

One New Species of Freshwater *Jesogammarus* (Crustacea, Amphipoda, Anisogammaridae) from South Korea

Lee, Kyung Sook and Seo, In Soon

(Department of Biology, College of Natural Sciences, Dankook University,
Ch'ungnam 330-180, Republic of Korea)

한국 담수산 *Jesogammarus*(Crustacea, Amphipoda, Anisogammaridae)의 1신종

이 경 숙 · 서 인 순
(단국대학교 자연대학 생물학과)

적 요

1987년 7월부터 1990년 5월까지 경기도, 충청남도, 충청북도 그리고 전라북도의 11개 지역의 웅덩이와 샘물에서 담수산 옆새우류를 채집하여 관찰한 결과 *Jesogammarus* (*Annanogammarus*) 1신종이 확인되어 *Jesogammarus* (*Annanogammarus*) *koreaensis*라고 명명하여 기재한다. 본종은 *Jesogammarus* (*Annanogammarus*) *fluviialis* Morino 1985와는 제1안테나 첫번째 병부마디에 distal spine이 있는 점이 다르다.

Key words: *Jesogammarus*, Amphipoda, taxonomy, Korea.

INTRODUCTION

The family Anisogammaridae is one of the endemic Gammaroidean families living in littoral marine, intertidal, estuarine or coastal freshwater of the north Pacific rim region (Bousfield 1979, Tzvetkova 1975). Bousfield (1979) revised the status of *Anisogammarus* Derzhvin, *Eogammarus* Birstein, and *Spinulogammarus* Tzvetkova in the family Anisogammaridae and added seven new genera including *Annanogammarus* (type species: *Gammarus annandalei* Tattersall, 1922) and *Jesogammarus* (type species: *Anisogammarus*

(*E.* *jesoensis*, Shellenberg, 1937). The species of the Gammaroidea in Japan have been studied by Tattersal (1922), Schellenberg (1937), Stephensen (1944), Uéno (1971), Tzvetkova (1975). While reporting *Jesogammarus paucisetulosus* based on the new generic conception of Bousfield (1979), Morino (1984) found that this species shared the same characteristics with *Jesogammarus* Bousfield and *Annanogammarus* Bousfield. Thereafter, in course of the taxonomical study of the Japanese anisogammarids, Morino (1985) amended *Annanogammarus* Bousfield as a subgenus of *Jesogammarus* and described four new species and redescribed two species belonging to *Jesogammarus* (*Jesogammarus*) and *Jesogammarus* (*Annanogammarus*). Also, he added one new species, in 1986. The study on freshwater anisogammarids from Korea was begun by Uéno (1940), who reported *Anisogammarus* (*Eogammarus*) *ryotoensis* in Ch'öngnyangni, Chungnyangch'ön. After Uéno, there has been no taxonomic study on anisogammarids in Korea.

