

The Brachyuran Crabs (Crustacea: Decapoda) of Chindo Island, Korea

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ABSTRACT

The ten species, *Nobilum japonicum japonicum*, *Paradorippe granulata*, *Pilumnus minutus*, *Carcinoplax vestitus*, *Eucrate crenata*, *Uca lactea*, *Ilyoplax pingi*, *Nanosesarma gordonii*, *Achaeus tuberculatus*, *Parthenope validus*, are added to the brachyuran fauna of the Chindo Island and its adjacent islets. With the previously known 36 species, total 46 species from the Chindo I. and its adjacent islets are listed and two grapsid species, *Hemigrapsus longitarsis* and *Sesarma erythroductyla*, are redescribed with illustrations.

Key words: brachyuran crabs. Chindo Island. *Hemigrapsus longitarsis*.
Sesarma erythroductyla

INTRODUCTION

The brachyuran crabs are one of the well-known coastal invertebrate groups in Korea. However, their faunistic studies on the localized areas and taxonomic studies on many species have been conducted insufficiently. The marine fauna of the Chindo Island is very important for the marine zoogeographical study in Korea because the Chindo I. is located between the Yellow Sea and the South Sea. About the brachyuran fauna of the Chindo I. and its adjacent islets, 36 species have been reported through only three literatures (Kamita, 1941; Kim and Kim, 1982; Kim and Kwon, 1983). Under these circumstances, a scientific survey was carried out in order to reveal the brachyuran fauna of the Chindo I., and the present study was based on the materials collected during the periods from July 23-25, and November 1-3, 1994 in the Chindo I. Specimens were chiefly obtained from muddy flats of the littoral zone and preserved in 95% ethanol immediately. As a result of examining the present materials, 32 species were identified. Of which ten species are new to the brachyuran fauna of the Chindo I. and its adjacent islets. In this paper, total 46 species are listed with some new

informations, if any, and two grapsid species are redescribed with illustrations because of the poor taxonomic informations about these species in Korea.

The drawing and the measuring were made with the aid of a drawing tube. Classification scheme is after Bowman and Abele (1982). In description, the following abbreviations were used: cb, carapace breadth at the widest part; cl, carapace length; mw, merus width; ml, merus length; iw, interorbital width (or width of the frontal region).

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

SYSTEMATIC ACCOUNT

The following systematic list about the brachyuran fauna of the Chindo I. and its adjacent islets consists of all the species appeared in the previous literatures and newly examined in the present study. In this list, single asterisk (*) indicates the species newly reported from the Chindo I. and its adjacent islets by the present study. The "Material examined" section lists all specimens examined and the "Literatures" section lists the references containing the species reported from these areas.

Infraorder Brachyura Latreille, 1803 계 하목

Family Dorippidae MacLeay, 1838 조개치레 과

***1. *Nobilum japonicum japonicum* (Von Siebold, 1824) 조개치레**

Material examined. 1 ♀, southern part of Chindo I., 25 July 1994.

Remarks. This species is newly reported from Chindo Island.

***2. *Paradorippe granulata* (De Haan, 1839) 움조개치레**

Material examined. 1 ♂, southern part of Chindo I., 25 July 1994.

Remarks. This species is newly reported from Chindo Island.

Family Calappidae De Haan, 1833 금계 과

3. *Matuta planipes* Fabricius, 1798 그물무늬금계

Literatures. Kim, 1982: 137 (Kahak).

Family Leucosiidae Samouelle, 1819 밤계 과

4. *Philyra pisum* De Haan, 1841 밤계

Material examined. 2 ♂♂, 3 ♀♀, Anch'i, 24 July 1994.

Literatures. Kim, 1982: 137 (Chöndu, Nokjin, Hoedong); Kim and Kwon, 1983: 238 (Hajo I.).

Family Majidae Samouelle, 1819 물맞이계 과

***5. *Achaeus tuberculatus* Miers, 1879 가는다리아케우스계**

Material examined. 3 ♂♂, southern part of Chindo I., 25 July 1994.

Remarks. This species is newly reported from Chindo Island.

6. *Pugettia quadridens quadridens* (De Haan, 1837) 뿔물맞이게**Material examined.** 1 ♂, Pojŏn, 2 Nov. 1994; 1 ♂, Hoedong, 1 Nov. 1994.**Literatures.** Kim, 1982: 146 (Hoedong, Yŏmi); Kim and Kwon, 1983: 328 (Hajo I., Ch'ŏngdŏng I.).

