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**Taxonomic Studies of the Family Pleustidae
(Crustacea, Amphipoda, Gammaridea)
from Coastal Waters of Northern
Japan. II. The Genus *Pleusymtes***

By

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(With 17 Text-figures)

As the second issue of the serial taxonomic work on the pleustid amphipods of northern Japan, here are described three new species and a new subspecies of the genus *Pleusymtes* J.L. Barnard. This is the first record of the genus from Japan.

The type-series are deposited in the Zoological Museum, Faculty of Science, Hokkaido University. For the detailed explanation of the measured body parts and the provenance of materials, see the first issue of this series (Ishimaru, 1984).

Abbreviations. so, setae (or spines) omitted; ds, dorsal view; vr, ventral view; ant, anterior view; post, posterior view; inn, inner view; out, outer view; R, right part; L, left part; SI, Shin-ichi Ishimaru.

Descriptions

Genus *Pleusymtes* J.L. Barnard, 1969

Pleusymtes J.L. Barnard, 1969, p. 425.

***Pleusymtes brachypalma* n. sp.**

(Figs. 1-5)

Type-series. Holotype: ♂, 5.4 mm: 0.8 m depth, tide pool, among algae, Rausu, Hokkaido, 19-V-1983, SI coll.— Paratypes: 1 ♂, 5.8 mm: intertidal, among algae, Rausu, 19-V-1983, SI coll.— 3 ♂♂, 4.7, 6.3, 6.7 mm: 3 m depth, among algae, Rausu, 4-VI-1984,

SI coll.

Male (holotype). Body (Fig. 1-A) 5.4 mm long, moderately chitinized, lustrous; color yellowish white after a few months preservation in 5%-formalin; cuticle (Fig. 4-F) sculptured with fine round pits arranged in short arcs. Head (Fig. 1-B) about as long as first two pereonites combined. Rostrum of medium length, with blunt apex. Lateral cephalic lobe moderately produced forward, rectangular, with subacute apex. Cheek acute at apex. Superior and inferior antennal sinuses relatively deep. Eye small, somewhat kidney-shaped, with a black core surrounded by a narrow band of transparent facets. Back (Fig. 1-A) smooth. Coxae 1-4 of medium depth, successively deeper. Epimeron 1 (Fig. 1-C) tapering, with round apex; epimeron 2 subquadrate, with subacute posteroventral corner; epimeron 3 subquadrate, slightly extending backward, evenly curved backward at posterior margin, with round apex. Urosome about as long as pleonite 3; urosomite 1 as long as pleonite 3; urosomite 2 very short.

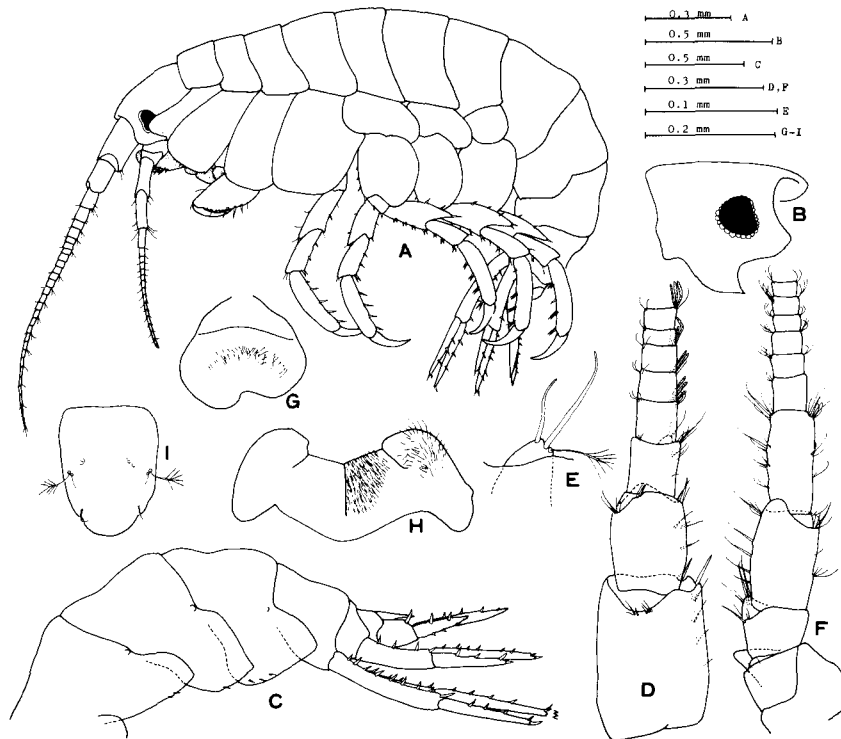


Fig. 1. *Pleusymtes brachypalma* n. sp. Male (holotype). A, habitus; B, head; C, pleon; D, antenna 1 (R, out); E, accessory flagellum; F, antenna 2 (R, out); G, labrum; H, labium (vr); I, telson (ds).

Antenna 1 (Fig. 1-D) about half as long as body length. Peduncular article 1 1.5 times longer than peduncular article 2, bearing a row of setal groups on ventral face, armed with a spine at apex. Peduncular article 2 about 1.8 times longer than peduncular article 3, bearing a few setae on ventral face. Primary flagellum thick, 2.4 times longer than peduncle, 27-articulate; first flagellar article as long as wide; second article wider than long and the others gradually becoming longer and narrower distally; first three articles furnished apically with two sets of armaments, one of which consisting of setules and the other of setules and aesthetascs; each succeeding article alternately furnished with two sets of setules or two sets equal to the first three articles. Accessory flagellum (Fig. 1-E) uniarticulate, small, not fused with peduncle. *Antenna 2* (Fig. 1-F) about 70% as long as antenna 1. Gland cone of medium length, reaching distal margin of peduncular article 3. Peduncular article 4 twice longer than article 3, lined with a row of long setae along dorsal margin. Peduncular article 5 a little shorter than article 4, lined with a row of long setae along dorsal margin. Flagellum thick, 1.3 times longer than peduncle, 15-articulate; first flagellar article longer than wide; second article wider than long and the others gradually becoming longer and narrower distally; each article with two sets of apical setules.

Labrum (Fig. 1-G) subcircular, moderately and asymmetrically incised. *Mandible*. Right mandible (Fig. 2-A) subquadrate; molar well developed, cylindrical, heavily chitinized, with grinding surface (Fig. 2-C) packed with long granules; incisor (Fig. 2-D) with 6 denticles; spine row of 8 spines. Palp 1.7 times longer than body of mandible, 3-articulate; article 2 lined densely with many setae along posterior margin; article 3 falcate, armed along posterior margin with 8 pectinate spines between which a few setae intervene, bearing three long setae at apex, and a seta inset at basal part of anterior margin, with outer face highly bristly. Left mandible similar to right one; incisor (Fig. 2-E) with 7 denticles; lacinia mobilis with 7 denticles. *Labium* (Fig. 1-H) typical to the family, without inner lobe; margin between both outer lobes bevelled. *Maxilla 1* (Fig. 2-F). Inner plate small, with a thick plumose seta. Outer plate apically armed with a ventral and a dorsal row, each consisting of 4 and 5 pectinate spines. Palp biarticulate, as thick as, and extending beyond outer plate; proximal article short, without seta; distal article bristly, armed with 6 strong spines, furnished with a setal row obliquely. *Maxilla 2* (Fig. 2-G). Inner plate oval, bearing a thick plumose seta, furnished with two setal rows apicomarginally. Outer plate about as thick as inner one, furnished apicomarginally with two setal rows; ventral row consisting of thicker setae than those of dorsal row. *Maxilliped* (Fig. 2-H). Distal margin of basal article 1 oblique, with a group of setae medially, subacute around distal portion; both basal articles 1 fused with each other in about half of length. Inner plate (Fig. 2-J) reaching base of palp, adz-shaped, armed with 5 thick setae along inner margin; apex with 4 setae, a thick seta and three stumpy spines. Basal article 2 bearing a long seta at distal edge of outer margin. Outer plate (Fig. 2-I) reaching apex of palp article 1, furnished with a

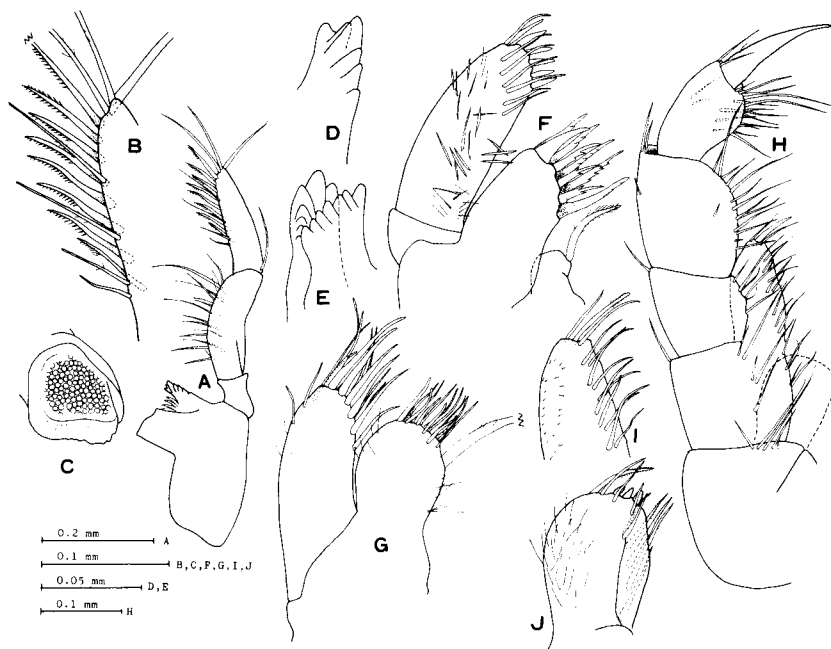


Fig. 2. *Pleusymtes brachypalma* n. sp. Male (holotype). A, mandible (R, inn); B, palp article 3 of mandible; C, grinding surface of mandible; D, incisor (R, inn); E, incisor and lacinia mobilis (L, inn); F, maxilla 1 (R, vr); G, maxilla 2 (R, vr); H, maxilliped (R, vr); I, outer plate of maxilliped (R, vr); J, inner plate of maxilliped (R, vr).

setal row along inner margin; a relatively thick seta arising from apex. Palp 4-articulate, lined with many setae along inner margin; article 1 with a long seta at distal edge of outer margin; article 2 with a setule medially and two long setae at distal edge of outer margin; article 3 not distally produced, without pectinate spines; article 4 falcate, 1.4 times longer than article 3; dorsal face of articles 3-4 highly bristly.