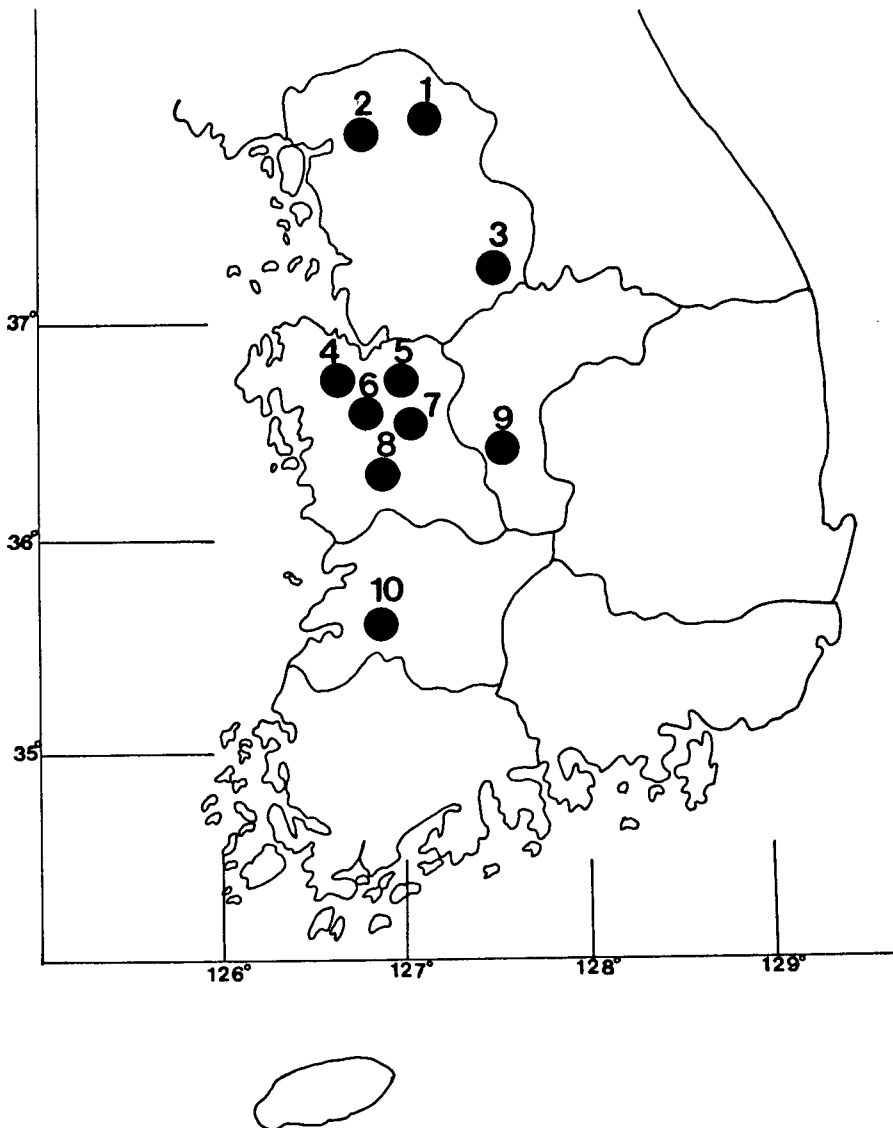


Fig. 1. A map showing the localities where the materials were collected.

MATERIALS AND METHODS

The specimens examined in this study were collected from 11 sites of Kyönggi-do, Ch'ungch'öngnam-do, Ch'ungch'öngbuk-do and Chöllabuk-do during the period from July 1, 1987 to May 4, 1990 (Fig. 1). Samplings were made chiefly from ponds and springs. Collections were made with a rice net (pore size: 2mm). All samples were preserved in 95% alcohol. The appendages were mounted on glass slides with polyvinyl lactophenol and examination was conducted at 30X, 64X or 100X magnification of light or stereomicroscope. Drawings and measurements were made with a camera lucida and drawing tube. The classification system in this study was based on Morino (1985). All the specimens are deposited in the Department of Biology, Dankook University.

LOCALITIES

Kyönggi-do. 1. Paech'on-myön; 2, Pöpwon-üþ; 3, Pungnae-myön.

Ch'ungch'öngnam-do. 4, Yömchi-myön; 5, Sönggö-üþ; 6, Ch'önan-shi; 7, Mokch'ön-myön; 8, Naesan-myön.

Ch'ungch'öngbuk-do. 9, Puyong-myön.

Chöllabuk-do. 10, Kobu-myön.

