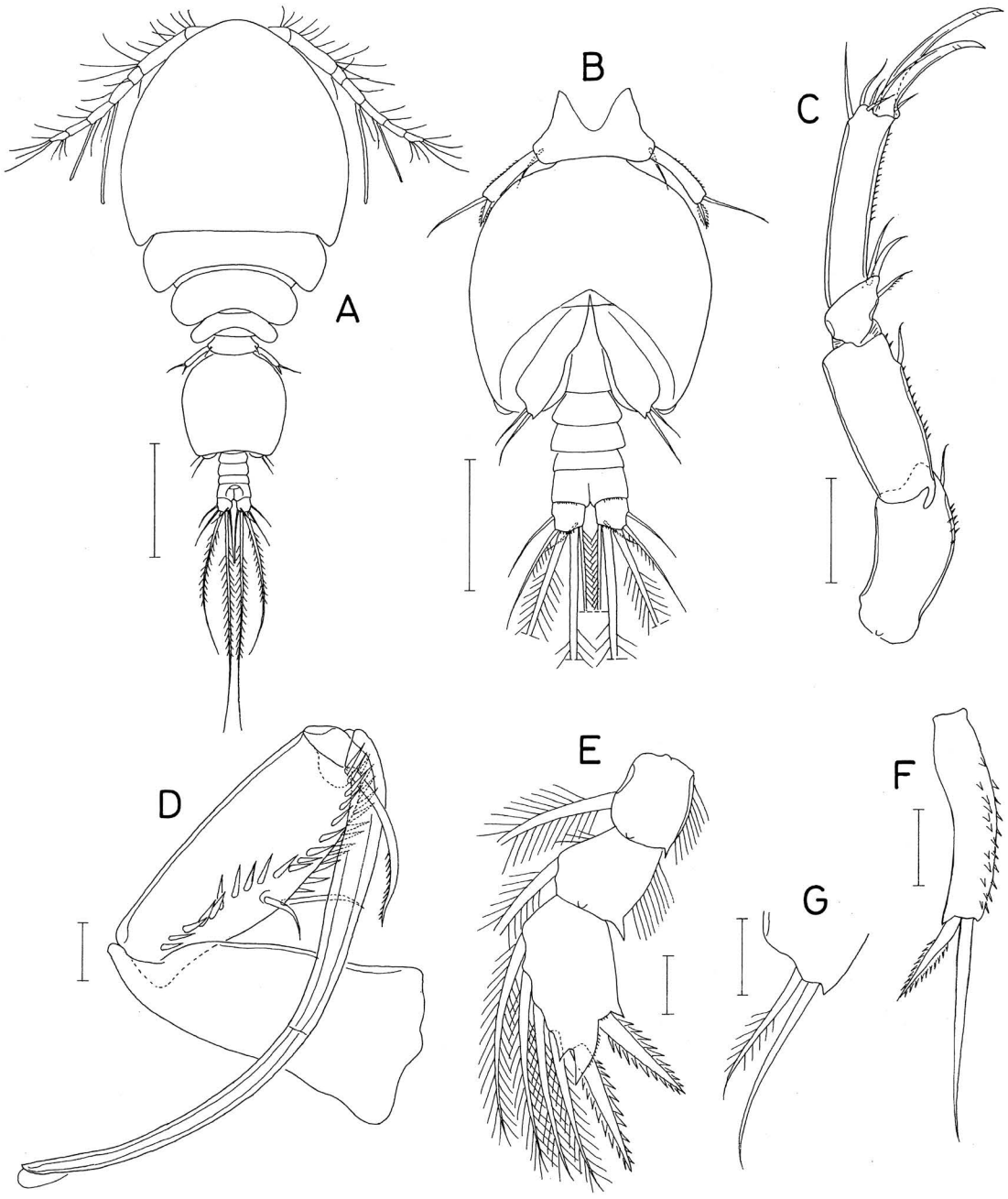

Fig. 13. *Acanthomolgus rugosus* n. sp., male. A, Habitus, dorsal; B, Urosome, ventral; C, Antenna; D, Maxilliped; E, Endopod of leg 1; F, Exopod of leg 5; G, Leg 6. Scale bars: A=0.2 mm, B=0.1 mm, C=0.05 mm, D–G=0.02 mm.

respectively. Anal somite with row of small spinules along posteroventral margin (Fig. 11C). Caudal ramus (Fig, 11C) as long as wide (29×29 μm), armed with 6 setae and ornamented with spinules along posteroventral margin.

Rostrum (Fig. 11D) tapering, with round apex. Antennule (Fig. 11E) slender, 376 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4+aesthetasc, 2+aesthetasc, and 7+aesthetasc; all setae naked; aesthetascs thin, setiform. Antenna (Fig. 11F) 4-segmented; armature formula 1, 1, 3, and 5+2 claws; first endopodal segment 81×45 μm; second endopodal segment lacking claw; third endopodal segment 4.33 times longer than wide (104×24 μm), 1.28 times longer than first endopodal segment; 2 terminal claws slightly unequal in length, slender one 95 μm long, thicker one 76 μm

long, both shorter than third endopodal segment.

Labrum (Fig. 11G) and mandible (Fig. 11H) as in *A. dokdoicus* n. sp. Maxillule (Fig. 11I) with 4 setae. Maxilla (Fig. 11J) with arched, serrate distal lash; inner seta on distal segment spiniform, with 8 spinules along outer margin and 3 spinules on distal region of inner margin; anterior seta (seta II) with minute spinules on inner margin; proximal seta (seta III) obscure. Maxilliped (Fig. 12A) as in *A. dokdoicus* n. sp.; 2 setae on second segment 35 and 19 μm long, respectively; spine and spiniform process on third segment subequal in length.

Legs 1 (Fig. 12B), 2 (Fig. 12C) and 3 with 3-segmented exopod and endopod. Leg 3 similar to leg 2, except bearing 3 spines and 2 setae on third endopodal segment (Fig. 12D). Inner distal corner of basis of legs 2 and 3 slightly notched, as indicated by arrowhead in Fig. 12C. Outer seta on basis of legs 1–4 small, naked. Leg 4 (Fig. 12E) with 3-segmented exopod and 2-segmented endopod; inner coxal seta vestigial; inner spine of first endopodal segment 32 μm long, naked; second endopodal segment 82 × 24 μm, 2 distal spines 83 and 33 μm long, respectively, both with serrate margins. Armature formula for legs 1–4 as in *A. dokdoicus* n. sp.

Leg 5 (Fig. 11B) consisting of dorsolateral naked seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 12F) 146 μm long, with blunt, ear-like inner proximal expansion (35 μm wide across this region), weak protrusion on inner margin near middle (29 μm wide across this region), distally with 2 lobes and 2 annulate setae (107 and 60 μm long, respectively) and ornamented with many scales scattered on outer surface. Leg 6 (Fig. 12G) represented by 2 unequal setae and 1 cusp on genital operculum.

Male. Body (Fig. 13A) narrower than that of female. Body length 868 μm. Prosome 563 × 398 μm. Cephalothorax 375 μm long, lacking dorsal suture line defining cephalosome and first pedigerous somite. Urosome (Fig. 13B) 6-segmented. Fifth pedigerous somite 92 μm wide, much narrower than genital somite. Genital somite large, 178 × 182 μm, subcircular. Four abdominal somites 25 × 53, 20 × 58, 14 × 53, and 25 × 57 μm, respectively. Caudal ramus 25 × 25 μm.

Rostrum as in female. Antennule with 3 additional aesthetascs, 2 on second segment and 1 on fourth segment. Antenna (Fig. 13C) similar to that of female, but with more spinules on inner margin of coxobasis and first and third endopodal segments; third endopodal segment 90 × 20 μm.

Labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 13D) consisting of 3 segments and terminal claw; first segment unarmed and unornamented; second segment with 2 subequal, naked seta and 2 longitudinal rows of spinules; short third segment unarmed; terminal claw elongate, arched, bearing proximally 1 large and 1 small seta.

Legs 1–4 segmented as in female. Third endopodal segment of leg 1 (Fig. 13E) armed with 2 spines and 4 setae; its distal process enlarged. Exopodal segment of leg 5 (Fig. 13F) slightly arched, 4.58 times longer than wide (55 × 12 μm), with nearly parallel inner and outer margins, armed distally with 1 compound spine (26 μm long) and 1 naked seta (58 μm long), and ornamented with scales on outer surface. Leg 6 (Fig. 13G) represented by 2 unequal setae and 1 pointed process on genital operculum.

