



A study on the *Macrobrachium* Bate, 1868 (Crustacea: Decapoda: Palaemonidae) of Purba Medinipur District, West Bengal, India

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Abstract

This study revealed existence of 10 species of *Macrobrachium* Bate, 1868 from Purba Medinipur District, West Bengal. Of these *Macrobrachium banjarae* is being recorded for the first time from West Bengal. 8 species viz. *M. idae*, *M. idella*, *M. lamarrei*, *M. malcolmsoni*, *M. mirabile*, *M. rude*, *M. scabriculum* and *M. villosimanus* are reported for the first time from Purba Medinipur district and 4 species viz., *M. banjarae*, *M. lamarrei*, *M. malcolmsoni*, *M. villosimanus* are endemic to the Indo-Burma region.

Keywords: *Macrobrachium*, Palaemonidae, Prawn.

Introduction

Macrobrachium is a widely distributed freshwater as well as estuarine genus of prawn, abundantly found in tropical and subtropical areas of the world^{1,2}. *Macrobrachium* are common food source of fishes, alligators, turtles, aquatic birds and mammals³. All the species are economically important having good market value. Only *Macrobrachium rosenbergii* is cultured commercially in large scale but other species are also good source of protein in human diet.

Purba Medinipur (22°57'10"- 21°36'33"N and 88°21'40"- 86°33'50"E) district of West Bengal State being rich in lotic and lentic water bodies provide good source of prawn fishery. According to Integrated Taxonomic Information System⁴, May 2018, there are approximately 227 species under genus *Macrobrachium*. According to Jayachandran⁵, while describing diversity and taxonomy of palaemonid prawns reported 56 species from India. Jayachandran and Indira⁶ raised the number to 60 and Radhakrishnan et al.⁷ in their checklist reported about 62 species of *Macrobrachium*. Valarmathi⁸ opined that there are 68 species. Klotz⁹ mentioned existence of 13 species in West Bengal. While Chanda¹⁰ recorded 5 species of *Macrobrachium* from Paschim Medinipur district Ghosh¹¹ mentioned about *Macrobrachium rosenbergii* from Rupnarayana river of Purba Medinipur district. Since there is no comprehensive work on genus *Macrobrachium* of Purba Medinipur district the present study has been contemplated.

Materials and methods

Present investigation was conducted in Purba Medinipur district of West Bengal state. Being rich, good source of prawn fishery a survey was conducted from 22.07.2017 to 18.05.2018. Prawns

were collected using different types of nets viz., drag net, stake net, cast net, dip net, bag net, barrier net, scoop net, push net, and gill net from ponds, rice fields, canals and rivers. After collection, the specimens were preserved in rectified spirit (90%). Body parts of taxonomic importance were dissected and studied under stereoscopic binocular microscope (Magnus MS 24). Specimens were measured using a sliding caliper with an ocular micrometer. Species were identified using standard literature like George¹², Jalihal et al.¹³, Mariappan et al.¹⁴, Jayachandran⁵.

Results and discussion

In all 10 species of *Macrobrachium* were collected in the present study. An annotated list is given below.

Family Palaemonidae Rafinesque, 1815

Subfamily Palaemoninae Rafinesque, 1815

Genus *Macrobrachium* Bate, 1868

Diagnostic character of genus *Macrobrachium*: Hepatic spine present; branchiostegal spine absent; dactyl of last three legs simple; 2nd chelate legs robust; mandibular palp 3-jointed; 3rd maxilleped with arthrobranch and pleurobranch; propodus of 5th pereopod with two traverse rows of setae on posterodistal margin.

*Macrobrachium banjarae*¹⁵

Synonymy:

Palaemon banjarae Tiwari, 1958¹⁵

Materials Examined: 2 males (45 and 53 mm) and 2 females (38 and 40 mm) from Sankarara canal near Tamluk, 06.11.2017.

Diagnostic Characters: Rostrum large, overreaching the antennal scale; distal end of rostrum sharp, and prominently

upturned; rostral formula 10-11/5-7 with 2-3 post orbitals; rostrum to carapace ratio is 0.76-0.86; carapace glabrous; second pereopod equal, slender, longer, stouter than first pair, measuring 0.66-0.77 times as total body length; finger 0.6 - 0.7 times as long as palm with delicate hairs at tip; palm is 0.5-0.6 times as long as carpus; carpus 1.5 times as long as merus; tubercles present on all parts of cheliped; reddish brown extending from carpus to fingertip of 2nd cheliped; telson elongated with narrow posterior margin, 1.71-1.75 times as long as 6th abdominal segment; tip blunt; exopod of uropod with a subapical spine.



