

## Redescription of Recent Freshwater Ostracods (Crustacea: Ostracoda) from Korea: A Systematic Study of Four Species of Family Cyprididae

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한국 현생 담수 패충류(갑각 상강 : 패충 강)의 재기재 :  
Cyprididae 과 4종의 분류학적 연구

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### 적 요

현생 담수산 패충류에 대한 분류학적 연구로, 남한의 48개 지점에서 채집된 표본을 관찰한 결과 4종의 한국미기록종이 동정되었다: *Cyprinotus uenoi* Brehm, 1936, *Heterocypris incongruens* (Ramdohr, 1808), *Dolerocypris fasciata* (O.F. Müller, 1776), *Dolerocypris sinensis* Sars, 1903. 이로써 남한에서는 5종, 2아종의 현생 담수산 패충류가 알려지게 되었다.

Key words: systematic study, recent, freshwater, Ostracoda, Korea.

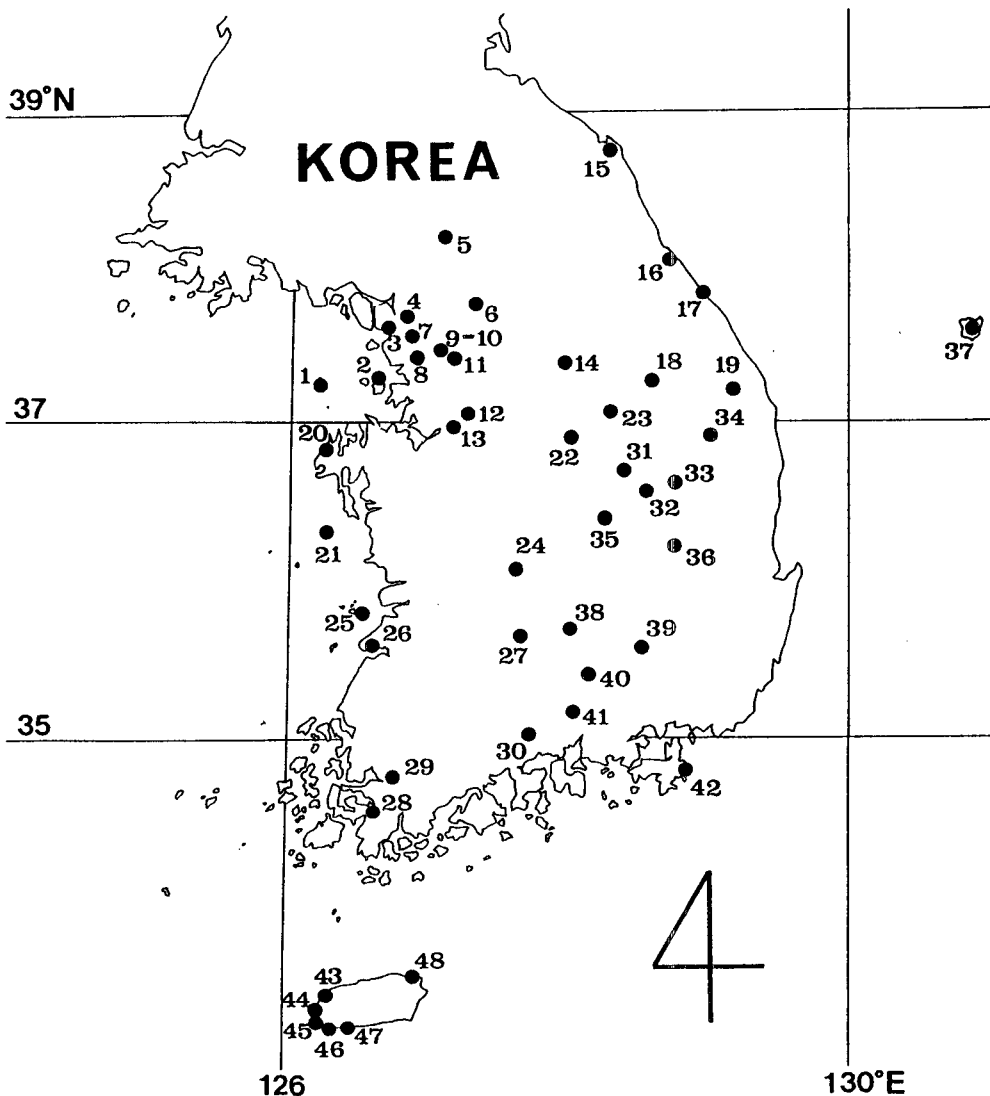
### INTRODUCTION

Recent freshwater ostracods, small benthonic crustaceans, are abundant and widely distributed in the various freshwater habitats, especially in shallow depth of ricefields, ponds, and bogs (Pennak, 1978).

The systematic work on Korean species has been done only by McKenzie in 1972. McKenzie (1972)

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**Fig. 1.** A map showing the localities where the materials were collected. 1, Chilli, Tögjök Is.; 2, Yöngjong Is.; 3, Wölgot, Gimp'o-gun; 4, Ilsan, Koyang-gun; 5, Yönc'h'on-ü; 6, Ch'önmasan mountin; 7, Haeng-jusansöng; 8, Ilchik res., Kwangmyöng-shi; 9, Seoul Nat'l Univ.; 10, a pond in Kyonghee Univ.; 11, Munwön-dong, Kwach'ön-shi; 12, Kosam res., Ansöng-gun; 13, Towön-dong, Songt'an-shi; 14, Shillim-myön, Saemal resting place (Wönsöng-gun); 15, Hwajinp'o; 16, Yang-yang-ü; 17, Kangrung univ. (Kangrüng-shi); 18, Yönhwa, Yöndang (Yöng-wöl-ü); 19, Nükku, Togye-ü; 20, a pond a Ch'üllip'o Arboretum; 21, Wönsan Is.; 22, Salmi, Ch'üngju-shi; 23, Komyöng-dong, Chech'ön-shi; 24, Tong-i, Yöngdong-gun; 25, Sönyu Is.; 26, Kyökp'o, Puan-gun; 27, Changsu-ü; 28, Haenam-ü; 29, Taedong bank, Yöng-am-gun; 30, Chinsang-myön, Kwang-yang-gun; 31, Sangp'o, Mungyöng-ü; 32, Chömmch'ön-shi bus terminal; 36, Sa-dong, Namyang, Hyönp'o (Ullüng Is.); 37, a pond of Kyongbuk Univ.; 38, Kimch'ön-dong, Köch'ang-ü; 39, Ch'angnyöng-ü, Magonü (Ch'angnyöng-gun); 40, Obu-myön, Sanch'öng-gun; 41, P'yönggö-dong, Chinju-shi; 42, Kujora, Mangchi, (Köje-gun); 43, Tumo, Namcheju-gun; 44, Kosan, Namcheju-gun; 45, Oito, Namcheju-gun; 46, Shindo, Posöng (Namcheju-gun); 47, Sagye, Namcheju-gun; 48, Chongdal, Bukcheju-gun.

recorded three species (one species and two subspecies) (*Candona morimotoi*, *Cypridopsis coreana coreana*, and *Cypridopsis coreana elongata*) as new to science. As these species are subterranean species, not occurring in the general freshwater habitats such as ricefields, ponds, and bogs, common recent freshwater ostracods still remain unknown in Korea. The purpose of this paper is to clarify the fauna of Korean ostracods occurring in the general freshwater habitats.

From this study, four species of recent freshwater ostracods are identified and all of them are new to South Korea. Up to now, seven species (five species and two subspecies) of recent freshwater ostracods are known to South Korea.

## MATERIALS AND METHODS

Materials were collected from 48 localities in South Korea (Fig. 1), and most of them occurred in ricefields, ponds and bogs. Collections were made with handnet or hand-made zooplankton net (mesh size: 120 $\mu$ m). Collected samples were narcotized by adding about 10ml of concentrated chloreton (Sigma cat. no. lot. T-5138) dissolved in 95 percent ethanol per one litter sample solution. After 1-2 hours, the samples would be fully narcotized and the 95 percent ethanol were added as preservative. The isolated specimens were mounted and dissected in glycerol on wooden slide under a stereoscopic dissecting microscope, using a pair of dissection needles (made by a fret saw or tungsten wire). Drawing and measuring were made with the aid of a camera lucida. Body length, height, and width of all specimens shown in this paper are given by measuring the large valves.

All specimens reported here are deposited in the Department of Molecular Biology, Seoul National University.

## SYSTEMATIC ACCOUNTS AND DESCRIPTIONS

Class Ostracoda Latreille, 1806  
 Subclass Podocopa G.W. Müller, 1894  
 Order Podocopida Sars, 1866  
 Suborder Podocopina Sars, 1886  
 Superfamily Cypridoidea Baird, 1845  
 Family Cyprididae Baird, 1845  
 Subfamily Cyprinotinae Bronstein, 1947  
 Genus *Cyprinotus* Brady, 1886

### 1. *Cyprinotus uenoi* Brehm, 1936 (Figs. 2-3)

*Cyprinotus uenoi* Brehm, 1936 (pp. 374-376, figs. 1-4); Okubo, 1974 (pp. 63-66, figs. 3a-g).

