

Occurrence of Alpheid Shrimp, *Alpheus compressus* (Decapoda: Caridea: Alpheidae) in Korea

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ABSTRACT

Alpheid shrimp are found worldwide in temperate and tropical waters. They live in burrows in sandy and muddy bottoms and also in crevices of rocks and coral reefs. The genus *Alpheus* is the most diverse group of alpheid shrimp. Continuous taxonomic study on shrimps collected from Korean waters revealed that an alpheid shrimp collected from Daesambudo Island was identified as *Alpheus compressus*. This species belongs to the *brevirostris* group of the genus *Alpheus* and is distinguished from other known species of the genus *Alpheus* in Korea by the laterally compressed body. Korean *Alpheus* fauna now consists of 15 species of five species groups.

Keywords: Decapoda, Alpheidae, *Alpheus compressus*, snapping shrimp, Korea

INTRODUCTION

The genus *Alpheus* Fabricius, 1798 is the most diverse group in the family Alpheidae Rafinesque, 1815.

Seven species groups are at the present recognized in the genus *Alpheus* in the world: *brevirostris*, *crinitus*, *diadema*, *edwardsii*, *macrocheles*, *obesomanus* and *sulcatus*. In Korea, 15 species belonging to five species groups of the genus *Alpheus*, *brevirostris*, *crinitus*, *diadema*, *edwardsii* and *macrocheles*, were previously reported: (1) *A. digitalis* De Haan, 1844, *A. brevicristatus* De Haan, 1844 of *brevirostris* group (Hayashi and Nagata, 2002); (2) *A. paralcione* Coutière, 1905 and *A. spongiarum* Coutière, 1897 of *crinitus* group (Koo and Kim, 2004); (3) *A. paracrinitus* Miers, 1881 of *diadema* group (Koo and Kim, 2005b); (4) *A. hoplocheles* Coutière, 1897, *A. bisincisus* De Haan, 1849, *A. heeia* Banner & Banner, 1975, *A. japonicus* Miers, 1879, *A. lobidens* De Haan, 1849, *A. malabaricus* (Fabricius, 1775), *A. pacificus* Dana, 1852, *A. richardsoni* Yaldwyn, 1971, *A. sudara* Banner & Banner, 1966 of *edwardsii* group (Kim and Kim, 1997; Cha et al., 2001; Yang and Anker, 2003; Yang and Ko, 2005; Yang et al., 2007); (5) *A. albatrossae* (Banner, 1953) of *macrocheles* group (Koo and Kim, 2005a). In the case of *A.*

heeia, the larval study without descriptions of adult morphology was reported (Yang and Kim, 1999). Thus, 14 species of the genus *Alpheus* are listed in National Species List of Korea (National Institute of Biological Resources, 2020). On April 20, 2009, the Jeju Ilbo, a local newspaper, reported that *A. compressus* Banner and Banner, 1981 was found in the southern and western seas of Jeju as a result of investigation by the National Institute of Fisheries Science. However, so far this species has not been reported to the scientific community. As a result of continuous taxonomic study on shrimps from Korean waters, one specimen collected from Daesambudo Island was turned out to be *A. compressus*. This species belongs to the *brevirostris* group. Now, this species is newly added to the Korean fauna, and the Korean *Alpheus* fauna consists of 15 species belonging to five species groups.

The specimen was collected from subtidal fine silt sediments of Daesambudo Island by Smith-McIntyre grab (SM grab) and preserved in 95% ethyl alcohol. The abbreviation “cl” refers to carapace length from the tip of rostrum to the posterior dorsal margin of the carapace. Drawings were made with the aid of a camera lucida.

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SYSTEMATIC ACCOUNTS

Order Decapoda Latreille, 1802
 Family Alpheidae Rafinesque, 1815
 Genus *Alpheus* Fabricius, 1798

¹**Alpheus compressus* Banner and Banner, 1981 (Fig. 1)
Alpheus compressus Banner and Banner, 1981: 226, fig. 3;
 Chace, 1988: 19; Miya, 1995: 272, fig. 1; Hayashi, 1998:
 209, 213; Sha et al., 2019: 26, fig. 2.10.

