

New Records of Three Xanthid Crabs (Decapoda: Brachyura: Xanthidae) from Jejudo Island in Korea

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ABSTRACT

Three xanthid crabs, *Liomera margaritata*, *Neoxanthops lineatus* and *Pilodius miersi*, are described and illustrated for the first time in Korea. *Liomera margaritata* and *N. lineatus* are the first species of their genera to be found in Korea. The three species represent extensions of their previously known ranges and bring the number of known species of the xanthid crabs to 25 from Korean waters.

Keywords: Xanthidae, *Liomera*, *Neoxanthops*, *Liomera margaritata*, *Neoxanthops lineatus*, *Pilodius miersi*, Korea

INTRODUCTION

The family Xanthidae is one of the largest families in the Brachyura and includes 628 species of 117 genera of 13 subfamilies (Ng et al., 2008). Currently, 22 species [*Actaea ployacantha* (Heller, 1861), *Actaea semblatae* Guinot, 1976, *Actaeodes hirsutissimus* (Rüppell, 1830), *Atergatis floridus* (Linnaeus, 1767), *Atergatis reticulatus* (De Haan, 1835), *Atergatopsis germaini* A. Milne Edwards, 1865, *Banareia subglobosa* (Stimpson, 1858), *Calvactaea tumida* Ward, 1933, *Cycloxanthops truncatus* (De Haan, 1837), *Forestia depressa* (White, 1848), *Gaillardiellus orientalis* (Odhner, 1925), *Leptodius exaratus* (H. Milne Edwards, 1834), *Lybia caestifera* (Alcock, 1898), *Macromedaeus distinguendus* (De Haan, 1835), *Microcassiope orientalis* Takeda and Miyake, 1969, *Medaeops granulosus* (Haswell, 1882), *Nanocassiope granulipes* (Rathbun, 1939), *Neoliomera insularis* (Adams and White, 1849), *Novactaea pulchella* (A. Milne Edwards, 1865), *Palapedia integra* (De Haan, 1835), *Pilodius nigrocrinitus* Stimpson, 1859, and *Platypodia tomentosa* (De Man, 1902)] belonging to 20 genera of nine subfamilies (Actaeinae, Chlorodiellinae, Euxanthinae, Kraussiinae, Liomerinae, Polydectinae, Xanthinae, Zalasiinae and Zosiminae) have been recorded from Korean waters (Lee et al., 2010).

Liomera margaritata (A. Milne Edwards, 1873), *Neoxanthops lineatus* (A. Milne Edwards, 1867), and *Pilodius miersi* (Ward, 1936) were collected in approximately 25 m depth by SCUBA diving off Hyeongjeseom Island (Mosulpo, Jeju-

do Island). The genera, *Liomera* Dana, 1851 and *Neoxanthops* Guinot, 1968, are reported for the first time in Korea. Now Korean Xanthid crabs consist of 25 species belonging to 22 genera.

Drawings were made with the aid of camera lucida. The abbreviations “cl” and “cw” refer to carapace length from the tip of frontal margin to the posterior dorsal margin of the carapace and to the width of the carapace measured at the widest part, respectively. All specimens were preserved in 95% ethanol. The classification follows that of Ng et al. (2008) and terminology used for carapace regions generally follows



Fig. 1. *Liomera margaritata*, male (cl 13.7 mm, cw 23.7 mm). cl, carapace length from the tip of frontal margin to the posterior dorsal margin of the carapace; cw, the width of the carapace measured at the widest part.