Gnathopod 1 (Fig. 3-A). Coxa 1 small, 70% as long as coxa 2, angular at anterior margin, tapering distally, with anteroventral corner slightly produced forward, with a small but distinct notch (Fig. 3-B) at posteroventral corner. Article 2 with a thick seta distally on anterior margin. Article 3 with a triangular distal lobe. Article 4 toothless. Article 5 triangular, with a short and broad posterior lobe. Article 6 oval, longer than articles 3-5 combined, subchelate, with two long setae on inner face; palm (Fig. 3-C) a little shorter than posterior margin, delimited by three groups of spines, connected a little angularly with posterior margin; palmar margin undulatory, medially with a small tooth. Article 7 falcate, a little longer than palm, with a row of small hairs along inner margin. *Gnathopod 2* (Fig. 3-D) larger than gnathopod 1. Coxa 2 subquadrate. Article 4

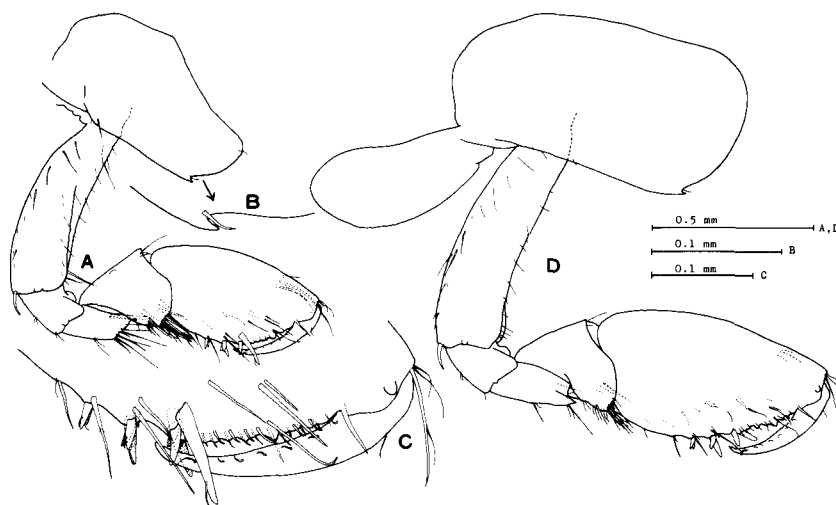


Fig. 3. *Pleusymtes brachypalma* n. sp. Male (holotype). A, gnathopod 1 (R, out); B, posterovenral corner of coxa 1; C, palm of gnathopod 1 (R, out); D, gnathopod 2 (R, out).

with a distinct tooth. Article 5 triangular, slightly narrower than that of gnathopod 1, with a slightly narrower and longer posterior lobe. Article 6 enlarged, about as long as article 2, without long seta on inner face; palm very short, half as long as posterior margin, delimited by three groups of spines, straightly connected with posterior margin. Article 7 falcate, a little longer than palm.

Pereopod 3 (Fig. 4-A). Coxa 3 similar to coxa 2. Article 4 narrow, extending anterodistally to reach 30% length of article 5. Articles 5-6 lined with a row of spines along posterior margin. Other armaments consisting of setules and setae. *Pereopod 4* (Fig. 4-B). Coxa 4 subquadrate; posterior angle of the excavation subacute, with round apex. *Pereopod 5* (Fig. 4-C). Coxa 5 with posterior lobe slightly deeper than anterior one. Article 2 posteriorly lobate, with spinose anterior margin and smooth posterior margin; posterior lobe extending distally not to reach distal margin of article 3. Article 4 of medium width, lined with a row of spines along both anterior and posterior margins; posterior lobe reaching 75% length of article 5. Articles 5-6 spinose along anterior margin. *Pereopod 6* (Fig. 4-D). Coxa 6 posterolobate; posterior lobe longer and deeper than anterior one. *Pereopod 7* (Fig. 4-E). Coxa 7 circular. Posterior lobe of article 2 extending distally to reach distal margin of article 3.

Pleopods relatively thinner than those of other members of the genus. *Pleopod 1* (Fig. 5-A). Peduncle furnished with a few plumose setae. Inner ramus 1.5 times longer than peduncle; outer ramus 1.4 times longer than inner one; 9 articles on inner ramus and 12 on outer; proximal article of inner ramus

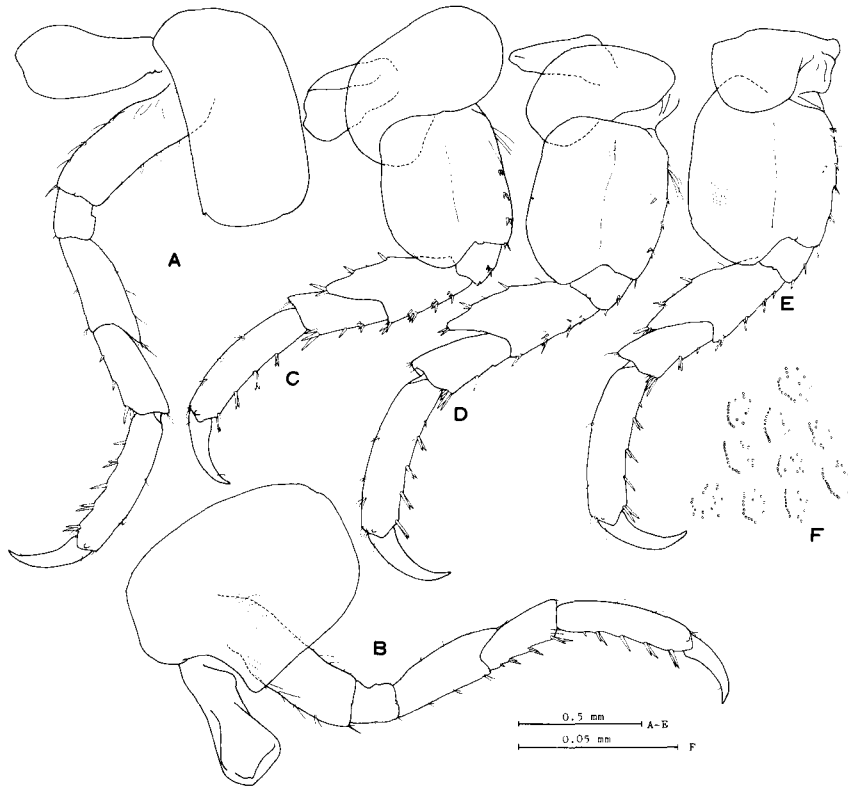


Fig. 4. *Pleusymte brachypalma* n. sp. Male (holotype). A-E, pereopods 3-7 (R, out); F, cuticular sculpture on pereopod 7.

shorter than that of outer; plumose setae of terminal article (Fig. 5-E) short. *Pleopod 2* (Fig. 5-B) a little longer than pleopod 1. Inner ramus twice longer than peduncle; outer ramus 80% as long as inner one; proximal article of inner ramus longer than that of outer one. A pair of terminal setae on inner ramus (Fig. 5-F) very thick, furnished on anterior face with two rows of scales, which are triangular in medial portion and gradually become longer distally. A pair of terminal setae on outer ramus (Fig. 5-G) relatively thick, sparsely furnished with short hairs laterally. *Pleopod 3* (Fig. 5-C) about 80% as long as pleopod 1. Peduncle with two spines (Fig. 5-D) distally on inner margin. Both rami equal in length, 1.8 times longer than peduncle; proximal article of inner ramus longer than that of outer one; plumose setae on both terminal articles longer than those of pleopod 1.

Uropod 1 (Fig. 5-J). Peduncle armed with a row of spines along both ridges, bearing a large stout spines at distal end of outer ridge. Inner ramus as long as

peduncle, armed with a row of small spines along outer ridge and a row of large spines along inner ridge, bearing two apical protrusions; a spine of medium length inset between both protrusions. Outer ramus 85% as long as inner one, armed with a row of large spines along outer ridge and a row of small spines along inner ridge. *Uropod 2* (Fig. 5-K) 85% as long as uropod 1. Inner ramus 1.4 times longer than peduncle. Outer ramus about as long as peduncle. *Uropod 3* (Fig. 5-L) about 60% as long as uropod 1. Peduncle bearing a spine on outer ridge distally. Inner ramus 2.4 times longer than peduncle, with blunt apex. Outer ramus about 60% as long as inner one.

Telson (Fig. 1-I) linguiform, about as long as peduncle of uropod 3 *in situ* (Fig. 1-C), 1.3 times longer than wide, subapically bearing two setules; a pair of two penicillate hairs issued medially near lateral margins.

