

Terrestrial Isopoda (Crustacea) from Cheju Island, Korea

Do Heon Kwon

(Department of Biology, Inje University, Kimhae 621-749, Korea)

ABSTRACT

Twenty-one species of the terrestrial isopods are recorded from Cheju Island and Ch'uja Islands, Korea. *Quepartoniscus tuberculatus*, n. gen., n. sp., is described. The genus *Koshiniscus* Nunomura is considered to be a junior synonym of *Armadilloniscus* Uljanin, *Armadilloniscus hoshikawai* Nunomura and *A. amakusaensis* Nunomura of *A. ellipticus*, *Mongoloniscus nipponicus* (Arcangeli) of *M. vannamei* (Arcangeli), *Nagurus tsushimaensis* Nunomura, *N. pallidus* Nunomura, and *Mongoloniscus nigrogranulatus* Kwon and Taiti of *M. koreanus* (Verhoeff). *Nagurus sinuosus* Nunomura is transferred to *Lucasioides* Kwon, *Protracheoniscus pannuosus* Nunomura (of which *P. awaensis* Nunomura, *Nagurus gotoensis* Nunomura, and *N. izuharaensis* Nunomura are synonyms) to *Agnara* Budde-Lund, and *Armadillo obscurus* Budde-Lund to *Venezillo* Verhoeff. Several poorly known species are re-described and illustrated.

Key words: Terrestrial Isopoda, new genus, new species, Cheju Is., Ch'uja Is., Korea

INTRODUCTION

Recently Kwon (1993), in his review and comprehensive account, recorded 18 species of Oniscidea from Korea including North Korea. And Kwon *et al.* (1993) added a new species, *Littorophiloscia lineata* and considered *L. koreana* Ferrara and Taiti, 1976 to be a junior synonym of *L. nipponensis* Nunomura, 1976 from Japan. So prior to this study, 19 species in 8 families of Oniscidea have been reported from Korea. Certainly this list is far from the real number of oniscidean

species present in Korea.

Korea, together with northern China and Japan, belongs to the Manchurian subregion of the Palaearctic region. Cheju Island (126°9'-126°58'E, 33°6'-34°0'N) is the largest island (area: 1825 km²) in Korea and located at the southernmost part of Korea. Ch'uja Islands (126°15'-126°30'E, 33°52'-34°0'N), located in the Korea Strait, are about 45 km north of Cheju Is. Cheju Is. and other islands lying in the Korea Strait maintain subtropical forests and the climate of the area is much milder than that of the Korean Peninsula. So the faunal study of this area is very interesting, considering the terrestrial isopods show the high diversity in tropical areas. But the knowledge of terrestrial isopods from these islands has been very poor. Only 6 species were previously recorded from Cheju Is. (Kwon, 1991; Kwon *et al.*, 1993): *Ligia exotica* Roux, *Ligidium koreanum* Flasarova, *Littorophiloscia nipponensis* Nunomura, *L. lineata* Kwon, Lee and Jeon, *Burmoniscus mauritiensis* Taiti and Ferrara, and *Armadillidium vulgare* (Latreille).

This paper deals with the recent material intensively collected by the author and his students from Cheju Is. and Ch'uja Is.

MATERIALS AND METHODS

Materials were collected from Cheju Island and near-by islets in June 1992 and May 1993, and from Ch'uja Is. in September 1993. For comparison, type specimens described by Nunomura (1984, 1987, 1990) and material collected by Prof. F. Silvestri (Portici) from Korea and Japan and studied by Arcangeli (1927, 1952) were also re-examined.

For the bibliography of each species, as a rule, only the original description and records from Korea are cited. In 'Material examined', collectors are referred only when the specimens were not collected by the author.

Abbreviations:

DEAP : Dipartimento di Entomologia Agraria dell'Universit , Portici, Italy

IJB : Department of Biology, Inje University, Kimhae, Korea

MHNG : Muséum d'Histoire Naturelle, Genève

TOYA : Toyama Science Museum, Toyama, Japan

DESCRIPTIONS

Family TYLIDAE Milne-Edwards, 1840 갯쥐머느리과(신칭)

Genus *Tylos* Audouin, 1826 갯쥐머느리속(신칭)

***Tylos granuliferus* Budde-Lund, 1885** 갯쥐머느리

Tylos granulatus Miers, 1877, p. 674, pl. 69, fig. 2, nomen nudum [non Krauss]

Tylos granuliferus Budde-Lund, 1885, p. 279; Kwon, 1993, p. 134, figs. 1-3.

Material examined. 35 ♂♂, 13 ♀♀, Udo, Piyangdo, 25.vi.1992, leg. J.T. Kim & K.H. Kang; 8 ♂♂, Söngsan-ri, sand beach, 24.vi.1992, leg. D.S. Jeon, J.T. Kim & K.H. Kang; 27 ♂♂, 10 ♀♀, Pyosön Beach, 24.vi.1992; 12 ♂♂, 8 ♀♀, 9 juvs., And k, Sagye-ri, coarse sand, 28.v.1993. (All

in IJB)

Distribution. Korea and Japan.

Family LIGIIDAE Brandt & Ratzeburg, 1833 갯강구과(신칭)

Genus *Ligia* Fabricius, 1798 갯강구속(신칭)

***Ligia exotica* Roux, 1828** 갯강구

Ligia exotica Roux, 1828, p. 3, pl. 13, fig. 9; Kwon, 1993, p. 137.

Ligia (Megaligia) exotica: Flasarova, 1972, p. 92, figs. 1-5.

Material examined. 3 ♂♂, Cheju, nr. Yongduam Rock, 26.vi.1992; 1 ♂, Choch'ön-üp, Sinch'on-ri, 26.vi.1992; 1 ♂, 1 ♀, Hamdök-ri, 26.vi.1992, leg. J.T. Kim & K.H. Kang; 7 ♂♂, 1 ♀, Udo, Obong-ri, 25.vi.1992; 1 ♂, 2 ♀♀, Söngsan-ri, 25.vi.1992; 2 ♂♂, Namwön-üp, Harye-ri, Mangjangp'o, 24.vi.1992; 2 ♂♂, 1 ♀, Sögwip'o, Sögwí-2-dong, 23.vi.1992; 5 ♂♂, 2 ♀♀, Andök, Hwasun-ri, 23.vi.1992, leg. D.S. Jeon & K.H. Kang; 1 ♂, 3 ♀♀, Kap'ado, 28.v.1993, leg. D.S. Jeon; 1 ♂, 2 ♀♀, Hangyöng, Kosan-ri, 27.vi.1992; 1 ♂, 4 ♀♀, Sangch'ujado, Taesö-ri, 26.ix.1993, leg. D.S. Jeon & Y.D. Seo; 5 ♂♂, 6 ♀♀, Hach'ujado, Yech'o-ri, 25-26.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Distribution. Circumtropical. Also distributed in China, Korea, and Japan.

Genus *Ligidium* Brandt, 1833 멧강구속(신칭)

***Ligidium koreanum* Flasarova, 1972** 멧강구

Ligidium koreanum Flasarova, 1972, p. 95, figs. 6-22; Kwon, 1993, p. 137.

Ligidium japonicum (non Verhoeff): Arcangeli, 1927, p. 267 [in part, from "Keijo" (= Pyongyang)]; Arcangeli, 1952, p. 311 [in part, from "Keijo"].

Material examined. 6 ♂♂, 4 ♀♀, Cheju, Ponggae-dong, 26.vi.1992; 2 ♂♂, 2 ♀♀, Choch'ön, Kyorae-ri, Sangumburi, 400 m in altitude, 24.vi.1992; 2 ♂♂, 3 ♀♀, nr. Manjanggal Cave, 26.vi.1992; 10 ♂♂, 17 ♀♀, Pijarim, 26.vi.1992; 2 ♀♀, Pyosön, Kasi-ri, 520 m in altitude, 24.vi.1992; 20 ♂♂, 41 ♀♀, Namwön-üp, Sillye-ri, Suak Valley, 520 m in altitude, 22.vi.1992; 19 ♂♂, 22 ♀♀, Halla Mt., Tonnaek'o, 500-650 m in altitude, 22.vi.1992, leg. D.S. Jeon & K.H. Kang; 1 ♂, Sögwip'o, Chöngbang-dong, 22.vi.1992; 2 ♀♀, Sammaebong, 22.vi.1992; 2 ♂♂, 9 ♀♀, Ch'önjeyön Waterfall, 23.vi.1992; 2 ♂♂, 5 ♀♀, Halla Mt., Yöngsil, 1000-1200 m in altitude, 23.vi.1992; 2 ♂♂, 5 ♀♀, Andök Valley, 27.v.1993; 1 ♂, 1 ♀, Hallim-üp, Sangmyöng-ri, 27.vi.1992; 8 ♂♂, 4 ♀♀, Aewöl-üp, Kwangryöng-1-ri, 27.vi.1992. (All in IJB).

Distribution. Korea and Japan (Kyushu and Tsushima Is.).

Family SCYPHACIDAE Dana, 1852 세갈래취머느리과(신칭)

Genus *Quelpartoniscus*, n. gen. 솔래취머느리속(신칭)

Type species. *Quelpartoniscus granulatus*, n. sp.

Diagnosis. Not able to roll up. Frontal line absent, supra-antennal line present. No noduli laterales. Pleon abruptly narrower than pereon. Antennule 3-segmented. Antenna with 4-articulated flagellum with minute (rudimentary) distal article. Mandible with multi-branched (more than 10) molar penicil. Maxillular endopod with 2 penicils. Maxilliped with 2-segmented palp; distal segment 4-lobed on inner margin; endite bearing a penicil. All pereopods with dactylar

organ. Pleopod exopods without lung. Uropod with cylindrical protopod, not grooved laterally; insertion of endopod proximal to that of exopod. Gender masculine.

Etymology. Quelpart + *Oniscus*. The generic name is derived from Quelpart Is., the former name of Cheju Is. which was known to the Westerners.

Remarks. The new genus is tentatively included in the family Scyphacidae, because it possesses all the characters of the genus, with the exception of the morphology of uropod, as defined and illustrated by Vandel (1973); especially the antenna with 4-articulated flagellum although the distal article is rudimentary, and the mandible with molar penicil multi-branched (more than 10), and the maxillular endopod bearing penicils. But the morphology of the uropod, with cylindrical protopod not grooved laterally and endopod inserted proximally than exopod, fits with the family Olibrinidae. This suggests that the new genus might belong to a new family but, for the time being, I prefer not to create a new one until a comparative revision of closely related genera ascribed in Scyphacidae (*Deto* Guérin, 1836, *Scyphax* Dana, 1852, *Alloniscus* Dana, 1856, *Scyphacella* Smith, 1873, *Armadilloniscus* Uljanin, 1875, *Scyphoniscus* Chilton, 1901, *Detonella* Lohmander, 1927, and *Marioniscus* Barnard, 1932) and Olibrinidae (*Olibrinus* Budde-Lund, 1913 and *Adoniscus* Vandel, 1955) is performed, because the family Scyphacidae is a heterogeneous taxon (Arcangeli, 1957).

***Quelpartoniscus granulatus*, n. sp. (Figs. 1, 2) 슬래쥐머느리(신칭)**

Holotype. ♂, 6.5 mm, Namwŏn-ŭp, Harye-ri, Mangjangp'o, dump of gravels in supralittoral zone, 24.vi.1992, leg. D.H. Kwon *et al.* (MHNG).

Paratypes. 3 ♂♂, 4 ♀♀, same data as holotype (MHNG); 5 ♂♂, 10 ♀♀, same data (IJB).

Description. Maximum length of male 6.5 mm, of female 7.7 mm. Color in alcohol light brown with usual pale muscle spots, both rami of uropod pigmentless. Cephalon and pereon covered with numerous tubercles topped with a scale spine on each, pleonites 1-3 each with a transverse row of tubercles near posterior margin; each tubercle bearing a scale spine on top. No noduli laterales and gland pores. Eye with about 15 ommatidia. Cephalon without frontal line, supra-antennal line bent downwards in middle. Pleon discontinuously narrower than pereon; pleonites 3-5 with small lateral points directed posteriorly. Telson triangular with distal part bent downwards. Antennule composed of 3 articles; article 2 bearing a long and a short plumose setae at distal corner, article 3 bearing a longitudinal series of 7-9 aesthetascs; aesthetascs not modified. Antenna long; peduncle and flagellum covered with numerous tubercles bearing a scale spine each on top; 3-articulated flagellum shorter than peduncular segment 5, flagellar articles 2 and 3 bearing 5 and 8 superimposed aesthetascs, respectively. mandible with molar penicil consisted of 10-12 plumose setae. Maxillular exopod with 12 inwardly curved teeth (with some denticulated), 1 outwardly curved tooth and 1 plumose seta; endopod with 2 penicils of unequal size at apex. Maxilliped with palp 4-lobed on inner margin; endite bearing 1 penicil and 3 teeth at apex. Pereopods with simple dactylar organ. Uropod with stout protopod shorter than exopod; insertion of endopod proximal to that of exopod, half the length of protopod.

Male. Pereopods 1-2 carpus swollen on sternal margin. Pereopods 1-3 propodus, carpus and merus densely lined with blunt setules on rostral surface, sternal surface and sternal margin, respectively. Pereopod 1 carpus with setose area. Pereopod 7 ischium concave on sternal margin, slightly twisted. Pleopod 1 endopod straight with apical part folded over and rounded apex; exopod triangular.

