Title	TAXONOMIC STUDIES ON THE SHALLOW WATER GAMMARIDEAN AMPHIPODA OF WEST KYUSHU, JAPAN -I. ACANTHONOTOZOMATIDAE, AMPELISCIDAE, AMPITHOIDAE, AMPHILOCHIDAE, ANAMIXIDAE, ARGISSIDAE, ATYLIDAE AND COLOMASTIGIDAE-
Author(s)	Hirayama, Akira
Citation	PUBLICATIONS OF THE SETO MARINE BIOLOGICAL LABORATORY (1983), 28(1-4): 75-150
Issue Date	1983-03-30
URL	http://hdl.handle.net/2433/176060
Right	
Type	Departmental Bulletin Paper
Textversion	publisher

TAXONOMIC STUDIES ON THE SHALLOW WATER GAMMARIDEAN AMPHIPODA OF WEST KYUSHU, JAPAN

I. ACANTHONOTOZOMATIDAE, AMPELISCIDAE, AMPITHOIDAE, AMPHILOCHIDAE, ANAMIXIDAE, ARGISSIDAE, ATYLIDAE AND COLOMASTIGIDAE[1)]

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With Text-figures 1–42

Introduction

Although the most comprehensive taxonomical studies of the gammaridean Amphipoda in Japan were tried by Nagata (1965a, b, c), his studies were restricted to the soft bottom in the Seto Inland Sea which is the enclosed sea in the warm water region, and the fauna in this region is comparatively poor. The studies on the talitroides by Iwasa (1934, 1939), Morino (1975, 1976), Hirayama (1980), and Hiwatari and Kajihara (1981a, b) were restricted to the materials in the beach and the sublittoral. In addition to these works some short reports have been published for Japanese gammaridean fauna (Stephensen 1932, 1938a, 1944a, Dahl 1944, J.L. Barnard 1967a, Nagata 1959, 1960, 1961a, b, etc.). Despite of these pioneer works, our knowledge on the Japanese gammaridean fauna is still insufficient since only restricted area have hitherto been surveyed. The Japanese Archipelago streches from the subtropical region to the cold temperate region, and is under complex influences of strong warm and cold currents. This geographic characteristic suggests the Japanese gammaridean fauna expected is much richer than now known.

I intend to try taxonomical studies of the shallow water gammaridean Amphipoda in west Kyushu, southern Japan, in this series. The materials examined were mainly collected in the ecological survey of the benthic organism in Ariake Sea, Tomioka Bay and its adjacent regions around the Amakusa Islands, and Shijiki Bay of Hirado Island, northern part of Nagasaki Prefecture, and the soft bottom surveyed ranged from sabdy to muddy bottom in less than 50 meter deep. These regions are the embayments strongly affected by the Tsushima current in the Japanese Warm water Regions (Briggs 1974). In the present study, I find 30 families,

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Publ. Seto Mar. Biol. Lab., XXVIII (1/4), 75–150, 1983. (Article 2)

78 genera, 124 species and 9 subspecies. Among them, 1 family, 3 genera, 54 species and 8 subspecies are new to science, and many other new to Japan are also recorded. Adding this result to the previous knowledge, the Japanese shallow water gammaridea fauna reaches 32 families and 194 species. I make a systematic key to the Japanese gammaridean families, and the genera and the species in west Kyushu. Moreover, I try the component analysis to the biogeographical distribution of the gammarids in west Kyushu and consider it in connection with the geological history.

The classification of the family and the superfamily does not coincide between J.L. Barnard and his coworkers (J.L. Barnard 1969c, 1973, J.L. Barnard and Drummond 1978, Karaman and J.L. Barnard 1979, J.L. Barnard and Karaman 1980), Bousfield (1973, 1977, 1978) and Myers (1981), but the family described in this series is mainly based on J.L. Barnard and his coworkers' system. As the present study is published serially in sparate papers, the reference is given in the present paper as the first series; the biogeographical consideration, the key to the family and the index of the species and subspecies will be given in the last series.

Acknowledgement

I wish to express my sincere thanks to Prof. T. Kikuchi, Amakusa Marine Biological Laboratory of Kyushu University for giving me the opportunity for the study, continuous encouragement throughout the course of the study and critical reading of the manuscript. On the other hand, I am deeply grateful to Dr. J.L. Barnard of Smithsonian Institution for his kind advice, critical reading of the manuscript in a part and sending me many invaluable reprints. Also, I wish to express my acknowledgement to the following scientists for kind complying my requests to the fruitful reprints and copies; Dr. K. Nagata, former staff of Nansei Regional Fisheries Research Laboratory; Dr. E. Harada, Seto Marine Biological Laboratory of Kyoto University; Dr. T. Hiwatari, Ocean Research Institute, University of Tokyo; Mr. Y. Ogasawara, Department of Fisheries, Tohoku University; Dr. E.L. Bousfield, Canada National Museum; Dr. G.S. Karaman, Biological Institute of Jugoslavia; Dr. D.E. Hurley, New Zealand Oceanographical Institute; Dr. J. Stock, Zoological Museum of Amsterdam University; and so on. I must express my sincere thanks to Dr. K. Baba of Kumamoto University and Dr. T. Itô of Kyoto University for their kind advice in the nomenclature and to Mr. H. Suzuki, Amakusa Marine Biological Laboratory of Kyushu University for his kind assistance in drawing the figures. I am also indebted to the following persons for sampling the materials and offering me the materials; Dr. M. Azuma of Nagasaki University, Mr. H. Minei of Kyushu University, and staffs and students of Amakusa Marine Biological Laboratory, Kyushu University. Moreover, I thank Miss Y. Ichimura and Mr. A. Morita of Kumamoto Fisheries High School for lending me the atlas.

Material examined

The materials of this study were mainly collected with a Smith-McIntyre grab sampler from the sediment bottom of the following sea regions (fig. 1);

Ariake Sea: The biggest embayment on the west coast of Kyushu. The area 1690 km^2, mean depth 20 m. The inner half of the sea muddy or muddy sand, and sandy bottom develops near baymouth. 20 stations. Date; June, 1976. Collector; T. Kikuchi and M. Tanaka. 21 stations. Date; November, 1977. Collector; T. Kikuchi and M. Tanaka.

Tomioka Bay: A small bay on the north east corner of Amakusa Shimoshima Island. The area 5 km^2, mainly within 15 m in depth. 81 stations. Date; May, 1978. Collector; Staffs of Amakusa Marine Biological Laboratory Benthos Study Group.

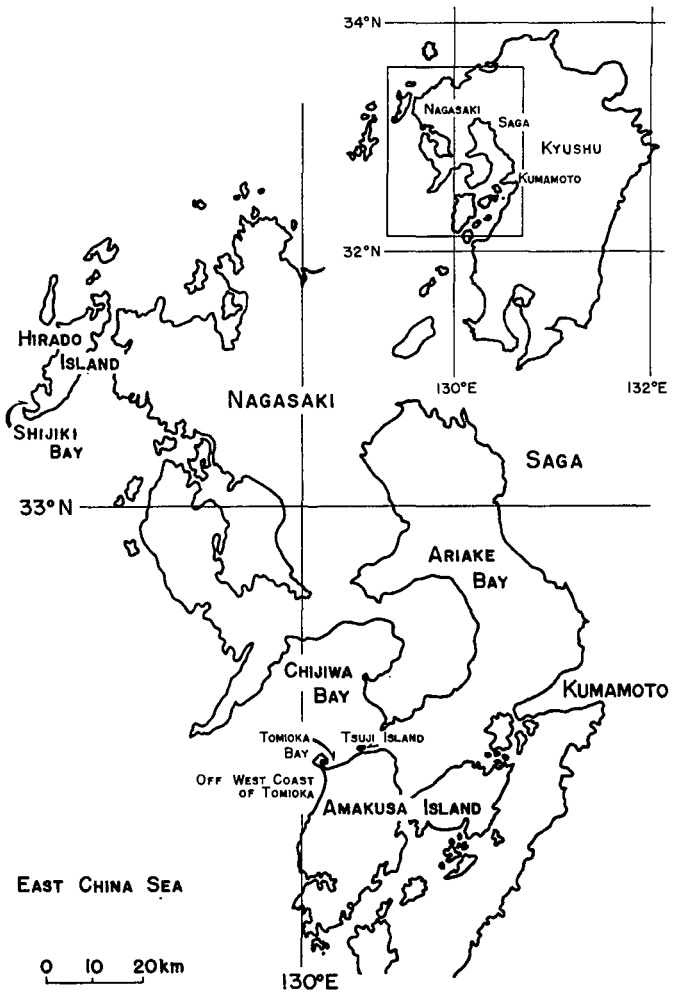

Fig. 1. Sampling area in west Kyushu.

Off west coast of Tomioka: Depth of sampling station ranges from 0 m to 50 m. 21 stations. Date; May, 1979. Collector; Staffs of Amakusa Marine Biological Laboratory Benthos Study Group.

Shijiki Bay: The bay locates southwest part of Hirado Island. The area 10 km^2, within 40 m in depth. 50 stations. Date; July, 1977. Collector; M. Azuma and his co-workers.

Colomastix azumai Hirayama and Kikuchi was collected from the sponge, *Tetilla serica*, by M. Azuma and his colaborators in Shijiki Bay, two new species of *Polycheria* were collected from the tunic of compound ascidia, *Amarousium pliciferum*, at the intertidal zone of Tsujishima Island near Tomioka Bay by T. Kikuchi, and *Orchomene breviceps* sp. nov. and *O. liomarigo* sp. nov. were collected from the mantle cavity of the clam, *Mactra chinensis*, on Fukuma coast, Fukuoka Prefecture, by H. Minei.

The type specimens are preserved in Amakusa Marine Biological Laboratory, Kyushu University.

Abbreviations. H: Head. A–1: Antenna 1. A–2: Antenna 2. U: Upper lip. L: Lower lip. M–1: Maxilla 1. M–2: Maxilla 2. Md: Mandible. LMd: Left mandible. RMd: Right mandible. Mx: Maxilliped. C–1, 2, 3, 4, 5, 6, 7: Coxa 1, 2, 3, 4, 5, 6, 7. G–1: Gnathopod 1. G–2: Gnathopod 2. P–1, 2, 3, 4, 5: Peraeopod 1, 2, 3, 4, 5. Pe–1, 2, 3: Pleon 1, 2, 3 or pleonal epimeron 1, 2, 3. Pl–1, 2, 3: Pleopod 1, 2, 3. Ur: Urosome. Ur–1, 2, 3: Uropod 1, 2, 3. T: Telson. ♂: Male. ♀: Female. y: Young. i: Inner plate. p: Palp. ——: Not type specimen.

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Description

Acanthonotozomatidae

Key to the genera of Acanthonotozomatidae

1 Gnathopod 2 minutely subchelate ..... *Cypsiphimedia*
Gnathopod 2 normal subchelate..... *Postodius*

Cypsiphimedia

Cypsiphimedia mala sp. nov.

(Fig. 2–4)

Body: Body compressed, stout, exoskelton hard. Head small, rostrum developed, but not extending beyond peduncular segment 1 of antenna 1, triangular, superior antennal sinus very deep, inferior antennal sinus absent, anterior head lobe producing far beyond rostrum, broad, rectangular, its upper distal rectangular part

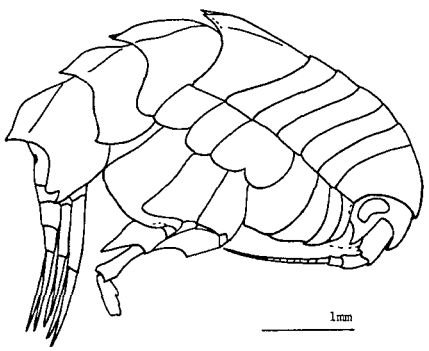

Fig. 2. *Cypsiphimedia mala* sp. nov. Holotype, male, 6.75 mm.

concaved, a little upturned distally. Eyes medium, reniform. Peraeonite 1 as broad as peraeonites 2–4 combined, rounded, extended forward on dorsal margin, peraeonites 2–6 subequal to each other in length and width, peraeonite 7 broad, carinate, extended above pleonite 1, its extension broad, bifid apically, pectinated marginally, coxae 1–4 gradually deeper, lower margin of these complex rounded, coxae 5–7 medium, basis of peraeopods 5–7 developed. Dorsal margin of pleonites 1–3 similar to one of peraeonite 7, distal extension densely pubescent, else upper half of posterior margins pectinate, pleonal epimeron 1 rounded, expanded posteriorly, anterodistal margin with three spines, pleonal epimeron 2 rectangular, but rounded anterodistally, with one posterodistal acute tooth, lower margin with three spines, pleonal epimeron 3 rectangular, but a little produced and rounded anterodistally, broader than pleonal epimeron 2, posterior margin with one medial stout and broad tooth and one distal smaller stout tooth, lower margin with four spines. Urosomite 1 subequal to pleonite 3 in length, longer than urosomites 2–3 combined, dorsal margin concaved medially, densely bristly in rows, urosomite 2 narrow, urosomite 3 rectangular in lateral view, longer than deep.

Antennae: Antenna 1 about one third as long as body length, peduncular segment 1 stout, finely and densely bristly, extended distally, peduncular segment 2 two thirds as long as and about as thick as peduncular segment 1, dorsal margin roundish, serrate, prominently produced forward, bifid apically, with two medial sets of three spines and one distal spine, else ventrodistal end extended, peduncular segment 3 about two thirds as long as and half as thick as peduncular segment 2, accessory flagellum uniarticulate, rudimentary, with three apical setae, each segment of main flagellum with one distal pair of aesthetascs except for proximal two segments and terminal segment. Antenna 2 rather slender, peduncular segment 2 rectangular, with two anterodistal teeth, ventrodistal end with one spine, peduncular segment 3 longer than peduncular segment 2, anterior margin with one medial set of one spine and one seta, and two distal pairs of spines, else with two apical teeth, peduncular segment 4 a little longer than peduncular segments 2–3 combined, a little more stout than peduncular segment 3, anterior margin with two medial sets of three and four spines, and four distal spines, with one apical stout tooth, ventrodistal end with one tooth and two spines, else distal end of lateral side with two spines, peduncular segment 5 longer than peduncular segment 4, slender, anterior margin with three pairs of four spines, its distal end with three spines.

Mouthparts: Mouthparts massive, produced forward. Upper lip incised, subrectangular, a little decreasing in width, emarginate. Inner plate of lower lip absent, apical margin of outer plate notched, distal margin of outer lobe densely bristly, molar process developed. Inner plate of maxilla 1 medium, dispersively pubescent on inner medial margin, inner distal margin with five pinnate setae, outer plate decreasing in width, not truncate, inner medial margin densely bristly, distal half with eight serrate tooth-like spines and one simple tooth-like spines, palp not extending beyond outer plate, biarticulate, rather slender, proximal segment about two thirds as long as terminal segment, with one seta, terminal segment with

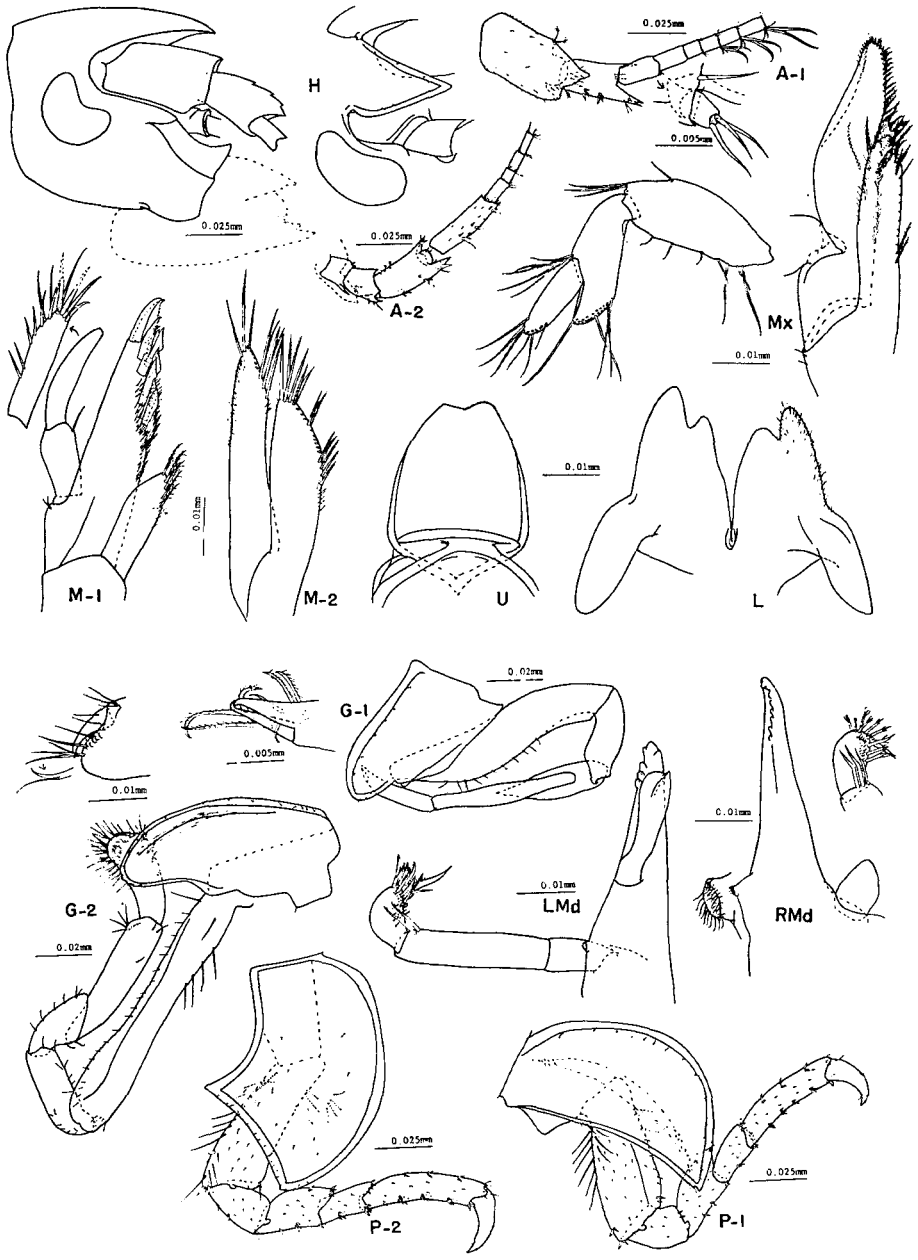

Fig. 3. *Cypsiphimedia mala* sp. nov. Holotype, male, 6.75 mm.

nine slender setae on distal half of one side, apex with four setae. Maxilla 2 rather slender, attenuate distally, inner distal half of inner plate with three single pectinate setae and twelve pairs of pectinate setae, apex with three pectinate and one simple setae, apex and inner distal margin of outer plate with fourteen pectinate setae. Left mandible slender, attenuate, incisor vestigial, with three apical blunt and vestigial teeth, else inner distal margin with three small blunt teeth, lacinia mobilis slender, long, dilated and rounded apically, with one tooth, molar process located on basal part, very small, cylindrical, ornated by setae marginally, molar rasp medium or weakly developed, palp located under level of molar process, developed, slender, but stout, almost uniform in thickness, four articulate, proximal segment shorter than half as long as 2nd segment, 2nd segment with two stout setae, terminal segment about half as long as 2nd segment, rounded apically, pectinated in two rows on one side, apical margin with seven pectinate and two simple setae, dactyl slender, falcate, pectinated proximally. Right mandible similar to left one, but incisor and lacinia mobilis absent, distal margin crenulate, distal end of 2nd segment of palp with three stout setae, apical margin of 3rd segment with nine spines armed with one pair of setae near apex. Inner plate of maxilliped slender, developed, outer distal half bristly, inner and apical margins with many pinnate setae, outer plate most expanded medially, developed, but attenuate on distal half, rounded apically, inner half pubescent, inner distal half with one proximal pair of pinnate setae and about twenty pinnate setae, else distal margin with about twenty-two spines, palp extending beyond outer plate, triarticulate, proximal segment half as long as palp, rounded on outer margin, outer distal half with one medial seta and one set of three setae, inner margin with two proximal long setae and five small setae, 2nd segment shorter than proximal segment, not slender, extending to proximal half of terminal segment along it, rounded distally, outer distal end with five setae, inner margin of the latter with two rows of twelve and nine setae, terminal segment longer than half as long as proximal segment, clavate, apical margin rounded, with fifteen setae.

Gnathopod 1: Coxa 1 decreasing in width, falcate, rounded on lower margin, with about ten minute setae on anterior and lower submargins. Gnathopod 1 slender, long, minutely chelate. Basis two fifths as long as gnathopod 1, slightly sinuous, most expanded medially, anteromedial margin with eleven small setae. Ischium about one third as long as basis. Merus longer than ischium, extended and tapered posterodistally, reaching medial margin of carpus. Carpus about two thirds as long as basis. Propod longer than half as long as carpus, posterodistal part attenuate, hooked apically, with one pair of pinnate setae basally, else with one simple seta. Dactyl straight, attenuate, extending beyond distal end of propod, hooked apically, with three pinnate and one simple setae.

Gnathopod 2: Coxa 2 narrow, subequal to coxa 1 in width, anterior margin gently rounded, ridged, with eleven minute setae, lower margin rounded, finely serrate in a part, with five minute setae. Gnathopod 2 slender, very long, minutely subchelate. Basis three sevenths as long as gnathopod 2, slightly compressed on

medial part, anterior margin slightly expanded and rounded on distal margin, with many minute setae and one proximal short seta, posteroproximal margin with four short setae, inner distal end with one transverse row of four small setae. Ischium about one third as long as basis, almost uniform in width, posteroproximal margin rounded, with several small setae, anterior margin with several small setae. Merus shorter than ischium, increasing in width, extended posterodistally, posterior margin rounded, with four small single setae and one distal pair of small setae, anterodistal end with two small setae. Carpus as long as ischium and merus combined, proximal part increasing in width, following part uniform in width, anterodistal margin with one small seta and one pair of small setae, posterodistal end with one row of five small setae. Propod slightly longer than ischium, dilated, rounded and a little extended posterodistally, anterodistal half with two single setae, one pair of setae and one distal row of four setae, posterodistal half setose in sets, posterodistal part densely pubescent, palm oblique, but gradually extending forward, with three single setae, one distal set of three setae and two opposite rows of about six minute setae, with one small spine basally. Dactyl small, slender, not beyond palm, falcate.

Peraeopod 1: Coxa 3 falcate, bristly, anterior and posterior margins continuously rounded, with many minute setae submarginally, proximal margin slightly curved inward, central longitudinal band pectinate. Peraeopod 1 dispersively bristly. Basis one third as long as peraeopod 1, anterior margin with four proximal short setae, several small setae, one single spine and one distal pair of spines, posterior margin with several short setae on proximal half and two distal pairs of spines. Ischium narrower than basis, shorter than half as long as the latter, longer than wide, anterior margin of outer side with two spines. Merus prominently extended anterodistally, gently expanded on proximal half of anterior margin, anterodistal half with one spine, two pairs of spines and one apical set of four spines, posterior margin longer than one of ischium, with two pairs of spines and one distal pair of spines. Carpus extended anterodistally, anterodistal end with three spines, posterior margin shorter than one of ischium, with four medial spines and six distal spines. Propod as long as merus and carpus combined, narrowed proximally, but following part uniform in width, subequal to carpus in width, anterior margin with three pairs of spines and four distal minute setae, posterior margin with three, three, two, three and three distal spines in formula. Dactyl about half as long as propod, stout, falcate.

