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Two new species of *Paramunna* from the Korean coast of the Sea of Japan (Crustacea: Isopoda: Asellota: Paramunnidae)

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Paramunna shornikovi sp. n. and *P. koreana* sp. n. are described from the Korean coast of the Sea of Japan. These meiobenthic isopods were collected in fine sands from a depth of 1-25.5 m. This is the first record of this genus from the Northwestern Pacific.

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Introduction

Although a number of papers on coastal marine isopods of Korea has been published, only two of them were dealing with Asellota (Jang & Kwon, 1990; Jang, 1991). The meiobenthic interstitial isopod fauna of this region is still unknown. Dr. E.I. Shornikov (Institute of Marine Biology, Vladivostok) kindly loaned to us a small collection of isopods from the meiobenthos samples of 1997. He collected these together with Dr. E.H. Lee (Korean University, Seoul) along the Japan Sea coast of Korea. A number of new asellota species, including a few Paramunnidae, were found. This paper deals with two new species of *Paramunna* Sars, 1886. About 25 species of this large genus have been described until now and almost all of them are known from the Southern Hemisphere (Winkler, 1994). Only three species have been found in the Northern Hemisphere: *P. bilobata* Sars, 1899 and *P. typica* (Tattersall, 1905) in the Northern Atlantic and *P. quadratifrons* Iverson & Wilson, 1981 in South California. The latter is the only species recorded from the Northern Pacific.

Species described here represent the first record of the genus *Paramunna* from the Asian coast of the Northern Pacific. Both species have been found in fine sands from a depth of 1-25.5 m. The specimens are deposited in the Museum of the Institute of Marine Biology (MIMB), Vladivostok, Russia.

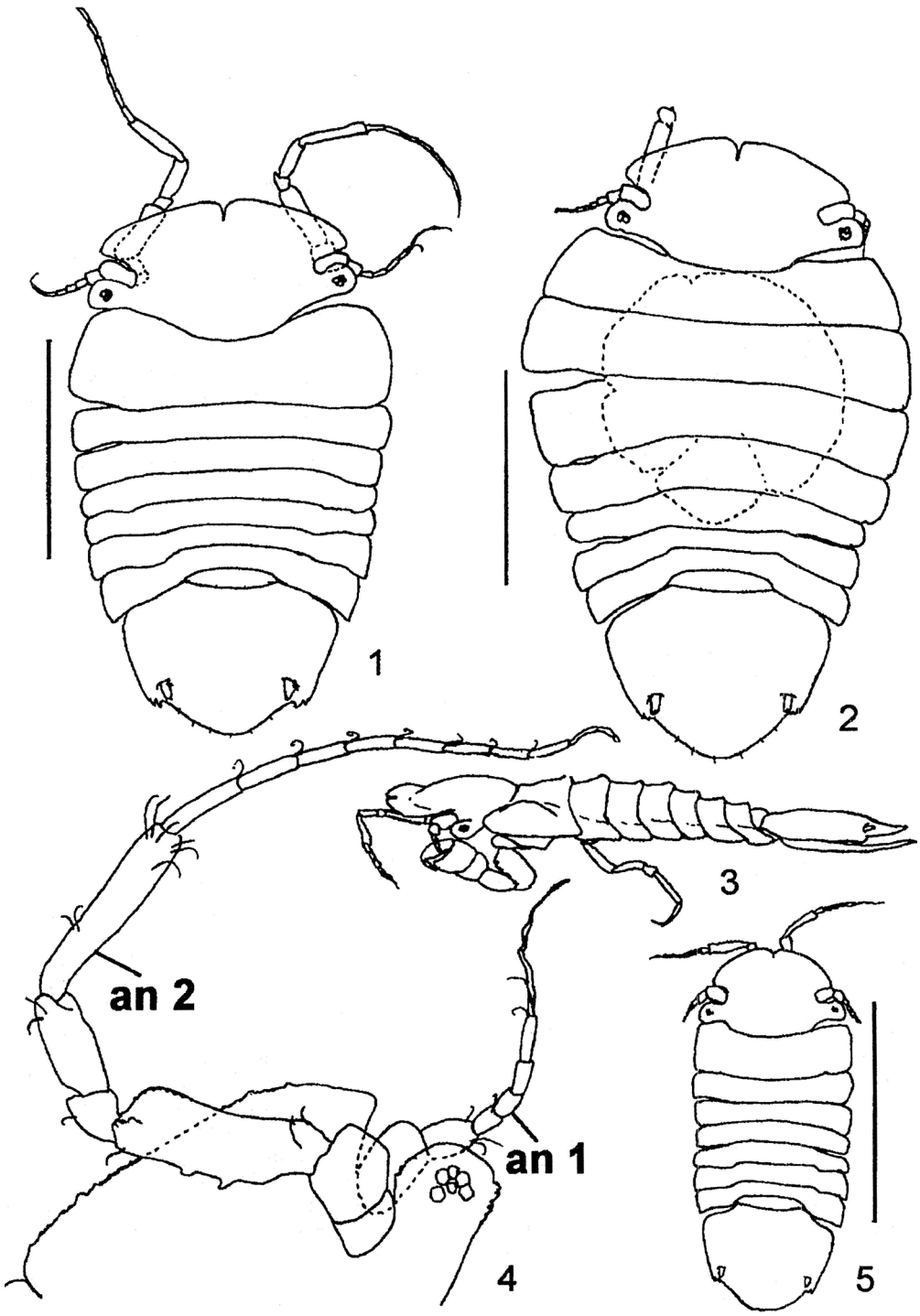
Paramunna shornikovi sp. n.