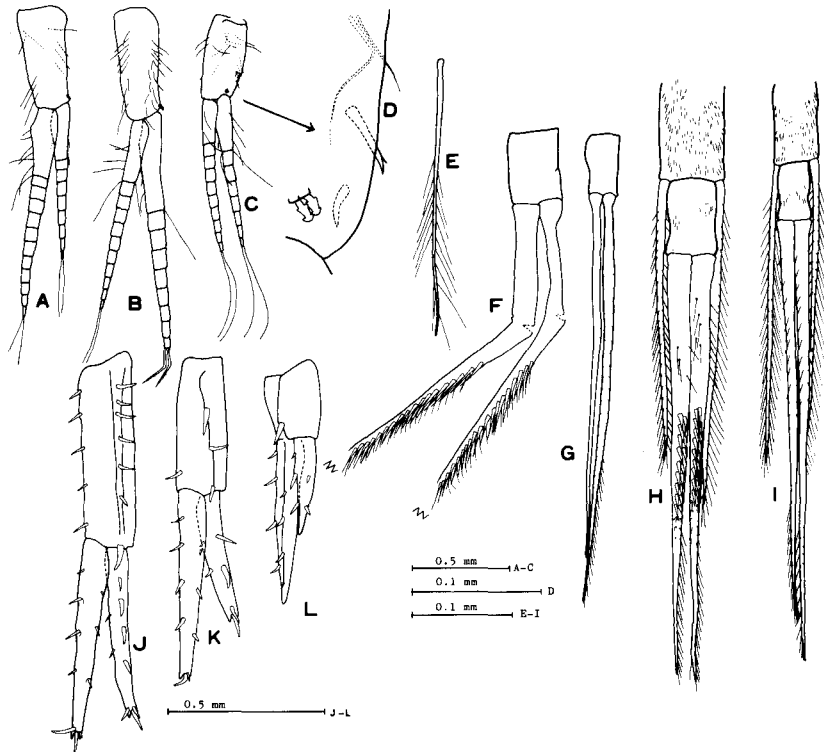


Fig. 5. *Pleusymtes brachypalma* n. sp. Male (holotype). A-C, pleopods 1-3 (R, ant); D, spines on peduncle of pleopod 3 (R, ant; so); E, terminal seta of outer ramus of pleopod 1; F, terminal setae of inner ramus of pleopod 2; G, terminal setae of outer ramus of pleopod 2; J-L, uropods 1-3 (R, ds). Male (paratype, 5.9 mm). H, terminal setae of inner ramus of pleopod 2; I, terminal setae of outer ramus of pleopod 2.

Male (paratype). Body 5.8 mm long.

Pleopod 2 (Fig. 5-H, I). Terminal setae on both rami equal in structure to those of the holotype.

Female unknown.

Remarks. The new species is closely related to *Pleusymtes japonicus* (Gurjanova, 1938), by having the dorsally setose peduncle of antenna 2, and the short palm of gnathopod 2 of which palmar margin is heavily undulatory. But the new species is easily distinguishable in the following structures (corresponding conditions of the latter in parentheses): antenna 2 is a little shorter than article 4 (exceedingly longer); the eye is circular but somewhat kidney-shaped, and consists of a core surrounded by a very thin transparent band of facets (completely circular and consists of a small core surrounded by a thick transparent band of facets); coxa 1 strongly attenuates distally (expands distally); spines arranged in a row at the posterior margin of the article 4 of pereopod 7 is by far shorter in the former than in the latter species.

In addition, the present new species has pleopods probably quite unique among the family Pleustidae. To date, little attention has been paid to the structure of pleopods in the pleustids, so that pleopods have not been mentioned at all in the past descriptions. Probably this was due to its structural uniformity in most species of the family. Indeed all species treated in the present paper, except for the present new species, have the pleopods whose shape and length are similar to each other; outer ramus is a little shorter than inner one, and both rami are fringed with plumose setae of ordinary type generally found in many gamma-ridean species. In this species, however, outer ramus is by far longer than inner one in pleopod 1, and considerably shorter than inner one in pleopod 2. Terminal setae of the pleopod 2 show considerable structural difference from other plumose setae of the pleopod 2 which are of ordinary type. Moreover, the terminal setae differ between inner and outer rami.

The epithet refers to the short palm of the gnathopod 2.

Pleusymtes kamui n. sp.

(Figs. 6-9)

Type-series. Holotype: ♂, 7.5 mm: 75 m depth, 13 km off Yuhbetsu, Okhotsk Sea, 31-VIII-1980.—Paratype: 1 juv, 5.4 mm: data same as the holotype.

Male (holotype). Body (Fig. 6-A) 7.5 mm long, strongly chitinized; color yellowish white after a few years preservation in 5%-formalin. Head (Fig. 6-B) a little longer than first two pereonites combined. Rostrum of medium length,

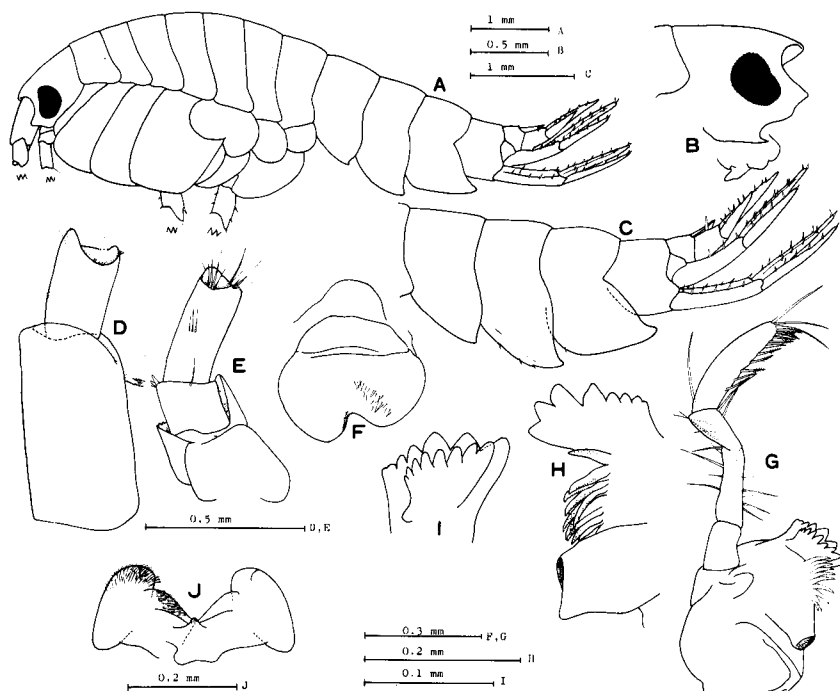


Fig. 6. *Pleusyntes kamui* n. sp. Male (holotype). A, habitus; B, head; C, pleon; D-E, antennae 1-2 (R, out); F, labrum; G, mandible (L, inn); H, mandible (R, inn); I, incisor and lacinia mobilis (L, inn); J, labium (vr).

with subacute apex. Lateral cephalic lobe moderately produced forward, rectangular, with subacute apex. Cheek produced forward, small, acute at apex. Superior antennal sinus deep. Inferior antennal sinus smaller than superior one. Eye large, kidney-shaped, deep reddish brown, without surrounding band of facets. Back (Fig. 6-A) smooth. Coxae 1-4 of medium depth, successively deeper. Epimeron 1 (Fig. 6-C) tapering, with subacute apex; epimeron 2 tapering, with sinuous posterior margin, bearing subacute posteroventral corner well produced backward; epimeron 3 subquadrate, strongly prolonged backward, with a large subacute tooth at posteroventral corner. Urosome as long as pleonite 3; urosomite 1 about 1.5 times longer than urosomite 3; urosomite 2 short, completely hidden behind urosomite 1.

Antenna 1 (Fig. 6-D) broken. Peduncular article 1 robust, twice thicker and longer than article 2, without apical tooth, bearing large hood-like expansion on anterior face. *Antenna 2* (Fig. 6-E) broken. Gland cone long to reach distal margin of peduncular article 3. Peduncular article 3 armed with a pair of spines on anterior face distally. Peduncular article 4 twice longer than article 3.

Labrum (Fig. 6-F) subcircular, moderately and asymmetrically incised. *Mandible*. Left mandible (Fig. 6-G) subquadrate; molar well developed, cylindrical, heavily chitinized, with grinding surface packed with low granules; incisor (Fig. 6-I) with 7 denticles; lacinia mobilis with 8 denticles; spine row of 10 spines. Palp twice longer than body of mandible, 3-articulate; article 2 lined with several setae along both anterior and posterior margins; article 3 falcate, armed with 11 pectinate spines, bearing three long setae at apex, and a seta inset at basal part of anterior margin, with outer face highly bristly. Right mandible (Fig. 6-H) similar to left one; incisor with 8 denticles. *Labium* (Fig. 6-J) typical to the family, without inner lobe; margin between both outer lobes bevelled. *Maxilla 1* (Fig. 7-A). Inner plate small, with a plumose seta. Outer plate apically armed with a ventral and a dorsal row, each consisting of 4 and 5

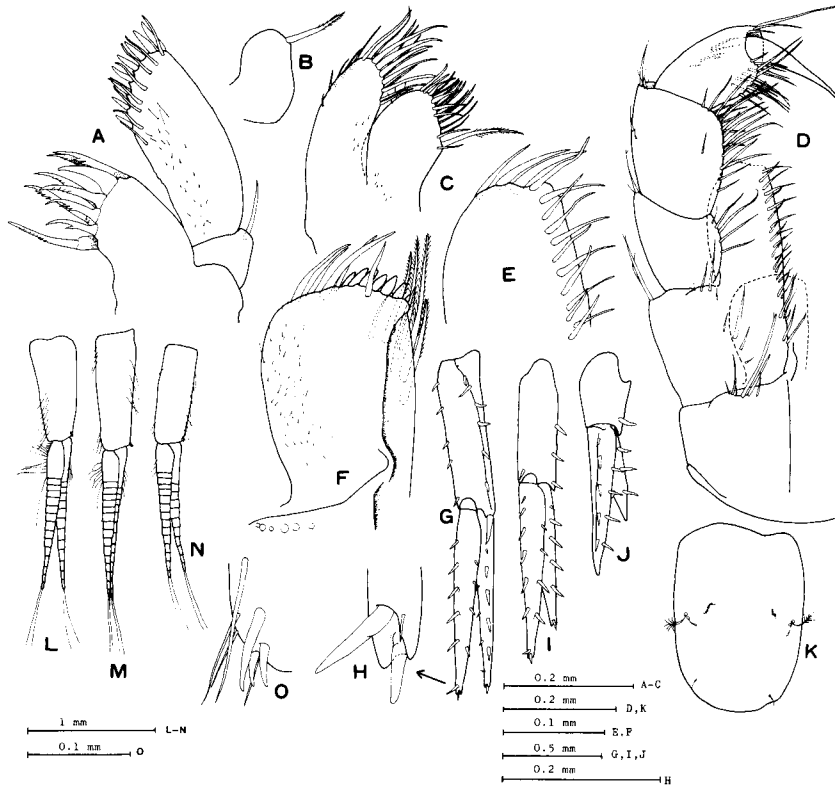


Fig. 7. *Pleusymtes kamui* n. sp. Male (holotype). A, maxilla 1 (L, vr); B, inner plate of maxilla 1 (R, vr); C, maxilla 2 (R, vr); D, maxilliped (R, vr); E, outer plate of maxilliped (R, vr); F, inner plate of maxilliped (R, vr); G, uropod 1 (R, ds); H, terminal spines of inner ramus of uropod 1; I-J, uropods 2-3 (R, ds); K, telson (ds); L-N, pleopods 1-3 (R, ant; so); O, spines on peduncle of uropod 3 (R, post).

