

## A New Species of the Genus *Paradexamine* (Crustacea: Amphipoda: Dexaminidae) from Korea

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**Abstract:** *Paradexamine jindoensis* n. sp. belonging to family Dexaminidae was collected from Jindo Island, Korea. The new species is fully illustrated and compared with related congeners. The new species resembles highly *P. houtete*, in having the tooth formulae of dorsal pleonites, 1-3-3-3, rear to front and in bearing short spines on the mandible. However, it is characteristic in having the several morphological differences of mouth parts, slender appendages, and longer peduncular article 2 of antenna 1 than article 1.

**Key words:** *Paradexamine*, Dexaminidae, Amphipoda, Korea

Eighteen genera have been reported in the family Dexaminidae over the world. Among them, the genus *Paradexamine* Stebbing, 1899 is the largest one in the family. As yet, 39 species have been recognized (Barnard and Karaman, 1991; Mayer, 1995; Ren, 2006). Many species of this genus have been dominantly reported in Australia (Barnard, 1972), which are mainly bearing round ocular lobe. Eleven species have been reported far eastern Asia, including eight species bearing acute ocular lobe: *P. latifolia* Ren, 2006, *P. mozambica* Ledoyer, 1979, *P. pacifica* (Thomson, 1879), *P. rewa* Myers, 1985, and *P. setigera* Hirayama, 1984, from China; *P. bisetigera* Hirayama, 1984, *P. gigas* Hirayama, 1984, *P. marlie* Barnard, 1972, *P. micronesica* Ledoyer, 1979, *P. setigera* Hirayama, 1984, *P. fraudatrix* Tzvetkova, 1976, and *P. flindersi* (Stebbing, 1906), from Japan. From Korea two species, *P. fraudatrix* Tzvetkova, 1976 and *P. gigas* Hirayama, 1984 were reported by Kim et al., (2006). As a new species is described in this study, so a total three species are currently recorded from Korea in the genus *Paradexamine*.

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### MATERIALS AND METHODS

Specimens were collected by using a light-trap from the shallow waters of Jindo Island in Korea during the June, 2004. The specimens were fixed with 80% ethyl alcohol and dissected in glycerol on cobb's aluminium hollow slide. Drawings and measurements were performed with the aid of a drawing tube, under a stereomicroscope (Olympus SZX12) and the differential interference contrast microscope with Nomarski optics (Olympus BX51). The body length was measured from the tip of rostrum to apex of the telson, along the dorsal parabolic line of the body. Type specimens are deposited in the National Institute of Biological Resources (NIBR), Incheon, Korea. Dissected paratypes (11 ♀♀) and other specimens are deposited in the Department of Life Sciences, Dankook University.

### TAXONOMIC ACCOUNTS

Order Amphipoda Latreille, 1816  
Suborder Gammaridean Latreille, 1803  
Family Dexaminidae Leach, 1814  
Genus *Paradexamine* Stebbing, 1899  
***Paradexamine jindoensis* n. sp. (Figs. 1-5)**

**Material examined.** 34 ♀♀, Dangkkeute Jindo Is. (34° 28'54"N, 126°09'32"E), 28 Jun. 2004, collected by Y. H. Kim. Holotype (♀ : NIBRIV0000108697) and paratypes (2 ♀♀ : NIBRIV0000108698) are deposited in the NIBR, and the remaining paratypes (including dissected 11 females) in the collection of the authors.

**Description. Female.** Body (Fig. 1, Fig. 2A) about 5.5 mm long, rostrum protruded between antenna 1, anterior cephalic lobe acute. Eye small, ovate. Dorsal pleonites tooth formulae 1-3-3-3-0(1), rear to front.