**Material examined:** 1♂, Towön-dong, Songt'an-shi, Jul. 19. 1987 (C.Y. Chang); 4♂♂, 2♀♀, Ilsan, Goyang-gun, Jun. 14. 1989; 4♂♂, 4♀♀, Yönc'h'ön-üp, Aug. 13. 1989 (G.J. Bae and H.B. Gong); 5♂♂, 4♀♀, Saemal resting place, Wönsöng-gun, Sep. 28. 1989; 2♂♂, 2♀♀, Hwajinp'o, Apr. 21. 1989; 3♂♂, 5♀♀, Kangrung Univ., Kangrüng-shi, May 29. 1986 (I.H. Kim); 3♂♂, 5♀♀, Haenam-üp, Jul 7. 1986 (I.H. Kim); 1♀, Ch'unyang, May 5. 1987 (C.Y. Chang); 3♂♂, 2♀♀, Kimch'ön-dong, Köch'ang-üp, May 14. 1989; 4♂♂, 1♀, Ch'angnyöng-üp, Jul. 5. 1986 (I.H. Kim); 2♂♂, 1♀, Magonüp, Ch'angnyöng-gun, Jul. 22. 1987

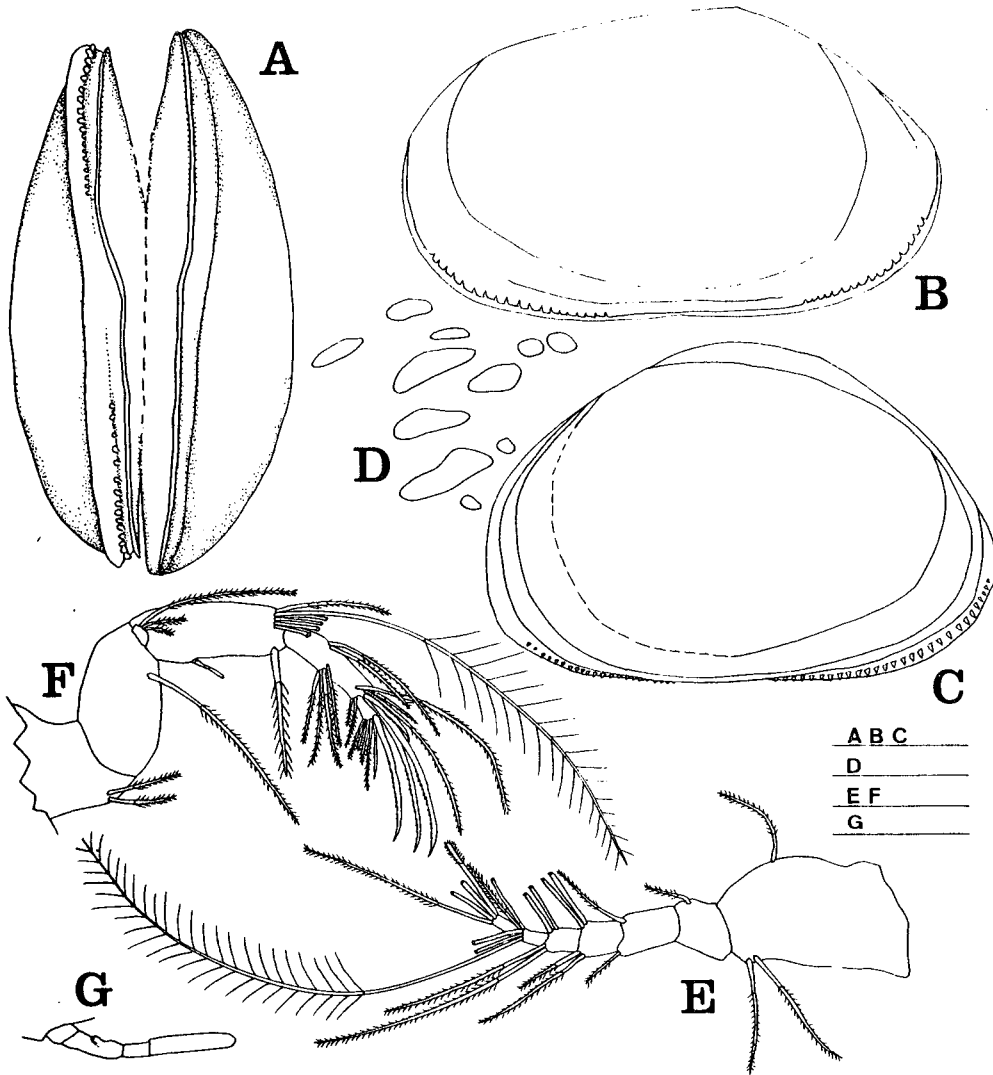


Fig. 2. *Cyprinotus uenoi* Brehm, 1936. Female: A, ventral view of carapace; B-C, lateral exterior views of left and right valves; D, muscle scars; E, first antenna; F, second antenna; G, sense club. (Scale: A, B, C=470 $\mu$ m; D=160 $\mu$ m; E, F=190 $\mu$ m; G=40 $\mu$ m).

(S.M. Yoon); 4 ♂♂, 3 ♀♀ Mangchi, Kōje-gun, May 4, 1989.

**Description of female:** Carapace length 1.72-1.98mm, maximum height 0.98-1.20mm situated at 2/5 of length from anterior end, maximum width 1.40-1.45mm at just behind middle.

Carapace (Fig. 2A) spindle shaped in dorsal view; posterior end broader and more rounded than anterior end.

Surface of carapace smooth, covered with small pits and hairs evenly. Left valve larger than right valve. White to dirty brown in color.

Left valve subreniform in exterior lateral view; dorsal margin convex; antero-dorsal margin almost straight and shorter than postero-dorsal margin; postero-dorsal margin convex; anterior end narrower than posterior

end; ventral margin almost straight, but slightly concave at middle.

Right valve subtriangular at exterior lateral view; gibbous hump present dorsally; ventral margin more concave than left valve at middle.

Left valve (Fig. 2B), in lateral interior view, selvage well developed, forming whole free margin; without flange; list present ventrally and antero-dorsally.

Right valve (Fig. 2C), in lateral interior view, tuberculated at antero-ventral and postero-ventral margin; selvage well developed, forming whole free margin; without flange; list present along inside of free margin.

Adductor muscle scars (Fig. 2D) with four large and five small scars; two mandibular scars smaller than large muscle scars.

First antenna (Fig. 2E) with seven podomeres. Length ratio of first to seventh podomeres along dorsal margin, 42: 13: 14: 10: 8: 6: 7. Sixth podomere bearing four long natatory bristles; seventh bearing two natatory. All natatory bristles 1.1 times as long as whole length of first antenna.

Second antenna (Fig. 2F) with two podomeres of protopodite, three podomeres of endopodite and one small podomere of exopodite. First podomere of protopodite bearing two ventral bristles. Exopodite bearing two short and one long bristles; long bristle reaching to distal end of first podomere of endopodite, short bristles less than 1/4 length of long bristle. Length ratio of podomeres 1-3 of endopodite along dorsal margin, 54: 39: 7. Ventral margin of first podomere of endopodite bearing one four-segmented sense club (Fig. 2G) situated at about 7/10 distance from distal end of this podomere. Length of sense club 0.055mm. First podomere of endopodite bearing five long plumose and one short spinose distal bristles; plumose bristles far overreaching terminal claws and short spinose bristle 1/4 length of plumose bristles. Second podomere of endopodite bearing two long and one short stout terminal claws; long claws 2/3 times of whole length of endopodite and short claws 1/3 length of long claws. Third podomere of endopodite bearing one stout and one slender terminal claws; stout claws slightly shorter than long claws of second podomere and slender claw reaching to 1/2 length of stout claw of third podomere.

Mandible (Fig. 3A) with two podomeres of protopodite, three podomeres of endopodite, and one platelike exopodite. First podomere of protopodite bearing one row of seven teeth (Fig. 3B). Third podomere of endopodite bearing five stout terminal claws.

Maxilla (Fig. 3C) with one branchial plate, three masticatory processes, one two-segmented palp. Second podomere of palp bearing three bare stout and three spinose slender bristles. Outer masticatory process bearing two spinose, two stout tuberculated, one L-shaped hairy, and five bare bristles on distal end. Middle masticatory process bearing 10 bare bristles. Inner masticatory process bearing many bare and short bristles and one spinose long bristle.

First thoracic leg (Fig. 3D) with one protopodite, one endopodite, and one exopodite plate. Protopodite bearing 15 spinose bristles on distal margin. Endopodite (Fig. 3F) with non-segmented palp bearing three spinose bristles distally.

Second thoracic leg (Fig. 3G) with two fused podomeres of protopodite and four podomeres of endopodite. Fourth podomere of endopodite bearing one spinose bristle on distal end of ventral margin, this bristle 1/3 length of terminal claw.

Third thoracic leg (Fig. 3H) with two fused podomeres of protopodite and three podomeres of endopodite. Third podomere of endopodite short and bearing one long backward-pointed spinose bristle, this bristle 2/3 length of second podomere.

