



Short Communication

First record of a menippid crab *Myomenippe hardwickii* (Gray, 1831) from Hukitola, Odisha coast, India

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A menippid crab *Myomenippe hardwickii* (Gray, 1831) was obtained in the macrobenthic collections from Hukitola, a mangrove-associated Bay located south of Bhitarkanika, Odisha, on the east coast of India. Although the crab was reported from the coastal waters adjoining Andhra Pradesh and West Bengal, documentation of the species from Odisha remained elusive until the current study. Therefore, species diagnosis with suitable illustrations and ecological details are provided.

[**Keywords:** Bhitarkanika, Brachyura, Macrobenthos, Mangroves, Odisha, Stone crab]

Introduction

On India's east coast, the Bhitarkanika mangroves in Odisha are well-known globally for their biodiversity. Nevertheless, many other coastal regions of the State, apparently rich in faunal resources, remain unexplored. For example, Hukitola Bay (20°24'26.84 N, 86°44'1.12 E to 20°27'59.01 N, 86°46'35.17 E), in Jambu Kharnasi, towards the south of Bhitarkanika and north of the Mahanadi estuary is one such area. Therefore, benthic explorations (2017 – 2021) were undertaken, considering the near absence of information on biodiversity from the region.

During one such survey (28.02.2021), a menippid crab *Myomenippe hardwickii* (Gray, 1831), was obtained in the macrobenthic collections. Only four genera and thirteen species represent the brachyurans of the family Menippidae¹. These crabs resemble stones and are commonly known as “Stone crabs”. The crab is also called Hardwicke’s crab, after the

collector's name, Gen. Hardwicke². Further, their robust chelipeds clench objects forcefully and do not release them quickly. The myth is that they let loose their grip by a thunderclap, hence called “Thunder crabs”.

Remarkably they pull in their appendages, feign lifelessness, and mimic stones. The behavior, as mentioned above, easily distinguishes them from other brachyuran crabs and is perceived to ward off predators. Such organisms often occur in shallow waters and extend their distribution to the mangrove-fringed intertidal zones, most often preferring stretches of mudflats swathed by the mytilid bivalve *Perna* spp.³. The genus *Myomenippe*, characterized by granulated, well-delineated carapace and disproportionately sized chelipeds are of particular interest. The front is bilobate, with three teeth each. The orbits are entirely closed, leaving the antennary flagellum from the orbital gap.

Worldwide, the species has been documented from the east coast of Africa⁴, Mauritius⁵, Bangladesh⁶, Taiwan⁷, Japan⁸, and from Southeast Asian countries, namely, Myanmar⁹, Thailand¹⁰, Philippines³, Malaysia and Singapore¹¹, and Indonesia¹².

In India, the species is reported from the west coast, such as, Gujarat^{13,14}; Maharashtra¹⁵⁻¹⁸ (a planktonic larval form from Dandi creek¹⁵); Goa^{17,19}; and Karnataka^{20,21}. Further, from Tamil Nadu^{13,22} on the southeast coast, farther extending east to Andhra Pradesh^{13,23,24}; and West Bengal^{13,25-27}. It was also recorded from the Andaman and Nicobar Islands²⁸. But, intriguingly, none from the coastline of Odisha until the present study.

Materials and Methods

A single female specimen was obtained from the shallow waters in Hukitola (20°38.4969 N, 86°78.3572 E to 20°27'59.01 N, 86°46'35.17 E), a bar built estuarine embayment, south of Bhitarkanika, adjoining the Bay of Bengal, India (Fig. 1). Benthic sampling was undertaken with a Naturalist’s dredge (20×50 cm; mesh size ~ 0.6 cm²) operated from a fishing boat. The hauled macrobenthic specimens were washed with seawater, sorted, relaxed in seawater and 10 % magnesium chloride solution, and then preserved in 10 % neutralized