SYSTEMATIC ACCOUNT AND DESCRIPTIONS

Superclass Crustacea Pennant, 1777

Class Malacostraca Latreille, 1806

Order Amphipoda Latreille, 1816

Suborder Gammaridea Latreille, 1803

Family Anisogammaridae Bousfield, 1977

Genus *Jesogammarus* Bousfield, 1979

Subgenus *Annanogammarus* Morino, 1985

***Jesogammarus (Annanogammarus) koreaensis*, new species** (Fig. 2, 3, 4)

Materials examined: Holotype: 1 ♂ (DJKH 0001), Sönggö-üþ, (body length: 13mm), Feb. 28, 1990 (I.S. Seo). Paratypes: 14 ♂♂, 18 (ovi.) ♀♀ (DJKP 0002), Sönggö-üþ, Feb. 28, 1990 (I.S. Seo); 1♂ (DJKP 0003), Pungnae-myön, Jul, 1, 1987 (H.L. Park); 5 ♂♂, 106 (ovi.) ♀♀ (DJKP 0004), Puyong-myön, Apr. 10, 1988 (K.S. Lee); 35 ♂♂ 22 (ovi.) ♀♀ (DJKP 0005), Yömchi-myön, Mar. 26, 1989 (K.U. Lee); 18 ♂♂, 11 (ovi.) ♀♀ (DJKP 0006), Ch'önan-shi, Feb. 27, 1990 (H.C. Cheon); 2 (ovi.) ♀♀ (DJKP 0007), Sönggö-üþ, Feb. 28, 1990 (I.S. Seo); 3 ♂♂, 21 (ovi.) ♀♀ (DJKP 0008), Mokch'ön-myön, Mar. 3, 1990 (H.C. Cheon); 22 ♂♂, 4 (31 ovi.) ♀♀ (DJKP 0009), Mokch'ön-myön, Mar. 3, 1990 (H.C. Cheon); 12 ♂♂, 12 (20 ovi.) ♀♀ (DJKP 0010), Pöpwon-üþ, Mar. 4, 1990 (H.C. Cheon); 11 ♂♂, 6 (ovi.) ♀♀ (DJKP 0011), Naesan-myön, Mar. 11, 1990 (J.M. Kim); 16 ♂♂, 8 (34 ovi.) ♀♀ (DAKP 0012), Paech'on-myön, Mar. 12, 1990 (K.J. Seo); 1 ♀ (ovi.), 40 Juv. (DJKP 0013) Kobu-myön, May. 4, 1990 (K.J. Seo).

Diagnosis: Peduncular segment 1 of antenna 1 with a posterodistal spine. Inner and outer margins of

