

Alteuthoides affinis, a New Peltidiid Copepod (Harpacticoida) Associated with the Sponge from Cheju Island, Korea

Sa Heung Kim and Won Kim*

Department of Molecular Biology, Seoul National University, Seoul 151-742, Korea

Key Words:

Copepoda
Harpacticoida
Peltidiid
Alteuthoides
New species
Callyspongia

A new species of harpacticoid copepod *Alteuthoides affinis* associated with the sponge *Callyspongia elegans* (Thiele) was collected from offshore waters of Cheju Island, Korea, and is described with illustrations. In this genus, only one species, *A. kootare* Hicks, has been known to occur in association with an hexacnellid sponge from New Zealand. The new species is similar to *A. kootare* in the general morphologies such as the shape of body, oral appendages, and thoracic legs. However, it can be separated from *A. kootare* by the expanded genital double somite, P1 exopod bearing only one claw without reduced accessory nail, and acute rostrum.

Whereas roughly sixty peltidiid copepods are currently known to occur in intertidal and shallow subtidal macroalgae, only two species each belonging to the genera *Alteuthellopsis* Lang and *Alteuthoides* Hicks are assigned to be copepod associates of marine invertebrates. Humes (1981) described the first animal-inhabiting species of this family, *Alteuthellopsis corallina*, from washings of the scleractinian corals collected in Madagascar, Indo-West Pacific. A number of adults, 189 females and 111 males, were found on various hard corals, suggesting that the association was not accidental. Recently, Hicks (1986) established a new genus *Alteuthoides* to accommodate a single species, *Alteuthoides kootare*. Many specimens, 44 females and 50 males, were collected from an hexactinellid sponge, *Symplectella rowi* Dendy, taken from 120 m off the east Coromandel Coast of New Zealand.

During an investigation of harpacticoids associated with sponges in offshore waters of Cheju Island, a new peltidiid copepod belonging to genus *Alteuthoides* was collected from washings of the sponge *Callyspongia elegans* (Thiele). The present new material occurs on high frequency compared with other harpacticoid copepods and reveals the specific relationship to the host. In this paper we describe this new species of *Alteuthoides*.

Materials and Methods

Sponges were collected from offshore waters of Munsum, Cheju Island, Korea by scuba diving at 15 to 35 m depth. In order to obtain the copepods the host

sponges were agitated in 10% ethylalcohol and the sediments were fixed with 4% formalin. The washings were then examined and the copepods were sorted out under a dissecting microscope. The copepods were dissected and measured in lactic acid. The drawings were made with the aid of a camera lucida.

The terminology is adopted mainly from Lang (1948, 1965). Mandibular gnathobase (Milke, 1984) is used instead of pars inciva, pars molaris, and lacina mobilis. The terminology of Boxshall (1985) for the segmental composition of mandible and maxilliped is followed.

Abbreviations used in the text and figures are: exp=exopod; enp=endopod; P1-P6=first to sixth legs.

Results

Alteuthoides affinis, new species (Figs. 1-4)

Material examined: 42 ♀♀ and 13 ♂♂ collected from 3 individuals of the sponge, *Callyspongia elegans* (Thiele), in offshore waters (about 30 m) of Munsumin, Cheju Island, Korea, on 21 August 1997. Holotype ♀, allotype ♂, and paratypes (20 ♀♀, 10 ♂♂) will be deposited in the U.S. National Museum of Natural History, Smithsonian Institution. Other paratypes including dissected paratypes are kept in the collection of authors.

