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Copepoda (Poecilostomatoida: Anchimolgidae) Associated with the Scleractinian Coral *Gardineroseris planulata* (Dana) from the Moluccas

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ABSTRACT

Three new species of poecilostomatoid copepods are described as associates of the scleractinian coral *Gardineroseris planulata* (Dana) from the Moluccas: *Sociellus geminus* n. sp., *Odontomolgus mucosus* n. sp. and *O. unioviger* n. sp. The genus *Sociellus* is transferred from the Rhynchomolgidae to the Anchimolgidae. The previously described four species of the genus *Paramolgus* (*P. angustus*, *P. eparmatoides*, *P. gibberulus*, and *P. setellus*) of the Rhynchomolgidae, associated with *Gardineroseris planulata*, are transferred as well to the genus *Anchimolgus* in the Anchimolgidae.

Key words: Copepoda, Poecilostomatoida, *Anchimolgus*, *Odontomolgus*, *Sociellus*, new species, Moluccas

INTRODUCTION

Cnidaria is one of invertebrate groups most preferred by copepod associates as hosts. The scleractinian corals serve as hosts for much more copepods than other groups of cnidarians (Humes, 1985b, 1994b).

Gardineroseris planulata (Dana) is a scleractinian coral distributed in the tropical Pacific and the Indian Oceans. As associates of this coral species, Humes (1985a) reported three species of copepods, *Xarifia clavellata*, *X. filata*, and *X. rasilis*, from the Great Barrier Reef, Australia. From the same coral species, Humes (1992a) recorded *Sociellus torus*, *Odontomolgus pumilus* and *Paramolgus ampullaceus* also from the Great Barrier Reef. In the same year and from the same coral species Humes (1992b) also reported *Paramolgus angustus*, *P. eparmatoides*, *P. gibberulus*, *P. stellatus*, *Euxynus capulus*, and *Moluccomolgus lordus* from the Moluccas. Therefore *Gardineroseris planulata* is thus far known to harbor 12 species of copepods, a diverse copepod fauna on a species of coral. These copepods were taken from only a single colony of the coral in each place (Humes, 1985a, 1992a, b). With additional three species of copepods in the present paper, the number of species of copepods associated with *G. planulata* becomes 15, an example of the highest multiple association of copepods with a single species of marine invertebrates, along with the coral *Galaxea fascicularis* (L.) that also habors 15 species of copepods (Humes, 1996). Moreover, a comparison of the compositions of copepod species between the Great Barrier Reef and the Moluccas reveals that the copepod fauna is quite different between the two areas. This fact suggests that the worldwide copepod fauna on *G. planulata* may be much more diverse than known.

During the examining the copepod samples collected by the late Dr. Arthur G. Humes, the former Professor of Boston University, I found a sample vial containing several species of copepods from *G. planulata*. A microscopic examination of these copepods revealed that several species, including three new ones to be described herein, were remained there. These copepods came from the same colony of host from which Humes (1992b) described already six new species of copepods mentioned above from the Moluccas.

MATERIAL AND METHODS

All copepod material examined in this paper had been loaned from the National Museum of Natural History, Smithsonian Institution, United States. These copepods were all collected by Dr. A.G. Humes in 1975 and were then kept in that museum since the death of Dr. Humes. The sources of the copepod material mentioned in the following description of species follow the Humes' collection note.

Before microscopical observation and dissection copepod materials were immersed in lactic acid for at least 10 minutes. Dissection were done using the reverse slide method (Humes and Gooding, 1964). All figures were drawn with the aid of a camera lucida. In description of species, body lengths were measured from the apex of cephalothorax to the distal end of caudal rami, excluding caudal setae. In the

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armature formula of legs 1-4, Roman numerals represent spines and Arabic numerals indicating setae. Type specimens have been deposited in the above museum.

DESCRIPTION OF SPECIES

Order Poecilostomatoida Kabata, 1979
Family Anchimolgidae Humes and Boxshall, 1996
Genus *Anchimolgus* Humes and Stock, 1972
***Anchimolgus angustus* (Humes, 1992) (Fig. 1)**

Material examined. Eleven ♀♀, 5♂♂ from the scleractinian coral *Gardineroseris planulata* (Dana), in 3 m, Gomumu Island, south of Obi, the Moluccas (01°50′00″S, 127°30′45″E), 30 May 1975, collected by A. G. Humes.
Remarks. The examined copepod specimens are the remnants remained after the designation of type specimens of "*Paramolgus angustus*" described by Humes (1992b). The body form (Fig. 1A, B) and the shape of urosome (Fig. 1C) and caudal rami (Fig. 1D) are not different from those in the original description. However, it is found that Humes (1992a) overlooked the morphology of mandible. The inner margin of the mandible is apparently bilobed (Fig. 1E) rather than linear as he described. According to the revision of lichomolgoid complex by Humes and Boxshall (1996), the family Anchimolgidae is differentiated from other families of the complex mainly by the morphology of mandible in which the inner margin is bilobed. Therefore *Paramolgus angustus* should be removed from the Rhynchomolgidae to the Anchimolgidae in which it should be placed in the genus *Anchimolgus*.

Other minor differences from the original description are found in the maxillule (Fig. 1F) which is armed with 3 setae rather than 4, in the maxilla (Fig. 1G) in which the inner seta is ornamented with stiff spinules, in the sizes of setae on the third segment of female maxilliped (Fig. 1H), and in the free segment of leg 5 (Fig. 1I) which is small but expanded.

It is known that the species of the Anchimolgidae are the associates of scleractinian corals, and those of the Rhynchomolgidae are associates of various invertebrates including the scleractinians (Humes and Boxshall, 1996). *Paramolgus* is a genus of the Rhynchomolgidae, consisting of 35 known species mainly associated with the alcyonaceans, of which the following five are known to be associates of the scleractinian coral *Gardineroseris planulata*: *Paramolgus ampullaceus* Humes, 1992; *P. eparmatoides* Humes, 1992; *P. gibberulus* Humes, 1992; *P. setellus* Humes, 1992; and *P. pavonae* Humes, 1994. Of these, four species, except for *P. ampullaceus*, are illustrated in the original descriptions to have a mandible in which the inner margin is bilobed (Humes, 1992a, b, 1994a). Therefore these four species also should be removed to the Anchimolgidae, within the genus *Anchimolgus*. *Paramolgus ampullaceus* is suspected to have the same type of mandible, thus is needed to be re-examined.

Genus *Odontomolgus* Humes and Stock, 1972
***Odontomolgus mucosus* n. sp. (Figs 2-4)**

Material examined. Four ♀♀, 2♂♂ collected from the scleractinian coral *Gardineroseris planulata* (Dana), in 3 m Gomumu Island, south of Obi, the Moluccas (01°50′00″S, 127°30′45″E), collected by A. G. Humes, 30 May 1975. Holotype (♀, USNM 1081641), allotype (♂, USNM 1081642), and paratypes (2♀♀, USNM 1081643) have been deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D. C., United States. Dissected paratypes (1♀, 1♂) are kept in the collection of the author.
Female. Body (Fig. 2A) narrow. Body length 906 μm (891-914 μm) based on 4 specimens. Maximum width 212 μm. Prosome fusiform and 476 μm long. Cephalothorax divided by faint dorsal suture line into cephalosome and first pedigerous somite, distinctly longer than wide. Urosome (Fig. 2B) 5-segmented. Fifth pedigerous somite 115 μm wide, with several fine spinules on lateral edges. Genital double-somite 107 μm long, with prominent lateral expansion in anterior half and narrower posterior half, 117 μm wide across expanded anterior part and 62 μm wide across narrower posterior part. Genital areas located dorsally in anterior one-third length of somite. Three abdominal somites unornamented, 53 × 57, 43 × 54, and 70 × 52 μm, repectively, from anterior to posterior. Caudal ramus 96 × 22 μm (ratio 4.36 : 1), with 6 caudal setae and narrow membrane on terminal margin; 2 median terminal ones (largest one 100 μm long) of caudal setae fringed bilaterally with membrane, instead of hairs, on distal half (Fig. 2C). Egg sac not seen.

Rostrum longer than wide and continued by ridge to anterior part of labrum (Fig. 2D). Antennule (Fig. 2E) 7-segmented, slender, 193 μm long, with armature formula 4, 13, 6, 3, 4+1 aesthetasc, 2+1 aesthetasc, and 7+1 aesthetasc. All setae naked. Antenna (Fig. 2F) 4-segmented. First segment slightly longer than wide, with 1 inner distal seta. Second segment about 81 × 27 μm, with small seta on inner margin. Third segment 25 × 23 μm, with 3 small inner setae. Fourth segment 19 × 17 μm and unarmed. Terminal claw 26 μm long, strongly curved distally.

