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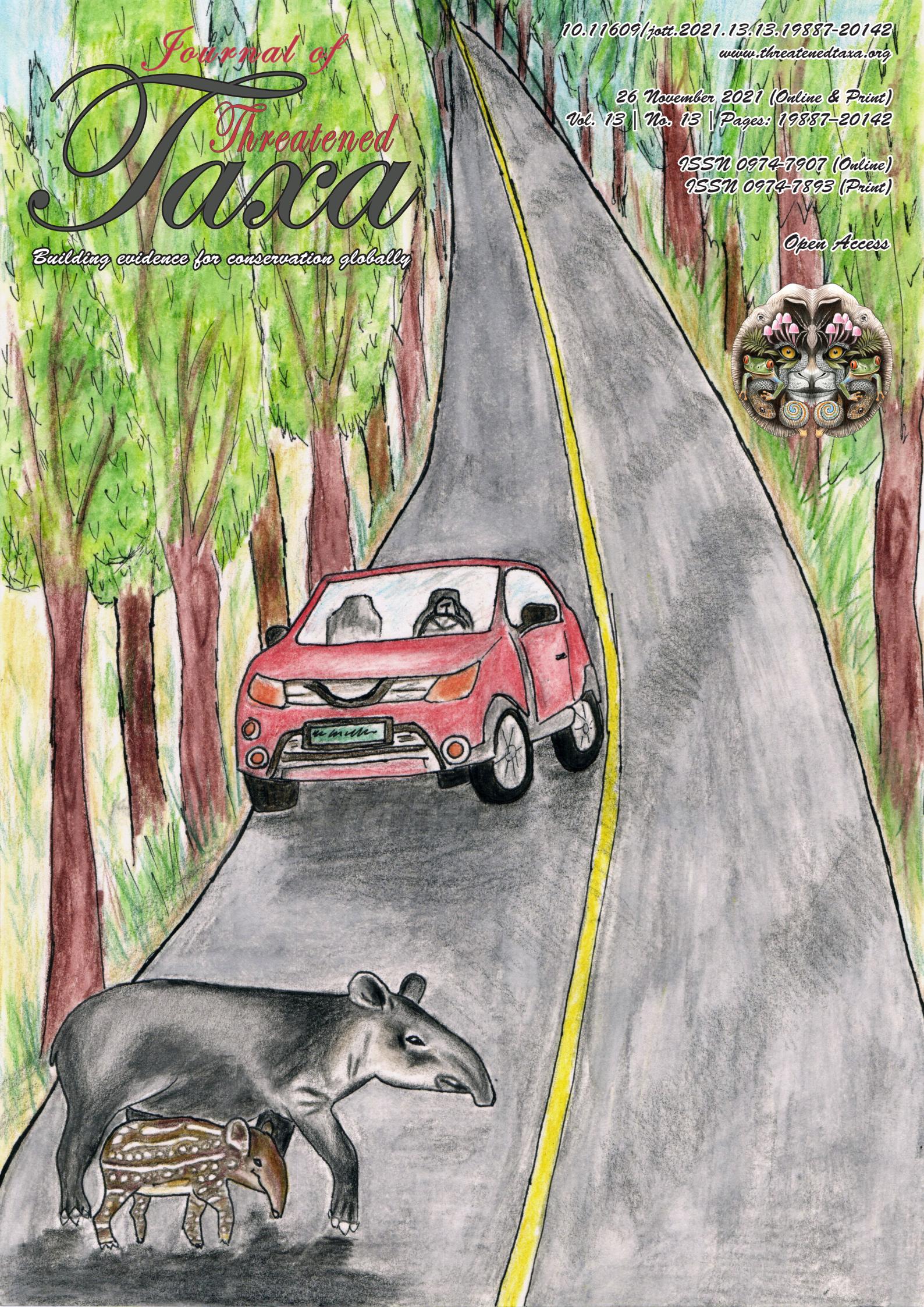
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Caption: Lowland Tapir *Tapirus terrestris* (Medium—watercolours on watercolour paper) © Aakanksha Komanduri.



