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Copepoda Poecilostomatoida associated with Bivalvia from New Guinea

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Abstract

Four species of Copepoda Poecilostomatoida are recorded from the mantle cavity of bivalve molluscs collected in West New Guinea (Irian Barat, Indonesia). Two of these are new to science: *Pseudanthessius dimorphus* and *Lichomolgus hoi* n. spp.

Introduction, material and locality

Through the courtesy of the late Mr A. Stiva (Amsterdam), I received a small collection of Copepoda found in the mantle cavity of marine Bivalvia from the intertidal zone of Serui, on the island of Japen, Irian Barat (= West New Guinea), Indonesia. The hosts were collected in 1957 by Mr D. Smits, to whom I am indebted for placing his material in the hands of Mr R. G. Moolenbeek, keeper of Molluscs of the Zoölogisch Museum, Amsterdam (ZMA), who kindly provided me with their names. The copepods have been deposited in the same museum.

The four species of copepods present in the Smits' collections belong to four different families, all of the suborder Paecilostomatoida. Two species were previously known, two others are new to science.

Descriptive part

Family Clausidiidae

Leptinogaster digita Kim & Ho, 1991. Fig. 1.
Kim & Ho, 1991: 2–6, Figs 1–3.

Material. 2♀, 2♂, from *Solen (Solen) corneus* Lamarck, 1818 (ZMA Co. 201.456).

Remarks. *L. digita* was recently described by Kim & Ho from another species of *Solen*, *S. grandis* Dunker,

from the Korean part of the Yellow Sea. The present New Guinean material agrees with *L. digita* in most, but not all respects. Points of agreement are: body shape, length of caudal rami, structure of antennae 1 and 2, mouthparts, paragnath, maxilliped, leg 5 and chaetotaxis of legs 2 to 4. The chaetotaxis of leg 4 agrees with Kim & Ho's Fig. 3B, but disagrees with their description (the third endopodite segment is armed III-2 in our material, as in the figure of the Korean material, but the text gives III-3 as armature).

The most marked difference is found in the genital segment of the female, which bears a shortish, bilobed protrusion in the Korean specimens, against 3 discrete finger-shaped processes, the largest of which being very long, in the New Guinean material (Fig. 1c). Slight differences are furthermore observed in (1) body size (♀ from Korea 3.97–4.50 mm long, 1.00–1.13 mm wide, ♂ 2.97–3.91 mm long; ♀ from New Guinea 3.32 mm long and 0.89 mm wide, ♂ 2.40 mm long); (2) third segment of the exopodite of leg 1 (laterobasal element plumose in New Guinean material, see Fig. 1a, against smooth and spiniform in Korean material); (3) shape of coxopodites of legs 2 to 4 (broadly rounded in New Guinean material, see Fig. 1b), against drawn out into a narrow, tapering point in Korean material).

For the moment, I do not attach taxonomic importance to these differences, in the light of the overwhelming degree of similarity between Korean and New Guinean specimens.