Remarks. *Acanthomolgus rugosus* n. sp. is comparable with *A. triplus* n. sp. and *A. dokdoicus* n. sp. in having both the dorsal tubercle on the third pedigerous somite and the ear-like inner proximal expansion on the exopodal segment of female leg 5. However, *A. rugosus* n. sp. is distinctly distinguished from the two congeners by the form of the female genital double-somite, which is longer than wide (cf. wider than long in *A. triplus* n. sp. and *A. dokdoicus* n. sp.) and has a rugose dorsal surface (cf. smooth in the two congeners). Other differences of the new species from the two congeners are summarized in Table 1.

Acanthomolgus taenichaetatus n. sp. (Figs. 14–16)

lsid:zoobank.org:act:C9B9AE6D-28B4-4850-B60A-862A99A2B7D8

Type material. Holotype (intact ♀, HNIBRIV7483), intact paratypes (2♀♀, HNIBRIV7484), and dissected paratypes (1♀, 1♂) from washings of the horny coral *Anthoplexaura dimorpha* (Inaba), Geomoon Island (34°01′0.04″N, 127°17′41.02″E), SCUBA, depth 20.4 m, collected by J. G. Kim and H. K. Kim, 05 Oct 2022. Intact type specimens have been deposited in the HNIBR, Mokpo. Dissected paratypes are kept in the collection of I.-H. Kim.

Etymology. The name of the new species is derived from Greek *taeni* (= a ribbon) and *chaet* (= bristle), referring to the ribbon-like setae on the caudal rami and swimming legs.

Female. Body (Fig. 14A) broad. Body length 1.07 mm in figured and described specimen. Prosome 704 × 540 μm. Cephalothorax 509 μm long, slightly wider than long, with dorsal suture line delimiting cephalosome and first pedigerous somite. Posterolateral corners of all prosomal somites rounded. Urosome (Fig. 14B) 5-segmented. Fifth pedigerous somite 140 μm wide. Genital double-somite 1.11 times longer than wide (155 × 140 μm), consisting of broader anterior 80% and narrower posterior 20%; genital apertures positioned dorsolaterally in middle of double-somite. Three free abdominal somites 44 × 75, 29 × 69, and 46 × 75 μm, respectively. Anal somite with minute spinules along posteroventral margin. Caudal ramus (Fig. 14C) 1.76 times longer than wide (60 × 34 μm), armed with 6 setae; 2 median termi-

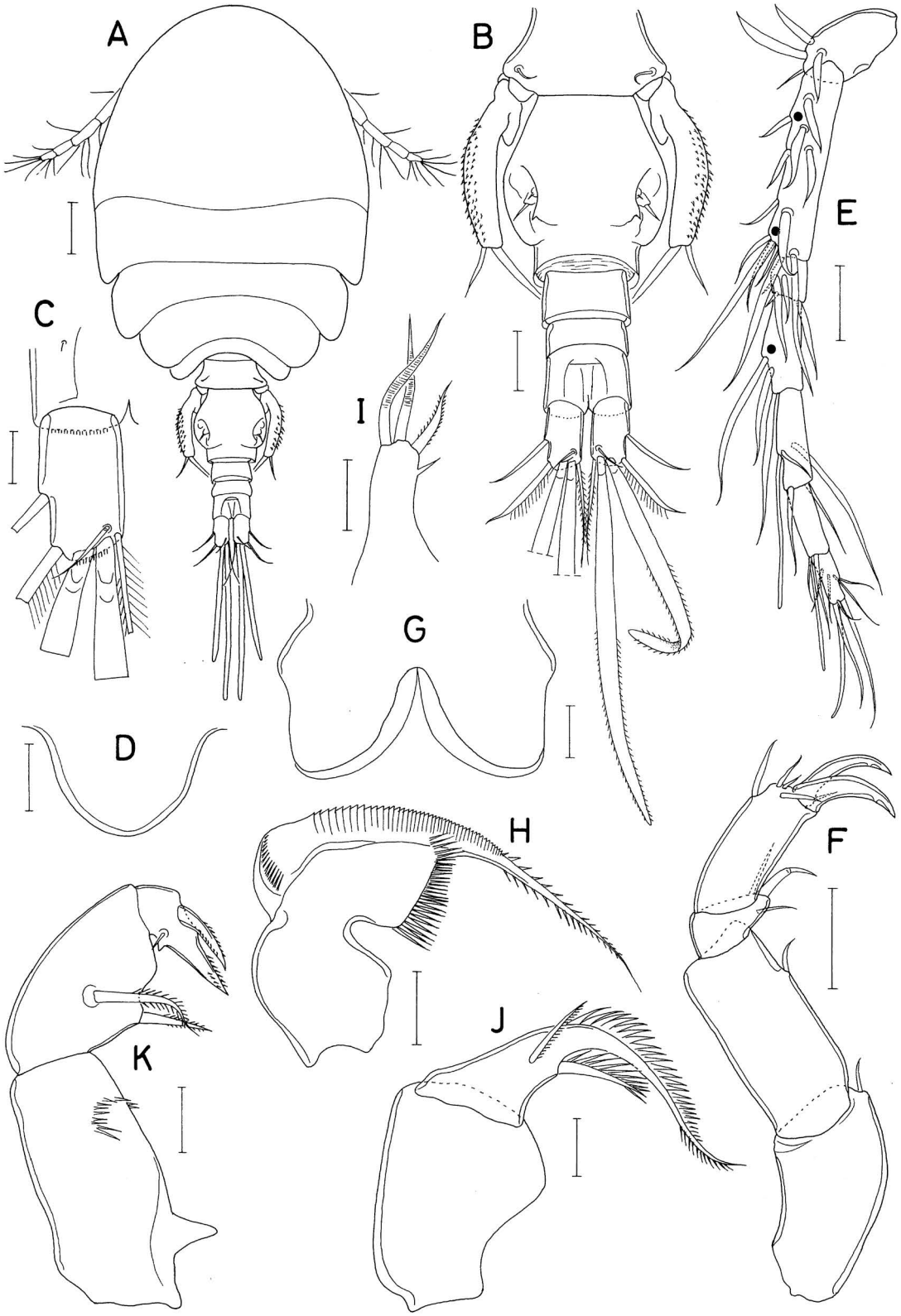

Fig. 14. *Acanthomolgus taenichaetatus* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Left caudal ramus, dorsal; D, Rostrum E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla; K, Maxilliped. Scale bars: A=0.1 mm, B, D–F=0.05 mm, C, G–K=0.02 mm.