First record of a freshwater crab, *Maydelliathelphusa masoniana* (Henderson, 1893) (Decapoda: Brachyura: Gecarcinidae) from West Bengal, India

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Abstract: The genus *Maydelliathelphusa* Bott, 1969 includes five species, *M. masoniana* (Henderson, 1893), *M. edentula* (Alcock, 1909), *M. falcidigitis* (Alcock, 1910), *M. harpax* (Alcock, 1909), and *M. lugubris* (Wood-Mason, 1871), and is endemic to India. Out of the five species, only *Maydelliathelphusa lugubris* (Wood-Mason, 1871) was reported from West Bengal previously. Present study reports the second species, *M. masoniana* (Henderson, 1893), from West Bengal, India for the first time.

Keywords: Crustacea, Decapoda, description, diagnosis, endemic, freshwater crabs, Gecarcinidae, taxonomy.

Freshwater crabs belonging to infraorder Brachyura of order Decapoda are important in terms of nutrient cycles, bio-indicators of environments, disease transmission and small scale fisheries (Cumberlidge et al. 2009; Valarmathi 2017; Harhoglu et al. 2018; Kotwal & Sharma 2020). They are characterized by a broad carapace-covered cephalothorax having five pairs of thoracic legs or pereiopods (one pair of chelipeds, four pairs of walking legs) and a reduced abdomen (Deb 1999; Yeo et al. 2008). These crabs complete their entire life cycle in freshwater environments without moving to saltwater (Yeo et al. 2008).

The freshwater crab diversity of India comprises a total of 127 species divided into two families: Potamidae Ortmann, 1896 and Gecarcinidae Rathbun, 1904 (Pati

2021). The genus *Maydelliathelphusa* Bott, 1969 belongs to the Gecarcinidae and is represented by five species: *M. masoniana* (Henderson, 1893), *M. edentula* (Alcock, 1909), *M. falcidigitis* (Alcock, 1910), *M. harpax* (Alcock, 1909), and *M. lugubris* (Wood-Mason, 1871) (Ng et al. 2008). All of these are found in India (Valarmathi 2017), but only *M. lugubris* is reported from West Bengal (Deb 1999). The present study records *M. masoniana* for the first time from West Bengal.

MATERIALS & METHODS

During an ichthyological survey, two specimens of *M. masoniana* were collected from a small stream (26.229°N, 89.255°E, elevation 32m) of the Brahmaputra River system in Cooch Behar district, West Bengal, India (Image 1). The collected specimens were immediately photographed; morphometric measurements were taken and preserved in 70% alcohol after anaesthetized. The specimens were identified as per the standard identification keys of Henderson (1893), Alcock (1910a,b), and Ng et al. (2008). The specimens were deposited in the Aquatic Animal Biodiversity Museum of the Department of Industrial Fish & Fisheries, Asutosh College, Kolkata (Reg. No. AABM/IFF/AC/CRUSTACEA/CRAB-1 to 2).

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Image 1. Location of the study area (26.229°N , 89.255°E , elevation 32m). Source: Official website of Cooch Behar district, Government of West Bengal <www.coochbehar.gov.in>

TAXONOMY

Class Malacostraca Latreille, 1802
 Order Decapoda Latreille, 1802
 Infraorder Brachyura Linnaeus, 1758
 Section Eubrachyura Saint Laurent, 1980
 Superfamily Gecarcinucoidea Rathbun, 1904
 Family Gecarcinucidae, Rathbun, 1904
 Genus *Maydelliathelphusa* Bott, 1969

Maydelliathelphusa masoniana (Henderson 1893) (Image 2A & 3A)

Holotype: *Telphusa masoniana* Henderson, 1893 (pl. XXXVII. fig. 1–4)

Type locality: River Jumna, a series; North-West Provinces, four males (Day); “India” two dried specimens (Brit. Mus.)

Material examined: Reg. No. AABM/IFF/AC/CRUSTACEA/CRAB/1 to 2, Date 16.v.2021, two individual (01 male and 01 female), small stream (26.229°N , 89.255°E) of the Brahmaputra River system in Cooch Behar district, West Bengal, India, collected by R.K. Das.

Measurement: Carapace length 55–60 mm, carapace width 75–82 mm, weight 180–190 g) (Details are presented in Table 1).