Figure-1: *Macrobrachium banjarae*¹⁵.

Distribution: Endemic to India, found in Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra.

Remarks: This species is being recorded for the first time from West Bengal. It is rather rare in this district. Specimen examined differed from the type specimen in the rostral formula which is 10-11/5-7 instead 12-15/4-6. This is under IUCN threat category Data Deficient.

*Macrobrachium idae*¹⁶

Synonymy:

Palaemon idae Heller, 1862¹⁶

Palaemon (Eupalemon) idae subinermis Nobili, 1899¹⁷

Palaemon (Eupalemon) ritsemae De Man, 1897¹⁸

Palaemon (Eupalemon) mariae Coutiere, 1900¹⁹

Palaemon (Eupalemon) robustus De Man, 1902²⁰

Macrobrachium idae Holthuis, 1950²¹

Materials examined: 3 Non berried females (60 to 80mm) from rice field at Radhamoni, 05.10.2017, 3 berried females (56 to 75 m.m.) from Rupnarayana river, Haldia, 23.10.2017.

Diagnostic Characters: Rostrum slightly upturned; shorter than antennal scale, sometimes reaches antennal scale; Rostral formula 9-10/4-6 with 2 post orbitals; rostrum to carapace ratio

0.58-0.70; eyes prominent with pigmented cornea; branchiostegal suture not extending posteriorly beyond hepatic spine; telson with posterior apex not overreaching posterolateral spines; antennal scale with lateral margin slightly convex; 1st pereopod with chela less than 3 times as long as carpus; 2nd pereopods similar, not usually equal in length, palm subcylindrical, fingers pubescent on either side of proximal part of opposable margins, later dentate proximally; fingers not with gaping, 1/2 as long as palm, later naked; chela shorter than carpus, palm more than half as long as carpus, carpus more than twice as long as merus; 3rd pereopod overreaching antennal scale by more than length of dactyl; propodus not covered with spines or scales; Exopod of uropod without accessory subapical spine.



Figure-2: *Macrobrachium idae*¹⁶.

Distribution: Australia, Bangladesh, India, Indonesia, Madagascar, Malaysia, Papua New Guinea, Seychelles, Singapore and Thailand.

India: Karnataka, Kerala, West Bengal.

West Bengal: Hooghly river, Howrah, Kolkata.

Remark: This species is reported for the first time from Purba Medinipur district where it is very common.

*Macrobrachium idella idella*²²

Synonymy:

Palaemon (Eupalaemon) idae idella Hilgendorf, 1898²²

Palaemon (Eupalaemon) multidentis Coutiere, 1900¹⁹

Palaemon multidentis Coutiere, 1901²³

Palaemon idae Henderson et Matthai, 1910²⁴

Macrobrachium idella Holthuis, 1950²¹

Materials Examined: 2 males (85 and 90mm) from Rupnarayan river, Kolaghat and 1 male (82mm) from Rasulpur river, Kalinagar, 29.7.2017.



Figure-3: *Macrobrachium idella idella*²².

Diagnostic Characters: Rostrum straight, slightly longer than the tip of antennular peduncle, rostral formula 10-11/5-6 with 2 post orbitals; carapace smooth, rostrum to carapace ratio 0.50-0.53; second pereopod equal, slender overreaching the antennal scale by half of the carpus, larger than first pair, measuring about 1.33 to 1.45 times of the total body length; fingers 0.75-0.86 times as long as palm; chela 1.17-1.22 times of carpus; carpus 1.35-1.46 times as long as merus and cylindrical; fingers are pubescent; telson elongated with narrow posterior margin, 1.50-1.83 times as long as 6th abdominal segment; exopod of uropod with a subapical spine and tubercles.

Distribution: India, Madagascar, Tanzania

India: Karnataka, Maharashtra, West Bengal

West Bengal: Hooghly river (Kolkata), Piyali river (Uttarbhag)

Remarks: Common in rivers of Purba Medinipur district and first record from this district.