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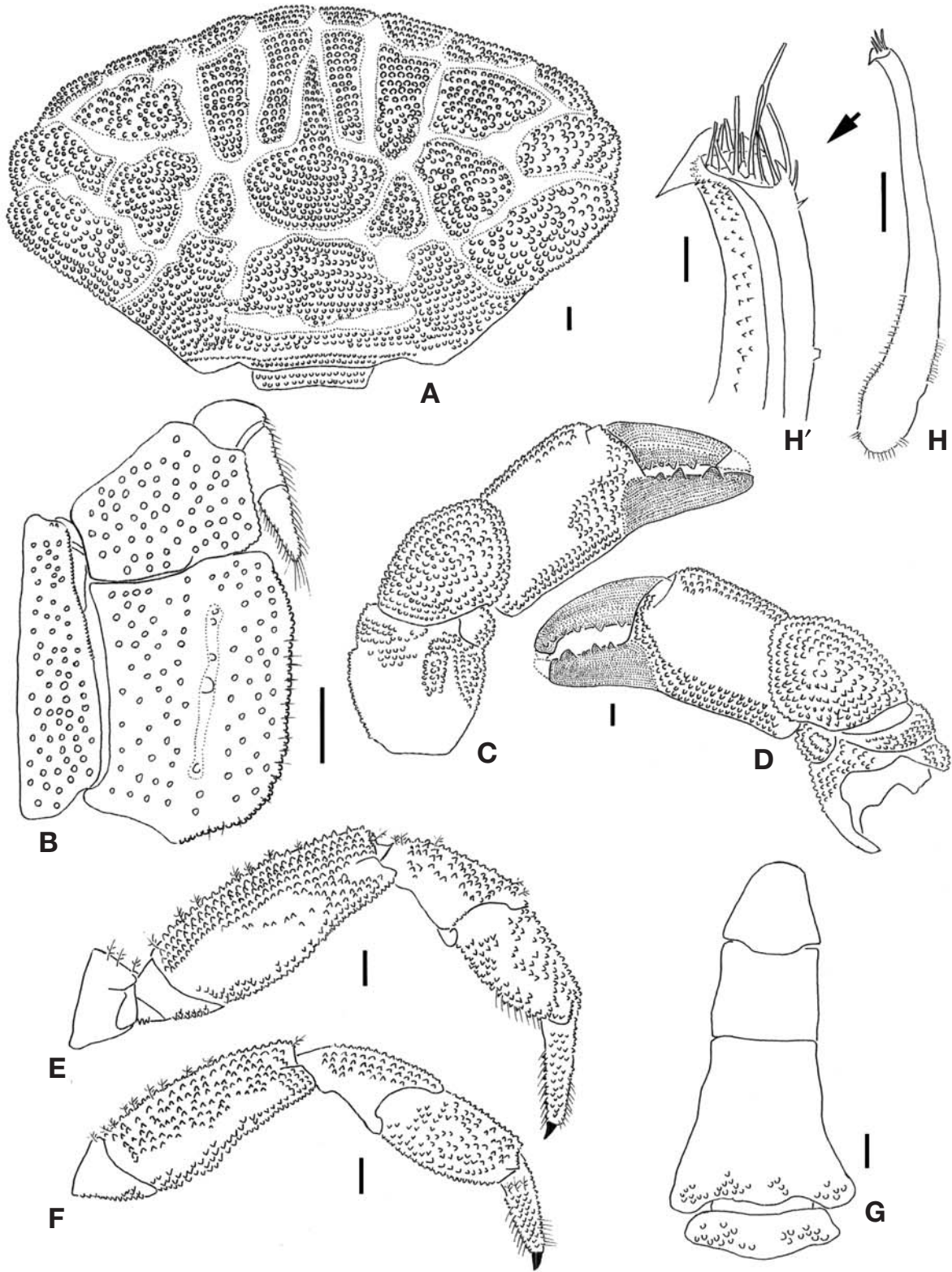


Fig. 2. *Liomera margaritata*, male (cl 13.7 mm, cw 23.7 mm). A, Dorsal view of carapace; B, Third maxilliped; C, Left cheliped; D, Right cheliped; E, F, Third to fourth ambulatory legs; G, Abdomen; H, H', Gonopod. Scale bars: A-H=1 mm, H'=0.1 mm. cl, carapace length from the tip of frontal margin to the posterior dorsal margin of the carapace; cw, the width of the carapace measured at the widest part.

those of Serène (1984). All specimens are deposited at the corresponding author's collection of Silla University, Busan.