Diagnosis: The carapace is broader than long, slightly depressed; epigastric cristae distinct, rugose, located somewhat anterior to postorbital cristae without merging with the latter (Image 2A, 3A); postorbital cristae

well defined towards the sides; a wide gap between frontal margin and postorbital cristae; external orbital tooth prominent; anterolateral margin with prominent epibranchial tooth; wide frontal margin, frontal median triangle incomplete (Image 2B & 3B); cervical groove well developed; mesogastric furrow deep, slightly bifurcated posteriorly; chelipeds asymmetric and massive (Image 2 E), carpus with a strong spine, propodus and dactylus with strong teeth which can meet only at the tips creating a wide gap between them (Image 2E); 6th pleonal somite of adult male slightly longer than breadth with concave lateral margin (Image 2F).

Description: The morphometric measurements of the identified species are presented in Table 1. The carapace enlarged, broader than length ($\text{cw}/\text{cl} = 1.36$), slightly depressed, dorsal surface smooth; epigastric cristae distinct, rugose, located anterior to postorbital cristae without merging with the latter; postorbital cristae well defined towards the sides, a wide gap between frontal margin and postorbital cristae (Image 2A, 3A); orbits large, external orbital tooth prominent; wide frontal margin ($\text{fw}/\text{cw} = 0.18$); anterolateral margin with prominent epibranchial tooth; cervical groove well defined; mesogastric furrow deep, slightly bifurcated posteriorly; eyes smaller than orbital space, eyestalk short, narrow (Image 2B, 3B); mandibular palp three-segmented; 1st, 2nd maxilliped with long flagellum on exopods; 3rd maxilliped almost cover buccal cavity when closed (Image 2B, 3B);

Table 1. Morphometric measurement of carapace and right cheliped of the identified crab (mm).

| Characters | <i>M. masoniana</i> (n= 1) (Male) | <i>M. masoniana</i> (n= 1) (Female) |
|-------------------------------------|--------------------------------------|---|
| Carapace length | 60 | 55 |
| Carapace width | 82 | 75 |
| Distance between epibranchial tooth | 62 | 60 |
| Frontal width | 15 | 14 |
| Posterior width of the carapace | 28 | 26 |
| Merus length | 38 | 32 |
| Merus width | 25 | 20 |
| Carpus length | 30 | 25 |
| Carpus width | 27 | 20 |
| Propodus length | 80 | 57 |
| Propodus width | 36 | 27 |
| Dactylus length | 55 | 42 |

ischium subrectangular, longer than broad, with a narrow medial groove; merus nearly pentagonal, broader than long; exopod slender, longer than ischium, reaching the base of merus, with a long flagellum (Image 2D).

Chelipeds smooth, asymmetrical and massive, right cheliped larger than the left (Table 2, 3) carpus, with strong spine, propodus and dactylus with 12 to 13 strong teeth which can meet only at the tips creating a wide gap between them (Image 2E); ambulatory legs (P2–P5) stout, shorter than chelipeds; P3 longest and P5 shortest, dactylus longer than propodus with four rows of spines on the margins.

Pleon of the male smooth, glabrous, conical; pleonal somites 1, 2 almost rectangular, narrower than somite 3; pleonal somites 3–5 trapezoidal; 6th pleonal somite slightly longer than breadth with concave lateral margin; telson conical with equal length and breadth (Image 2C, 2 F); thoracic sternites smooth, glabrous; suture S4/S5, S5/S6, S7/S8 discernible; sternopleonal cavity deep, long, reaching to imaginary line joining cheliped coxae; G1 stout, distal portion tapering gradually, slightly turned outward; G2 elongated; G1 longer than G2, approximately 1.7 times the length of G2 (Image 2G).

In the female, pleonal somite 1 is the shortest; pleonal somites 2–5 are progressively longer; 6th pleonal somite is longest (Image 3C, 3D); telson triangular; vulvae on S6 (VD/SW= approximately 0.38), large, deep, touching the suture S5/S6 (Image 3 E).

Colour: Dark brown in fresh condition.