Labrum (Fig. 2G) bilobed, with broad membrane along posterior margin of lobes. Mandible (Fig. 2H) with prominent proximal notch. Inner margin distinctly bilobed. Con-

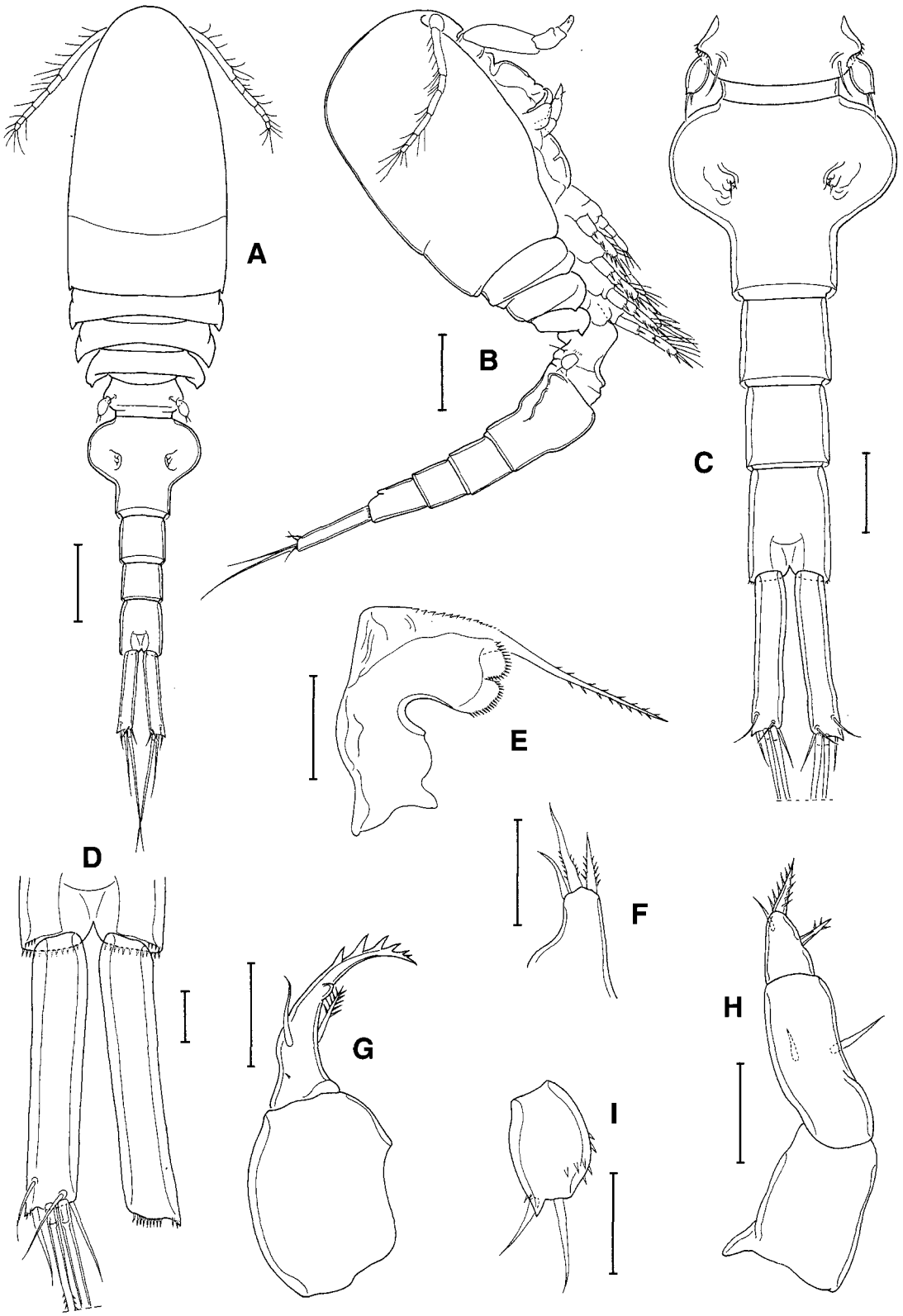

Fig. 1. *Anchimolgus angustus* (Humes), female. A, habitus, dorsal; B, habitus, lateral; C, urosome, dorsal; D, caudal rami, dorsal; E, mandible; F, maxillule; G, maxilla; H, maxilliped; I, free segment of leg 5. Scale bars=0.1 mm (A, B), 0.05 mm (C, E), 0.02 mm (D-I).

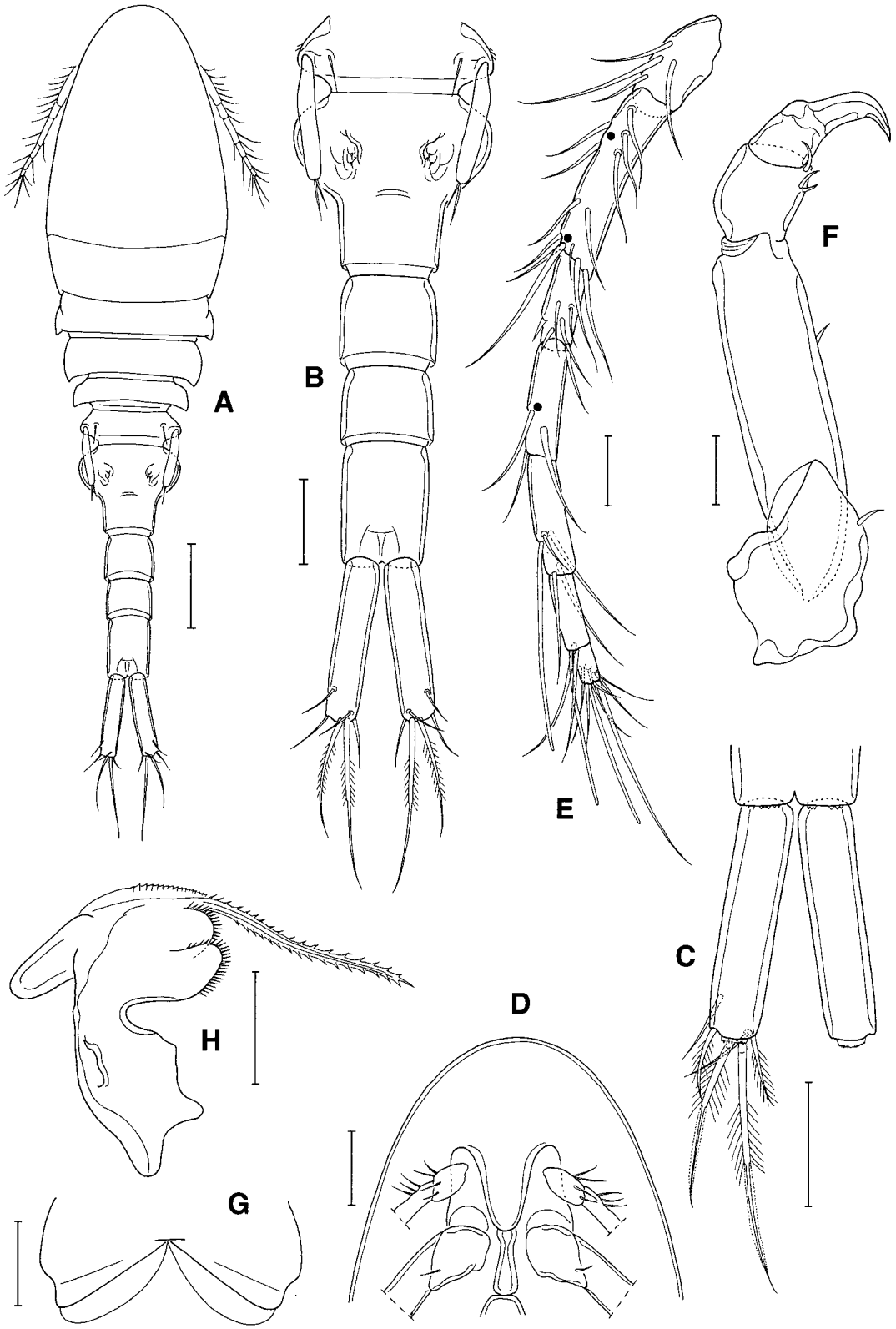

Fig. 2. *Odontomolgus mucosus* n. sp. female. A, habitus, dorsal; B, urosome, dorsal; C, caudal rami, dorsal; D, rostral area, ventral; E, antennule (dots represent places of addition of aesthetasc in male); F, antenna; G, labrum; H, mandible. Scale bars=0.1 mm (A), 0.05 mm (B-D), 0.02 mm (E-H).