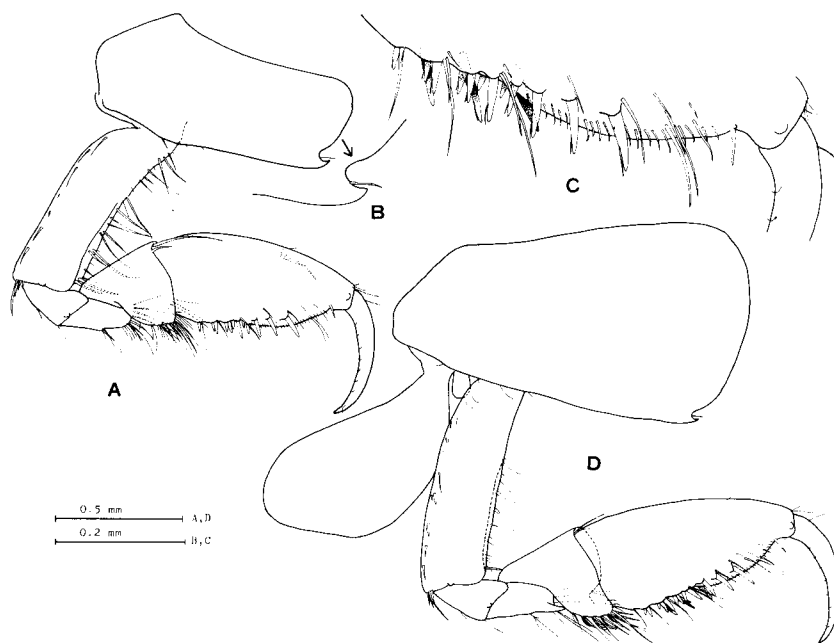


Fig. 8. *Pleusymtes kamui* n. sp. Male (holotype). A, gnathopod 1 (R, out); B, posteroventral corner of coxa 1; C, palm of gnathopod 1 (R, out); D, gnathopod 2 (R, out).

pectinate spines. Palp biarticulate, only a little thicker than and extending beyond outer plate; proximal article short, with a long spine; distal article slightly expanding, bristly, armed with 8 strong spines obliquely at apex, furnished with a setal row obliquely. *Maxilla 2* (Fig. 7-C). Inner plate oval, obliquely truncate, bearing a thick plumose seta, furnished with two setal rows apicomarginally. Outer plate thinner than inner one, furnished apicomarginally with two setal rows; ventral row consisting of thicker setae than those of dorsal one. *Maxilliped* (Fig. 7-D). Distal margin of basal article 1 oblique, with a group of setae medially, subacute around distal portion; both basal articles 1 fused with each other in 20% of length. Inner plate (Fig. 7-F) reaching base of palp, adz-shaped, armed with 6 thick setae along inner margin; apex with 4 setae, a thick seta, and 7 stumpy spines. Basal article 2 bearing a set of long setae at distal edge of outer margin. Outer plate (Fig. 7-E) exceeding apex of palp article 1, furnished with many setae along inner margin; two thick spines (or setae?) arising from apex. Palp 4-articulate, lined with many setae along inner margin; article 1 with a set of setae at distal edge of outer margin; article 2 with a set of setae medially and distally on outer margin; article 3 not distally produced, with many finely pectinate setae; article 4 falcate, a little longer than article 3; dorsal face of articles 3-4 highly bristly.

Gnathopod 1 (Fig. 8-A). Coxa 1 small, 75% as long as coxa 2, slightly narrowing distally, with a large tooth (Fig. 8-B) at posteroventral corner. Article 2 setose along anterior margin, lined with a row of spines along posterior margin. Article 3 with a triangular distal lobe. Article 4 toothless. Article 5 triangular, with a short and broad posterior lobe, furnished along posterior margin with a few setal rows. Article 6 oblong, as long as article 2, subchelate, with two long setae on inner face; palm (Fig. 8-C) a little longer than posterior margin, delimited by 4 groups of spines, accompanied submarginally on outer face with a row of spines running from second group of delimiting spines to medial portion of palm, straightly connected with posterior margin; palmar margin smooth, without small tooth. Article 7 falcate, as long as palm, with a row of small hairs along inner margin. *Gnathopod 2* (Fig. 8-D). Coxa 2 large, distally expanding. Article 2 minutely setulose along anterior margin. Article 4 with a distinct tooth. Article 5 triangular, with a posterior lobe slightly narrower and longer than that of gnathopod 1. Article 6 larger than that of gnathopod 1.

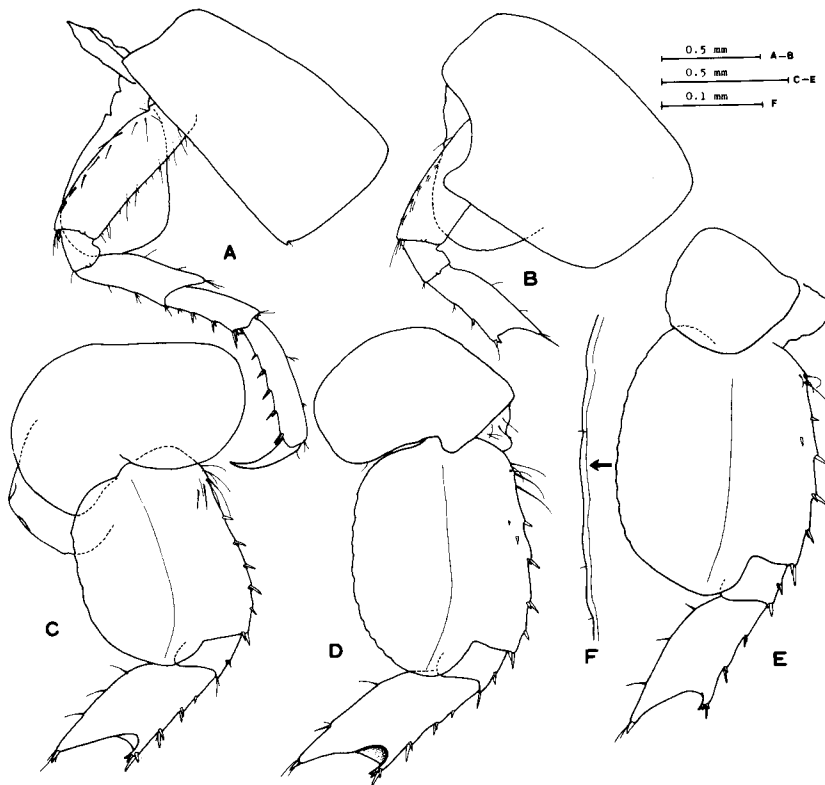


Fig. 9. *Pleusymtes kamui* n. sp. Male (holotype). A-E, pereopods 3-7 (R, out); F, posterior margin of article 2 of pereopod 7 (R, out).

Pereopod 3 (Fig. 9-A). Coxa 3 quadrate, slightly expanding distally, with a minute but distinct notch at posteroventral corner. Article 2 bearing a few spines along posterior margin. Article 4 narrow, extending anterodistally to reach 40% length of article 5. Articles 5-6 lined with a row of spines along posterior margin. Other armaments consisting of setules and setae. *Pereopod 4* (Fig. 9-B). Coxa 4 subquadrate; posterior angle of the excavation subacute, with round apex. Article 4 bearing a few spines along posterior margin. *Pereopod 5* (Fig. 9-C). Coxa 5 with posterior lobe deeper than anterior one. Article 2 posteriorly lobate, with spinose anterior margin, and with minutely and irregularly undulatory posterior margin; posterior lobe extending distally not to reach distal margin of article 3. Article 4 of medium width, lined with a row of spines along anterior margin and with a row of stiff setae along posterior margin, bearing a spine distally on posterior margin. *Pereopod 6* (Fig. 9-D). Coxa 6 strongly postero-lobate; posterior lobe much longer and deeper than anterior one. *Pereopod 7* (Fig. 9-E). Coxa 7 subcircular. Posterior lobe of article 2 somewhat truncate.

Pleopod 1 (Fig. 7-L). Peduncle furnished with a few plumose setae. Inner ramus 1.5 times longer than peduncle; outer ramus as long as inner one; 13 articles on inner ramus and 16 on outer one; proximal article long, furnished with plumose setae marginally. *Pleopod 2* (Fig. 7-M) as long as pleopod 1. *Pleopod 3* (Fig. 7-N) about 90% as long as pleopod 1. Peduncle with three spines distally on inner margin.

Uropod 1 (Fig. 7-G). Peduncle armed with a row of spines along both ridges, bearing a large stout spine at distal end of outer ridge. Inner ramus 1.2 times longer than peduncle, armed with a row of small spines along outer ridge and with a row of large spines along inner ridge, bearing two apical protrusions (Fig. 7-H); a spine of medium length inset between both protrusions. Outer ramus 95% as long as inner one, armed with a row of large spines along outer ridge and with a row of small spines along inner ridge. *Uropod 2* (Fig. 7-I) about 90% as long as uropod 1. Inner ramus 1.4 times longer than peduncle. Outer ramus 80% as long as inner one. *Uropod 3* (Fig. 7-J) about 70% as long as uropod 1. Peduncle armed with a spine on outer ridge distally. Inner ramus twice longer than peduncle, with blunt apex. Outer ramus 60% as long as inner one.

Telson (Fig. 7-K) linguiform, about as long as peduncle of uropod 3 *in situ* (Fig. 6-C), 1.5 times longer than wide, subapically bearing two setules; a pair of two penicillate hairs issued medially near lateral margins.

Female unknown.

