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Ten new species of siphonostomatoid copepods (Crustacea) associated with marine invertebrates from Korea

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Ten new species in three families (Asterocheridae, Dinopontiidae, and Entomolepididae) of siphonostomatoid copepods are described as associates of marine invertebrates from Korea. These new species are *Acontiophorus decamerus* n. sp., *A. enneamerus* n. sp., *A. acuminatus* n. sp., *Asteropontoides parvus* n. sp., *Rhynchomyzon rostrale* n. sp., *Scottocheres jungi* n. sp., and *Thermocheres viridis* n. sp. in the Asterocheridae, *Stenopontius brevicauda* n. sp. and *S. alatus* n. sp. in the Dinopontiidae, and *Entomopsyllus aplanatus* n. sp. in the Entomolepididae. The three new species of *Acontiophorus* differ from one another primarily in the segmentation of female antennule, the shape of genital double-somite, and the relative length of the caudal ramus. As diagnostic features of *Asteropontoides parvus* n. sp., the caudal ramus is 1.43 times longer than wide and the antennule is 19-segmented in the female. *Rhynchomyzon rostrale* n. sp. resembles *R. rubrovittatum* Sars, 1915, yet can be distinguished by its relatively shorter caudal ramus, which is about 2.8 times longer than wide in the female and by a larger seta on the basis of the maxilliped. In *Scottocheres jungi* n. sp., the female's caudal ramus is 1.25 times longer than wide, with a 17-segmented antennule. *Thermocheres viridis* n. sp. distinctively possesses a small mandibular palp. In *Stenopontius brevicauda* n. sp., the female caudal ramus is slightly wider than it is long, with the inner coxal seta present on legs 2 to 4. *Stenopontius alatus* n. sp. uniquely features a wing-like lateral expansion on the genital double-somite and first abdominal somite. *Entomopsyllus aplanatus* n. sp. stands out among its congeners by having four spines and four setae on the third exopodal segment of both legs 1 and 4.

Keywords: Asterocheridae, Dinopontiidae, Entomolepididae, symbiotic copepods, taxonomy

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Introduction

In the "national species list of Korea" (National Institute of Biological Resources, 2019), 135 species of siphonostomatoid copepods recorded in Korean waters up to that time were listed. These siphonostomatoid copepods included 93 fish-parasitic species and 42 species associated with marine invertebrates. New species and records of siphonostomatoids added to the Korean fauna since then comprise two new species of Asterocheridae (*Acontiophorus estivalis* and *Thermocheres pacificus*) reported by Lee *et al.* (2022); four new species of Asterocheridae (*Amalomyzon elongatum*, *Dokdocheres rotundus*, *Asterocheres banderae*, and *Scottocheres nesobius*) by Kim & Lee (2023); eight new species (*Artotrogus muricatus*, *Artotrogus parmatus*, *Cryptopontius bilobatus*, *Chejupontius variabilis*, *Sewellopontius pterophorus*, *S. macrochelatus*, *Bradypontius culicis*, *Neopon-*

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tius rectus) and one new record (*Pteropontius cristatus* Giesbrecht, 1895) by Lee & Kim (2023); and 14 new species (*Asterocheres geminus*, *A. processus*, *A. culicis*, *A. eurychelatus*, *A. scutellatus*, *A. spiniventer*, *A. fici*, *A. serratus*, *A. tridentatus*, *A. nodulosus*, *A. tetraodontis*, *A. dokdoicus*, *A. exilis*, and *A. zodius*) and one new record (*A. siphonatus* Giesbrecht, 1897) by Kim & Lee (2024). In total, the siphonostomatoid copepods associated with marine invertebrates in Korean seas now number 72 species. This paper describes ten additional new species of siphonostomatoid copepods associated with marine invertebrates found along the southern coasts of Korea.

Materials and Methods

Collected copepod specimens were preserved in 80% ethanol. Before microscopic examination, selected copepod specimens were immersed in lactic acid for approximately 10 minutes. Dissections and microscopic observations employed the reversed slide technique described by Humes and Gooding (1964). Drawings were created using a microscope equipped with a drawing apparatus. The lengths of copepod appendage segments represent the average of the longest and shortest margins. The terminology used in this paper primarily follows that of Huys and Boxshall (1991). Type specimens have been deposited in the National Marine Biodiversity Institute of Korea (MABIK), Seocheon, and the Honam National Institute of Biological Resources (HNIBR), Mokpo.

Results and Discussion

Class Copepoda Milne Edwards, 1840
Order Siphonostomatoida Burmeister, 1835
Family Asterocheridae Giesbrecht, 1899
Genus *Acontiophorus* Brady, 1880

***Acontiophorus decamerus* n. sp. (Figs. 1, 2)**
https://zoobank.org/urn:lsid:zoobank.org:act:81ECF01E-F385-4006-96E6-37C9C19C78DE

Type material. Holotype (intact ♀; MABIK CR00257785), intact paratypes (10 ♀♀; MABIK CR00257786) and dissected paratype (1 ♀) collected from sponge washings at Munseom, Seogwipo, Jeju Island (33°13′39.4″N, 126°33′48.2″E), SCUBA, at a depth of 56 m, by Taekjun Lee, on 25 April 2023. The holotype and intact paratypes have been deposited at the National Marine Biodiversity Institute of Korea (MABIK), Seocheon. The dissected paratype is maintained in the collection of I.-H. Kim.

Etymology. The name derives from the Greek *deca* (= ten) and *mero* (= part), referring to the 10-segmented antennule in the female.

Female. Body (Fig. 1A) narrowing from anterior to posterior. Body length of figured and described specimen 536 μm. Prosome 375 μm long, consisting of cephalothorax and second to fourth pedigerous somites. Cephalothorax 236 × 261 μm. Second pedigerous somite with angular posterolateral corners; other prosomal somites with rounded posterolateral corners. Urosome (Fig. 1B) 4-segmented. Fifth pedigerous somite 74 μm wide. Genital double-somite 0.81 times longer than wide (55 × 68 μm); genital apertures positioned dorsolaterally in middle of double-somite; lateral margins of genital region roundly protruded. Two free abdominal somites 25 × 42 and 27 × 40 μm, respectively. Anal somite (Fig. 1D) with pair of longitudinal rows of 5 or 6 thick setules on ventral surface; posterior margin unornamented. Caudal ramus (Fig. 1C) 2.19 times longer than wide (35 × 19 μm), armed with 6 setae, but no setules or spinules present on ventral surface and distal margin; setae II and VII positioned at distal quarter of ramus length; seta VI inserted on digitiform process.

Rostrum (Fig. 1K) small, strongly tapering. Antennule (Fig. 1E) short, 88 μm long, 10-segmented; articulation between 2 terminal segments incomplete, discernible only on one side; armature formula 2, 13, 7, 2, 7, 4, 1 + aesthetasc, 1, 3, and 8; setae densely arranged; aesthetasc on seventh segment large, longer than total of segments, with constriction at distal quarter. Antenna (Fig. 1F) consisting of coxa, basis, 1-segmented exopod, and 2-segmented endopod; coxa short and unarmed; basis unarmed but ornamented with 3 long setules at inner distal corner; exopod digitiform, 4.0 times longer than wide (24 × 6 μm), armed with 3 setae (1 proximal, 1 small subdistal, and 1 sparsely pinnate, large distal); first endopodal segment 19 μm long, unarmed and unornamented; second endopodal segment 24 μm long, armed with 5 setae (1 proximal, 1 large distal, 3 unequal subdistal) and ornamented subdistally with transverse row of several spinules.

Oral siphon (Fig. 1G) bendable, extending to posterior margin of genital double-somite, consisting of tapering proximal one-fifth and thin distal four-fifths. Mandible (Fig. 1H) consisting of thread-like stylet and short, 1-segmented palp tipped with 1 minute seta and 1 large, heavily pinnate seta. Maxillule (Fig. 1I) bilobed; smaller outer lobe with 1 small, naked and 3 pinnate setae; inner lobe with 5 unequal distal setae (2 pinnate setae, 2 equally long, naked setae, and 1 small naked seta). Maxilla (Fig. 1J) 2-segmented; proximal segment (syncoxa) unarmed; distal segment (basis) arched, about 1.5 times longer than proximal segment, ornamented with rows of spinules. Maxilliped (Fig. 2A) 5-segmented; first segment (syncoxa) 52 μm long, partially divided by faint line into precoxal and coxal regions, with 1 seta subdistally on inner margin and row of spinules on outer margin of coxal region; basis 47 μm

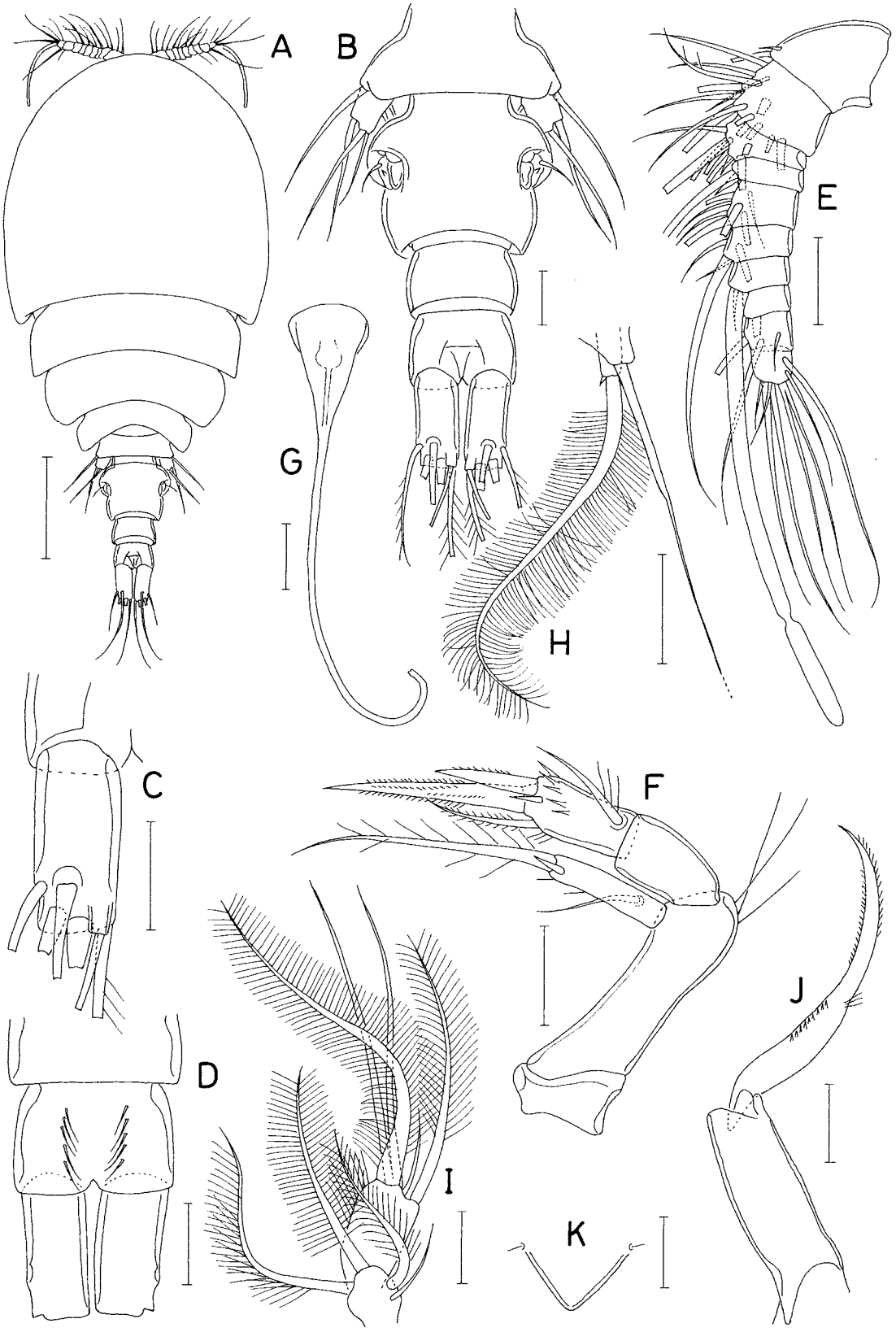


Fig. 1. *Acontiophorus decamerus* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, left caudal ramus, dorsal; D, anal somite and caudal rami, ventral; E, antennule; F, antenna; G, oral siphon; H, mandible; I, maxillule; J, maxilla; K, rostrum. Scale bars: A, 0.1 mm; B–F, I, J, 0.02 mm; G, H, 0.05 mm; K, 0.01 mm.

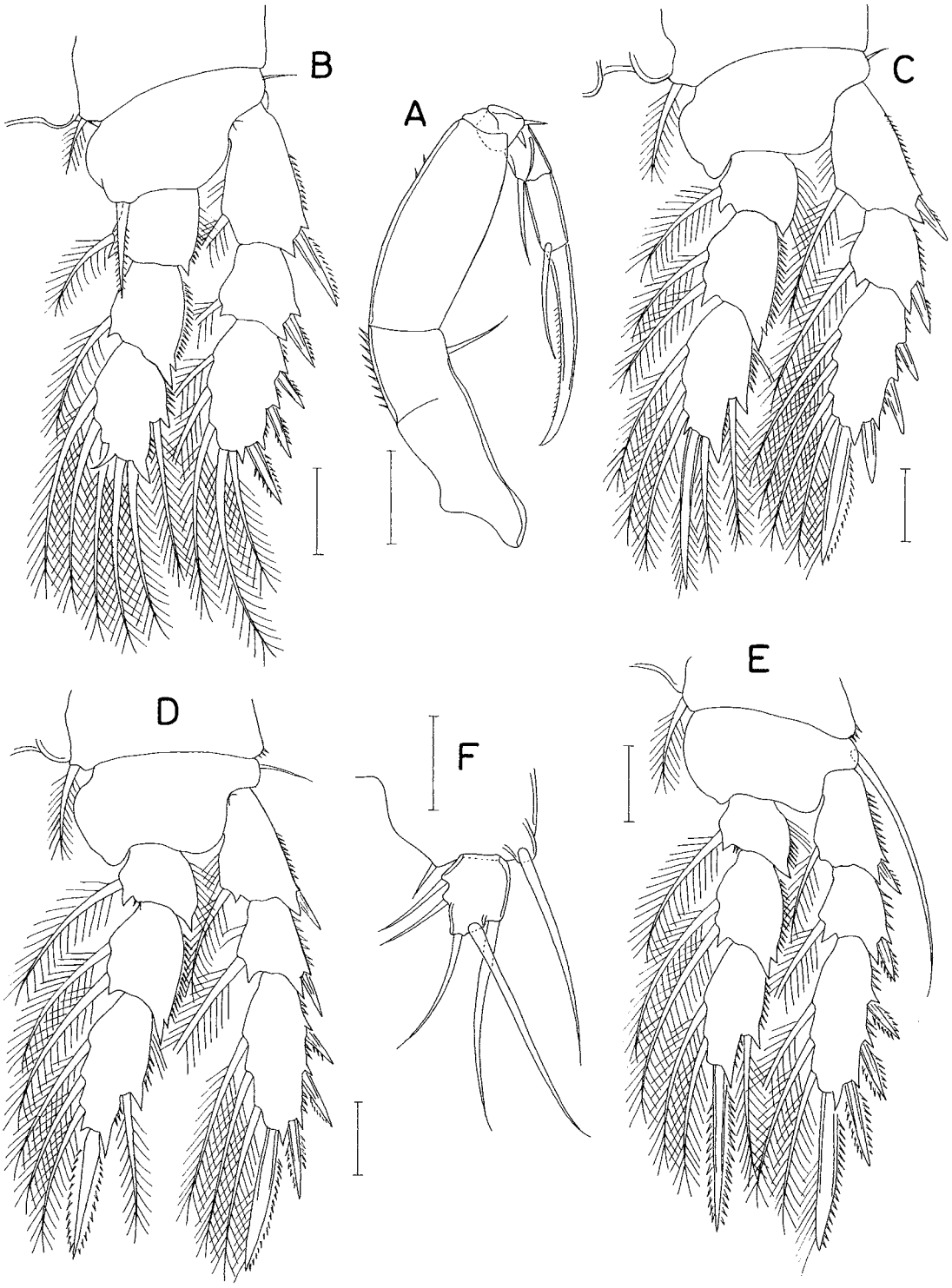


Fig. 2. *Acontiophorus decamerus* n. sp., female. A, maxilliped; B, leg 1; C, leg 2; D, leg 3; E, leg 4; F, leg 5. Scale bars: 0.02 mm.

long, unarmed, but with few spinules on outer margin; armature formula of 3 endopodal segments 2, 2, and 1 + claw; terminal claw arched, 44 μm long, about 2.8 times longer than terminal segment, ornamented with minute spinules along concave inner margin.

Legs 1−4 (Fig. 2B−E) biramous, with 3-segmented rami. Outer seta on basis small in legs 1−3, but large in leg 4. Inner distal spine on basis of leg 1 setiform, with minute spinules on margins. Second endopodal segment of legs 1−4 with bicuspid outer distal corner. Distal spine on third

endopodal segment pinnate in leg 2 but serrate in legs 3 and 4. Armature formula for legs 1–4 as follows:

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

Leg 5 (Fig. 2F) consisting of protopod and 1-segmented exopod; protopod not articulated from somite, wider than long, with 1 large outer and 1 small inner setae, both setae naked; exopodal segment 1.13 times longer than wide (17 × 15 μm), armed with 5 naked setae (1 outer subdistal, 2 distal, and 2 inner). Leg 6 (Fig. 1B) represented by 1 seta and 1 spinule on genital operculum.

Male. Unknown.

Remarks. *Acontioporus decamerus* n. sp. is most closely related to *A. estivalis* Lee, Chang & Kim, 2022 also found in Korean waters. Both species exhibit many similar morphological features, including proportional lengths of caudal rami and oral siphon, segmentation and ornamentation of the maxilliped, and identical armature formulae for legs 1 to 5. However, the new species is not conspecific with *A. estivalis*, due to several differences: (1) the body length of the female distinctly shorter, 536 μm versus 938 μm in *A. estivalis* as reported by Lee *et al*. (2022); (2) the female's cephalothorax is wider than it is long, contrasting with the equally proportioned cephalothorax of *A. estivalis*; (3) the genital double-somite of the new species features a centrally positioned genital aperture and the rounded posterolateral corners, whereas *A. estivalis* has its genital apertures at the anterior of the double-somite with angular posterolateral corners; (4) the new species has an unornamented caudal ramus compared to the ornamaneted caudal ramus of *A. estivalis*; and (5) the female's antennule is 10-segmented in the new species, in contrast to the 11-segmented antennule in *A. estivalis*.

Acontiophorus enneamerus n. sp. (Figs. 3, 4)

https://zoobank.org/urn:lsid:zoobank.org:act:423DB17F-1DE3-4D75-83A7-77B939367B20

Type material. Holotype (intact ♀; MABIK CR00257787), intact paratype (♀; MABIK CR00257788), and dissected paratype (♀) from washings of mixed species of sponges, at Munseom, Seogwipo, Jeju Island (33°13′39.4″N, 126°33′48.2″E), at a depth of 56 m, collected by Taekjun Lee, on 25 April 2023. The holotype and intact paratype have been deposited in the National Marine Biodiversity Institute of Korea (MABIK), Seocheon. The dissected paratype is held in the collection of I.-H. Kim.

Etymology. The specific name is derived from the Greek *enne* (= nine) and *mero* (= part), alluding to the nine-segmented antennule in the female.

Female. Body (Fig. 3A) tapering posteriorly. Body length of dissected paratype 665 μm. Prosome 448 μm long. Cephalothorax 300 × 348 μm, distinctly wider than pedigerous somites. All prosomal somite with rounded posterolateral corners. Urosome (Fig. 3B) 4-segmented. Fifth pedigerous somite 95 μm wide. Genital double-somite 0.84 times as long as wide (79 × 94 μm), widest at anterior 34% region, followed by evenly tapering posterior part; genital apertures positioned dorsolaterally at region just posterior to widest region; posterolateral region of genital apertures bearing pointed process (Fig. 4G). Two free abdominal somites 34 × 48 and 28 × 47 μm, respectively. Anal somite (Fig. 3D) ornamented with 2 oblique rows of 9 thick setules on ventral surface. Caudal ramus (Fig. 3C) 1.91 times longer than wide (42 × 22 μm), armed with 6 setae and ornamented with several small spinules on mediodorsal surface and 6 thick setules on medioventral surface (Fig. 3D); seta VI tipped on digitiform process.