Furca (Fig. 3I) slender; biramus, each ramus one small subterminal, one large terminal claws. Length

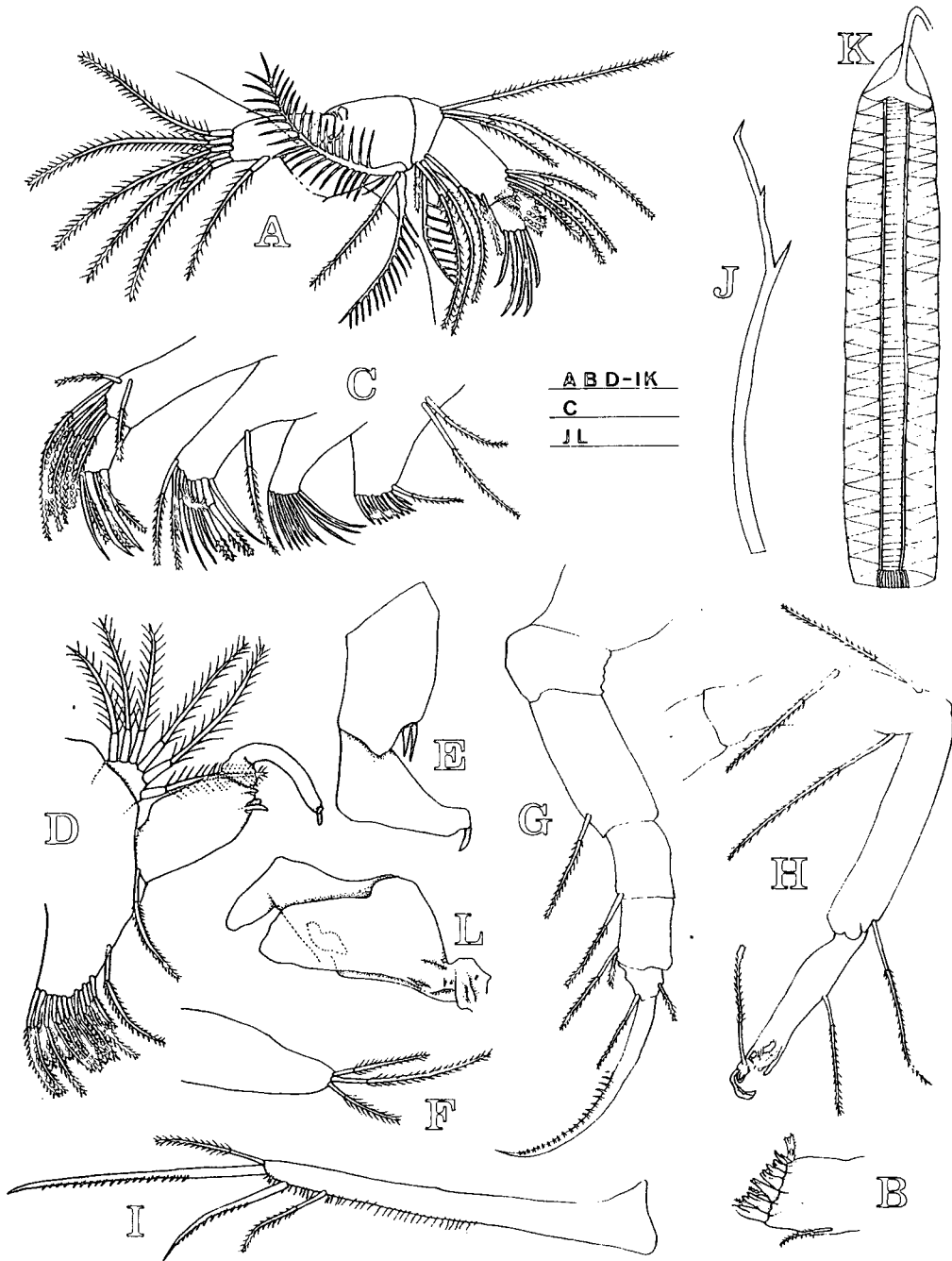


Fig. 3. *Cyprinotus uenoi* Brehm, 1936. A-C. female: A, mandible; B, teeth of mandible; C, maxilla. D,E. male: D, first thoracic leg (left); E, endopodite of first thoracic leg (right). F-J. female: F, endopodite of first thoracic leg; G, second thoracic leg; H, third thoracic leg; I, furca; J, furcal attachment. K,L. male: K, Zenker's organ; L, hemipenis (Scale: A, B, D-I, K=120 $\mu$ m; C=80 $\mu$ m; J, L=180 $\mu$ m).

ratio of furcal ramus, terminal claw, subterminal claw, dorsal bristle and distal bristle, 39: 26: 15: 10.

Furcal attachment (Fig 3J) slender and bearing one very short dorsal branch and one long ventral branch with one twig.

Description of male: Similar with female in carapace and soft parts.

Male smaller than female (length range; 1.5-1.7mm).

Endopodite of first thoracic leg (Fig. 3D) transformed into prehensile organ: asymmetrical; second podomere of left endopodite hook-shaped with small claw on distal end; second podomere of right endopodite (Fig. 3E) tumid and subtriangular.

Penis 3/4 length of Zenker's organ.

Zenker's organ bearing 27-30 spinose whorles.

Remarks: This species has been recorded only in the Far East Asia-Manchuria (China) and Japan. The present specimens differ slightly from those recorded in two localities in following points: (i) The maximum height of left valve is situated at 38-40 percent of the length from anterior end in Korean specimens, while 40-45 percent in Japanese, 35 percent in Manchurian. (ii) Zenker's organs of Korean specimens have 27-30 spinose whorles, those of Japanese 30-33, those of Manchurian 36.

Distribution: China (Manchuria), Japan and Korea.

Genus *Heterocypris* Claus, 1893

2. *Heterocypris incongruens* (Ramdohr, 1808) (Figs. 3-4)

*Cypris incongruens* Ramdohr, 1808 (pp. 85-86, Tab. 3, figs. 1-12, 15, 18-20); Brady and Norman, 1889 (pp. 73-74, pl. 12, figs. 8-9); Kaufmann, 1900 (pp. 264-269, Taf. 15, figs. 10-12, Taf. 18, fig. 5); Ekman, 1908 (p. 171); Sharpe, 1908 (pp. 405-406, pl. 54, figs. 1-3).

*Heterocypris incongruens*: Claus, 1892 (pp. 161, 198, Taf. 1, fig. 5, Taf. 6, fig. 7, Taf. 12, figs. 3-4); Sars, 1924 (pp. 116-117, pl. 4, figs. 1-2); Sars, 1928 (pp. 125-126, pl. 57); Klie, 1938 (pp. 118-121, figs. 403-408); Bronstein, 1947 (pp. 138-140, fig. 64, pl. 8, figs. 1, 6, 7); Hartman, 1964 (pp. 33, 59, 81); Okubo, 1972b (pp. 73-84, fig. 1); Mahoon and Iqbal, 1986 (pp. 148-149, figs. 32-38); Meisch, 1987 (p. 105).

*Cyprinotus incongruens*: Sars, 1903b (p. 222); G.W. Müller, 1912 (p. 165); Alm, 1916 (pp. 71-73, fig. 39); Henry, 1923 (p. 278); Arora, 1931 (pp. 84-85, pl. 7, figs. 40-43); Gautier, 1931 (pp. 383-386); Sharpe, 1945 (p. 815, fig. 1270a-e); Chapman, 1963 (p. 15, pl. 4, figs. 8-9).

*Cyprinotus (Heterocypris) incongruens*: Vávra, 1909 (p. 107, figs. 443-447).

*Cyprinotus incongruens incongruens*: Furtos, 1933 (p. 447, pl. 4, figs. 8-12).

Material examined: 4 ♀♀, Chilli, Töggjök Is., May 22, 1986 (C.B. Kim); 1 ♀, Yöungjong Is., Oct. 30, 1989; 7 ♀♀, May 21, 1989 (C.B. Kim and H.B. Gong); 3 ♀♀, Munwön-dong, Kwach'ön-shi, May 13, 1989 (S.M. Yoon); 5 ♀♀, Munwön-dong, Kwach'ön-shi, Aug. 11, 1989 (S.M. Yoon); 2 ♀♀, Wölgot, Gimp'o-gun, Jul. 10, 1990; 3 ♀♀, Towön-dong, Songt'an-shi, Jul. 19, 1987 (S.M. Yoon and C.Y. Chang); 2 ♀♀, Towön-dong, Songt'an-shi, Sep. 3, 1989; 1 ♀, Haengiusansöng, Sep. 29, 1987 (M.K. Shin); 5 ♀♀, IIsan, Goyang-gun, Jun. 14, 1989; 10 ♀♀, Seoul National Univ., May 1, 1989; 4 ♀♀, Seoul National Univ., Sep. 15, 1989; 7 ♀♀, Ch'önmasan mountin, Jun. 6, 1989 (C.B. Kim); 4 ♀♀, Kwangmyöng-shi, Sep. 3, 1989; 2 ♀♀, a pond in Kyonghee Univ., Oct. 26, 1984 (C.Y. Chang); 1 ♀, Kosam res., Ansöng-gun, Jul. 21, 1986; 3 ♀♀, Shilim-myöñ, Wönsöng-gun, Sep. 10, 1989; 5 ♀♀, Hwajinp'o Apr. 21, 1989; 1 ♀, Saemal resting place, Wönsöng-gun, Sep. 28, 1989; 3 ♀♀, Kangrung Univ., Kangrüng-shi, May 21, 1986 (I.H. Kim); 5 ♀♀, Nükku, Togye-