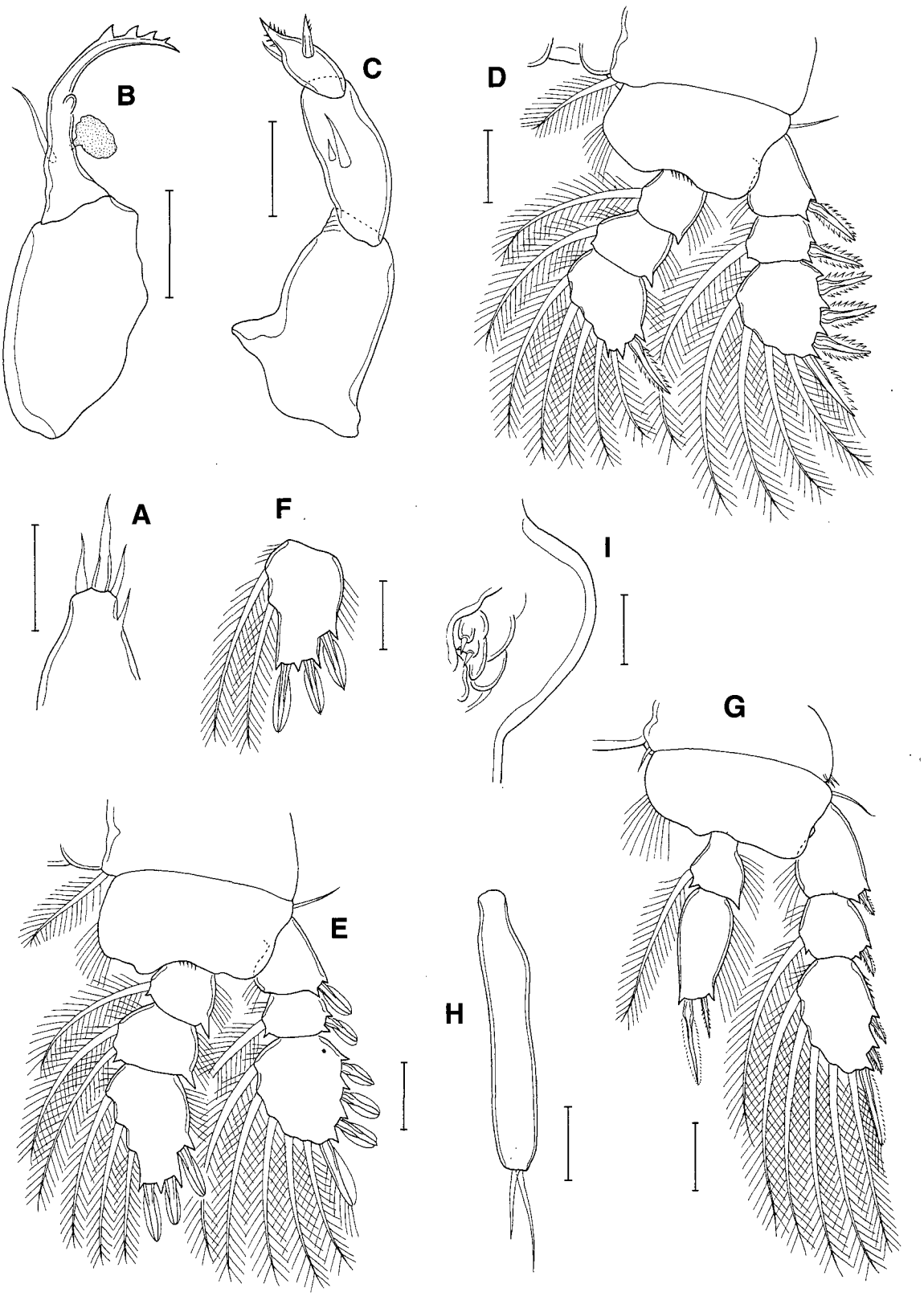

Fig. 3. *Odontomolgus mucosus* n. sp. female. A, maxillule; B, maxilla; C, maxilliped; D, leg 1; E, leg 2; F, third endopodal segment of leg 3; G, leg 4; H, free segment of leg 5; I, right genital area. Scale bars=0.02 mm.

vex side with prominent, wing-like process. Terminal lash elongate with serrate margins. Maxillule (Fig. 3A) armed with 1 subterminal element and 3 naked terminal setae. Maxilla (Fig. 3B) with unarmed first segment. Second segment slender, terminated by arched lash bearing 4 serrations on distal half of convex outer margin, with 1 nodular tubercle near base of lash; anterior seta unornamented; inner seta transformed to characteristical, mucus-like globular nature; outer proximal seta not seen. Maxilliped (Fig. 3C) 3-segmented. First segment largest but unarmed. Second segment with 2 setae in midlength (12 and 4 μm long respectively). Third segment with 1 seta and 1 spine and terminated by spine-like process bearing spinules on both sides.

Legs 1-3 with 3-segmented exopod and endopod (Fig. 3D-F). Leg 4 (Fig. 3G) with 3-segmented exopod and 2-segmented endopod. Second endopodal segment of leg 4 32 × 16 μm; its 2 terminal spines 25 (inner one) and 12 μm (outer one). Armature formula of legs 1-4 as follows:

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

Leg 5 consisting of free segment and small seta near base of free segment. Free segment (Fig. 3H) elongate, slightly constricted near middle, 76 × 12.7 μm (ratio 5.98 : 1), unornamented, with 2 terminal setae (27 and 19 μm respectively). Leg 6 represented by 2 small spiniform setae in genital area (Fig. 3I).

Male. Body (Fig. 4A) resembling that of female. Body length 895 μm (other specimen 936 μm). Maximum width 200 μm. Prosome almost identical to that of female in form. Urosome (Fig. 4B) 6-segmented. Fifth pedigerous somite 98 μm wide. Genital somite nearly quadrangular, 146 × 136 μm. Four abdominal somites 36 × 55, 47 × 52, 37 × 48, and 62 × 46 μm. Caudal ramus 116 × 21 μm, ratio 5.52 : 1.

Rostrum as in female. Antennule added by 3 aesthetascs: 2 on second segment and 1 on fourth segment, as indicated by dots in Fig. 2E. Antenna (Fig. 4C) added by several small scales located proximal to innter seta.

Labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 4D) 4-segmented. First segment broadest but unarmed. Second segment with expanded inner margin, 1 simple seta and 1 blunt, spiniform seta bearing subterminal process on inner margin, and scale-like spinules near base of setae and proximal part of segment. Third segment short and unarmed. Fourth segment as claw bearing 2 proximal setae and distal membrane.

Third endopodal segment of leg 1 (Fig. 4E) armed with 2 spines and 4 setae (armature formula II, 4). Legs 2-4 as in female. Free segment of leg 5 (Fig. 4F) short, 21 × 11 μm; its 2 terminal setae 23 and 15 μm respectively. Leg 6 represented by 2 small setae on posterior margin of genital flap (Fig. 4B).

Etymology. The specific name *mucosus* ("mucous" in Latin) refers to the transformation of the inner seta on the second segment of the maxilla to a mucus-like appearance.

Remarks. *Odontomolgus mucosus* n. sp. shows a combination of characteristics as follows: the third exopodal segment of leg 4 is armed with three spines and five setae (formula II, I, 5); the fourth segment of antenna is longer than the third segment; and the female genital double-somite is shorter than wide. This combination of characters is shared by four congeners: *O. actinophorus* (Humes and Frost, 1964), *O. campulus* (Humes and Ho, 1968), *O. exilipes* Kim, 2003, and *O. pumilus* Humes, 1992. They differ from *O. mucosus* in having the following features.

In *Odontomolgus actinophorus* the prosome is broad, the ratio of the length to width of caudal ramus is 3.48 : 1 (4.36 : 1 in *O. mucosus*), the process on the convex side of mandible is slender and pointed (blunt in *O. mucosus*), the maxillule is armed with three setae (four in *O. mucosus*), and the free segment of female leg 5 is bullated and 2.10 times as long as wide (Humes and Frost, 1964) (slender and 5.98 times as long as wide in *O. mucosus*).

In *Odontomolgus campulus* the prosome is relatively broad, the caudal ramus is 3.18 times as long as wide, the maxillule is armed with three terminal setae, the lash of maxilla is ornamented with numerous spinules (4 or 5 serrations in *O. mucosus*) on convex margin, and the free segment of female leg 5 is small and 2.62 times as long as wide (Humes and Ho, 1968).

In *Odontomolgus exilipes* the prosome is expanded, the maxillule is armed with three elements, the third segment of antenna is armed with two setae (three setae in *O. mucosus*), and the caudal ramus is 2.06 times as long as wide (Kim, 2003).