(Figs 1-25)

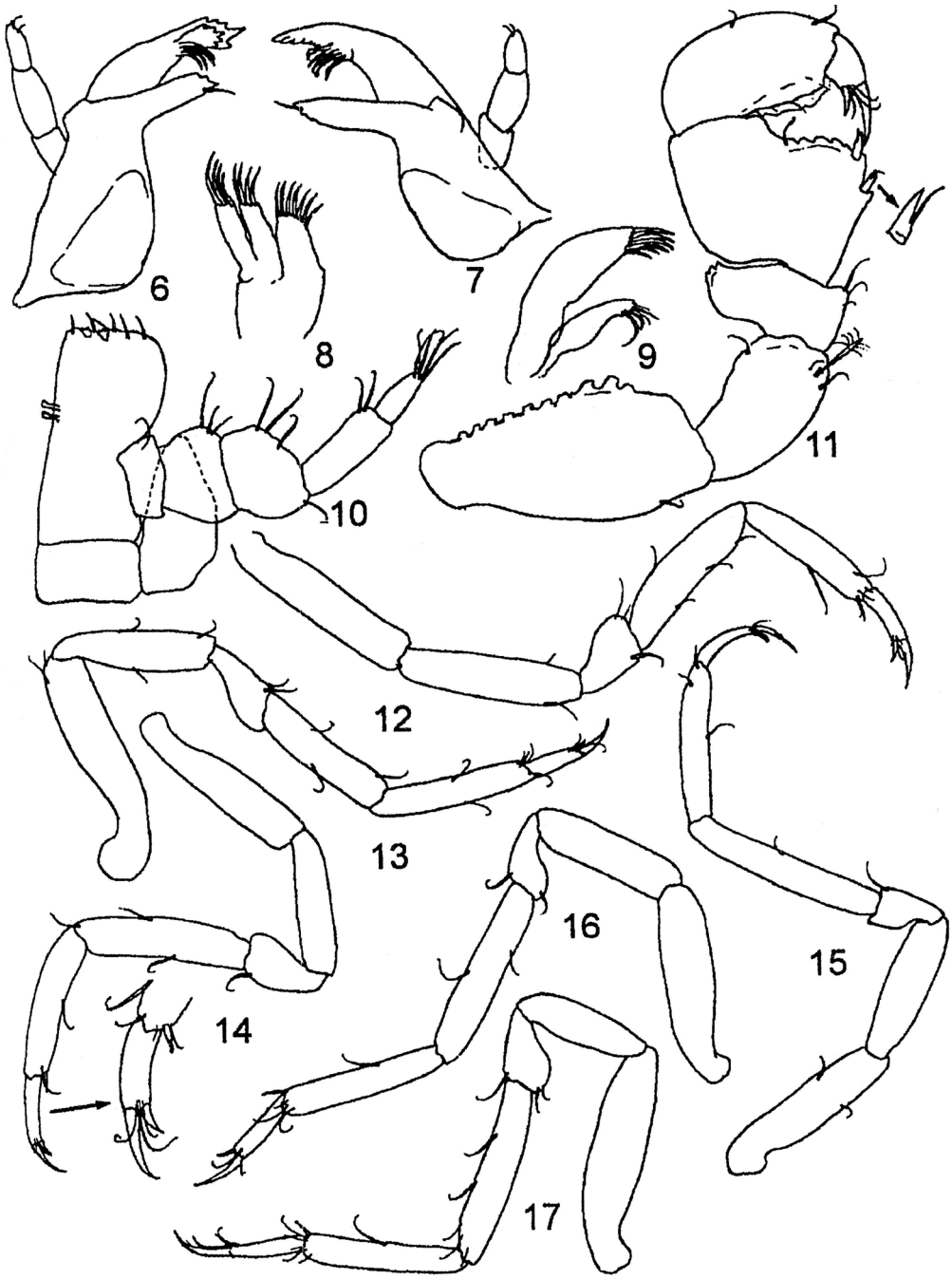
Holotype, ♂, 2.4 mm long, MIMB 3348, and *allotype*, ♀, 2.8 mm long, MIMB 3349: **Korea**, *Kyongbuk Prov.*, St. 70, 35°59′28″N, 129°27′30″E, depth 1 m, polluted sea, thin film of oil on the surface of sea water, *Phyllospadix* and algae, 25.VIII.1997.