Family Hymenosomatidae MacLeay, 1838 말랑게 과

7. *Rhynchoplax messor* Stimpson, 1858 주걱말랑게**Material examined.** 4 ♂♂, 6 ♀♀, Hoedong, 1 Nov. 1994.**Literatures.** Kim, 1982: 146 (Hoedong, Yŏmi).

Family Parthenopidae MacLeay, 1838 자게 과

***8. *Parthenope valida* De Haan, 1839** 자게**Material examined.** 1 ♂, Hoedong, 25 July 1994.**Remarks.** This species is newly reported from Chindo Island.

Family Portunidae Rafinesque, 1815 꽃게 과

9. *Ovalipes punctatus* (De Haan, 1883) 깨다시꽃게**Literatures.** Kim, 1982: 138 (Kahak).**10. *Portunus trituberculatus* (Miers, 1876)** 꽃게**Literatures.** Kim, 1982: 138 (Kahak, Kŭmgap).**11. *Charybdis bimaculata* (Miers, 1886)** 두점박이민꽃게**Material examined.** 1 ♂, 2 ♀♀, southern part of Chindo I., 25 July 1994.**Literatures.** Kim, 1982: 138 (Chindo I.); Kim and Kwon, 1983 (Sangjŏ I., Nulok I.).**12. *Charybdis japonica* (A. Milne Edwards, 1861)** 민꽃게**Material examined.** 1 ♂, Kŭmgap, 23 July 1994; 2 ♀♀, Namdong, 25 Aug. 1994; 1 ♂, 2 ♀♀, Kulp'ŏ, 25 July 1994; 1 ♂, Hoedong, 1 Nov. 1994.**Literatures.** Kim, 1982 (Kahak, Kŭmgap).

Family Goneplacidae MacLeay, 1838 원숭이게 과

13. *Carcinoplax vestita* (De Haan, 1833)** 털보원숭이게**Material examined.** 1 ♂, southern part of Chindo, 25 July 1994.**Remarks.** This species is newly reported from Chindo Island.14. *Eucrate crenata* De Haan, 1835** 무딘이빨게**Material examined.** 2 ♂♂, southern part of Chindo, 25 July 1994.**Remarks.** This species is newly reported from Chindo Island.

Family Xanthidae MacLeay, 1838 부채계 과

15. *Macromedaeus distinguendus* (De Haan, 1835) 꽃부채계

Material examined. 3 ♂♂, 2 ♀♀, Hoedong, 1 Nov. 1994.

Literatures. Kim, 1982: 139 (Hoedong).

16. *Sphaerozius nitidus* Stimpson, 1858 비단부채계

Material examined. 3 ♂♂, 2 ♀♀, Hoedong, 1 Nov. 1994.

Literatures. Kim, 1982: 140 (Yömi).

***17. *Pilumnus minutus* De Haan, 1833 애기털보부채계**

Material examined. 1 ♀, Wondari, 23 July 1994.

Remarks. This species is newly reported from Chindo Island.

18. *Pilumnopeus makianus* (Rathbun, 1929) 두드러기네톱니부채계

Material examined. 2 ♂♂, 2 ♀♀, Kulp'o, 25 July 1994.

Literatures. Kim, 1982: 140 (Hoedong).

Family Grapsidae MacLeay, 1838 바위계 과

19. *Pachygrapsus crassipes* Randall, 1840 바위계

Material examined. 2 ♂♂, 1 ♀, Pojŏn, 24 July 1994.

Literatures. Kim, 1982: 143 (Yömi); Kim and Kwon, 1983: 328 (Dokgö I., Ch'öngdöng I., Kalmok I., Nulok I.).

20. *Eriocheir japonicus* De Haan, 1835 동남참게

Literatures. Kim, 1982: 143 (Gachi).

21. *Hemigrapsus sanguineus* (De Haan, 1835) 무늬발게

Material examined. 3 ♂♂, 1 ♀, Kümgap, 23 July 1994; 3 ♂♂, 5 ♀♀, Pojŏn, 24 July 1994; 2 ♂♂, 3 ♀♀, Namdong, 25 July 1994; 1 ♂, 4 ♀♀, Kulp'o, 25 July 1994; 3 ♂♂, 3 ♀♀, Hoedong, 1 Nov. 1994.

Literatures. Kim, 1982: 143 (Chöndu, Nokjin, Hoedong, Tolmok); Kim and Kwon, 1983: 328 (Hajo I., Ch'öngdöng I., Kwansa I., Kalmok I.).

