한국동물분류학회지 제12권 제4호
The Korean Journal of Systematic Zoology
Vol. 12, No. 4: 397-466 (December 1996)

Copepoda of Artotrogidae (Siphonostomatoida) from the Sea of Japan

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ABSTRACT

Seventeen copepod species of Artotrogidae are recorded from the Korean coast of the Sea of Japan. They are 4 new species of *Artotrogus*, 3 new species of *Bradypontius*, 4 new species of *Cryptopontius*, 2 species of *Myzopontius* (one is new), 2 species of *Pteropontius* (one is new), and 2 new species of a new genus. *Myzopontius pungens* Giesbrecht and *Pteropontius decorus* Ho are also reported as new records for Korean fauna. These artotrogid copepods were collected from 2 species of bryozoan, 1 species of ascidian, sea weeds, and benthic materials. A brief taxonomic review of the genus *Artotrogus* is given as well.

Key words: Copepoda, Artotrogidae, new species, Sea of Japan, Korea

INTRODUCTION

The siphonostomatoid copepods of Artotrogidae have been rarely recorded in recent decades. Eiselt (1961) revised the classification of Artotrogidae and synonymized the former families Dyspontidae and Myzopontidae to Artotrogidae. This family consists currently of more than 70 species in 18 genera. About half of these genera are still known as monotypic. Some species among these copepods are known to be associated with the marine invertebrates, such as sponges and corals, but most of them were found free on the sea bottom. In Far Eastern seas, there has been no record on the artotrogid copepods, with one exception of Ho (1984) who described *Pteropontius decorus* from a sponge in the Sea of Japan.

A couple of years ago the author visited a small fishery port located north of Sokcho on the Korean

coast of the Sea of Japan where he found a coral-like bryozoan colony (*Heteropora pelliculta* Waters) caught in a fishing net. This bryozoan colony was taken out, moved to the laboratory, and then washed with water. The washings were examined under the microscope for any associated animals. Unexpectedly a number of copepod species were found among the washings. Since then a few more invertebrate species those were supposed to contain the copepod associates were examined. This paper records the artotrogid copepods found among these copepod associates. The following invertebrates and benthic materials have been found to carry copepod associates of Artotrogidae.

1. From the bryozoan *Heteropora pelliculata* Waters: *Artotrogus rotundus* n. sp.; *Artotrogus acutus* n. sp.; *Bradypontius crassisetus* n. sp.; *Bradypontius heteroporus* n. sp.; *Cryptopontius quinquesetus* n. sp.
2. From the bryozoan *Leieschara orientalis* (Kluge): *Cryptopontius digitatus* n. sp.
3. From washings of the ascidian *Halocynthia hilgendorfi igaboja* (Oka): *Artotrogus halocynthiae* n. sp.; *Artotrogus incidentus* n. sp.; *Bradypontius halocynthiae* n. sp.; *Cryptopontius ascidius* n. sp.; *Myzopontius pungens* Giesbrecht, 1895; *Pteropontius trimerus* n. sp.; *Ascidipontius concavus* n. gen., n. sp.; *Ascidipontius rarus* n. gen., n. sp.
4. From washings of *Heteropora pelliculata*, and *Halocynthia hilgendorfi igaboja* (Oka): *Pteropontius decorus* Ho, 1984
5. From washings of *Halocynthia hilgendorfi igaboja*, and sea weeds: *Myzopontius venustus* n. sp.
6. From washings of *Heteropora pelliculata*, *Halocynthia hilgendorfi igaboja* and a submerged fishing net: *Cryptopontius donghaensis*, n. sp.

In the description of each species, the body lengths were measured from the tip of cephalothorax to the posterior margin of caudal rami. Measurements are based on the specimens soaked in lactic acid. The drawings were made with the aid of a camera lucida.

The type specimens of the new species dealt with in this paper will be deposited in the U. S. National Museum of Natural History, Smithsonian Institution, Washington, D. C.

SYSTEMATICS

Genus ***Artotrogus*** Boeck, 1859

Taxonomic review of the genus

Species of *Artotrogus* seem not to carry rich species-specific morphological variabilities that are usable to recognize species. A comparison of hitherto known species and Korean specimens results in that the morphologies of prosome, mouth organs, antenna and legs are not variable enough depending on species. However, among others, the morphological features of urosome seem most reliable in taxonomy of *Artotrogus*, as already indicated by McKinnon (1988).

In the present record the following six formerly recorded species are recognized as valid in the genus

Artotrogus.

***Artotrogus orbicularis* Boeck, 1859**

Artotrogus orbicularis Boeck, 1859, p. 172, pl. 1; Giesbrecht, 1899, p. 111, pl. 9, figs. 24-34; pl. 10, figs. 33-35

Non *Artotrogus orbicularis*: Sars, 1915, p. 133, pl. 78.

?*Artotrogus orbicularis:* Eiselt, 1986, p. 295, figs. 1, 2.

Distribution. Norway (Boeck, 1859, in association with a mollusk of the genus *Doris*) and Mediterranean (Giesbrecht, 1899).

Remarks. Based on Boeck' s (1859) illustration, this species can be recognized by the characters that the posterolateral expansions of genital double somite is tapering, slender and roundly ended, the antennule is 9-segmented, and the siphon extends over the base of maxilliped. In these respects, *A. orbicularis* sensu Giesbrecht (1899) seems to agree with the original description. Eiselt' s (1986) specimens from Alaska under the name of this species are too variable to be recognized as a single species. They seem to constitute an amalgam of several species.

***Artotrogus sarsi* nom. nov.**

Artotrogus orbicularis Boeck *sensu* Sars, 1915, p. 133, pl. 78.

Distribution. Norway (Sars, 1915, free living or associated with nudibranch mollusks).

Remarks. *A. orbicularis* Boeck *sensu* Sars (1915) does not agree with the original description and Giesbrecht' s (1899) record. In the Sars' specimens, the posterolateral expansions of genital double somite is straight backwards and ended truncate, the siphon reaches only the base of maxilliped, and leg 1 has the inner seta on basis (there is no element on this area in *A. orbicularis sensu stricto*, according to Giesbrecht' s illustration). Therefore I propose *Artotrogus sarsi* as *nomen novum* based on the description of Sars (1915) for the replacement of *Artotrogus orbicularis* Boeck *sensu* Sars, 1915.

***Artotrogus gladiator* (Giesbrecht, 1899) comb. nov.**

Dystrogus gladiator Giesbrecht, 1899, p. 110, pl. 9, figs. 14-23.

Distribution. Mediterranian.

Remarks. *Dystrogus* Giesbrecht, 1899, *Tardotrogus* Eiselt, 1961, and *Glyptotrogus* McKinnon, 1988 are the genera allied to *Artotrogus* in that they have no leg 4. *Tardotrogus* can be typified by the greatly reduced metasome and the wing-like expansions of the genital double somite. *Glyptotrogus* can also be differentiated from related genera by the 4-segmented maxilliped (fourth and fifth segments are fused) with two strong claws on the terminal segment and by the rather developed free segment of leg 5.

On the other hand, *Dystrogus*, a monotypic genus known only by males of *D. gladiator*, had been differentiated from the allied genera mainly by having only 2 spines on the exopodal third segment of leg 1, the long siphon, and the ovoid body shape. However, the status of this genus seems not to be justified, because it is found that the number of spines on this segment is variable with the right and

left legs within the same individual as shown in *Artotrogus haikungae* by McKinnon (1988) and *A. halocynthiae* n. sp. in this paper. It is certain that the body shape may be of sexually dimorphic as can be seen in the descriptions of the present paper. The length of oral siphon alone may not be a characteristic usable in recognizing a genus of Artotrogidae. Doubt about the generic status of *Dystrogus* was already mentionted by Sars (1915). Consequently, *Dystrogus gladiator* Giesbrecht, 1899 seems better to move to *Artotrogus* and be designated as *Artotrogus gladiator* (Giesbrecht), with treating the genus *Dystrogus* as *nomen dubium*.

***Artotrogus latifurcatus* Nicholls, 1944**

Artotrogus latifurcatus Nicholls, 1944, p. 43, fig. 19; McKinnon, 1988, p. 974.

Distribution. Australia.

Remarks. This species is known only by males from the Australian waters.

***Artotrogus haikungae* McKinnon, 1988**

Artotrogus haikungae McKinnon, 1988, p. 978, figs. 3-5, 6d-f.

Distribution. Australia.

***Artotrogus sardae* McKinnon, 1988**

Artotrogus sardae McKinnon, 1988, p. 975, figs. 1, 2, 6a-c.

Distribution. Australia.

Descriptions of Korean species

***Artotrogus rotundus*, n. sp. (Figs. 1-3)**

Type specimens. 4 ♀♀ and 1 ♂ collected from wahings of a colony of the bryozoan Heteropora pelliculata Waters caught by a fishing net from the Sea of Japan, off Gajin (approximately 38° 28′ N, 128° 31′ E), on 27 November 1994. Holotype ♀, allotype (left ones maxillae, maxillipeds and legs 1-3 were dissected out) and 2 ♀♀ paratypes will be deposited in U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratype is kept in the collection of the author.

Female. Body (Fig. 1A) circular, with large prosome and small urosome. Body length 1.17 mm (1.12-1.52 mm) and greatest width 0.92 mm (0.91-1.12 mm), based on 4 specimens. Prosome 4-segmented, but third metasome not visible from dorsal view. First pedigerous somite completely fused with cephalosome, both forming large cephalothorax. Cephalothorax 743 ㎛ in midline, occupying about 0.62 length of whole body, with concave posterior border and bluntly angular posterior corners of epimera. First metasomite strongly arched; its epimera extending beyond level of midlength of genital double somite, with bluntly angular posterolateral corners. Epimera of second metasomite directed backwards, nearly extending to level of posterior border of first abdominal somite, with bluntly angular posterior corners. Third metasomite very short. Urosome (Fig. 1B, C) 5-segmented and about 300 ㎛ long. Fifth pedigerous somite 153 ㎛ wide, hardly visible from dorsal view of

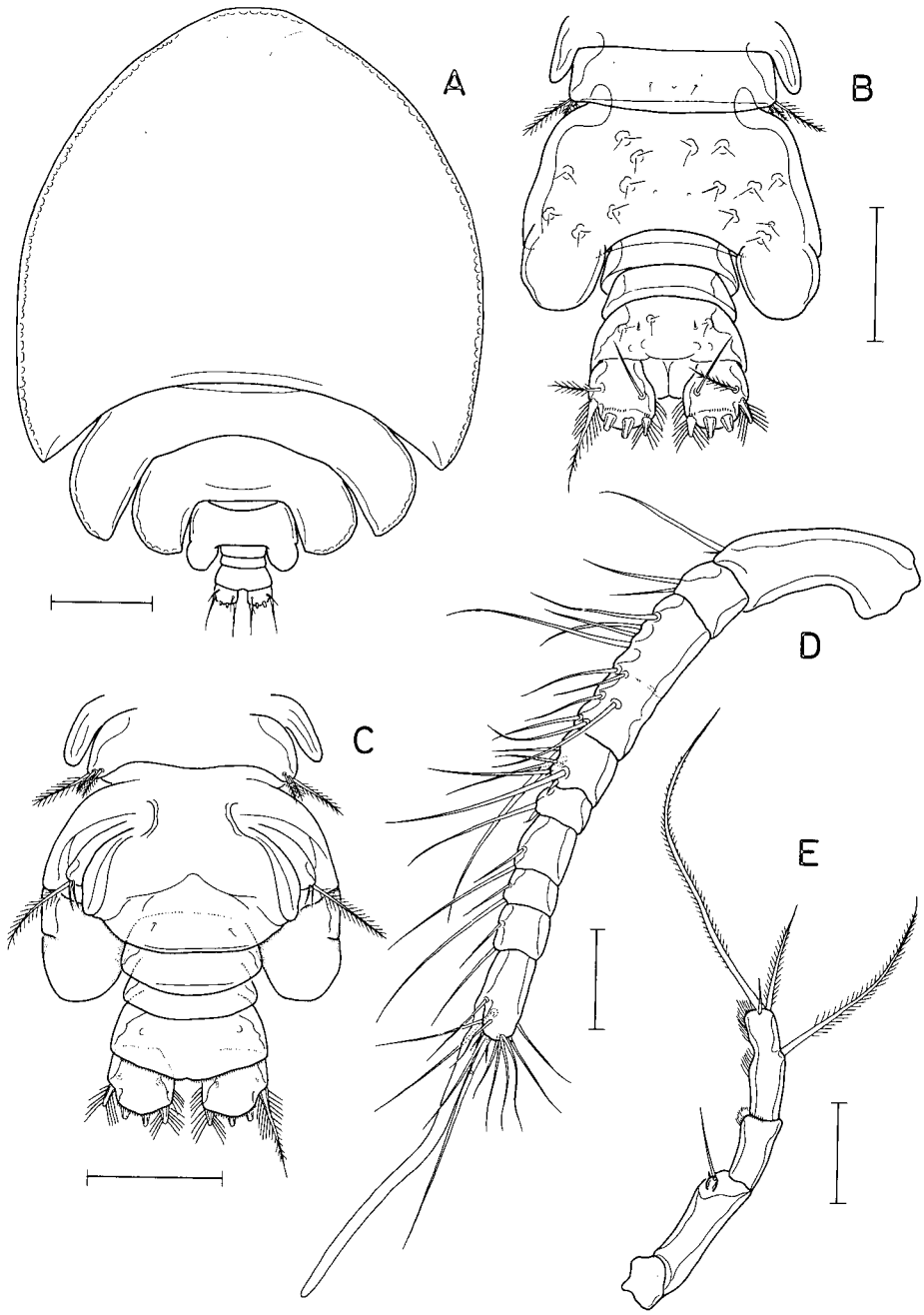

Fig. 1. *Artotrogus rotundus,* n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, same, ventral; D, antennule; E, antenna. Scales: A= 0.2 mm; B, C= 0.1 mm; D, E= 0.05 mm.

habitus. Genital double somite 93 μm long in dorsal midline, or 162 μm in ventral midline, and 220 μm wide, with 7-8 pairs of sensillae on each side of dorsal surface; posterolateral expansions about 83 x 63 μm (1.32:1), rounded posteriorly, and nearly extending to level of posterior border of second abdominal somite. Genital area located ventrolaterally (Fig. 1C). Three abdominal somites 31 x 103, 18 x 100, and 48 x 115 μm respectively (measured ventrally), each broadened posteriorly (Fig. 1C). Second abdominal somite distictly shorter than other 2 abodominal somites. Anal somite with fine spinules on posteroventral border. Caudal ramus short, 50 (measured ventrally) x 50 μm (1:1), with setules on inner margin and 6 caudal setae; inner dorsal one among caudal setae glabrous; other 5 setae plumose; posterior margin of caudal ramus convex, fringed with fine spinules. Egg sac spherical, about 300 μm in diameter, containing about 7 eggs, and brooded on ventral surface of body in front of genital double somite (as in Pl. 78 of Sars, 1915). Each egg about 150 μm in diamter.

Rostrum blunt, not isolated from cephalothorax, with truncated posterior tip. Antennule (Fig. 1D) 9-segmented, 363 μm long, with armature formula 1, 2, 10, 7, 2, 2, 2, 2, and 14+1 aesthetasc. Sixth to eighth segments brownish. First segment the longest; third segment next longest, and occasionally divided vestigially into 2 parts, each comprising 4 proximal and 6 distal setae. Combined length of second and third segments 1.16 times longer than first segment. Aesthtasc on terminal segment 175 μm long, longer than distal 6 segments. Antenna (Fig. 1E) with short coxa. Basis 57 x 22 μm long. Exopod small, 1-segmented, longer than wide, apically with 1 minute, spinule-like seta and 1 longer, 37 μm-long, seta, the latter longer than endopodal first segment. Endopod 2-segmented; first segment 33 x 20 μm, with fine setules distally; second segment 55 x 18 μm, distally narrowed, with 3 apical setae of extremely unequal size (172, 55, 18 μm respectively), and 1 long subapical seta of 105 μm.

Siphon 535 μm long, tapering evenly towards tip, extending slightly beyond bases of maxillipeds. Mandible armed with 10 teeth. Maxillule (Fig. 2A) bilobed; outer lobe 80 μm, apically with 1 small and 2 long, thin, subequal-sized setae; inner lobe 120 μm long, 1.5 times longer than outer lobe, with 1 minute (13 μm), 1 small (45 μm) and 1 distinctly larger (213 μm) setae. Maxilla (Fig. 2B) strong, with unarmed basal segment; claw longer than basal segment, with 1 small seta near distal two-fifths and a cluster of minute spinules on subdistal area. Maxilliped (Fig. 2C) consisting of 5 segments and claw; first segment with 1 small inner distal seta and setules on outer distal corner; second segment with 1 small seta near distal third of inner margin and minute spinules on distal half of inner margin; third segment with 1 small outer seta; fourth segment not clearly divided from third segment, with 1 inner distal seta; fifth segment with 1 rather strong seta at inner distal corner; claw strong, weakly and evenly curved, with minute spinules on inner margin.

Leg 1 (Fig. 2D), leg 2 (Fig. 2E) and leg 3 (Fig. 2F) biramous, with 3-segmented rami. Leg 1 smaller than other 2 legs, with small protuberance on dorsal surface of basis. Exopodal spines of leg 1 with small distal flagellum. Endopodal second segment of all legs with bicuspid process at outer distal angle. Endopodal third segment of leg 2 with bicuspid process near base of outer seta. This area of leg 3 with mono- or bicuspid process. Outer margin of endopodal segments of all legs and proximal 2 exopodal segments of legs 1 and 2 with setules. Outer margin of exopodal first segment of leg 3 smooth. Legs 1-3 with following armature formula (Roman numerals represent spines, and Arabic ones, setae):

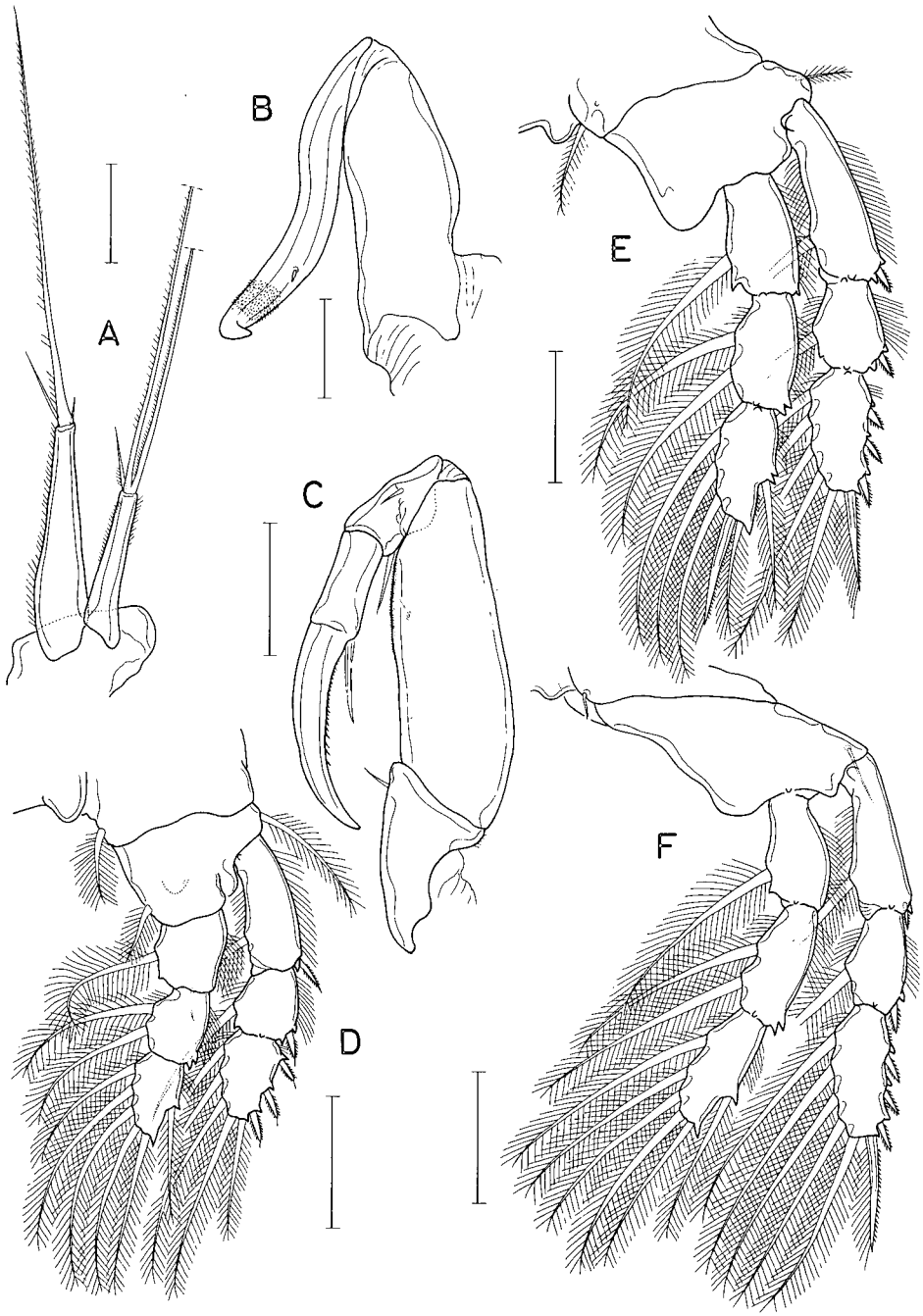

Fig. 2. *Artotrogus rotundus*, n. sp., female: A, maxillule; B, maxilla; C, maxilliped; D, leg 1; E, leg 2; F, leg 3. Scales: A= 0.05 mm; B-F= 0.1 mm.

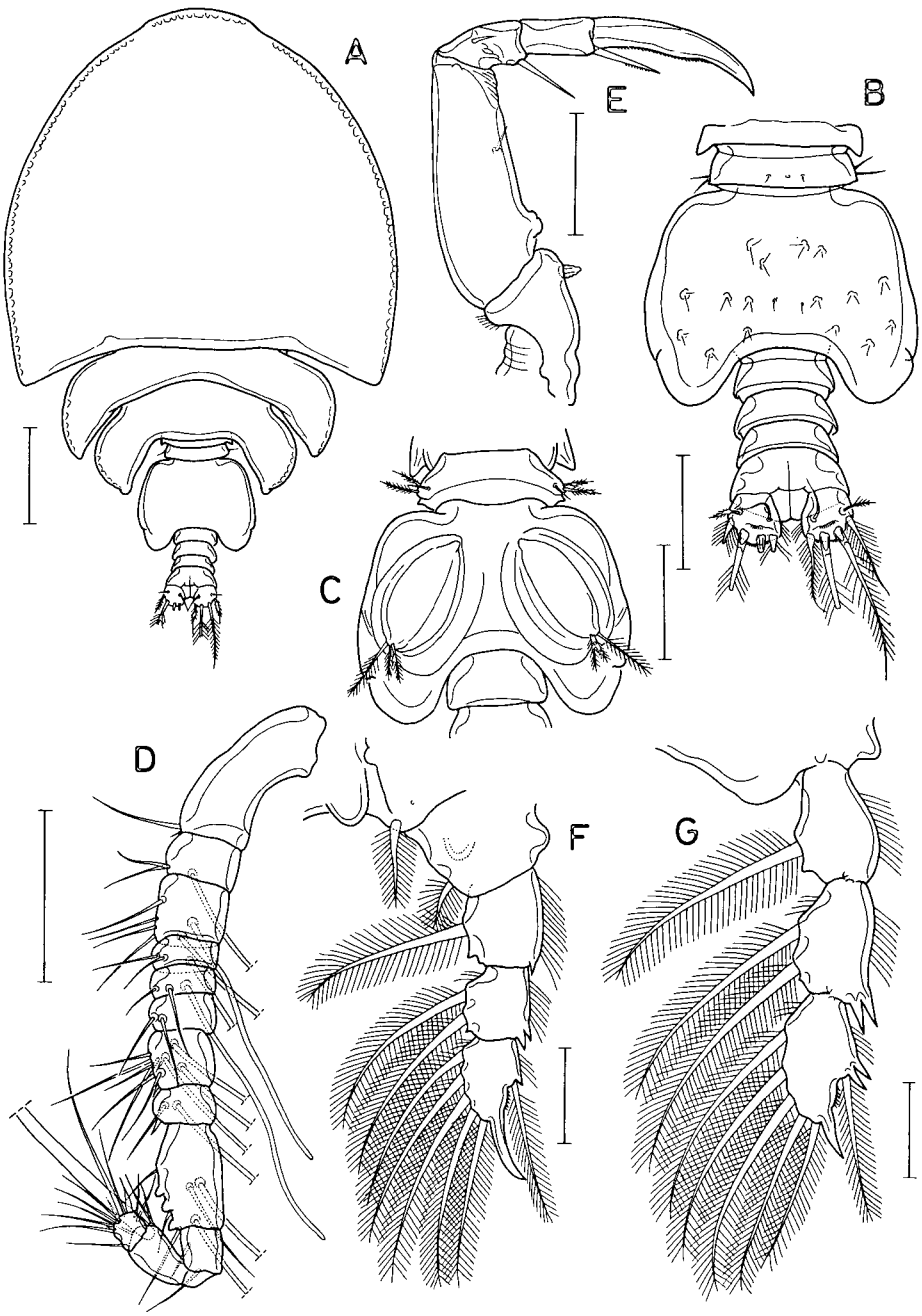

Fig. 3. *Artotrogus rotundus*, n. sp., male: A, habitus, dorsal; B, urosome, dorsal; C, frontal portion of urosome, ventral; D, antennule; E, maxilliped; F, endopod of leg 1; G, endopod of leg 3. Scales: A= 0.2 mm; B-E= 0.1 mm; F, G= 0.05 mm.

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III, 5; enp. 0-1; 0-2; 1,5

Leg 2: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,5

Leg 4 absent. Leg 5 represented by 3 small plumose setae, without free segment (Fig. 1C). Leg 6 represented by 1 plumose setae and 2 setules on each genital area (Fig. 1C).

Male. Body (Fig. 3A) 10-segmented, relatively elongated, and 1.24 mm long. Cephalothorax moderately large, 0.71 mm long and 0.81 mm wide. First and second metasomites distinctly narrower than cephalothorax. Posterior corners of second metasomite not pointed but nipple-shaped. Urosome (Fig. 3B) 6-segmented and 350 ㎛ long. Genital somite 140 ㎛ long in dorsal midline, and 235 ㎛ wide; lateral margins weakly convex; posterolateral expansions shorter than wide, their tips extending over level of posterior border of first abdominal somite. Caudal ramus as long as wide.

Antennule (Fig. 3D) 12-segmented, and geniculate between penultimate and antepenultimate segments; first segment the longest. Armature formula of antennule: 1, 2+1 aesthetasc, 4+2 aesthetascs, 2+1 aesthetasc, 2+1 aesthetasc, 2, 8+3 aesthetascs, 2+1 aesthetasc, 4+2 aesthetascs, 2, 2+1 aesthetasc, and 11. Aesthetasc on penultimate segment large, 197 ㎛ long. Antenna as in female.

Mouth organs as in female except for maxilliped (Fig. 3E) with thick, modified seta on first segment and weakly bilobed protuberance on proximal inner margin of second segment.

Armature formula of legs as in female. Third endopodal segment of leg 1 with 1 large distal process (Fig. 3F). Endopod of legs 2 and 3 (Fig. 3G) with large bicuspid processes on second segment and near base of outer seta of third segment, and large, acute distal process on third segment. Leg 5 represented by 3 small setae of subequal size. Leg 6 represented by 1 longer and 2 smaller, plumose setae in genital area (Fig. 3C).

Etymology. The name of the new species, *Artotrogus rotundus*, refers to the "circular" (*rotundus* in Latin) body shape.

Remarks. *Artotrogus rotundus* n. sp. has the lobate posterolateral expansions of genital double somite. The only other previously known species which has such roundly ended posterolateral expansions of this somite is *A. oribicularis*, although these expansions of the latter species is more slender and tapering. *A. orbicularis* can not be confluent with the new species, because this European species has no inner element on the basis of leg 1, and has 5 setae on the terminal segment of leg 3 endopod (6 setae in *A. rotundus*).

A. latifurcatus is known only by males. The male of this species has the shorter siphon (not extending over maxilliped as in the new species) and numerous aesthetascs on antennule. These features can not be found in the male of *A. rotundus.*

Artotrogus acutus, n. sp. (Figs. 4-6)

Type specimens. 3 ♀♀ and 1 ♂ collected from washings of a colony of the bryozoan Heteropora pelliculara Waters caught by a fishing net (depth unknown) in the Sea of Japan, off Gajin (approximately 38°28′N, 128°31′E), on 5 March 1995. Holotype ♀ and 1 ♀ paratype will be deposited in the U. S. National Museum of of Natural History, Smithsonian Institution. Dissected

allotype and 1 ♀ paratype are retained in the collection of the author.

Female. Body (Fig. 4A) flat, discoid, with large, circular prosome and small urosome. Body length of dissected paratype 1.65 mm, and greatest width 1.51 mm. Prosome 4-segmented, but third metasomite not visible from dorsal view of habitus. First pedigerous somite completely fused with cephalosome, both forming cephalothorax. Cephalothorax 1.10 mm long in midline, occupying 0.67 length of whole body, with concave posterior border. Epimera of cephalothorax pointed posteriorly. First and second metasomites strongly arched. Epimera of first metasomite extending to level of midlength of anal somete. Epimera of second metasomite extending to level of posterior part of anal somite. Urosome (Fig. 4B, C) 5-segmented and 390 μm long. Fifth pedigerous somite 185 μm wide, not visible from dorsal view of body. Genital double somite relatively small, 77 μm long in dorsal midline, or 123 μm in ventral midline, and 208 μm wide; posterolateral expansions relatively small, 82 x 38 μm, tapering, pointed posteriorly, slightly divergent, longer than wide, and extending in dorsal view to level of posterior border of first abdominal somite. Three abdominal somites 28 x 138, 25 x 143, and 115 x 213 μm respectively. Anal somite large, distinctly broadened posteriorly, with minute spinules on posteroventral border. Caudal ramus quadrangular, 73 x 87 μm (0.84:1), wider than long; inner margin slightly convex, with setules. All of 6 caudal setae plumous. Posterior margin of caudal ramus relatively straight, with fine spinules.

Rostrum weakly developed as in previous species. Antennule (Fig. 4D) 8-segmented, 385 μm long, with armature formula: 1, 1, 6, 6, 2, 3, 2, and 12+1 aesthetasc. First segment the longest, 104 μm long, and 1.11 times longer than combined second and third segments. Antenna (Fig. 4E) with short coxa. Basis short, 37 x 28 μm. Exopod small, 1-segmented, nearly as long as wide, apically with 1 minute, spinule-like seta and 1 longer seta, the latter longer than first endopodal segment. Endopod 2-segmented; first segment 47 x 23 μm; second segment long and slender, 70 x 17 μm, with 3 apical setae of extremely unequal size (205, 58 and 30 μm, respectively) and 1 long subapical seta (100 μm).

Siphon 450 μm long, extending to bases of maxillipeds. Mandible as in previous species. Maxillule (Fig. 4F) bilobed; outer lobe 97 μm long, apically with 1 small (33 μm), 1 long (162 μm), and 1 extremely long setae; inner lobe 137 μm long, 1.41 times longer than outer lobe, with 3 relatively small, glabrous setae (125, 33, and 7 μm respectively). Maxilla (Fig. 5A) massive, with unarmed basal segment; claw distinctly curved, longer than basal segment, with small seta near distal two-fifths and a cluster of minute spinules on subdistal area. Maxilliped (Fig. 5B) consisting of 5 segments and claw; first segment with 1 small inner distal seta; second segment with 1 small seta near distal fourth of inner margin and minute spinules near base of the seta; third segment with 1 small outer seta; fourth segment not clearly divided from the third, with 1 inner distal seta; fifth segment with 1 larger, weakly barbed seta at inner distal corner; claw strong, weakly curved distally, with minute spinules on inner margin.