Adult female: Body elipsoid as Fig. 1A, dorsoventrally depressed, tapering posteriorly, moderately vent in lateral view. Total length 0.84 mm (0.76-0.89 mm) except for rostrum and caudal setae, greatest width 0.51 mm (0.49-0.52 mm) measured at posterior margin of cephalothorax, based on 10 specimens. Dorsal integument of body ornamented with many small and

* To whom correspondence should be addressed.
Tel: 82-2-880-6695, Fax: 82-2-872-1993

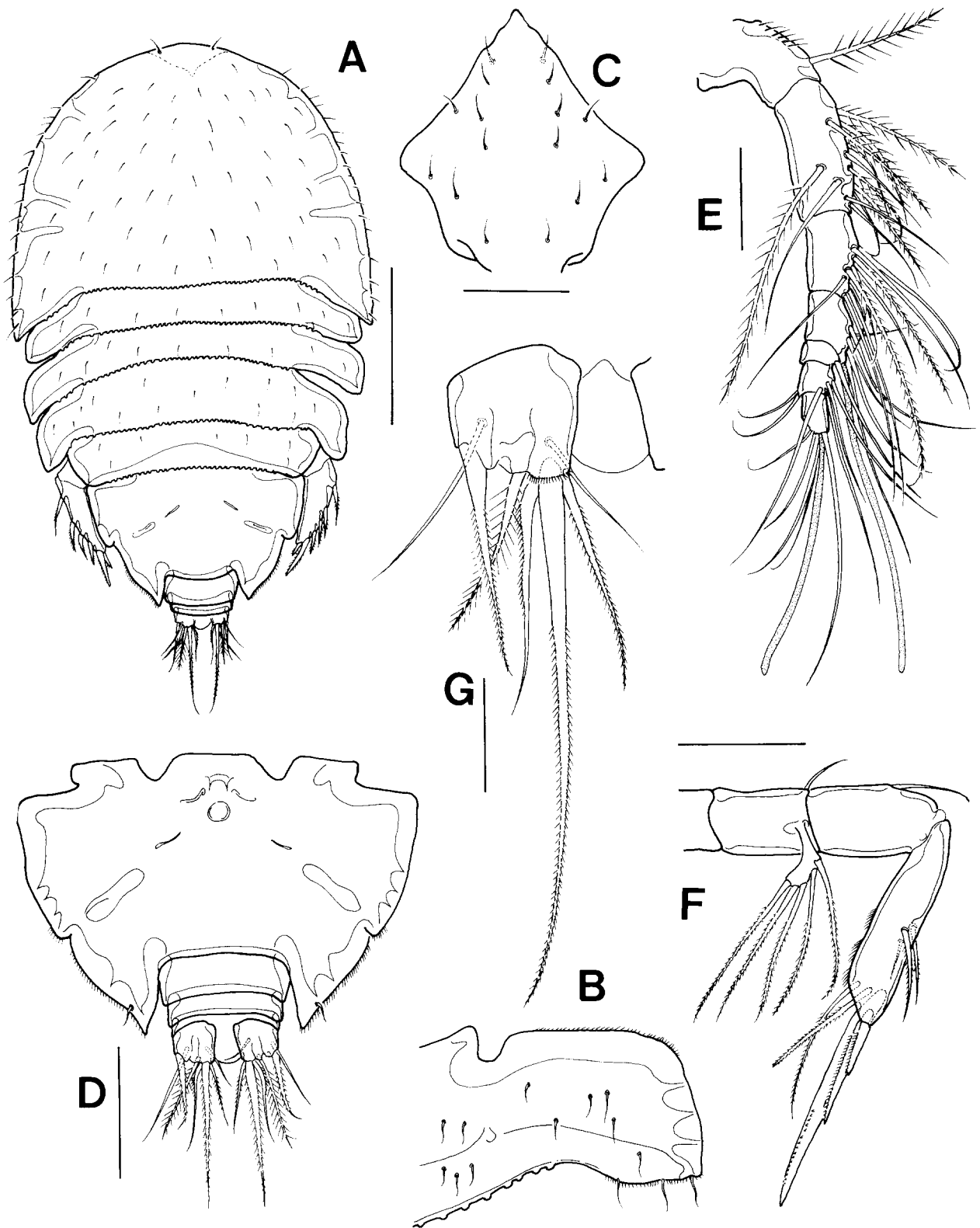


Fig. 1. *Alteuthoides affinis*, new species. Female. A, Habitus, dorsal. B, Second metasomite, right dorsal. C, Rostrum. D, Urosome, ventral. E, Antennule. F, Antenna. G, Caudal ramus. Scale bars=0.025 mm (G), 0.05 mm (C, E, F), 0.1 mm (D), and 0.2 mm (A).