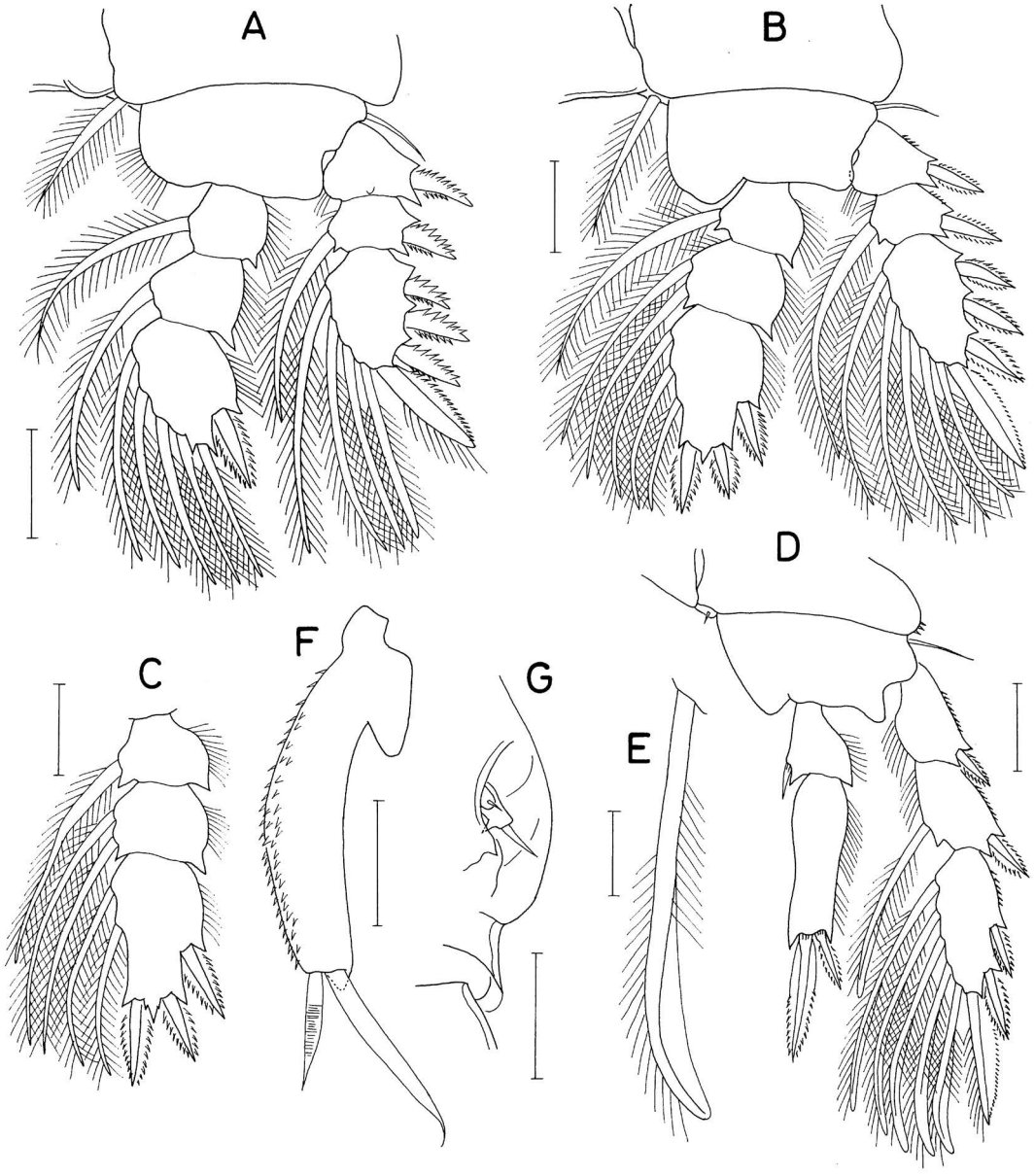

Fig. 15. *Acanthomolgus taenichaetatus* n. sp., female. A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4; E, Distal seta of third exopodal segment of leg 4; F, Exopod of leg 5; G, Right genital aperture. Scale bars: A–D, F, G = 0.05 mm, E = 0.02 mm.

nal setae (setae IV and V) broad, ribbon-like; outer seta (seta II) positioned at 57% region of ramus length; posteroventral margin of ramus with fine spinules.

Rostrum (Fig. 14D) large, semicircular. Antennule (Fig. 14E) slender, 407 μm long, 7-segmented; armature formula 4, 13, 5, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; setae on proximal segments mostly broadened, some of them scalpel-like. Antenna (Fig. 14F) 4-segmented; armature formula 1, 1, 2 + claw, and 5 + 2 claws; first endopodal segment 95 × 51 μm; third endopodal segment 2.17 times longer than wide (63 × 29 μm), distinctly shorter than first endopodal segment; 2 terminal claws subequal in length, shorter than third endopodal segment, slender claw 55 μm long, and thicker claw 52 μm long.

Labrum (Fig. 14G) with broad posterolateral lobes. Mandible (Fig. 14H) with straight, spinulose inner margin, deep inner proximal notch, long distal lash, and row of minute spinules at convex outer corner proximal to gnathobase. Maxillule (Fig. 14I) as lobe bearing 4 setae; innermost one of 3 distal setae bearing minute spinules along margins,

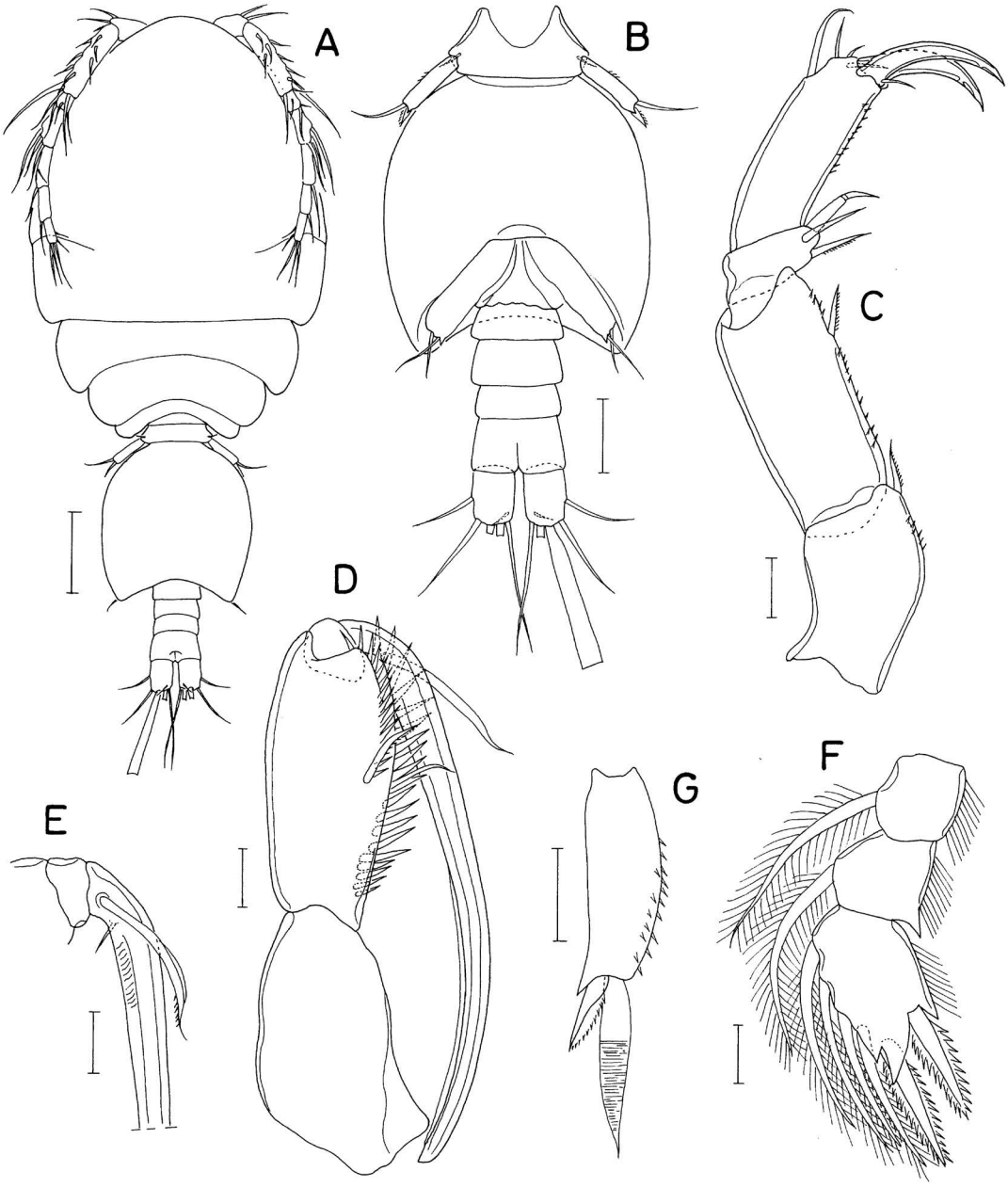

Fig. 16. *Acanthomolgus taenichaetatus* n. sp., male. A, Habitus, dorsal; B, Urosome, ventral; C, Antenna; D, Maxilliped; E, Endopod and proximal part of terminal claw of maxilliped; F, Endopod of leg 1; G, Exopod of leg 5. Scale bars: A=0.1 mm, B=0.05 mm, C–G=0.02 mm.

other 3 setae naked. Maxilla (Fig. 14J) consisting of syncoxa and basis; syncoxa unarmed; basis with long, spinulose distal lash and 2 setae; inner seta (seta I) about 0.4 times as long as distal lash, with 9 spinules along its outer margin and 1 spinule on inner margin; anterior seta (seta II) slender, with fine spinules along its inner margin; seta III absent. Maxilliped (Fig. 14K) 3-segmented, consisting of syncoxa, basis, and 1-segmented endopod; syncoxa unarmed but ornamented with hemi-circular row of spinules at distal third; basis with 2 spinulose setae, 38 and 22 μm long, respectively; endopod terminating in spiniform process bearing 2 rows of fine spinules, with 1 spinulose spine, and proximally with 1 small pointed process and 1 small seta.