Paratypes. 1 ♀, 2.1 mm long, St. 32, 36°0′03″N, 129°27′58″E, depth 25.5 m, rocky and fine-grained muddy sand, 19.VIII.1997; 2 juvenile specimens, St. 62, 36°05′42″N, 129°29′07″E, depth 24.5 m, fine-grained sand with shrimps, 24.VIII.1997; 2 ♂, 1 ♀, St. 66, 36°04′43″N, 129°32′25″E, depth 25.5 m, gravel with fine sand, 24.VIII.1997.

Description of holotype. Body (Figs 1, 3) 1.7 times as long as wide. Cephalon half as long as wide, one fourth of body length, 0.8 times as wide as pereonite 1. Posterior margin not deeply recessed into pereonite 1. Frontal plate of cephalon expanded, with a narrow median indentation; lateral angles of plate extending almost to lateral margins of eyestalks. Eyestalks projecting into posterior part of cephalon. Pereonite 1 widest and longest, 0.4 times as long as cephalon, laterally 1.6 times as long as medially and more than twice as long as remaining pereonites laterally. Pereonites 2-7 subequal in median length, gradually narrowing from 2 to 7. Pereonites 4 and 5 shortest laterally, with rounded lateral margins. Pereonites 6 and 7 angled posterolaterally, laterally nearly twice as long as medially. Pleonite subequal in



Figs 1-5. *Paramunna shornikovi* sp. n. (**1**, **3**, **4**, ♂, holotype; **2**, ♀, allotype; **5**, juvenile specimen, paratype). **1**, **2**, **5**, body, dorsal view; **3**, body, lateral view; **4**, left antennae, ventral view. Scale: 0.5 mm.



Figs 6-17. *Paramunna shornikovi* sp. n. (♂, holotype). **6**, left mandible; **7**, right mandible; **8**, maxilla 2; **9**, maxilla 1; **10**, maxilliped; **11-17**, pereopods 1-7.

length to last pereonite. Pleotelson appreciably narrower than pereonite 7. Pleotelson 0.7 times as long as wide; its lateral margins smooth; posterolateral angles dentate; posterior margin rounded, with a few setae. Pleotelson proximal part 1.3 times as wide as distal part at level of posterolateral angles. Uropods inserted dorsolaterally in last third of pleotelson.

Antenna 1 (Fig. 4) 6-articulated; article 1 broadest and longest; article 2 half as wide and long as article 1, with a few setae distally; articles 3 and 4 subequal; article 5 slightly longer and narrower than previous one; last article slightly narrower than and 1.4 times as long as article 5, with aesthetasc.

Antenna 2 (Fig. 4) almost 3 times as long as antenna 1; article 2 more than twice as long as and slightly wider than article 1; article 3 2.5 times as long as article 2, slightly narrower, with medial and distolateral teeth; article 4 small; article 5 almost half as long as article 3; article 6 about twice as long as article 5, with a tuft of simple distal setae. Flagellum consists of 8 articles decreasing distally. All flagellar articles with 1 small seta each; last article with long aesthetasc.

Mandibles (Figs 6, 7) incisor part 5-toothed; lacinia mobilis of left mandible also 5-toothed; spine row of left mandible of 4 and right – of 5 members. Molar narrow, with short sharp tooth and 1 seta distoventrally. Palp 0.4 times as long as mandibular body. Articles 1 and 3 subequal in length; article 2 widest and 1.7 times as long as article 1; article 3 with 2 small hook-like setae.

Maxilla 1 (Fig. 9) outer lobes with 9 claw-like setae on narrow distal margin; inner lobe half as wide as outer lobe, with setae.