22. *Hemigrapsus penicillatus* (De Haan, 1835) 풀게

Material examined. 3 ♂♂, 6 ♀♀, Kümgap, 23 July 1994; 2 ♂♂, 5 ♀♀, Anch'i, 24 July 1994; 4 ♂♂, 2 ♀♀, Pojŏn, 24 July 1994; 5 ♂♂, 3 ♀♀, Namdong, 25 July 1994; 3 ♂♂, 4 ♀♀, Kulp'o, 25 July 1994; 2 ♂♂, 1 ♀, Hoedong, 1 Nov. 1994.

Literatures. Kim, 1982: 143 (Chöndu, Nokjin, Hoedong, Sömgang, Kahak, Tolmok); Kim and Kwon, 1983: 328 (Sangjo I., Hajo I., Kwansa I., Kwanmae I., Dokgö I.).

23. *Hemigrapsus longitarsis* (Miers, 1879) 긴종아리풀게 (Figs. 1, 2)

Heterograpsus longitarsis Miers, 1879, p. 37, pl. 2, fig. 3 (cited from Sakai, 1976); Ortmann, 1894, p. 715 (cited from Sakai, 1976).

Eriocheir misakiensis Rathbun, 1919, p. 593, pl. 23. (cited from Sakai, 1976)

Brachynotus longitarsis: Balss, 1922, p. 151 (cited from Sakai, 1976).

Hemigrapsus longitarsis: Shen, 1932, p. 168, text-figs. 106, 107, pl. 7, fig. 3; Sakai, 1935, p. 229, pl. 62, fig. 2; 1939, p. 674, pl. 75, fig. 2; 1965, p. 199, pl. 94, fig. 2; 1976, p. 651, text-fig. 357; Kamita, 1941, p. 207, text-figs. 114a, b.

Material examined. 4 ♂♂, 2 ♀♀ (Ovig.), Hoedong, 1 Nov. 1994.

Literatures. Kim and Kwon, 1983: 328 (Hajo I.).

Description. Carapace (Fig. 1) nearly quadrangular (cl/cb ratio 0.92 ± 0.10 in male, 0.94 ± 0.17 in female), moderately convex, with well defined dorsal regions; each region convex, covered with fine hairs. Frontal region nearly 1/2 carapace width; frontal margin finely granulated and almost straight with middle part slightly concave. Outer orbital tooth acute. Lateral margin with two distinct anterolateral teeth. Suborbital crest (Fig. 2B) with five large and long granules in male, and about 16 small granules in female.

Eyes well developed and pigmented.

Chelipeds sexually dimorphic, larger and more robust in male; merus with distal margin acute medially; carpus unarmed; palm covered with long hairs on outer surface and with thick, long pubescent tufts on inner surface in male (Fig. 2D) but with no thick tufts in female; a longitudinal row of small granules present on outer surface inferiorly (Fig. 2A).

Walking legs fairly long and slender. Second walking leg (Fig. 2C) with merus about 2.42 times as