In *Odontomolgus pumilus* the caudal ramus is 3.06 times as long as wide, the maxillule is armed with three setae, the terminal setae on the endopod of leg 4 are extremely unequal in size, each 23 and 6.5 μm (25 and 12 μm in *O. mucosus*), and the second segment of male maxilliped is armed with one stout spiniform seta, one slender seta, and one setule (Humes, 1992a).

Most of all, the transformation of inner seta on the second segment of the maxilla to a mucus-like globular element is considered to be the most characteristic feature of the new species. The only other previously known example of the

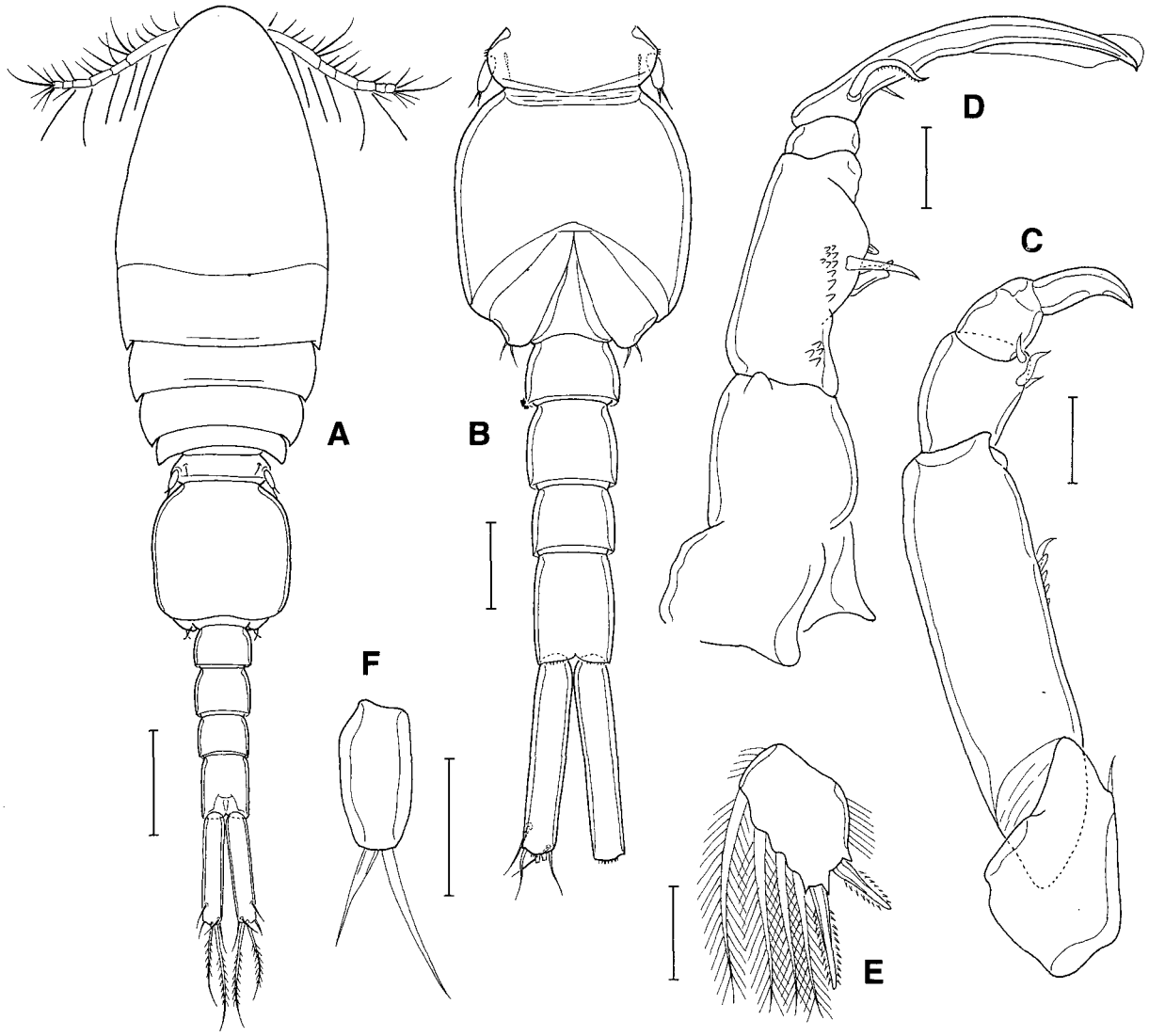

Fig. 4. *Odontomolgus mucosus* n. sp. male. A, habitus, dorsal; B, urosome, ventral; C, antenna; D, maxilliped; E, third endopodal segment of leg 1; F, free segment of leg 5. Scale bars=0.1 mm (A), 0.05 mm (B), 0.02 mm (C-F).

similar transformation of the same seta is observable in *O. actinophorus* where the seta is transformed to a hairy globule but is not mucus-like as in *O. mucosus*.

Odontomolgus unioviger n. sp. (Figs 5-7)

Material examined. Four ♀♀, 1♂ collected from the scleractinian coral *Gardineroseris planulata* (Dana), in 3 m Gomumu Island, south of Obi (01°50′00″S, 127°30′45″E), collected by A. G. Humes, 30 May 1975. Holotype (♀, USNM 1081644), allotype (♂, dissected and mounted on a slide, USNM 1081645), and paratypes (2♀♀, USNM 1081646) have been deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D. C. Dissected paratype (♀) is kept in the collection of the author.

Female. Body (Fig. 5A, B) narrow, similar to preceding species. Body length of dissected specimen 850 μm. Mean body length 882 μm (850-912 μm) based on 4 specimens. Maximum width 209 μm. Maximum dorsoventral depth 240 μm. Prosome 456 μm long. Cephalothorax divided by faint dorsal suture line into cephalosome and first pedigerous somite. Urosome (Fig. 5C) 5-segmented. Fifth pedigerous somite 127 μm wide. Genital double-somite 105 μm long, anteriorly expanded, with nearly parallel lateral margins of anterior expansion; maximum width 122 μm, but 71 μm wide across narrower posterior part. Three abdominal somites unornamented, 50×61, 43×58, and 65×64 μm, respectively from anterior to posterior. Caudal ramus (Fig.