Maxilla 2 (Fig. 8) outer and middle lobes with 4, inner lobe with 8 setulated setae; setae on all lobes of almost same length, nearly half as long as lobes.

Maxilliped (Fig. 10) endite as wide as basis, distal margin straight, with 5 simple and 2 fan setae, 2 coupling hooks at level above inserting point of palp. Article 1 short; second article 0.7 times as long as wide, twice as long as article 1, with 3 distomedial setae. Article 3 of similar shape and size as article 2, with 3 medial and 1 distal seta. Article 4 with 2 distal setae, 2.7 times as long as wide, 0.4 times as wide as article 3. Article 5 almost half as long and 0.6 times as wide as article 4, with 5 distal setae each as long as article. Epipode 2.3 times as long as wide and 0.8 times as long as basis.

Pereopod 1 (Fig. 11) basis swollen, twice as long as wide, with large truncated teeth dorsally; ischium 0.7 times as long as basis, 1.8 times as long as wide, with 2 setae; merus half as long as wide, distodorsal margin dentate, 3 distal articles forming a subchela; carpus is widest article, 0.7 times as long as wide, twice as long as merus, distal ventral half dentate, with 2 short stout sensory setae ventrally nearly 0.2 times as long as article; propodus twice as long as wide, with ventral transparent border and a few small setae; dactylus as long as wide; dorsal claw slightly longer than article; ventral claw half as long and wide as dorsal one.

Pereopods 2-7 (Figs 12-17) subequal in length and proportions of articles, slightly shorter than pereopod 1. Bases approximately 4 times as long as wide, 0.3 times as wide as pereopod 1 basis; ischii slightly shorter than bases; meri about half as long as ischii, with long ventral whip seta and a few dorsal setae; carpi of pereopods 2 and 3 slightly shorter, pereopods 4-7 slightly longer than corresponding ischii, with a few ventral whip setae; propodi slightly shorter than carpi, with 1 long ventral whip seta in midlength and a few distoventral setae; dactyli half as wide as propodi, almost as long as meri, 3-4 times as long as wide.

Pleopod 1 (Figs 18, 19) length 2.3 times proximal width and 1.7 times largest width; lateral tips without setae, distolateral margins with 2 setae on each side.

Pleopod 2 (Figs 18, 20) protopod 0.7 times as long as pleopod 1, twice as long as wide, lateral setose margin rounded. Stylet of endopod as long as protopod, semicircularly curved, slender, much tapering distally; exopod stout, rectangular hook-shaped.

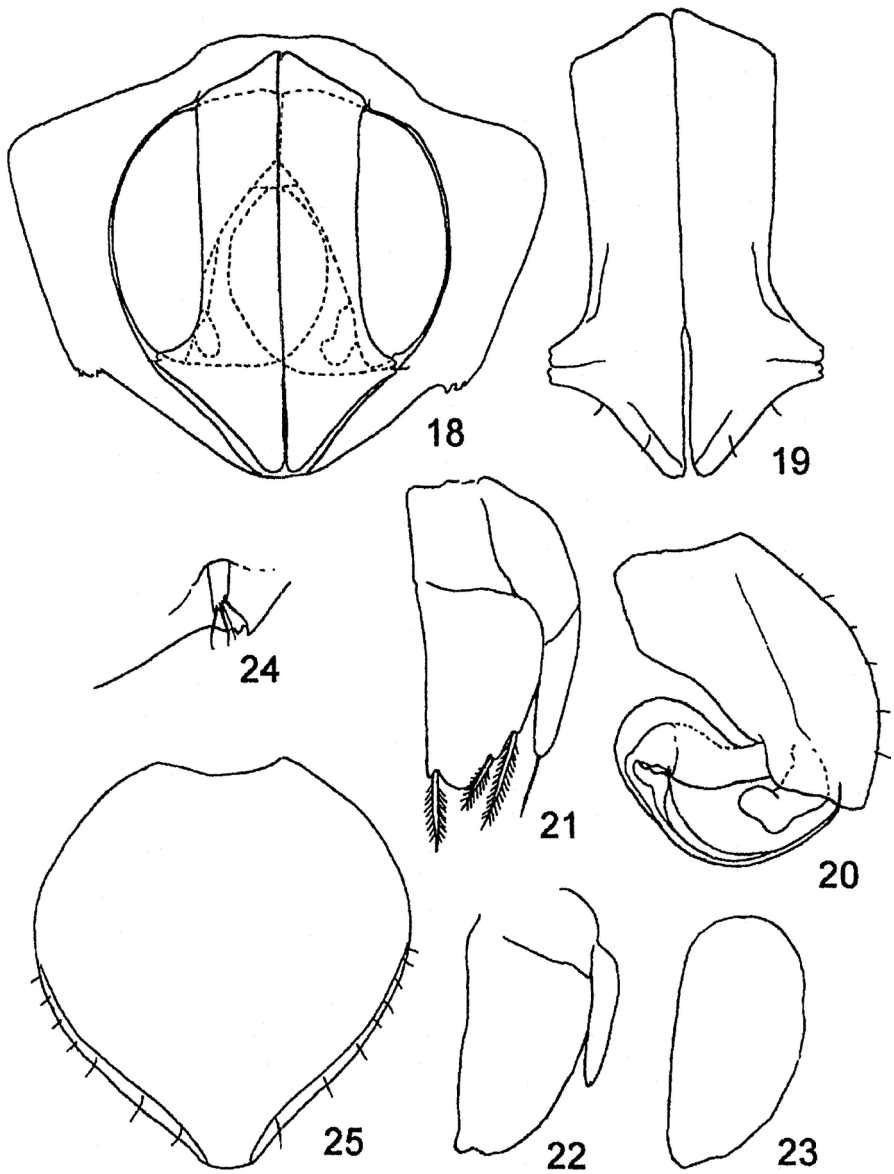
Pleopod 3 (Fig. 21) exopod not reaching endopod tip; second article 0.3 times as wide as endopod; central and outer setae of endopod placed nearby and separated from inner seta by rounded lobe.