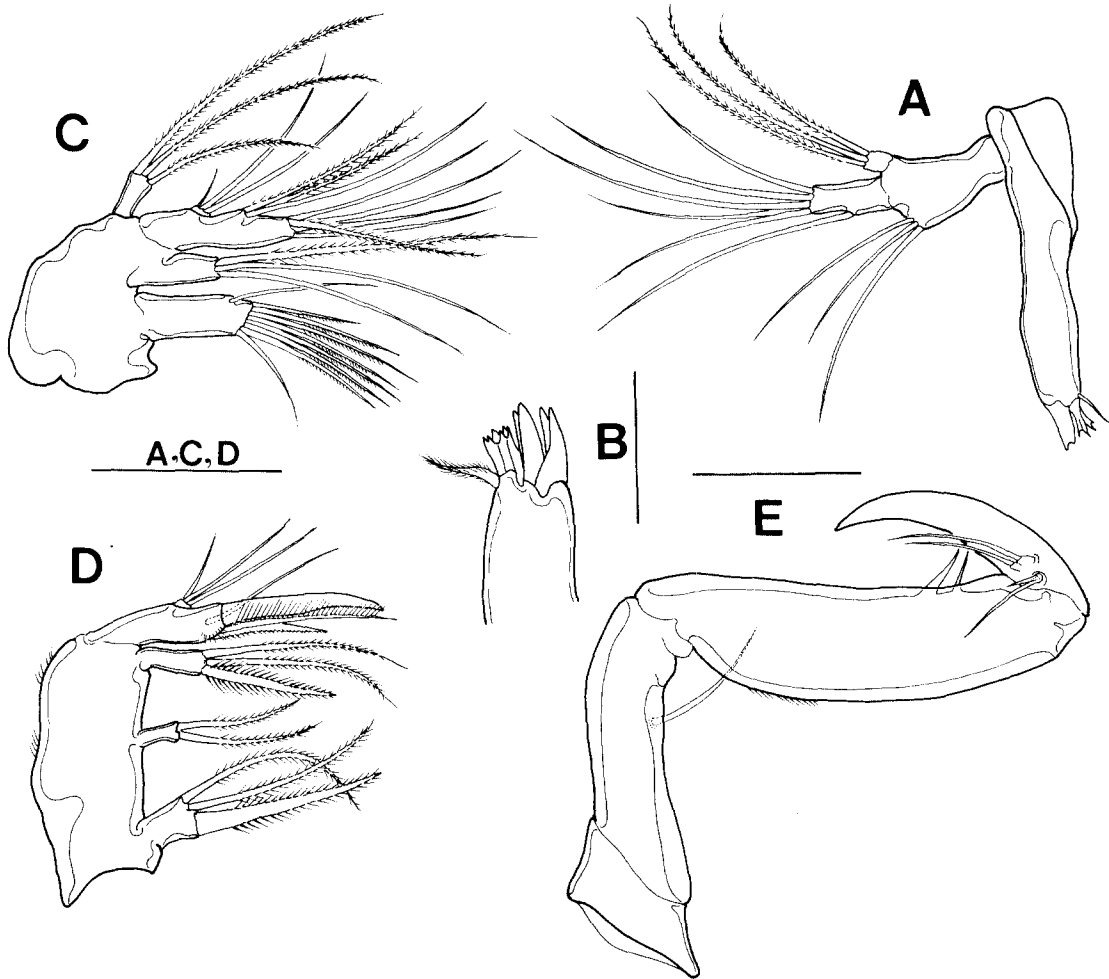


Fig. 2. *Alteuthoides affinis*, new species. Female. A, Mandible. B, Gnathobase of Mandible. C, Maxillule. D, Maxilla. E, Maxilliped. Scale bars=0.025 mm.

