

Taxonomic Studies on the Shallow Water Gammaridean
Amphipoda of West Kyushu, Japan

IV. Dexaminidae (*Guernea*), Eophilantidae, Eusiridae,
Haustoriidae, Hyalidae, Ischyroceridae¹⁾

By

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With Text-figures 124-161

Dexaminidae

Guernea

Key to the species of *Guernea*

- 1 Urosomite 1 lacking dorsal keel.....*G. magnaphilostoma*
Urosomite 1 with dorsal keel2
2 Anterior head lobe extending far beyond peduncular segment 1 of antenna 1
..... *G. tomiokaensis*
This character not combined3
3 Dorsal keel of urosomite 1 extending above urosomites 2-3.....*G. nullispina*
Dorsal keel of urosomite 1 rounded, not extending backward.....*G. terelamina*
Dorsal keel of urosomite 1 erecting upward, triangular, not extending back-
ward*G. rectocephala*

Guernea (Guernea) magnaphilostoma sp. nov.

(Figs 124-128)

Body: Triangular rostrum weak, head as long as peraeonites 1-2 combined, ventral angle of anterior margin with one small notch, anterior part of ventral margin with one minute spine. Eyes very large. Peraeonites 1-3 subequal to each other in size, peraeonites 4-7 larger than peraeonite 3. Pleon much developed, about twice as large as peraeonite 7, pleonal epimera deep, pleonal epimeron 1 slightly

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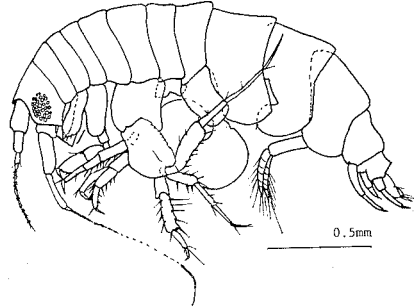


Fig. 124. *Guernea (Guernea) magnaphilostoma* sp. nov.
Holotype, male, 2.5 mm.

expanding forward, anterior margin of pleonal epimeron 2 extending forward, rounded, ventral margin with three small setae on anterior half, anterior margin of pleonal epimeron 3 extending forward, rounded, posterior margin slightly expanding backward, ventral margin with six short or small setae. Urosome smaller than pleonite 3, urosomites 2-3 coalescent, smaller than urosomite 1, back of urosomite 1 depressed medially, posteriorly with two opposite pairs of setae, both lateral sides of ventral margin with two setae and one posterior acute tooth, back of coalescent urosomites 2-3 slightly depressed medially, excave in V-form on central part of posterior half, lateral opposite keels with three spines respectively.

Antennae of male: Antenna 1 about one third as long as body length, accessory flagellum absent, peduncular segment 1 as long as lateral length of head, regularly and densely pubescent on inner side, peduncular segment 2 with four sets of three or four setae on posterior margin, peduncular segment 3 one third as long as peduncular segment 2; flagellum longer than peduncle. Antenna 2 shorter than body length, peduncle subequal to antenna 1 in length, peduncular segment 3 rectangular, small, peduncular segment 4 setose on inner side, depressed and concave posteriorly, peduncular segment 5 a little longer than and half as thick as peduncular segment 4; terminal segment of flagellum needle-like, very long.

Antennae of female: Antenna 1 very similar to one of male, but inner side of peduncular segment not pubescent. Antenna 2 shorter than antenna 1, peduncular segment 4 stubby, peduncular segment 5 longer than half of peduncular segment 4; flagellum three-articulate, article 1 subequal to article 2 in length, thicker than the latter, terminal segment one third as long as article 2, apically with two short and two longer setae.

Mouthparts: Apical margin of upper lip truncate, central part slightly producing, periphery of apex pubescent. Outer lobe of lower lip triangular, mandibular process obsolescent, shoulder bristly; inner lobe small, rounded, both lobes coalescent. Mandible lacking palp, incisor forming chisel-like tooth, molar process developed very well, with one plumose seta in left mandible and one simple seta in right mandible, rasp weak, lacinia mobilis chisel-like, with one bifurcate tooth in right mandible and seven blunt teeth in left mandible. Inner plate of maxilla

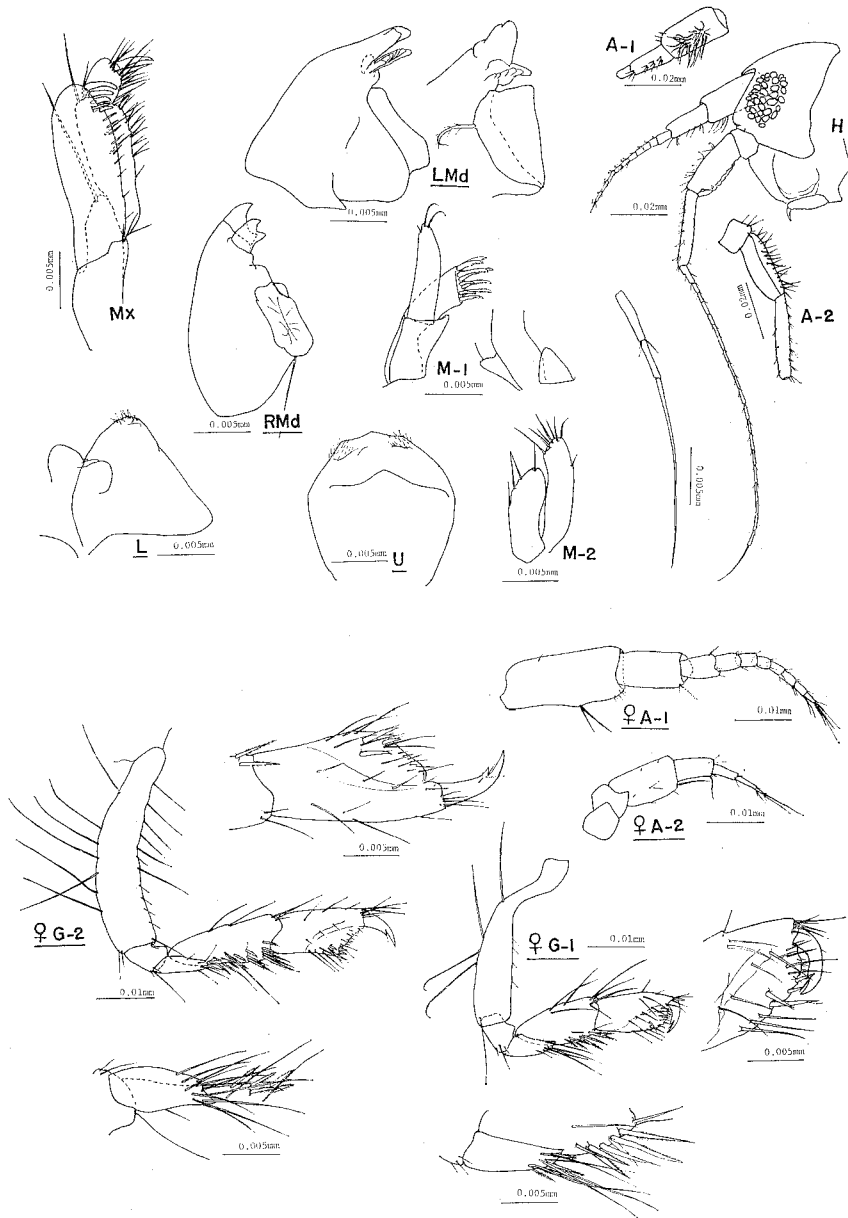


Fig. 125. *Guernea (Guernea) magnaphilostoma* sp. nov. Holotype, male, 2.5 mm. LMd, RMd, ♀A-1, ♀A-2, ♀G-1, ♀G-2; Paratype no. 1, female, 2.5 mm.

1 triangular, without any seta, apical margin of outer plate with four paired and one single teeth, these teeth pectinate; palp uniaarticulate, extending far beyond outer plate, apex rounded, humped, with one short and two longer setae. Inner plate of maxill 2 with three facial and one apical setae, outer plate with seven apical simple and one outer-distal setae. Inner plate of maxilliped rudimentary, bud-

like, with two short setae; outer plate very large, reaching middle of palpar article 3, rounded apically, with nine inner short and apically blunt setae, and one slender and four stout teeth on inner distal margin, these inner distal teeth growing to distal one in size and apical tooth slightly curved inward distally; palp four-articulate, outer side of article 1 apically with one very long seta, article 2 prolonged, dispersively setose on inner margin, with one row of three longer stout setae on upper lateral side and two short and one long setae on apex of outer side, article 3 almost cylindrical, stubby, with five setae on inner side, dactyl surrounded by many setae, claw-like.

Gnathopod 1: Coxa 1 very small, scoop-like, ventral margin bluntly conical, with two setae. Both sexes very similar to each other in gnathopod 1. Basis very long, slender, progressively making broader, in male with two anteromedial small, one posteromedial very long and one posterodistal short setae, in female only with four anteromedial long setae. Ischium small, rectangular. Merus triangular, anteriorly connecting with about half part of carpus, posterodistally with three short and two longer setae in male, and four short pectinate and five longer simple setae in female. Carpus about half as long as basis, posterior margin in male with one proximal paired and three single pectinate setae, and three simple setae, in female with one, two paired, two single and one distal paired pectinate setae in formula. Propod rectangular, a little growing in width, shorter than carpus, posterior thin plate triangular, anterior margin in male with one single and two paired pectinate setae, in female lacking pectinate setae, boundary between anterior thick part and posterior thin plate oblique, in male with one row of five pectinate setae, in female with four simple setae; palm almost transverse, defined by two single spines and one pair of spines of which one is large, else with two posterior spines and several minute setae. Dactyl reaching palmar spines when closed, falcate, grasping margin with one medial acute tooth of which basal concavity is armed with one small seta.

Gnathopod 2: Coxa 2 twice as long as coxa 1, rather slender, slightly curved, ventral margin with four short setae. Gnathopod 2 very similar to gnathopod 1 in form, but a little larger than the latter; posterior margin of carpus in male with one, two, two, three and four distal pectinate setae in formula, in female with one, two, two, three and five distal pectinate setae in formula; propod gradually a little increasing in width, anterior margin and anterolateral part with one row of about five setae and many distal setae, boundary between thin and thick parts with four pectinate setae in male and three simple setae in female, posterodistal margin with three single simple setae, palm almost transverse in male, but in female oblique, defined by one pair of spines and two single spines, with several minute setae.

Peraeopod 1: Coxa 3 subequal to coxa 2 in depth, slenderer than the latter, ventral margin uneven, with four short setae, posteroventral margin with one short seta. Peraeopod 1 longer than gnathopod 2. Basis growing at posteromedial part of coxa 3, a little longer than coxa 3, with two proximal long, four medial short and three distal long setae on anterior margin, and one medial long and seven distal long setae on posterior margin. Ischium rectangular, anterodistal small projection

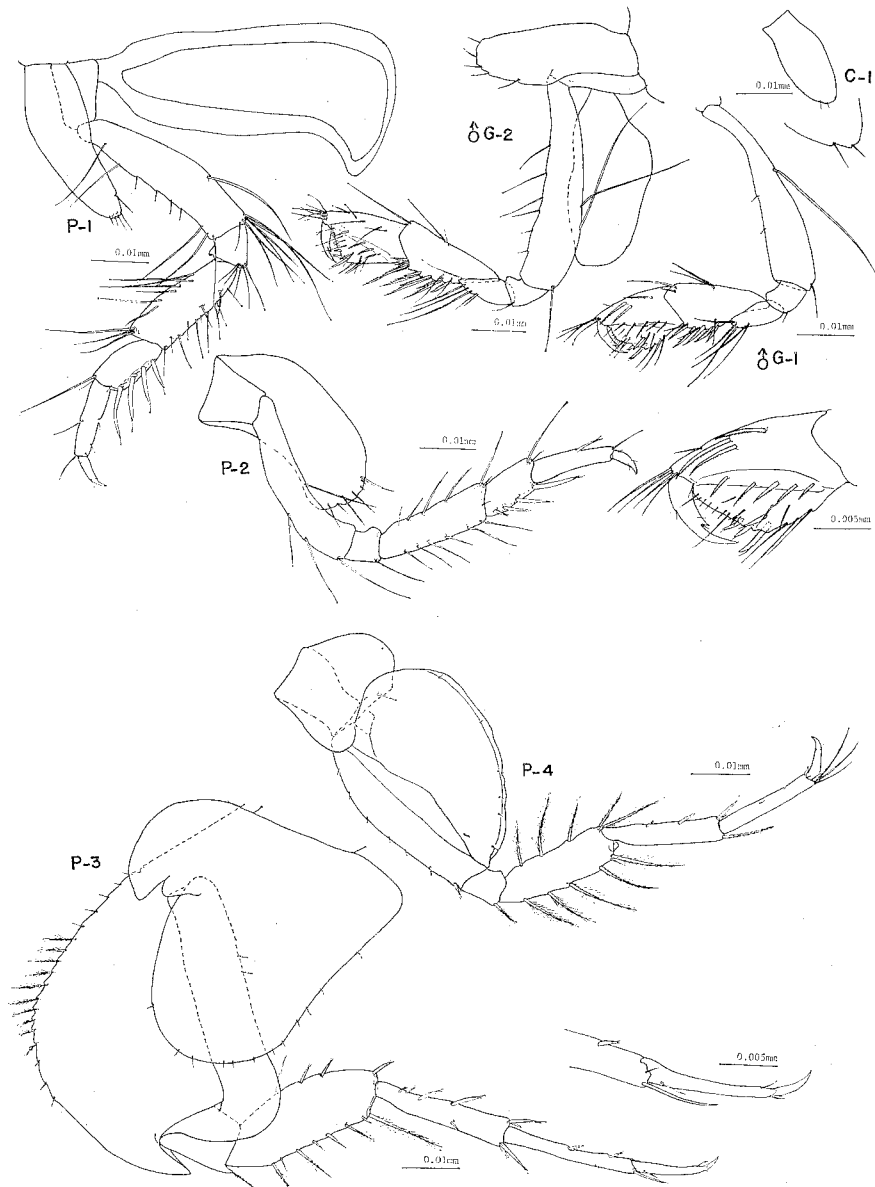


Fig. 126. *Guernea (Guernea) magnaphilostoma* sp. nov. Holotype, male, 2.5 mm.

rounded, thin, posterodistal margin with five short setae. Merus two thirds as long as basis, a little growing in width, anterior margin with six single long setae and one distal set of three long setae, posterior margin not smooth, with about twelve short or small setae. Carpus narrow proximally, flattened posteriorly, with one anterodistal set of two small and long setae, four posterior stout spines growing in size, and one posterodistal small seta. Propod longer than carpus, broader than half as broad as the latter, with one medial and one distal small setae on anterior margin,

and one medial and two distal small setae on posterior margin. Dactyl falcate.

Peraeopod 2: Coxa 4 slightly curved backward, nearly one and half times as broad as coxa 3, ventral margin roundish, crenulate, with seven small and short setae. Peraeopod 2 very similar to peraeopod 1 in size and form, but less setose. Basis with one anteromedial long seta, and three long setae on posterior half margin. Ischium with one posterodistal long seta. Propod with one anteromedial spine.

Peraeopod 3: Coxa 5 very large, divided in two parts by concavity and small projection, anterior lobe small, one third as deep as posterior lobe, rounded anteriorly, ventral part triangular, posterior lobe deep, continuously rounded on anterior and ventral margins, almost perpendicular posteriorly. Peraeopod 3 growing out of anterior lobe of coxa 5. Basis subequal to coxa 5 in size, anterior margin roundly expanding, finely serrate, with five small spines, ten plumose setae and three small spines in formula on proximal two thirds, anterodistal end much projecting, reaching middle of ischium, taper, receiving anterior margin of ischium, posterior thin plate uniform in width, extending beyond ischium, rounded distally, with two medial small setae. Anterodistal small projection of ischium acute, distally with one short plumose seta. Merus longer than twice as long as ischium, anteriorly with one proximal small seta, three spines and three medial short and one distal long plumose setae, posteriorly with three medial and one distal spines. Carpus subequal to merus in length, about one third as broad as distal part of merus, a little growing in thickness, anteriorly with one medial spine and two distal spines of which one is long, posteriorly with two proximal small and two medial long spines, and one distal pair of one small and one long spines. Propod as long as carpus, half as thick as distal part of the latter, anteriorly with one medial minute seta and one distal set of one minute and one long stout setae, posteriorly with two medial and distal spines. Dactyl falcate, slender, two thirds as long as propod, composing of two parts which are defined by small depression and two short setae, distal part small, nail-like.

Peraeopod 4: Coxa 6 bilobate, anterior lobe smaller, ventral margin semicircular, posterior lobe expanding backward, ventral margin straight, with one medial seta. Basis one third as long as peraeopod 4, anterior margin nearly perpendicular, with five minute setae, one spine at one fifth from distal end, and one distal set of one minute seta and one spine, posterior margin rounded, most expanded proximally, not projecting distally, with six small setae. Ischium anterodistally with one short plumose seta. Merus two thirds as long as basis, with five anterior short, three posterior and one posterodistal paired plumose setae. Carpus as long as merus, half as broad as distal part of the latter, with one anterodistal short plumose seta, two posteromedial spines and one posterodistal pair of small and long spines. Propod as long as carpus, with four anterodistal short and two posteromedial minute setae, and one posterodistal pair of locking spines of which one is stout. Dactyl falcate.

Peraeopod 5: Coxa 7 larger than coxa 5, nearly semicircular. Basis broadly expanding backward in semicircle, not prominently extending distally, perpendicu-

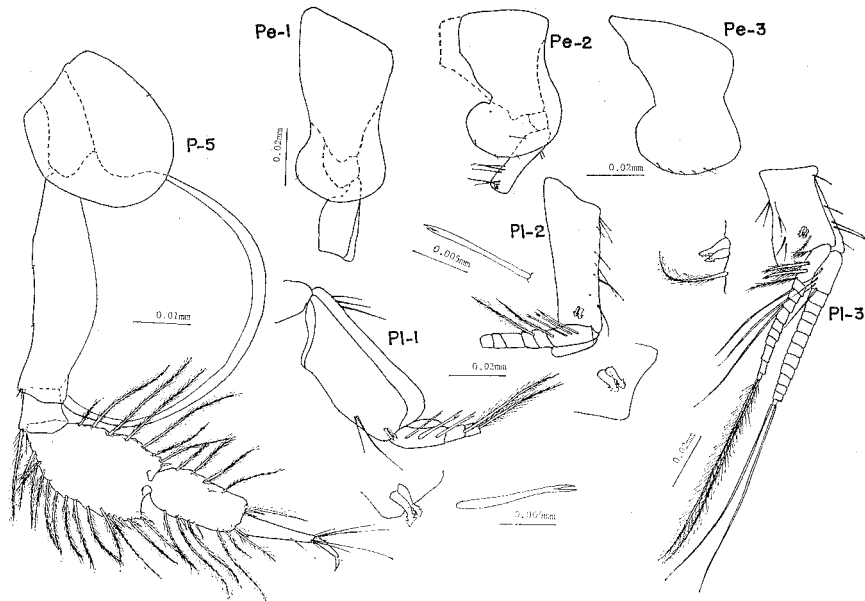


Fig. 127. *Guernea (Guernea) magnaphilostoma* sp. nov. Holotype, male, 2.5 mm.

lar anteriorly, with two anteromedial minute and one paired anterodistal small setae. Ischium rectangular, anterodistally with one long plumose and three simple short setae. Merus about three times as long as ischium, truncate, crenulate both anteriorly and posteriorly, anteriorly with two paired and ten single plumose setae, and four spines on one third margin from distal end, posteriorly with one short and five long plumose setae, and one distal set of one long plumose seta and one spine. Carpus shorter and narrower than merus, rounded proximally, anteriorly with four plumose setae, two spines and two distal set of one or two spines and one plumose seta, posteriorly with four plumose setae and one distal set of one plumose seta and two spines. Propod half as broad as distal part of carpus, a little growing in width, with one short simple seta at one third from anterodistal end, with several distal short and long simple setae. Dactyl longer than half as long as propod, geniculate distally, its angle with one minute seta.