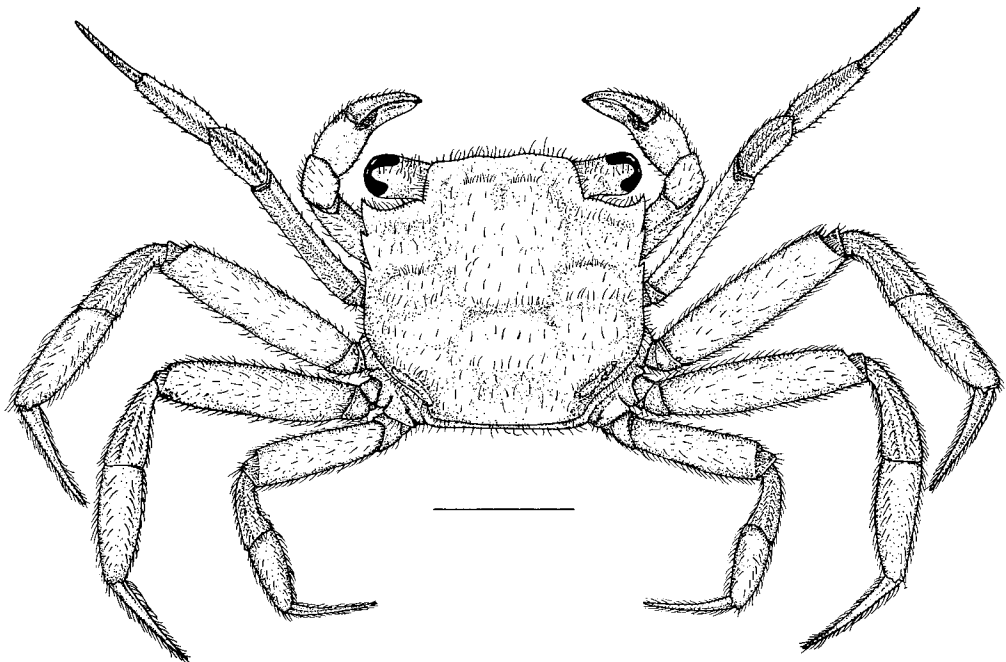


Fig. 1. *Hemigrapsus longitarsis*, male, cb 0.98 mm, dorsal view (Scale, 0.5 mm).

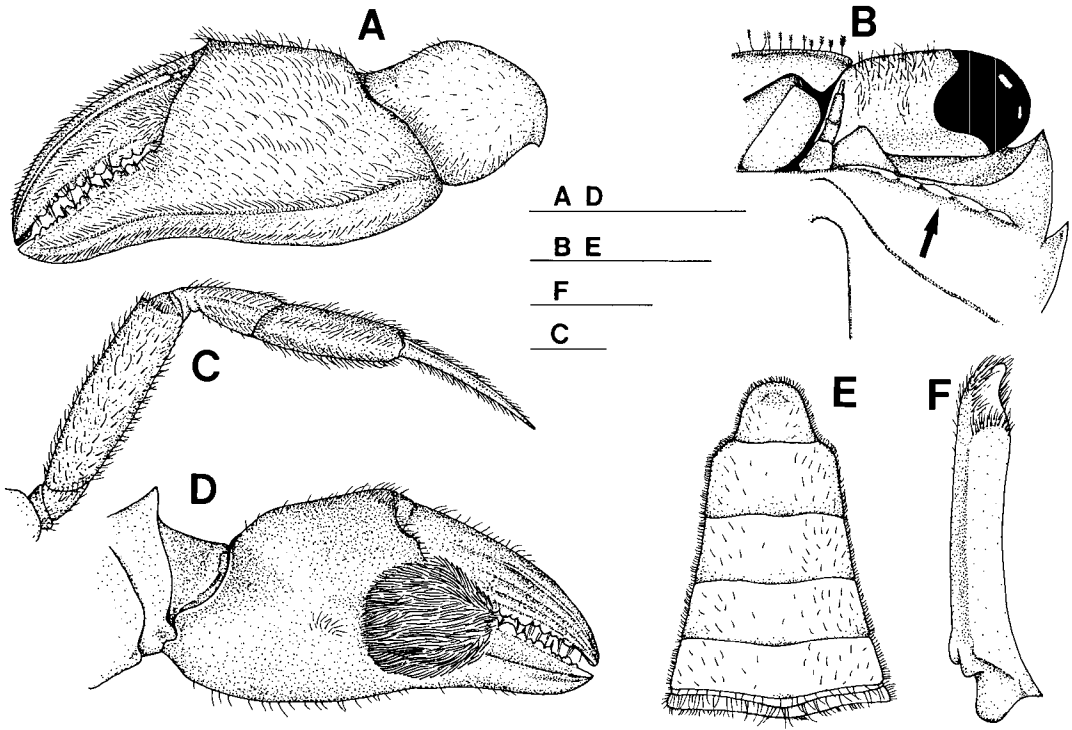


Fig. 2. *Hemigrapsus longitarsis*: A, chela of left cheliped, outer view; B, suborbital region; C, right second walking leg; D, chela of left cheliped, inner view; E, abdomen; F, right gonopod outer view (Scales: A-E = 0.2 mm; F = 0.1 mm).

long as carpus, ml/mw about 4.45; propodus about 1.53 times as long as carpus; dactylus subequal to propodus. Female walking legs shorter than male; merus about 2.24 times as long as carpus, ml/mw about 3.33; propodus about 1.38 times as long as carpus; dactylus subequal to propodus.

Male abdomen (Fig. 2E) with seven segments unfused; terminal (seventh) segment with rounded tip. Male gonopod (Fig. 2F) simple with endpiece slightly curved and amber-colored.

Remarks. *H. longitarsis* was reported as a new species from Korea by Miers (1879). Since then, Kim (1973) cited Kamita's (1941) short description of this species reported from Tongyöng and Changsaengp'o. Thereafter, Kim and Kwon (1983) reported this species from the Hajo I. near Chindo I. and Kim (1985) reported this species from Chukp'yön of the East Sea without any description and illustrations. Therefore this species is redescribed here with illustrations.