SYSTEMATIC ACCOUNTS

Order Decapoda Latreille, 1802
 Superfamily Xanthoidea MacLeay, 1838
 Family Xanthidae MacLeay, 1838
 Subfamily Liomerinae Sakai, 1976
^{1*}Genus *Liomera* Dana, 1851

^{2*}*Liomera margaritata* (A. Milne Edwards, 1873)
 (Figs. 1, 2)

Carpilodes margaritatus A. Milne Edwards, 1873: 182, Pl. 5, fig. 2.

Liomera margaritata: Sakai, 1965: 144, Pl. 72, fig. 3; Guinot, 1967: 266; Serène, 1968: 72; Sakai, 1976: 396, fig. 211; Dai and Yang, 1991: 271, Pl. 34(2), fig. 145(2).

Liomera (Liomera) margaritata: Serène, 1984: 63, Pl. 7A, fig. 23.

Materials examined. 1 ♂ (cl 13.7 mm, cw 23.7 mm), Hyeongjeseom Island, 16 Jun 2009, Ko HS, SCUBA at 25 m depth.

Description. Carapace (Figs. 1, 2A) transversely ovoid, about 1.7 times broader than long, dorsal surface covered with rounded granules except on smooth inter-regional furrows; regions well distinct, separated by strong furrows. 1F and 2F confluent, not separated from frontal margin; 1M and 2M fused but 2M divided longitudinally into 2 parts; 1L to 5L distinct clearly but 2L and 3L fused. 1R and 2R fused; 3R not defined. Anterolateral margins divided into 4 rounded lobes by shallow sinus, margins granulated. Posterolateral margins oblique, somewhat straight. Frontal margin slightly projecting, divided into 2 lobes by narrow fissure.

Third maxilliped (Fig. 2B) punctuated on surface; ischium subrectangular, about 1.4 times longer than broad; longitudinal groove on medially; inner margin granulated and with setae. Antero-external angle of merus produced. Distal half of inner margin of expod granulated.

Chelipeds (Fig. 2C, D) subsymmetrical, slightly short; surfaces of meri, carpi and palm covered with rounded granules except on distomedial surface of palm naked; fingers bluntly pointed, curved, dark brown colored, cutting margins with triangular teeth.

Third and fourth ambulatory legs (Fig. 2E, F) flattened, covered with triangular granules; meri with setae on anterior margins; carpi with setae on distal margins; propodi with long setae on distal half of posterior margins; dactyli with

long setae on distal half of margins; tips pointed, curved, dark brown colored.

Male abdomen (Fig. 2G) relatively narrow; segments 3 to 5 fused; segment 6 longer than broad. Telson coniform.

First gonopod (Fig. 2H, H') relatively long, slender, recurved, with truncated tip; spinules and long setae on distal margin.

Color of in life. Carapace and legs reddish violet, fingers of chelipeds and dactyli of ambulatory legs dark brown.

Habitat. Crevices of coral reef or under stones.

Distribution. Red Sea, Aden, Madagascar, China, Japan, Indonesia, New Guinea, New Caledonia, Samoa (Sakai, 2004) and now to Korea.

Remarks. Thirty-three species of *Liomera* have been reported world-wide (Ng et al., 2008). *Liomera margaritata* is distinguished from other species by having fused 1M and 2M, longitudinally divided 2M, and fused 2L and 3L (Serène, 1984). On this respect our specimen agrees well with Serène's description (1984). However, it is slightly different from the latter in the carapace, which has 5L incompletely divided into 1R +2R in his description, but, 5L is completely divided into 1R +2R in our specimen.

Subfamily Xanthinae MacLeay, 1838

^{3*}Genus *Neoxanthops* Guinot, 1968

^{4*}*Neoxanthops lineatus* (A. Milne Edwards, 1867)
 (Figs. 3, 4)

Cycloxanthus lineatus A. Milne Edwards, 1867: 269.