Pleonal epimera 1-3 (Figs. 2B, 5A) with posteroventral tooth, its gradually getting bigger distally, with 2, 4, 5 or 6

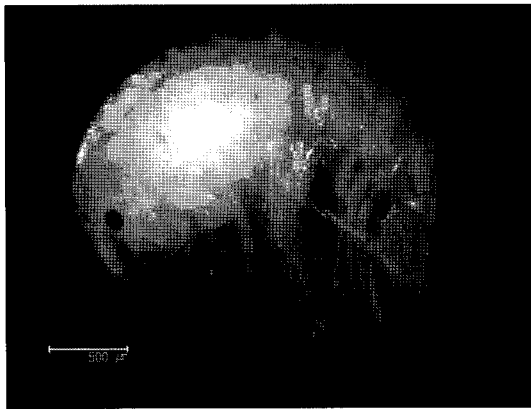


Fig. 1. *Paradexamine jindoensis* n. sp., female, 5.5 mm

cluster of ventral spines, respectively. Urosomite 1 carinate posterodorsally, with 1 pair dorsolateral spines, urosomites 2-3 coalescent, with 1 pair anterior and two pairs posterior spines, respectively.

Antenna 1 (Fig. 2C). A little longer than 1/2 length of body; peduncular articles rectangular, length ratio 1-3=1.00:1.50:0.40; its flagellum with 18~20-segmented; accessory flagellum a cube with 3 unequal simple setae.

Antenna 2 (Fig. 2D). 0.57 times as long as antenna 1; gland corn of article 2 well developed; peduncular articles 3-5 setaceous facially, length ratio=1.00:3.94:2.70, article 4 longer than others; its flagellum 9-segmented, 0.77 times as long as peduncle.

Lower lip (Fig. 2E). Outer lobe with 1 long and 1 short corns, respectively, mandibular process small, upturned and curled.

Maxilla 1 (Figs. 2F, 5B). Inner plate small, with 1 (apical tiny plumose) or 2 (apical tiny plumose and subapical simple) setae; outer plate with 11 tooth-like spines (simple, bifid and denticulate) apically; palp uniaarticulate, extending slightly beyond outer plate, with 6 simple setae.

Maxilla 2 (Fig. 2G). Inner plate shorter than outer one, inner margin with 4-5 simple setae, 6-7 simple or tiny plumose setae apically; edge of outer plates with simple or tiny plumose setae overall.

Mandible (Figs. 3A, 3B, 5C, 5D). Incisor produced forward, with blunt teeth, lacinia mobilis well developed, bifid, 2 or 3 tiny accessory spines on left, 1 or 2 on right, molar process developed, truncate, with ragged seta each side, regular setae on right.

Maxilliped (Fig. 3C). Inner plate small, with 4 apical setae and 7 lateral setae; outer plate large, almost reaching end of palp article 3, inner margin with 3 proximal setae and 16 conical teeth, outer distal margin with 3 simple setae; palp 4 articulate, rather slender, inner margin setaceous, slightly extending outer plate.

Gnathopod 1 (Fig. 3D). Coxa 1 more or less shaped like trapezium, with weakly setose anterior, interior and ventral

margins; basis rectangular, 1.12 times as long as carpus and propodus combined; merus taper posterodistally, 0.59 times as long as carpus; carpus gradually widening, 1.08 times as long as propodus; middle interior side of propodus with 1 row of 8 simple setae, palm oblique, finely serrate, subequal in length to ventral margin, delimited by 5 spines distally; dactylus falcate, with 1 feeble seta proximally.

Gnathopod 2 (Fig. 3E). Similar to gnathopod 1, but coxa 2 rectangular, carpus and propodus more slender and longer, palm of propodus delimited by 6 spines distally.

Pereopod 3 (Fig. 3F). Coxa 3 similar to coxa 2; length ratio of articles 2-7=1.00:0.19:0.64:0.49:0.55:0.39.

Pereopod 4 (Fig. 4A). Nearly similar to pereopod 3, except posterodistal margin of coxa 4 somewhat rounded.

Pereopod 5 (Fig. 4B). Coxa 5 broad, bilobate, 0.90 times as wide as long, anterior lobe protruding roundly downward, ventral margin of posterior lobe with 4 spines, posterointerior side with feeble setae; basis longish ovate form, posteroventral lobe roundly downward, reaching somewhat distal margin of ischium, with several cluster of long to short spines and setae along anterior margin, posterior margin slightly serrate, with row of feeble setose; merus 1.54 times as long as carpus, anterior margin straight, with 4 cluster of spines, posterior margin with 7 spines and 4 setae; carpus slightly longer than propodus; dactylus falcate, with 1 tiny plumose seta anteroproximally.