*Macrobrachium lamarrei*²⁵

Synonymy:

Palaemon lamarrei H. Milne Edwards, 1837²⁵

Palaemon lamarrei De Man, 1897¹⁸

Macrobrachium lamarrei Holthuis, 1950²¹

Materials Examined: 10 females (38 to 45mm) from Haldi river near Hanschara, 10 Females (40 to 50 mm) from Keleghai river near Goramahala, 10.11.2017.



Figure-4: *Macrobrachium lamarrei*²⁵.

Diagnostic Characters: Rostrum extends beyond the apex of the antennal scale, upper margin with slight convexity over the eyes; rostral formula 8-10/5-6 with 2 postorbitals; teeth on dorsal margin arranged uniformly with uninterrupted distal gap; teeth in lower margin arranged compactly upto the tip; rostrum the carapace ratio 0.9 - 1.0; eyes developed; second pereopod slender, equal, overreaches antennal scale, less than half of total body length; fingers 0.70 - 0.80 times of palm; carpus 1.45- 1.60 times as long as chela and 1.40 - 1.50 times as long as merus; telson about 1.5 times as long as 6th abdominal segment; exopod of uropod without subapical spine.

Distribution: Endemic to India and Nepal.

India: Aassam, Bihar, Meghalaya, Odisha, Rajasthan, Tamilnadu, West Bengal.

West Bengal: Bankura, Canning, Darjeeling, Jalpaiguri, Kolkata, Purulia.

Remarks: Common in Purba Medinipur district and is reported for the first time from this district.

*Macrobrachium malcolmsoni*²⁶

Synonymy:

Palaemon malcolmsoni H. Milne Edwards, 1844²⁶

Macrobrachium malcolmsoni Holthuis, 1950²¹

Materials Examined: 2 males (11.5mm and 12mm) and 1 female (10mm) Patashpur, 20.10.2017.



Figure-5: *Macrobrachium malcolmsoni*²⁶.

Diagnostic Characters: Rostrum reaching almost end of antennal scale, tip slightly upturned, basal crest high, rostral formula 11-13/8-9 with 2 post orbitals, teeth on distal part of dorsal margin widespread; second pereopod equal slender, very long, overreaching the antennal scale by merus; fingers pubescent except the tip; chela 1.125 to 1.275 times as long as carpus; palm 0.75 to 0.8 times as long as carpus; merus 0.74 to 0.75 times as long as carpus; tip of telson overreaching posterolateral spines, carapace with spinules anteriorly; exopod of the uropod with a subapical spine.

Distribution: Bangladesh, India, Pakistan, Sri Lanka.

India: Manipur, Tamilnadu, West Bengal.

West Bengal: Gangetic plain and Paschim Medinipur district.

Remarks: This is rare in Purba Medinipur district and is reported for the first time from this district.

Macrobrachium mirabile²⁷

SYNONYMY:

Palaemon mirabilis Kemp, 1917²⁷

Macrobrachium mirabile Holthuis, 1950²¹

Materials Examined: 2 females (35 and 36.5 mm) from pond at Tamluk, 18.5.18. and 2 females (42 and 45 mm) from Patashpur, 02.08.17.



Figure-6: *Macrobrachium mirabile*²⁷.

Diagnostic Characters: Rostrum not reaching distal end of antennal scale, with high dorsal crest, rostral formula: 14-15/1-2 with 4-5 post orbitals, dorsal teeth subequally spaced; branchiostegal suture not extending posteriorly beyond hepatic spine; telson with posterior apex not overreaching posterolateral spines; antennal scale with lateral margin straight; 1st pereopod with chela more than 1/2 as long as carpus; 2nd pereopods subequal in length and similar in form, palm subcylindrical, fingers not concealed by dense pubescence, not dentate on opposable margins, not gaping, fingers 1.3 times as long as palm, later without any dense pubescence, chela 1.5 times as long as carpus, palm less than 3/4 as long as carpus, carpus more than 3/4th as long as merus, not longitudinally grooved; 3rd pereopod overreaching antennal scale by length of dactyl, propodus not spinose or scaly; exopod of uropod with a subapical spine.

Distribution: Borneo, India, Indonesia Malayasia, New Guinea, Thailand.

India: West Bengal.

West Bengal: Gangetic delta, Shibpur.

Remarks: Rare species in Puba Medinipur district and recorded for the first time from this district.

Macrobrachium rosenbergii²⁸.