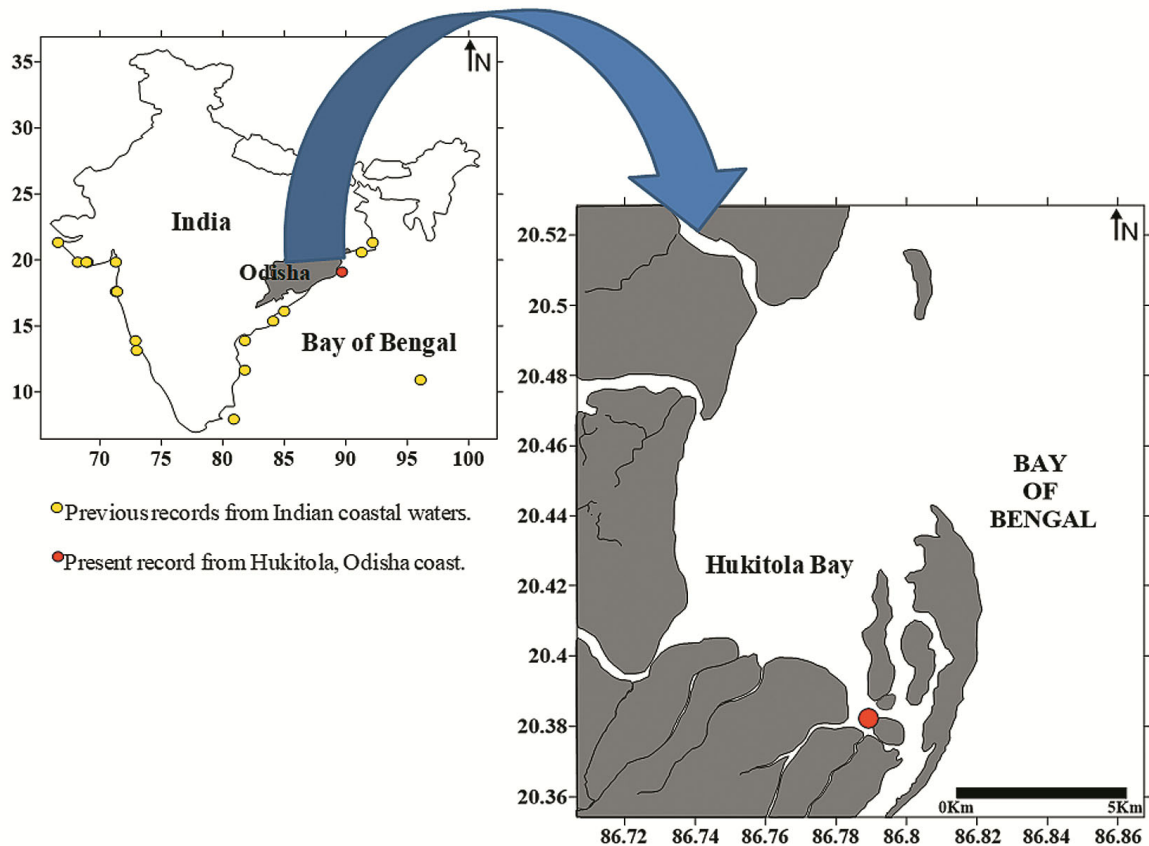


Fig. 1 — Location map showing the site of collection, in Hukitola Bay, Odisha, east coast of India

formaldehyde. Morphometric measurements of the brachyuran crab sample were recorded using a dial caliper (Carbon fiber electronic Vernier digital caliper (Safeseed, China); resolution: 0.01 mm and accuracy ± 0.2 mm). Identification was carried out based on important taxonomic characters described in literature^{8,23,29}. The specimen was photographed (digital Nikon camera and camera integrated with Leica Stereo zoom microscope, Model: LEICA EZ4W), vouchered, and deposited in the collections of the Environmental Science Laboratory, Department of Zoology, Ravenshaw University, Cuttack, India. The classification adopted in this work is that of Ng *et al.*³⁰. The water and sediments were analyzed according to standard protocols³¹⁻³³.

Material examined

Single female specimen; voucher no. ESLDZRUBC1; dated 28.02.2021; collected from Hukitola Bay, in the proximity of mangroves (20°22.908 N, 86°47.462 E) of Jambu Kharnasi region, Odisha, India, from a depth of 3.96 m.

Results

Identification

Systematic account

Subphylum: Crustacea Brünnich, 1772
 Class: Malacostraca Latreille, 1802
 Order: Decapoda Latreille, 1802
 Infraorder: Brachyura Linnaeus, 1758
 Family: Menippidae Ortmann, 1893
 Genus: *Myomenippe* Hilgendorf, 1879
Myomenippe hardwickii (Gray, 1831) (Plate 1a – g; Table 1)

Synonyms

Cancer Hardwickii Gray, *Zool Miscell*, London: 40 (1831), type locality: Indian Ocean.

Menippe (Myomenippe) granulosa, Alcock, *J Asiat Soc Bengal*, 67 (2) (1898) pp. 179.