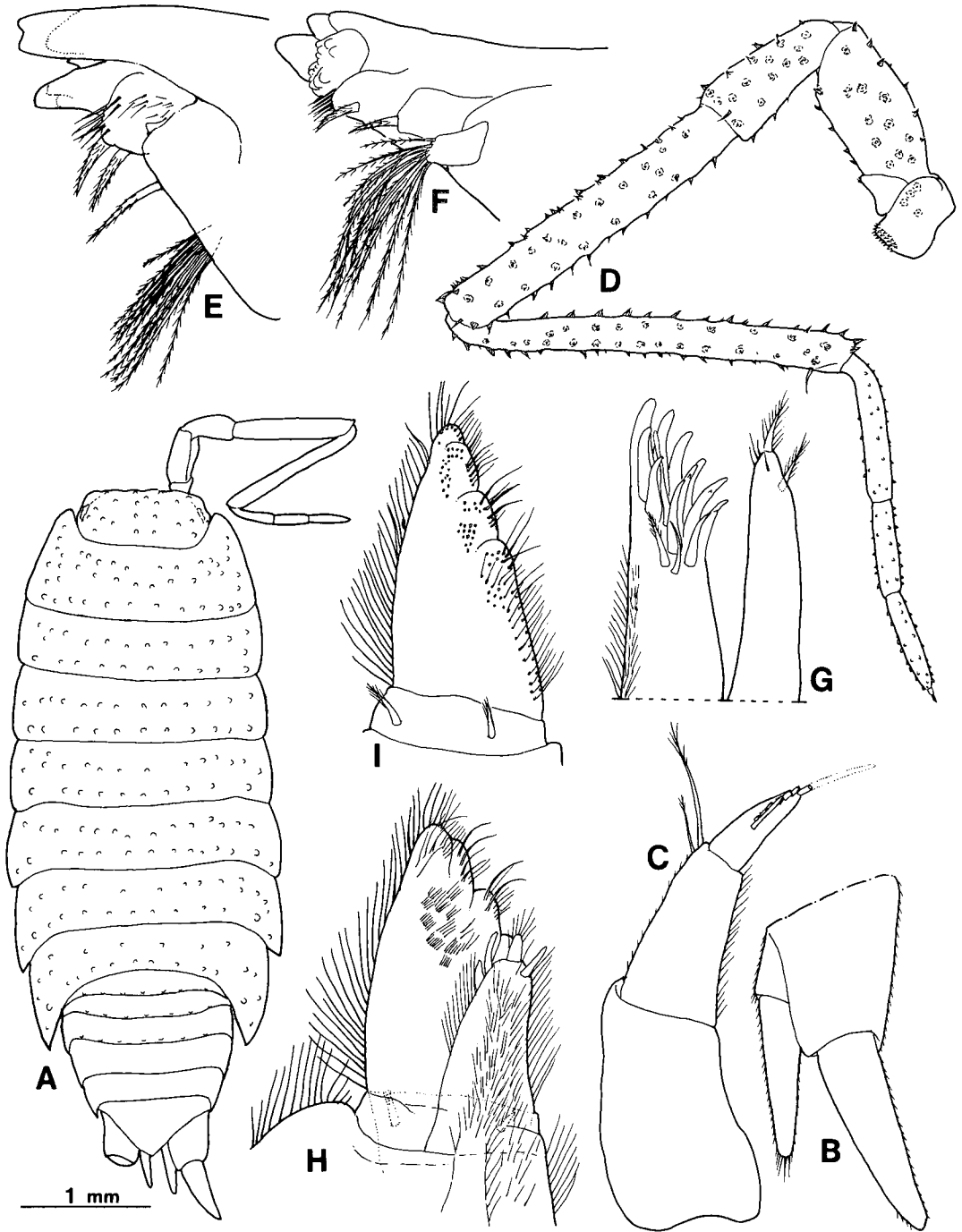


Fig. 1. *Quepartoniscus granulatus*, n. gen., n. sp., ♂: A, habitus; B, right uropod; C, antennule; D, antenna; E, left mandible; F, right mandible; G, maxillule; H, maxilliped; I, maxillipedal palp.

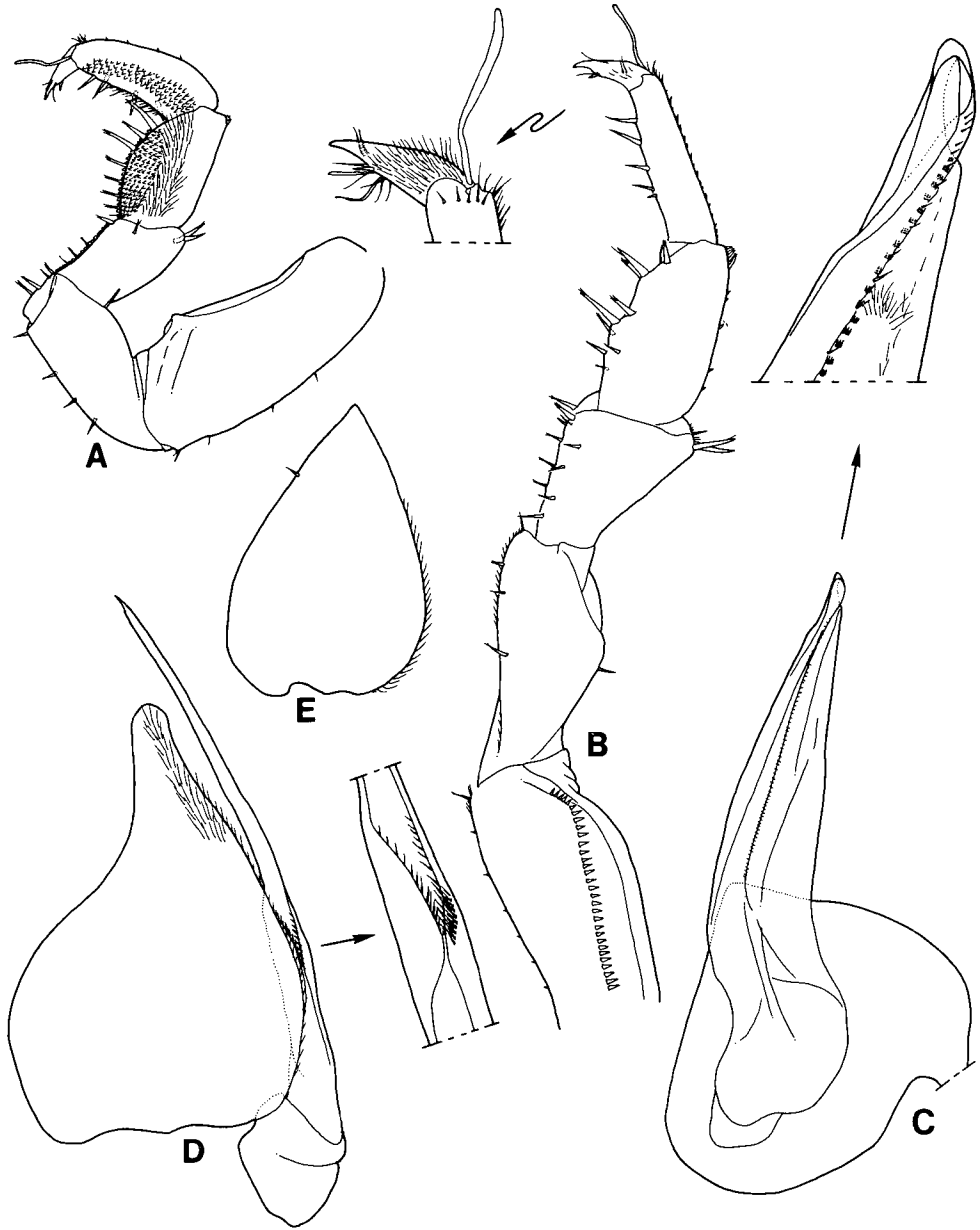


Fig. 2. *Quepartoniscus granulatus*, n. gen., n. sp., ♂: A, pereopod 1; B, pereopod 7; C, pleopod 1; D, pleopod 2; E, pleopod 5 exopod.

Pleopod 2 endopod styliform with acute apex; exopod longer than wide with concave outer margin; no marginal plumose setae.

Etymology. The specific name is derived from the granulated dorsum.

Remarks. This species lives in a dump of gravels of about 5 cm in diameter under influence of wave. Nunomura (1986, 1990) described *Scyphax nipponensis* from Misaki, Osaka Pref., Japan, and S.

tsushimaensis from Tsushima Is., respectively. They certainly are not members of *Scyphax* and probably belong to *Quelpartoniscus*. But the new species is distinguished from both of the Japanese species by the trapezoid cephalon.

Genus *Alloniscus* Dana, 1856 모래무지취머느리속 (신칭)

***Alloniscus balssi* (Verhoeff, 1928)** 모래무지취머느리 (신칭)

Japononiscus balssi Verhoeff, 1928: 32, figs. 7-16.

Alloniscus balssi: Kwon, 1993: 138, fig. 4.

Material examined. 2 ♂♂, 4 ♀♀, Cheju, nr. Yongduam Rock, 26.vi.1992; 16 ♂♂, 11 ♀♀, Choch'on-ŭp, Sinch'on-ri, 26.vi.1992; 2 ♂♂, 7 ♀♀, Hamdök-ri, sand dune, 26.vi.1992. 8 ♂♂, 4 ♀♀, Kujwa-ŭp, Hado-ri, 26.vi.1992; 5 ♂♂, 10 ♀♀, Udo, Piyangdo, 25.vi.1992, leg. J.T. Kim & K.H. Kang; 11 ♂♂, 5 ♀♀, Söngsan-ri, 25.vi.1992; 4 ♀♀, Pyosön Beach, 24.vi.1992; 16 ♂♂, 16 ♀♀, Namwön-ŭp, Harye-ri, Mangjangp'o, 24.vi.1992; 2 ♂♂, 2 ♀♀, Chöngbang-dong, nr. Chöngbang Waterfall, 22.vi.1992; 5 ♂♂, 9 ♀♀, 1 juv., Andök, Sagye-ri, 28.v.1993; 1 ♂, 7 ♀♀, Taejöng, Sindo-2-ri, Pangatdong, 28.v.1993; 11 ♂♂, 20 ♀♀, Kap'ado, 28.v.1993, leg. D.S. Jeon; 5 ♂♂, 9 ♀♀, Hangyöng, Kosan-ri, 27.vi.1992; 4 ♂♂, 5 ♀♀, Aewöl-ŭp, Aewöl-ri, Handamdong, 27.vi.1992; 30 ♂♂, 40 ♀♀, 47 juvs., Hach'ujado, Yech'o-ri, 25.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Distribution. Korea and Japan.

Genus *Armadilloniscus* Uljanin, 1875 세갈래취머느리속 (신칭)

***Armadilloniscus hawaiianus* Taiti and Ferrara, 1989** 두드럭세갈래취머느리 (신칭)

Armadilloniscus hawaiianus Taiti and Ferrara, 1989: 75, fig. 14.

Material examined. 1 ♀, Udo, Obong-ri, supralittoral zone, under cobble on very coarse sand, 25.vi.1992 (IJB).

Distribution. Korea, Japan, and Hawaii Is.

Remarks. The single female specimen is tentatively identified as *Armadilloniscus hawaiianus* described from Coconut Island, Oahu, Hawaii Islands (Taiti and Ferrara, 1989) although there are slight differences in the tergal ornamentation: cephalon with 2 more small tubercles in front of 2 anterior prominent bosses, pleonite 1 with 2 small tubercles, pleonite 3 with a smaller tubercle each lateral to paramedian one. The present material was collected together with *Armadilloniscus ellipticus*. Nunomura (1990) instituted a new genus, *Koshiniscus*, and described a new species, *K. notojimensis*, from Notojima Island, Ishikawa Pref., Honshu, Japan and placed the genus in the family Trichoniscidae. But *K. notojimensis* might be ascribed to *Armadilloniscus* in the shape of telson and uropod and is most probably conspecific with the present specimen, considering the tergal ornamentation. So *Koshiniscus* is considered a junior synonym of *Armadilloniscus*.

***Armadilloniscus ellipticus* (Harger, 1878)** 세갈래취머느리 (신칭)

Armadilloniscus ellipticus Harger, 1878, p. 373; Kwon, 1993, p. 139.

Armadilloniscus litoralis: Taiti & Ferrara, 1989, p. 82.

Material examined. 2 ♂♂, 29 ♀♀, Udo, Obong-ri, supralittoral zone, under cobble on very coarse sand, 25.vi.1992; 9 ♂♂, 31 ♀♀, Andök, Taep'yöng-ri, 27.v.1993; 16 ♂♂, 27 ♀♀, 1

juv., Kap'ado, 28.v.1993, leg. D.S. Jeon. (All in IJB).

Distribution. Korea, Japan, Hong Kong, Malaysia, Hawaii Is., the Atlantic coast of North America, Bermuda, Madeira, Azores, Mediterranean coasts, and Madagascar.

Remarks. Re-examination of *Armadilloniscus hoshikawai* Nunomura, 1984 (♂ holotype, JAPAN, Okinawa I., Itoman City, Komesu, TOYA Cr-2777) and *A. amakusaensis* Nunomura, 1984 (♂ holotype, JAPAN, Kumamoto Pref., Reihoku-cho, Tomioka, Tomoe-zaki, TOYA Cr-2781) proved that these species were synonymous with *A. ellipticus*. For further synonymy of this species, refer to Taiti and Ferrara (1989).

***Armadilloniscus albus* Nunomura, 1984 (Figs. 3, 4) 흰세갈래쥐머느리(신칭)**

Armadilloniscus albus Nunomura, 1984: 16, figs. 38-39.

Material examined. 4 ♂♂, 3 ♀♀, 1 juv., Hach'ujado, Yech'o-ri, 25-26.ix.1993, leg. D.S. Jeon &

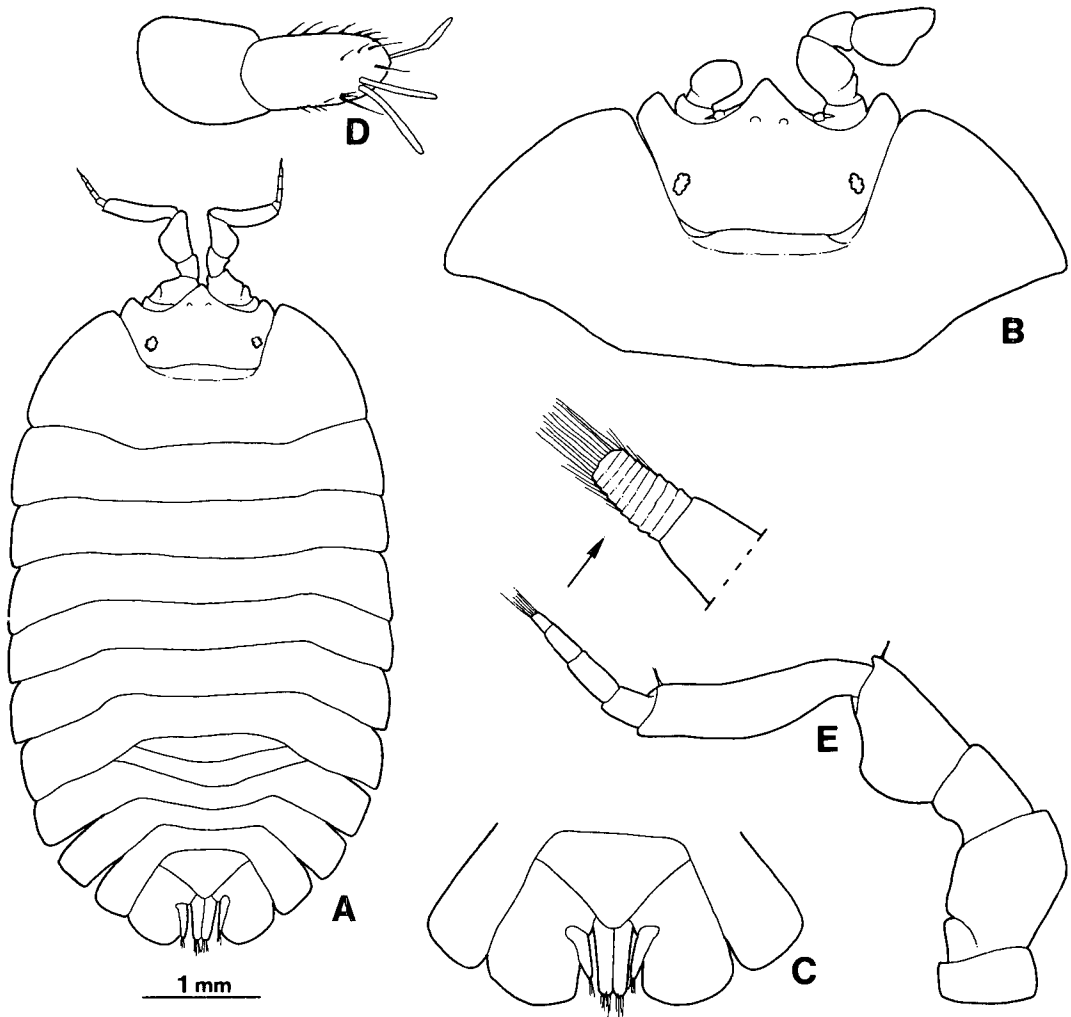


Fig. 3. *Armadilloniscus albus* Nunomura: A, habitus; B, cephalon and pereonite 1; C, pleonite 5, telson and uropods; D, antennule; E, antenna.