Leg 1 (Fig. 5C), leg 2 (Fig. 5D) and leg 3 (Fig. 5E) biramous, all of them with 3-segmented rami. Leg 1 smaller than other 2 legs, with small protuberance on dorsal surface of basis, and characteristically with only 2 spines on exopodal third segment and no element on inner margin of basis. All exopodal spines of leg 1 with small distal flagellum. Endopodal second segment of leg 1 with small, monocuspid process at outer distal corner. This area in legs 2 and 3 with bicuspid

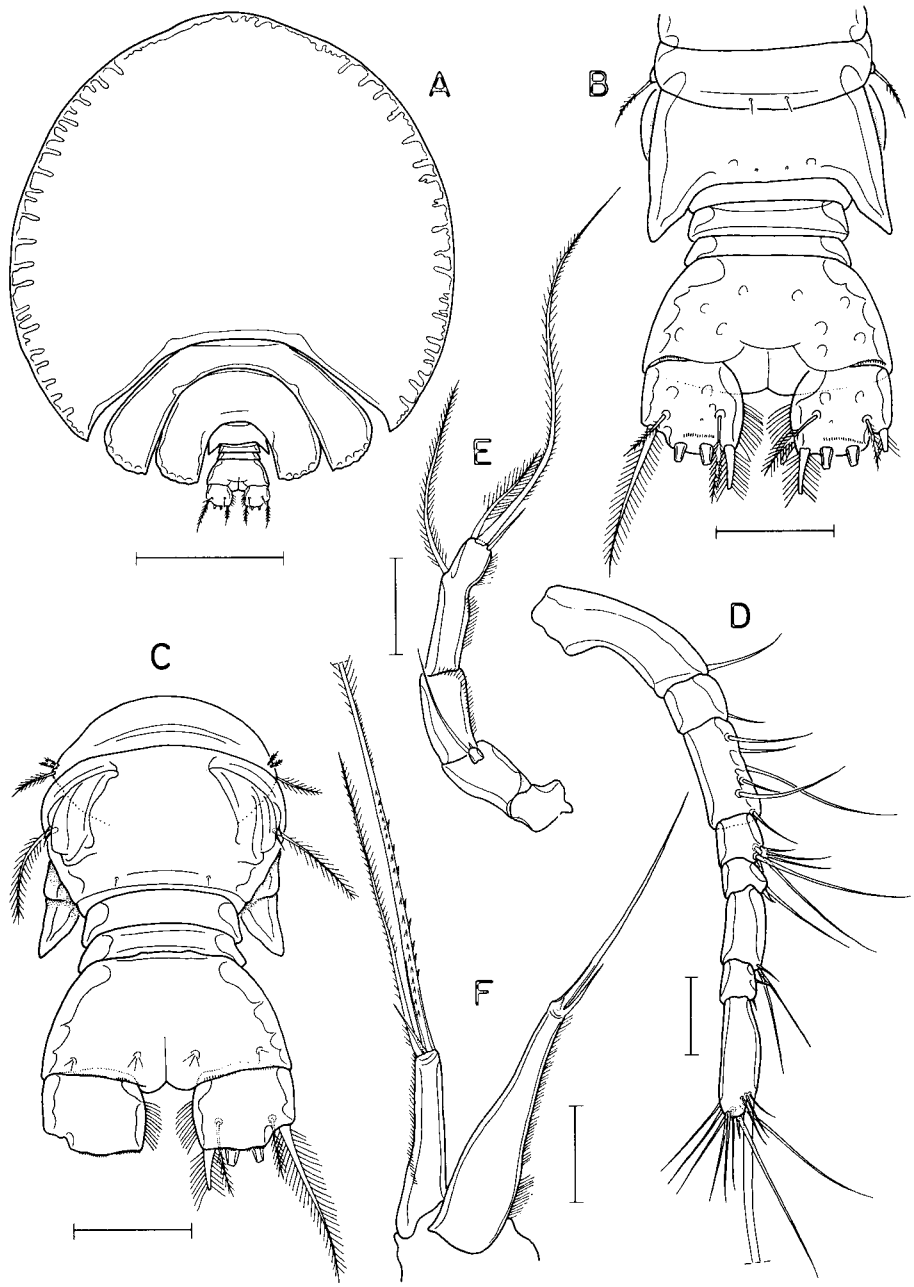

Fig. 4. *Artotrogus acutus*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, same, ventral; D, antennule; E, antenna; F, maxillule. Scales: A= 0.5 mm; B, C= 0.1 mm; D-F= 0.05 mm.

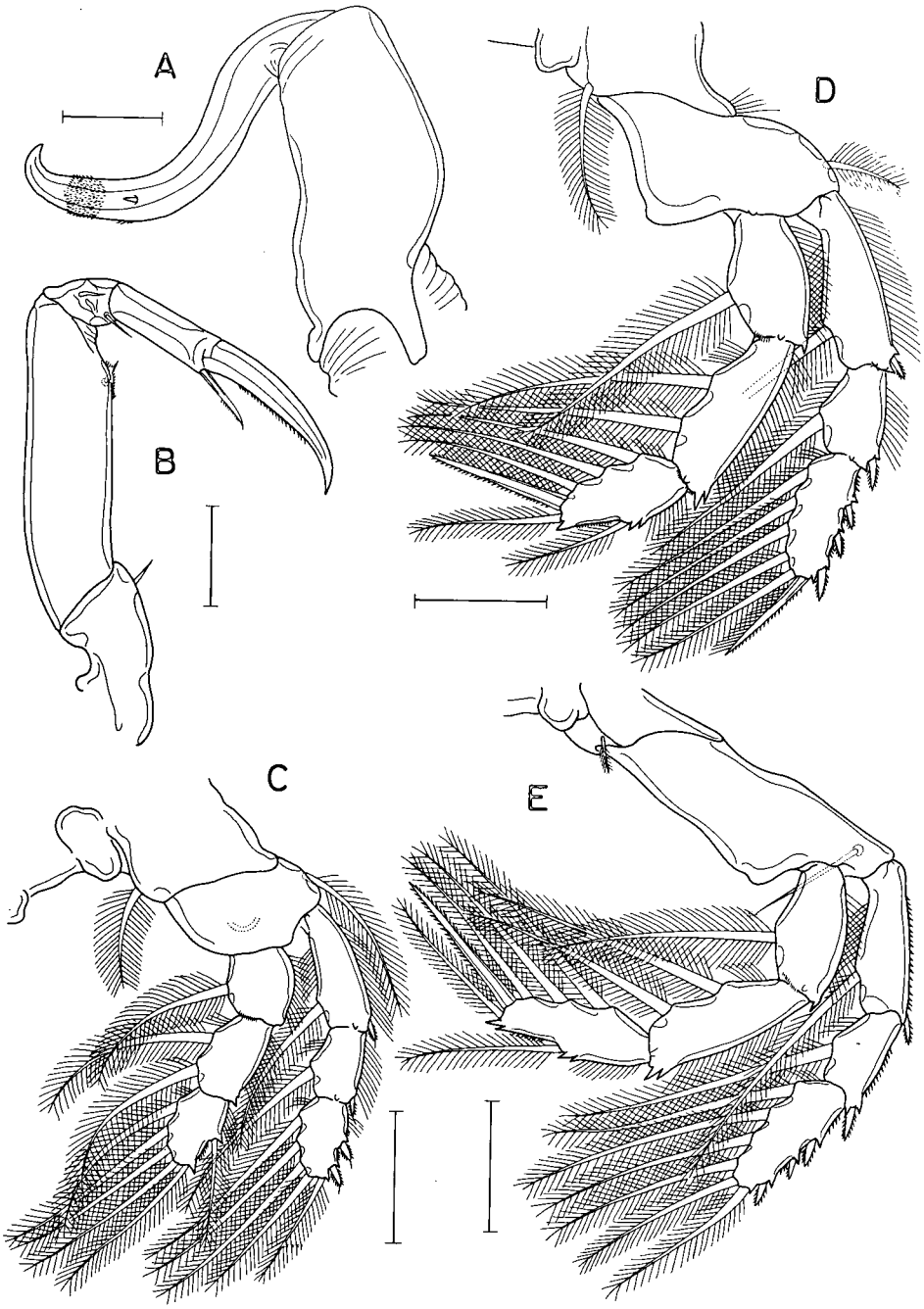

Fig. 5. *Artotrogus acutus*, n. sp., female: A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E, leg 3. Scales: A-E= 0.1 mm.

process. Outer margin of endopodal third segment near base of outer seta in legs 2 and 3 with bicuspid process. Outer distal corner of endopodal third segment of legs 2 and 3 with monocuspid or bicuspid process. Outer margin of proximal 2 exopodal segments of legs 1 and 2 with setules, but this area of leg 3 armed with spinules. Legs 1-3 with following armature formula (Roman numerals represent spines, and Arabic ones, setae):

Leg 1: coxa 0-1; basis 1-0; exp. I-1; I-1; II, 5; enp. 0-1; 0-2; 1, 5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1, 1, I, 3

Leg 4 absent. Leg 5 represented only by 2 smaller and 1 longer, plumose setae, without free segment (Fig. 4C). Leg 6 represented by 1 plumose setae and 2 small setules in each genital area (Fig. 4C).

Male. Body (Fig. 6A) elliptical, 1.30 mm long and 1.01 mm wide. Urosome (Fig. 6B) 6-segmented. Epimera of metasomes less expanded than in female. Genital somite 218 μm wide, with convex lateral margins. Posterolateral extensions of genital somite tapering and pointed, but less prominent than those of female (Fig. 6B, C). Caudal ramus slightly wider than long.

Antennule (Fig. 6D) 10-segmented, geniculate between terminal and penultimate segment, with armature formula: 1, 1+13 aesthetascs, 3+18 aesthetascs, 2+2 aesthetacs, 1+1 aesthetasc, 5+3 aesthetascs, 2+1 aesthetasc, 3+2 aesthetascs, 2, and 11+1 aesthetasc. Fourth segment divided into 2

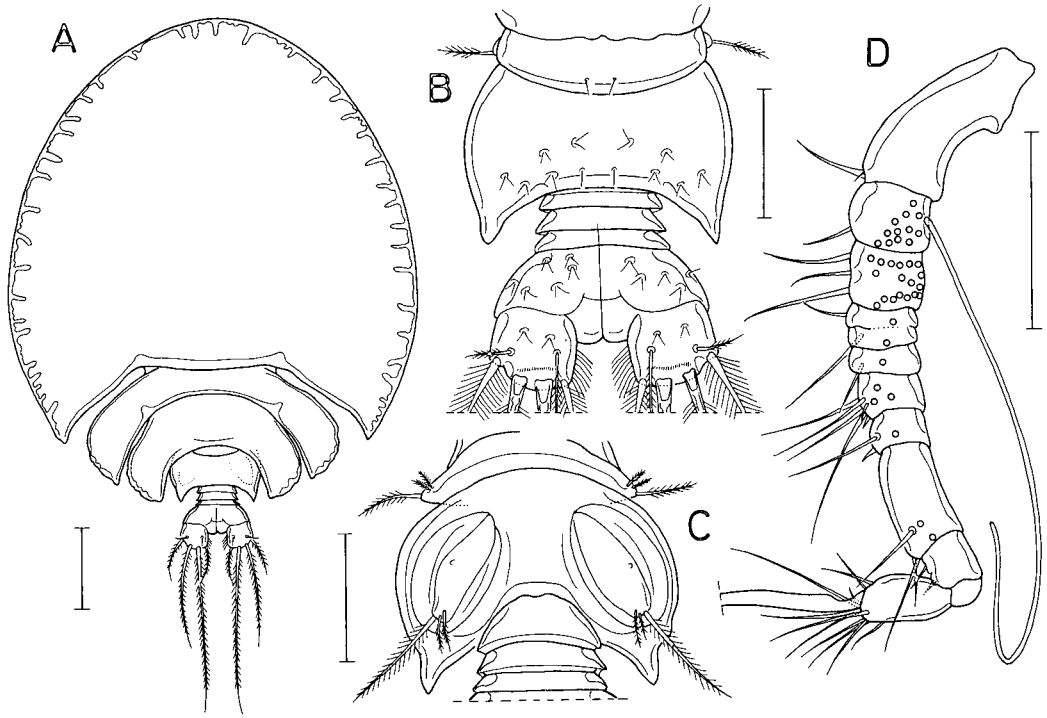

Fig. 6. *Artotrogus acutus*, n. sp., male: A, habitus, dorsal; B, urosome, dorsal; C, anterior part of urosome, ventral; D, antennule (open circles represent the attachment of aesthetescs). Scales: 0.1 mm in all.

incomplete divisions. Aesthetascs on second to seventh segments long and thin.

Mouth organs and legs showing no difference from those of female.

Etymology. The specific name *acutus* alludes the acute posterolateral extensions of female genital double somite.

Remarks. *Artotrogus acutus* n. sp. resembles *A. sardae* and *A. haikungae* in having the 8-segmented female antennule (9-segmented in other species). These three species also bear in common the rather short and more or less tapering posterolateral expansions of genital double somite. However, the new species can be separated from *A. sardae* in the absence of the inner element on the posterior margin of the basis of leg 1 and in the armature of the terminal segment of leg 1 exopod (II,5, against III,5 in *A. sardae*). The new species also can easily be differentiated from *A. haikungae*, because the latter species has the 2-segmented abdomen, an unusual segmentation of abdomen.

Artotrogus halocynthiae, n. sp. (Figs. 7-9)

Type specimens. 1 ♀ and 3 ♂♂ collected from washings of 30 *Halocynthia hilgendorfi igaboja* (Oka) collected at about 20 m depth in the Sea of Japan, off Kangreung, on 9 June 1995. Holotype ♂ and 1 ♀ paratype will be deposited in the U. S. National Museum of Natural History. Allotype ♀ and 1 ♂ paratype (both dissected) are kept in the collection of the author.

Female. Body (Fig. 7A) circular, discoid, with large prosome and small urosome. Body length 2.06 mm, and greatest width 1.82 mm. Prosome 4-segmented, but third metasome concealed from dorsal view. First pedigerous somite completely fused with cephalosome. Cephalothorax 1.28 mm long in midline, 0.62 length of whole body, with concave posterior border and pointed posterior corner of epimera. First metasomite arched; its epimeral areas extending to level of posterior border of first abdominal somite, with pointed corner. Epimera of second metasomite nearly extending to level of posterior border of second abdominal somite, with angular posterolateral corners. Urosome (Fig. 7B, C) 5-segmented and 513 μm long. Fifth pedigerous somite short, 245 μm wide, with pointed posterior corners. Genital double somite 165 μm long in dorsal midline, or 192 μm in ventral midline, and 400 μm wide when measured between lateral magins of posterolateral expansions, with a number of pairs of sensilla on flat dorsal surface; posterolateral expansions 229 x 100 μm, large and long, longer than the somite, divergent, rounded posteriorly, and extending beyond midlength of anal somite. Genital area located ventrolaterally (Fig. 7C). Three abdominal somites 50 x 163, 33 x 154, and 96 x 175 μm respectively (measured ventrally). Anal somite with fine spinules on posteroventral border. Caudal ramus short, quadrangular, slightly broadened distally, 80 x 88 μm, 1.1 time wider than long, with setules on inner margin; 2 dorsal ones among 6 caudal setae glabrous; other 4 setae plumose; posterior margin slightly convex in the middle, with fine spinules.

Rostrum as in previous species. Antennule (Fig. 7D) 9-segmented, 482 μm long, with armature formula 1, 2, 9, 8, 2, 2, 2, 2, and 14+1 aesthetasc. First segment the longest, 150 μm long, 1.20 times longer than second and third segments combined; third segment the next longest. Aesthtasc on terminal segment about 180 μm long, straight, slightly shorter than distal 6 segments. Antenna (Fig. 7E) relatively slender, with short coxa. Basis 76 μm long and unarmed. Exopod small, 1-segmented,

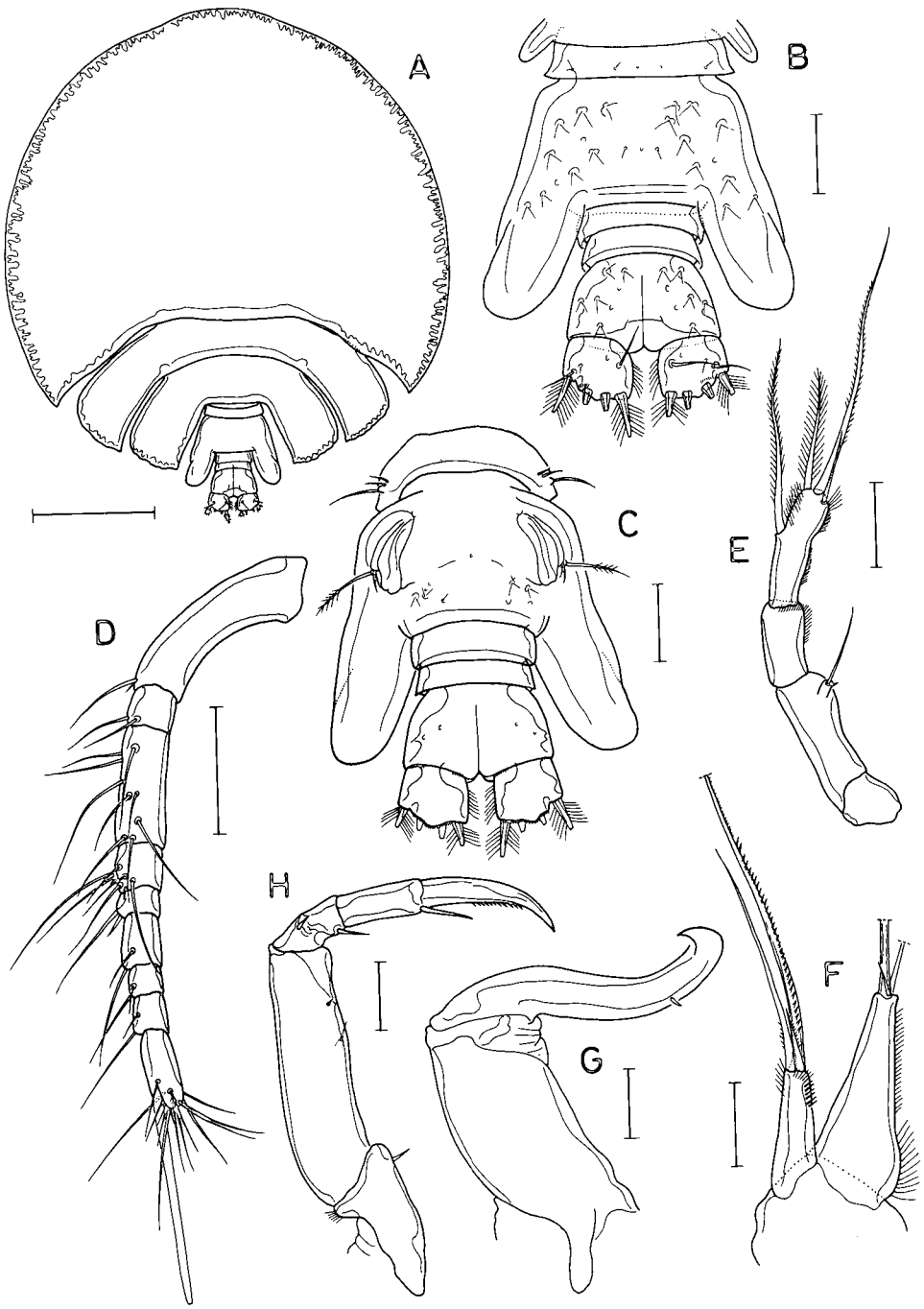

Fig. 7. *Artotrogus halocynthiae*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, urosome, ventral; D, antennule; E, antenna; F, maxillule; G, maxilla 2; H, maxilliped. Scales: A= 0.5 mm; B-D, G, H= 0.1 mm; E, F= 0.05 mm.

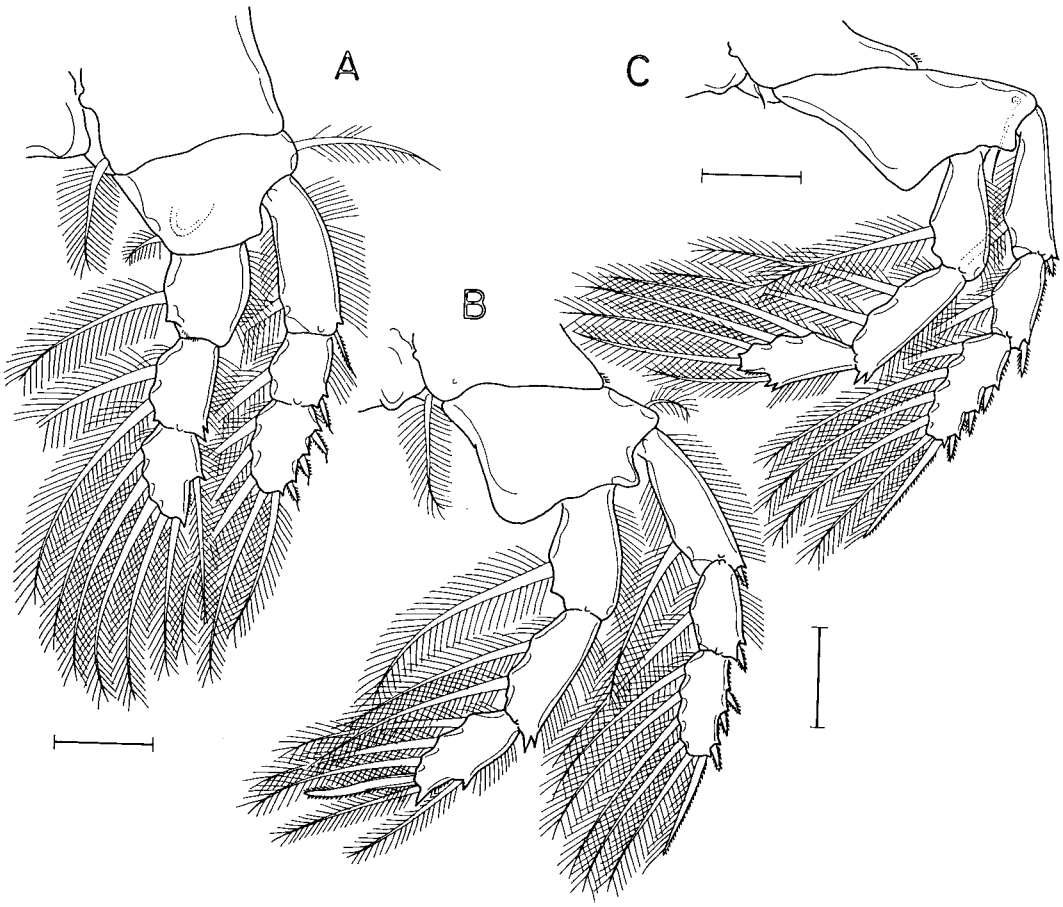

Fig. 8. *Artotrogus halocynthiae*, n. sp., female: A, leg 1; B, leg 2; C, leg 3. Scales: 0.1 mm in all.

longer than wide, apically with 1 minute, spinule-like seta and 1 longer seta. Endopod 2-segmented; first segment 50 x 15 μm; second segment narrow, 71 x 12 μm, with 3 apical setae of unequal size (163, 71, 42 μm respectively), and 1 long subapical seta of 115 μm.

Siphon 365 μm long, relatively short, not extending to base of maxillipeds. Mandible armed with 10 teeth. Maxillule (Fig. 7F) bilobed; outer lobe 77 μm long, apically with 3 setae of unequal size (smallest seta 23 μm long); inner lobe 125 μm long, 1.62 times longer than outer lobe, with 3 setae of unequal size (2 smaller setae 144 and 40 μm respectively). Maxilla (Fig. 7G) massive, with unarmed basal segment; claw longer than basal segment, with small seta near distal two-fifths. Maxilliped (Fig. 7H) consisting of 5 segments and claw; first segment with 1 small inner distal seta and setules on outer distal corner; second segment with 1 small seta near distal two-fifths of inner margin; third segment with 1 small outer seta; fourth segment not clearly divided from third segment, with 1 inner distal seta; fifth segment with 1 seta at inner distal corner; claw strong, curved near distal third, with minute spinules on inner margin.

Leg 1 (Fig. 8A), leg 2 (Fig. 8B) and leg 3 (Fig. 8C) biramous, all with 3-segmented rami. Leg 1 slightly smaller than other 2 legs, with small tubercle on dorsal surface of basis. Outer spine on exopodal first segment of leg 1 setiform. All exopodal spines of leg 1 with short distal flagellum. Endopodal second segment of all legs with bicuspid process at outer distal angle. Endopodal third segment near outer seta of leg 3 with bicuspid process. Outer margin of endopodal segments of all legs and proximal 2 exopodal segments of legs 1 and 2 with setules. Outer margin of exopodal first segment of leg 3 smooth. Legs 1-3 with following armature formula (Roman numerals represent spines, and Arabic ones, setae):

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III, 5; enp. 0-1; 0-2; 1, 5

Leg 2: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1, 1, I, 3

Leg 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1, 4

Leg 4 absent. Leg 5 represented by 2 small and 1 longer setae, without free segment (Fig. 6C). Leg 6 represented by 1 plumose seta and 2 setules in genital area.

Male. Body (Fig. 9A) narrower than in female, 1.65 mm long, and 1.25 mm wide. Cephalothorax 970 m in midline. Urosome (Fig. 9B) 6-segmented. Genital somite 330 μm wide, with well-developed posterolateral expansions terminating near midlength of anal somite. Third postgenital somite shortest among four postgenital somites. Caudal ramus 67 x 73 μm.

Antennule (Fig. 9D) 12-segmented, geniculate between penultimate and antepenultimate segments, with armature formula: 1 (+1 minute seta), 2+1 aesthetasc, 4+2 aesthetascs, 2+1 aesthetasc, 1+1 aesthetasc, 2+1 aesthetasc, 8+3 aesthetascs, 2+1 aesthetasc, 4+1 aesthetasc, 2, 2+1 aesthetasc, and 12. First segment the longest. Nineth segment with 2 processes on anterior margin. Antenna as in female.

Maxillule (Fig. 9E) similar to that of female. Three terminal setae of outer lobe 200, 125, and 42 μm, respectively, and three terminal setae of inner lobe 103, 42, and 10 μm, respectively. Maxilliped with tubercle on proximity of inner margin of second segment (Fig. 9F). Other mouth organs as in female.

Legs with same armature formula as in female. Leg 2 with stronger bicuspid process on outer distal corner of endopodal second segment of legs 2 and 3. Endopodal terminal segment of leg 3 distinctly sexually dimorphic: angle near seta on outer margin quadri-cuspid. A very tiny, vestigial seta present next to terminal seta (Fig. 9G). Leg 6 represented as 2 smaller and 1 longer setae in genital area (Fig. 9C).

Etymology. The specific name *halocynthiae* is derived from the generic name of the host.

Remarks. *Artotrogus halocynthiae* n. sp. resembels *A. orbicularis* Boeck and *A. sarsi* nom. nov. in having 5 elements (I,4) on the terminal segment of leg 3 endopod (6 elements in all the other known species). The new species can be differentiated from *A. orbicularis* by the shorter siphon which is not extending to the base of maxilliped (in *A. orbicularis*, it is extending beyond the base of maxilliped) and by having the seta on the posterior margin of the basis of leg 1. The new species differs also from *A. sarsi* in having the longer and roundly ended posterolateral expansions of the genital double somite (in *A. sarsi*, they are truncate and shorter than in *A. halocynthiae*).

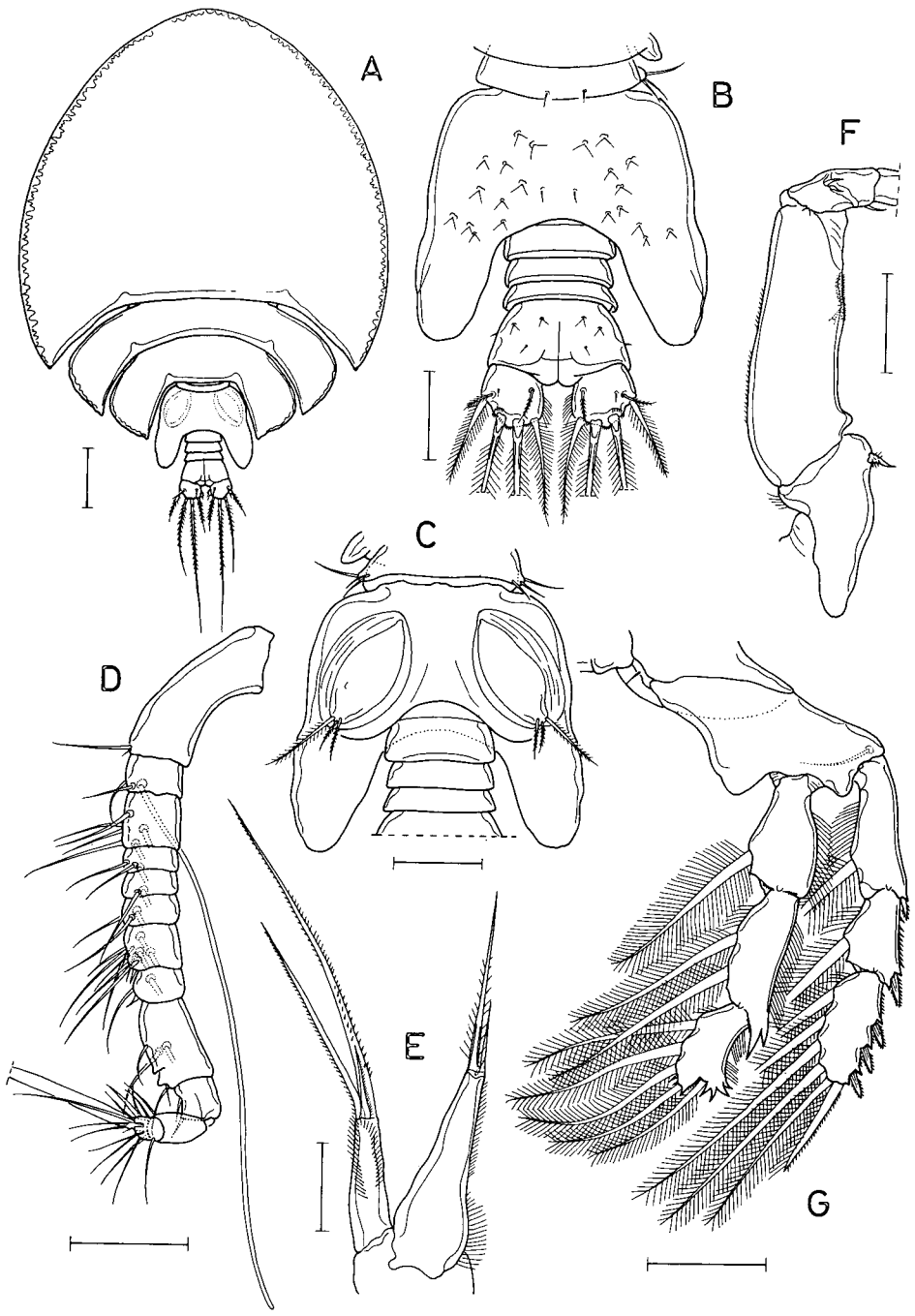

Fig. 9. *Artotrogus halocynthiae*, n. sp., male: A, habitus, dorsal; B, urosome, dorsal; C, anterior part of urosome, ventral; D, antennule; E, maxillule; F, proximal part of maxilliped; G, leg 3. Scales: A = 0.2 mm; B-D, F, G = 0.01 mm; E = 0.05 mm.