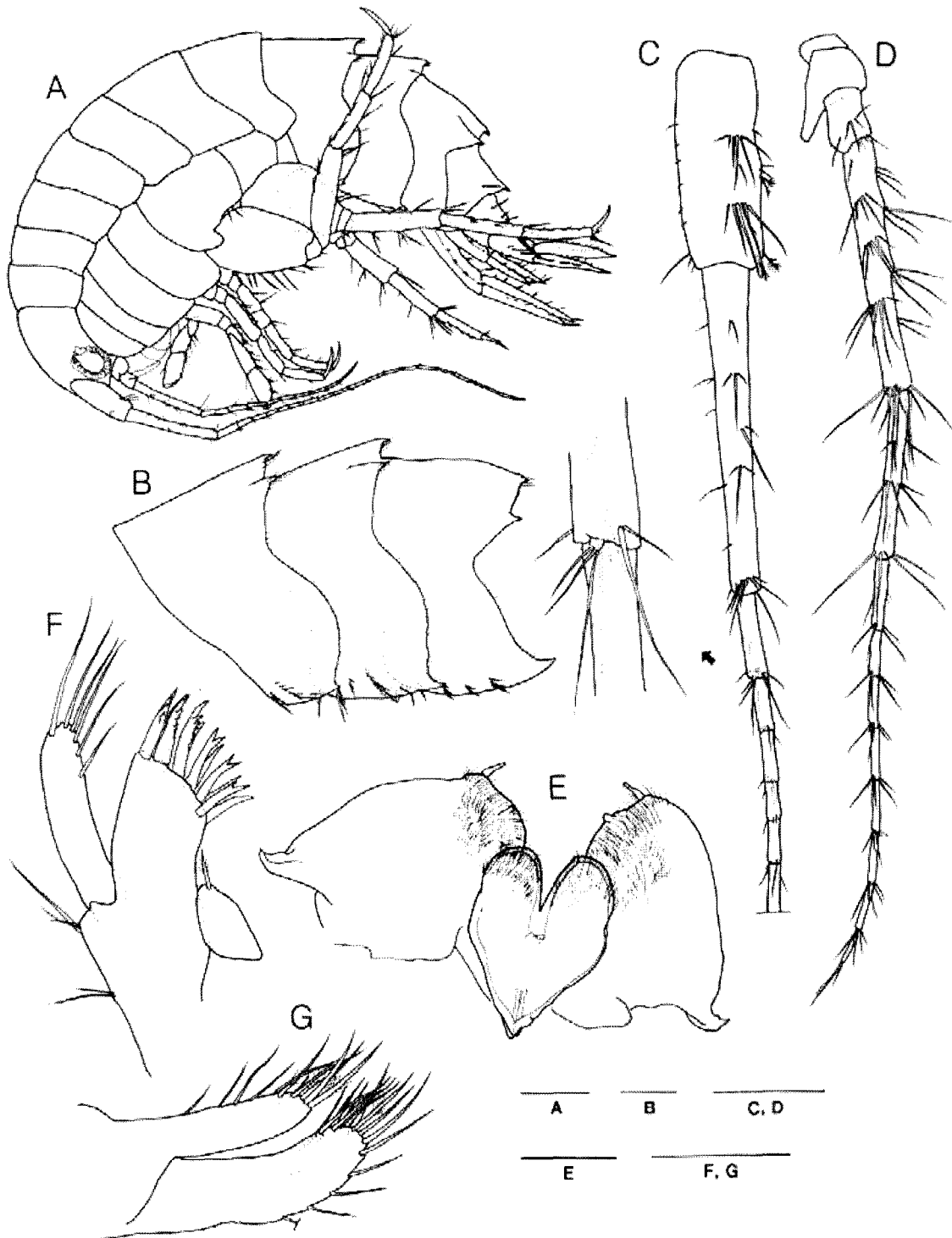
Pereopod 6 (Fig. 4C). Coxa 6 similar to coxa 5, but anterior margin straight, protrudent anterior lobe with 6 setae, 0.73 times as wide as coxa 5; basis ovate, subequal in length to merus, posterior margin serrate, with row of feeble setae and 4 spines; merus 1.19 times as long as carpus, with 5 cluster of spines anteriorly, posterior margin with 1, 2, 2, 2, 5 spines in formula; carpus 1.19 times as long as propodus, with 4 cluster of spines both margins; dactylus falcate, 0.49 times as long as propodus.

