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Short communication

A New Record of the Varunid Crab, *Varuna yui* (Decapoda: Varunidae), from Korea

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ABSTRACT

The varunid crab, *Varuna yui* Hwang & Takeda, 1986, is known as widely distributed in the Southeast Asian region. Three specimens of varunid crabs were collected near the estuary of the river from Korea and identified as *V. yui*. *Varuna yui* could be distinguished from the other congeneric species, *V. litterata* (Fabricius, 1798), by having a more extended mesial lobe on the distal region of the male first gonopod. In this paper, morphological diagnosis and illustrations of the newly collected *V. yui* are provided. The specimens examined herein were deposited in the National Marine Biodiversity Institute of Korea and Nakdonggang National Institute of Biological Resources.

Keywords: varunid species, new record, Varunidae, *Varuna*, Korean fauna

INTRODUCTION

The family Varunidae contains crab species commonly found in the intertidal zone. On rocky shores, they can easily be found in crevices or under stones, while on soft sediments, they usually dig underneath the sediment. Varunid crabs are currently comprised of 160 species in 38 genera (Davie et al., 2015) worldwide, with 20 species in 12 genera recorded in Korea to date (Lee et al., 2021). The genus *Varuna* H. Milne Edwards, 1830 consists of two species, *V. litterata* (Fabricius, 1798) and *V. yui* Hwang & Takeda, 1986. *Varuna* species mainly live in fresh, brackish, and estuarine waters, and are prevalent enough to be used for food in Southeast Asia. Despite their wide distribution across Southeast Asia, Oceania, Taiwan, and Japan, they have not been reported in Korean waters yet.

During a continuous faunal study of Korean crabs, three specimens of *Varuna* species were collected from Korean waters and identified as *V. yui*. These specimens were collected from a drainage channel at Gangjeong Port in Jeju-do Island and drainage of Agokcheon Stream in Yeongdeok-gun, and all of them were found in brackish water areas. In this paper, we report the first *Varuna* species discovered in Korean waters with a morphological diagnosis and illustrations.

A stereomicroscope (Leica M205C, Wetzlar, Germany) was used to observe the microscopic parts. Drawings and photographs were obtained using a drawing tube attached to a stereomicroscope and a digital SLR camera (Nikon D810, Tokyo, Japan), respectively. Measurements were taken using a digital slide caliper to the nearest 0.1 mm. Carapace length (cl) was measured in the midline from the anterior to the posterior dorsal margin of the carapace. Carapace width (cw) was defined as the widest part of the carapace. Voucher specimens were deposited at the National Marine Biodiversity Institute of Korea (MABIK) and Nakdonggang National Institute of Biological Resources (NNIBR).

SYSTEMATIC ACCOUNTS

Superfamily Grapsoidea MacLeay, 1838
Family Varunidae H. Milne Edwards, 1853
Subfamily Varuninae H. Milne Edwards, 1853
[1]*Genus *Varuna* H. Milne Edwards, 1830

Korean name: [1]*기수참게속 (신칭)

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[1]***Varuna yui* Hwang & Takeda, 1986 (Figs. 1, 2)**

Varuna yui Hwang & Takeda, 1986: 12, figs. 1A–C, 2A–F (type locality: Da-Taung village, I-Lan County, Taiwan); Chokki & Ishihara, 1987: 107, figs. 3, 4, 5A–D; Davie, 1992: 350; Ng, 1998: 1141 (key), 1144.

Varuna litterata: Ng, 1988: 116, fig. 52.

Material examined. Korea: 1♂, 1♀ (cl 19.3, 26.6 mm, cw 20.6, 27.8 mm), Jeju-do: Seogwipo-si, Gangjeong-dong, Gangjeong Port, 33°13′32″N, 126°28′24″E, 9 Nov 2015, EtOH fixed, coll. Jin-Hyeop Jeong (MABIK CR00248703–4); 1♂ (cl 18 mm, cw 20 mm), Gyeongsangbuk-do: Yeongdeok-gun, Wonhwang-ri, Agokcheon, 36°34′30″N, 129°24′57″E, 9 Jun 2021, EtOH fixed, coll. Ju-Yeon Kim (NNIBR IV74516).