Peraeopod 2: Coxa 4 subrectangular, bristly, anterior margin gently rounded, posterior margin gently curved inward, lower margin oblique, with many minute setae, posterodistal end tapered. Peraeopod 2 similar to peraeopod 1 in shape. Anterior margin of basis with four proximal short setae, with two distal sets of one spine and one short seta, posterior margin setose throughout, with one spine and one distal set of three spines. Posterior margin of ischium with two medial spines and two distal small setae. Anterodistal half of merus with one medial pair of spines and four apical spines, posterior margin with one medial transverse row of six spines and one distal row of six spines. Anterior margin of propod with two, three and

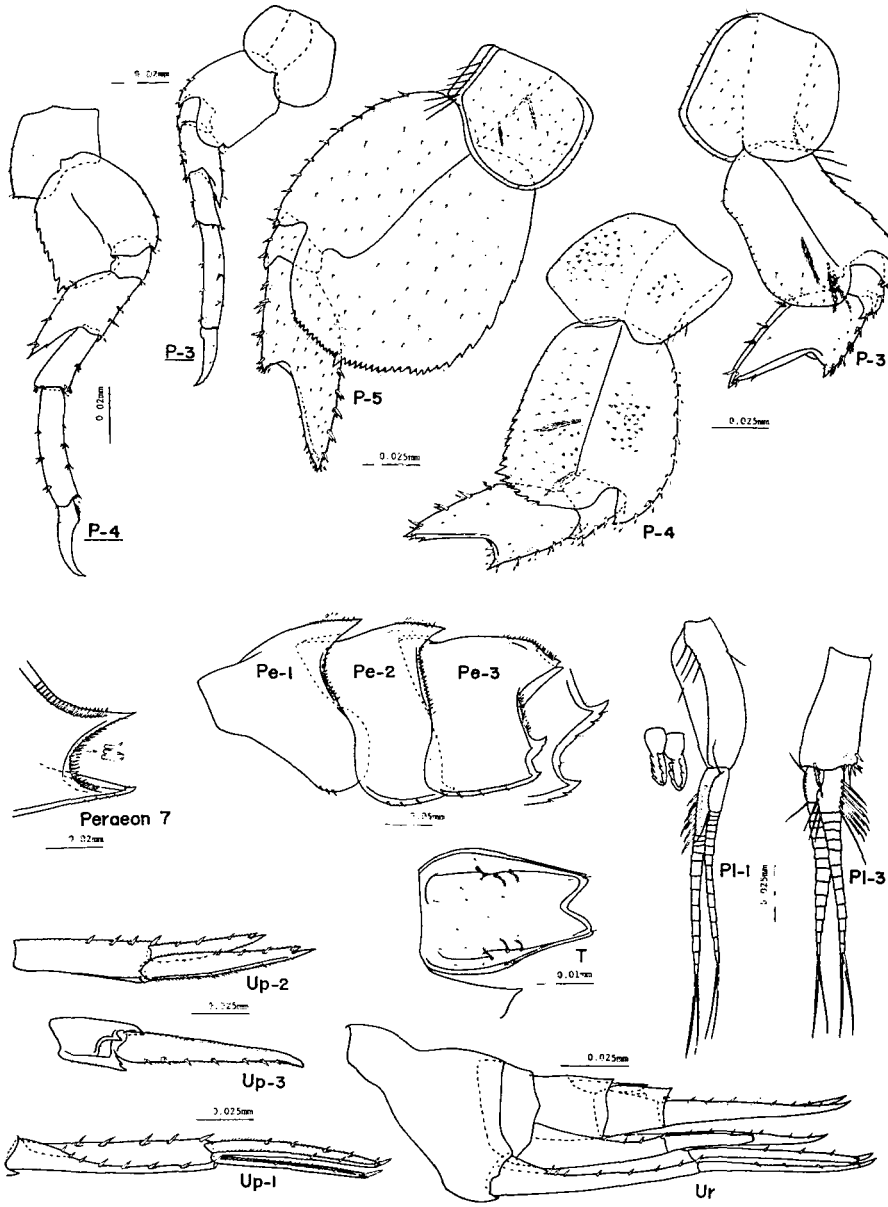

Fig. 4. *Cypsiphimedia mala* sp. nov. Holotype, male, 6.75 mm.

two spines medially, and four distal minute setae, posterior margin with one spine, three sets of four spines and one distal set of three spines.

Peraeopod 3: Coxa 5 bilobed, subrectangular, pectinate and bristly, anterior lobe rounded, posterior lobe a little deeper, rectangular, with many marginal minute setae. Basis broadly expanded, extended and rounded anterodistally, posterior thin plate extending beyond ischium, rounded distally, slightly concaved posteriorly, with many marginal minute setae, with three pinnate setae on anterodistal half of inner side, anterior margin with three proximal setae and eight spines. Ischium short, subsquare, but prominently produced anterodistally, anterior margin with two medial pairs of spines and three distal spines. Merus broadly expanded backward, prominently extending beyond proximal half of carpus posteriorly, a little produced anterodistally, anterior margin with two, three and four spines in formula, posterior margin with one spine and five pairs of spines, else anterodistal margin of posterior extension with two spines. Carpus, propod and dactyl lost in the holotype specimen, but perfect in paratype no. 5 (young specimen). Carpus as long as anterior margin of merus, uniform in width, anterior margin with one medial pair of spines and three distal spines. Propod about twice as long as carpus, narrower than the latter, uniform in width, anterior margin with two medial pairs of spines and three distal spines, posterior margin with one spine, two sets of two spines and one minute seta, and one distal set of five minute setae. Dactyl half as long as propod, falcate.

Peraeopod 4: Coxa 6 bilobed, pectinate and bristly, anterior margin of anterior lobe with five short setae, lower margin rounded, posterior lobe rectangular. Basis broadly expanded, extending beyond ischium posteriorly, anterodistal extension stout, rounded, anterior margin with eight single, two, one, two and one spines in formula, posterior thin plate rectangular, distal half of posterior margin and posterior half of distal end serrate, especially distal tooth stout, anterodistal half of inner side with many pinnate setae. Ischium short, broader than long, prominently produced anterodistally, anterior margin with two medial single spines and three distal spines. Merus broadly expanded backward, extending beyond half of carpus posteriorly, produced anterodistally, anterior margin with one spine, one pair of spines, two sets of three spines and four distal spines in formula, posterior margin with two proximal single spines and four pairs of spines, else anterodistal margin of the posterior extension with two spines. Carpus, propod and dactyl lost in the holotype specimen, but perfect in the paratype no. 5 (young). Carpus as long as anterior margin of merus, anterior margin with one medial set of three spines and one distal set of four spines, posterodistal end with three spines. Propod about twice as long as carpus, narrower than the latter, anterior margin with one spine and three sets of three spines, posterior margin with two, three and two spines medially, and one distal minute seta. Dactyl longer than half as long as propod, stout, falcate.

Peraeopod 5: Coxa 7 pubescent and dispersively pectinate, inner central line with many pinnate setae, anterior margin with seven short setae, posterior and lower

margins rounded. Basis broadly expanded, extending to about proximal half of posterior margin of merus, circular, prominently produced anterodistally, anterior margin with ten single spines and one distal pair of spines, posterior thin plate rounded, lower margin and apical half of posterior margin serrate, especially medial tooth of lower margin prominently produced anterodistally, anterior margin with one medial spine and one distal pair of spines. Merus broadly expanded, very much extended posterodistally, produced anterodistally, anterior margin with three sets of three spines and one distal set of six spines, posterior margin pubescent on distal half, with one spine, one pair of spines, one spine and six pairs of spines, both sides of anterior margin on the posterior extension with many spines. Carpus, propod and dactyl lost.

Pleopods: Pleopods 1–2 similar to each other, peduncle stout, longer than two thirds as long as rami, outer margin of proximal segment on outer ramus with twelve pinnate setae, inner margin of proximal segment on inner ramus with six bifid setae, terminal swimming setae longer than one third as long as rami. Peduncle of pleopod 3 shorter than one of pleopod 1, outer distal margin with several spines.

Uropods: Uropod 1 a little extending beyond uropods 2–3, slender, peduncle shorter than inner ramus, with eight spines on outer margin and five spines on inner margin, rami slender, pectinate on upper margin throughout, outer ramus a little shorter than inner ramus, outer margin with three medial spines and one distal spine, apex with one nail-like spine, distal half of outer margin on inner ramus with three spines, inner margin with five spines, apex with one nail-like spine. Uropod 2 shorter than uropod 1, peduncle a little shorter than outer ramus, pubescent on outer margin, with four spines on distal half, inner distal end with one spine, outer ramus distinctly shorter than inner ramus, pectinate on upper margin, outer margin with one notch near apex, with four spines, inner ramus pectinate on upper margin, outer margin with one notch near apex, with four spines, inner margin with four spines. Uropod 3 two thirds as long as uropod 1, peduncle two fifths as long as inner ramus, stout, prominently produced ventrodistally, both apices of upper margin with one acute tooth respectively, else outer distal end with one small spine, outer ramus unknown, inner ramus attenuate, pectinated marginally, outer margin with seven spines.

Telson: Telson subequal to peduncle of uropod 3 in length, a little decreasing in width, emarginate, both apices rounded, with one small notch and one minute seta, dorsal side concave, dispersively with many minute setae, both lateral ridges with three medial pinnate setae.

Material examined. Holotype: male, 6.75 mm. Paratype no. 5: 3.25 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 5 specimens. Collection No.: AMBL-Amph. 100.

Remarks. I have only a few informations of *C. gibba* K.H. Barnard (J.L. Barnard 1969c), but the new species is distinguished from it by the sldneer coxa 4 tapered distally and not prominently expanded posterodistally. Also, the new species distinctly differs from *C. stegosaura* in highly developed dorsal armature of peraeon and pleon (Griffiths 1975).

Postodius n. gen.

Diagnosis and relationship. The new genus is closely related to *Odius*, but differs from it in the following points; in the new species, palp of maxilliped triarticulate, gnathopod 1 uncompletely chelate, rather simple, and telson entire, not emarginate. Type-species: *Postodius inperfectus* sp. nov. The gender is musculine.

Postodius imperfectus sp. nov.

(Fig. 5–8)

Body: Body compressed, carinate on peraeonites 1–7 and pleonites 1–3, exoskelton hard. Dorsal margin of head continuously rounded to rostrum, slightly longer than peraeonite 1, rostrum much developed, almost reaching near distal end of proximal segment of antenna 1, narrow, triangular, superior antennal sinus deeply concave, rounded, anterior head lobe a little producing beyond distal end of peduncular segment 2 of antenna 1, rectangular, inferior antennal sinus shallow, concave in rectangle, lower margin narrow. Eyes reniform or <-formed, large. Peraeonite 1 as broad as peraeonites 2–3 combined, anterior part of dorsal margin prominently produced, peraeonites 2–7 gradually increasing in dorsal length, peraeonite 6 as long as peraeonite 1, coxae 1–4 subequal to each other in depth, subequal to each peraeonite in depth, with marginal edge, coxa 1 obliquely produced forward, concealing mouthparts and lower part of head. Pleonites 1–3 equal to peraeonite 7 in dorsal length, equal to each other in dorsal length and depth, pleonal epimeron 1 gradually decreasing in width, lower margin narrow, rounded, pleonal epimeron 2 subrectangular, gradually narrowing, anterior and anterodistal margins continuously rounded, upper part of posterior margin concave, with one stout upturned tooth. Urosome subequal to pleonites 1–2 combined in dorsal length, slender, urosomite 1 twice as long as urosomites 2–3 combined.

Antennae: Antenna 1 one fifth as long as body length, stout, gradually decreasing in thickness, accessory flagellum absent, each peduncular segment slightly produced distally, naked, peduncular segment 1 as long as peduncular segments 2–3 combined, peduncular segment 2 twice as long as peduncular segment 3, flagellum five articulate, primary segment longer than peduncular segment 3, with three rows of many aesthetascs, distal end of following segments with three or two aesthetascs. Antenna 2 shorter than antenna 1, peduncular segment 1 broad, twice as wide as long, peduncular segment 2 distinctly narrower than peduncular segment 1, upper distal end produced, peduncular segment 3 twice as long as peduncular segment 2, subequal to the latter in thickness, peduncular segment 4 subequal to peduncular segment 3 in length and thickness, peduncular segment 5 about as long as peduncular segment 4, gradually decreasing in length and thickness.

Mouthparts: Mouthparts large, prominently produced downward. Upper lip long semioval. Lower lip lacking inner plate, outer plate slender, shoulders prominently produced, attenuate, incised apically, mandibular process developed, but not

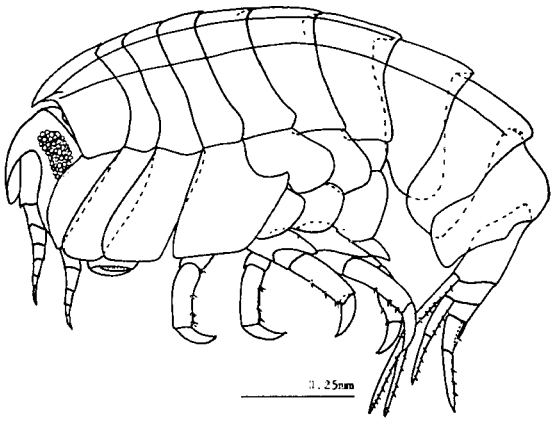

Fig. 5. *Postodius imperfectus* sp. nov. Holotype, male, 2.0 mm.

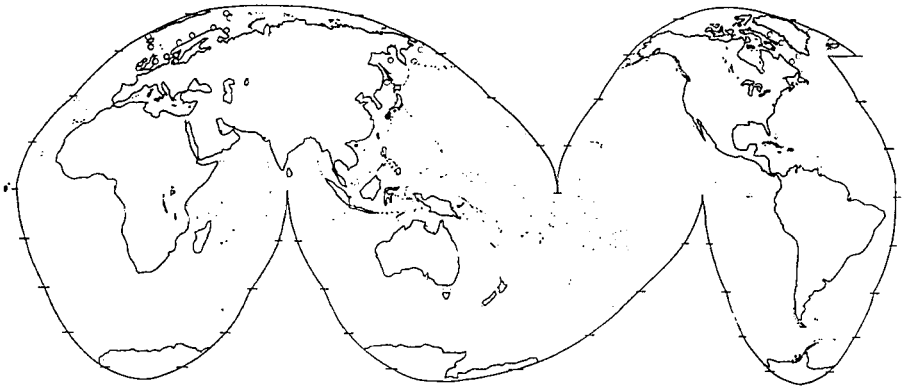

Fig. 6. Distribution of *Postodius imperfectus* sp. nov. (●) and *Odius* spp. (○) in the world.

expanded downward. Inner plate of maxilla 1 with one pinnate apical seta, outer plate gradually attenuate, apex falcate, with one stout and falcate tooth near apex, with four pairs of bifid teeth on distal part, following proximal part dispersively setose in longitudinal rows, palp uniarticulate, very short, attenuate, with one apical simple seta. Maxilla 2 not broad, especially outer plate slender, with one longitudinal row of six simple setae on distal part, inner plate shorter than outer plate, distal margin with eleven short stout setae, proximal margin dispersively pubescent. Mandibles similar to each other, slender, incisor weakly produced, narrow, serrate apically, distal half from molar process with two opposite rows of seven spines and several minute setae, molar process placed medially, prominently produced, medium, not ridged distally, lacking molar process, long, triarticulate, almost uniform in thickness, proximal segment short, medial segment with one medial small seta, terminal segment as long as medial segment, slightly roundish, upper margin with one longitudinal row of seventeen short setae, pubescent, apex with two minutely bifid spines and two broadly bifid spines. Inner plate of maxilliped developed, setose

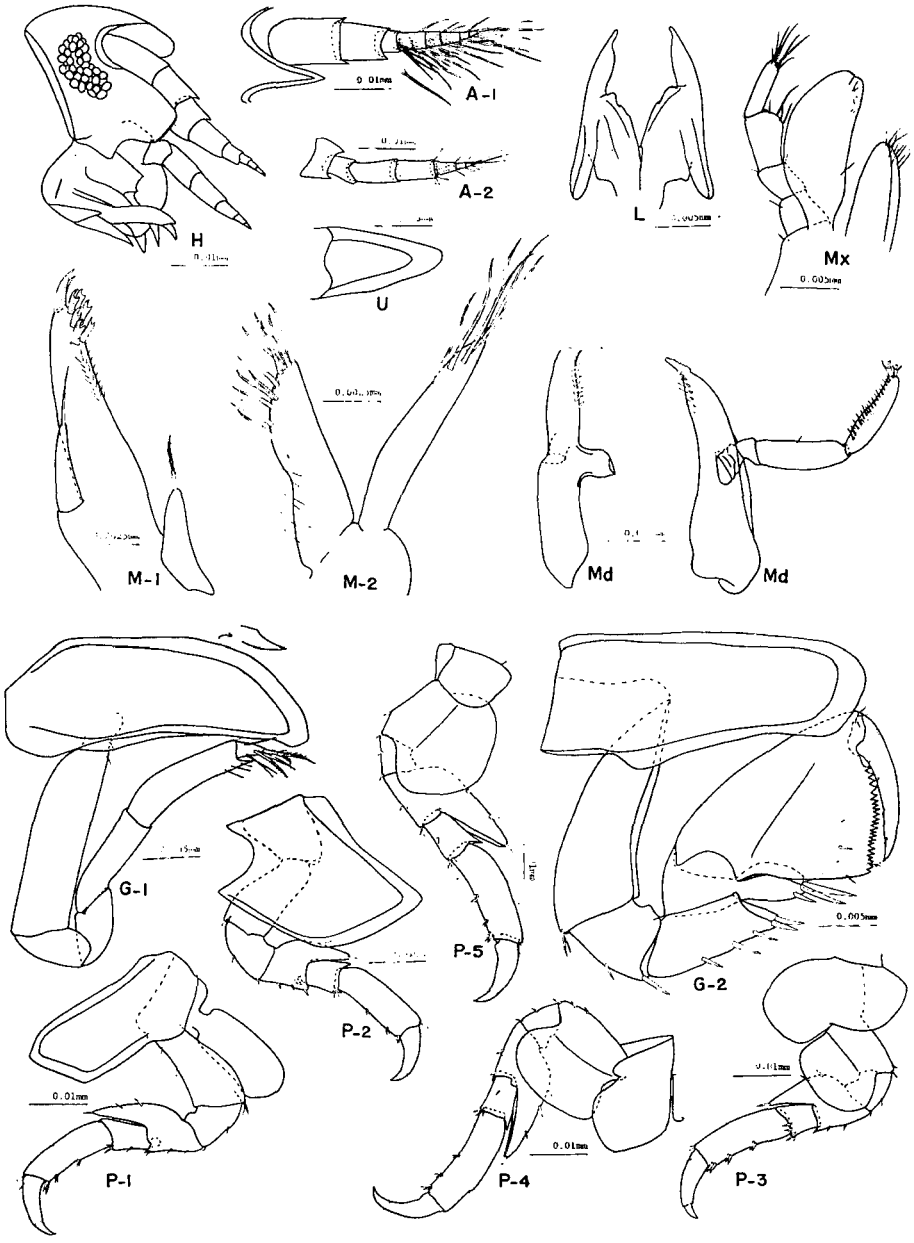

Fig. 7. *Postodius imperfectus* sp. nov. Holotype, male, 2.0 mm.

apically, outer plate much developed, broad, inner apical margin with some minute setae, palp four articulate, a little extending beyond outer plate, not broad, proximal three segments subequal to each other in width, less setose, proximal two segments subequal to each other in length, 3rd segment one and half times as long as 2nd segment, terminal segment as long as 3rd segment, about half as broad as the latter, uniform in width, apex oblique, with seven short setae.

Gnathopod 1: Coxa 1 falcate, anterior margin gently rounded. Gnathopod 1 slender, nearly simple. Basis two thirds as long as coxa 1, stout, uniform in width except for proximal part, anteroproximal margin with two small setae. Ischium one third as long as basis, posterior margin of merus rounded, twice as long as basis, posterior margin of merus rounded, twice as long as anterior margin, distal end oblique. Anteroproximal margin of carpus roundish, following part almost uniform in width. Propod slightly longer than carpus, as broad as it, slightly curved proximally, posterodistal end acutely produced, reaching medial part of dactyl, posterodistal margin with three short setae. Dactyl conical, about one third as long as propod, anteroproximal margin with one simple seta, posterior margin with one proximal pair of simple setae and two paris of stout setae longitudinally pectinated near apex.

Gnathopod 2: Coxa 2 subrectangular, about three times as long as wide, lower margin roundish. Basis about two thirds as long as basis, gradually increasing in width, posterodistal end with one seta and one spine. Posterior margin of ischium twice as long as anterior margin, about half as long as basis, with two medial and distal spines. Merus semicylindrical, posterior margin one and half times as long as one of ischium, with three medial single spines and one pair of spines on distal end, distal end gradually extending backward, concave. Carpus triangular, anterior margin almost as long as anterior margin of merus, posterior lobe much developed, dilated, posterior margin fitting on distal end of distal pairing spines of merus, reaching posteromedial part of propod, anterior margin fitting on it, distal magrin with four spines. Propod gradually expanding, attaining twice as broad as basal width, longer than basis, palm transverse, gently rounded, serrate, with one pair of spines near posterodistal end. Dactyl falcate, reaching palmar defining spines, grasping margin with four minute setae.

Pereaopod 1: Coxa 3 similar to coxa 2. Peraeopod 1 stout. Basis two thirds as long as coxa 3, gradually increasing in width, posterodistal end with one seta and one spine, anteroproximal half with two small setae. Ischium similar to one of gnathopod 1. Posterior margin of merus as long as one of ischium, with two medial spines and one spine on distal end, anterior margin roundly expanded, extending beyond carpus, with two medial spines and one apical spine. Carpus two thirds as long as posterior margin of merus, posterior margin with one medial spine and one pair of spines on distal end. Propod twice as long as carpus, posterior margin with two pairs of spines and one pair of locking spines on about distal half, anterior margin with three medial minute setae. Dactyl falcate, stout, shorter than propod.

Peraeopod 2: Coxa 4 nearly rectangular, deeply concaved in rectangle on

posteroproximal one third, lower margin roundish. Peraeopod 2 similar to peraeopod 1.

Peraeopod 3: Coxa 5 bilobed, divided by medial shallow concavity, posterior lobe a little deeper than anterior lobe, rounded, anterior lobe also rounded. Basis almost as large as posterior lobe of coxa 5, anterior margin with two distal spines, posterior thin plate broadly expanded, rounded, wider than muscular part, producing beyond ischium, its distal margin rounded. Ischium, merus, carpus, propod and dactyl similar to those of peraeopod 2 except for posterodistal end of carpus with four spines.

Peraeopod 4: Coxa 6 bilobed, lower margin of anterior lobe narrow, rounded, posterior lobe rectangular, roundish. Peraeopod 4 very similar to peraeopod 3 except for the following points; anteromedial margin of merus with one pair of spines, posterodistal end more extended, posteromedial margin with three spines, posterodistal end of capus distinctly produced, anteromedial margin with one small spine.

Peraeopod 5: Coxa 7 subrectangular, roundish. Peraeopod 5 very similar to peraeopod 4 except for posterior thin plate of basis more expanded.

Pleopods: Pleopod 1 slender, long, peduncle a little shorter than rami, outer ramus seven plus one vestigial segments, proximal segment with one medial bifid seta, inner ramus eight plus one vestigial segments, terminal swimming setae about half as long as rami.

Uropods: Uropod 1 extending far beyond uropods 2–3, slender, peduncle longer than outer ramus, outer margin with six spines, inner distal end with one spine, outer ramus slightly longer than or equal to inner ramus in length, truncate, outer margin with four spines, inner margin with one spine, apex with four spines, inner ramus truncate, outer margin with one spine, inner margin with two spines, apex with four spines. Uropod 2 longer than peduncle of uropod 1, peduncle as long as inner ramus, outer margin with five spines, inner distal end with one spine, both rami truncate, outer ramus shorter than inner ramus, with four spines on inner margin and three apical spines, inner ramus with two spines on outer distal half, one spine on inner medial margin and four apical spines. Uropod 3 as long as uropod 2, peduncle half as long as inner ramus, with one spine on outer distal end, both rami tapered, outer ramus longer than half as long as inner ramus, with two

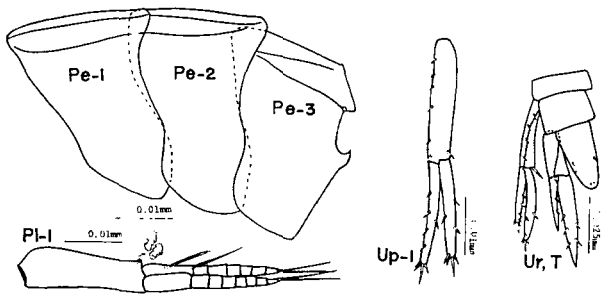

Fig. 8. *Postodius imperfectus* sp. nov. Holotype, male, 2.0 mm.

medial spines, inner ramus with three spines on outer margin and two spines on inner margin.

Telson: Telson entire, long semioval, longer than peduncle of uropod 3, both medial margins with one small stout seta respectively.

Material examined. Holotype: male, 2.0 mm. Type-locality: Ariake Sea. Date: June, 1976. Paratype: 4 specimens. Collection No.: AMBL.-Amph. 62.

