

First Record of *Hippa adactyla* (Fabricius, 1787) [Crustacea, Anomura, Hippidae] from Indonesian waters

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Running head: First record of *Hippa adactyla*

Abstract: The specimens of *Hippa adactyla* (Crustacea, Anomura, Hippidae) were collected from several coasts of Indonesia (Sumatera, Java, Bali-Lombok, Sulawesi) represents the first record of this species in Indonesia and confirms its presence in the Indian Ocean and Wallacea region. Its systematic and morphological characteristics (median lobe carapas anterior have 3-4 lobe and left antenna with two to six articles) are described, and its distribution in Indonesia is presented.

Keywords: anomura, first finding, *Hippa adactyla*, Indonesia

INTRODUCTION

The sand crab superfamily Hippoidea is distributed from the Indo-West Pacific to the Atlantic region (Boyko and Harvey 2002). These sand crabs live in intertidal areas (swash zones) and engage in very quick sand digging (Lastra *et al.* 2002). The presence of sand crabs in the family Hippidae in Indonesia is well known, but few studies have been performed on this group. Many members of the

Hippidae family are present along Indonesia's seashore, including species of the genera *Hippa* (Fabricius 1787) and *Emerita* (Scopoli 1777). Other species include *H. admirabilis* in Papua and *H. celaeno* in Makassar, Sulawesi and Ambon, Moluccas (de Man 1896).

Information about the existence of sand crabs in the genus *Emerita* was revealed by Efford (1976) during an expedition in Bengkulu, Sumatera. Members of Hippidae are also widely distributed along the west coast of Sumatera and south coast of Jawa. The abundance of *H. adactyla* (also known as *Remipes testudinarius*) (Miers 1878) has been important in the field of exploration research. This species is distributed from Madagascar to Australia and extends eastward to the Marquesas Islands and northward to Japan (Boyko & Harvey 1999). However, the distribution of this sand crab from Sumatera to Jawa has not been recorded. This report is the first record of *H. adactyla* in Indonesia.

MATERIALS AND METHODS

Genus *Hippa* Fabricius, 1787

Hippa adactyla

Material Examined: Sumatera. Bengkulu: 3 males, 1 ov. female (MZB Cru 4105), 3°47'S 102°14'E, coll. D. Purnama, 10 Sep 2014; Padang Pariaman: 1 male, 1 ov. female (MZB Cru 4106), 0°27'S 99°58'E, coll. P.U. Ardika, A. Farajallah, F. Akhsani, 27 Sep 2014. **Jawa.** Pelabuhan Ratu, Sukabumi: 1 female, 1 ov. female (MZB Cru 4107), 0°32'S 100°04'E, 27 Dec 2013; Pangandaran: West Beach, 5 males, 3 ovigerous females, 3 females, 7°41'S 108°39'E, coll. K.A. Widayati, J.I. Dwifajarningsih, 22 Dec 2014. Cilacap: 3 ov. females (MZB Cru 4108), 7°43'S 109°01'31.6"E, coll. IPB, Mar 2013. **Bali.** Gianyar: Lebih Beach, 1 male, 4 ov. females (MZB Cru 4115), 8°07'S 115°04'E coll. Y. Wardiatno, A. Mashar, A. Farajallah, 22 Sep 2014. **Lombok.** Gili Meno Island North Lombok, Gili Indah: 2 males (MZB Cru 4116), 8°20'S 116°03'E coll. Y. Wardiatno, A. Mashar, A. Farajallah, 22 Sep 2014. **Sulawesi.** Banggai Island: 1 female (MZB Cru 4117). 1°36'S 123°29'E, coll. M. Sataral, 1 Nov 2013.

Sample collection was done by hand along the coastline of each study site. The specimens were photographed with a Canon 1100D camera (Canon, Tokyo, Japan). They were preserved in 70% alcohol, which 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), Indonesia.