Diagnosis. Carapace (Figs. 1A, 2A) quadrilateral, smooth, slightly broader than long, width narrow posteriorly. Cardiac region, gastric region, and branchial region divided by distinct H-formed grooves. Antero-lateral border bearing three distinct broad, low teeth in both directions, decreasing in size posteriorly. Supraorbital border deep and slightly angulated. Antennules transversely oblique. Basal segment of antenna slightly longer than broad; flagellum stands in inner hiatus. Buccal cavern (Fig. 1B) squared, broader than long. Chelipeds (Fig. 2B) short and naked, each one almost same size; comparatively large and inflated; dactylus slightly curved to ventral, cutting edges with several well developed granulated teeth. Ambulatory legs (Fig. 2C) flattened, with long hair on flexor margin; meri with one small disto-extensor spine; propodi and dactyli having long hair on extensor and flexor margins; dactyli sharped distally. Abdomen (Figs. 1B, 2D, E) consisting of seven plates; in male, lateral limits divergent posteriorly, each lateral and distal border with short setae; in female, somewhat rounded, fourth plate broadest, each lateral and distal border with long soft setae. First gonopod (Fig. 2F, G) with two lobes at apex, mesial lobe distinctly elongated.

Habitat. Estuarine water and freshwater streams near the estuary.

Distribution. The Sunda Shelf up to Taiwan and the Philippines, Japan (Kanagawa), and Korea.

Remarks. *Varuna yui* Hwang & Takeda, 1986 closely resembles *V. litterata* (Fabricius, 1798) morphologically. Hwang & Takeda (1986) reported that the two species could be distinguished according to the morphological characteristics of the carapace, cheliped, abdomen, the first male gonopod, and ambulatory legs. Ng (1988) mentioned that these characteristics are intraspecific variations, but Davie (1992) noted that *V. yui* is valid considering the features of the abdomen and the first gonopod of the male. However, among these characteristics, the first gonopod is the most distinct characteristic that distinguishes the two species (Ng, 1998). The morphological differences in the first gonopod between both species are as follows. First, the apex of the mesial lobe is divided into two by a deep fissure at the median part in *V. yui* but not in *V. litterata*. Second, the mesial lobe is elongated in *V. yui* but similar in length in *V. litterata* (Hwang and Takeda, 1986; Ng, 1998). The present specimens agree well with previous descriptions of *V. yui* by the shape of the mesial lobe of the first gonopod.

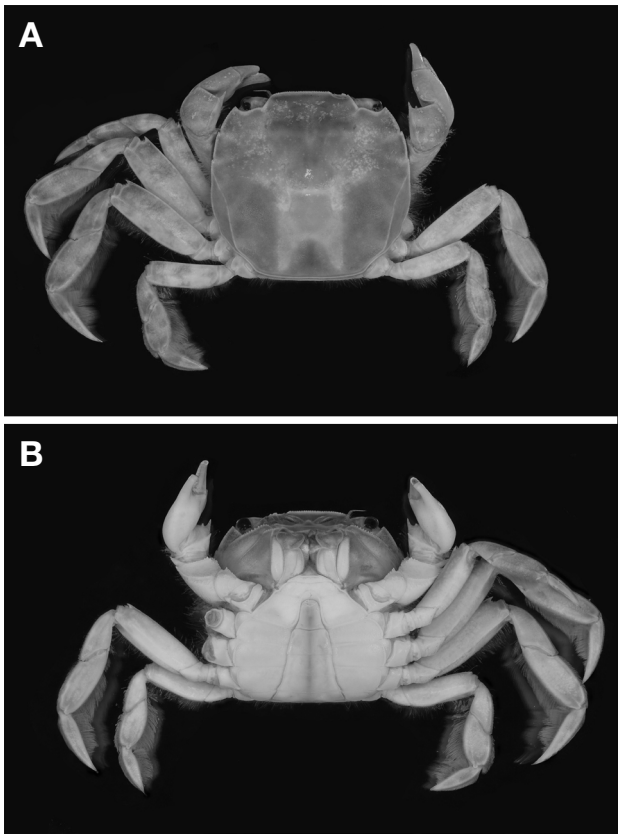

Fig. 1. *Varuna yui* Hwang & Takeda, 1986, male (cl 19.3 mm, cw 20.6 mm) (MABIK CR00248703). A, Overall dorsal view; B, Overall ventral view. cl, carapace length; cw, carapace width.