Legs 1 (Fig. 15A), 2 (Fig. 15B) and 3 with 3-segmented rami. Leg 4 (Fig. 15D) with 3-segmented exopod and 2-segmented endopod. Leg 3 similar to leg 2, except bearing 3

spines and 2 setae on third endopodal segment (Fig. 15C). Leg 4 with rudimentary inner coxal seta; inner spine on first endopodal segment short, naked, 19 μm long; second endopodal segment 91 × 31 μm, its 2 distal spines 73 and 35 μm long, respectively. Setae on swimming legs blunt at tip, some of them tape-like, broadened (Fig. 15E). Armature formula for legs 1–4 as in *A. rugosus* n. sp.

Leg 5 consisting of dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 15F) arched, 145 μm long, 32 μm wide in middle, with ear-like inner proximal expansion (42 μm across this region), numerous spinule-like scales on outer surface, 1 small, blunt process distally, and armed distally with 2 broad, naked setae; inner seta 82 μm long and outer seta 47 μm long. Leg 6 (Fig. 15G) represented by 1 small seta, 1 minute setule, and 1 pointed cusp on genital operculum.

Male. Body (Fig. 16A) narrower than that of female. Body length 845 μm. Prosome 509 μm long. Cephalothorax 382 × 375 μm, with incomplete dorsal suture line laterally. Urosome (Fig. 16B) 6-segmented. Fifth pedigerous somite narrow, 95 μm wide. Genital somite wider than long, 164 × 182 μm, with concave posterior margin. Four abdominal somites 24 × 64, 31 × 62, 24 × 56, and 36 × 65 μm, respectively. Caudal ramus 1.41 times longer than wide (41 × 29 μm); 2 mid-terminal setae ribbon-like as in female.

Rostrum as in female. Antennule with 3 additional aesthetascs, 2 on second and 1 on fourth segments at places of dark spots in Fig. 14E. Antenna (Fig. 16C) with additional minute spinules along inner margin of segments; setae on proximal 2 segments pectinate along inner margin.

Labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 16D) consisting of 3 segments and terminal claw; first segment (syncoxa) unarmed and smooth; second segment with 2 setae in middle, 1 row of spinules along entire inner margin, and another row of smaller spinules along distal half of inner margin; third segment (Fig. 16E) small and unarmed; terminal claw as long as 3 segments combined, proximally with 1 seta, 1 setule, and several wrinkles (Fig. 16E).

Leg 1 endopod (Fig. 16F) with 2 spines and 4 setae on third segment. Legs 2–4 as in female. Exopodal segment of leg 5 (Fig. 16G) 45 × 15 μm, bearing pointed process distally, armed distally with 1 short spine (18 μm long) and 1 broad, naked seta (39 μm long), and ornamented with scales on outer surface. Leg 6 represented by 2 small setae and 1 cusp on distal region of genital operculum (Fig. 16B).

Remarks. *Acanthomolgus taenichaetatus* n. sp. is clearly distinguished from all congeners by a striking diagnostic feature, the presence of the broadened, ribbon-like setae on the caudal rami and swimming legs. Two mid-terminal setae (setae IV and V) on the caudal rami, in particular, are markedly broadened and flattened. As other diagnostic features typifying the new species, (1) the caudal ramus of the female is 1.76 times longer than wide; (2) the third endopodal segment (terminal segment) of the antenna is distinctly shorter than the first endopodal segment; (3) two terminal claws of the antenna are subequal in length; and (4) the exopodal segment of female leg 5 has an ear-like inner proximal expansion.

Acanthomolgus crassae n. sp. (Figs. 17–19)

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Type material. Holotype (♀, dissected and mounted on a slide, HNIBR2384), intact paratype (♂, HNIBRIV2385), and dissected paratype (♂) from washings of the octocoral *Euplexaura crassa* Kükenthal, 1908, Chuja Island (33°47′51.6″N, 126°19′21.9″E), SCUBA, depth 24 m, collected by T. W. Chung, 22 Jun 2022. Holotype and intact paratype have been deposited in the HNIBR, Mokpo. Dissected paratype is kept in the collection of I.-H. Kim.

Etymology. The name of the new species is taken from the specific name of its host *Euplexaura crassa*.

Female. Body (Fig. 17A) moderately broad. Body length 1.15 mm. Prosome 795 × 623 μm. Cephalothorax 1.15 times wider than long, with dorsal suture line between cephalosome and first pedigerous somite. All prosomal somites with rounded posterolateral corners. Urosome (Fig. 17B) 5-segmented; fifth pedigerous somite 154 μm wide. Genital double-somite 0.89 times longer than wide (148 × 166 μm), nearly circular, with narrower distal 20%; genital aperture positioned dorsally slightly anterior to middle. Three free abdominal somites 45 × 86, 34 × 80, and 38 × 73 μm, respectively. Anal somite with spinules on posteroventral margin (Fig. 17C). Caudal ramus (Fig. 17C) 1.06 times longer than wide (34 × 32 μm), armed with 6 setae and ornamented with row of minute spinules on posteroventral margin.

Rostrum (Fig. 17D) distinct, semicircular. Antennule (Fig. 17E) slender, 394 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked. Antenna (Fig. 17F) consisting of coxobasis and 3-segmented endopod; armature formula 1, 1, 3, and 5 + 2 claws; first endopodal segment 1.96 times longer than wide (94 × 48 μm), with few spinules on inner margin; third endopodal segment 2.73 times longer than wide (82 × 30 μm), shorter than first endopodal segment; 2 terminal claws subequal, 58 and 50 μm long, respectively, much shorter than third endopodal segment.

Labrum (Fig. 17G) with broad posterolateral lobes and narrow median incision. Mandible (Fig. 17H) with long dis-

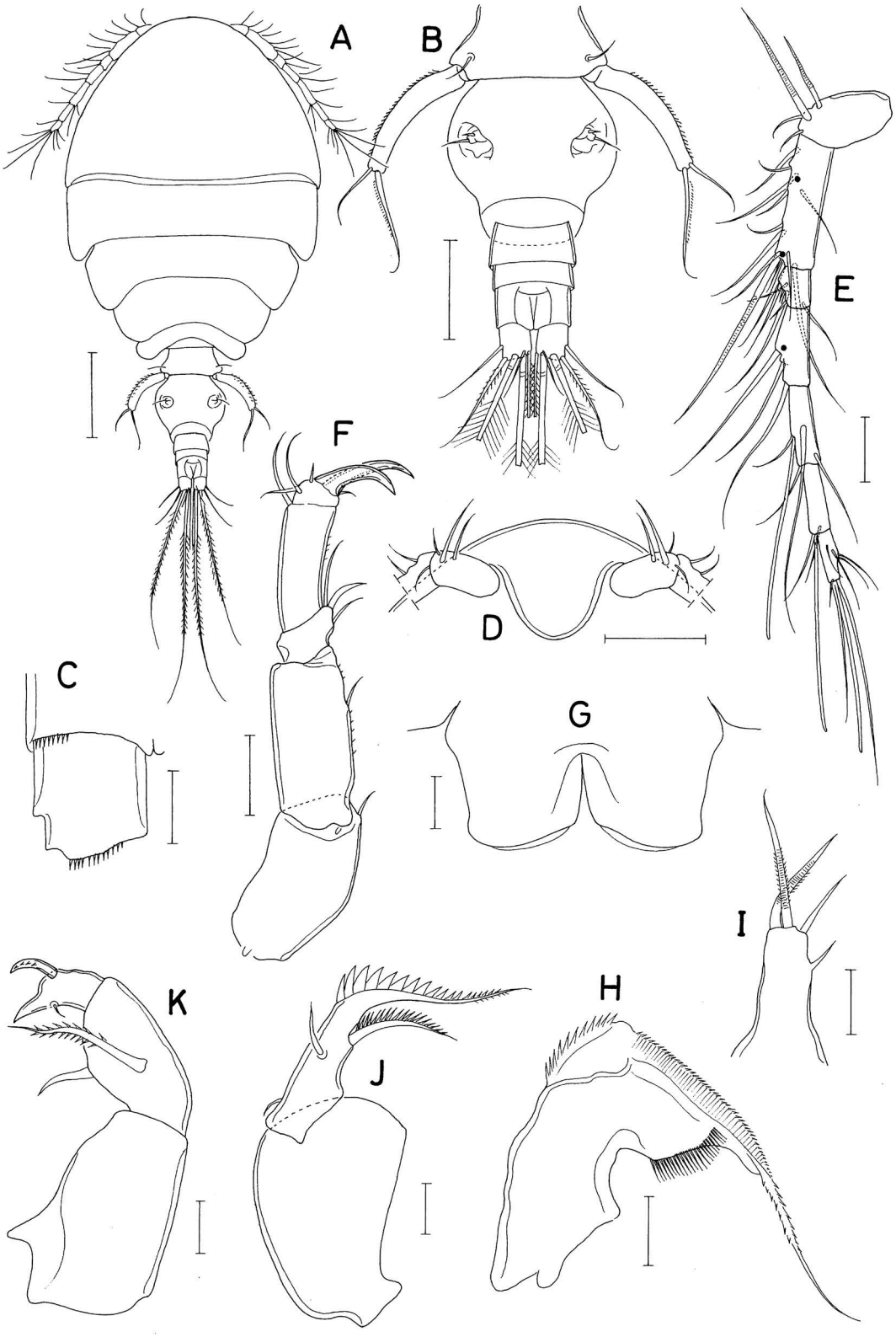

Fig. 17. *Acanthomolgus crassae* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Right caudal ramus, ventral; D, Rostral region, ventral; E, Antennule; F, Antenna; G, Labrum; H, Mandible; I, Maxillule; J, Maxilla; K, Maxilliped. Scale bars: A = 0.2 mm, B, D = 0.1 mm, C, G–K = 0.02 mm, E, F = 0.05 mm.