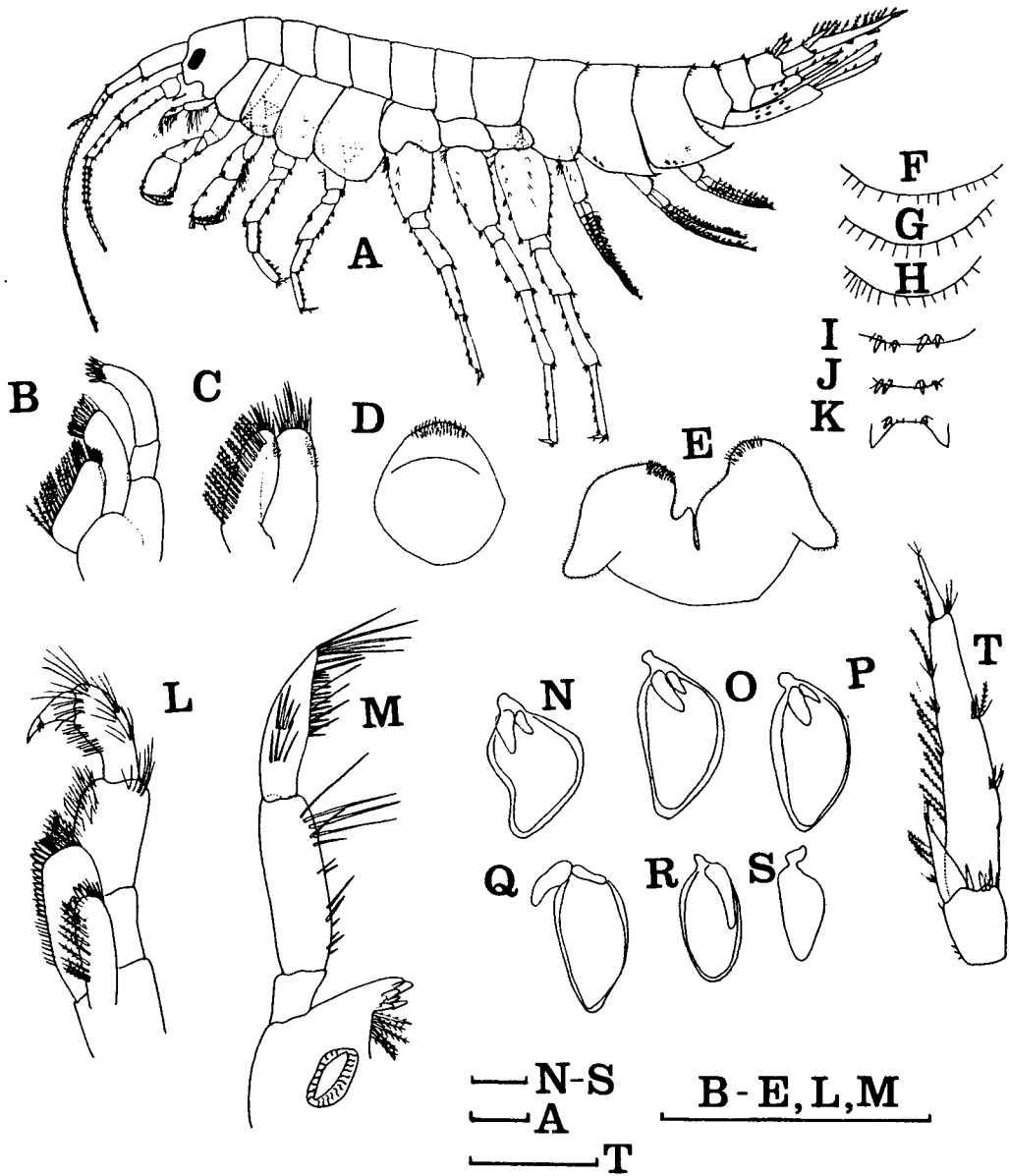


Fig. 2. *Jesogammarus* (*Annangammarus*) *koreaisis*, new species, A, paratype male (12.8mm); B-T, holotype male (13.0mm); B, maxilla 1; C, maxilla 2; D, upper lip; E, lower lip; F, pleonite 1; G, pleonite 2; H, pleonite 3; I, urosomite 1; J, urosomite 2; K, urosomite 3; L, maxilliped; M, mandible and mandibular palp; N, coxal gill 2; O, coxal gill 3; P, coxal gill 4; Q, coxal gill 5; R, coxal gill 6; S, coxal gill 7; T, uropod 3. Scale bars = 1mm.

outer ramus of uropod 3 and outer margin of inner ramus of uropod 3 with plumose setae.

Description of male (holotype): Eyes medium, subreniform. Antenna 1 half as long as body length; peduncular segment 1 longer than segment 2, segment 1 with a posterodistal spine; segment 2 with two bundles of short posteromarginal setae, segment 2 longer than segment 3; flagellum with 29 (24-29) segments;