Ampeliscidae

Key to the genera of Ampeliscidae

1 Dactyl of peraeopod 5 spiniform. ..... *Byblis*
Dactyl of peraeopod 5 lanceolate. ..... *Ampelisca*

Byblis

Byblis japonica Dahl, 1945

B. japonica: Dahl 1945, p. 14; Nagata 1960, p. 168; Nagata 1965a, P. 153–154.

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

Amplelisca

Key to the species of *Ampelisca*

1 Corneal lenses one paired..... 2
Corneal lenses two paired..... 3
2 Rostrum narrow. ..... *A. misakiensis*
Rostrum broad. ..... *A. cyclops iyoensis*
3 Basis of peraeopod 3 prominently produced anteriorly..... *A. furcigera*
This character not combined. 4
4 Head produced forward in rectangle..... *A. brevicornis*
This character not combined. 5
5 Peduncular segment 2 of antenna 1 subequal to peduncular segment 1 in length. ..... *A. bocki*
Peduncular segment 2 of antenna 2 distinctly longer than peduncular segment 1. 6
6 Anterodistal end of head not narrow. ..... *A. miharaensis*
Anterodistal end of head narrow. ..... *A. naikaiensis*

Ampelisca misakiensis Dahl, 1944

(Fig. 9)

A. misakiensis: Dahl 1944, p. 6–9; Nagata 1965a, p. 152; Imbach 1967, p. 64; J.L. Barnard 1967, p. 7.

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

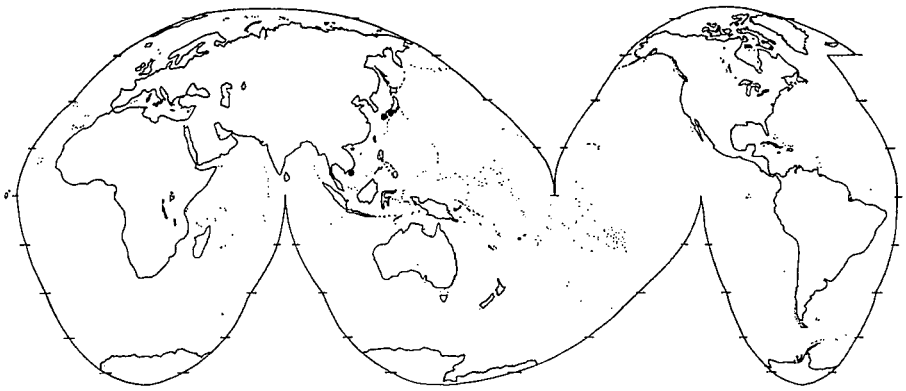

Fig. 9. Distribution of *Ampelisca misakiensis* Dahl (●) in the world.

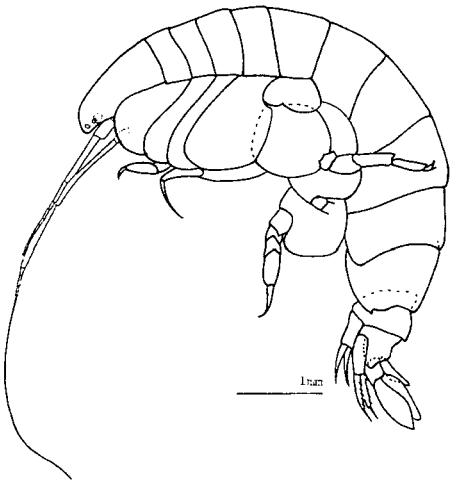

Fig. 10. *Ampelisca cyclops iyoensis* (Nagata). Male, 8.5 mm.

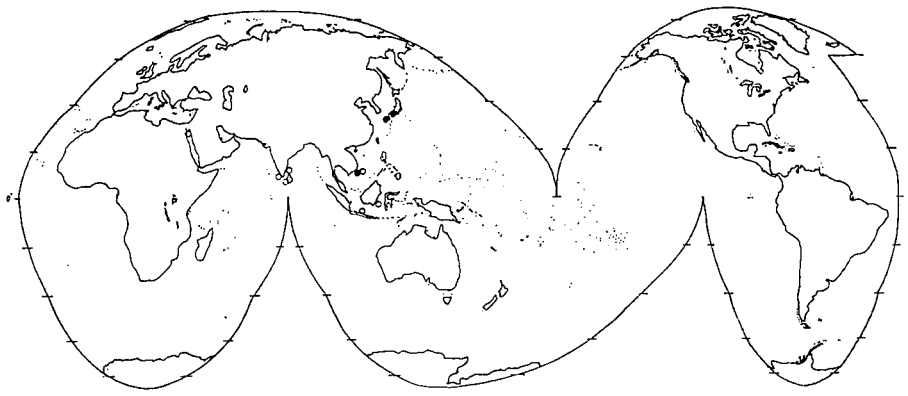

Fig. 11. Distribution of *Ampelisca cyclops cyclops* Walker (○) and *A. cyclops iyoensis* (Nagata) (●) in the world.

Ampelisca cyclops Walker, 1904 *iyoensis* Nagata, 1959

(Fig. 10–13)

A. iyoensis Nagata, 1959: Nagata 1959, p. 274–277.
A. cyclops: Nagata 1965a, p. 151–152.
A. cyclops iyoensis; Imbach 1967, p. 59.

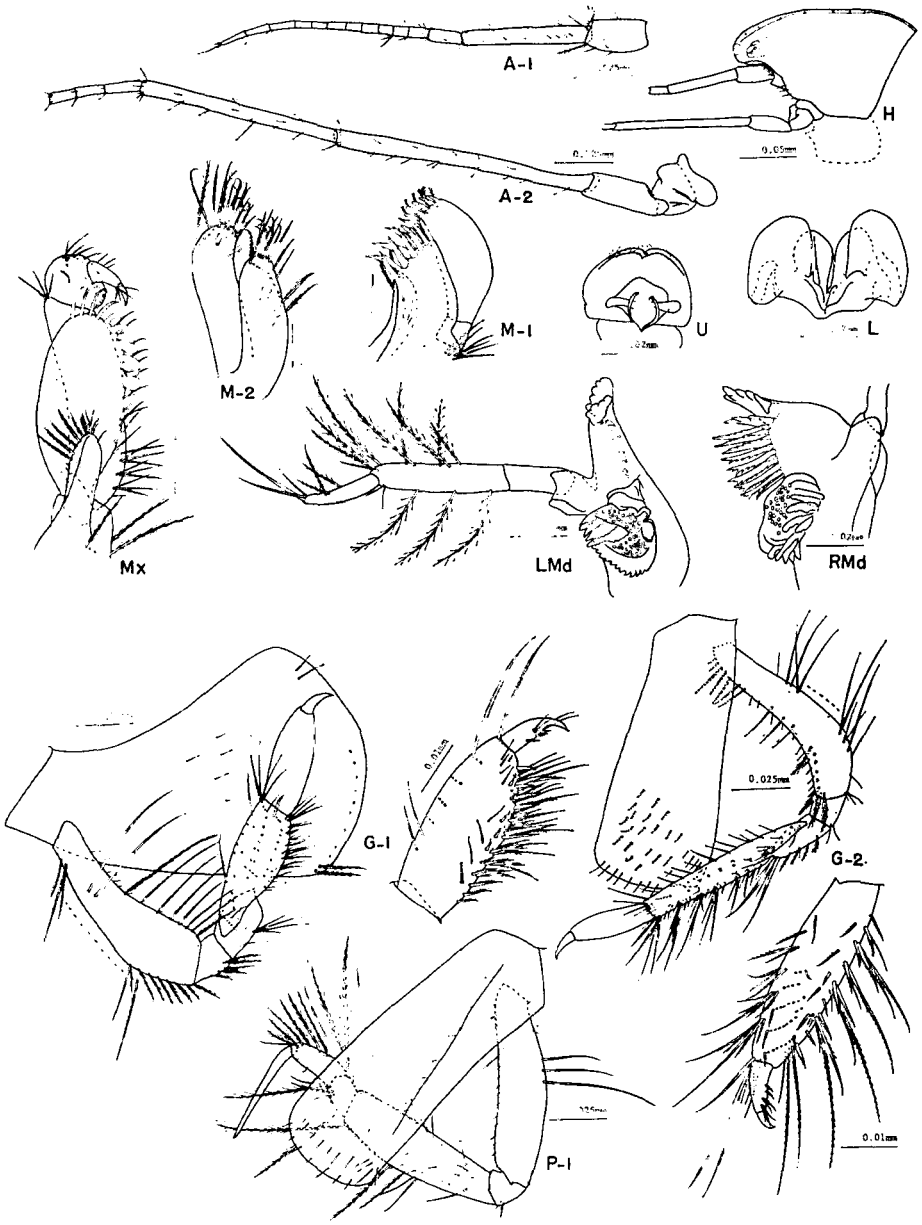

Fig. 12. *Ampelisca cyclops iyoensis* Nagata. Male, 8.5 mm.

Material examined: Male, 8.5 mm. Ariake Sea, Tomioka Bay, Shijiki Bay. Collection No.: AMBL.-Amph. 107. (7 specimens).

Remarks: See Nagata's (1959) for the description.

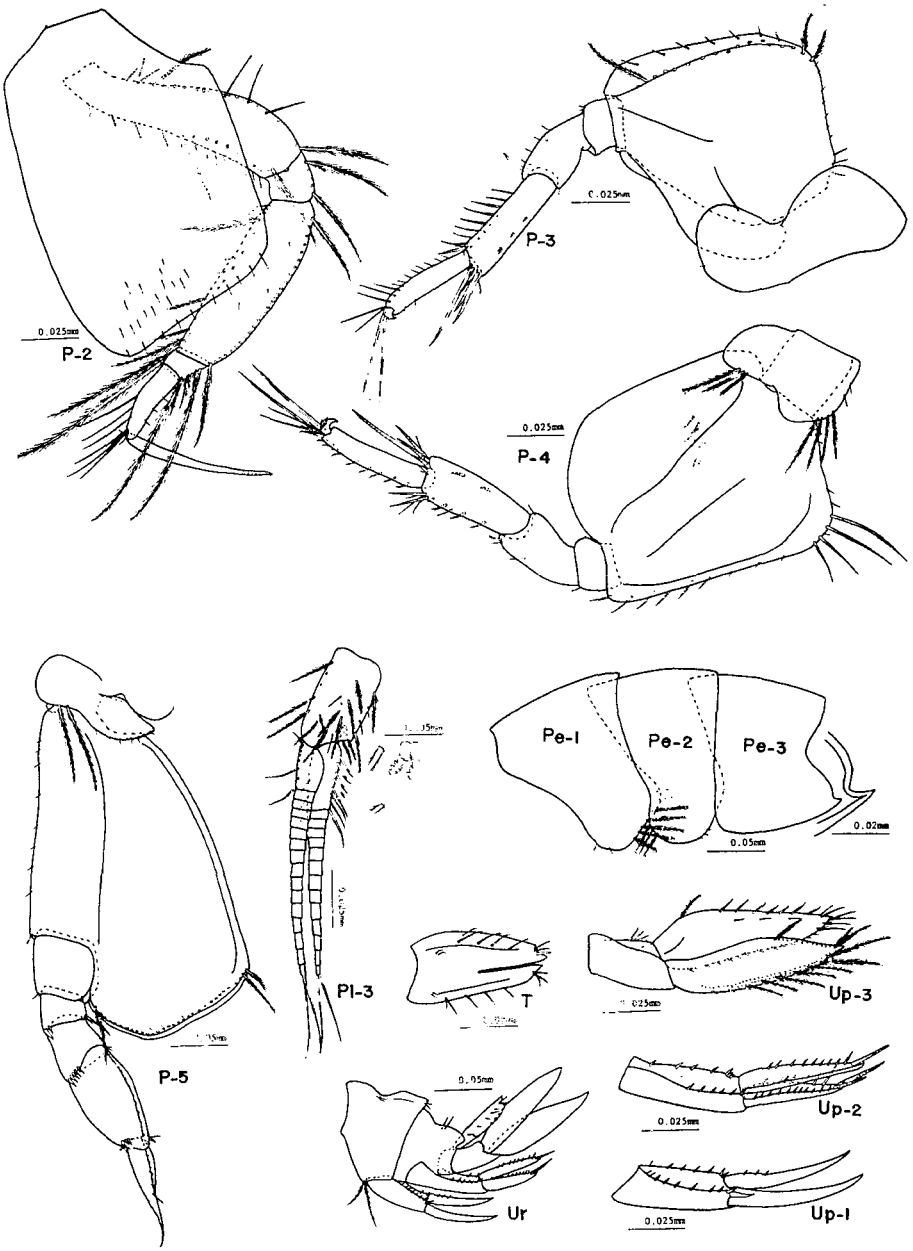

Fig. 13. *Ampelisca cyclops iyoensis* Nagata. Male, 8.5 mm.

Ampelisca furcigera Bulycheva, 1936

(Fig. 14–17)

A. furcigera: Bulycheva 1936, p. 242–244; Gurjanova 1951, p. 314–316; J.L. Barnard 1960b, p. 26–27; J.L. Barnard 1967a, p. 6; J.L. Barnard 1967b, p. 6; Nargulis 1967, p. 299–301.

Material examined: Female, 17.0 mm. Tomioka Bay. Collection No.: AMBL.-Amph. 106. (4 specimens).

Body: Body large, often rounded. Head as long as peraeonites 1–2 combined, rostrum short, superior antennal sinus distinct, shallow, roundly curved, anterior head lobe prominently produced, located on medial level of head, inferior antennal sinus abruptly oblique. Corneal lens of eyes two paired, one pair located on upper distal end of head, the other located on apex of anterior head lobe. Peraeonites 1–4 gradually widening, coxae 1–4 much developed, coxa 1 much extending beyond head. Pleonites 1–3 subequal to each other in length, dorsodistal end with one pair of small setae, pleonal epimeron 1 rectangular, pleonal epimeron 2 wider than pleonal epimeron 1, lower and posterior margin continuously rounded, pleoral

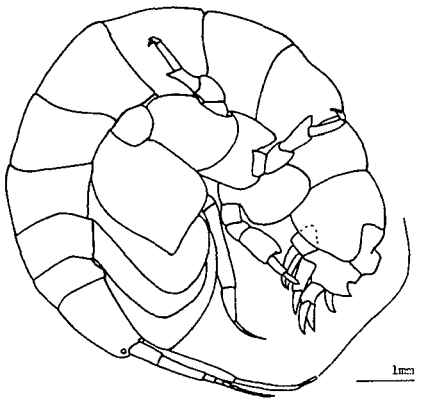

Fig. 14. *Ampelisca furcigera* Bulycheva. Female, 17.0 mm.

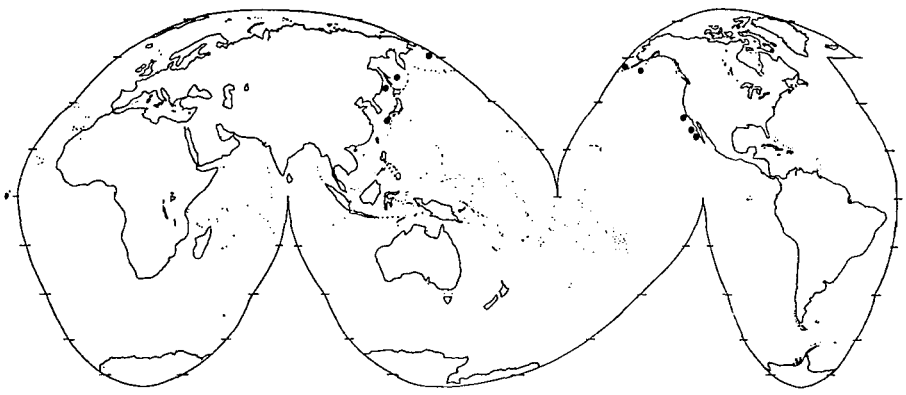

Fig. 15. Distribution of *Ampelisca furcigera* Bulycheva (●) in the world.

epimeron 3 broader than pleonal epimeron 2, rectangular. Urosomite 1 about half as broad as deep, dorsodistal half with prominent and semicircular keel, with three distal setae, urosomites 2–3 coalesced, as long as urosomite 1, anterior half of dorsal margin with low keel, posterior half with prominent, triangular and densely pubescent keel.

Antennae: Antenna 1 about one fifth as long as body length, peduncular segment 1 about one third as long as head length, with four distal pinnate setae, peduncular segment 2 distinctly slenderer than peduncular segment 1, one and half times as long as the latter, with one distal pinnate seta, peduncular segment 3 distinctly narrower than peduncular segment 2, shorter than one third as long as the latter, flagellum composing of five plus one rudimentary segments, proximal five segments with one distal slender spine, terminal segment with three apical slender spines. Antenna 2 about three times as long as antenna 1, peduncular segments 1–2 short, but stubby, peduncular segment 3 with two medial pinnate setae and one distal pinnate seta, peduncular segment 4 narrower than peduncular segment 3, about three times as long as the latter, dispersively setose, peduncular segment 5 about two thirds as long as peduncular segment 4, dispersively setose.

Mouthparts: Mouthparts rather massive. Upper lip semicircular, a little concaved medially, densely pubescent apically. Lower lip unknown. Inner plate of maxilla 1 medium, apical margin rounded, with two setae, inner margin of outer plate bristly, apex with twelve serrate tooth-like spines, outer distal end of palpal hump with two long setae, palp biarticulate, gradually widening, far beyond outer plate, proximal segment short, apex of terminal segment broad, serrate, with four conical spines and five setae. Maxilla 2 medium, inner distal and apical margins of inner plate with one row of five pinnate setae, and many stout and feeble setae, outer plate a little broader than inner plate, inner half of apical margin with twelve stiff and nine feeble setae, outer half with one row of five dispersively pinnate and two simple setae. In left mandible, incisor produced inward, broad, with five blunt teeth, lacinia mobilis broad, with three teeth, accessory teeth seven, serrate, seven accessory pinnate setae, molar process medium, truncate, serrate on lower margin, molar rasp medium, palpal hump prominent, palp located on level of molar process, triarticulate, proximal segment short, 2nd segment three times as long as proximal segment, gently curved proximally, with two medial small setae and one distal pinnate seta, terminal segment narrower than 2nd segment, longer than half as long as the latter, apex rounded, with two long setae, else distal margin with one small seta. Right mandible similar to left one, but lacinia mobilis bifid, narrower than one of left mandible, accessory teeth five. Inner plate of maxilliped medium, with five conical teeth and seven pinnate and simple setae, outer plate extending beyond 2nd segment of palp, broad, inner margin with eight spatulate teeth and eight setae, apex with two slender long teeth, palp four articulate, rather slender, proximal two segments two thirds as long as palp, inner distal end of proximal segment with one pair of setae, inner margin of 2nd segment with many pectinate setae, outer distal end with one simple seta, 3rd segment short, dilated, distal margin with two sets of three pectinate setae, four short simple setae and one pair of small setae, dactyl

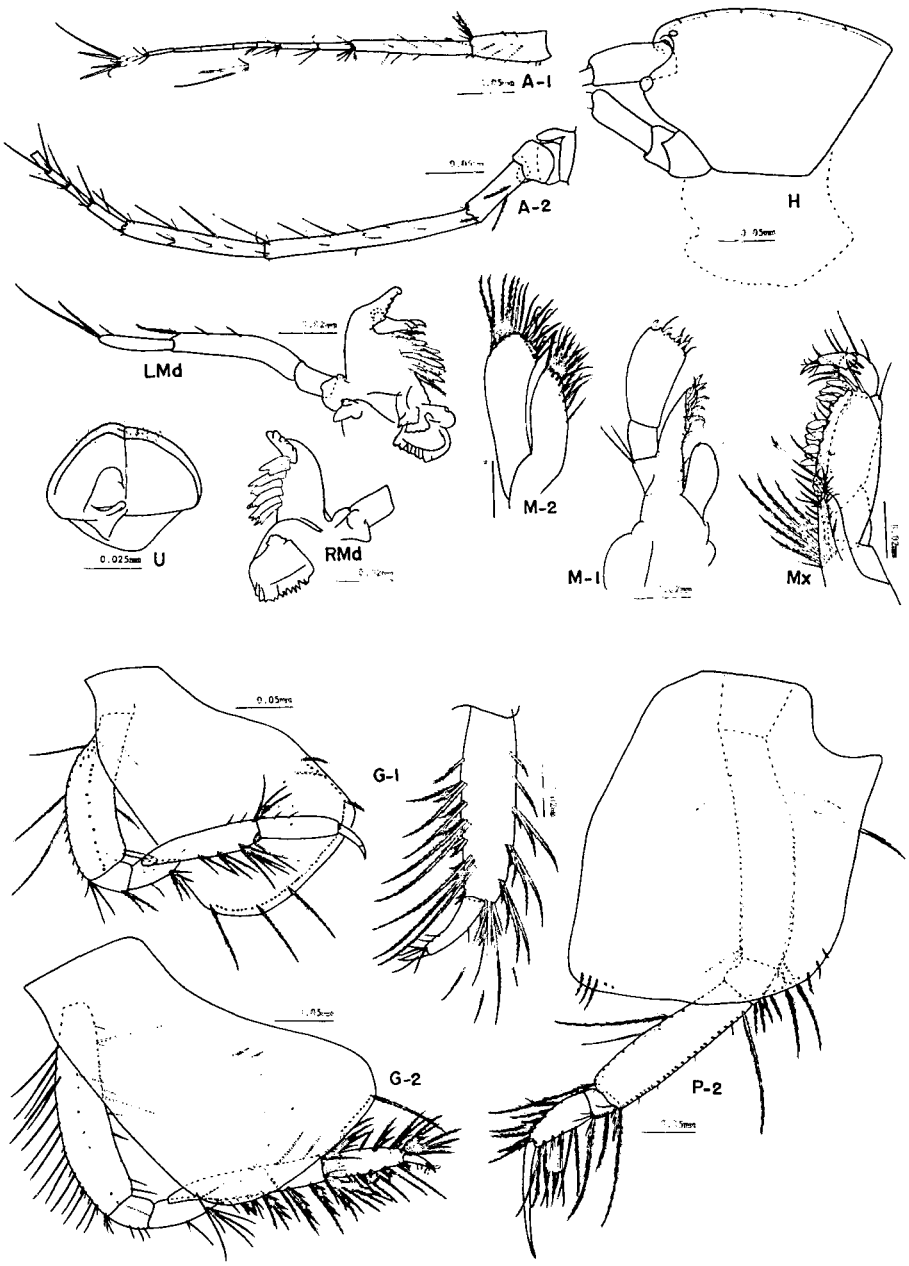

Fig. 16. *Ampelisca furcigera* Bulycheva. Female, 17.0 mm.

as long as 3rd segment, slender, falcate, apically with nail-like spine and four small setae.

Gnathopod 1: Coxa 1 gradually widening a little, rectangular, but lower margin roundish, with many long and short pinnate setae in one row, anterodistal margin with eight short setae in one row, anterodistal margin with eight short setae in one row, anterodistal part of inner side with many pinnate setae in rows. Gnathopod 1 simple, slender. Basis longer than one third as long as gnathopod 1, posteroproximal part setose, posteroproximal half with nine pectinate setae, posteroproximal half with seven small stout setae and one distal set of three setae, central line of inner side with one longitudinal row of about thirteen setae, anterior margin with eleven pectinate setae and one pair of simple setae. Ischium short, longer than wide, postrodistal end with one pectinate and one simple setae. Merus one third as long as basis, attenuate, posterior margin with one medial simple seta and one set of five pectinate setae. Anterodistal margin of carpus with two small simple setae, and one distal set of three pectinate and three small simple setae, posterodistal half with two, three, five and seven pectinate setae in formula. Propod two thirds as long as carpus, a little slenderer than the latter, anterior margin with two single, three, four, four and seven short and long pectinate setae, posterior margin with one, three, two, three, two and three short and long pectinate setae in formula, posterodistal margin with one longitudinal row of five small pectinate setae. Dactyl half as long as propod, falcate, with nail-like tooth, two small single setae and one set of three small setae near apex.

Gnathopod 2: Coxa 2 gradually extending forward on distal half, inner side with many pinnate setae on distal half, lower margin with one row of many long pinnate setae. Gnathopod 2 slender, simple, similar to gnathopod 1. Basis two fifths as long as gnathopod 2, anterior margin with many short and long setae, posterior margin with fourteen long setae, six small stout setae on distal half and one distal set of four small setae, inner central line with one longitudinal row of nine short setae. Ischium short, posterior half with three small setae. Merus one third as long as basis, attenuate, posterodistal half with one pair of setae and one distal set of four setae. Anterodistal half of carpus with three pinnate setae and one distal set of four long pinnate and one simple setae, inner distal end with six short pinnate setae, posterior margin with one, two, three, five, five and eleven distal pinnate setae in formula. Propod half as long as carpus, anterodistal half with one pinnate seta, three sets of four pinnate setae and one distal set of three pinnate and one simple setae, posterior margin with two small pinnate setae, one set of one small pinnate and one long simple setae, one set of two pairing small pinnate and one long pinnate setae, one set of two small and two long pinnate setae, and one distal set of two small and three long pinnate setae. Dactyl similar to one of gnathopod 1, but shorter than half as long as propod.

Peraeopod 1: Coxa 3 similar to coxa 2. Basis two fifths as long as peraeopod 1, anterior margin with nineteen short simple setae and two pairs of short simple setae, posterior margin with twenty long simple and two distal pinnate setae.