Cycloxanthops lineatus: Rathbun, 1910: 350, Pl. 2, fig. 15;



Fig. 3. *Neoxanthops lineatus*, female (cl 12.2 mm, cw 18.7 mm). cl, carapace length from the tip of frontal margin to the posterior dorsal margin of the carapace; cw, the width of the carapace measured at the widest part.

Korean name: ^{1*}주름부채계속 (신칭), ^{2*}주름부채계 (신칭), ^{3*}줄무늬부채계속 (신칭), ^{4*}줄무늬부채계 (신칭)

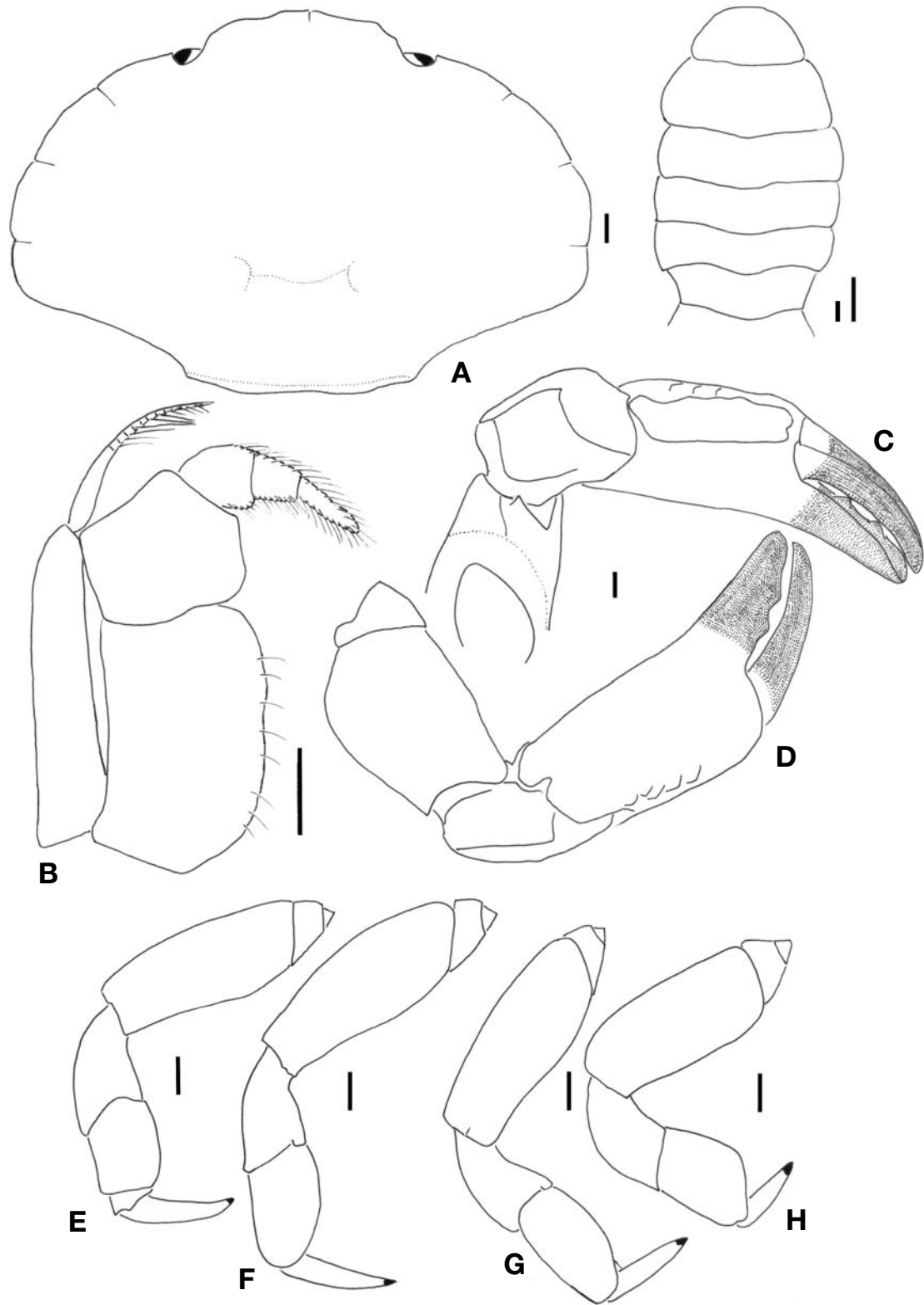


Fig. 4. *Neoxanthops lineatus*, female (cl 12.2 mm, cw 18.7 mm). A, Dorsal view of carapace; B, Third maxilliped; C, Dorsal view of left cheliped; D, Ventral view of left cheliped; E-H, First to fourth ambulatory legs; I, Abdomen. Scale bars: A-I=1 mm. cl, carapace length from the tip of frontal margin to the posterior dorsal margin of the carapace; cw, the width of the carapace measured at the widest part.

Terada, 1982: 169.

Neoxanthops lineatus: Guinot, 1968: 700, fig. 16; Sakai, 1976: 436, Pl. 157, fig. 1; Takeda, 1978: 40; Serène, 1984: 211 (key), 212, Pl. 29C, fig. 127; Minemizu, 2000: 263.

Materials examined. 1 ♀ (cl 12.2 mm, cw 18.7 mm), Hyeongjeseom Island, 16 Jun 2009, Ko HS, SCUBA at 25 m depth.

Description. Carapace (Figs. 3, 4A) naked, fan-shaped, about 1.5 times broader than long; regions not defined; surface convex medially. Anterolateral margins arched prolonged far backward, sharply crested, divided into 4 lobes by 3 narrow fissures. Posterolateral margins slightly concaved. Frontal margin well produced, directed downward; divided into 2 lobes by longitudinal fissure.

Third maxilliped (Fig. 4B). Ischium subrectangular, about 1.4 times longer than broad; bearing setae on inner margin; antero-external angle of merus produced.