Rostrum absent. Antennule (Fig. 3E) short, 102 μm long, 9-segmented; armature formula 2, 14, 6, 2, 6, 3, 1 + aesthetasc, 5, and 7; setae densely arranged; aesthetasc on seventh segment shorter than total length of segments. Antenna (Fig. 3F) with unarmed coxa; basis bearing long setules at inner distal corner and on subdistal inner margin; exopodal segment 3.0 times longer than wide (33 × 11 μm), bearing 1 small seta near middle and 1 large, pinnate seta and 1 spiniform process distally; first endopodal segment 17 μm long, unarmed; second endopodal segment 23 μm long, armed with 5 very unequal setae consisting of 1 proximal pinnate seta, 2 broad, spiniform setae covered with numerous spinules all over (longer distal one 65 μm long and shorter subdistal one 43 μm long), 1 small distal seta, and 1 finely spinulose subdistal seta.

Oral siphon (Fig. 3G) bendable, extremely long, 622 μm long, extending to distal margin of caudal rami, consisting of tapering proximal 15% and thin distal 85%. Mandible (Fig. 3H) consisting of thread-like stylet and unsegmented palp; palp bearing 1 small spinule-like setule and tipped with large, plumose seta; latter seta not articulated from palp segment. Maxillule (Fig. 3I) bilobed; outer lobe 15 × 15 μm, with 1 small, naked seta and 3 larger pinnate seta; inner lobe 22 × 18 μm, with 5 unequal setae, 2 of them pinnate, remaining 3 naked. Maxilla (Fig. 3J) 2-segmented, ornamented as in *A. decamerus* n. sp. Maxilliped (Fig. 4A) 5-segmented; armature formula 1, 0, 2, 2, and 1; first segment (completely fused precoxa and coxa) 64 μm long, with spinules on outer margin; second segment (basis) also 64 μm long, bearing spinules on outer margin; terminal segment 27 μm long, terminal claw 57 μm long, bearing fine spinules along concave margin.

Leg 1 (Fig. 4B) lacking inner coxal seta. Armature formula of legs 2–4 (Fig. 4C–E) as in *A. decamerus* n. sp. Leg 4 with moderately long outer seta on basis. Leg 5 (Fig. 4F)

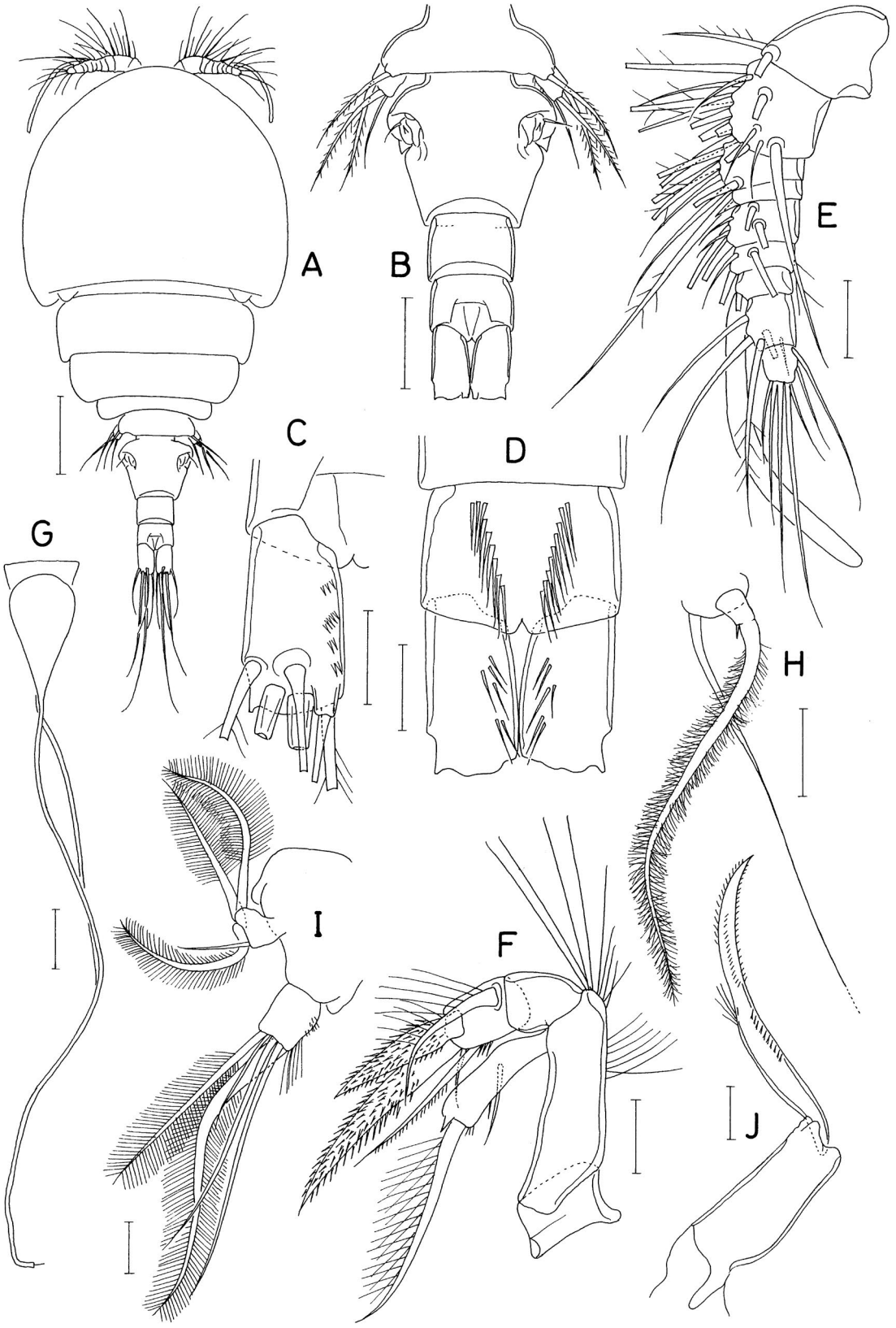


Fig. 3. *Acontiophorus enneamerus* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, left caudal ramus, dorsal; D, anal somite and caudal rami, ventral; E, antennule; F, antenna; G, oral siphon; H, mandible; I, maxillule; J, maxilla. Scale bars: A, 0.1 mm; B, G, 0.05 mm; C−F, H−J, 0.02 mm.

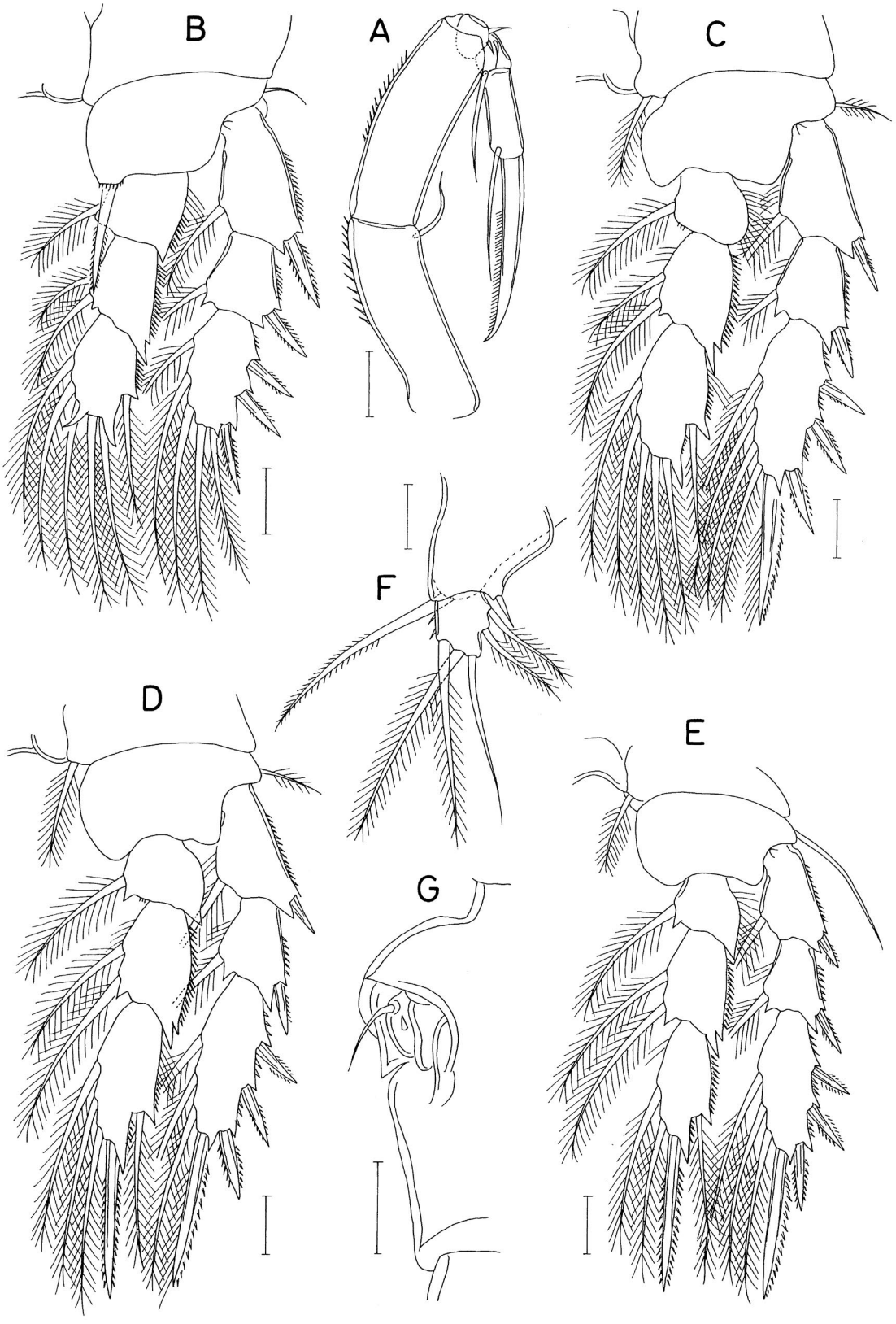


Fig. 4. *Acontiophorus enneamerus* n. sp., female. A, maxilliped; B, leg 1; C, leg 2; D, leg 3; E, leg 4; F, leg 5; G, left side of genital double-somite, dorsal. Scale bars: 0.02 mm.

consisting of protopod and free exopod; protopod fused with somite as long as wide, with 1 weakly pinnate outer distal seta and 1 small, naked inner distal seta; exopodal segment small, 1.11 times longer than wide (20 × 18 μm) armed with 5 setae (1 pinnate outer subdistal, 1 pinnate and 1 naked distal, and 2 shorter pinnate inner). Leg 6 (Fig. 4G) as 1 naked seta and 1 spinule on genital operculum.

Male. Unknown.

Remarks. *Acontiophorus enneamerus* n. sp. closely resembles *A. pilosus* Kim & Je, 2000, which is associated with a bryozoan in Korea (Kim & Je, 2000). Both species share the absence of the inner seta on the coxa of leg 1, and have a nine-segmented female antennule, a feature possessed only by them and *A. usuaiensis* Johnsson, 2001. They also have similarly proportioned female caudal rami. However, they cannot be identified as the same species due to several significant distinctions: (1) the presence of a pointed process on the lateral margin near the genital aperture in *A. enneamerus* n. sp., which is absent in *A. pilosus*; (2) a smooth lateral margin of the caudal ramus in *A. enneamerus* n. sp., as opposed to a pinnate margin in *A. pilosus*; (3) the two large terminal spiniform elements of the antenna are uniformly spinulose in *A. enneamerus* n. sp., whereas in *A. pilosus* they display two or more rows of spinules; (4) the largest terminal spiniform element of the antenna in *A. enneamerus* n. sp. is about 2.9 times longer than its terminal segment, while it is only about 2.0 times longer in *A. pilosus*; and (5) the female adult body of *A. enneamerus* n. sp. measures approximately 0.67 mm, smaller than the 0.92 mm reported for *A. pilosus* in the original description (Kim & Je, 2000). These differences have been validated through re-examination of newly collected specimens of *A. pilosus*.

Acontiophorus acuminatus n. sp. (Figs. 5, 6)

https://zoobank.org/urn:lsid:zoobank.org:act:E4B7321E-4F22-4C78-A40B-FB6E001F2617

Type material. Holotype (intact ♀, HNIBR IV7753), intact paratype (♀, HNIBR IV7754), and dissected paratype (♀) from washings of mixed species of sponges, near Biyang-do, Jeju Island (33°24′17.0″N, 126°12′16.5″E), SCUBA, depth 5−10 m, collected by Tae Won Jung and Jong Guk Kim, on 13 June 2023. Both the holotype and intact paratype have been deposited in the Honam National Institute of Biological Resources (HNIBR), Mokpo. The dissected paratype is maintained in the collection of I.-H. Kim.

Etymology. The specific name of the new species is from the Latin *acumin* (= a point), alluding to the sharply pointed posterolateral corners of the genital double-somite and first free abdominal somite.

Female. Body (Fig. 5A) moderately broad. Body length 770 μm in dissected and figured specimen. Prosome 524 μm long, consisting of cephalothorax and second to fourth pedigerous somites. Cephalothorax 378 × 415 μm, with pointed posterolateral corners. Second pedigerous somite with acutely pointed posterolateral corners. Third and fourth pedigerous somites with nipple-shaped posterolateral corners. Urosome (Fig. 5B) 4-segmented. Fifth pedigerous somite 121 μm wide. Genital double-somite slightly wider than long (100 × 105 μm), consisting of slightly expanded anterior third and narrower posterior two-thirds bearing parallel lateral margins; genital apertures located dorsolaterally at posterior region of anterior expansion. Genital double-somite and first free abdominal somites bearing acutely pointed posterolateral corners. Anal somite with minute spinules along posteroventral margin. Caudal ramus (Fig. 5C) short, 1.10 times longer than wide (32 × 29 μm), armed with 6 setae and ornamented with several spinules on lateral surface, 4 transverse rows of fine spinules on mediodorsal surface, and row of fine spinules along posteroventral margin; seta VI tipped on digitiform process.

Rostrum absent. Antennule (Fig. 5D) 212 μm long, 16-segmented; armature formula 2, 2, 11, 7, 2, 2, 2, 2, 2, 2, 2, 1, 1 + aesthetasc, 2, 4, and 7; aesthetasc on thirteenth segment half as long as total segments. Antenna (Fig. 5E) slender; coxa unarmed; basis elongate, 4.9 times longer than wide (68 × 14 μm long), unarmed; exopodal segment 3.86 times longer than wide (27 × 7 μm), as long as first endopodal segment, armed with 1 naked seta in middle and distally with 1 small, naked and 1 large, pinnate setae; first endopodal segment 27 μm long, unarmed; second endopodal segment 31 μm long, armed with 1 proximal pinnate seta, 1 small, pinnate subdistal seta, 1 naked distal seta, and 1 large spiniform distal seta of 93 μm long.

Oral siphon (Fig. 5F) bendable, extending to posterior margin of genital double-somite, consisting of tapering proximal quarter and thin distal three quarters. Mandible (Fig. 5G) as in *A. enneamerus* n. sp. Maxillule bilobed; outer lobe (Fig. 5I) bearing 3 pinnate setae; inner lobe (Fig. 5H) with protruded medial margin bearing fine spinules, armed distally with 2 large naked setae, 2 large pinnate setae and 1 small naked seta. Maxilla (Fig. 5J) slender; proximal segment unarmed; distal segment arched, longer than proximal segment, characteristically bearing 1 large naked seta at proximal third, followed by row of minute spinules along concave margin. Maxilliped (Fig. 6A) slender, 6-segmented, but articulation between proximal 2 segments incomplete, discernible only on one side; armature formula 0, 1, 1, 2, 1, 1 + claw; basis 114 μm long, ornamented with fine spinules along outer margin, its inner seta small, positioned at proximal third of segment length; terminal segment 32 μm long; terminal claw 77 μm long.

Legs 1−4 (Fig. 6B−E) segmented and armed as in *A. decamerus* n. sp.; outer seta on basis pinnate, well-developed.

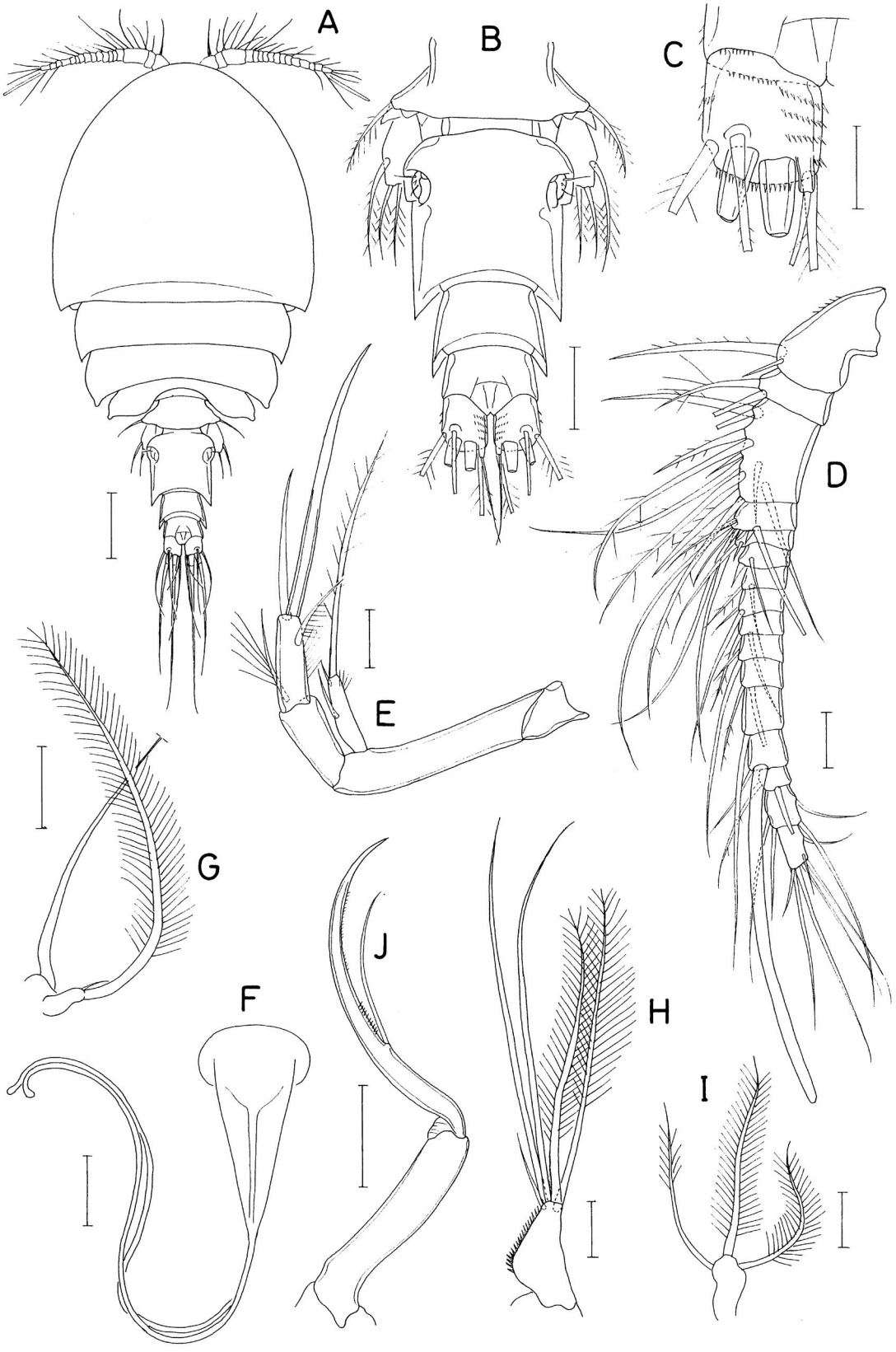


Fig. 5. *Acontiophorus acuminatus* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, left caudal ramus, dorsal; D, antennule; E, antenna; F, oral siphon; G, mandible; H, inner lobe of maxillule; I, outer lobe of maxillule; J, maxilla. Scale bars: A, 0.1 mm; B, F, G, J, 0.05 mm; C−E, H, I, 0.02 mm.