Ischium short, posterior margin subequal to width in length, with two medial and distal pinnate setae. Merus half as long as basis, anterodistal two thirds with nine pinnate setae, posterior margin with eight long pinnate setae and one distal pair of long pinnate setae, else with three short pinnate setae. Carpus short, trapezioid, proximal margin about half as broad as distal margin of merus, posterodistal end with one long pinnate setae, one pair of long pinnate setae and one small simple seta. Propod about half as long as merus, gradually narrowing a little, anterodistal half with three long pinnate setae and one distal pair of long pinnate setae, posterodistal two thirds with four long pinnate setae. Dactyl twice as long as propod, slender, gently curved, with one apical pit.

Peraeopod 2: Coxa 4 broader than coxa 3, rectangular, but posteroproximal part concaved in rectangle, lower margin with many short pinnate setae in one row. Basis about one third as long as peraeopod 2, anterior margin with seventeen short simple setae, posterior margin with twenty-five long pinnate setae. Ischium short, subsquare, posterodistal half with four pinnate setae. Merus about three fourths as long as basis, anterior margin with two longitudinal rows of fourteen pinnate and thirteen simple setae, posterior margin with twenty-four pinnate setae and one distal set of four pinnate setae. Carpus short, trapezioid, posterodistal half with six pinnate setae and three distal short simple setae. Propod two fifths as long as merus, gradually narrowing a little, anterior margin with eight pinnate setae and one distal short simple seta, posterior margin with four long simple and five long pinnate setae. Dactyl about twice as long as propod, slender, gently curved.

Peraeopod 3: Coxa 5 bilobed, shallow, anterior lobe rounded, posterior lobe extended backward, rounded posteriorly. Basis about half as long as peraeopod 3, broadly expanded, circular, especially anterodistal margin broadly extended and expanded, lobate, with two pinnate setae and one minute seta, base of anterodistal expansion notched, anteroproximal three fourths with nineteen pinnate setae, inner posterodistal end with three pinnate setae. Ischium stout, broader than long, anterodistal end with one pinnate and two minute setae. Anterior margin of merus twice as long as one of ischium, rounded, with five simple setae, and one distal set of two pinnate and one simple setae, posterior margin about half as long as anterior margin. Carpus longer than ischium, increasing in width, extended posterodistally, proximally narrower than merus, distal end about one and half times as broad as proximal width, anterior margin with three pinnate setae, and one distal set of two pinnate and one minute setae, posterodistal end with three small spines and seven short setae which gradually lengthen and are serrate on distal half. Propod distinctly longer than carpus, slender, produced anterodistally, anterodistal end with four stout setae which gradually lengthen and are serrate on distal half, posterior margin with four simple setae which gradually lengthen. Dactyl small, hook-like, anteroproximal half rasp-like, apex blunt.

Peraeopod 4: Coxa 6 bilobed, anterior margin with five pinnate setae, posterior lobe extended backward. Peraeopod 4 comparatively similar to peraeopod 3. Basis broadly expanded, most expanded distally, anterodistal lobe smaller than one

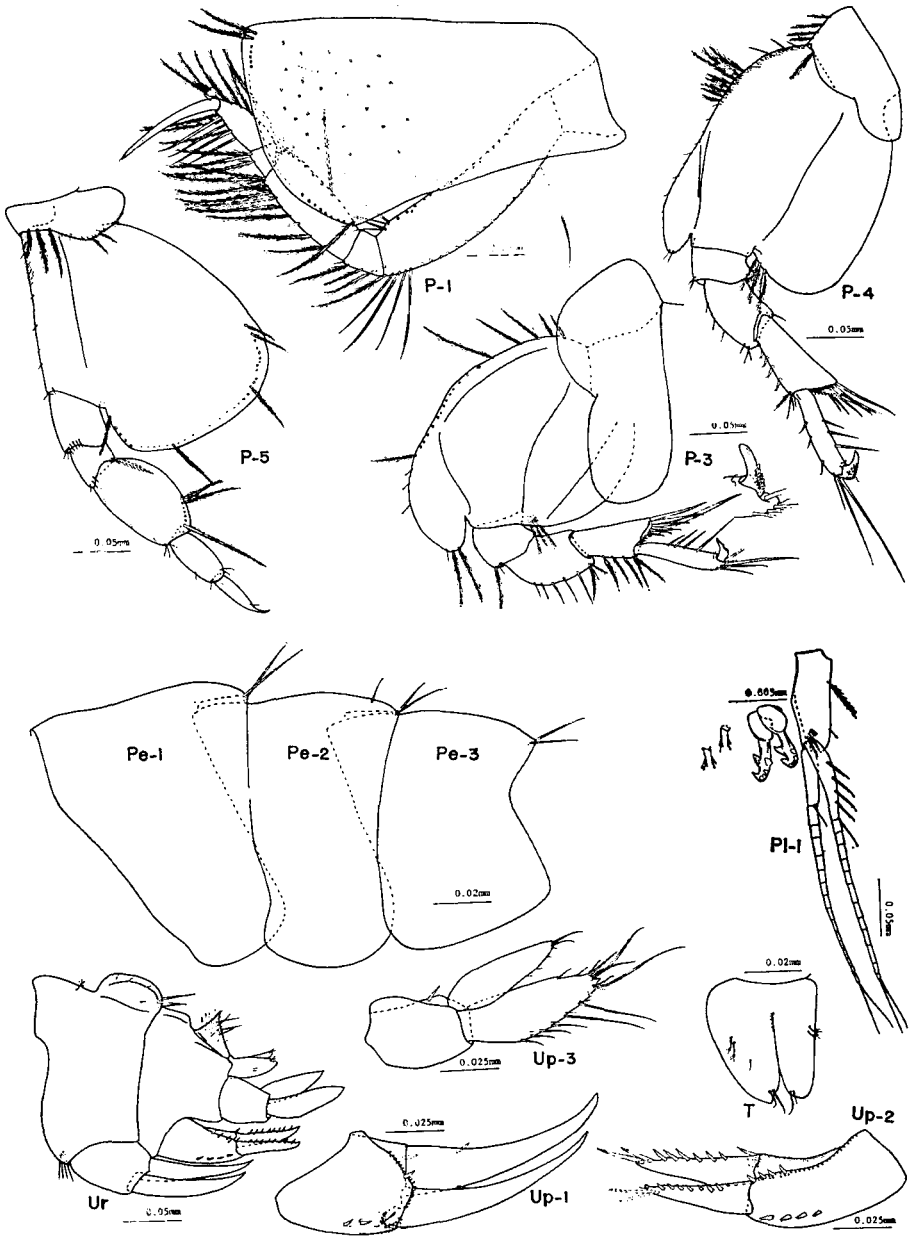

Fig. 17. *Ampelisca furcigera* Bulycheva. Female, 17.0 mm.

of peraeopod 3, with two apical small setae, anteroproximal half densely pubescent, with three proximal simple setae and eight distal pinnate setae, anterodistal half with nine minute setae, posterodistal end with three pinnate setae. Ischium short, twice as broad as long, anterodistal end with one pair of small setae. Merus similar to one of peraeopod 3 in shape, anterior margin with three medial small and three distal setae, posterodistal end with one small seta. Carpus similar to one of peraeopod 3 in shape, anterior margin with four spines, and one distal set of one pinnate and four small simple setae, posterodistal end with four small spines and six stout setae which gradually lengthen and are serrate on distal half. Propod similar to one of peraeopod 3 in shape, anterior margin with three medial spines and three distal long simple setae which gradually lengthen. Dactyl similar to one of peraeopod 3.

Peraeopod 5: Coxa 7 shallow, prominently extended backward, densely pubescent marginally, lower margin with three anterior pinnate and two posterior pinnate setae. Basis broadly and gradually expanding, extending beyond ischium, lower margin of posterior thin plate almost transverse, with many pinnate setae, anterior margin densely pubescent proximally, with five and two distal small setae. Ischium about two fifths as long as anterior margin of basis, rectangular, longer than wide, anterodistal end with one transverse row of seven small setae. Merus about half as long as ischium, narrower than the latter, anterior margin twice as long as posterior margin, with three distal small setae, posterodistal end with one spine and one pinnate seta. Carpus about as long as ischium and merus combined, expanded posteriorly, anterior margin with three medial and three distal small setae, posterodistal one third with seven pinnate setae. Propod two thirds as long as carpus, roundish, anterior margin with one and two distal small setae, posterodistal end with two small setae. Dactyl as long as propod, apex nail-like, with two small setae. Dactyl as long as propod, apex nail-like, with one minute seta.

Pleopods: Pleopods slender, developed. Peduncle of pleopod 1 slender, about one third as long as rami, inner distal end with two coupling spines and two pinnate setae, both rami slender, equal to each other in length, proximal segment of inner ramus about one third as long as inner ramus, with four bifid setae and one narmal pinnate seta on inner margin, terminal swimming setae about one fourth as long as rami.

Uropods: Peduncle of uropod 1 about half as long as rami, very stout, outer ventral margin with two medial spines, upper and distal margins of outer side pectinate, with one apical spine, inner margin with one spine, rami equal to each other in length, stout, attenuate, falcate, inner ramus with one medial spine. Uropod 2 as long as uropod 1, peduncle longer than rami, stout, outer ventral margin with one longitudinal row of four spines, outer margin of upper side pectinate overall, with four distal spines, inner margin pubescent, with three apical spines, both rami subequal to each other in length, attenuate, with seven spines and two distal long spines. Uropod 3 as long as uropod 2, peduncle shorter than inner ramus, stout, inner margin with one spine, rami foliaceous, outer ramus longer than inner ramus,

with eight short and long setae and six small setae on outer margin, inner distal margin with two small setae, and one distal set of four short and long setae, inner ramus with two apical short setae, else with four small setae near apex.

Telson: Telson triangular, deeply cleft near base, each lobe with one pair of pinnate setae and one small seta on outer submargin, and one set of one simple and one pinnate setae on inner distal margin.

Remarks. The present specimens well agree with Bulycheva's figures and description (Bulycheva 1936).

Ampelisca brevicornis (Costa, 1853)

(Fig. 18)

A. brevicornis: Walker 1895, p. 100–101: K.H. Barnard 1916, p. 132–133: Chevreux and Fage 1925, p. 77–78; Schellenberg 1928, p. 634; K.H. Barnard 1932, p. 84–85; Schellenberg 1932, p. 130–132; Stephensen 1935, p. 125; Pirlot 1936, p. 277–278; Daniel 1947, p. 117; K.H. Barnard 1940, p. 442; Dahl 1944, p. 9–12; Dahl 1946, p. 5–6; Oldevig 1959, p. 26; Nagata 1959, p. 265–266; Nagata 1960, p. 167–168; Nagata 1965a, p. 150–151; Nayer 1966, p. 137–138; Imbach 1967, p. 55–57; Ledoyer 1967, p. 9, 11; Ledoyer 1968, p. 188; Ledoyer 1969b, p. 184; Griffiths 1974a, p. 177; Griffiths 1974b, p. 211; Griffiths 1974c, p. 271–272; Griffiths 1975, p. 103; Rabindranath 1975, p. 257–261; Karaman 1975b, p. 7–12.

A. laevigata: Chevreux 1887, p. 309; Sars 1895, p. 169–170; Chevreux 1935, p. 67.

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

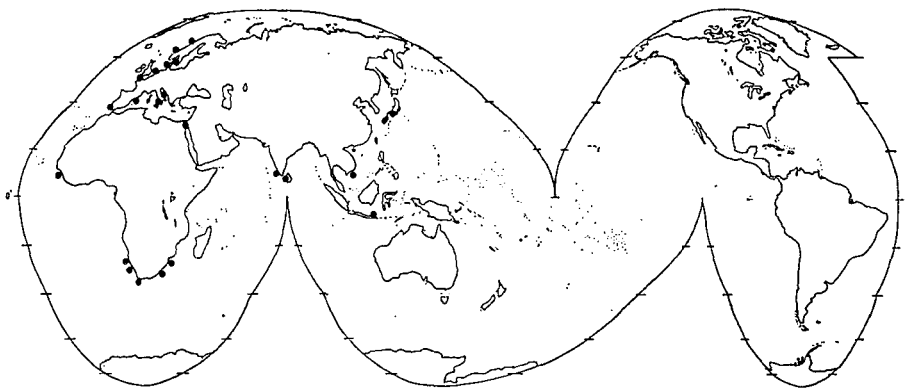

Fig. 18. Distribution of *Ampelisca brevicornis* (Costa) (●) in the world.

Ampelisca bocki Dahl, 1944

(Fig. 19)

A. bocki: Dahl 1944, p. 2–6; Nagata 1959, p. 274; Nagata 1965a, p. 152; Imbach 1967, p. 55.

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

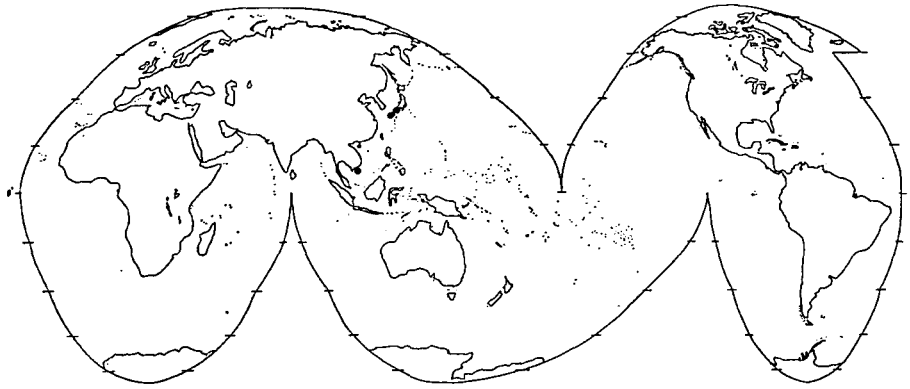

Fig. 19. Distribution of *Ampelisca bocki* Dahl (●) in the world.

Ampelisca miharaensis Nagata, 1959

(Fig. 20)

A. miharaensis: Nagata 1959, p. 266–270; Nagata 1960, p. 168; Nagata 1965a, p. 152–153; Imbach 1967, p. 62, 64; J.L. Barnard 1967, p. 7.

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

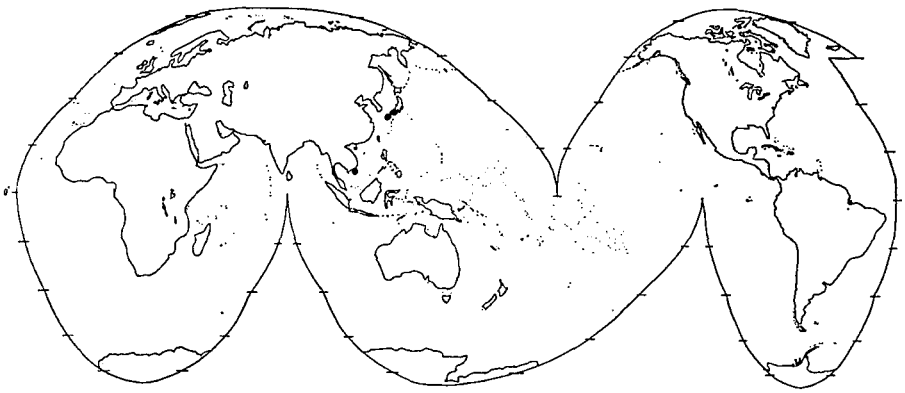

Fig. 20. Distribution of *Ampelisca miharaensis* Nagata (●) in the world.

Ampelisca naikaiensis Nagata, 1959

A. naikaiensis: Nagata 1959, p. 270–274; Nagata 1960, p. 168; Nagata 1965a, p. 153.

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

Ampithodae

Ampithoe

Key to the species of *Ampithoe*

1 Pleonal epimeron 3 with one posterodistal small tooth.....*A. lacertosa*
Pleonal epimeron 3 rounded posterodistally. 2

2 Basis of peraeopods 1–2 slender. .....*A. pollex*
Basis of peraeopods 1–2 slightly or distinctly expanded 3
3 Basis of peraeopod 5 prominently expanded in rectangle .....*A. orientalis*
This character not combined. 4
4 Outer plate of lower lip prominently notched .....*A. ramondi*
Outer plate of lower lip less notched. .....*A. valida*

Ampithoe lacertosa (Bate, 1958)

(Fig. 21)

A. lacertosa: Stebbing 1906, p. 633; Gurjanova 1951, p. 895–897; J.L. Barnard 1954b, p. 31–33; Nagata 1960, p. 175–176; Nagata 1965c, p. 313–314; J.L. Barnard 1965b, p. 9–12; J.L. Barnard 1967c, p. 15; J.L. Barnard 1969b, p. 83.

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

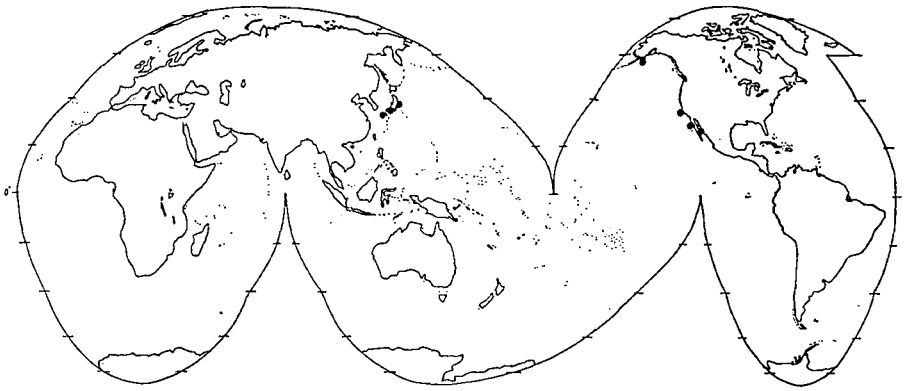

Fig. 21. Distribution of *Ampithoe lacertosa* (Bate) (●) in the world.

Ampithoe pollex Kunkel, 1910

(Fig. 22)

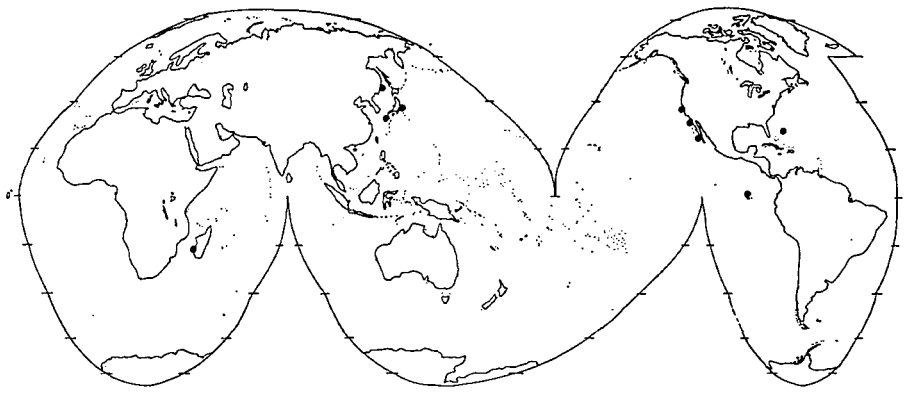

Fig. 22. Distribution of *Ampithoe pollex* Kunkel (●) in the world.

A. pollex: J.L. Barnard 1954b, p. 29-31; J.L. Barnard 1964a, p. 111; J.L. Barnard 1965b, p. 22–25; J.L. Barnard 1969a, p. 190; J.L. Barnard 1969b, p. 84–85; Ledoyer 1972, p. 182; J.L. Barnard 1979, p. 18–20.

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

Ampithoe orientalis (Dana, 1853)

(Fig. 23)

A. orientalis: Stebbing 1906, p. 641; J.L. Barnard 1955a, p. 26–28; Nagata 1965, p. 315; J.L. Barnard 1970b, p. 50–51; J.L. Barnard 1971a, p. 35.

Material examined: Tomioka Bay.

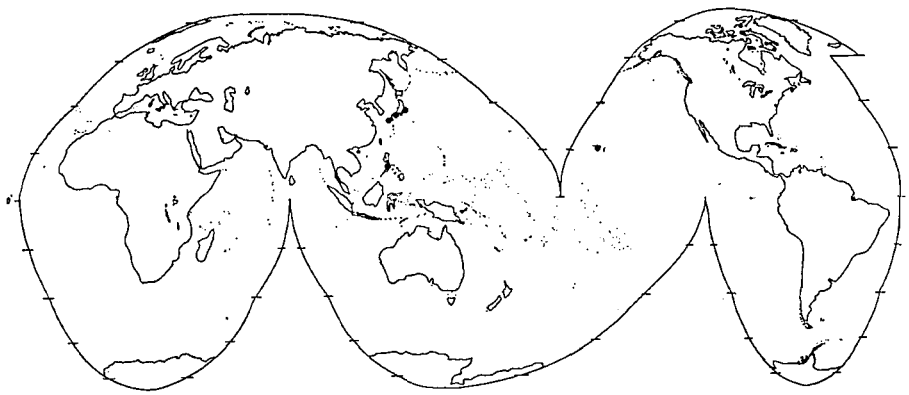

Fig. 23. Distribution of *Ampithoe orientalis* (Dana) (●) in the world.

Ampithoe ramondi (Audouin, 1826)

(Fig. 24)

A. ramondi: Walker 1905, p. 931; Stebbing 1906, p. 642; Schellenberg 1928, p. 665–666; Pirlot 1938, p. 346–347; Schellenberg 1938, p. 87; K.H. Barnard 1940, p. 480; Shoemaker 1942, p. 40; J.L. Barnard 1955a, p. 28–29; Nagata 1960, p. 176; J.L. Barnard 1963b, p. 217; Nagata 1965c,

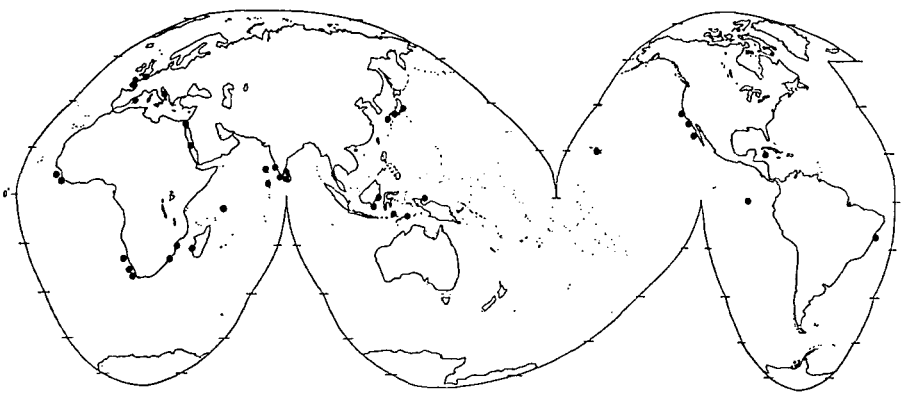

Fig. 24. Distribution of *Ampithoe ramondi* (Audouin) (●) in the world.

p. 315; J.L. Barnard 1965b, p. 25–27; Nayer 1966, p. 160; Ledoyer 1967, p. 21; J.L. Barnard 1969a, p. 190; Sivaprakasam 1969, p. 571–673; Ledoyer 1969c, p. 186; J.L. Barnard 1970b, p. 50, 52–53; Krapp-Schickel 1970, p. 356–357; Greze 1971, p. 127; Rabindranath 1972a, p. 162–165; Ledoyer 1972b, p. 182, 185; Ledoyer 1973b, p. 40; Griffiths 1973, p. 277; Griffiths 1974a, p. 179; Griffiths 1974b, p. 274; Griffiths 1975, p. 106; Ledoyer 1978b, p. 221; Ledoyer 1979, p. 146; J.L. Barnard 1979, p. 17, 20–21.

A. vaillanti: Chevreux 1900, p. 100; K.H. Barnard 1916, p. 253–255; Chevreux and Fage 1925, p. 333–334; Reid 1951, p. 264–265; Ledoyer 1968, p. 1968.

A. simulans Alderman, 1936: Alderman 1936, p. 68–70.

A. penicillata: Heller 1866, p. 43–44; Krapp-Schickel 1974, p. 343.

Material examined: Tomioka Bay.

Ampithoe valida (Smith, 1873)

(Fig. 25)

A. valida: Stebbing 1906, p. 635; Alderman 1936, p. 68; J.L. Barnard 1954b, p. 34–35; Nagata 1965c, p. 314; J.L. Barnard 1965b, p. 34–36; J.L. Barnard 1967a, p. 15; Bousfield 1973, p. 180–181; Fox and Bynum 1975, p. 225.

Material examined: Tomioka Bay.