üp, May 5. 1987 (I.H. Kim); 10♀♀, Yönhwa, Yöng-wöl-üp, Jun 21. 1986 (I.H. Kim); 7♀♀, Kangrung Univ. Kangrüng-shi, May 29. 1986 (I.H. Kim); 5♀♀, Yang-yang-üp, Jul. 3. 1986 (N.G. Paik); 2♀♀, Gomyöng-dong, Chech'ön-shi, Sep. 10. 1989; 1♀, Salmi, Ch'ungju-shi, Sep. 10. 1989; 2♀♀, Wönsan Is., Aug. 1. 1986; 1♀, a pond at Ch'üllip'o Arboretum (C.Y. Chang), Oct. 7. 1985; 5♀♀, Ton-i, Yöngdong-gun, May 6. 1989; 5♀♀, Sönyu Is., May 6. 1986 (S.M. Yoon); 6♀♀, Kyökp'o, Puan-gun, Aug. 13. 1989 (K.S. Chae);

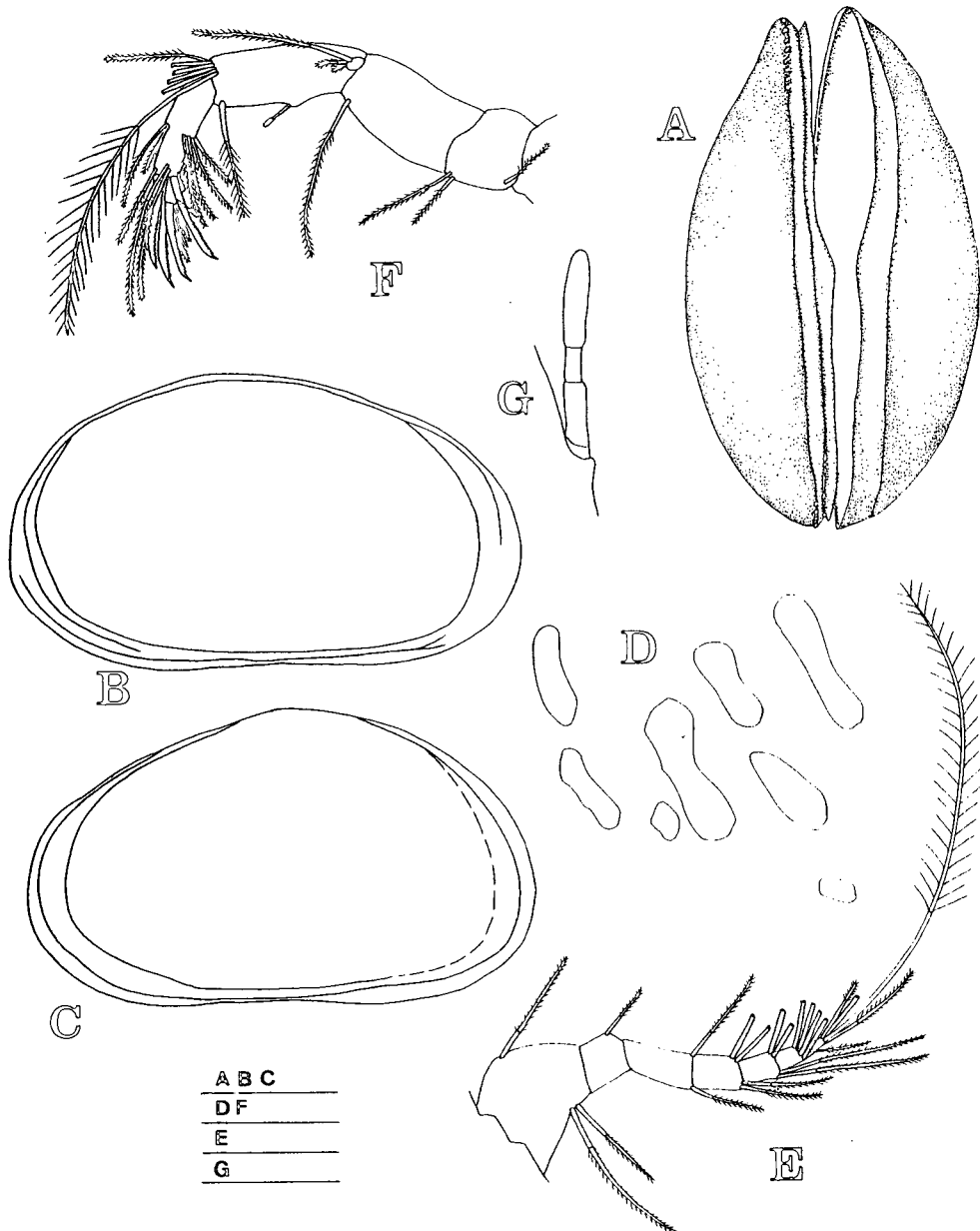


Fig. 4. *Heterocypris incongruens* (Ramdohr, 1808). female: A, ventral view of carapace; B-C, lateral exterior views of left and right valves; D, muscle scars; E, first antenna; F, second antenna; G, sense club (Scale; A, B, C = 400µm; D, F = 100µm; E = 190µm; G = 30µm).



6♀♀, Chinsang-myŏn, Kwang-yang-gun, Sep. 16. 1989; 4♀♀, Changsu-ŭp, Sep. 16. 1989; 10♀♀, Sangp'o, Mungyŏng-ŭp, Sep. 30. 1989 (S.M. Yoon); 5♀♀, Namyang, Ullŭng Is., Jul. 11. 1989; 2♀♀, Sangju-shi bus terminal, Sep. 12. 1989; 3♀♀, Yech'ŏn-ŭp, Sep. 12. 1989; 4♀♀, Sa-dong, Ullŭng Is., Jul. 11. 1989; 1♀, Hyŏnp'o, Ullŭng Is., Jul. 15. 1989; 3♀♀, Chŏmch'on-shi bus terminal, Sep. 12. 1989; 4♀♀, Ch'unyang, May 5, 1987 (C.Y. Chang); 1♀, a pond in Kyongbuk Univ., Jul. 5. 1986 (C.B. Kim); 4♀♀, Kujora, Kŏje-gun, May 5. 1989; 3♀♀, P'yŏnggŏ-dong, Chinju-shi, May 15. 1989; 5♀♀, Ch'angnyŏng-ŭp, Jul. 5. 1986 (I.H. Kim); 1♀, Magonŭp, Ch'angnyŏng-gun, Jul. 22. 1987 (S.M. Yoon); 1♀, Kosan, Namcheju-gun, Jul. 9. 1986 (I.H. Kim); 1♀, Shindo, Namcheju-gun, Jul. 9. 1986 (I.H. Kim); 3♀♀, Sagye, Namcheju-gun, Apr. 26, 1990; 2♀♀, Tumo, Namcheju-gun, Apr. 26. 1990; 2♀♀, Oito, Namcheju-gun, Apr. 26. 1990; 2♀♀, Chongdal, Bukcheju-gun, Apr. 26. 1990.

**Description of female:** Carapace length 1.41-1.63mm, maximum height 0.85-0.95mm just behind middle, maximum width 0.73-0.79 mm behind middle.

Surface of carapace covered with small pits and thin hairs evenly, Dirty yellow to light brown in color.

Carapace (Fig. 4A) spindle-shaped in dorsal view; posterior end rounded, broader than anterior end.

Left valve subreniform in exterior lateral view, larger than right valve, overlapping right valve; dorsal margin slightly convex; anterior margin asymmetrically rounded, narrower than posterior margin; posterior margin symmetrically rounded; antero-dorsal margin straight, longer than postero-dorsal margin; postero-dorsal margin slightly convex; ventral margin almost straight, but very slightly concave at middle.

Right valve subtriangular in exterior lateral view; shape very similar with left valve; dorsal margin more convex than left; without gibbous hump.

Left valve (Fig. 4B), in interior lateral view, with selvage, forming whole free margin; without flange; list present from antero-ventral to postero-dorsal margins; list also existing at antero-dorsal margin; inner margin visible faintly.

Right valve (Fig. 4C), in interior lateral view, with flange along outer margin; inside of flange with selvage; without list; inner margin visible inconspicuously.

Adductor muscle scars (Fig. 4D) with four large and two small scars. Two mandibular scars large and locating near ahead of adductor muscle scars.

First antenna (Fig. 4E) with seven podomeres. Length ratio of first to seventh podomeres along dorsal margin, 39: 12: 15: 12: 9: 6: 7. Sixth podomere bearing four long natatory bristles; seventh podomere bearing two natatory bristles. All natatory bristles 1.3 times as long as whole length of first antenna.