***Artotrogus incidentus*, n. sp. (Figs. 10 & 11)**

Type specimen. 2 ♀♀ from washings of external surface of 10 *Halocynthia hilgendorfi igaboja* (Oka) collected off Kangreung, on 23 January 1996. Holotype will be deposited in the U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratype is kept in the collection of the author.

Female. Body (Fig. 10A) large, circular, and 2.13 mm long. Cephalothorax 1.40 mm long in midline, with weak but broad rostral prominence. Posterior corners of cephalothorax tapering, acutely pointed, and slightly curved outwardly. Epimera of first metasomite widely isolated from cephalothorax, leaving broad indentation, and extended beyond epimera of second metasomite. Third metasomite invisible from dorsal view of body. Urosome (Fig. 10B-D) 5-segmentd. Fifth pedigerous somite 271 μm wide. Genital double somite 330 μm wide, with 2 pairs of posterior expansions (posterodorsal and posteroventral) on each side: posterodorsal process less sclerotized, about 116 x 75 μm, blunt in dorsal view (Fig. 10C) but tapering in lateral view (Fig. 10B); posteroventral process sclerotized, shorter than posterodorsal one, triangular, tapering in ventral view (Fig. 9D) but hemicircular in lateral view (Fig. 9B). Three postgenital somites about 62 x 175, 33 x 175, and 83 x 208 μm, respectively. Caudal ramus 75 x 87 μm, slightly wider than long, with 6 caudal setae.

Antennule (Fig. 10F) 8-segmented, 517 μm long; first 3 segments 133, 161 (about 1.2 times longer than the first), and 44 μm long, respectively. Antenna (Fig. 10G) with short coxa. Basis about 95 x 37 μm. Exopod small, about twice as long as wide, with 1 distal seta. Endopod 2-segmented. First segment 55 x 31 μm wide. Terminal segment distinctly slender than the first, 105 x 23 μm, with 3 terminal setae (median one very long, and other 2 nearly equal in length) and 1 long, lateral seta located at distal 40 %.

Siphon about 580 μm long, and extends slightly over bases of maxillipeds. Mandible not examined. Maxillule (Fig. 10H) bilobed. Outer lobe 125 μm long and slender, with 2 extremely long (both more than 280 μm long) and 1 short (50 μm) setae. Inner lobe tapering, 180 μm long, 1.44 times as long as outer lobe, with 3 terminal setae: one being extremely long, more than 210 μm; another one of intermediate length 105 μm, and the other one very small. Maxilla (Fig. 10I) massive. First segment stout and relatively short. Second segment strongly curved in the middle and terminally with 1 subdistal seta and 1 process near the middle. Maxilliped (Fig. 11A) consisted of 5 segments and terminal claw. Seta near inner distal corner of first segment transformed to a short and quadrish, molar-like element. Terminal segment gradually thickened distally. Claw relatively massive.

Leg 1 (Fig. 11B), leg 2 (Fig. 11C), and leg 3 biramous, all of them with 3-segmented rami. Leg 4 absent. Legs 2 and 3 with identical setal formula. Unlike in leg 2, outer margin of exopodal first segment of leg 3 glabrous, but spinulated on outer margins of second and third segments of same ramus. Armature formula of legs 1-3 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III,5 enp. 0-1; 0-2; 1,5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,5

Leg 5 represented by 3 setae on weak prominence on each side of first urosomite (Fig. 9B). Leg 6 represented by 1 longer and 2 smaller setae in genital area (Fig. 9B, D).

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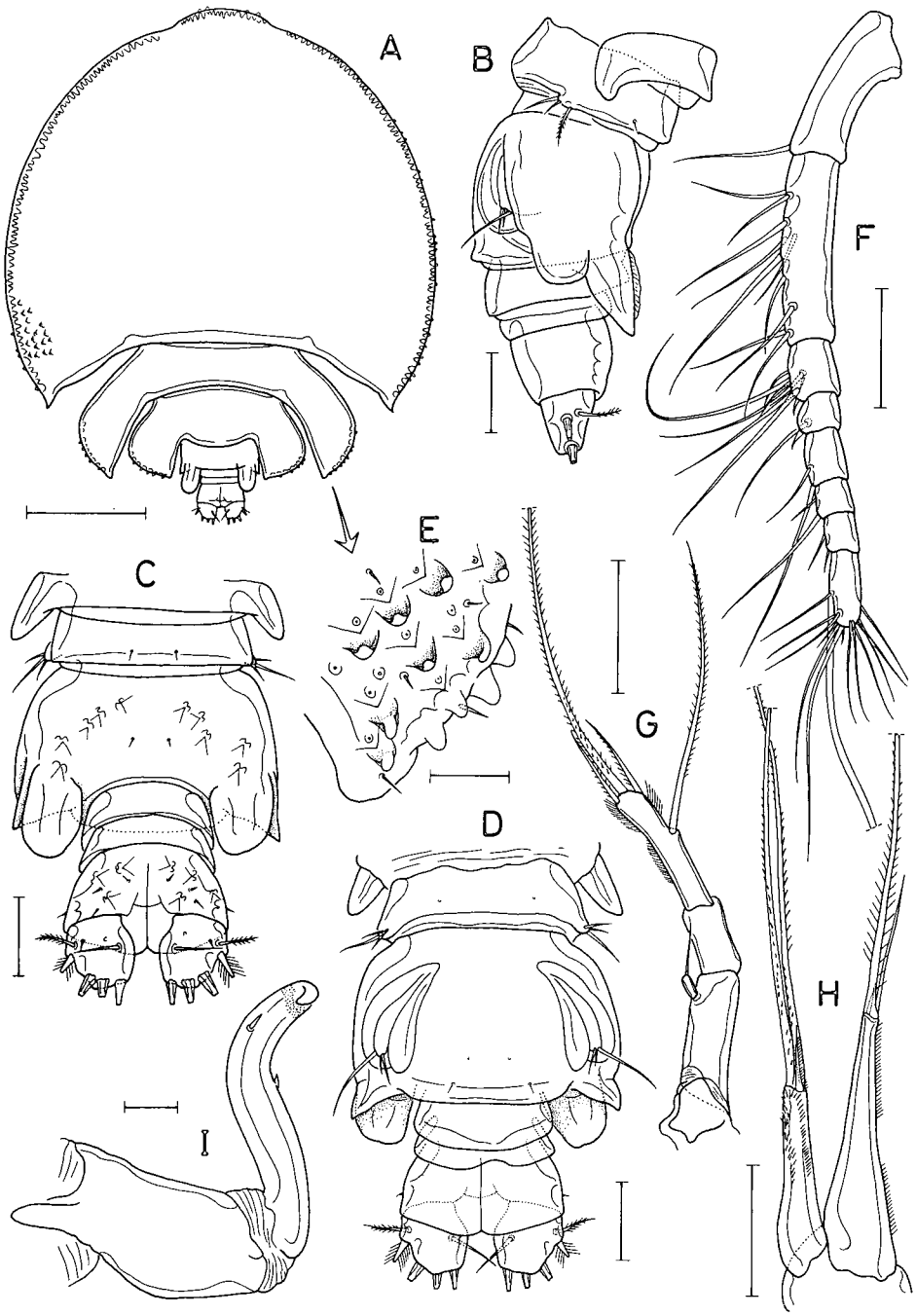

Fig. 10. *Artotrogus incidentus*, n. sp., female: A, habitus, dorsal; B, urosome, lateral; C, same, dorsal; D, same, ventral; E, posterior extrimity of epimera of first metasomite, dorsal; F, antennule; G, antenna; H, maxillule; I, maxilla. Scales: A= 0.5 mm; B-D, F, G-I= 0.01 mm; E= 0.05 mm.

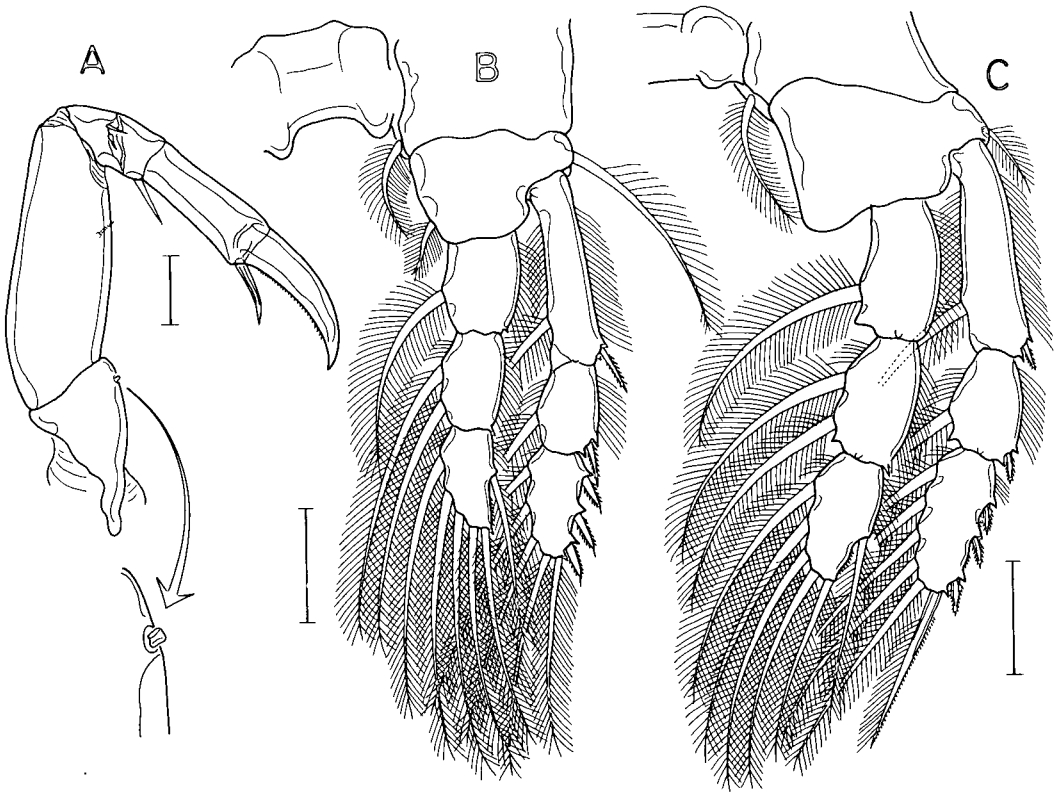

Fig. 11. *Artotrogus incidentus*, n. sp., female: A, maxilliped; B, leg 1; C, leg 2. Scales: 0.1 mm in all.

Male. Unknown.

Etymology. The specific name *incidentus* is from the Latin *incido* (to cut open) and *dent* (tooth). It alludes the deep indentation between the cephalothorax and epimera of the first metasomite.

Remarks. *Artotrogus incidentus* n. sp. has the following armature of legs: 1) There is a seta on the posterior margin of the basis of leg 1; 2) the exopodal terminal segment of leg 1 has 3 spines and 5 setae (III, 5); 3) the endopodal terminal segment of leg 3 has 6 elements. This combination of characters is shared with *A. sardae* and *A. rotundus*. However, *A. incidentus* can be distinguished from the two (and all other known species of *Artotrogus*) by having the two (not one) posterolateral expansions on each side of genital double somite and by the larger body size.

It seems remarkable that *A. incidentus* and *A. sardae* have the 8-segmented female antennules in which the second segment is the longest unlike the other species where the segmentation of antennule is known, although both species are easily distinguished as mentioned above. *A. incidentus* can also be recognized by other diagnostic characteristics that the posterior corners of cephalothorax are sharply pointed and slightly curved outward, and the epimera of first metasomite are widely isolated from the cephalothorax and extended over epimera of second metasomite.

The following key may be useful to distinguish the known species of *Artotrogus*.

1. Basis of leg 1 with seta on posterior margin near base of endopod ——— 2
   Basis of leg 1 without seta on posterior margin near base of endopod ——— 6
2. Terminal segment of leg 3 endopod with 5 elements ——— 3
   Terminal segment of leg 3 endopod with 6 elements ——— 4
3. Posterolateral expansions of genital double somite directed backwards and truncate ——— *A. sarsi*
   Posterolateral expansions of genital double somite directed posterolaterally and ended roundly ——— *A. halocynthiae*
4. Female antennule 9-segmented ——— *A. rotundus*
   Female antennule 8-segmented ——— 5
5. Siphon not reaching base of maxilliped; posterolateral expansions of genital double somite not extending beyond posterior border of first abdominal somite ——— *A. sardae*
   Siphon extending slightly over base of maxilliped; posterolateral expansions of genital double somite extending beyond posterior border of first abdominal somite ——— *A. incidentus*
6. Female abdomen 2-segmented ——— *A. haikungae*
   Female abdomen 3-segmented ——— 7
7. Siphon extending to insertion of leg 1; terminal segment of leg 1 exopod with 6 elements (II,4) ——— *A. gladiator*
   Siphon not extending to insertion of leg 1; terminal segment of leg 1 exopod with more than 6 elements (II,5 or III,5) ——— 8
8. Endopodal third segment of leg 3 with 5 elements; siphon extending over base of maxilliped ——— *A. orbicularis*
   Endopodal third segment of leg 3 with 6 elements; siphon extending to base of maxilliped ——— 9
9. Exopodal third segment of leg 1 with 8 elements (III,5); male antennule 12-segmented ——— *A. latifurcatus*
   Exopodal third segment of leg 1 with 7 elements (II,5); male antennule10-segmented ——— *A. acutus*

Genus *Bradypontius* Giesbrecht, 1895

Bradypontius crassisetus, n. sp. (Figs. 12 & 13)

Type specimens. 3 ♀♀ collected from washings of a colony of the bryozoan *Heteropora pelliculata* Waters caught with a fishing net in the Sea of Japan, off Gajin (approximately 38° 28′ N, 128° 31′ E), on 27 November 1994. Holotype and 1 paratype will be deposited in U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratype is kept in the collection of the author.

Female. Body (Fig. 12A) 1.45 mm long and 0.82 mm wide. Cephalothorax relatively large, 780 μm long, with relatively straight posterior border, its epimeral areas of not expanded backwards, with angular corners. First metasomite distinctly narrower than cephalothorax, its epimeral areas directed backwards, tapering, with acute tip. Second and third metasomites 554 μm and 369 μm wide

respectively, their epimeral areas curved backwards, both ended in same level, posterior corners of the second pointed. Urosome (Fig. 12B) 5-segmented. Genital double somite 140 μm long with distinct, wing-like anterior expansion (Fig. 12C), 228 μm wide in this part, and narrower posterior part 125 μm wide; Posterior margins of anterior expansion weakly crenulate and convex. Egg sac semi-spherical. Three postgenital somites 50 x 102, 48 x 97, and 77 x 100 μm, respectively, with all of them becoming wider posteriorly. Caudal ramus 85 x 45 μm (1.89:1), with 2 small, naked setae on posterodorsal surface and 4 distal plumose setae. Both lateral margins parallel. Inner margin with setules proximally and distally.

Antennule (Fig. 12D) 370 μm long, and 8-segmented, with armature formula: 1, 14, 7, 2, 2, 2, 2, and 14+1 aesthetasc. Setae on segments relatively small. Second segment the longest, followed by first and terminal segments. Aesthetasc on terminal segment moderately large, originated near midlength of the segment. Antenna (Fig. 12E) with coxa of 25 μm long. Basis 55 μm long. Exopod small, about 10 x 5 μm, with 2 subequal setae, both of them extended slightly beyond distal border of endopodal first segment. Endopod 2-segmented; first segment 35 μm long, with setules on inner margin; second segment 40 μm long, with 1 lateral seta located on proximal 0.38 of the segment and 3 apical setae; two smaller ones of apical setae weakly plumose, and larger one strong, spiniform and 62 μm long.

Siphon 673 μm long and slender, reaching insertion of leg 1. Mandible with 7 teeth and 1 spinular process distally (Fig. 12F). Maxillule (Fig. 12G) bilobed; outer lobe 70 μm long, apically with 2 large and 1 small setae; inner lobe tapering, very thin distally, 120 μm long, apically with 1 longer, setules-tipped seta and 1 small seta. Maxilla (Fig 12H) consisting of 2 segments and claw; second segment very narrow, as long as basal segment with small subapical setae and apical spinules; claw relatively short with minute spinules along concave margin. Maxilliped (Fig. 13A) consisting of 5 segments and claw; first segment with 1 inner distal setae and setules on outer distal corner; second segment with setules on outer margin and 1 small plumose seta at distal 0.3 of inner margin; third segment with 2 small outer distal setae; fourth segment weakly demarcated from the third, with 1 inner distal seta; fifth segment with 1 inner distal seta; claw distinctly longer than fifth segment, distally curved, with minute spinules along concave margin.

Leg 1 (Fig. 13B), leg 2 (Fig. 13C), leg 3, and leg 4 (Fig. 13D) biramous, with 3-segmented rami, and following armature formula:

Leg 1: coxa 0-1; basis 1-I; exp. I-1; I-1; III,5; enp. 0-1; 0-2; 1,5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-0; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,2

Leg 1 with inner coxal seta characteristically lanceolated; basis with tubercle on dorsal surface near base of endopod (Fig. 13B); inner distal spine of basis very short, setiform, and hardly reaching base of seta of endopodal first segment. Outer margins of exopodal first and second segments of leg 1 with setules, but same area of legs 2-4 with spinules. Legs 1-3 with bicuspid processes at outer distal corner of endopodal second segment. Inner coxal seta of leg 4 plumose basally but spinulated distally. Endopod of leg 4 slender, 154 μm long, about 0.6 times as long as exopod.

Leg 5 with setal formula 1, 3. Free segment knob-like (Fig. 12C), as long as wide, tipped by 2

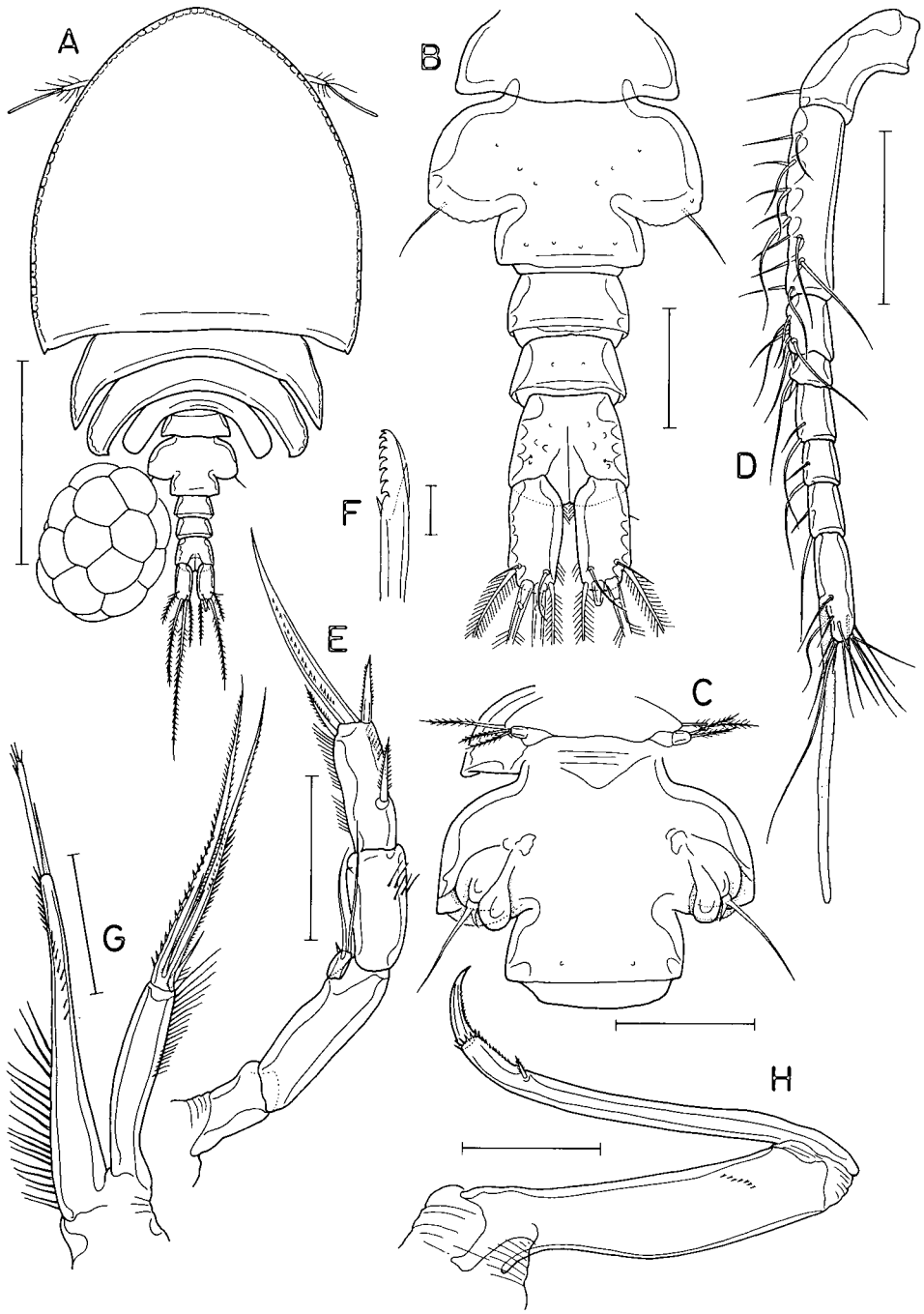

Fig. 12. *Bradypontius crassisetus*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, first urosomite and genital double somite, ventral; D, antennule; E, antenna; F, terminal portion of mandible; G, maxillule; H, maxilla. Scales: A= 0.5 mm; B, C, D, F= 0.1 mm; E, G= 0.05 mm; F= 0.01 mm.

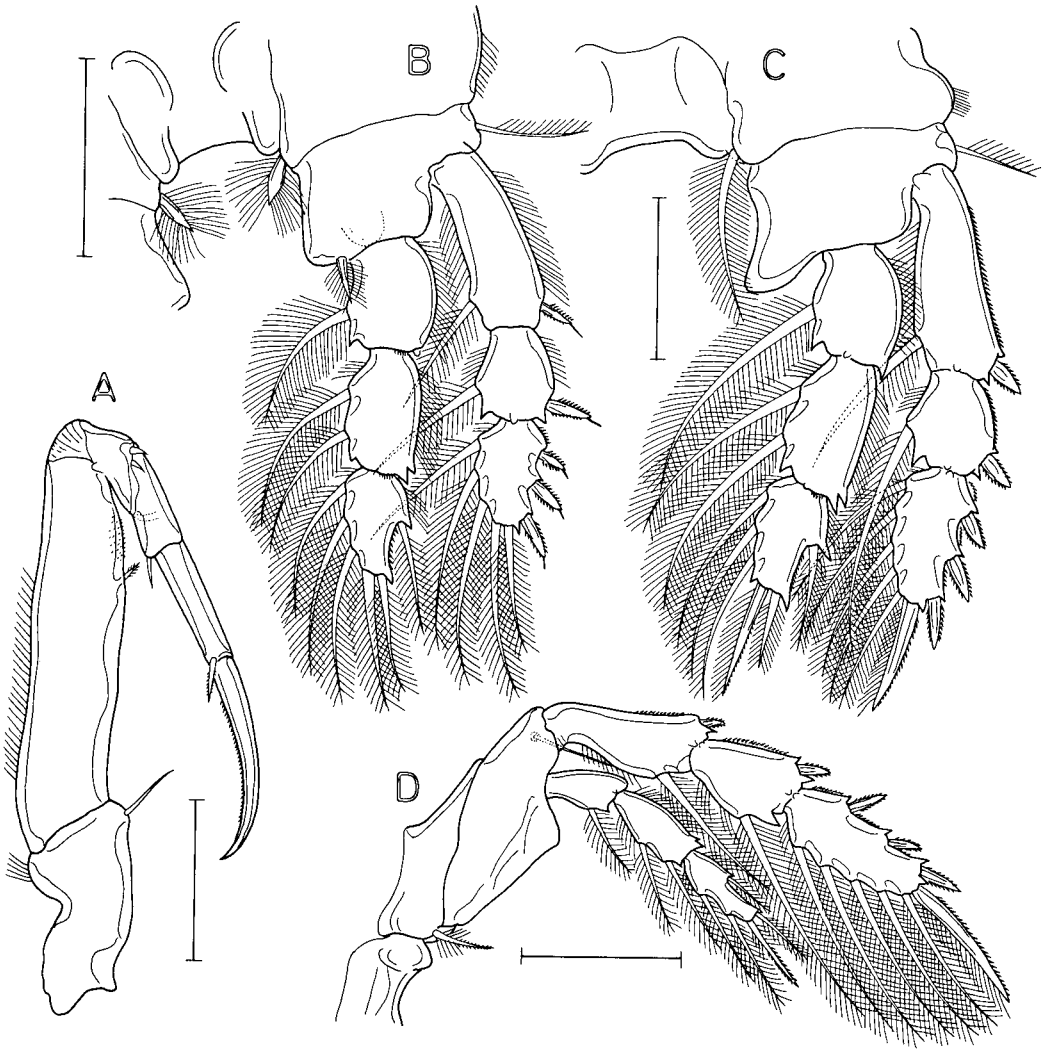

Fig. 13. *Bradypontius crassisetus*, n. sp., female: A, maxilliped; B, leg 1; C, leg 2; D, leg 4. Scales: 0.1 mm in all.

plumose setae and on dorsal margin 1 tiny seta (not shown in Fig. 12C). Leg 6 consisting of 1 small, spiniform and 1 longer setae in genital area (Fig. 12C); both setae glabrous.

Male. Unknown.

Etymology. The specific name *crassisetus* is derived from *crassus* (meaning "thick" in Latin) and *seta*, alluding to the lanceolated inner coxal seta of leg 1.

Remarks. Among 16 species of *Bradypontius*, including the most recently described *B. macginitiei* Eiselt, 1986, three species are not known of their segmentation of female antennule. They are *B. tenuipes*, *B. unidens*, both described by Hansen (1923), and *B. ovatus* describd by Nicholls (1944). The latter two species were recorded based only on the males.

B. tenuipes is not related to *B. crassisetus* n. sp., because it has unusually well-developed leg 5 carrying 4 setae on the free segment. *B. ovatus* is not related to the new species either, for this Australian species bears the 0, 0, 2 setae respectively on the three segments of leg 4 endopod. *B. unidens* can also be distinguished from the new species by its large body which is 1.65 mm long (Hansen, 1923), in spite of the male.

Among the remaining 13 species where the female antennules are known, only *B. magniceps* (Brady), the European species, has 8-segmented female antennules (Sars, 1915) as the new species. Moreover these two species have the same armature of leg 4, and curiously the identical shape of the inner coxal seta on the basis of leg 1 which is very short, medially thick, and thus lanceolated. The other example of this laceolated seta can be found in *B. major* Sars, 1915 in addition to the two species just mentioned.

B. crassistus can be distinguished from *B. magniceps* by its smaller body size (1.45 mm, against 1.80 mm in *B. magniceps*), by its shorter siphon (extending to the insertion of leg 1, against extending to the insertion of leg 2 in *B. magniceps*), by a broader caudal ramus (ratio 1.89:1, against more than twice in *B. magniceps*), and by non-produced posterolateral corners of cephalothorax (they are clearly projected in *B. magniceps*).

***Bradypontius halocynthiae*, n. sp. (Figs. 14 & 15)**

Type specimen. 3 ♀♀ and 2 ♂♂ collected from washings of the external surface of the ascidian *Halocynthia hilgendorfi igaboja* (Oka) caught by a fishing net at 20 m depth in the Sea of Japan, off Kangreung, on 9 June 1995. Holotype, allotype and 1 ♀ paratype will be deposited in the U. S. National Museum of Natural History. Dissected paratypes (1 ♀, 1 ♂) are kept in the collection of the author.

Female. Body (Fig. 14A) relatively large, 1.60 mm long. Cephalothorax large, 850 x 830 μm, without dorsal crest. Posterolateral corners of cephalothorax round, weakly extended backwards. First metasomite distinctly narrower than cephalothorax; its epimera tapering, narrow, and directed backwards. Second metasomite slightly longer than first mtasomite; its epimera distinctly broader than that of first metasomite, curved inward, with angular posterior corner. Third metasomite short, with pointed epimera.

Urosome (Fig. 14B) 6-segmented. Fifth pedigerous somite 187 μm wide. Genital double somite 104 μm long, with wing-like anterolateral expansions, 227 μm wide across anterior expansions, and 137 μm wide across posterior narrower part. Three abdominal somites 63 x 112, 50 x 103, and 75 x 105 μm, respectively. Caudal ramus 83 x 50 μm (1.66:1), with parallel margins and 6 plumose setae. Inner margin smooth without setules. Posterior margin of caudal ramus fringed with minute spinules. Antennule (Fig. 14D) 10-segmented, with armature formula: 1, 2, 10, 2, 7, 2, 2, 2, 2, and 14+1 aesthetasc. First segment the longest. Third segment the next longest. Aesthetasc on terminal segment as long as 5 distal segments. Antenna (Fig. 14E) with coxa of about 2 μm long, followed after short precoxa. Basis 44 μm long, with 1 small, spiniform seta near base of exopod. Exopod small, longer than wide, and tipped by 2 setae of unequal size. Endopod 2-segmented. First segment 38 μm and unarmed. Second segment 47 μm long, armed with 4 setae: lateral seta 40 μm long and located at

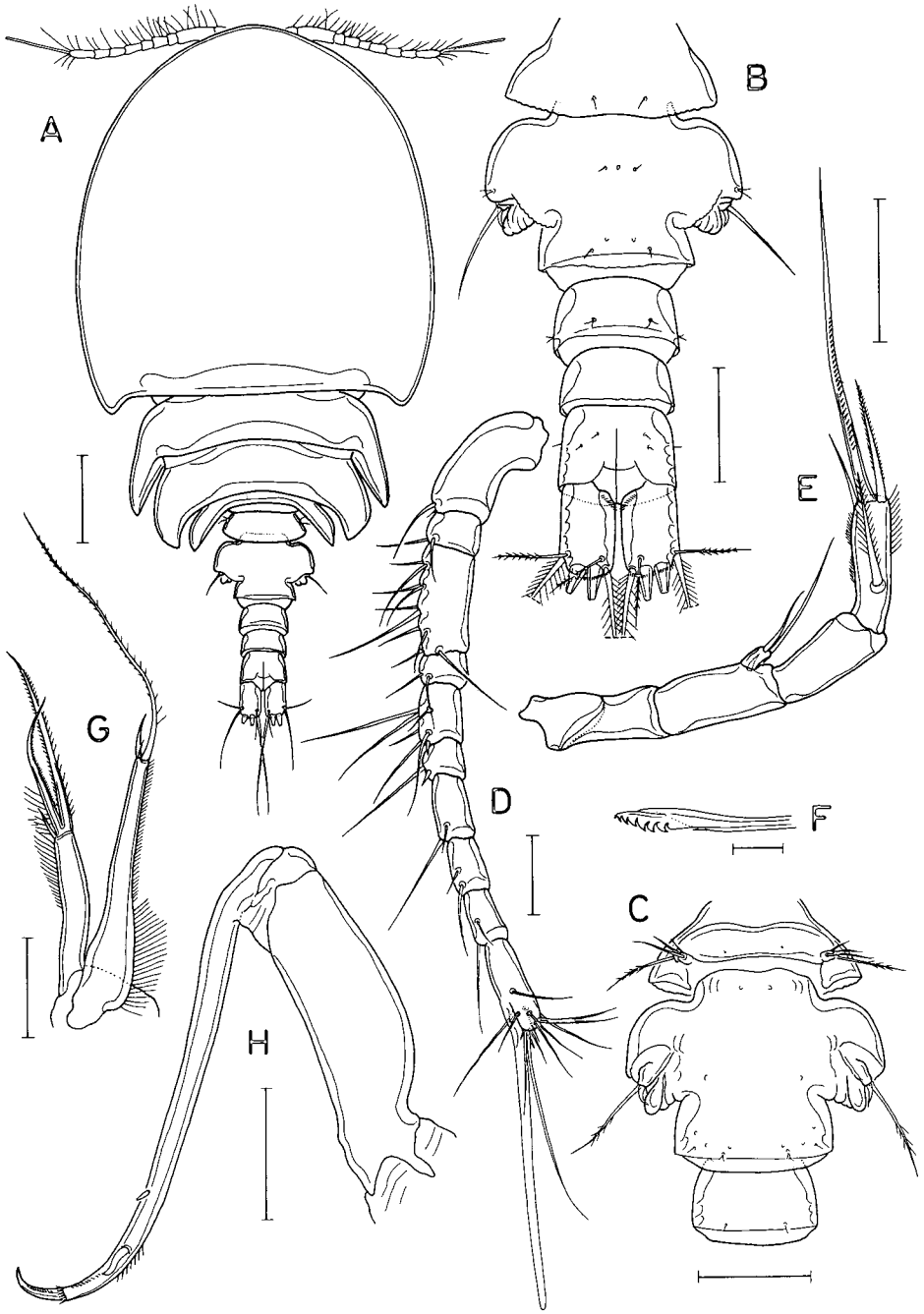

Fig. 14. *Bradypontius halocynthiae*, n. sp, female. A, habitus, dorsal; B, urosome, dorsal; C, anterior part of urosome, ventral; D, antennule; E, antenna; F, distal part of mandible; G, maxillule; H, maxilla. Scales: A= 0.2 mm; B, C, H= 0.1 mm; D, E, G= 0.05 mm; F= 0.01 mm.