Pleopods: Peduncle of pleopods short, stout, terminal swimming setae very long.

Uropods: Uropod 1 extending beyond uropods 2-3, peduncle prominently longer than rami, inner margin with two medial and distal spines; both rami equal to each other in length, outer ramus with four outer, one inner-distal and two apical long spines, one of apical spines longer than half as long as rami, very stout, inner ramus with two inner-medial and inner-distal spines, two apical short spines and one apicomедial long spine which is subequal to rami in length. Uropod 2 longer than two thirds as long as uropod 1, peduncle longer than rami, with four outer and one inner distal spines; outer ramus with three outer spines and two apical spines of which one is as long as rami, inner ramus with three terminal spines of which

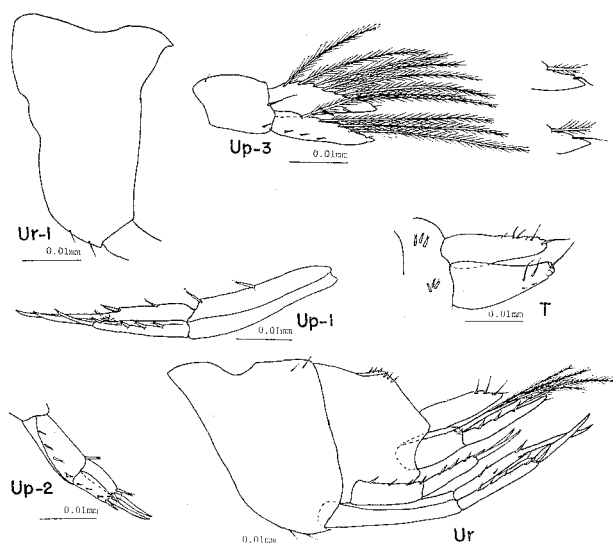


Fig. 128. *Guernea (Guernea) magnaphilostoma* sp. nov. Holotype, male, 2.5 mm.

central one is as long as ramus. Peduncle of uropod 3 stout, shorter than rami, with one outer-distal spine; both rami equal to each other in length, with one distal small seta respectively, else outer ramus with three spines on outer proximal half margins and four inner long plumose setae, inner ramus with two outer spines and seven inner long plumose setae.

Telson: Telson thoroughly cleft, each lobe long-triangular, rounded and uneven distally, with one apical short seta, distal part with two minute and two or three short setae.

Material examined. Holotype: Male, 2.5 mm. Type-locality: Ariake Sea. Date: June, 1976. Paratype: 4 specimens. Collection No.: AMBL-Amph. 14.

Remarks. The new species has the maxilla I with uniarticulate palp. Hitherto, this character is known to *Guernea* in three species, *Guernea (Guernea) petalocera* (J.L. Barnard & Ledoyer 1973), *G. (G.) endota* (J.L. Barnard 1972a) and *G. (G.) unchalka* (J.L. Barnard 1972a). Antenna I in the latter two species is armed with one accessory flagellum well developed, but the new species and *G. (G.) petalocera* lack it. Moreover, the new species can be distinguished from *G. (G.) petalocera* by urosomites 2-3 of which back is smooth.

***Guernea (Prinassus) terelamina* sp. nov.**

(Figs 129-131)

Body: Roundish, compressed, back dispersively setose. Head large, dorsal margin roundish, subequal to peraeonites 1-3 combined in length, rostrum triangular, small, superior antennal sinus deep, anterior head lobe extending to near

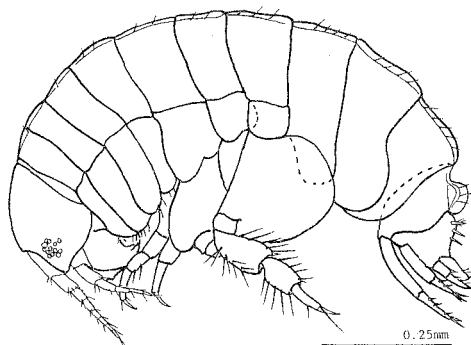


Fig. 129. *Guernea (Prinassus) terelamina* sp. nov. Holotype, female (?), 1.5 mm.

distal end of peduncular segment 1 of antenna 1, rounded apically, upper margin with three minute setae, ventral margin with four short setae. Eyes medium, placing on anterior head lobe, each ommatidium not concentrated. Peraeonites 1-3 subequal to each other in size, also peraeonites 4-7 subequal to each other in size, coxae 1-3 as deep as each peraeonite, equal to each other in depth, following coxae gradually shallower. Pleonite 1 as long as peraeonite 7, pleonites 2-3 a little longer than pleonite 1; pleonal epimera 1-2 similar to each other in shape, anterior and posterior margins rounded, ventral margin with one seta, posteroventral margin a little expanding backward; pleonal epimeron 3 rounded, posterior part of ventral margin with two stiff setae or spines. Urosome shortened, longer than pleonite 3, stout, urosomite 1 twice as high as wide, back deeply concave medially, risen in nearly semicircle on posterior half part, a little extending backward above following urosomite, marginal plate of its rising thin, with two sets of opposite setae on both lateral sides; urosomites 2-3 coalescent, back concave, gradually going down, both lateral ridges of back splayed, producing backward, acute distally, with three or four pinnate spines and one apical small seta.

Antennae: Antenna 1 very short, accessory flagellum absent, peduncular segment about half as long as back of head; flagellum five-articulate, proximal segment a little longer than peduncular segment 3, with one apical pair of setae. Antenna 2 shorter than antenna 1, peduncular segment 2 wider than long, gland cone relatively well developed, producing to near or beyond distal end of peduncular segment 3, peduncular segment 3, peduncular segment 4 about twice as long as peduncular segment 3; flagellum three-articulate, gradually shortening, each segment with several distal short setae.

Mouthparts: Massive. Upper lip subrectangular. Inner plate of lower lip rounded apically, dispersively pubescent on inner margin, outer lobe rounded, lacking mandibular process, shoulder with one cone, dispersively pubescent around cone. Inner plate of maxilla 1 very small, naked, outer plate apically with three simple teeth and five teeth armed with four to two medial setae; palp uniaarticulate, with three apical stiff setae. Maxilla 2 slender, inner plate short, extending beyond

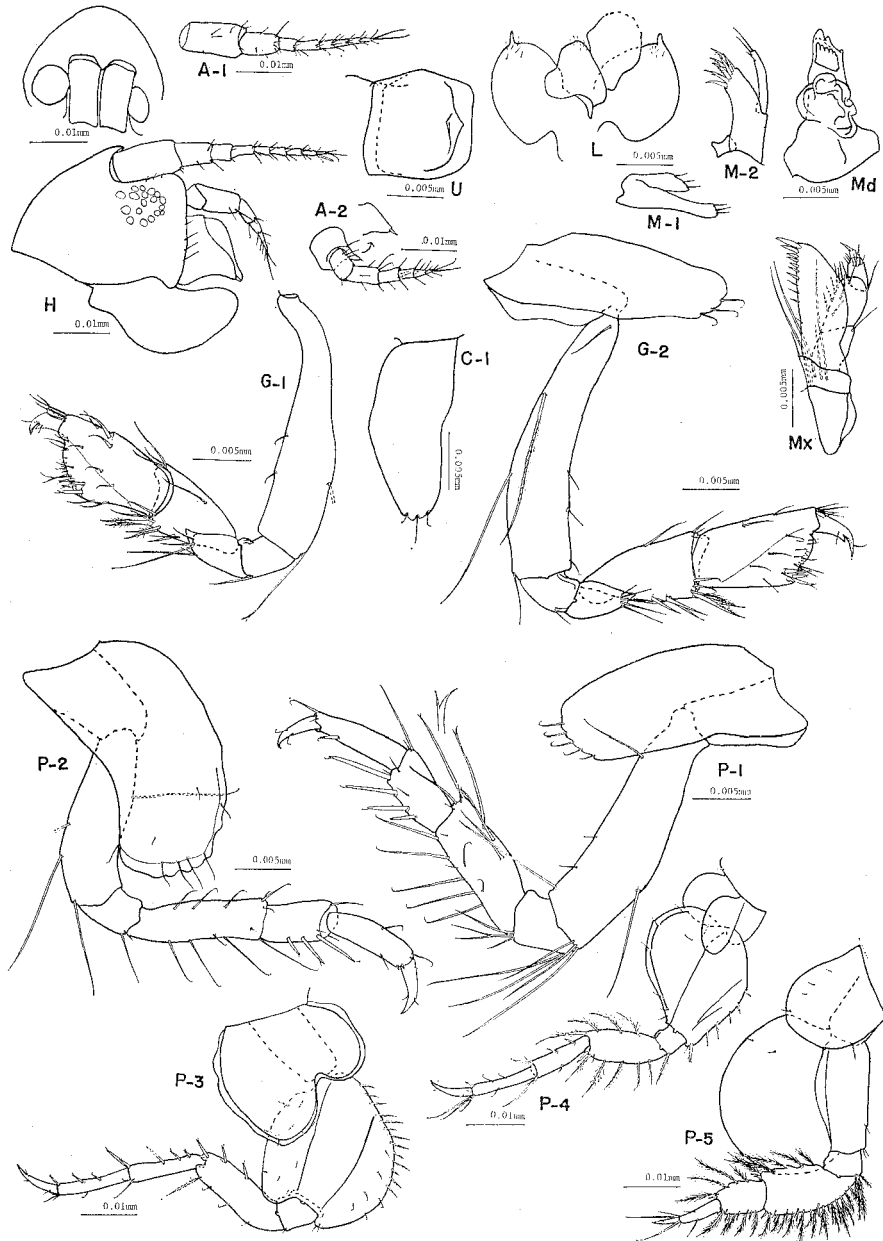


Fig. 130. *Guernea (Prinassus) terelamina* sp. nov. Holotype, female (?), 1.5 mm.

half of outer plate, apical margin diagonal, with three short stiff setae; apex of outer plate truncate, with three stiff setae. Mandible stout, lacking palp, molar process placing proximally, large, shrivel, lacking rasp, incisor broad, with three blunt teeth, lacinia mobilis broad, with five small blunt teeth. Maxilliped rather undeveloped, especially palp weak; inner plate rudimentary, with one apical simple

seta; outer plate relatively well developed, broad, proximal margin with four very long setae, inner margin straight, inner distal half with four proximal setae and seven distal teeth which gradually elongate; palp four-articulate, not extending beyond outer plate, proximal two segment stout, subequal to each other in length, inner margin of 2nd segment setose, 3rd segment two thirds as long as 2nd, cylindrical, apical margin surrounded by many small setae, terminal segment small, with one apical needle-like spine.

Gnathopod 1: Coxa 1 deep, ventral margin with three setae. Basis shorter than half of gnathopod 1, twisted proximally, gradually widening, anterodistal half with two small setae, posterodistal half with two long setae of which apex is bifid. Ischium longer than wide, with one posterodistal seta. Merus semicylindrical, taper distally, subequal to ischium in length, posterodistal margin oblique, with five long and short setae, the major part of anterior margin connecting with carpus. Carpus as long as ischium and merus combined, gradually widening, posterodistal half margin with one proximal slender spine, one medial pair of pinnate slender spines and one distal pair of pinnate slender spines. Propod longer than carpus, a little gradually expanding, anteriorly with three medial and four distal setae, posteriorly with two medial setae, lateral side with three setae in one diagonal row which runs between posterior thin plate and muscular part; palm slightly oblique, gently rounded, setose, defined by four spines. Dactyl stout, falcate, almost reaching palmar spines, grasping margin with one acute tooth near apex.

Gnathopod 2: Gnathopod 2 closely similar to gnathopod 1.

Peraeopod 1: Coxa 3 similar to coxa 2, ventral margin with five short setae. Basis about two fifths as long as peraeopod 1, with one medial long seta at one third from posterodistal end and one posterodistal set of five long setae. Ischium with four posterodistal short setae. Merus about half as long as basis, with three anteromedial long and two apical long setae of which distal part is bifurcate, posterior margin not smooth, with five long stout and four short setae. Carpus narrower than and about half as long as merus, anterodistally with one small simple and one long bifurcate setae, posteriorly with four spines which gradually elongate and of which distal one reaches distal one fourth of propod. Propod shorter than merus, with two minute and one short stout setae anterodistally, and one stout seta near distal end. Dactyl falcate, about half as long as propod, with two minute setae near apex.

Peraeopod 2: Coxa 4 curved forward, anterior half of ventral margin crenulate, with four setae. Peraeopod 2 similar to peraeopod 1 in size and form. Basis about one third as long as peraeopod 2, with one posterodistal seta. Carpus with three posterior spines. Propod with one distal pair of locking spines.

Peraeopod 3: Coxa 5 bilobate, roundish, anterior lobe larger than posterior lobe. Basis rounded posteriorly, a little produced posterodistally, with thirteen small pinnate spines on posteroproximal two thirds margin and two small setae on following margin, posteriorly with two apical small setae and one marginal row of four small setae, anterior thin plate expanded overall in almost same width,

extending beyond ischium, with three marginal setae. Ischium subsquare, posterior margin longer than anterior margin. Merus shorter than basis, almost uniform in width, produced and rounded both antero- and posterodistally, posteriorly with three small setae and one distal set of one small simple and one long pinnate setae, on anterodistal half margin with three spines. Carpus shorter than merus, growing out between both distal projections of merus, narrower than half as broad as merus, with two posterodistal short setae, three spines on anteroproximal half margin and one anterodistal pair of long and short spines. Propod as long as and a little narrower than carpus, anteriorly with two medial and one distal spines. Dactyl about half as long as propod, scimitar, with two opposite minute setae near apex.

Peraeopod 4: Coxa 6 bilobate, about half as long as coxa 5. Basis most and largely expanding proximally, abruptly narrowing on anterodistal half of anterior thin plate which does not produced distally, rounded anteriorly, on anterodistal half margin with six dispersively pinnate spines. Ischium square, with one anterodistal stout pinnate seta. Merus two thirds as long as basis, slightly rounded, a little compressed proximally, a little producing both antero- and posterodistally, posteriorly with four short setae, and one distal set of one spine and one short and one minute simple setae, anteriorly with three and one distal short setae, these short setae pinnate and stout. Carpus shorter than merus, with one posteromedial small spine, one posterodistal pair of one short poorly pinnate and one long stout setae, two anteromedial spines, and one anterodistal pair of long and short spines. Propod as long as and a little narrower than carpus, with one posteromedial small seta, one distal set of three long setae, two anteromedial small setae and one anterodistal locking spine. Dactyl similar to one of peraeopod 3.

Peraeopod 5: Coxa 7 semioval, larger than coxa 6. Peraeopod 5 shorter than peraeopod 4. Basis prominently winged backward in semicircle, extending beyond ischium, perpendicular anteriorly. Ischium broader than long, with four anterodistal pinnate setae. Merus rounded anteroproximally, two thirds as long as muscular part of basis, anteriorly with nine single pinnate setae, three medial pairs of pinnate setae, six spines on two thirds margin from distal end, and one submarginal row of three small setae on one third margin from distal end, posteriorly with five pinnate setae and one distal pair of spines. Carpus about half as long as and narrower than merus, roundish, anteriorly with five pinnate setae, two small setae and four spines, posteriorly with three pinnate setae, and one distal set of one small and one pinnate setae and one spine. Propod as long as carpus, slender, with two medial opposite short setae, both distal ends with one pair of one long and one short or small setae. Dactyl not falcate, about half as long as propod, with two opposite setae near apex.

Pleopods: Pleopods very similar to each other, rather slender; outer ramus five-articulate, proximal segment lacking bifid setae, inner ramus six- or seven-articulate, terminal swimming setae subequal to rami in length.

Uropods: Uropod 1 extending beyond uropods 2-3, peduncle one and half times as long as outer ramus, with two setae on proximal margin of outer lateral

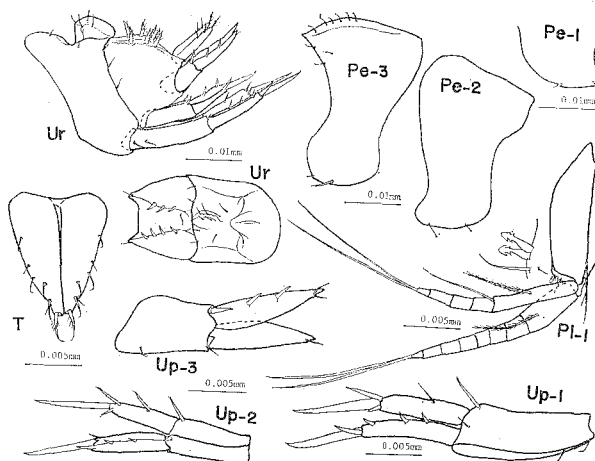


Fig. 131. *Guernea (Prinassus) terelamina* sp. nov. Holotype, female (?), 1.5 mm.

side, one apicomedial small seta and one inner-distal short stout seta; both rami truncate, outer ramus longer than inner ramus, with three outer spines and two apical stout spines of which one is subequal to outer ramus in length, inner ramus with one inner-medial short stiff seta and three stout spines of which central one is equal to inner ramus in length. Uropod 2 about half as long as uropod 1, peduncle equal to outer ramus in length, both outer and inner distal ends with one spine; rami truncate, outer ramus with three outer spines, one inner-distal stiff seta and one apical stout spine which is as long as outer ramus, inner ramus a little shorter than outer ramus, with one inner-medial, two distal and one apical stout spines, apical spine as long as inner ramus. Uropod 3 longer than uropod 2 excluding apical spine, peduncle stout, shorter than rami, outer distal end with one stout spine; both rami foliaceous, with one or two apical small setae, else outer ramus with two medial spines.

Telson: Telson longer than half of uropod 3, thoroughly cleft, truncate, triangular, outer margin of both plates with four single setae, one pair of setae at near distal end and one apical pinnate seta.

Material examined. Holotype: Female (?), 1.5 mm. Type-locality: Shijiki Bay. Date: June, 1977. Collection No.: AMBL-Amph. 28.

Remarks. Present species is distinguished from the known species of the subgenus *Prinassus* by the outer plate of lower lip without stout teeth and the outer plate of maxilla 2 with six or more setae.

***Guernea (Prinassus) tomiokaensis* sp. nov.**

(Figs 132–133)

Body: Small, compressed. Head rectangular, obliquely extending downward

and forward, roundish dorsally, rostrum rudiment, triangular, anterior head lobe extending to apex of peduncular segment 2 of antenna 1, ventral margin lacking inferior antennal sinus, obliquely going down backward. Pleon carinate; pleonal epimeron 1 compressed posteroproximally, a little produced anterodistally, with one anterodistal small seta, ventral margin gradually going up backward, roundish; pleonal epimeron 2 rounded, compressed anteroproximally, ventral margin with three stiff setae; pleonal epimeron 3 subrectangular, with three stiff setae on anterior half of ventral margin. Back of urosomite 1 depressed medially, raised, with quadrantal plate which is well developed but does not extend backward above following urosomite; urosomites 2-3 coalescent, back swelling medially in lateral view, ridged marginally, these ridges with five opposite pairs of spines.

Antennae: Very short. Antenna 1 lacking accessory flagellum, upper margin of peduncular segment 1 not smooth, peduncular segment 2 longer than half as long as and narrower than peduncular segment 1, peduncular segment 3 about half as long as peduncular segment 2; main flagellum seven-articulate, each segment with one aesthetasc except for proximal two segments. Antenna 2 shorter than antenna 1, peduncular segment 2 stout, distally wider than peduncular segment 3, gland cone stout, extending beyond peduncular segment 3, peduncular segment 3 longer than wide, peduncular segment 4 one and half times as long as peduncular segment 3, peduncular segment 5 longer than half as long as peduncular segment 4; flagellum triarticulate, segments progressively shortening.