Synonyms:

Palaemon carcinus Fabricius, 1798²⁹

Palaemon rosenbergii De Man, 1879²⁸

Palaemon carcinus rosenbergii Ortmann, 1891³⁰

Palaemon whitei Sharp, 1893³¹

Palaemon spinipes Schenkel, 1902³²

Palaemon dacqueti Sunier, 1925³³

Macrobrachium rosenbergii Holthuis, 1950²¹

Materials examined: 2 males (13.5cm and 14cm) and 2 females (12cm and 13cm) from Sankarara canal, Tamluk 13.09.17, 2 males (12cm and 15cm) and 1 (10cm) female from Rupnarayana river, Kolaghat, 1 male (14cm) and 1 female (13 cm) from Haldi river, Haschara, 04.09.2018.



Figure-7: *Macrobrachium rosenbergii*²⁸.

Diagnostic Characters: Rostrum overreaching antennal scale, rostral formula: 10-15/10-12 with 2-3 post orbitals, dorsal teeth unequally spaced; branchiostegal suture not extending posteriorly beyond hepatic spine; telson with posterior apex overreaching posterolateral spines; antennal scale with lateral margin straight; 1st pereopod with chela less than half as long as carpus; 2nd pereopods subequal in length and similar in form, palm subcylindrical, movable finger clothed in dense pubescence on proximal 3/4 of length (in adults), fixed finger without pubescence, fingers dentate on proximal 1/2 of opposable margins (in adults), more than 3/4 as long as palm, palm without any dense pubescence, chela 1.2 to 1.5 times as long as carpus, carpus nearly 1.25 times as long as merus, with indistinct longitudinal groove; 3rd pereopod over reaching antennal scale by less than length of dactyl, propodus bearing rather numerous spines or sharp scales.

Distribution: Australia, Bangladesh, Brazil, Brunei Darussalam, Cambodia, China, India, Indonesia (Jawa), Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Thailand.

India: Andhra Pradesh, Karnataka, Kerala, Maharastra, Tamilnadu, West Bengal.

West Bengal: Bankura, Darjeeling, Jalpaiguri, Paschim Medinipur, Purba Medinipur, Purulia, Kolkata.

Remarks: Very common species of *Macrobrachium* in Purba Medinipur district.

Macrobrachium rude³⁴

Synonymy:

Palaemon rudis Heller, 1862³⁴

Palaemon mossambicus Hilgendorf, 1879³⁵

Palaemon alcocki Nobili, 1903³⁶

Macrobrachium rude Holthuis, 1950²¹

Materials examined: 2 males (93.5 and 95mm) and 1 female (91 mm) from Sankarara canal, Tamluk, 1 male (93 mm) and 1 female (100 mm) from Rupnarayana river, 23.04.18.



Figure-8: *Macrobrachium rude*³⁴.

Diagnostic Characters: Rostrum straight, reaching upto the tip of antennal scale, tapering distally, rostral formula 9-10/3-4 with 2 post orbitals; hepatic spine situated at lower level than antennal spine; posterior margin of telson distinct, with 2 pairs of spines, anterior one longer the tip of telson; 2nd pair of pereopods very long and heavy, all segments covered with a short and dense pubescence; cutting edges of fingers with 1 or 2 large proximal teeth, rest of the edges entire, with a row of granules at each side, carpus shorter than propodus and much longer than merus; exopod of uropod with a subapical spine.

Distribution: Bangladesh, India, Kenya, Madagascar, South Africa and Sri Lanka.

India: Kerala, Maharashtra, Odisha, Tamilnadu, West Bengal.

West Bengal: Darjeeling, Hooghly, Howrah, North 24-Paraganas, Paschim Medinipur, South 24 paraganas.

Remarks: It is common species of Purba Medinipur district and is first record from here.

*Macrobrachium scabriculum*³⁴

Synonymy:

Palaemon scabriculus Heller, 1862³⁴

Palaemon (s. s.) *dolichodactylus* Hilgendorf, 1879³⁵

Palaemon (*Parapalaemon*) *dolichodactylus* Hilgendorf, 1898²²

Palaemon (*Parapalaemon*) *scabriculus* Nobili, 1900³⁷

Palaemon dolichodactylus Coutiere, 1901²³

Palaemon dubius Henderson and Matthai, 1910²⁴

Macrobrachium scabriculum Holthuis, 1950²¹

Materials Examined: 2 males (40 mm and 44 mm) from perennial pond near Itaberia canal, 09.12.2017.