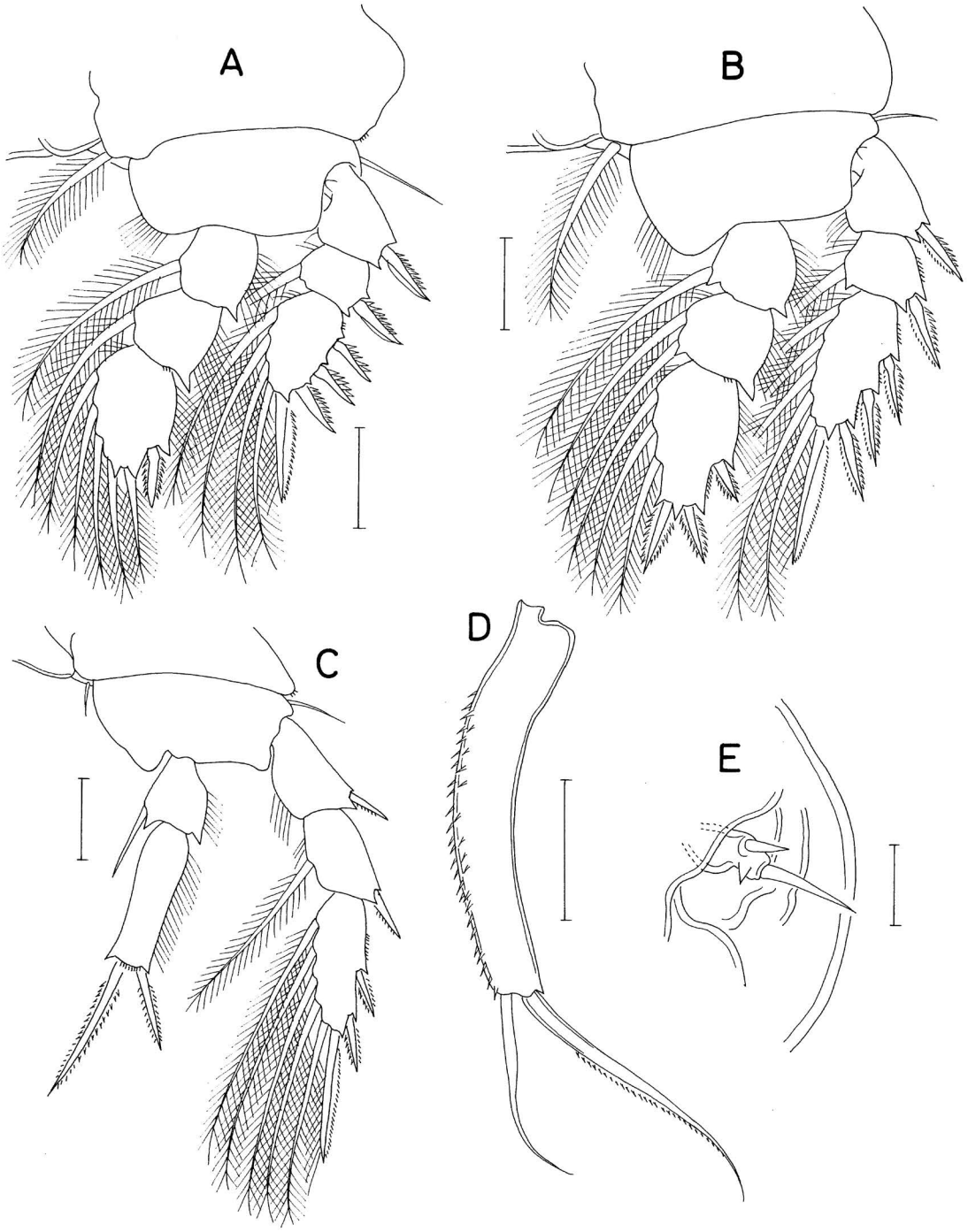

Fig. 18. *Acanthomolgus crassae* n. sp., female. A, Leg 1; B, Leg 2; C, Leg 4; D, Exopod of leg 5; E, Right genital aperture. Scale bars: A–D = 0.05 mm, E = 0.02 mm.

tal lash, shallow inner proximal notch, row of spinules on convex outer margin proximal to gnathobase, fine denticles along outer margin of gnathobase, and moderately short inner margin bearing setules. Maxillule (Fig. 17I) with 4 setae; 2 apical larger ones of them finely spinulose. Maxilla (Fig. 17J) with unarmed syncoxa; basis with unilaterally spinulose inner seta, naked anterior seta and rudimentary proximal seta; distal lash serrate along distal margin, about twice longer than inner seta. Maxilliped (Fig. 17K) 3-segmented; first segment (syncoxa) longest but unarmed; second seg-