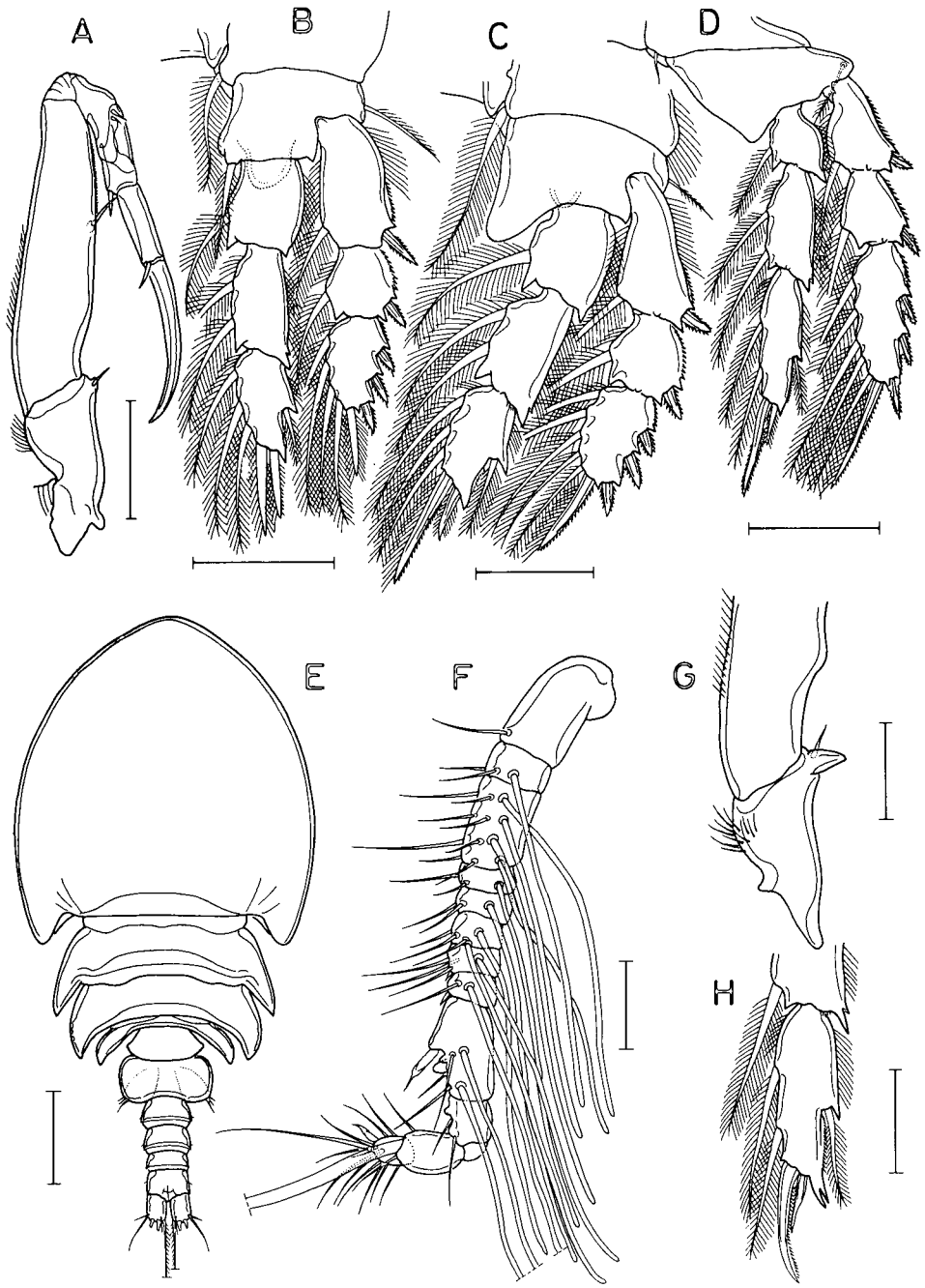

Fig. 15. *Bradypontius halocynthiae*, n. sp. Female: A, maxilliped; B, leg 1; C, leg 2; D, leg 4. Male: E, habitus, dorsal; F, antennule; G, proximal part of maxilliped; H, terminal segment of leg 4 endopod. Scales: A-D= 0.1 mm; E= 0.2 mm; F-H= 0.05 mm.

proximal one-third length of segment; 3 terminal setae 119, 45, and 28 μm, respectively, median one stiff and distinctly larger than other two.

Siphon long and slender, reaching insertion of leg 2. Mandible with 7 teeth distally (Fig. 14F). Maxillule (Fig. 14G) bilobed. Outer lobe 70 μm long, apically with 2 large (outer one slightly shorter than the other and curved inward at distal one-third) and 1 small setae. Inner lobe very narrow distally, 125 μm long, apically with 1 very long, whip-like seta, 1 short and 1 minute setae. Maxilla (Fig 14H) consisting of 2 segments and claw; second segment very narrow, longer than basal segment, with 2 small distal setae (distal one twisted) and spinules; claw short, strongly curved, with minute spinules along concave margin. Maxilliped (Fig. 15A) consisting of 5 segments and claw. First segment with 1 inner distal setae mounted on a weak protrusion and setules near outer distal corner. Second segment with setules on outer margin, 1 small plumose seta at distal 0.4 of inner margin, and minute spinules on inner margin distal to the seta. Third segment with 2 small outer distal setae. Fourth segment weakly demarcated from the third, with 1 inner distal seta. Fifth segment with 1 inner distal seta. Claw distinctly longer than fifth segment and evenly curved.

Leg 1 (Fig. 15B), leg 2 (Fig. 15C), leg 3, and leg 4 (Fig. 15D) biramous, with 3-segmented rami, and following armature formula:

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III,5; enp. 0-1; 0-2; 1,5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-0; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,2

Inner coxal seta of leg 1 as long as endopodal first segment; basis with large tubercle on dorsal surface near base of endopod; two termianl setae on endopodal third segment thick. Outer margin of exopodal first segment of legs 1 and 2 proximally setiferous and distally spinulated, but this margin of leg 3 proximally spinulated and distally naked. Endopod of leg 4 well-developed, as long as, but more slender than, exopod; terminal seta on terminal segment short, not longer than half length of nearby spine. Legs 1-3 with bicuspid processes at outer distal corner of endopodal second segment.

Leg 5 with setal formula 1, 3. Free segment knob-like (Fig. 14C). Leg 6 consisting of 1 small, curved, spiniform seta and 1 longer, weakly plumose seta in genital area (Fig. 14C).

Male. Body (Fig. 15E) shaped basically as in female, and 1.29 mm long. Cephalothorax 641 x 632 μm, with rather produced apex. Urosome 6-segmented. Genital somite quadrish, much wider than long, 103 x 195 μm. Four postgenital somite 58 x 107, 55 x 98, 42 x 90 μm, and 63 x 90 μm, respectively. Caudal ramus 55 x 43 μm (1.28:1).

Antennule (Fig. 15F) 12-segmented, and geniculate between penultimate and antepenultimate segment, with armature formula: 1, 2+1 aesthetasc, 8+4 aesthetascs, 2+1 aesthetasc, 2+1 aesthetasc, 3+2 aesthetascs, 4+1 aesthetasc, 2+1 aesthetasc, 4+2 aesthetascs, 2, 2+1 aesthetasc, and 13. One seta on nineth and another one of terminal segment modified to thick element. Nineth and tenth segments each armed additionally with 2 tubercles on antrior margin. Antenna as in female.

Maxilliped with strong, tapering inner distal process on first segment (Fig. 15G). Other mouth organs and armature formula of legs 1-4 as in female. Endopodal first segment of leg 2 with pronounced outer and inner distal angles. Distal third of terminal spine of endopodal third segment

leg 2 serrate on both sides. Endopodal third segment of leg 4 (Fig. 15H) sexually dimorphic: its inner distal angle strongly projected and distally bifid; its terminal spine distally curved outwards and serrate on outer margin.

Etymology. The specific name, *halocynthiae*, is derived from the generic name of the host ascidian.

Remarks. *Bradypontius halocynthiae* n. sp. can be compared with *B. dentatus* Hansen (1923), *B. siphonatus* Giesbrecht, 1895 and *B. macginitiei* Eiselt, 1986, all of them having 10-segmented female antennules. The new species is distinguished from *B. dentatus* by the smaller body size (1.60 mm, compared to 2.29 mm in *B. dentatus*) and blunt, weakly projected posterolateral corners of cephalothorax (it is acute and prominently projected in *B. dentatus*), from *B. siphonatus* by the shorter siphon which extends to the insertion of leg 2 (in *B. siphonatus* it is extremely long, extending to the middle of abdomen), and from *B. macginitiei* by the 12-segmented male antennule (9-segmented in *B. macginitiei*), by the slender distal segment of maxilla (massive in *B. macginitiei*), and by the shorter caudal ramus.

Bradypontius heteroporus, n. sp. (Fig. 16 & 17)

Type specimen. Holotype ♀ collected from washings of a colony of the Bryozoan *Heteropora pelliculata* Waters taken from a fishing net at Kangreung, in the Sea of Japan, on 9 March 1996. The dissected appendages of the holotypes is mounted in lactophenol on a slide; tergite and urosome are contained in a vial; the slide and vial will be deposited in the U. S. National Museum of Natural History, Smithsonian Institution.

Female. Body (Fig. 16A) relatively large, broad, 1.69 mm long, yellow in color, with hard tergites. Cephalothorax wider than long, 0.92 mm long in midline and 1.06 mm wide, with moderately projected and pointed posterolateral corners. Epimera of first and second metasomites with sharply pointed posterior corners. Third metasomite visible from dorsal view of body. Urosome (Fig. 16B, C) 5-segmented. Fifth pedigerous somite 233 μm wide, almost quadrangular, with weakly crenulated posterodorsal border. Genital double somite 153 μm in dorsal midline and 333 μm wide, with well-developed, flap-like, posterolateral expansions. Three postgenital somites 67 x 146, 50 x 136, 73 x 167 μm, respectively, each of them distincly broader posteriorly. Caudal ramus 83 x 70 μm (1.19:1), with 6 setae, setules on posterior part of inner margin, and spinulated posterior margin.

Rostrum triagular, with angular posterior tip. Antennule (Fig. 16D) 8-segmented, 398 μm long, with armature formula: 1, 13, 7, 2, 2, 2, 2, and 14 + 1 aesthetasc. Second segment the longest, and first the next longest. Antenna (Fig. 15E) with unarmed coxa of about 37 x 21 μm. Basis 55 x 24 μm, slightly broader in the middle. Exopod very small, knob-like, tapering, wider than long, with 1 terminal and 1 lateral setae. Endopod 2-segmented. First segment unarmed, 39 x 23 μm. Second segment 50 x 18 μm, with setules on lateral margins, and armed with 4 elements: proximal seta 28 μm long, located at proximal 1/3 length of segment; 3 terminal elements relatively short, consisted of 63 μm-long seta, 39 μm-long spine and 19 μm-long, small seta.

Siphon 575 μm long, relatively thick, extending to insertion of leg 1. Mandible distally with 7 teeth and 1 sharp process. Maxillule (Fig. 16F) bilobed. Inner lobe 142 μm long, nearly twice as long as outer lobe, becoming abruptly slender in distal half, terminally with 1 long, 1 small, and 1 minute

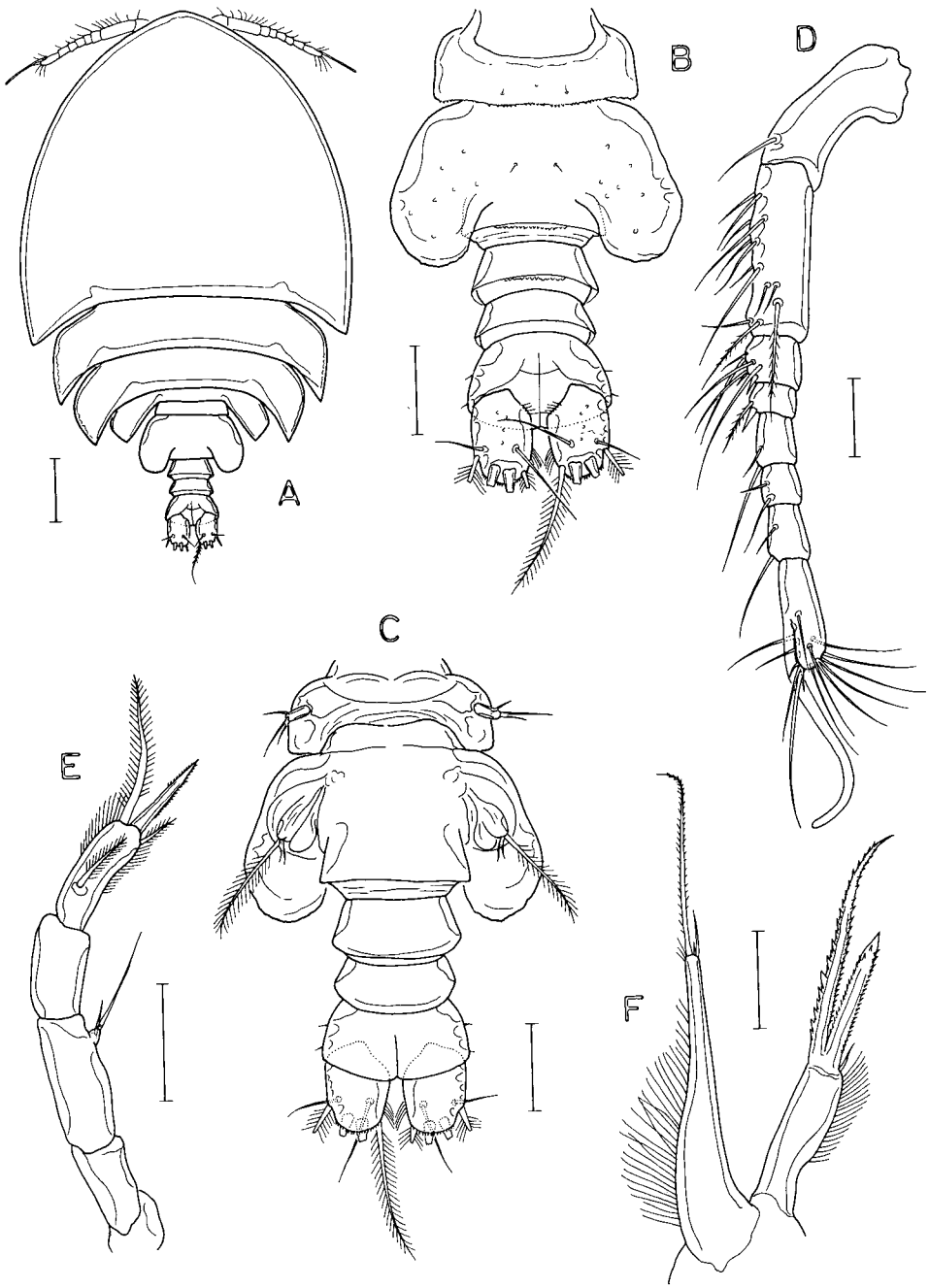

Fig. 16. *Bradypontius heteroporus*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, same, ventral; D, antennule; E, antenna; F, maxillule. Scales: A= 0.2 mm; B, C= 0.1 mm; D-F= 0.05 mm.

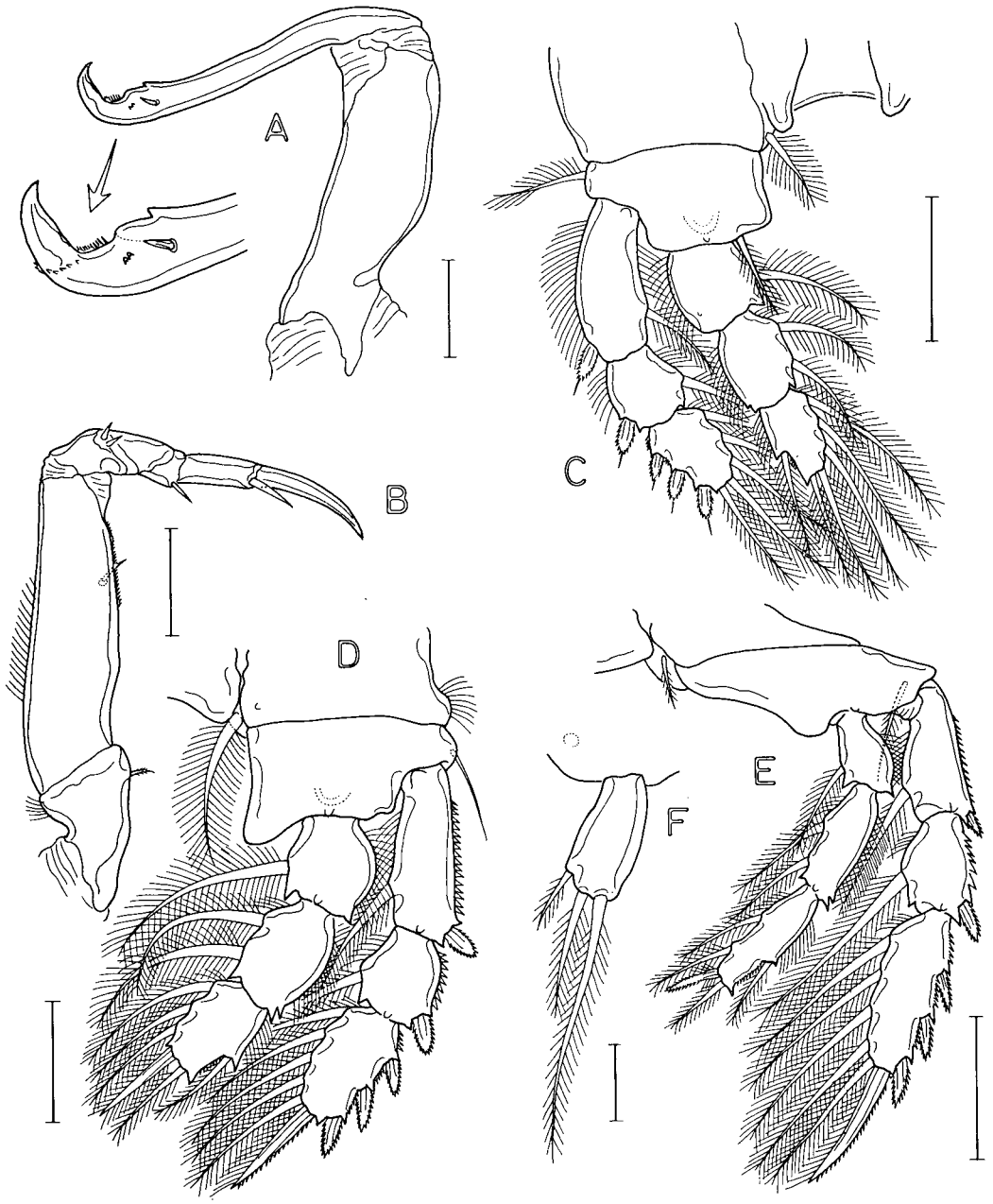

Fig. 17. *Bradypontius heteroporus*, n. sp., female: A, maxilla; B. maxilliped; C, leg 1; D, leg 2; E, leg 4; F, leg 5. Scales: A-E= 0.1 mm; F= 0.02 mm.

setae. Outer lobe 75 μm long, constricted in proximal one-third, with setules on outer margin and terminally with 2 thick, strong elements of unequal length and 1 small seta. Maxilla (Fig. 17A) 2-segmented. First segment unarmed. Second segment with massive distal portion and distally with 1 spur, 1 seta, 2 small tubercles, and spinules on concave marin. Claw completely fused to second segment, thick and short, with spinules basally. Maxilliped (Fig. 17B) 5-segmented, with armature formula: 1, 1, 2, 1, 1 + claw. Second segment with minute spinules on distal half of inner margin. Third segment sub-divided into 2 parts.

Leg 1 (Fig. 17C), leg 2 (Fig. 17D), leg 3, and leg 4 (Fig. 17E) biramous, all of them with 3-segmented rami. Outer margin of exopodal first segment of leg 1 with setules, but this margin in legs 2-4 crenated. Inner one of 2 termianl setae of endopodal third segment of leg 2 spiniform. Terminal spine on the same position of leg 3 basally plumous but crenated distally. Endopod of leg 4 more slender and shorter than exopod, 0.8 times as long as the latter. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,5

Leg 2: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,5

Leg 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,2

Leg 5 (Fig. 17F) consisted of 1 seta on somite and free segment. Free segment relatively developed, about 34 x 18 μm (1.89 : 1), with 3 terminal plumose setae Leg 6 represented by 1 long, plumose seta and 2 small setules in gental area (Fig. 17F).

Male. Unknown.

Etymology. The specific name is a modification of the generic name of the host.

Remarks. It is regrettable that only a single specimen is available for the description of this species. Notwithstanding this, it seems preferable to name it because this is considered a good species. This species has a unique genital double somite which bears well-developed, lobate posterior expansions. Such expansions on genital double somite are not found in hitherto known species of *Bradypontius*.

Genus *Cryptopontius* Giesbrecht, 1899

Cryptopontius digitatus, n. sp. (Figs. 18 & 19)

Type specimens. 13 ♀♀ and 2 ♂♂ collected from washings of a colony of the bryozoan *Leieschara orientalis* (Kluge) taken from a fishing net, off Kangreung in the Sea of Japan, on 14 March 1995. Holotype ♀, allotype and 11 ♀♀ paratypes will be deposited in U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratypes (1 ♀, 1 ♂) are kept in the collection of the author.

Female. Body (Fig. 18A) 1.19 mm long. Cephalothorax 0.62 x 0.67 mm, slightly wider than long, incorporating first pedigerous somite, with rounded apex. Posterolateral corners of cephalothorax angular, but not pointed, nor extended posteriorly. First to third metasomites 527, 460, and 313 μm -wide respectively. Epimeral areas of first metasomite extended posteriorly, with pointed posterolateral corners. Epimeral areas of second and third metasomes with angular posterolateral

corners. Epimera of third metasomite reaching near middle of anterior expansion of genital double somite. Urosome (Fig. 18B) 5-segmented. Fifth pedigerous somite 140 μm wide, with angular posterolateral coners. Genital double somite 140 μm long, with well-developed, laterally somewhat tapering, anterior expansion (208 μm wide in this part) and narrower posterior part (120 μm wide). Three postgenital somites 50 x 85, 45 x 80, and 53 x 70 μm, respectively. Anal somite with parallel lateral margins. Caudal ramus 60 x 34 μm (1.76:1), with 2 small, glabrous dorsal setae and 4 distal plumose setae. No setules on margins.

Antennule (Fig. 18D) 303 μm long and 8-segmented, with armature formula: 1, 14, 7, 2, 2, 2, 2, and 14+1 aesthetasc. Second segment the longest. Aesthetasc of terminal segment originated at midlength of the segment, nearly as long as distal 6 segments combined. Antenna (Fig. 18E) characteristically stocky. Coxa 20 x 17 μm. Basis 21 x 20 μm. Exopod small, with 1 very small and 1 longer setae; the latter extending beyond middle of endopodal second segment. Endopod 2-segmented. First segment 18 x 17 μm, nearly as long as wide. Second segment 32 x 16 μm, twice as long as wide, with setules on margins, and 3 apical seta (24, 50, and 24 μm respectively, and 2 of them spiniform) and 1 lateral seta; the latter located at proximal 0.46 of the segment.

Siphon 338 μm long, relatively short, extending slightly beyond bases of maxillipeds. Mandible terminally with 7 teeth and 1 spinule (Fig. 18F). Maxillule (Fig. 18G) bilobed, both lobes relatively stout. Outer lobe 45 μm long, apically with 2 large setae of equal length and 1 small seta. Inner lobe tapering, 80 μm long, with 1 plumose and 1 minute setae; outer margin of outer lobe and inner margin of inner lobe with setules. Maxilla as Fig. 17H, with short claw. Maxilliped (Fig. 19A) 5-segmented, excluding claw. Claw thick and very weakly curved.

Leg 1 (Fig. 19B), leg 2 (Fig. 19C) and leg 3 biramous, all of them with 3-segmented rami. Leg 1 with short inner coxal seta; inner distal spine on basis as long as endopodal first segment, proximally plumose, but distally serrate. Leg 4 (Fig. 19D) characteristical in having 1-segmented, vestigial endopod tipped by 1 seta. Iner coxal seta of leg 4 small, proximally plumose and distally serrate. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-I; exp. I-1; I-1; III,5; enp. 0-1; 0-2; 1,5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 1

Leg 5 with setal formula of 1, 3. Free segment knob-like, tipped by 2 setae, with 1 small lateral seta on dorsal margin (Fig. 18C). Leg 6 represented by 1 small and 1 longer setae in genital area (Fig. 18C).

Color orange.

Male. Body (Fig. 19E) 1.11 mm long, with broad cephalothorax and narrower metasomes. Cehalothorax 510 x 600 μm, 1.18 times broader than long. Urosome 6-segmented. Genital somite broader distally and 118 x 179 μm. Four postgenital somites 63 x 90, 52 x 77, 40 x 70 μm, and 50 x 73 μm, respectively. Caudal ramus 62 x 36 μm (1.72:1).

Antennule (Fig. 19F) 12-segmented and geniculate between penultimate and antepenultimate segments, with armature formula: 1, 10, 2+1 aesthetasc, 2, 2+1 aesthetasc, 2+1 aesthetasc, 4+1 aesthetasc, 2+1 aesthetasc, 4+2 aesthetascs, 2, 2+1 aesthetasc, and 12. Nineth segment with 2

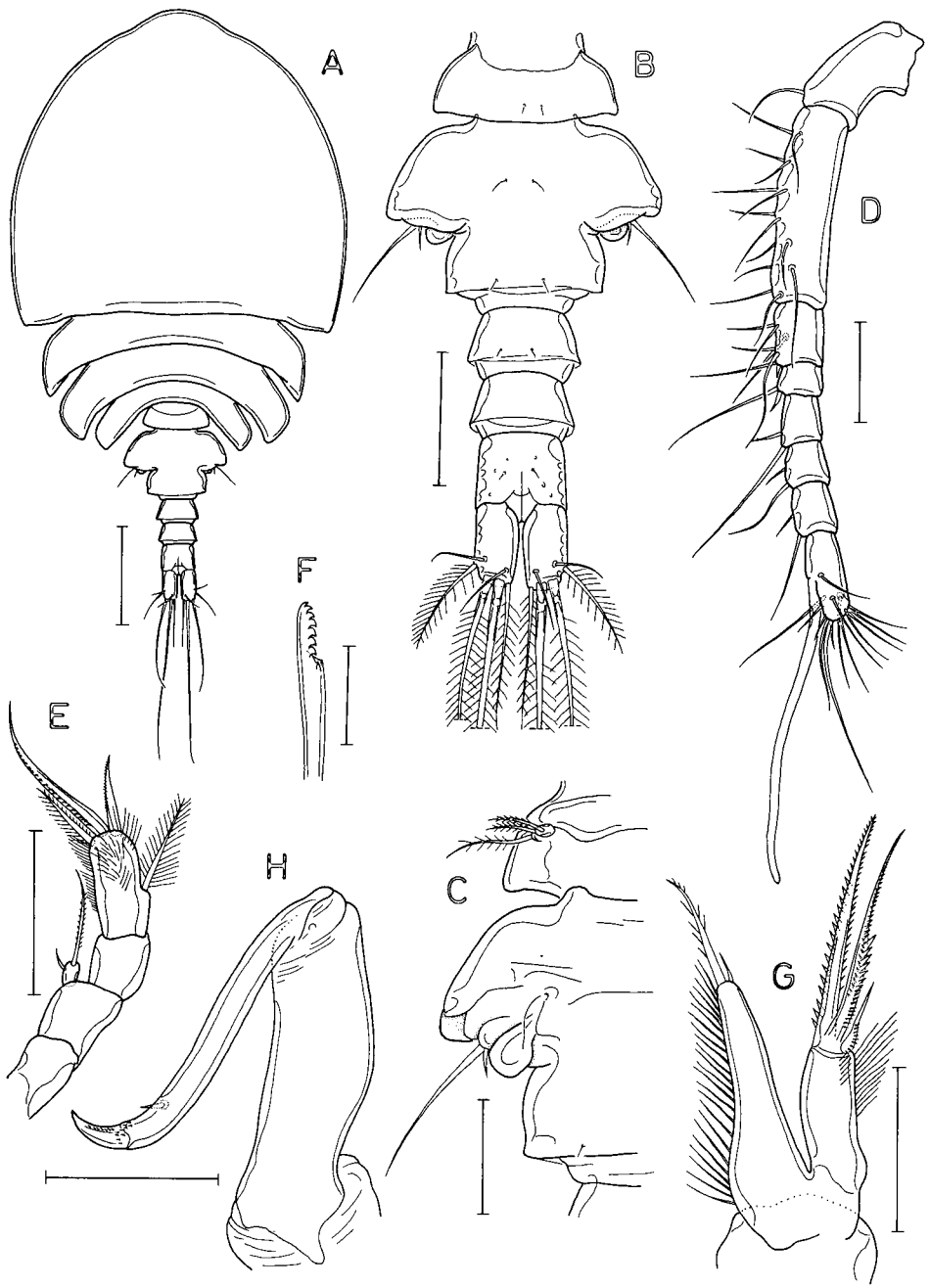

Fig. 18. *Cryptopontius digitatus*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, right side of first urosomite and genital double somite, ventral; D, antennule; E, antenna; F, terminal portion of mandible; G, maxillule; H, maxilla; Scales: A=0.2 mm; B, H=0.1 mm; C, D, E, G=0.05 mm; F= 0.02 mm.

