

First Record of Crinoid Symbiotic Crab, *Harrovia japonica* (Decapoda: Brachyura: Pilumnidae) from Korea

Seok Hyun Lee and Hyun Sook Ko*

Department of Biology, Silla University, Busan 617-736, Korea

ABSTRACT

The crinoid symbiotic crabs, *Harrovia japonica* were collected for the first time from Geomundo Island in Korea. At present, there are two species of the Eumedoninae in Korean waters.

Key words: first record, *Harrovia japonica*, Pilumnidae, Eumedoninae, Korea

INTRODUCTION

Eumedoninid crabs of the family Pilumnidae are a specialized group of brachyurans, which are symbiotic with echinoderms. They are easily overlooked due to their small size and cryptic coloration (Castro, 1989). Currently 32 described of 12 genera are known in the Eumedoninae (Ng et al., 2008). The genus *Harrovia* is an obligate symbiont of crinoids and contains seven described species. *Harrovia elegans* De Man, 1887 has been only known species from Korea (Kim, 1973; Kim and Kim, 1997). *H. japonica* Balss, 1921 were collected in about 20 m depth by SCUBA diving. Now, we report firstly this species in the present paper.

Drawings were made with the aid of camera lucida. The abbreviation "cl" refers to carapace length from the tip of the frontal margin to the posterior dorsal margin of the carapace. All specimens were preserved in 95% ethanol. The classification follows that of Ng et al. (2008). Materials examined in this study are deposited in collection of Silla University, Busan.

SYSTEMATIC ACCOUNTS

Superfamily Pilumnoidea Samouelle, 1819

Family Pilumnidae Samouelle, 1819

Subfamily Eumedoninae Dana, 1852

Genus *Harrovia* Adams and White, 1849

¹**Harrovia japonica* Balss, 1921 (Figs. 1, 2)

Harrovia japonica Balss, 1921, p. 177; 1922, p. 136, figs. 8, 9; Chia et al., 1993, p. 266 [note only]; Minemizu, 2000, p. 224; Sakai, 2004, p. 877.

*To whom correspondence should be addressed

Tel: 82-51-999-9473, Fax: 82-51-999-5176

E-mail: hsko@silla.ac.kr



Fig. 1. *Harrovia japonica* Balss, 1921, male (cl 8.1 mm).

Harrovia elegans: Sakai, 1932, pp. 42, 54, pl. 2, fig. 2; 1976, pp. 298-299, fig. 166d, pl. 100; Takeda, 1982, p. 137, fig. 404; Miyake, 1983, pp. 56, 212, fig. 5, pl. 19.

Material examined. 2♂ (cl 7.9, 8.1 mm), 1♀ (cl 13.9 mm), Geomundo Island, 02 Aug. 2007(S.H. Lee), by SCUBA diving in 20 m depth, (SUZCR 103259).

Description. Carapace (Figs. 1, 2A, B) hexagonal, 1.4 times broader than long, regions not defined; dorsal surface covered with thick pubescent; protogastric and mesobranchial regions slightly tuberculate, each region with bundle of robust setae. Anterolateral margins separated into 4 lobes; first and second lobes separated by narrow fissure, seemed to be fused, margins granulated and subtruncated, edge of second lobe highly spiniform; third and fourth lobes subequal, highly spiniform, directed anteriorly. Frontal margin with small narrow median fissure, slightly deflexed, almost straight in dorsal view, covered with many tubercles. Infraorbital and

¹*갯갯고사리계 (신칭)