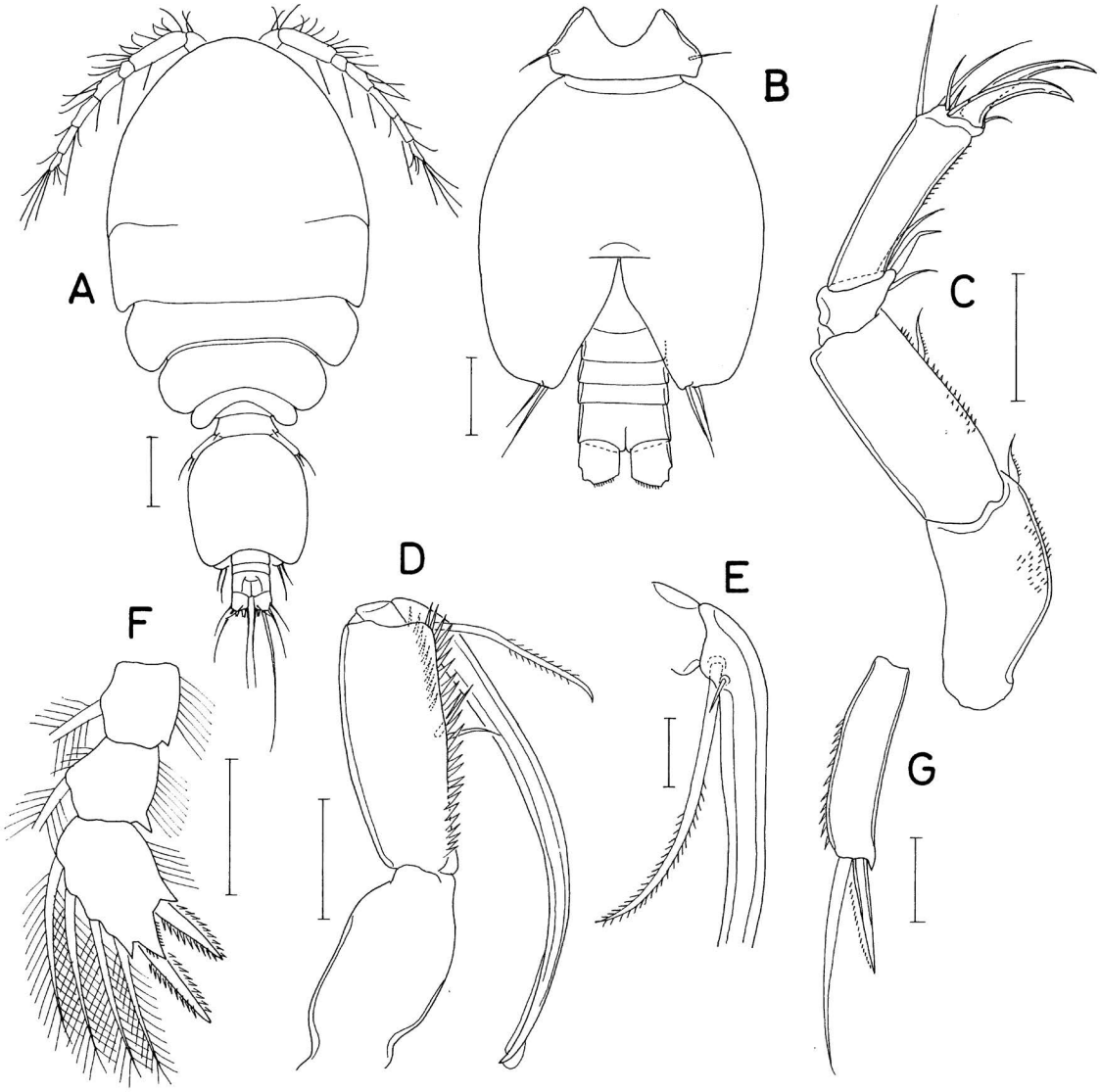

Fig. 19. *Acanthomolgus crassae* n. sp., male. A, Habitus, dorsal; B, Urosome, ventral; C, Antenna; D, Maxilliped; E, Proximal region of terminal claw of maxilliped; F, Endopod of leg 1; G, Exopod of leg 5. Scale bars: A=0.1 mm, B–D, F=0.05 mm, E, G=0.02 mm.

ment with 2 setae, longer one of them spinulose, 2.5 times longer than shorter naked seta; third segment (endopod) with spiniform distal process, 1 curved spine, and 1 small seta.

Legs 1 (Fig. 18A), 2 (Fig. 18B), and 3 with 3-segmented rami. Leg 4 (Fig. 18C) with 3-segmented exopod and 2-segmented endopod. Leg 3 same as leg 2 except bearing 3 spines and 2 setae on third endopodal segment. Leg 4 with small but distinct inner coxal seta; inner spine of first endopodal segment naked, 45 μm long, longer than segment; second endopodal segment 90 × 30 μm; 2 distal spines 98 (inner) and 54 (outer) μm long, respectively. Armature formula for legs 1–4 as in *A. taenichaetatus* n. sp.

Leg 5 consisting of dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 18D) arched, slender, 6.17 times longer than wide (142 × 23 μm), lacking proximal expansion, with spinules on outer surface, and armed distally with shorter outer seta (70 μm long) and longer inner seta (110 μm long). Leg 6 (Fig. 18E) represented by 2 unequal, naked setae and 1 cusp on genital operculum.

Male. Body (Fig. 19A) 862 μm long. Prosome 564 × 400 μm. Dorsal suture line of cephalothorax incomplete. Urosome (Fig. 19B) 6-segmented. Fifth pedigerous somite 98 μm wide. Genital somite slightly longer than wide (200 × 182 μm), occupying more than 60% length of urosome. Abdominal somites short. Caudal ramus 1.12 times longer than

wide (29 × 26 μm).

Rostrum as in female. Antennule with 3 additional aesthetascs, 2 on second segment and 1 on fourth segment at places of dark spots on Fig. 17E. Antenna (Fig. 19C) different from that of female in bearing spinules on inner margin of segments and spinulose seta on proximal 2 segments.

Labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 19D) consisting of 3 segments and terminal claw; first segment unarmed, second segment with 2 small setae of equal length and shape, row of spinules on entire inner margin, and another row of spinules along distal half of inner margin; terminal claw as long as 3 segments combined, proximally with 1 large, distally spinulose seta and 1 rudimentary seta (Fig. 19E).

Leg 1 endopod (Fig. 19F) with 2 spines and 4 setae on third segment. Legs 2–4 as in female. Exopodal segment of leg 5 (Fig. 19G) 4.0 times longer than wide (48 × 12 μm) bearing spinules on slightly convex outer margin, 1 cusp on inner distal corner, and distally with 1 spine (28 μm long) and 1 naked seta (54 μm long). Leg 6 (Fig. 19B) represented by 2 small, naked setae at distal region of genital operculum.

Remarks. In most species of *Acanthomolgus*, the exopodal segment of female leg 5 has an inner proximal expansion. But six species in the genus, like *A. crassae* n. sp., do not have any proximal expansion on the exopodal segment of female leg 5 and are, thus, comparable with the new species. These six species are *A. bandaensis* Kim I.H., 2007, *A. geminus* Kim I.H., 2005, *A. jei* n. sp., *A. longiunguifer* Kim I.H., 2005, *A. mononyx* Stock, 1975, and *A. pollicaris*. *Acanthomolgus crassae* n. sp. differs from *A. mononyx* by the shorter caudal ramus which is 1.06 times longer than wide in contrast to 2.16 times longer than wide in the latter species (Stock, 1975); from *A. bandaensis*, *A. geminus*, and *A. longiunguifer* by the shorter terminal claws of the antenna which are shorter than the third endopodal segment (cf. at least one of the two terminal claws is longer than the third endopodal segment in the latter three species); from *A. jei* n. sp., *A. mononyx*, and *A. pollicaris* by having four setae on the maxillule (cf. three setae in the latter three species); and from *A. bandaensis*, *A. geminus*, *A. mononyx*, and *A. pollicaris* by having a longer exopodal segment of female leg 5 which is 142 μm long (cf. less than 100 μm long in the latter four species).

Acanthomolgus notialis n. sp. (Figs. 20–22)

lsid:zoobank.org:act:2B50BC9B-148B-45F9-ADEC-663CFE940FB0

Type material. Holotype (intact ♀, MABIK CR00254758), intact paratypes (7 ♀♀, MABIK CR00254759), and dissected paratypes (1♀, 1♂) from washings of an octocoral, Gapado, Jeju Island (33°10′20″N, 126°17′30″E), SCUBA, depth 53 m, collected by T. Lee, 27 Apr 2023. Holotype and intact paratypes have been deposited in the MABIK, Seocheon. Dissected paratypes are retained in the collection of I.-H. Kim.

Etymology. The name is derived from *notial* (Latin, southern), indicating its discovery in the southern coast of Korea.

Female. Body (Fig. 20A) rather narrow. Body length 955 μm in dissected and figured specimen. Mean body length 960 μm (936–998 μm), based on 10 specimens. Prosome 679 μm long. Cephalothorax 447 × 422 μm, slightly longer than wide, with faint dorsal suture line between cephalosome and first pedigerous somite. All prosomal somites bearing blunt or rounded lateral corners. Urosome (Fig. 20B) 5-segmented. Fifth pedigerous somite 124 μm wide. Genital double-somite 1.13 times longer than wide (133 × 118 μm); with narrower anterior fifth and posterior fifth, and broadened middle three-fifths; lateral margins of broadened region roundly convex, widest in middle; genital apertures positioned dorsally. Three free abdominal somites 22 × 68, 18 × 67, and 32 × 64 μm, respectively. Anal somite with fine spinules along posteroventral margin (Fig. 20C); anal region large. Caudal ramus (Fig. 20C) 1.11 times longer than wide (31 × 28 μm), armed with 6 setae and ornamented with spinules along posteroventral margin.

Rostrum semicircular, with rounded distal margin. Antennule (Fig. 20D) long, slender, 382 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked, slender; aesthetascs also slender, setiform. Antenna (Fig. 20E) 4-segmented; coxobasis (first segment) with 1 naked seta; first endopodal segment (second segment) 82 μm long, with 1 naked seta on inner margin and 3 longitudinal rows of fine spinules; short second endopodal segment with 1 annulate claw and 2 naked setae; third endopodal segment 3.58 times longer than wide (93 × 26 μm), longer than first endopodal segment, armed with 2 claws and 5 setae at distal region, and ornamented with minute spinules along inner margin; 2 terminal claws shorter than third endopodal segment, longer slender claw 88 μm long, shorter thicker claw 75 μm long.