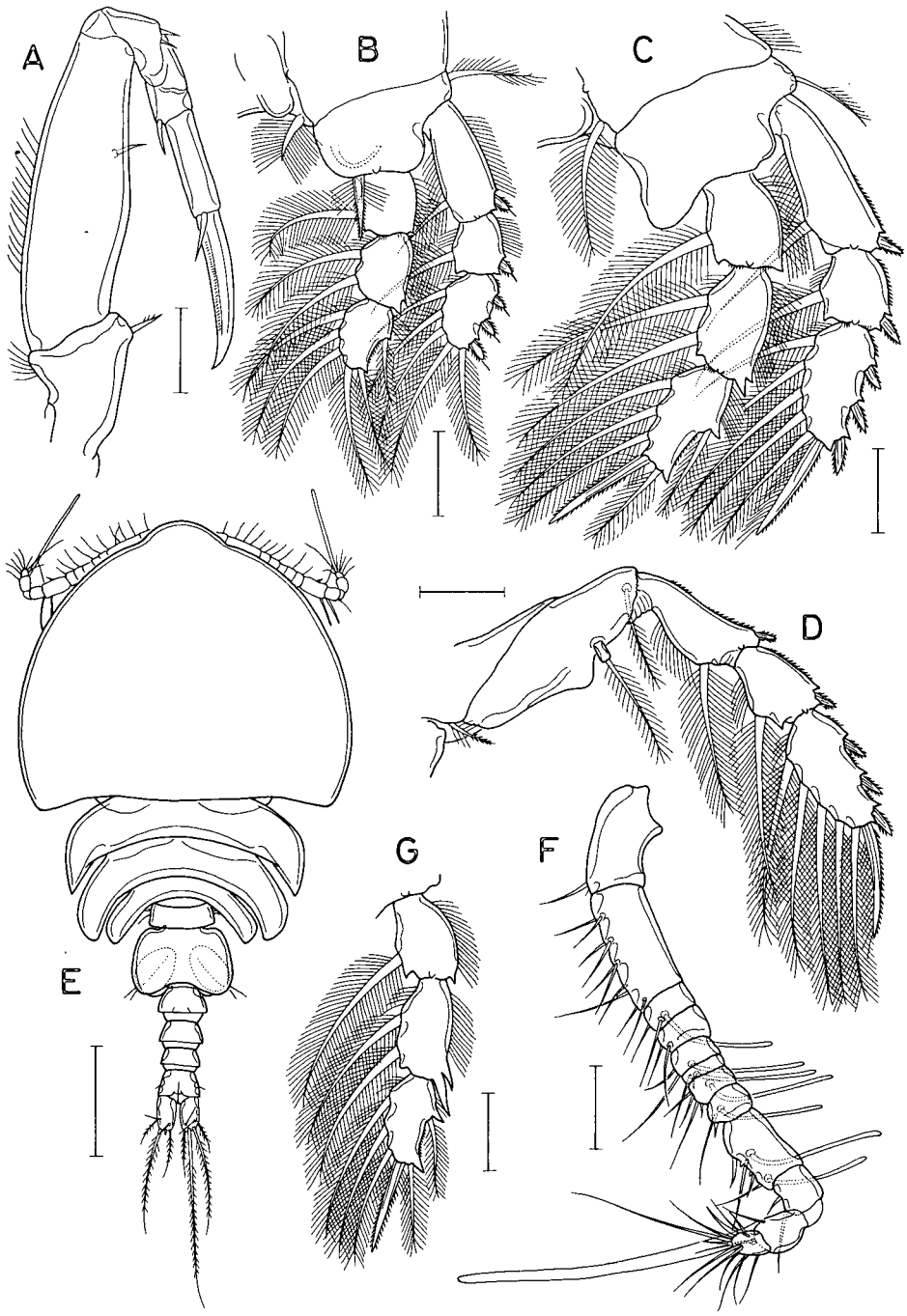

Fig. 19. *Cryptopontius digitatus*, n. sp. Female: A, maxilliped; B, leg 1; C, leg 2; D, leg 4. Male: E, habitus, dorsal; F, antennule; G, endopod of leg 3. Scales: A-D, F, G= 0.05 mm; E= 0.2 mm.

small tubercles added on anterior margin.

Antenna, mouth organs and armature formula of legs 1-4 as in female. Endopodal second segment of leg 3 with enlarged bicuspid process on outer distal corner (Fig. 19G). Leg 6 represented by 3 setae on genital area. Other morphological aspects as in female.

Etymology. The specific name *digitatus* is from *digitus* ("finger" in Latin). It alludes to the 1-segmented, finger-like endopod of leg 4.

Remarks. In having only one-segmented endopod of leg 4 *Cryptopontius digitatus* n. sp. is a unique species among the artotrogid copepods having 3-segmented exopod of leg 4. The least number of the endopodal segments of this leg, if present, is two, as observable in the genera *Arctopontius* Sars, 1917 and *Metapontius* Hansen, 1923. However, foundation of a new genus based on the new species seems not needed.

A trace of leg 4 endopod can also be found in *C. brevicaudatus* (Brady, 1899) and *C. latus* (Brady, 1910) as redescribed by Eiselt (1961). But in these Brady' s species the endopod is mere a negligible trace, not so distinct as in the new species.

Cryptopontius donghaensis, n. sp. (Figs. 20-22)

Type specimens. 8 ♀♀ and 4 ♂♂ collected from washings of a submerged (2 m depth) fishing net at the Port Imwon (about 100 km south of Kangreung) in the Sea of Japan, on 4 August 1992. Holotype ♀, allotype and 8 paratypes (6 females and 2 males) will be deposited in U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratypes (1 ♀, 1 ♂) are in the collection of the author.

Other material examined. 2 ♀♀ from washings of *Halocynthia hilgendorfi igaboja* collected from the Sea of Japan, off Kangreung, on 23 January 1996; 2 ♀♀ from washings of *Heteropora pelliculata* Waters collected from the Sea of Japan, off Kangreung, on 10 March 1996.

Female. Body (Fig. 20A) 1.43 mm (other 2 measured specimens 1.36 and 1.69 mm) long. Cephalothorax 786 x 760 μm, slightly longer than wide, incorporating first pedigerous somite, with rather pronounced apex and short dorsal crest; posterolateral corners rather extended posteriorly and acutely pointed. Epimeral area of first metasomite bent backwards, tapering and pointed. Epimeral area of second metasomite also bent posterolaterally, very broad, extending slightly beyond anterior border of genital double somite, with parallel anterior and posterior margins, and convex lateral margin (Fig. 20C). Third metasomite very small, hardly visible from dorsal view of animal. Urosome (Fig. 20B) 5-segmented. Fifth pedigerous somite 188 μm wide, pointed laterally. Genital double somite 175 μm long; anterior expansions well-developed and tapering laterally (Fig. 20B, D), 280 mm which is weakly crenate posteriorly. Narrower posterior part of genital double somite relatively short, 145 μm wide, its anterior part of lateral sides covered by flap of anterior expansion. Egg sac rather variable in size, 370-450 μm in diameter. Three postgenital somites 62 x 117, 50 x 107, and 63 x 110 μm, respectively. Caudal ramus 70 x 50 μm (1.40:1), with setules on distal part of inner margin, and 2 dorsal and 4 terminal setae.

Antennule (Fig. 20E) 355 μm long and 8-segmented, with armature formula: 1, 12, 8, 2, 2, 2, 2, and 14+1 aesthetasc. Second segment the longest and followed by the first. Aesthetasc on terminal

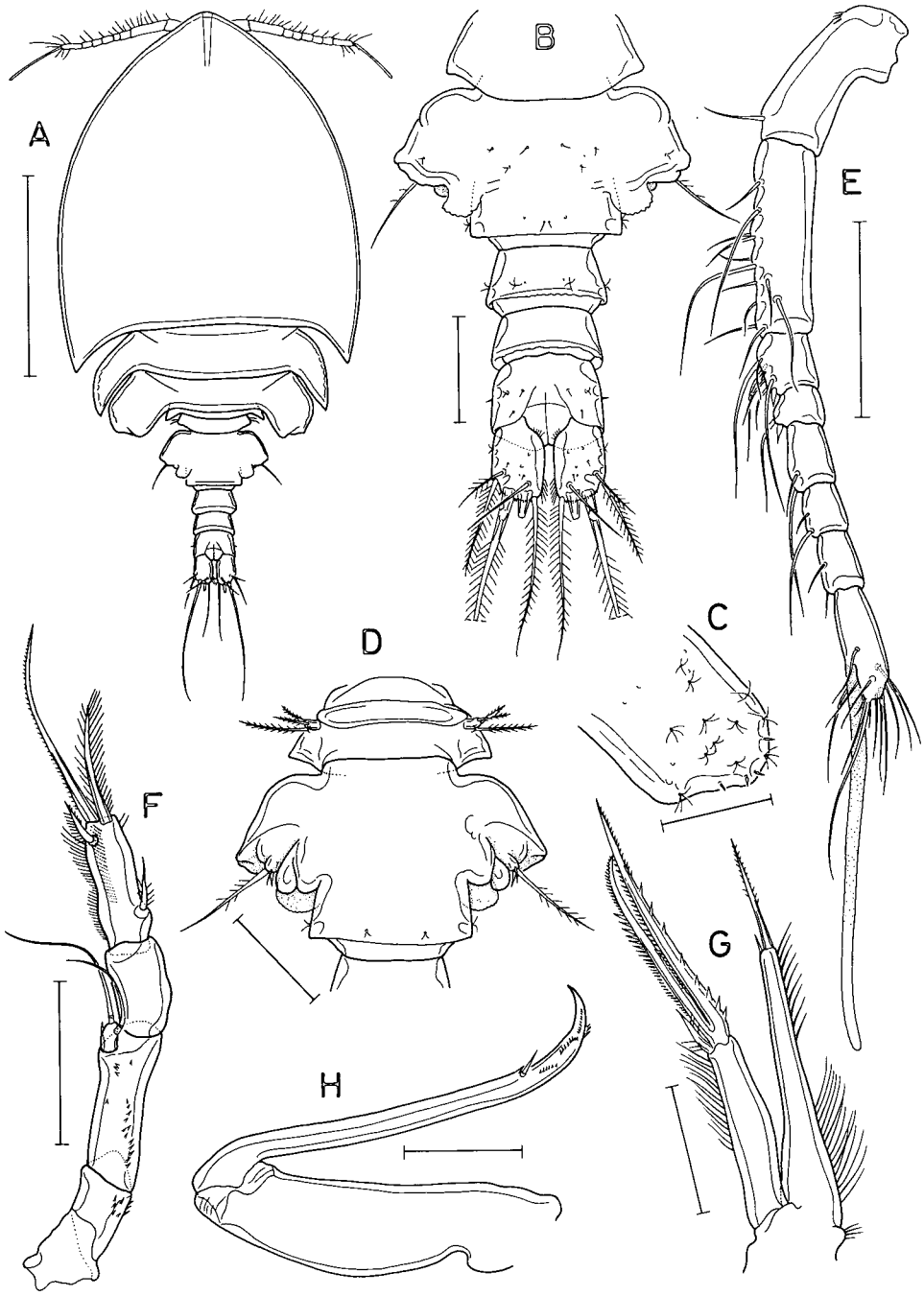

Fig. 20. *Cryptopontius donghaensis*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, epimera of second metasome, dorsal; D, first urosomite and genital double somite, ventral; E, antennule; F, antenna; G, maxillule; H, maxilla. Scales: A, 0.5 mm; B-E, H= 0.1 mm; F, G= 0.05 mm.

segment 200 μm long. Antenna (Fig. 20F) with coxa of 37 x 18 μm. Basis relatively long and 50 x 18 μm. Both coxa and basis with small spinules on magins. Exopod small, 1-segmented, about 9 μm long, with 2 longer setae and 1 minute seta (or spinule). Endopod 2-segmented. First segment 29 x 17 μm and unarmed. Second segment 40 x 16 μm, more than twice as long as wide, with setules on lateral margins and 4 setae: 2 apical setae 65 and 35 μm long, respectively; subapical seta smaller, 15 μm long; proximal seta very short, 13 μm long, and located at basal one-fourth of the segment.

Siphon long and thin, reaching insertion of leg 2. Maxillule (Fig. 20G) bilobed. Outer lobe 70 μm long, with 2 strong (subequal in length) and 1 small apical setae. Inner lobe 107 μm long and tapering, with 1 longer and 1 minute setae. Maxilla (Fig. 20H) 2-segmented. Distal segment very slender. Claw completely fused with second segment. Maxilliped (Fig. 21A) consisting of 5 segments and claw. First segment with small spinules on inner margin, 1 seta near inner distal corner, and setules on distal part of outer margin. Second segment with rather stiff setules on basal half of outer margin, 1 small seta at distal 0.4 of inner margin and minute spinules on inner margin distal to the seta. Third segment with 2 small distal setae. Fourth segment vaguely demarcated from the third, with 1 inner distal seta. Fifth segment more slender, with 1 inner distal seta. Claw rather strongly curved, with minute spinules on concave margin.

Leg 1 (Fig. 21B), leg 2 (Fig. 21C) and leg 3 biramous, all of them with 3-segmented rami. Leg 1 with moderately long inner coxal seta; inner seta on basis long, reaching middle of endopodal second segment; endopodal third segment characteristically without seta on outer margin; exopodal first segment with setules on outer margin, but this margin of legs 2-4 with spinules. Outer distal corner of endopodal second segment of legs 1-3 with bicuspid process. Posterior margin of basis between rami in legs 1-3 with acutely pointed process. Leg 4 (Fig. 21D) lacking endopod. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III,5; enp. 0-1; 0-2; 5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5

Leg 5 (Fig. 20E) with setal formula 1, 3. Free segment longer than wide, tipped by 2 plumose setae, with 1 small lateral spinule-like seta. Leg 6 represented as 2 setules and 1 seta in genital area (Fig. 20D).

Male. Body (Fig. 21F) 1.19 mm long. Cephalothorax 620 x 580 μm. Epimera of second metasomite tapering. Third metasome ivisible in dorsal view. Urosome (Fig. 21G) 6-segmented. Genital somite relatively large, 140 x 237 μm, with concave posterior border. Posterolateral parts of genital somite rather expanded backwards. Four postgenital somites 46 x 105, 44 x 100, 35 x 90, and 42 x 97 μm, respectively. Caudal ramus 60 x 44 μm (1.36:1).

Antennule (Fig. 22A) 10-segmented, geniculate between penultimate and antepenultimate segments, with armature formula: 1, 8+3 aesthetascs, 2+1 aesthetasc, 2, 8+3 aesthetascs, 2+1 aesthetasc, 7 (2 of them being spinules or processes)+2 aethetascs, 2, 2+1 aesthetasc, and 13. Aesthetasc on penultimate segment very large, with a weak constriction in the middle. Antenna as in female.

Maxilla (Fig. 22B) with 2 curvatures on inner margin of first segment. Maxilliped with beak-like

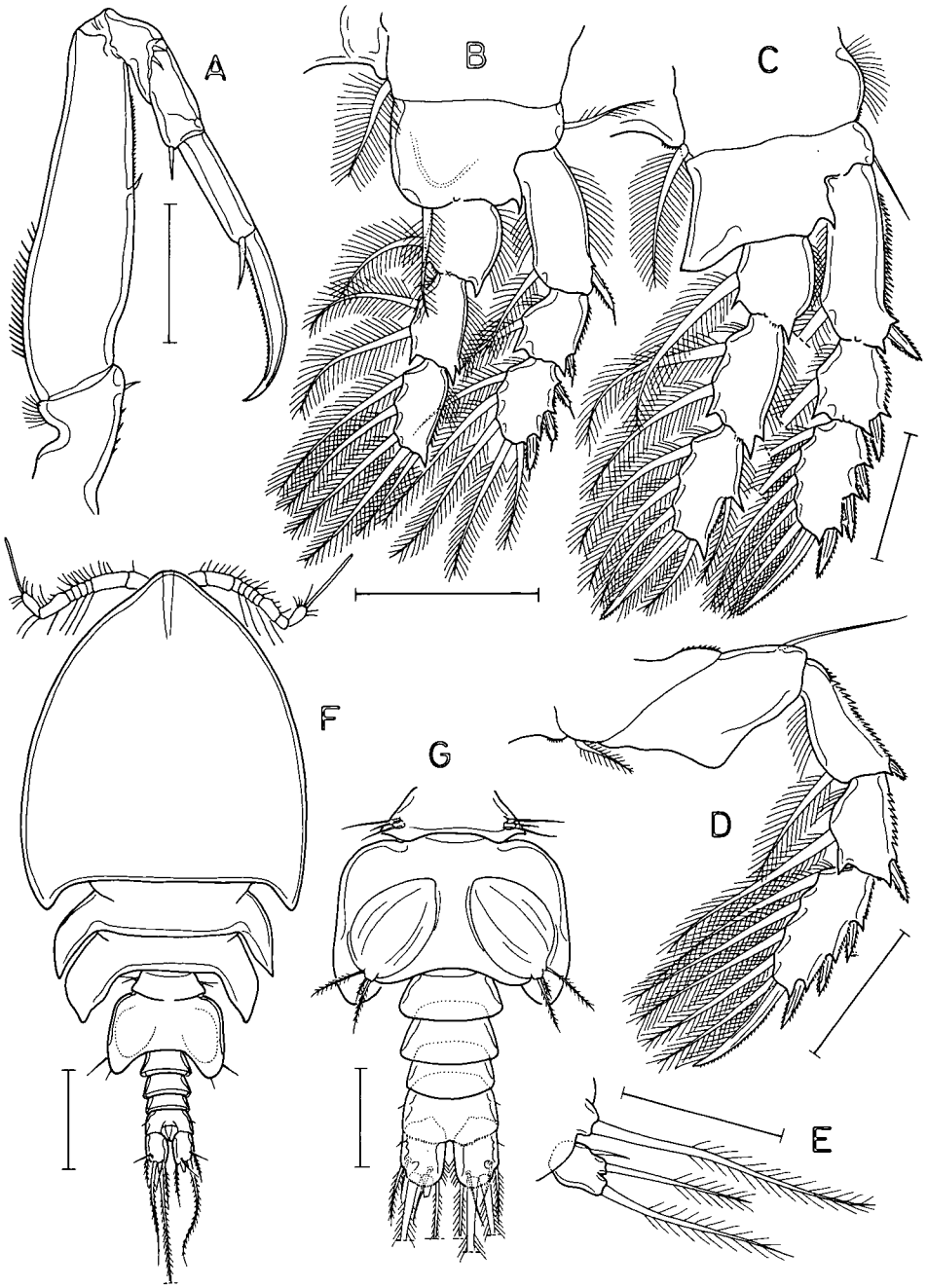

Fig. 21. *Cryptopontius donghaensis*, n. sp. Female: A, maxilliped; B, leg 1; C, leg 3; D, leg 4; E, leg 5. Male: F, habitus, dorsal; G, urosome, ventral. Scales: A-D, G= 0.1 mm; E=0.05 mm; F=0.2 mm.

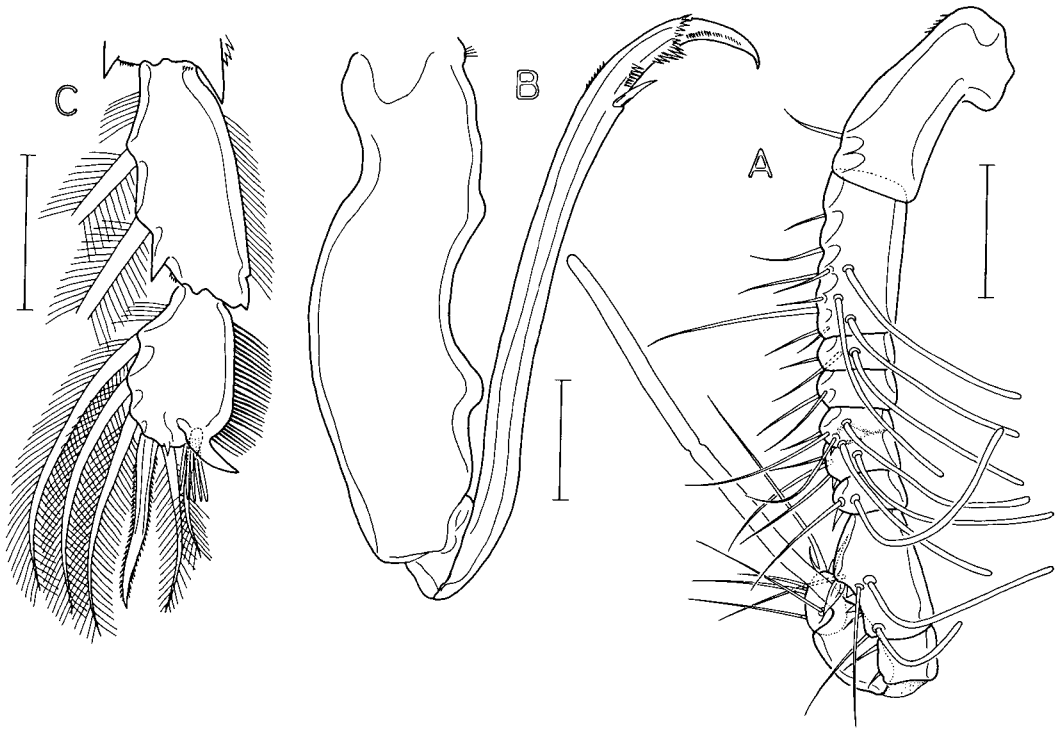

Fig. 22. *Cryptopontius donghaensis*, n. sp., male: A, maxillule; B, maxilla; C, distal segments of endopod of leg 3. Scales: 0.05 mm in all.

process on inner distal corner of first segment.

Leg 3 sexually dimorphic: bicuspid process of endopodal second segment indistinct; endopodal third segment with sharp spiniform process and a tuft of setiform elements on outer distal coner, and armature formula of 2, I, 3 (Fig. 22C). Leg 5 represented by 2+1 setae in genital area (Fig. 21G).

Other characters as in female.

Etymology. The specific name *donghaensis* is from "Dong-hae" (meaning "East Sea"), the Korean name for the Sea of Japan where the type locality is located in.

Remarks. Since the revision of Artotrogidae by Eiselt (1961) who treated 14 species as valid in *Cryptopontius*, including *C. brevicaudatus* (Brady, 1899) that was omitted in both his list on p. 362 and the key of Stock (1965), two more species have been added to this genus, i.e., *C. minor* by Stock (1965) and *C. ricinius* by Malt (1991), except for the species dealt with in this report.

The 8-segmented female antennule of the new species is a characteristic shared with *C. ignotus* (Brady, 1910), *C. latus* (Brady, 1910), *C. minor* Stock, 1965, *C. ricinius* Malt, 1991, and *C. digitatus* n. sp. The latter species are not allied to *C. donghaensis* because it has the endopod of leg 4. *C. donghaensis* is also distinguished from *C. ignotus* by the presence of 2 large and 1 small setae on the outer lobe of maxillule compared to only 1 large seta in *C. ignotus*, from *C. latus* by the unequal lengths of maxillular lobes compared to the equal lengths in *C. latus*, from *C. minor* by the larger size (1.43 mm, in contrast to 0.85 mm in *C. minor*) and having 8 elements on the exopodal

third segment of leg 1 (7 elements in *C. minor*), and from *C. ricinius* by the narrower caudal ramus (ratio 1.40, in contrast to 0.8 in *C. ricinius*).

It is interesting to find that the new species has only 5 setae on the endopodal third segment of leg 1, without one on the outer margin. Nicholls (1944) described *C. longipes* from the Australian waters as it also bears 5 setae on the same segment of leg 1. Unfortunately the structure of leg 1 of *C. longipes* is uncertain because Nicholls mentioned that he could not observe correctly leg 1 of his species.

***Cryptopontius quinquesetus*, n. sp. (Figs. 23 & 24)**

Type specimen. 3 ♀♀ and 1 ♂ collected from washings of a bryozoan colony *Heteropora pelliculata* Waters taken from a fishing net at Gajin (approximately 38° 28′ N, 128° 31′ E), in the Sea of Japan, on 21 October 1995. Holotype ♀ and 1 ♀ paratype will be deposited in the U. S. National Museum of Natural History, Smithsonian Institution. Dissected allotype and 1 ♀ paratype are in the collection of the author.

Female. Body (Fig. 23A) large, 1.56 mm long, with thick and hard tergites. Cephalothorax 0.92 mm- wide, with dorsal crest and pronounced posterolateral corners extending slightly beyond level of posterior border of first metasome. Epimeral areas of first metasomite tapering and well-developed. Epimeral areas of second metasomite rather broad, bluntly ended, and extending to middle of anterior expansions of genital double somite. Third metasomite hardly seen from dorsal view of body. Urosome (Fig. 23B) 5-segmented. Fifth pedigerous somite pointed laterally. Genital double somite 175 μm long, with well-deveolped anterior expansions (Fig. 23B, C) and on each side about 5 multi-ramified sensillae; area of anterior expansions 283 μm wide and broadened posteriorly; narrower posterior part 170 μm wide and posteriorly broadened. Three abdominal somites 55 x 120, 48 x 105, and 75 x 122 μm respectively. Anal somite broadened distally. Caudal ramus 80 x 59 μm (1.36:1), with 1 setule on outer margin, 6 caudal setae, and setules on proximal and distal portions of inner margin.

Tergum triangular and pointed posteriorly. Antennule (Fig. 23D) 8-segmented, 383 μm long, with armature formula: 1, 12, 7, 2, 2, 2, 2, and 14 +1 aesthetasc. Second segment the longest and followed by the first. Aesthetasc on terminal segment with constriction at proximal 0.4 of length. Antenna (Fig. 23E) relatively slender. Coxa 33 μm long and narrower than basis. Basis 60 μm long, about 3.7 times as long as wide and unarmed. Exoped small, slightly longer than wide, with 2 subequal terminal setae and 1 spinule on lateral margin. Endopod 2-segmented. First segment 40 μm long, unarmed and distally broadened. Second segment 52 μm long, about 3 time as long as wide, with 4 setae: two terminal setae subequal in length, and 67 μm and 70 μm respectively; subterminal seta very small, 17 μm long; proximal seta 36 m long, located at proximal 0.3 length of the segment, extending to terminal margin of the segment.

Siphon 517 μm long, extending slightly beyond bases of maxillipeds. Maxillule (Fig. 23F) bilobed, both lobes very slender. Outer lobe terminally with 1 tiny, 1 moderately long and 1 distinctly longer setae. Inner lobe longer than outer lobe, with 2 terminal setae, one of them minute. Maxilla (Fig. 23G) strong; distal segment longer than basal one, its distal portion remarkably massive. Maxilliped

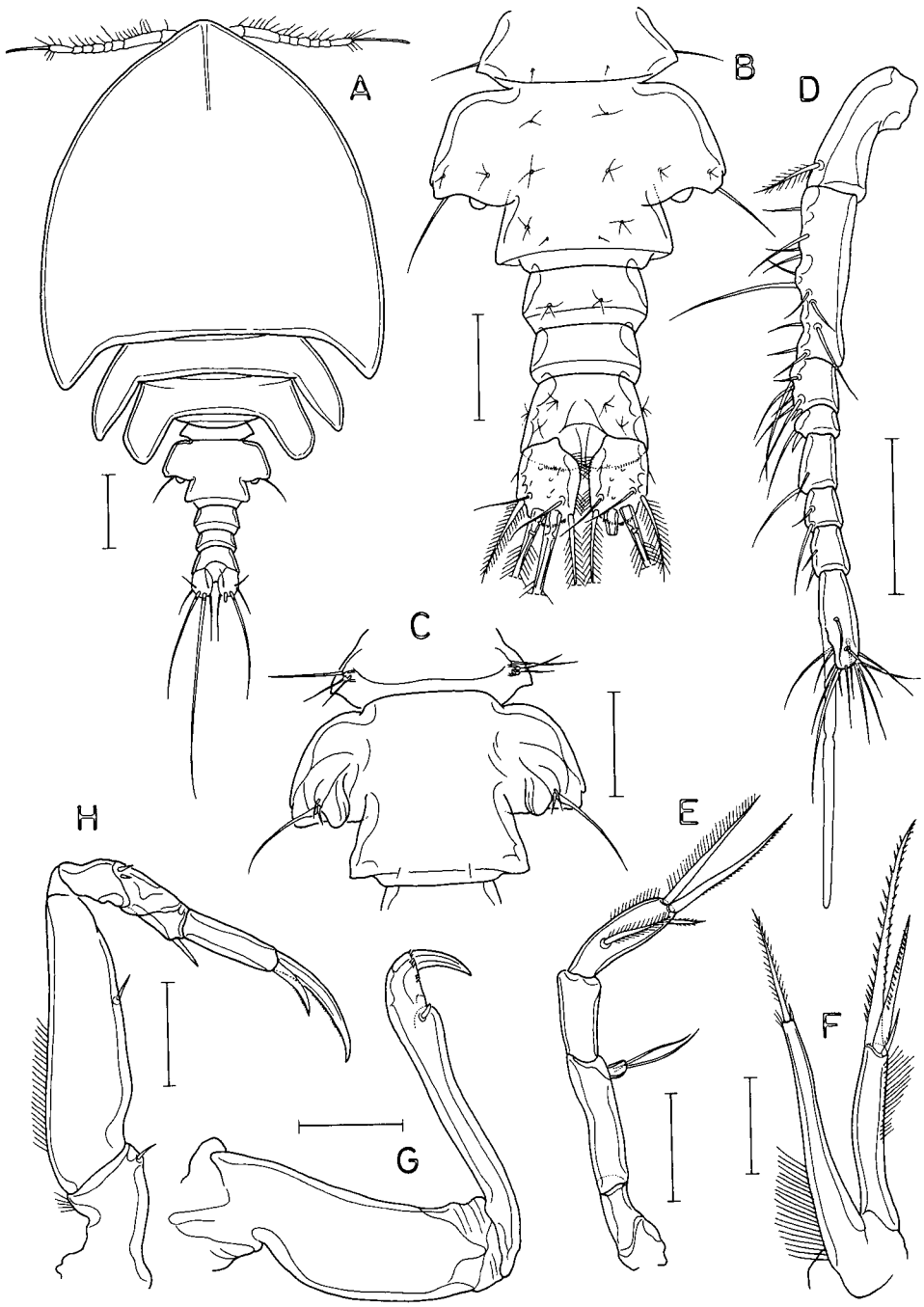

Fig. 23. *Cryptopontius quinquesetus*, n. sp., female: A, habitus, dorsal; B, urosome, C, fifth pedigerous somite and genital double somite, ventral; D, antennule; E, antenna; F, maxillule; G, maxilla; H, maxilliped. Scales: A= 0.2 mm; B-D, G, H= 0.1 mm; E, F= 0.05 mm.