Pleopod 4 (Fig. 22) exopod narrow, reaching distal third of endopod.

Uropod (Fig. 24) uniramous; ramus subcylindrical, obliquely truncated, 2.4 times as long as wide, with 4 terminal setae as long as ramus.

Female allotype, ovigerous (Fig. 2). Body broadest at pereonite 2; cephalon 0.6 times as wide as pereonite 2. Pereonites 1-3 subequal in length; pereonite 4 slightly shorter. Posterior part of body (pereonites 5-7 and pleotelson) similar in shape and proportions to that in male. Mouthparts and pereopods not sexually dimorphic.

Pleopod 2 of female (Fig. 25) 1.1 times as long as wide; distal part with ventrally curved, setose lateral margins.



Figs 18-25. *Paramunna shornikovi* sp. n. (**18-24**, ♂, holotype; **25**, ♀, allotype). **18**, pleotelson, ventral view; **19-23**, pleopods 1-5; **24**, uropod; **25**, operculum.

Juvenile specimen (Fig. 5) body with parallel sides; cephalon semicircular.

Etymology. The species is named after carcinologist Dr. E.I. Shornikov, who collected this material.

Remarks. This species differs from others of the genus in the narrow molar prosess as in *Pleurogonium* Sars, 1882 and from *Pleurogonium* in the following characters: wide cephalon with eyes on prominent lateral eyestalks; short antenna 1 that is one third as long as antenna 2; 3 posterior pereonites similar to anterior ones in the direction and length of tergal plates; coxae of pereopods 5-7 not visible dorsally; mandible with 3-articulated palp. *P. shornikovi* sp. n. seems to be very close to *P. bilobata* Sars, 1899 (see also Wilson, 1980, Figs 1A, 1D, 1E, and Just, 1990, Fig. 1A) in the shape of the cephalon and wide posterior pereonites. It differs from the latter in the al-

most entire, expanded frontal plate with a small median indentation, lateral angles of the plate extend almost to lateral margins of eyestalks; in *P. bilobata*, the frontal plate consists of widely diverging lobes. The dorsal position of uniramous uropods of *P. shornikovi* sp. n. also distinguishes it from *P. bilobata*, which has biramous uropods inserted posterolaterally.

Paramunna koreana sp. n.
(Figs 26-45)

Holotype, ♂, 2.1 mm long, MIMB 3351, and *allotype*, ♀, 1.7 mm long, MIMB 3352: **Korea**, *Kangwon Province*, St. 26, 37°16′47″N, 129°19′26″E, depth 1-2.5 m, *Phyllospadix* and algae occur, 18.VIII.1997.

Paratypes. 2 ♂ 2.1 mm and 1.6 mm long, 1 ♀ 2.2 mm long, MIMB 3353, **Korea**, *Kyongbuk Province*, St. 66, 36°04′43″N, 129°32′25″E, depth 25.5 m, 20.VIII.1997.