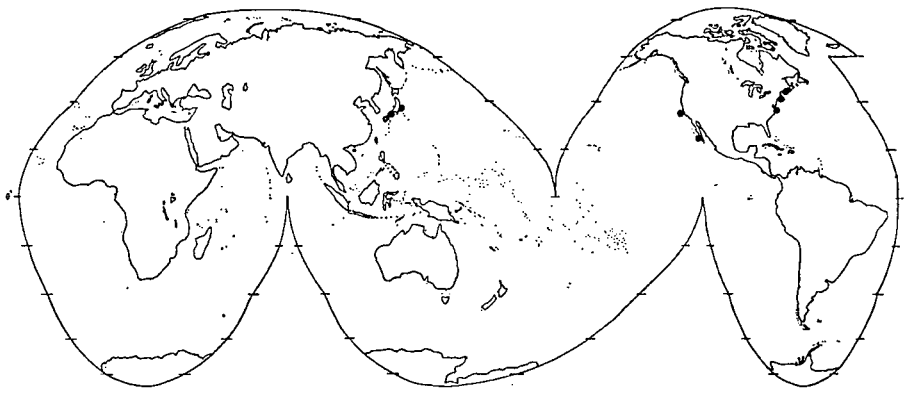

Fig. 25. Distribution of *Ampithoe valida* (Smith) (●) in the world.

Amphilochidae

Key to the genera of Amphilochidae

1 Gnathopod 1 simple ..... *Terepeltopes*
Gnathopod 1 not simple. 2
2 Basis of peraeopods 3–5 slender..... *Cyproidea*
Basis of peraeopods 3–5 broadly expanded ..... *Gitanopsis*

Terepeltopes n. gen.

Diagnosis. Accessory flagellum of antenna 1 absent. Mandibular palp triarticulate, molar process tritulative, large. Palp of maxilla 1 uniarticulate. Gna-

thopod 1 simple, propod rectangular, truncate, distinctly broader than dactyl, dactyl erected, falcate, stout. Gnathopod 2 subchelate, palm distinct, almost parallel to anterior margin of propod. Coxa 2 vestigial. Basis of peareopods 3–4 linear, but one of peraeopod 5 strongly widened. Urosomite 1 elongate, dorsal keel developed, triangular, vaulted over and beyond following segments, urosomites 2–3 short. Outer ramus of uropod 3 longer than half as long as inner ramus. Telson elongate, but not extending beyond peduncle of uropod 3. Type species is *Terepeltopes dolichorhunia* sp. nov. The gender is femine.

Remarks. The new genus resembles *Unyapheonoides* (J.L. Barnard 1972a), *Austropheonoides* (J.L. Barnard 1972b), *Peltopes* (J.L. Barnard 1969c) and *Moolapheonoides* (J.L. Barnard 1974), but distinctly differs from them in the following points; Basis of peraeopods 3–5 or peraeopods 4–5 broadly expanded, dorsal keel of urosomite 1 except for *Peltopes* not vaulting over following segments, gnathopods of *Peltopes* and gnathopod 1 of *Austopheonoides* simple, and urosomite 3 in *Austopheonoides* longer than urosomite 2.

Basis of peraeopods 3–5 in *Narapheonoides* (J.L. Barnard 1972b) is similar to these of the new genus except for the basis of peraeopod 3 of *Narapheonoides* prominently expanded, but the new genus is distinguished from *Narapheonoides* by the mandible lacking palp and the dorsal keel of urosomite 1 not strongly vaulted over following segments.

Terepeltopes dolichorhunia sp. nov.

(Fig. 26–28)

Body: Body roundish, complex of head, peraeon and coxae oval or circular, peraeonites 3–5 much developed, also coxae 3–4 much developed, forming shield, pleon and urosome comparatively slender. Head deeper than wide, dorsal margin longer than peraeonites 1–2 combined, roundish, rostrum reaching proximal two thirds of peduncular segment 1 of antenna 1, a little decurved, narrow, tapered, superior antennal concavity deep, narrow, anterior head lobe a little extending

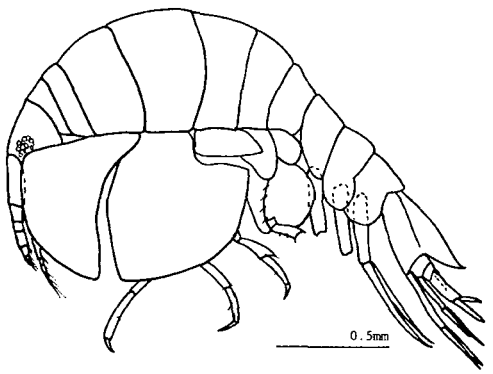

Fig. 26. *Terepeltopes dolichorhunia* sp. nov. Holotype, female, 2.75 mm.

beyond rostrum, apex upturned, acute, inferior antennal sinus oblique, almost straight. Eyes medium, circular, placed on center of face. Peraeonites 1–2 narrow, peraeonite 3 wider than peraeonites 1–2 combined, peraeonite 4 the widest and the deepest, peraeonites 5–7 seriously narrower and shallower, coxae 3–4 deeper than peraeonite 4. Dorsal margin of pleonites 2–3 subequal to one of peraeonite 7 in length, one of pleonite 3 wider than one of pleonite 2, pleonal epimeron 1 produced backward, semioval, lower margin undefined, pleonal epimeron 2 gradually going down, roundish, posterior margin a little expanded backward, pleonal epimeron 3 wider than pleonal epimeron 2, anterior margin slightly curved backward, posterior margin gently convex, lower margin roundish. Urosome slender, tail-like, urosomite 1 subequal to pleonites 2–3 combined in length, dorsal keel developed, laminate, gradually widening, extending to about middle of peduncle of uropod 3, apex upturned, acute, dorsal margin with seven minute setae, urosomites 2–3 narrow, small, ventrodistal margin of urosomite 3 with triangular thin plate which reaches middle of peduncle of uropod 3.

Antennae: Antenna 1 longer than twice as long as upper margin of head, not slender, peduncular segment 1 as long as head length of peduncular segments 2–3 combined, stout, peduncular segment 2 a little narrower than peduncular segment 1, distal end produced, peduncular segment 3 two thirds as long as peduncular segment 2, distal end of lower margin with two small setae, accessory flagellum absent, flagellum four articulate, narrowed step by step, proximal segment about half as long as peduncular segment 3, trapedium in lateral view, lower medial margin with two protrusions which are truncate and are armed with one pair of long aesthetascs, distal end with one long aesthetasc, 2nd segment wider than long, upper distal end with one small seta, lower distal end a little produced, truncate, with one long aesthetasc and one pair of short setae, 3rd segment square, narrower than 2nd segment, lower distal end with one long aesthetasc, terminal segment about half as broad as 3rd segment, about two thirds as long as proximal segment, with four apical setae. Antenna 2 a little shorter than antenna 1, slender, peduncular segment 1 broad, gland cone of peduncular segment 2 thick and stout, almost reaching distal end of peduncular segment 3, apex blunt, peduncular segment 4 twice as long as peduncular segment 3, a little narrowed medially, a little produced around distal end, peduncular segment 5 as long as and as broad as peduncular segment 4, upper medial margin with two small setae, a little produced on distal end, distal end with one small pinnate and several simple setae, flagellum four articulate, progressively shortening and narrowing, proximal segment shorter than half of peduncular segment 5, narrower than the latter, lower distal end of segments 2–3 and apex of terminal segment with a few setae.

Mouthparts: Upper lip asymmetrically bilobed, not pubescent, epistome developed. Inner lobes of lower lip undefined, rather coalesced, shoulders of outer lobe risen, densely bristly, apex bumpy, inner medial margin with two protrusions and five minute spines, mandibular process vestigial. Inner plate of maxilla 1 emarginate, with one apical minute seta, apical margin of outer plate largely

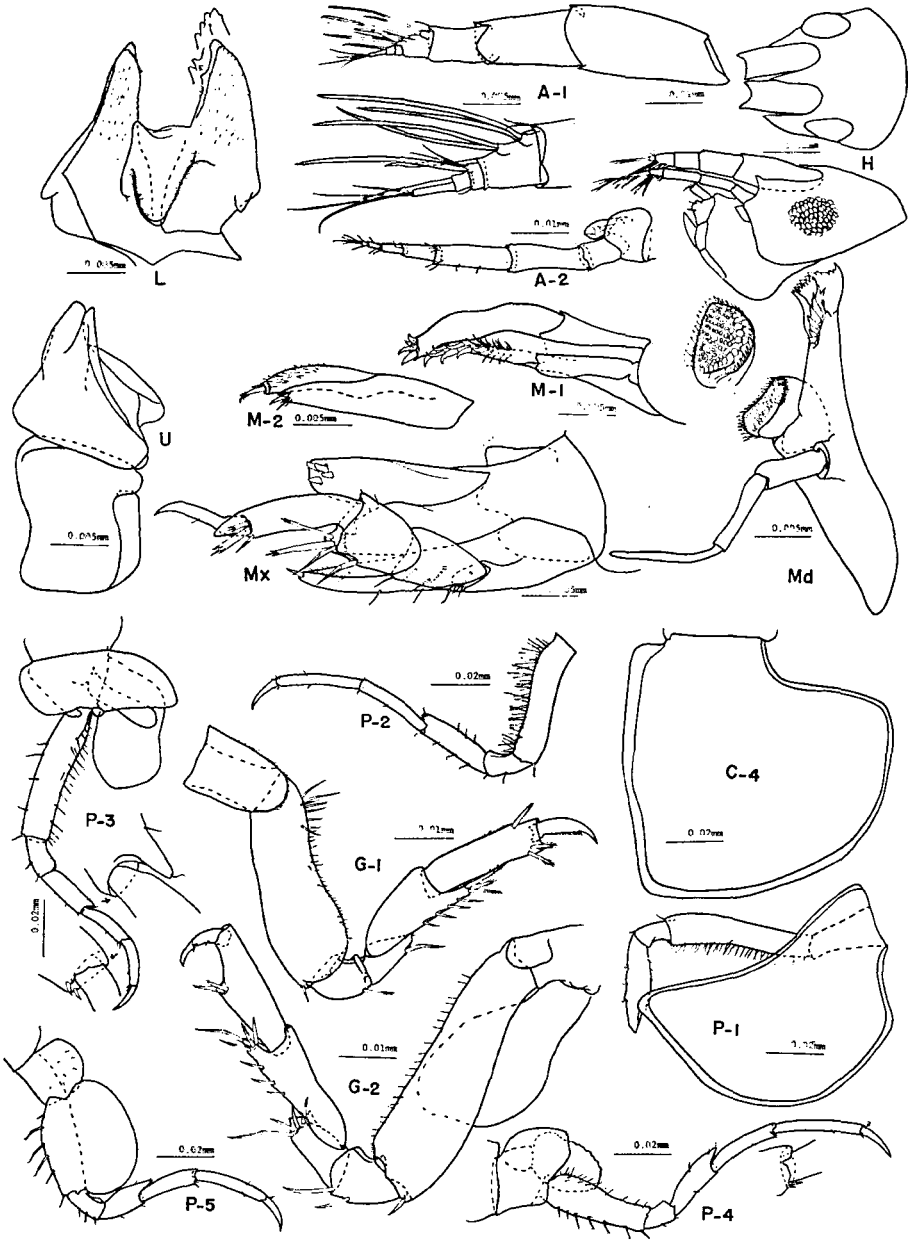

Fig. 27. *Terepeltopes dolichorhunia* sp. nov. Holotype, female, 2.75 mm.

oblique, distal part falcate, inner half with thirteen setae in two opposite rows, remainder with six teeth, palp broad, stout, extending beyond outer plate, apex truncate, with four teeth. Inner plate of maxilla 2 not pubescent, apex truncate, with four teeth unsegmented, with one stout spine and three small setae, outer plate extending beyond inner plate, pubescent, apex truncate, with one small seta and one stout spine of which apical margin is armed with several setae. Mandible slender, molar process placed on medial level, prominently produced, large, rasp developed, marginally rugose, distal half of body gradually narrowed, incisor splayed, developed, serrate, lacinia mobilis narrowed, slightly splayed, serrate apically, else distal margin under lacinia mobilis with nine stout teeth which gradually lengthen, and of which distal six teeth are serrate, palpal hump placed nearly under molar process, prominently produced, wider than proximal segment of palp, palp triarticulate, slender, long, progressively narrowing, without any seta and any spine, proximal segment the most stout, terminal segment the longest, very slender, apex blunt. Inner plate of maxilliped not broad, apex truncate, with four conical teeth, outer plate extending beyond inner plate, inner margin pubescent, apex truncate, with four small teeth unsegmented, with one acute spine, palp four articulate, proximal two segments stout, broad, subequal to each other in size, inner distal end with three conical teeth, one simple spine of which proximal part is stout and uniform in thickness, and two long spines of which apex is three-folked, else with one stout spine near distal end of which proximal part is stout and uniform in thickness, 3rd segment subequal to proximal two segments in length, about half as thick as the latter, outer distal margin broadly and prominently extended, rounded apically, inner distal end with one simple spine and two long and small three-folked spines, dactyl falcate, narrower than 3rd segment, subequal to the latter in length, inner medial margin with one minute seta.

Gnathopod 1: Coxa 1 small, long semioval, finely pubescent. Gnathopod 1 simple, normal. Basis about two fifths as long as gnathopod 1, anterior margin with many spines throughout, especially proximal spines longer, distal margin rounded, a little produced, posterodistal angle with one spine. Ischium about one third as long as basis, curved, posterior margin three times as long as anterior margin, rounded, with one spine on distal end, finely pubescent on distal margin. Merus triangular, posterior margin subequal to one of ischium in length, posterodistal margin with one stout spine and one small seta. Carpus gradually widening, anterior margin about half as long as basis, roundish, posterior margin with four stout spines on distal half, distal end extending to proximal one fourth of propod, semicylindrical, stout, truncate, apical terrace with two stout spines pectinated on distal margin and one long stout spine pectinated on distal two thirds. Propod two thirds as long as basis, two thirds as broad as distal end of carpus, uniform in width, anterior margin finely pubescent, distal margin with one stout pectinate spine, posterodistal margin with two stout pectinate spines, distal end produced, forming concavity. Dactyl falcate, stout, about half as long as propod, proximal margin about half as broad as propod, proximal two thirds stout, with eleven small spines and

one distal tooth.

Gnathopod 2: Coxa 2 vestigial, undefined. Gnathopod 2 subequal to gnathopod 1 in size, subchelate. Anterior margin of basis with many small spines throughout except for proximal margin, especially its distal end with seven small spines in one row, posterodistal end with one stout spine. Ischium with two long stout spines on distal margin. Merus as long as ischium, subcylindrical, gradually narrowing a little, truncate, apex with five stout spines, one of them especially long. Anterodistal end of carpus produced, semicylindrical, posterodistal end produced as one of gnathopod 1, with three simple and one pectinate spines, else posterodistal half with three spines. Propod as long as carpus, anterior margin almost straight, distal end forming deep pocket, proximal half of posterior margin gradually expanding a little, palm distinct, nearly parallel to anterior margin, defined by one protrusion and two spines of which one is three-folked and is armed with one apical seta. Dactyl falcate, grasping margin with two medial spines.

Peraeopod 1: Anterior margin of coxa 3 expanded throughout, rounded, posterior margin gently concave, inner side finely pubescent. Peraeopod 1 slender. Anterior margin of basis densely setose throughout, posterodistal end with one spine. Ischium short, anterodistal end with one spine. Merus gradually expanding on anteroproximal margin, anteroproximal half with three spines, posteromedial margin with three spines. Carpus, propod and dactyl lost in the holotype specimen.

Peraeopod 2: Coxa 4 quadrate, anterior margin almost straight, posterior margin largely extended backward, inner side finely pubescent. Peraeopod 2 slender. Basis about one third as long as peraeopod 2, almost uniform in width, anterior margin densely setose, posterodistal end with one spine. Ischium about one third as long as basis, posteroir margin longer than anterior margin, with one medial spine and one spine on distal end. Merus about two thirds as long as basis, proximal margin gradually widening a little, anterior margin with three medial spines, anterodistal end produced, stout, with one spine, posterior margin with three medial spines, a little produced on distal end, its extension with one spine. Carpus as long as merus, about half as broad as merus, uniform in width, anterodistal margin with two setae, posterior margin with one medial spine and one distal spine. Propod longer than carpus, slightly narrower than the latter, anterior margin with one medial and one distal setae, posterior margin with one medial spine and one distal pair of locking spines. Dactyl scimitar.

Peraeopod 3: Coxa 5 rectangular, broad, lower margin straight, posterior margin roundish, gradually extending backward, inner side finely pubescent. Peraeopod 3 slender. Basis shorter than half of peraeopod 3, uniform in width, anterior margin with four medial spines and one spine on distal end, posterior margin setose. Ischium about one third as long as basis, as broad as the latter, anterodistal half with two spines, posterodistal margin a little expanded. Merus a little longer than ischium, as broad as the latter, anterior margin with two medial spines and one spine on distal end, posterodistal margin with one minute seta, its distal end produced, with one apical minute seta. Carpus as long as merus, narrower than

the latter, slightly curved backward, anterior margin with one medial spine and one pair of spines on distal end, posterior half of distal end slightly extended. Propod as long as carpus, a little narrower than the latter, slightly curved backward, anterior margin with one medial spine and one pair of locking spines on distal end. Dactyl scimitar.

Peraeopod 4: Coxa 6 expanded backward and downward, posterodistal angle with one minute seta. Peraeopod 4 slender, as long as peraeopod 3. Basis shorter than one third as long as peareopod 4, slightly expanded backward proximally, posterior margin setose, anterior margin with seven spines. Ischium one third as long as basis, anterodistal half with two spines, posterodistal half a little expanded, rounded. Anterior margin of merus twice as long as anterior margin of ischium, with one medial spine, posterior margin gradually expanding, roundish, with one medial seta, posterodistal end prominently expanded in triangle, with two setae. Carpus longer than merus, about half as broad as distal margin of the latter, uniform in width, anterodistal half with one medial spine and one pair of spines on distal end, posterodistal end slightly produced. Propod shorter than basis, a little narrower than carpus, anterior margin with one medial spine and one pair of locking spines on distal end. Dactyl scimitar.

Peraeopod 5: Coxa 7 semicircular, expanded backward, anterior margin straight, inner side finely pubescent. Peraeopod 5 shorter than peraeopod 4. Basis shorter than one third as long as peraeopod 5, anterior margin slightly rounded, with six spines, posterior thin plate much expanded, rounded, its inner side finely pubescent. Anterior margin of ischium one third as long as anterior margin of basis, with three spines on distal half. Anterior margin of merus longer than one of ischium, with one medial spine and one distal spine, posterior margin gradually expanding proximally, distal extension triangular, reaching about proximal one third of carpus, with two minute setae. Carpus longer than merus, about half as broad as distal margin of the latter, slightly curved backward, anterodistal end with one pair of spines. Propod shorter than basis, narrower than carpus, anteromedial margin with one spine, posteromedial margin with one minute seta. Dactyl scimitar.

Pleopods: Pleopods developed, similar to each other, peduncle stout, shorter than rami, proximal segment of both rami pubescent in one row on posterior margin, proximal segment of outer ramus with only one medial bifid seta, swimming setae short.

Uropods: Uropod 1 extending beyond uropod 2, slender, peduncle equal to rami in length, both rami equal to each other in length, slender, tapered, both margins of both rami pectinate except for apical margin naked. Uropod 2 extending beyond uropod 3, slender, peduncle equal to outer ramus in length, pectinate on outer margin throughout, outer ramus about three fourths as long as inner ramus, both margins of both rami pectinate except for apical margin naked. Peduncle of uropod 3 equal to outer ramus in length, outer margin pectinate, prominently produced distally, acute, outer ramus two thirds as long as inner ramus, both margins of both rami pectinate except for apical margin naked.

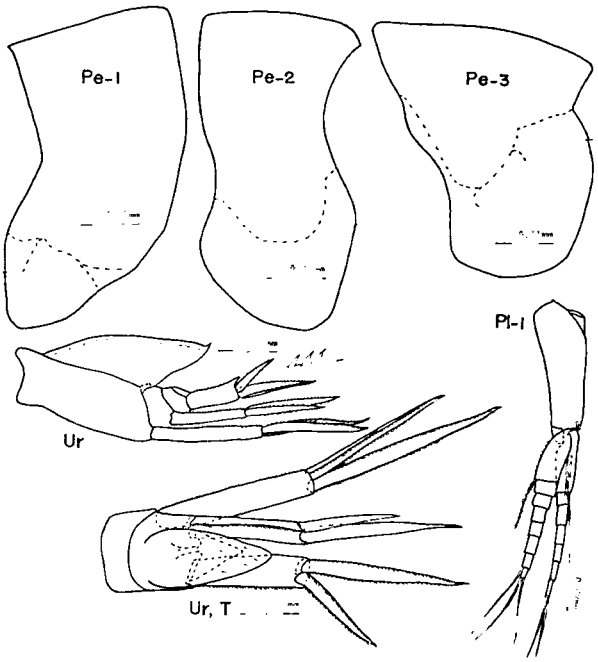

Fig. 28. *Terepeltopes dolichorhunia* sp. nov. Holotype, female, 2.75 mm.

Telson: Telson entire, elongate, long semioval, reaching proximal two thirds of peduncle of uropod 3, dorsodistal half with several minute setae.

Material examined. Holotype: Female, 2.75 mm. Type-locality: Shijiki Bay. Date: June, 1977. Paratype: 2 specimens. Collection No.: AMBL-Amph. 27.

Cyproidea

Cyproidea liodactyla Hirayama, 1978

C. liodactyla: Hirayama 1978b, p. 245–251.

Material examined: Tomioka Bay, Ariake Sea.

Gitanopsis

Key to the genera of *Gitanopsis*

1 Telson short ..... *G. breviculus*
Telson elongate 2
2 Basis of gnathopod 2 prominently extended posterodistally..... *G. robastodentes*
Basis of gnathopod 2 not extended posterodistally, its posterodistal end with one stout spine 3
3 Grasping margin of dactyl of gnathopod 2 smooth ..... *G. longus*
Grasping margin of dactyl of gnathopod 2 pectinate ..... *G. japonica*

Gitanopsis japonica sp. nov.

(Fig. 29–30)

Body: Head large, upper margin rounded, rostrum triangular, reaching distal end of peduncular segment 1 of antenna 1, roundly curved downward, superior antennal sinus deep, rounded, anterior head lobe broad, rounded, lower margin going down. Eyes large, placed on central part of lateral head. Peraeonites 1–4 narrow, equal to each other in width, peraeonite 5 a little wider than peraeonite 4, peraeonites 6–7 about twice as wide as peraeonite 4, the greater part of coxa 1 concealed by coxa 2, coxae 1–4 gradually deeper, coxa 4 deeper than peraeonite 4. Pleonites 1–3 wider than peraeonite 7, lower margin of pleonal epimeron 1 gradually going down, posterior margin slightly expanded medially, lower margin of pleonal epimeron 2 roundish, gradually going down, posterodistal end with one broad and

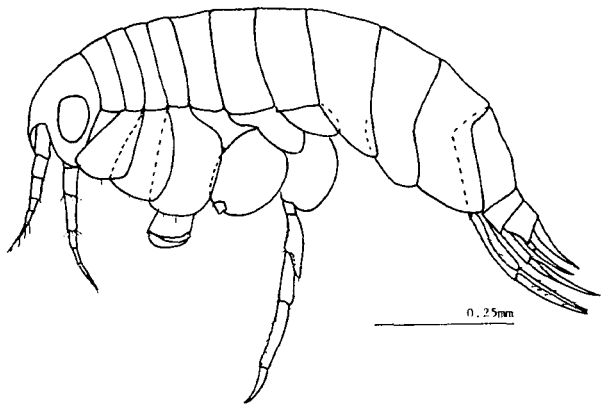

Fig. 29. *Gitanopsis japonica* sp. nov. Holotype, male (?), 1.25 mm.

acute tooth, posterior margin of pleonal epimeron 3 gently expanded medially, posterodistal margin rounded. Urosomite 1 far longer than pleonite 3, ventrodistal end with one acute tooth, urosomite 2 narrow, dorsal length of urosomite 3 as wide as one of urosomite 2, posterolateral margin gradually extending backward, ventrodistal end projected, with one small concavity.