RESULTS

In total, 35 specimens were collected. Fresh specimens exhibited a greyish black-and-white pattern on the carapace (Figure 1) and a round to oval shape, and they had a carapace length of 2.4 to 3.5 cm. The median lobes comprised two lobes with one thorn in the middle, similar to *H. admirabilis*, and 46 to 59 setose pit rows were present on the submarginal carapace. The main distinctive characteristics of these specimens were that the number of left antenna with two to six articles and the number increasing with growth and age (Haig 1974). The ocular peduncle was longer than that in other *Hippa* species. The first pereopod on the right and left commonly had a different length. Specimens in this study had an elongated, orange-coloured spermatophore located near the left third pereopod. *Hippa adactyla* is a synonym of *Remipes testudinarius* from New South Wales (Haig 1970).

SYSTEMATICS (Boyko 1999):

Infraorder ANOMURA Macleay 1838

Family HIPPIDAE Stimpson, 1858

Genus *HIPPA* Fabricius, 1787

Remipes denticulatifrons White, 1847 (junior synonym)

Remipes testudinarius Latreille, 1806 (junior synonym)

Remipes testudinarius var. *denticulatifrons* Miers, 1878 (junior synonym)

Hippa adactyla Fabricius, 1787

TYPE MATERIAL. Pelabuhan Ratu, Sukabumi: 1 female, 1 ov. female (MZB Cru 4107), 0°32'S 100°04'E, 27 Dec 2013.

Diagnosis: The carapace of *H. adactyla* wide and flat (Figure 2e). The submarginal rows not clear and comprise 25 to 40 rows. The carapace grooves transverse, brown, with short antennules and four

median lobes (one lobe in the middle) (Figure 2a). The first pereopod simple (elongated) and no cheliped (Figure 2b). The dactyl acute (Figure 2c). Antennules with three to four articles (Figure 2d).

DISCUSSION

The morphological characteristics of the specimens in this study were consistent with those of the Taiwan species *Hippa* (Fabricius, 1787) and *Hippa adactyla* (Osawa & Chan 2010). *Hippa adactyla* is a species in the family Hippidae and has been reported in Taiwan and Australia (Haig 1970). This species inhabits swash zones and engages in sand digging. It has been found along the west coast of Sumatera (Padang) and south coast of Jawa (Pelabuhan Ratu) to Bali; but we also found one specimen on Banggai Island of Sulawesi. No previous reports suggest that this species has been found in Kalimantan. *Hippa adactyla* from each location exhibits the same characteristics and colours. This species is also morphologically identical to *H. ovalis*, which is found in Sulawesi (Osawa & Chan 2010). The specimens found on the west coast of Sumatera had an average length and width of 2 to 3 cm. These specimens differed from those on the south coast of Jawa and Bali-Lombok, which had a greater average length and width of 3 to 4 cm.

Based on the distribution of this species in Taiwan (Osawa & Chan 2010), its distribution might be affected by sea currents and various biological factors. The textures of the substratum of the west coast of Sumatera and south coast of Jawa are nearly identical, characterised by rough brown sand. The colour of the crabs' carapace was influenced by the colour of the sand in their particular habitat (Wenner 1972). More female than male specimens was found in this study. Ovigerous female species were dominant. This phenomenon indicates the regeneration of this species (Forward *et al.* 2007). The scarce information on the biology and distribution of *H. adactyla* does not clearly indicate the geographical distribution of this species. The presence of sand crabs along the coast of Sumatera, Jawa, Bali-Lombok and Sulawesi needs further study, and phylogeographic analysis would help to elucidate the source of this population in Indonesian intertidal zones.

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Figure 1: Specimen of *H. adactyla* (ovigerous female) from Pelabuhan Ratu, south coast of Jawa, Indonesia.