Mouthparts: Massive. Upper lip rounded apically. Inner plates of lower lip coalescent basally, outer plate obliquely arised on inner plates, oval, shoulders and inner margin densely pubescent, shoulder with one gland cone. Inner plate of maxilla 1 small, without any seta, outer plate with two bifid tooth-like spines and seven pectinate tooth-like spines, palp uniaarticulate, growing out at medial level of outer plate, apex rounded, with three small setae. Inner plate of maxilla 2 distinctly shorter than outer plate, rounded apically, with five inner-distal setae, outer plate slenderer than inner plate, rounded apically, apex with three paired small and one single small setae. Both mandibles similar to each other, lacking palp, accessory spines and setae, incisor broad, rounded apically, lacinia mobilis broad, gently concave apicomediaally, molar process well developed, aberrant, placing on proximal part, shrivel. Inner plate of maxilliped small, rather vestigial, with one apical short seta, outer extension well developed, with three very long setae; outer plate much developed, reaching proximal one third of palpal article 3, with eleven inner conical teeth; palp slender, four-articulate, end of proximal segment with one outer-distal long seta, 2nd segment about half as long as palp, inner margin with six inner-proximal short setae, nine inner-distal pairs of short setae and one outer-distal comparatively long seta, 3rd segment half as long as 2nd segment, truncate, distal two thirds gradually narrowing, with six pairs of small setae on inner-distal two thirds and six outer-distal small setae, distal segment one third as long as 3rd segment, stout, truncate, with two setae and one apical small spine.

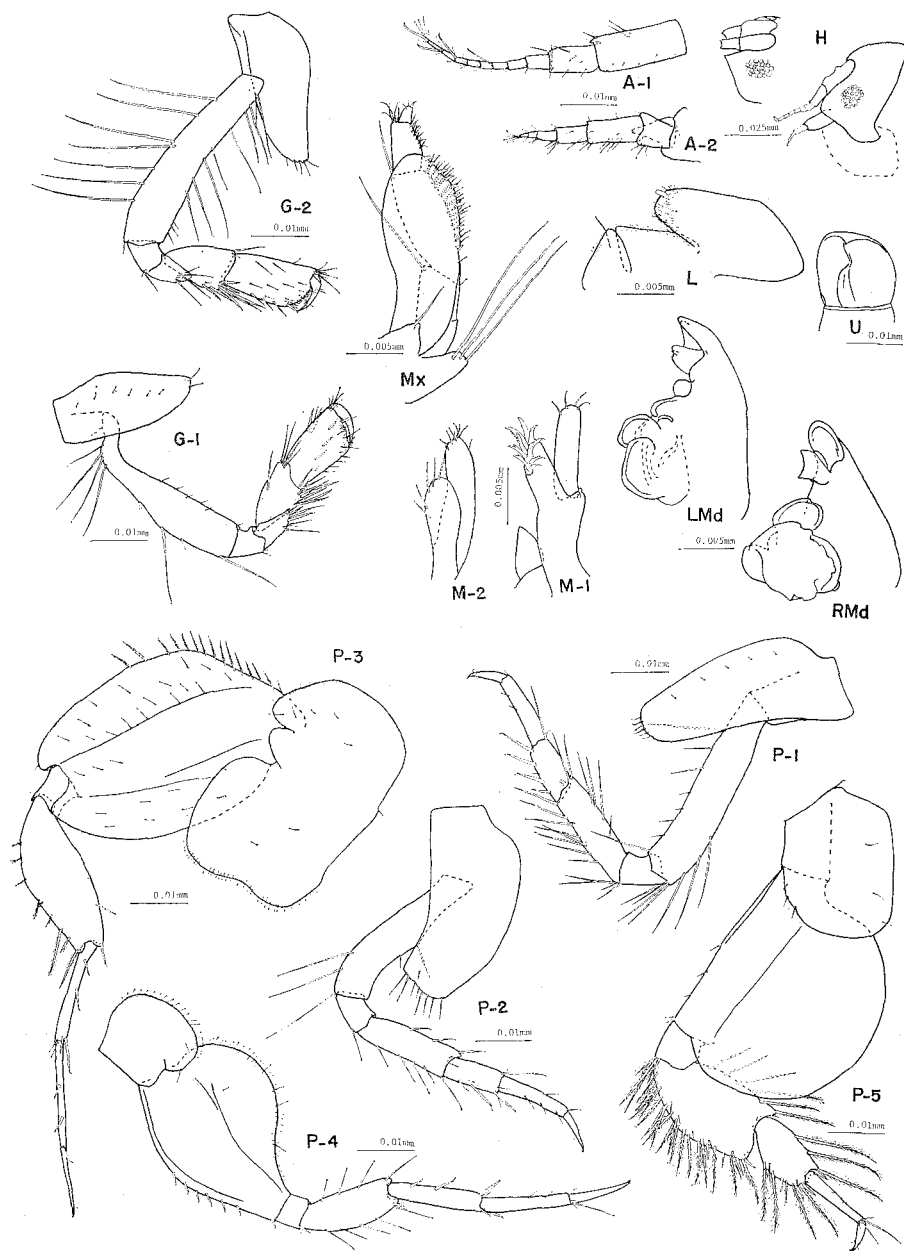


Fig. 132. *Guernea (Prinassus) tomiokaensis* sp. nov. Holotype, female, 2.5 mm.

Gnathopod 1: Subchelate. Coxa 1 small, long semioval, with two ventral setae. Basis half as long as gnathopod 1, prominently curved proximally, its posterior corner with four long setae. Ischium short, longer than broad. Merus longer than ischium, attenuate distally, anterior free margin very short, posterodistal margin with three simple and three thick pectinate setae. Carpus as long as ischium and

merus combined, triangular, with one anteromedial seta and one anterodistal transverse row of four setae, posterodistally with five thick pectinate and four simple setae. Propod rectangular, longer than merus and carpus combined, with one anteromedial pair of thick pectinate setae, four posterior small setae, and one oblique row of four pectinate setae on inner side, palm almost transverse, defined by four spines, with about four small setae curved distally and several short setae. Dactyl reaching palmar spines when closed, falcate, grasping margin with one small tooth near apex.

Gnathopod 2: Coxa 2 similar to coxa 1, but deeper than the latter, with five ventral setae. Gnathopod 2 similar to gnathopod 1 except for following points; basis not curved proximally, anteriorly with eight long and three small setae, posteriorly with seven long and one distal small setae; posterodistal end of merus lacking pectinate setae; posterodistal margin of carpus with two single pectinate setae and one distal row of five pectinate setae, inner side of propod with one oblique row of four simple setae in stead of pectinate setae.

Peraeopod 1: Coxa 3 similar to coxa 2 but a little deeper, with six ventral setae. Basis two fifths as long as peraeopod 1, posterodistal two third margin with three single setae and one distal set of four setae. Ischium shorter than twice as long as wide. Merus about half as long as basis, a little producing and truncate anterodistally, its extension with one apical pair of long setae, anteriorly with one small, one short and one paired short setae, posteriorly with two single, three and three single short setae. Carpus about half as long as and narrower than merus, with one anterodistal short seta and four posterior long spines. Propod longer and distinctly narrower than carpus, with one anterodistal minute seta, and two small setae on posterodistal half margin. Dactyl half as long as propod, falcate.

Peraeopod 2: Coxa 4 as deep as coxa 3, gently curved and gently expanding anteromedially, with eight ventral setae. Peraeopod 2 similar to peraeopod 1 but less setose, carpus with three posterior spines.

Peraeopod 3: Coxa 5 very large, rectangular, bilobate. Basis about one third as long as peraeopod 3, prominently produced both antero- and posterodistally, broadly expanding, oval, dispersively setose on outerlateral side, with fifteen short pinnate setae on anteroproximal two thirds margin, posterior thin plate slender. Ischium short, square. Merus two thirds as long as basis, dilating, most expanding forward medially, produced both antero- and posterodistally, with nine anterior short and small pinnate setae, one posterodistal minute seta and one posteroapical spine. Carpus half as long as basis, very slender, with two spines on posteroproximal half and one posterodistal set of two short and long spines. Propod as long as and slenderer than carpus, posteriorly with two medial single and one distal locking spines. Dactyl two thirds as long as propod, slender, falcate.

Peraeopod 4: Coxa 6 small, bilobate, divided by shallow concavity, rounded posteriorly, densely bristly on posterior margin. Basis one third as long as peraeopod 4, most expanded backward proximally, with six and one apical spines on anterodistal margin, posterior thin plate attenuate distally, bristly on margin. Ischium

broader than long, with one anterodistal spine. Merus half as long as basis, slightly dilating, producing both antero- and posterodistally, with four anterior thick setae, one anterodistal set of one spine and one short seta, and three posteromedial short and one posterodistal setae. Carpus shorter than and half as broad as merus, with one anterodistal pair of spines, two posteromedial spines, and one posterodistal set of two small and long spines. Propod as long as and slightly narrower than carpus, with one posterior locking spine. Dactyl two thirds as long as propod, nearly falcate.

Peraeopod 5: Coxa 7 rectangular, angles rounded. Basis about two fifths as long as peraeopod 5, very much winged backward, semicircular, anteriorly perpendicular, with one anterodistal set of one small seta and one spine. Ischium square, with four anterodistal thick pinnate setae. Merus about half as long as basis, dilating, concave apically, with many anterior pinnate setae in singles and pairs, four spines on one third from anterodistal end and six posterior pinnate setae. Carpus compressed proximally, broadly dilating on two thirds from distal end, a little produced both antero- and posterodistally, on anterior half margin from distal end with five pinnate and two small simple setae and four spines, on posterior half margin from distal end with two long pinnate setae and one apical set of one long pinnate seta and one spine. Propod slender, as long as carpus, with two posteromedial small setae and two distal sets of two small and short setae. Dactyl longer than half as long as propod, falcate.

Pleopods: Pleopods similar to each other, short. Peduncle of pleopod 1 shorter than rami, stout, broad, with one outer distal pinnate seta and one inner distal set of one pinnate seta and two coupling spines; rami equal to each other in length, outer ramus nine-articulate, proximal segment with three outer pinnate

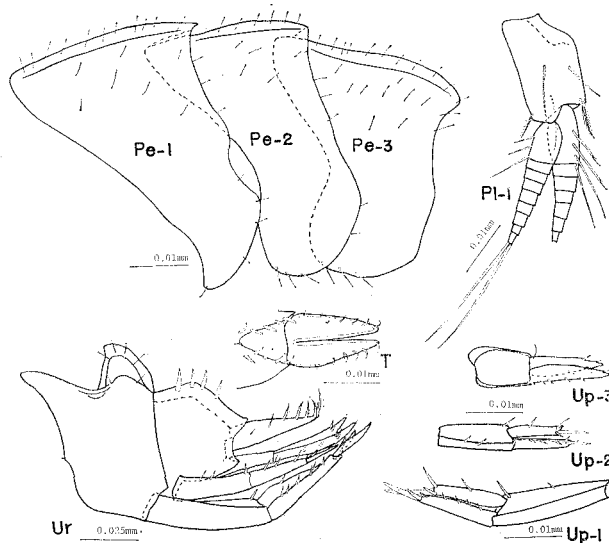


Fig. 133. *Guernea (Prinassus) tomiokaensis* sp. nov. Holotype, female, 2.5 mm.

setae, inner ramus seven-articulate, proximal segment with two bifid pinnate and two ordinary pinnate setae on inner margin, terminal swimming setae subequal to rami in length.

Uropods: Uropod 1 excluding apical spines not extending beyond uropod 3, peduncle about two thirds as long as rami, with two inner-medial and inner-apical spines; both rami equal to each other in length, truncate, outer ramus with five outer spines, one inner-distal spine and two apical stout spines of which one is about half as long as outer ramus, inner ramus with one inner medial spine, two distal opposite spines and one stout apical spine which is about half as long as inner ramus. Uropod 2 about two thirds as long as uropod 1, peduncle as long as rami, with two outer-medial and two apical opposite spines; both rami equal to each other in length, truncate, produced distally, outer ramus with three outer, two apical opposite and one apical longer spines, inner ramus with one inner medial, two apical opposite and one apical longer spines. Uropod 3 as long as uropod 2, peduncle two thirds as long as rami, with one outer-apical spine; both rami equal to each other in length, attenuate, with one small notch and one minute seta near apex of outer margin, outer ramus with four outer spines, inner ramus with two outer and one inner spines.

Telson: Telson two thirds as long as uropod 3, subtriangular, deeply cleft to near base, rounded apically, outer margin of each lobe with four small stout setae on half margin from distal end and four or five marginal minute setae.

Material examined. Holotype: Female, 2.5 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 9 specimens. Collection No.: AMBL-Amph. 92.

Remarks. The new species is similar to *Guernea (Prinassus) reduncans* (J.L. Barnard 1970a) and *G. (P.) terelamina* sp. nov. in the dorsal ridge of urosomite 1. It differs from the former in the palp of maxilla 1 with only two apical long setae and the outer plate of lower lip lacking the stout tooth. Also, it is distinguished from the latter by both plates of maxilla 2 with only three setae respectively.

***Guernea (Prinassus) nullispina* sp. nov.**

(Figs 134-136)

Body: Small, compressed, slender. Head longer than peraeonites 1-2 combined, rostrum short, anterior head lobe producing beyond middle of peduncular segment 1 of antenna 1. Eyes medium, circular. Pleonites 1-3 subequal to each other in length, slightly carinate; pleonite 1 as long as peraeonites 6-7 combined; pleonal epimeron 1 extending backward, broad, rectangular, with two anteroventral small stiff setae; pleonal epimeron 2 broad, long oval, with five ventral small stiff setae; pleonal epimeron 3 as large as pleonal epimeron 2, oval, with five ventral small stiff setae. Urosome subequal to pleonite 3 in length, urosomite 1 distinctly concave dorsomedially, posterior half of back carinate, gradually going up, extending above following segment to middle of it, hood-formed, urosomites 2-3

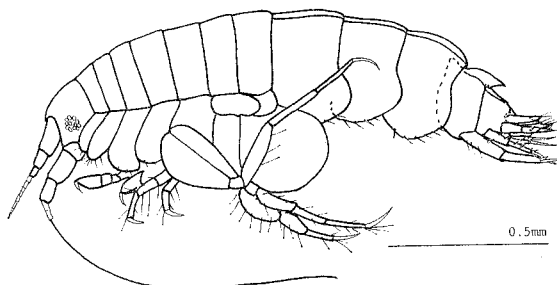


Fig. 134. *Guernea (Prinassus) nullispina* sp. nov. Holotype, male, 1.75 mm.

coalescent, ridged on back.

Antennae: Antenna 1 short, one fourth as long as body length, accessory flagellum absent, peduncular segment 1 stout, about half as long as head, not smooth on upper margin, extending ventrally, inner medial margin densely setose in rows, peduncular segment 2 about half as long as and distinctly narrower than peduncular segment 1, peduncular segment 3 one third as long as peduncular segment 2, producing ventrodistally, with one short aesthetasc; flagellum seven-articulate, with one aesthetasc on each segment except for terminal one. Antenna 2 shorter than body length, peduncular segment 2 short, gland cone developed, but not extending beyond following segment, peduncular segment 3 broader than long, peduncular segment 4 gradually narrowing, densely bristly in rows on inner margin throughout, peduncular segment 5 two thirds as long as preceding segment; flagellum slender.

Mouthparts: Prominently massive. Upper lip rounded apically. Lower lip lost in dissection. Inner plate of maxilla 1 small, without any seta, outer plate with seven tooth-like spines, one of them simple, three pectinate and three armed with one minute tooth; palp uniarticulate, extending beyond outer plate, rounded apically, with two apical setae. Maxilla 2 weak, inner plate shorter and broader than outer plate, with two apical setae, outer plate with seven apical minute setae. Mandibles lacking palp, similar to each other, triangular, incisor broad, roundly concave apicomediaally, lacinia mobilis medium, bifid, molar process well developed and prominently produced, shriveled. Inner plate of maxilliped small, rather vestigial, with two apical setae, outer producing lobe developed, rounded apically, with four very long setae; outer plate well developed, broad, not extending beyond article 3 of palp, with ten anterior teeth of which distal three are especially stout; palp slender, proximal segment with one inner-distal and two outer-distal setae, 2nd segment longer than half as long as palp, with twelve setae in singles and pairs, outer distal end with one seta, 3rd segment obliquely truncate, with five inner pairs of setae and four outer-distal setae, terminal segment small, cylindrical, truncate, with one stout nail-like spine and two setae.

Gnathopod 1: Subchelate. Coxa 1 small, with three ventral small setae. Basis three sevenths as long as gnathopod 1, narrowed and curved proximally, gradually widening, with two posteromedial long, one posterodistal long and two

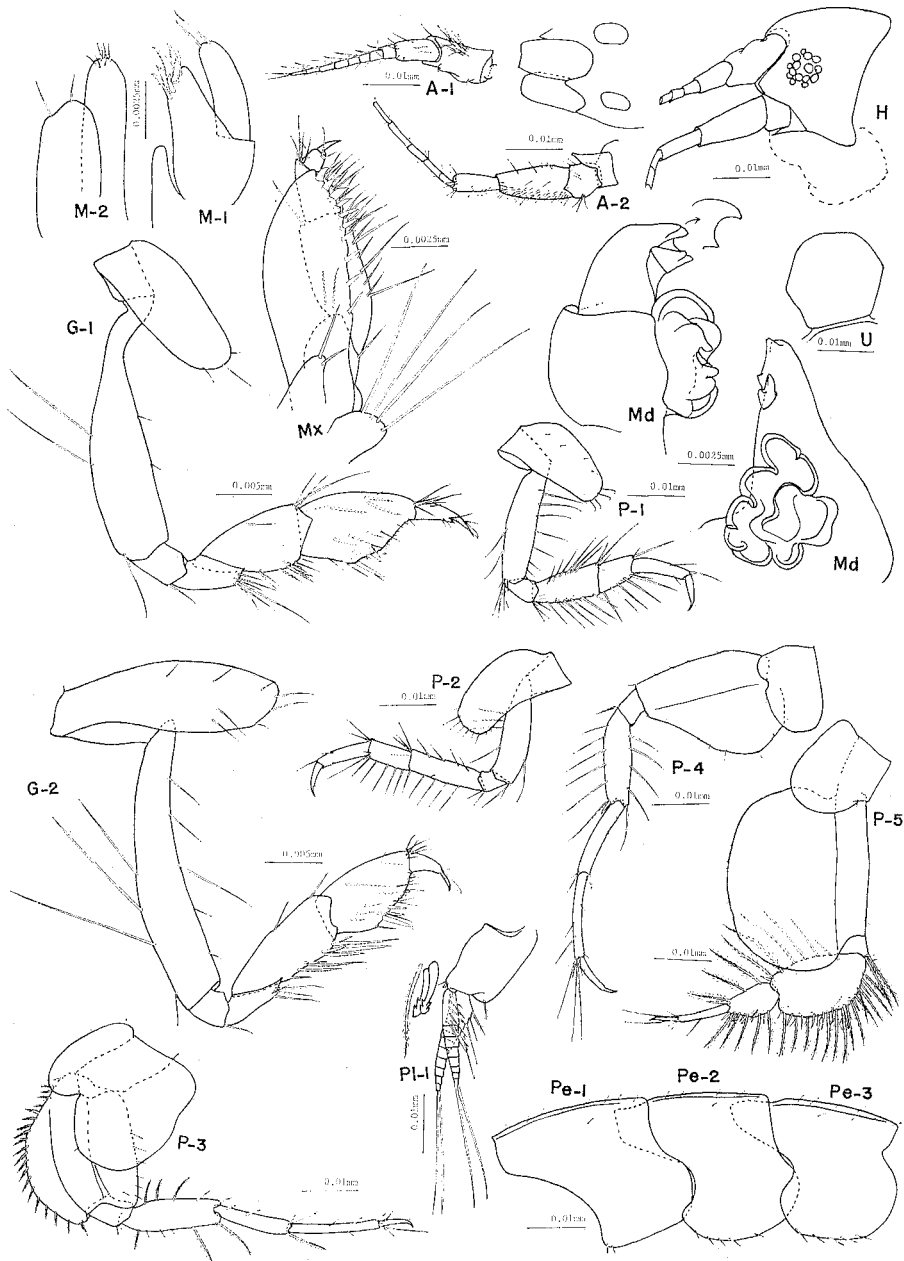


Fig. 135. *Guernea (Prinassus) nullispina* sp. nov. Holotype, male, 1.75 mm.

anteromedial small setae. Ischium rectangular, broader than long, with one posterodistal short seta. Merus about one and half times as long as ischium, obliquely truncate, with six posterodistal setae. Carpus half as long as basis, gradually widening, extending outer-distally, with four anterodistal setae, posterodistally with one pair of short setae and three pinnate and three simple setae. Propod as long as

carpus, anterior margin twice as long as posterior margin, with four distal setae, submarginally with one single pectinate and one paired pectinate setae, posterior margin with two setae; palm oblique, defined by four spines, with seven small setae curved apically and one inner-submarginal row of three pectinate setae. Dactyl fitting on palm when closed, falcate, hooded, grasping margin with one medial tooth.