long hairs, not sculptured in reticulate pattern. Cephalothorax semicircular anteriorly, nearly as long as its width. Each somite of prosome including cephalothorax and somite of P5 serrated along posterior margin (Fig. 1D). Posterior epimeral areas of somites of P2-4 not pointed. Ratio of length of prosome to that of urosome 1.32 : 1. Rostrum triangular with highly acute tip. Genital double somite triangular, expanded laterally; lateral margin notched; posterior margin acute, nearly reaching beyond terminal margin of caudal rami. Genital field with circular and chitinous excrescences and 4 setae. Three urosomites small, with a sensilla on those of lateral corner; length of first urosomite about as long as that of following 2 somites. Caudal rami about as wide as long at greatest dimensions, with 7 setae, notched in distal margin.

Antennule (Fig. 1E) 7-segmented, stretched downward ventrally (not visible in dorsal view), nearly as long as width of body; segment 1 with marginal hairs posteriorly

and a plumose seta anterodistally; segment 2 largest. Formula: 1, 0, 0, 0+1 aesthetasc, 0, 0, 0+1 aesthetasc.

Antenna (Fig. 1F) with rectangular basis bearing a small seta posteriorly. Endopod 2-segmented; segment 2 with 3 medial and 2 distal setae, and 3 lightly serrate claws. Exopod 1-segmented, with 2 inner-lateral and 3 distal setae.

Mandibular coxa (Fig. 2A) elongate, with gnathobase (Fig. 2B) bearing 1 seta and several processes. Coxa-basis with 3 smooth setae. Endopod relatively well development, 2.3 times longer than that of exopod, with 1 medial and 5 distal smooth setae. Small exopod with 3 finely barbed setae.

Precoxal arthrite of maxillule (Fig. 2C) elongate, with 9 spine-like setae. Coxa somewhat shorter than precoxa, with 3 distal setae; coxal exopodite. Basis about double length of coxa, with 3 medial and 5 distal setae. Endopod rudimentary with 3 setae. Exopod well developed with 3 barbed setae.