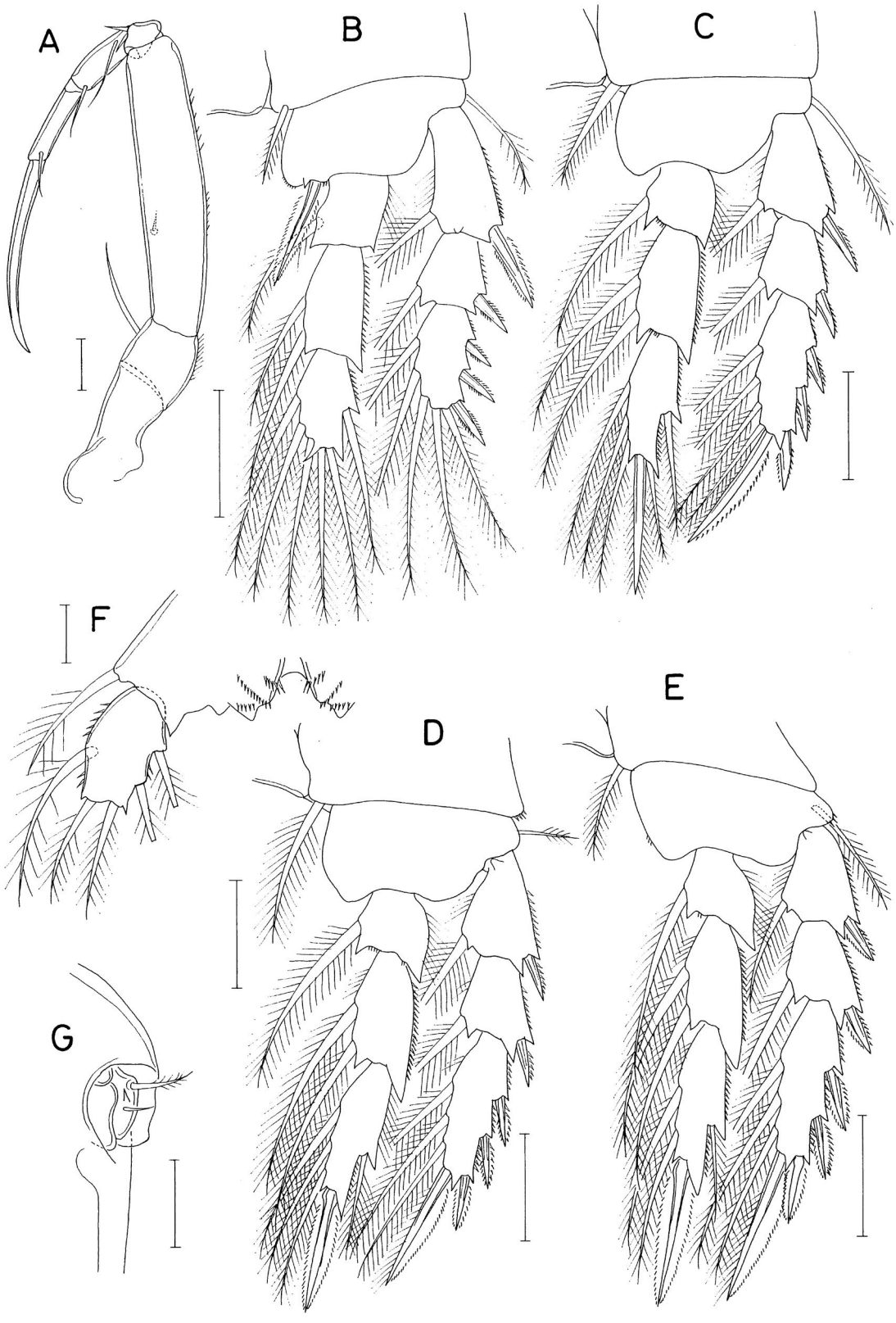


Fig. 6. *Acontiophorus acuminatus* n. sp., female. A, maxilliped; B, leg 1; C, leg 2; D, leg 3; E, leg 4; F, leg 5; G, right genital aperture, dorsal. Scale bars: A, F, G, 0.02 mm; B–E, 0.05 mm.

Leg 5 (Fig. 6F) consisting of protopod and free exopod; protopod completely fused with somite, armed only with 1 pinnate outer distal seta, ornamented with 3 rows of minute spinules on serrate inner margin; inner distal corner of protopod acutely projected; exopodal segment 1.72 times longer than wide, armed with 5 pinnate setae (1 outer, 2 distal, and 2 inner) and ornamented with several spinules on outer and inner margins. Leg 6 (Fig. 6G) represented by 1 pinnate and 1 smaller naked setae and 1 spinule on genital operculum.

Male. Unknown.

Remarks. Existing species of *Acontiophorus* can be classified into two groups. The first group consists of eight species including *A. scutatus* (Brady & Robertson, 1873), while the second group also comprises eight species including *A. ornatus* (Brady & Robertson, 1876) and *A. acuminatus* n. sp. In the "*ornatus* group", the second segment (basis) of the maxilla bears a large seta, the caudal ramus is relatively short, typically not exceeding 1.1 times its width, and the inner margin of the protopod of leg 5 is serrate. In contrast, in the "*scutatus* group", there is no seta on the second segment of the maxilla, the caudal ramus is longer, at least 1.6 times its width, and the inner margin of the protopod of leg 5 is smooth.

The segmentation of the antennule appears to be a reliable taxonomic character in *Acontiophorus*. The female antennule of existing species is nine-segmented in three species, ten-segmented in two species, 11-segmented in four species, 13-segmented in two species, and 16-segmented in four congeners. *Acontiophorus acuminatus* n. sp. has a 16-segmented female antennule, aligning it with four other species, namely, *A. armatus* Brady, 1880, *A. brevifurcatus* Stock, 1966, *A. maldivensis* Sewell, 1949, and *A. ornatus*. All these five species pertain to the *ornatus* group. Despite the incomplete descriptions of most *ornatus* group species, they can be distinguished from *A. acuminatus* n. sp. based on distinct differences.

In *A. armatus*, the body is significantly larger, nearly twice as long as that of *A. acuminatus* n. sp., measuring 1.5 mm in females according to its original description by Brady (1880). The maxillule bears three "pinnate" setae on the inner lobe and two setae on the outer lobe. In *A. brevifucatus*, the cephalothorax and the second pedigerous somite have blunt or rounded posterolateral corners. The caudal ramus is wider than long, the second endopodal segment of legs 1, 3 and 4 features a bicuspid outer distal corner, the outer lobe of the maxillule has 1 pinnate and 2 naked setae, and the exopod of leg 5 is armed with four setae, as Stock (1966) described or illustrated. In *A. maldivensis*, the genital double-somite and the first free abdominal somite exhibit blunt posterolateral corners. The second segment (basis) of the antenna is three times longer than it is wide, according to Sewell (1949) (compared to approximately five times in *A. acuminatus* n. sp.). The second endopodal segment of the antenna is shorter than the first (contrary to the reverse condition in *A. acuminatus* n. sp.), and the exopod of leg 5 is armed with 4 setae. *Acontiophorus acuminatus* n. sp. more closely resembles *A. ornatus* than other species. Sars (1921) illustrated the more extensively studied the European species *A. ornatus*, which has a genital double-somite longer than it is wide, an exopodal segment of the antenna shorter than the first endopodal segment, a distal seta on the exopod of the antenna significantly shorter than that of the new species, extending only slightly beyond the distal margin of the second segment, and the protopod of leg 5 is articulated from the fifth pedigerous somite. These distinctions establish *A. acuminatus* as a new species.

Genus *Asteropontoides* Stock, 1975

***Asteropontoides parvus* n. sp. (Figs. 7–9)**

https://zoobank.org/urn:lsid:zoobank.org:act:AF84D087-77E3-4E80-AD9D-5B8C1F6EC506

Type material. Holotype (intact ♀, HNIBR IV2396), intact paratypes (1 ♀, 1 ♂, HNIBR IV2397), and dissected paratypes (1 ♀, 1 ♂) from washings of various sponge species, near Beomseom, Seogwipo, Jeju Island (33°13′28.7″N, 126°30′46.9″E), at a depth of 20 m, SCUBA, collected by Tae Won Jung, on 20 July 2022. The holotype and intact paratypes have been deposited in the Honam National Institute of Biological Resources (HNIBR), Mokpo. The Dissected paratypes are kept in the collection of I.-H. Kim.

Etymology. The name reflects the small body size, derived from the Latin word *parv*, meaning 'small'.

Female. Body (Fig. 7A) narrow. Body length 634 μm in dissected an figured specimen. Prosome 366 μm long, fusiform, consisting of cephalothorax and second to fourth pedigerous somites. Cephalothorax almost as long as wide (264 × 261 μm). Cephalothorax and second and third pedigerous somites with pointed or angular posterolateral corners; fourth pedigerous somite with strongly concave posterior margin and rounded posterolateral corners. Urosome (Fig. 7B) 4-segmented. Fifth pedigerous somite 81 μm wide. Genital double-somite 1.30 times longer than wide (95 × 73 μm), consisting of broadened proximal half and narrower distal half, widest at proximal one-fifth; genital apertures positioned dorsally at 36% region of double-somite length. Two free abdominal somites 34 × 43 and 34 × 45 μm, respectively. Anal somite with fine spinules along posteroventral margin (Fig. 7D). Caudal ramus (Fig. 7C, D) 1.43 times longer than wide (30 × 21 μm), almost rectangular, armed with 6 pinnate setae and ornamented with fine spinules along posteroventral margin.

Rostrum (Fig. 7E) longer than wide, beaklike, with pointed distal apex. Antennule (Fig. 7F) slender, 19-segmented, but articulations between second and sixth segments in-

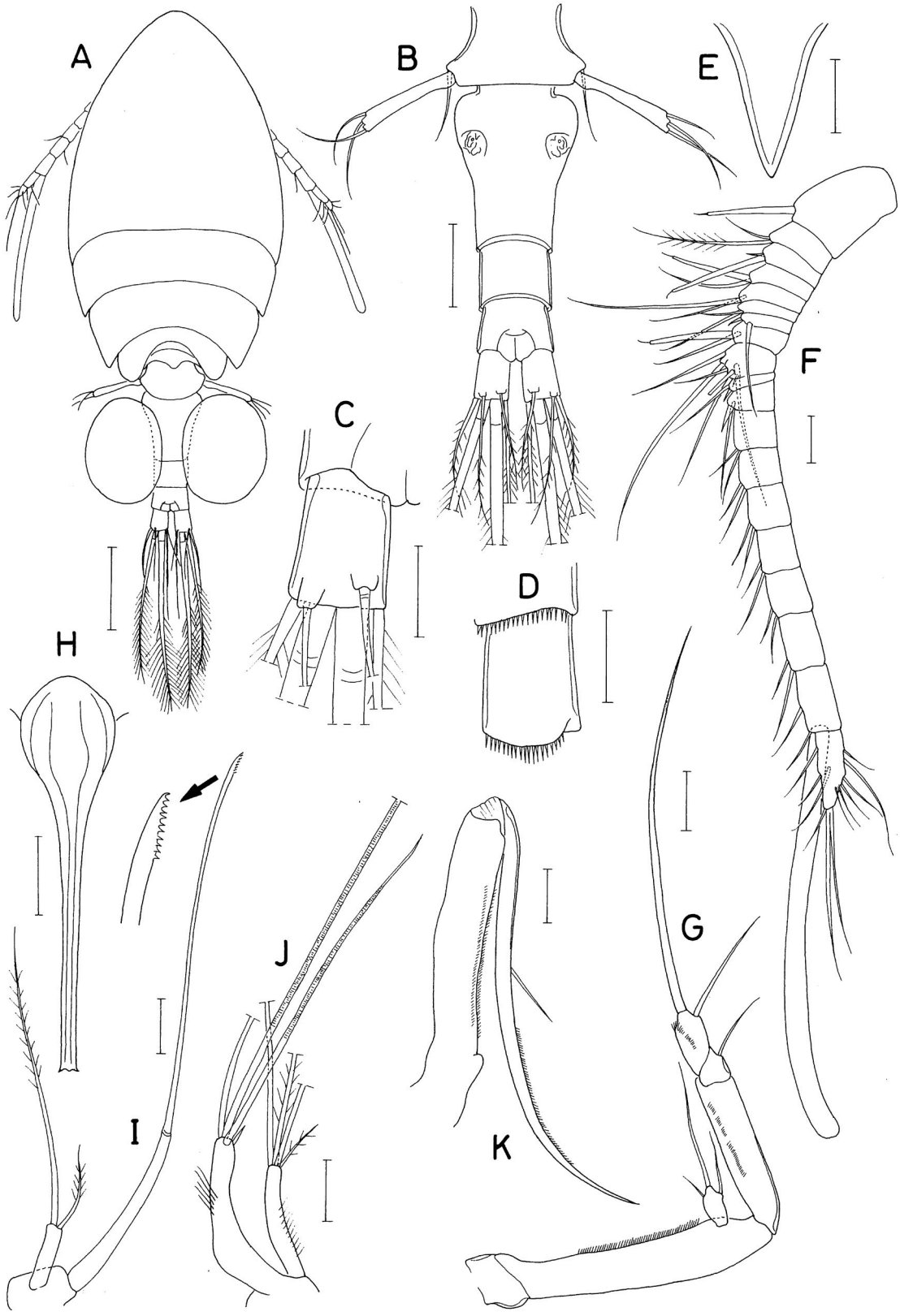


Fig. 7. *Asteropontoides parvus* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, left caudal ramus, dorsal; D, left caudal ramus, ventral; E, rostrum; F, antennule; G, antenna; H, oral siphon; I, mandible; J, maxillule; K, maxilla. Scale bars: A, 0.1 mm; B, H, 0.05 mm; C–G, I–K, 0.02 mm.

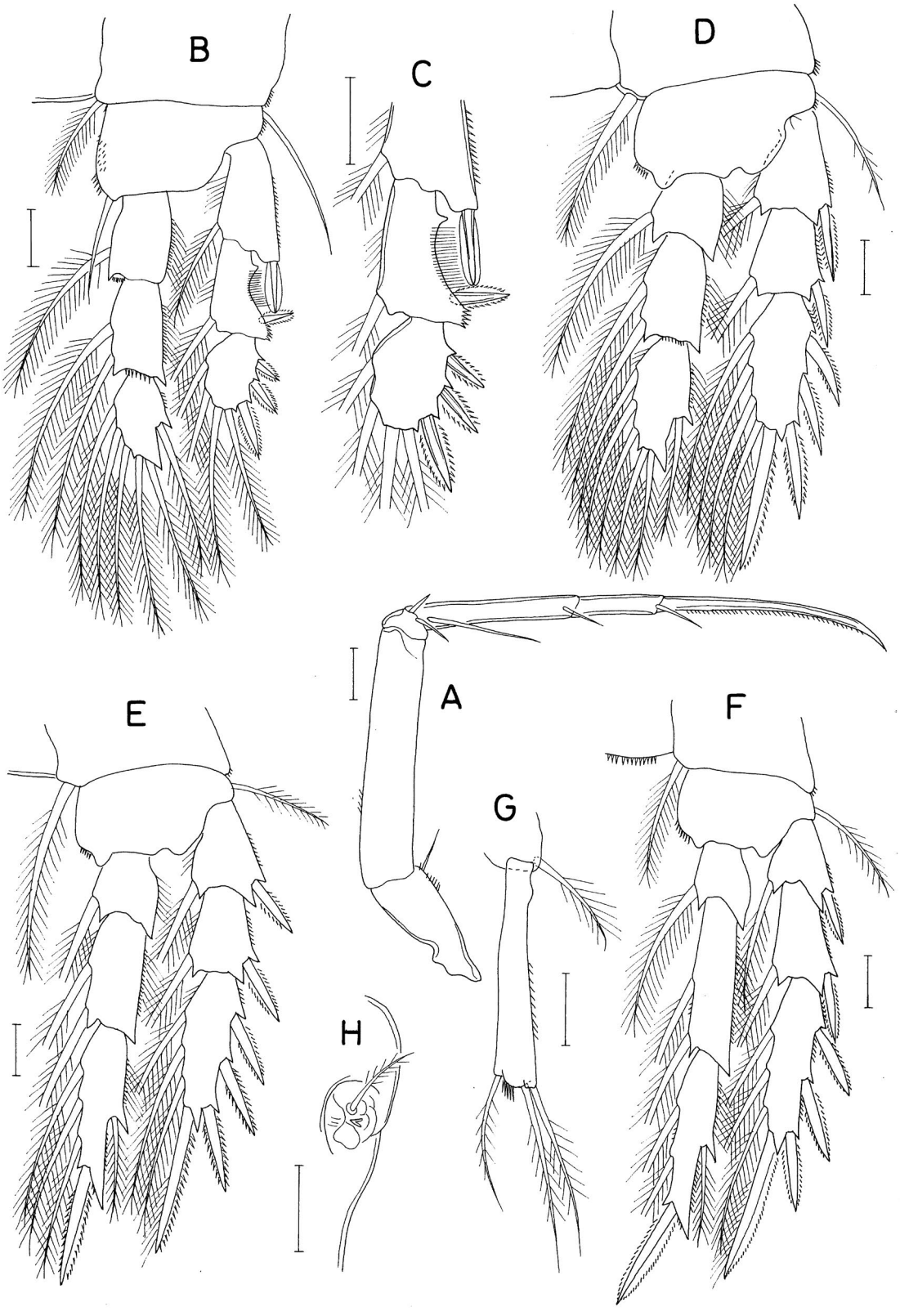


Fig. 8. *Asteropontoides parvus* n. sp., female. A, maxilliped; B, leg 1; C, exopod of leg 1; D, leg 2; E, leg 3; F, leg 4; G, leg 5; H, right genital aperture, dorsal. Scale bars: 0.02 mm.