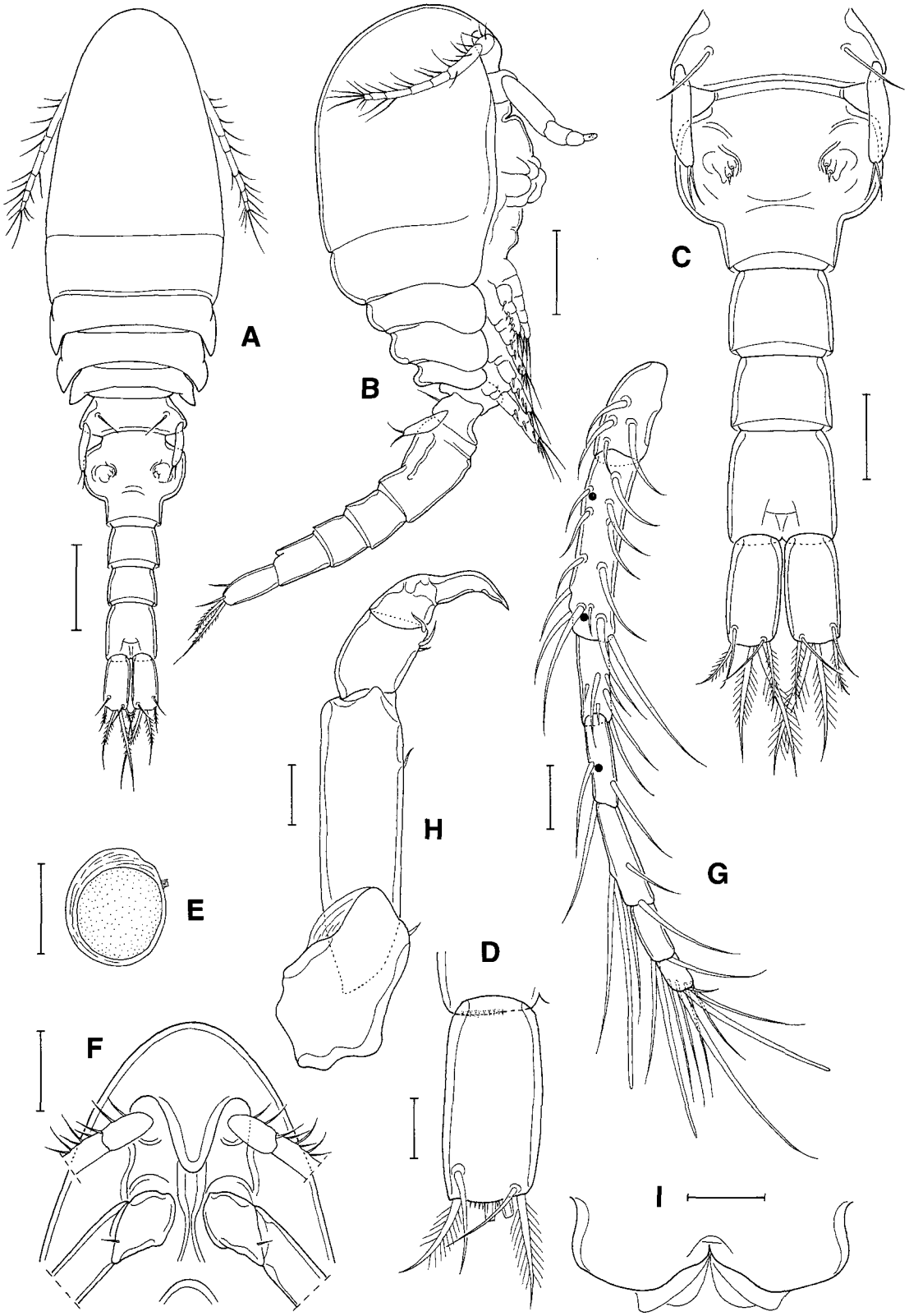

Fig. 5. *Odontomolgus unioviger* n. sp. female. A, habitus, dorsal; B, habitus, lateral; C, urosome, dorsal; D, left caudal ramus, dorsal; E, egg sac; F, rostral area, ventral; G, antennule (dots represent places of addition of aesthetasc in male); H, antenna; I, labrum. Scale bars=0.1 mm (A, B, E), 0.05 mm (C, F), 0.02 mm (D, G-I).

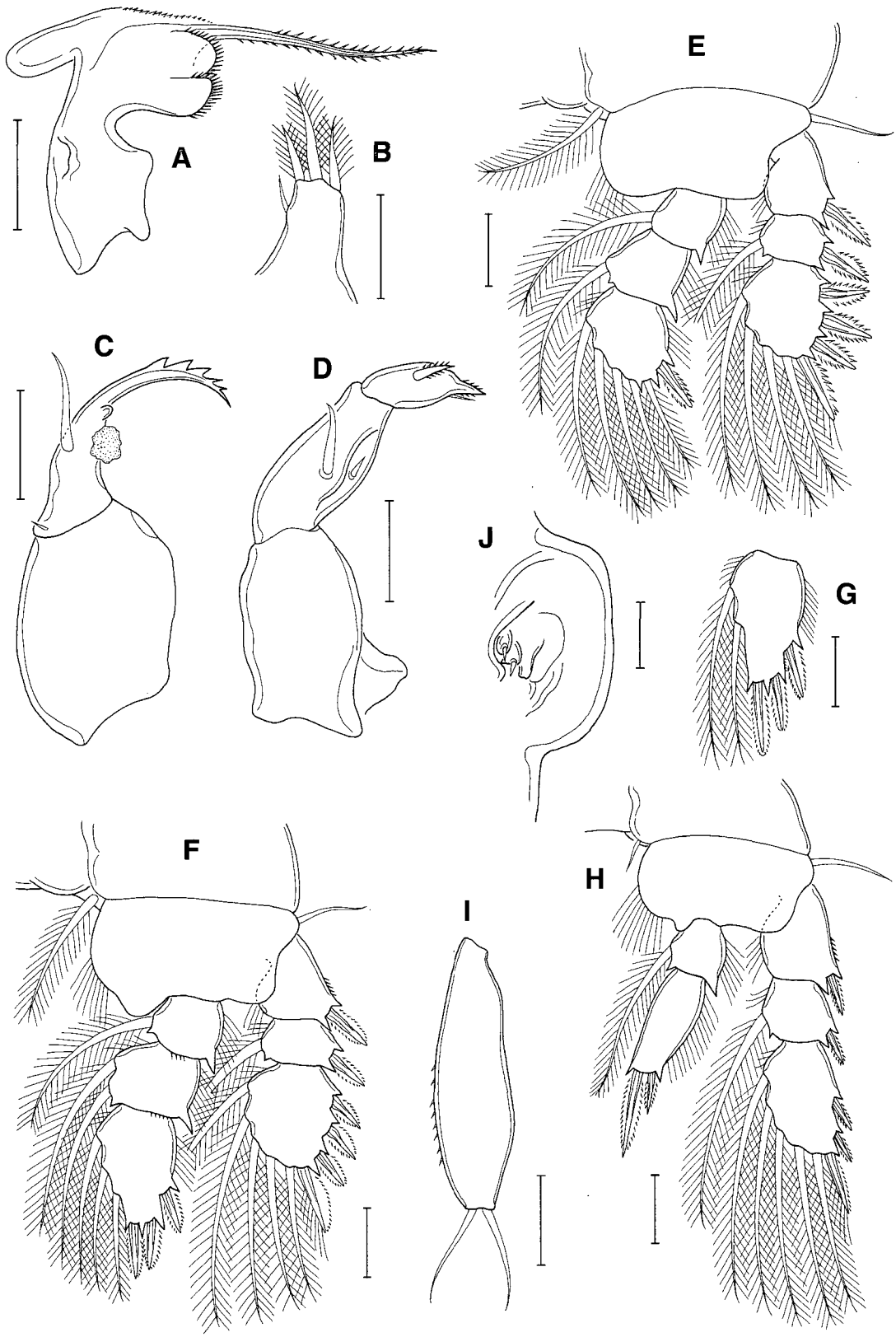

Fig. 6. *Odontomolgus unioviger* n. sp. female. A, mandible; B, maxillule; C, maxilla; D, maxilliped; E, leg 1; F, leg 2; G, third endopodal segment of leg 3; H, leg 4; I, free segment of leg 5; J, right genital area. Scale bars=0.02 mm.