Material examined. Korea: 1 specimen (HNIBRIV111, sex not determined because of missing second pleopod) (cl 7 mm), Daesambudo Island, Samsan-myeon, Yeosu-si, Jeollanam-do, 34°03'0"N, 127°24'18"E, depth: 15 m, 5 Jul 2017, coll. S.-k. Lee.

Description. Body highly compressed. Rostum (Fig. 1A, B) rather broad at base, reaching to middle of visible part of first antennular segment; tip directing forward. Rostral carina absent.

Ocular hood very slightly inflated dorsally with no distinct orbitorostral groove. Anterior inner margin of ocular hood very slightly concave.

First antennular segment bearing deep triangular carina extending from ventral inner margin, acute at ventral part (Fig. 1C). Second segment about 2.3 times as long as broad, 1.8 times as long as visible part of first segment and 1.8 times as long as third segment. Stylocerite broad proximally, abruptly narrowing to sharp point at tip, almost reaching to distal margin of first segment.

Scaphocerite with lateral margin slightly convex anteriorly. Distal spine reaching to middle of third antennular segment. Inner blade regularly narrowing distally, slightly shorter than adjacent distal spine. Cleft between inner blade and distal spine shallow, arising from distal 0.13 of scaphocerite.

Carpocerite overreaching distal end of antennular peduncle by less than half length of third antennular segment. Basicerite bearing sharp, rather long lateral spine.

Third maxilliped missing in the present specimen.

Major chela of first pereopod (Fig. 1D, E) somewhat elongated, without sculpturing, about 3.4 times as long as broad, bearing sparse long setae on inferior margin. Lateral face bearing granules becoming minute, forward-directed denticles on inferior margin and onto lower parts of lateral face; superior margin bearing few scattered minute granules. Fingers occupying distal 0.3 of chela, slightly narrower than palm. Movable finger slightly compressed laterally, lowly arched at proximal two thirds of superior margin and then regularly arched anteriorly, tip bluntly rounded, reaching to tip of im-

movable finger. Immobile finger with tip directing slightly upward and outward; inferior margin almost straight. Merus about 4.5 times as long as broad at distal end with superior margin bearing sharp tooth on distal margin (not visible in Fig. 1D, E); inferior inner margin bearing minute granules and with a sharp spine at distal end (not visible in Fig. 1E); inferior outer margin bearing few minute granules with no spine at distal end.

Minor chela of first pereopod (Fig. 1F, G) about 5.3 times as long as broad. Fingers narrower than palm, occupying 0.7 length of chela, with acute curved tips clearly overlapping, slightly gaping. Merus about 5.6 times as long as broad at distal end with inferior inner margin bearing four minute movable spines and one strong acute immobile spine at distal end. Carpus bearing an immobile spine on superior margin distally (not visible in Fig. 1F, G).

Fingers of chela of second pereopod (Fig. 1H) slightly longer than palm. First segment of carpus 2.2 times as long as second; second segment about 1.8 times as long as third; third segment almost subequal to fourth; fifth segment about 1.7 times as long as fourth.

Third and fourth pereopods missing in the present specimen.

Ischium of fifth pereopod (Fig. 1I) bearing one distinct movable spine; dactylus subspatulate (not visible in Fig. 1I).

Pleura (Fig. 1J) of first five abdominal somites broadly rounded on ventral regions. First three abdominal sternites with one sharp immobile spine at each midline.

Telson (Fig. 1K) about 2.2 times as long as broad at anterior end, armed with two pairs of dorsal spines and with no longitudinal median depression on dorsal surface. Lateral margin almost straight. Posterior margin regularly convex, bearing several long setae and armed with a pair of movable spines at each lateral end; inner spine 3 times as long as outer one.