Gnathopod 2: Coxa 2 similar to coxa 1 in form, but deeper. Gnathopod 2 similar to gnathopod 1, except for the following points; basis not curved proximally; carpus posteriorly with two single setae, two pairs of setae, one seta and one pair of pectinate setae; inner side of propod anteriorly with one submarginal row of four pectinate setae; dactyl hooded, lacking tooth.

Peraeopod 1: Coxa 3 similar to coxa 2, but slightly expanding forward on proximal part, with four ventral setae. Basis two fifths as long as peraeopod 1, with eight anterior short setae, two single setae near posterodistal end and one posterodistal set of six setae. Ischium longer than wide, with six posterodistal setae. Merus about half as long as basis, with six anterior setae and one anterodistal set of three short and one minute setae, posteriorly with six short and three small setae. Carpus about half as long as merus, with two anterodistal short and small setae, four posterior single setae and one posterodistal pair of short setae. Propod shorter than merus, narrower than carpus, with one short seta at one third from anterodistal end, and one anterodistal short and one posterodistal small setae. Dactyl about half as long as propod, distal part nail-like.

Peraeopod 2: Coxa 4 similar to coxa 3, with nine ventral small setae. Peraeopod 2 similar to peraeopod 1, but less setose.

Peraeopod 3: Coxa 5 bilobate, rounded ventrally, posterior lobe twice as broad as and deeper than anterior lobe. Basis developed, about one third as long as peraeopod 3, roundly expanding anteriorly, producing anterodistally, with twenty-one anterior short pinnate setae, posterior thin plate not extending beyond ischium, not rounded, with several marginal small setae. Ischium longer than wide. Merus depressed proximally, producing both antero- and posterodistally, with three anterior pinnate and three posterior pinnate setae, one spine at one third from posterodistal end and one posterodistal spine. Carpus shorter than and half as thick as merus, with one anterodistal pinnate seta, two posteroproximal spines and one posterodistal set of two small and long spines. Propod as long as merus, narrower than carpus, with one anteromedial minute, three anterodistal and one posteromedial small setae, one spine at one third from posterodistal end and one posterodistal spine. Dactyl shorter than half as long as propod, falcate, distal part nail-like.

Peraeopod 4: Coxa 6 bilobate, divided by shallow concavity, posterior lobe expanding backward in twice as broad as anterior lobe. Basis two sevenths as long as peraeopod 4, most expanding backward proximally, not expanding and not extending posterodistally. Ischium longer than wide, with one anterodistal short pinnate seta. Merus two thirds as long as basis, slightly dilating, producing both

antero- and posterodistally, with five anterior long setae, one anterodistal set of one spine and one long seta, and four posterior and one posterodistal long setae. Carpus shorter than and distinctly narrower than merus, with one anterodistal set of one small seta and one spine, and two posterodistal short setae. Propod as long as merus, anteriorly with two medial minute and one distal minute setae, on posterodistal half margin with two short setae and one distal set of three long and three short setae. Dactyl longer than half as long as propod, falcate, distal part nail-like.

Peraeopod 5: Coxa 7 subsquare, a little larger than coxa 6. Basis about two fifths as long as peraeopod 5, much expanding backward in rectangle, extending far beyond ischium, densely bristly on posterior margin overall. Ischium short, broader than long, anterodistally with two long pinnate and two minute setae. Merus two thirds as long as basis, dilating, rounded anteroproximally, anteriorly with twelve single and one paired pinnate setae and eight spines of which seven on two thirds from distal end grow between pinnate setae respectively, posteriorly with six pinnate setae and one distal set of one pinnate setae and one spine. Carpus half as long as merus, dilating forward, oval, anteriorly with five pinnate setae and seven spines, posteriorly with two pinnate setae and one distal set of one pinnate seta and one spine. Propod as long as carpus, slender, with one anteromedial short seta, one anterodistal set of one long and two small setae, one posteromedial small seta and one posterodistal pair of long and short setae. Dactyl two thirds as long as propod, slightly falcate.

Pleopods: Pleopods similar to each other, short, peduncle of pleopod 1 stout, slightly shorter than rami, with one outer-distal pinnate seta and one inner distal set of one pinnate seta and one paired coupling spines; outer ramus nine-articulate, proximal segment with four outer pinnate setae; inner ramus eight-articulate, proximal segment with three bifid and three simple pinnate setae, terminal swimming setae one and half times as long as rami.

Uropods: Uropod 1 excluding terminal long spine not extending beyond uropod 3, peduncle one and half times as long as outer ramus, with one proximal longitudinal row of three spines on outer lateral side, one medial spine on upper outer margin and two medial and apical spines on inner upper margin; outer ramus a little longer than inner ramus, truncate, with two inner-medial and three apical spines, inner ramus with one inner-medial and three apical spines, one apicomедial spine of both rami stout and subequal to inner ramus in length. Uropod 2 two thirds as long as uropod 1, peduncle twice as long as inner ramus, with one inner-apical spine and four outer spines of which one grows apically; outer ramus longer than inner ramus, with one apical pair of short and long spines, three outer spines and one inner-apical spine, inner ramus with one apical long, one outer-medial and one inner-distal spines. Uropod 3 longer than uropod 2, peduncle shorter than rami, with one apical spine; both rami equal to each other in length, attenuate, outer ramus with two outer spines and one outer minute seta near apex, inner ramus with two outer spines, and one proximal short, five long and one distal

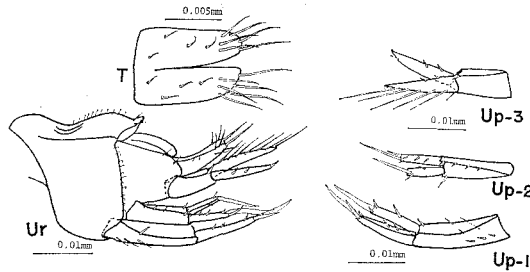


Fig. 136. *Guernea (Prinassus) nullispina* sp. nov. Holotype, male, 1.75 mm.

minute setae on inner margin.

Telson: Telson half as long as uropod 3, rectangular, deeply cleft to near base, apical part of each lobe rounded, with three marginal long setae and one transverse row of three long setae, else each lobe with one longitudinal row of three small setae and one proximal short seta.

Material examined. Holotype: Male, 1.75 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 2 specimens. Collection No.: AML-Amph. 91.

Remarks. In the present species, the dorsal ridge of urosomite 1 extends backward and the back of urosomites 2-3 lacks spines. Hitherto, these characters are not found in the known species of *Guernea*.

***Guernea (Prinassus) rectocephala* sp. nov.**

(Figs 137-138)

Body: Small, compressed, pereonites 6-7 and pleonites 1-3 carinate. Head as long as pereonites 1-2 combined, rectangular in lateral view, rostrum vestigial, anterior head lobe not extending beyond peduncular segment 1 of antenna 1, ventral margin almost straight. Eyes medium, ocelli dispersive. Pleonites 1-3 equal to each other in length; pleonal epimeron 1 curved backward, anteroventral angle producing, with two small pinnate setae; pleonal epimeron 2 gently concave anteriorly, ventral margin gradually going up, with four spines on anterior half margin; pleonal epimeron 3 producing forward, with six ventral spines. Urosomite 1

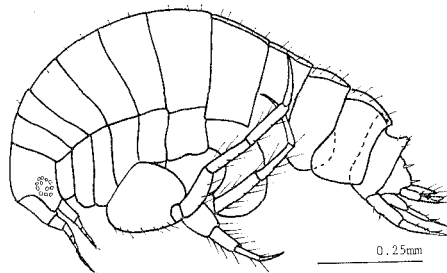


Fig. 137. *Guernea (Prinassus) rectocephala* sp. nov. Holotype, female (?), 1.5 mm.

slightly concave dorsomedially, dorsal trapezoid laminal protrusion never extending backward, with three minute setae, urosomites 2-3 coalescent, back with two pairs of opposite spines.

Antennae: Antenna 1 about one fourth as long as body length, accessory flagellum absent, peduncular segment 1 distinctly shorter than head length, stout, peduncular segment 2 about half as long as peduncular segment 1, producing on upper distal end, peduncular segment 3 two thirds as long as peduncular segment 2, a little producing anterodistally; flagellum six-articulate, proximal segment as long as peduncular segment 3, distal 3rd and 2nd segments with one distal aesthetasc, terminal segment vestigial, with long setae. Antenna 2 about half as long as antenna 1, peduncular segment 2 prominently producing and expanding forward, concealing the greater part of peduncular segment 3, gland cone much developed, peduncular segment 3 extending upper-distally, peduncular segment 4 with two ventrodistal long setae, peduncular segment 5 two thirds as long as and distinctly narrower than peduncular segment 4, with one ventrodistal long seta; flagellum three-articulate, gradually reducing in width and length, terminal segment apically with two long and one small setae.

Mouthparts: Comparatively massive. Upper lip rounded but flattened apically. Inner plate of lower lip developed, densely pubescent apically, outer plates V-formed, distal part oval, obliquely astride on proximal part, densely pubescent apically, mandibular process rather vestigial. Inner plate of maxilla 1 vestigial, outer plate with eight tooth-like spines of which three are at least armed with one small tooth; palp uniaarticulate, extending beyond outer plate, truncate, with two apical setae. Maxilla 2 weak, inner plate short, rather broader, with three apical setae, outer plate slender, with seven apical setae in two rows. Both mandibles similar to each other, lacking palp, accessory spines and setae, prominently producing outward proximally, attenuate on distal half part, incisor smooth, lacinia mobilis small, obtusely serrate, molar process developed, shriveled marginally. Inner plate of maxilliped very small, triangular, with two apical setae, proximal part with rectangular plate which is well developed and is armed with four very long setae; outer plate much developed, reaching middle point of article 3 of palp, on inner margin with three tooth-like and four small spines and six stiff setae in formula; palp slender, four-articulate, proximal segment with two outer-distal long setae, article 2 with two inner single small setae, five inner pairs of small setae, and one outer-distal long seta, article 3 half as long as article 2, with four inner pairs of setae and four outer-distal setae, terminal segment small, truncate, apically with one seta and one spine.

Gnathopod 1: Small, subchelate. Coxa 1 small, long oval, with four ventral small setae. Basis about half as long as gnathopod 1, distinctly compressed proximally. Ischium short, with two posterodistal small and short setae. Merus triangular in lateral view, anterior free margin very short, with six posterodistal setae. Carpus as long as ischium and merus combined, extending anterodistally, anteriorly with one medial and four distal setae, posteriorly with three pairs of stout and

pectinate setae, and one distal set of two stout pectinate and one slender simple setae. Propod slightly longer and narrower than carpus, most expanding medially, posterior margin about half as long as anterior margin, with two distal stiff setae, inner lateral side with one oblique row of three short and one long setae; palm oblique, defined by four spines, with one proximal pair of stiff setae, three small setae and four minute setae curved distally. Dactyl not reaching defining spines of palm when closed, falcate.

Gnathopod 2: Gnathopod 2 similar to gnathopod 1 except for following points: coxa 2 deeper than coxa 1, with three ventral short setae; basis not depressed proximally; carpus posteriorly with one medial set of three short pectinate setae and one distal transverse row of five stout pectinate setae.

Peraeopod 1: Cox 3 similar to coxa 2, but deeper and larger than the latter, with five ventral setae. Basis two fifths as long as peraeopod 1, anteriorly with twelve long setae and one distal pair of setae, posteriorly with seven short setae and one distal set of six short setae. Ischium short, one and half times as long as wide, with six outer-distal short setae. Merus half as long as basis, slightly dilating medially, anteriorly setose, posteriorly with six long stiff and several small setae. Carpus half as long as merus, posteriorly with four stick setae and one distal pair of stick setae. Propod one and half times as long as and distinctly narrower than carpus, with two anterodistal stiff and one posterodistal small setae. Dactyl half as long as propod, falcate.

Peraeopod 2: Coxa 4 broad, subrectangular, roundly expanding anteriorly, with seven pinnate short setae on ventral and posteroventral margins. Peraeopod 2 very similar to peraeopod 1, but less setose and lacking long setae.

Peraeopod 3: Coxa 5 rectangular. Basis one third as long as peraeopod 3, much expanding anteromedially, anteriorly with many short pinnate setae, posterior thin plate narrow, a little extending beyond ischium, rounded distally, throughout with eleven marginal minute setae. Ischium rectangular, broader than long, anterodistally with one short pinnate and one small simple setae. Merus half as long as basis, extending both antero- and posterodistally, with four anterior short pinnate setae, two short pinnate setae on posteroproximal half margin and three spines on following margin. Carpus two thirds as long as and about half as broad as merus, producing distally, with one anterodistal pinnate seta, two posterior single spines and one posterodistal pair of spines. Propod as long as and about half as wide as carpus, posteriorly with one medial minute seta, one spine at one third from distal end and one distal spine. Dactyl as long as propod, slender, distal part nail-like.

Peraeopod 4: Coxa 6 bilobate, subrectangular, one and half times as broad as deep. Basis about two thirds as large as one of peraeopod 3, winged, but compressed on posterior one third margin from distal end. Ischium longer than wide, with one anterodistal short pinnate seta. Merus two thirds as long as basis, producing both antero- and posterodistally, anteriorly with three short and two distal longer setae, posteriorly with three short and one distal longer setae, these setae pinnate. Carpus as long as merus, compressed proximally, with one anterodistal

set of one minute and one short pinnate setae, two posteroproximal minute setae and two posterodistal spines. Propod longer and narrower than carpus, anteriorly with three and four distal long setae, posteriorly with two medial minute setae, one distal locking spine and one distal short seta. Dactyl shorter than half as long as propod, falcate distal part nail-like.

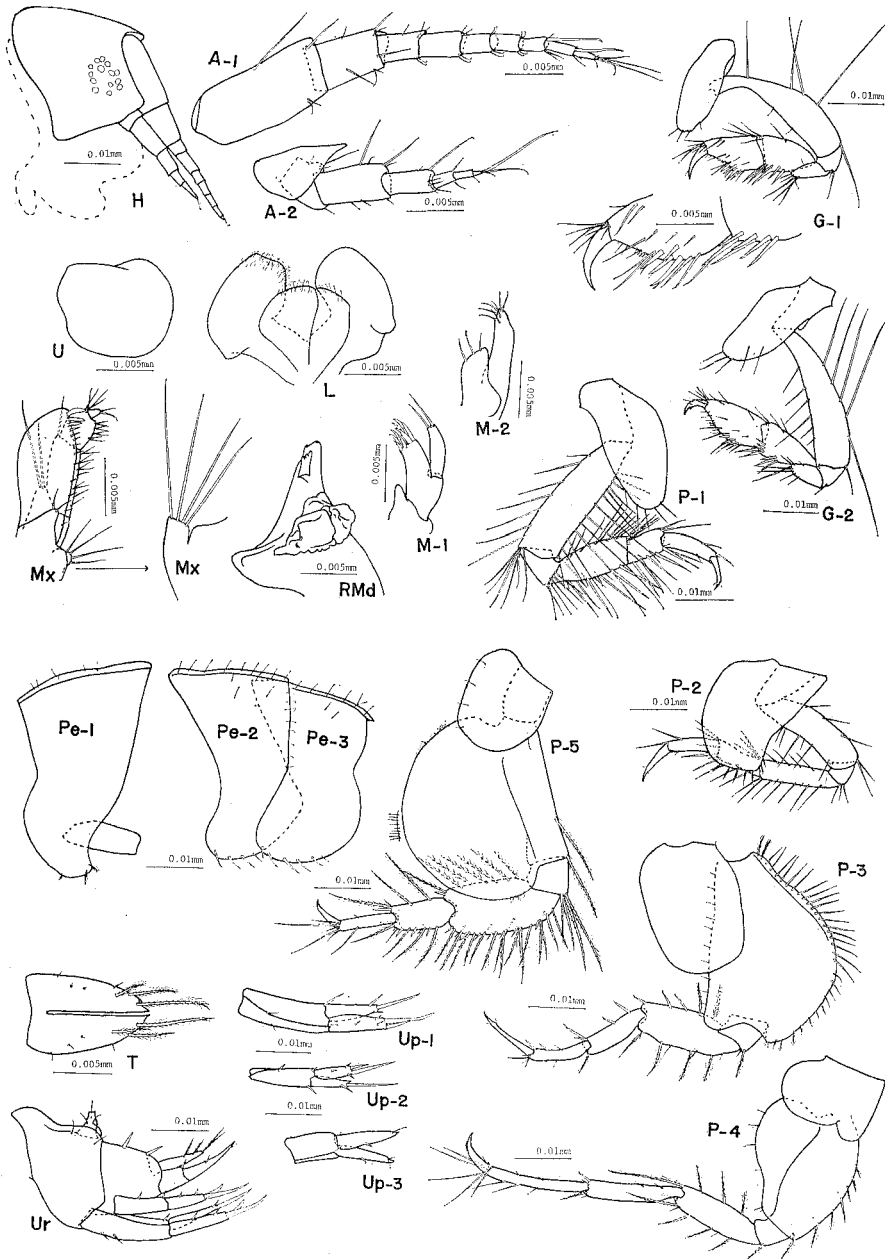


Fig. 138. *Guernea (Prinassus) rectocephala* sp. nov. Holotype, female (?), 1.5 mm.

Peraeopod 5: Coxa 7 small, subsquare. Basis two fifths as long as peraeopod 5, semicircular, most expanding medially, extending beyond ischium, anterior margin perpendicular, with two long pinnate setae on one third from distal end, posterior margin densely bristly throughout. Ischium short, broader than long, with four anterodistal pinnate setae. Merus two thirds as long as basis, dilating, producing both antero- and posterodistally, anteriorly with nine single pinnate setae, three pairs of pinnate setae, seven spines and four submarginal short setae, posteriorly with six pinnate setae and one distal set of one pinnate seta and one spine. Carpus about half as long as merus, compressed proximally, producing both antero- and posterodistally, anteriorly with four pinnate setae, three simple setae, three spines and one apical set of one spine and one pinnate seta, posteriorly with two pinnate setae and one distal set of one spine and one minute seta. Propod as long as and half as broad as carpus, with one anteromedial simple, five anterodistal simple and one posteromedial minute setae. Dactyl longer than half as long as propod, falcate, distal part nail-like.

Uropods: Uropod 1 excluding apical spine not extending beyond uropod 3, peduncle one and half times as long as outer ramus, with two ventral small setae and one inner-distal spine; both rami truncate, outer ramus slightly longer than inner ramus, with two outer, one inner-distal and two apical spines, inner ramus with two distal opposite and one apical spines, apical long spine of both rami equal to inner ramus in length, slender. Uropod 2 two thirds as long as uropod 1, peduncle about one and half times as long as rami, with one outer-medial and two distal opposite spines; both rami equal to each other in length, truncate, outer ramus with one outer-medial, two distal opposite and one apical spines, inner ramus with one inner-distal and one apical spines, apical spine of both rami needle-like, longer than rami. Uropod 3 as long as uropod 2, peduncle shorter than rami, with one outer-apical spine; both rami equal to each other in length, attenuate, with one outer-medial spine and one pair of small setae near apex respectively.