Menippe hardwickii, Deb, *Zool Surv India, State Fauna Series 3: Fauna of West Bengal, Part*, 10: 373 (1998).

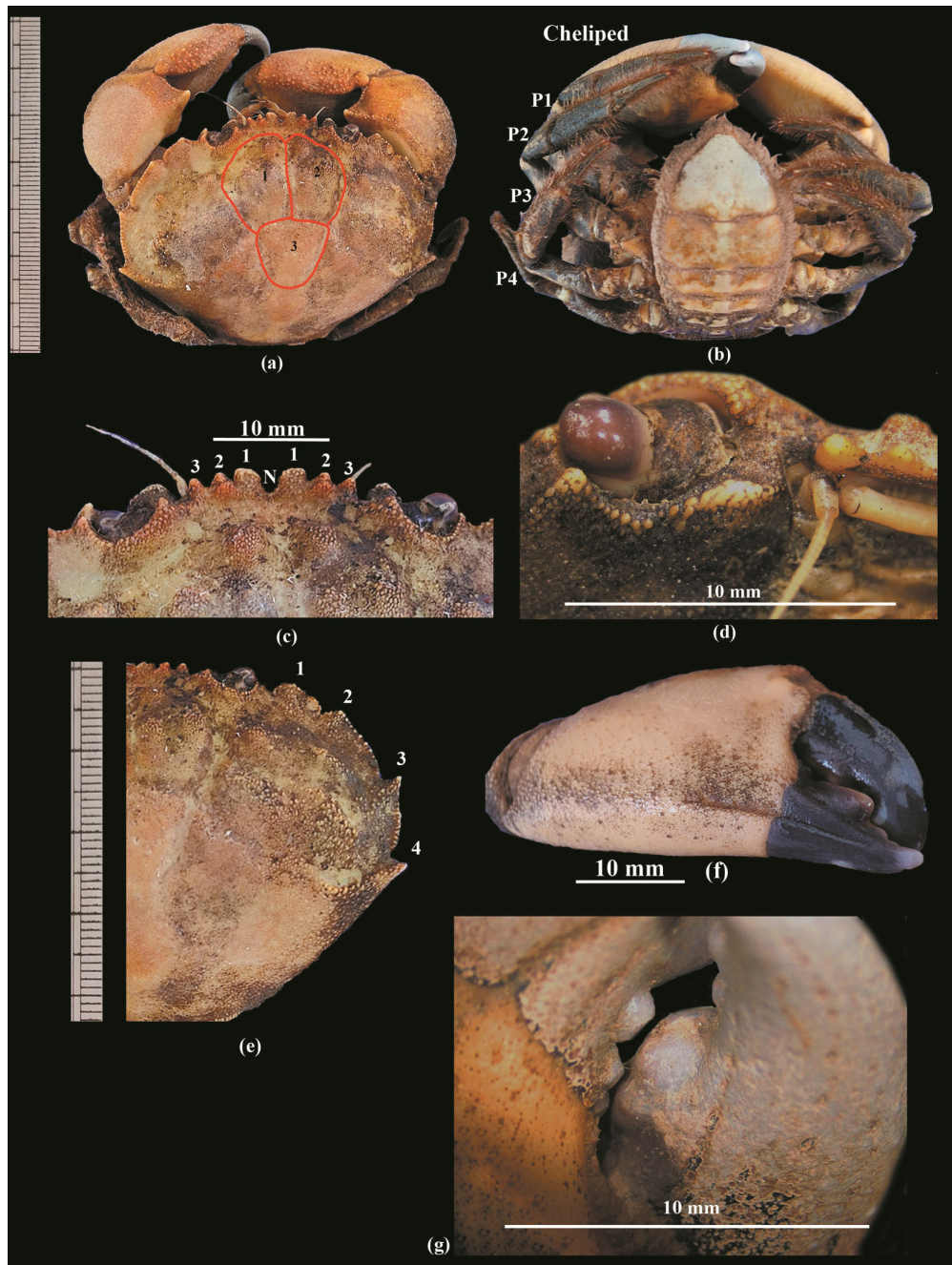


Plate 1 — Diagnostic illustrations of *Myomenippe hardwickii* After Ian⁴: a) Dorsal view showing 3 portions of the gastric region, b) Ventral view showing cheliped and 4 pereopods (P1-P4), c) Bilobed frontal margin with 3 teeth each, d) Antennary flagellum left out from the orbital gap, e) Anterolateral margin with 4 teeth, f) Propodus and dactylus of larger chela, and g) molariform tooth at the basal region of dactylus of larger chela