Second antenna (Fig. 4F) with two podomeres of protopodite, three podomeres of endopodite, and one small podomeres exopodite. First podomere of protopodite bearing two ventral bristles. Exopodite bearing two short and one long bristles; long bristle reaching distal end of first podomere of endopodite. Length ratio of podomeres 1-3 of endopodite along dorsal margin, 50: 40: 8. Ventral margin of first podomere of endopodite bearing one four-segmented sense club (Fig. 4G) situated at about 7/10 distance from distal end of this podomere. Length of sense club 0.053mm. Near dorsal margin of first podomere of endopodite bearing five plumose and one short spinose distal bristles; plumose bristles far overreaching terminal claws and spinose bristle reaching to 1/3 length of long bristles. Second podomere of endopodite bearing three stout terminal claws. Third podomere of endopodite bearing one long stout and one short thin terminal claws.

Mandible (Fig. 5A) with two podomeres of protopodite, three podomeres of endopodite, and one platelike exopodite. First podomere of protopodite bearing one row of seven teeth (Fig 5B). Third podomere of endopodite bearing three stout terminal claws, Slightly shorter than whole length of podomeres 2-3.

Maxilla (Fig. 5C) with one branchial plate, three masticatory processes, one two-segmented palp. Second podomere of palp bearing six bare bristles; three bristles stouter, longer than other three. Outer masticatory process bearing two spinose, two stout and tuberculated, one L-shaped hairy, and four bare bristles on distal end. Middle masticatory process bearing nine bare bristles. Inner masticatory process bearing 13 bare bristles.

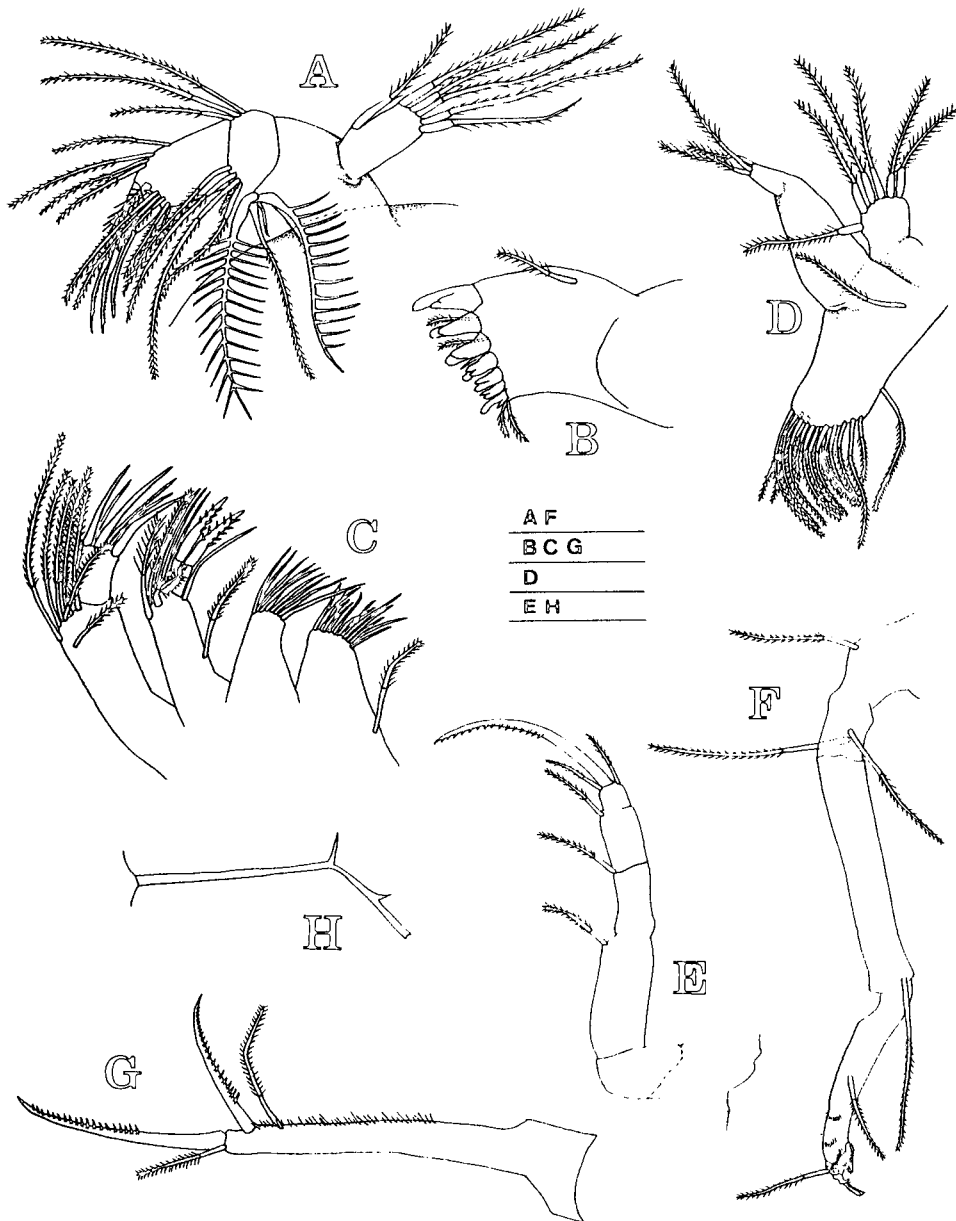


Fig. 5. *Heterocypris incongruens* (Ramdohr, 1808). female: A, mandible; B, teeth of mandible; C, maxilla; D, first thoracic leg; E, second thoracic leg; F, third thoracic leg; G, furca; H, furcal attachment (Scale: A, F = 120 $\mu$ m; B, C, G = 90 $\mu$ m; D = 100 $\mu$ m; E, H = 150 $\mu$ m).

First thoracic leg (Fig. 5D) with one protopodite, one endopodite, and one exopodite plate. Protopodite bearing one bristle situated at 1/3 distance from distal end and 14 terminal bristles on distal margin.

Second thoracic leg (Fig. 5E) with two fused podomeres of protopodite and four podomeres of endopodite. Second podomere of endopodite bearing one spinose bristle on distal end of ventral margin, this bristle slightly overreaching distal end of third podomere.

Third thoracic leg (Fig. 5F) with two fused podomeres of protopodite and three podomeres of endopodite. Third podomere of endopodite bearing one long backward-pointed spinose bristle, this bristle 1/2 length of second podomere.

Furca (Fig. 5G) slender and biramus; each ramus with one small subterminal, one large terminal claws. Length ratio of furcal ramus, terminal claw, subterminal claw, dorsal bristle and distal bristle, 38: 23: 16: 13: 10.

Furcal attachment (Fig. 5H) slender; bearing one very short dorsal branch and one long ventral branch with one twig.

**Remarks:** Claus (1882), Vávra (1909) and Klie (1938) have described male specimens, but Sars (1928) mentioned that male specimens were so rare that he could not examine them. We also could not examine males from Korean specimens. This species is most abundant in Korean freshwater habitats and highly variable in body size and carapace shape. *H. incongruens* similar with *H. rotundratus* Bronstein, 1928. *H. incongruens* (length range: 1.41-1.63mm) is larger than *H. rotundratus* (length less than 1.25mm) in length (Bronstein, 1947).

**Distribution:** Cosmopolitan.

Subfamily Dolerocypridinae Triebel, 1961.

Genus *Dolerocypris* Kaufmann, 1900.

### 3. *Dolerocypris fasciata* (O.F. Müller, 1776)

(Figs. 6-7)

*Cypris fasciata* O.F. Müller, 1776 (p. 162, cited from Delorme, 1970).

*Dolerocypris fasciata*: Sars, 1903a (p. 36, pl. 4, fig. 6a); Alm 1916 (pp. 70-71, fig. 38); Sars, 1928 (p. 127, pl. 58); Klie, 1938 (p. 123, figs. 413-414); Bronstein, 1947 (p. 133, fig. 59); Triebel, 1959 (pp. 161-162, Taf. 12, figs. 8a-c, Taf. 14, figs 8d-h); Hartmann, 1964 (p. 32); Rome, 1969 (p. 184, fig. 8); Delorme, 1970 (pp. 162-163, figs. 77-85); Victor and Fernando, 1981 (pp. 110-112, figs. 10-24); Petkovski, 1960 (pp. 103-106, Abb. 3-4).

**Material examined:** 5♀♀, Munwŏn-dong, Kwach'ŏn-shi, May 13. 1989 (S.M. Yoon); 6♀♀, Ilsan, Goyang-gun, Jun. 14. 1989; 5♀♀, Yŏnch'ŏn-ŭp, Aug. 13. 1989 (G.J. Bae and H.B. Gong); 1♀♀ Wŏlgot, Gimp'o-gun, Jul. 10. 1990; 1♀, Yŏndang, Yŏng-wŏl-ŭp, Jun. 24. 1986 (I.H. Kim); 2♀♀, Komyŏng-dong, Chech'ŏn-shi, Sep. 10. 1989; 2♀♀, Chinsang-myŏn, Kwang-yang-gun, Sep. 16. 1989; 4♀♀, Hyŏnp'o, Ullŭng Is., Jul. 15. 1989; 3♀♀, Yech'ŏn-ŭp, Sep. 12. 1989; 10♀♀, Sa-dong, Ullŭng Is., Jul. 12. 1989; 3♀♀, Kosan, Namcheju-gun, Feb. 11. 1986 (I.H. Kim); 5♀♀, Sagye, Namcheju-gun, Apr. 26. 1990.