Uropodal endopod (Fig. 1K) with inner depression at anterior half very slight. Uropodal exopod with lateral margin terminating in acute, minute immobile tooth flanking short small movable spine.

Distribution. Southwest of Manila Bay, Philippines (Banner and Banner, 1981; type locality), Réunion, Adaman Sea west of peninsular Thailand, South China Sea southeast of Hong Kong, and Selat Sunda, Indonesia (Chace, 1988), Japan (Miya, 1995; Hayashi, 1998), Beibu Gulf, South China Sea and Taiwan (Sha et al., 2019), Daesambudo Island, South Sea, Korea (present study).

Remarks. The present species agrees well with the original description of Banner and Banner (1981). However, the present specimen differs from the original description by the followings: In the original description, (1) the rostrum reaching to near end of first antennular segment, (2) the stylocerite

Korean name: ¹*측면납작딱총새우 (신칭)

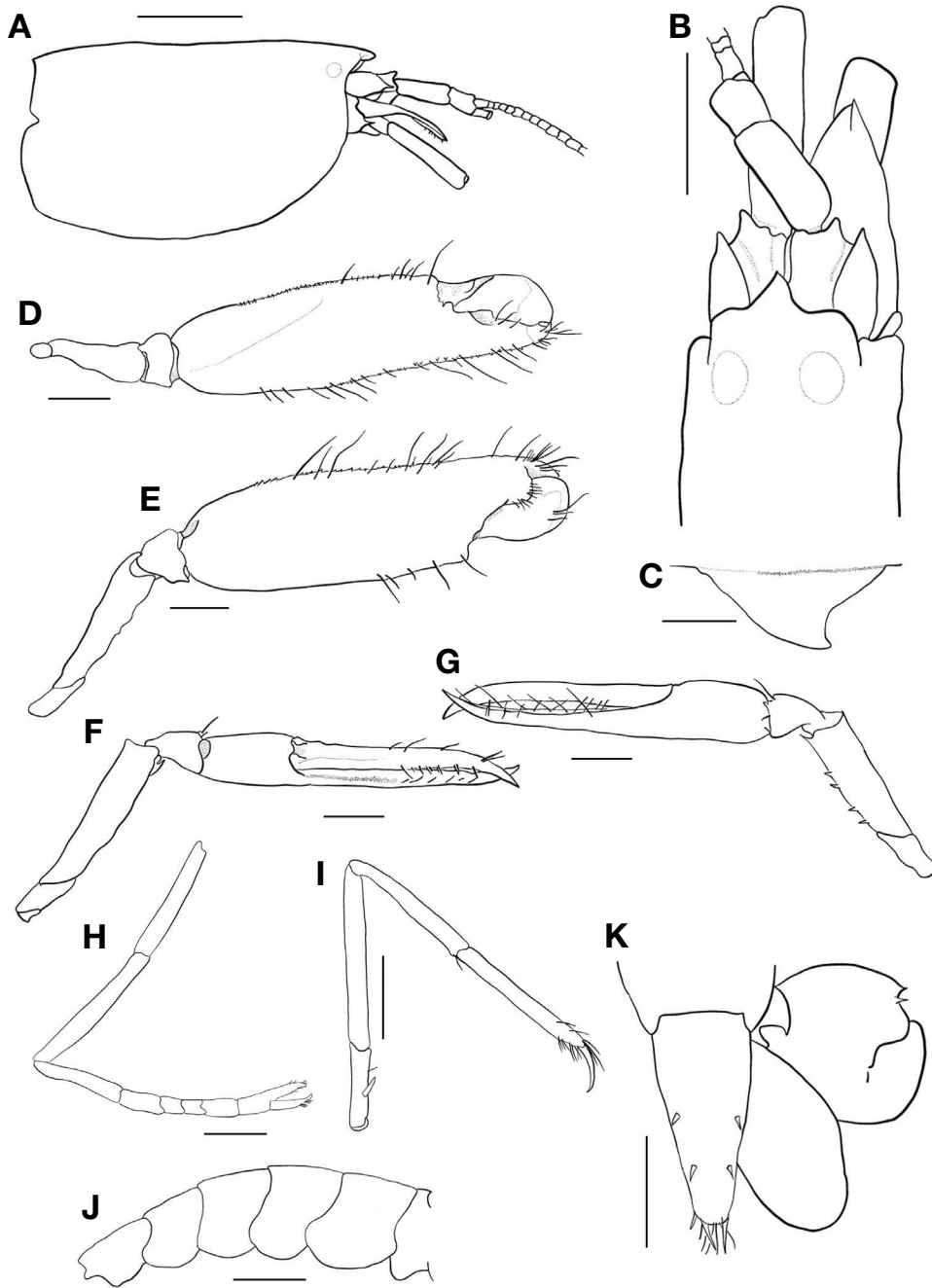


Fig. 1. *Alpheus compressus* Banner and Banner, 1981 (cl 4.9 mm). A, Whole body without third maxilliped and pereopods, lateral view; B, Anterior region, dorsal view; C, Carina below right first antennular segment; D, Large (right) first pereopod, outer face; E, Same, inner face; F, Small (left) first pereopod, outer face; G, Same, inner face; H, Right second pereopod; I, Right fifth pereopod; J, Abdomen; K, Telson and uropods. Scale bars: A, D-I=2 mm, B, C, J, K=1 mm.

acute, reaching just past end of first antennular segment, (3) inferior margin of the basicerite with a strong acute tooth, almost as long as stylocerite, (4) merus of first major pereopod with 7 small spines and small, acute sub-terminal tooth; superior margin terminating in 3 narrow, acute teeth. In the