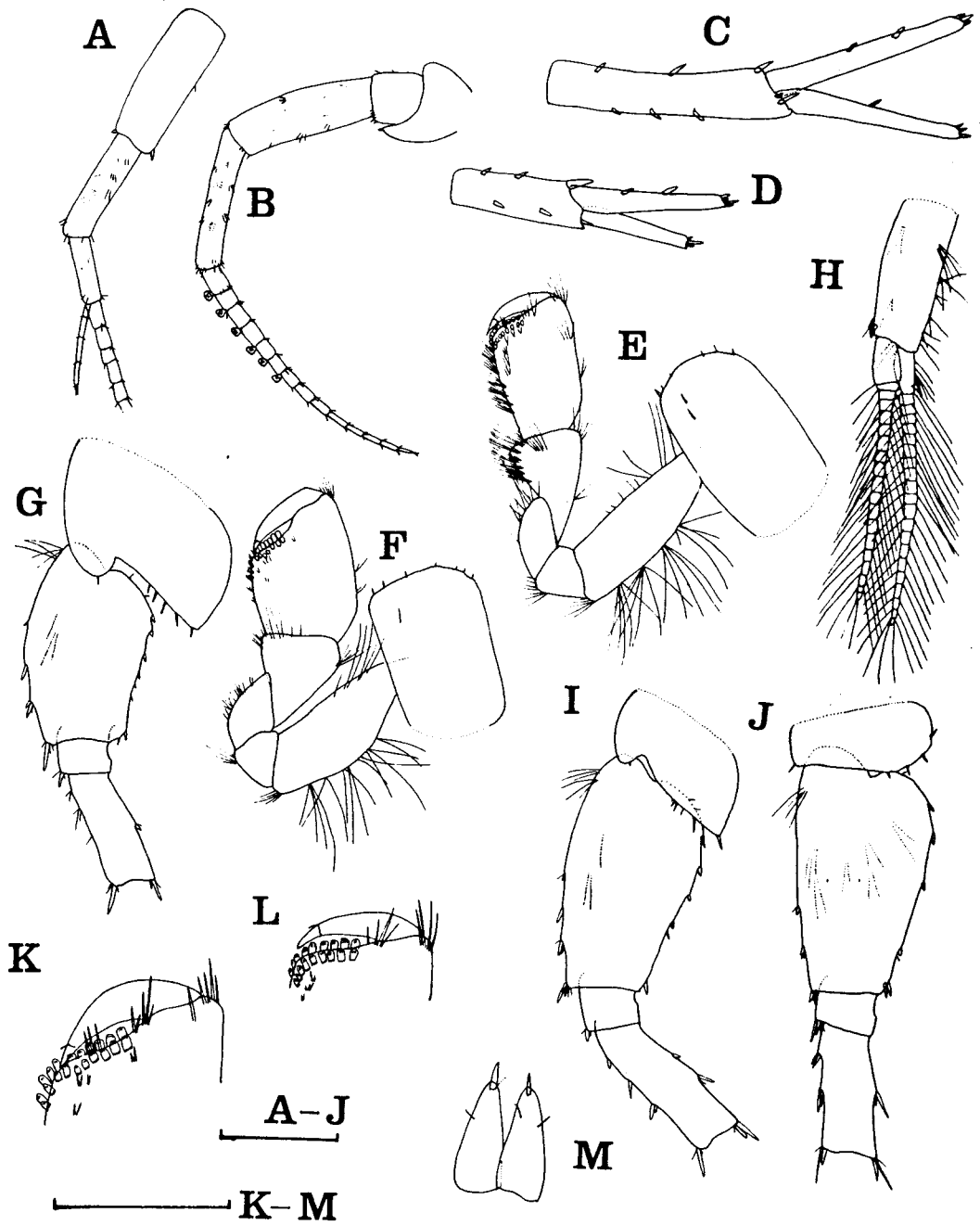


Fig. 3. *Jesogammarus (Annanogammarus) koreaensis*, new species, holotype male (13.0mm). A, antenna 1; B, antenna 2; C, uropod 1; D, uropod 2; E, gnathopod 2; F, gnathopod 1; G, pereopod 5; H, pleopod 1; I, pereopod 6; J, pereopod 7; K, gnathopod 1; L, gnathopod 2; M, telson. Scale bars = 1mm.