Description of holotype. Body (Figs 26, 28) 1.8 times as long as wide, with almost parallel lateral margins. Cephalon half as long as wide; posterior margin deeply recessed into pereonite 1. Central rounded part dorsally convex. Frontal margin half as wide as head at level of eyestalks, concave medially, rounded lateral lobes protruding, turned upwards. Eyestalks placed midlength of cephalon. Dorsal eyes with 4 ommatidia each. Pereonite 1 longest, 0.6 times as long as cephalon medially, laterally twice as long as medially, almost 3 times as long as remaining pereonites laterally, with rounded and convex dorsolateral parts. Pereonites 2-7 subequal, angled posterolaterally, laterally about 1.5 times as long as medially. Pleonite subequal in length to last pereonite. Pleotelson 0.7 times as long as wide, 0.85 times as wide as pereonite 7; its lateral margins smooth; posterior margin rounded, with a few setae. Proximal part of pleotelson 1.7 times as wide as distal part at level of posterolateral angles. Lateral margins of all pereonites and pleotelson with transparent border, set with sparse setae. Uropods inserted ventrally in deep notches.

Antenna 1 (Fig. 29) 6-articulated; article 1 broadest and longest, 1.8 times as long as wide; second article 0.7 times as wide and 0.6 times as long as article 1; article 3 about half as long and wide as article 2; articles 4 and 5 subequal; 2 last articles half as wide as article 5, with small setae and aesthetascs.

Antenna 2 (Fig. 29) about twice as long as antenna 1; article 2 twice as long as and slightly wider than article 1; article 3 three times as long as article 2, slightly narrower; article 4 half as long as article 3; article 5 almost twice as long as article 4; article 6 subequal to article 5, with tuft of simple distal setae; flagellum consists of 6 articles decreasing distally, combined length of flagellar articles subequal to article 6. All flagellar articles with 1 small seta each; last article with long aesthetasc.

Mandibles (Figs 30, 31) incisor part 5-toothed; lacinia mobilis of left mandible also 5-toothed; spine row of left and right mandibles of 4 and 5 members, respectively. Molar longer than incisor part, expanded distally, with 2 short sharp teeth ventrally and dorsally. Palp 0.4 times as long as mandibular body. Second article 1.5 times as long as article 1; article 3 shortest and narrowest, with 2 small hook-like setae.

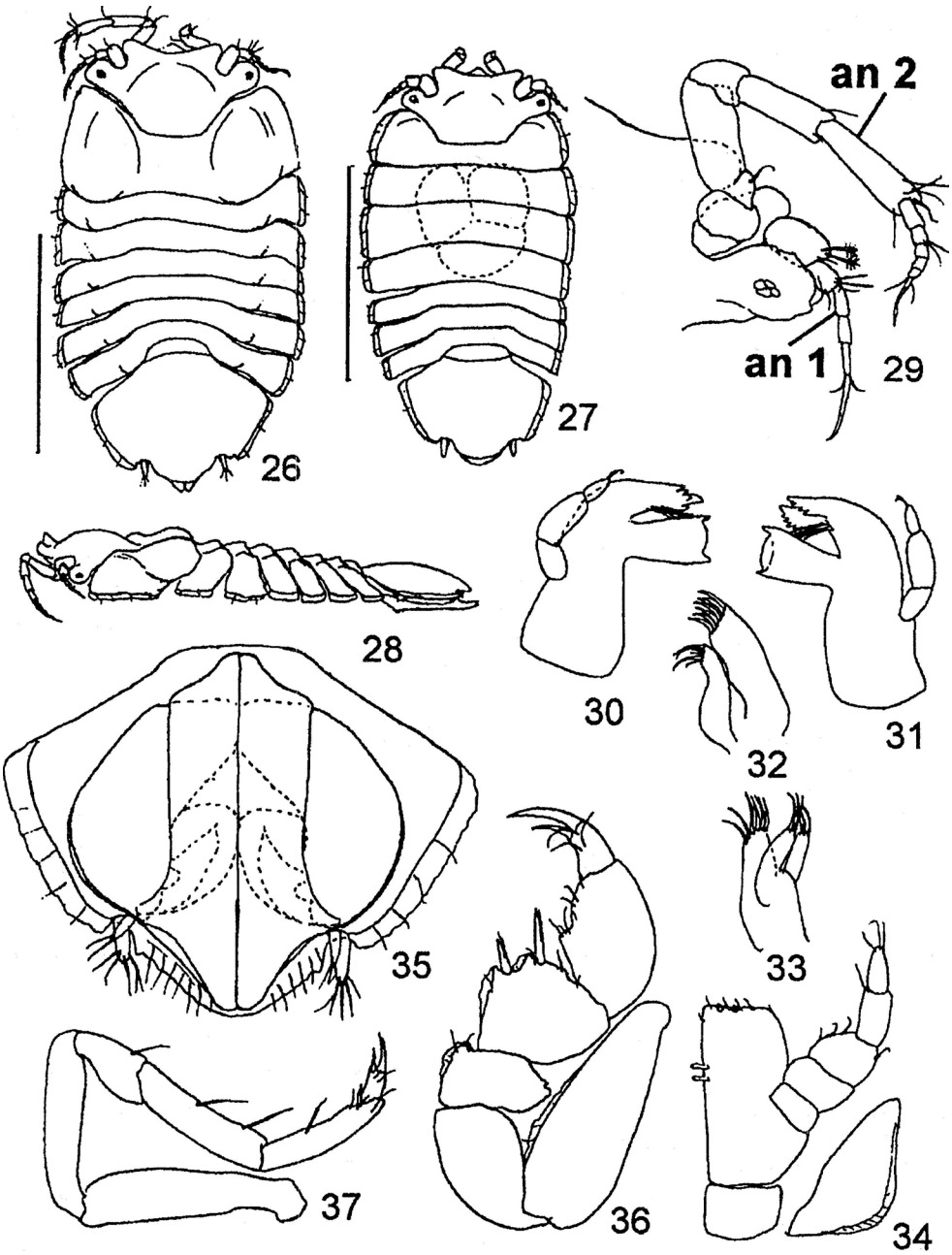
Maxilla 1 (Fig. 32) outer lobes with 9 claw-like setae on narrow distal margin; inner lobe half as wide as outer lobe.