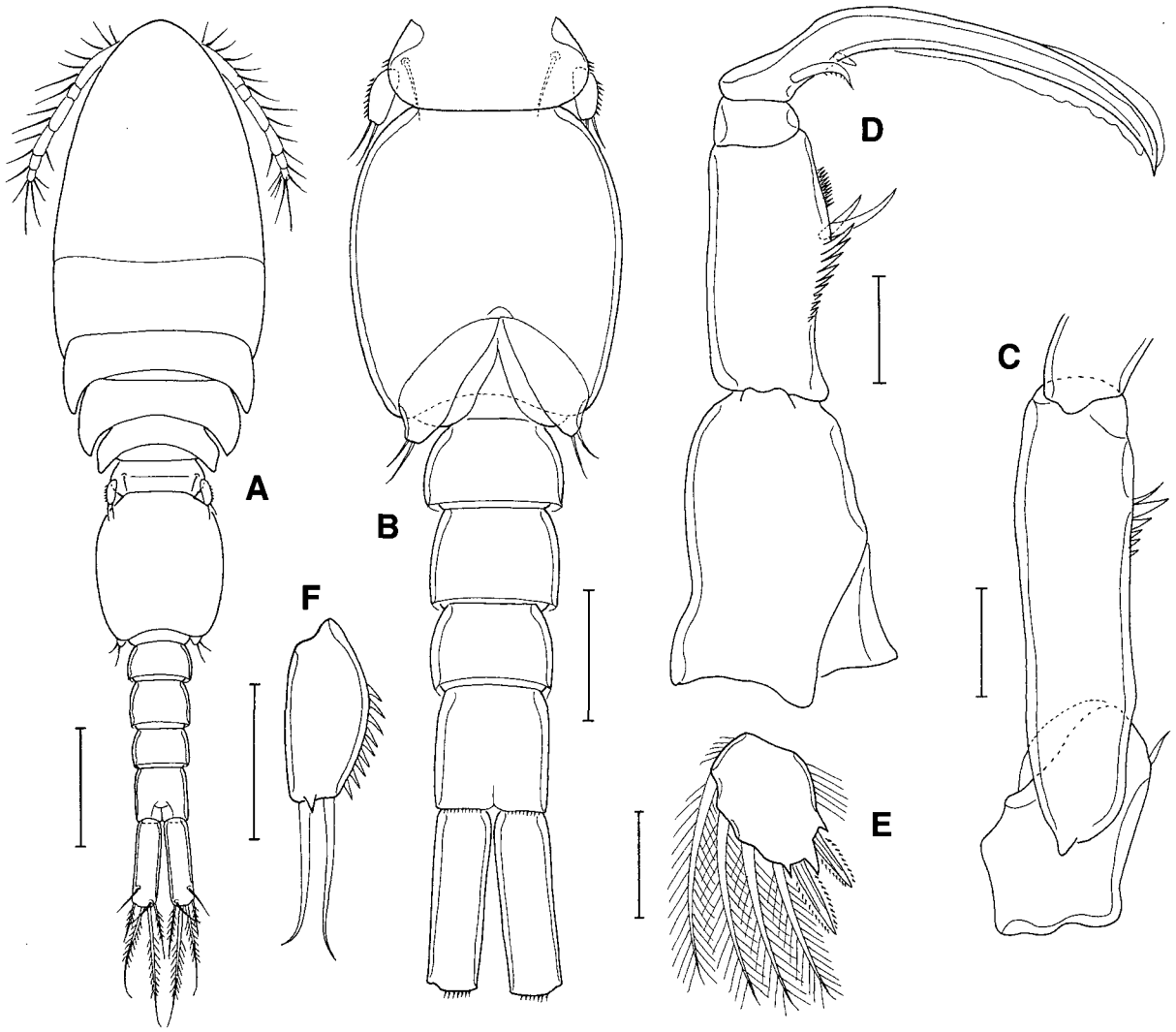

Fig. 7. *Odontomolgus unioviger* n. sp. male. A, habitus, dorsal; B, urosome, ventral; C, proximal segments of antenna; D, maxilliped; E, third endopodal segment of leg 1; F, free segment of leg 5. Scale bars=0.1 mm (A), 0.05 mm (B), 0.02 mm (C-F).

5D) broad, quadrangular, 67 × 32 μm, ratio 2.09 : 1, with 6 caudal setae. Longest one of caudal setae 88 μm long. Egg sac (Fig. 5E) thick, containing only a single egg, 117 μm in diameter.

Rostrum longer than wide as in Fig. 5F. Antennule (Fig. 5G) 196 μm long, 7-segmented, with armature formula 4, 13, 6, 3, 4+1 aesthetasc, 2+1 aesthetasc, and 7+1 aesthetasc. All setae naked. Antenna (Fig. 5H) 4-segmented. First segment slightly longer than wide, with 1 small inner distal seta. Second segment approximately 77 × 28 μm, with 1 small inner seta. Third segment 25 × 22 μm, with 3 small inner distal setae. Fourth segment 16 × 14 μm, unarmed. Claw 28 μm long and curved.

Labrum (Fig. 5I) with shallow median excision and membrane on inner side of posterior lobes. Mandible (Fig. 6A) with distinct proximal notch. Inner nargin distinctly bilobed. Convex side with distinct, wing-like expansion. Terminal lash slender and elongate, with spinulated margins. Maxillule (Fig. 6B) armed with 1 naked subterminal element and 3 terminal plumous setae. Maxilla (Fig. 6C) with unarmed first segment. Second segment terminated by arched terminal lash bearing 5 serrations on distal half of outer margin, with 1 node-like tubercle near base of terminal lash; anterior seta unornamented; inner seta transformed to characteristical, mucus-like globular nature; outer proximal seta minute. Maxilliped (Fig. 6D) 3-segmented. First segment largest but unarmed. Second segment with 2 setae in midlength (14 and 4 μm long respectively) and longitudinal wrinkle. Third segment with 1 seta and 1 spine and terminated by spine-like process bearing spinules on

both sides.

Legs 1-3 with 3-segmented exopod and endopod (Fig. 6E-G). Leg 4 (Fig. 6H) with 3-segmented exopod and 2-segmented endopod. Second endopodal segment of leg 4 31 × 14 μm; its 2 terminal spines 25 and 12 μm. Armature formula of legs 1-4 as follows:

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

Leg 5 consisting of free segment and seta near base of free segment. Free segment (Fig. 6I) fusiform, 58 × 17 μm, ratio 3.47 : 1, widest near distal third, with spinules on outer margin and 2 terminal setae (24 and 23 μm respectively). Leg 6 represented by 2 small, spiniform setae in genital area (Fig. 6J).

Male. Body (Fig. 7A) resembling that of female. Body length 729 μm. Maximum width 176 μm. Urosome (Fig. 7B) 6-segmented. Fifth pedigerous somite 76 μm wide. Genital somite 121 × 104 μm, with rounded anterior and posterior corners. Four abdominal somites 31 × 53, 35 × 49, 31 × 47, and 47 × 43 μm. Caudal ramus 72 × 21 μm, ratio 3.43 : 1.

Rostrum as in female. Antennule added by 3 aesthetascs: 2 on second segment and 1 on fourth segment, as indicated by dots in Fig. 5E. Antenna added by several spinules located proximal to innter seta (Fig. 7C).

Labrum, mandible, maxillule, and maxilla as in female. Maxilliped (Fig. 7D) 4-segmented. First segment broadest but unarmed. Second segment with slightly expanded inner margin, 2 unequal setae, spinules on inner margin proximal to inner setae and minute spinules on distal part of inner margin. Third segment short and unarmed. Fourth segment as claw bearing 2 proximal setae.

Third endopodal segment of leg 1 (Fig. 7E) armed with 2 spines and 4 setae (armature formula II,4). Legs 2-4 as in female. Free segment of leg 5 (Fig. 7F) small, 22 × 11 μm, with spinules on outer margin; its 2 terminal setae subequal. Leg 6 represented by 2 small setae on posterior margin of genital flap (Fig. 7B).

Etymology. The specific name *unioviger* is a combination of the Latin words *unicus* (single), *ovum* (egg), and *gero* (to carry). It alludes to the presence of only a single egg in the egg sac.

Remarks. *Odontomolgus unioviger* n. sp. is similar to the preceding *O. mucosus* in the possession of the slender body and the almost identical shape of antenna and maxilla, and especially the similarly transformed inner seta on the second segment of the maxilla. Differences between the two species are in the shape of the genital double-somite of the female where the expanded anterior part is rounded laterally in *O. mucosus* but is nearly quadrangular in *O. unioviger*, in the caudal ramus which is slender and 4.36 times as long as wide in *O. mucosus* but is broad and 2.09 times as long as wide in *O. unioviger*, and in the free segment of female leg 5 which is 5.98 times as long as wide in *O. mucosus* but is 3.47 times as long as wide in *O. unioviger*.

Genus *Sociellus* Humes, 1992

Sociellus geminus n. sp. (Figs 8-10)

Material examined. Two ♀♀, 2♂♂ collected from the scleractinian coral *Gardineroseris planulata* (Dana), in 3 m Gomumu Island, South of Obi (01° 50′00″S, 127° 30′45″E), collected by A. G. Humes, 30 May 1975. Holotype (♀, USNM 1081659) and allotype (♂, USNM 1081660) have been deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D. C. Dissected paratypes (1♀, 1♂) are kept in the collection of the author.

Female. Body (Fig. 8A, B) elongate, slender, and nearly cylindrical in dorsal view. Body length 974 μm (another specimen 908 μm). Maximum width 200 μm. Suture line distinct between cephalosome and first pedigerous somite. Cephalosome 235 μm long, longer than wide. First to fifth pedigerous somites 91 × 196, 82 × 179, 62 × 159, 47 × 147, and 44 × 138 μm respectively from anterior to posterior. Urosome (fig. 8C) 5-segmented. Genital double-somite gradually narrowed posteriorly, 157 × 152 μm in dorsal view, and convex ventral margin in lateral view. Genital areas located dorsally. Three abdominal somites 102 × 98, 79 × 82, and 58 × 67 μm, gradually shortened and narrowed from anterior to posterior. Caudal ramus 49 × 24 μm, ratio 2.04 : 1, with 6 naked caudal setae. All these caudal setae shorter than caudal ramus. Egg sac not seen.

Rostrum distinctly tapering and beak-like (Fig. 8D). Antennule (Fig. 8E) 131 μm long and 7-segmented, with armature formula 3, 10, 6, 3, 4+1 aesthetasc, 2+1 aesthetasc, and 7+1 aesthetasc; all setae naked. Antenna (Fig. 8F) 4-segmented. First segment slightly longer than wide, with 1 inner distal seta. Second segment approximately 53 × 30 μm, with 1 inner seta. Two distal segments distinctly narrower than second segment. Third segment 23 × 13 μm, with 3 small inner distal setae. Fourth segment unarmed, 15 × 11 μm. Terminal claw 21 μm long, weakly curved.