present specimen, (1) the rostrum reaching to middle of visible part of first antennular segment, (2) the stylocerite not reaching to the distal end of first antennular segment, (3) inferior margin of the basicerite with an acute tooth, not as long as stylocerite, (4) merus of first major pereopod with inferior inner

margin bearing minute granules and with a sharp spine at distal end; superior margin terminating in one acute tooth.

DISCUSSION

Alpheus compressus belongs to the *brevirostris* group. The *brevirostris* group is recognized by the following characteristics: ocular teeth absent; ocular hoods often prominent. Major chela always strongly compressed, more or less quadrangular in section; often with faces demarked by noticeable angle; with or without transverse groove proximal to fingers. Movable finger of the minor chela often balaeniceps in male. Third pereopod with the merus usually unarmed, the dactylus always simple, at times flattened and subspatulate (Kim and Abele, 1988). *Alpheus compressus* is distinguished from other known species of the *brevirostris* group in Korea by the laterally compressed body. Now Korean Alpheidae fauna consists of 26 species of nine genera [*Alpheus* (15 species), *Arete* (1), *Athanas* (1), *Automate* (1), *Betaeus* (2), *Prionalpheus* (1), *Salmonaeus* (1), *Stenalpheops* (1), and *Synalpheus* (3)]. One other species of *Athanas* was reported through the larval study without description of adult morphology and so is not listed in National Species List of Korea (Yang and Kim, 2003, National Institute of Biological Resources, 2020).

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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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REFERENCES

Banner AH, Banner DM, 1981. Crustacés Décapodes: Alpheidae. In: Résultats des campagnes MUSORSTOM: I. Philippines