Remarks. The present new species resembles *Pleusymtes quadrangularis* (Margulis, 1963), by having the article 6 of gnathopods 1-2 accompanied with a row of spines submarginally on outer face along palmar margin. But, in detail, the article 6 of gnathopods 1-2 of the new species conspicuously differs from the latter species in the following points (corresponding conditions of the latter species in parentheses): palm is oblong (oval); the palmar margin is shorter than the

posterior margin (by far longer than the posterior margin); the accompanying row of spines extends from the second group of spines of the posterior margin to the medial region of the palm (present only along proximal two-thirds of the palm, not along the posterior margin); there exists 4 groups of delimiting spines on the posterior margin (only one group). The new species also can be distinguished from the latter in other characters such as: coxa 1 less produced forward at anteroventral corner, and with a large tooth at posteroventral corner; wider and shorter lobe of the article 6 of gnathopods 1-2; more expanding palp of maxilla 1; kidney-shaped eyes; minutely and irregularly undulatory posterior margin of the article 2 of pereopods 5-7; shorter article 4 of pereopods 5-7.

The new species has posteriorly prolonged epimera similar to those of *Pleusymtes coquilla* J.L. Barnard, 1971, but there is a certain amount of morphological difference between them such as gnathopods and so on.

The epithet is derived from the language of Ainu, meaning "God". Noun.

Pleusymtes mucidus n. sp.

(Figs. 10-13)

Type-series. Holotype: ov ♀, 2.8 mm: 0.5 m depth, among *Laminaria* belt, Oshoro, Hokkaido, 1-VII-1982, SI coll.—Paratypes: 1 ♂?, 3.0 mm: locality same as the holotype, 27-V-1982, SI coll.—2 ♀♀, 3.6, 4.8 mm; 1 ov ♀, 3.8 mm: 0.5 m depth, among *Sargassum* belt, Oshoro, 14-VI-1982, SI coll.—1 ♀, 1.6 mm; 4 ov ♀♀, 2.4, 2.7, 2.9, 3.3 mm; 1 ♂?, 2.6 mm: data same as the holotype.—1 ♂?, 2.2 mm: 0.3 m depth, on boulders, Oshoro, 29-X-1982, H. Hoshikawa coll.—1 ov ♀, 3.3 mm: 3 m depth, on boulders, Oshoro, 18-IV-1983, H. Hoshikawa coll.—1 ov ♀, 4.0 mm: intertidal, among *Leathesia* and other algae scraped from the surfaces of boulders, Ohzuchi, Iwate Pref., 14-VI-1983, H. Hoshikawa coll.

Female (holotype). Body (Fig. 10-A) 2.8 mm long, moderately chitinized, lustrous; color light brown after a few days preservation in 5%-formalin. Head (Fig. 10-C) a little shorter than pereonites 1-3 combined. Rostrum of medium length, with blunt apex. Lateral cephalic lobe moderately produced forward, gently rounded. Cheek acutely produced forward. Superior and inferior antennal sines moderately deep. Eye deep red after a few days preservation in 5%-formalin, large, circular. Back (Fig. 10-A) smooth. Coxae 1-4 of medium depth, successively deeper. Epimeron 1 (Fig. 10-D) tapering posterodistally, bluntly rounded at apex, with sinuous posterior margin; epimeron 2 with a prominent tooth at posteroventral corner, sinuous at posterior margin; epimeron 3 subquadrate, mostly straight at posterior margin, extending at posteroventral corner into a blunt tooth. Urosome about 70% as long as pleonites 2-3 combined; urosomite 1 the longest, as long as pleonite 3; urosomite 2 half as long as urosomite 3; urosomite 3 half as long as urosomite 1. Body aesthetascs issued

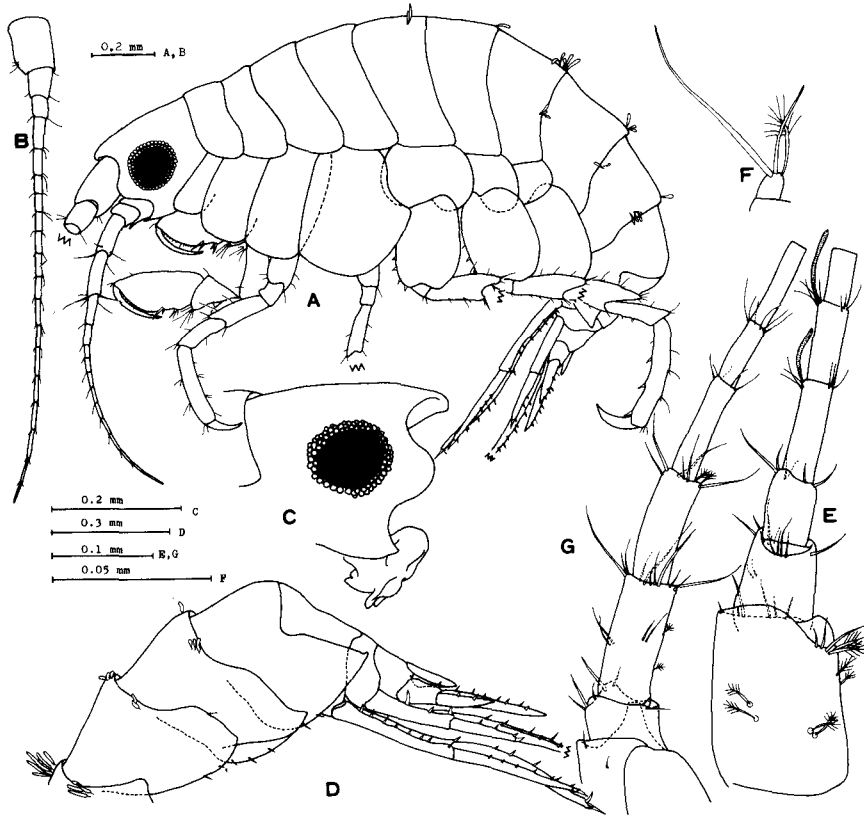


Fig. 10. *Pleusymtes mucidus* n. sp. Female (holotype). A, habitus; B, antenna 1 (R, out); C, head; D, pleon; E, antenna 1 (R, out); F, accessory flagellum; G, antenna 2 (R, out).

from pereonites 5-6 medially in a row, and from pereonite 7 and pleonites 1-2 medially and laterally in three rows.

Antenna 1 (Fig. 10-B, E) long, about 60% as long as body length. Peduncular article 1 robust, a little longer than succeeding two articles combined. Peduncular article 2 half as long as article 1. Peduncular article 3 about 60% as long as article 2. Primary flagellum 4 times longer than peduncle, 16-articulate; each flagellar article longer than wide; first two articles furnished apically with two sets of armaments, one of which consisting of setules and the other of setules and aesthetascs; each succeeding article alternately bearing two sets of setules or two sets equal to the first two articles. Accessory flagellum (Fig. 10-F) uniaarticulate, small, not fused with peduncle. *Antenna 2* (Fig. 10-G) about 70% as long as antenna 1. Gland cone of medium length, reaching distal margin of peduncular

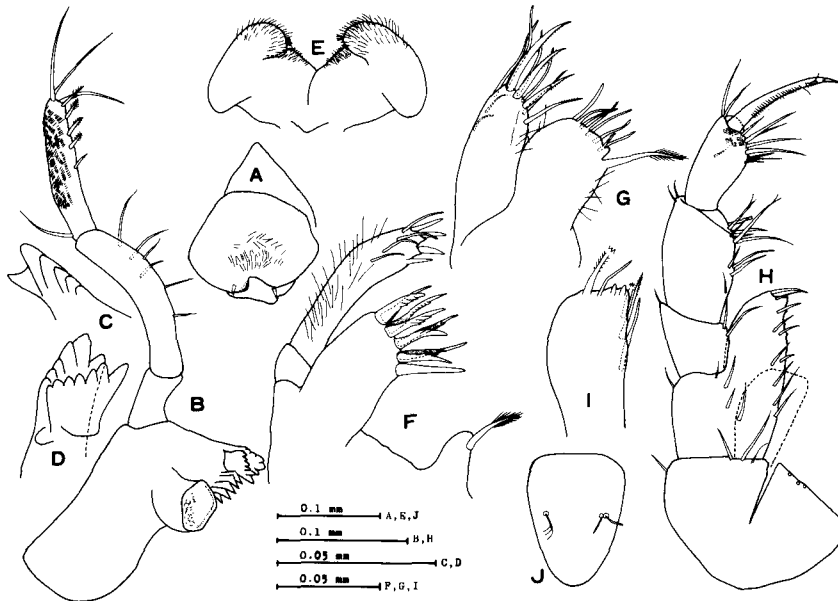


Fig. 11. *Pleusymtes mucidus* n. sp. Female (holotype). A, labrum; B, mandible (L, inn); C, incisor (R, inn); D, incisor and lacinia mobilis (L, inn); E, labium (vr); F-G, maxillae 1-2 (R, vr); H, maxilliped (R, vr); I, inner plate of maxilliped (R, vr); J, telson (ds).

article 3. Peduncular article 3 short, bearing two long spines dorsally, with triangular extension on inner face. Peduncular article 4 about three times longer than article 3, fringed apically with many long setae. Peduncular article 5 a little shorter than article 4. Flagellum about 1.5 times longer than peduncle, 12-articulate; each flagellar article longer than wide, with two sets of apical setules.