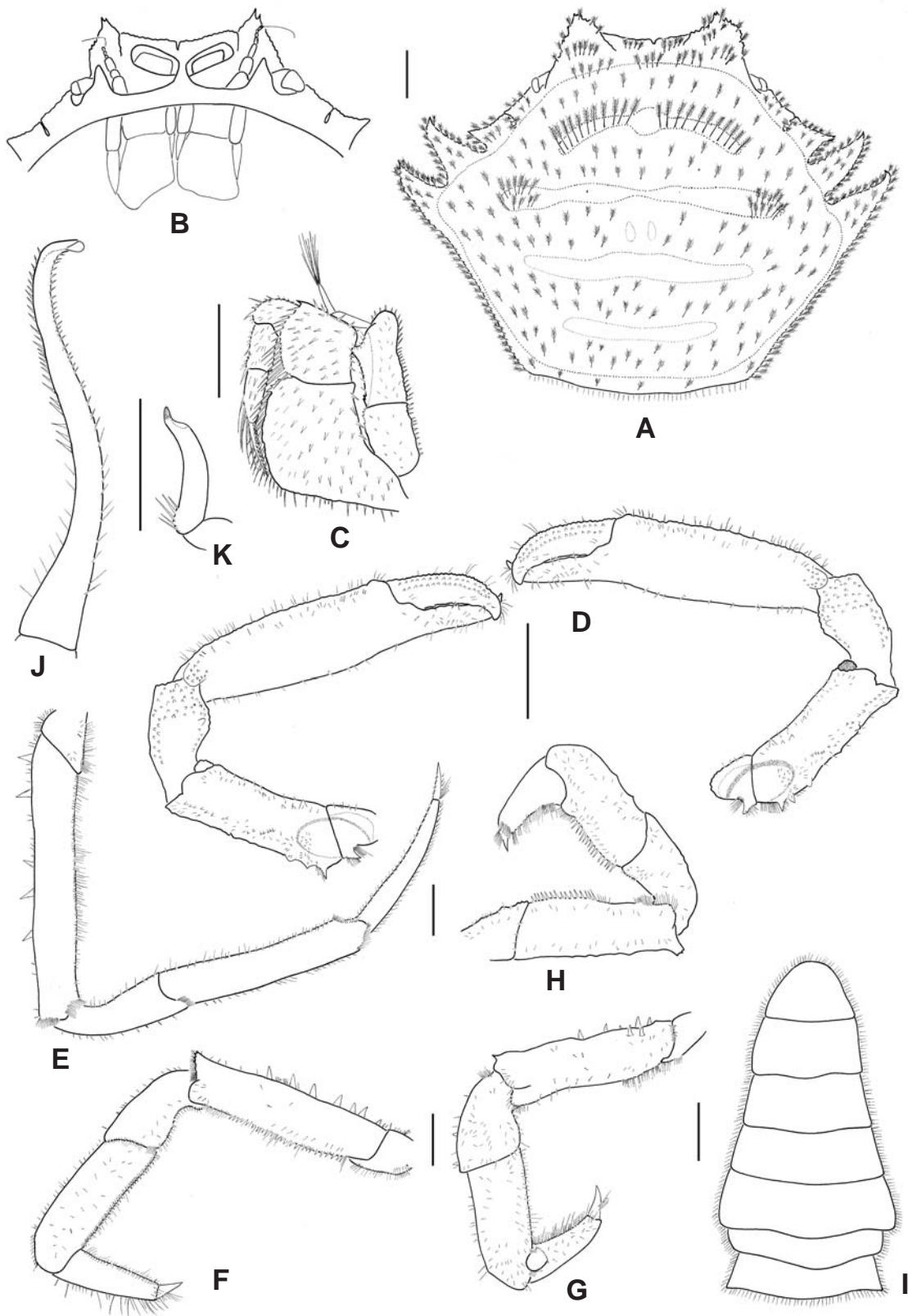


Fig. 2. *Harrovia japonica* Balss, 1921, male. (cl 8.1 mm) A, dorsal view; B, face of carapace; C, third maxilliped; D, chelipeds, dorsal view; E-H, first to fourth ambulatory legs; I, abdomen of male; J, first gonopod; K, second gonopod. Scale bars=1 mm (A-K).

subhepatic teeth comparatively broad and strong.

Third maxilliped (Fig. 2B, C) covered with small setae; ischium subrectangular, small spines on outer margin; bearing setae on inner margin.

Chelipeds (Fig. 2D) long, robust, subcylindrical, subequal; merus with small blunted granules on inner and outer margins, proximal part of merus with 1 or 2 pointed granules on outer margin; carpus with small blunted granules on distal part; propodus covered with setae on outer surface; fingers blunted, recurved, granulated, cutting margins with 2 molariform teeth.

Ambulatory legs (Fig. 2E-H) generally short, stout, but first ambulatory leg long, slender; merus with 7-8 strong pointed spines on inner margin; carpus and propodus covered with short and long setae; dactylus pointed, inner and outer margins with short and long setae.

Abdomen of male (Fig. 2I) 7-segmented; telson semicircular, surface smooth.

Gonopods (Fig. 2J, K). First gonopod long, slender, inner and outer margins with setae; tip bent at approximately 90°. Second gonopod short, stout, curved and segmented at proximal part; distal part directed upward.

Color in life. Generally dark reddish brown, with 4 yellow-colored transverse bands on dorsal surface of carapace. Outer margin of carapace except frontal margin yellow.

Habitat. The present specimens were found with crinoids in about 20 m depth.