Habit & Habitat: *M. masoniana* creates small burrows at the adjoining areas of soil and water of the stream for living and breeding purpose (Image 4A–C). Their preferred

Table 2. Morphometric measurement of chelipeds (right and left) of *M. masoniana* (Male) in mm.

| Podomeres | Right cheliped | Left cheliped |
|-----------------|----------------|---------------|
| Merus length | 38 | 37 |
| Merus width | 25 | 21 |
| Carpus length | 30 | 27 |
| Carpus width | 27 | 23 |
| Propodus length | 80 | 62 |
| Propodus width | 36 | 27 |
| Dactylus length | 55 | 42 |

Table 3. Morphometric measurement of chelipeds (right and left) of *M. masoniana* (Female) in mm.

| Podomeres | Right cheliped | Left cheliped |
|-----------------|----------------|---------------|
| Merus length | 32 | 30 |
| Merus width | 20 | 18 |
| Carpus length | 25 | 23 |
| Carpus width | 20 | 18 |
| Propodus length | 57 | 52 |
| Propodus width | 27 | 22 |
| Dactylus length | 42 | 33 |

habitat is the small or narrow canals or streams with slow-moving water. They are nocturnal in habit.

Distribution: India: Uttar Pradesh (Krishnamurthy 1995), Assam, Meghalaya, Jammu & Kashmir (Kotwal & Sharma 2020), West Bengal (present study).

Conservation status: As per the IUCN Red List of threatened species, the species belongs to the Least Concern (LC) category (Cumberlidge 2008).

DISCUSSIONS

The freshwater crab, *M. masoniana* was originally described as *Telphusa masonina* in the year 1893 by Henderson using type locality of river Jumna, North-West Provinces, India. Alcock (1910) transferred the species to the sub-genus *Barytelphusa* Alcock, 1909 of the Genus *Paratelphusa* Edwards, 1853 using a specimen from northern to central India. Bott (1970) created the subgenus *Maydelliathelphusa* and placed the species in that subgenus in a revisionary work. Specimen collected in the present study is in agreement with the original description of *M. masoniana*. In an earlier study, Krishnamurthy (1995), reported the species from Uttar Pradesh, India. Recently, the species has been reported from Jammu & Kashmir (Kotwal & Sharma 2020).



Image 2A. *Maydelliathelphusa masoniana* (Henderson, 1893) (Male) (Dorsal view). © R.K. Das.



Image 2B. *M. masoniana* (Henderson, 1893) (Male) (Frontal view). © R.K. Das.



Image 2C. *M. masoniana* (Henderson, 1893) (Male) (Ventral view). © R.K. Das.



Image 2E. Right cheliped of a male *M. masoniana*. © R.K. Das.



Image 2D. 3rd maxilliped of a male *M. masoniana*. © R.K. Das.



Image 2G. Sternopleonal cavity of a male crab showing G1 and G2. © R.K. Das.



Image 2F. Pleon of a male *M. masoniana*. © R.K. Das.



Image 3A. *M. masoniana* (Henderson, 1893) (Female) (Dorsal view).
© R.K. Das.



Image 3B. *M. masoniana* (Henderson, 1893) (Female) (Frontal view).
© R.K. Das.



Image 3C. *M. masoniana* (Henderson, 1893) (Female) (Ventral view).
© R.K. Das



Image 3D. Pleon of a female *M. masoniana* © R.K. Das.



Image 3E. Thoracic sternite showing vulvae in female crab. © R.K. Das.

CONCLUSION

The present study extends the distribution of *M. masoniana* to West Bengal. As all the five species of the genus *Maydelliathelphusa* are similar morphologically, molecular taxonomy to confirm the morphological taxonomy of the species is warranted. Further studies are needed to investigate the biology, threat and conservation of this species, and to evaluate the potentiality of the species for commercial fisheries in that region.

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Image 4A. Crab burrow in the marginal area between soil and water.
© R.K. Das.



Image 4B. Crab burrow. © R.K. Das.



Image 4C. Location of a crab in a crab burrow. © R.K. Das.

Keys to the species of *Maydelliathelphusa*

- 1 (a) Epigastric and postorbital crests on either side united *M. edentula*
- 1 (b) Epigastric and postorbital crests are incompletely or indistinctly separated from one another 2
- 2 (a) External orbital tooth broad and blunt; lateral epibranchial tooth small and blunt, or obsolescent; carapace flattish 3
- 2 (b) External orbital tooth and lateral epibranchial tooth prominent; carapace convex/ tumid 4
- 3 (a) 6th abdominal segment of male squarish with lateral side slightly concave *M. lugubris*
- 3 (b) 6th abdominal segment of male is longer than distal breadth *M. falcidigitis*
- 4 (a) Carapace less convex; chelipeds are symmetric *M. harpax*
- 4 (b) Carapace greatly convex; chelipeds are asymmetric *M. masoniana*

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