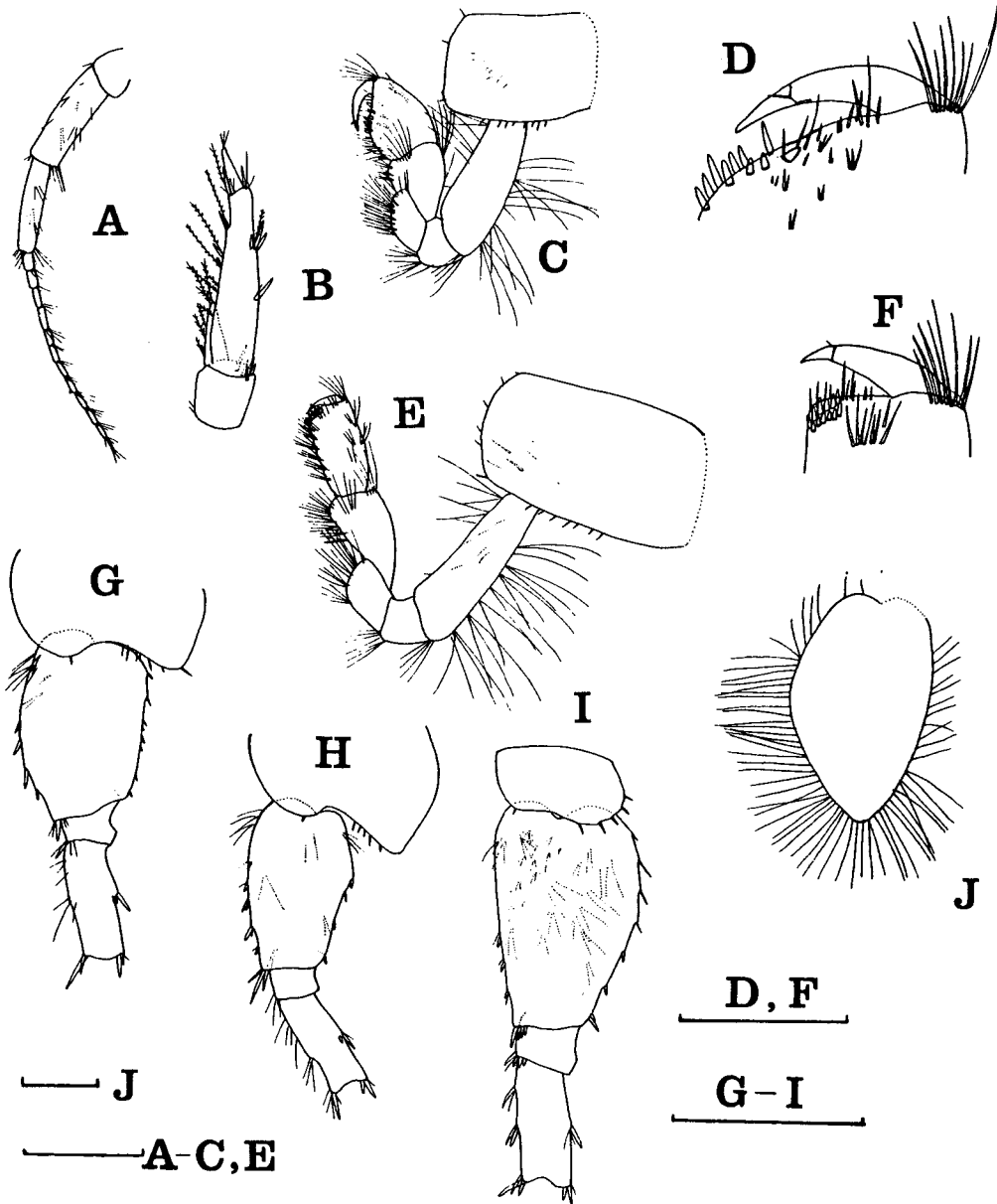


Fig. 4. *Jesogammarus (Annanogammarus) koreaensis*, new species, paratype female (7.7mm). A, antenna 2; B, uropod 3; C, gnathopod 1; D, gnathopod 1; E, gnathopod 2; F, gnathopod 2; G, pereopod 5; H, pereopod 6; I, pereopod 7; J, blood plate 2. Scale bars = A-C, E, G-J, 1mm; D, F, 0.5mm.

accessory flagellum with 5 (4-6) segments. Antenna 2 shorter than antenna 1; peduncular segment 5 a little shorter than segment 4, both segments with 3-4 bundles of shorter setae on posterior, interior and anterior margins; flagellum with 14 (13-15) segments, with cup-calceoli. Maxilla 1, inner plate with 17 (14-20) plumose setae; outer plate distally with four simple spines and eight pectinate spines; segment 2 of palp with five apical spine and four short setae. Maxilla 2 with 17 (15-18) plumose setae on face of inner plate.