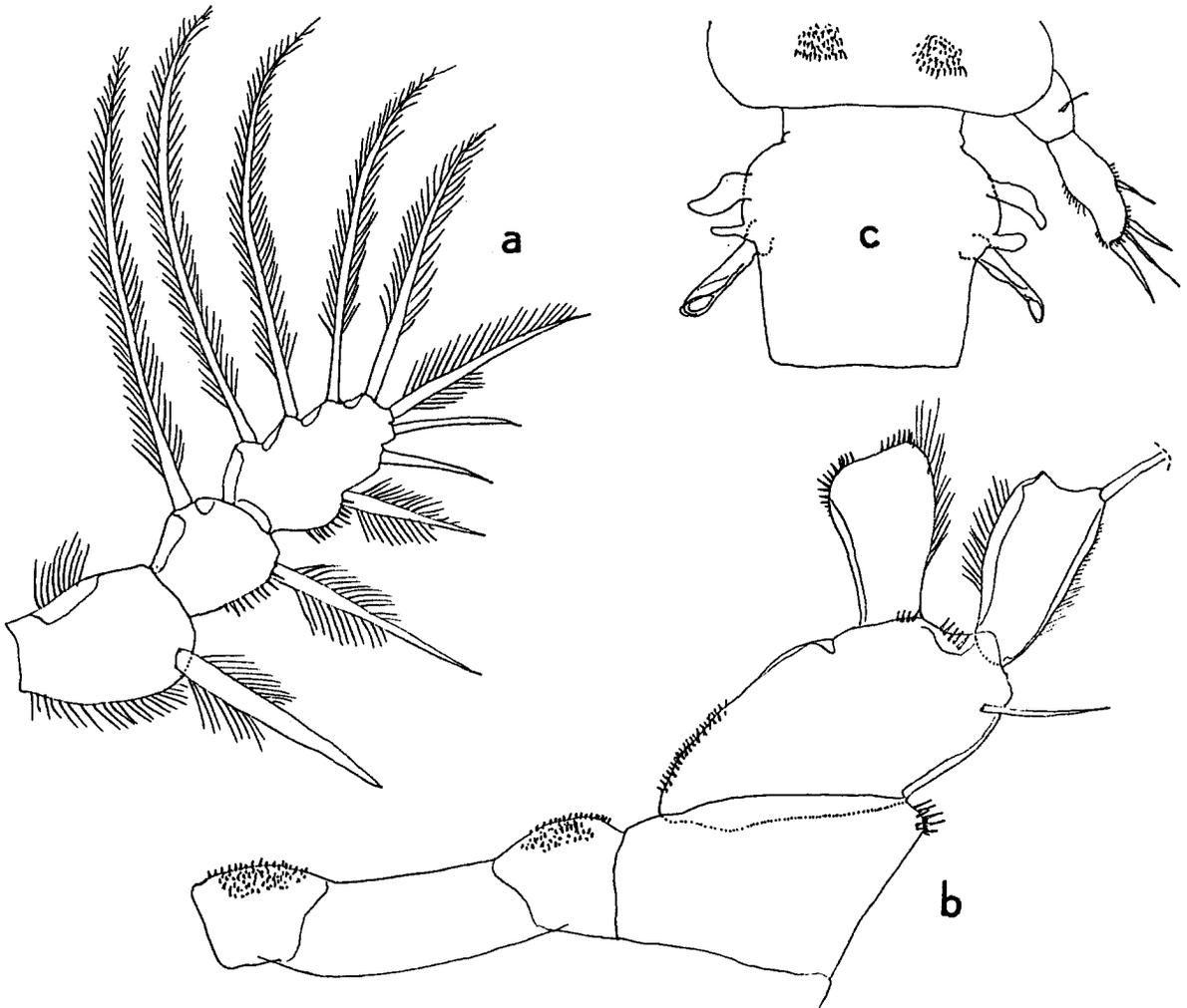


Fig. 1. *Leptinogaster digita* Kim & Ho, 1991, ♀. a, exopodite of leg 1 (scale 4); b, basal part of leg 3 (2); c, fifth leg and genital segment (1). Scales on Fig. 3.

Family Anthessiidae

Anthessius saecularis Stock, 1964
Stock, 1964: 113–117, Figs 1–4.

Material. 1 non-adult specimen, from *Tapes literatus* (Linnaeus, 175) (ZMA Co. 201.457).

Remarks. This species was described by Stock from the same host and the same locality. The additional specimen was discovered while examining the residue on the bottom of the jar in which the host molluscs were preserved.

Family Lichomolgidae

Lichomolgus hoi n.sp. Figs 2–3.

Material. 1 ♀ holotype) and 4 ♀ (paratypes), from *Antigona (Periglypta) puerpera* (Linnaeus, 1771) (= *Venus puerpera* L.) (ZMA Co. 201.458).

Description. Female. Body length 1.22–1.23 mm, greatest width of cephalosome 0.54–0.59 mm. Cephalosome widest segment urosome less than half as long as cephalosome + metasome (Fig. 2a). Genital segment (Fig. 2b) widest posterior to middle, distinctly narrowed behind genital opening; urosome segment 4 ventrally with 5 hyaline spinules, left and right on pos-