Maxilla 2 (Fig. 33) all lobes subequal in length; outer and middle lobes with 4, inner lobe with 8 setulated setae; setae on all lobes about half as long as lobe.

Maxilliped (Fig. 34) endite rectangular, 0.8 times as wide as basis; distal margin straight, with few simple and 2-3 fan setae, 2 coupling hooks at level above inserted palp. Palp 1.2 times as long as basis. Article 1 short; article 2 half as long as wide, 1.5 times as long as article 1; article 3 of similar shape, slightly longer and narrower than article 2, with 3 medial and 1 distolateral setae. Article 4 half as long and wide as article 3, with 1 distal seta. Last article 0.8 times as long and 0.7 times as wide as article 4, with 3 distal setae slightly shorter than article. Epipode triangular, half as long as wide, subequal in length to and 0.8 times as wide as basis; lateral margin with transparent border.

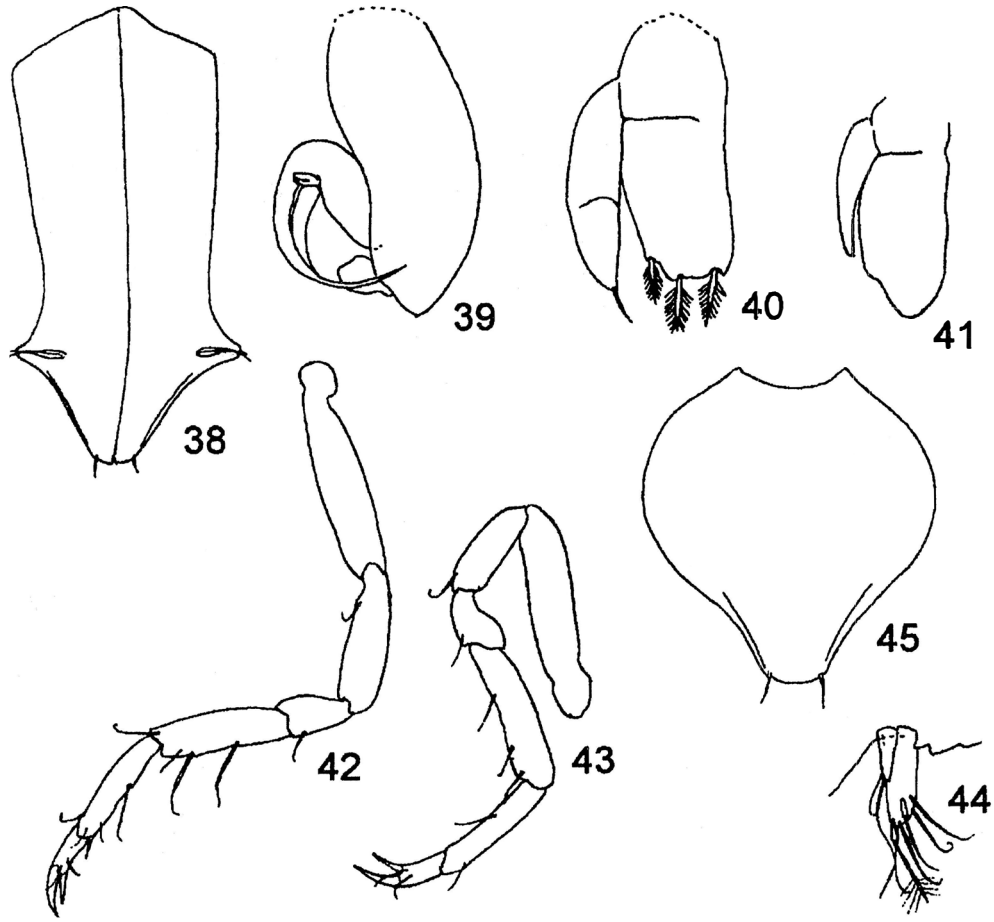
Pereopod 1 (Fig. 36) basis 2.7 times as long as wide, with transparent border on dorsal margin; ischium 0.6 times as long as basis, 1.9 times as long as wide; merus about half as long as wide, distodorsal margin dentate, with transparent border ventrally; carpus is widest article, 0.8 times as long as wide, twice as long as merus, with 2 stout, unequal, bifid sensory setae and transparent border ventrally, distal seta is longest, 0.6 times as long as article; propodus 1.6 times as long as wide, with ventral border and few small setae; dactylus 1.3 times as long as wide; dorsal claw 1.4 times as long as article; ventral claw half as long and wide as dorsal.