Antennae: Both antennae short, subequal to each other in length, a few setose. Peduncle of antenna 1 seriously narrowing, peduncular segment 2 as long as peduncular segment 1, inner margin with two medial and distal spines, peduncular segment 3 shorter than peduncular segment 2, flagellum five articulate, gradually narrowing, proximal segment two thirds as long as peduncular segment 3, narrower than the latter. Peduncular segments 1–3 of antenna 2 short, rather broader, both distal ends of peduncular segment 3 projected, acute, peduncular segment 4 stout, peduncular segment 5 as long as peduncular segment 4, narrower than the latter, proximal segment of flagellum two thirds as long as peduncular segment 5, narrower than

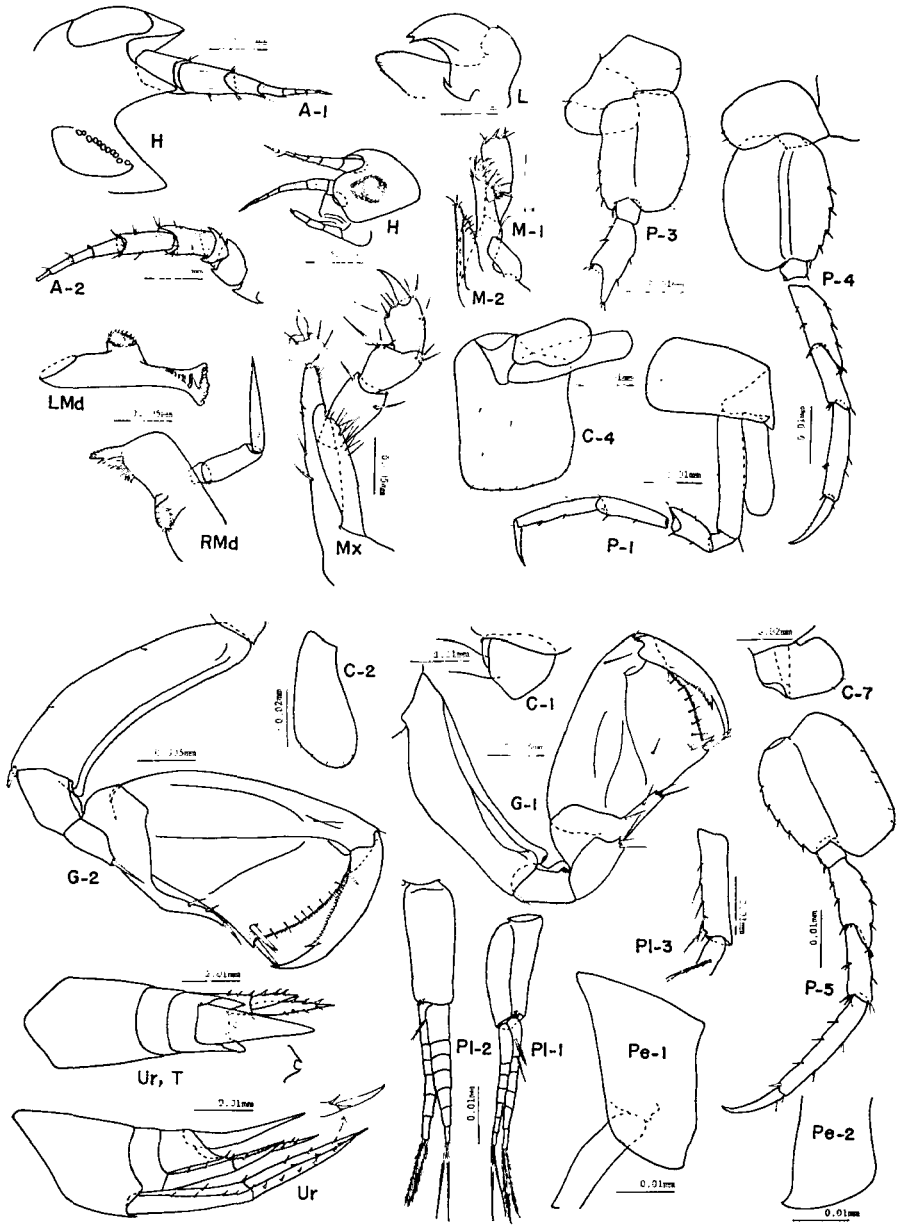

Fig. 30. *Gitanopsis japonica* sp. nov. Holotype, male (?), 1.25 mm.

the latter.

Mouthparts: Upper lip lost in dissection. Inner plate of lower lip developed, larger than outer plate, pubescent, outer plate curved outward, apical margin rounded, with two teeth, pubescent, mandibular process broken. Inner plate of maxilla 1 medium, oval, with one apical simple seta, outer plate with one comb-like tooth, six simple and serrate teeth, six stiff setae on inner margin and two pairs of long and short setae on outer margin, palp biarticulate, broad, proximal segment about half as long as terminal segment, apical margin of terminal segment braod, not smooth, with three teeth and three setae. Incisor of both mandibles developed, bluntly serrate, right mandible lacking lacinia mobilis, with nine accessory blades, on the other hand left mandible with lacinia mobilis serrated apically, with nine accessory blades, these accessory blades broad and serrated apically, gradually becoming smaller to proximal one, molar process prominently produced, cylindrical, distal margin serrate, rasp developed, palp of right mandible triarticulate, placed on upper level of molar process, proximal segment trapezioid, small, medial segment cylindrical, without any seta, terminal segment narrower than medial one, conical, tapered, with one longitudinal row of minute setae, left mandible lacking palp. Maxilliped weakly developed, apical margin on inner plate produced, with two spines on outer side, outer margin setose, outer plate truncate, apical margin finely serrate, with one seta and one foliaceous tooth serrated marginally, outer apical margin with several fine setae, inner margin with five setae, palp four articulate, proximal three segments not elongate, subequal to each other in length, distal end of proximal segment with one seta, outer distal margin with one seta, 2nd segment gradually expanding, inner distal end with four setae, outer distal end with three setae, width of 3rd segment about half as broad as distal margin of 2nd segment, inner half of distal end with four setae, outer margin with one medial seta and one distal pair of setae, dactyl shorter than 3rd segment, nail-like, placed on its distal end.

Gnathopod 1: Coxa 1 pentagonal, lower margin rounded. Basis shorter than half of gnathopod 1 in length, posteroproximal margin gently rounded, posterodistal end with one seta. Ischium short, longer than wide, anterodistal end roundly expanded. Merus as long as ischium, posterodistal end a little projected, acute, with three setae, the greater part of anterior margin covered with carpus. Carpus sectorial, posterodistal extension developed, reaching middle of posterior margin of propod, uniform in width, truncate, with two apical setae, else with two setae. Propod as long as basis, large, gradually widening, anterodistal margin with one seta and two distal setae, palm transverse, gently rounded a little, minutely pectinate, with seven setae throughout, with two posterodistal stout spines. Dactyl falcate, reaching posterodistal end of propod, proximal two thirds broad, serrate on grasping margin, these teeth gradually increasing in size, distal one third slender, scimitar, smooth on grasping margin.

Gnathopod 2: Coxa 2 gradually widening, lower margin rounded, with five minute setae. Gnathopod 2 very similar to gnathopod 1 in shape, larger than the

latter. Posterodistal end of basis with one stout spine. Merus semicylindrical, distal margin narrowed, truncate, apex with one stiff seta. Posterior extension of carpus slender, reaching two thirds of posterior margin of propod, with two medial and one apical stout setae. Palm and dactyl very similar to those of gnathopod 1.

Peraeopod 1: Coxa 3 rectangular, lower margin slightly roundish, with four minute setae on posterior half. Peraeopod 1 slender, uniform in width. Basis one third as long as peraeopod 1, anterior margin with one medial minute seta, posterodistal end with one small stiff seta. Ischium small, anterior margin half as long as posterior margin. Posterior margin of merus about one third as long as basis, with two medial and distal spines, anterior margin extended in triangle, with two medial and one apical spines. Carpus longer than half as long as basis, roundly produced distally, posterior margin with two medial and distal spines, anterodistal end with one seta. Propod two thirds as long as basis, anterior margin with two medial small and one distal setae, posterior margin with one medial spine, one medial set of one spine and one seta, and one distal locking spine. Dactyl scimitar, slender, two thirds as long as propod, posterior margin minutely pectinate.

Peraeopod 2: Coxa 4 rectangular, broad, posteroproximal margin largely expanded backward, slightly concave medially, lower margin and posterodistal half with several minute setae. Basis very similar to one of peareopod 1. Remainder parts lost.

Peraeopod 3: Coxa 5 bilobed, both lobes subequal to each other in size, anterior lobe roundish, posterior part of lower margin with one minute seta. Basis subrectangular, roundish, anterodistal half with one minute seta and four spines, produced distally, posterior margin with several minute setae. Ischium small, square. Anterior margin of merus about half as long as basis, with one spine, one pair of spines and one distal pair of spines, posterior margin gradually expanding and rounded proximally, with two medial spines, distal extension triangular, much developed, with three apical spines. Remainders lost.

Peraeopod 4: Coxa 6 bilobed, anterior lobe small, posterior lobe much expanded downward, subrectangular, lower margin roundish, with two minute setae. Basis oval, anterodistal half crenulate, with five spines, posterior margin with six minute setae. Ischium small, wider than long, anterodistal end with one small seta. Posterior margin of merus about half as long as basis, anterior margin gradually expanding and rounded proximally, with three medial spines, distal extension triangular, not reaching middle of carpus, with three apical spines. Carpus as long as posterior margin of merus, anterodistal end with one small stout seta, posterodistal end with one pair of spines. Propod one and half times as long as carpus, anteromedial margin with two small stout setae, posterior margin with one medial pair of spines and one distal locking spine. Dactyl scimitar, two thirds as long as propod, anterior margin finely pectinate.

Peraeopod 5: Coxa 7 small, expanded backward, posterior margin rounded. Basis not oval, rather rectangular, anterior margin slightly rounded, with six spines, posterior thin plate rectangular, broadly expanded throughout, with seven minute

setae on posterior margin, its distal end extending beyond ischium. Ischium small, square, anterodistal end with one spine. Anterior margin of merus longer than half of basis in length, with two medial spines and one distal pair of spines, posterior margin gradually expanding proximally, gently rounded throughout, distal expansion triangular, reaching one third of carpus, with three apical spines, else medial margin with three spines. Carpus longer than anterior margin of merus, anterior margin with one medial pair of spines and three spines on distal end, posterior margin with one medial small seta and one pair of setae on distal end. Propod subequal to merus and carpus combined in length, anterior margin with three spines and one locking spine, posterior margin with two medial pairs of setae and one distal seta. Dactyl about half as long as propod, scimitar, anterior margin finely pectinate.

Pleopods: Pleopods very similar to each other, peduncle shorter than rami, outer ramus six articulate, proximal segment with one bifid seta, inner ramus seven articulate, terminal swimming setae about half as long as rami.

Uropods: Uropod 1 extending far beyond uropod 2, peduncle equal to outer ramus in length, outer margin with five spines, inner margin with two spines, outer ramus slightly shorter than inner ramus, tapered, outer margin with five spines, inner ramus tapered, with three pairs of spines. Uropod 2 a little extending beyond telson, peduncle longer than outer ramus, but shorter than inner ramus, outer margin with three spines, inner margin with one apical spine, outer ramus foliaceous, tapered, longer than inner ramus, with three spines on outer margin, inner ramus tapered, with three spines on outer margin, with two spines on inner margin. Uropod 3 lost.

Telson: Telson lobate, elongate, triangular, apex blunt.

Material examined. Holotype: Male (?), 1.25 mm. Type-locality: Shijiki Bay. Date: June, 1977. Collection No.: AMBL-Amph. 33.

Remarks. The present species is closely related to *Gitanopsis vilordes* (J.L. Barnard 1962d) in the gnathopods, the telson and so on, but is clearly distinguished from it by the following points; (1) accessory flagellum uniarticulate, (2) anterior head lobe acute, (3) posterior extension of carpus of gnathopod 1 reaching three fourths of posterior margin of propod. Also, the present species differs from *G. vilordes* (Nagata 1965a) by the posterodistal end of basis of gnathopod 2 lacking spines.

Gitanopsis longus sp. nov.

(Fig. 31–32)

Body: Body small, oval. Head except for rostrum shorter than peraeonites 1–2 combined, distinctly deeper than dorsal length, rostrum decurved, inserted between both antennae 1, not beyond peduncular segment 1 of antenna 1, superior antennal sinus deeply concaved, anterior head lobe prominently produced, rounded distally, lacking inferior antennal sinus. Eyes very large, circular. Coxae 2–4

developed, gradually deeper and wider, coxa 1 small, the greater part concealed by coxa 2. Pleonites 1–3 subequal to each other in length, slightly longer than peraeonite 7, pleonal epimeron 1 extended backward, gradually narrowing a little, rounded on posterodistal margin, anterodistal margin with one spine, pleonal epimeron 2 wider than pleonal epimeron 1, expanded on posterodistal margin, lower margin gradually going up posterodistally, anterior and lower margins continuously rounded, with five spines, pleonal epimeron 3 subequal to pleonal epimeron 2 in width, slightly expanded backward, anterior and lower margins continuously rounded, with three spines. Urosome slender, urosomite 1 distinctly longer than pleonite 3, urosomite 2 narrow, urosomite 3 longer than urosomite 2, lateral expansion much developed, reaching middle of telson.

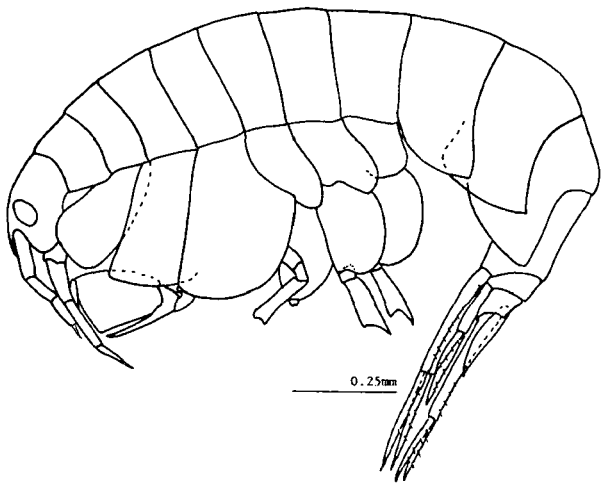

Fig. 31. *Gitanopsis longus* sp. nov. Holotype, female, 2.50 mm.

Antennae: Both antennae subequal to each other in length, about one fifth as long as body length. Peduncle of antenna 1 gradually and distinctly narrowing, especially peduncular segment 3 about two thirds as broad as peduncular segment 2, peduncular segment 2 with two transverse rows of four and five setae on upper medial margin, and five and six setae on both distal ends, peduncular segment 3 two thirds as long as peduncular segment 2, accessory flagellum uniarticulate, vestigial, with one apical pair of setae, main flagellum eight articulate, gradually narrowing, articles 3–7 with one or two distal aethetascs. Peduncular segment 1 of antenna 2 small, attached on ventral part of peduncular segment 2, peduncular segment 2 short, wider than long, gland cone developed, extended forward, triangular, peduncular segment 3 about as long as peduncular segment 2, prominently produced laterodistally, its extension rounded, with one pair of spines, peduncular segment 4 uniform in width, ventral margin with two sets of three spines, one pair of spines, and one spine, upper margin with one pair of spines, five spines and setae,

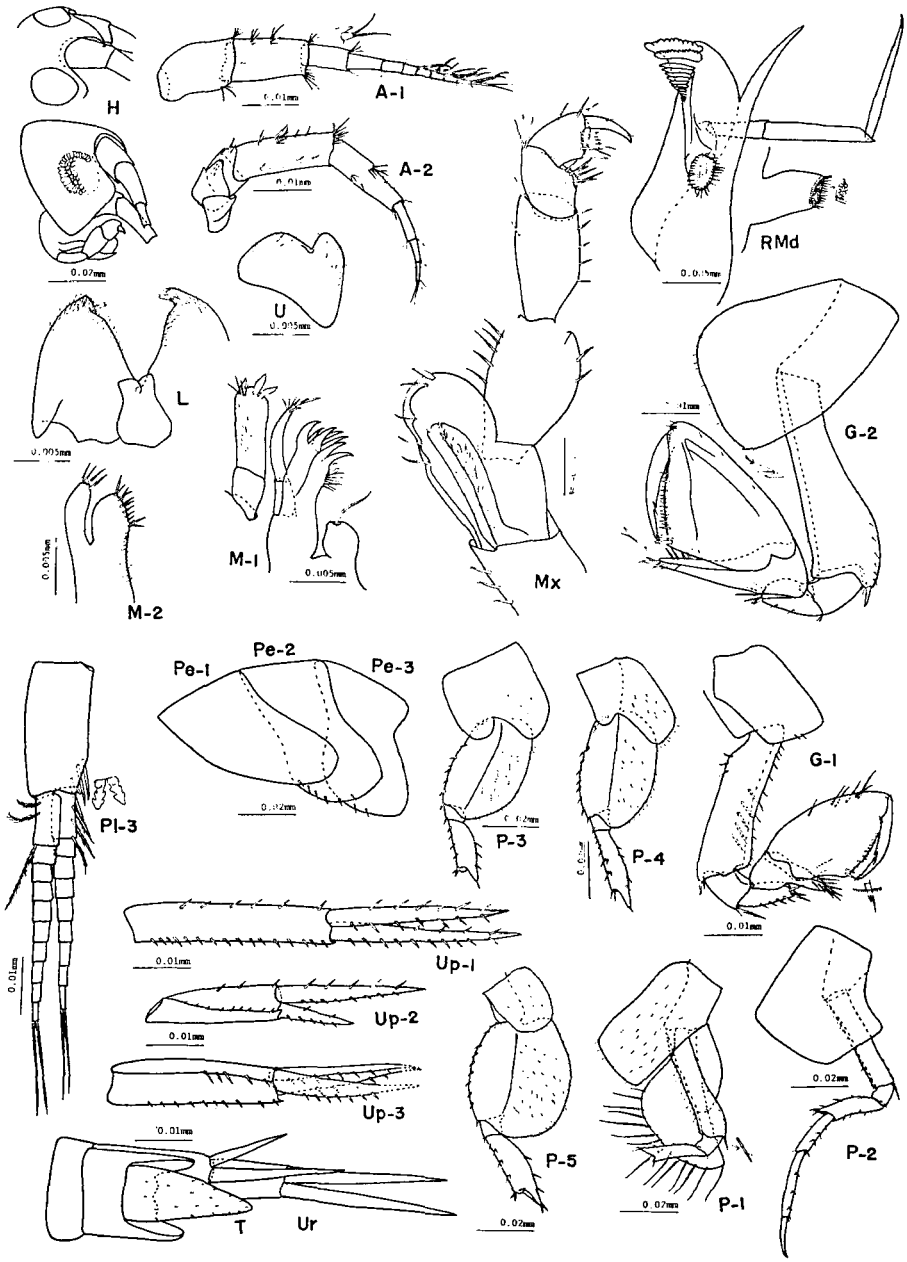

Fig. 32. *Gitanopsis longus* sp. nov. Holotype, female, 2.50 mm.

two single setae, and one distal set of six and one pinnate setae, peduncular segment 5 subequal to peduncular segment 4 in length, distal half distinctly narrowed, with several setae on proximal half, distal margin surrounded by setae, flagellum four articulate, gradually narrowing and shortening, terminal segment vestigial.

Mouthparts: Upper lip bilobed, asymmetric, densely pubescent apically. Inner lobes of lower lip small, coaleced except for apical part, each lobe of outer plate triangular, shoulders densely pubescent, produced inward, with four small teeth and one gland bifid tooth, mandibular process small. Inner plate of maxilla 1 medium, bulbous, with one apical simple seta, outer plate densely setose on inner distal margin, with seven large and five smaller teeth, three teeth unsegmented, palp biarticulate, extending far beyond outer plate, uniform in width, proximal segment about half as long as distal segment, distal segment dispersively pubescent on outer margin, rounded apically, apical margin with three spatulate teeth pectinated marginally and one row of four small setae. Both plates of maxilla 2 coalesced basally, inner plate broader than outer plate, rounded apically, distal part of inner margin with four pairs of stiff spines and three single stiff spines, remainder pubescent, outer plate a little extending beyond inner plate, apex rounded, with four spines. Both mandibles similar to each other, incisor broad, roundly serrate, lacinia mobilis similar to incisor, but smaller than the latter, accessory teeth thirteen, broad, but gradually narrowing, proximal teeth vestigial, molar process prominently produced, medium in size, cylindrical, truncate, with many marginal setae, molar rasp medium, lamina of distal margin lancinate, much developed, extending beyond body, palp placed to level of molar process, slender, triarticulate, geniculate between distal two segments, primary segment half as long as terminal segment, 2nd segment obliquely truncate, apical margin finely pectinate, terminal segment slightly longer than 2nd segment, attenuate, acute apically, finely bristly on distal two thirds. Inner plate of maxilliped medium, pubescent, apical margin rounded, with four conical teeth, outer plate extending beyond half of proximal segment of palp, broad, rounded, inner distal half with three setae, apical margin with one seta and one spatulate tooth, inner distal margin finely serrate, else ventral side with eight spines, palp four articulate, proximal segment broad, shorter than half as long as palp, inner margin with five spines, outer distal margin with two spines, 2nd segment about half as long as primary segment, inner distal end with six spines, outer distal end with three spines, 3rd segment narrower and shorter than 2nd segment, but broad, outer margin twice as long as inner margin, inner distal end surrounded by eight spines, outer distal margin with one spine and one pair of spines, dactyl attached to outer distal end of 3rd segment, as long as it, slender, falcate.

Gnathopod 1: Coxa 1 rectangular, half as large as coxa 2, lower margin with two medial small spines. Gnathopod 1 distinctly smaller than gnathopod 2. Basis about two thirds as long as gnathopod 1, compressed on posteroproximal margin, posteroproximal margin with three small spines, posterodistal end with one pair of spines, anterior margin with fourteen small setae on outer side and five long stout

spines on about half of inner side. Posterior margin of ischium twice as long as anterior margin, with one long spine and two small setae distally, about two thirds as broad as distal end of basis. Merus one and half times as long as ischium, extended posterodistally, truncate, anterior free margin very short, posterodistal two thirds with four spines, posterodistal end with one row of three spines. Carpus triangular, as long as ischium, posterodistal end much extending backward and forward beyond merus, reaching middle of posterior margin of propod, its lobe surrounded by ten spines. Propod three fourths as long as basis, gradually expanding on proximal half, anterior margin rounded, with three setae on each side of medial margin, posterior margin about two fifths as long as anterior margin, palm oblique, broad, roundish, defined by two spines, finely pectinate except for anterodistal margin, each side with seven or six small bifid spines. Dactyl long, reaching palmar defining spines, grasping margin with one medial tooth.

Gnathopod 2: Coxa 2 gradually increasing in width, extended forward, lower margin with many minute setae, with one posterodistal small tooth. Basis expanded backward on distal margin, its expansion with six small setae, posterodistal end distinctly produced, truncate, with two small setae and one stout spine. Ischium slightly curved, posterior visual margin one fourth as long as basis, twice as long as anterior margin, anterodistal end produced forward on inner side. Merus as long as ischium, decreasing in thickness, anterior free margin very short, posterior margin with two medial setae, distal end with one spine and five stiff setae. Carpus triangular, as long as merus, much extending beyond propod, its extension stout, truncate, a little beyond posterodistal end of propod, outer distal end with two spines, apex with one pair of spines, inner medial margin with six spines. Propod board, gradually expanding, anterior margin about twice as long as posterior margin, with three medial small and two distal small setae, palm almost transverse, broad, defined by one pair of stout spines, finely pectinate, with about eight bifid spines on each side. Dactyl reaching palmar defining spines, falcate, grasping margin with one medial tooth.

Peraeopod 1: Coxa 3 rectangular, one and half as deep as coxa 2, lower margin with eleven small setae and one posterodistal small tooth. Peraeopod 1 slender. Basis slightly expanded on posterodistal margin, posterodistal margin with seven small setae and one distal spine, both sides of anterior margin setose, these setae small. Ischium short, rectangular, slightly longer than wide, posterodistal end with one small seta. Merus half as long as basis, largely extended anterodistally, anterior margin with two small setae, three stiff setae and one apical set of two stiff and one small setae, posterior margin with four small setae and one apical spine. Carpus, propod and dactyl lost.

Peraeopod 2: Coxa 4 as deep as coxa 3, most expanded backward medially, the widest part twice as broad as coxa 3, upper half of posterior margin concaved in rectangle. Peraeopod 3 slender. Basis, ischium and merus similar to those of peraeopod 1, but anterodistal half of merus with two spines, and one apical set of one small seta and two spines, posterior margin with three small setae and two spines,

lacking apical spine. Carpus as long as posterior margin of merus, about two thirds as broad as the latter, anterior margin with four small setae, posterior margin with one spine and three pairs of spines. Propod one and half times as long as carpus, narrower than the latter, anterior margin with five small setae, posterior margin with four pairs of spines. Dactyl longer than half as long as propod, falcate.

Peraeopod 3: Coxa 5 bilobed, two thirds as deep as coxa 4, lower margin of anterior lobe rounded, posterior lobe distinctly deeper than anterior one, posterior margin rounded. Basis oval, much expanded posteriorly, anterior margin with eleven spines throughout, posterior thin plate rounded marginally, dispersively bristly, not producing beyond ischium, finely setose marginally. Ischium short, wider than long, anterodistal end with one spine. Carpus gradually expanding backward on proximal margin, prominently extended in triangle, anterior margin with four spines and one distal pair of spines, posterodistal half with three and one apical spines. Carpus, propod and dactyl lost.