Labrum (Fig. 11-A) subcircular, moderately and asymmetrically incised. **Mandible.** Left mandible (Fig. 11-B) subquadrate; molar well developed, cylindrical, heavily chitinized, with grinding surface packed with low granules; incisor (Fig. 11-D) with 6 denticles; lacinia mobilis with 7 denticles; spine row of 6 spines. Palp twice longer than body of mandible, 3-articulate; article 2 lined with a row of simple setae along posterior margin; article 3 falcate, armed with 5 pectinate spines along posterior margin, bearing three setae at apex, and a seta at basal part of anterior margin, with outer face highly bristly. Right mandible similar to left one; incisor (Fig. 11-C) with 6 denticles. **Labium** (Fig. 11-E) typical to the family, without inner lobe; margin between both outer lobes bevelled. **Maxilla 1** (Fig. 11-F). Inner plate small, triangular, with a plumose seta. Outer plate apically armed with a ventral and a dorsal row, each consisting of 4 and 5 pectinate spines. Palp biarticulate, extending beyond outer plate;

proximal article without seta; distal article digitate, bristly, armed with 4 strong spines, furnished with a setal row obliquely. *Maxilla 2* (Fig. 11-G). Inner plate oval, bearing a long plumose seta, furnished with two setal rows apicomarginally. Outer plate thinner than inner one, furnished apicomarginally with two setal rows; ventral row consisting of thicker setae than those of dorsal row. *Maxilliped* (Fig. 11-H). Distal margin of basal article 1 oblique, with a group of simple setae medially, subacute around distal portion; both basal articles 1 fused with each other in half of length. Inner plate (Fig. 11-I) reaching base of palp, adz-shaped, armed with three spines on inner margin medially; apex with a seta, a long spine and two stumpy spines. Basal article 2 bearing a setule at distal edge of outer margin. Outer plate exceeding apex of palp article 1, furnished with a setal row along inner margin; a slender spine arising from apex. Palp 4-

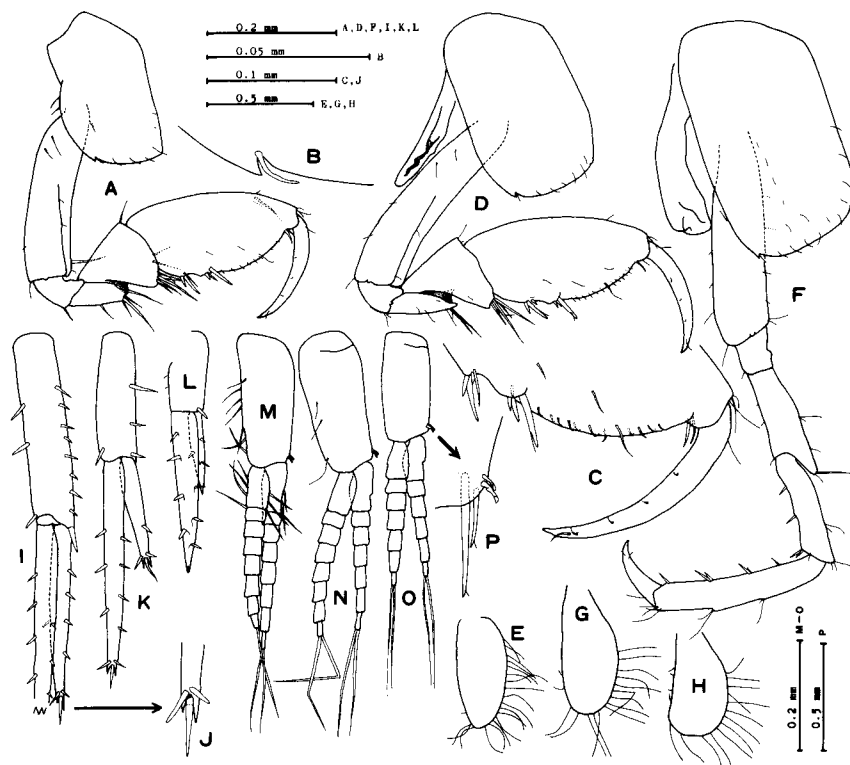


Fig. 12. *Pleusymtes mucidus* n. sp. Female (holotype). A, gnathopod 1 (R, out); B, posteroventral corner of coxa 1; C, palm of gnathopod 1 (R, out); D, gnathopod 2 (R, out); E, oostegite of gnathopod 2 (R); F-G, pereopod 3 (R, out); H, oostegite of pereopod 4 (R); I, uropod 1 (R, ds); J, terminal spines of outer ramus of uropod 1; K-L, uropods 2-3 (R, ds); M-O, pleopods 1-3 (R, ant; so); P, spines on peduncle of pleopod 3 (R, ant).

articulate, ornamented with setae along inner margin; article 1 with a setule at distal edge of outer margin; article 2 with two setules at distal edge of outer margin; article 3 not distally produced, without pectinate spine; article 4 falcate, slightly longer than article 3; dorsal face of articles 3-4 highly bristly.

Gnathopod 1 (Fig. 12-A). Coxa 1 with anteroventral corner right-angled, with a small but distinct notch (Fig. 12-B) at posteroventral corner. Article 2 with a thick seta distally on anterior margin. Article 3 with a triangular distal lobe. Article 4 toothless. Article 5 triangular, with a short and broad posterior lobe. Article 6 oval, longer than articles 3-5 combined, subchelate, with a long seta on inner face; palm (Fig. 12-C) a little longer than posterior margin, delimited by two groups of spines, smoothly connected with posterior margin; palmar margin smooth, with a row of small hairs along inner margin.

Gnathopod 2 (Fig. 12-D). Coxa 2 subquadrate. Article 4 with a distinct tooth. Article 5 triangular, with a slightly narrower and longer posterior lobe. Article 6 about as large as that of gnathopod 1, without long seta on inner face.

Pereopod 3 (Fig. 12-F). Coxa 3 similar to coxa 2. Article 4 narrow, extending anterodistally to reach 30% length of article 5. Articles 5-6 lined with a row of spines along posterior margin. Other armaments consisting of setules and setae. *Pereopod 4* (Fig. 13-A). Coxa 4 subquadrate, shallowly excavate; posterior angle of the excavation obtuse-angled, with blunt apex. *Pereopod 5* (Fig. 13-B). Coxa 5 with both lobes equal in length and depth. Article 2 posteriorly lobate, with spinose anterior margin and smooth posterior margin; posterior lobe extending distally not to reach distal margin of article 3. Article 4 of medium width, lined with a row of spines along both anterior and posterior margins; posterior lobe reaching about 40% length of article 5. Articles 5-6 spinose along anterior margin. *Pereopod 6* (Fig. 13-C). Coxa 6 posterolobate; posterior lobe deeper than anterior one. *Pereopod 7* (Fig. 13-D, E). Coxa 7 circular. Article 2 with slightly serrulate posterior margin.

Pleopod 1 (Fig. 12-M). Peduncle furnished with a row of plumose setae along outer margin. Inner ramus 1.4 times longer than peduncle; outer ramus a little shorter than inner one. (This condition may be aberrant, because in other specimens outer rami are a little longer than inner ones.); 10 articles on both rami; proximal article long, furnished with plumose setae marginally. *Pleopod 2* (Fig. 12-N) as long as pleopod 1, with outer ramus a little longer than inner one. *Pleopod 3* (Fig. 12-O) about 85% as long as pleopod 1. Peduncle with two long spines (Fig. 12-P) distally on inner margin.

Uropod 1 (Fig. 12-I) very long. Peduncle armed with a dense and a sparse row of spines along outer and inner margin respectively, bearing a large stout spine at distal end of outer ridge. Inner ramus about 1.1 times longer than peduncle, sparsely armed with a row of spines along both inner and outer ridges, and armed with two apical protrusions; a spine of medium length inset between both protrusions. Outer ramus (Fig. 12-J) 85% as long as inner one. *Uropod 2* (Fig.

12-K) about 90% as long as uropod 1. Peduncle armed with a spine on inner ridge distally and with a sparse row of spines along outer ridge. Inner ramus about 1.6 times longer than peduncle. Outer ramus about half as long as inner one. *Uropod 3* (Fig. 12-L) about half as long as uropod 1. Peduncle bearing a spine on outer ridge distally. Inner ramus about twice longer than peduncle, with blunt apex. Outer ramus half as long as inner one.

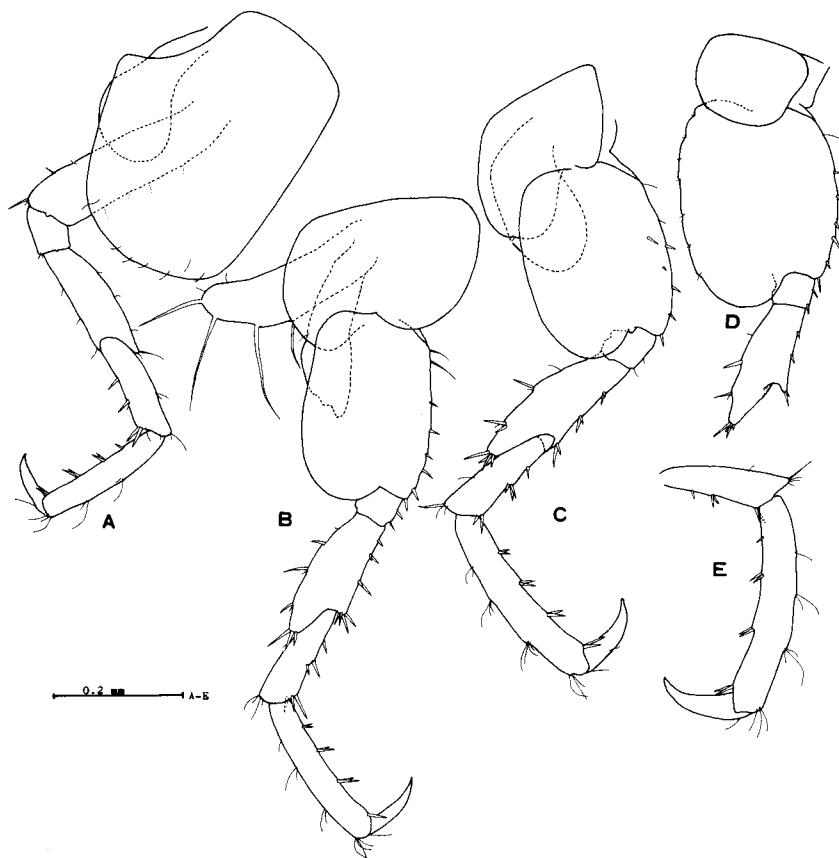


Fig. 13. *Pleusymtes mucidus* n. sp. Female (holotype). A-D, pereopods 4-7 (R, out); E, pereopod 7 (L, out).

Telson (Fig. 11-J) triangular, about 1.3 times longer than peduncle of uropod 3 *in situ* (Fig. 10-D), about 1.4 times longer than wide, without apical setules; a pair of two penicillate hairs issued medially near lateral margins.

Male ?. No remarkable difference from female can be seen.