In key to the Japanese species of the genus *Hemigrapsus*, Sakai (1976) considered the following features as the main key characteristics of *H. longitarsis*: entire animal pilose, carapace as long as broad, lateral borders parallel, three anterolateral teeth subequal in size, and dactyli of walking legs much longer than propodi. The present specimens showed these characteristics except that the carapace slightly broader than long, and the dactyli are subequal to propodi (Figs. 1, 2c).

Distributions. Oshoro Bay, Hokaido to Nagasaki, Japan; the South Sea and the East Sea, Korea; North China.

24. *Hemigrapsus sinensis* Rathbun, 1929 털보꼬마풀게**Material examined.** 1 ♂, Anch'i, 24 July 1994; 2 ♂♂, 1 ♀, Hoedong, 25 July 1994.**Literatures.** Kim, 1982: 144 (Hoedong); Kim and Kwon, 1983: 329 (Hajo I.).**25. *Gaetice depressus* (De Haan, 1833)** 남작게**Material examined.** 3 ♂♂, 4 ♀♀, Pojŏn, 24 July 1994; 1 ♂, 1 ♀, Namdong, 25 July 1994; 3 ♂♂, 1 ♀, Kulp'o, July 25, 1994; 1 ♂, 2 ♀♀, Kŭngap, 23 July 1994.**Literatures.** Kim, 1982: 144 (Hoedong, Yŏmi, Tolmok); Kim and Kwon, 1983: 329 (Hajo I.).***26. *Nanosesarma gordonii* (Shen, 1935)** 꼬마사각게**Material examined.** 1 ♂, Hoedong, 1 Nov. 1994.**Remarks.** This species is newly reported from Chindo Island.**27. *Sesarma pictum* (De Haan, 1835)** 사각게**Material examined.** 4 ♂♂, 2 ♀♀, Kŭngap, 23 July 1994; 2 ♂♂, 4 ♀♀, Wondari, 23 July 1994; 3 ♂♂, 6 ♀♀, Anch'i, 24 July 1994; 1 ♂, 3 ♀♀, Pojŏn, 24 July 1994; 2 ♂♂, 2 ♀♀, Namdong, 25 July 1994; 1 ♂, 3 ♀♀, Kulp'o, 25 July 1994.**Literatures.** Kim, 1982: 144 (Kach'i, Tolmok, Yŏmi, Nokjin); Kim and Kwon, 1983: 329 (Sŏngnam I., Sangjo I., Hajo I., Ch'ŏngdŭng I., Kwansa I., Kalmok I.).**28. *Sesarma plicatum* (Latreille, 1803)** 가지게**Literatures.** Kamita, 1941: 87 (Chindo I.).**29. *Sesarma haematocheir* (De Haan, 1833)** 도둑게**Material examined.** 4 ♂♂, 6 ♀♀, Pojŏn, 24 July 1994.**Literatures.** Kim, 1982: 145 (Kach'i, Nokjin, Hoedong, Tolmok).**30. *Sesarma dehaani* H. Milne Edwards, 1853** 말뚝게**Literatures.** Kim, 1982: 145 (Posan-ri, Tolmok).**31. *Sesarma erythroductyla* Hess, 1865** 붉은발사각게 (Figs. 3, 4)*Sesarma erythroductyla* Hess, 1865, p. 151, pl. 6, fig. 10 (cited from Sakai, 1976); Ortmann, 1894, p. 725 (cited from Sakai, 1976).*Sesarma* (*Parasesarma*) *erythroductyla*: De Man, 1895, p. 189 (cited from Sakai, 1976); Sakai, 1939, p. 684; 1965, p. 201, pl. 96, fig. 4; 1976, p. 657, text-fig. 359.**Material examined.** 5 ♂♂, Namdong, 25 July 1994**Literatures.** Kim, 1982: 145 (Kach'i)**Description.** Carapace (Fig. 3) broader than long (cl/cb ratio = 0.87 ± 0.21 in male, 0.84 ± 0.16 in female), moderately convex; surface smooth, with well-defined dorsal regions; each region moderately convex; gastric and cardiac regions separated by H-shaped groove; branchial region with five oblique striae. Lateral margin subparallel, concave medially. Interorbital region subdivided into