Pereopod 7 (Fig. 4D). Coxa 7 small, subrectangular; basis rectangular and narrow, 1.46 times as long as merus, both margins with feeble setae and spines; merus subequal in length to carpus, with 3 cluster of spines anteriorly; carpus 1.11 times as long as propodus, distal end with spines around; propodus 1.68 times as long as dactylus.

Uropod 1 (Fig. 4E). Peduncle shorter than rami, with 4 dorsolateral, 5 medial, 4-5 basofacial spines and 1 apicolateral large spine; outer ramus slightly shorter than inner one, with 2 longitudinal rows of 6 and 5 spines, respectively, apical short and long spines, inner ramus with 2 longitudinal rows of 7 and 6 spines, respectively, 1 apical spine.

Uropod 2 (Fig. 4F). 0.61 times as long as uropod 1; peduncle subequal in length to outer ramus, with 2 dorsolateral, medial spines, respectively and 1 apicolateral spine; outer ramus 0.77 times as long as inner one.

Uropod 3 (Fig. 4G). Slightly longer than uropod 2;

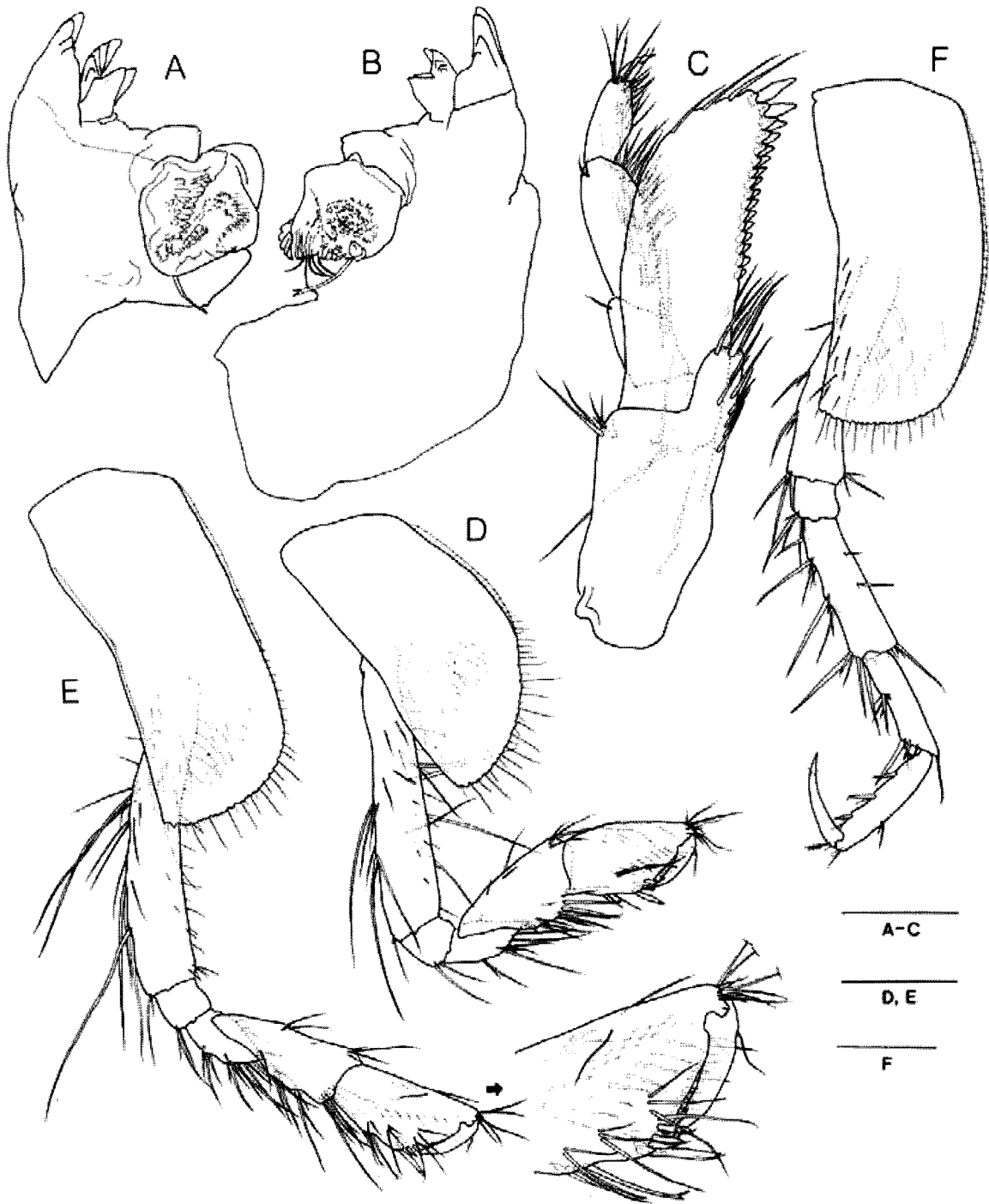


**Fig. 2.** *Paradexamine jindoensis* n. sp., female, 5.5 mm: A, habitus, lateral; B, pleonites; C, antenna 1; D, antenna 2; E, lower lip; F, maxilla 1; G, maxilla 2. Scales bars=0.4 mm (A), 0.2 mm (B-D), 0.1 mm (E-G).

peduncle short, 0.66 times as long as outer ramus, with 3 dorsolateral, 4 medial and 1 apicolateral large spine; outer ramus slightly shorter than inner one; both rami distal apices converge, foliaceous, with 2 rows of spines, broader than ones of uropod 1 and 2.

Telson (Figs. 4H, 5E). Longish, 2.54 times as long as

wide, covered with setule over all; thoroughly cleft, each lobe ridged on central line, dorsal surface with pair of penicillate setae; lateral margin with row of spines, respectively; apices truncate and serrate irregularly, with 1 distal spine of medium size set in apical notch, respectively.