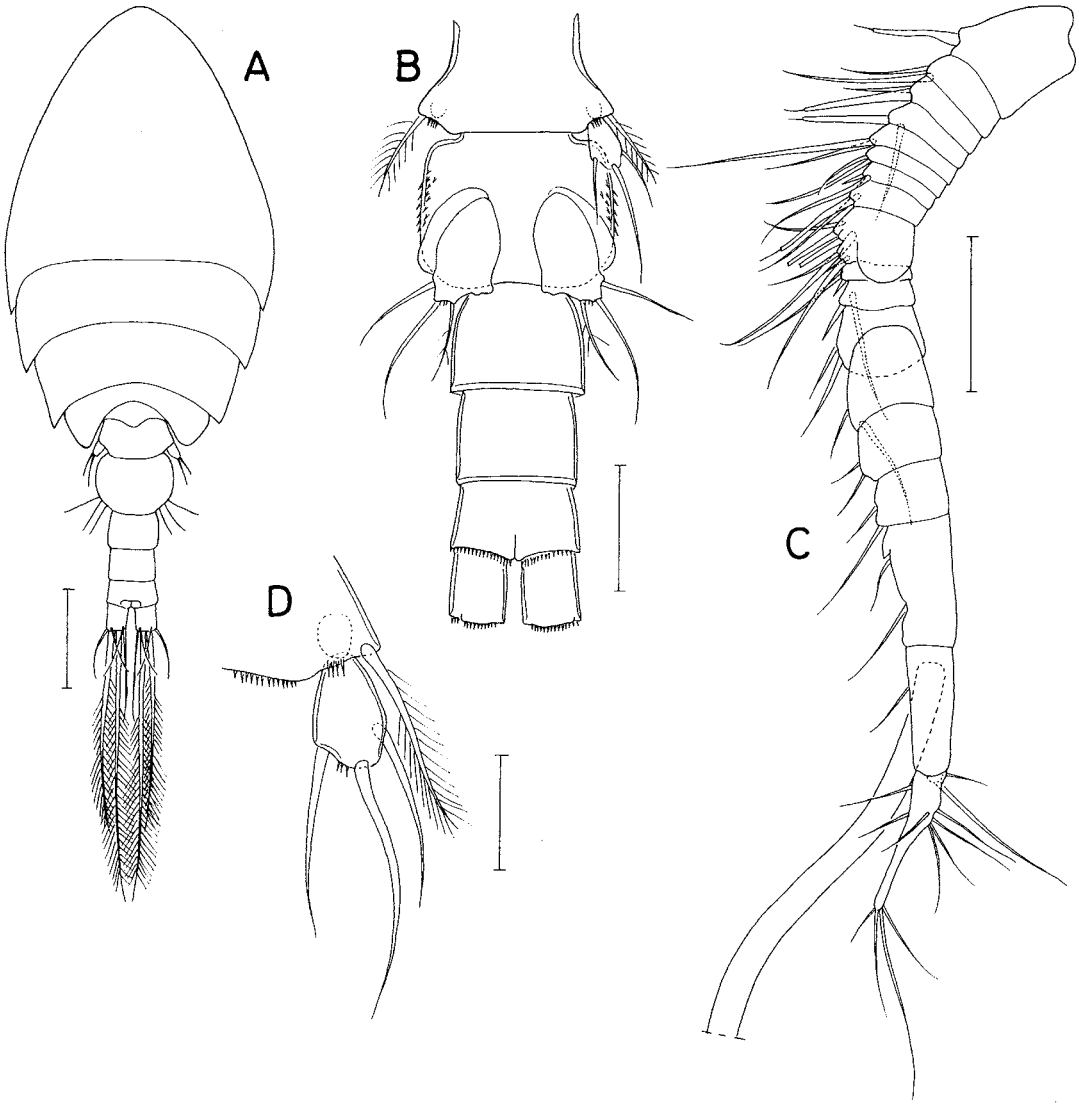


Fig. 9. *Asteropontoides parvus* n. sp., male. A, habitus, dorsal; B, urosome, ventral; C, antennule; D, leg 5. Scale bars: A, 0.1 mm; B, C, 0.05 mm; D, 0.02 mm.

complete, recognizable only on one side; first, nineth, eighteenth, and terminal segments with 1 seta, 7 setae, 2 setae + aesthetasc, and 12 setae, respectively; other segments with 2 setae each; aesthetasc on penultimate segment about 60% as long as total segments. Antenna (Fig. 7G) slender, consisting of coxa, basis, small exopod, and 3-segmented endopod; coxa short, unarmed; basis unarmed, but ornamented with minute spinules on outer margin; exopodal segment about twice longer than wide (15 × 7 μm), bearing 3 setae; first endopodal segment unarmed, 52 × 13 μm, with 1 longitudinal row of minute spinules; second endopodal segment short, with 1 seta; third endopodal segment slightly longer than wide, with 1 large distal seta (115 μm long), 1 shorter subdistal seta, and 1 row of minute spinules.

Oral siphon (Fig. 7H) consisting of expanded proximal quarter and slender distal three quarters, extending between legs 1 and 2. Mandible (Fig. 7I) consisting of stylet and 1-segmented palp; stylet thin, articulated at proximal third, 220 μm long, bearing 11 minute teeth at distal region, as arrowed in Fig. 7I; palp 25 μm long, tipped with 2 unequal, pinnate setae, larger seta 117 μm long. Maxillule (Fig. 7J) consisting of 2 slender lobes; outer lobe 38 μm long, with 4 distal setae and setulose outer margin; inner lobe 55 μm long, bearing 1 minute and 3 large distal setae and several setules on inner margin. Maxilla (Fig. 7K) 2-segmented; proximal segment unarmed, but bearing 2 longitudinal rows of minute spinules on inner margin; distal segment thin, arched, about 1.4 times longer than proximal segment, bearing 1 seta at proximal 40% region, fol-

lowed by row of minute spinules along concave margin. Maxilliped (Fig. 8A) slender, 5-segmented; armature formula 1, 0, 2, 2, and 1 + claw; second segment 100 μm long; fourth and fifth segments 58 and 33 μm long, respectively; terminal claw 91 μm long, with fine spinules along concave margin.

Legs 1–4 (Fig. 8B–F) with 3-segmented rami. Outer seta on basis naked in leg 1 but pinnate in legs 2–4. Inner distal element on basis of leg 1 as thin, naked seta. Second endopodal segment of legs 1–4 with monocuspid outer distal corner. Second exopodal segment of leg 1 with nipple-shaped outer proximal process, concave, setulose outer margin, and serrate outer distal corner (Fig. 8C). Second endopodal segment of legs 1–4 with 2 inner setae. Legs 3 and 4 with slender rami. Distal margin of intercoxal plate smooth in legs 1–3, but spinulose in leg 4. Armature formula for legs 1–4 as follows:

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

Leg 5 (Fig. 8G) consisting of short protopod and elongate exopod; protopod completed fused with somite, bearing 1 pinnated dorsodistal seta; exopodal segment 5.73 times longer than wide (63 × 11 μm), gradually broadened distally, armed distally with 3 pinnated setae, spinules on outer margin, and patch of several spinules on distal margin. Leg 6 (Fig. 8H) represented by 1 pinnate seta and 1 spinule on genital operculum.

Male. Body (Fig. 9A) resembling that of female. Body length 620 μm. Prosome 409 μm long, Anterior part of cephalothorax tapering anteriorly. Urosome (Fig. 9B) 5-segmented. Fifth pedigerous somite 77 μm wide, bearing spinules on ventrodistal margin (Fig. 9D). Genital somite quadrate, 62 × 77 μm, with scattered spinules on lateral surfaces. Three abdominal somites 41 × 53, 36 × 48, and 28 × 51 μm, respectively. Caudal ramus 1.32 times longer than wide (29 × 22 μm).

Rostrum and antenna as in female. Antennule (Fig. 9C) 18-segmented; first, nineth, seventeenth, and terminal segments with 1 seta, 7 setae, 2 setae + aesthetasc, and 12 setae, respectively; other segments each bearing 2 setae; terminal segment characteristically attenuated distally; nineth segment inflated ventrodistally.

Antenna, oral siphon, mandible, maxillule, maxilla, maxilliped, and legs 1–4 as in female. Leg 5 (Fig. 9D) consisting of 1 pinnate lateral seta on fifth pedigerous somite and free exopod; exopodal segment ovoid, 20 × 13 μm, with 3 naked setae and several spinules on distal margin.

Remarks. The genus *Asteropontoides* comprises four acknowledged species: *A. attenuatus* (Thompson & Scott A., 1903), *A. elephatinus* Johnson, 1998, *A. nicobaricus* (Sewell, 1949), and *A. acutirostris* Kim, 2016. The ratios of length to width of the female caudal ramus in these species are 2.5 for *A. attenuatus*, 0.48 for *A. elephantinus*, 0.8 for *A. nicobaricus*, and 2.37 for *A. acutirostris*. The female antennule is 18-segmented in *A. attenuatus* and *A. nicobaricus*, 15-segmented in *A. elephantinus*, and 20-segmented in *A. acutirostris*. With a caudal ramus that is 1.43 times longer than wide in the female and a 19-segmented female antennule, *A. parvus* n. sp. is easily distinguishable from the four congeners. The unique possession by *A. parvus* n. sp. of a digitiform outer proximal process and a serrate outer distal corner on the second exopodal segment of leg 1 is unprecedented in *Asteropontoides*, further distinguishing *A. parvus* n. sp.

Genus *Rhynchomyzon* Giesbrecht, 1895

***Rhynchomyzon rostrale* n. sp. (Figs. 10, 11)**

https://zoobank.org/urn:lsid:zoobank.org:act:7465BAE7-783F-4886-8719-80C0AD6FBBCC

Type material. Holotype (♀, dissected and mounted on a slide; HNIBR IV7756) from washings of invertebrates, near Biyang-do, Jeju Island (33°24′13.8″N, 126°12′17.3″E), SCUBA, at a depth of 40 m, on a sandy bottom, collected by Tae Won Jung and Jong Guk Kim, on 23 June 2023. The holotype has been deposited in the Honam National Institute of Biological Resources (HNIBR), Mokpo.

Etymology. The specific name refers to the well-developed rostrum of this new species.

Female. Body (Fig. 10A) rather narrow, 920 μm long. Prosome 527 μm long, fusiform, consisting of cephalothorax and second to fourth pedigerous somites. Cephalothorax longer than wide (372 × 355 μm). Third pedigerous somite with acutely pointed, projected posterolateral corners. Fourth pedigerous somite with deeply concave posterodorsal margin. Urosome (Fig. 10B) 5-segmented. Fifth pedigerous somite 104 μm wide, with membranous fringe along posterodorsal margin. Genital double-somite 1.2 times longer than wide (143 × 120 μm), consisting of broadened anterior third and narrower posterior two-thirds; broader anterior part with beaklike posterolateral process on each side; genital apertures positioned dorsolaterally at posterior region of broad anterior part near base of beaklike process. Three free abdominal somites 45 × 71, 30 × 67, and 35 × 68 μm, respectively. Anal somite with membranous fringe along posteroventral margin (Fig. 10C). Caudal rami divergent; each ramus (Fig. 10C) nearly rectangular, 2.84 times longer than wide (91 × 32 μm), bearing pointed process at inner and outer distal corners, armed with 6 setae, ornamented with thin setules on inner margin, fringed with membrane of uneven width along posteroventral margin.

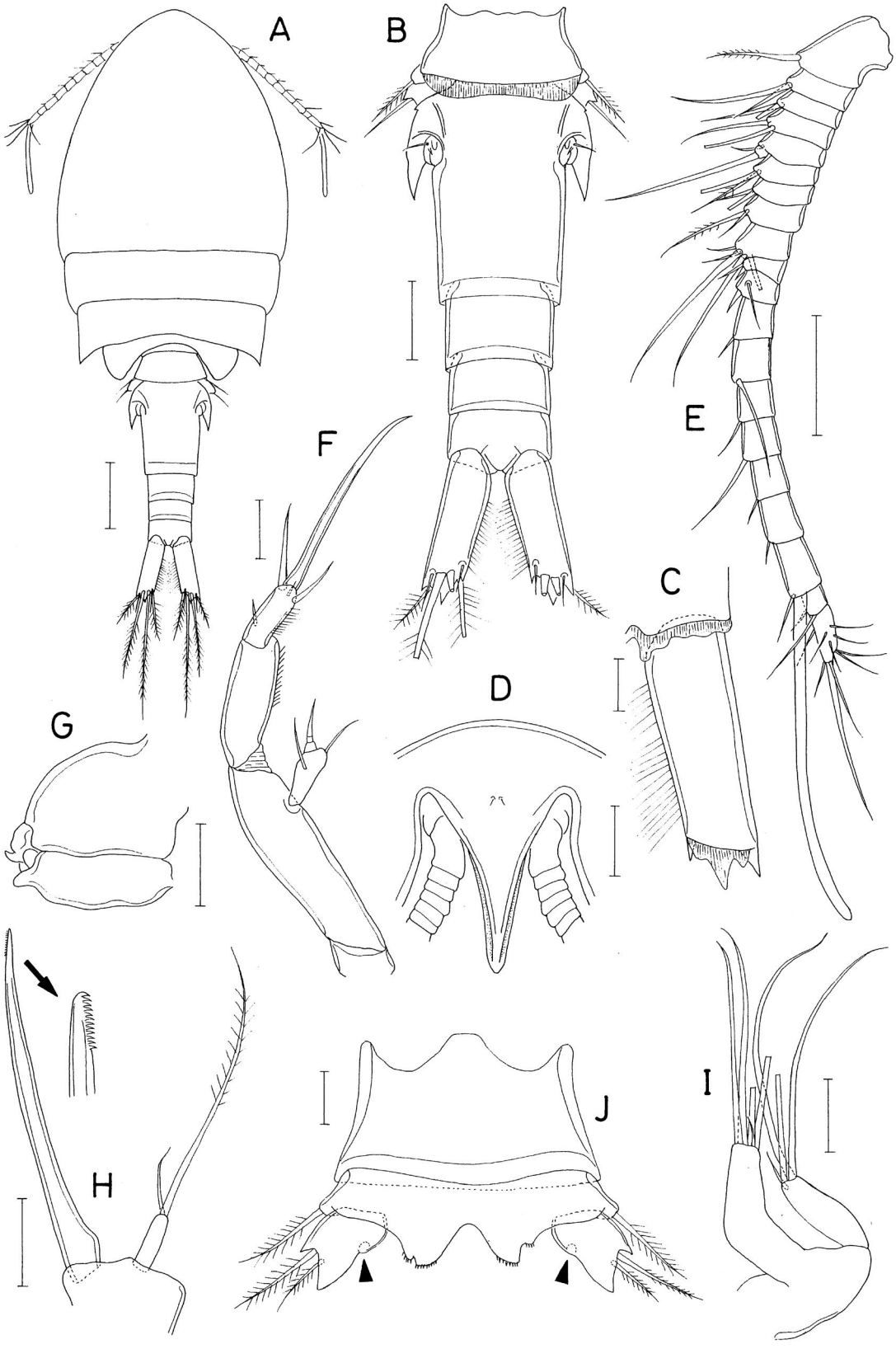


Fig. 10. *Rhynchomyzon rostrale* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, left caudal ramus, ventral; D, rostral area; E, antennule; F, antenna; G, oral cone, left; H, mandible; I, maxillule; J, fifth pedigerous somite and leg 5 pair, ventral. Scale bars: A, 0.1 mm; B, D, E, G, 0.05 mm; C, F, H–J, 0.02 mm.

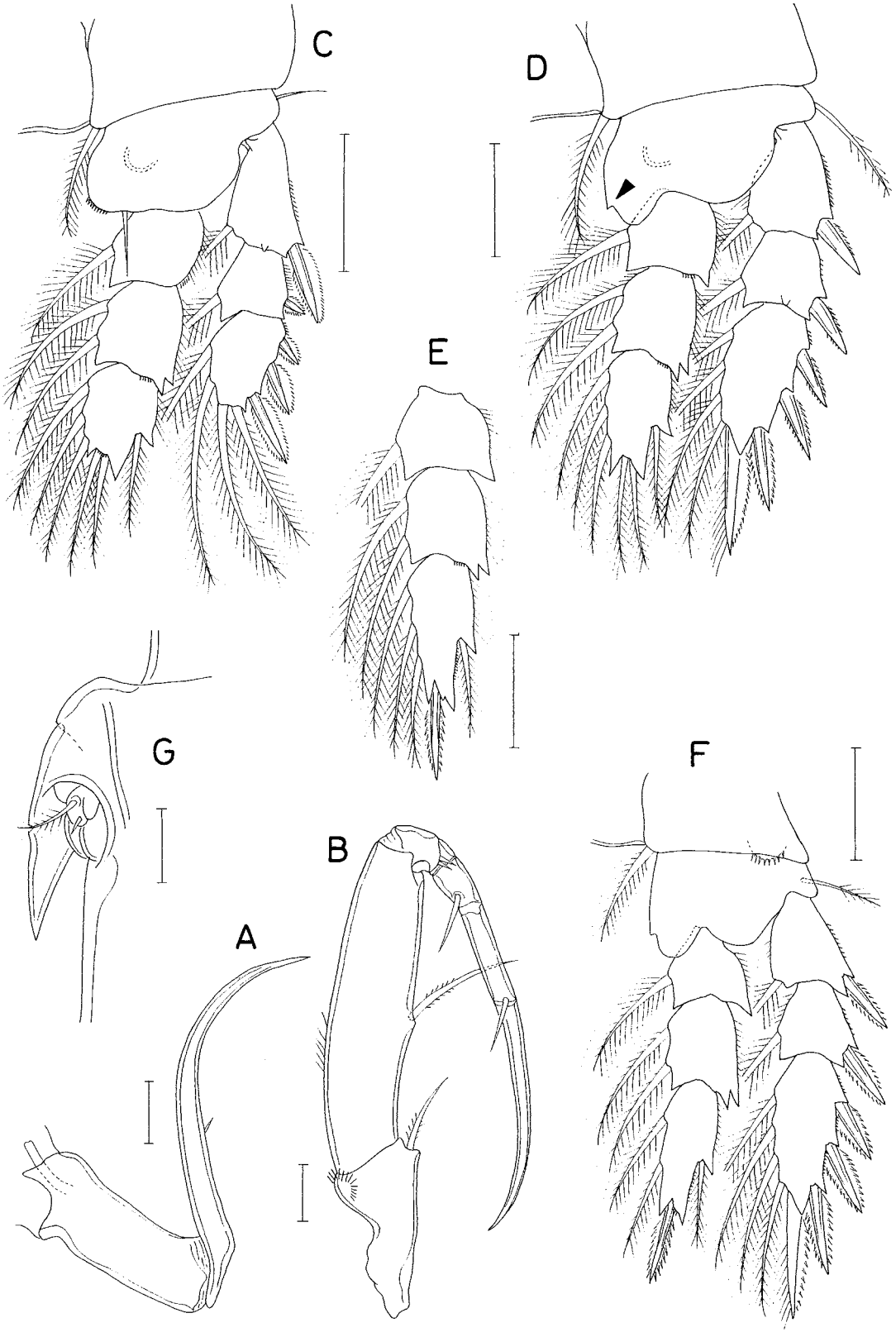


Fig. 11. *Rhynchomyzon rostrale*. n. sp., female. A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E, endopod of leg 3; F, leg 4; G, left genital aperture, dorsal. Scale bars: A, B, G, 0.02 mm; C−F, 0.05 mm.

Rostrum (Fig. 10D) large, beaklike, longer than wide. Antennule (Fig. 10E) slender, 282 μm long, 20-segmented; first, twelfth to seventeenth segments each with 1 seta; nineth segment with 5 setae; second to eighth segments each with 2 setae; eighteenth segment with 1 seta plus 1 aesthetasc; and terminal segment with 10 setae; setae mostly small and thin. Antenna (Fig. 10F) consisting of coxa, basis, 1-segmented exopod, and 2-segmented endopod; coxa short, unarmed; basis also unarmed, 73 μm long; exopod 22 × 8 μm, gradually broadened distally, with 1 subdistal and 2 distal setae, inner one of latter 2 setae annulated proximally; first endopodal segment 42 μm long, with row of setules on outer margin; second endopodal segment 24 μm long, with 1 proximal seta, 3 unequal distal setae, and slender, spiniform terminal claw of 73 μm long.

Oral cone (Fig. 10G) short, about 100 μm long, as long as wide. Mandible (Fig. 10H) consisting of stylet and palp; stylet 82 μm long, bearing 12 minute teeth at distal region, as arrowed in Fig. 10H; palp 1-segmented, 13 μm long, tipped with 1 large pinnate seta (64 μm long) and 1 small naked seta. Maxillule (Fig. 10I) bilobed; outer lobe tipped with 1 rudimentary and 3 large, naked setae; inner lobe bent in middle, tipped with 1 rudimentary and 4 large, naked setae. Maxilla (Fig. 11A) 2-segmented; proximal segment with short excretory tube proximally; distal segment as arched claw bearing 1 small setule at 40% region of concave margin. Maxilliped (Fig. 11B) 6-segmented; armature formula 1, 1, 2, 0, 1, and 1 + claw; inner seta on second segment (basis) large; terminal segment 33 μm long; terminal claw 78 μm long.

Legs 1 (Fig. 11C), 2 (Fig. 11D), 3, and 4 (Fig. 11F) with 2-segmented protopod and 3-segmented rami; inner coxal seta well-developed, pinnate; outer seta on basis small, naked in leg 1 but distinct, pinnate in legs 2–4. Basis of leg 1 and 2 with tubercle on posterior surface. Basis of leg 1 with minute spinules at inner distal corner; inner distal seta thin, straight, spiniform. Basis of leg 2 with angle on subdistal inner margin (as indicated by arrowhead in Fig. 11D). Leg 3 similar to leg 2, except bearing 1 spine and 4 setae on third endopodal segment (Fig. 11E). Leg 4 with small, spinulose tubercle on posterior surface of coxa (Fig. 11F). Armature formula for legs 1–4 as follows:

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

Leg 5 (Fig. 10J) consisting of protopod and free exopod; left and right protopod fused with each other, without any division between them, bearing 1 seta at outer distal corner and weakly bilobed, spinulose inner distal protrusion; exopodal segment slightly longer than wide, with pointed outer distal process, broad inner distal process, 2 pinnate seta on distal margin, and 1 scar of setal insertion on inner margin at places indicated by arrowheads in Fig. 10J. Leg 6 (Fig. 11G) represented by 1 pinnate and 1 small, naked setae on genital operculum.

Male. Unknown.