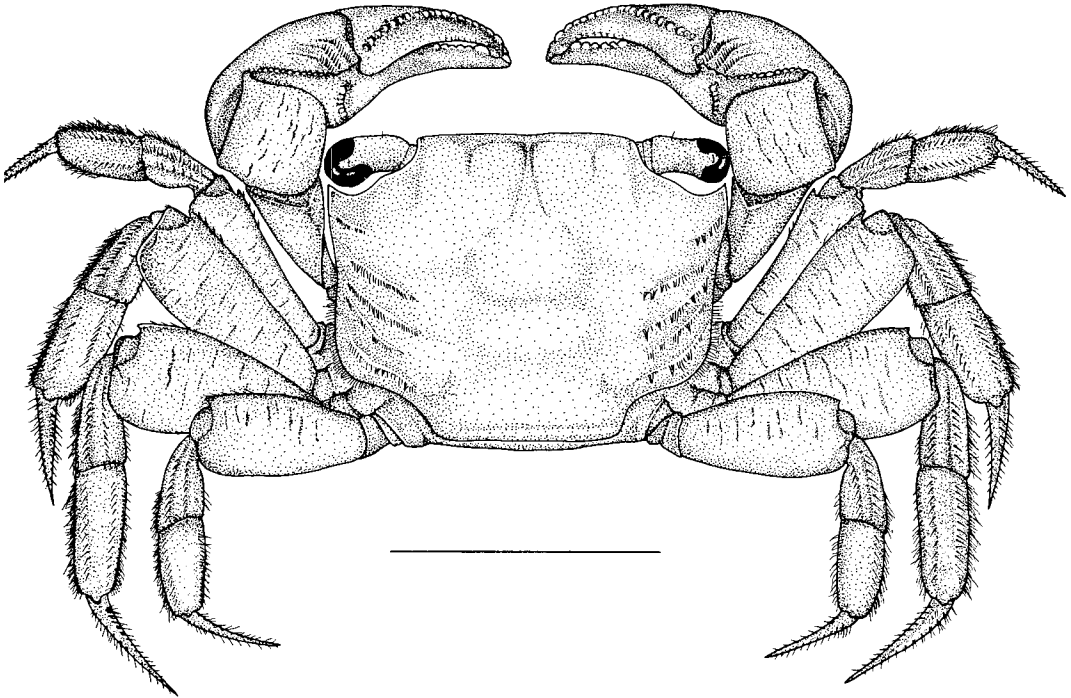


Fig. 3. *Sesarma erythroductyla*, male, cb 1.48 mm, dorsal view (Scale, 1 mm).

four low lobes, with median sinus deeper than submedial pair. Frontal margin nearly 1/2 carapace width ($iw/cb = 0.57 \pm 0.03$ in male, 0.56 ± 0.04 in female); slightly concave medially. Outer orbital angle acute; no tooth or lobe posterior to it.

Eyes well developed, pigmented.

Chelipeds sexually dimorphic, larger and more robust in male. Dorsal surfaces of merus and carpus with short rows of fine granules. Palm (Fig. 4A) swollen, with distinct three ridges dorsally; inner surface with one transverse row of small granules (Fig. 3); outer surface with short, faint longitudinal row of small granules. Fingers subequal to palm with outer surface red-colored; tips acute, spooned, and amber-colored; movable finger broad and thick proximally with dorsal surface bearing about nineteen to twenty one tubercles along entire length.

Walking legs relatively broad. Third walking legs (Fig. 4E) with merus about 2.5 times as long as carpus, bearing transverse rows of small granules on outer surface and a large subdistal tooth on dorsal margin, ml/mw about 2.45 ± 0.47 in male, 2.37 ± 0.31 in female; propodus about 1.32 times as long as carpus; dactylus slightly shorter than propodus.

Male abdomen (Fig. 4G) with seven segments unfused, narrowing disally from third segment; last segment about as long as sixth one, broadly rounded in distal margin.

Male gonopod (Fig. 4B, C) simple, slender, with tip strongly bent about 90° angle in lateral view; amber-colored chitinous process relatively long.