Telson: Telson semioval, deeply cleft to near base, apex taper, each lobe with three pinnate and one small setae on distal part, submarginally with two medial oblique rows of three minute setae.

Material examined. Holotype: Female (?), 1.5 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 2 specimens. Collection No.: AMBL-Amph. 90.

Remarks. The present species is related to Japanese *Prinassus* in mouthparts, gnathopods and peraeopods but is clearly distinguished from it by the dorsal process of urosomite 1.

Eophliantidae

Ceinia

Ceinia japonica Stephensen, 1933

(Fig. 139)

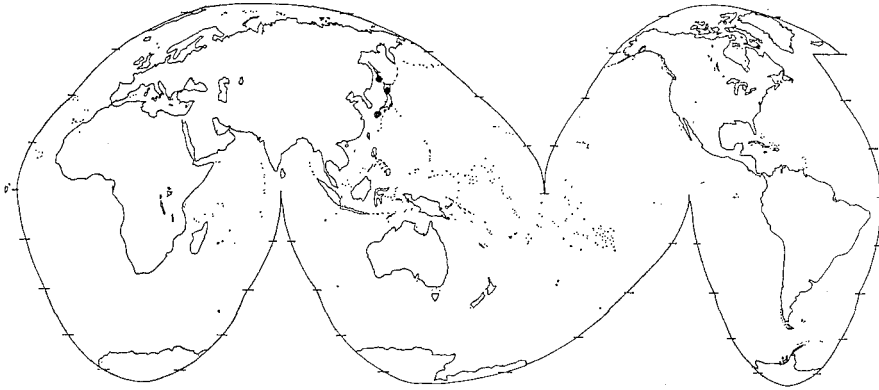


Fig. 139. Distribution of *Ceimia japonica* Stephensen (●) in the world.

C. japonica: Gurjanova 1951, p. 824–825; J.L. Barnard 1972c, p. 183.

Material examined: Tomioka Bay.

Eusiridae

Key to the genera of Eusiridae

- | | | |
|---|-----------------------------------|--------------------|
| 1 | Accessory flagellum absent | <i>Pontogeneia</i> |
| | Accessory flagellum present | 2 |
| 2 | Gnathopods eusirid | <i>Eusirus</i> |
| | Gnathopods not eusirid | <i>Eusiroides</i> |

Pontogeneia

Pontogeneia rostrata Gurjanova, 1938

(Fig. 140)

P. rostrata: Gurjanova 1951, p. 719; J.L. Barnard 1962c, p. 81; Nagata 1965b, p. 185–186;

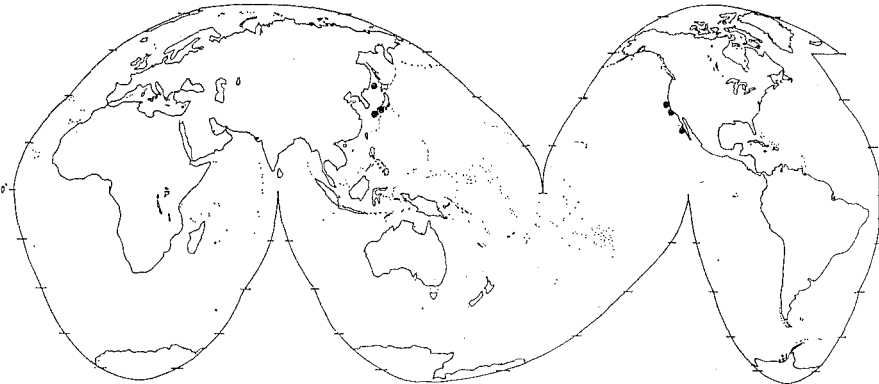


Fig. 140. Distribution of *Pontogeneia rostrata* Gurjanova (●) in the world.

Reid & J.L. Barnard 1967, p. 17; J.L. Barnard 1969b, p. 111-112, 114; J.L. Barnard, 1979, p. 49.
Material examined. Ariake Sea, Shijiki Bay, Tomioka Bay.

Eusirus

Eusirus longipes Boeck, 1861

(Figs 141-147)

E. longipes: Chevreux 1887, p. 305; Walker 1895, p. 305; Chevreux 1900, p. 65; Stebbing 1906, p. 34; Sexton 1909, p. 864-865; Chevreux & Fage 1925, p. 201-202; Daniel 1937, p. 122; Stephensen 1940b, p. 284; Gurjanova 1951, p. 702; Oldevig 1959, p. 81; Ledoyer 1968, p. 198; Krapp-Schickel 1974b, p. 341; Ledoyer 1977, p. 355-356.

Material examined. Male, 6.5 mm. Ariake Sea. Collection No.: AMBL-Amph. 56. (11 specimens).

Body: Head small, longer than peraeonite 1, rostrum short, superior antennal sinus rectangular, broad, anterior head lobe not producing beyond rostrum, inferior antennal sinus rectangular, deep. Eyes very large, reniform. Peraeonites gradually growing in depth, coxae shallow. Pleonites 1-3 subequal to each other and peraeonites 6-7 combined in length, pubescent, dorsodistal end of pleonites 1-2 distinctly producing, not pubescent; pleonal epimeron 1 rounded, densely spiny anteriorly; pleonal epimeron 2 producing anteroventrally, densely spiny on

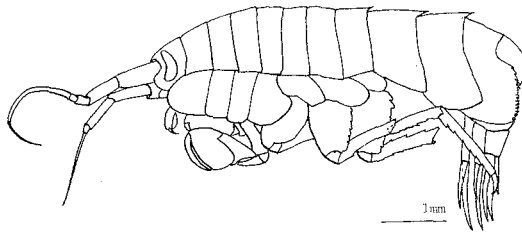


Fig. 141. *Eusirus longipes* Boeck. Male, 6.5 mm.

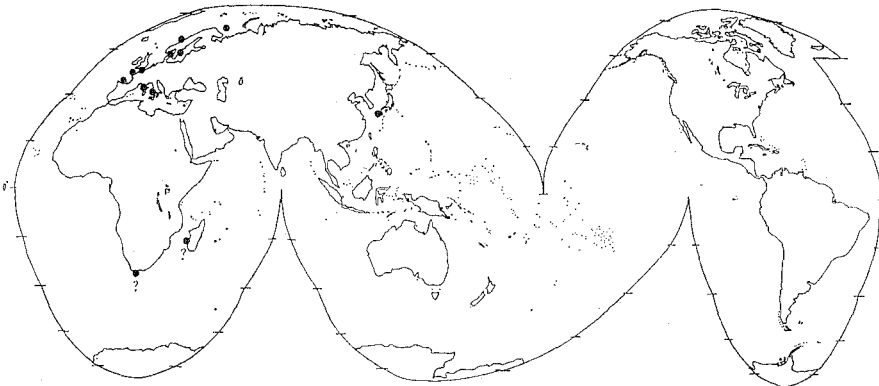


Fig. 142. Distribution of *Eusirus longipes* Boeck (●) in the world.

anteroventral part, slightly expanding posterodistally, with one distal acute tooth; pleonal epimeron 3 almost perpendicular anteriorly, ventral margin with eight spines and two medial sets of three and two spines, posterior margin gently and slightly expanding, rounded, remarkably and acutely serrate, these lower teeth upturning, upper teeth directing downward, each concavity with one small seta. Urosome developed, longer than pleonite 3, urosomite 1 subequal to urosomites 2-3 combined in dorsal length, urosomite 2 subequal to urosomite 3 in dorsal length, urosomite 3 not extending posterolaterally beyond middle point of peduncle of uropod 3.

Antennae: Antenna 1 stout, about half as long as body length, peduncular segment 1 stout, pubescent, equal to head excluding rostrum in length, upper distal end with one bifid projection, of which concavity is armed with four setae, and two pinnate setae, peduncular segment 2 shorter and slenderer than peduncular segment 1, pubescent, producing on upper distal end, with five transverse rows of several setae on upper side and two distal opposite pinnate setae, peduncular segment 3 one fourth as long as peduncular segment 2, trapezoid, upper-distally with one calceolus; accessory flagellum uniarticulate, slender, equal to proximal segment of main flagellum in length, setose apically; main flagellum about one and half times as long as peduncle, proximal segment subequal to peduncular segment 3 in length, with two medial and distal calceoli, the greater part of following segments distally with one calceolus. Antenna 2 subequal to antenna 1 in length, peduncular segments 1-4 pubescent, peduncular segment 1 small, extending to peduncular segment 3; upper distal projection of peduncular segment 2 reaching near middle point of peduncular segment 3, acute, with one spine, lower projection bifid apically,

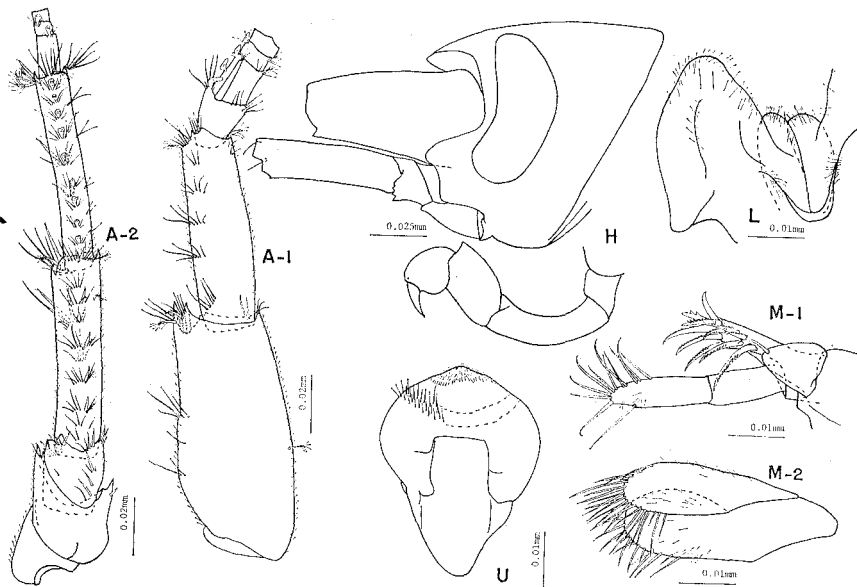


Fig. 143. *Eusirus longipes* Boeck. Male, 6.5 mm.

reaching near apex of peduncular segment 3; upper distal projection of peduncular segment 3 with three and four spines, with one and four spines on lower distal projection and one transverse row of three spines on upper margin; peduncular segment 4 three times as long as peduncular segment 3, projecting distally, inner side with four transverse rows of one spine and one pinnate and several simple setae, and three transverse rows of several simple setae and sometimes plus one pinnate seta, outer side with two transverse rows of one or two spines and several simple setae, distal part with two long and short spines and about three pinnate and many simple setae; peduncular segment 5 as long as peduncular segment 4, producing distally, inner side with nine transverse rows of one calceolus and several simple setae, outer medial part with two transverse rows of one spine and several simple setae, and one row of three setae, distal end with one spine and about four pinnate and many simple setae; flagellum shorter than peduncle, proximal segment one fourth as long as peduncular segment 5, the greater part of segments with one calceolus.

Mouthparts: Upper lip rounded and producing apically, apical part minutely and densely pubescent, surrounded by peripheral circular band of bristles. Inner plates of lower lip small, coalescent, pubescent, shoulders broad, rounded, densely pubescent, mandibular process weak. Inner plate of maxilla 1 medium, triangular, with one apical pinnate seta, outer plate with eleven tooth-like spines of which ten are pectinate; palp much developed, biarticulate, almost uniform in thickness, apical segment longer than proximal one, rounded apically, with eleven apical setae. Maxilla 2 normal, both plates subequal to each other in size, pubescent, setose apically. Incisor of mandible broad, smooth apically, with one blunt tooth on both sides, lacinia mobilis broad and with eight blunt teeth in left mandible,

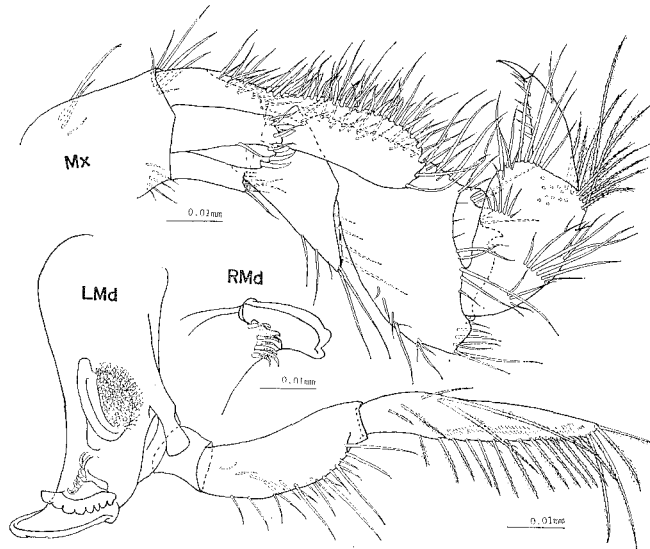


Fig. 144. *Eusirus longipes* Boeck. Male, 6.5 mm.

and small and bifid in right mandible, accessory blades seven in left mandible and six in right mandible, molar process large, ridged and rugose marginally, rasp well developed, palpal hump laminate; palp much extending beyond body, stout, tri-articulate, medial segment slightly curved, gently dilating medially, with one proximal oblique row of five setae, setose on anterior margin, apical segment half as long as palp, anteriorly with thirteen small simple setae on distal half margin and eighteen pinnate setae of which apical two are long, upper side with two longitudinal rows of minute setae on anterior submargin, and one oblique row of three pinnate short setae and one pair of long pinnate setae on posteroproximal submargin. Inner plate of maxilliped small, with three conical teeth and eight simple setae; outer plate reaching middle point of 2nd segment of palp, with seven proximal feeble, twenty-two thick and two apical long slender setae on inner side; palp four-articulate, well developed, proximal two segments much expanding outward, broad, 2nd segment densely setose on inner margin, with three ventrodistal teeth, 3rd segment compressed proximally, with many long pinnate setae on outer distal part and several rows of simple setae on outer and inner margins, dactyl falcate, stout, as long as 3rd segment, with apical stout nail, grasping margin with six spines.

Gnathopod 1: Cryptic, well developed. Coxa 1 flabellate, serrate postero-ventrally, ventrally setose. Basis uniform in width, anterior margin grooved, receiving carpus, anteroinner margin setose, with two pairs of spines. Ischium one fifth as long as and narrower than basis, anteriorly expanding and extending on outer side, outer expanding plate with two long setae. Merus a little longer than ischium, prominently producing and forming wall anterodistally, with about twenty pinnate short setae. Carpus L-formed, concave and grooved anteriorly, receiving propod, anterior part two thirds as long as basis, slender, making hinge distally,

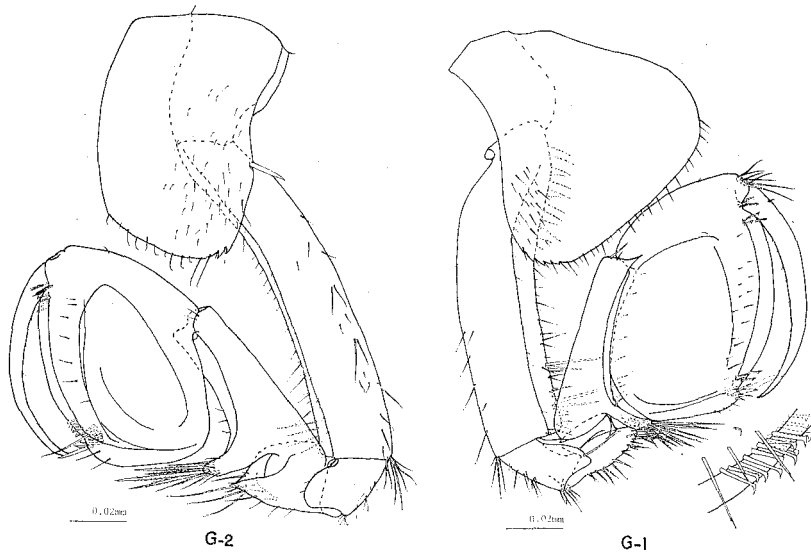


Fig. 145. *Eusirus longipes* Boeck. Male, 6.5 mm.

produced and taper posterodistally on outer side, with nine posterior stiff setae on inner side; posterior lobe extending a little beyond merus, blunt distally, with four rows of short and long pectinate setae on inner side. Propod almost as long as basis, oval, thick, a little producing and forming pocket posterodistally, its pocket marginally with one transverse row of seven small, one short stout and one long stout spines, receiving apex of dactyl when closed; palm oblique, rounded, longer than anterior margin, with two opposite rows of hook-like spines on both sides and one longitudinal row of eight simple spines along hook-like spines. Dactyl falcate, slender, covering palm when closed, grasping margin with about thirteen minute setae.

Gnathopod 2: Coxa 2 rectangular, slightly concave posteromedially, with two posterodistal teeth on ventral margin and one posteromedial stout spine. Gnathopod 2 slightly smaller than gnathopod 1, but very similar to the latter except for carpus lacking posterodistal tooth.

Peraeopod 1: Slender, long. Coxa 3 similar to coxa 2. Basis almost as long as following three segments combined, densely pubescent anteriorly and dispersively pubescent posteriorly. Ischium one fifth as long as basis, obliquely truncate. Merus longer than half as long as basis, producing anterodistally, with one anterodistal spine. Carpus about one third as long as basis, producing on inner distal end, obliquely truncate, with six posterior spines. Propod half as long as basis and ischium combined, with nine posterior pairs of spines. Dactyl one third as long as propod, with apical nail.

Peraeopod 2: Coxa 4 prominently broader than coxa 3, expanded ventrally.

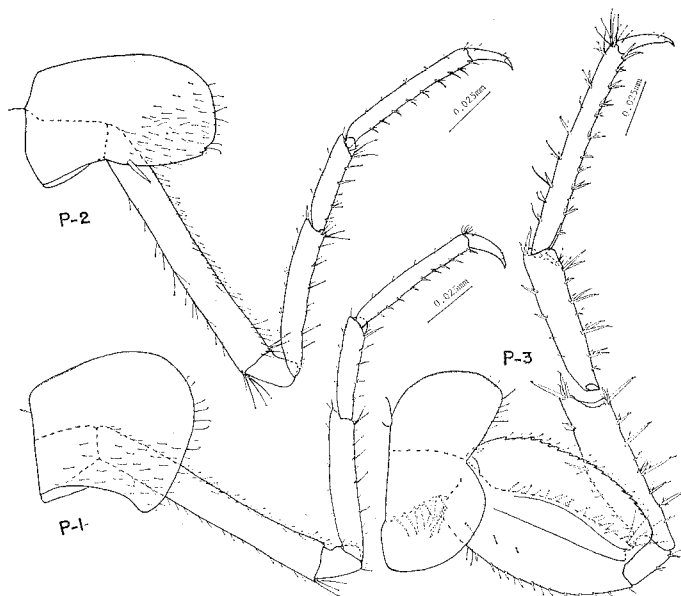


Fig. 146. *Eusirus longipes* Boeck. Male, 6.5 mm.

Peraeopod 2 very similar to peraeopod 1 except for following points: carpus posteriorly with four pairs of spines and one distal spine; propod posteriorly with nine pairs of spines and one single spine.