Maxilliped, inner plate shorter than outer plate in length; inner plate with nine plumose facial setae, apical margin with three spines and inner distal margin with two bent pectinate spines; outer plate with closely packed nine (9-13) medial marginal simple spines, three (three-five) pectinate spines confined to distal part. Mandibular palp segment 1 without spines; segment 2 with four inner marginal setae and 10 inner sub-marginal setae; segment 3 shorter than segment 2, outer faces with two bundles of setae. Gnathopod 1, coxa with posterior margin without setae, lower margin with seven setae; basis with posterior and anterior margins with long setae; propod with palmar margin with 10 outer and 10 inner striated peg spines. Gnathopod 2, coxa with posterior margin without setae, lower margin with five setae and with one spine posteriorly, inner face of coxa with two spinules; propod slender and with nine outer and nine inner striated peg spines. Pereopod 3, coxa with posterior margin with one spinule and lower margin with one spinule, two setae; basis with posterior and anterior margins with long setae. Pereopod 4, coxa with posterior margin with five spinules, concave part of posterior margin narrow. Pereopod 5, lobe of anterolower margin of coxa with one seta and lower margin with five spinules; basis with anterior margin with five spines and setae, posterior margin with five spines and six setae. Pereopod 6, coxa lobe of anterolower margin with one setae, lower margin with two spinules and four setae; basis with posterior margin with four spines and four setae, anterior margin with seven spines, inner face with long setae. Pereopod 7, coxa with posterior margin with four spinules; basis with posterior margin with six spines and three setae, anterior margin with six spines, inner face with bundles of long setae. Accessory lobes of gills 2-5 unequal in length. Gills 2-4 longer than respective bases; gill 5 subequal to basis of pereopod 5 in length; gill 6 longer than 1/2 of basis of pereopod 6, accessory lobe longer than 1/2 of main lobe; gill 7 subequal to 1/2 of basis of pereopod 7 in length. Pleonites 1, 2 and 3 with 13, 13 and 15 setae, respectively. Pleonal epimeron 1 with anterior corner with 17 setae; pleonal epimeron 2 with two spines on sublower margin and inner face with two spines; pleonal epimeron 3 with three spines on sublower margin. Urosomites 1, 2 and 3 with four, four and two inserted spines with interspersed setae on distal dorsal margin, respectively. Uropods 1 and 2, peduncles with two rows of spines marginally. Uropod 1, rami shorter than peduncle; inner ramus with 2 outer marginal spines; outer ramus with one inner marginal spine. Uropod 2, inner ramus with 2 outer marginal spines; outer ramus bare marginally. Uropod 3, outer ramus sublinear and two-segmented, inner margin with four spines and nine plumose setae (seven-nine), outer margin with two clusters of spines and one plumose seta, terminal segment distinct (1/4 of proximal segment); inner ramus as long as 1/3 (25-35%) of outer ramus, outer margin with one spine and four plumose setae. Telson longer than maximum basal width, with apical spines and distolateral setae.

Description of female (Paratype): Body length 7.7mm (ovigerous), smaller than male. Setae of peduncular segments of antenna 2 longer than those of male. Propods of gnathopod 1 and 2 smaller than those of male; gnathopod 1, coxa with posterior margin with eight setae, inner face with many setae; propod with palmar margin oblique and with five outer and five inner simple spines. Gnathopod 2, coxa with posterior margin with seven setae, inner face with two spinules and setae; propod slender, and palmar margin vertical, with six inner and six outer simple spines. Egg number 120 (100-240). Gills 2-5 longer than the respective bases, gills 6-7 longer than 1/2 of the respective bases. Brood plate 2, expanded anteriorly, with numerous marginal setae. Uropod 3, smaller than that of male; inner margin of outer ramus with three spines and seven plumose setae and outer margin with two clusters of spines and one plumose seta; inner ramus 1/3 as long as outer ramus, outer margin with two spines and five plumose setae, terminal segment 1/4 as long as proximal segment.