Remarks. The present new species differs from *Pleusymtes subglaber* (Barnard and Given, 1960) in the structure of gnathopods 1-2 and the relative length of uropods 1-3. *P. subglaber* has a small tooth medially on the palmar margin of gnathopods 1-2 respectively, but it is absent in the new species. Moreover, uropod 2 is the longest of the uropods in *P. subglaber*, whereas uropod 1 is the longest in the new species. The new species resembles *P. japonicus* (Gurjanova, 1938), but differs from it in the following points: antennae 1-2 and gnathopods 1-2 are less setose in the former species; the plam of gnathopods 1-2 smooth, whereas undulatory in the latter; each flagellar article of antenna 2 is longer than wide in the former, whereas wider than long in the latter; coxa 1 somewhat attenuates in the former, but expands distally in the latter; peduncular article 4 of antenna 2 is longer than article 5 in the former, but shorter in the latter. The new species also resembles *P. suberitobius* (Gurjanova, 1938), but differs from it in the shape of coxa 1, the shape of the palm of gnathopods 1-2, and the armature of telson. Further, the new species is somewhat similar to *P. buttoni* (Dunbar, 1954) in the shapes of head and eye, but they are obviously distinct from each other in the relative length of articles 4-5 of pereopods 5-7, and the strength of expansion in the article 4 of pereopods 5-7. The following additional characters are recognized as specifically different from *P. buttoni*: the shape of coxa 1, the shape of the palm of gnathopods 1-2, armature of telson, and the shape of epimeron 3.

The epithet refers to the first impression of the dorsum bearing many body aesthetascs, which look like fungi.

***Pleusymtes quadrangularis brevipes* n. subsp.**

(Figs. 14-17)

Type-specimen. Holotype: ♂?, 5.4 mm: 10 m depth, among algae on hard bottom, Nakanose, Akkeshi Bay, Hokkaido, 22-VII-1982, S.F. Mawatari, K. Kubota, Y. Kobatake and H. Saito coll.

Male ? (holotype). Body (Fig. 14-A) 5.4 mm long, moderately chitinized, lustrous; color white after a few months preservation in 5%-formalin. Head (Fig. 14-B) a little longer than pereonites 1-2 combined. Rostrum of medium length, with blunt apex. Lateral cephalic lobe moderately produced forward, circular. Cheek large, produced forward, with acute apex. Eye brown after a few months preservation in 5%-formalin, large, circular, with a surrounding band of transparent facets. Back (Fig. 14-A) smooth. Coxae 1-4 of medium depth, successively deeper. Epimeron 1 (Fig. 14-C) tapering, with an acute tooth at posteroventral corner; epimeron 2 subquadrate, with similar armature to epimeron 1; epimeron

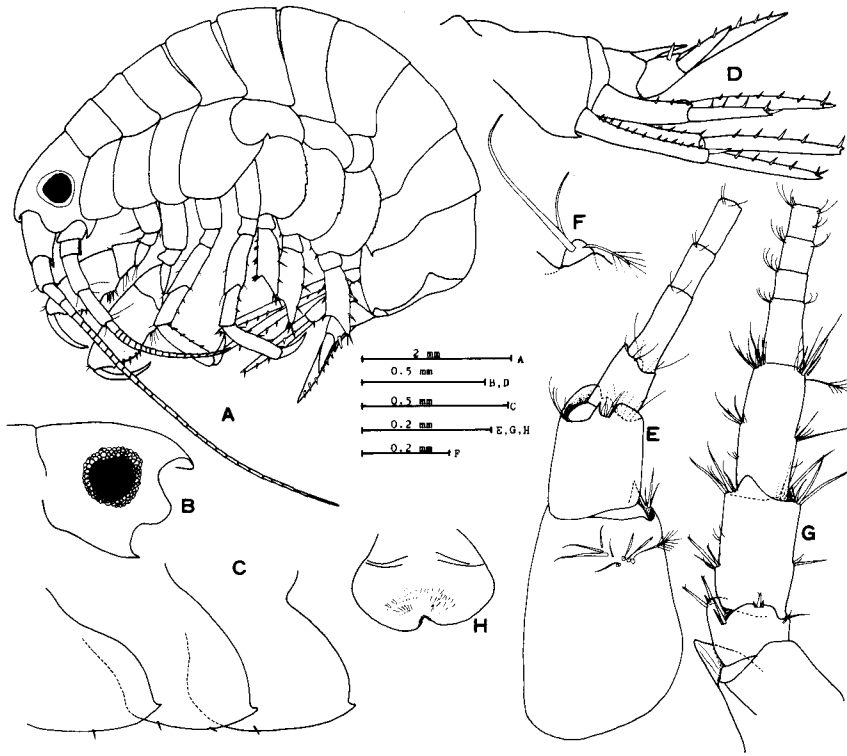


Fig. 14. *Pleusymtes quadrangularis brevipes* n. subsp. Male? (holotype). A, habitus; B, head; C, epimera 1-3; D, urosome; E, antenna 1 (R, out); F, accessory flagellum; G, antenna 2 (R, out); H, labrum.

3 subcircular, with posterior margin gently curved backward, and with a distinct acute tooth at posteroventral corner. Urosome (Fig. 14-D) a little longer than pleonite 3; urosomite 1 about three times longer than urosomite 3; urosomite 2 short.

Antenna 1 (Fig. 14-E) long, about half as long as body length. Peduncular article 1 somewhat attenuated, twice longer than article 2, armed with a small acute tooth ventrally on apical margin. Peduncular article 2 twice longer than article 3, showing complicated apical margin which is produced into a small acute tooth and a round expansion at outer side, and produced into an apically-incised expansion. Primary flagellum thin, 3.5 times longer than peducle, 30-articulate; each flagellar article longer than wide; first four articles apically furnished with two sets of armaments, one of which consisting of setules and the other of setules and aesthetascs; each succeeding article alternately furnished with two sets of setules or two sets equal to the first four articles. Accessory flagellum (Fig. 14-F)

uniarticulate, small, not fused with peduncle. *Antenna 2* (Fig. 14-G) half as long as antenna 1. Gland cone reaching distal margin of peduncular article 3. Peduncular article 3 armed with long spines dorsally and laterally on apical margin. Peduncular article 4 twice longer than article 3, furnished with a group of long spines medially on dorsal margin, with apical margin roundly produced laterally and acutely produced ventrally. Peduncular article 5 a little longer than article 4. Flagellum thin, 1.1 times longer than peduncle, 19-articulate; first flagellar article longer than wide; second article wider than long and the others gradually becoming longer and narrower distally; each article with two sets of apical setules.

Labrum (Fig. 14-H) subcircular, slightly and asymmetrically incised. *Mandible*. Right mandible (Fig. 15-A) subquadrate; molar well developed, cylindrical, heavily chitinized, with smooth grinding surface (Fig. 15-C); incisor (Fig. 15-B) with 7 denticles; spine row of 6 spines. Palp twice longer than body

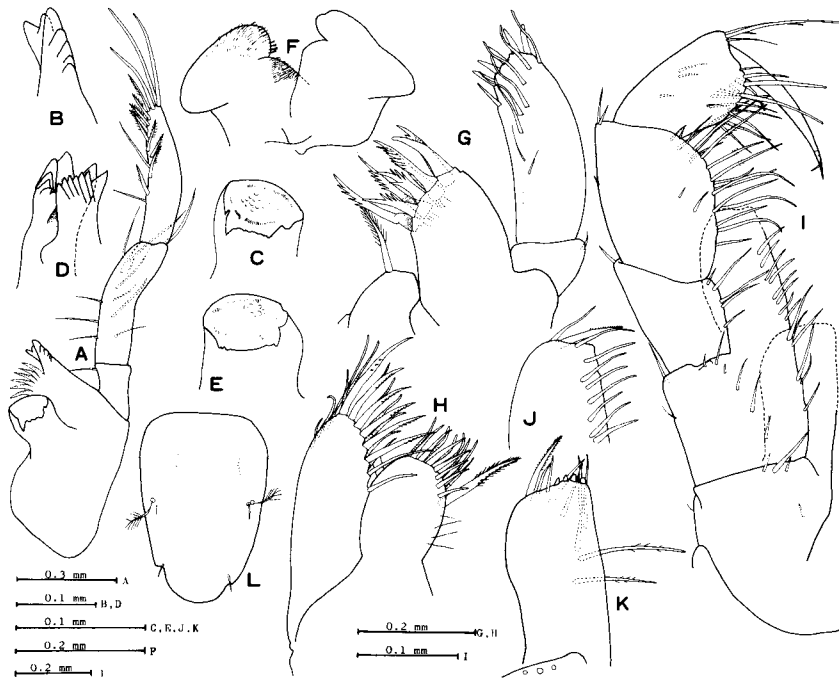


Fig. 15. *Pleusymtes quadrangularis brevipes* n. subsp. Male? (holotype). A, mandible (R, inn); B, incisor (R, inn); C, molar (R, inn); D, incisor and lacinia mobilis (L, inn); E, molar (L, inn); F, labium (vr); G, maxilla 1 (L, vr); H, maxilla 2 (R, vr); I, maxilliped (R, vr); J, outer plate of maxilliped (R, vr); K, inner plate of maxilliped (R, vr); L, telson (ds).