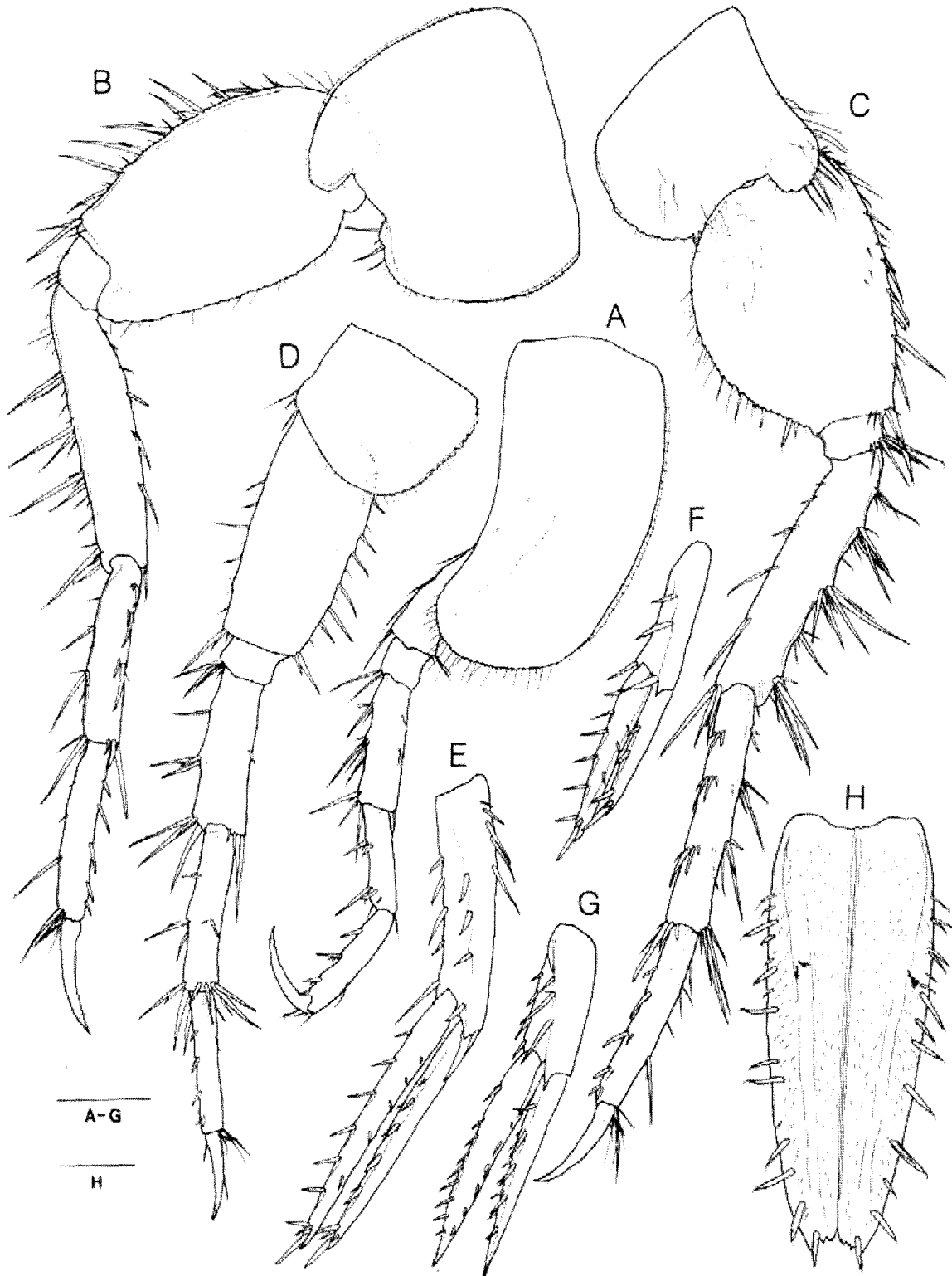


**Fig. 3.** *Paradexamine jindoensis* n. sp., female, 5.5 mm: A, left mandible; B, right mandible; C, maxilliped; D, gnathopod 1; E, gnathopod 2; F, pereopod 3. Scales bars=0.2 mm (D-F), 0.1 mm (A-C).

**Male.** Unknown.

**Remarks.** Genus *Paradexamine* belonging to the family Dexaminidae is characterized by the tooth formulae of dorsal pleonites. Our new species with the tooth formulae 1-3-3-3-0(1), rear to front, is close to *P. churinga* Barnard, 1972, which is distributed in Australian waters, *P. houtete* Barnard, 1972 from littoral waters of New Zealand, *P.*

*micronesica* Ledoyer, 1978 from Madagascar and Japan, *P. gigas* Hirayama, 1984 from shallow water of Japan and Korea. The new species, however, is obviously distinguished from them by the characters listed in table 1 and the combination of following features: 1) the ocular lobe of cephalon is pointed and acute (while rounded-quadrate anteriorly in *P. churinga*); 2) the mandibular process of



**Fig. 4.** *Paradexamine jindoensis* n. sp., female, 5.5 mm: A, pereopod 4; B, pereopod 5; C, pereopod 6; D, pereopod 7; E, uropod 1; F, uropod 2; G, uropod 3; H, telson. Scales bars = 0.2 mm (A-G), 0.1 mm (H).

lower lip is upturned and curled (while blunt, weakly developed in *P. micronesica* and *P. gigas*); 3) mandible has a little tiny accessory spines (while large spines in *P.*

*churinga*, short spines in *P. houtete*, no spine in *P. micronesica* and *P. gigas*). Therefore the new species is similar to *P. houtete* Barnard, 1972. However, several