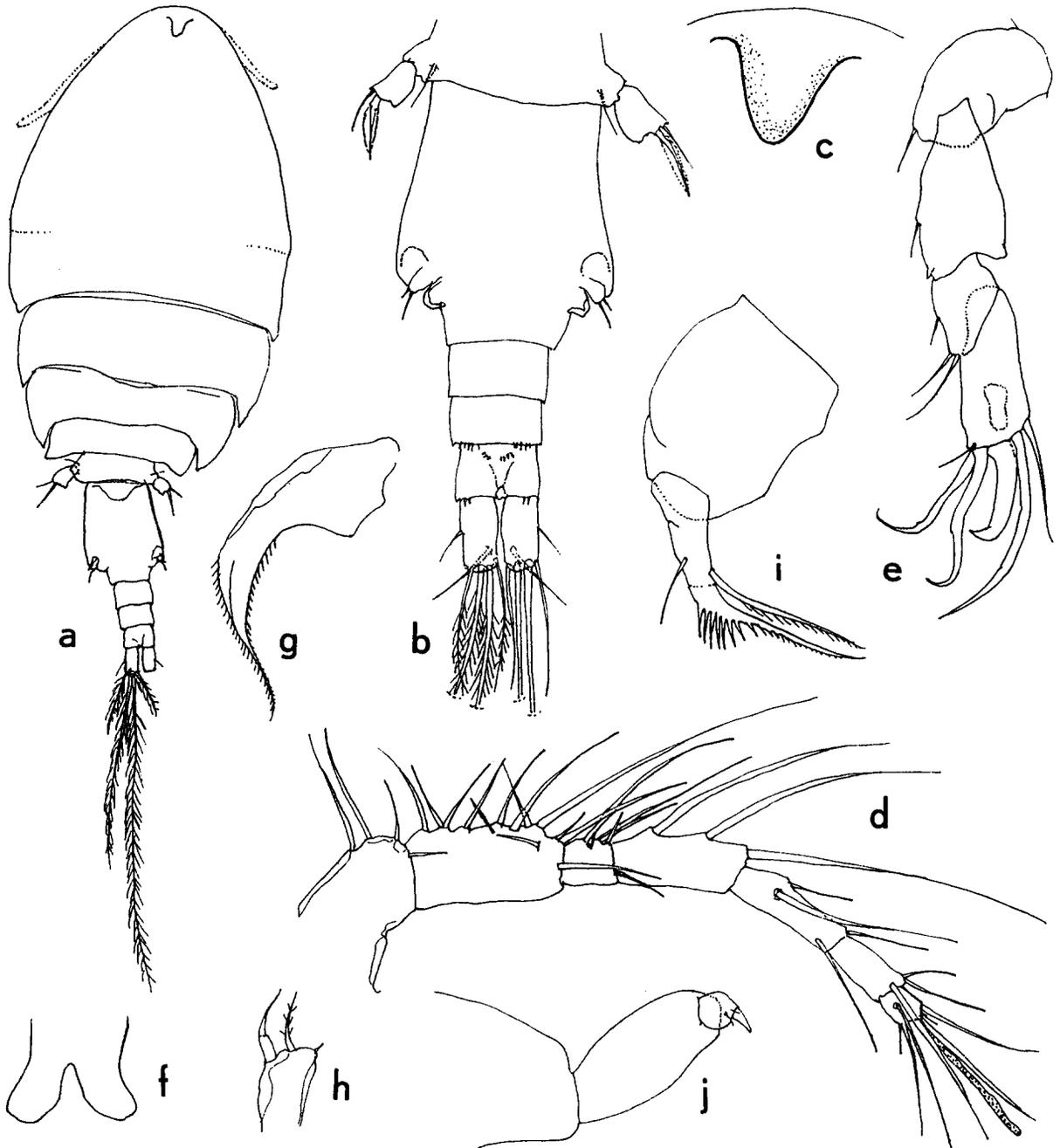


Fig. 2. *Lichomolgus hoi* n. sp., ♀. a, body, dorsal (scale 1); b, urosome, ventral (2); c, rostrum, ventral (4); d, antenna 1 (4); e, antenna 2 (4); f, labrum (2); g, mandible (3); h, maxilla 1 (3); i, maxilla 2 (3); j, maxilliped (3). Scales on Fig. 3.

terior margin; urosome segment 5 ventrally with 3 or 4 hyaline spinules left and right, near anterior margin and close to body axis; segment 5 moreover with 2 ventral spinules left and right on posterior margin. Caudal ramus $60 \times 29 \mu\text{m}$ (about twice as long as wide); lateral seta implanted slightly before middle; dorsal seta

long; 4 plumose distal setae 7 of which two longest longer than urosome (Fig. 2a, b).

Rostrum (Fig. 2c) tapering rounded lobe. Antenna 1 (Fig. 2d) rather slender; chaetotaxis 4, 13, 5, 3, 4, 3, 6 + 1A; distal segment small, as long as wide.