Remarks. The genus *Rhynchomyzon* comprises six known species. The closest relative of *R. rostrale* n. sp. is *R. rubrovittatum* Sars, 1915, known from Norwegian waters. These two species share the unique feature of a large, pointed process on the lateral margins of the genital double-somite (absent on the same place in other species) and the armature formula II, I, 4 (three spines plus four setae) on the third exopodal segment of leg 1 (contrasting with formula III, I, 4 in other species). However, they are distinct species: in the Norwegian species, the caudal ramus of the female is about 5.5 times longer than wide when measured the illustration of Sars (1915), the endopod of the antenna is 3-segmented, the inner seta on the basis of the maxilliped is small, and the basis of leg 1 lacks an inner distal seta. These significant differences clearly distinguish *R. rostrale* n. sp. from its most closely related species, *R. rubrovittatum*.

Genus *Scottocheres* Giesbrecht, 1897

***Scottocheres jungi* n. sp. (Figs. 12, 13)**

https://zoobank.org/urn:lsid:zoobank.org:act:B6E15D6C-DE19-4CA2-AC7B-7C1085A0562F

Type material. Holotype (intact ♀; HNIBR IV2386), intact paratypes (2 ♀♀; HNIBR IV2387), and dissected paratypes (1 ♀, 1 ♂) from mixed species of sponges, Chuja Island (33°47′513.6″N, 126°19′21.9″E), SCUBA, at a depth of 24 m, SCUBA, collected by Tae Won Jung, on 22 June 2022. The holotype and intact paratypes have been deposited in the Honam National Institute of Biological Resources (HNIBR), Mokpo. The dissected paratypes are retained in the colletion of I.-H. Kim.

Etymology. The species is named in tribute to Dr. Tae Won Jung, who collected these specimens.

Female. Body (Fig. 12A) narrow. Body length 927 μm in dissected and figured specimen. Prosome 606 μm long, with thin exoskeleton. Cephalothorax 358 × 321 μm, sub-circular. First 3 prosomal somites separated from one another by broad arthrodial membranes. Second to fourth pedigerous somites 276, 264, and 200 μm wide, respectively. Urosome (Fig. 12B) 4-segmented. fifth pedigerous somite 114 μm wide, with angular posterolateral corners. Genital double-somite broad, 160 × 150 μm, with convex lateral margins, dentiform angle in middle of lateral margin, followed by weak subsidiary angle; genital apertures positioned dorsally in middle of double-somite length.

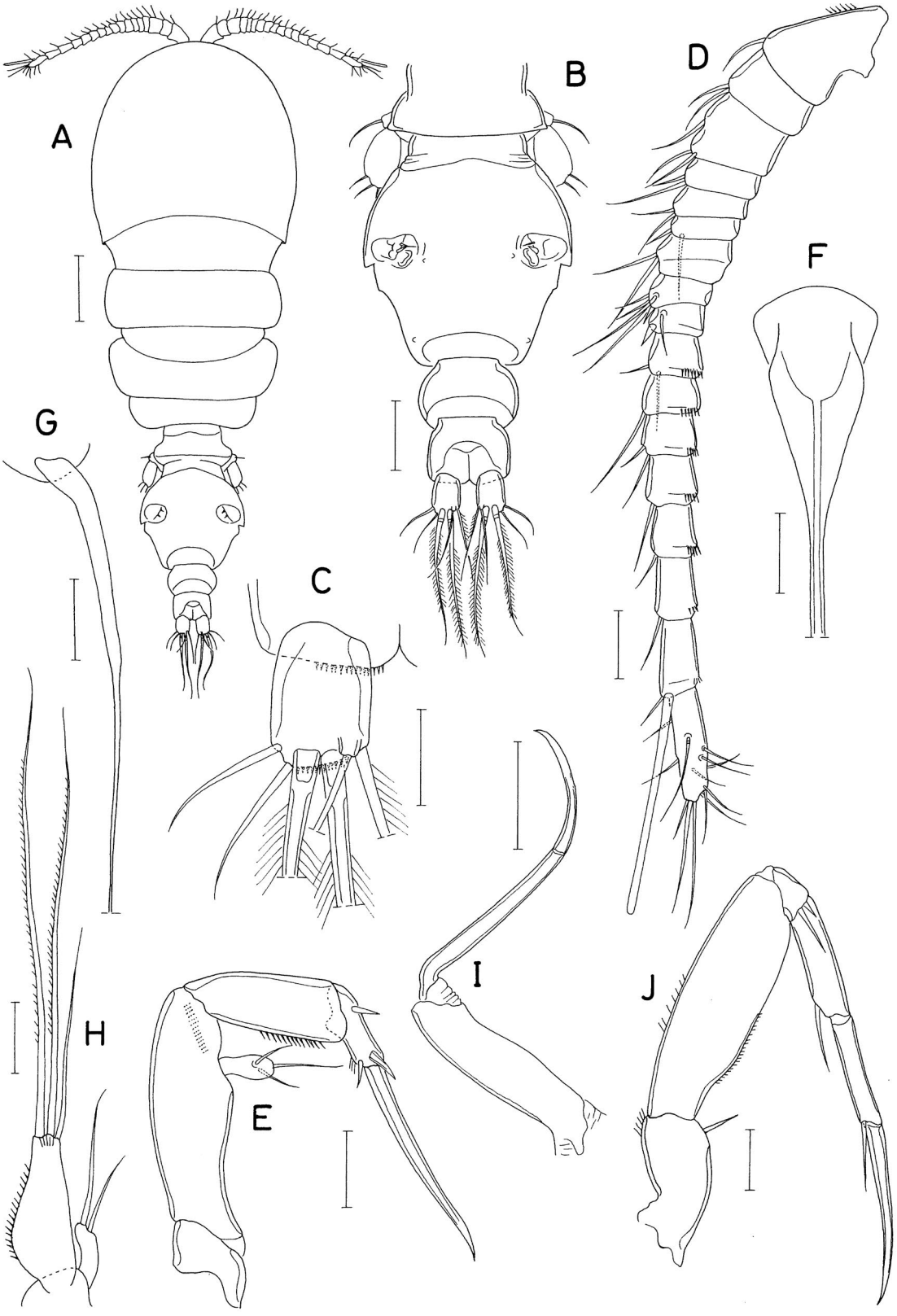


Fig. 12. *Scottocheres jungi* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, left caudal ramus, dorsal; D, antennule; E, antenna; F, oral siphon; G, mandible; H, maxillule; I, maxilla; J, maxilliped. Scale bars: A, 0.1 mm; B, F, I, 0.05 mm; C–E, G, H, J, 0.02 mm.

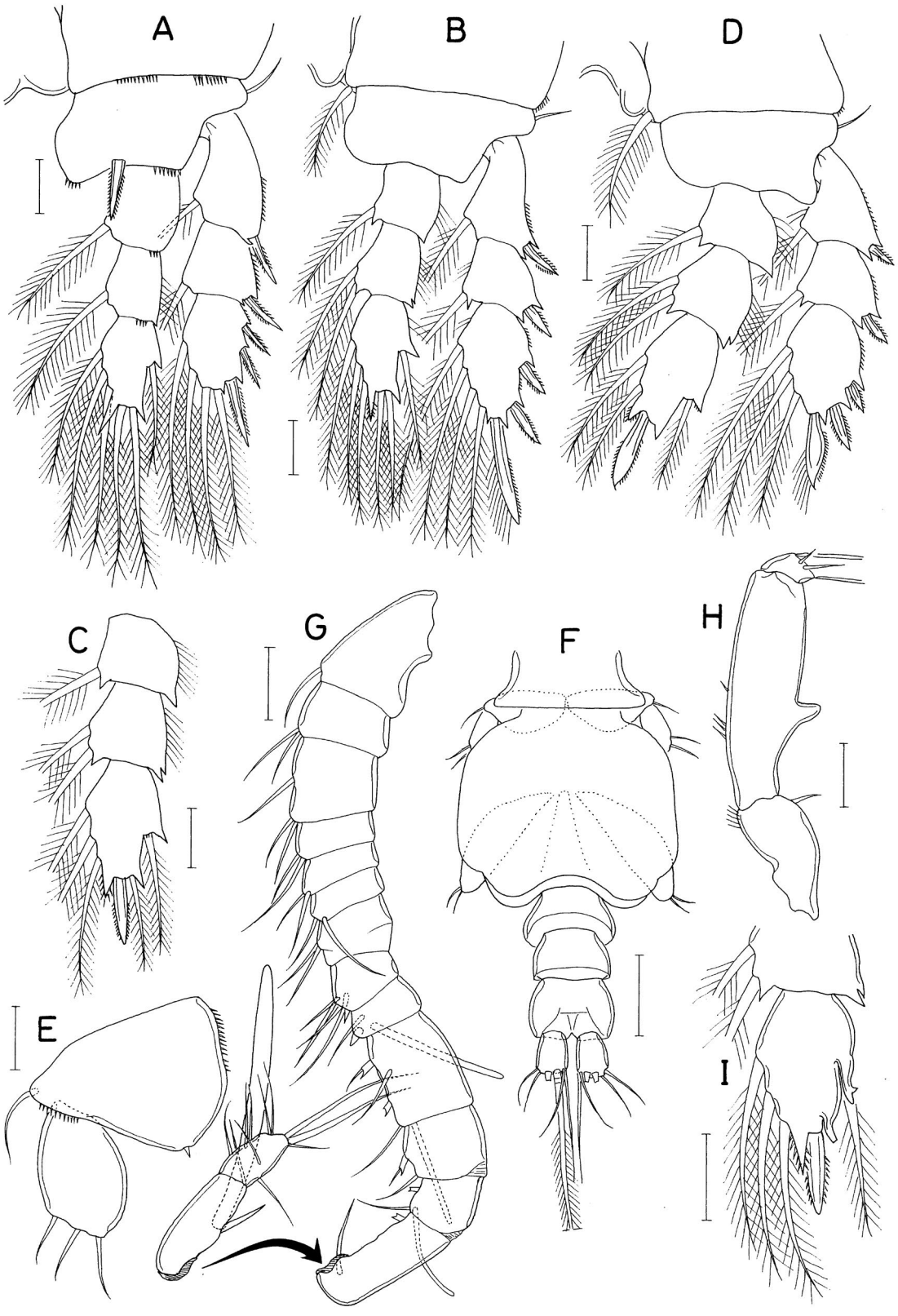


Fig. 13. *Scottocheres jungi* n. sp., female. A, leg 1; B, leg 2; C, endopod of leg 3; D, leg 4; E, leg 5. Male: F, urosome, dorsal; G, antennule; H, proximal part of maxilliped; I, third endopodal segment of leg 3. Scale bars: A–E, G–I, 0.02 mm; F, 0.05 mm.

First free abdominal somite 42 × 71 μm, with convex lateral margins. Anal somite 45 × 59 μm, with minute spinules along posteroventral margin. Caudal ramus (Fig. 12C) 1.25 times longer than wide (30 × 24 μm), with 6 setae and row of minute spinule along posteroventral margin; seta VII tipped on tubercle.

Rostrum absent. Antennule (Fig. 12D) 247 μm long, 17-segmented; armature formula 1, 2, 3, 2, 2, 2, 2, 5, 2, 2, 1, 2, 1, 1, 1, 1 + aesthetasc, and 13; first segment with several spinules on anterior margin; tenth to sixteenth segments bearing transverse row of minute spinules on posterior side near their distal margin; all setae small and naked. Antenna (Fig. 12E) with short, unarmed coxa; basis 63 μm long, with row of minute spinules subdistally; exopodal segment 14 × 7 μm, with inflated distal half and 3 naked setae (2 subdistal and 1 distal); endopod 2-segmented; first endopodal segment 37 × 16 μm, unarmed but with row of spinules on outer margin; second endopodal segment 19 × 7 μm, with 3 small, spiniform setae (1 proximal and 2 subdistal), few setules at outer subdistal region, and spiniform terminal claw of 58 μm long.

Oral siphon (Fig. 12F) consisting of slightly inflated proximal part and thin distal part, reaching insertions of legs 3. Mandible (Fig. 12G) represented by thin stylet, lacking palp. Maxillule (Fig. 12H) bilobed; outer lobe small, 15 μm long, bearing 2 naked setae (40 and 24 μm long, respectively); inner lobe 41 μm long, with spinulose, inflated inner margin, tipped with 3 setae (127, 120, and 60 μm long, respectively, from inner to outer). Maxilla (Fig. 12I) slender; proximal segment 95 μm long; distal segment slender, claw-like, divided by articulation-like annulation into proximal (89 μm long) and distal (60 μm long) parts. Maxilliped (Fig. 12J) consisting of syncoxa, basis, and 3-segmented endopod; armature formula 1, 0, 2, 1, and 1 + claw; minute spinules present on outer distal region of syncoxa and on proximal half of outer and inner margins of basis; third endopodal segment and terminal claw 36 and 59 μm long, respectively.

Legs 1 (Fig. 13A), 2 (Fig. 13B), 3, and 4 (Fig. 13D) with 2-segmented protopod and 3-segmented rami; inner coxal seta absent in leg 1, but present in legs 2–4; outer seta on basis small, naked. Inner distal spine on basis of leg 1 shorter than first endopodal segment, 18 μm long, spinulose. Leg 3 similar to leg 2, except bearing 1 spine plus 5 setae on third endopodal segment (Fig. 13C). Inner distal process of third endopodal segment of legs 2–4 spinulose. Distal spine on third exopodal and endopodal segments of leg 4 inflated. Armature formula for legs 1–4 as follows:

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

Leg 5 (Fig. 13E) consisting of protopod and exopod; protopod 45 × 63 μm, broad, plate-like, articulated from somite, armed with 1 naked outer distal seta and rudimentary, spinule-like inner distal seta, and ornamented with 1 row of minute spinules on outer part of distal margin and proximal part of inner margin; exopodal segment 1.43 times longer than wide (40 × 28 μm), bearing 3 subequal, naked setae on oblique distal margin. Leg 6 represented by 1 small seta and 1 spinule on genital operculum

Male (with damaged prosome)**.** Urosome (Fig. 13F) 5-segmented. Fifth pedigerous somite 92 μm wide. Genital somite nearly quadrate, 110 × 136 μm. Three abdominal somites with convex lateral margins, 30 × 56, 30 × 47, and 37 × 53 μm, respectively. Caudal ramus 1.47 times longer than wide (28 × 19 μm).

Rostrum absent. Antennule (Fig. 13G) 15-segmented, with strong geniculation between thirteenth and fourteenth segments; armature formula 1, 2, 3, 2, 2, 2, 2, 5, 2 + aesthetasc, 4 + aesthetasc, 2, 2 + aesthetasc, 2, 2 + aesthetasc, and 11; some setae on tenth to fourteenth segments rod-shaped or tipped with setule. Antenna as in female.

Oral siphon, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 13H) bearing digitiform, prominent process on inner margin of basis.

Legs 1, 2, and 4 as in female. Third endopodal segment of leg 3 (Fig. 13I) with distally bifurcate, elongated process on outer margin and truncate, elongated outer distal process. Leg 5 armed as in female. Leg 6 (Fig. 13F) represented by 2 small, naked setae on genital operculum.

Remarks. In the genus *Scottocheres* the armature formula of legs 1–4 varies across species. The armature formulae for leg segments of *S. jungi* n. sp. are (1) III, 2, 2 for the third exopodal segment of leg 1 (shared by six congeners), (2) II, I, 4 for the third exopodal segment of leg 2 (shared by five congeners), (3) II, I, 4 for the third exopodal segment of leg 3 (shared by five species), (4) 1, 1 + I, 3 for the third endopodal segment of leg 3 (shared by six congeners), (5) II, I, 3 for the third exopodal segment of leg 4 (shared by five congeners), (6) 1, I, 2 for the third endopodal segment of leg 4 (shared by eight congeners), and (7) 0–1 for the coxa of legs 2–4 (but not for the coxa of leg 1) (shared by four congeners). Two species in the genus, *S. laubieri* Stock, 1967 and *S. mipoensis* Kim, 2016, share all eight armature formulae with *S. jungi* n. sp. *Scottocheres mipoensis* was recorded from Korea and can be excluded from further comparison with the new species due to having an 18-segmented female antennule and a 16-segmented male antennule (Kim, 2016). *Scottocheres laubieri* was discovered in association with sponges in the Mediterranean (Stock, 1967). Although *S. laubieri* shares the same armature formulae for legs and antennule segmentation with *S. jungi* n. sp., it differs from the new species in the following features: (1) the genital double-somite is narrow, approximately 1.56 times longer

than wide, according to the illustration by Stock (1967) (vs. the double somite is 1.07 times longer than wide in *S. jungi* n. sp.), (2) the first free abdominal somite of the female is distinctly longer than wide (vs. wider than long in *S. jungi* n. sp.), (3) the outer lobe of the maxillule is armed with three setae (vs. two setae in *S. jungi* n. sp.), (4) the male antennule bears aesthetascs on proximal segments (vs. no aesthetasc on the proximal segments in *S. jungi* n. sp.), and (5) the outer and distal processes of the third endopodal segment of male leg 3 are not transformed (vs. the processes are modified in *S. jungi* n. sp.).

In *Scottocheres* the length-to-width of caudal ramus varies across species. In *S. jungi* n. sp., the ratio is 1.25, which may uniquely characterize this new species, as in the 11 species of the genus, the ratio is approximately 1 or less, or exceeds 2.

Johnsson *et al.* (2001) reported *S. laubieri* from Brazilian waters, but their material needs confirmation of the species identity due to incongruences with the original description, e.g., an inner coxal seta on leg 1, a monocuspid outer distal corner on the second endopodal segment of legs 1, 3, and 4, no outer distal seta on the protopod of leg 5, and the exopod of leg 5 where the mid-terminal seta is longer than the other two nearby setae.

Genus *Thermocheres* Kim, 2010

***Thermocheres viridis* n. sp. (Figs. 14, 15)**

https://zoobank.org/urn:lsid:zoobank.org:act:B84E8AF3-1CC9-462A-B7C1-CD3A88BF661B

Type material. Holotype (♂, dissected and mounted on a slide; MABIK CR00257789) was collected from mixed species of sponges near Munseom, Seogwipo, Jeju Island (33°13′39.4″N, 126°33′48.2″E), SCUBA, at a depth of 56 m, by Taekjun Lee, on 25 April 2023. The holotype has been deposited in the National Marine Biodiversity Institute of Korea (MABIK), Seocheon.

Etymology. The name deriveds from Latin *virid* (= greenish) and refers to the greenish body color of the new species.

Male. Body (Fig. 14A) greenish, 1.03 mm long. Prosome 629 μm long. Cephalothorax 418 × 473 μm. All prosomal somite with acutely pointed posterolateral corners. Urosome (Fig. 14B) 6-segmented. Fifth pedigerous somite 130 μm wide. Genital somite nearly quadrangular, wider than long (109 × 165 μm), bearing acutely pointed posterolateral corners; genital operculum with cusp on subdistal inner margin. Four abdominal somites 55 × 125, 47 × 109, 31 × 93, and 45 × 95 μm, respectively; first and second abdominal somites with acutely pointed, posteriorly extended posterolateral corners. Anal somite with minute spinules on posteroventral margin. Caudal rami slightly divergent; each ramus (Fig. 14C) 2.02 times longer than wide (85 × 42 mm), slightly narrowing distally, armed with 6 setae and ornamented with thin setules on inner margin and membranous fringe on posteroventral margin; setae II and VII positioned subdistally and dorsally at same plane.

Rostrum (Fig. 14D) lightly longer than wide, tapering, with rounded distal apex. Antennule (Fig. 14E) 17-segmented, geniculated between fifteenth and sixteenth segments; First to fifth, seventh, eleventh, and fourteenth segments each with 2 setae + aesthetasc, sixth and tenth segments each with 2 setae, nineth segment with 7 setae + 3 aesthetascs, twelfth segment each with 4 setae + aesthetasc, thirteenth and fifteenth segments each with 1 seta; penultimate segment with 1 seta + aesthetasc, and terminal segment with 11 setae; all setae naked. Aesthetasc on penultimate segment about 0.6 times as long as entire segments; aesthetascs on other segments thin, generally as long as that of penultimate segment. Antenna (Fig. 14F) slender, consisting of coxa, basis, 1-segmented exopod, and 2-segmented endopod; coxa 27 μm long, unarmed; basis 64 μm long, unarmed but ornamented with longitudinal row of pectinated spinules along distal half; exopodal segment 17 × 5.5 μm, bearing 3 setae; first endopodal segment 35 μm long, unarmed but with thin spinules on inner and outer margins; second endopodal segment 29 μm long, terminated in elongated spine (120 μm long), with 3 pinnated setae (1 proximal and 2 distal) and setules on outer surface.