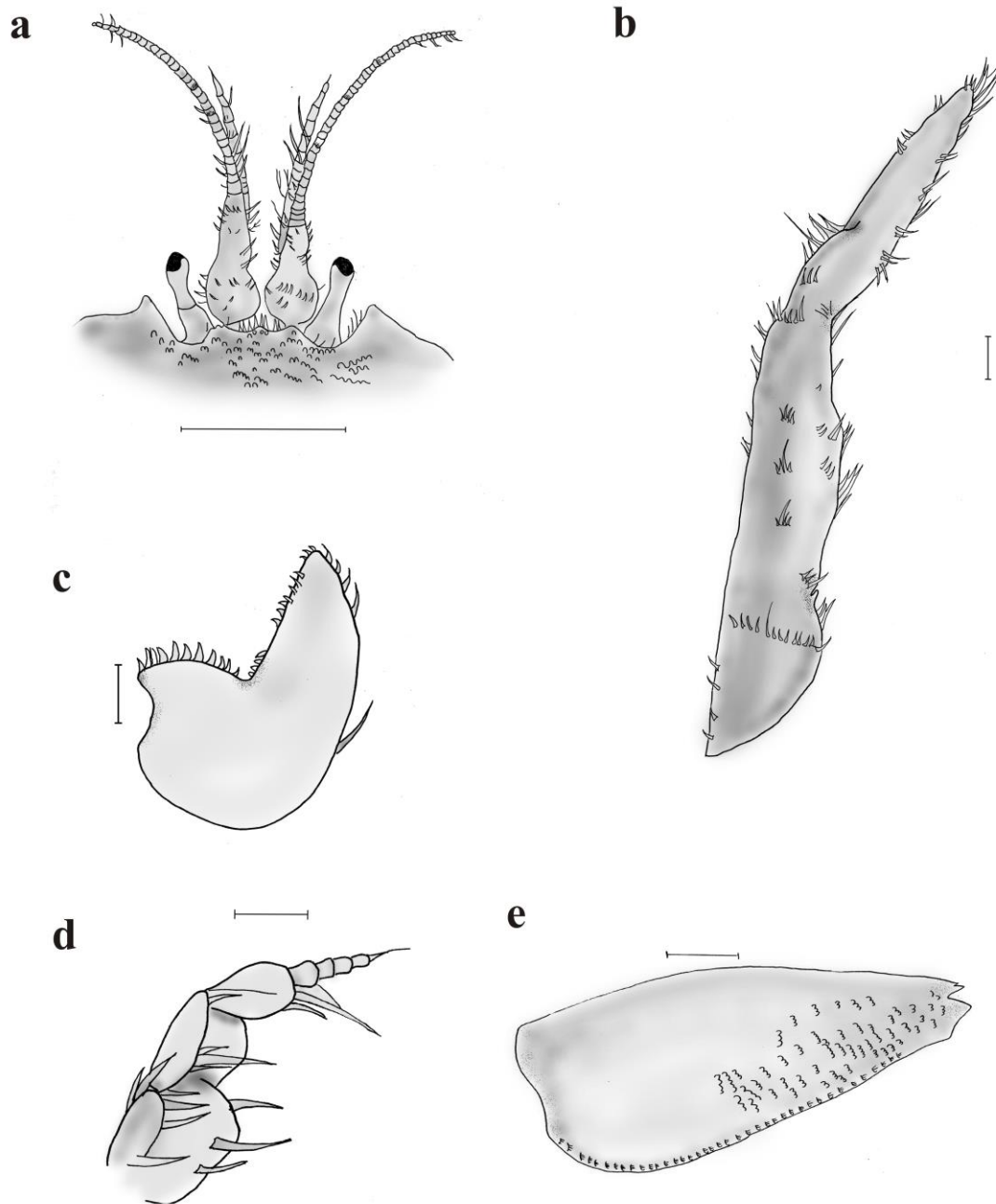


Figure 2: *Hippa adactyla* (Fabricius, 1787) (34.2 mm) **a.** Anterior carapace, dorsal aspect. **b.** Right pereopod 1. **c.** Dactyl, outer aspect **d.** Antennules, inner aspect **e.** Submarginal carapace (bar scale a, d, e = 3.0 mm; b = 2.0 mm; c = 1.0 mm).