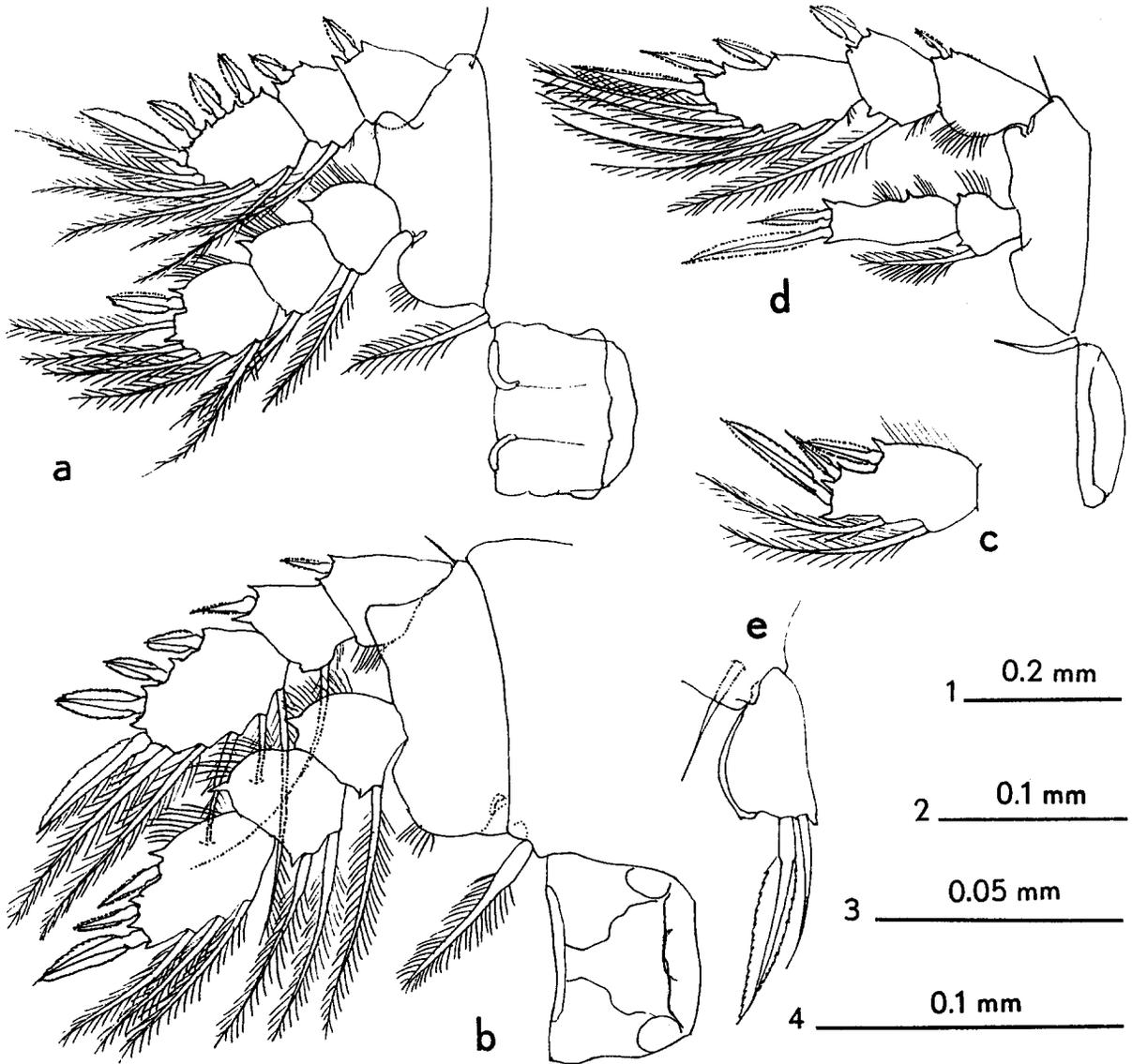


Fig. 3. *Lichomolgus hoi* n.sp., ♀. a, leg 1 (scale 4); b, leg 2 (4); c, distal endopodite segment of leg 3 (4); d, leg 4 (4); e, leg 5 (3).

Antenna 2 (Fig. 2e): segment 1 with 1 mediobasal seta; segment 2 with 1 seta in middle of medial margin, and small mediobasal lobe; segment 3 with 3 setae; segment 4 short in comparison with related species, distally with 1 strong claw, 3 claw-like setae, 1 shorter lateral seta, and 1 very small medial seta.

Labrum (Fig. 2f) bilobed. Mandible (Fig. 2g) with slender base, gradually merging into long, slender lash; proximal part of convex margin unornamented; distal part and concave side with fine spinules. Maxilla 1 (Fig. 2h) with 3 distal elements: a strong spine, a plumose seta, and a minute spinule. Maxilla 2 (Fig. 2i)

with unarmed basal segment and 2 distal lashes; main lash with long, slender teeth in proximal part, very small teeth in distal part; auxiliary lash almost setiform, with fine setules on one margin. Maxilliped (Fig. 2j) with two unarmed basal segments; distal segment globular, with short claw and 2 setules.

Legs 1 to 4 (Fig. 3a–d) as usual in the genus. Legs 2 and 3 similar, but for armature of 3rd endopodite segment. Second endopodite segment of leg 4 with 1 sharp lateral tooth and 2 very unequal distal spines. Chaetotaxis formula of legs 1 to 4:

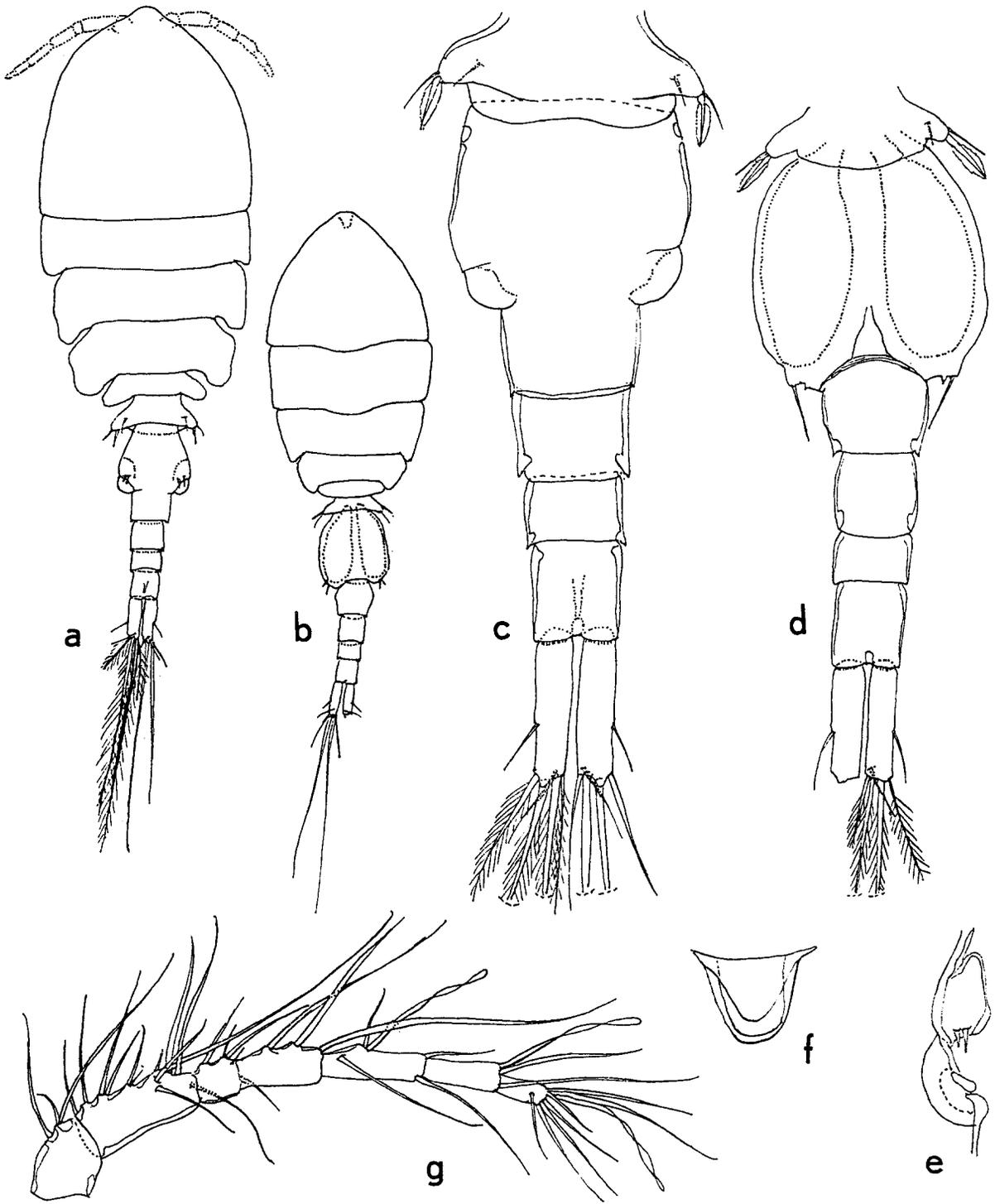


Fig. 4. *Pseudanthessius dimorphus* n.sp. a, female, dorsal (scale 5); b, male, dorsal (5); c, urosome, ♀, ventral (6); d, urosome, ♂, ventral (5); e, left genital area, ♀, dorsal (2); f, rostrum, ♀, ventral (2); g, antenna 1, ♀ (4). Scales on Figs 3 and 6.