Left cheliped (Fig. 4C, D) relatively long, robust; anterior margin of carpus crenulated; palm long, slender, proximal and anterior margins crenulated; fingers slender, curved, brown colored; cutting margin of fixed finger with 2 triangular teeth.

Ambulatory legs (Fig. 4E-H) naked, generally short, stout, flattened; fourth ambulatory legs shorter than others; dactyli long, tips bluntly pointed, brown colored.

Female abdomen (Fig. 4I) elongated, 6-segmented. Telson semicircular, broader than long.

Color of in life. Red diagonal lines distributed on lateral each half on carapace, fingers of chelipeds and proximal parts of propodi and dactyli of ambulatory legs are dark brown.

Habitat. Crevices of coral reef and under stones.

Distribution. Red Sea, Aden, Kenya, Zanzibar, Madagascar, Japan, Taiwan, Australia, New Caledonia (Sakai, 2004) and now to Korea.

Remarks. The genus *Neoxanthops* was separated from the genus *Cycloxanthops* Rathbun, 1897 (Guinot, 1968). At present, three species [*N. lineatus* (A. Milne-Edwards, 1867), *N. quadrilobatus* (Sakai, 1939) and *N. rotundus* Guinot, 1968] of this genus have been recorded world-wide (Sakai, 2004). *Neoxanthops lineatus* is distinguished from other species by having a depressed carapace with undefined regions and outer margins of the ambulatory legs without crest (Sakai, 1976). This species seems to be similar to *C. truncatus* in Korea, however, it is easily distinguished from *C. truncatus* by having red diagonal lines distributed on lateral each half and the margin of carapace extremely arched anterolaterally.

Subfamily Chlorodiinae Ng and Holthuis, 2007

Genus *Pilodius* Dana, 1851

¹**Pilodius miersi* (Ward, 1936) (Figs. 5, 6)

Chlorodopsis miersi Ward, 1936: 4, Pl. 2, figs. 1-3.

Pilodius granulatus (not Stimpson, 1859): Sakai, 1976: 460, Pl. 164, fig. 3; Serène, 1984: 239 (key); Dai and Yang, 1991: 329, Pl. 43(3), fig. 165B.

