

## The mole crab *Hippa marmorata* (Hombron et Jacquinot, 1846) (Crustacea Anomura Hippidae): a first record from Indonesian waters

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### ABSTRACT

Specimens of *Hippa marmorata* (Hombron et Jacquinot, 1846) (Crustacea Anomura Hippidae) were collected from several coastlines of Indonesia (Sulawesi, Lombok, Tual Island, and West Papua). The specimens represent the first record of this species in Indonesia and confirm its presence in the Wallacea Line region and to its eastern fringes. Its systematic and morphological characteristics (i.e., anterior median lobe of carapace having two lobes and left antenna having two to three articles) are described. This finding provides new information on the geographical distribution of the species in Indonesian waters.

### KEY WORDS

Anomura; first record; mole crab; Hippidae; Indonesia.

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### INTRODUCTION

Mole crabs of the family Hippidae are distributed from the Indo-West Pacific (eastern coast of North America, the Red Sea, and Indonesia in the east) to the Atlantic region (Boyko & Harvey, 2002). These mole crabs commonly live in intertidal areas (swash zones) and engage in quick sand digging (Lastra et al., 2002).

The presence of mole crabs of the family Hippidae in Indonesia is well known, but few studies have been carried out on this group. Many members of the family Hippidae are present along Indonesia's seashore, including species of the genera *Hippa* (Fabricius, 1787) and *Emerita* (Scopoli, 1777). Other species include *H. admirabilis* (Thallwitz, 1892) in Papua and *H. celaeno* (de Man, 1896) in

Makassar, Sulawesi and Ambon, Moluccas (de Man, 1896). Information on the existence of mole crabs in the genus *Emerita* was reported by Efford (1976) during an expedition in Bengkulu, Sumatra.

Members of Hippidae are also widely distributed along the west coast of Sumatra and the south coast of Java. The abundance of *H. marmorata* (Hombron et Jacquinot, 1846) has been important in the field of exploration, which has contributed information on the geographical distribution of species of sand crab in Indonesia. *Hippa marmorata* is distributed across Tanzania, Hawaii, New South Wales in Australia, China, Japan, Western California, Panama, and the Galapagos Islands (Efford, 1972). However, the occurrence of this mole crab in Indonesia has not previously been recorded. The finding of *H. marmorata* documented in this report is the first in Indonesian territorial waters.

## MATERIAL AND METHODS

Figure 1 provides a map showing the locations where the specimens were collected. All specimens in each location were obtained by digging the sand in their habitat. The collected specimens were photographed with a Lumix G3 camera (Panasonic, Tokyo, Japan). They were preserved in 70% alcohol that was replaced with 96% alcohol in the laboratory, and then drawn using a camera lucida. Specimens were deposited in the Museum Zoologicum Bogoriense, Research Institute for Biology, Indonesian Institute of Science (LIPI) to obtain a registration number.

## SYSTEMATICS

Infraorder ANOMURA Macleay, 1838

Family HIPPIDAE Stimpson, 1858

Genus *Hippa* Fabricius, 1787

***Hippa marmorata*** (Hombron et Jacquinot, 1846)  
*Remipes pacificus* Dana, 1852 (junior synonym)

TYPE MATERIAL. West Papua. Sorong, Jefman Island: 3 females, 3 males (MZB Cru 4153), 0°55'S, 131°07'E, coll. Fatmawati, 7 Feb 2015.

DIAGNOSIS. The carapace of *H. marmorata* was wide and flat (Figs. 2, 6). The submarginal comprises 20 to 40 rows. The carapace grooves were transverse and cream in colour, with short antennules and two median lobes (Fig. 3). The dactyl was not acute (obtuse) (Fig. 4). The antennules comprised two articles (Fig. 5).

EXAMINED MATERIAL. Lombok. Gili Meno Island, North Lombok, Gili Indah: 1 male, 1 female, 3 ov. females (MZB Cru. 4125), 8°20'S, 116°03'E, coll. Y. Wardiatno, A. Mashar, A. Farajallah, 22 Sept 2014. Sulawesi. Banggai Islands: 1 male, 2 ov. females (MZB Cru. 4126), 1°36'S, 123°29'E, coll. M. Sataral, 1 Nov 2013. Kei Islands. Tual: 3 males, 1 female, 6 ov. females (MZB Cru. 4127), 5°43'S, 132°42'E, coll. IPB, Aug 2014. West Papua. Sorong, Jefman Island: 3 females, 3 males (MZB Cru. 4153), 0°55'S, 131°07'E, coll. Fatmawati, 7 Feb 2015.

REMARKS. The systematics followed is that of Boyko et Harvey (1999). In total, 24 specimens

were collected. Fresh specimens exhibited a white (cream) and grey pattern on the carapace (see figure 2), a round to oval shape, and a carapace length of 2.0 to 2.5 cm. The anterior median lobe comprised two lobes (similar to *H. celaeno*), and 20 to 40 setose pit rows were present on the submarginal carapace. The main distinctive characteristic of these specimens was the number of left antennae with two articles (Osawa et al., 2010). The ocular peduncle was shorter than that in *H. adactyla*. The first pereopod commonly differed in length between the right and left sides.

## DISCUSSION AND CONCLUSIONS

*Hippa marmorata* are closely related to *H. ovalis* (Osawa et al., 2010), and the two species have similar antennulae, comprising two to three segments. The morphological characteristics of the specimens in this study were consistent with those of the Taiwan species *Hippa* and *Hippa marmorata* (Osawa et al., 2010). *Hippa marmorata* is in the family Hippidae and has been reported in Taiwan and Australia as a possible synonym of *H. pacifica* (Haig, 1974).