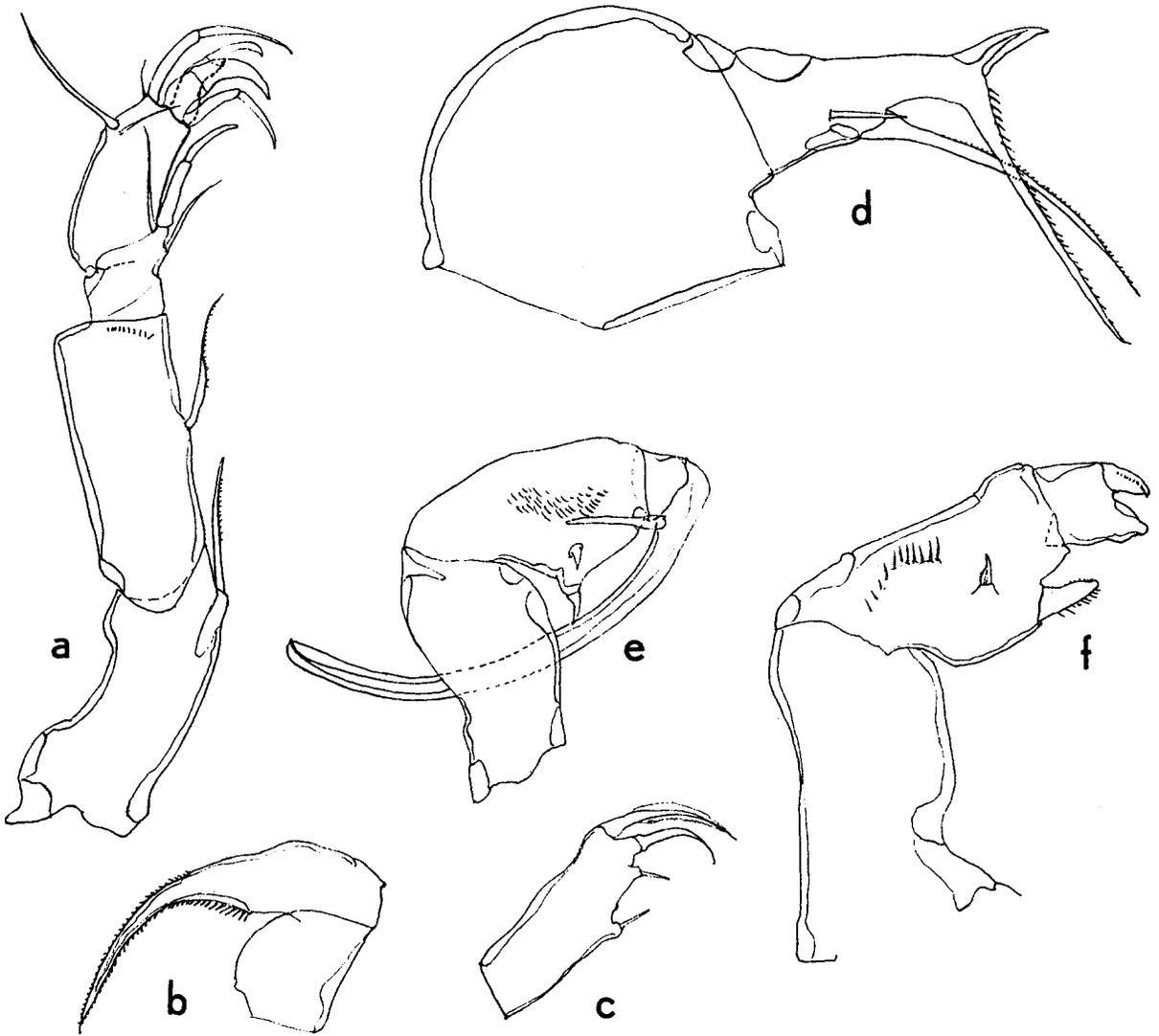


Fig. 5. *Pseudanthessius dimorphus* n.sp. a, antenna 2, ♀ (scale 4); b, mandible, ♀ (4); c, maxilla 1, ♀ (3); d, maxilla 2, ♀ (3); e, maxilliped, ♂ (3); f, maxilliped, ♀ (3). Scales on Fig. 3.

coxp. basp. exp.			enp.
P1	0-1	1-0; I-0; I-1; III-I-4	0-1; 0-1; I-5
P2	0-1	1-0; I-1; III-I-5	0-1; 0-2; III-3
P3	0-1	1-0; I-1; III-I-5	0-1; 0-2; III-2
P4	0-1	1-0; I-0; I-1; II-1-5	0-1; II.

Fifth leg (Fig. 3e) $42 \times 23 \mu\text{m}$, with strongly convex, unnotched medial margin and almost straight lateral margin; one strong distomedial spine and slightly shorter distolateral seta. Sixth leg represented by 2

unequal setules, placed on lobe behind genital aperture (Fig. 2b).

Ovisacs and male unknown.

Etymology. This species is named in honour of Dr Jushy Ho, of Long Beach, California, in recognition of numerous fine contributions on copepods.

Remarks. Humes & Stock (1973: 190) provided a key to the 18 species classified at that time with *Lichomolgus* s. str. They removed many species formerly attributed to *Lichomolgus* to other genera. After 1973, the following species of *Lichomolgus* have been