This species seems to be similar to *Neoeriocheir leptognathus* (Rathbun, 1913) in Korea by having smooth and subquadrate carapace, almost straight frontal margin, three teeth in anterolateral margin of carapace, short chelipeds, and long hair on extensor and flexor margins in ambulatory legs. However, *V. yui* is easily distinguished from *N. leptognathus* by not having a turf of setae on the inner surface of the chela (Ko and Lee, 2012).

Korean name: [1]*기수참게 (신칭)

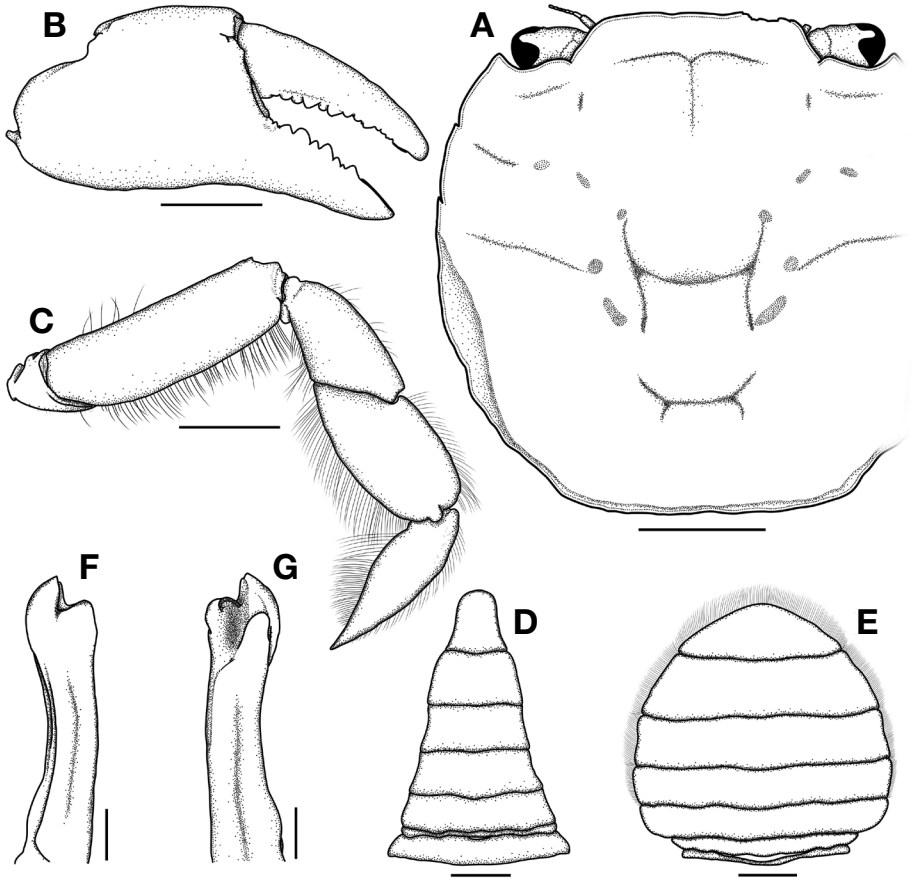

Fig. 2. *Varuna yui* Hwang & Takeda, 1986, male (cl 19.3 mm, cw 20.6 mm) (MABIK CR00248703) (A–D, F, G); same, female (cl 26.6 mm, cw 27.8 mm) (MABIK CR00248704) (E). A, Carapace, dorsal view; B, Right cheliped, outer view; C, Right fourth ambulatory leg, dorsal view; D, E, Abdomens, ventral views; F, Right first gonopod, mesial view, setae omitted; G, Right first gonopod, lateral view, setae omitted. cl, carapace length; cw, carapace width. Scale bars: A, E=5 mm, B, C=3 mm, D=2 mm, F, G=1 mm.