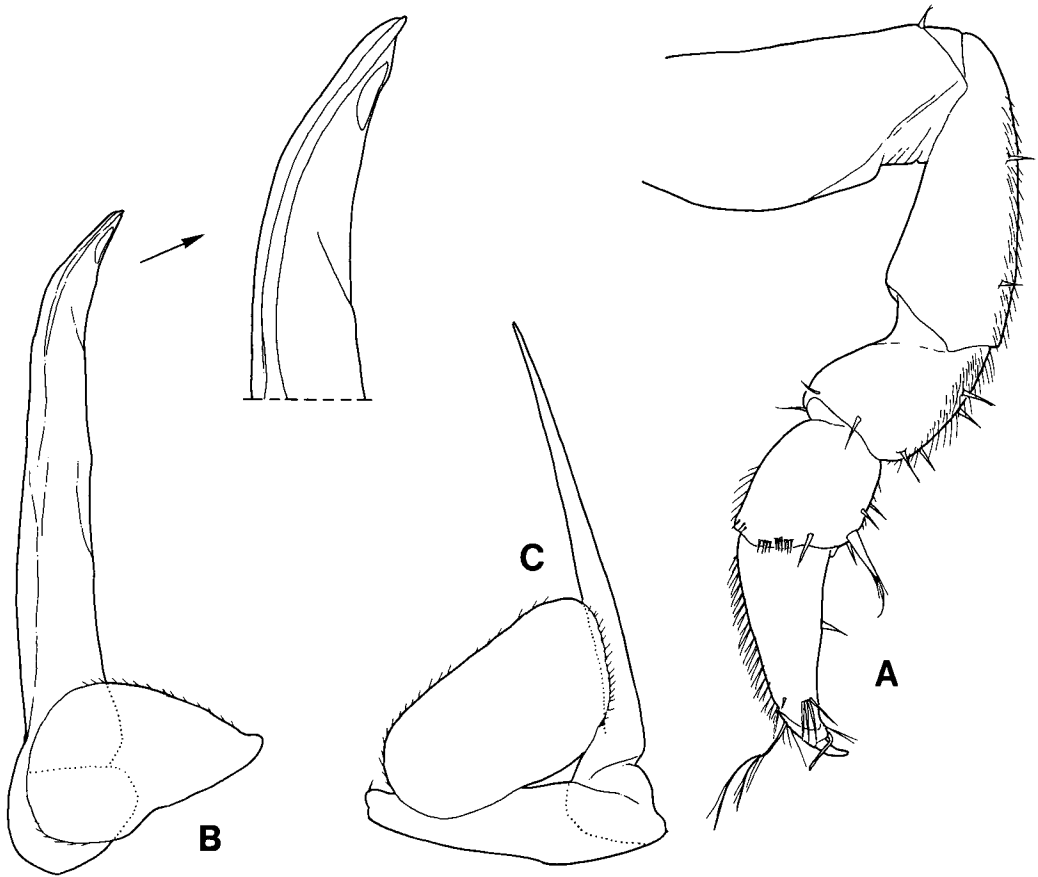


Fig. 4. *Armadilloniscus albus* Nunomura, ♂: A, pereopod 7; B, pleopod 1; C, pleopod 2.

Y.D. Seo; 4 ♀♀, Sangch'ujado, Taesŏ-ri, 26.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Type material examined. ♂ (Holotype, TOYA-Cr-2769), JAPAN, Osaka Pref., Sennan-gun, Misaki-cho, Nagamatsu (near Nagasaki), 18.ix.1975, leg. N. Nunomura.

Distribution. Korea and Japan.

Remarks. The present specimens were identified after comparison with the holotype. *Armadilloniscus albus* is easily distinguished from all the other species of the genus by the peduncular segment 4 of antenna with enlarged basal part. The diagnostic characters are illustrated in Figs. 3 and 4 based on the specimens from Korea.

Family PHILOSCIIDAE 남방취머느리과 (신칭)

Genus *Littorophiloscia* Hatch, 1947 갯가취머느리속

***Littorophiloscia nipponensis* Nunomura, 1986** 갯가취머느리

Littorophiloscia nipponensis Nunomura, 1986, p. 10, fig. 61; Kwon et al., 1993, p. 556, fig. 1.

Littorophiloscia koreana Taiti & Ferrara, 1986, p. 1369, figs. 14-15; Kwon, 1993, p. 139.

Material examined. 3 ♀♀, Andŏk, Taep'yŏng-ri, 27.v.1993; 3 ♂♂, 14 ♀♀, Kap'ado, 28.v.1993, leg. D.S. Jeon; 17 ♂♂, 34 ♀♀, Hach'ujado, Yech'o-ri, seashore, 25.ix.1993, leg. D.S. Jeon

& Y.D. Seo. (All in IJB).

Distribution. Korea and Japan.

***Littorophiloscia lineata* Kwon, Lee and Jeon, 1993** 등줄갯가쥐며느리

Littorophiloscia lineata Kwon, Lee and Jeon, 1993, p. 558, figs. 2-3.

Material examined. 13 ♂♂, 13 ♀♀, Sögwip'o, Sögwí-2-dong, 23.vi.1992; 5 ♂♂, 9 ♀♀, Mosülp'o, 27.v.1993; 4 ♂♂, 3 ♀♀, Hach'ujado, Yech'o-ri, 25.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Distribution. Korea.

Genus *Burmoniscus* Collinge, 1914 남방쥐며느리속(신칭)

***Burmoniscus mauritiensis* (Taiti and Ferrara, 1983)** 남방쥐며느리(신칭)

Renneloscia mauritiensis Taiti and Ferrara, 1983, p. 203, fig. 2.

Burmoniscus mauritiensis: Kwon, 1993, p. 139.

Material examined. 2 ♂♂, 19 ♀♀, Cheju, Ponggae-dong, 26.vi.1992; 1 ♂, 12 ♀♀, nr. Manjanggul Cave, 26.vi.1992; 4 ♂♂, 17 ♀♀, Kujwa-üp, Hado-ri, 26.vi.1992; 7 ♀♀, Söngsan, Onp'yöng-ri, 24.vi.1992. 5 ♀♀, Songüp, 24.vi.1992; 3 ♀♀, Namwön, T'aehüng-ri, 24.vi.1992; 1 ♂, 20 ♀♀, Sögwip'o, Chöngbang-dong, 22.vi.1992; 2 ♂♂, 20 ♀♀, Sammaebong, 22.vi.1992; 2 ♂♂, 6 ♀♀, Chungmun, 27.v.1993; 6 ♂♂, 21 ♀♀, Andök Valley, 23.vi.1992, leg. D.S. Jeon & K.H. Kang; 12 ♂♂, 20 ♀♀, Taejöng, Kuök-ri, 29.v.1993, leg. D.S. Jeon. (All in IJB).

Distribution. Korea (Cheju Is.), China, Taiwan, Hawaiian Islands, and Mauritius.

Family ONISCIDAE (?) Latreille, 1806

Genus *Exalloniscus* Stebbing, 1911 개미부치쥐며느리속(신칭)

***Exalloniscus silvestrii* Kwon and Taiti, 1993** 제주개미부치쥐며느리(신칭) (Figs. 5-7)

Exalloniscus silvestrii Kwon and Taiti, 1993, p. 27, figs. 98-113.

Material examined. 1 ♀, Cheju, nr. Yongduam Rock, 26.vi.1992; 1 ♂, 2 ♀♀, Hamdök-ri, sand dune, nr. ants' nest, 26.vi.1992; 1 ♀, nr. Majanggul Cave, 26.vi.1992; 1 ♀, Songüp, 24.vi.1992. 1 ♀, Halla Mt., Tonnaek'o, 500-650 m in altitude, 22.vi.1992, leg. D.S. Jeon & K.H. Kang; 1 ♂, 2 ♀♀, Sögwip'o, Chöngbang-dong, 22.vi.1992; 1 ♂, Chungmun, 27.v.1993; 11 ♂♂, 20 ♀♀, Andök, Hwasun-ri, Hadong, 28.v.1993; 1 ♀, Kap'ado, 28.v.1993, leg. D.S. Jeon; 2 ♂♂, Hach'ujado, Muk-ri, 26.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Description. Maximum length of male 2.9 mm, of female 3.7 mm. Color in alcohol creamy light with scattered brown pigments. Dorsum covered with two types of scale spines (Fig 6) regularly arranged. Body convex, lateral borders of pereonites not seen in dorsal view. Cephalon transversely wide; rounded antero-lateral lobes shorter than median lobe. Frontal line straight, supraantennal line bent downwards in middle. Eyes without lens, only demarcated by dark pigments. Pereonite 1 with straight posterior margin, postero-lateral corner more or less obtusely rounded, pleonite 2 with posterior margin straight and right-angled postero-lateral corner rounded. Pereonites 3-7 with corners progressively pointing further backwards. Pleonal epimera 3-5 falciform, directed backwards. Telson wider than long with concave sides and rounded apex. Antennule with two aesthetascs and a transverse row of superimposed ones on third article. Antenna with peduncular segment 5 shorter

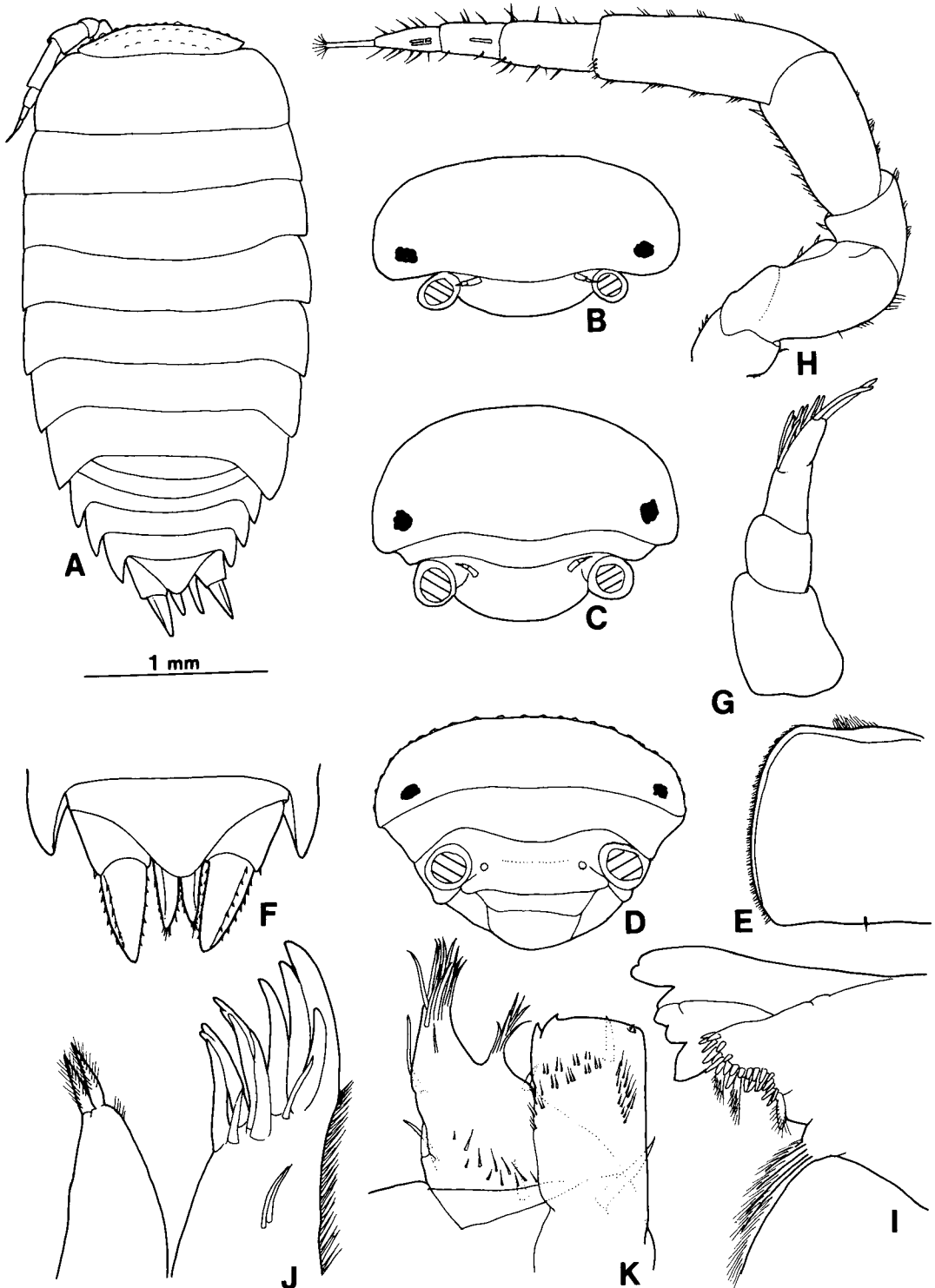


Fig. 5. *Exalloniscus silvestrii* Kwon and Taiti: A, habitus; B, cephalon, dorsal view; C, cephalon, frontal view; D, cephalon, anterior view; E, left perenite 1 epimeron; F, pleonite 5, telson and uropods; G, antennule; H, antenna; I, mandible; J, maxillule, K, maxilliped.