Variation. The present species shows the variation in some characteristics according to the size of specimens. Compared with the small specimens, the bigger ones show the following characteristics. 1. The movable finger bears about 10 tubercles dorsally (Fig 4F). 2. The palm bears large scattered tubercles instead of transverse row of granules on inner surface and scattered granules throughout

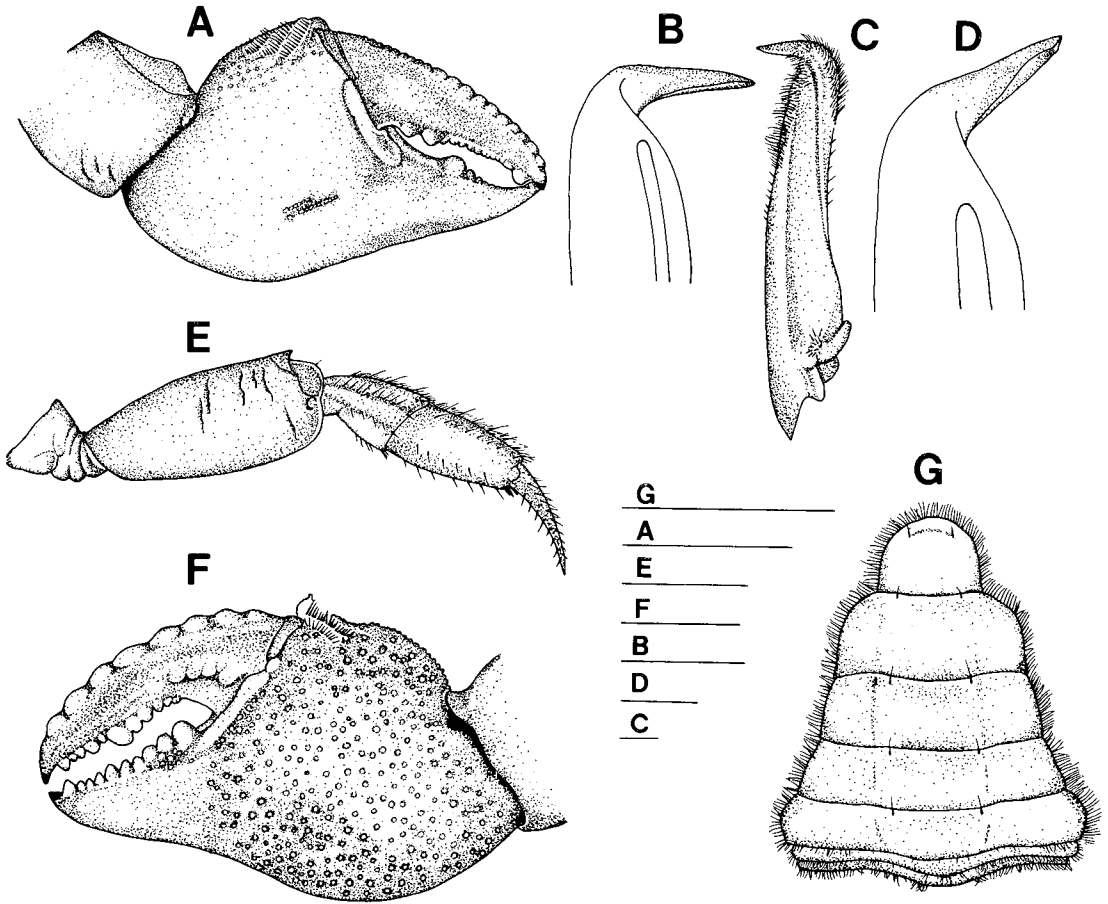


Fig. 4. *Sesarma erythroductyla*: A, chela of right cheliped, outer view; B, left gonopod, inner view; C, left gonopod, outer view; D, left gonopod, inner view; E, right third walking leg; F, chela of left cheliped, outer view; G, abdomen. (D, F, male, cb = 2.71 mm) (Scales, A, E-G = 0.5 mm; B-D = 0.05 mm).

outer surface (Fig 4F). 3. Carapace bears fine scattered pubescence on dorsal surface. 4. Endpiece of gonopod is bent about 45° angle in stead of 90° angle (Fig. 4D).

Remarks. In Korea, *S. erythroductyla* was reported as new to Korea by Kim and Kim (1982) without any detailed description and illustrations. In key to the Japanese species of the subgenus *Parasesarma*, Sakai (1976) considered the following features as the main key characteristics of *S. erythroductyla*: the lateral borders of carapace convergent posteriorly, the inner surface of palm of chela with a transverse crest, the upper border of movable finger with 25 to 26 tubercles, and the dactylus of walking legs rather longer, being not much shorter than the propodus. The present specimens are well accorded with Sakai's key characteristics except the number of tubercles on the upper border of movable finger (10-20 in our specimens). The present species are characteristic in that the movable fingers are red-colored in outer surface, and the endpiece of male gonopod is strongly curved about a 90° angle (or 45° angle in bigger specimen) in lateral view.