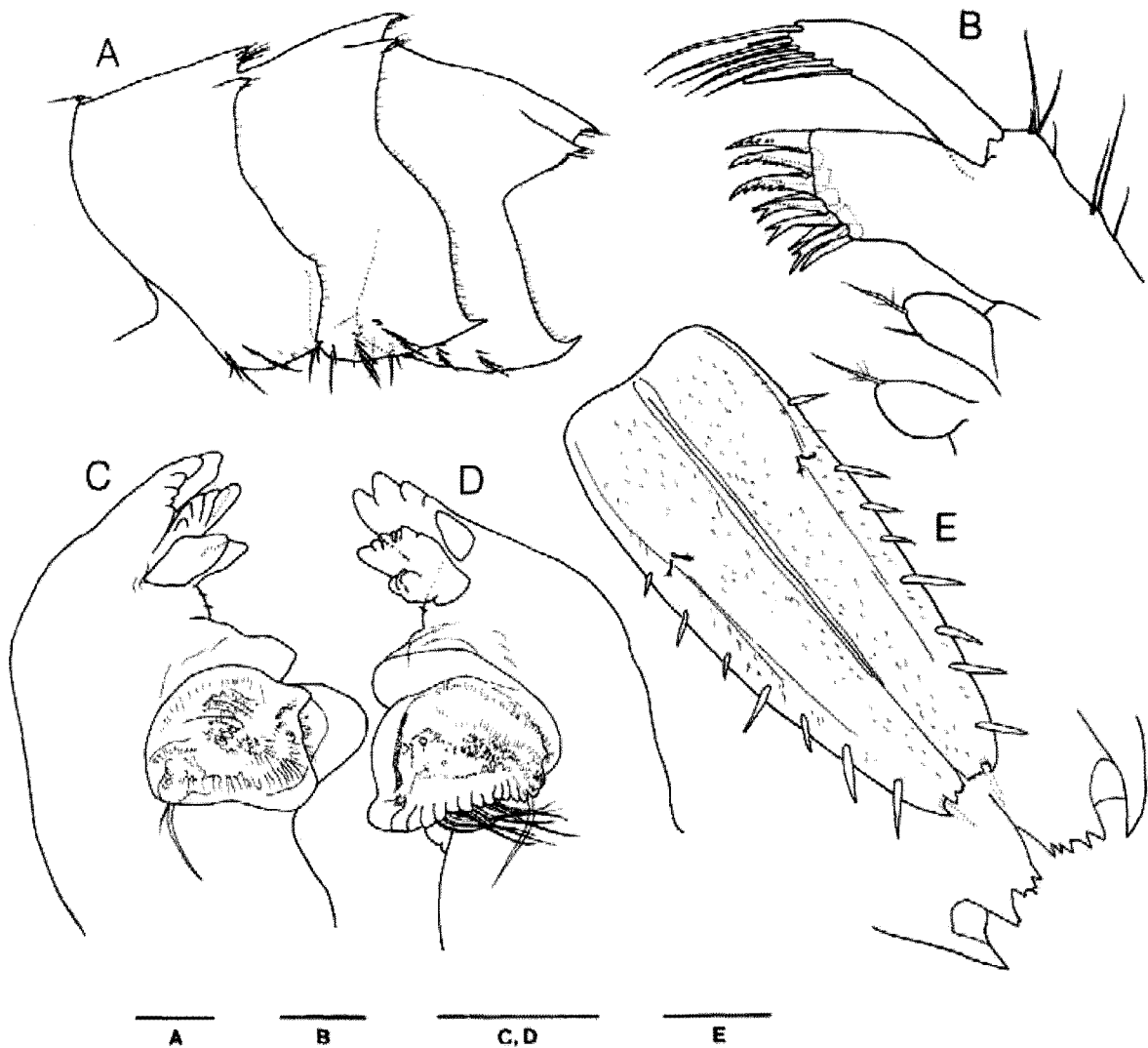


Fig. 5. *Paradexamine jindoensis* n. sp., female, 5.0 mm: A, pleonites; B, maxilla 1; C, left mandible; D, right mandible; E, telson. Scales bars=0.2 mm (A), 0.1 mm (C-E), 0.05 mm (B).

morphological differences are found between our new species and *P. houtete*: 1) the peduncular article 2 of antenna 1 is 1.3-1.5 times as long as article 1 (while subequal in *P. houtete*); 2) the spines of mandible are a little tiny, about 1/10 as long as lacinia mobilis (while 1/3 as long as lacinia mobilis in *P. houtete*); 3) the outer lobe of lower lip bears unequal in length of 2 corns (while subequal in 2 corns in *P. houtete*); 4) the inner margin of inner plate of maxilla 2 bears 4-5 simple setae (while lacking seta in *P. houtete*); 5) the inner plate of maxilliped bears 7 lateral setae (while lacking seta in *P. houtete*); 6) the articles of pereopods 3-7 narrow and longish (while shorter and wider in *P. houtete*); 7) the carpus of pereopods 6-7 are slightly longer than propodus (while propodus 1.25 times as long as carpus in *P. houtete*); 8) coxa 7 without posterodistal tooth (while with a pointed tooth in *P. houtete*).