Peraeopod 3: Coxa 5 bilobate, both lobes subequal to each other in size. Basis one fourth as long as peraeopod 3, long oval, produced posterodistally, serrate posteriorly, with eleven anterior spines, inner posterodistal end of muscular part with four short setae. Ischium longer than wide, anteriorly with two sets of one spine and one small seta. Merus shorter than basis, slightly expanding backward proximally, prominently producing posterodistally, with four posterior spines and

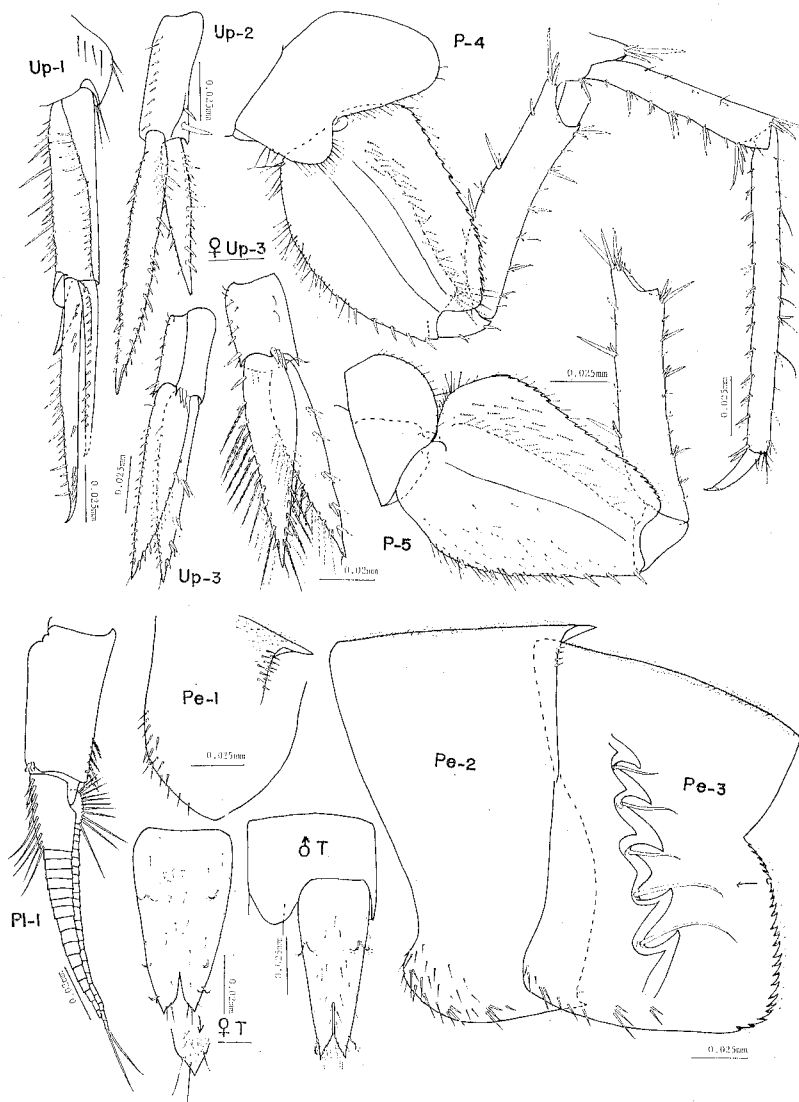


Fig. 147. *Eusirus longipes* Boeck. Male, 6.5 mm. ♀Up-3, ♀T; Female, 8.5 mm.

one posterodistal set of four spines, anterior margin with one, three, two, three and three distal spines in formula. Carpus as long as merus, with two pairs of spines and one distal set of three spines on posterior half margin from distal end, else three pairs of spines and four sets of four spines alternatively growing on anterior margin. Propod slenderer than and one and half times as long as carpus, anteriorly with eleven pairs of spines and one single spine, posteriorly with two sets of one spine and one seta, four sets of four opposite spines and one seta, several marginal setae and seven distal setae. Dactyl similar to one of peraeopod 1.

Peraeopod 4: Coxa 6 bilobate, posterior lobe expanding backward and downward, both lobes setose ventrally. Peraeopod 4 similar to peraeopod 3, but longer, basis densely setose on anteroproximal two thirds margin, with nine spines on anterior two thirds from distal end.

Peraeopod 5: Coxa 7 semicircular, ventrally setose. Basis very similar to one of peraeopod 4, but most expanded backward proximally. Ischium and merus very similar to those of peraeopod 4 except for ischium lacking spines. Other segments unknown.

Pleopods: Pleopods developed, stout. Peduncle of pleopod 1 stout, about half as long as rami, with one row of five short pinnate setae on posterodistal submargin of inner side; proximal segment in outer ramus with one transverse row of bifid unpinnate and five simple pinnate setae, in inner ramus with one transverse row of eleven pinnate setae, terminal swimming setae about one fourth as long as rami.

Uropods: Uropod 1 not extending beyond uropod 2, peduncle intermediate between both rami in length, inner laterodistal lobe prominently developed, apicoventral spine very stout and long, both sides of upper part spiny; rami taper, outer ramus about three fourths as long as inner ramus, spiny on outer margin, inner ramus on outer margin with four proximal, one medial and four distal spines, inner two thirds margin from distal end spiny. Uropod 2 shorter than uropod 1, peduncle shorter than outer ramus, with two outer-distal stout and ten inner small spines; rami taper, marginally pectinate and spiny except for apical margin, outer ramus about two thirds as long as inner ramus. Uropod 3 longer than inner ramus of uropod 2, peduncle shorter than half as long as rami, stout, with three apicomedial, one outer-apical and five or six inner spines; both rami taper, foliaceous, with one apical seta, outer ramus with three or four outer pairs of spines and one outer-distal spine, spiny on inner two thirds from distal end, often many pinnate setae growing.

Telson: Telson as long as rami of uropod 3, progressively decreasing in width, dispersively bristly, covered with minute triangular scales, cleft in Y-form apically, distal inner side of its cleavage with several setae, both outer submargin with a few pairs of pinnate setae and a few single pinnate seta.

Remarks. The specimens on my hand well agree with G.O. Sars's figures and description (G.O. Sars 1895) and R.L. Lincoln's (Lincoln 1979) except for the following differences; (1) peraeonite 7 lacking dorsal tooth and (2) coxae 2-3 lacking one posteromedial spine.

*Eusiroides**Eusiroides monoculoides* (Haswell, 1880) *japonicus* subsp. nov.

(Figs 148–154)

Body: Large, finely bristly. Head as long as peraeonites 1–2 combined, anterior head lobe rectangular, inferior antennal sinus shallow. Eyes very large, reniform. Peraeonites similar to each other in size, coxae 1–4 not deep. Pleonite 1 as broad as peraeonites 6–7 combined; pleonal epimeron 1 rather slender, rectangular, gradually extending downward, gently expanding backward postero-medially, with one anteroventral spine and one posteroventral small tooth; pleonal epimeron 2 rectangular, slightly producing forward, ventrally with three sets of one spine and one or two setae; pleonal epimeron 3 broader than pleonal epimeron 2, rectangular, slightly producing forward anteroventrally, slightly expanding posteriorly, with three spines on anterior half of ventral margin and seven upturned teeth, each concavity of posterior margin with one minute seta. Urosome stout, longer than pleonite 3, urosomite 3 square, much expanding backward.

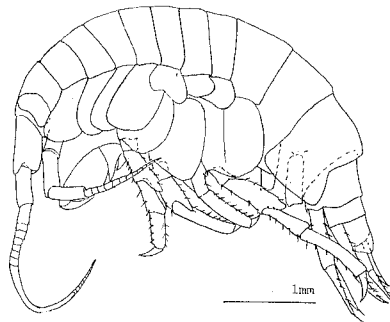


Fig. 148. *Eusiroides monoculoides japonicus* subsp. nov.
Holotype, male, 6.0 mm.

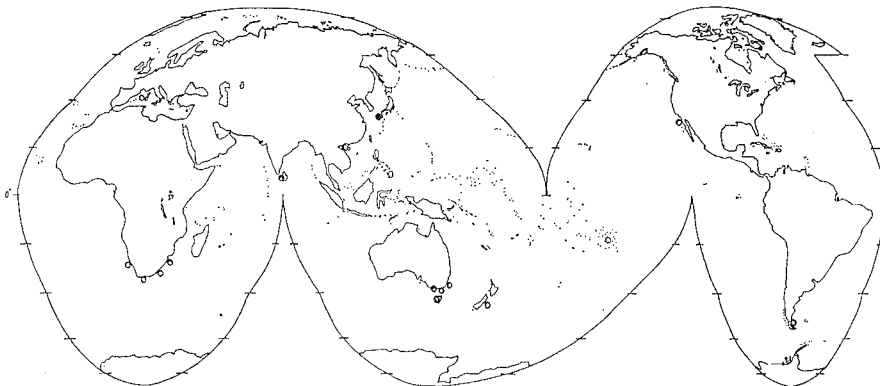


Fig. 149. Distribution of *Eusiroides monoculoides japonicus* subsp. nov. (●) and *E. monoculoides* (Haswell) (○) in the world.

Antenna 1: Antenna 1 stout, about half as long as body length, peduncular segment 1 as long as head, lower margin with two transverse rows of three or five setae and one distal row of nine simple and two small pinnate setae, inner side with one medial oblique row of five small pinnate setae and one upper-distal transverse row of six gradually shortened and eight small pinnate setae; peduncular segment 2 about two thirds as long as peduncular segment 1, partially produced distally, ventrally with two medial transverse rows of setae and one distal transverse row of two pinnate and ten simple setae, inner side dispersively setose; peduncular segment 3 longer than half of peduncular segment 2, gradually a little expanding, produced ventrodistally, ventrodistally with two peculiar accessory protuberances; accessory flagellum uniarticulate, not extending beyond proximal segment of main flagellum, club-like; proximal segment of main flagellum about half as long as peduncular segment 3, ventrodistally with one peculiar protuberance, following proximal segments much shortened, with one calceolus, posterior half segments elongate, with one pair of aesthetascs in every three segments. Antenna 2 shorter than antenna 1, peduncular segment 1 small, triangular, connecting with lower proximal margin of peduncular segment 2; peduncular segment 2 square in lateral view, broadly produced on both inner and outer sides, outer producing plate crenulate, with seven long stiff setae; peduncular segment 3 subequal to peduncular segment 2 in length, distally with six ventral, seven outer-medial long and seven upper setae; peduncular segment 4 stout, long, uniform in thickness, produced both outer- and inner-distally, setose in transverse rows, especially with one ventro-

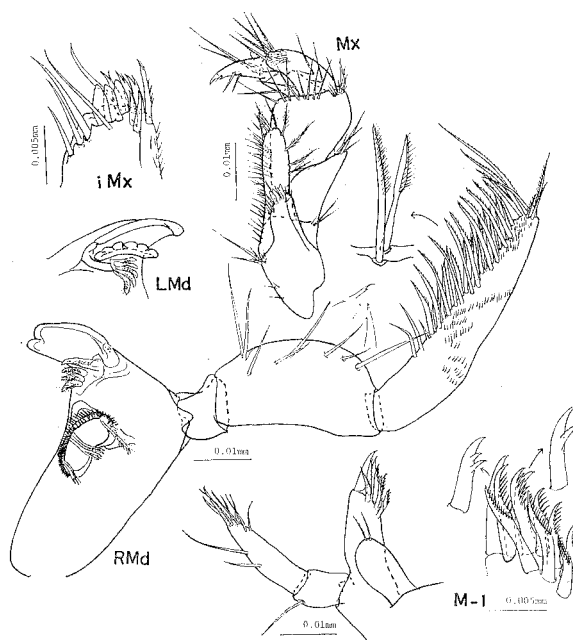


Fig. 150. *Eusiroides monoculoides japonicus* subsp. nov. Holotype, male, 6.0 mm.

proximal longitudinal row of ten short pinnate setae, and three upper-distal small pinnate and one outer-distal pinnate setae; peduncular segment 5 as long as peduncular segment 4, gradually decreasing in thickness, splayed distally, on upper half margin from distal end with two sets of one calceolus and several short setae arrayed in one row; proximal segment of flagellum stout, each segment with one calceolus on outer or inner distal end alternatively.

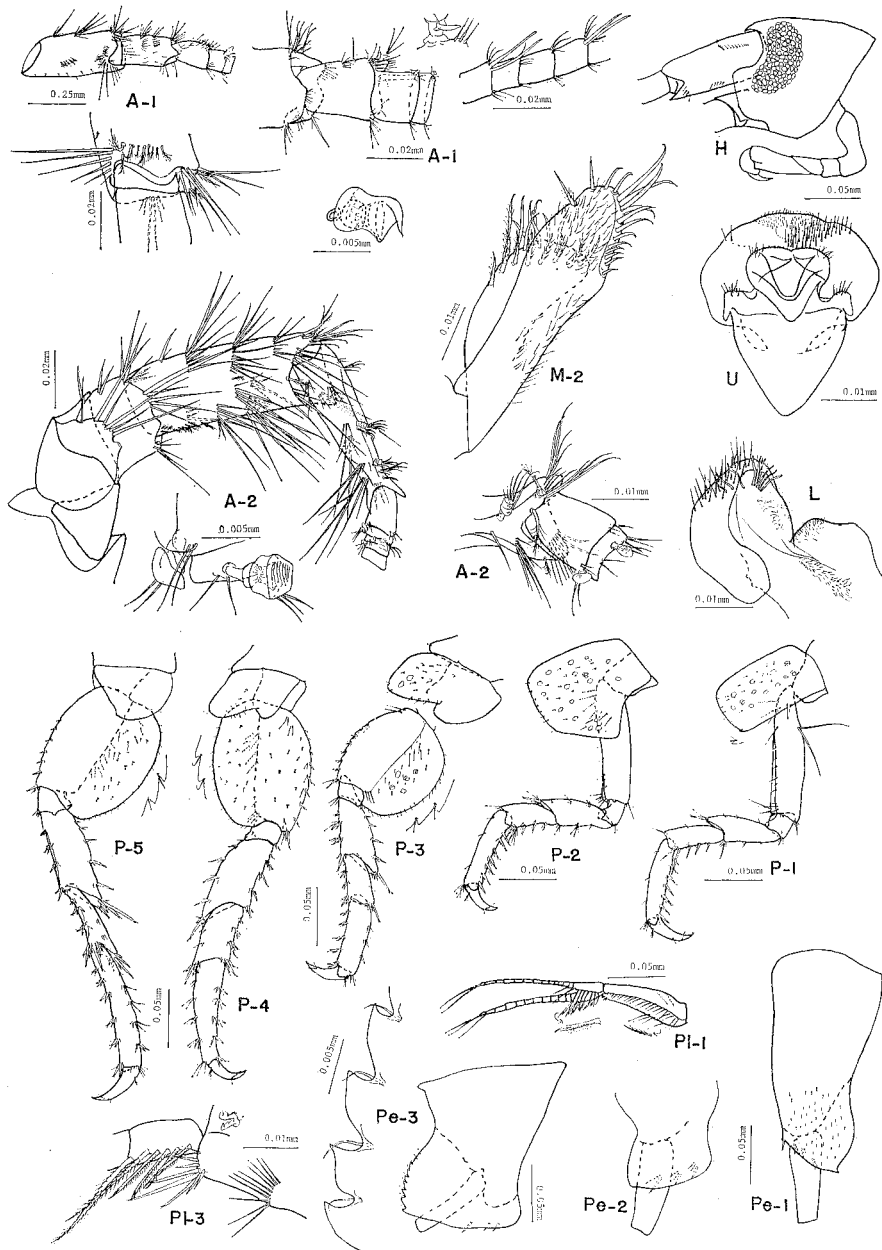


Fig. 151. *Eusiroides monoculoides japonicus* subsp. nov. Holotype, male, 6.0 mm.

Mouthparts: Labrum of upper lip semicircular, finely pubescent apically, peripheral part of apex closely bristled in band; epistom triangular. Inner lobe of lower lip broad, coalescent into outer lobes, pubescent, both inner and outer lobes not defined, mandibular process rather degenerated, broad, densely pubescent on inner margin, shoulders densely setose on outer side, with three small spines, one row of six short string-like setae, and two single string-like setae. Inner plate of maxilla 1 medium, with two apical simple and pinnate setae, outer plate with four pairs of comb-like teeth, and two short teeth medially armed with one or two pairs of acute teeth; palp biarticulate, proximal segment short, with one outer-distal seta, terminal segment longer than twice as long as and slenderer than proximal segment, with two outer-medial setae, three inner-distal pairs of setae and one apical pair of spine-like stout setae. Inner plate of maxilla 2 distinctly shorter than outer plate, with eight facial pinnate setae, apex with one inner pinnate and eight simple setae; outer plate densely pubescent, apical margin rounded, with one pinnate and three simple setae on inner side and eleven progressively elongated simple setae on outer side. Mandible very large, molar process medium, with one pinnate seta, rasp well developed, incisor much producing, broad, with three blunt teeth, lacinia mobilis developed, broad, with six blunt teeth in left mandible and three blunt teeth in right mandible, accessory blades four in left mandible and three in right mandible, stout, pubescent in rows, with several pairs of small teeth; palp growing out of outer distal end of body, much developed, triarticulate, proximal segment small, trapezium, medial segment gently expanded on anterior margin which is armed with one transverse row of six setae and one proximal pair of setae, these setae stiff, bifid apically, terminal segment falcate, truncate, one and half times as long as medial segment, naked on proximal part, gradually decreasing in thickness on remainder, bristly in rows on upper side, anteriorly with one row of six simple and twelve brusy setae, and one upper row of eleven slender brusy setae, apex with ten short and long pinnate setae. Inner plate of maxilliped small, apex rounded, not smooth, with three conical, two simple and three stout bifid teeth, one slender bifid tooth armed with setae, and five stout slender setae; outer plate with many pairs of setae on inner margin and six dispersively pinnate setae on apical and outer margins; palp four-articulate, complex of proximal two segments rectangular, broad, 2nd segment produced in triangle on outer side, with three outer distal spines, 3rd segment about half as long as proximal two segments combined, bristly in transverse rows on outer distal part, with five outer-distal pinnate setae, dactyl falcate, with one acute nail, with two inner-medial stiff setae.

Gnathopod 1: Coxa 1 progressively widening forward, dispersively and minutely setose on inner side, with three posteroventral minute teeth. Basis about one third as long as gnathopod 1, gradually expanding backward posteroproximally, expanding on both outer and inner sides of anterior margin, with one pair of long setae on posteroproximal angle, four spines on anterodistal end of inner side and several short, small and long setae on distal and outer-anterior margin. Ischium small, with eight outer-distal setae. Merus larger than ischium, semicylindrical,

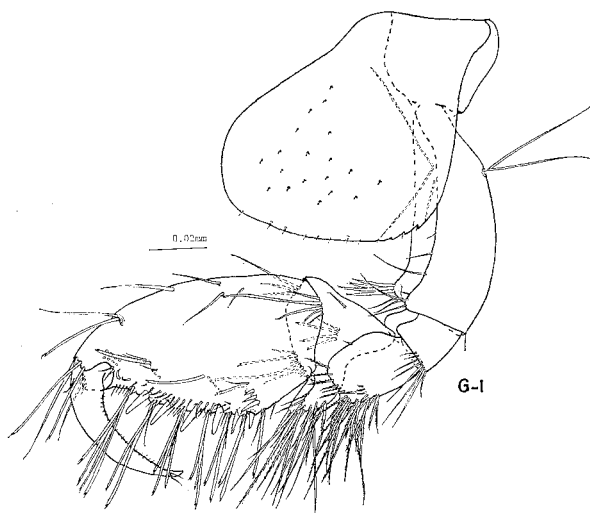


Fig. 152. *Eusiroides monoculoides japonicus* subsp. nov. Holotype, male, 6.0 mm.

posterodistal projection small, triangular, posterior half margin from distal end with three transverse rows of one spine and several short and long pectinate setae and one distal transverse row of eight long pectinate setae, outer distal margin with one transverse row of six short pectinate setae, anteromedial margin of outer side with one small seta. Carpus triangular, posterior lobe well developed, expanding beyond merus, with five rows of several short and long pectinate setae, inner side with one central transverse row of three bifid and one simple setae, one anterodistal row of three simple setae and one posterodistal row of one simple and six bifid setae, inner distal end with one row of one simple and four bifid setae. Propod shorter than half as long as gnathopod 1, oval, outer submargin along palm with three transverse rows of three, seven and six bifid setae, and two distal opposite rows of four bifid setae, anterodistal end on both sides with three simple and bifid long setae; palm continuous to posterior margin, almost perpendicular, long, defined by one transverse row of three spines at proximal one third of posterior margin, with six stout conical teeth, six sets of one to four long bifid and one short simple setae, one longitudinal row of seventeen small setae and many marginal minute setae. Dactyl falcate, not reaching palmar defined spines when closed, grasping margin with twenty-three minute setae throughly and one pair of small setae near apex.