The species inhabits swash zones and engages in sand digging. It has been found along the west coast of Lombok, Banggai, Tual Island, and West Papua. No previous reports describe the discovery of this species in Sundaland. Its distribution is thus spread across regions around the Wallacea Line and to its eastern fringes. The *Hippa marmorata* collected from each location exhibit similar characteristics and colours. This species is also morphologically identical to *H. ovalis*, which is found in Sulawesi (Osawa et al., 2010). The specimens found in Papua displayed different carapace colour patterns in the male and female; the female specimen was relatively uniformly coloured, whereas the male was patterned.

Based on the distribution of this species in Taiwan (Osawa et al., 2010), its distribution is possibly affected by sea currents and various biological factors. The substrate textures of the west coast of Sumatra and of the south coast of Java are nearly identical, whereas the sand from Sulawesi, Lombok, and Papua differs and is white, similar to the colouring of the carapace of *H. marmorata*. The colour of the crabs' carapace is generally influenced

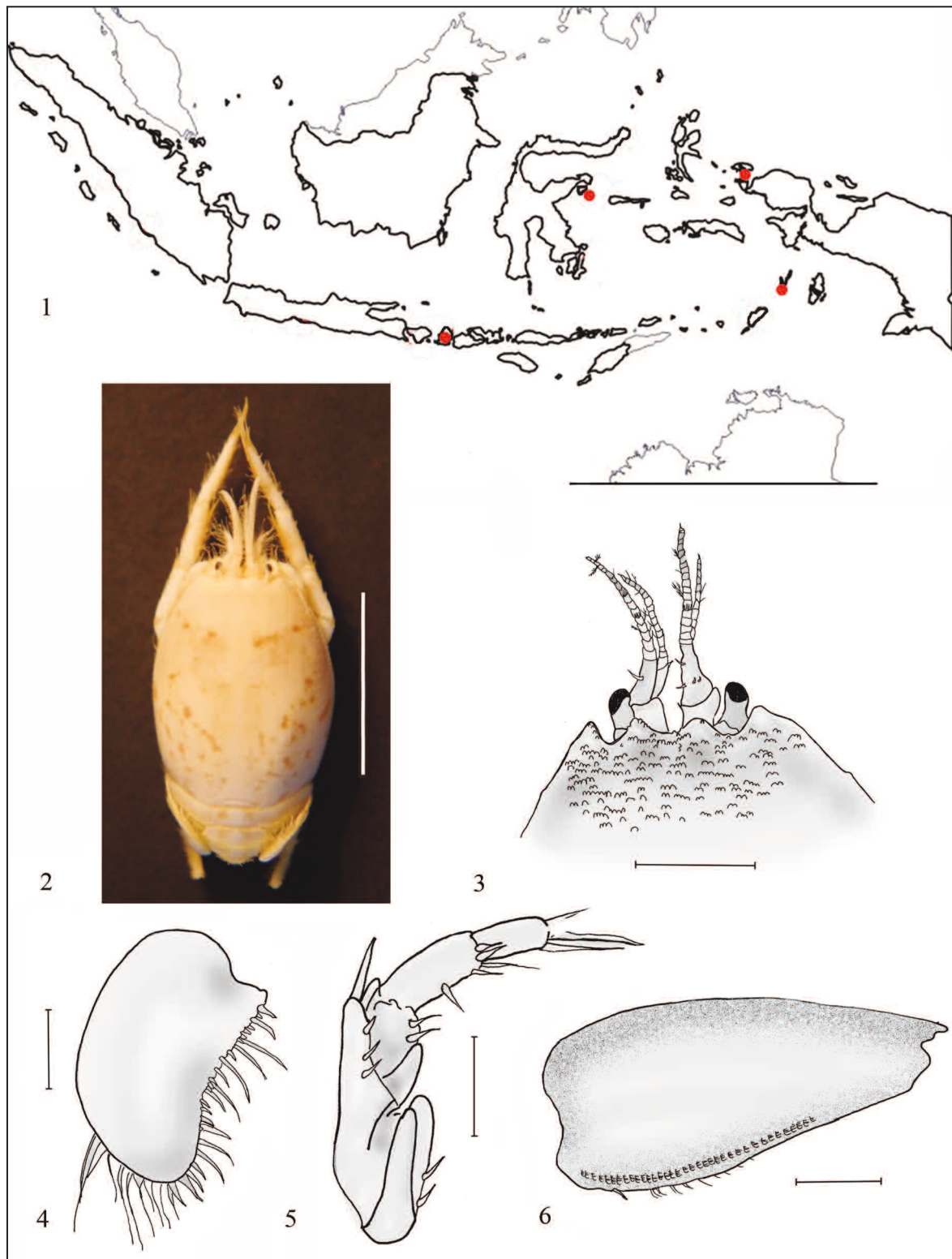


Figure 1. Map of Indonesia. Red circles indicate the locations where the specimens were collected. Figure 2. Specimen of *Hippa marmorata* (male) from Jefman Island, West Papua, Indonesia (scale: 1.0 mm). Figure 3. *Hippa marmorata* (26.50 mm) anterior carapace (length ratio = 20.78 mm). Fig. 4. Idem, dactyl (dorsal view). Fig. 5. Idem, antennulae. Fig. 6. Idem, submarginal carapace. Scale: Figs. 3, 6 = 4.0 mm, Figs. 4, 5 = 1.0 mm.

by the colour of the sand in their particular habitat (Wenner, 1972). More female than male specimens were found in this study. Ovigerous female species were dominant, indicating that the species is in regeneration (Forward et al., 2007).

The scarce information on the biology and distribution of *H. marmorata* does not provide any clear indication of the geographical distribution of this species in Indonesia. Further study is required to better understand its distribution, and phylogeographic analysis would be helpful in elucidating the source of this population in Indonesian intertidal zones.

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