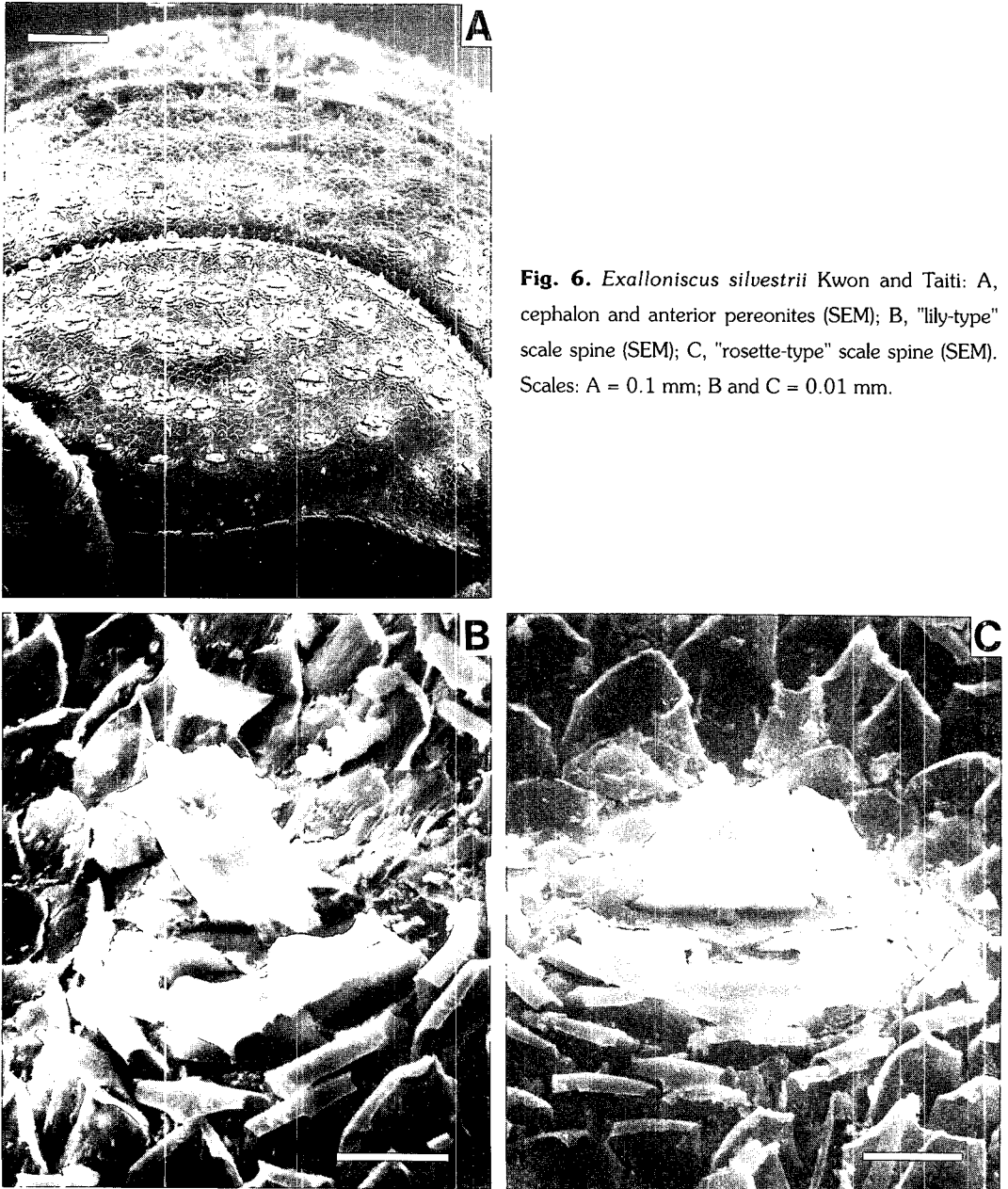


Fig. 6. *Exalloniscus silvestrii* Kwon and Taiti: A, cephalon and anterior pereonites (SEM); B, "lily-type" scale spine (SEM); C, "rosette-type" scale spine (SEM). Scales: A = 0.1 mm; B and C = 0.01 mm.

than flagellum; ratio of flagellar articles 3:2:2; flagellar articles 2 and 3 with 1 and 2 aesthetascs, respectively. Mandible with molar penicil consisting of some plumose setae, arising from a common stalk. Maxillule with endopod bearing 4 + 5 (2 cleft) long and 2 small teeth; endopod with two subequal penicils at apex. Maxilliped with a minute penicil on endite. Uropod with protopod not exceeding tip of telson, and short exopod.

Male. Pereopod 1-2 with brushes of trifid setae on carpus and merus. Pereopod 7 ischium distally with quadrangular lobe on rostral surface of tergal margin. Pleopod 1 exopod wider than long with almost straight outer margin; endopod with 2 falciform lobes, diminishing in size distally, on outer

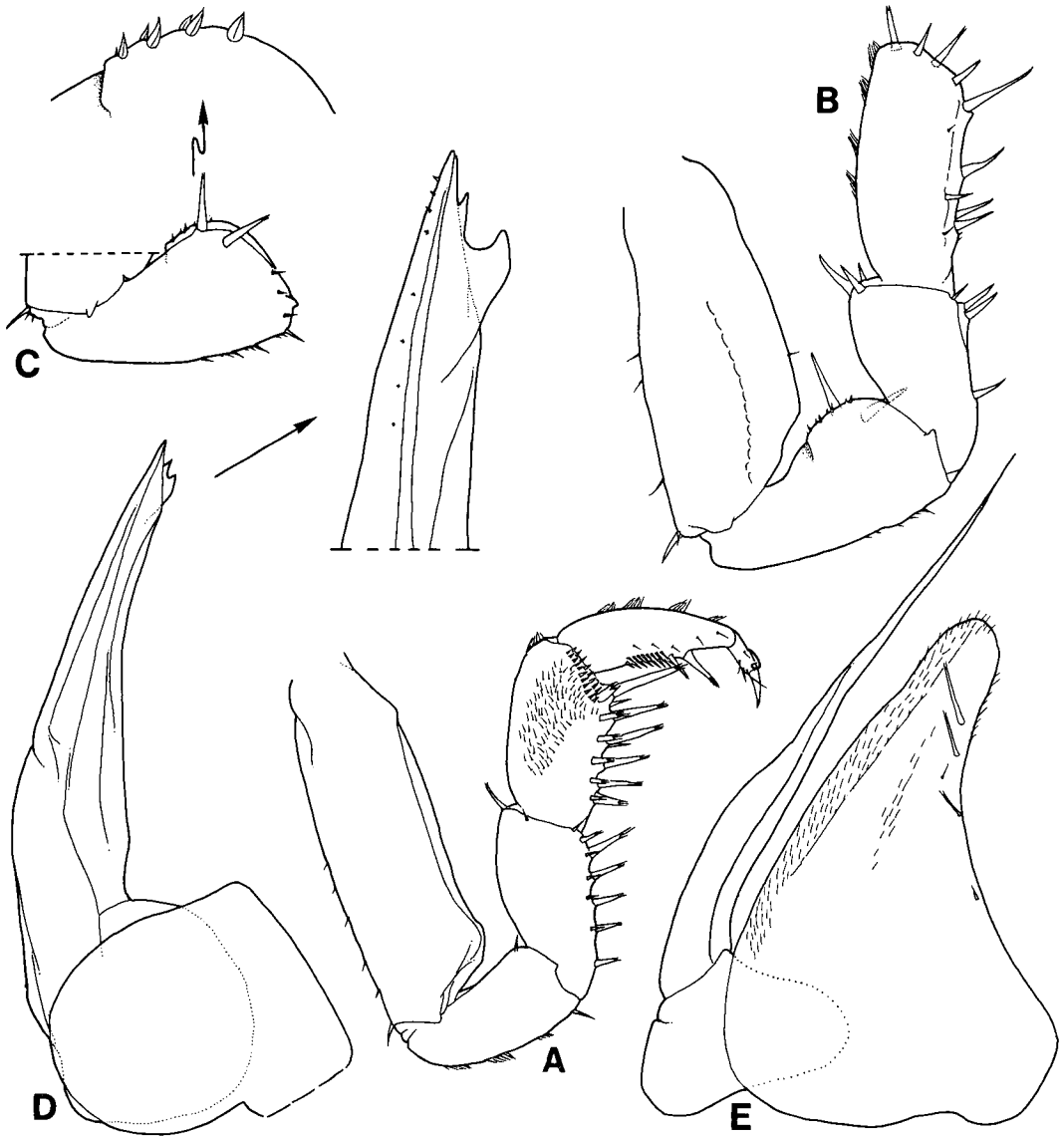


Fig. 7. *Exalloniscus silvestrii* Kwon and Taiti, ♂: A, pereopod 1; B, pereopod 7, part; C, ischium of pereopod 7, caudal surface; D, pleopod 1; E, pleopod 2.

margin of apical part and pointed apex. Pleopod 2 endopod with filiform distal part, much longer than exopod.

Distribution. Korea and southern China.

Remarks. Only two species of the genus *Exalloniscus* distribute the Palearctic Region (Manchurian subregion): *E. cortii* Arcangeli, 1927 from Korea, northern China and Japan, and *E. silvestrii* Kwon and Taiti, 1993 from southern China). *E. silvestrii* was described on a male and 2 females which were preserved in spirits for 67 years. It is redescribed and figured here on new material. The present specimens show slight differences from the original description; the present specimens have eye only

demarcated by pigments (vs. *e* ommatidia), male pereopod 7 ischium with quadrangular lobe on sternal margin distally (vs. medially) (compare Fig. 7C and Fig. 110 of Kwon and Taiti, 1993), male pleopod 1 endopod with apical part bearing 2 (vs. 3) falciform lobes. Almost all the species of *Exalloniscus* are found in association with ants or termites (Taiti and Ferrara, 1988; Ferrara *et al.*, 1988). The present species was sometimes collected near ants' nests but was not associated with ants. Many specimens were collected from places where there is no ants' nest.

Family TRACHELIPIDAE Strouhal, 1958 쥐머느리과(신칭)

Genus *Lucasioides* Kwon, 1993 돌쥐머느리속(신칭)

***Lucasioides sinuosus* (Nunomura, 1987) n. comb.** 제주돌쥐머느리(신칭) (Figs. 8-9)

Nagurus sinuosus Nunomura, 1987: 10, fig. 104.

Material examined. 7 ♂♂, 16 ♀♀, Sögwip'o, nr. Ch'önjeyön Waterfall, 23.vi.1992 (IJB).

Material re-examined. 1 ♂ (holotype, TOYA, Cr-6549), 1 ♀ (allotype, TOYA, Cr-6550), 2 ♂♂ [paratypes, TOYA, Cr-6551-6553 (mixed with 1 ♀ *Ligidium japonicum*)], Japan, Kochi Pref., Tosa-gun, Tosa-cho, Mitsutsuji-yama, 26.vii.1976 leg. Y. Nishikawa.

Description. Maximum length of male 9.5 mm, of female 12 mm. Color in alcohol brown or dark brown with pale muscle spots on cephalon and pereon; a lighter narrow band each on base of pereonites 2-7 epimera. Cephalon and pereon distinctly granulated. No gland pores. Co-ordinates of noduli laterales on pereonites typical of *Lucasioides*: noduli laterales on pereonites 2-4 much farther from lateral margins than those on pereonites 1 and 5-7. Eye with 12-15 ommatidia. Cephalon with well developed triangular median lobe, dorsally concave, and much protruding in the middle; rounded antero-lateral lobes well developed. All pereonal epimera bent outwardly. Pereonite 1 (Fig. 8E) with postero-lateral corners acutely rounded; posterior margin deeply concave at sides. Pereonite 2 with posterior margin slightly concave at sides. Telson triangular with much narrower distal part and deeply concave sides. Antenna 2 with peduncular article 5 longer than flagellum; ratio of flagellar articles 1: 2. Buccal pieces typical of *Lucasioides* (Kwon, 1993). Pleopodal exopods with *Protracheoniscus*-type lung. Uropodal exopod 1.5 times as long as endopod.

Male. Pereopod 7 carpus with rounded lamellate lobe on tergal margin; ischium with sternal margin slightly concave and fringed with setae, 8 trifold setae on tergal margin, rostral surface with a deep depression fringed with setule along proximal border. Pleopod 1 endopod with distal part beak-shaped and bent outwards, lined with minute setules; exopod with bilobed distal part, outer lobe larger than inner lobe. Pleopod 2 endopod styliform, longer than exopod. Pleopod 5 exopod as in Fig. 9D.

Distribution. Formerly recorded only from the type locality, Kochi Pref., Shikoku, Japan.

Remarks. This species was described by Nunomura (1987) as *Nagurus sinuosus*. As his definition of *Nagurus* (see Nunomura, 1987, p. 3) fits better to *Lucasioides*, this species has all the characters of the genus *Lucasioides*, including the *Protracheoniscus*-type lung, so is transferred to *Lucasioides*.

The specimens from Cheju Is. was identified after the comparison with the type specimens from Japan. *Lucasioides sinuosus* is close to *L. gliotosi* (Arcangeli, 1927) in the morphology of pereonite 1 but easily distinguished by the more developed median lobe and rounded antero-lateral lobes of cephalon, the bilobed distal part of pleopod 1 exopod in male with outer lobe larger than inner one (in *L. gliotosi*, inner lobe is larger).

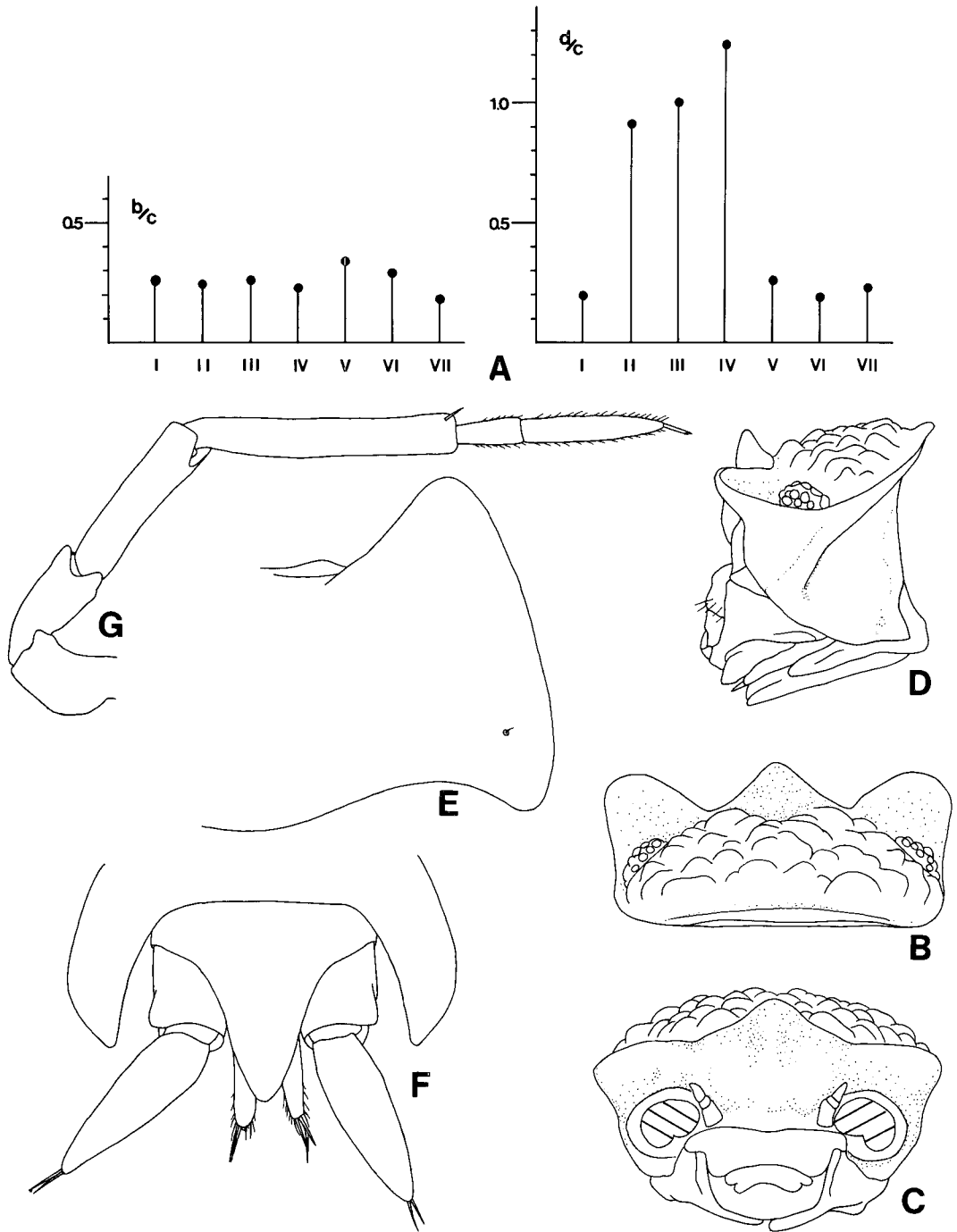


Fig. 8. *Lucasioides sinuosus* (Nunomura): A, co-ordinate of noduli laterales on pereonites; B, cephalon, dorsal view; C, cephalon, frontal view; D, cephalon, lateral view; E, right epimeron of pereonite 1; F, pleonite 5, telson and uropods; G, antenna.