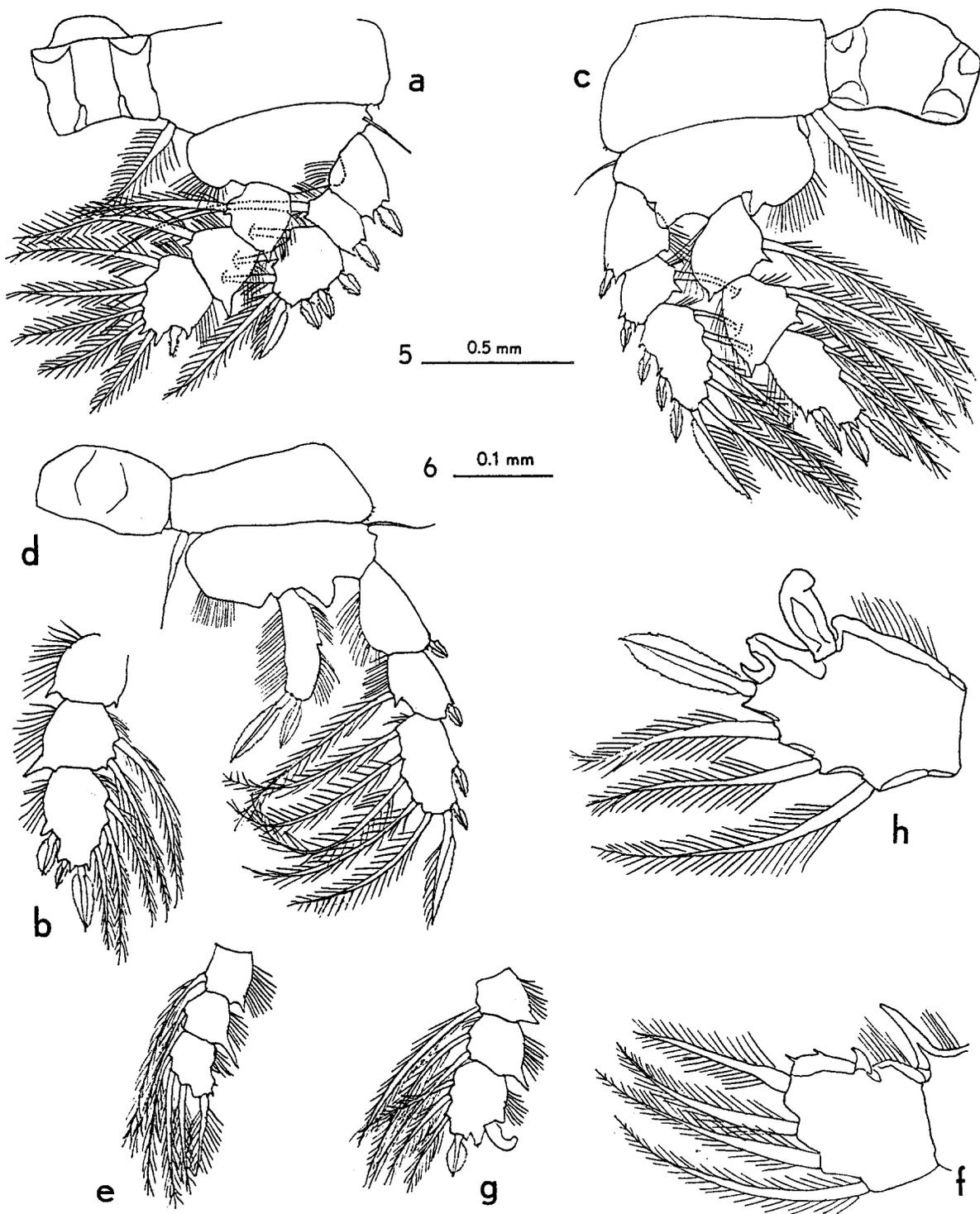


Fig. 6. *Pseudanthessius dimorphus* n.sp. a, leg 1, ♀ (scale 2); b, endopodite of leg 2, ♀ (2); c, leg 3, ♀ (2); d, leg 4, ♀ (2); e, endopodite of leg 1, ♂ (2); f, distal part of endopodite of leg 1, ♂ (3); g, endopodite of leg 2, ♂ (2); h, distal segment of endopodite of leg 2, ♂ (3). Scales on Fig. 3.

described: *L. bidentipes* Ho, 1980, *L. eganae* Gotto, 1975, *L. hippopi* Humes, 1976, *L. nakaii* Matsuzaki & Ogawa, 1989, *L. sadoensis* Ho, 1980, *L. similis* Ho & Kim, 1991, and *L. uncus* Jones, 1976.

Lichomolgus hoi n.sp. does not pass couplet 5 of the key of Humes & Stock (1973), since it does not comply with either article of the couplet. None of the more recently described species fits *L. hoi* either. The new species is characterized by a unique combination of characters: the shape of the genital segment, the short distal segment of antenna 1, the not very slender distal segment of antenna 2, the presence of 1 strong claw and 3 claw-like setae on the distal segment of antenna 2, the bulbous shape of leg 5, and the length/width ratio of the caudal ramus. Especially the shape of leg 5 of the new species is characteristic. The new species confirms the host preference shown by most members of *Lichomolgus*: tunicates and bivalves.

Family Pseudanthessiidae

Pseudanthessius dimorphus n.sp. Figs 4–6.

Material. 1 ♀ (holotype), 1 ♂ (allotype), 2 juveniles. From *Lutraria (Psammophila) australis* Reeve, 1854 (= *Lutraria philippinarum* Reeve, 1854) (ZMA Co. 201.459).

Description. Female: Body (Fig. 4a) length 1.83 mm, greatest width cephalosome 0.64 mm. Rostrum (Fig. 4f) tongue-shaped. First pedigerous segment free from cephalosome. Metasome segments 1 to 3 hardly narrower than cephalosome, metasome segment 4 much narrower. Urosome (Fig. 4c) 5-segmented. Genital segment with wide anterior half, slightly inflated near genital orifices, latter with 2 spines (Fig. 4e). Ornamentation of post-genital segments restricted to ventroposterior row of minute spinules along posterior margin of anal segment. Caudal ramus *c.* 1.4 times as long as anal segment, length 144 µm, greatest width 41 µm; lateral seta well distad of middle; distodorsal seta rather long; 4 terminal, plumose setae.