**Description:** Male unknown. Carapace length 1.30-1.60mm, maximum height 0.56-0.60mm at just behind middle of left valve, maximum width 0.54-0.59mm at middle.

Surface of carapace smooth, covered with long hairs evenly; light bluish green in color.

Carapace (Fig. 6A) compressed and elongated laterally; spindle shaped in dorsal view; right valve longer than left valve; right valve overlapping left valve around anterior and posterior margin, while overlapped by left valve ventrally.

Left valve elongated subtriangular in lateral exterior view; dorsal margin smoothly arched at middle; anterior margin wide and curved bluntly; posterior margin narrow and rounded asymmetrically; ventral margin almost straight but slightly concave at middle.

In lateral exterior view, shape of two valves very similar; dorsal margin of right valve smoothly arched and lower in height than left valve; ventral margin more concave than left valve.

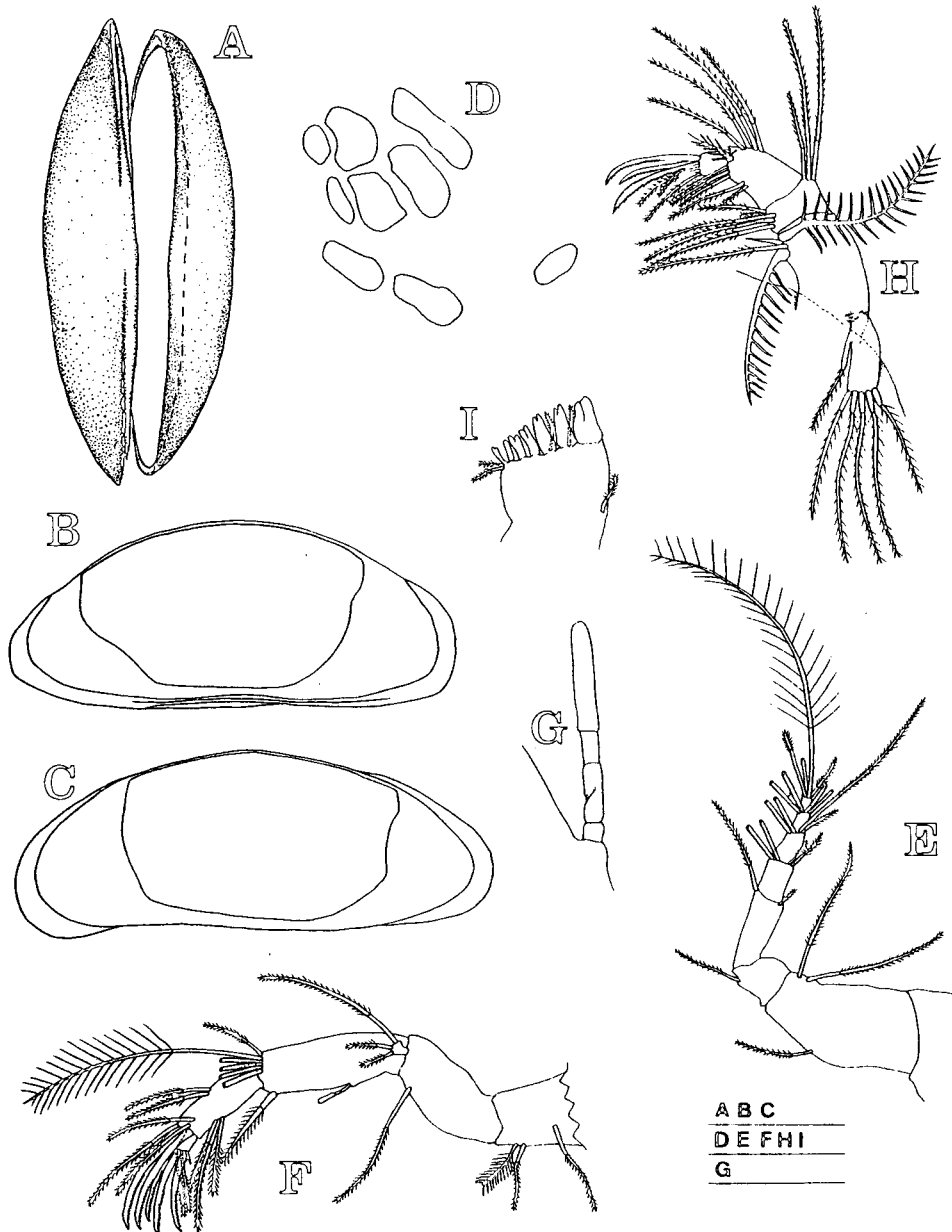


Fig. 6. *Dolerocypris fasciata* (O.F. Müller, 1776). Female: A, ventral view of carapace; B-C, lateral exterior views of left and right valves; D, muscle scars; E, first antenna; F, second antenna; G, sense club; H, mandible; I, teeth of mandible (Scale: A,B, C=450 $\mu$ m; D,E,F,H, I=190 $\mu$ m; G=50 $\mu$ m).

Selvage forming free margin of left valve (Fig. 6B) in lateral interior view; list conspicuous around inside of selvage; without flange; inner margin wide and conspicuous; anterior infold wider than posterior infold.

In lateral interior view of right valve (Fig. 6C), flange forming free margin at anterior and posterior margin; selvage forming free margin ventrally.

Adductor muscle scars (Fig. 6D) with four large and three small scars. Two large mandibular scars locating ahead of muscle scars.

First antenna (Fig. 6E) with seven podomeres. Length ratio of first to seventh podomeres along dorsal margin, 38; 11; 16; 12; 10; 8; 5. Sixth podomere bearing four long natatory bristles; seventh bearing two natatory. All natatory bristles subequal to whole length of first antenna.

Second antenna (Fig. 6F) with two podomeres of protopodite, three of endopodite, and one small exopodite. First podomere of protopodite bearing two ventral bristles and one of which plumose. Exopodite bearing two short and one long bristles; long bristle reaching to distal end of first podomere of endopodite and short bristles reaching to less than 1/3 length of long bristles. Length ratio of podomeres 1-3 of endopodite along dorsal margin, 55: 38: 7. Ventral margin of first podomere of endopodite bearing one four-segmented sense club (Fig. 6G) situated at about 7/10 distance from distal end of this podomere. Length of sense club 0.054mm; length ratio of four segments, 9: 27: 15: 49. Near dorsal margin of first podomere of endopodite bearing five long plumose and one short spinose bristles on distal end; plumose bristles slightly overreaching terminal claws and spinose bristle reaching to less than 1/3 length of plumose bristles. Second and third podomeres of endopodite bearing three and two stout terminal claws, respectively; termini of all claws approximately equal.

Mandible (Fig. 6H) with two podomeres of protopodite, three of endopodite, and one platelike exopodite. First podomere of protopodite bearing one row of seven teeth (Fig. 6I). Third podomere of endopodite bearing three stout terminal claws, subequal to whole length of podomeres 2-3.

Maxilla (Fig. 7A) with one branchial plate, three masticatory processes, one two-segmented palp. Second podomere of palp bearing six bare bristles; three bristles stouter, longer than other three. Outer masticatory process bearing one spinose, two stout bare, one L-shaped hairy, and six bare bristles on distal end. Middle masticatory process bearing nine bare bristles. Inner masticatory process bearing many bare bristles and two long pectinated bristles.

Second thoracic leg (Fig. 7C) with two fused podomeres of protopodite and four podomeres of endopodite. Each of first and second podomeres of protopodite bearing one short spinose bristle. Second podomere of endopodite bearing one spinose bristle on distal end of ventral margin, this bristle slightly overreaching distal end of third podomere.

Third thoracic leg (Fig. 7D) with two fused podomeres of protopodite and three podomeres of endopodite. Third podomere of endopodite bearing one long backward-pointed spinose bristle, this bristle 4/5 length of second podomere.

Furca (Fig. 7E) biramus, each ramus with one small subterminal, one large terminal claws; large claw with 14 and small claw with 13 teeth. Furcal ramus somewhat asymmetrical; right ramus slightly concave ventrally; left almost straight.

Furcal attachment (Fig. 7F) Y-shaped; median rod stick four times as long as ventral branch.

*Distribution:* Cosmopolitan.