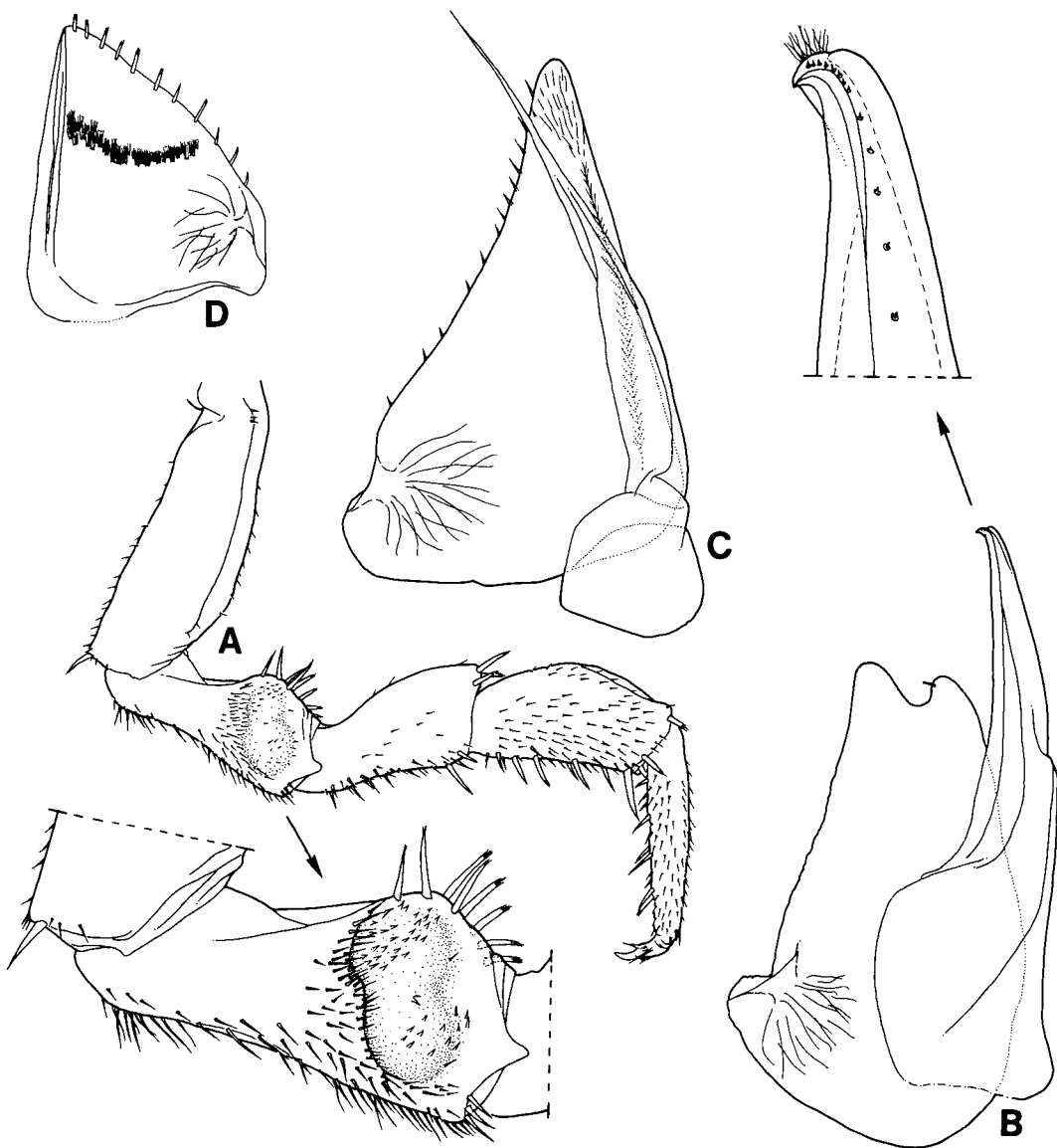


Fig. 9. *Lucasioides sinuosus* (Nunomura), ♂: A, pereopod 7; B, pleopod 1; C, pleopod 2; D, pleopod 5 exopod.

Diagnostic characters are here described and illustrated in Figs. 8 and 9 based on material from Cheju Is.

Genus *Agnara* Budde-Lund, 1908 얼룩쥐머느리속(신칭)

***Agnara pannuosus* (Nunomura, 1987) n. comb.** 얼룩쥐머느리(신칭) (Figs. 10-11)

Protracheoniscus pannuosus Nunomura, 1987, p. 56, fig. 125.

Material examined. 4 ♂♂, 23 ♀♀, Cheju, nr. Yongduam Rock, 26.vi.1992; 6 ♂♂, 46 ♀♀, nr. Manjanggul Cave, 26.vi.1992; 7 ♂♂, 18 (1 with male-like pleopodal endopods 1 and 2) ♀♀,

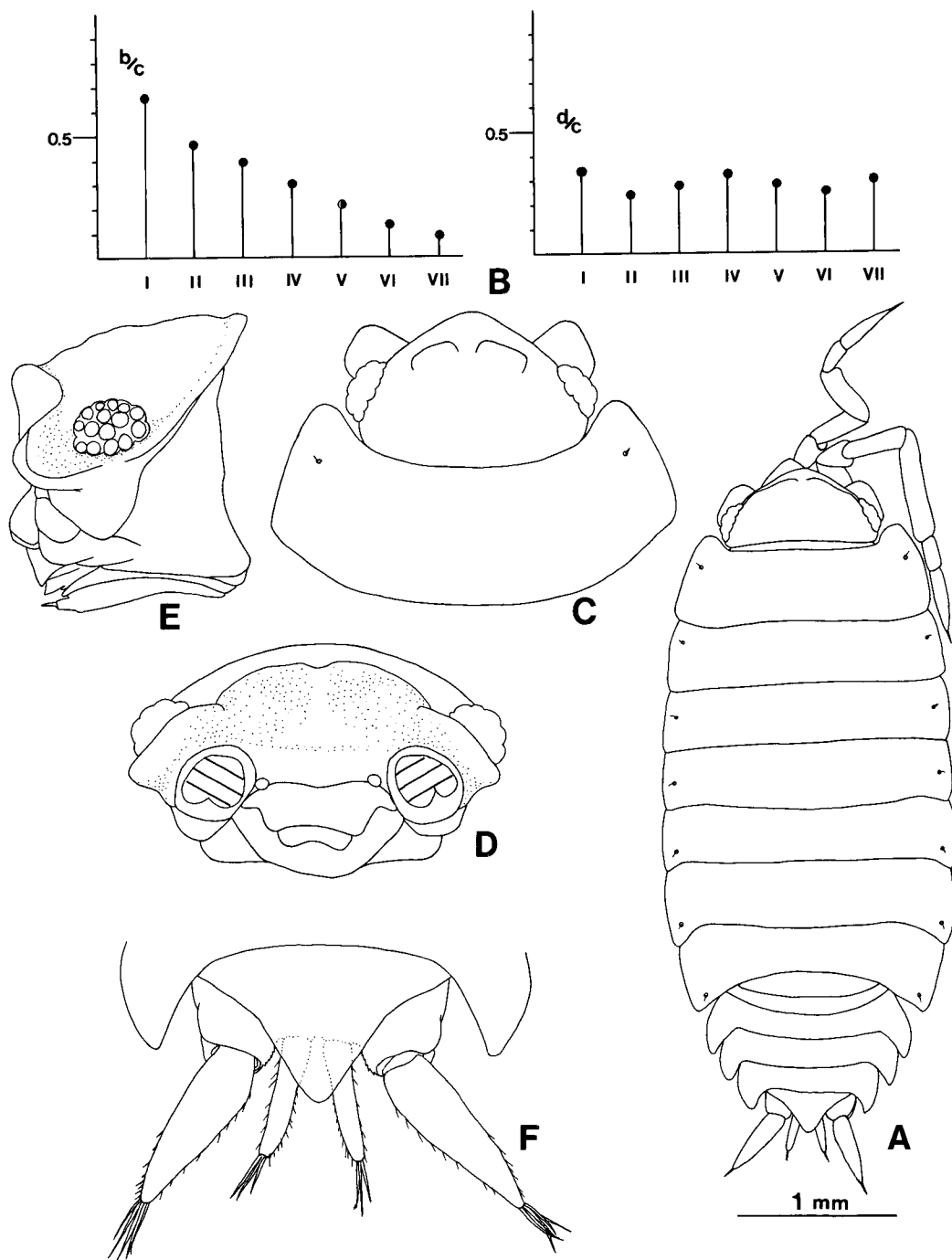


Fig. 10. *Agnara pannosus* (Nunomura): A, habitus; B, co-ordinates of noduli laterales on pereonites; C, cephalon and pereonite 1; D, cephalon, frontal view; E, cephalon, lateral view; F, pleonite 5, telson and uropods.

Pijarim, 26.vi.1992; 6 ♂♂, 12 ♀♀, Söngsan-ilch'ulbong, 10-70 m in altitude, 25.vi.1992; 6 ♂♂, 21 ♀♀, Pyosön, Kasi-ri, 150 m in altitude, 24.vi.1992; 2 ♂♂, 8 ♀♀, Songgüp, 24.vi.1992; 12 ♂

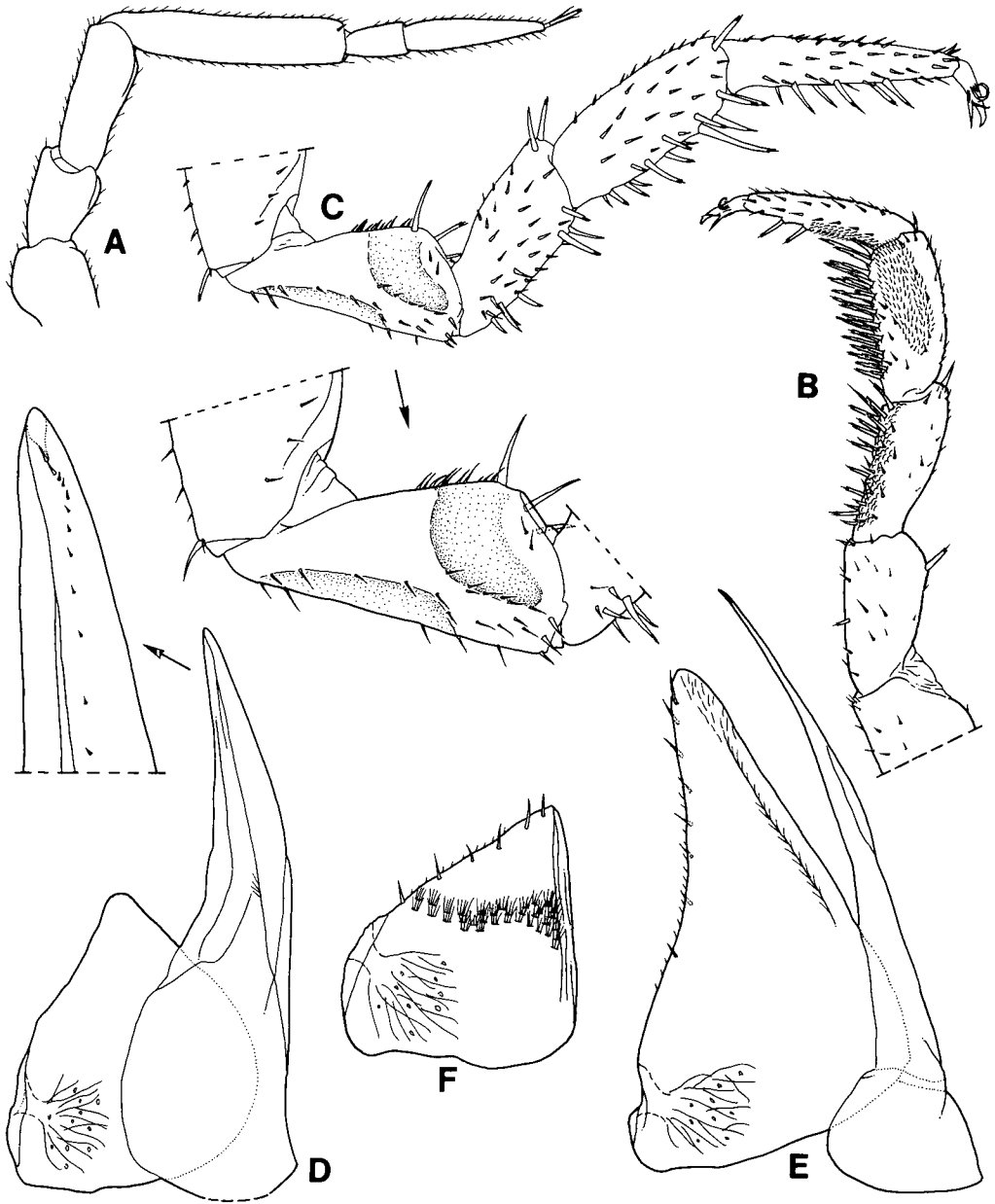


Fig. 11. *Agnara pannuosus* (Nunomura), ♂: A, antenna; B, pereonite 1; C, pereopod 7; D, pleopod 1; E, pleopod 2; F, pleopod 3 exopod.

♂, 25 ♀♀, Suak Valley, 520 m in altitude, 22.vi.1992; 6 ♂♂, 13 ♀♀, Namwön-up, Harye-ri, Mangjangp'o, 24.vi.1992; 4 ♂♂, 9 ♀♀, Halla Mt., Tonnaek'o, 500-650 m in altitude, 22.vi.1992, leg. D.S. Jeon, K.H. Kang; 2 ♂♂, 41 ♀♀, Sögwip'o, Chöngbang-dong, 22.vi.1992; 25 ♂♂, 85 (15 with male-like pleopodal endopods 1 and 2) ♀♀, Sammaebong, 22.vi.1992; 5 ♂♂, 19 ♀♀, Ch'önjeyön Waterfall, 23.vi.1992; 11 ♂♂, 19 ♀♀, Andök, Sagye-ri, 28.v.1993; 11 ♂♂, 25 ♀

♀, Kap'ado, 28.v.1993, leg. D.S. Jeon; 1 ♂, 4 ♀♀, Hallim, Kūmak-ri, 440 m in altitude, 29.v.1993; 6 ♂♂, 15 ♀♀, Aewōl-ūp, Kwangryōng-1-ri, 27.vi.1992; 1 ♂, Hach'ujado, Muk-ri, 26.ix.1993, D.S. Jeon, Y.D. Seo. (All in IJB).