Labrum (Fig. 8G) with 2 posterior lobes. Mandible (Fig. 8H) with deep proximal notch. Inner margin distinctly bilobed. Outer wing-like process large, about 3 times as long as wide, with pointed tip. Terminal lash slender, with

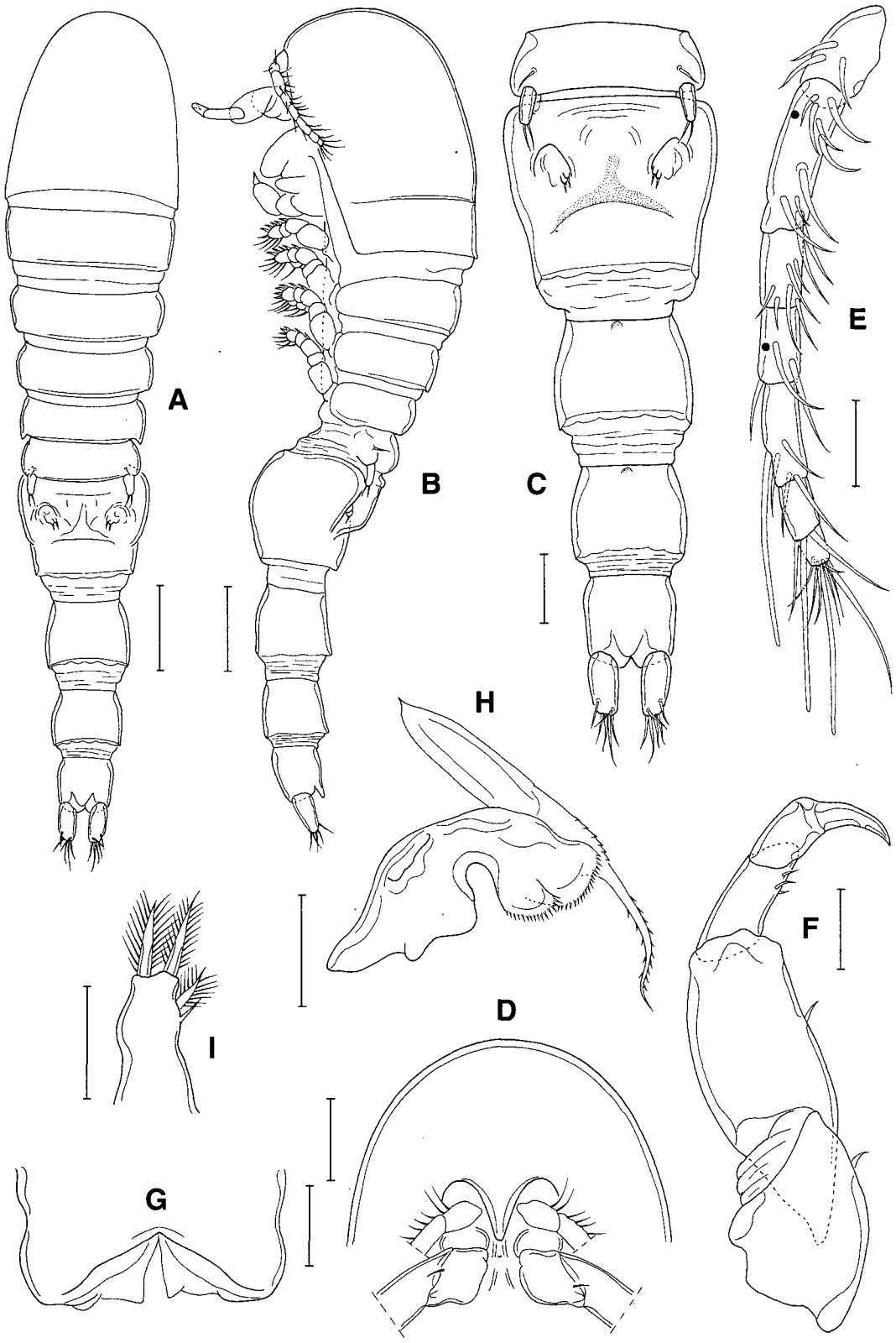

Fig. 8. *Sociellus geminus* n. sp. female. A, habitus, dorsal; B, habitus, lateral; C, urosome, dorsal; D, rostral area, ventral; E, antennule (dots represent places of addition of aesthetasc in male); F, antenna; G, labrum; H, mandible; I, maxillule. Scale bars= 0.1 mm (A, B), 0.05 mm (C, D), 0.02 mm (E-I).

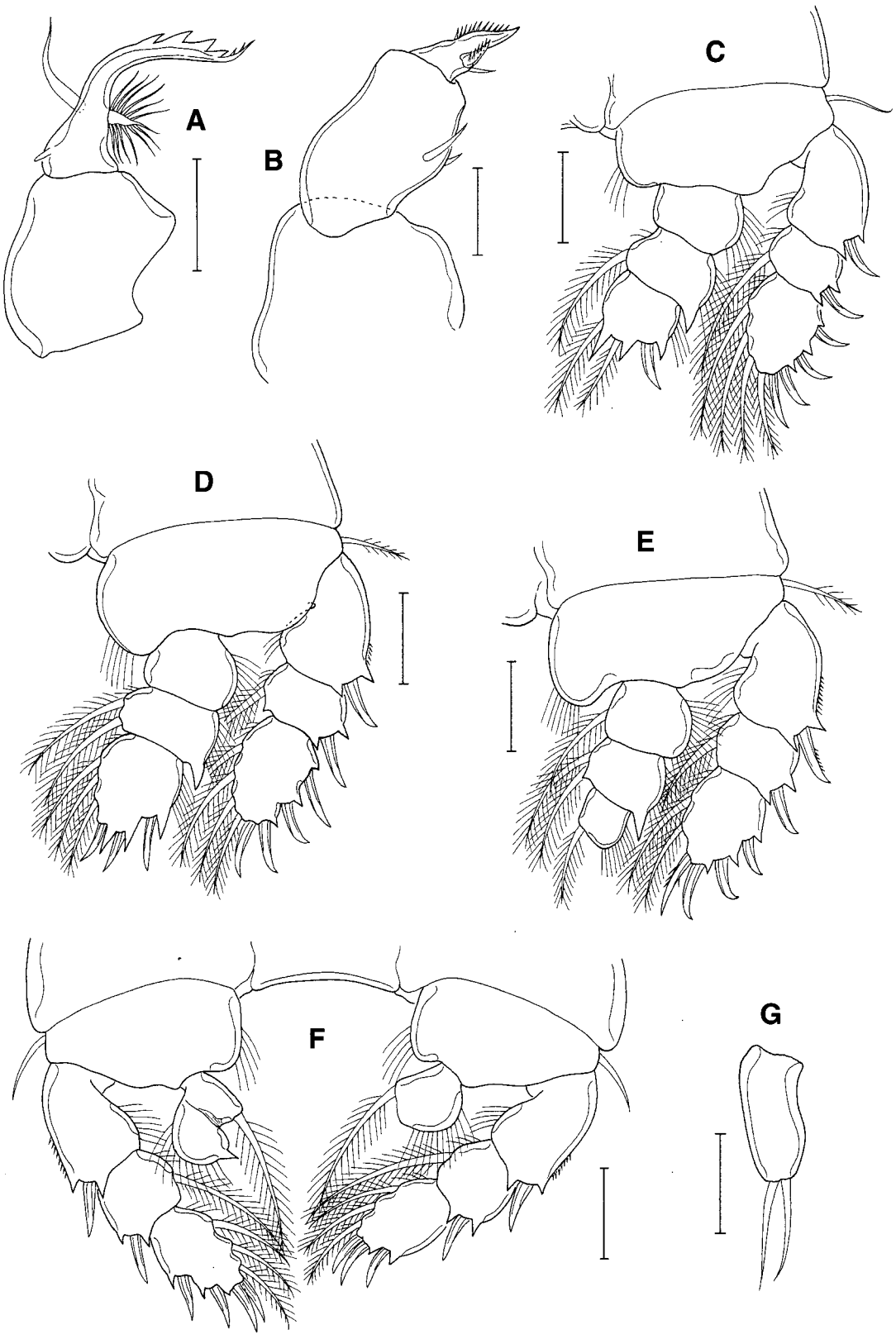

Fig. 9. *Sociellus geminus* n. sp. female. A, maxilla; B, maxilliped; C, leg 1; D, leg 2; E, leg 3; F, pair of leg 4; G, free segment of leg 5. Scale bars=0.02 mm.