Distribution. Sagami Bay, Tosa Bay, Yoron Island, Japan; Pacific Ocean; Sydney; the Yellow Sea, Korea.

32. *Cyclograpsus intermedius* Ortmann, 1894 비단게**Literatures.** Kim and Kwon, 1983: 328 (Sŏngnam I., Kalmok I.).**33. *Helice tridens tridens* De Haan, 1835** 방게**Literatures.** Kim, 1982: 145 (Kach'i).**34. *Helice tridens wuana* Rathbun, 1929** 수동방게**Literatures.** Kim, 1982: 145 (Kach'i, Nokjin, Tolmok).**35. *Helice tridens tientsinensis* Rathbun, 1929** 갈게**Literatures.** Kim, 1982: 145 (Nokjin); Kim and Kwon, 1982: 329 (Sangjo I.).

Family Pinnotheridae De Haan, 1833 속살이게 과

36. *Pinnotheres sinensis* Shen, 1932 굴속살이게**Material examined.** 4 ♂♂, 2 ♀♀, Wondari, 23 July 1994; 1 ♀, Kagye, 24 July 1994.**Literatures.** Kim, 1982: 141 (Hoedong).

Family Ocypodidae Rafinesque, 1815 달랑게 과

37. *Ocypode stimpsoni* Ortmann, 1897 달랑게**Literatures.** Kim and Kwon, 1983: 329 (Kwansa I.).***38. *Uca lactea lactea* (De Haan, 1835)** 흰발농게**Material examined.** 1 ♂, 1 ♀, Namdong, 25 July 1994.**Remarks.** This species is newly reported from Chindo Island.**39. *Uca arcuata* (De Haan, 1833)** 농게**Material examined.** 3 ♂♂, 2 ♀♀, Namdong, 25 July 1994.**Literatures.** Kamita, 1941: 81 (Chindo I.); Kim, 1982: 141 (Nokjin).**40. *Scopimera globosa* De Haan, 1835** 엽낭게**Literatures.** Kim and Kwon, 1983: 329 (Kwanmae).**41. *Ilyoplax dentimerosa* Shen, 1932** 털콩게**Literatures.** Kim, 1982: 142 (Kach'i).***42. *Ilyoplax pingi* Shen, 1932** 펄털콩게**Material examined.** 4 ♂♂, 3 ♀♀, Anch'i, 24 July 1994.**Remarks.** This species is newly reported from Chindo Island.**43. *Macrophthalmus dilatatus* (De Haan, 1835)** 길게**Material examined.** 1 ♂, 1 ♀, Anch'i, 24 July 1994; 1 ♂, 2 ♀♀, Namdong, 25 July 1994.

Literatures. Kim, 1982: 142 (Sömang); Kim and Kwon, 1983: 329 (Hajo I.).

44. *Macrophthalmus japonicus* (De Haan, 1835) 칠게

Material examined. 5 ♂♂, 6 ♀♀, Anch'i, 24 July 1994; 3 ♂♂, 6 ♀♀, Namdong, 25 July 1994; 3 ♂♂, 2 ♀♀, Kulp'o, 25 July 1994.

Literatures. Kim, 1982: 142 (Kach'i, Nokjin); Kim and Kwon, 1983: 329 (Sangjo I., Hajo I.).

45. *Cleistostoma dilatatum* De Haan, 1835 세스랑게

Material examined. 4 ♂♂, 6 ♀♀, Namdong, 25 July 1994.

Literatures. Kim, 1982: 142 (Kach'i, Nokjin); Kim and Kwon, 1983: 329 (Sangjo I.).

46. *Camptandrium sexdentatum* Stimpson, 1858 여섯니세스랑게

Literatures. Kim, 1982: 143 (Chöndu).

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진도의 계류(갑각상강: 십각목)

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요 약

진도에 서식하는 계류의 종류상에 10종(*Nobilum japonicum japonicum*, *Paradorippe granulata*, *Pilumnus minutus*, *Carcinoplax vestitus*, *Eucrate crenata*, *Uca lactea*, *Ilyoplax pingi*, *Nanosesarma gordonii*, *Achaeus tuberculatus*, *Parthenope validus*)이 새롭게 추가된다. 과거 진도 근해에서 알려진 36종의 계류를 포함한 총 46종에 대한 분류 목록을 작성하였으며, 바위게과 2종인 *Hemigrapsus longitarsis*와 *Sesarma erythroductyla*는 도판과 함께 재기재 하였다.