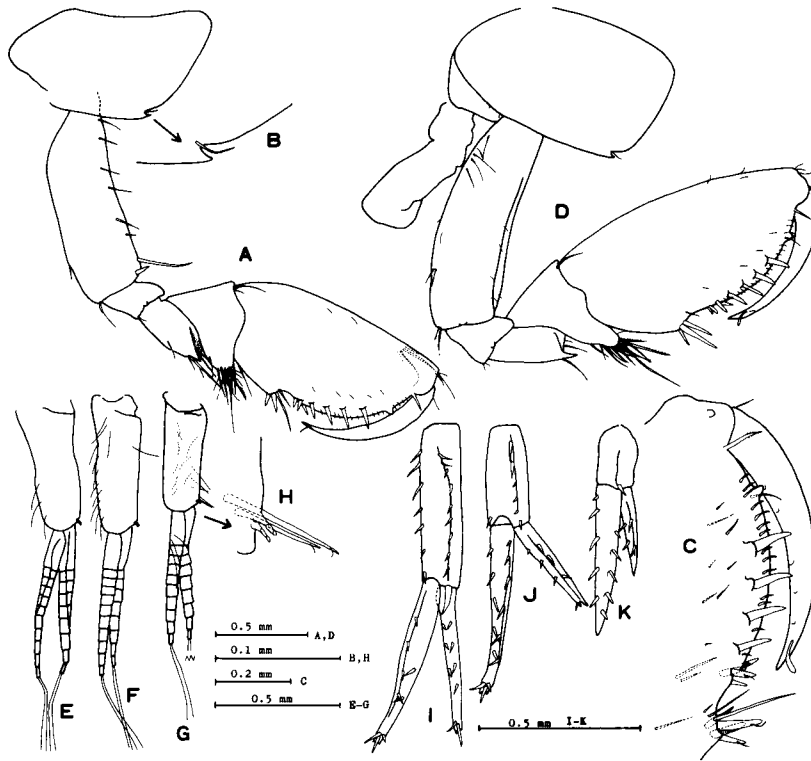


Fig. 16. *Pleusymtes quadrangularis brevipes* n. subsp. Male? (holotype). A, gnathopod 1 (R, out); B, posteroventral corner of coxa 1; C, palm of gnathopod 1 (R, out); D, gnathopod 2 (R, out); E-G, pleopods 1-3 (R, ant; so); H, spines on peduncle of pleopod 3 (R, ant); I-K, uropods 1-3 (R, ds).

of mandible, 3-articulate; article 2 lined with many setae along posterior margin; article 3 falcate, armed along posterior margin with 9 pectinate spines between which a few setae intervene, bearing three long setae at apex, and a seta inset at basal part of anterior margin, with outer face highly bristly. Left mandible similar to right one; incisor (Fig. 15-D) with 7 denticles; lacinia mobilis with 7 denticles. *Labium* (Fig. 15-F) typical to the family, without inner lobe; margin between both outer lobes bevelled. *Maxilla 1* (Fig. 15-G). Inner plate small, with a plumose seta. Outer plate apically armed with a ventral and a dorsal row, each consisting of 4 and 5 pectinate spines. Palp biarticulate, a little thinner than outer plate, extending beyond outer plate; proximal article short, with a minute setule; distal article armed with 6 strong spines, furnished with a setal row obliquely. *Maxilla 2* (Fig. 15-H). Inner plate oval, bearing a thick plumose seta, furnished with two setal rows apicomarginally; ventral row consisting of a

little thicker setae than those of dorsal row. Outer plate about as thick as inner one, furnished apicomarginally with two setal rows; ventral row consisting of minutely pectinate and thicker setae than those of dorsal row. *Maxilliped* (Fig. 15-I). Distal margin of basal article 1 oblique, with a group of spine-setae medially, subacute around distal portion; both basal articles 1 fused with each other in about half of length. Inner plate (Fig. 15-K) long, reaching base of palp, adz-shaped, armed with 5 thick setae along inner margin, and with two thick setae on inner face subapically; apex with two setae, a thick seta and 4 stumpy spines. Basal article 2 bearing a long seta at distal edge of outer margin. Outer plate (Fig. 15-J) exceeding apex of palp article 1, furnished with a setal row along inner margin; a thick spine arising from apex. Palp 4-articulate, ornamented with many setae along inner margin; article 1 with a spine-seta on outer margin distally; article 2 with a setule medially and a pair of setae distally on outer margin; article 3 not distally produced, with two ill-pectinate spines; article 4 falcate, as long as article 3, with a nail; dorsal face of articles 3-4 highly bristly.

Gnathopod 1 (Fig. 16-A). Coxa 1 strongly produced forward, with a small but distinct notch (Fig. 16-B) at posteroventral corner. Article 2 with a long seta and a spine distally on anterior margin. Article 3 with a distal lobe. Article 4 with a distinct tooth. Article 5 triangular, with a relatively long and narrow posterior lobe. Article 6 oval, as long as article 2, subchelate, with two long setae on inner face; palm (Fig. 16-C) 1.5 times longer than posterior margin, delimited by two groups of spines, smoothly connected with posterior margin which is concave between both groups of spines; palmar margin smooth, distally with a small tooth, accompanied with a row of large spines submarginally on outer face. Article 7 falcate, as long as palm, with a row of small hairs along inner margin. *Gnathopod 2* (Fig. 16-D). Coxa 2 subquadrate. Article 2 weakly setulose along anterior margin. Article 5 triangular, with a slightly narrower and longer posterior lobe. Article 6 larger than that of gnathopod 1, without long seta on inner face.

Pereopod 3 (Fig. 17-A). Coxa 3 similar to coxa 2. Article 4 narrow, extending anterodistally to reach 40% length of article 5. Articles 5-6 lined with a row of spines along posterior margin. Other armaments consisting of setules and setae. *Pereopod 4* (Fig. 17-B). Coxa 4 subquadrate; posterior angle of the excavation subacute, with round apex. *Pereopod 5* (Fig. 17-C). Coxa 5 with posterior lobe slightly deeper than anterior one, having a small notch and a few spines (Fig. 17-D) along ventral margin. Article 2 posteriorly lobate, with spinose anterior margin and serrate posterior margin; posterior lobe weakly extending distally not to reach distal margin of article 3. Article 4 of medium width, lined with a row of spines along both anterior and posterior margins; posterior lobe reaching half length of article 5. Articles 5-6 spinose along anterior margin. *Pereopod 6* (Fig. 17-E). Coxa 6 postero lobate; posterior lobe much longer and deeper than anterior one. *Pereopod 7* (Fig. 17-G, H). Coxa 7 circular.

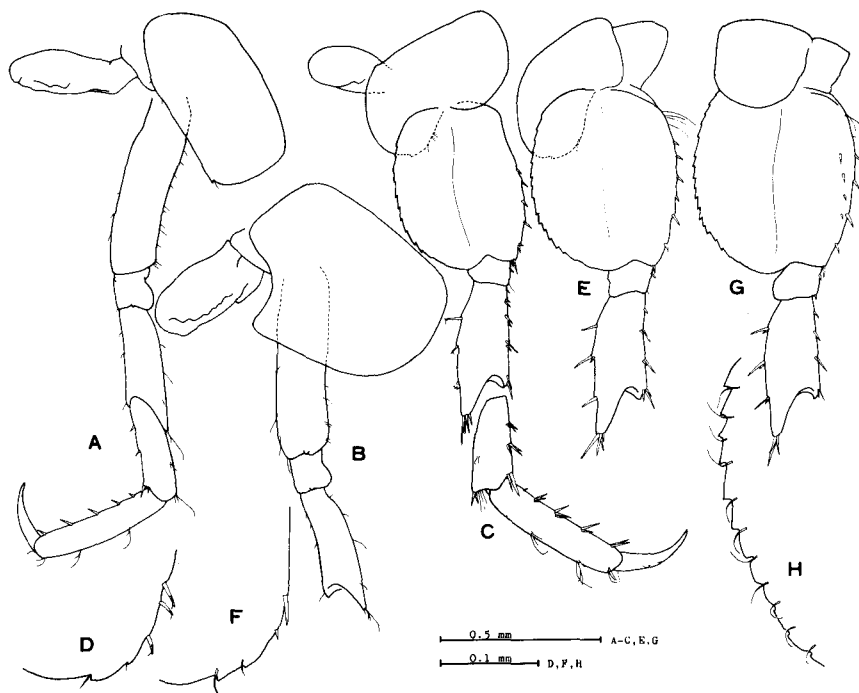


Fig. 17. *Pleusymtes quadrangularis brevipes* n. subsp. Male? (holotype). A-C, pereopods 3-5 (R, out); D, spines on coxa 5; E, pereopod 6 (R, out); F, spines on coxa 6; G, pereopod 7 (R, out); H, posterior margin of article 2 of pereopod 7.

Pleopod 1 (Fig. 16-E). Peduncle furnished with a few plumose setae. Inner ramus 1.2 times longer than peduncle; outer ramus only a little longer than inner one; 9 articles on inner ramus and 11 on outer one; proximal article long. *Pleopod 2* (Fig. 16-F) as long as pleopod 1. *Pleopod 3* (Fig. 16-G) 85% as long as pleopod 1. Peduncle with two long spines (Fig. 16-H) distally on inner margin.

Uropod 1 (Fig. 16-I). Peduncle armed with a row of spines along both ridges, bearing a large stout spine at distal end of outer ridge. Inner ramus as long as peduncle, armed with a row of spines along both ridges, and with two apical protrusions; a spine of medium length inset between both protrusions. Outer ramus 80% as long as inner one. *Uropod 2* (Fig. 16-J) 80% as long as uropod 1. Inner ramus 1.8 times longer than peduncle. Outer ramus 60% as long as inner one. *Uropod 3* (Fig. 16-K) 60% as long as uropod 1. Peduncle bearing a spine on outer ridge distally. Inner ramus 2.6 times longer than peduncle, with blunt apex. Outer ramus 55% as long as inner one.

Telson (Fig. 15-L) linguiform, 1.2 times longer than peduncle of uropod 3 *in situ* (Fig. 14-D), 1.5 times longer than wide, subapically with two small notches

and setules; a pair of two penicillate hairs issued medially near lateral margins.

Female unknown.

Remarks. The present new subspecies well corresponds to the nominate form, *P. quadrangularis* (Margulis, 1963), in the characteristic structure of gnathopods 1-2, but differs from it in the following points: the article 4 of pereopods 5-7 is shorter than that of the nominate subspecies; lateral cephalic lobe is circular in the new subspecies, whereas quadrangular in the nominate subspecies.

The new subspecies resembles *P. kamui* n. sp. in the structure of gnathopods 1-2, but is easily discernible in the structures already mentioned in the remarks of *P. kamui*.

The subspecific name denotes the short article 4 of the pereopods 5-7.

Summary

Three new species and one new subspecies of the genus *Pleusymtes* (Amphipoda, Gammaridea, Pleustidae) were described from the coastal waters of the northern Japan; these were *Pleusymtes brachypalma*, *P. kamui*, *P. mucidus*, and *P. quadrangularis brevipes*.

P. brachypalma is most noticeable of the four species, for it has three pairs of pleopods structurally and proportionally different from each other, in contrast with that these appendages are usually of the same structure in many species of gammarideans.

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