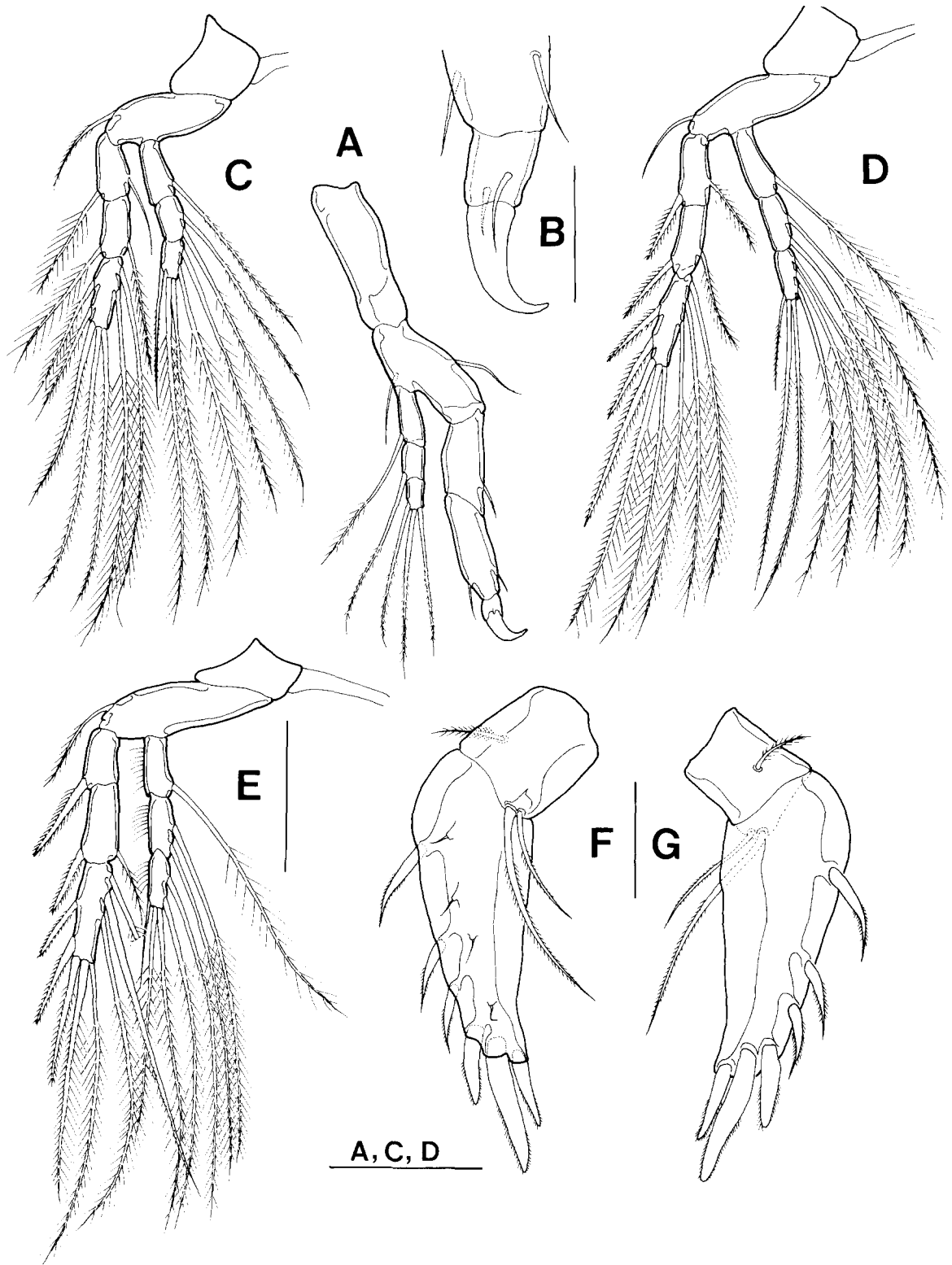


Fig. 3. *Alteuthoides affinis*, new species. Female. A, P1. B, Third segment of P1. C, P2. D, P3. E, P4. F, P5, ventral. G, P5, dorsal. Scale bars=0.025 mm (B) and 0.05 mm (A, C-G).