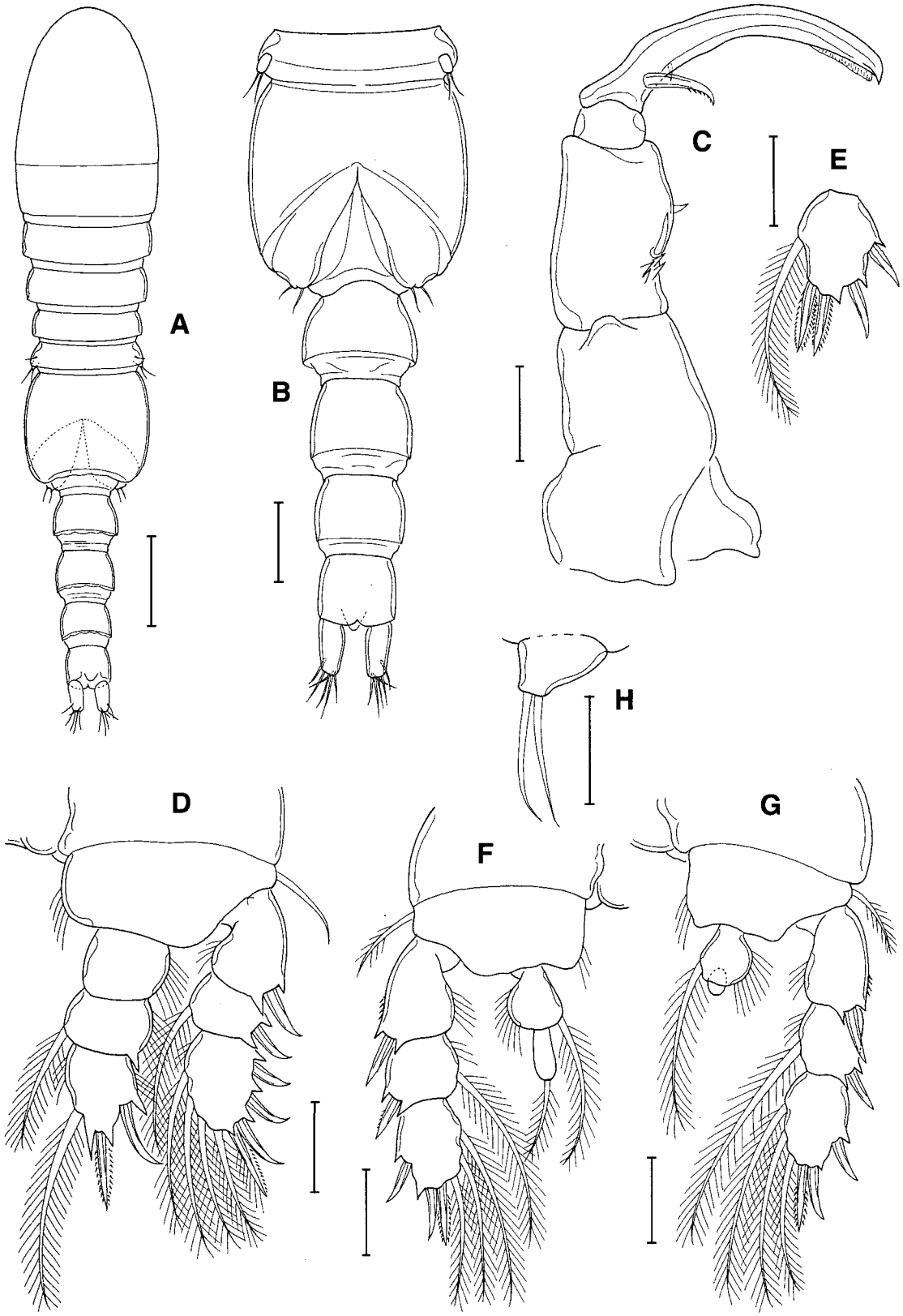

Fig. 10. *Sociellus geminus* n. sp. male. A, habitus, dorsal; B, urosome, ventral; C, maxilliped; D, leg 1; E, third exopodal segment of leg 3; F, G, leg 4; H, free segment of leg 5. Scale bars=0.1 mm (A), 0.05 mm (B), 0.02 mm (C-H).

spinules on both margins. Maxillule (Fig. 8I) armed subterminally with 1 smooth setiform element, 1 plumous subdistal seta and 2 plumous apical setae. Maxilla (Fig. 9A) with unarmed first segment. Second segment with 1 small blunt proximal seta, relatively large anterior seta, and inner seta ornamented with large setules. Lash with 6 serrations on convex margin, distal 2 of them small and spiniform. Maxilliped (Fig. 9B) 3-segmented. First segment expanded but unarmed. Second segment with 2 unequal setae (13 and 4 μm respectively) on inner side. Third segment tapering, with spinules on outer side of spiniform process, 1 spiniferous spine and 1 small seta.

Legs 1-3 (Fig. 9C-E) with 3-segmented exopod and endopod. Leg 4 (Fig. 9F) with 3-segmented exopod and 1- or 2-segmented endopod. Setation of legs 1 and 4 variable. Spines on legs simple, without lateral serration. Legs 1-4 lacking inner coxal seta. Armature formula of legs 1-4 as follows:

Leg 1: coxa 0-0; basis 1-0; exp. I-0; I-1; III, I, 4;
enp. 0-0; 0-1; I, 2 or I, 3
Leg 2: coxa 0-0; basis 1-0; exp. I-0; I-1; II, II, 4;
enp. 0-0; 0-2; III, 3
Leg 3: coxa 0-0; basis 1-0; exp. I-0; I-1; II, II, 2;
enp. 0-1; 0-2; 1
Leg 4: coxa 0-0; basis 1-0; exp. I-0; I-1; I, II, 3 (or II, II, 3);
enp. 1 (or 0-1; 0)

Leg 5 located dorsally (Fig. 8C); its free segment small, 26 × 12 μm with 2 naked terminal setae of 21 and 20 μm long respectively. Leg 6 represented by 2 small setae in genital area (Fig. 8C).

Male. Body (Fig. 10A) resembling that of female. Body length 765 μm (another specimen 754 μm). Urosome (Fig. 10B) 6-segmented. Fifth pedigerous somite 123 μm wide. Genital somite 133 × 135 μm, with rounded posterolateral corners. Four abdominal somites 55 × 70, 58 × 63, 50 × 57, and 42 × 47 μm respectively from anterior to posterior. Caudal ramus 33 × 15 μm, ratio 2.20 : 1.

Rostrum as in female. Antennule added by 2 aesthetascs: 1 on second segment proximally and 1 on fourth segment. Antenna as in female.

Labrum, mandible, maxillule, and maxilla as those of female. Maxilliped (Fig. 10C) 4-segmented. First segment longest but unarmed. Second segment with 2 unequal inner setae and 4 spinules on proximal part of inner side. Third segment short and unarmed. Fourth segment as claw, 63 μm long, evenly curved, proximally with 1 small and 1 larger setae.

Third endopodal segment of leg 1 (Fig. 10D) armed with 2 spines and 1 seta (formula I, I, 1). Third exopodal segment of leg 3 (Fig. 10E) with 4 spines and 1 seta or 4 spines and 2 setae (formula II, II, 1 or II, II, 2). Leg 4 (Fig. 10F, G) with 3 spines and 3 setae on third exopodal segment; endopod variable in shape, 2-segmented, with armature formula 0-1; 1 or 0-1; 0. Free segment of leg 5 very small, located ventrolaterally, strongly tapering, 12 × 16 μm, with 2 setae of identical length (25 μm). Leg 6 represented by 2 small setae on posterior margin of genital flap (Fig. 10B).

Etymology. The specific name *geminus* is a Latin meaning "twin". It alludes to the sharing the same species of the coral host, *Gardineroseris planulata*, by the new species and its congener *S. torus*.

Remarks. The genus *Sociellus* has been a monotypic genus in the Rhynchomolgidae, known by *S. torus* Humes, 1992 from the Great Barrier Reef, Australia, as an associate of *Gardineroseris planulata*. *Sociellus geminus* n. sp. is so similar to *S. torus* in body form and other major characters that they can not be placed in different genera. Unlike the original description, *S. torus* is considered to have a mandible of anchimolgid type as in *S. geminus*. *Sociellus* is herewith placed in the family Anchimogidae.

Sociellus geminus may be differentiated from *S. torus* by the following characters: 1) the larger body size with the length of 974 μm in the female (0.75-0.82 mm in *S. torus*); 2) the larger caudal rami with the size of 49 × 24 μm, the ratio 2.45 : 1, (29 × 18 μm, the ratio 1.61 : 1, in *S. torus*); 3) the presence of four elements on the maxillule (only two setae in *S. torus*); 4) the possession of three spines and three setae on the third endopodal segment of leg 2 (three spines and two setae in *S. torus*); 5) the three-segmented endopod of leg 3 with setae (2-segmented without seta in *S. torus*); 6) the possession of four spines and two setae on the third exopodal segment of leg 3 (three spines and two setae or four spines and one seta in *S. torus*); 7) the possession of four spines and three setae or three spines and three setae on the third exopodal segment of leg 4 (three spines and two setae or two spines and two setae in *S. torus*).

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