- (18-28 Mars 1976) (Ed., Forest J). Mémoires du Muséum National d'Histoire Naturelle Série A Zoologie, 91:217-235.
- Cha HK, Lee JU, Park CS, Baik CI, Hong SY, Park JH, Lee DW, Choi YM, Hwang K, Kim ZG, Choi KH, Sohn H, Sohn MH, Kim DH, Choi JH, 2001. Shrimps of the Korean waters. National Fisheries Research and Development Institute, Busan, pp. 1-188.
- Chace FA, 1988. The caridean shrimps (Crustacea: Decapoda) of the Albatross Philippine Expedition, 1907-1910, Part 5: Family Alpheidae. Smithsonian Contributions to Zoology, 466:1-99.
- Fabricius JC, 1775. Systema entomologiae sistens insectorum classes ordines, genera, species adiectis synonymis, locis, descriptionibus, observationibus. Libraria Kortii, Flensburgi et Lipsiae (Flensburg and Leipzig), pp. 1-832.
- Hayashi KI, 1998. Prawns, shrimps and lobsters from Japan (100). Family Alpheidae - Genus *Alpheus* 9. Aquabiology, 116:209-216.
- Hayashi KI, Nagata M, 2002. Identity of *Alpheus digitalis* De Haan, 1844 and description of a new closely related species from the northwestern Pacific (Decapoda: Caridea: Alpheidae). Crustacean Research, 31:73-90. https://doi.org/10.18353/crustacea.31.0_73
- Kim HS, Kim W, 1997. Lists of animals in Korea (excluding insects). Korean Society of Systematic Zoology, Seoul, pp. 212-233.
- Kim W, Abele LG, 1988. The snapping shrimp genus *Alpheus* from the eastern Pacific (Decapoda: Caridea: Alpheidae). Smithsonian Contributions to Zoology, 454:1-119. <https://doi.org/10.5479/si.00810282.454>
- Koo H, Kim W, 2004. New reports of snapping shrimps, *Alpheus paracyone* and *A. spongiorum* (Decapoda: Caridea: Alpheidae) from Korea. Korean Journal of Systematic Zoology, 20:21-29.
- Koo H, Kim W, 2005a. Occurrence of alpheid shrimp, *Alpheus albatrossae* (Decapoda: Caridea: Alpheidae) in Korea. Korean Journal of Systematic Zoology, 21:73-79.
- Koo H, Kim W, 2005b. Occurrence of alpheid shrimp, *Alpheus paracrinatus* (Decapoda: Caridea: Alpheidae) in Korea. Korean Journal of Systematic Zoology, 21:251-257.
- Miya Y, 1995. Four species of *Alpheus* from intertidal and shallow water mudflats in the Sea of Ariake, Kyushu, Japan (Crustacea, Decapoda, Alpheidae). Bulletin of the Faculty of Liberal Arts, Nagasaki University, Natural Science, 35:271-288.
- National Institute of Biological Resources, 2020. National species list of Korea. II. Vertebrates, Invertebrates, Protozoans. Designzip, Seoul, pp. 1-908 (in Korean).
- Rafinesque CS, 1815. Analyse de la Nature, ou Tableau de l'Univers et des Corps Organisés. L'Imprimerie de Jean Barra-vecchia, Palermo, pp. 1-224.
- Sha JL, Wang YR, Cui DL, 2019. The Alpheidae from China Seas. Springer Nature Singapore Pte Ltd., Singapore, pp. 1-322.
- Yang HJ, Anker A, 2003. New records of alpheid shrimps (Decapoda, Caridea, Alpheidae) from Korea. Korean Journal of

- Systematic Zoology, 19:1-9.
- Yang HJ, Kim CH, 1999. The early zoeal stages of *Alpheus heeia* Banner and Banner, 1975 reared in the laboratory (Decapoda, Caridea, Alpheidae). *Crustaceana*, 72:25-36.
- Yang HJ, Kim CH, 2003. Early zoeas of *Athanas parvus* De Man, 1910 (Decapoda: Caridea: Alpheidae) reared in the laboratory. *Proceedings of the Biological Society of Washington*, 116:710-718.
- Yang HJ, Ko HS, 2005. New record of *Alpheus pacificus* Dana (Decapoda: Alpheidae) from Korea. *Journal of Fisheries Science and Technology*, 8:34-38.
- Yang HJ, Ko HS, Kim W, 2007. Redescription of *Alpheus bisincisus* De Haan (Decapoda: Alpheidae) from Korea. *Journal of Fisheries Science and Technology*, 10:37-42.

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