Pereopods 4-6 missing. Pereopods 2 (Fig. 37), 3 (Fig. 42) and 7 (Fig. 43) subequal in length and proportions of articles, pereopod 2 slightly longer (1.2), pereopod 3 subequal, and pereopod 7 slightly shorter than pereopod 1. Bases more than 4 times as long as wide, 0.3 times as wide as pereopod 1. Ischii slightly



Figs 26-37. *Paramunna koreana* sp. n. (**26, 28-37**, ♂, holotype; **27**, ♀, allotype). **26, 27**, body, dorsal view; **28**, body, lateral view; **29**, ventral view of left antennae; **30**, right mandible; **31**, left mandible; **32**, maxilla 1; **33**, maxilla 2; **34**, maxilliped; **35**, pleotelson, ventral view; **36**, pereopod 1; **37**, pereopod 2. Scale: 0.5 mm.

shorter than bases; meri about half as long as ischii, with long ventral whip seta; carpi of pereopods 2 and 3 slightly shorter, pereopod 7 slightly longer than corresponding ischii, with 2-3 ventral whip setae; propodi slightly shorter than carpi, with 1 long ventral whip seta midlength and a few distoventral setae; dactyli only slightly narrower than propodi, almost one third as long as propodi and twice as long as wide.



Figs 38-45. *Paramunna koreana* sp. n. (**38-44**, ♂, holotype; **45**, ♀, allotype). **38-41**, pleopods 1-4; **42**, pereopod 3; **43**, pereopod 7; **44**, uropod; **45**, operculum.

Pleopod 1 (Figs 35, 38) 2.2 times as long as its proximal width and twice as long as its largest width; lateral tips with 2 small setae; distal tip with 1 seta on each side.

Pleopod 2 (Fig 35, 39) protopod 2.5 times as long as wide; lateral margin rounded. Stylet of endopod 0.6 times as long as protopod, curved, tapering distally. Exopod stout, slightly concave distally.

Pleopod 3 (Fig. 40) exopod reaching endopod tip, half as wide as endopod. Setae of endopod placed at equal distances from each other.

Pleopod 4 (Fig. 41) exopod tapering distally, reaching distal third of endopod.

Uropod (Fig. 44) biramous; rami subcylindrical; exopod 3 times as long as wide, 2 plumose and 4 terminal whip setae as long as ramus; endopod half as long and wide as exopod, with 2 long terminal whip setae.

Female ovigerous; allotype (Fig. 27) similar to male; pereonite 1 shorter, pereonites 2-4 longer than in male.

Pleopod 2 of female (Fig. 45) almost as long as wide; apex narrow, with 2 simple setae.

Etymology. P. koreana is named after its location.

Remarks. This species seems to be very close to *P. magellanensis* Winkler, 1994 in the shape of the cephalon and a transparent border on lateral margins of body. It differs from the latter in the more protruded and angled anterolateral lobes of the cephalon, shorter pleotelson, shorter antennae, normal form of article 3 of antenna 2 (without protrusion on lateral margin present in *P. magellanensis*), and stouter pereopod 1.

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