Material re-examined. 1 ♂ (holotype, TOYA-Cr-6761), JAPAN, Ishikawa Pref., Hakui City, Shibagaki, 26 May 1986 leg. N. Nunomura; 1 ♂ holotype (TOYA-Cr-6738), 1 ♂, 2 ♀♀ paratypes (TOYA-Cr-6740-6743, mixed with 1 ♀ *Burmoniscus* sp.) of *Protracheoniscus awaensis* Nunomura, 1987, JAPAN, Tokushima Pref., Tokushima City, Bizan, no date, leg. H. Harada (TOYA-Cr-6738); 1 ♂ holotype (TOYA-Cr-10842) of *Nagurus gotoensis* Nunomura, 1991, JAPAN, Nagasaki Pref., Fukue-jimam Kishuku-cho, foot of Nanatsu-dake, 8.vii.1988 leg. N. Nunomura; 1 ♂ holotype (TOYA-Cr-10848) and 1 ♀ allotype (TOYA-Cr-10849) of *Nagurus izuharaensis* Nunomura, 1991, JAPAN, Nagasaki Pref., Tsushima Island, Shimoagata-gun, Izuhara-cho, Izuhara, 5.vii.1988 leg. N. Nunomura.

Description. Maximum length of male 5.5 mm, of female 7 mm. Color in alcohol brown, dark brown or purple-brown with usual pale muscle spots on cephalon and pereon, or mottled pattern on pereon, pleon, and telson. Cephalon and pereon weakly granulated. No gland pores. Noduli laterales on pereonite 1-7 progressively closer to posterior margin, more or less at the same distance from lateral margin. Eye with 13-14 ommatidia. Cephalon with developed median lobe demarcated from vertex by shallow concavity, and slightly protruding upwards in the middle; antero-lateral lobes quadrangular, well developed. Frontal line distinct with a notch in the middle. Pereonite 1 epimeron with posterior margin almost straight. Telson trinular with slightly concave sides. Antenna with peduncular segment 5 slightly longer than flagellum; ratio of flagellar articles 2:5; flagellar article 2 bearing 3+2 superimposed aesthathescs. Pleopodal exopods with *Protracheoniscus*-type pleopodal lung. Uropodal exopod 1.5 as long as endopod.

Male. Pereopods 1-3 with setulose area on rostral surface; carpus and merus bearing brush of trifold setae on sternal margin. Pereopod 7 carpus not expanded on tergal margin; ischium slightly concave on sternal margin, 3 long and several short setae on tergal margin, a shallow depression on rostral surface. Pleopod 1 endopod without sexual modification; distal part straight with rounded apex; exopod semicircular, longer than wide. Pleopod 2 endopod styliform, slightly longer than exopod. Pleopod 5 exopod as in Fig. 11F.

Distribution. Korea and Japan.

Remarks. Re-examination of type specimens of *Protracheoniscus pannuosus* Nunomura, 1987, *P. awaensis* Nunomura, 1987, *Nagurus gotoensis* Nunomura, 1991 and *N. izuharaensis* Nunomura, 1991 proved that they were conspecific. *Protracheoniscus pannuosus* is here chosen as the valid name. *P. pannuosus* is here transferred to the Oriental genus *Agnara* because it fits in the coordination of noduli laterales on pereonites, and pleopod 1 exopod of male without sinus at distal part. This species is close to *A. gallagheri* (Ferrara and Taiti, 1988) from Oman and *A. ferrarai* Jeon and Kwon, 1995 from Taiwan in the cephalon with well developed antero-lateral lobes, but easily distinguished by the shape of the pleopod 1 exopod of male which is longer than broad.

Genus *Mongoloniscus* Verhoeff, 1930 쥐며느리속 (신칭)

***Mongoloniscus vannamei* (Arcangeli, 1927) 꼬마쥐며느리 (신칭)**

Porcellio (*Nagara*) *Van Namei* Arcangeli, 1927, p. 243. [in part, from Changsha, China; Fusan (=

Pusan), Korea; and Kumamoto, Kioto (= Kyoto), Nara, Kobe and 2 ♀♀ Mt. Maya, nr. Kobe, Japan].

Porcellio (Nagara) sundaicus (non Dollfus): Arcangeli, 1927, p. 248, fig. 15.

Nagara (Nagara) Van Namei: Arcangeli, 1952, p. 302. (in part).

Protracheoniscus (Mongoloniscus) nipponicus Arcangeli, 1952, p. 299.

Nagurus Van Namei: Arcangeli, 1963, p. 12. (in part).

Mongoloniscus nipponicus: Kwon, 1993, p. 150, figs. 14-15.

Material examined. 3 ♂♂, 8 ♀♀, Cheju, Ponggae-dong, 26.vi.1992; 3 ♂♂, 9 ♀♀, nr. Manjanggal Cave, 26.vi.1992; 1 ♀, Udo, 25.vi.1992, leg. J.T. Kim & K.H. Kang; 2 ♂♂, 9 ♀♀, Söngsan, Onp'yöng-ri, 24.vi.1992; 8 ♀♀, Songüp, 24.vi.1992; 9 ♂♂, 39 ♀♀, Chungmun, 27.v.1993; 2 ♂♂, 1 ♀♀, Taejöng-üp, Kuök-ri, 29.v.1993, leg. D.S. Jeon; 5 ♂♂, 7 ♀♀, Hallim-üp, Sangmyöng-ri, 27 Jun. 1992; 4 ♂♂, Aewöl-üp, Küm döck-ri, 29.v.1993. (All in IJB)

Type material examined: 1 ♀ (lectotype) [designated by Kwon (1993)], JAPAN, Nara, 23.vii.1925, leg. F. Silvestri; 1 ♀ (paralectotype), JAPAN, Kobe, 24.vi.1925, leg. F. Silvestri; 2 ♀♀, Kumamoto, 8.vi.1925, leg. F. Silvestri. (All in DEAP).

Distribution. China, Korea, and Japan.

Remarks. Redescrining *Mongoloniscus nipponicus* (Arcangeli, 1952), Kwon (1993) considered that the syntypes of *Porcellio (Nagara) vannamei* Arcangeli, 1927 belonged to 3 different species: *Mongoloniscus nipponicus*, *Mongoloniscus vannamei*, and a species belonging to different genus. Syntypes from Nara, Kobe and Kumamoto, which were identified as *Mongoloniscus vannamei* by Kwon (1993) are all females so it is very difficult to recognize at species level. After careful comparison with the specimens of all the known trachelipodid species from Japan (deposited at TOYA), both of the external morphology and of the co-ordinates of noduli laterales on pereonites, *Mongoloniscus nipponicus* and *M. vannamei* are herein considered as synonyms.

***Mongoloniscus koreanus* Verhoeff, 1930** 고려쥐며느리(신칭)

Protracheoniscus (Mongoloniscus) koreanus Verhoeff, 1930, p. 117, figs. 14-15.

Mongoloniscus koreanus: Kwon, 1993, p. 149, figs. 12-13.

Material examined. 5 ♂♂, 10 ♀♀, Aewöl-üp, Wöndong, 29.v.1993; 5 ♂♂, 12 ♀♀, Kujwa-üp, Hado-ri, nr. seashore, 26.vi.1992; 8 ♂♂, 30 ♀♀, Söngsan-ilch'ulbong, 25.vi.1992; 8 ♂♂, 5 ♀♀, Hach'ujado, Muk-ri, 25-26.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Variations. The number of ommatidia in eye varies from 20 to 25. The number of plumose setae between lacinia mobilis and molar process of mandible varies from 3 to 5.

Distribution. Southern Korea, Japan (Kyushu and southern Honshu) and southern China.

Remarks. This species was described on a single male specimen collected in "Korea" (Verhoeff, 1930) and redescribed by Kwon (1993). Re-examination of the holotypes of *Nagurus tsushimaensis* Nunomura, 1987 (TOYA-Cr-6543) and *N. pallidus* Nunomura, 1991 (TOYA-Cr-10850), both from Tsushima Island, Japan, proved that these species are conspecific with *Mongoloniscus koreanus*. Several species described by Nunomura (1987, 1991) also are certainly synonyms of *M. koreanus*. *M. nigrogranulatus* Kwon & Taiti, 1993 from southern China is another synonym of *M. koreanus*. So the genus *Mongoloniscus* comprises only 3 valid species: *M. koreanus* and *M. vannamei*, both from southern Korea, southern Japan and southern China, and *M. sinensis* from northern China.

M. koreanus is characteristic in 1) the antenna having the ratio of flagellar articles of 1:2, while in

M. sinensis 1:1, and in *M. vannamei* 1:3; 2) pereopod 6 basis of male fringed with setae and a distal protrusion on sternal margin; and 3) pleopod 1 exopod with 2-lobed distal part separated by a deep sinus, outer lobe larger than inner lobe. For the descriptions and figures, refer to Kwon and Taiti (1993) as *M. nigrogranulatus* and Kwon (1993).

Family PORCELLIONIDAE Verhoeff, 1918 양취머느리과(신칭)

Genus *Agabiformius* Verhoeff, 1908 얼룩양취머느리속(신칭)

***Agabiformius lentus* (Budde-Lund, 1885) 얼룩양취머느리(신칭)**

Lyprobius lentus Budde-Lund, 1885, p. 230.

Material examined. 11 ♂♂, 6 ♀♀, Choch'ön, Hamdök-ri, 26.vi.1992; 8 ♂♂, 10 ♀♀, Söngsan-ilch'ulbong, 25.vi.1992; 2 ♀♀, Andök, Hwasun-ri, Hadong, 28.v.1993. (All in IJB).

Distribution. All the lands round the Mediterranean Sea. It has also been recorded, as introduced, from China, Macao, Hawaii Is., Mexico, Haiti, Venezuela, Bermuda, Madeira, Canary Is., Senegal, Seychelles, and Oman. This is the first record of the species for Korea.

Genus *Porcello* Latreille, 1804 양취머느리속(신칭)

***Porcello laevis* (Latreille, 1804) 양취머느리(신칭)**

Porcello laevis Latreille, 1804, p. 46; Kim et al., 1990, p. 229, fig. 3; Kwon, 1993, p. 155.

Material examined. 1 ♂, 6 ♀♀, Choch'ön, Hamdök-ri, 26.vi.1992; 1 ♂, 7 ♀♀, Udo, Yönp'yöng-ri, 25.vi.1992, leg. J.T. Kim & K.H. Kang; 1 ♂, Söngsan-ri, 25.vi.1992; 1 ♀, Sögwip'o, Chöngbang-dong, 22.vi.1992; 3 ♂♂, 6 ♀♀, 1 juv., Andök, Sagye-ri, 28 May 1993; 1 ♂, 1 ♀, Taejöng, Sindo-2-ri, 28.v.1993; 1 ♀, Hyöpchae Beach, 27.vi.1992; 1 ♂, 2 ♀♀, Aewöl'üp, Aewöl-ri, Handamdong, 27.vi.1992. (All in IJB).

Distribution. Cosmopolitan species of Mediterranean origin.

Genus *Porcellionides* Miers, 1877 꿀뚝양취머느리속(신칭)

***Porcellionides pruinosus* (Brandt, 1833) 꿀뚝양취머느리(신칭)**

Porcellio pruinosus Brandt, 1833, p. 181.

Porcellionides pruinosus: Kim et al., 1990, p. 228, fig. 2; Kwon, 1993, p. 155.

Material examined. 5 ♀♀, Cheju, Iho-dong, 27.vi.1992; 2 ♂♂, 7 ♀♀, Choch'ön, Hamdök-ri, 26.vi.1992; 1 ♂, 1 ♀, Kujwa-üp, Hado-ri, 26.vi.1992; 1 ♀, Udo, Obong-ri, 25.vi.1992; 2 ♂♂, 4 ♀♀, Söngsan-ri, 25.vi.1992; 6 ♂♂, 15 ♀♀, Söngsan, Onp'yöng-ri, 24.vi.1992; 1 ♀, Songüp, 24.vi.1992; 2 ♂♂, 3 ♀♀, Namwön, Harye-ri, Mangjangp'o, 24.vi.1992; 1 ♂, 4 ♀♀, Sögwip'o, Chöngbang-dong, 22.vi.1992; 2 ♀♀, nr. Ch'önjeyön Waterfall, 23.vi.1992; 3 ♂♂, 3 ♀♀, Andök, Sagye-ri, 28.v.1993; 1 ♀, 1 juv., Mos üp'o, 27.v.1993; 3 ♀♀, Taejöng-üp, Sindo-2-ri, Pangatong, 28.v.1993; 2 ♂♂, 1 ♀, Kap'ado, 28.v.1993, leg. D.S. Jeon; 1 ♂, 4 ♀♀, Hyöpchae-ri, Hallim Park, 27.vi.1992; 2 ♀♀, Aewöl'üp, Kwangryöng-1-ri, 27.vi.1992; 3 ♀♀, Sangch'ujado, Taesö-ri, 26.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Distribution. Cosmopolitan species of Mediterranean origin.

Family ARMADILLIDAE Brandt and Ratzeburg, 1831 남방공벌레과(신칭)

Genus *Venezillo* Verhoeff, 1928 남방공벌레속(신칭)

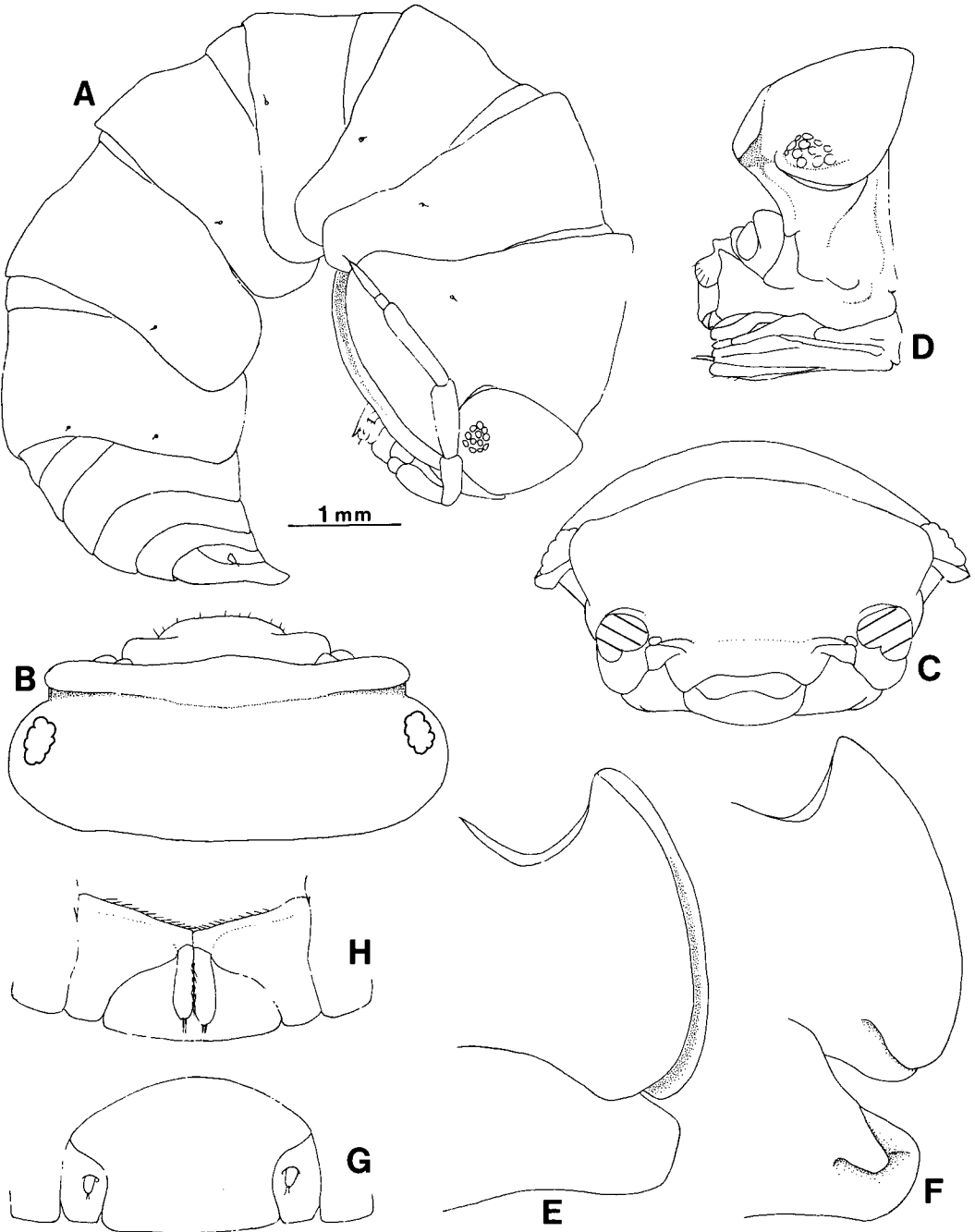


Fig. 12. *Venezillo obscurus* (Budde-Lund): A, habitus, lateral view; B, cephalon, dorsal view; C, cephalon, frontal view; D, cephalon, lateral view; E, right epimera of pereonites 1 and 2, dorsal view; F, left epimera of pereonites 1 and 2, ventral view; G, telson and uropod, dorsal view; H, telson and uropod, ventral view.