Gnathopod 2: Coxa 2 rectangular, with one posteromedial spine and one posterodistal small notch armed with one minute seta. Gnathopod 2 very similar to gnathopod 1 except for following points: basis lacking inner anterodistal spines; posterior setae on merus and carpus simple; propod more setose.

Peraeopod 1: Coxa 3 very similar to coxa 2. Basis about one third as long as peraeopod 1, with one posteroproximal pair of long setae and one posterodistal spine. Ischium short, square, with one posterodistal spine. Merus half as long as

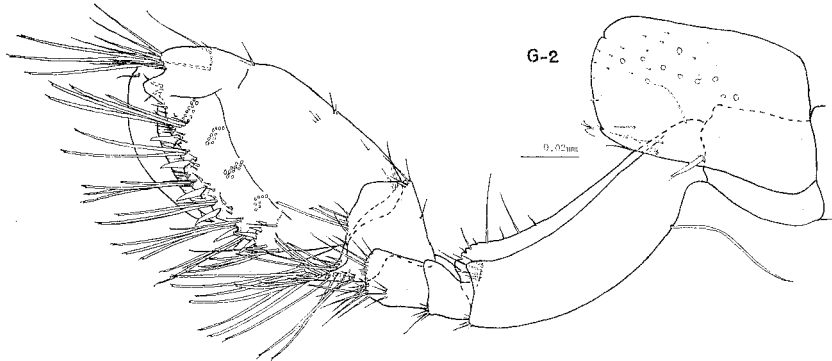


Fig. 153. *Eusiroides monoculoides japonicus* subsp. nov. Holotype, male, 6.0 mm.

basis, extending anterodistally to about proximal one third of carpus, with one anterodistal and one posterodistal spines. Carpus as long as posterior margin of merus, with three posterior spines, one distal pair of long spines and two anteromedial and anterodistal spines. Propod about two thirds as long as basis, with seven posterior spines. Dactyl falcate, apically with nail.

Peraeopod 2: Coxa 4 broader than coxa 2, expanding in triangle posteromedially. Peraeopod 2 similar to peraeopod 1, but carpus posterodistally with three stout and seven small setae.

Peraeopod 3: Coxa 5 bilobate, posterior lobe rectangular, expanding backward. Basis circular, finely serrate posteriorly, with two anteroproximal short setae, seven anterior sets of one small spine and one or two small setae, and one anterodistal set of one short spine and several small and short setae, inner side of posterior thin plate with several short and many minute setae. Ischium short, broader than long, with three anterodistal spines. Merus gradually expanding forward, extending to proximal one third of carpus, posteriorly with four spines and one distal set of four small spines, anteriorly with one set of one spine and one seta, two sets of two spines and three setae, and three distal spines. Carpus shorter than anterior margin of merus, anteriorly with one, two and three distal spines in formula, posterodistally with one long and four small spines. Propod slightly curved, shorter than merus and carpus combined, with five anterior pairs of spines. Dactyl falcate, with one pair of setae near apex.

Peraeopod 4: Coxa 6 bilobate, posterior lobe slightly expanding backward and downward. Peraeopod 4 similar to peraeopod 3 except for the following points: longer than peraeopod 3; ischium with one anterodistal pair of spines; merus anteriorly with one spines, two pairs of spines and two sets of three spines; propod posteriorly with one medial spine and one pair of spines at one fourth from distal end.

Peraeopod 5: Coxa 7 semicircular. Peraeopod 5 very similar to peraeopod 4, but basis more elongated.

Pleopods: Pleopods 1-2 very similar to each other, inner margin of peduncle setose throughly, proximal segment of outer ramus with seven bifid setae, swimming

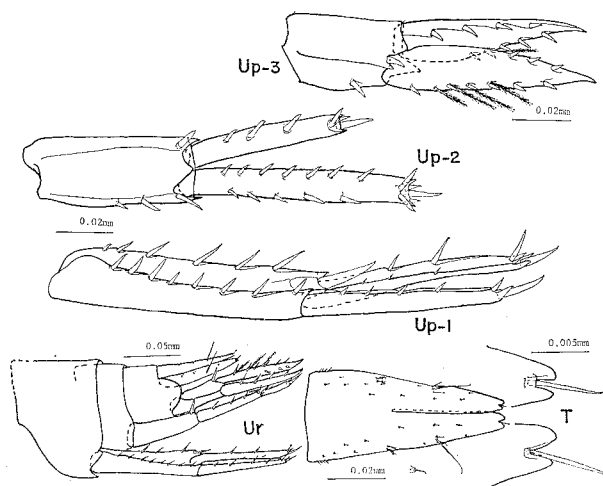


Fig. 154. *Eusiroides monoculoides japonicus* subsp. nov. Holotype, male, 6.0 mm.

setae short. Pleopod 3 with eight spines on outer-distal end of peduncle and four bifid and dispersively pinnate setae on proximal segment of outer ramus.

Uropods: Uropod 1 not reaching apex of uropod 2, peduncle longer than rami, with eight outer, six inner and one apicomедial large spines; both rami equal to each other in length, almost uniform in width, truncate, distal end of both lateral sides with one triangular projection, outer ramus with five outer and one apical large spines, inner ramus with three outer small and two inner spines, and two apical pairs of large and smaller spines. Peduncle of uropod 2 equal to outer ramus in length, produced on both lateral sides, with one outer-distal spine and three spines on inner half margin from distal end; both rami truncate, distally with one acute projection on both lateral sides, outer ramus two thirds as long as inner ramus, with three medial and three apical spines, inner ramus with seven outer and five inner spines, one distal pair of spines and three apical spines of which central one is long. Uropod 3 subequal to peduncle and outer ramus combined in uropod 2 in length, peduncle about half as long as rami, prominently produced on inner-distal end, with one outer-distal spine and one spine at inner one third margin from distal end; both rami foliaceous, taper, outer ramus with four outer spines, four inner single spines and one medial set of one spine and one pinnate seta, inner ramus with three spines on outer margin, and one spine, one pinnate seta, three sets of one spine and one pinnate seta and two single spines in formula on inner margin.

Telson: Telson triangular, subequal to rami of uropod 3 in length, a little gradually narrowing, dispersively with minute setae, cleft a little beyond middle point, both outer margins with three proximal small setae, one pair of small pinnate setae and one set of one central long and two small setae at one third from distal end, apex of each lobe bilobate, rounded, each concavity with one small seta.

Material examined. Holotype: Male, 6.0 mm. Type-locality: Shijiki Bay. Date: June, 1977. Paratype: 3 specimens. Collection No.: AMBL-Amph. 29.

Remarks. The present subspecies is distinguished from the nominate subspecies *Eusiroides monoculoides monoculoides* (see J.L. Barnard 1963b, 1972c) by the trifle characters; (1) posterior margin of pleonal epimera 1–2 finely serrate, (2) posterior margin of pleonal epimeron 3 with ten to fifteen upturned teeth, and (3) both lobes of telson with two apical setae.

Else, the present species is similar to *E. diplonyx* (Ledoyer 1972) and *E. dellavallii* (Chevreux & Fage 1925) but we can pick up the following differences: In *E. diplonyx*, locking spines of peraeopods 1–2 straight, (2) pleonal epimeron 2 serrate on posteroventral short margin and (3) both apices of telson not concave; in *E. dellavallii*, (1) inner plate of maxilla 1 only with one seta, (2) outer plate of maxilla 1 with seven teeth, (3) posteroventral angle of pleonal epimeron 2 acute and (3) telson slightly depressed on outer medial margin.

Haustoriidae

Eohaustorius

Eohaustorius subulicola sp. nov.

(Figs 155–157)

Body: Broad fusiform, depressed. Head much depressed, as long as peraeonites 1–3 combined, rostrum short, decurved. Eyes absent. Peduncle of both antennae 1–2 protecting head and mouthparts. Each peraeonite narrow, progressively growing in depth, coxae 3–5 medium, other coxae weak. Pleon much developed, pleonites 1–2 equal to each other in length, pleonite 3 one and half times as long as pleonite 2, pleonal epimeron 1 rectangular, roundly expanding backward, with three ventral pinnate and four posterior pinnate setae, pleonal epimeron 2 broader than pleonal epimeron 1, extending backward and taper posteroventrally, with five pinnate setae on posterior two thirds of ventral margin and three posterior pinnate setae, pleonal epimeron 3 sinuous ventrally, with four ventromedial pinnate setae and one lateral row of three pinnate setae, posteroventral extension much developed, hook-like, largely upturned, with one upper-medial pinnate seta. Urosome reduced, remarkably depressed, often folded and concealed under pleonite 3.

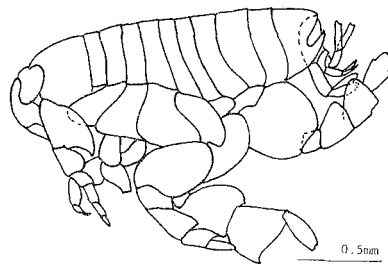


Fig. 155. *Eohaustorius subulicola* sp. nov. Holotype, male, 2.25 mm.

Antennae: Antenna 1 short, peduncular segments 1-2 broad, stubby, peduncular segment 1 with one oblique row of six long pinnate setae, and several long and short pinnate setae on inner side, peduncular segment 2 as long as peduncular segment 1, most expanding backward medially, with four longitudinal rows of long pinnate setae on inner side, peduncular segment 3 one and half times as long as peduncular segment 2, slender, slightly curved in S-form, on inner side with six distal long pinnate and one central long pinnate setae; accessory flagellum growing at inner-medial expansion of peduncular segment 3, biarticulate, as long as peduncular segment 3, distal segment as long as and slenderer than proximal segment, with one apical set of two long and one short simple setae; main flagellum five-articulate, segments subequal to each other in length, article 2 with one distal pair of aesthetascs, articles 3-4 with one distal aesthetasc, terminal segment with four apical long setae. Antenna 2 subequal to antenna 1 in length, peduncular segments 1-3 short, broad, peduncular segment 2 extending outward, complex of peduncular segments 4-5 forming shield, peduncular segment 4 broadly winged outward, most expanding distally, extending to middle point of peduncular segment 5, outer margin with seventeen long pinnate setae throughout and one submarginal row of five setae pinnated on distal half, upper central part and distal connecting margin with short setae pinnated on distal half, peduncular segment 5 expanding outward medially, with seven long pinnate setae on expanding margin, two long pinnate and one distally pinnate short and one simple setae on postero-distal margin, one posteroproximal distally pinnate seta, and six long pinnate setae on outer half margin from distal end; flagellum four-articulate, progressively decreasing in thickness, proximal two segments with one distal long pinnate seta.

Mouthparts: Upper lip broadly expanding apically, pubescent on apico-central part. Inner plate of lower lip relatively well developed, densely pubescent on inner margin, outer plate lacking mandibular process, densely pubescent on inner margin, shoulders rounded. Inner plate of maxilla 1 small, with one distally pinnate seta; outer plate with six smaller simple or pectinate tooth-like spines, one longer tooth-like spine armed with three apical teeth, and one broad and stout tooth apically armed with four teeth; palp extending far beyond outer plate, biarticulate, distal segment longer than twice as long as proximal segment, most expanding medially, outer half margin from distal end with one row of four pinnate setae and one row of seven simple setae, these longitudinal rows opposite. Maxilla 2 broad, subequal to each other in length, apical margin of inner plate rounded, with two rows of seven and four pinnate setae, and one row of eight simple setae; outer plate rectangular, with two outer long pinnate setae, one apical row of eight pinnate setae and one apical row of eight simple stiff setae. Both mandibles similar to each other, incisor slightly curved inward, narrow, chisel-like, lacinia mobilis tooth-like, accessory blades two, pectinate marginally, mandibular process prominently producing, truncate, basally with one small accessory process, molar rasp pectinate, weak, basal process of palp absent; palp growing out on upper level of molar process, triarticulate, remarkably developed, proximal segment small, medial

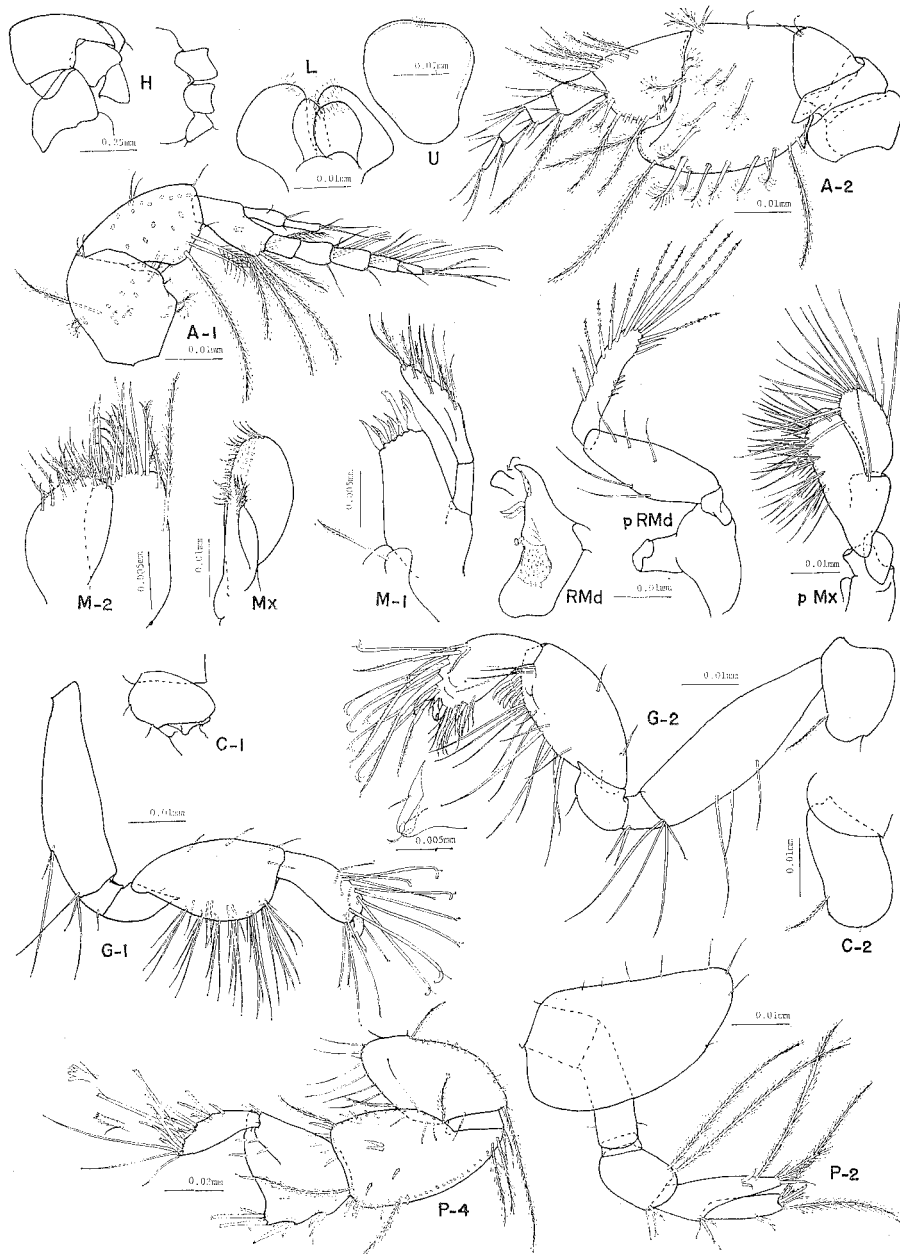


Fig. 156. *Eohaustorius subulicola* sp. nov. Holotype, male, 2.25 mm.

segment most expanding medially, with two medial setae on one side margin and three setae on half margin of the other side from distal end, distal segment as long as medial segment, uniform in width, on one side margin with four medial short and two distal longer setae, on the other side and apical margin with twelve

biarticulate setae of which apical slender part is armed with several opposite tubercles. Inner plate of maxilliped medium, apically with two conical teeth, two outer rows of eight pinnate setae, and two inner small pinnate setae; outer plate relatively developed, broad, inner face with eleven conical teeth, inner side of ventral part densely setose in longitudinal rows; palp triarticulate, proximal segment scale-like, medial segment broad leaf-formed, gradually expanding inward proximally, inner lobe well developed, not extending beyond distal segment, densely setose in one longitudinal and seven transverse rows on inner margin, distal segment long oval, with fifteen long setae.

Gnathopod 1: Simple. Coxa 1 vestigial. Basis three sevenths as long as gnathopod 1, slightly expanding backward, with one set of one short and one long setae at proximal two thirds of posterior margin and one posterodistal set of one short and two long setae. Ischium short, twice as broad as long, with one posterodistal small seta. Merus one third as long as basis, taper distally. Carpus one and half times as long as propod, broadly expanding backward, truncate, posterior part of inner side with six transverse rows of three to seven setae, one single seta and three pairs of short setae, anterior submargin with three short setae. Propod slightly dilating distally, rounded apically, anterior half margin from distal end with four stiff long setae and four transverse rows of two, five, five and two setae of which apical part is blunt and bend, posterodistal end with one row of three long stiff setae, and one pair of long stiff setae. Dactyl small, gently bending, with one apical stout spine.

Gnathopod 2: Longer than gnathopod 1, minutely chelate. Coxa 2 small, concealed in the greater part by coxa 3, with one ventral pinnate seta. Basis about three sevenths as long as gnathopod 2, with three posteromedial long setae and one distal set of one short and three long setae. Ischium short, longer than wide, with one distal pair of short spines. Merus half as long as carpus, taper apically, rounded posteriorly. Carpus two thirds as long as basis, long oval, anteriorly with two proximal and medial small setae, posteriorly with thirteen short and long setae and five distal teeth, these teeth biarticulate, falcate and setose on one side margin of distal part, else both inner and outer distal extensions with two long setae. Propod long oval, anterior half margin from distal end with eight setae distally bent and six biarticulate setae of which distal part is slender and setose on one side margin, distal one third of posterior margin with five very stout pectinate setae, two pairs of short setae and three distal setae, else distal part of outer side with several small setae; palm concave, with one spine. Dactyl short, reaching apex of palm when closed, with one anteromedial seta.

Peraeopod 1: Stout. Coxa 3 very much expanding forward, gently concave posteriorly, with one posteromedial pinnate and four ventral short simple setae. Basis two fifths as long as peraeopod 1, with two anterior and five posterior pinnate setae on distal one third part. Ischium short, twice as wide as long, with one posterodistal small simple seta. Merus subequal to half as long as basis in length, gradually expanding forward, anterodistally with three pinnate and one small simple

setae, posteriorly with three single long pinnate setae and one distal row of five long pinnate and one short simple setae. Carpus shorter than merus, broadly expanding, truncate, on posterior half margin from distal end with four proximal pinnate setae, three long and one small simple spines and one serrate spine, anterodistally with two long pinnate and one short simple setae. Propod shorter than carpus, cut on posterior side, rounded apically, posteriorly with four pectinate spines on outer margin and three simple and one pectinate spines on inner margin, apex with one pair of short setae. Dactyl absent.

Peraeopod 2: Distinctly shorter than peraeopod 1, aberrant. Coxa 4 as deep as coxa 3, most expanding forward proximally, anterior and ventral margins continuously rounded. Basis one third as long as peraeopod 2, uniform in width. Ischium very short, wider than twice as broad as long. Merus about two thirds as long as basis, roundish, with three anterodistal spines and two posterodistal very long pinnate setae. Carpus rather slender, prominently extending to apex of propod, its extension uniform in width, rather slender, truncate, apically with three spines and two very long pinnate setae, posteriorly with one very long pinnate seta and one distal pair of spines; anterior margin half as long as basis, with one distal set of two opposite spines and one small seta. Propod uniform in width, truncate, with one medial set of one spine and one seta, and four apical long pinnate setae. Dactyl spine-like, with one minute tooth near apex.