The new species is also similar to *Paradexamine marlie*

Barnard, 1972 from Japanese waters written by Hirayama (1984). But, Hirayama might misidentify his specimen as *P. marlie*. The tooth formulae of dorsal pleonites in *P. marlie* 1-3-3-0, rear to front, that is, teeth are not developed on pleonite 1, but Hirayama's description of tooth formulae 1-3-3-3, is rather similar to that in our new species. But our new species is distinguished from Hirayama's description by the combination of the following features: 1) the inner plate of maxilliped bearing lateral setae in our new species (while lacking seta in Hirayama's description); 2) telson, basis of pereopods 5 and 7 are slender and longish in our new species (while more wider in Hirayama's description).

**Distribution.** The new species is known only from the type locality, Jindo Island, Korea.

**Etymology.** The new species is named after the type locality, Jindo Island, Korea.

**Table 1.** Character comparison of *Paradexamine* species which bearing pleonites tooth formulae 1-3-3-3

Character and distribution	Species					
	<i>P. churinga</i> (♀)	<i>P. houtete</i> (♀)	<i>P. micronesica</i> (♂?)	<i>P. gigas</i> (♂)	Hirayama's specimen (♀)	<i>P. jindoensis</i> n. sp. (♀)
Body length	3.4 mm	3.7 mm	3.0 mm	3.5 mm	3.5 mm	5.5 mm
Pleonites tooth formulae	1-3-3-3-0	1-3-3-3-0	1-3-3-3-0	1-3-3-3-0	1-3-3-3-0	1-3-3-3-0(1)
Ocular lobe	rounded	acute	acute	acute	acute	acute
Lower lip mandibular process	apically unturned	apically unturned	blunt, weakly developed	blunt, weakly developed	apically unturned	apically unturned
corn	1 long 1 medium corns	subequal in 2 corns	1 corn	1 corn	2 corns	1 long and 1 short corns
Mandible accessory spine	2 large spine (R) 3 large spine (L)	2 thin, short spine	no spine	no spine	?	1 or 2 tiny spines (R) 2 or 3 tiny spines (L)
Maxilla 2 inner margin of inner plate	no seta	no seta	no seta	no seta	4 setae	4-5 setae
Maxilliped inner plate	small, no lateral seta	no lateral seta	vestigial, no lateral seta	very small, no lateral seta	no lateral seta	7 lateral setae
Antenna 1 length of peduncular article 2	1.2 times as long as article 1	subequal in length	1.6 times as long as article 1	1.5 times as long as article 1	slightly longer than article 1	1.3-1.5 times as long as article 1
Gnathopod 1 number of interior side setae of propodus	7-9	5	4	several	9	8
Peropods 6, 7	carpus slightly longer than propodus	propodus 1.25 times as long as carpus	propodus 2/3 as long as carpus	carpus slightly longer than propodus	carpus slightly longer than propodus	carpus slightly longer than propodus
	narrow and longish	short and wide	narrow and longish	narrow and longish	narrow and longish	narrow and longish
Telson	slender and longish	slender and longish	slender and longish	rectangular	long oval	slender and longish
Distribution	Australia (Barnard, 1972)	New Zealand (Barnard, 1972)	Madagascar (Ledoyer, 1986), Japan (Hirayama, 1984)	Japan (Hirayama, 1984), Korea (Kim et al, 2006)	Japan (Hirayama, 1984)	Jindo Is., Korea (in the present study)

## ACKNOWLEDGMENTS

This research was supported by a grant (no. 2006-421) from the Ministry of Environment of the Korean Government.

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[Received August 4, 2008; accepted September 12, 2008]