Oral siphon (Fig. 14J) 380 μm long, slender, evenly narrowing distally. Mandible (Fig. 14G) consisting of segment-like coxa, thin stylet, and small palp; stylet 354 μm long, bearing 11 teeth at distal region (Fig. 14I); palp (Fig. 14H) small, digitiform, unsegmented, not articulated from coxa, tipped with 2 small setae. Maxillule (Fig. 14G) bilobed; outer lobe small, 25 μm long, bearing 4 setae (2 distal and 2 subdistal); inner lobe 104 μm long, distally armed with 1 rudimentary and 3 extremely long setae, latter 3 setae subequal in length, blunt and spinulose at tip. Maxilla (Fig. 15A) slender, 2-segmented; both segments unarmed; distal segment terminated in spiniform claw, with 1 minute seta at distal third and several setules distally; claw spinulose, about 0.38 times as long as segment. Maxilliped (Fig. 15B) consisting of syncoxa, basis, and 3-segmented endopod; armature formula 1, 1, 2, 2, and 1 + claw; basis with rounded protrusion, its inner seta minute, positioned at distal region of protrusion; setae on second and third endopodal segments pinnate; third endopodal segment 54 μm long; terminal claw 95 μm long, bearing spinules along concave margin.

Legs 1–4 (Fig. 15C–F) with 2-segmented protopod and 3-segmented rami; all these legs with pinnate inner seta on coxa and pinnate outer seta on basis. Leg 1 basis with thin, naked inner distal seta and spinules on inner distal corner. Second endopodal segment of legs 1–4 with bicuspid outer distal corner. Leg 4 with rudimentary inner distal

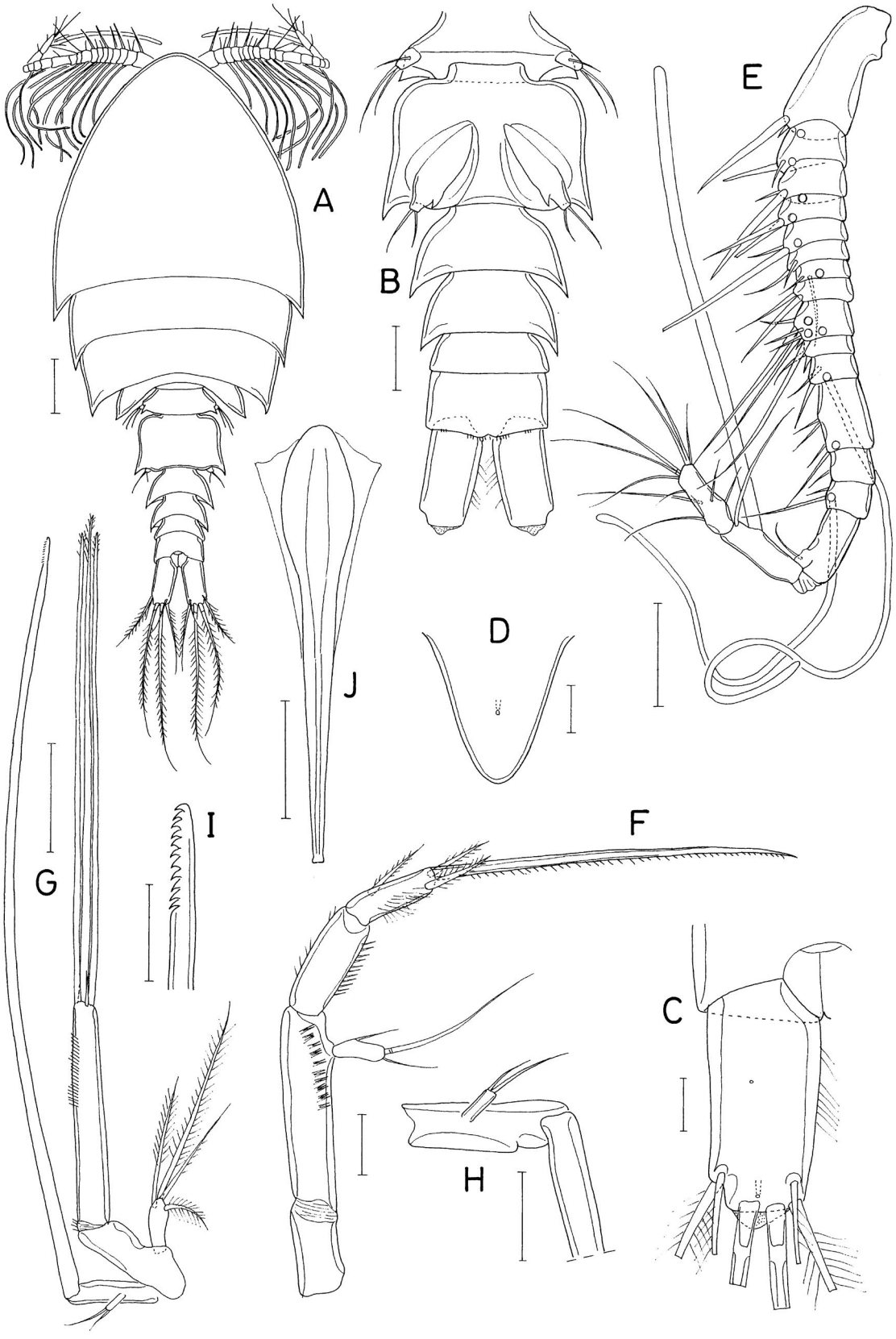


Fig. 14. *Thermocheres viridis* n. sp., male. A, habitus, dorsal; B, urosome, ventral; C, left caudal ramus, dorsal; D, rostrum; E, antennule; F, antenna; G, mandible and maxillule; H, proximal part of mandible; I, distal part of mandible; J, oral siphon. Scale bars: A, J, 0.1 mm; B, E, G, 0.05 mm; C, D, F, H, 0.02 mm; I, 0.01 mm.

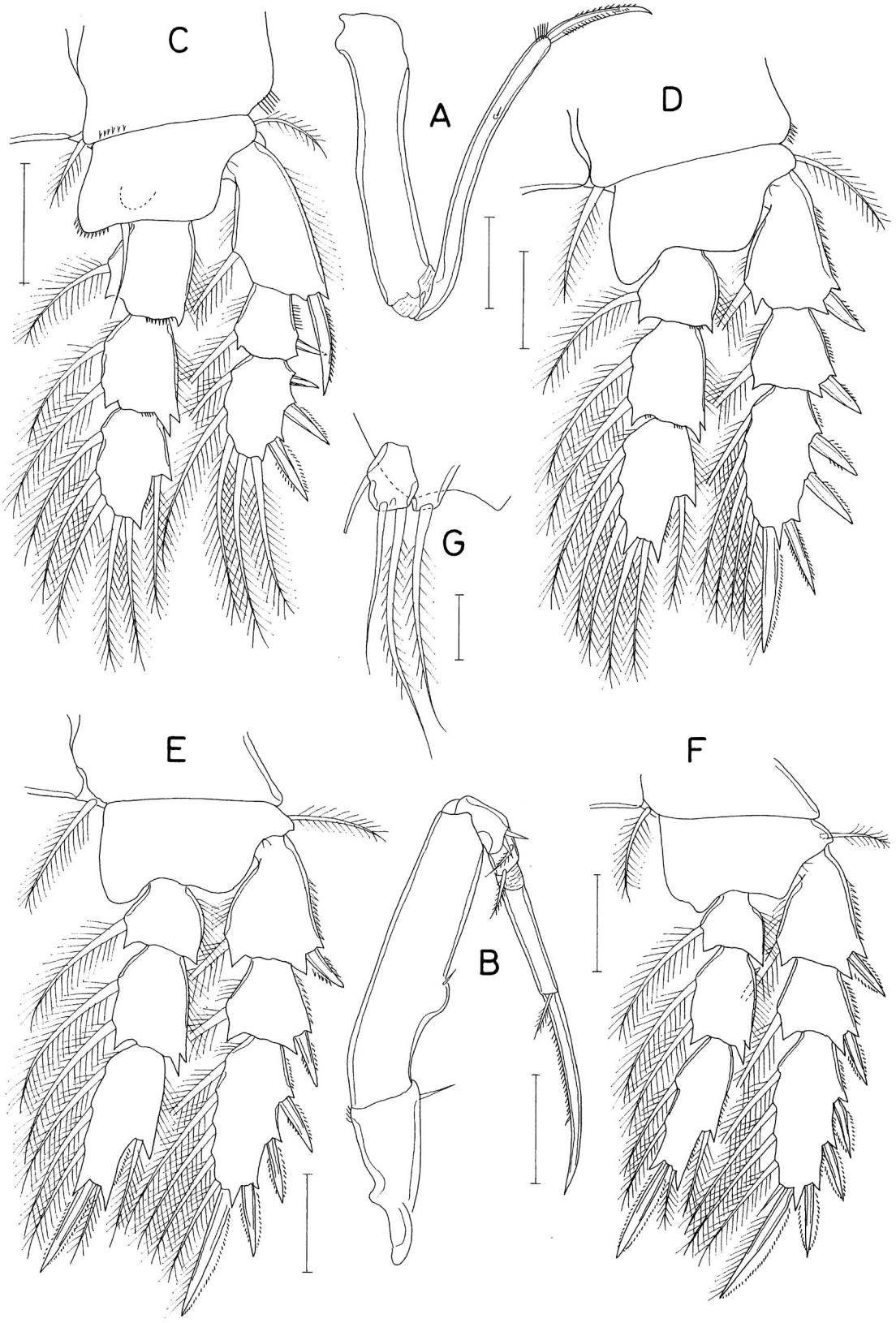


Fig. 15. *Thermocheres viridis* n. sp., male. A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E, leg 3; F, leg 4; G, leg 5. Scale bars: A–F, 0.05 mm; G, 0.02 mm.

seta on third exopodal segment. Armature formula for legs 1–4 as follows:

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

Leg 5 (Fig. 15G) consisting of pinnate dorsolateral seta of fifth pedigerous somite and small, free exopod; exopodal segment 1.24 times longer than wide (21 × 17 μm), bearing 3 setae of unequal lengths, longest one pinnate, others naked. Leg 6 (Fig. 14B) represented by 2 small distal setae and 1 subdistal cusp on genital operculum.

Female. Unknown.

Remarks. The genus *Thermocheres* includes two species, *T. validus* Kim, 2010, known from Madagascar, and *T. pacificus* Lee, Chang and Kim, 2022 from Korea (Kim, 2010; Lee *et al*., 2022). Although differences between species of *Thermocheres* are slight, *T. viridis* n. sp. is distinguishable from the two congeners: (1) by the one-segmented mandibular palp tipped with two setae, as opposed to the palp represented by a vestigial seta in *T. validus* or the absence of a palp in *T. pacificus*; (2) by possessing the rudimentary inner distal seta on the third endopodal segment of leg 4, as opposed to the seta well-developed seta in *T. validus* or the reduced size in *T. pacificus*; and (3) by having a rounded distal apex of the rostrum, in contrast to the acutely pointed, beak-like apex in *T. validus* or the angular apex in *T. pacificus*. Additionally, the new species features one spine plus four setae (formula 1, 1 + I, 2) on the third endopodal segment of leg 4, further distinguishing it from *T. pacificus* (formula 1, I, 2 in the latter species).

Family Dinopontiidae Murnane, 1967
Genus *Stenopontius* Murnane, 1967

***Stenopontius brevicauda* n. sp. (Figs. 16–18)**
https://zoobank.org/urn:lsid:zoobank.org:act:1B23B07E-6276-46BB-AFBE-2A09695621E2

Type material. Holotype (intact ♀; HNIBR IV7486), intact paratypes (2 ♀♀; HNIBR IV7487), and dissected paratypes (2 ♀♀, 1 ♂) from washings of mixed species of sponges, Ullung Island (37°31′31.98″N, 130°56′17.35″E), SCUBA, depth 32 m, collected by Tae Won Jung, 28 November 2022. The holotype and intact paratypes have been deposited in the Honam National Institute of Biological Resources (HNIBR), Mokpo. The dissected paratypes are retained in the collection of I.-H. Kim.

Etymology. The name, a noun, derives from Latin *brev* (= short) and *cauda* (= tail), referring to the short caudal rami of the new species.

Female. Body (Fig. 16A) narrow. Body length 536 μm in figured and described specimen. Prosome elliptical, 307 μm long. Cephalothorax 175 × 190 μm. Cephalothorax and first pedigerous somites with angular posterolateral corners; third and fourth pedigerous somites with rounded lateral corners. Fourth pedigerous somite with deeply concave posterodorsal margin. Urosome (Fig. 16B) 5-segmented. Genital double-somite 1.7 times longer than wide (95 × 56 μm), widest at proximal 36% region, followed by concave lateral margins; genital apertures indistinct, positioned dorsolaterally at widest region. Three free abdominal somites 35 × 46, 33 × 43, and 18 × 43 μm, respectively. Anal somite (Fig. 16C) characteristically short. Caudal rami (Fig. 16C) widely divergent, widely separated from each other; each ramus 0.94 times longer than wide (16 × 17 μm), quadrangular, armed with 6 setae; setae II, III, and VII naked, other 3 setae pinnate; inner and outer margins naked or ornamented with few spinules. Egg sac (Fig. 16A) 243 × 125 μm, containing single large egg.

Rostrum absent. Antennule (Fig. 16D) 132 μm long, 10-segmented; armature formula 0, 1, 6, 4, 3, 3, 1, 0, 1, and 11 + 2 aesthetascs; third segments with incomplete articulation on ventral surface; terminal segment longest, occupying 40% length of antennule, its proximal major aesthetasc extending slightly over distal end of segment, constricted at region slightly distal to middle; all setae naked. Antenna (Fig. 16E) slender, 5-segmented; coxa (first segment) unarmed and unornamented; basis (second segment) with 2 small setae subdistally representing exopod, and ornamented with minute spinules along outer margin; armature formula of endopod 0, 1, and 1 + spine; terminal spine straight, as long as sum of 3 endopodal segments; first and third endopodal segment with setules on outer margin.

Oral cone (Fig. 16F) stout, 84 μm long, with truncate distal tip. Mandible (Fig. 16G) represented by attenuated stylet of 80 μm long, lacking palp; stylet acutely pointed at tip, lacking any visible tooth. Maxillule (Fig. 16H) bilobed, each lobe with 3 setae distally; inner lobe with spinules on outer margin, its 3 distal setae pinnate, subequal in length, innermost one 45 μm long. Maxilla (Fig. 16I) with smooth proximal segment; distal segment slender, arched, bearing row of spinules in subdistal region. Maxilliped (Fig. 16J) 5-segmented; armature formula 0. 0. 2, 1, and 1 + claw; articulation between first and second segments incomplete; second segment with minute, rudimentary cusp on middle of inner margin; second endopodal segment 18 μm long, with inflated outer margin, with few spinules at apical region of outer margin; third endopodal segment 22 μm long; terminal claw straight, spiniform, 58 μm long, with few spinules on inner margin.

Legs 1–4 (Fig. 17A–D) with 2-segmented protopod and 3-segmented rami; inner coxal seta absent in leg 1 but pre-

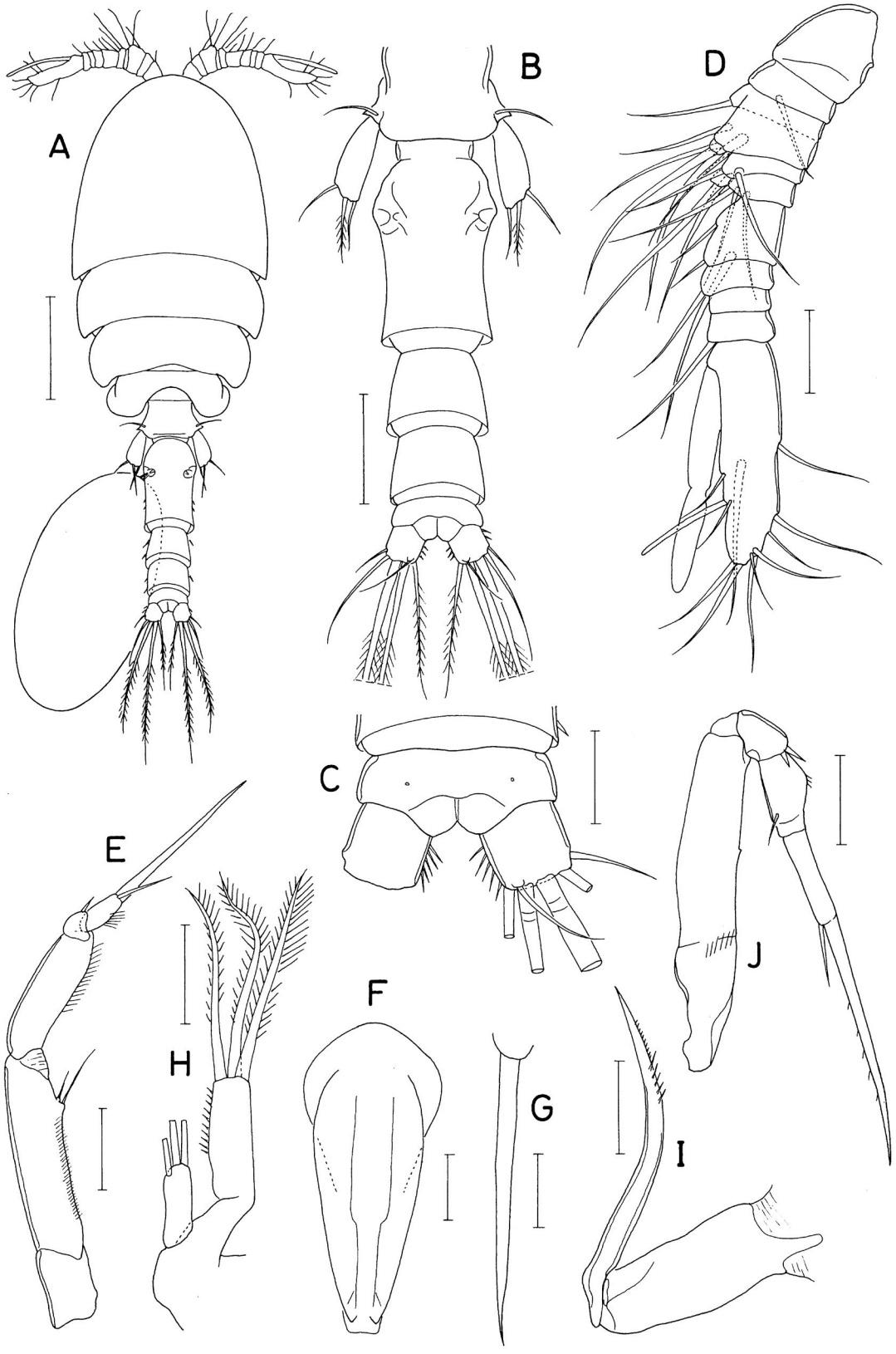


Fig. 16. *Stenopontius brevicauda* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, anal somite and caudal rami, dorsal; D, antennule; E, antenna; F, oral cone; G, mandible; H, maxillule; I, maxilla; J, maxilliped. Scale bars: A, 0.1 mm; B, 0.05 mm; C–J, 0.02 mm.