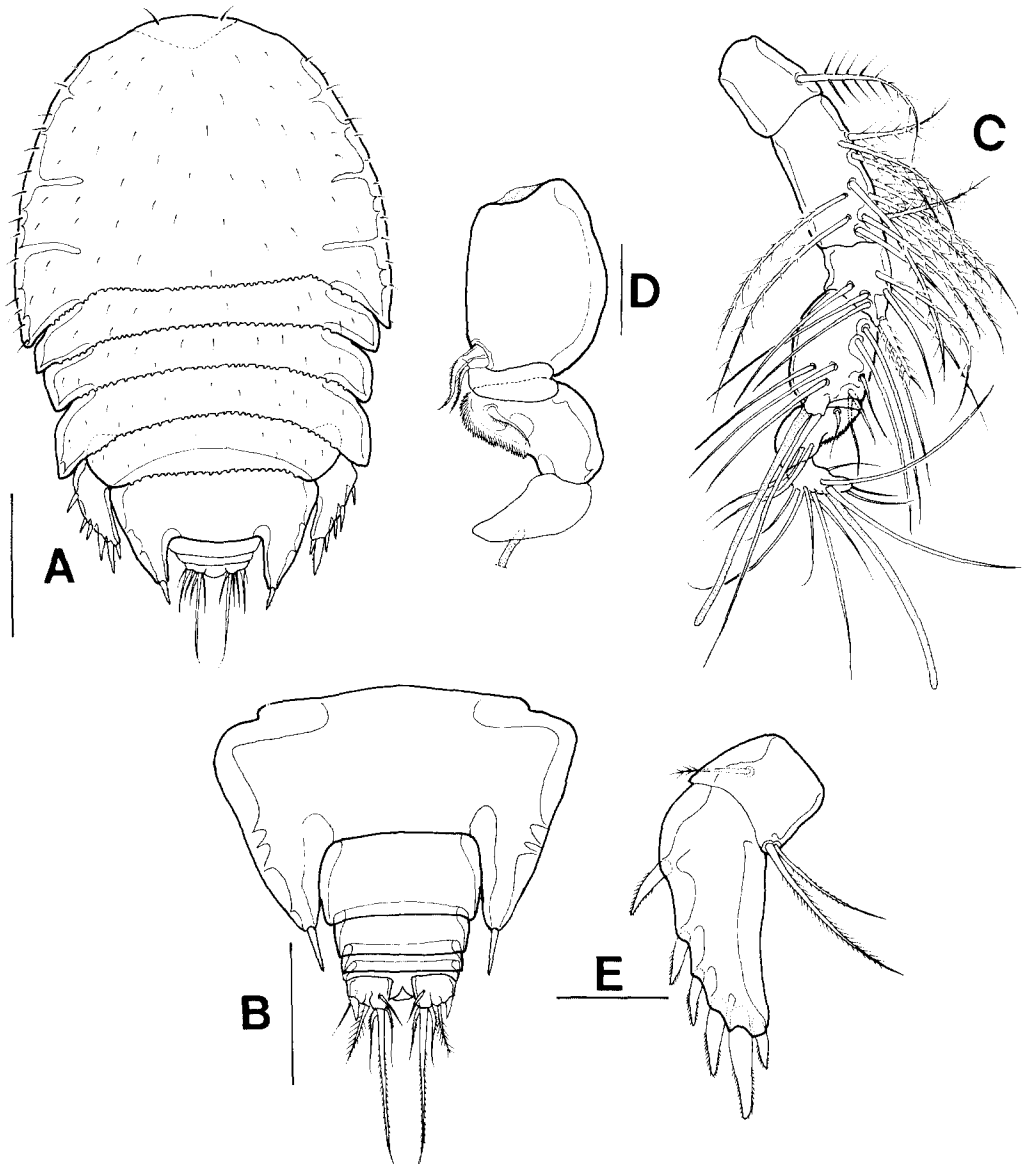


Fig. 4. *Altheuthoides affinis*, new species. Male. A, Habitus, dorsal. B, Urosome, ventral. C, Antennule. D, P5, ventral. Scale bars=0.025 mm (D), 0.05 mm (C, E), 0.1 mm (B), and 0.2 mm (A).

Maxilla with rectangular syncoxa bearing 3 endites; proximal endite largest, with 3 setae; medial one small, with 2 setae; distal one slender and long with 3 setae. Basal endite with a claw like spine and 4 setae; of these distal seta spiniform and others normal. Endopod rudimentary with 3 smooth setae.

Maxilliped (Fig. 2D) prehensile, large compared with other oral appendages. Syncoxa elongate, with a seta. Basis elongate, nearly 4 times as long as wide; inner edge of palm nearly platness, with 2 spines in distal half; outer edge moderately concave with fine hairs anteriorly. Endopod represented by a strong claw reaching nearly half of palm; 4 smooth setae present

near base of claw.