Antenna 1 (Fig. 4g) 7-segmented; armature 3, 12, 5, 3, 4 + 1A, 2 + 1A, 7 + 1A.

Antenna 2 (Fig. 5a): segments 1 and 2 elongate, each with 1 barbed seta; segment 3 trapezoidal, with 1 thin claw-like element and 2 setae; segment 4 with 2 lateral, subterminal setae, 2 heavy, jointed distal claws, 2 thin, jointed claws, and 1 short seta.

Mandible (Fig. 5b) produced into slender lash, basal portion of convex side unadorned; distal portion of convex side and concave side with minute spinules. Maxilla 1 (Fig. 5c) consisting of single, elongate segment, armed with 1 long and 2 short setae, and 1 spine. Maxilla 2 (Fig. 5d) with unarmed basal segment; distal segment with thin distal lash; lash with 1 enormous basal tooth and numerous minute spinules; auxiliary lash setiform, barbed; short seta implanted at base of auxiliary lash. Maxilliped (Fig. 5f) 3-segmented; segment 1 unarmed; segment 2 with longitudinal row of spinules, large, barbed, triangular spine, and 1 short spine; segment 3 cheliform.

Both rami of legs 1 to 3 (Figs 6a–c) 3-segmented. Leg 4 (Fig. 6d) with 3-segmented exopodite and 1-segmented endopodite, latter elongate, with distinct notch + spiniform process at middle of lateral margin. Chaetotaxis formula:

	coxp.	basp.	exp.	enp.
P1	0-1	1-0	I-0; I-1; III-1-4	0-I; 0-1; I-5
P2	0-1	1-0	I-0; I-1; III-I-5	0-1; 0-2; III-3
P3	0-1	1-0	I-0; I-1; III-I-5	0-1; 0-2; III-2
P4	0-1	1-0	I-0; I-1; II-I-5	II

Fifth leg (Fig. 4c) fused with urosomite 1, with 1 distal seta and 1 distal spine.

Ovisacs unknown.

Male. Body (Fig. 4h) length 1.50 mm, greatest width of cephalosome 0.49 mm. Urosome (Fig. 4d) 6-segmented. Genital segment with regularly convex lateral margins; armed at lateroposterior angle with 1 triangular spine or process and 1 seta. Armature anal segment as in female. Caudal ramus 122 µm long, 30 µm wide.

Following appendages showing sexual dimorphism:

- antenna 1, with 1 additional aesthetasc on segments 2 and 4;
- maxilliped (Fig. 5e) with longitudinal field on spinules on segment 2; segment 3 small, trapezoidal; terminal claw very long, curved, concave side with hyaline lamella at distal end and 1 obtuse spine proximally;
- leg 1 endopodite (Fig. 6e, f) with spiniform process on lateral margin of segment 2 longer than in female; segment 3 with 4 setae (instead of 5), lateral spine short, curved;

– leg 2 with 2 spines (instead of 3) on third endopodite segment (Fig. 6g, h); lateral spine crooked, distal spine replaced by thump-like process.

Etymology. The specific name, *dimorphus*, alludes to the marked sexual dimorphism in the endopodites of legs 1 and 2.

Remarks. The species of this genus known before 1972 are enumerated and keyed by Humes & Stock (1973). Later additions to the genus are *Ps. comanthi* Humes, 1972, *Ps. implanatus* Humes, 1977, *Ps. pictus* Humes, 1977, *Ps. vinnulus* Humes, 1977, and *Ps. limatus* Humes, 1978. The present New Guinean species resembles to a certain extent *Ps. latus* Illg, 1950, a taxon from the Pacific coast of the U.S., associated with a flatworm, and *Ps. tenuis* Nicholls, 1944, from an unknown host in South Australia. From *Ps. latus* it differs in the shape of the endopodite of leg 4 (unnotched and inflated in *Ps. latus*, laterally notched and linear in *Ps. dimorphus*), in the caudal ramus (about 6 times as long as wide in *Ps. latus*, close to 4 times in *Ps. dimorphus*), in the presence of marked sexual dimorphism in the armature of the third endopodite segment of leg 2 is *Ps. dimorphus* (absent in *Ps. latus*), and in several other details.

From *Ps. tenuis*, which is not described or illustrated in a very detailed way, *Ps. dimorphus* differs at least in the distal armature of antenna 2 (with 4 claws in *Ps. dimorphus*, all elements setiform in *Ps. tenuis*), and in the strongly enlarged basal tooth on the main lash of maxilla 2 (teeth on lash regularly graduate in *Ps. tenuis*).

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