Pilodius miersi: Clark and Galil, 1993: 1136, figs. 7A-G, 34A, 41D.

Materials examined. 1 ♂ (cl 7.5 mm, cw 13 mm), Hyeongjeseom Island, 16 Jun 2009, Ko HS, SCUBA at 25 m depth.

Description. Carapace (Figs. 5, 6A) convex, transversely ovoid, about 1.7 times broader than long; regions well defined, elevated, separated by strong furrows, covered with irregularly granules and setae. 1F and 2F fused. 1M produced, with 3 spines anteriorly. 2M divided into longitudinally. 3M tripartite, anterior lobe surpassing anterior margin of 2M. 1L to 5L distinct clearly. 1P and 2P distinct clearly, 2P disjuncted medially. Anterolateral margins divided into 4 spines, tuberculated; apical spine directed anteriorly, yellowish brown colored. Posterolateral margins oblique, somewhat straight. Frontal margin arched, granulated; divided into 2 lobes by U-shape notch.

Third maxilliped (Fig. 6B) punctuated on surface. Ischium subrectangular, about 1.5 times longer than broad, inner margin granulated and with setae, longitudinal groove on medially; antero-inner margin with small spines; merus with setae on inner margin; antero-external angle produced, with small spines; dactylus setose, with spines medially

Chelipeds (Fig. 6C, D) asymmetrical, relatively long, robust, covered with granules and setae; palms long, slender, conical



Fig. 5. *Pilodius miersi*, male (cl 7.5 mm, cw 13 mm). cl, carapace length from the tip of frontal margin to the posterior dorsal margin of the carapace; cw, the width of the carapace measured at the widest part.

Korean name: ¹*검은손부채게 (신칭)