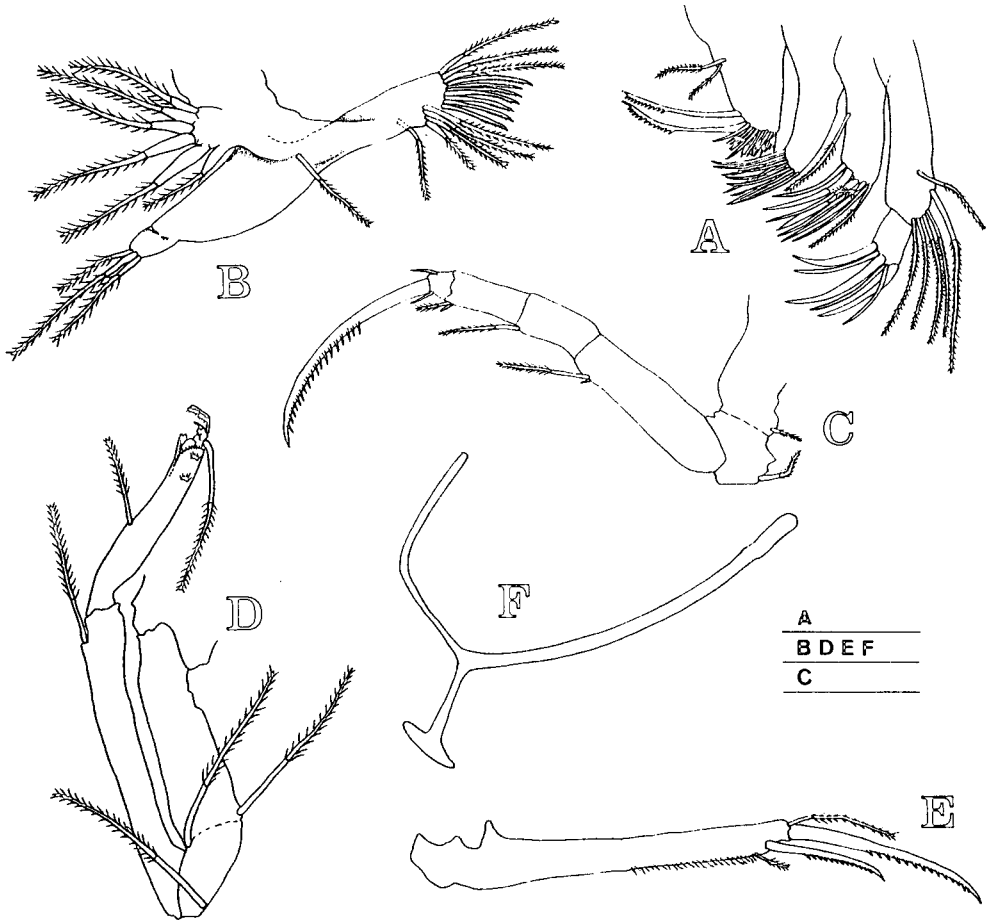


Fig. 7. *Dolerocypris fasciata* (O.F. Müller, 1776). Femel: A, maxilla; B, first thoracic leg; C, second thoracic leg; D, third thoracic leg; E, furca; F, furcal attachment (Scale; A = 80 $\mu$ m; B,D,E, F = 120 $\mu$ m; C = 190 $\mu$ m).

#### 4. *Dolerocypris sinensis* Sars, 1903

(Figs. 8-9)

*Dolerocypris sinensis* Sars, 1903a (pp. 37-38, pl. 4, figs. 7a-b); G.W. Müller, 1912 (p. 192); Bronstein, 1947 (pp. 133-134, fig. 60, pl. 7); Triebel, 1959 (pp. 162-165, tab. 15, figs. 9-15a, tab. 16, figs. 15b-18); Hartmann, 1964 (pp. 33, 58); Danielopol, 1965 (p. 448); Marazanof, 1965 (p. 98); Okubo, 1972a (p. 49, pl. I, figs. D, E, O, Pl. II, figs. A, B); Delorme, 1970 (p. 163, figs. 7a-7b); Rome, 1969 (p. 184, fig. 8); Victor and Fernando, 1981 (pp. 112-114, figs. 25-37); Meisch, 1987 (p. 106); Petkovski, 1960 (pp. 103-106, Abb. 1-2).

**Material examined:** 2♀♀, Munwŏn-dong, Kwach'ŏn-shi, May 13, 1989 (S.M. Yoon); 1♀, Aug. 11, 1989 (S.M. Yoon); 2♀♀, Wŏlgot, Gimp'o-gun, Jul. 10, 1990; 1♀, Yŏnch'ŏn-ŭp, Aug. 13, 1989 (G.J. Bae and H.B. Gong); 2♀♀, Saemal resting place, Wonsŏng-gun, Sep. 28, 1989; 3♀♀, Taedong bank, Yŏng-am-gun, Jul. 26, 1988; 4♀♀, Chinsang-myŏn, Kwang-yang-gun, Sep. 16, 1989; 10♀♀, Sa-dong, Ullŭng Is., Jul. 11, 1989; 3♀♀, Namyang, Ullŭng Is., Jul. 11, 1989; 6♀♀, Obu-myŏn, Sanch'ŏng-gun, Sep. 14, 1989; 5♀♀, Kosan, Namcheju-gun, Jul. 11, 1986 (I.H. Kim); 3♀♀, Posŏng, Namcheju-gun, Jul. 9, 1986 (I.H. Kim); 2♀♀, Tumo, Namcheju-gun, Apr. 26, 1990.

**Description:** Male unknown, Carapace length 1.91-2.01mm, maximum height 0.64-0.67mm at just behind

middle, maximum width 0.65-0.67mm at middle.

Surface of carapace smooth, covered with long hairs evenly; light bluish green in color.

Carapace (Fig 8A) compressed and very elongated laterally; spindle shaped in dorsal view; right valve longer than left; right valve overlapping left around anterior and posterior margin, overlapped by left ventrally.

Left valve very elongated subtriangular in lateral exterior view; dorsal margin very slightly convex at mid-

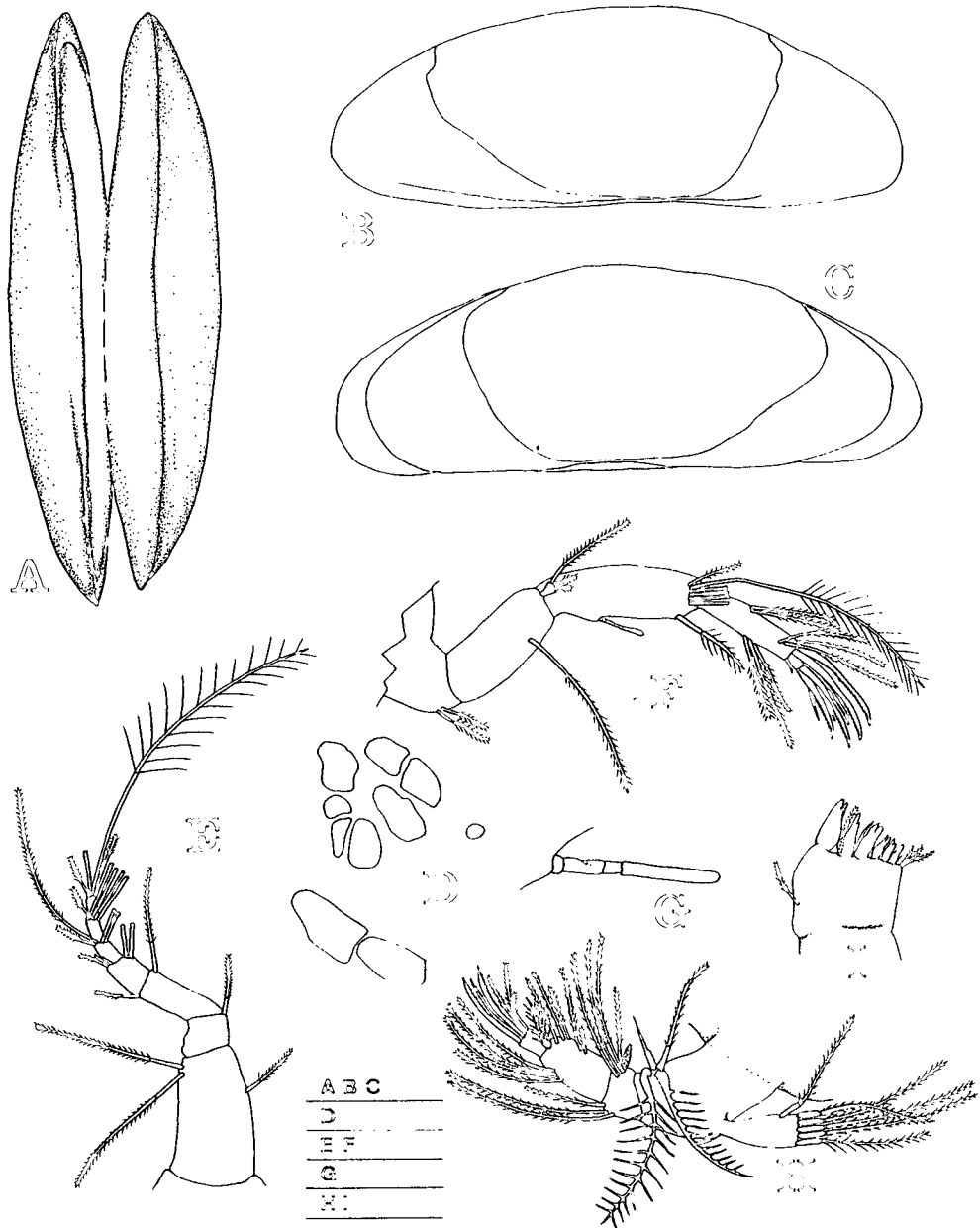


Fig. 8. *Dolerocypris sinensis* Sars, 1903. Female: A, ventral view of carapace; B-C, lateral exterior views of left and right valves; D, muscle scars; E, first antenna; F, second antenna; G, sense club; H, mandible; I, teeth of mandible (Scale; A, B, C = 470 $\mu$ m; D = 130 $\mu$ m; E, F = 190 $\mu$ m; G = 40 $\mu$ m; H, I = 120 $\mu$ m).