Peraeopod 4: Coxa 6 similar to coxa 5, but anterior lobe smaller than one of coxa 5. Peraeopod 4 similar to peraeopod 3 except for number of spines. Anterior margin of basis with twelve spines. Anterior margin of merus with four single spines, two pairs of spines and one apical pair of spines, posterior margin with two proximal single, two distal single and one apical spines. Carpus, propod and dactyl lost.

Peraeopod 5: Coxa 7 small, rectangular, lower and posterior margins finely setose. Basis more expanded backward than one of peraeopod 4, extending beyond ischium, anterior margin with twelve spines, posterior thin plate dispersively bristly, finely setose marginally. Ischium rectangular, wider than long, anteroditsal end with one spine and two fine setae. Merus similar to one of peraeopod 4, anterior margin with one spine, three pairs of spines and one apical pair of spines, posterior margin with three single spines and one apical pair of spines, posterior margin with three single spines and one apical pair of spines. Carpus, propod and dactyl lost.

Pleopods: Pleopods similar to each other. Peduncle of pleopod 3 stout, longer than half as long as rami, inner distal end with three long spines and one pair of coupling spines, outer ramus ten articulate, proximal segment about one fourth as long as outer ramus, outer margin with two proximal pinnate and one distal pinnate setae, inner ramus nine articulate, proximal segment slightly shorter than one of outer ramus, inner margin with two bifid and one normal pinnate setae, terminal swimming setae two fifths as long as rami.

Uropods: Uropod 1 not extending beyond uropod 3, peduncle subequal to rami in length, with sixteen spines on outer margin and six spines on inner margin, rami attenuate, equal to each other in length, apices acute, outer ramus with twelve spines on outer margin and four spines on inner distal half, inner ramus with seven spines on outer margin and six spines on inner margin. Uropod 2 two thirds as long as uropod 1, peduncle shorter than inner ramus, with nine spines on outer margin and three spines on inner margin, both rami attenuate, apices acute, outer ramus half as long as inner ramus, with five spines on outer margin and two spines

on inner margin, inner ramus with eight spines on outer margin and five spines on inner margin. Uropod 3 four fifths as long as uropod 1, peduncle as long as rami, outer margin with ten spines on outer margin and five spines on inner margin, rami equal to each other in length, attenuate, apices acute, outer ramus with five spines on outer margin and eight spines on inner margin, inner ramus with seven spines on outer margin.

Telson: Telson entire, triangular, shorter than half as long as uropod 3, distinctly longer than twice as long as proximal width, dispersively setose, apex rounded.

Material examined. Holotype: Female, 2.50 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 8 specimens. Collection No.: AMBL-Amph. 83.

Remarks. The present species is closely related to *Gitanopsis vilordes* (J.L. Barnard 1962d) and *G. japonica* sp. nov., but is distinguished from them by the posterior extension of carpus on the gnathopod 2 extending beyond the posterior margin of propod.

Gitanopsis breviculus sp. nov.

(Fig. 33–34)

Body: External appearance very similar to *Gitanopsis longus* sp. nov.. Eyes medium, circular. Pleonal epimerons very similar to those of *G. longus* sp. nov., but anterior margin of pleonal epimeron 1 with two spines, anterior margin and anterior half of lower margin on pleonal epimeron 2 with five spines, pleonal epimeron 3 lacking spine. Urosome slender, ventrolateral side of urosomite with one spine.

Antennae: Antennae short, about one fifth as long as body length, subequal to each other in length. Peduncle of antenna 1 gradually narrowing, peduncular segment 1 extended ventrodistally, peduncular segment 2 subequal to peduncular segment 1 in length, peduncular segment 3 two thirds as long as peduncular segment 2, accessory flagellum uniarticulate, vestigial, with two apical small setae, main flagellum six articulate, gradually decreasing in thickness and length except for terminal segment, terminal segment very slender, distinctly longer than last second segment, each of articles 2–5 with one pair of aethetascs on distal end. Peduncle of antenna 2 shortened in comparison with those of *G. longus* sp. nov., peduncular segment 1 scale-like, attaching on ventral margin of peduncular segment 2, peduncular segment 2 rectangular, gland cone stout, but short, peduncular segment 3 wider than long, anteromedial margin with one pair of small spines, peduncular segment 4 narrower than peduncular segment 3, with one transverse row of three or four setae on both medial margins, both distal ends with several setae, peduncular segment 5 as long as peduncular segment 4, narrower than the latter, with one transverse row of four setae on both medial margins, with several setae on both distal ends, flagellum five articulate, gradually shortening and narrowing except for terminal segment.

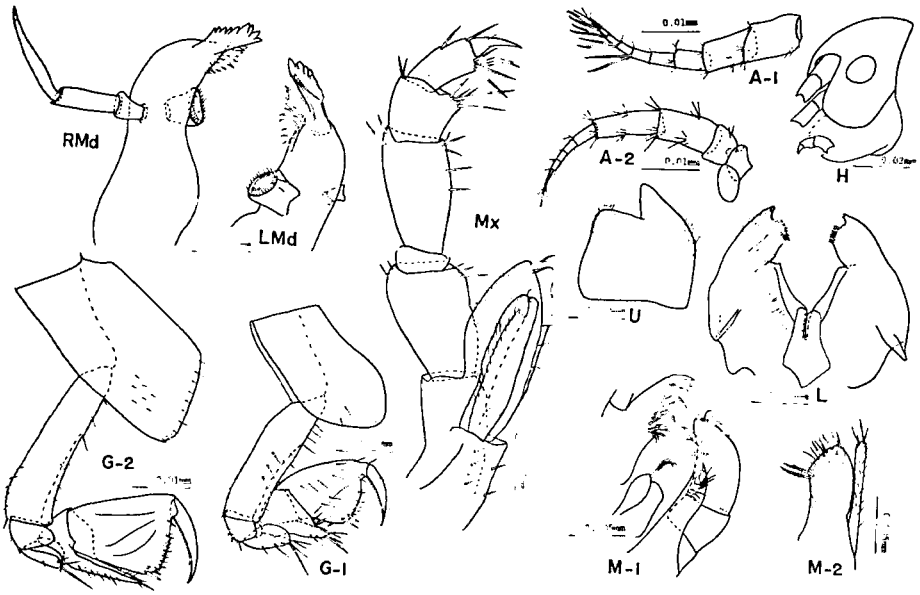

Fig. 33. *Gitanopsis breviculus* sp. nov. Holotype, female, 2.25 mm.

Mouthparts: Upper lip similar to one of *G. longus* sp. nov., lateral margin densely bristly. Inner plate of lower lip small, coaleced, but distal part divided by deep cleft, distal part of outer plate produced inward, broad, obliquely truncate, densely bristly, with one distal stout and blunt protuberance and eight small bifid teeth, mandibular process small, weakly developed. Inner plate of maxilla 1 medium, apex rounded, with one seta pubescent on distal half, outer plate with thirteen stout setae in rows, three bifid and four simple teeth, palp biarticulate, broad, extending beyond outer plate, gently curved, proximal segment about half as long as distal segment, wider than long, apex of distal segment rounded, with four conical teeth and one short simple seta. Outer plate of maxilla 2 slender, bristly, apex rounded, with four setae, inner plate broad, bristly, apical margin with one pair of pinnate setae on inner distal end and eight simple setae. In left mandible, incisor prominently produced inward, inner half of apical margin serrate, outer half with six teeth, lacinia mobilis smaller than incisor, serrate apically, accessory teeth eleven, sword-formed, gradually decreasing in size, serrate apically, molar process medium in size, but prominently produced, cylindrical, ridged apically, apical margin surrounded by setae, molar rasp medium, palp placed to level of molar process, slender, distinctly shorter than one of *G. longus* sp. nov., triarticulate, proximal segment short, trapedium, article 2 two thirds as long as distal segment, with one apical small tooth, distal segment attenuate, acute apically, with one longitudinal row of minute setae. Right mandible very similar to left mandible except for incisor lacking finely serrate part, with nine teeth, lacinia mobilis absent, accessory teeth ten. Maxilliped very similar to one of *G. longus* sp. nov.

Gnathopod 1: Coxa 1 shallower than coxa 2, lower margin rounded. Basis about two fifths as long as gnathopod 1, both sides of anterior margin with several short setae, posterodistal margin with two minute and one distal setae, else inner medial margin with one longitudinal row of three spines. Ischium rectangular, short, posterior margin longer than wide, with two medial spines and one distal set of one minute and one stiff setae. Merus semicylindrical, one and half times as long as ischium, anterior free margin short, posterior margin with one, two, one and four apical setae in formula. Carpus triangular, as long as posterior margin of merus, expanded and extended posterodistally, its extension stout, beyond middle of posterior margin of propod, rounded apically, with several stiff setae. Propod two thirds as long as basis, broad, gradually increasing in width, anterior margin twice as long as posterior margin, anterior submargin with one longitudinal row of seven setae, palm transverse, roundish, defined by two spines, finely serrate except for anterior margin, with five bifid spines and one simple seta. Dactyl fitting on palm, falcate, with one tooth near apex, pectinate from proximal margin to the tooth.

Gnathopod 2: Coxa 2 rectangular, not extended forward, lower margin oblique, with eleven minute setae and one anterodistal small tooth. Gnathopod 2 a little larger than gnathopod 1. Basis about two fifths as long as gnathopod 2, slightly expanded backward on distal margin, its posterodistal margin with four small setae and one seta on distal end, anterior margin with several small setae. Ischium short, expanded forward on outer anterodistal margin, wider than long, posterior margin rounded, with one medial small seta and one distal spine. Merus one and half times as long as ischium, semicylindrical, truncate, anterior free margin very short, posteromedial margin with one spine, distal margin with two spines on outer side and three stiff setae on inner side. Carpus triangular, as long as merus, posterodistal extension stout, attenuate, apex blunt, not reaching palmar defining spines, its posterior margin with two opposite rows of three and four setae, apex with three setae, its inner margin with two setae on outer distal margin and three minute setae on inner distal half. Propod about two thirds as long as basis, gradually increasing in width, posterior margin three fourths as long as anterior margin, palm defined by two stout spines, transverse, distinctly serrate except for anterior smooth margin, posterodistal angle rounded, anteroproximal margin with one pair of stiff setae, serrate margin with seven small spines on outer side and four small spines on inner side. Dactyl fitting on palm, falcate, grasping margin with one spine-like tooth near apex, distinctly pectinate to the distal tooth.

Peraeopod 1: Coxa 3 deeper than coxa 2, rectangular, lower margin with seven minute setae and one posterodistal small tooth. Basis slender, anterior margin with nine small setae armed with one distal minute seta, posterodistal margin with two minute setae and one distal pair of setae armed with one distal minute seta. Ischium short, longer than wide, posterior margin twice as long as anterior margin. Merus compressed anteroproximally, extended forward anterodistally, anterior margin with one seta, one pair of one spine and one seta, one spine, and one apical

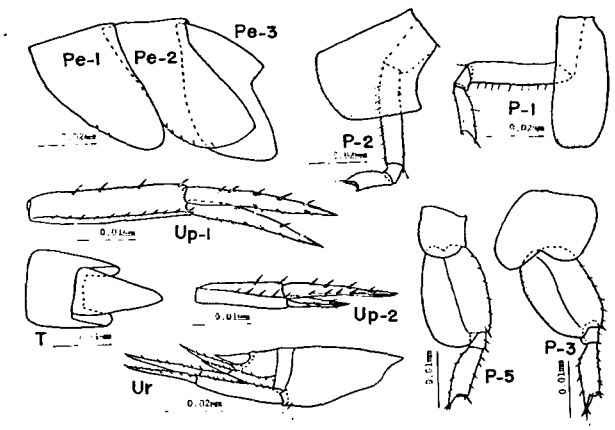

Fig. 34. *Gitanopsis breviculus* sp. nov. Holotype, female, 2.25 mm.

pair of spine and one seta, posterior margin with three minute setae. Carpus, propod and dactyl lost.

Peraeopod 2: Coxa 4 as deep as coxa 3, most expanded backward at posteroproximal one third, its margin gently concave, lower margin with ten minute setae. Peraeopod 2 similar to peraeopod 1.

Peraeopod 3: Coxa 5 bilobed, posterior lobe equal to anterior one in width, but deeper than the latter, rounded on lower margin. Basis long oval, anterior margin with seven single spines and one distal set of two spines and one minute seta, posterior thin plate broadly expanded, extending beyond middle of ischium, with many marginal minute setae. Ischium rectangular, wider than long, anterior margin with two medial and distal spines. Merus compressed posteroproximally, prominently extended posterodistally, longer than half as long as basis, anterior margin with three single spines and two pairs of spines, posterior margin with four spines and one apical set of three spines.

Peraeopod 4: Peraeopod 4 lost.

Peraeopod 5: Coxa 7 small, subsquare, lower margin rounded. Peraeopod 5 very similar to peraeopod 3. Basis more expanded distally, extending beyond ischium. Ischium square, short, anterior margin with two medial and distal spines. Merus with four single spines and one distal pair of spines on anterior margin, with four single spines and one apical set of three spines on posterior margin.

Uropods: Uropod 1 extending far beyond uropod 2, equal to inner ramus in length, with eleven spines on outer margin and four spines on inner margin, both rami attenuate, acute apically, outer ramus a little shorter than inner ramus, with seven spines on outer margin and four spines on inner margin, inner ramus with four spines on outer margin and five spines on inner margin. Uropod 2 two thirds as long as uropod 1, peduncle shorter than inner ramus, with five spines on outer margin and two spines on inner margin, both rami attenuate, acute apically, outer ramus longer than half as long as inner ramus, with three spines on outer margin

and one spine near apex of inner margin, inner ramus with five spines on outer margin and four spines on inner margin. Uropod 3 lost.

Telson: Telson triangular, rounded apically, as long as peduncle of uropod 2, distinctly shorter than twice as long as proximal width.

Material examined. Holotype: Female, 2.25 mm. Type-licaloty: Tomioka Bay. Date: May, 1978. Collection No.: AMBL-Amph. 85.

Remarks. The present species is closely related to *Gitanopsis pele* (J.L. Barnard 1970b) in the gnathopods, the maxilla 2, the telson and so on, but differs from it in the pleonal epimerons 1–2 with one small posteroventral tooth, the shoulders of lower lip with only two stout teeth and the subsymmetrical upper lip.

Gitanopsis robastodentes sp. nov.

(Fig. 35)

Body: External appearance very similar to *Gitanopsis longus* sp. nov. Eyes very large, circular. Pleonal epimerons 1–3 similar to those of *G. longus* sp. nov., but posterodistal end of pleonal epimeron 3 with one small blunt tooth. Urosome very similar to those of *G. longus* sp. nov., but both ventral outer sides of urosomite 1 with three spines respectively.

Antennae: Antennae 1–2 subequal to each other in length, about one fifth as long as body length, similar to those of *G. longus* sp. nov. Peduncular segment 1 of antenna 1 produced dorsodistally, its extension crenulate apically, with several setae, peduncular segment 2 with one medial seta and several distal setae, accessory flagellum uniarticulate, vestigial, with three apical setae, main flagellum six articulate, proximal segment slightly shorter than peduncular segment 3, distal end of articles 2–5 with one pair of aesthetascs, terminal segment narrow, not short, with three apical setae. Antenna 2 similar to one of *G. longus* sp. nov., but less setose, distal end of peduncular segment 5 produced, flagellum five articulate.

Mouthparts: Upper lip similar to one of *G. longus* sp. nov., asymmetrical. Lower lip very similar to one of *G. longus* sp. nov., shoulders with one gland cone and one more stout tooth. Maxilla 1 very similar to one of *G. longus* sp. nov., apical setae of inner plate with one pinnate seta, inner distal margin of outer plate with one row of five setae, apical margin with five slender teeth and seven stout teeth, these teeth not articulate, apical margin of palpal article 2 with three spatulate teeth pectinated marginally, one stout seta and one row of three slender setae. Maxilla 2 more deeply cleft than one of *G. longus* sp. nov., bristly, inner plate with two proximal stout setae, one distal stout seta, three pairs of slender setae and one slender seta, these stout setae armed with several setae. Mandibles very similar to those of *G. longus* sp. nov. except for proximal segment of palp prominently produced on upper distal end. Maxilliped similar to one of *G. longus* sp. nov., inner plate densely bristly, with four conical teeth, outer plate densely bristly, inner medial

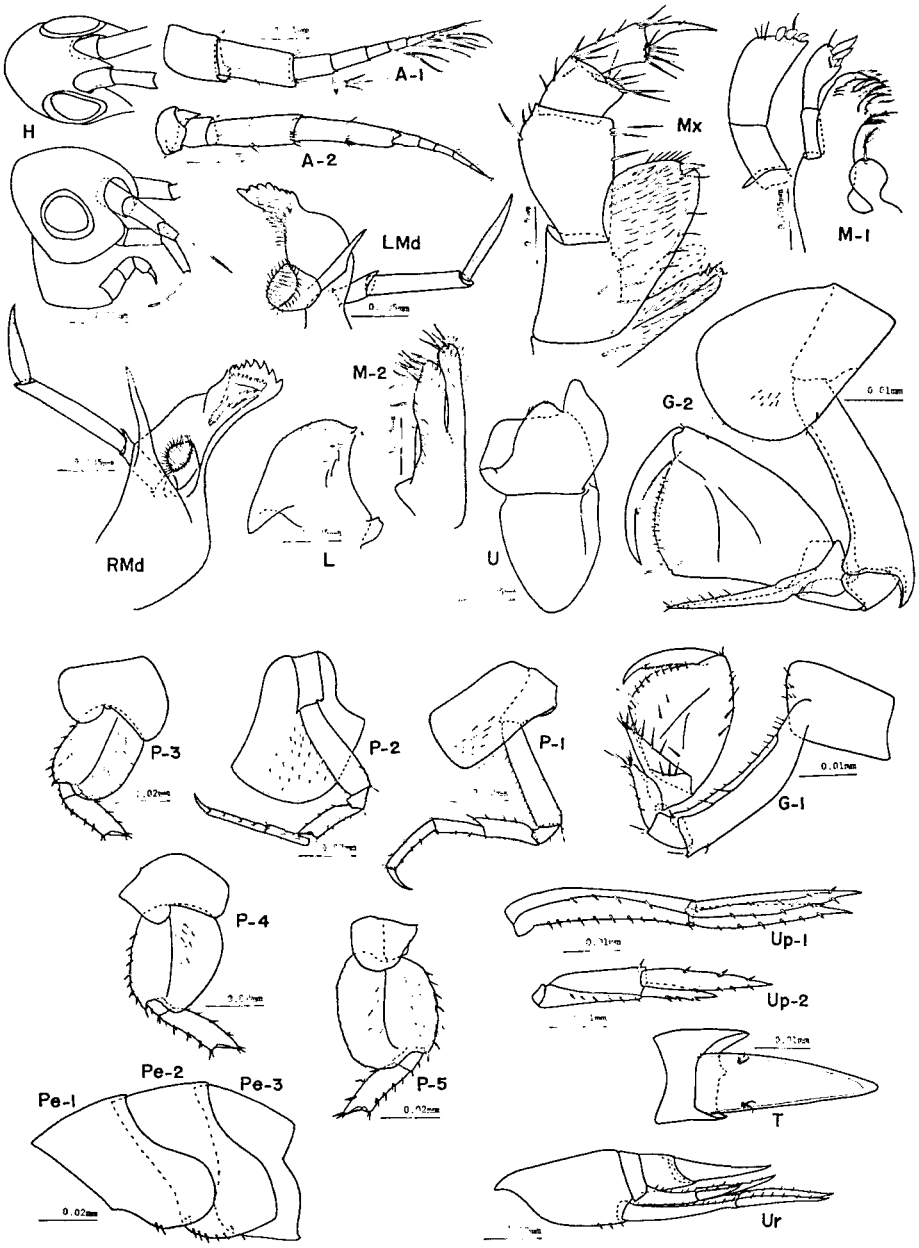

Fig. 35. *Gitanopsis robastodentes* sp. nov. Holotype, female, 2.75 mm.

margin with four setae, inner distal margin finely pectinate, with one seta and one spatulate tooth, apical margin with seven small setae. Dactyl more stout than one of *G. longus* sp. nov.

Gnathopod 1: Coxa 1 rectangular, small, the greater part concealed by coxa 2, lower margin with one single spine and two rows of three spines. Gnathopod 1 very similar to *G. longus* sp. nov. Outer margin of basis with several small spines and six small setae, inner distal margin with two setae, posterodistal end with one stiff seta. Posterodistal end of ischium with one stiff and three small setae. Merus one and half times as long as ischium, attenuate and truncate, posterior margin with four setae, apex with six stiff setae. Carpus triangular, extending along propod to about distal one third of posterior margin of propod, posterior half of inner distal end and posterodistal end with ten stiff setae, else inner side with one row of three stiff setae. Propod broad, gradually widening, anterior margin roundish, with one longitudinal row of five stiff setae, and one distal seta, posterior margin half as long as anterior margin, almost straight, palm oblique, more rounded than one of *G. longus* sp. nov., defined by one pair of long and short spines, finely serrate, with eight small spines on inner side and one spine on outer side. Dactyl reaching palmar defining spines, falcate, grasping margin with one tooth at about proximal two thirds, its proximal two thirds and tooth serrate.

Gnathopod 2: Coxa 2 gradually expanding forward, lower margin rounded, with ten minute setae, posterodistal margin with ten spines. Basis expanded anterodistally, extended posterodistally, posterodistal extension stout, falcate, reaching about middle of ischium, with three minute setae on anterior margin. Ischium gradually extending on anterior margin, posterior margin as long as the widest part, twice as long as anterior margin. Merus one and half times as long as ischium, inner distal end with three stiff setae. Carpus triangular, posterior extension attenuate, slender, reaching palmar defining spines, acute apically, outer distal half with six setae, inner distal half with three setae. Propod slightly shorter than basis, broad, gradually expanding, posterior margin two thirds as long as anterior margin, palm transverse, roundish, defined by one pair of long and short spines, finely serrate, with seven small setae on outer side and thirteen setae on inner side. Dactyl falcate, reaching palmar defining spines, with one medial tooth, serrated to the tooth.

Peraeopod 1: Coxa 3 rectangular, lower margin with one fine seta, posterodistal margin with four small setae. Basis about three eighths as long as peraeopod 1, anterior margin with many short setae, posterodistal half with several small setae, its distal end with one stiff and one small setae. Ischium short, posterior margin three times as long as anterior margin, twice as long as wide, with two medial and distal setae. Merus half as long as basis, expanded and extended posteriorly, anterior margin with one small seta, two pairs of short setae, one seta and one apical pair of setae, posterior margin with seven small and one apical more stout setae. Carpus about half as long as basis, anterior margin with one seta and one distal pair of setae, posterior margin with one set of two spines and one seta, and one distal

pair of spines. Propod two thirds as long as basis, narrower than carpus, anterodistal half with three pairs of small setae, posterior margin with four pairs of small spines. Dactyl half as long as propod, falcate.

Peraeopod 2: Coxa 4 deeper than coxa 3, most expanded backward at proximal one third, proximal one third rectangular, posterodistal margin rounded, lower margin with many fine setae. Peraeopod 2 very similar to peraeopod 1.

Peraeopod 3: Coxa 5 bilobed, lower margin of anterior lobe rounded, posterior lobe deeper than anterior lobe, posterior margin of posterior lobe rounded, anterior margin slightly concave. Basis oval, winged, anterior margin with eight spines, posterior thin plate produced and rounded distally, with several minute setae, else inner side with several setae. Ischium short, rectangular, anterior margin twice as long as posterior margin, as broad as distal width, with three spines. Merus compressed posteroproximally, extended distally, anterior margin two thirds as long as basis, with one spine, one pair of spines, one spine and three pairs of spines, posterior margin with four single spines and one apical set of three spines. Carpus, propod and dactyl lost.

Peraeopod 4: Coxa 6 similar to coxa 5, but smaller than the latter. Peraeopod 4 very similar to peraeopod 3. Posterior thin plate of basis more produced and a little narrower distally than one of peraeopod 3, anterior margin with nine spines. Ischium with two medial and distal spines. Anterior margin of merus with one spine and four pairs of spines, posterior margin with three single spines, one pair of spines and one apical set of three spines. Carpus, propod and dactyl lost.

Peraeopod 5: Coxa 7 small, semicircular. Peraeopod 5 similar to peraeopod 4, but larger than the latter. Basis more expanded backward and extended than one of peraeopod 4, anterior margin with eight spines, posterior margin finely serrate, with many fine setae, inner side with spines and setae. Ischium short, longer than wide, anterior margin with two medial and distal spines. Anterior margin of merus with one single spine and four pairs of spines, posterior margin with four spines and one apical set of three spines.