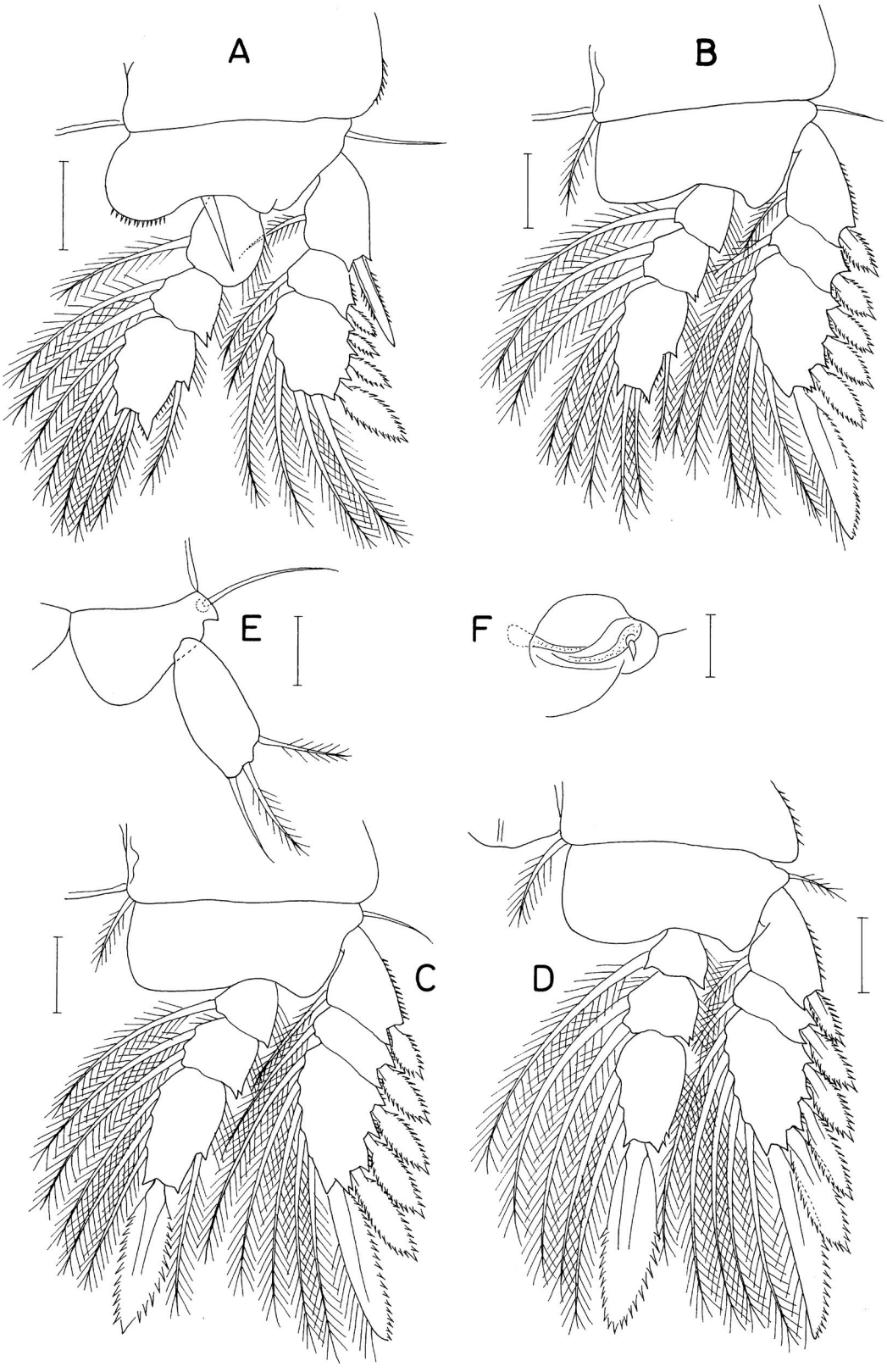


Fig. 17. *Stenopontius brevicauda* n. sp., female. A, leg 1; B, leg 2; C, leg 3; D, leg 4; E, left leg 5, ventral; F, genital aperture. Scale bars: A–E, 0.02 mm; F, 0.01 mm.

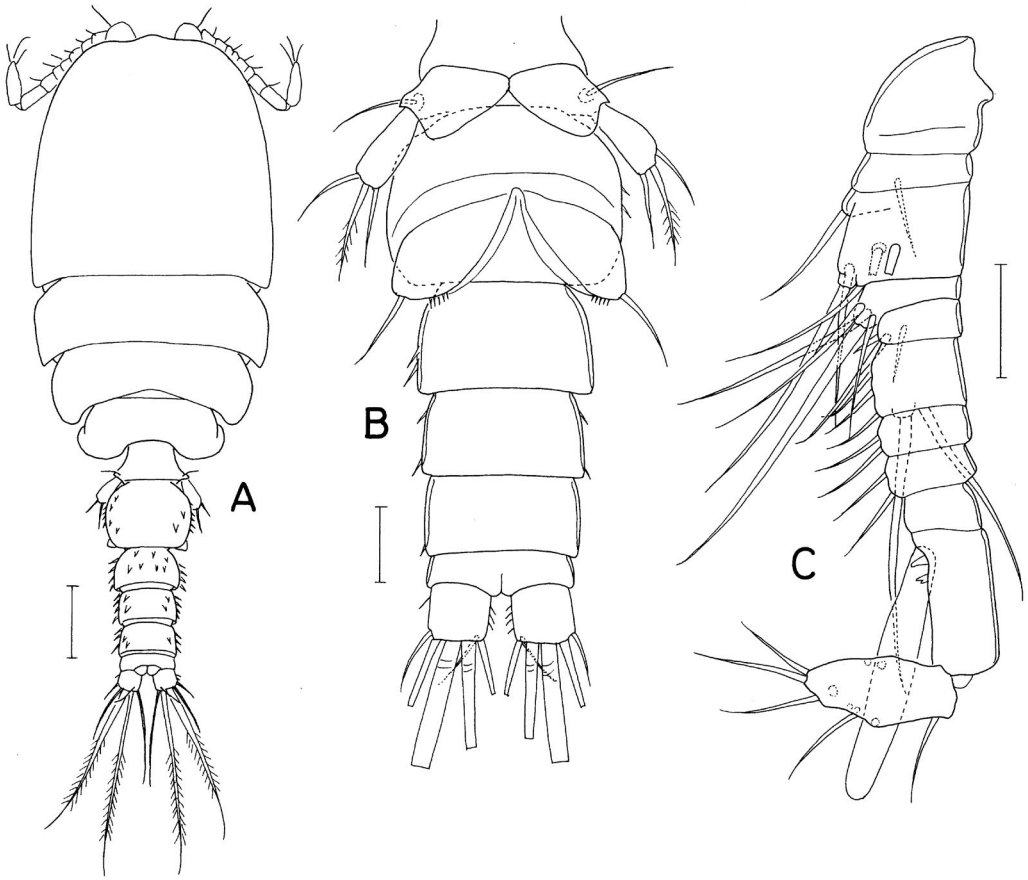


Fig. 18. *Stenopontius brevicauda* n. sp., male. A, habitus, dorsal; B, urosome, ventral; C, antennule. Scale bars: A, 0.05 mm; B, C, 0.02 mm.

sent in legs 2–4. Basis of leg 1 with spiniform inner distal seta and spinules on inner distal margin. Most of spines, especially those of legs 2–4 broad, leaf-like. Second endopodal segment of legs 1–4 with bicuspid outer distal corner. Third exopodal segment of legs 2 and 3 also with bicuspid outer distal process. Third endopodal segment of leg 4 with 2 denticles at subdistal region of outer margin. Armature formula for legs 1–4 as follows:

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

Leg 5 (Fig. 17E) 2-segmented; protopod (proximal segment) wider than long (27 × 40 μm), articulated from somite, bearing 1 naked dorsolateral seta and pointed lateral apex; exopodal segment 2.29 times longer than wide (39 × 17 μm), broadening distally, with 1 subdistal pinnate outer seta and 2 distal setae (naked inner seta and pinnate outer one). Leg 6 (Fig. 17F) probably represented by 1 small spinule on genital operculum.

Male. Body (Fig. 18A) similar in form to that of female. Body length 462 μm. Prosome 282 μm long. Cephalothorax 170 × 173 μm, with almost parallel lateral margins. Urosome (Fig. 18B) 6-segmented. Genital somite 47 × 63 μm, nearly quadrangular; genital operculum with several minute spinules on subdistal inner margin and tipped with 1 seta. Four abdominal somites 28 × 47, 23 × 44, 22 × 41, and 12 × 40 μm, respectively. Caudal ramus 15 × 16 μm, armed as in female.

Rostrum absent. Antennule (Fig. 18C) 11-segmented, geniculate between penultimate and terminal segments; armature formula for first to penultimate segments 0, 1, 6, 4, 3, 5, 2, 2, 0, 2 + aesthetasc; armature of terminal segment uncertain due to detachment of armature elements. Antenna as in female.

Oral siphon, mandible, maxillule, maxilla, maxilliped, and legs 1–4 not different from those of female. Leg 5 (Fig. 18B) armed as in female, but outer subdistal seta on exopod naked. Leg 6 (Fig. 18B) represented by 1 naked seta tipped on distal apex of genital operculum.

Remarks. The genus *Stenopontius* comprises four species associated with sponges in shallow waters: *S. boxshalli* Malt, 1991 and *S. parvus* Boxshall, 1990, both document-

ed in Hong Kong (Boxshall, 1990; Malt, 1991); *S. humesi* Murnane, 1969, from the Atlantic coast of North America (Murnane, 1967); and *S. spinulatus* Kim, 2010 from Madagascar (Kim, 2010). *Stenopontius brevicauda* n. sp. can be distinguished from its four congeners by its elongate genital double-somite, which is approximately 1.7 times longer than it is wide (in contrast, in the four congeners, the double-somite is wider than long or as long as wide), by its short caudal rami, which are wider than long (whereas the caudal rami in the four congeners are significantly longer than wide), by having three setae on the outer lobe of the maxillule (compared to two setae in the four congeners), and by having an inner seta on the coxa of legs 2−4 (unlike the absence of an inner seta in all legs 1−4 of the congeners).

***Stenopontius alatus* n. sp. (Figs. 19, 20)**

https://zoobank.org/urn:lsid:zoobank.org:act:3E665D8C-5CDF-407B-A8FE-BFAEDC3AD997

Type material. Holotype (♀, dissected and mounted on a slide; MABIK CR00257790) from washings of dredged invertebrates collected from the Korea Strait (33°13′ 39.4″N, 126°33′48.2″E), at a depth of 127 m, collected by Jimin Lee, on 17 March 2024. The holotype has been deposited in the National Marine Biological Institute of Korea (MABIK), Seocheon.

Etymology. The name is derived from the Latin *alat* (= winged), referring to the wing-like lateral expansions of the genital double-somite and first abdominal somite.

Female. Body (Fig. 19A) small, narrow, slightly dorsoventrally depressed. Body length 455 μm. Prosome with parallel lateral margins, 239 × 155 μm. Cephalothorax 134 μm long, wider than long. Fourth pedigerous somite with irregularly curved posterior margin. Urosome (Fig. 19B) 5-segmented. Fifth pedigerous somite narrow, 60 μm wide. Genital double-somite 85 × 126 μm, peculiarly consisting of narrow anterior 40% (68 μm wide at this part) and greatly broadened, wing-like posterior 60%, with produced, angular posterolateral corners; genital apertures positioned dorsolaterally at posterior region of narrow anterior part. First abdominal somite 34 × 85 μm, with wing-like, posterolateral expansions. Second abdominal somite 22 × 56 μm, posterolaterally expanded. Anal somite (Fig. 19C) 27 × 43 μm, with angular posterolateral corners and large anal operculum; anal operculum covering proximal part of caudal rami. Caudal ramus (Fig. 19C) 1.56 times longer than wide (25 × 16 μm), broadening distally, with pointed posterolateral and posteromedial corners, armed with 6 short setae; dorsal seta (seta VII) naked, other setae pinnate.

Rostrum absent. Antennule (Fig. 19D) 12-segmented; armature of proximal segments uncertain, due to damage of setae; armature of distal 3 segments 3, 1, and 10 + aesthetasc; terminal segment longest; ninth segment distinctly narrower than other segments. Antenna (Fig. 19E) consisting of 4 segments and terminal claw; coxa short, unarmed; basis 33 μm long; exopod represented by 2 subequal, naked setae located at about distal third of outer margin of basis; first endopodal segment (third segment) unarmed, 30 μm long; second endopodal segment 12 μm long, bearing 3 small setae; terminal claw smooth, strongly curved at distal 80% region, with acutely pointed distal tip.

Oral siphon (Fig. 19F) 98 × 34 μm, gradually narrowing distally, with truncate distal apex. Mandible (Fig. 19G) represented by straight, needle-like stylet of 84 μm long; palp absent. Maxillule (Fig. 19G) bilobed; small outer lobe 10 μm long, tipped with 2 equal, naked setae, both of them 38 μm long; inner lobe about 30 μm long, tipped with 3 subequal, naked setae, longest middle one of them 59 μm long. Maxilla (Fig. 19H) 2-segmented; proximal segment (syncoxa) 30 μm long, smooth; distal segment (basis) 60 μm long, bearing spinules and setules on convex margin. Maxilliped (Fig. 19I) 5-segmented; armature formula 0, 0, 0, 2, and 1 + claw; lengths of second segment (basis) to terminal claw 42, 9, 30, 24, and 32 μm, respectively.

Legs 1−4 (Fig. 20A−D) with 3-segmented rami; coxa lacking inner seta. Intercoxal plate of legs 2−4 sparsely covered with spinules. Inner margin of basis of legs 1−4 protruded, that of legs 1−3 with fine spinules. First exopodal segment of leg 1 lacking inner seta. Outer and distal setae on third endopodal segment of leg 1 naked. Inner seta on first exopodal segment of legs 2−4 short. Second endopodal segment of legs 1−4 with bicuspid outer distal corner. Armature formula for legs 1−4 as follows:

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

Leg 5 (Fig. 19J) consisting of protopod and exopod; protopod distinctly articulated from somite, bearing 1 pinnate seta on outer margin; exopodal segment oval, 1.42 times longer than wide (51 × 36 μm), bearing 3 small, naked setae on distal margin; lengths of these setae 25, 9, and 14 μm, respectively, from inner to outer. Leg 6 (Fig. 19K) represented by 1 seta and 1 spinules on genital operculum.

Male. Unknown.

Remarks. The new species is clearly distinguishable from other species of *Stenopontius* by the unique shape of the female urosome, featuring wing-like lateral expansions on the genital double-somite and the first abdominal somite. These are distinctive key characteristics of the new species.

The armature condition (two spines plus five setae) on the third exopodal segment of leg 1 is also unique with-

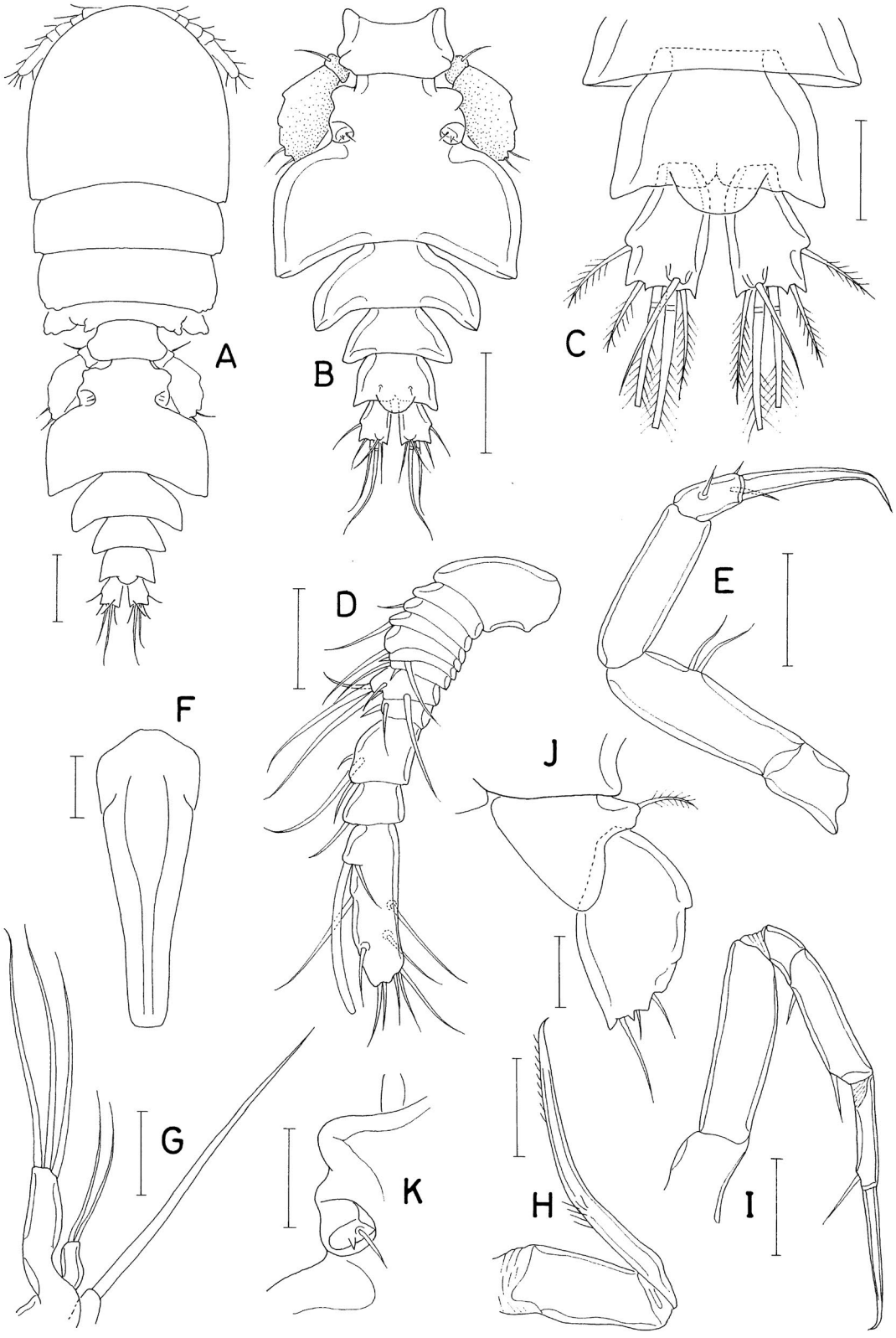


Fig. 19. *Stenopontius alatus* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, anal somite and caudal rami, dorsal; D, antennule; E, antenna; F, oral siphon; G, mandible and maxillule; H, maxilla; I, maxilliped; J, leg 5; K, left genital aperture, dorsal. Scale bars: A, B, 0.05 mm; C–K, 0.02 mm.