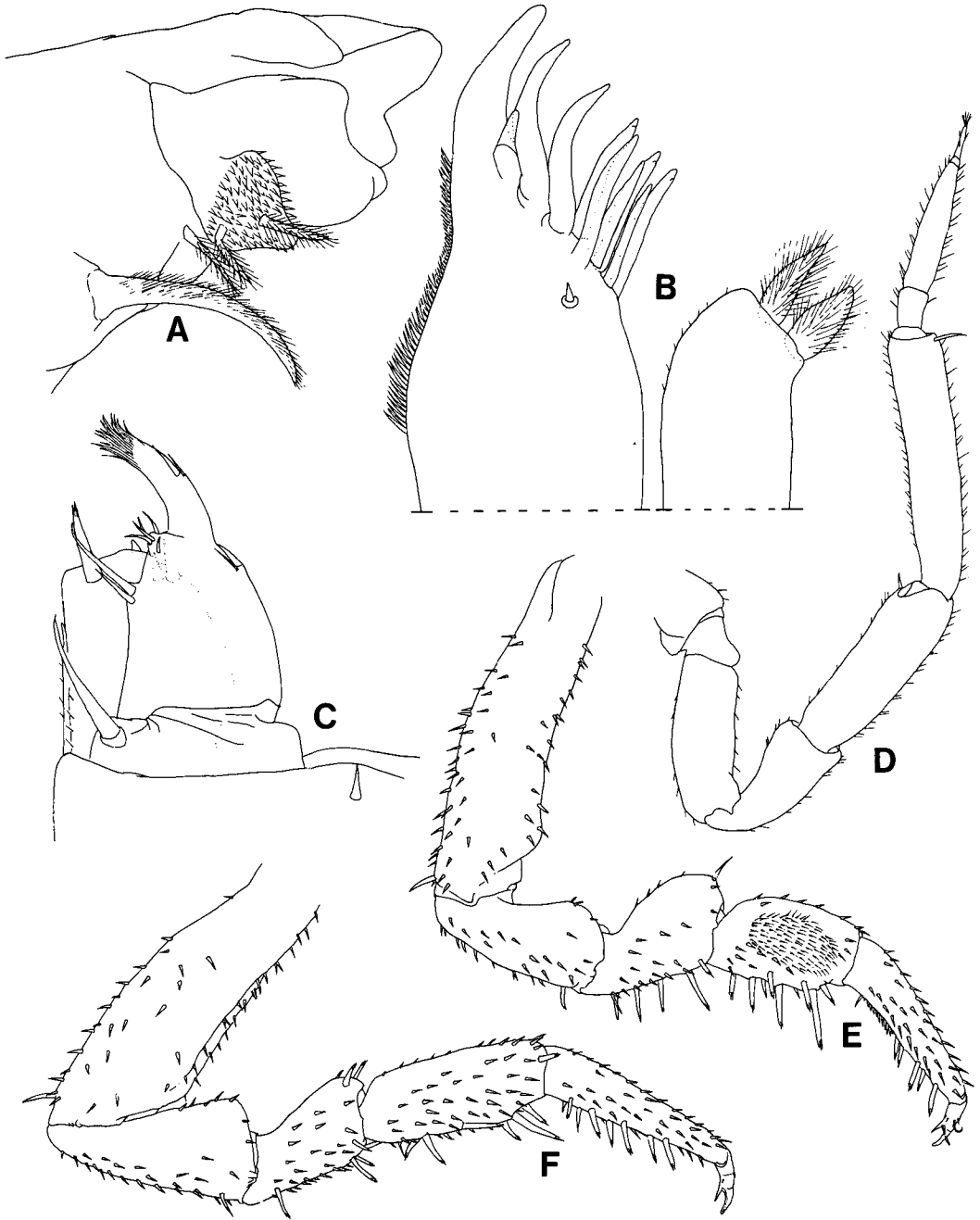


Fig. 13. *Venezillo obscurus* (Budde-Lund), ♂: A, mandible; B, maxillule; C, maxilliped; D, antenna; E, pereopod 1; F, pereopod 7.

***Venezillo obscurus* (Budde-Lund, 1885), n. comb. 고려공벌레(신칭) (Figs. 12-14)**

Armadillo obscurus Budde-Lund, 1885, p. 285.

Material examined. 2 ♂♂, 26 ♀♀, Cheju, nr. Yongduam Rock, 26.vi.1992; 12 ♀♀, nr.

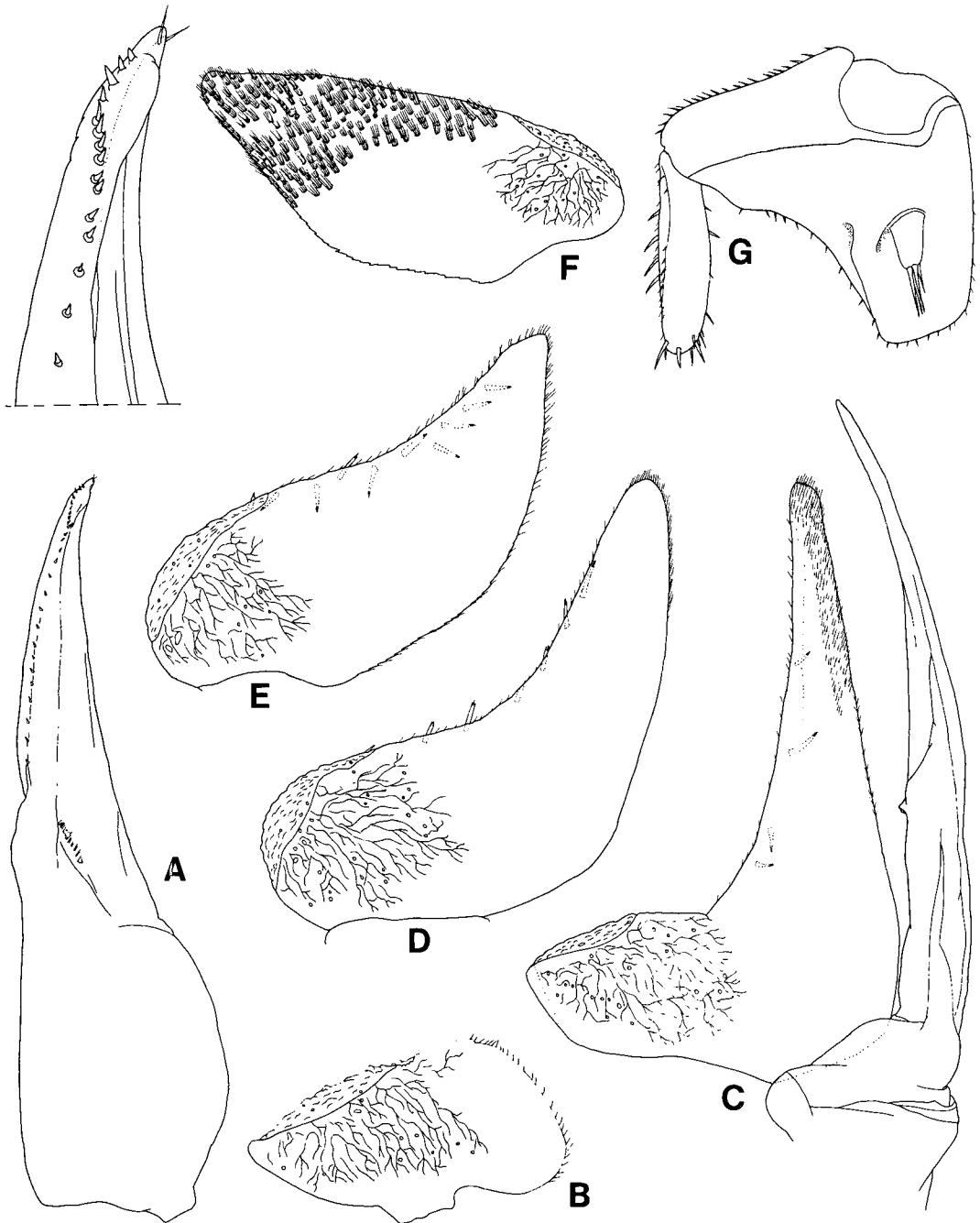


Fig. 14. *Venezillo obscurus* (Budde-Lund), ♂: A, endopod of pleopod 1; B, exopod of pleopod 1; C, pleopod 2; D, exopod of pleopod 3; E, exopod of pleopod 4; F, exopod of pleopod 5; G, uropod.

Manjanggal Cave, 26.vi.1992; 2 ♂♂, 7 ♀♀, Pijarim, 26.vi.1992; 1 ♂, 2 ♀♀, Söngsan-ilch'ulbong, 25.vi.1992; 4 ♀♀, Pyosön, Kasi-ri, 150 m in altitude, 24.vi.1992; 2 ♂♂, 7 ♀♀, Songüp, 24.vi.1992. 7 ♂♂, 22 ♀♀, Suak Valley, 520 m in altitude, 22.vi.1992; 4 ♀♀, Namwön,

Taehŭng-ri, 24.vi.1992; 1 ♀, Halla Mt., Tonnaek'o, 500-650 m in altitude, 22.vi.1992, leg. D.S. Jeon & K.H. Kang; 1 ♂, 30 ♀♀, Sŏgwip'o, Chŏngbang-dong, 22.vi.1992; 6 ♂♂, 10 ♀♀, nr. Ch'ŏnjoyon Waterfall, 23.vi.1992; 1 ♂, 4 ♀♀, Andŏk, Hwasun-ri, 23.vi.1992, leg. D.S. Jeon & K. H. Kang; 2 ♀♀, Hallim, Sangmyŏng-ri, 27.vi.1992. (All in IJB).

Description: Maximum length of male 7.5 mm, of female 9.5 mm. Color in alcohol dark brown with usual yellowish muscle spots; a light narrow median stripe on pereon and pleon; pereonal epimera and uropods yellowish; telson usually dark brown, rarely yellowish; frontal shield and antenna dark brown. Pereonites 1-6 with a pair of noduli laterales, pereonite 7 with two pairs; noduli laterales on pereonite 4 farther from lateral margin than those on pereonites 1-3, 5 and 6. Eye usually with 12 or 13 ommatidia, rarely with up to 16. Cephalon with frontal shield not protruding over vertex, slightly turned on vertex. Pereonite 1 with thickened lateral margin grooved on entire margin. Antenna with flagellum shorter than peduncular segment 5; ratio of flagellar articles 1:3. Mandible with an unbranched molar penicil. Maxillule with exopod bearing 4+6 teeth; endopod with 2 subequal stout penicils. Maxilliped as in Fig. 13C. All pleopod exopod with "uncovered lung". Uropodal exopod short, directed posteriorly, inserted dorsally on protopod.

Male. Pereopods without any sexual modification. Pleopod 1 exopod very small; endopod with distal part slightly bent outwards and rounded apex bearing 2 setae. Pleopod 2 exopod longer than wide, endopod longer than exopod with styliform distal part.

Distribution. Korea and Japan. This species also distributes southern part of Korea Peninsula (unpublished data).

Remarks. This species was described as *Armadillo obscurus* from Yokohama, Japan (Budde-Lund, 1885), and transferred to the genus *Spherillo* Dana with additional localities of "Uweno Park" in Tokyo and "Moji", Japan (Budde-Lund, 1904). Nunomura (1990) transferred this species (he erroneously spelled as *obsclusus*) to *Sphaerillo* Verhoeff (nomen nudum) and redescribed this species based on the specimen from Uweno Park which was reported by Budde-Lund (1904) with some figures.

Specimens from Cheju Is. were identified as the Japanese species compared with illustrations provided by Budde-Lund (1904, Tab. IX, Fig. 3) and Nunomura (1990, Fig. 142K), especially in having the unbranched molar penicil of mandible, the stout penicils of maxillular endopod, and the morphology of telson and uropod, and transferred to genus *Venezillo*. This species fits very well to *Venezillo*, particularly in the morphology of cephalon, the thickened lateral margin of pereonite with deep schisma, the large quadrangular ventral lobe on pereonite 2, the unbranched molar penicil of mandible, the subequal penicils of maxillipedal endopod, and the morphology of uropod. But it differs in the co-ordination of noduli laterales on pereonites (in *V. parvus*, a pair of noduli laterales on each pereonite which are almost at the same distance from lateral margin, except for one on pereonite 7 which is much farther from lateral margin), characters (number and position) of uncertain taxonomic importance in Armadillidae at the generic level. Although *Armadillo clausus* Budde-Lund, 1885, the type-species of *Venezillo*, most probably has the same type of pleopodal lung ("uncovered lung" in all pleopodal exopods, cf. Fig. 22 in Ferrara et al., 1994) with *V. obscurus* (see Fig. 74 in Vandell, 1952), but several species have "covered lung" with a single opening (spiracle) at least in anterior pleopods (cf., Vandell, 1952). Further study on this structure might be needed to clarify the importance of pleopodal lung-type in Armadillidae.

Because previous descriptions and illustrations were inadequate and insufficient for safe identification of this species, *V. obscurus* is re-described and figured in detail based on the material from Cheju Is.