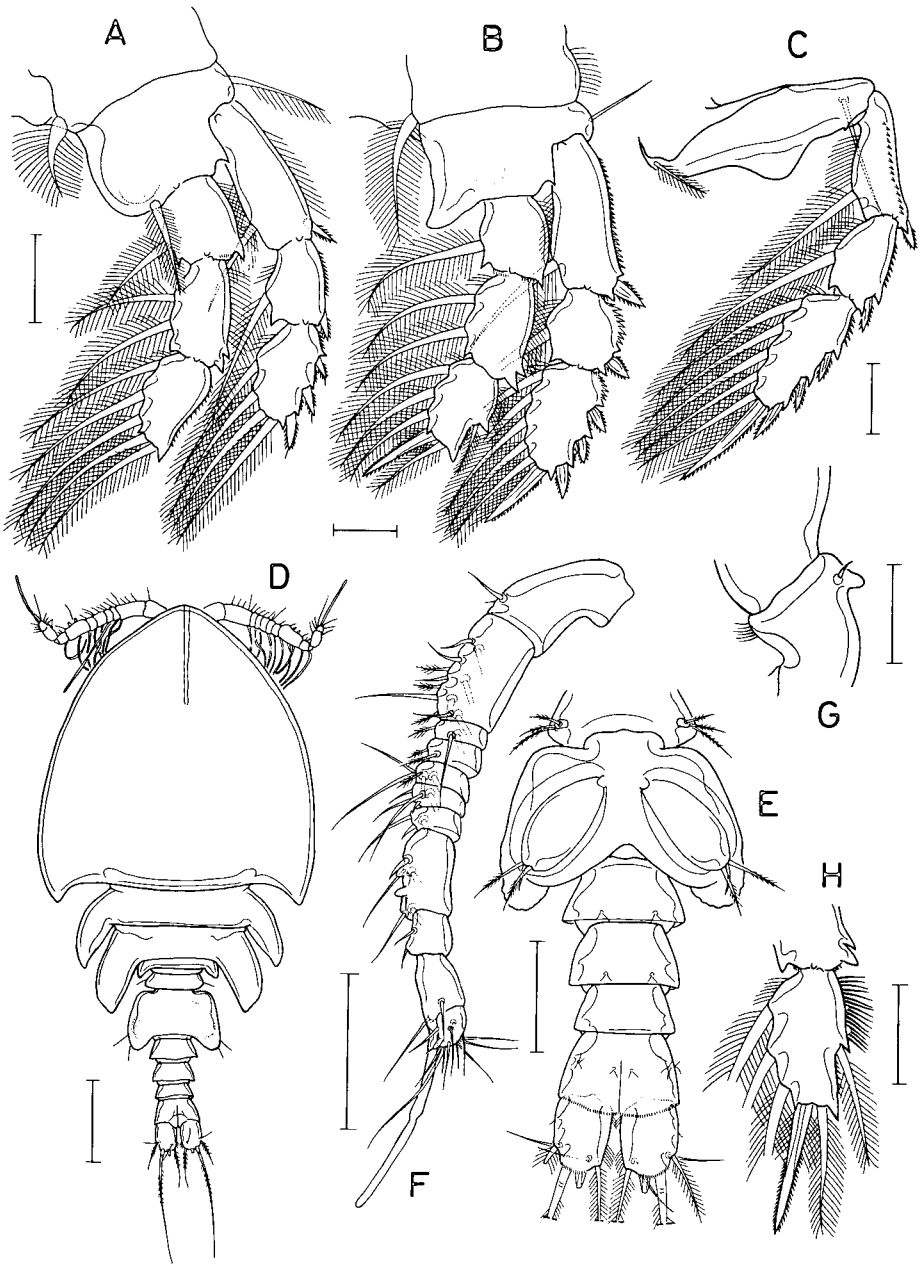

Fig. 24. *Cryptopontius quinquesetus*, n. sp. Female: A, leg 1; B, leg 2; C, leg 4. Male: D, habitus, dorsal; E, urosome, ventral; F, antennule; G, distal part of first second segment of maxilliped; H, distal segment of leg 3 endopod. Scales: A-C, G, H= 0.05 mm; D= 0.2 mm; E, F= 0.1 mm.

(Fig. 22H) as usual, relatively slender. Seta on terminal segment spiniform. Claw evenly curved.

Leg 1 (Fig. 24A), leg 2 (Fig. 24B) and leg 3 biramous, all of them with 3-segmented rami. Leg 4 (Fig. 24C) without endopod. Inner coxal seta of leg 1 relatively short and proximally thick. Inner seta on basis of leg 1 long, extending to base of proximal seta of endopodal second segment; terminal segment of endopod having only 5 setae, without seta on outer margin; third segment of exopod armed with 3 spines and 4 setae. Armature formula of legs 1- 4 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III, 4; enp. 0-1; 0-2; 5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5

Leg 5 with setal formula of 1, 3. Free segment as a small lobe, with 2 distal setae and 1 small lateral seta. Leg 6 as 2 small and 1 longer setae in genital area (Fig 23C).

Male. Body (Fig. 24D) resembles that of female, but more slender, 1.32 mm long. Cephalothorax 660 μm wide. Urosome (Fig. 24E) 6-segmented. Genital somite 218 μm wide, broader posteriorly, with flap-like posterior expansion on each side. Four postgenital somites distinctly broadened distally, 53 x 110, 50 x 100, 40 x 90, and 63 x 108 μm, respectively. Caudal ramus broad, 63 x 52 μm (1.21:1).

Antennule (Fig. 24F) 11-segmented, with armature formula: 1, 8+4 aesthetascs, 2+1 aesthetasc, 2, 3+2 aesthetascs, 4+1 aesthetasc, 2+1 aesthetasc, 4+2 aesthetascs (+2 tuberble-like processes), 2, 2+1 aesthetascs, and 12. Antenna as in female.

First segment of maxilliped with blunt, tubercle-like process near inner distal corner (Fig. 24G). Other mouth organs as in female. Legs 1-4 also as in female, except endopodal third segment of leg 3 in which setules on proximal outer margin thick. (Fig. 24H).

Etymology. The specific name *quinquesetus* is a combination of *quinque* ("five" in Latin) and *seta*. It alludes the bearing of only 5 *setae* on the endopodal third segment of leg 1.

Remarks. This species has an unusual combination of armatures of leg 1: the exopodal third segment of leg 1 bears three spine and four setae (III,4); the endopod of the same leg has two setae on the second segment and 5 setae on the third segment. This combination of armatures on leg 1 is observable only in some specimens of *C. donghaensis*. *C. quinquesetus* is distinguished from *C. donghaensis* by the different shape of epimeral area of the second metasomite, the massive distal segment of maxilla, the different sexual dimorphism of leg 3 endopod, and the 11-segmented male antennule.

Cryptopontius ascidius, n. sp. (Figs. 25 & 26)

Type specimens. 7 ♀♀ and 3 ♂♂ collected from washings of the external surface of the ascidian *Halocynthia hilgendorfi igaboja* (Oka) caught at 20 m depth in the Sea of Japan, off Kangreung, on 9 June 1995. Holotype ♀, allotype and 5 paratypes (4 ♀♀ and 1 ♂) will be deposited in the U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratypes (2 ♀♀, 1 ♂) are retained in the collection of the author.

Female. Body (Fig. 25A) 1.15 mm long. Cephalothorax semicircular, 640 μm long in midline, 690 μm wide, without dorsal crest. Posterolateral corners of cephalothorax strongly projected backwards

and roundly ended. Apical area of cephalothorax not pronounced. Indentation between cephalothorax and first metasomite very wide. External surface of tergite of cephalothorax ornamented by numerous small tubercles each having a pore and tipped by minute setule as in Fig. 25B. Epimeral areas of first metasomite dircted posterolaterally, tapering and pointed. Epimeral areas of second metasomite broader and curved inward. Third metasomite very short, with acutely pointed epimera. Urosome (Fig. 25C) 5-segmented and stocky. Fifth pedigerous somite increasingly broader posteriorly, with steeply oblique lateral margins and angular posterolateral corners, 150 μm in maximum width. Genital double somite very broad, 127 μm long, with well-developed anterior expansions (200 μm wide in this area); narrower posterior part relatively broad, 127 μm wide, occupying 1/3 length of the somite. Three postgenital somites broad and short, 46 x 91, 29 x 81, and 41 x 77 μm, respectively. Caudal ramus 36 x 34 μm (1.06:1), with 6 caudal setae, its posterior margin fringed with spinules.

Antennule (Fig. 25E) 286 μm long, 10-segmented, with armature formula: 1, 2, 6, 2, 7, 2, 2, 2, 2, 14+1 aesthetasc. First segment the longest, and third segment the next longest. Antenna (Fig. 25F) with unarmed, narrow coxa of 18 μm long. Basis about 35 μm long. Exopod about twice as long as wide, with 2 distal setae of unequal length and 1 lateral spinule. Endopod 2-segmented. First segment 29 μm long and unarmed. Second segment 41 μm long and armed with 4 setae: proximal seta 29 μm long, located at basal 0.37 length of segment; two terminal setae 70 μm and 37 μm, respectively; subterminal seta very small and 14 μm long.

Siphon relatively short, very thin, not reaching insertion of leg 1, its distal portion curved to right side in all observed specimens. Mandible with 7 teeth as in other preceding species descirbed in this report. Maxillule (Fig. 25G) bilobed. Outer lobe 58 μm, distally with 2 large, spinulated setae and 1 small seta. Inner lobe 88 μm, tapering, distinctly longer than outer lobe, distally with 1 very long, glabrous and 1 tiny seta. Maxilla (Fig. 25H) 2-segmented. Distal segment very slender, with 1 subdistal seta. Claw very short and strongly curved. Maxilliped (Fig. 25I) consisting of 5 segments and claw. First segment with a duct-like, truncated process at inner distal corner. Second segment with setules on outer margin, and on inner margin 1 seta and fine spinules in distal half. Three distal segment with 2 setae, 1 seta, and 1 seta + claw, respectively.

Leg 1 (Fig. 26A), leg 2 (Fig. 26B) and leg 3 biramous, all of them with 3-segmented rami. Leg 1 with moderately long inner coxal seta; inner seta on basis short, reaching slightly beyond base of seta of endopodal first segment. Exopodal first segment of legs 1 and 2 with setules on outer margin, but this margin of legs 3-4 with spinules. Outer distal corner of endopodal second segment of leg 1 with monocuspid process, but this process in legs 2 and 3 bicuspid. Two terminal spines of endopodal third segment in leg 2 and 1 spine of same segment in leg 3 setiform. Leg 4 (Fig. 26C) without endopod; its coxa without inner seta. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III,5; enp. 0-1; 0-2; 1,5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,II,3

Leg 4: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5

Leg 5 represented by 1 seta and free segment with 3 short setae. Leg 6 as 1 longer seta and 1 smaller inwardly curved seta in genital area (Fig. 24C, D).

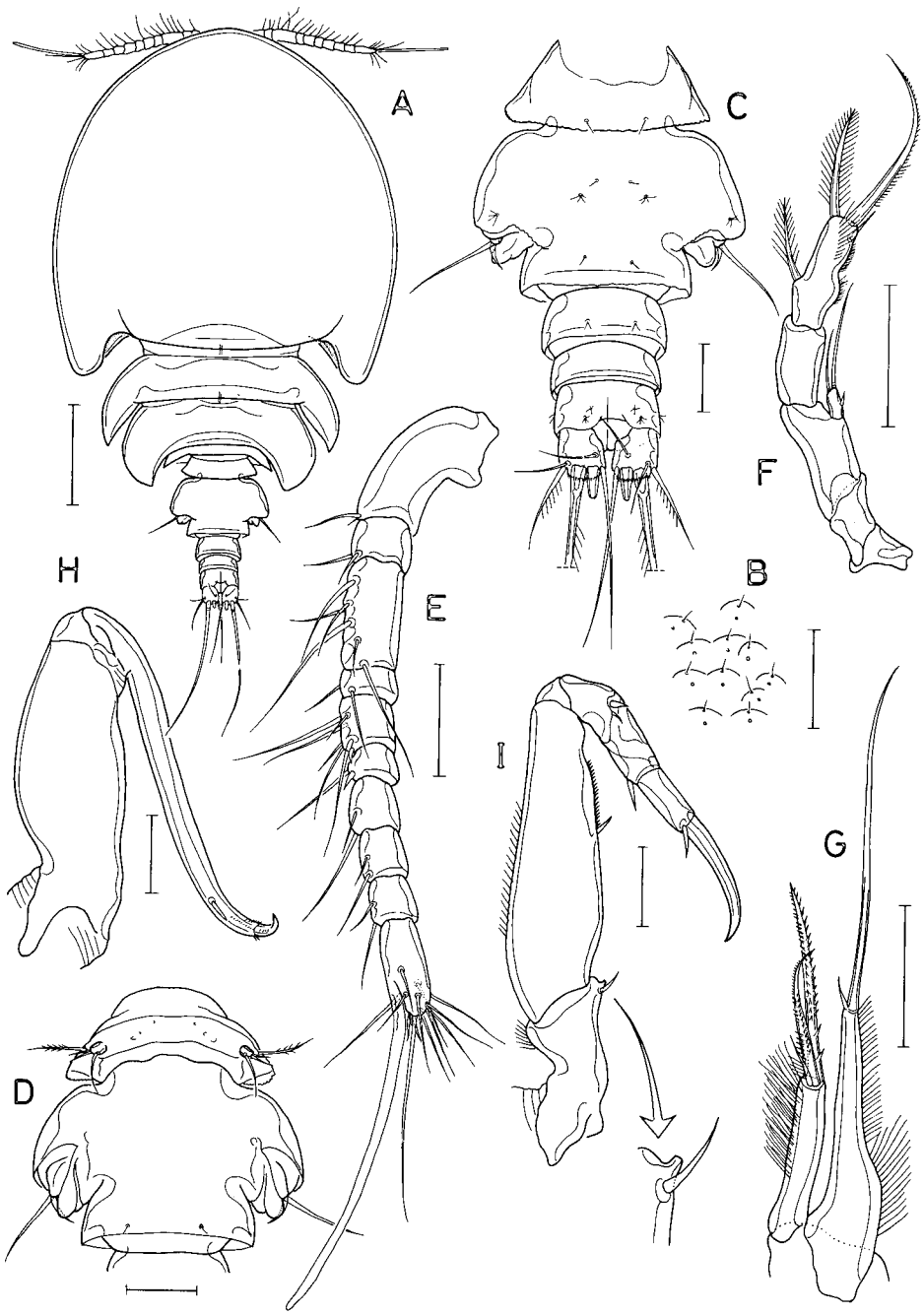

Fig. 25. *Cryptopontius ascidius*, n. sp., female(440-7): A, habitus, dorsal; B, armature of external surface of tergites; C, urosome; D, first urosomal somite and genital double somite, ventral; E, antennule; F, antenna; G, maxillule; H, maxilla; I, maxilliped. Scales: A= 0.2 mm; B-I= 0.05 mm.

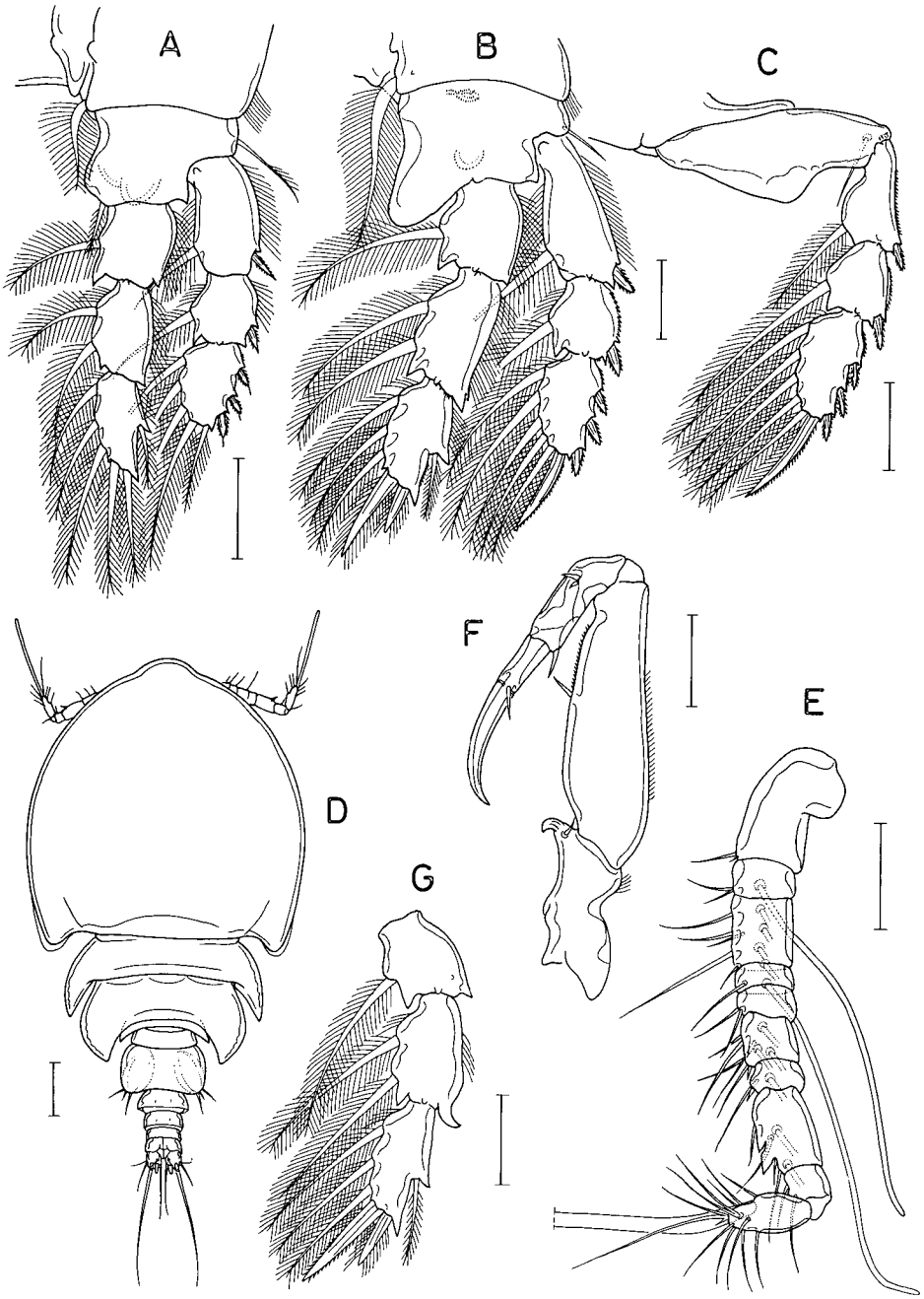

Fig. 26. *Cryptopontius ascidius*, n. sp. Female: A, leg 1; B, leg 2; C, leg 4. Male: D, habitus, dorsal; E, antennule; F, maxilliped; G, endopod of leg 3. Scales: A-C, E-G = 0.05mm; D = 0.1mm

Male. Body (Fig. 26D) resembles that of female and 0.99 mm long. Cephalothorax 523 μm wide, with weakly marked apical prominence. Urosome 6-segmented. Genital somite 96 x 155 μm, relativly large. Four abdominal somites 40 x 93, 33 x 72, 18 x 65, and 25 x 65 μm, respectively. First abdominal somite posteriorly broadened. Third abdominal somite remarkably shorter. Caudal ramus 25 x 30 μm, 1.2 times wider than long.

Antennule (Fig. 26E) 10-segmented, geniculate between terminal and penultimate segments, with armature formula: 2 (1 being negligible), 2+1 aesthetasc, 5+4 aesthetascs, 1+1 aesthetasc, 2, 6+3 aesthetascs, 2+1 aesthetasc, 4+2 aesthetascs (added by 2 processes on anterior margin), 2, and 13+1 aesthetasc. Aesthetasc on terminal segment large, 176 μm long, nearly as long as distal 8 segments. Antenna with a small tubercle on margin of basis.

Maxilliped (Fig. 26F) not different from that of female, except for first segment with beak-like, curved process on inner distal corner. Other mouth organs as in female.

Legs 1-4 with same armature formula as those of female, but endopodal second segment of leg 3 with monocuspid, enlarged and curved process on outer distal corner (Fig. 26G). Leg 6 represented by 3 setae in genital area, posterior one of them distinctly larger.

Etymology. The specific name *ascidius* is derived from the name of host taxon, Ascidiacea.

Remarks. That the first segment is the longest among antennular segments in *C. ascidius* n. sp. seems a sole characteristic in the genus, because in other species the longest segment of antennule where known is the second or third. The segmentation of antennule (10 segments) in both sexes is also a rare feature that is shared only with *C. capitalis* (Giesbrecht, 1895), although these two species differ in the armature of exopodal third segment of leg 1. Additionally, a combination of characteristics that the roundly produced epimeral areas of cephalothorax, the stocky urosome, the relatively short caudal rami, the shape of inner distal process of the first segment of maxilliped, and the absence of inner coxal seta on leg 4 may typify this species.

Genus *Myzopontius* Giesbrecht, 1895

Myzopontius venustus, n. sp. (Figs. 27-28)

Type specimens. 4 ♀♀ and 8 ♂♂ collected from washings of sea weeds taken from a fishing net, off Kangreung in the Sea of Japan, on 19 April 1993. Holotype ♀, allotype and 8 paratypes (2 ♀♀ and 6 ♂♂) will be deposited in U. S. National Museum of Natural History, Smithsonian Institution. Two dissected paratypes (1 ♀, 1 ♂) are kept in the collection of the author.

Other material examined. 6 ♀♀ from washings of *Halocynthia hilgendorfi igaboja* caught at 20 m depth off Kangreung in the Sea of Japan (SCUBA), on 9 June 1995.

Female. Body (Fig. 27A) cyclopiform, 9-segmented, and 0.94 mm long. Cephalothorax completely incorporating first pedigerous somite, 430 x 420 μm, with acutely pointed posterolateral corners. Posterior border of cephalothorax fringed with broad, translucent membrane. Metasomites gradually narrower from anterior to posterior ones. First and second metasomites about 90 x 323 and 70 x 270 μm, repectively. Third metasomite 190 μm wide, with convex lateral margins and deeply concave posterior margin. Urosome (Fig. 27B) 5-segmented. Fifth pedigerous somite 101 μm wide. Genital

double somite 98 x 100 μm, almost as long as wide, and as wide as fifth pedigerous somite; anterior part slightly widened. Genital area located dorsolaterally at about anterior 0.4 length of somite. Three postgenital somites 39 x 73, 28 x 67, and 42 x 67 μm, respectively. Posteroventral border of anal somite fringed with spinules (Fig. 27C). Caudal ramus (Fig. 27C) 46 x 32 μm, with setules along inner margin, 6 caudal setae, and 1 setule on outer margin; posterior margin fringed with spinules.

Antennule (Fig. 27D) 257 μm long and 12-segmented, with armature formula: 2, 6, 2, 2, 2, 1, 7, 2, 2, 2, 2, and 13+1 aesthetasc. Terminal segment the longest, and followed by first and second segments. Aesthethasc on terminal segment 170 μm long. Antenna (Fig. 27E) with coxa of 28 x 16 μm. Basis 30 x 15 μm, twice as long as wide, with setules on inner distal margin. Exopod 1-segmented, small, 12 x 5 μm, with 1 apical plumose seta and 1 smaller subapical one. Endopod 2-segmented. First segment 20 x 14 μm. Second segment 40 x 11 μm, exactly twice as long as first segment, with 3 spical setae of 53, 115, and 37 μm, respectively, and 1 proximal seta which is longer than the segment and located at proximal 0.2 length of the segment.

Rostrum pointed posteriorly and beak-like. Siphon very long and slender, reaching insertion of leg 2. Mandible also very long and thin. Maxillule (Fig. 27F) bilobed. Outer lobe more slender but longer than inner lobe, 55 μm long, with 2 large (105 and 70 μm respectively) and 1 small setae. Inner margin setulose. Inner lobe broader, expanded in the middle, but tapering in distal half, with 1 large seta of 152 μm, 1 small seta and 1 setule; inner margin setulose. Maxilla (Fig. 27G) 2-segmented. First segment unarmed, rather staright, broadest in the middle; second segment slender, gradually narrowed toward tip, with 1 small seta; claw completely fused to second segment; part of claw long and armed with spinules on concave margin. Maxilliped slender and consisted of 5 segments and terminal claw, as Fig. 27H.

Leg 1(Fig. 27I), leg 2 (Fig. 28A), leg 3, and leg 4 (Fig. 28B) biramous, all of them with 3-segmented rami. Leg 1 with inner coxal seta distinctly shorter than basis; inner spine of basis extending to base of proximal seta of endopodal second segment. Outer distal corner of endopodal second segment of legs 1-4 each with bicuspid process. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-I; exp. I-1; I-1; III,5; enp. 0-1; 0-2; 1,5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-0; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,2

Leg 5 (Fig. 27C) with setal formula of 1, 3. Free segment tapering, with 3 long plumose setae. Leg 6 represented by 1 seta and 1 spinule in genital area (Fig. 1B).

Male. Body (Fig. 28D) similar to that of female, 0.85 x 0.35 mm in size, and 10-segmented. Urosome (Fig. 28E) 6-segmented Fifth pedigerous somite 97 μm wide, distinctly narrower than genital somite. Genital somite 83 x 115 μm, quadangular. Four postgenital somites 47 x 76, 39 x 68, 30 x 63, and 36 x 63 μm, respectively. Caudal ramus 41 x 31 μm (1.32:1).

Antennule (Fig. 28F) 13-segmented, geniculate between terminal and penultimate segments, with armature formula: 2 (one is minute), 6, 2, 2+1 aesthetasc, 2+1 aesthetasc, 1, 2+1 aesthetasc, 2+1 aesthetasc, 4, 2+1 aesthetasc, 4 (one is spiniform) +2 aesthetascs, 2, and 13+1 aesthetasc. Aesthetasc on last segment 145 μm long, distinctly larger, with basal constriction.

Leg 5 represented by 3 setae in genital area (Fig. 28E).

Other characters as in female.

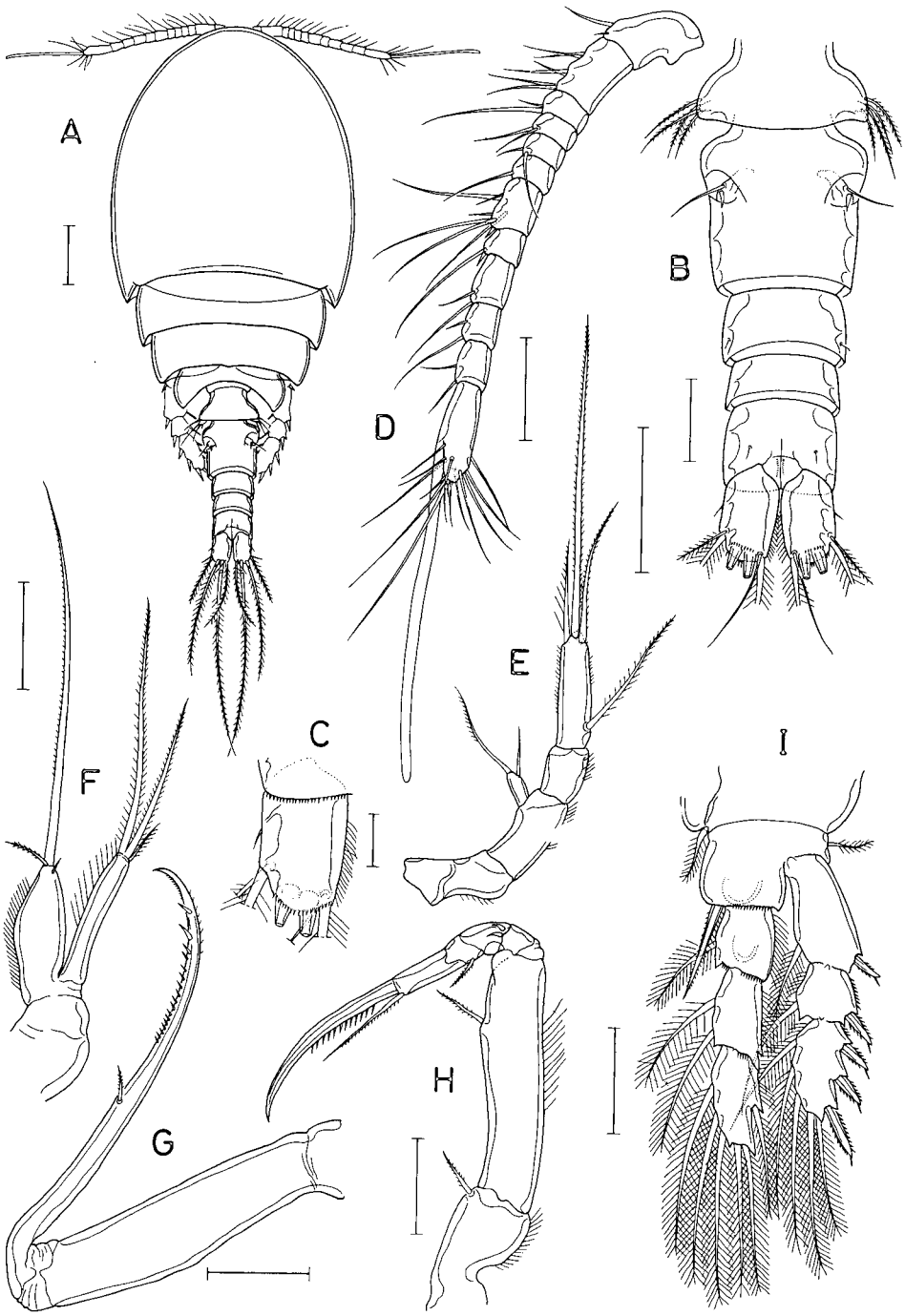

Fig. 27. *Myzopontius venustus*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, caudal ramus, ventral; D, antennule; E, antenna; F, maxillule; G, maxilla; H, maxilliped; I, leg 1. Scales: A= 0.1 mm; B, D-I= 0.05 mm; C= 0.02 mm.

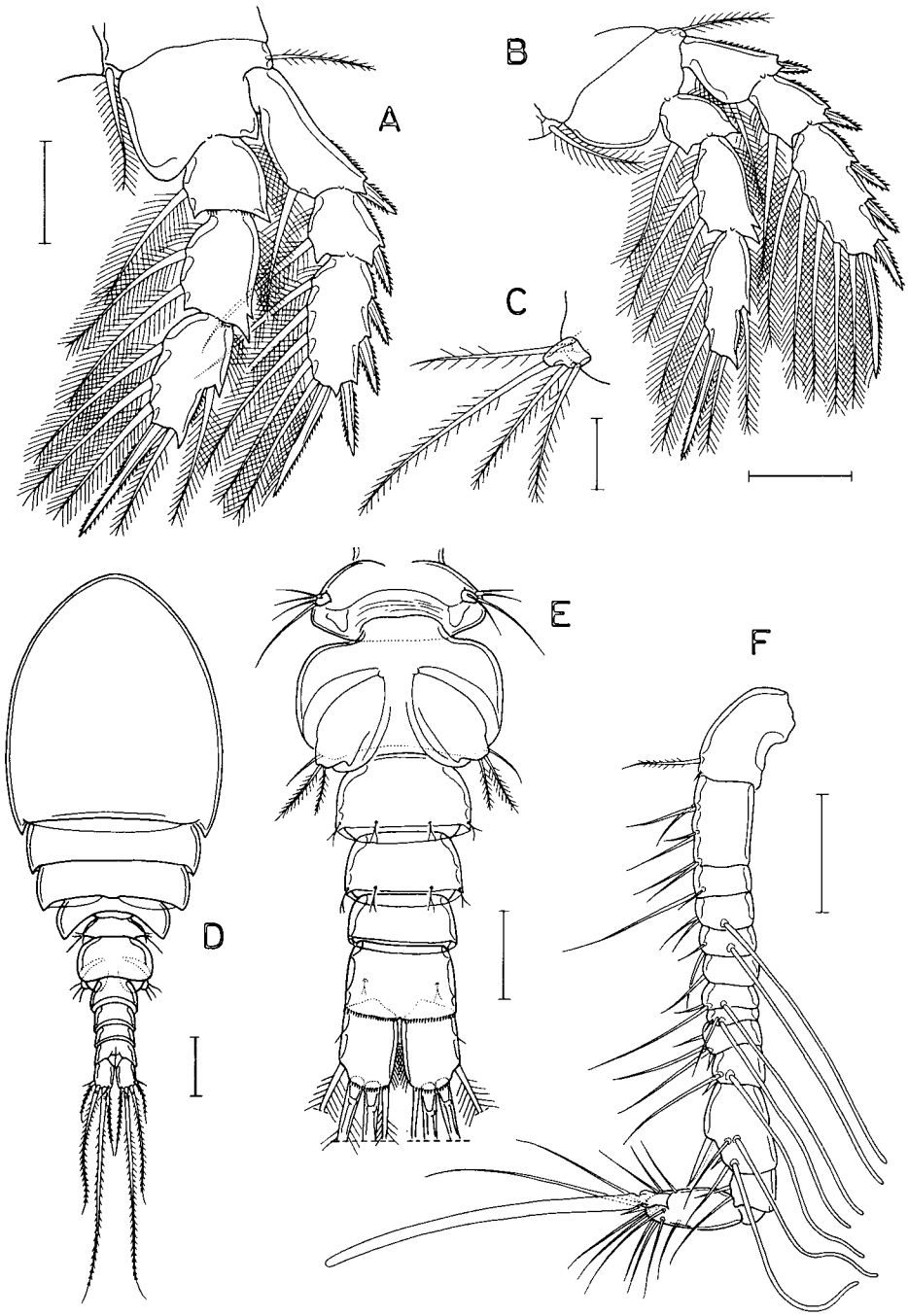

Fig. 28. *Myzopontius venustus*, n. sp., female: A, leg 2; B, leg 4; C, leg 5. Male: D, habitus, dorsal; E, urosome, ventral; F, antennule. Scales: A, B. E, F= 0.05 mm; C= 0.02 mm; D= 0.1 mm.