Remarks: The present species is different from *Eogammarus ryotoensis* (Uéno, 1940) in the arrangement of spines on the three urosomal segments, so this species is considered different from it. The present species is similar to the type specimens of *Jesogammarus (Annanogammarus) annandalei* (Tattersall, 1922) collected from Lake Biwa in the arrangement of spines on the three urosomal segments, but different from the following characters: (1) many plumose setae of outer margin of outer ramus of uropod 3 in this species, whereas a few plumose setae in *J. annandalei* (2) concave part of posterior margin of coxa of P4 narrow in this species, whereas that of *J. annandalei* wide. The present species is different from the specimens of *Jesogammarus (Annanogammarus) annandalei* (Tattersall, 1922) redescribed by Morino (1985) in following characters: (1) peduncular segment 1 of antenna 1 with a posterodistal spine in this species, whereas without posterodistal spine in *J(A.) annandalei*. (2) outer plate of maxilliped with simple spines in this species, whereas outer plate of maxilliped with pectinate spines in *J(A.) annandalei*. (3) posterior margin of basis of pereopod 7 without bundle of setae proximally in this species, whereas with bundles of long setae in *J(A.) annandalei*. The present species is closely related to *J(A.) fluvialis* Morino, 1985, but different from the following characters: (1) many setae on the three pleonites in this species, whereas a few setae in *J(A.) fluvialis*. (2) many egg number (100-240) in female of this species, whereas fewer (17) in *J(A.) fluvialis*. (3) peduncular segment 1 of antenna 1 with a posterodistal spine in this species, whereas in *J(A.) fluvialis* without posterodistal spine.

Etymology. The specific name, "koreaensis" is from the Republic of Korea, to which the type locality of the present species belongs.

ABSTRACT

The anisogammaridean specimens collected from pond and spring habitats at 11 locations in Kyönggi-do, Ch'ungch'öngnam-do, Ch'ungch'öngbuk-do and Chöllabuk-do during the period from July 1, 1987 to May 4, 1990 were identified and one new species belonging to *Jesogammarus* was recognized. This species, which has a posterodistal spine on the peduncular segment 1 of antenna 1, is different from *Jesogammarus (A.) fluvialis*.

REFERENCES

- Bousfield, E. L., 1979. The Amphipod Superfamily Gammaroidea in the Northeastern Pacific Region: Systematics and Distributional Ecology. Bull. Biol. Soc. Wash. No. 3 (1979). pp. 297-357.
- Morino, H., 1984. On a new freshwater species of Anisogammaridae (Gammaroidea: Amphipoda) from central Japan. Publ. Itako Hydrobiol. Stn., **1**: 17-23.
- Morino, H., 1985. Revisional sutides on *Jesogammarus-Annanogammarus* group (Amphipoda: Gammaroidea) with description of four new species from Japan. Publ. Itako Hydrobiol. Stn., **2**: 9-55.
- Morino, H., 1986. A new species of the Subgenus *Annanogammarus* (Amphipoda: Anisogammaridae) from Lake Suwa, Japan. Publ. Itako Hydrobiol. Stn., **3**: 1-11.
- Schellenberg, A., 1937. Schlüssel und Diagnosen der dem Süßwasser-gammarus nahestehenden Einheiten ausschließlic der Arten des Baikalsees und Australiens. Zool. Anz. **117** (11/12): 267-280.
- Stephensen, K., 1944. Some Japanese amphipods. Vidensk. Medd. fra Dansk naturh. Foren., Bd. **108**: 25-88.
- Tattersall, W. M., 1922. Zoological Results of a Tour in the Far East. Part VIII. Mem. Asiat. Soc. Bengal, Vol. VI. pp.

445-451.

Tzvetkova, A. N., 1975. Littoral Gammaridae of northern and far-eastern seas of the U.S.S.R. and adjacent waters (in Russian). Acad. Nauk. USSR, Zool. Inst., Leningrad. 257 pp.

Uéno, M., 1940. Some freshwater amphipods from Manchoukuo, Corea and Japan. Bull. biogeogr. Soc. Japan, **10** (4): 63-85.

Uéno, M., 1971. The Fauna of the Insular Lava Caves in west Japan. VII. Subterranean Amphipoda. Bull. Nat. Sci. Mus. Tokyo, **14** (2): 161-170.

RECEIVED: 19 OCTOBER 1990

ACCEPTED: 26 OCTOBER 1990