Family ARMADILLIDIDAE Brandt and Ratzenburg, 1831 공벌레과(신칭)

Genus *Armadillidium* Brandt and Ratzenburg, 1831 공벌레속(신칭)

***Armadillidium vulgare* (Latreille, 1804)** 공벌레

Armadillidium vulgare Latreille, 1804, p. 48.

Armadillidium vulgare: Verhoeff, 1937, p. 422; Kim et al., 1990, p. 236, fig. 5; Kwon, 1993, p. 156.

Material examined. 4 ♂♂, 11 ♀♀, Cheju, nr. Yongduam Rock, 26.vi.1992; 1 ♂, Kyorae-ri, Sangumburi, 400 m in altitude, 24.vi.1992. 5 ♂♂, 12 ♀♀, nr. Manjanggal Cave, 26.vi.1992; 1 ♂, 3 ♀♀, Udo, Ch'önjin-ri, 25.vi.1992, leg. J.T. Kim & K.H. Kang; 2 ♂♂, 12 ♀♀, Söngsan, Onp'yöng-ri, 24.vi.1992; 5 ♂♂, 1 ♀, Pyosön, Kasi-ri, 150 m in altitude, 24.vi.1992; 3 ♂♂, 4 ♀♀, Songüp, 24.vi.1992; 1 ♂, Suak Valley, 520 m in altitude, 22.vi.1992; 9 ♂♂, 24 ♀♀, Namwön-üp, Harye-ri, Mangjangp'o, 24.vi.1992; 1 ♂, 1 ♀, Halla Mt., Tonnaek'o, 500-650 m in altitude, 22.vi.1992, leg. D.S. Jeon, K.H. Kang; 4 ♂♂, 14 ♀♀, Sögwip'o, Chöngbang-dong, 22.vi.1992; 6 ♂♂, 9 ♀♀, Sammaebong, 22.vi.1992; 1 ♂, 1 ♀, Halla Mt., Körinsasüm, 640 m in altitude, 23.vi.1992; 7 ♂♂, 11 ♀♀, Chungmun, nr. Ch'önjeyön Waterfall, 23.vi.1992; 1 ♂, 1 ♀, Mos Ip'o, 27.v.1993; 3 ♂♂, 3 ♀♀, Kap'ado, 28.v.1993, leg. D.S. Jeon; 1 ♂, 2 ♀♀, Hanyöng, Kosan-ri, 27.vi.1992; 1 ♂, 1 ♀, Hallim-üp, Kümak-ri, 440 m in altitude, 29.v.1993; 2 ♂♂, 1 ♀, Aewöl-üp, Kündök-ri, 29.v.1993; 1 ♂, 6 ♀♀, Sangch'ujado, Taesö-ri, 26.ix.1993, leg. D.S. Jeon & Y.D. Seo. (All in IJB).

Distribution. Cosmopolitan.

DISCUSSION

This study increased Oniscidea fauna of Cheju Province (Cheju Island and Ch'uja Islands) from 6 to 21 species. One species of the genus *Quepartoniscus*, n. gen., is described as new and other 7 species are new records for Korea. Korean terrestrial isopods now comprise 27 species in 10 families.

Due to the poor knowledge on the terrestrial isopods in the East Asia, particularly in northern China, it is very difficult to discuss their distribution properly. However, according to their present distribution, the Oniscidea from Cheju area can be grouped as follows.

(A) Cosmopolitan (5 species)

Armadilloniscus ellipticus, *Agabiformius lentus*, *Porcellio laevis*, *Porcellionides pruinosus*, *Armadillidium vulgare*. Except for *Armadilloniscus ellipticus*, the other 4 species have a Mediterranean origin.

(B) Pantropical species or species with a wide distribution in the Pacific and/or Indo-Pacific areas (3 species)

Ligia exotica, *Armadilloniscus hawaiianus*, and *Burmoniscus mauritiensis*.

The first 2 species, together with *Armadilloniscus ellipticus* from the preceding group, are littoral and halophilic with a great facility of dispersal. *Burmoniscus mauritiensis* has an apparently disjunct distribution: Mauritius (type locality) in the western Indian and more widely in the northeast Asia (southern China, Taiwan, and Cheju Is.).

(C) Manchurian species (11 species)

Tylos granuliferus, *Ligidium koreanum*, *Armadilloniscus albus*, *Alloniscus balssi*, *Littorophiloscia nipponensis*, *Exalloniscus silvestrii*, *Lucasioides sinuosus*, *Agnara pannuosus*, *Mongoloniscus vannamei* (= *M. nipponicus*), *M. koreanus* and *Venezillo obscurus*.

While ten species (except for *E. silvestrii*) co-occur in Korea and Japan, only three (*Mongoloniscus vannamei*, *M. koreanus*, and *E. silvestrii*) in Korea and southern China. But probably many of them are expected to be found also in China, if the vast area would be properly investigated. *Exalloniscus silvestrii*, *Mongoloniscus vannamei* and *M. koreanus* are included in this group despite their occurrences in the southern China (Kwon and Taiti, 1993)

(D) Endemic species (2 species)

Quepartoniscus granulatus, n. sp. and *Littorophiloscia lineata*. The endemism of Cheju Island is extremely low. Only a single species, *Quepartoniscus granulatus*, is known to be an endemic species of Cheju Is. *Littorophiloscia lineata* is endemic in Korea.

As a whole, Manchurian species are major components of this area, comprising 11 species (52.4%) out of 21 species. And, as expected, this area has a rich oniscidean fauna. Twenty-one species (74.1%) out of 27 Korean species inhabit Cheju Is., and the following 6 species were found nowhere in Korea outside Cheju Island and/or Ch'uja Islands: *Quepartoniscus granulatus*, n. sp., *Armadilloniscus hawaiianus*, *A. albus*, *Burmoniscus mauritiensis*, *Lucasioides sinuosus*, and *Agabiformius lentus*. It is worth pointing out that the common woodlice in Korea, *Lucasioides gigliotosi* and *Koreoniscus racovitzai*, do not populate Cheju Is.

ACKNOWLEDGEMENTS

The author wish to thank Drs. F. Ferrara and S. Taiti (Florence) for their helpful suggestions to this study. Mr. N. Nunomura (TOYA) is particularly acknowledged for the loan of material and the hospitality and facilities provided during a short visit to his museum by the author. Many thanks are due to Messrs. D.S. Jeon, J.T. Kim, K.H. Kang, Y.S. Kang, and Y.D. Seo for their helping the collecting, and to Ms. K.A. Lee for providing a part of drawings.

REFERENCES

- Arcangeli, A., 1927. Isopodi terrestri raccolti nell'Estremo Oriente dal Prof. Filippo Sivestri. Boll. Lab. Zool., Portici, 20: 211-269.
- Arcangeli, A., 1952. Correzioni riguardanti Crostacei Isopodi terrestri dell'Estremo Oriente. Archo zool. ital., 37: 291-326.
- Arcangeli, A., 1957. Il genere *Armadilloniscus* Ulj. e gli Scyphacidae (Crostacei Isopodi terrestri). Atti Acad. Sci.,

Torino, 91: 1-30.

- Arcangeli, A., 1963. Precisazioni sopra il genere *Nagurus* Holthuis 1949 (= *Nagara* B.L. 1908). Boll. Ist. Mus. Zool. Univ., Torino, 6: 5-20.
- Budde-Lund, G., 1885. Crustacea Isopoda terrestria per familias et genera et species descripta. Haunia, Nielsen & Lydiche, 320 pp.
- Budde-Lund, G., 1904. A revision of "Crustacea Isopoda terrestria" with additions and illustrations. 2. Spherilloninae, 3. Armadillo. Kjobenhavn, H. Hagerup, Publisher, pp. 33-144, pls. 6-10.
- Ferrara, F, U. Maschwitz, S. Steghaus Kovac and S. Taiti, 1988. The genus *Exalloniscus* Stebbing, 1911 (Crustacea, Oniscidea) and its relationship with social insects. Pubbl. Ist. Ent. Univ. Pavia, 36(1987): 43-46.
- Ferrara, F, P. Paoli and S. Taiti, 1994. Philosciids with pleopodal lungs? The case of the genus *Aphiloscia* Budde-Lund, 1908 (Crustacea: Isopoda: Oniscidea), with a description of six new species. J. nat. Hist., 28: 1231-1264.
- Ferrara, F. and S. Taiti, 1979. A Check-list of terrestrial isopods from Africa (South of the Sahara). Monitore zool. ital. (N.S.), Suppl. 12: 89-215.
- Flasarova, M., 1972. Über einige Isopoden aus Korea (Isopoda, Oniscoidea). Ann. Zool. (Warszawa), 29(4): 91-113.
- Garthwaite, R.L., R. Lawson and S. Taiti, 1992. Morphological and genetic relationships among four species of *Armadilloniscus* Uljanin, 1875 (Isopoda: Oniscidea: Scyphacidae). J. nat. Hist., 26: 327-338.
- Harger, O., 1878. Description of new genera and species of Isopoda, from New England and adjacent regions. Amer. J. Sci., 15: 373-379.
- Kim, E.J., D.H. Moon and U.B. Jo, 1990. Taxonomic study on the four species of terrestrial isopod, Oniscoidea from Pusan Area in Korea. J. Sci., Pusan Natl Univ. (Pusan, Korea) 49: 225-251 (in Korean).
- Kwon, D.H., 1993. Terrestrial Isopoda (Crustacea) from Korea. Korean J. Zool., 36: 133-158.
- Kwon, D.H., K.A. Lee and D.S. Jeon, 1993. *Littorophiloscia lineata*, n. sp. from Korea with remarks on the synonymies associated with *Littorophiloscia nipponensis* Nunomura, 1986 (Isopoda, Oniscidea, Philosciidae). Korean J. Zool., 36: 556-561.
- Kwon, D.H. and S. Taiti, 1993. Terrestrial Isopoda (Crustacea) from southern China, Macao and Hong Kong. Stuttgarter Beitr. Naturk., Ser. A, 490: 1-83.
- Latreille, P.A., 1804. Histoire naturelle, générale et particulière, des Crustacés et des Insectes. Vol. 7, 413 pp., Paris.
- Miers, E.J., 1877. On a collection of Crustacea, Decapoda and Isopoda, chiefly from South America with descriptions of new genera and species. Proc. zool. Soc., London, 43: 653-679, pls. 66-69.
- Nunomura, N., 1986. Studies on the terrestrial isopod crustaceans in Japan III. Taxonomy of the families Scyphacidae (continued), Marioniscidae, Halophilosciidae, Philosciidae and Oniscidae. Bull. Toyama Sci. Mus., 9: 1-72.
- Nunomura, N. 1987. Studies on the terrestrial isopod crustaceans in Japan IV. Taxonomy of the Families Trachelipidae and Porcellionidae. Bull. Toyama Sci. Mus., 11: 1-76.
- Nunomura, N. 1990. Studies on the terrestrial isopod crustaceans in Japan V. Taxonomy of the families Armadillidiidae, Armadillidae and Tylidae, with taxonomic supplements to some other families. Bull. Toyama Sci. Mus., 13: 1-58.
- Nunomura, N. 1991. Studies on the terrestrial isopod crustaceans in Japan VI. Further supplements to the taxonomy. Bull. Toyama Sci. Mus., 14: 1-26.

- Roux, P., 1828. Crustacés de la Méditerranée et de son littoral. Paris et Marseille
- Schmalfuss, H. and F. Ferrara, 1978. Terrestrial Isopods from West Africa, part 2: Family Tyliidae, Ligidae, Trichoniscidae, Styloniscidae, Rhyscotidae, Halophilosciidae, Philosciidae, Platyarthridae, Trachelipidae, Porcellionidae, Armadillididae. *Monitore zool. ital. (N.S.) Suppl.* 11(2): 15-97.
- Taiti, S. and F. Ferrara, 1986. Taxonomic revision of the genus *Littorophiloscia* Hatch, 1947 (Crustacea, Isopoda, Oniscoidea) with description of six new species. *J. nat. Hist.*, 20: 1347-1380.
- Taiti, S. and F. Ferrara, 1989. New species and records of *Armadilloniscus* Uljanin 1875 (Crustacea Isopoda Oniscoidea) from the coasts of the Indian and Pacific oceans. *Trop. Zool.* 2: 59-88.
- Taiti, S. and F. Ferrara, 1991. Terrestrial Isopods (Crustacea) from the Hawaiian Islands. *Bishop Museum Occasional Papers*, 31: 202-227.
- Vandel, A., 1952. Etude des isopodes terrestres récoltés au Vénézuéla par le Dr. G. Marcuzzi suivie de considérations sur le peuplement de Continent de Gondwana. *Mem. Mus. Civ. St. Nat., Verona*, 3: 59-203.
- Vandel, A., 1962. Isopodes terrestres (Deuxième Partie). *Fauna de France*, 66: 417-931.
- Vandel, A., 1969. Results of the speleological survey in South Korea 1966. XIII. Isopodes terrestres récoltés dans les Grottes de Corée. *Bull. nat. Sci. Mus. Tokyo*, 12(1): 157-159.
- Vandel, A., 1973. Les Isopodes terrestres de l'Australie étude systématique et biogéographique. *Mém. Mus. natl. Hist. nat. (Sér. A)*, 82: 1-171, 1 map.
- Verhoeff, K.W., 1928. Über einige Isopoden der zoologischen Staatsammlung in München. 38. Isopoden-Aufsatz. *Zool. Anz.*, 76: 25-36, 113-123.
- Verhoeff, K.W., 1930. Über Isopoden aus Turkestan. 42. Isopoden-Aufsatz. *Zool. Anz.*, 91: 101-125.
- Verhoeff, K. W., 1937. Über einige neue und bekante Isopoda terrestria. *SB. Ges. naturf. Fr., Berlin*, 1936: 411-430.

RECEIVED: 25 September 1995

ACCEPTED: 5 November 1995

제주도산 육서 등각류(절지동물문, 갑각류)

권도현

(인제대학교 자연과학대학 생물학과)

요약

제주도와 추자군도의 육서 등각류 21종을 보고하였다. *Quelpartonicus*를 신속으로, *Q. granulatus*를 신종으로 기재하였다. *Koshiniscus Nunomura*를 *Armadilloniscus* Uljanin의 同物異名으로 처리하였다. *Armadilloniscus hoshikawai* Nunomura와 *A. amakusaensis* Nunomura는 *A. ellipticus*의, *Mongoloniscus nipponicus*(Arcangeli)는 *M. vannahmei*(Arcangeli)의, *Nagurus tsushimaensis* Nunomura, *N. pallidus* Nunomura 및 *Mongoloniscus nigrogranulatus* Kwon and Taiti는 *M. koreanus* (Verhoeff)의 동물이명이었다. *Nagurus sinuosus* Nunomura는 *Lucasioides* 속으로, *Protracheoniscus pannuosus* Nunomura(동물이명인 *P. awaensis* Nunomura, *Nagurus gotoensis* Nunomura 및 *N. izuharaensis* Nunomura 포함)는 *Agnara*속으로 *Armadillo obscurus* Budde-Lund는 *Venezillo*속으로 이전하였다. 이전의 기재가 명확하지 않은 종들은 그림과 함께 재기재하였다.