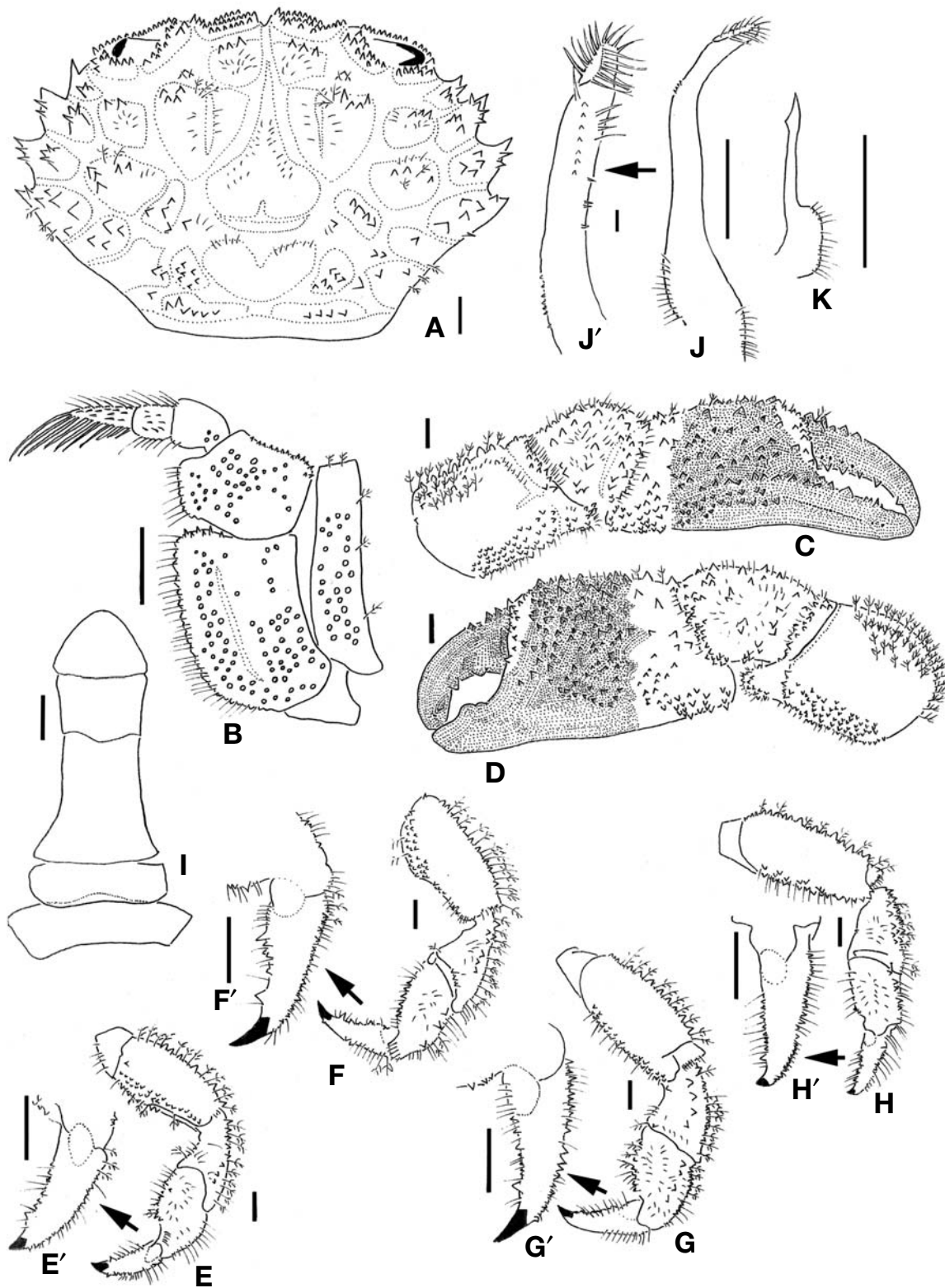


Fig. 6. *Pilodius miersi*, male (cl 7.5 mm, cw 13 mm). A, Dorsal view of carapace; B, Third maxilliped; C, Left cheliped; D, Right cheliped; E-H, First to fourth ambulatory legs; E'-H', Enlargement of dictylus of first to fourth ambulatory legs; I, Abdomen; J, J', First gonopod; K, Second gonopod. Scale bars: A-K=1 mm, J'=0.1 mm. cl, carapace length from the tip of frontal margin to the posterior dorsal margin of the carapace; cw, the width of the carapace measured at the widest part.

tubercles over upper surfaces while lower surfaces naked, black colored band encircled except distal margins; fingers massive, tips bluntly pointed, black colored; cutting margins of both fingers with triangular teeth; 2 rows of conical tubercles from proximal to medial parts on upper margins of movable fingers.

Ambulatory legs (Fig. 6E-H') generally short, robust, covered with granules and setae; fourth ambulatory leg shortest; meri with spines on anterior margins; dactyli with spines on both margins, dactyls pointed end, tips curved, black colored.

Male abdomen (Fig. 6I) relatively narrow; segments 3 to 5 fused; lateral margins slightly concaved. Telson coniform.

Gonopods (Fig. 6J-K). First gonopod long, slender, recurved; proximal parts of both margins with setae; spoon-shaped tip, setose, with spines disto-medially. Second gonopod short, straight; proximal part of inner margin convex, with setae; tip spear-shaped.

Color of in life. Generally reddish brown. Palms and fingers of chelipeds black.

Habitat. Crevices of coral reef.

Distribution. Australia, China, Japan, Singapore (Clark and Galil, 1993) and now to Korea.

Remarks. Until now, *P. nigrocrinitus* was the only recorded *Pilodius* species in Korea (Ko and Takeda, 1999), therefore, *P. miersi* is the second species of the genus *Pilodius*. *Pilodius miersi* much resembles *P. nigrocrinitus* by having tuberculated anterolateral margins, however, they can be distinguished by the placement of black color in the palm of cheliped. Our specimen is almost identical to Clark and Galil's description (1993). However, a minute difference is found in the ambulatory legs. According to Clark and Galil (1993), the dactyli of ambulatory legs are naked on anterior margins, while our specimen's ambulatory legs are covered with spines.

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