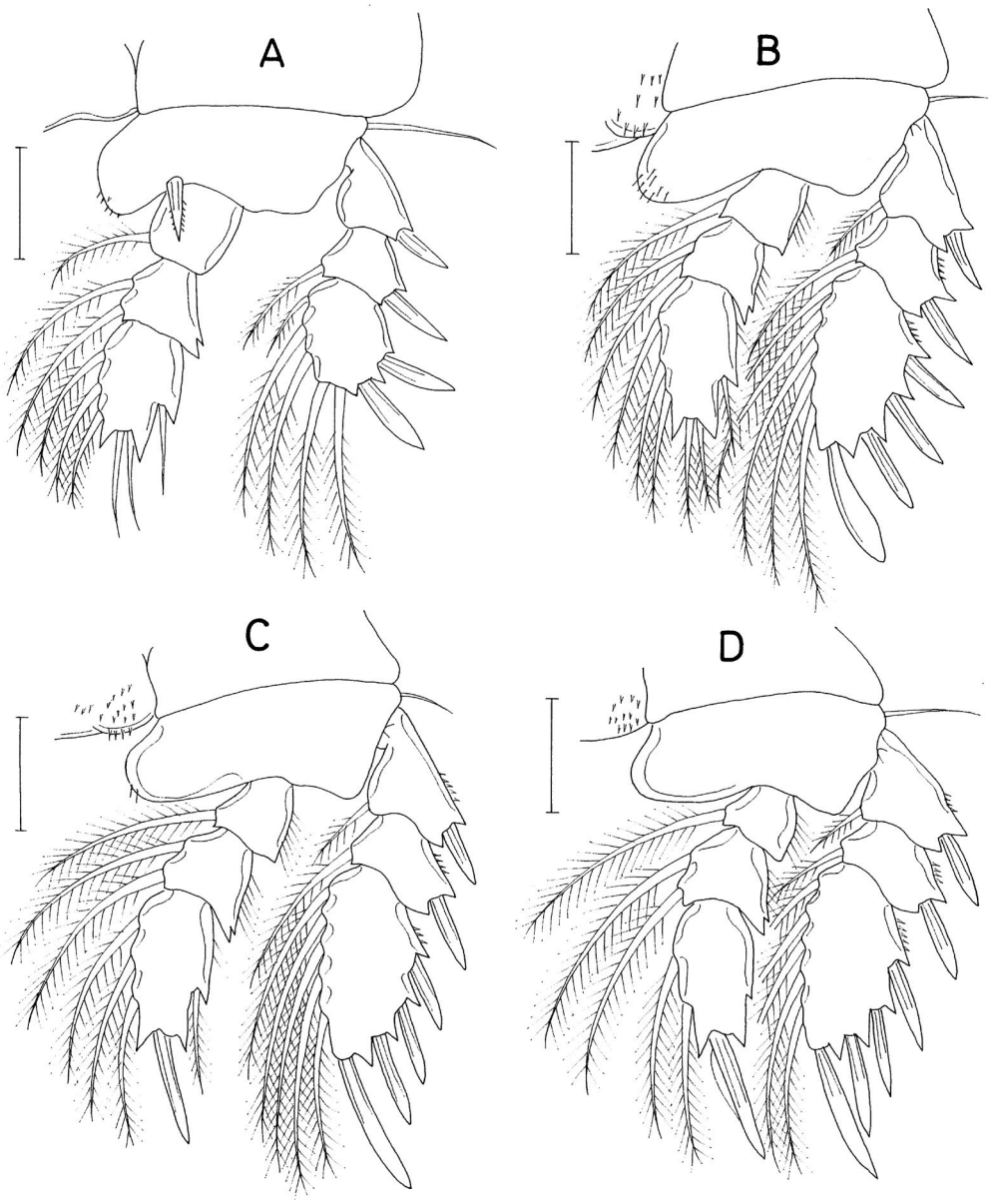


Fig. 20. *Stenopontius alatus* n. sp., female. A, leg 1; B, leg 2; C, leg 3; D, leg 4. Scale bars: 0.02 mm.

in the genus, as it differs from the condition present in *S. boxshalli* and *S. humesi* or compared to three spines plus five setae in *S. parvus* and *S. brevicauda* n. sp., or three spines plus four setae in *S. spinulatus* Kim, 2010 (Marnane, 1967; Boxshall, 1990; Malt, 1991; Kim, 2010).

Family Entomolepididae Brady, 1899
Genus *Entomopsyllus* McKinnon, 1988

***Entomopsyllus aplanatus* n. sp. (Figs. 21–23)**
https://zoobank.org/urn:lsid:zoobank.org:act:2A265E6C-B851-4207-860E-4DD6E5B96470

Type material. Holotype (intact ♀; MABIK CR00257791), intact paratypes (20 ♀♀, 2 ♂♂; MABIK CR00257792), and dissected paratypes (2 ♀♀, 2 ♂♂) from washings of mixed species of sponges, Munseom, Seogwipo, Jeju Island (33°13′39.4″N, 126°33′48.2″E), SCUBA, at a depth of 56 m, collected by Taekjun Lee, on 25 April 2023. The holotype and intact paratypes have been deposited in the National Marine Biodiversity Institute of Korea (MABIK), Seocheon. The dissected paratype is retained in the collection of I.-H. Kim.

Etymology. The specific name is derived from the Latin *aplanat* (= flattened), referring to the flattened body of the new species.

Female. Body (Fig. 21A) extremely flattened dorsoventrally, oval in dorsal view. Mean body length (prosomal length) 1.19 mm (1.13–1.26 mm), based on 10 specimens. Body of figured and described specimen 1.22 mm long. Maximum width 0.84 mm. Prosome covering whole body, except distal part of caudal rami, consisting of cephalothorax and second to fourth pedigerous somites; lengths of these 4 somites 606, 115, 76, and 436 μm, respectively, measured along midline. Urosome (Fig. 21B) 3-segmented, consisting of genital complex and 2-segmented abdomen. Fifth pedigerous somite completely fused with genital double-somite to form genital complex. Genital complex 170 × 132 μm, consisting of broader proximal 47% and narrower remaining part; genital apertures positioned dorsolaterally at about proximal third of genital complex; ventrodistal part of genital complex bearing pair of oblique rows of spinules on each side (Fig. 21C). Two free abdominal somites 80 × 75 and 90 × 75 μm, respectively. Caudal rami widely separated from each other; each ramus (Fig. 21D) 2.96 times longer than wide (77 × 26 μm), armed distally with 6 setae and ornamented with thin setules on inner margin; setae II and VII naked, tipped on digitiform process; setae III and VI unilaterally pinnate; 2 median terminal setae (setae IV and V) bipinnate.

Rostrum absent. Antennule (Fig. 21E) slender, 17-segmented; first, third, sixth, fifteenth, and terminal segments bearing 1 seta, 8 setae, 7 setae, 2 setae + aesthetasc, and 11 setae, respectively; other segments bearing 2 setae each; all setae naked; aesthetasc on fifteenth segment thin; first segment longest, and third segment second longest. Antenna (Fig. 21F) consisting of coxa, basis, 1-segmented exopod, and 2-segmented endopod; coxa short, unarmed; basis unarmed but with longitudinal row of several denticles on proximal region; exopodal segment elongate, 71 μm long, longer than first endopodal segment, with 1 distal and 1 subdistal small setae and setules on margins; first endopodal segment 64 μm long, unarmed but ornamented with minute, distally bifurcate spinules in distal half of segment; second endopodal segment 33 μm long, bearing 4 setae (1 proximal, 1 subdistal, and 2 small, distal) and setules on all surfaces and tipped with spiniform claw of 64 μm long.

Oral siphon (Fig. 21G) consisting of short, expanded proximal part and long, slender distal part, extending to posterior margin of genital double-somite. Mandible (Fig. 21H) consisting of fibril-like stylet and slender palp; palp 2-segmented, proximal segment 45 μm long, distal segment arched, 77 μm long, setulose along convex margin, tipped with 2 unequal, naked setae (85 and 38 μm long, respectively). Maxillule (Fig. 21I) bilobed; outer lobe 64 μm long, spinulose along outer margin, tipped with 4 thin, naked setae; inner lobe 26 μm long, obscurely defined at base, tipped with 3 very unequal, thin setae (750, 197, and 68 μm long, respectively). Maxilla (Fig. 22A) stout; proximal segment with protruded outer margin proximally; distal segment strongly curved at subdistal region, bearing several spinules near distal third. Maxilliped (Fig. 22B) 6-segmented; armature formula 1, 1, 1, 2, 1, and 1 + claw; syncoxa with spinules at outer subdistal region; basis 152 μm long, bearing several minute spinules on outer margin and rudimentary inner seta; terminal segment 50 μm long, bearing patch of spinules in distal half; terminal claw 65 μm long.

Legs 1–3 (Fig. 22C–E) with 3-segmented rami. Leg 4 (Fig. 22F) with 3-segmented exopod, without endopod. Rami of legs slender. Inner coxal seta present in leg 1, but absent in legs 2–4. Basis of leg 1 with filiform inner distal seta and row of thin spinules near base of seta. Endopod of leg 1 arched, extremely slender, much longer than exopod. Outer distal corner of second endopodal segment of leg 3 bicuspid, but monocuspid in legs 1 and 2. Armature formula for legs 1–4 as follows:

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

Leg 5 (Fig. 21B) consisting of short protopod and elongated exopod; protopod not articulated from genital complex, with 1 small dorsodistal seta; exopodal segment arched, 173 × 17 μm, with 1 subdistal and 2 distal setae. Leg 6 (Fig. 21J) represented by 2 small, naked setae on genital operculum.

Male. Body (Fig. 23A) oval, 764 μm long. Prosome segmented as in female. Urosome (Fig. 23B) consisting of genital complex and 3-segmented abdomen. Genital complex roughly quadrate, wider than long. Anal somite longer than anterior abdominal somites. Caudal ramus 1.64 times longer than wide (36 × 22 μm), armed as in female.

Antennule 14-segmented, not geniculate; armature formula 1, 2, 8, 2, 2, 7, 2, 2, 4, 2, 2, 4, 4 + aesthetasc, and 11. Antenna as in female.

Oral siphon, mandible, maxillule, maxilla, maxilliped, and legs 1–4 not different from those of female. Leg 5 (Fig. 23B) exopodal segment 62 μm long, much shorter than that of female. Leg 6 (Fig. 23B) represented by 1 seta on distal apex of genital operculum.

Remarks. Currently, the genus *Entomopsyllus* includes five known species: *E. adriae* (Eiselt, 1959), *E. nicholsi* McKinnon, 1988, *E. stocki* Kim, 2004, *E. brevicaudatus* Lee & Kim, 2017, and *E. takara* Uyeno & Johnsson, 2018. Among these, *E. aplanatus* n. sp. is most closely related to *E. brevicaudatus*, as both species exhibit a 17-segmented female antennule, four setae on the third endopodal segment of leg 2, four spines plus four setae (formula III, I, 4) on the third exopodal segment of leg 3, and two setae

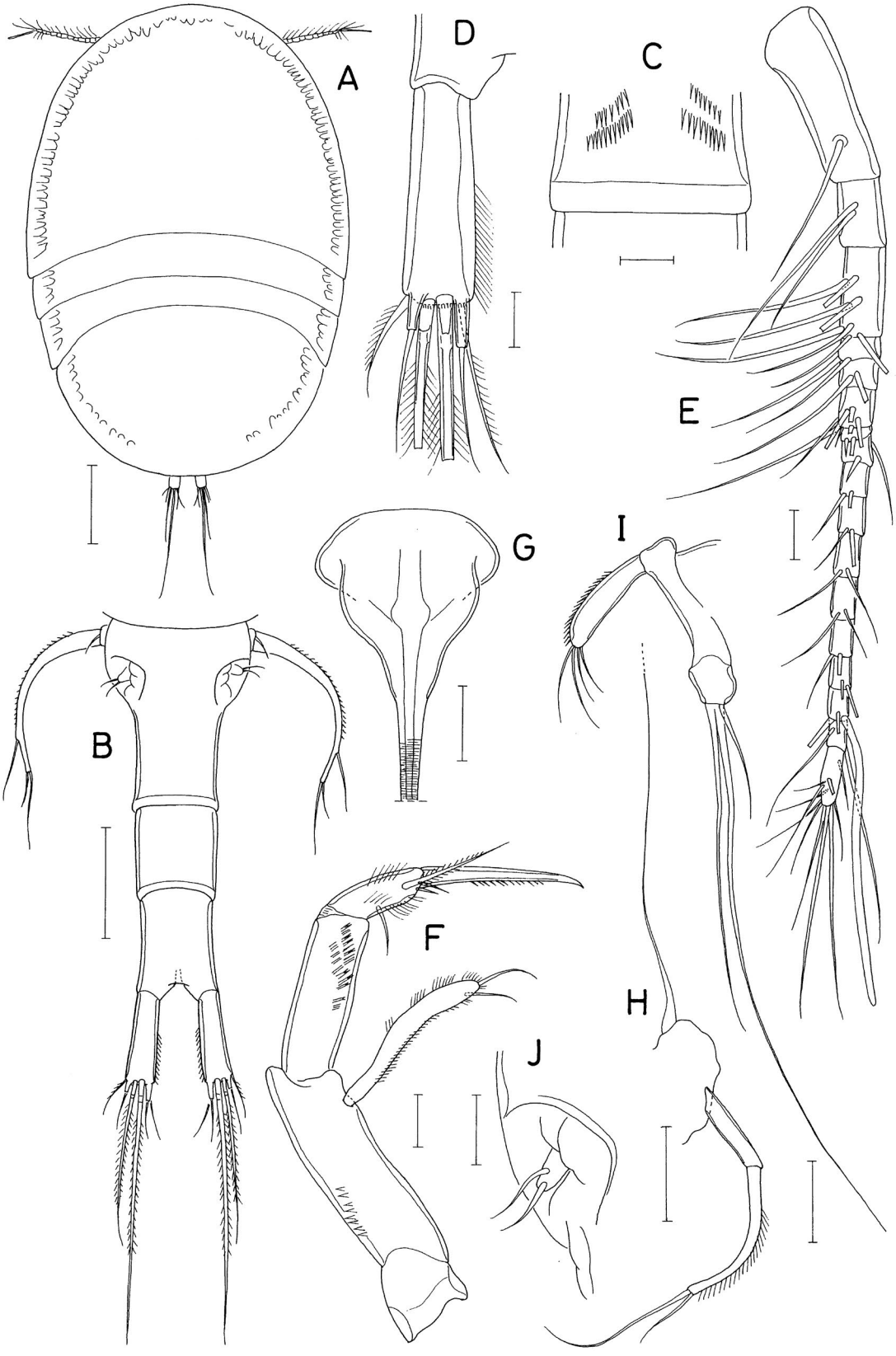


Fig. 21. *Entomopsyllus aplanatus* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, distal part of genital complex, ventral; D, left caudal ramus, dorsal; E, antennule; F, antenna; G, proximal part of oral siphon; H, mandible; I, maxillule; J. left genital aperture, dorsal. Scale bars: A, 0.2 mm; B, 0.1 mm; C–F, J, 0.02 mm; G–I, 0.05 mm.

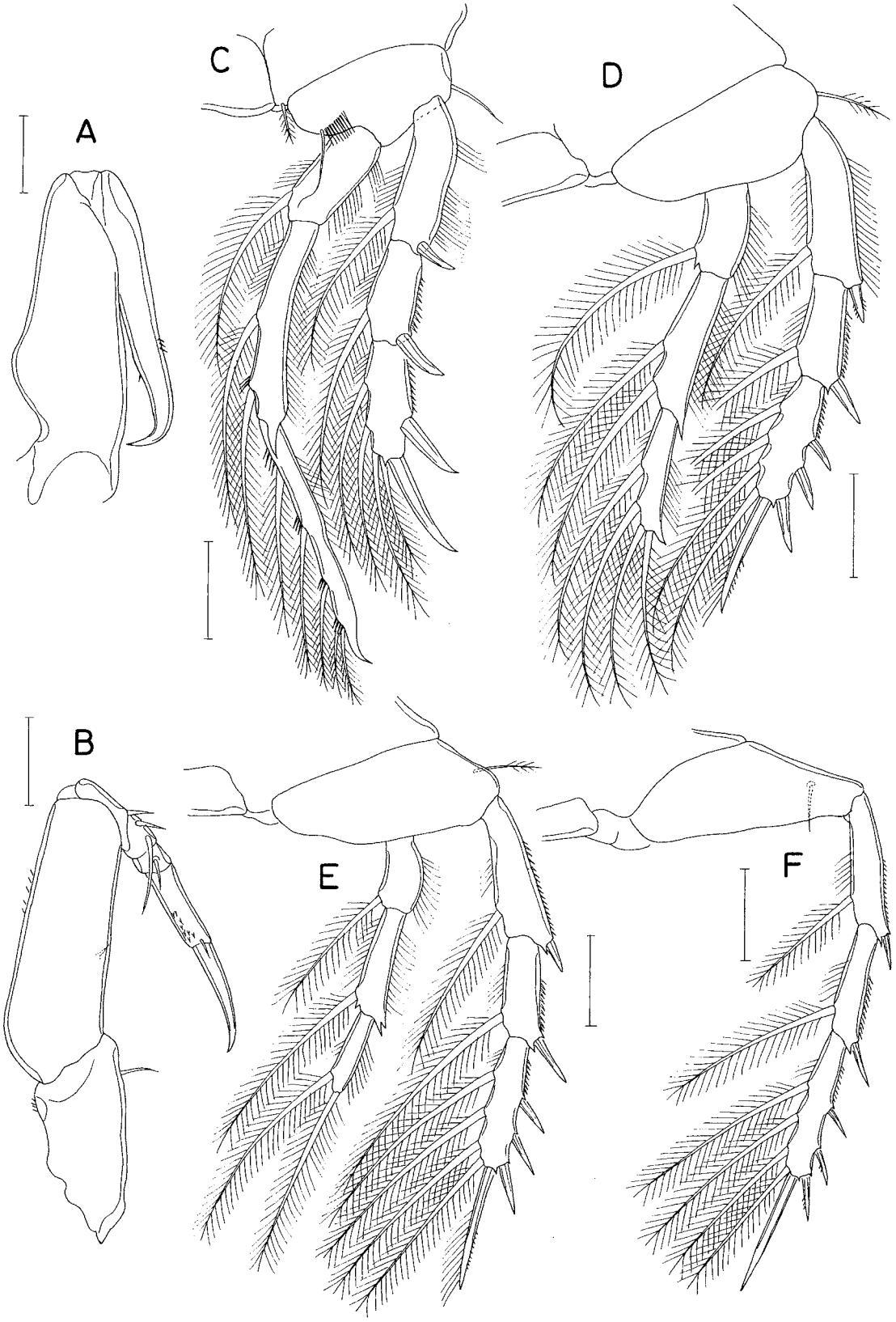


Fig. 22. *Entomopsyllus aplanatus* n. sp., female. A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E, leg 3; F; leg 4. Scale bars: 0.05 mm.

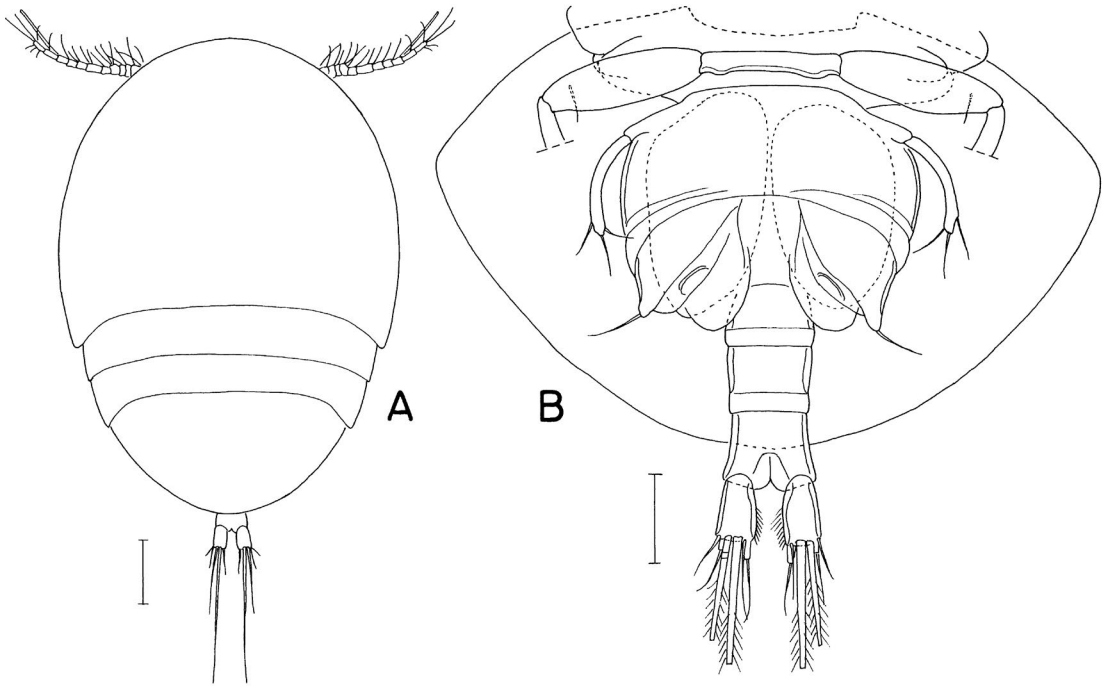


Fig. 23. *Entomopsyllus aplanatus* n. sp., male. A, habitus, dorsal; B, fourth pedigerous somites and urosome, ventral. Scale bars: A, 0.1 mm; B, 0.05 mm.

on the third endopodal segment of leg 3. However, *E. aplanatus* n. sp. differs from *E. brevicaudatus* by having four spines plus four setae (formula III, I, 4, rather than II, I, 4 as in *E. brevicaudatus* and other species) on the third exopodal segment of leg 2, and similarly on the third exopodal segment of leg 4. In the original description of *E. brevicaudatus*, Lee & Kim (2017) noted that the anal somite is unornamented. Therefore, the presence in *E. aplanatus* n. sp. of two pairs of rows of spinules on the ventral surface of the anal somite marks an additional distinctive difference from *E. brevicaudatus*.

Conflicts of Interest

The authors of this paper have no affiliations with any conflicting interests and are solely responsible for the contents of this paper.

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