Diagnostic Characters: Rostrum not reaching level of distal end of antennal scale, dorsal margin convex, rostral formula: 13-14/2 with 2-3 post orbitals, branchiostegal suture not extending posteriorly beyond hepatic spine; telson with posterior apex not overreaching posterolateral spines; antennal scale with lateral margin concave; 1st pereopod with chela half as long as carpus; 2nd pereopods unequal in length and dissimilar in form; major 2nd pereopod with palm compressed, fingers densely pubescent at extreme proximal ends, dentate on opposable margins, gaping, about as long as palm, palm

completely covered in dense pubescence (in large males), chela 2.75-3.50 times as long as carpus, palm 1.33-2. times as long as carpus, carpus from 4/5 to quite as long as merus, with distinct longitudinal groove; minor 2nd pereopod with fingers 1.25-1.50 times as long as palm; 3rd pereopod not overreaching antennal scale; exopod of uropod with movable accessory spine.



Figure-9: *Macrobrachium scabriculum*³⁴.

Distribution: Bangladesh, India, Indonesia, Kenya, Madagascar, Mozambique, Sri Lanka, Sumatra.

India: Andhra Pradesh, Karnataka, Kerala, Maharashtra, Odisha, Puducherry, Tamilnadu, Tripura, West Bengal,

West Bengal: Deltaic region, Tiwari³⁸

Remarks: Rarespecies in Purba Medinipur district and is first time record from here.

*Macrobrachium villosimanus*³⁹

SYNONYMY:

Palaemon villosimanus Tiwari, 1947³⁹

Materials Examined: 1 male (81.5mm) and 1 female (75mm) and from Sankarara canal, Tamluk, 02.08.2017, 1male (95mm) and 1 female (83mm) and from rice field at Radhamoni 22.07.2017, 1 female (94.5mm) from pond at Egra, 25.05.2017.



Figure-10: *Macrobrachium villosimanus*³⁹.

Diagnostic Characters: Rostrum long, slightly curved, extending beyond antennular peduncle, antennal scale by 3rd distal teeth; rostral formula 11-15/8-9 with 2 postorbitals; proximal teeth on dorsal margin closely packed but distal 2-3 teeth with gap; carapace smooth, rostrum to carapace ratio 1.11-1.27; carapace to total body length ratio 0.22-0.24; 2nd pereopod slender, equal, overreaching antennal scale by distal 1/3rd of carpus; fingers about 0.62-0.70 times as long as chela; carpus 1.50- 1.75 times as long as merus; setae present with an even gap on inner margin of fingers; telson elongated, 1.5-1.67 times as long as 6th abdominal segment; 2 pairs of dorsal spine and 2 pairs of posterior spine, inner spine stouter, longer but median spine longer than inner posterior spine; 2 plumose setae in between spines; exopod of uropod with a subapical spine.

Distribution: Bangladesh, Myanmar, India.

India: West Bengal.

West Bengal: Kolkata.

Remarks: *M. villosimanus* is rare species in Purba Medinipur district and this is first record from here.

Chanda¹⁰ recorded 5 species of *Macrobrachium* from Paschim Medinipur district, of which 4 species viz., *M. idae*, *M. malcolmsoni*, *M. rosenbergii*, *M. rude* have been recorded in this study. *M. javanicum* which is present in Paschim Medinipur district, may also be found in future from Purba Medinipur district. *M. banjaruae*, a Data Deficient species (IUCN Version 3.1), is being recorded for the first time from the state of West Bengal. However, the materials examined in the present study differ slightly from the type material in the rostral formula. Since Ghosh¹¹ has already reported *M. rosenbergii* from Purba Medinipur district, as such all the remaining 8 species are first record from this district. Four species viz. *M. banjaruae*, *M. lamarrei*, *M. malcolmsoni*, *M. villosimanus* are endemic to the Indo-Burma subregion.

Conclusion

Macrobrachium, an economically important genus of prawn, is a good source of protein in human diet. This study has revealed existence of 10 species in the inland water sources of Purba Medinipur district, of which one species is first record from the state of West Bengal and 8 species are first report from the district. Further in depth investigation may reveal existence of more species in this district.

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