Labrum (Fig. 20F) as in *A. crassae* n. sp. Mandible (Fig. 20G) similar to that of *A. crassae* n. sp., but inner margin slightly convex with 3 groups of spinules (7 proximal, 7 smaller middle, and 5 thicker and longer distal). Maxillule (Fig. 20H) with 4 setae, 2 larger apical ones weakly pinnate, equal in length. Maxilla (Fig. 20I) bearing minute spinules covering posterior surface of syncoxa; basis with about 16 spinules along distal margin of lash, and armed with 3 setae; seta I about 0.75 times as long as distal lash, bearing about 10 spinules along its outer margin; seta II with minute

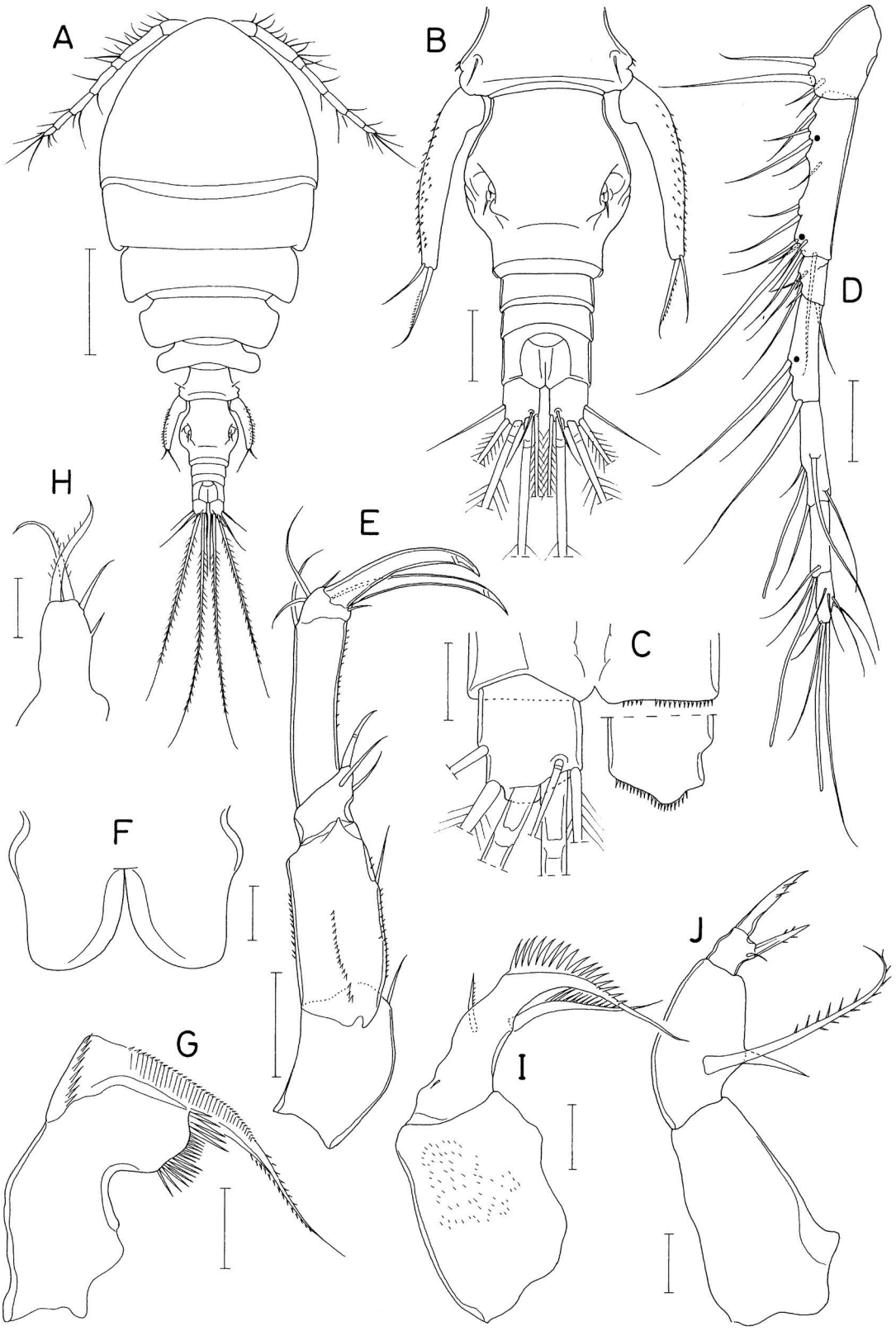

Fig. 20. *Acanthomolgus notialis* n. sp., female. A, Habitus, dorsal; B, Urosome, dorsal; C, Caudal rami, dorsal; D, Antennule; E, Antenna; F, Labrum; G, Mandible; H, Maxillule; I, Maxilla; J, Maxilliped. Scale bars: A=0.2 mm, B, D, E=0.05 mm, C, F–J=0.02 mm.

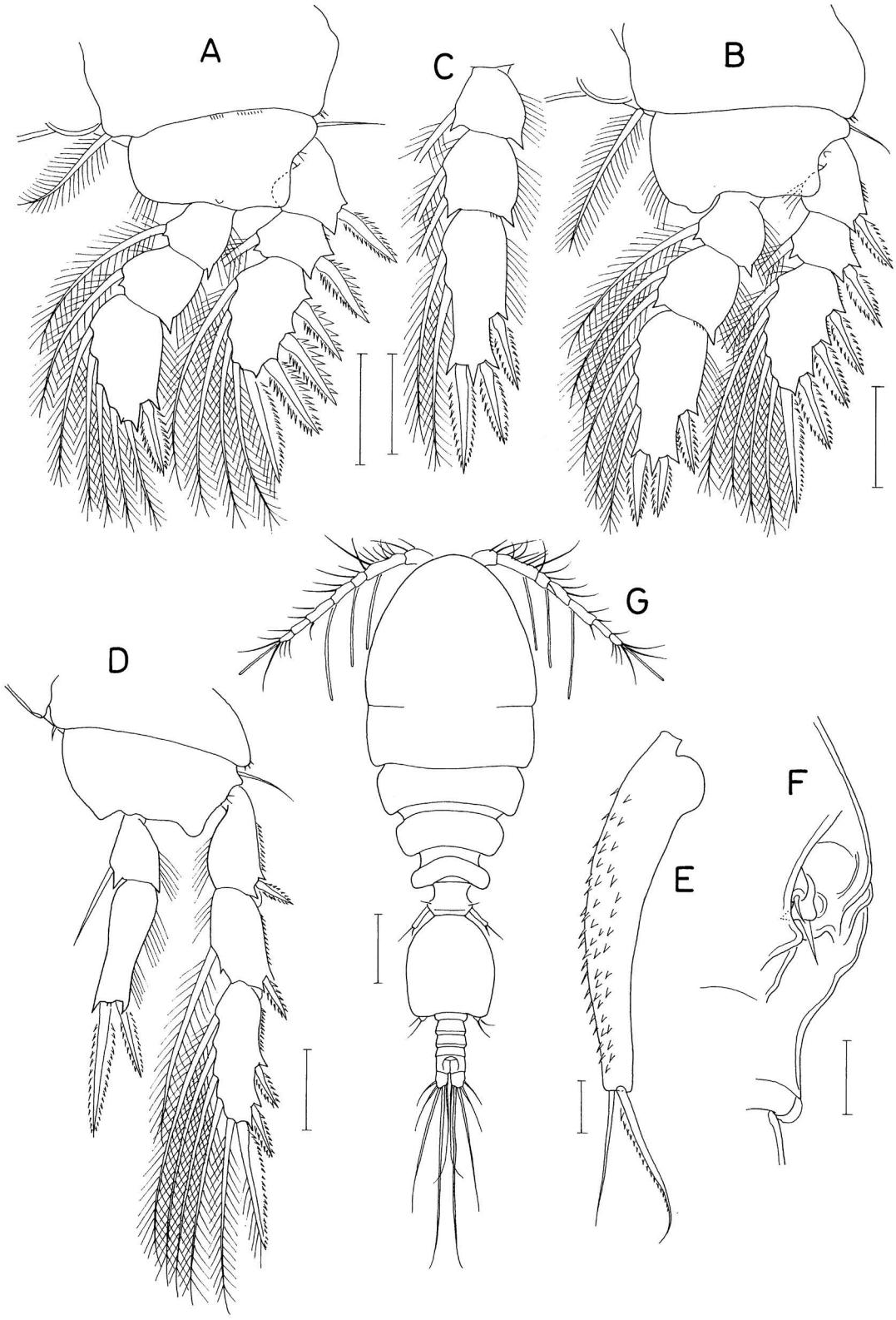

Fig. 21. *Acanthomolgus notialis* n. sp. Female: A, Leg 1; B, Leg 2; C, Endopod of leg 3; D, Leg 4; E, Exopod of leg 5; F, Right genital aperture. Male: G, Habitus, dorsal. Scale bars: A–D = 0.05 mm, E, F = 0.02 mm, G = 0.1 mm.