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CONFLICTS OF INTEREST

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

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REFERENCES

Chokki H, Ishihara T, 1987. A new record of *Varuna yui* Hwang & Takeda (Crustacea, Brachyura) from Japan. Natural History Report of Kanagawa, 8:107-110 (in Japanese with English summary).

Davie PJF, 1992. A new species and new records of intertidal crabs (Crustacea: Brachyura) from Hong Kong. In: The marine flora and fauna of Hong Kong and southern China III (Ed., Moreton B). Proceedings of the Fourth International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong, pp. 345-359.

Davie PJF, Guinot D, Ng PKL, 2015. Systematics and classification of brachyura. In: Decapoda: Brachyura, Treatise on zoology: anatomy, taxonomy, biology, 9C-II (Eds., Castro P,

Davie P, Guinot D, Schram FR, Von Vaupel Klein JC). Brill, Leiden, pp. 1049-1130. https://doi.org/10.1163/9789004190832_021

Fabricius JC, 1798. Supplementum entomologiae systematicae. Proft et Storch, Hafniae, pp. 1-572.

Hwang JJ, Takeda M, 1986. A new freshwater crab of the family Graspidae from Taiwan. Proceedings of the Japanese Society of Systematic Zoology, 33:11-18.

Ko HS, Lee SH, 2012. Invertebrate of Fauna of Korea. Vol. 21, No. 22. Crabs and Zeas I. Arthropoda: Malacostraca: Decapoda: Brachyura: Thoracotremata: Grapsoidea, Ocypodidea. National Institute of Biological Resources, Incheon, pp. 1-83.

Lee SK, Lee C, Noh J, Song SJ, Khim JS, 2021. First comprehensive ecological checklist of Brachyura in Korea: 1879-2020. Marine Pollution Bulletin, 171:112742. https://doi.org/10.1016/j.marpolbul.2021.112742

MacLeay WS, 1838. Illustrations of the Annulosa of South Africa: being a portion of the objects of natural history chiefly collected during an expedition into the interior of South Africa, under the direction of Dr. Andrew Smith, in the years 1834, 1835, and 1836; fitted out by the "Cape of Good Hope Association for Exploring Central Africa." In: Illustrations of the zoology of South Africa investigations (Ed., Smith A). Smith, Elder and Co., London, pp. 1-75.

Milne Edwards H, 1830. *Varune*. Varuna. Crust. In: Dictionnaire Classique d'Histoire Naturelle. Vol. 16 (Eds., Audouin MM, Bourdon, Brongniart A, Cambassèdes, De Candolle, Delafosse G, Deshayes, Deslonchamps E, Drapiez, Dumas, Edwards, Edwards HM, Fée A, Geoffroy Saint-Hilaire E, Geoffroy Saint-Hilaire I, Guérin, Guillemin, De Jussieu A, Kunth, Latreille, Lesson, Prévost C, Richard A, Saint-Vincent B). Rey et Gravier & Amable Gobin et Cie, Paris, p. 511.

Milne Edwards H, 1853. De la famille des ocypodides (Ocypodidae), suite. Annales des Sciences Naturelles Series 3 (Zoology), 20:163-228.

Ng PKL, 1988. The freshwater crabs of Peninsular Malaysia and Singapore. Department of Zoology, National University of Singapore, Shinglee Press, Singapore, pp. 1-156.

Ng PKL, 1998. Crabs. In: FAO Species Identification Guide for fishery purposes: the living marine Resources of the Western Central Pacific. Vol. 1 (Eds., Carpenter KE, Niem VH). Food and Agriculture Organisation, Rome, pp. 1046-1155.

Rathbun MJ, 1913. Descriptions of new species of crabs of the families Grapsidae and Ocypodidae. Proceedings of the United States National Museum, 46:353-358. https://doi.org/10.5479/si.00963801.46-2030.353

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