Peraeopod 3: Coxa 5 bilobate, posterior lobe extending downward, rounded ventrally, with seven short or long simple and three pinnate setae. Basis about one third as long as peraeopod 3, broad, a little extending outer-distally, posterior thin plate slender, with seven pinnate and six simple setae, anterior margin with eight long pinnate and one distal small simple setae, inner side with one transverse row of four pinnate setae. Ischium one third as long as basis, broad. Merus gradually expanding backward, extending over proximal part of carpus, truncate, anteriorly with nine pinnate setae, posteriorly with two long pinnate setae, one pair of spines, one set of three spines and one distal set of four spines, apical margin with five stout spines, outer side with one pairs of spines and one transverse row of five spines, inner side with one anterior transverse row of four long pinnate setae, and one row of four long pinnate setae and two single long pinnate setae on near distal end. Carpus distinctly shorter than merus, compressed proximally, with two anterior transverse rows of six spines and one anterodistal transverse row of five spines, these spines truncate, posterodistal end with three spines, outer side with one medial oblique row of five truncate spines. Propod half as long as basis, proximally two thirds as broad as distal end of carpus, truncate, gradually narrowing a little, with one anterior, two posterior and four apical spines. Dactyl absent.

Peraeopod 4: Coxa 6 rectangular, small, with one posteromedial pair of short setae and four posteroventral setae. Basis broadly and gradually expanding on proximal half part, not extending forward posteriorly, widest part subequal to length, anterior margin with sixteen pinnate setae, posterior margin with ten pinnate setae. Ischium very short, with one anterodistal pair of pinnate setae. Merus abruptly

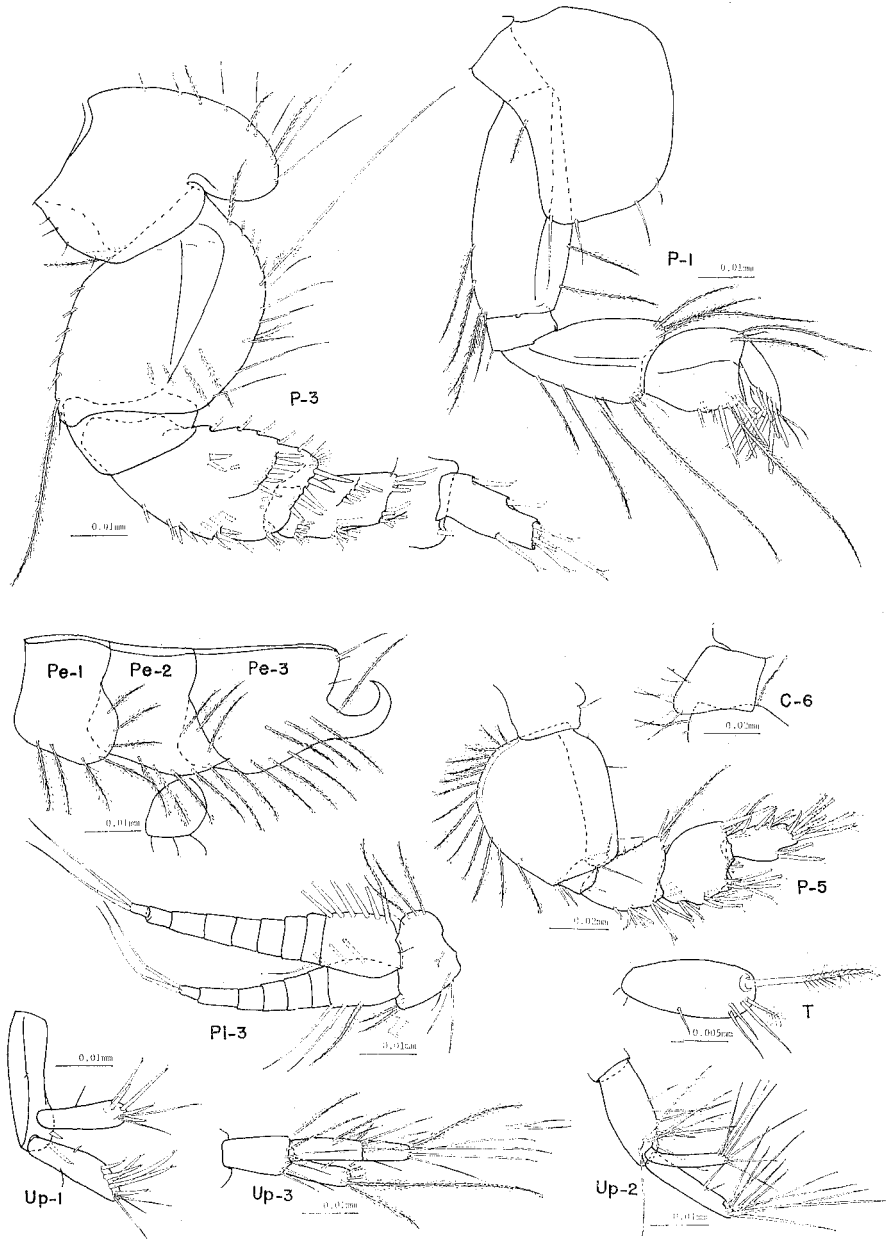


Fig. 157. *Eohaustorius subulicola* sp. nov. Holotype, male, 2.25 mm.

expanding backward proximally, with twenty-nine anterior pinnate setae, two medial and four distal spines on anterior one third from distal end, thirteen posterior pinnate setae, inner side with one spine, one pair of spines and one distal spine on posterior half submargin from distal end, two posterodistal pairs of spines, two single spines and one pair of spines. Carpus broadly expanding distally, distally wider

than long, transverse and concave distally, anterior margin with one pair of spines, one set of three spines and one distal set of four truncate spines, these spines pectinate, posterior half margin of distal end with one pair of spines, three spines on inner side and two spines on outer side. Propod growing out of posterodistal end of carpus, clavate, slightly compressed proximally, fitting on distal shallow concavity of carpus when closed, posterodistal margin obliquely truncate, with seven shorter spines serrated on distal part, two long spines and three long setae, apex of shorter spines with four acute teeth, one of long spines with six blunt teeth, posteromedial margin with two single spines and one pair of longer pectinate spines apically armed with acute teeth. Dactyl absent.

Peracopod 5: Shorter than peracopod 4. Coxa 7 absent. Basis two fifths as long as peracopod 5, broadly expanding forward, truncate, with fourteen anterior pinnate setae and one anterodistal pair of short stout setae, posterior thin plate slender, uniform in width, not producing distally. Ischium short, broader than long, with three anterodistal setae. Merus about half as long as basis, gradually extending backward up to subequal to length, with five posterior pinnate setae, one posterodistal set of three spines and one long pinnate seta, one anteromedial spine, one set of two simple and three pectinate spines at anterior one third from distal end and one anterodistal set of one pectinate spine and five truncate spines apically armed with teeth. Carpus as long as merus, subrectangular, compressed proximally, anteriorly with one set of one pectinate and two truncate spines, one set of two pectinate and four truncate spines and one distal set of two simple and four long truncate spines, on distal end of inner side with one medial set of one simple and two short truncate spines, posteriorly with one pinnate seta and four simple spines of which one is stout and long. Propod as long as and in most expanding part half as wide as carpus, truncate, slightly compressed proximally, with one set of three pectinate spines on terrace at anterior one third from distal end, two posterior pectinate spines, one posterior set of three pectinate spines, and seven posteroapical pectinate spines of which four long ones are bifid. Dactyl absent.

Pleopods: Much developed, stout, peduncle short, rami elongate. Peduncle of pleopod 3 prominently broader than long, with three outer long pinnate setae, three inner-proximal simple setae and one inner-distal set of one paired pinnate setae and two coupling truncate spines; outer ramus nine-articulate, proximal segment with six outer pinnate setae, inner ramus seven-articulate, proximal segment lacking bifid setae, with three pinnate setae on both outer and inner margins, terminal swimming setae half as long as rami.

Uropods: Peduncle of uropod 1 distinctly longer than rami, with two ventrodistal spines; both rami subequal to each other in length, clavate, rounded apically, outer ramus obliquely truncate, apically with four short and two long spines and three setae, medially with one small spine and one small seta, inner ramus apically with five short and long spines and two setae, medially with one short seta. Uropod 2 longer than uropod 1, peduncle as long as inner ramus, upper side of distal end with two simple long setae at both ends and three dispersively pinnate long setae,

outer half margin of upper side from distal end with two distal spine-like long setae and three long stiff setae; rami obliquely truncate, clavate, inner ramus distinctly shorter than outer ramus, with seven apical long setae, outer ramus with ten apical long setae and one pair of short stiff setae at one fourth from outer distal end. Uropod 3 subequal to uropod 2 in length, peduncle as long as inner ramus, upper distal end with two long pinnate setae on outer half margin and four long simple setae on inner half margin; rami clavate, outer ramus biarticulate, twice as long as inner ramus, proximal segment one and half times as long as distal segment, with one medial pair of pinnate and simple setae, distally with one pinnate and four simple setae, distal segment apically with one long pinnate and four bifid naked long setae; inner ramus with one medial pinnate and five apical long pinnate setae.

Telson: Telson small, both lobes completely detaching to each other, long oval, rounded apically, with one inner-medial short seta, apically with three simple short setae and two setae bristled on distal half part, one of apical pinnate setae very stout and long.

Material examined. Holotype: Male, 2.25 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 4 specimens. Collection No.: AMBL-Amph. 94.

Remarks. The new species and *Eohaustorius heliferus* (Gurjanove 1962) have the peculiar peraeopod 2 of which the carpus much extends posterodistally. But its posterior extension of *E. heliferus* broadly expands and is densely spiny on the posterior margin, and one of the new species is slender and is armed with only one pair of spines on the posterior margin. Else, the new species is distinguished from *E. heliferus* by the telson distally armed with many simple setae.

Hyalidae

Allorchestes

Allorchestes carinata Iwasa, 1939

(Fig. 158)

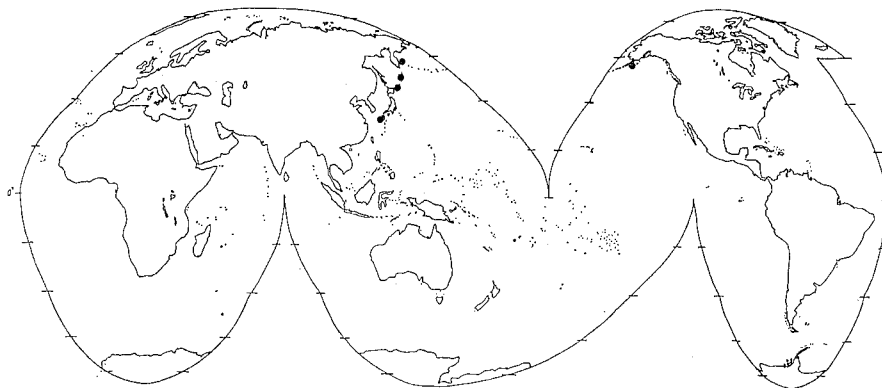


Fig. 158. Distribution of *Allorchestes carinata* Iwasa (●) in the world.

A. carinata: J.L. Barnard 1974, p. 48; J.L. Barnard 1979, p. 69–98.

A. malleolus carinata Iwasa, 1939: Iwasa 1939, p. 288–289; Bulycheva 1957, p. 118–120.

Material examined: Tomioka Bay.

Ischyroceridae

Key to the genera of Ischyroceridae

- | | | |
|---|----------------------------------------------------------------------------------------------------|---------------------|
| 1 | Uropod 3 uniramous | 2 |
| | Uropod 3 biramous | 3 |
| 2 | Uropod 2 uniramous | <i>Cerapus</i> |
| | Uropod 2 biramous | <i>Erichthonius</i> |
| 3 | Outer ramus of uropod 3 with one apical immensed and hooked spine, coxa 5 deeper than coxa 6 | <i>Jassa</i> |
| | Outer ramus of uropod 3 with one apical weak hook, coxa 5 not much deeper than coxa 6 | <i>Microjassa</i> |

Cerapus

Cerapus tubularis Say, 1817

(Fig. 159)

C. tubularis: Stebbing, 1906, p. 667–668; J.L. Barnard 1962b, p. 61–63; J.L. Barnard 1963b, p. 219; Nagata 1965c, p. 321; Ledoyer 1967, p. 23; J.L. Barnard 1969b, p. 101; Ledoyer 1969a, p. 179; Ledoyer 1969b, p. 186; Griffiths 1973, p. 282; Griffiths 1974b, p. 228; Griffiths 1974c, p. 277; Griffiths 1975, p. 137; Fox & Bynum 1975, p. 225; Morino 1976, p. 180–188.

No *C. abiditus*: Stebbing 1906, p. 668–669; Pirlot 1938, p. 349–352; J.L. Barnard 1961, p. 117.

Material examined: Tomioka Bay, Shijiki Bay.

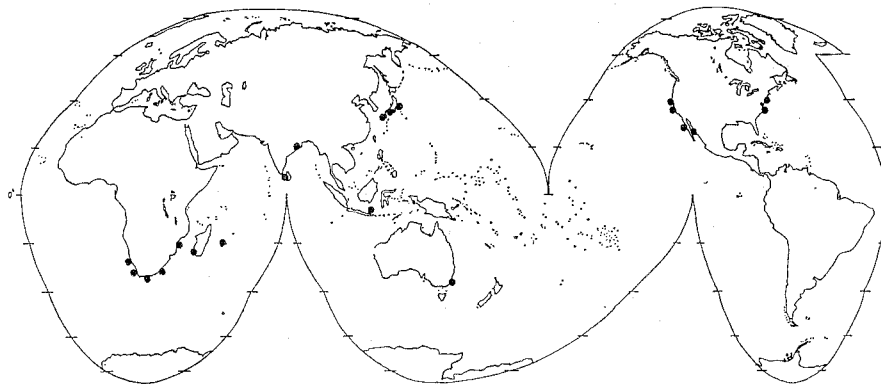


Fig. 159. Distribution of *Cerapus tubularis* Say (●) in the world.

*Erichthonius**Erichthonius pugnax* (Dana, 1852)

(Fig. 160)

E. pugnax: Stebbing 1906, p. 672; Pirlot 1938, p. 352-353; Hurley 1954c, p. 445-450; Nagata 1960, p. 179; Nagata 1965c, p. 320; Nayer 1966, p. 162; Ledoyer 1969b, p. 179-180.

E. macrodactylus: Stebbing 1906, p. 672.

E. brasiliensis: Irie 1956, p. 4; Ledoyer 1967, p. 23.

Material examined: Ariake Sea, Tomioka Bay, Shijiki Bay.

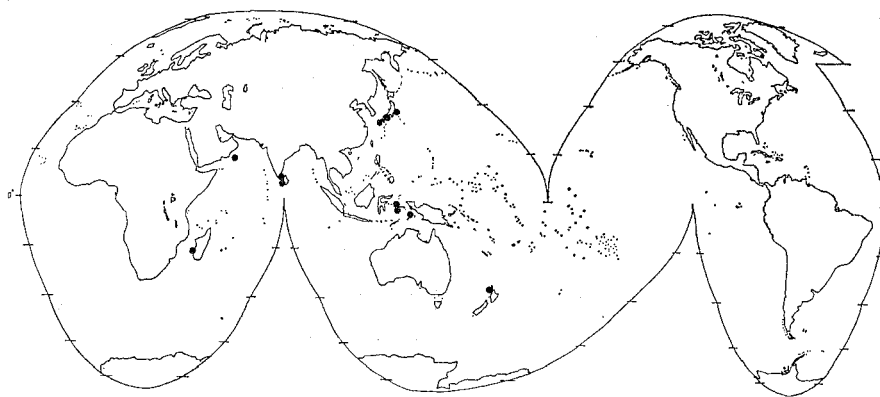


Fig. 160. Distribution of *Erichthonius pugnax* (Dana) (●) in the world.

*Jassa**Jassa falcata* (Montagu, 1808)

J. falcata: Stebbing 1906, p. 656; Chilton 1912, p. 511-516; K.H. Barnard 1916, p. 262-264; Chevreux & Fage 1925, p. 344-346; Schellenberg 1925, p. 187; Schellenberg 1926, p. 383-384; K.H. Barnard 1930, p. 392; Schellenberg 1931, p. 250-251; K.H. Barnard 1932, p. 241-242; Chevreux 1935, p. 128; Daniel 1937, p. 126; Nichols 1938, p. 127-128; Stephensen 1942, p. 391; Shoemaker 1942, p. 40; Reid 1951, p. 266; Sexton & Reid 1951, p. 29-91; Gurjanova 1951, p. 908-909; J.L. Barnard 1952, p. 23; Oldevig 1959, p. 110; Nagata 1965c, p. 315; Hamond 1967, p. 137; Reish & J.L. Barnard 1967, p. 17; Ledoyer 1968, p. 211; J.L. Barnard 1969b, p. 155-159; Krapp-Schickel 1970, p. 257; Bellan-Santini 1972a, p. 259-260; J.L. Barnard 1972c, p. 135; Bellan-Santini 1972b, p. 191; Bellan-Santini 1972c, p. 689; Bellan-Santini and Ledoyer 1974, p. 677; Thurston 1974, p. 46-47; Griffiths 1974a, p. 196; Griffiths 1974b, p. 245; Griffiths 1974c, p. 300; Griffiths 1975, p. 138; Fox & Bynum 1975, p. 227.

J. pulchella: Stebbing 1906, p. 654-655; Stephensen 1940a, p. 64.

Podocerus falcatus: Chevreux 1887, p. 315; Sars 1895, p. 594-595; Chevreux 1900, p. 106-107.

Podocerus odontonyx Sars, 1895: Sars 1895, p. 596-597.

Podocerus pulchellus, *P. monodon*, *Jassa falcata*: Krapp-Schickel 1974, p. 34.

Material examined: Tomioka Bay, Shijiki Bay.

Remarks. This species is cosmopolitan species except for both polar regions.

*Microjassa**Microjassa cumbrensis* (Stebbing et Robertson, 1891)

(Fig. 161)

M. cumbrensis: Walker 1895, p. 316; Stebbing 1906, p. 651-652; Chevreux & Fage 1925, p. 350-351; Daniel 1937, p. 126; Nagata 1965c, p. 315-316; Krapp-Schickel 1974a, p. 402-412.

Material examined: Shijiki Bay.

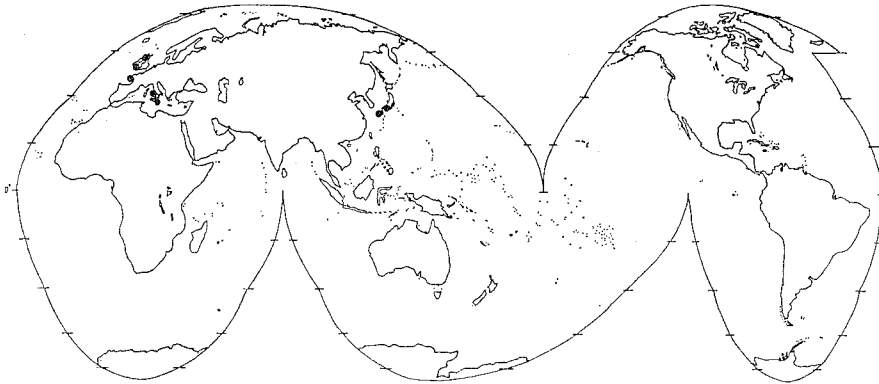


Fig. 161. Distribution of *Microjassa cumbrensis* (Stebbing et Robertson) (●) in the world.

(To be continued)