Remarks. Although *Harrovia japonica* was first described by Balss (1921), later it was synonymized with under the name of *Harrovia elegans* De Man, 1887, by Sakai (1932). Recently, Chia et al. (1993) suggested that *H. japonica* should be regarded as a distinct taxon from *H. elegans*. These two species much resemble each other. However, there are consistent differences in the characters of their anterolateral lobes of carapace. In *H. japonica*, the first and second anterolateral lobes are separated by a narrow fissure, sometimes seemed to be fused and their edges are highly spiniform and directed anteriorly, but in *H. elegans*, the former is separated by a wide cleft and the latter is blunted and directed laterally (Chia and Ng, 1998).

Korean specimens agree with *H. japonica* in almost all diagnostic characters proposed by Chia and Ng (1998), however, some differences are found. The inner and outer margins of first gonopod are with numerous setae and the outer margin of second gonopod is with five proximal setae in the present specimens, while in Chia and Ng (1998) only the distal part of outer margin of first gonopod is with setae and the outer margin of second gonopod is with seven proximal setae. Such differences seem to be due to intraspecific or geographical variation and may be insignificant.

Distribution. Japan, southern China (Chia and Ng, 1998) and

now Korea.

ACKNOWLEDGEMENTS

We are grateful to Mrs Se Jin Ok for help with drawing.

REFERENCES

- Adams, A. and A. White, 1848, 1849. Crustacea. In Adams, A., ed., The Zoology of the Voyage of H. M. S. Samarang, i-viii, 1-66, pls. 1-13. Reeve, Benham, and Reevem London.
- Balss, H., 1921. Diagonosen neuer Decapoden aus den Sammlungen der Deutschen Tiefsee-Expedition und der Japanischen Ausbeute Dofleins und Haberers. Zool. Anz., 52: 175-178.
- Balss, H., 1922. Die Dromiaceen, Oxystomen und Parthenopiden. Ostasiatische Decapoden, III. Arch. Naturgesch., 88: 104-140.
- Castro, P., 1989. Range extensions and new host records of eumedonid crabs of the genus *Harrovia* Adams & White, 1848 (Decapoda, Brachyura, Eumedonidae). Crustaceana, 57(1): 97-100.
- Chia, D.G.B. and P.K.L. Ng, 1998. A revision of *Ceratocarcinus* White, 1847 and *Harrovia* Adams and White, 1849 (Crustacea: Decapoda: Brachyura: Eumedonidae), two genera of crabs symbiotic with crinoids. Raff. Bull. Zool., 46: 493-563.
- Chia, D.G.B., P.K.L. Ng and D. Vandenspiegel, 1993. The identities of two crinoid symbionts, *Harrovia albolineata* Adams and White, 1849, and *H. longipes* Lanchester, 1990 (Decapoda, Brachyura, Eumedonidae). Crustaceana, 64(3): 259-280.
- De Man, J.G., 1887. Report on the Podophthalmous Crustacea of the Mergui Archipelago, collected for the trustees of the Indian Museum. J. Linn. Soc. London (Zoology), 22: 1-312.
- Kim, H.S., 1973. Anomura and Brachyura. Illustrated Encyclopedia of Fauna and Flora of Korea, vol. 14. Samwha Publishing Co., Seoul, pp. 1-506.
- Kim, H.S. and W. Kim, 1997. Decapoda. In List of Animals in Korea (excluding Insects). Academy Publishing Co., Seoul, pp. 212-223.
- Minemizu, R., 2000. Marine Decapod and Stomatopod Crustaceans mainly from Japan. Buninchi Sogo Publ., Co., Ltd., Tokyo, pp. 1-344. (In Japanese)
- Miyake, S., 1983. Brachyura (Crabs). Japanese Crustacean Decapods and Stomatopods in Colour. vol. II. Hoikusha Publishing Co. Ltd., Osaka, pp. 1-277.
- Ng, P.K.L., D. Guinot and P.J.F. Davie, 2008. Systema Brachyurorum : Part 1. An annotated checklist of extant brachyuran crabs of the world. Raff. Bull. Zool., 17: 1-286.
- Sakai, K., 2004. Crabs of Japan. World Biodiversity Database CD-ROM series.

Sakai, T., 1932. Notes on some rare materials of Japanese Oxyrhyncha. Sci. Rep. Tokyo Bunrika Daigaku, Section B, 1: 41-59.

Sakai, T., 1976. Crabs of Japan and the Adjacent Seas. Kodansha Ltd., pp. 1-773.

Takeda, M., 1982. Keys to the Japanese and foreign Crustaceans. Hokuryukan Ltd., Tokyo, pp. 1-284.

Received January 19, 2009
Accepted February 23, 2009