Etymology. The specific name *venustus*, meaning "elegant" in Latin, is taken for the graceful body form of the new species.

Remarks. There are three species known in *Myzopontius*, excluding *Myzopontius* sp. of Schirl (1973) who recorded it based on a copepodid. They are *M. australis* Nicholls, 1944 (re-described by Stock, 1966); *M. innominatus* (Brady, 1910) and *M. pungens* Giesbrecht, 1895. *M. venustus* n. sp. resembles *M. pungens* among these species, as it has the 12-segmented female antennules and a similar body size. The new species can be distinguished from *M. pungens* by the broader caudal rami (ratio 1.8:1, but about 3:1 in *M. pungens*), the shorter terminal segment of antennule, and the weaker anterior expansion of genital double somite, and the longer siphon.

Myzopontius pungens Giesbrecht, 1895 (Figs. 29 & 30)

Myzopontius pungens Giesbrecht, 1895, p. 182; 1899, p. 106, pl. 1, fig. 6, pl. 6, figs 1-14; Sars, 1917, p. 113, pl. 68.

Type specimens. 4 ♀♀ and 1 ♂ collected from washings of 30 *Halocynthia hilgendorfi igaboja* from 20 m depth in the Sea of Japan (SCUBA), off Kangrueng, on 9 June 1995. Holotype ♀ and 1 ♀ intact paratype will be deposited in the U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratypes (2 ♀♀) and allotype are retained in the collection of the author.

Female. Body(Fig. 29A) 1.01 mm long. Cephalothorax ovoid, 660 x 460 μm, with pointed posterior corners. Posterior corners of first metasomite pointed, but those of second and third metasomite blunt. Posterior margin of third metasomite deeply concave. Urosome (Fig. 29B) nearly cylindrical, narrow and 5-segmented. Fifth pedigerous somite narrower than genital double somite. Genital double somite slightly longer than wide, 105 x 101 μm, with distinct, round anterior expansion (Fig. 29C). Three postgenital somites 40 x 73, 30 x 70, 50 x 68 μm, respectively. Posteroventral border of anal somite finely spinulated (Fig. 3D). Caudal ramus (Fig. 29D) 82 x 32 μm (2.56:1), with setules on inner margin, 1 setule on outer margin, spinulated posterior margin, and 6 caudal setae.

Rostrum as in preceding species. Antennule (Fig. 29E) 300 μm long and 10-segmented but second segment subdivided into 3 parts (when these segments are considered as separate segments the antennule is 12-segmented), and third segment weakly divided from the second, with armature formula: 1, 9, 2, 1, 7, 2, 2, 2, 2, 14+1 aesthetasc. Antenn (Fig. 29F) with short precoxa. Coxa about 17 μm long. Basis 36 μm long, with setules on inner margin. Exopod small, 1-segmented, nearly twice as long as wide, with 1 terminal plumose seta and 1 subterminal, smaller seta. Endopod 2-segmented. First segment unarmed, 18 μm long, slightly longer than wide. Second segment long and slender, 42 μm 1ong, with 4 setae: proximal seta located at proximal 0.2 length of segment, longer than the segment; median one of 3 terminal setae very long, nearly 3 times as long as the segment.

Mandible not examined. Maxillule (Fig. 29G) bilobed. Outer lobe slender, 48 μm long, terminally with 2 long and 1 small setae. Inner lobe tapering in distal half, 57 μm, but not extending over end of outer lobe, with 1 very long terminal seta and shorter subterminal seta. Maxilla (Fig. 29H) 2-segmented. First segment slightly thickened near middle. Second segment extremely slender and long, with 1 small setae. Claw completely fused to second segment, strongly curved, with spinules on

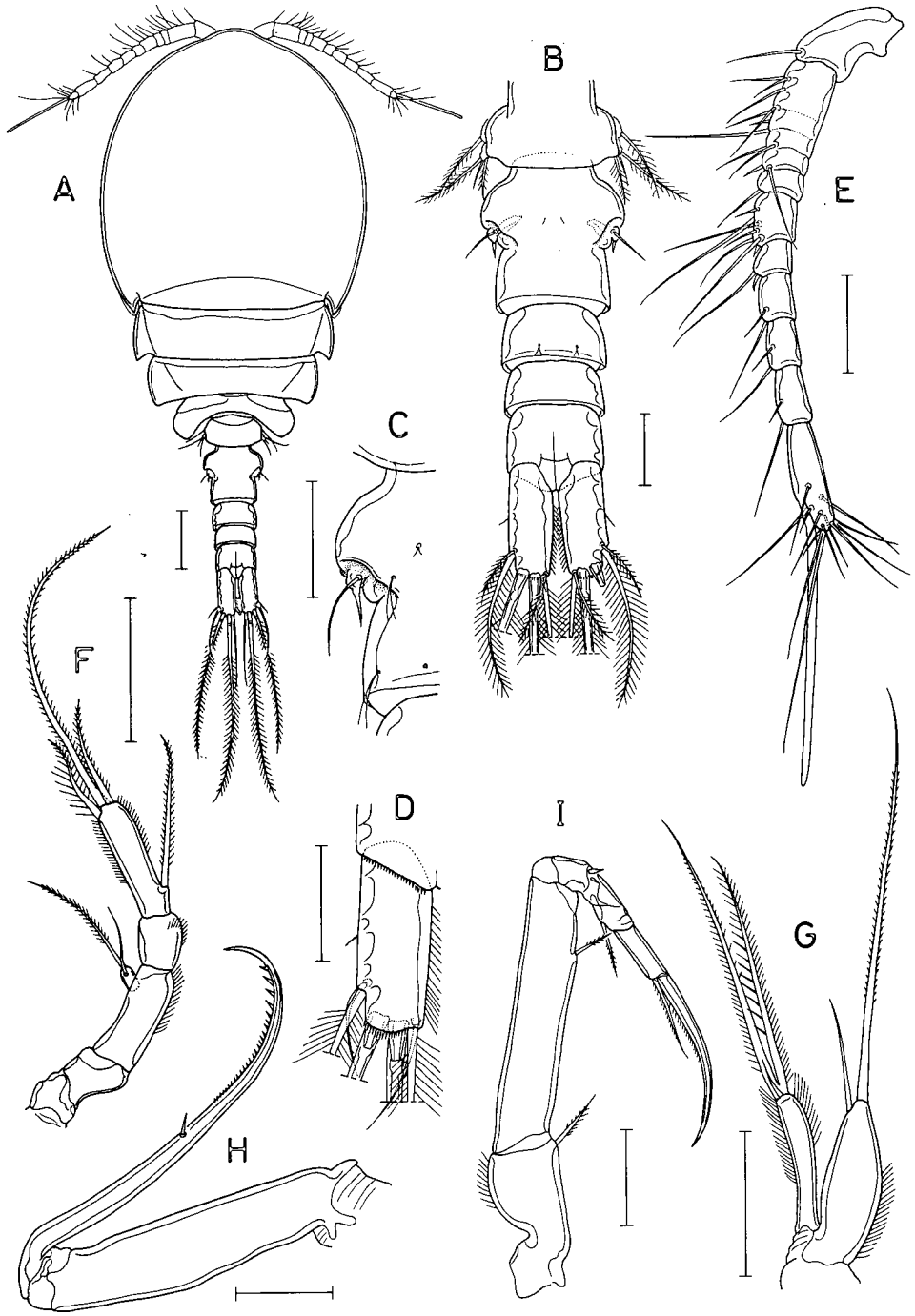

Fig. 29. *Myzopontius pungens* n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, left side of genital double somite, dorsal; D, caudal ramus; E, antennule; F, antenna; G, maxillule; H, maxilla; I, maxilliped. Scales: A= 0.1 mm; B-I= 0.05 mm.

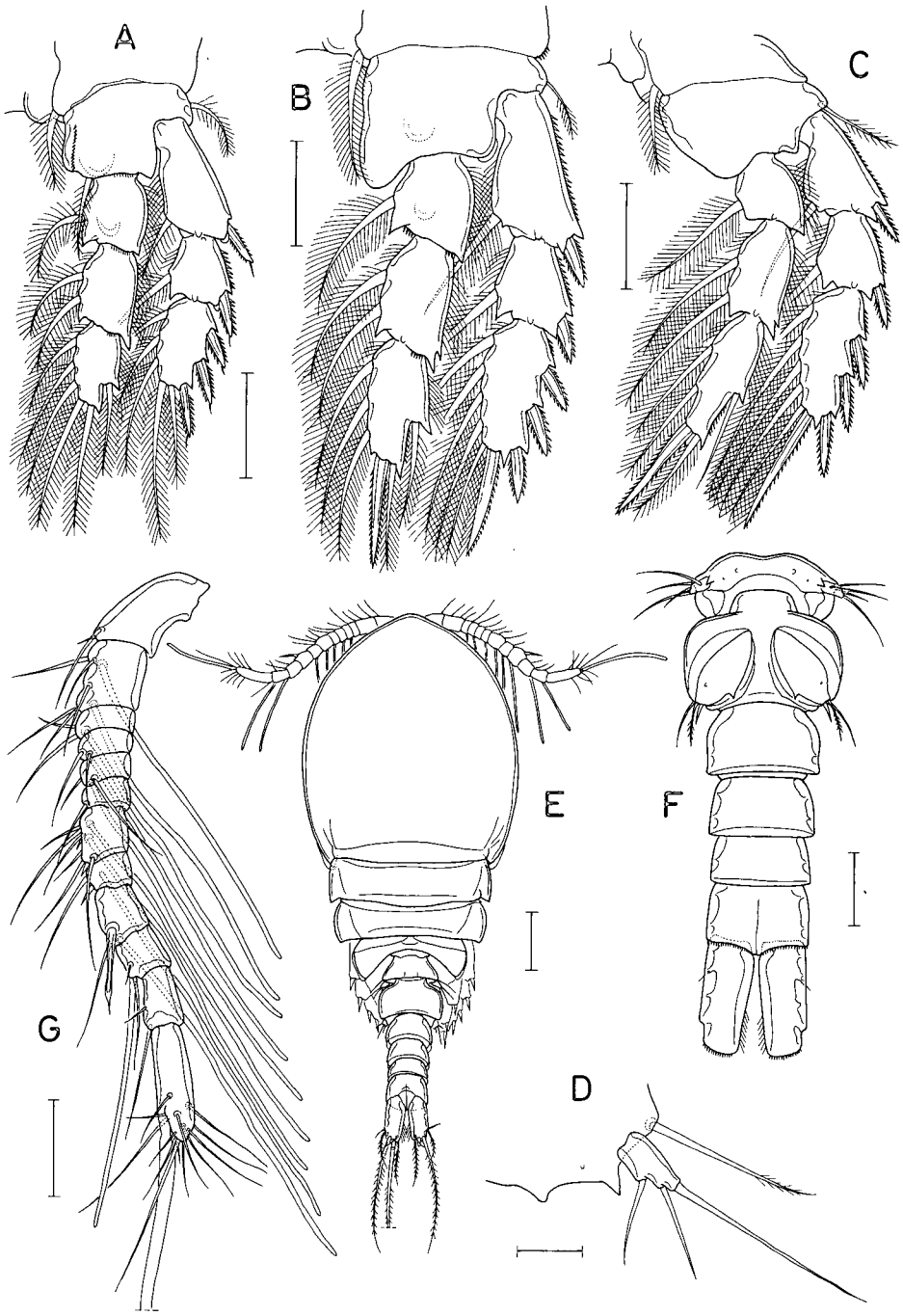

Fig. 30. *Myzopontius pungens* n. sp. female: A, leg 1; B, leg 2; C, leg 4; D, leg 5. Male: E, habitus, dorsal; F, urosome, ventral; G, antennule. Scales: A-C, F, G= 0.05 mm; D= 0.02 mm; E= 0.1 mm.

concave margin. Maxilliped (Fig. 29I) slender and 5-segmented, with armature formula: 1, 1, 2, 1, 1 + claw. Second segment with parallel margins. Claw very slender and long.

Leg 1 (Fig. 30A), leg 2 (Fig. 30B), leg 3, and leg 4 (Fig. 30C) biramous, with 3-segmented rami. Basis of leg 1 with a longitudinal row of spinules near inner margin. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. I-1; I-1; III,5; enp. 0-1; 0-2; 1,5

Legs 2 & 3: coxa 0-1; basis 1-0; exp. I-0; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,3

Leg 4: coxa 0-1; basis 1-0; exp. I-1; I-1; III,I,5; enp. 0-1; 0-2; 1,1,I,2

Leg 5 (Fig. 30D) consisted of 1 seta located on somite and free segment, and accompanied by 2 processes on somite posteriorly. Free segment 21 x 11 μm, with 3 glabrous setae. Leg 6 represented by 1 setiform spine and 1 thin seta in genital area (Fig. 29C).

Male. Body (Fig. 30E) resembles that of female, 904 μm long. Apex of cephalothorax weakly angular. Urosome (Fig. 30F) 6-segmented. Fifth pedigerous somite 100 μm wide. Genital somite quadrangular, about 68 x 108 μm. A spiniform process located at inner posterior area of genital field. Four postgenital somites 47 x 78, 41 x 72, 33 x 68, and 42 x 70 μm, respectively. Caudal ramus 75 x 33 μm (2.27:1).

Antennule (Fig. 30G) 12-segmented, with armature formula: 2 (one being minute), 5+2 aesthetascs, 2+1 aesthetasc, 2+1 aesthetasc, 2+1 aesthetasc, 1, 8+2 aesthetascs, 2+1 aesthetasc, 2+1 aesthetasc, 2+1 aesthetasc, 2, and 13+1 aesthetasc. One of 2 setae on nineth segment transformed to a pen-like element.

Antenna, oral appendages and legs 1-4 as in female. Leg 5 accompanied by a denticle near base of free segment (Fig. 30F). Leg 6 represented by 2 setae and 1 spiniform seta in genital area (Fig. 30F).

Remarks. My specimens show the distinctly more rounded cephalothorax than the illustrations of Giesbrecht (1899) and Sars (1915). The aesthetascs on the male antennule are more slender than the illustration of Giesbrecht (1899) as well. In the records of both previous authors the female antennule is distinctly 12-segmented unlike my specimens where it is 10-segmented, although the second segment have three subdivisions. However I consider these are minor differences, because the Korean specimens and those of previous records share more important characteristics. The similarities are in the lengths of body (slightly more or less than 1 mm) and caudal rami, and, most of all, in the morphology of male antennule (cf. pl. 6, fig. 7 in Giesbrecht, 1899) in which the segmentation, the armature formula, and the shape of a modified seta on the nineth segment are almost identical.

My identification may be supported by the zoogeographic knowledge about this species, for this copepod has been recorded from the western Europe, the Mediterranean, and the Arctic Ocean. It is therefore considered a circumpolar species.

Genus *Pteropontius* Giesbrecht, 1895

Pteropontius trimerus, n. sp. (Figs. 31 & 32)

Type specimens. 2 ♀♀ collected from washings of 10 *Halocynthia hilgendorfi igaboja* (Oka) taken from fishing nets at Chumunjin (20 km north of Kangreung) on the coast of the Sea of Japan,

on Feb. 28, 1996. Holotype will be deposited in the U. S. National Museum, Smithsonian Institution. Dissected paratype is kept in the collection of the author.

Other material examined. 1 ♀ (dissected) from washings of about 20 *Halocynthia hilgendorfi igaboja* caught with a fishing net in the Sea of Japan off Kangreung, on 1 April 1995.

Female. Body (Fig. 31A) moderately broad, 942 μm long. Cephalothorax 544 x 513 μm, longer than wide, occupying more than half length of body, not expanded laterally, with nearly parallel lateral margins, without frontal prominence at rostral area. First and second metasomites distinctly narrower than cephalothorax. Epimeral area of first metasomite tapering, directed posterolaterally. Epimera of second metasomite broad and blunt. Third metasomite very small, narrower than fifth pedigerous somite, and hardly visible in dorsal view of body. Urosome (Fig. 31B) 5-segmented. Fifth pedigerous somite much broader than long, with pointed posterior corners and steeply oblique lateral margins. Genital double somite 105 μm long, consisted of greatly expanded anterior and narrower posterior parts. Greatly expanded anterior expansion hemi-circular, flat, wing-like (192 μm wide across this area). Narrower posterior part 83 μm wide, distinctly wider than first abdominal somite (Fig. 31B, C). Three postgenital somites 33 x 63, 27 x 58, and 28 x 54 μm, respectively. Caudal rami slightly convergent, each 27 x 25 μm (1.08:1), with 6 caudal setae; posterior margin fringed with fine spinules (Fig. 31D).

Rostrum rather narrow, slightly longer than wide, almost fused to body, tapering but roundly ended. Antennule (Fig. 31E) 247 μm long, 8- or 9-segmented. In case of 8 segmentation (3 cases of 4 antennules) second and third segments fused. Armature formula of antennule: 1, 7 (or 6, 1), 6, 2, 2, 2, 2. and 14+1 aesthetasc. Antenna (Fig. 31F) with short coxa. Basis about 46 μm long, narrower distally. Exopod very small, shorter than wide, with 2 setae and 1 minute spinule. Endopod 2-segmented. First segment 28 μm long, with setules on outer margin. Second segment 32 μm, slightly narrower distally, with proximal (10 μm, located at basal 0.3 length of segment) and 3 terminal setae (23, 54 and 9 μm, respectively). Longest median one of terminal setae strong and straight.

Siphon (Fig. 31G) rather thick, 288 μm long, extending slightly over base of maxilliped. Mandible with 7 teeth distally (Fig. 31H). Maxillule (Fig. 31I) bilobed. Both lobes slender. Inner lobe tapering, longer than outer lobe, 65 μm long, terminally with 1 short (22 μm) and 1 tiny setae. Outer lobe very slender, 55 μm, with parallel margins and 3 terminal setae (82, 53, and 15 μm, respectively). Maxilla (Fig. 32A) with unarmed first segement. Second segment very slender, longer than first segment, with 1 small seta near distal third. Claw demarcated from second segment, curved, with fine spinules on distal corner and setules near outer distal corner. Second segment with a weak prominence near proximal fourth and 1 seta near distal third of inner margin. Third segment with 2 small setae and divided into proximal and distal parts by a line. Fourth and fifth segments each with 1 seta. Claw as long as distal 3 segments combined, moderaltely curved.

Leg 1 (Fig. 32C), leg 2 (Fig. 32D) and leg 3 biramous. Leg 4 (Fig. 32E) lacking endopod. Leg 1 with 2-segmented exopod and 3-segmented endopod. Endopodal second segment armed with 1 or 2 setae. Leg 3 identical to leg 2, except for absence of inner coxal setae and presence of spinules on outer margin of exopodal first segment instead of setules. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-0; exp. I-1; II,I,2; enp. 0-1; 0-1 (or 0-2); 4

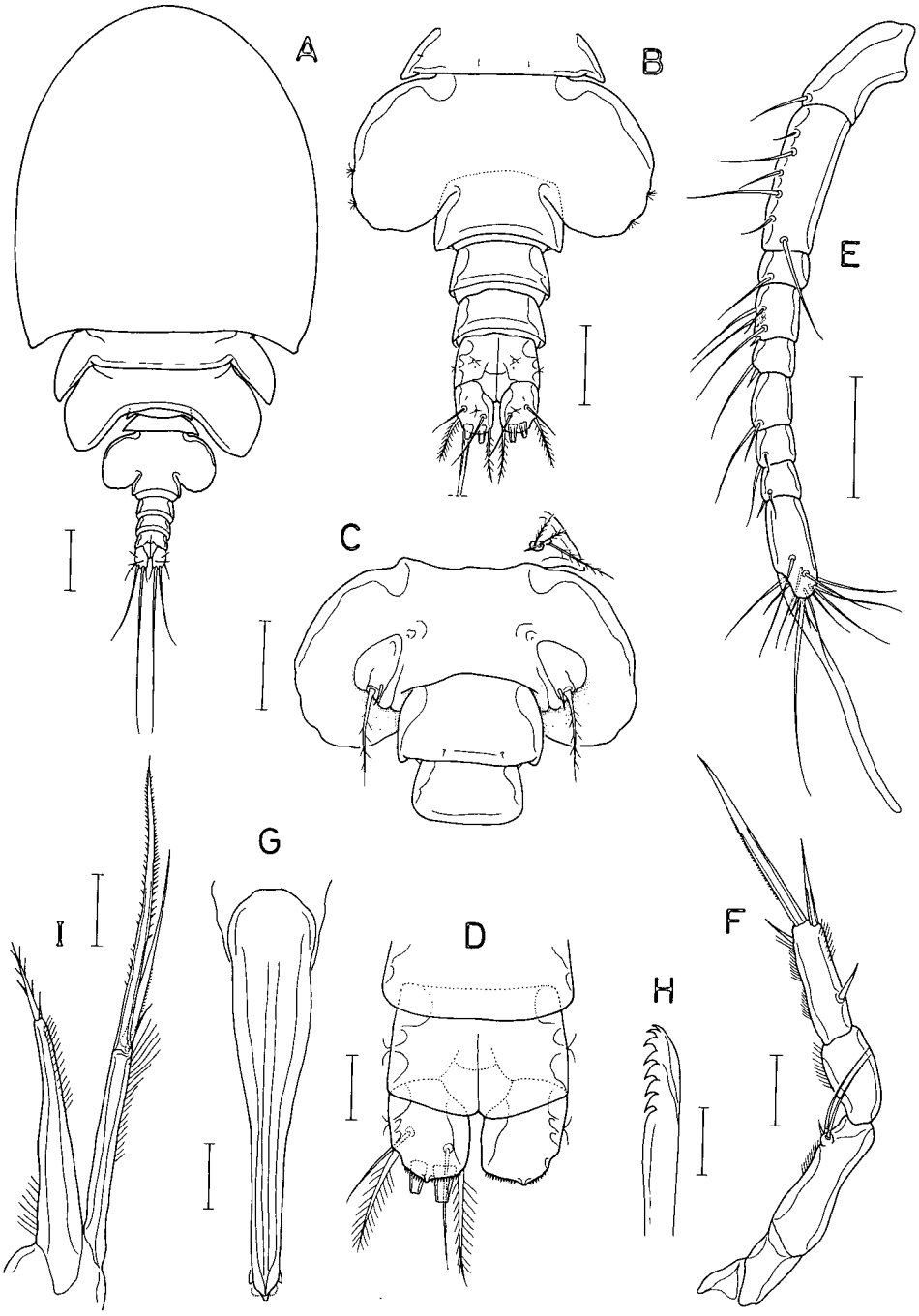

Fig. 31. *Pteropontius trimerus*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, anterior part of urosome, ventral; D, anal somite and caudal rami; E, antennule; F, antenna; G, oral siphon; H, mandible; I, maxilliule. Scales: A= 0.1 mm; B, C, E, G= 0.05 mm; D, F, I= 0.02 mm; H= 0.01 mm.

Leg 2: coxa 0-1; basis 1-0; exp. I-1; I-1; II,I,5; enp. 0-1; 0-2; 1,1,I,3
Leg 3: coxa 0-0; basis 1-0; exp. I-1; I-1; II,I,5; enp. 0-1; 0-2; 1,1,I,3
Leg 4: coxa 0-0; basis 1-0; exp. I-1; I-1; II,I,5

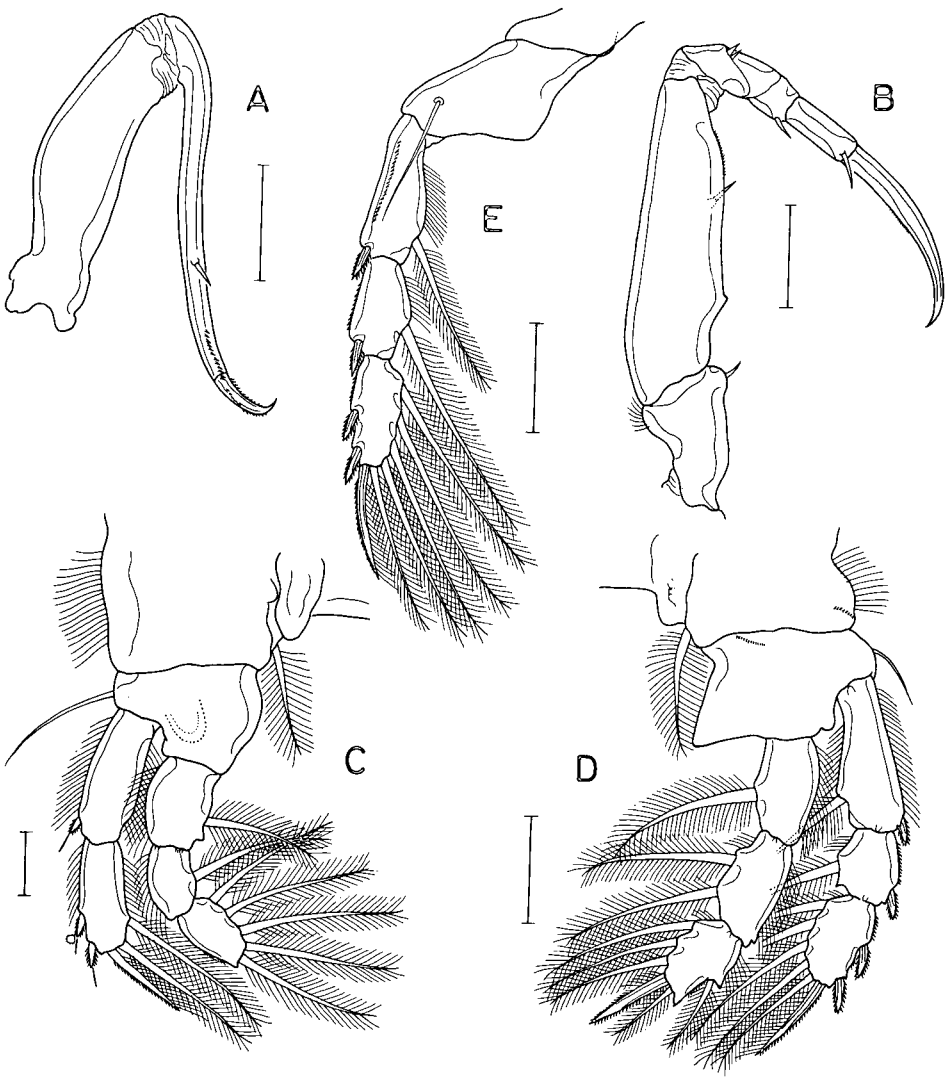

Fig. 32. *Pteropontius trimerus*, n. sp., female: A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E, leg both sides. Maxilliped (Fig. 32B) 5-segmented. First segment with 1 small seta on inner 4. Scales: A, B, D, E= 0.05 mm; C= 0.02 mm.

Leg 5 represented by 1 seta on fifth abdominal somite and very small, hardly longer than wide free segment armed with 2 terminal setae and 1 small lateral spinule (Fig. 31C). Leg 6 represented by 1 plumose seta and 1 small spiniform setule in genital area (Fig. 31C).

Male. Unknown.

Etymology. The specific name, *trimerus*, is taken for the 3-segmented endopod of leg 1 which is an unique feature for *Pteropontius*.

Remarks. The genus *Pteropontius* Giesbrecht, 1895 is known of five species of relatively small body size. They are *P. barbarus* Nicholls, 1944 from Australia, *P. cristatus* Giesbrecht, 1895 from Mediterranean, *P. decorus* Ho, 1984 from the Sea of Japan, *P. pediculus* Stock, 1966 from Mauritius, and *P. quartus* Sewell, 1949 from Gulf of Aden. The most diagnostic character of this genus is in the morphology of leg 1, in which the exopod is 1- or 2-segmented. The endopod is also reduced, except in *P. cristatus*, the type species, which has fully segmented endopod of leg 1 (Stock, 1965). In this respect the new species resembles *P. cristatus*. Interstingly, the new species has variable number of setae (1 or 2) on the second segment of endopod of leg 1 as in *P. cristatus*. However, *P. trimerus* has a body form different from that of *P. cristatus*. Species of *Pteropotius* usully have the laterally expanded cephalothorax, and the lateral pleurae on the genital double somite and first postgenital somite. Exceptions of these are the new species and *P. quartus*, both of them bear the slender cephalothorax and the non-expanded genital double and first postgenital somites. Otherwise both are not related, because the new species has the different segmentation of the endopod of leg 1 and the different armature of legs 1-4.

The new species has the other unique features in the antenna and maxillule. In this species the antenna bears the 2-segmented protopod and 2-segmented endopod as in most artotrogids. But in this appendage of all previously known species of *Pteropontius*, the coxa and basis, or the endopodal first and second segments, or the both, are fused. The maxillule of the new species also shows an unusuall shape. All the known congeners have a large terminal seta on the inner lobe. In the outer lobe there are two large terminal setae. The new species does not show such enlargement of setae on the maxillule.

Pteropontius decorus Ho, 1984

Pteropontius decorus Ho, 1984, p. 53, figs. 21-24.

Material examined. 1 ♀ and 1 ♂ from washings of 30 *Halocynthia hilgendorfi igaboya* (Oka), at Kangreung, on 9 June 1996; 3 ♂♂ from washings of 5 *Halocynthia hilgendorfi igaboya* (Oka), at Kangreung, on 19 November 1995; 2 ♀♀ and 1 ♂ from washings of 10 *Halocynthia hilgendorfi igaboya*, at Kangreung, 23 January 1996; 1 ♂ from washings of *Heteropora pelliculata* caught with a fishing net, at Kangreung, 10 March 1996.

Remarks. Although there are some minor differences found between my specimens and Ho's (1984) original description, they agree substantially with each other on most important points. Therefore, a redescription of this species is not needed in this report. Some differences found between the specimens from both sides of the Sea of Japan are in the armature of antennule of both sexes and female maxilliped.

Ascidipontius, n. gen.

Diagnosis. Body cyclopiform. Cephalothorax not expanded laterally. Urosome 5-segmented in female and 6-segmented in male. Female genital double somite with antero-lateral expansions. Female antennule 8-segmented, with aesthetasc on terminal segment. Male antennule 8-segmented. Antenna slender, with 1-segmented exopod; subterminal seta on terminal segment of endopod encircling the segment. Siphon long and thin. Maxillule with outer lobe longer than inner lobe. Legs 1-3 biramous, all of them with 3-segmented rami. Leg 4 lacking endopod. Exopodal first segment of leg 1 lacking inner seta. Exopodal second segment of leg 1 unarmed. Terminal segment of exopod and distal 2 segments of endopod of leg 1 with reduced number of armature. Leg 5 with small free segment.

Type species. *Ascidipontius concavus*, n. sp.