Uropods: Uropod 1 slender, extending far beyond uropod 2, peduncle as long as inner ramus, outer margin with ten spines and one apical spine, inner margin with four and one apical spines, both rami attenuate, acute apically, outer ramus slightly shorter than inner ramus, with six spines on outer margin and three spines on inner margin, inner ramus with five pairs of spines. Uropod 2 two thirds as long as uropod 1, peduncle slightly shorter than inner ramus, with six spines on outer margin and one inner apical spine, rami attenuate, acute apically, outer ramus longer than half as long as inner ramus, with three spines on outer margin and one spine on inner distal margin, inner ramus with four spines on outer margin and three spines on inner margin. Uropod 3 lost.

Telson: Telson triangular, elongate, reaching apex of uropod 2, three times as long as proximal width, apex rounded, both proximal margins with one pair of small setae respectively.

Material examined. Holotype: Female, 2.75 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 8 specimens. Collection No.: AMBL-Amph. 84.

Remarks. The new species is similar to *Gitanopsis vilordes* (J.L. Barnard 1962d) and other Japanese *Gitanopsis* spp. with the elongate telson, but distinctly differs from them by the posterodistal end of basis of gnathopod 1 with one stout tooth instead of spine.

Anamixidae

Paranamixis

Paranamixis aberro sp. nov.

(Fig. 36–37)

Body: Body normal in external appearance, but gnathopod 1 and coxa 1 absent, on the other hand coxa 2 and gnathopod 2 much developed, coxa 2 expanded forward to middle of head. Head triangular, anterodistal margin produced forward, with partition between both antennae 1, anterior and lower margins continuously rounded, with one shallow concavity medially. Eyes medium, circular, placed on central part of lateral head. Peraeonites 1–5 seriously deeper, peraeonites 5–7 equal to each other in size, pleonal epimeron 1 rounded, anterior part

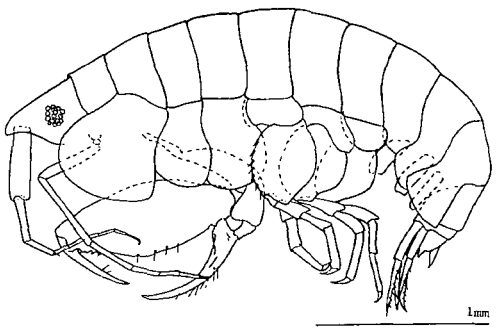

Fig. 36. *Paranamixis aberro* sp. nov. Holotype, male, 4.0 mm.

of pleonal epimeron 2 rounded, slightly expanded forward, posterior margin straight, with small blunt tooth on distal angle, pleonal epimeron 3 very similar to pleonal epimeron 2, but posterodistal tooth larger and more blunt than one of the latter, Urosome longer than pleonite 3, posterodistal end of urosomite 1 with one spine, urosomite 2 short, dorsal length of urosomite 3 short, lateral sides much expanded backward, scoop-like.

Antennae: Both antennae subequal to each other in length, shorter than half as long as body length. Antenna 1 attaching on dorsodistal extension of head, geniculated to head, peduncular segment 1 stout, subequal to head length, lower

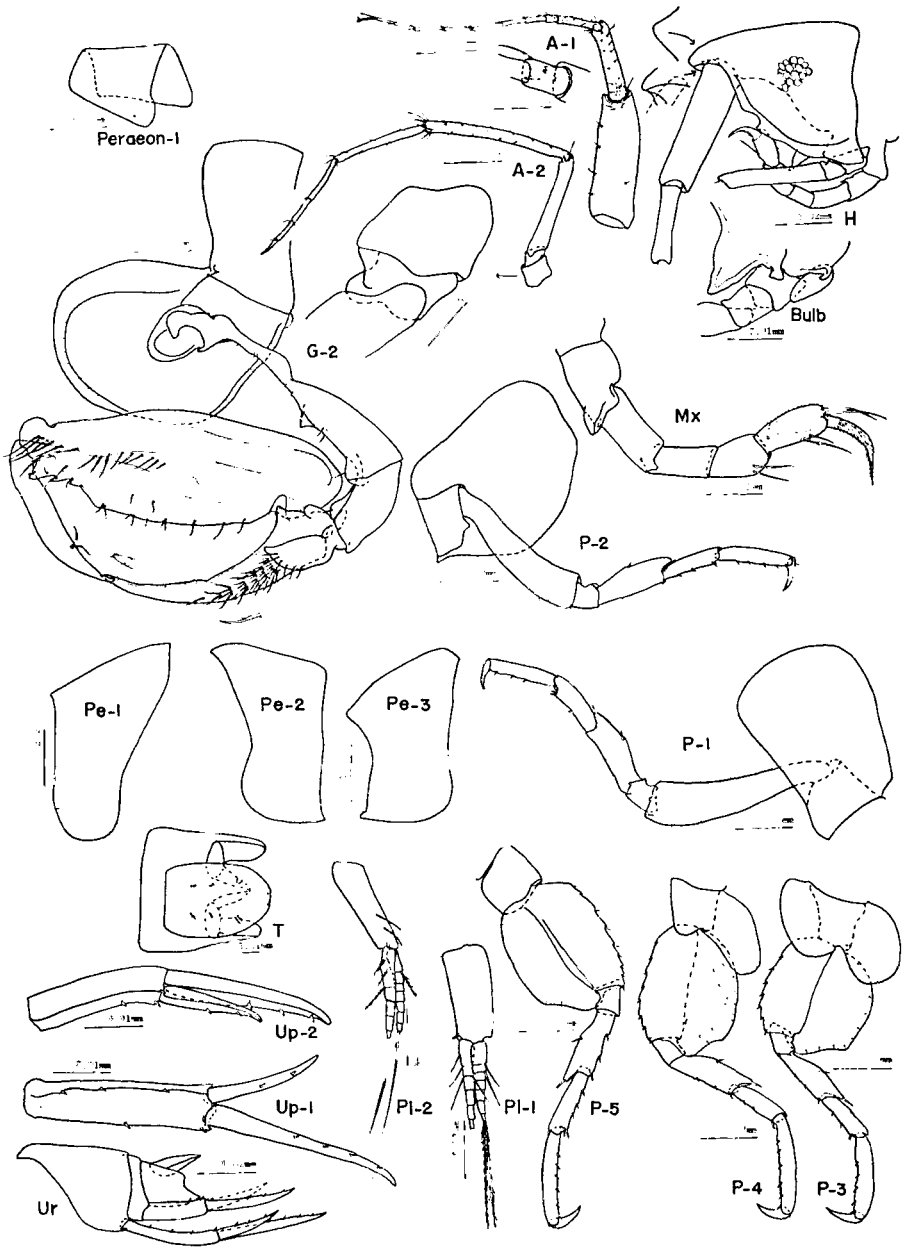

Fig. 37. *Paranamixis aberro* sp. nov. Holotype, male, 4.0 mm.

margin with four small setae in one row, distal end with several simple and small pinnate setae, peduncular segment 2 two thirds as long as peduncular segment 1, distinctly narrower than the latter, with many setae around, peduncular segment 3 two thirds as long as peduncular segment 2, distinctly narrower than the latter, with several setae around, accessory flagellum uniarticulate, small, with one apical pair of setae. Peduncular segments 1–2 of antenna 2 small, wider than long, peduncular segment 3 slender, anterodistal end produced, with one pair of setae, peduncular segment 4 one and half times as long as peduncular segment 3, slenderer than the latter, geniculate, with several setae around, peduncular segment 5 as long as peduncular segment 3, slenderer than peduncular segment 4, flagellum four articulate, proximal article about half as long as peduncular segment 5.

Mouthparts: Mouthparts consisting of oval balb, triangular keel and maxilliped. Maxilliped slender, inner plate very small, outer plate vestigial, palp four articulate, proximal three segments subequal to each other in length, proximal segment uniform in width, distal margin of 2nd segment dilated, with one pair of setae, 3rd segment roundish, upper margin densely bristly, with one distal pair of setae, ventrodistal half with three setae, dactyl longer than 3rd segment, about half as thick as the latter, largely curved medially, tapered, densely bristly.

Gnathopod 1: Coxa 1 and gnathopod 1 absent.

Gnathopod 2: Coxa 2 largely expanded forward, rounded, smooth marginally, lower margin setose. Basis gradually expanding, proximal half feeble, anteromedial margin with thin triangular protrusion, anterodistal end expanded, rounded, anterior margin with several small setae. Ischium stout, posterior margin about half as long as basis, twice as long as anterior margin, anterodistal end expanded, with one spine. Merus smaller than ischium, scale-like, attaching to posteroproximal part of carpus, distal margin with one row of six small setae. Carpus scimitar, extending far beyond middle of propod, completely overlapping distal part of dactyl, proximal part stout, posteromedial margin with nine, seven, one, six, four, two and one setae in rows in formula, each seta with one medial spine. Propod very large, as long as peraeonites 1–4 combined, anteroproximal margin expanded backward, fitting on ischium, rounded, inner distal half with one row of sixteen short setae, posterodistal margin with three teeth gradually increasing in size, with several setae, else posterior margin with four single setae and three pairs of setae, palm undefined. Dactyl developed, scimitar, grasping margin with one medial pair of setae.

Peraeopod 1: Coxa 3 rectangular, lower margin rounded. Basis shorter than half of peraeopod 1, gradually expanding a little, anterior and posterodistal margins with several minute setae. Ischium short, longer than wide. Posterior margin of merus shorter than half of basis in length, straight, with four minute setae, anterior margin gradually expanding proximally, rounded, with one medial spine, anterodistal expansion triangular, with one apical spine. Carpus shorter than posterior margin of merus, posterior margin with one medial spine and one distal pair of spines, anterior margin roundish. Propod as long as posterior margin of merus,

roundish, anterodistal half with three spines and one locking spines. Dactyl small, falcate, geniculate.

Peraeopod 2: Coxa 4 larger than coxa 3, anterior margin straight, lower and posterior margins continuously rounded. Peraeopod 2 very similar to peraeopod 1, posterior margin of carpus with two medial spines and one distal pair of spines, posterior margin of propod with five spines.

Peraeopods 3–5: Coxa 5 bilobed, both lobes subequal to each other in size, rounded. Coxa 6 bilobed, posterior lobe semioval, extended backward and downward to about twice of anterior lobe in width and depth. Coxa 7 subrectangular. Peraeopods 3–5 shorter than peraeopod 1, very similar to each other, but basis of peraeopod 5 slenderer than one of peraeopods 3–4. Basis oval, distal margin of thin plate obliquely cut down, not rounded, posterior margin with many minute setae, anterior margin with seven spines in peraeopod 3, eight spines in peraeopod 4 and nine spines in peraeopod 5. Remainders very similar to those of peraeopod 2, but anterior margin of merus with three spines, posteromedial margin of carpus with two spines in peraeopods 3–4 and three spines in peraeopod 5, posterodistal end with one pair of spines, posterior margin of propod with five spines and one locking spine in peraeopods 4–5.

Pleopods: Pleopods very similar to each other, peduncle stout, rami shorter than peduncle, outer ramus five articulate, inner ramus seven articulate, proximal segment of outer ramus on only peraeopod 3 with one bifid seta, terminal swimming setae longer than rami.

Uropods: Uropod 1 extending beyond uropod 2, peduncle shorter than inner ramus, outer margin with four small conical spines, inner margin with two medial and distal conical spines, outer ramus subequal to half of inner ramus in length, tapered, with two medial small spines, apex blunt. Peduncle of uropod 2 medium between both rami in length, outer distal half with two medial and apical spines, inner distal end with one spine, outer ramus longer than half as long as inner ramus, tapered, with two spines on distal half, apex blunt, inner ramus tapered, distal half with three spines, apex blunt.

Telson: Telson broad, entire, distal margin rounded, with two minute setae, dorsal margin with two opposite rows of two single setae and two pairing setae, these setae small, pinnate.

Material examined. Holotype: Male, 4.0 mm. Type-locality: Shijiki Bay. Date: June, 1977. Collection No.: AMBL-Amph. 31.

Remarks. Only three species are known to science at the present. The present species is easily distinguished from *Paranamixis bock* (Schellenberg 1938) and *P. excavatus* (Ledoyer 1978b) by the anterodistal margin of basis and the grasping margin of dactyl on the gnathopod 2 serrate. *P. indicus* lacks these characters, but I can not identify the present species with it because I do not know its detail. Base on J.L. Barnard's (1969c), Anamixidae lacks the accessory flagellum, but the present species has one vestigial accessory flagellum. And then, I nominate the present species as the new species, *Paranamixis aberro*, for the time being.

Argissidae

Argissa

Argissa hamatipes (Norman, 1869)

(Fig. 38–41)

A. hamatipes: Stebbing 1906, p. 9; Shoemaker 1930, p. 255, 258; Stephensen 1931, p. 261; Daniel 1937, p. 118; Stephensen 1940a, p. 41; Dahl 1946, p. 12; Gurjanova 1951, p. 327–328; Oldevig 1959, p. 62; J.L. Barnard 1962d, p. 151; Gurjanova 1962, p. 392; J.L. Barnard 1963b, p. 218–219; Nagata 1965a, p. 154–155; Nayer 1966, p. 140; Hamond 1967, p. 117; J.L. Barnard 1967b, p. 14–15; J.L. Barnard 1969a, p. 193; J.L. Barnard 1971b, p. 9; Griffiths 1975, p. 106; Fox and Bynum 1975, p. 225.

A. stebbingi: Chevreux and Fage 1925, p. 90; Chevreux 1935, p. 94.

A. typica Sars, 1895: Sars 1895, p. 141–142.

Material examined: 3.5 mm. Tomioka Bay. Collection No.: AMBL-Amph. 72. (2 specimens).

Remarks: See Nagata's (1965a) for the description.

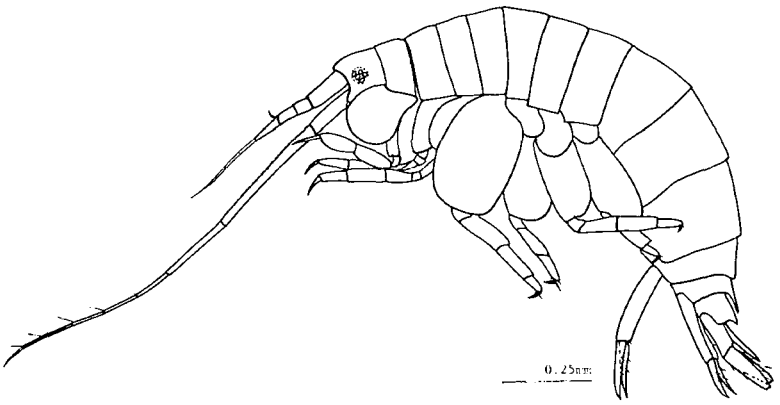

Fig. 38. *Argissa hamatipes* (Norman). 3.5 mm.

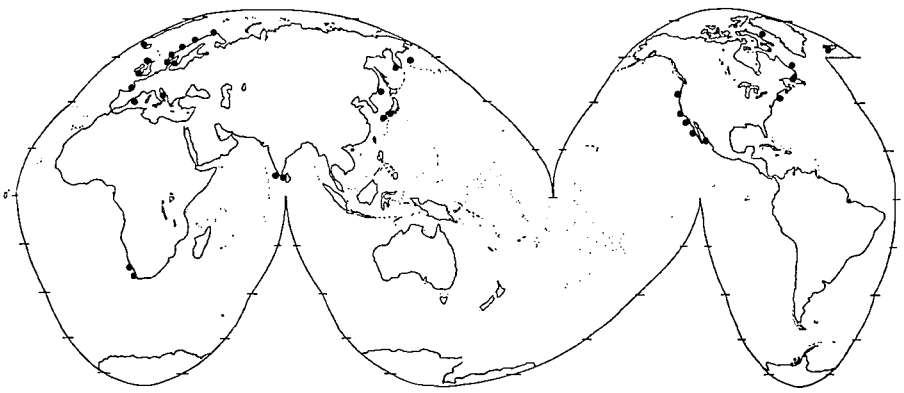

Fig. 39. Distribution of *Argissa hamatipes* (Norman) (◎) in the world.

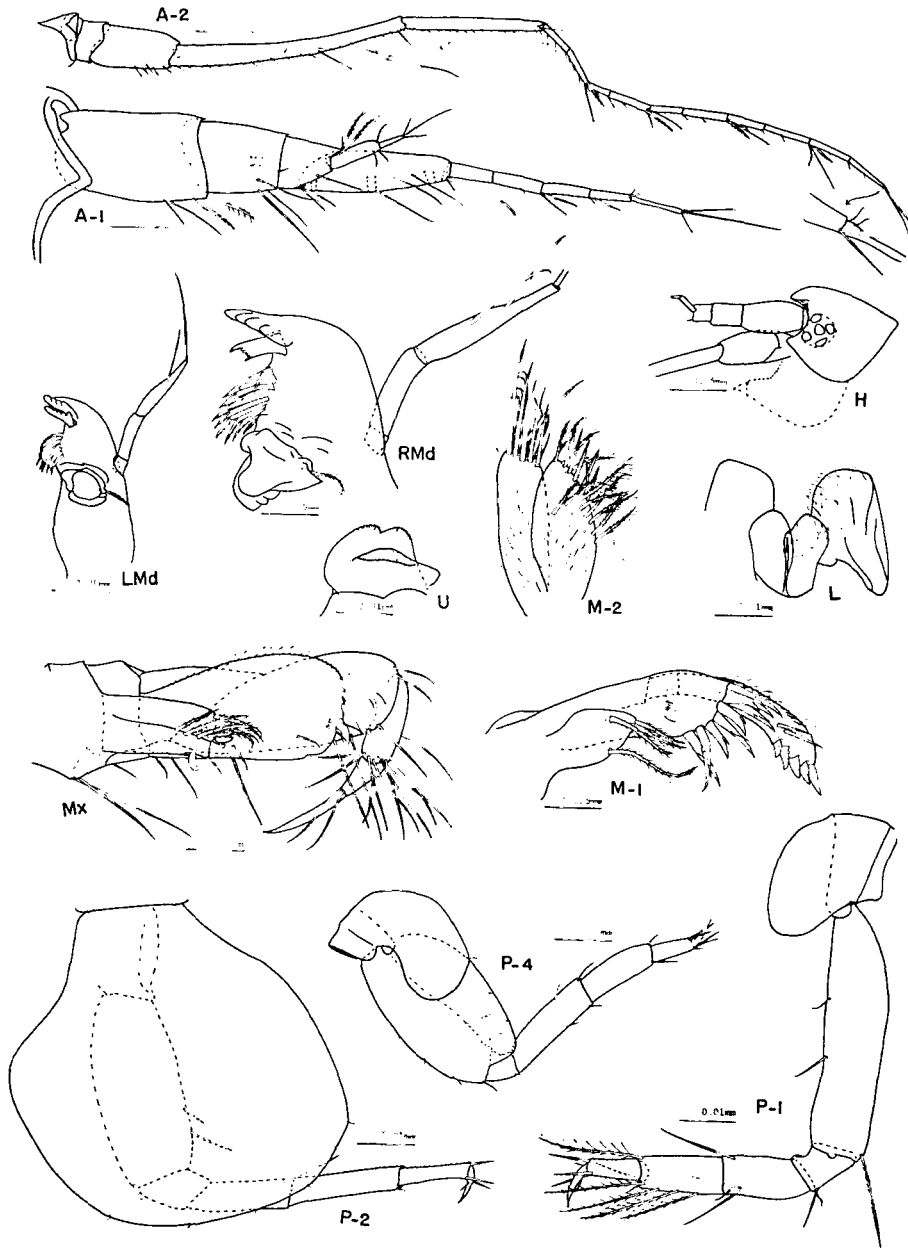

Fig. 40. *Argissa hamatipes* (Norman). 3.5 mm.

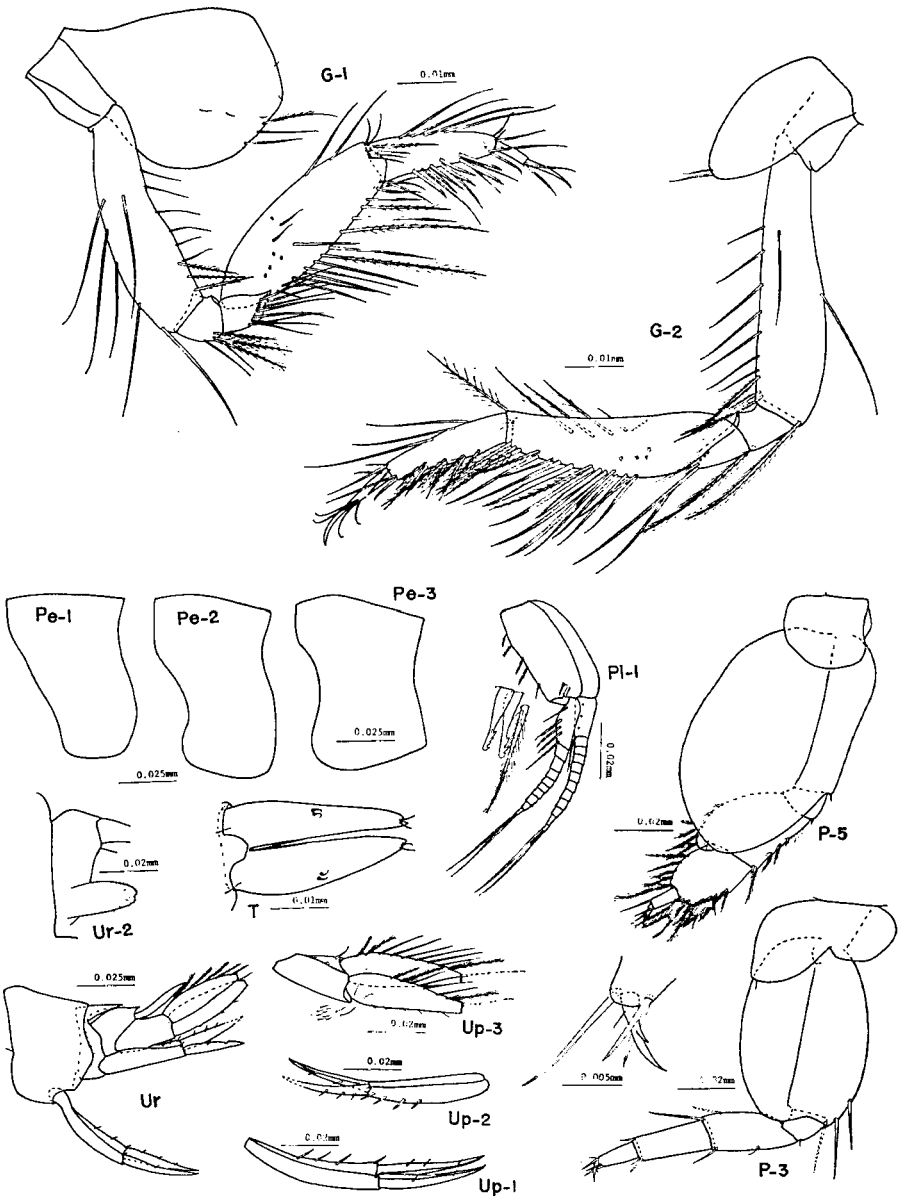

Fig. 41. *Argissa hamatipes* (Norman). 3.5 mm.

Atylidae

Atylus

Atylus japonicus Nagata, 1961

(Fig. 42)

A. japonicus: Nagata 1961a, p. 216–218; Nagata 1965a, p. 178; Ledoyer 1979, p. 156, 158.

Material examined: Tomioka Bay, Shijiki Bay.

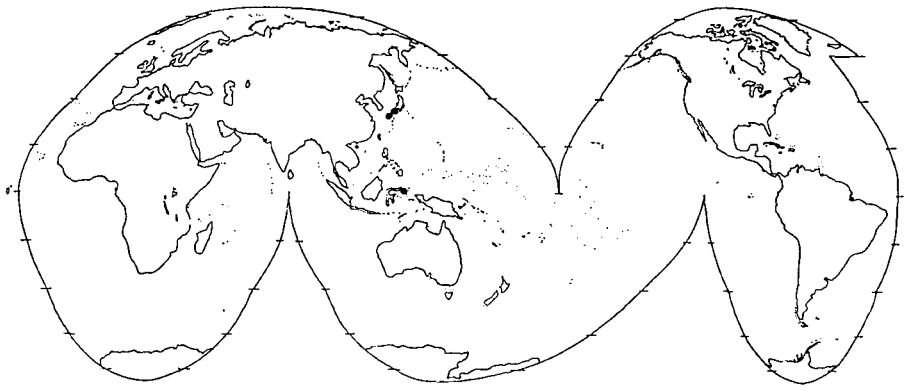

Fig. 42. Distribution of *Atylus japonicus* (Nagata) (●) in the world.

Colomastigidae

Colomastix

Colomastix azumai Hirayama, 1980

C. azumai: Hirayama 1980b, p. 113–141.

Material examined: Shijiki Bay.

(to be continued)