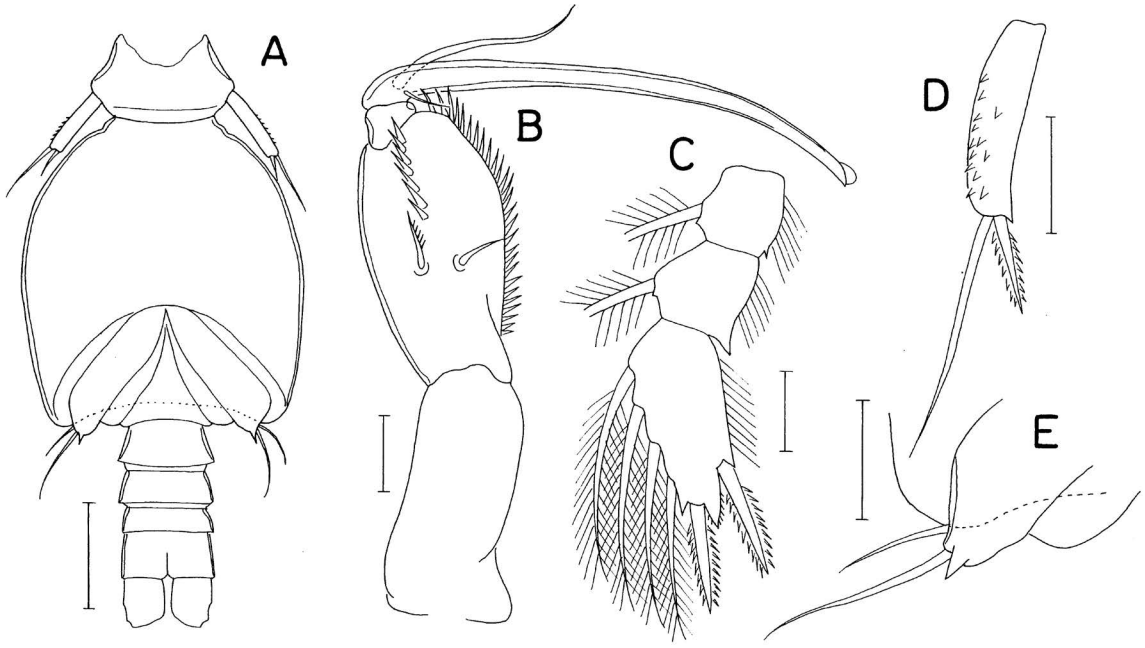

Fig. 22. *Acanthomolgus notialis* n. sp., male. A, Urosome, ventral; B, Maxilliped; C, Endopod of leg 1; D, Exopod of leg 5; E, Leg 6. Scale bars: A=0.05 mm, B–E=0.02 mm.

spinules on inner margin; seta III rudimentary. Maxilliped (Fig. 20J) 3-segmented; syncoxa (first segment) longest but unarmed; basis with 2 unequal setae, shorter one 23 μm long, naked; longer one 82 μm long, spinulose along distal two-thirds; endopod small bearing 2 unequal spines bearing few spinules, and 1 minute seta.

Legs 1 (Fig. 21A), 2 (Fig. 21B), 3, and 4 (Fig. 21D) 3-segmented and armed as in *A. crassae* n. sp. Leg 3 similar to leg 2, except bearing 3 spines and 2 setae on third endopodal segment (Fig. 21C). Outer seta on basis of all swimming legs small and naked. Leg 4 with rudimentary inner coxal seta; inner spine on first endopodal segment thin, 41 μm long; second endopodal segment 62×22 μm; two distal spines 69 (inner) and 41 (outer) μm long.

Leg 5 (Fig. 20B) represented by 1 small naked dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 21E) 4.73 μm long (142×30 μm), arched, gradually narrowing from proximal to distal, with rounded proximal inner expansion, spinules (or scales) covering outer surface, and distally with 2 setae; outer shorter naked seta 54 μm long, and inner longer seta 65 μm long, serrate along outer margin. Leg 6 (Fig. 21F) represented by 2 small setae and 1 tooth-like process on genital operculum.

Male. Body (Fig. 21G) narrower than that of female. Body length 782 μm. Prosome 480×255 μm. Cephalothorax 309 μm long, distinctly longer than wide, with incomplete dorsal suture line. Urosome (Fig. 22A) 5-segmented. Fifth pedigerous somite 70 μm wide. Genital somite 148×136 μm, subcircular. Four abdominal somites 22×45, 17×45, 11×44, and 21×44 μm, respectively. Caudal ramus 1.15 times longer than wide (23×20 μm).

Antennule with 3 additional aesthetascs, 2 on second segment and 1 on fourth segment at places of dark spots in Fig. 20D. Rostrum, antenna, labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 22B) consisting of 3 segments and terminal claw; second segment (basis) broadened near middle, bearing 2 setae of equal length (one of them naked, the other unilaterally spinulose) and 2 longitudinal rows of spinules (one of these rows along distal two-thirds and the other along entire inner margin); small third segment (endopod) unarmed; terminal claw elongate, arched, proximally with 1 long and 1 small seta, both naked.

Leg 1 with 2 spines and 4 setae on third endopodal segment (Fig. 22C). Legs 2–4 as in female. Exopodal segment of leg 5 (Fig. 22D) 3.78 times longer than wide, with spinules on outer surface, and distally with dentiform process, 1 compound spine (17 μm long) and 1 naked seta (43 μm long). Leg 6 (Fig. 22E) represented by 2 naked setae of unequal length and 1 tooth-like process on genital operculum.

Remarks. While describing *Acanthomolgus* species of the West Indies, Stock (1975) divided known species of this

genus into two groups, the *dionyx*-group and the *mononyx*-group. In the *dionyx*-group the smaller terminal claw of the antenna is at least half as long as the larger claw, and the inner margin of the second endopodal segment of leg 4 is naked, without setules. Whereas, in the *mononyx*-group the smaller terminal claw of the antenna is much reduced, setiform, and both the inner and outer margins of the second endopodal segment of leg 4 are setulose. All the new species described in the present paper, including *A. notialis* n. sp., belong to the *dionyx*-group. Within this group, four species, *A. bilobipes* Humes and Stock, 1973, *A. combinatus* Humes, 1974, *A. gorgoniae* Hymes, 1973, and *A. verseveldti* (Humes and Ho, 1968) are selected for a comparison with the new species, since these species have a relatively longer inner seta (seta I) on the basis of the maxilla, which is longer than a half length of the distal lash (in other species the inner seta is distinctly shorter than the half length of the distal lash). However, in the new species (1) the third endopodal segment (fourth segment) of the antenna is longer than the first endopodal segment (vs. the third endopodal segment is distinctly shorter than the first endopodal segment in the four congeners), (2) the shorter spine (outer spine) of the second endopodal segment of leg 4 is about 0.6 times as long as the longer spine (inner spine) (vs. the shorter spine is at most 0.5 times as long as the longer spine in the four congeners), (3) the maxillule bears four setae (vs. three setae in *A. bilobipes*, *A. combinatus*, and *A. gorgoniae*), (4) the inner seta (seta I) of the maxilla is about 0.75 times as long as the distal lash (vs. the inner seta is at most 0.65 times as long as the distal lash in the four congeners), and (5) the longer seta on the basis of the female maxilliped is 3.57 times longer than the shorter seta (vs. the longer seta is about 1.8 times longer than the shorter seta in *A. gorgoniae*), according to the original figure of Humes (1973).

In three species of the *dionyx*-group, *A. gentilis* (Humes and Ho, 1968), *A. hians* (Humes and Ho, 1968), and *A. mopsellae* Humes, 1974, a detailed form of the inner seta of the maxilla is not known. Nevertheless, the new species is distinguishable from these three species by having the caudal ramus which is longer than wide (cf. wider than long in the three species) and the very unequal pair of setae on the basis of the maxilliped in which the longer seta is 3.57 times longer than the shorter seta (cf. both setae are equal in length in *A. gentilis*, the longer seta is about three times longer than the shorter seta in *A. hians* or about twice longer in *A. mopsellae*).

ORCID

Jimin Lee: https://orcid.org/0000-0001-9004-8275
Taekjun Lee: https://orcid.org/0000-0003-4407-7862
Il-Hoi Kim: https://orcid.org/0000-0002-7332-0043

CONFLICTS OF INTEREST

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

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