Etymology. From "Ascidiacea", the name of host taxon, and "pontios", the suffix of many artotrogid genera. It alludes to the association of this copepod with the ascidian. Gender masculine.

Remarks. There are three genera in Artotrogidae, *Cryptopontius* Giesbrecht, 1899, *Dyspontius* Thorell, 1859 and *Pteropontius* Giesbrecht, 1895, lacking endopod on leg 4 as the new genus. In the morphology of leg 1 the new genus most resembles *Pteropontius*, because the species of these two genera have reduced armature on this leg. The most reduced number of armature on the terminal segment of exopod of leg 1 is found in *Pteropontius* as shown in *P. pediculus* Stock, 1966 (only 3 setae) or *P. barbarus* Nicholls, 1944 and *P. decorus* Ho, 1984 (2 spines + 3 setae). However *Pteropontius* differs from the new genus, because *Pteropontius* has at best 2-segmented exopod of leg 1, the expanded cephalothorax and the characteristical shape of genital double somite.

In most genera of Artotrogidae the cephalothorax is laterally expanded, with an extreme example found in *Artotrogus*. Among 18 known genera, including most recently recorded *Glyptotrogus* by McKinnon (1988), non-expanded cephalothorax as in the new genus is found in *Myzopontius* Giesbrecht, 1895 and *Neopontius* Scott, 1898. Other remarkable similarity of these genera with the new genus is in the maxillule in which the outer lobe is longer than the inner one. But unlike *Ascidipontius*, these two genera bear full sets of armature and no reduction of rami on legs 1-4, and the most developed leg 5 among Artotrogidae.

Ascidipontius concavus, n. sp. (Figs. 33-35)

Type specimens. 15 ♀♀ and 9 ♂♂ from washings of 6 *Halocynthia hilgendorfi igaboja* (Oka) at about 20 m depth in the Sea of Japan, off Kangreung, on 31 May 1995. Holotype female, allotype, and 22 paratypes (14 females and 8 males) will be deposited in the U. S. National Museum of Natural History, Smithsonian Institution. Dissected paratypes (2 females and 2 males) are in the collection of the author.

Other material examined. 5 ♀♀, 1 ♂ and 1 copepodid V ♀ from washings of the external surface of the test of about 20 *Halocynthia hilgendorfi igaboja* (Oka), from the Sea of Japan, off Kangreung, on 1 April 1995.

Female. Body (Fig. 33A) cyclopiform, 1.05 mm long, with thin but hard tergites. Cephalothorax

consisted of fused cephalosome and first pedigerous somite, not expanded laterally, 0.55 mm long in midline, 0.50 mm wide, ratio 1.1:1, slightly concave in posterior part of lateral margins, with moderately produced, rounded posterior corners, without dorsal crest. Metasomites short, with narrow and expanded epimera. Epimera of first metasomite widely separated from cephalothorax, tapering, with pointed posterior corner. Second metasome about twice as long as, but as wide as first metasomite; its epimera bluntly ended, extending beyond epimeral ends of third metasomite. Third metasome strongly arched, with roundly ended epimera. Urosome (Fig. 1B) 5-segmented. Fifth pedigerous somite about 0.7 times as wide as genital double somite, with angular posterior corners. Genital double somite 140 x 165 ㎛, with disticnt antero-lateral expansions (Fig. 33B, C). Narrower posterior part of genital double somite 94 ㎛ wide Posterodorsal margin of antero-lateral expansions finely serrate, covering dorsally anterior part of narrower portion of genital double somite. Three abdominal somites each becoming broader posteriorly, 38 x 79, 35 x 71, and 48 x 75 ㎛, respectively. Caudal ramus 54 x 37 ㎛ (1.46:1), with minute setules on posterior part of inner margin and 6 caudal seta, of which 4 terminal ones being plumose. Egg sac globular, containing only 3 eggs.

Antennule (Fig. 33D) 8-segmented, 236 ㎛ long, with setal formula: 1, 6, 5, 2, 2, 2, 2, 14+1 aesthetasc. First segment the longest, 1.2 times as long as the next longest, second segment, with setules on anterior margin. Aesthetasc on terminal segment longer than distal 6 segments combined. Antenna (Fig. 33E) slender. Coxa about 14 ㎛ long, unarmed. Basis straight, 54 ㎛ long, with parallel margins and setules. Exopod very small, longer than wide, apically with 1 spinule-like and 1 longer setae, the latter nearly as long as first segment of endopod. Endopod 2-segmented. First segment 32 ㎛ long with setules. Terminal segment 36 ㎛ long armed with 4 setae: proximal seta located at proximal 0.25 length of segment, short, less than half as long as segment; subterminal seta characteristically rotated round segment; 2 terminal setae very unequal in size, thin but straight, each 96 ㎛ and 44 ㎛.

Siphon (Fig. 33F) very thin and long, roundly curved. Mandible very thin, with 7 teeth distally, its tip shaped as Fig. 33G. Maxillule (Fig. 33H) bilobed, both lobes slender. Outer lobe distinctly longer than inner lobe, 75 ㎛ long, 1.60 times as long as inner lobe, with parallel margins and setules on margins, and armed terminally with 2 thick, spinulated setae and 1 small seta. Inner lobe weakly tapering, 47 ㎛ long, terminally with 1 long, whip-like, glabrous seta and 1 smaller plumose seta. Maxilla (Fig. 34A) consisting of 2 segments and claw. First segment rather broad, unarmed. Second segment slender, as long as first segment, with setules distally and 1 spiniform seta at distal third of the segment. Claw weakly demarcated from second segment, slender and strongly curved distally. Maxilliped (Fig. 34B) consisting of 5 segments and claw, with armature formula: 1, 1, 2, 1, 1+claw. First segment with setules on outer distal corner. Second segment with small setules on outer margin and fine spinules on distal half of inner margin. Claw long and weakly curved.

Leg 1 (Fig. 34C), leg 2 (Fig. 34D) and leg 3 biramous, with 3-segmented rami. Outer margin of exopodal first segment of legs 1-3 with setules, but this margin of leg 4 with spinules. Leg 1 distinctly smaller than legs 2-4; inner seta on basis long, extending beyond distal border of endopodal second segment. Two terminal setae on terminal segment of endopod of legs 2 and 3 spiniform. Outer distal corner of endopodal second segment of these 2 legs with bicuspid process. Legs 3 and 4 without

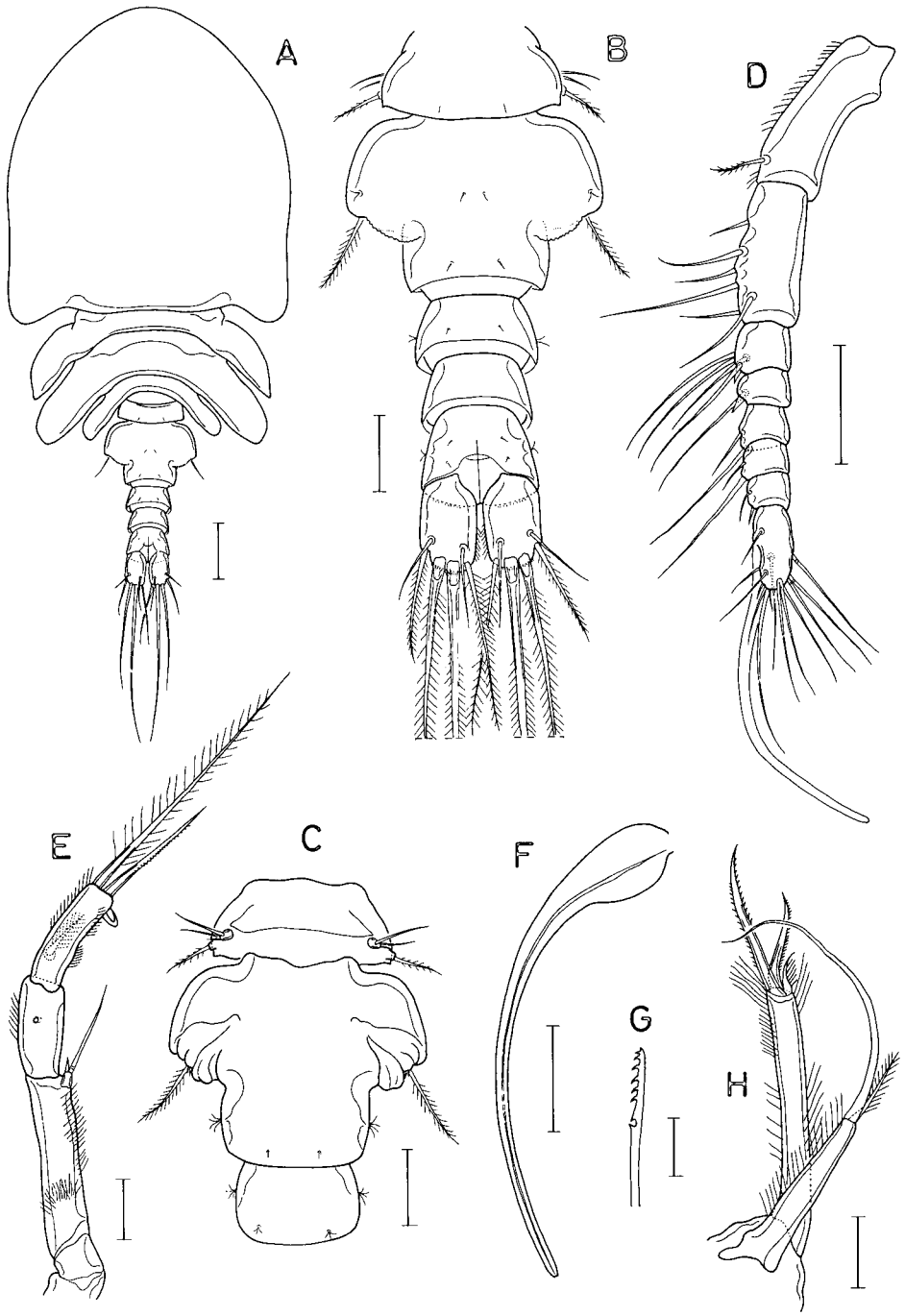

Fig. 33. *Ascidipontius concavus*, n. sp., female: A, habitus, dorsal; B, urosome, dorsal; C, anterior part of urosome, ventral; D, antennule; E, antenna; F, oral siphon; G, tip of mandible; H, maxillule. Scales: A, F= 0.1 mm; B-D= 0.05 mm; E, H= 0.02 mm; G= 0.01 mm.

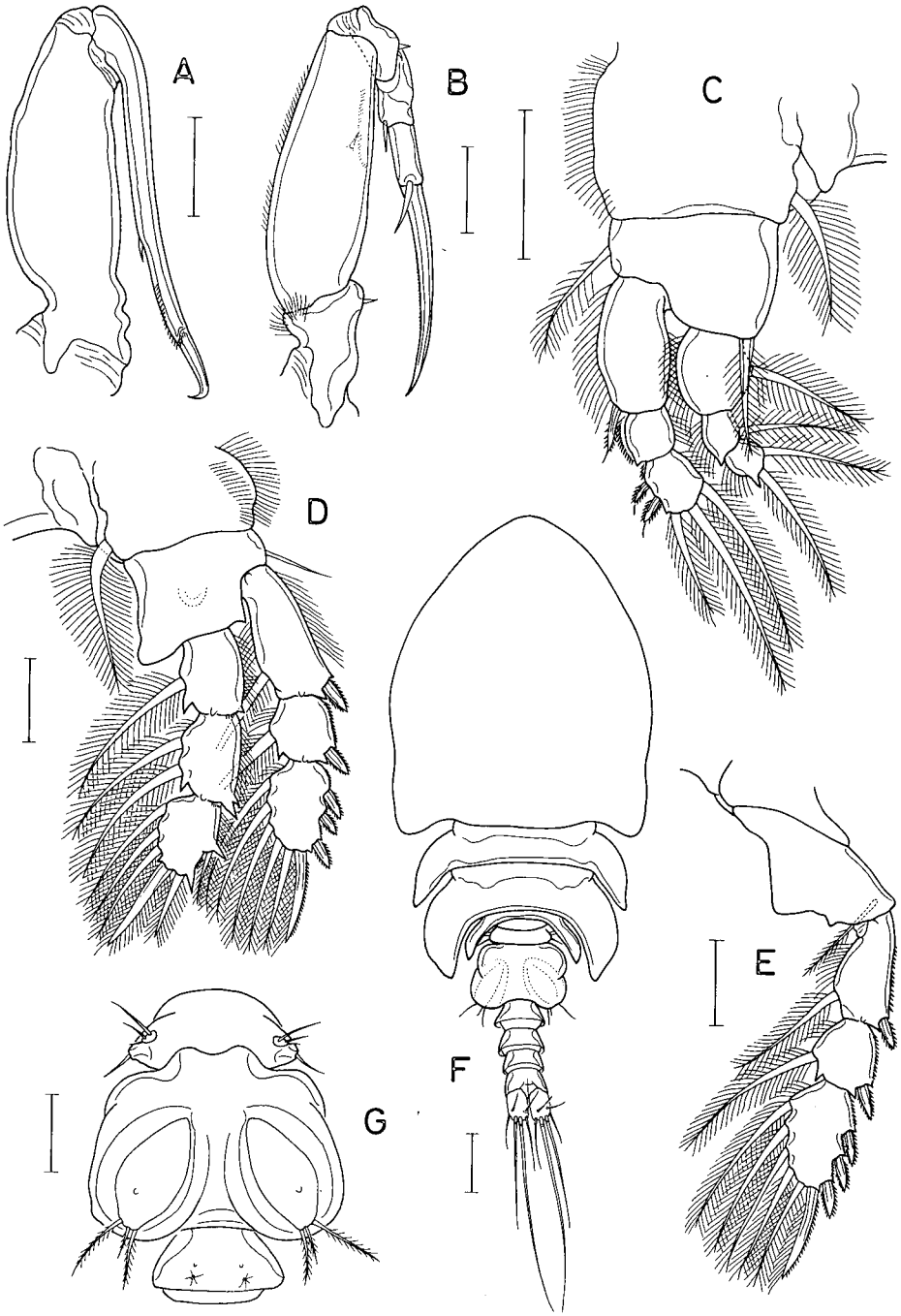

Fig. 34. *Ascidipontius concavus*, n. sp. female: A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E, leg 4. Male: F, habitus, dorsal; G, anterior part of urosome, ventral. Scales: A-E, G= 0.05 mm; F= 0.1 mm.

inner coxal seta. Leg 4 (Fig. 34E) without endopod. Posterior marigin of leg 4 with 1 large and 1 small, conical protrusions. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. 1-0; 0-0; II, 3; enp. 0-1; 0-1; 2

Leg 2: coxa 0-1; basis 1-0; exp. 1-1; I-1; III, I, 5; enp. 0-1; 0-2; 1, 5

Leg 3: coxa 0-0; basis 1-0; exp. 1-1; I-1; III, I, 5; enp. 0-1; 0-2; 1, 5

Leg 4: coxa 0-0; basis 1-0; exp. 1-1; 1-1; III, I, 5

Leg 5 consisted of 1 separated seta near posterior corners of fifth pedigerous somite and small free segment bearing 3 setae of unequall size (Fig. 33C). Leg 6 represented by 1 long plumose seta and 2 small spinules in genital area (Fig. 33C).

Color redish orange when alive.

Male. Body (Fig. 34F) generally as in female. Length 1.03 mm. Cephalothorax 525 x 450 μm. Urosome 6-segmented. Genital somite 125 x 163 μm, roughly trapezoid (Fig. 34G). Four abdominal segments 50 x 83, 46 x 79, 35 x 69, and 33 x 72 μm, respectively. Caudal ramus 42 x 35 μm (1.20:1).

Antennule (Fig. 35A) 8-segmented, geniculate between sixth and seventh segments, with seta formula: 1, 6, 5, 2, 3, 2, 2+1 aesthetasc, and 11. First segment the longest, with setules on anterior margin. Fifth segment with 2 processes, and sixth segment, 1 process on anterior margin. Aesthetasc on penultimate segment large, nearly as long as proximal 5 segments combined. One of setae on terminal segment modified to a thick, rod-shaped element.

Antenna and mouth organs as in female, except for maxilliped in which basal segment bears stout, recurved process on inner distal corner (Fig. 35B).

Leg 3 (Fig. 35C) sexually dimorphic. Terminal segment of endopod of this leg with thick setules on proximal part of outer margin. Distal part of this margin serrated. Leg 6 represented by 3 plumose

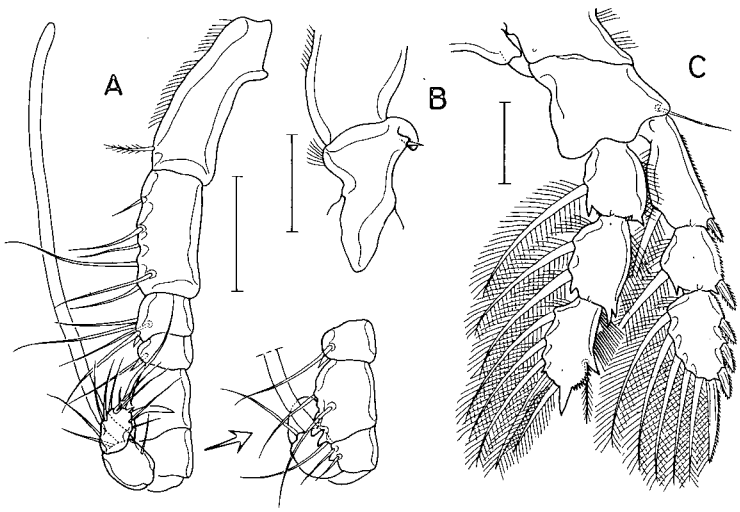

Fig. 35. *Ascidipontius concavus*, n. sp., male: A, antennule; B, proximal part of maxilliped; C, leg 3. Scales: A-C= 0.05 mm.

in each genital area (Fig. 34G).

Etymology The specific name "*concavus*" (=concave in Latin) alludes to the slightly concave lateral margins of cephalothorax.

***Ascidipontius rarus*, n. sp. (Figs. 36 & 37)**

Type specimens. 2 ♀♀ collected together with *Ascidipontius concavus* n. sp. Collection data as in *Ascidipontius concavus*. Holotype will be depositd in the U. S. National Museum of Natural History, Smithsonian Institution. Paratype (dissected) is kept in the collection of the author.

Female. Body (Fig. 36A) 1.18 mm long, with thin but hard tergites. Cephalothorax rather large and broad, consisted of fused cephalosome and first pedigerous somite, 0.63 mm long in midline, 0.65 mm wide, ratio 0.97:1, with parallel lateral margins and moderately produced posterior corners. Epimera of all metasomites directed posterolaterally. Epimera of first metasomite tapering. Second metasomite distinctly longer but narrower than first metasome, its epimeral ends blunt, extending beyond epimera of third metasomite. Third metasomite short, nearly truncate. Urosome (Fig. 36B) 5-segmented. Fifth pedigerous somite trapezoid, with angular posterior corners. Genital double somite 135 x 190 μm (0.71:1) with well-developed antero-lateral expansions (Fig. 36B, C). Lateral end of these expansions angular. Posterior part of genital double somite 100 μm wide. Three abdominal somites 43 x 88, 43 x 81, and 53 x 78 μm, respectively. Caudal ramus 63 x 35 μm (1.80:1), with 6 setae. Posterior margin of caudal ramus finely spinulated.

Antennule (Fig. 36D) 8-segmented, 255 μm long, with setal formula: 1, 7, 5, 2, 2, 2, 2, 14+1 aesthetasc. First segment the longest, 1.2 times as long as the next longest, second segment. Aesthetasc on terminal segment longer than distal 6 segments combined. Antenna (Fig. 36E) slender, almost identical to that of previous species. Coxa, basis and endopodal first segment continued in a line. Coxa about 29 μm long and unarmed. Basis 63 μm long, with parallel margins and setules on margins. Exopod very small, longer than wide, apically with spinule-like and 1 longer setae, the latter as long as first segment of endopod. Endopod 2-segmented. First segment 35 μm long, slightly broadened distally, with setules on inner margin. Terminal segment exactly same as long as first segment, with 4 setae: proximal seta shorter than half length of segment, based at proximal 1/3 length of segment; subterminal seta circling round segment as in previous species; two terminal setae thin but straight, 96 and 59 μm, respectively.

Siphon (Fig. 36F) very thin and long, 583 μm long, curved, with concave dorsal side. Mandible with 7 teeth distally, very thin and long, its tip shaped as Fig. 36G. Maxillule (Fig. 36H) bilobed, both lobes slender. Outer lobe distinctly longer than inner lobe, 80 μm long, 1.33 times as long as inner lobe, medially narrowed, with setules on margins, and armed terminally with 2 thick, spinulated setae and 1 small seta. Inner lobe tapering, 60 μm long, terminally with 1 extremely long, whip-like seta and 1 smaller seta. Both setae glabrous. Maxilla (Fig. 37A) slender and 2-segmented. First segment unarmed. Distal segment very slender with 1 small setae at distal 0.7 length of segment. Claw very thin, completely fused to second segment and distally curved. Maxilliped (Fig. 37B) consisting of 5 segments and claw, with armature formula: 1, 1, 2, 1, 1+claw. First segment with setules on outer distal corner. Seta on second segment located at distal 0.4 length of inner margin. Inner margin distal

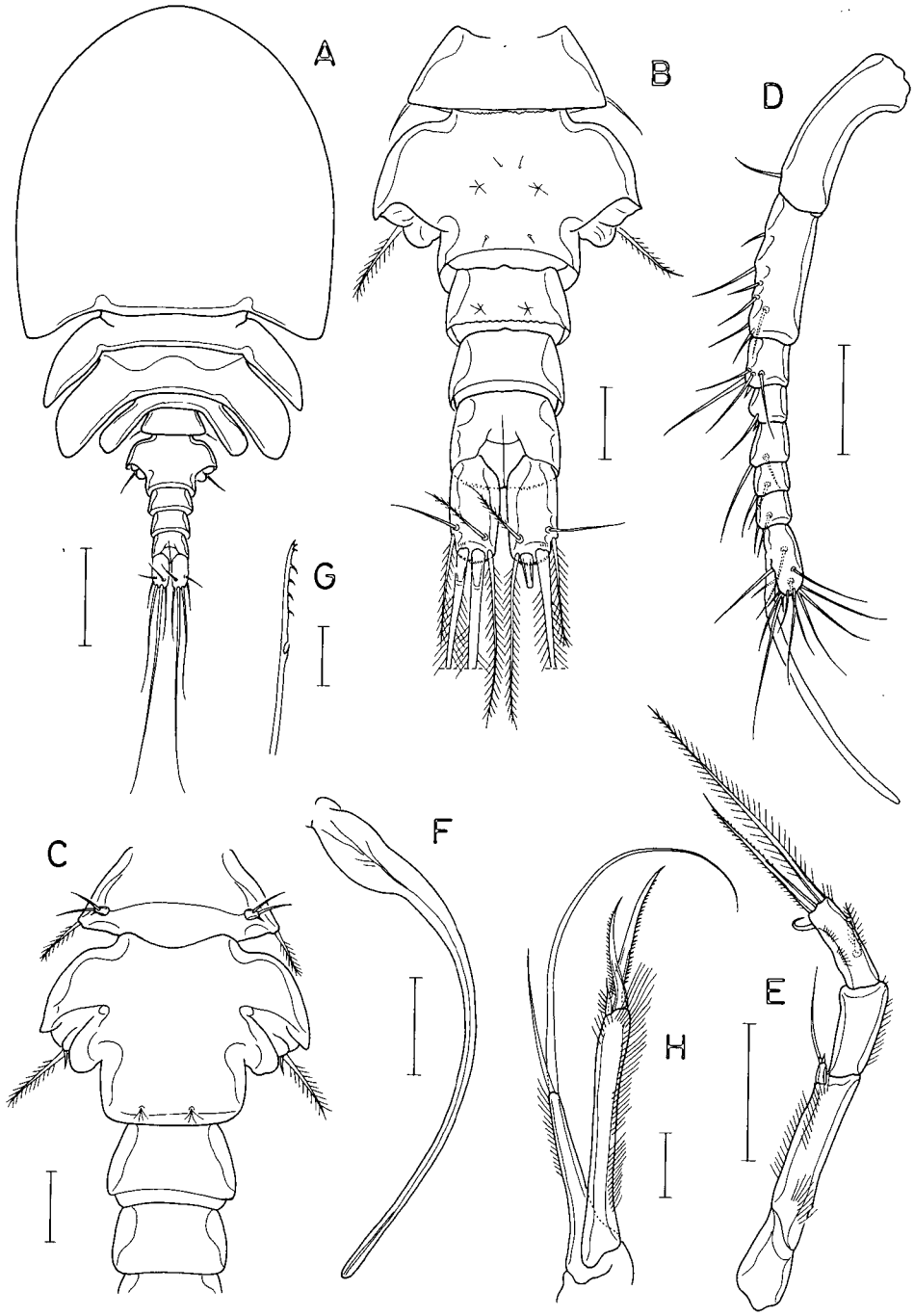

Fig. 36. *Ascidipontius rarus*, n. sp., female: A, habitus, dorsal, B, urosome, dorsal; C, anterior part of urosome, ventral; D, antennule; E, antenna; F, distal part of mandible; H, maxillule. Scales: A= 0.2 mm; B-E= 0.05 mm; F= 0.1 mm; G= 0.01 mm; H= 0.02 mm.

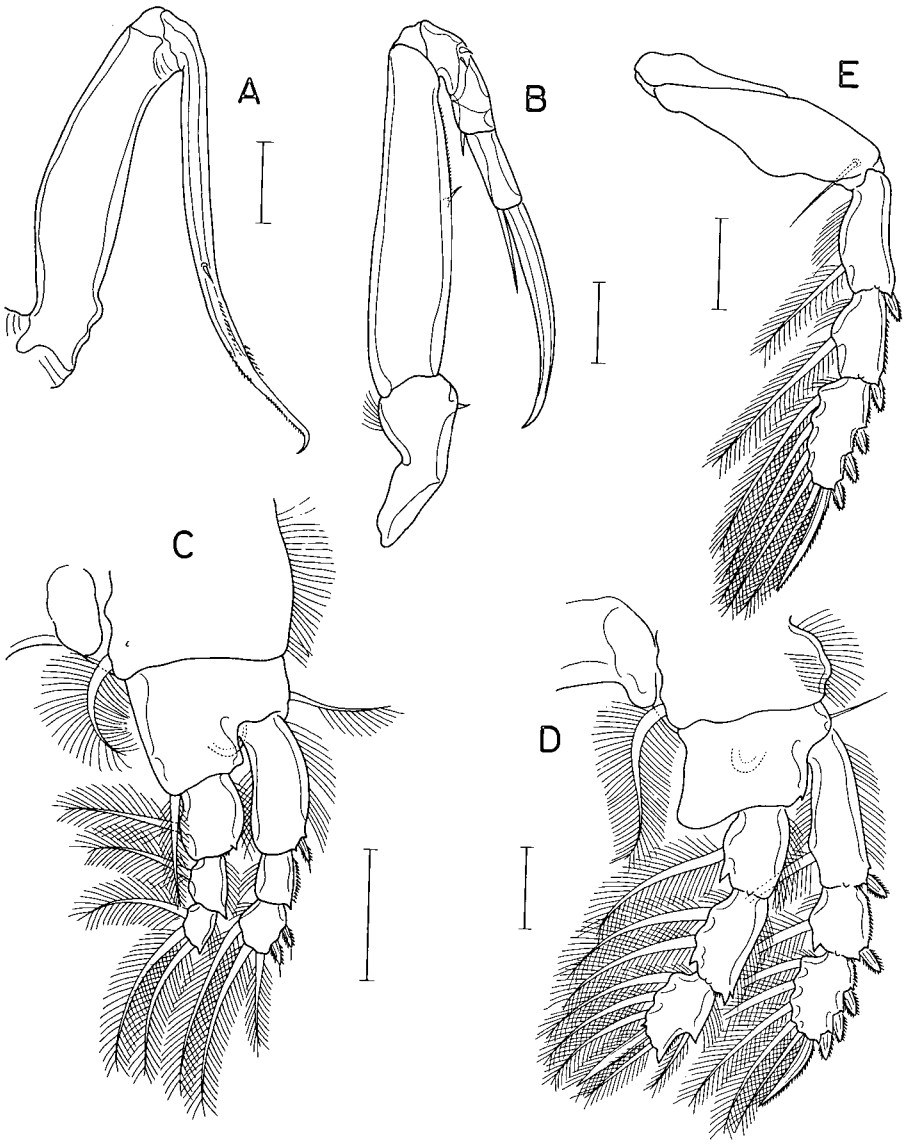

Fig. 37. *Ascidipontius rarus*, n. sp., female: A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E,leg 4. Scales: A-E= 0.05 mm.

to the seta of second segment with minute spinules. Outer margin without setules. Seta on inner distal corner of fifth segment rather long. Claw long and weakly curved.

Leg 1 (Fig. 37C), leg 2 (Fig. 37D) and leg 3 biramous, with 3-segmented rami. Outer margin of exopodal first segment of legs 1-3 with setules, but this margin of leg 4 naked. Leg 1 distinctly

smaller than legs 2-4; inner seta on basis straight, extending to distal border of endopodal second segment. Legs 3 and 4 without inner coxal seta. Outer margin of first exopodal segment naked without setules. Leg 4 (Fig. 37E) without endopod, with a indistinct protrusion on posterior margin of basis. One of 2 terminal setae on terminal segment of endopod of legs 2 and 3 spiniform. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-1; basis 1-1; exp. 1-0; 0-0; II, 3; enp. 0-1; 0-1; 3

Leg 2: coxa 0-1; basis 1-0; exp. 1-1; I-1; III, I, 5; enp. 0-1; 0-2; 1, 5

Leg 3: coxa 0-0; basis 1-0; exp. 1-1; I-1; III, I, 5; enp. 0-1; 0-2; 1, 5

Leg 4: coxa 0-0; basis 1-0; exp. 1-1; I-1; III, I, 5

Leg 5 consisted of 1 remotely separated seta located on posterior corner of fifth pdigerous somite and small free segment with 3 setae of unequall size (Fig. 36C). Leg 6 represented by 1 long plumose seta and 1 small spinule in genital area (Fig. 36C).

Color pinkish when alive.

Male. Unknown.

Etymology. The specific name *rarus* is a Latin meaning "infrequent". It is named so because only two specimens have been found from the host.

Remarks. *Ascidipontius rarus* n. sp. has the following features that are different from those of *A. concavus*: 1) the lateral margins of cephalothorax are not concave but are straight; 2) the caudal ramus is narrower, 1.80 times as long as wide, in contrast to 1.20 in *A. concavus;* 3) the number of setae on the second segment of antennule is 7, in contrast to 6 in *A. concavus;* 4) maxilla and maxilliped are more slender than those of *A. concavus*; 5) the endopodal third segment of leg 1 has 2 setae (this seem the most important diagnostic character), in contrast to 3 in *A. concavus.*

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RECEIVED: 18 October 1996
ACCEPTED: 9 December 1996

東海産 Artotrogidae科의 橈脚類

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요 약

동해안에서 잡힌 Artotrogidae과의 요각류 17종을 기록하였다. 이들은 *Artotrogus* 속의 4신종, *Bradypontius*속의 3신종, *Cryptopontius*속의 4신종, *Myzopontius* 속의 1신종 1미기록종, *Pteropontius*속의 1신종 1미기록종, 1신속에 속하는 2신종이다. 두 미기록종은 *Myzopontius pungens* Giesbrecht와 *Pteropontius decorus* Ho이다. 이들 17종은 태형동물 2종, 멍게 1종, 海草, 그리고 항구에 가라앉아 있던 廢그물로부터 채집된 것들이다. *Artotrogus*속의 분류에 대해서도 재검토하였다.