P1 (Figs. 3A, B) coxa elongate, rectangular, about 3 times as long as wide. Basis with a naked seta, another placed near base of endopod. First and second exopodal segments equal in length. Diminutive third segment (Fig. 3B) with only one recurved terminal claw, without any accessory process and spines. P2-P4 (Figs. 3C-E) with 3-segmented exopods and endopods; outer margin of P2 exopodal segments with elongate plumose setae instead of spines. Armature formulae for P2-P4 as follows:

P2 exp 1 : 1 : 2 2 3 enp 1 : 2 : 2 2 1

P3 exp 1 : 1 : 3 2 3 enp 1 : 2 : 3 2 1
P2 exp 0 : 1 : 3 2 3 enp 1 : 2 : 2 2 1

P5 (Figs. 3F, G) 2-segmented with complete suture. Baseoendopod nearly square, with 2 elongate ventral setae and a small dorsal seta. Exopod slightly curved, tapering distally, about twice as long as basal width; dorsal surface smooth, with 4 small setae along medial part longitudinally; lateral and distal margin with 6 stout spines.

Adult male: General body form (Fig. 4A) as in female. Total length 0.63 mm (0.58-0.65 mm), greatest width 0.42 mm (0.39-0.43 mm). Second and third prosomites nearly equal in width. Ratio of length of prosome to that of urosome 1.32 : 1. Rostrum as in female. Genital somite (Fig. 4B) tapering posteriorly, about twice wider than that of first free urosomite, posterior tip reaching behind posterior margin of following somite or over it. Genital somite and 4 postgenital somite nearly equal length. First free urosomite about as long as width of following 3 somites. Caudal ramus 1.2 times as wide as long, distal margin and setation as in female.

Antennule (Figs. 3C, D) prehensile, 7-segmented; fourth and seventh segments with aesthetascs; fifth segment very small; sixth segment with a row of chitinous cleat.

A2, Md, Mx 1, Mx 2, Mxp, and P1-P4 very like that of female.

P5 (Fig. 4E) as in female, but somewhat differing from female in having smaller size and more obtuse marginal spine.

Etymology: The specific name is from the Latin *affinis* (=akin to), alluding that the new species is very similar to *Alteuthoides kootare* Hicks, 1986.

Remarks: Recently, Hicks (1986) established a new genus *Alteuthoides* to accommodate a single species, *Alteuthoides kootare*, collected from an hexactinellid sponge, *Symplectella rowi* Dendy, in the offshore waters of New Zealand. This peltidiid genus is mainly characterized by the morphology of maxilliped, 2-segmented P5 and a single terminal claw of P1 with a reduced accessory nail. The new species shares with *A. kootare* in common characters such as the general body form, the similar leg armatures, the shape of female caudal rami bearing the notched distal margin, and the almost identical morphology of male. However, the new species is clearly separated by several morphological characteristics. In the generic diagnosis of *Alteuthoides*,

Hicks (1986) mentioned the significance of P1 exopod bearing only one claw with reduced accessory armature. Although the new species bears a single claw, it has not any accessory process. The posterior end of genital double somite is reaching near caudal ramus in the new species, but *A. kootare* is restricted to the end of the first free urosomite. And the tip of rostrum is more acute than that of *A. kootare*. Although several variations occur on the shape of the rostrum, expansion of genital double somite, and P1 claw, these characteristics mentioned above are useful and significant differences compared with *A. kootare*. Other minor differences were found on the mouth parts and P2 as follows. (1) There are two spines on the inner margin of the basis of maxilliped but only one spine in *A. kootare*. (2) Exopod of mandible is distinctly larger than that of *A. kootare*. (3) Well-developed plumose setae arise on the outer margin of P2 exopodal segments, but those of *A. kootare* are typical spines according to Hicks' illustration. (4) In the marginal spines of P5, the distance of the first to second is about 2 times compared with the second to third, but in *A. kootare* is nearly equal in distance. In Korea, the host sponge, *Callyspongia elegans* (Thiele), is commonly found from the shallow water due to warm current. It is likely that the new species is to be found throughout the range of the sponge host with high frequency and specificity.

Acknowledgements

This study was supported by the grants from the Education of Ministry (96-0184), Seoul National University Research Fund (97-06-2086), and Korea Science and Engineering Foundation through the Research Center for Cell Differentiation (97K3-0401-03-03-1).

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[Received March 28, 1998; accepted April 20, 1998]