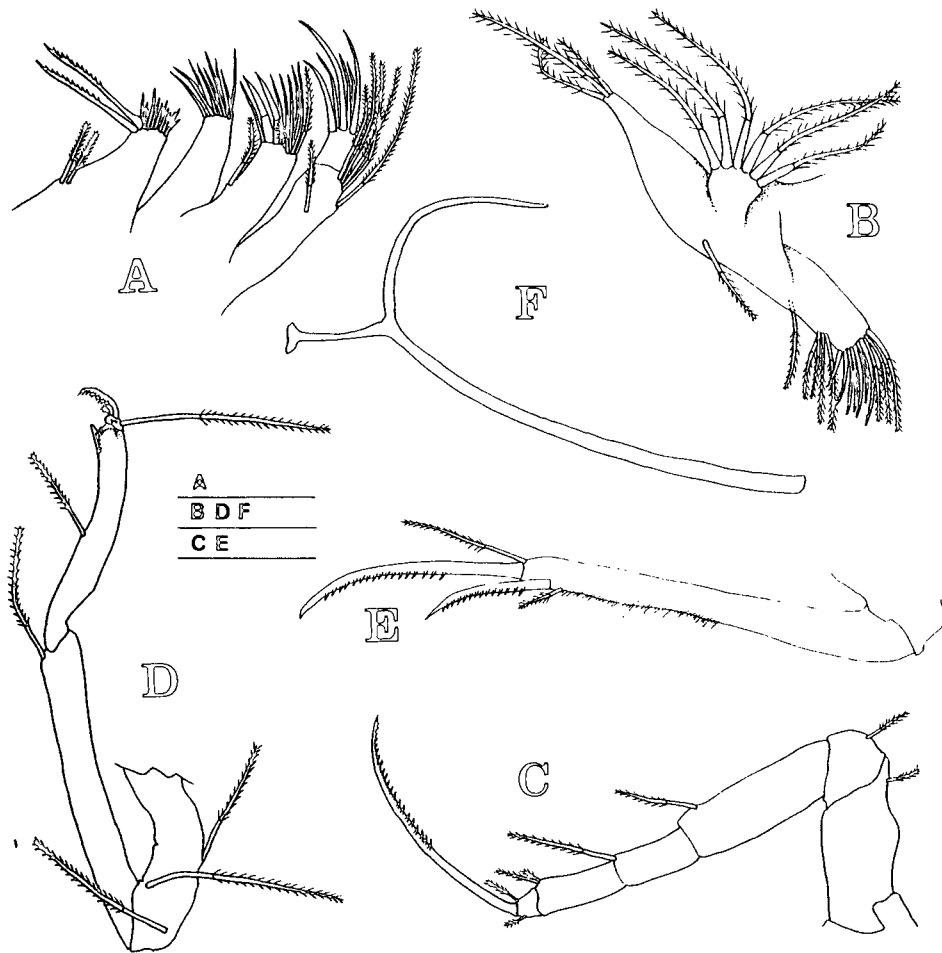


Fig. 9. *Dolerocypris sinensis* Sars, 1903. Female: A, maxilla; B, first thoracic leg; C, second thoracic leg; D, third thoracic leg; E, furca; F, furcal attachment (Scale; A = 80 $\mu$ m, B, D, F = 120 $\mu$ m; C, E = 160 $\mu$ m).

dle; anterior margin wide and curved bluntly; posterior margin narrow and rounded asymmetrically; ventral margin almost straight but slightly concave at middle.

In lateral exterior view, shape of two valves very similar; dorsal margin of right valve very smoothly arched and low in height; ventral margin more concave than left valve.

Selvage forming free margin of left valve (Fig 8B) in lateral interior view; with list at near inside of ventral margin inconspicuously, anterior and posterior parts without list; without flange; inner margin wide and conspicuous; anterior infold wider than posterior infold.

In lateral interior view of right valve (Fig. 8C), flange forming free margin at anterior and posterior margin; selvage forming free margin ventrally.

Adductor muscle scars (Fig 8D) with five large and three small scars; gathered roundly. Two large mandibular scars locating far ahead of muscle scars.

First antenna (Fig 8E) with seven podomeres. Length ratio of first to seventh podomeres along dorsal



margin, 37: 12: 15: 14: 7: 8: 7. Sixth podomere bearing four long natatory bristles; seventh bearing two natatory. All natatory bristles subequal to whole length of first antenna.

Second antenna (Fig. 8F) with two podomeres of protopodite, three of endopodite, and one small exopodite. First podomere of protopodite bearing two ventral bristles. Exopodite bearing two short and one long bristles; long bristle reaching to distal end of first podomere of endopodite, short bristles less than 1/3 length of long bristle. Length ratio of podomeres 1-3 of endopodite along dorsal margin, 50: 44: 6. Ventral margin of first podomere of endopodite bearing one four-segmented sense club (Fig 8G) situated at about 7/10 distance from distal end of this podomere. Length of sense club 0.060mm; length ratio of four segments, 6: 24: 11: 59. First podomere of endopodite bearing five long plumose and one short spinose distal bristles; plumose bristles slightly overreaching terminal claws and spinose bristle less than 1/3 length of plumose bristles. Second and third podomeres of endopodite bearing three and two stout terminal claws, respectively; tremini of all claws approximately equal.

Mandible (Fig 8H) with two podomeres of protopodite, three podomeres of endopodite, and one platelike exopodite. First podomere of protopodite bearing one row of seven teeth (Fig 8I). Third podomere of endopodite bearing three stout terminal claws, subequal to whole length of podomeres 2-3.

Maxilla (Fig. 9A) with one branchial plate, three masticatory processes, one two-segmented palp. Second podomere of palp bearing six bare bristles; three bristles stouter, longer than other three. Outer masticatory process bearing one spinose, two stout bare, one L-shaped hairy, and six slender and bare bristles on distal end. Middle masticatory process bearing nine bare bristles. Inner masticatory process bearing many bare and two long pectinated bristles.

First thoracic leg (Fig. 9B) with one protopodite, one endopodite, and one exopodite plate. Protopodite bearing one spinose bristle on mid-ventral margin, four spinose on ventral margin subterminally, seven claw-like, and three spinose terminal bristles on distal margin.

Second thoracic leg (Fig 9C) with two fused podomeres of protopodite and four podomeres of endopodite. Each first and second podomeres of protopodite bearing one short spinose bristle. Second podomere of endopodite bearing one spinose bristle on distal end of ventral margin, this bristle slightly overreaching distal end of third podomere.

Third thoracic leg (Fig 9D) with two fused podomeres of protopodite and three podomeres of endopodite. Third podomere of endopodite bearing one long backward-pointed spinose bristle, this bristle 4/5 length of second podomere.

Furcal (Fig 9E) biramus, each ramus with one small subterminal, one large terminal claws; large claw with 17 and small claw with 14 teeth. Furca ramus somewhat asymmetrical; right ramus slightly concave ventrally; left almost straight.

Furcal attachment (Fig 9F) Y-shaped; median rod stick 4.6 times as long as ventral branch.

Remarks: This species is closely related to *D. fasciata*. Carapaces of two species are highly elongated laterally and surface of carapaces smooth. While, two species are different at the following characteristics. (i) *D. sinensis* (length range: 1.91-2.01mm) is larger than *D. fasciata* (length range: 1.30-1.60mm). (ii) Dorsal margin of carapace *D. sinensis* is very slightly convex, but that of *D. fasciata* is arched conspicuously. The length of *D. sinensis* is more than 2.9 times of height, but that of *D. fasciata* is less than 2.7 times. (iii) The left valve of *D. fasciata* has conspicuous list along inside of selvage, but that of *D. sinensis* has inconspicuous list only ventrally. (iv) The distal podomere of sense club is 60% as long as sense club in *D. sinensis*, but that is 49% as long as sense club in *D. fasciata*.

Distribution: Cosmopolitan.

## ABSTRACT

The systematic study of recent freshwater ostracods were conducted on the materials collected from 48 localities in South Korea. Four species of ostracods are identified, and all of them are new to South Korea: *Cyprinotus uenoi* Brehm, 1936, *Heterocypris incongruens* (Ramdohr, 1808), *Dolerocypris fasciata* (O.F. Müller, 1776), *Dolerocypris sinensis* Sars, 1903. Up to now seven species (5 species and 2 subspecies) of recent freshwater ostracods are known to South Korea.

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