Diagnosis

Carapace predominantly muddy brownish and pale yellow colored with a faint greenish tinge; shape oval, broader than long, slightly domed; well-defined regions on carapace evident, separated by shallow depressions and overlaid with several small granules. Gastric region distinguished into three portions—two anterolateral and

one posterior. Raised portions of epibranchial region feature clusters of prominent vesiculous granules. Margin of carapace conspicuously granular. Anterolateral margins relatively thin and jagged, with four rather conspicuous teeth, separated by deep nicks; first three teeth close to the frontal region comparatively broad and anteriorly acuminate; last tooth short, narrow,

Table 1 — Morphometric measurements of female *Myomenippe hardwickii* (Gray, 1831)

Characters	Measurements (mm)	
	Carapace	
Width		57.7
Length		41.4
Frontal length		14.5
	Cheliped	
Merus		19.8
Carpus		21.0
Propodus		41.2
Dactylus		22.0
Weight (g)		57.223

and keeled. Low granular convexities seen on the anterolateral areas. Lateral regions of the carapace moderately undulated distinctly granular. Two ridged fragmented lines correspond with the curvature of anterolateral boundaries. Eyes green, ringed with red in fresh condition. Orbit wholly closed. Antennary flagellum excluded from the orbital gap. Frontal margin bilobed, approximately one-fourth of carapace breadth, separated from the orbit by a marked indent; each lobe has three teeth- one broad, squarish, pronounced, and the other two acuminate; third tooth, a little larger than the second. Third maxilliped rather large and fitted to buccal cavity. Both inner and outer margins of merus softly fuzzy. Hairy tufts on the inner apical region of carpus, propodus and dactylus. Chelipeds robust, right cheliped comparatively larger than the left; chela bulky, digits distinctly black, portly bearing serrated margins; bulbous molariform tooth present towards basal region of dactylus of larger chela. A contour of spaced-out granules extends from the distal end of the cheliped, culminating into tightly packed smaller granules towards the proximal inner slant of the cheliped. A minor spine stretches out from the curved carpus's inner corner; the outer surface of carpus grainy, pitted, and uneven with large vesiculous granules. Walking legs thin compared to chelipeds. Bristly exterior, joints profusely fringed with thin firm setae characterizing mainly margins of the upper four joints^{8,22,23,26,29}. Abdomen broad, flattened, consisting of seven distinct segments, sixth segment much wider than long, almost three times the length. Two pear shaped gonopore laterally present on sixth thoracic sternites.

Remarks

In contrast with the smooth carapace and chelipeds of *Menippe rumphii*, *Myomenippe hardwickii* has a much granular carapace and chelipeds. Further, each lobe of the bilobed front in the latter species has three

teeth, differing from *Menippe rumphii*, with only two teeth in each lobe. In the fresh condition, the eyes of *Menippe rumphii* are red, while those of *Myomenippe hardwickii* are green, ringed with red.

Ecology

The specimen was recorded from a depth of 3.96 m with salinity 24.58 PSU; dissolved oxygen 5.32 mg/l; pH 8.2; water temperature 29 °C; sediment organic matter 2.19 % with silty sand texture (Sand – 10.76 %, Silt – 88.58 % and Clay – 0.66 %). The species cohabited with decapod crustaceans such as *Penaeus* sp., and *Metopograpsus messor*, besides molluscs for example *Pirenella cingulata*, *Telescopium telescopium*, *Volegalea cochlidium*, *Indothais lacera*, *Tegillarca granosa*, *Placuna placenta*, *Vepricardium coronatum*, and *Paratapes textilis*.

Conclusion

Notwithstanding documentation of the species from most coastline habitats of the east coast, the records from Odisha were lacking. The occurrence of *M. hardwickii* reported in this study indicates an extended species distribution. This species has commercial potential; its large chelae are incredibly meaty and delectable¹¹. It underlines the importance of meticulous benthic sampling to unravel the local ecologies of the region under consideration.

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Conflict of Interest

There is no competing or conflict of interest.

Ethical Statement

This manuscript is the authors' original work, which has not been previously published nor is currently being considered for publication elsewhere. Further, it is to state that the work reflects the authors' research and analysis truthfully.

Author Contributions

Specimen acquisition: SP; Laboratory analysis and figures: SP, RB, PP & AM; Taxonomic identification: MKD; Writing: DR, SP & RB. Editing and review: MKD & DR.

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