

# A new species of *Macrobrachium* Bate, 1868 (Decapoda, Palaemonidae) from the dolphin trenches of Kulsri River, N. India, possibly under threat

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## Abstract

The Kulsri River, a major tributary of Brahmaputra River, N. India is reported to have resident population of Ganges river dolphin, *Platanista gangetica* (Roxburgh), which feeds on fishes and prawns. While surveying for the dolphins of the river, a number of fishes and prawns were collected. On identification, one of the prawns was found to be undescribed, and hence is described herein. The ecology of the river consisted of: temperature fluctuating widely from 15 to 28 °C, depth from 0.8 to 10 m, turbidity of 11–19 cm, sand mining @ 12,500 MT annually, and fish catch of 300–800 kg (from 1.5 km area). All these factors pose a great threat to the fish and prawn wealth of the river.

*Macrobrachium kulsriense* sp. nov. is a very small sized prawn (maximum size – 34.5 mm in total length), exhibiting species-specific characters, such as highly elevated and moderately long rostrum with 9–12 dorsal teeth, a single ventral tooth, and percentage ratios of ischium, merus, carpus, palm, dactylus of first and second chelipeds (19.05:28.57:33.33:09.52:09.52 and 21.43:25.00:21.43:14.28:17.86, respectively). The species shows close similarity with *Macrobrachium mirabile* (Kemp). The females are larger than males, eggs are large in size (1.2 × 0.9 mm) and fecundity is low (15–20).

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**Keywords:** *Macrobrachium kulsriense* sp.nov.; Kulsri river; N. India; Palaemonidae; Dolphin trenches; Ecology

## 1. Introduction

The Kulsri River, an important tributary of Brahmaputra River (India) is a major habitat of the Ganges river dolphin, *Platanista gangetica* (Roxburgh) (Gupta 1986; Mohan 1989; Mohan et al. 1993, 1998). One of the authors (LMRS) and his team made surveys in the Kulsri River for dolphins between October 1992 and June 1993 and also during November 1995. The temperature fluctuated widely, 15–28 °C; depth ranged from 0.8 to 10 m; and turbidity was high (Secchi disc readings),

ranging from 11 to 19 cm. In this river system, dolphins were found foraging in shallow areas and retreated to deeper trenches, feeding on fishes and prawns. During the survey, a number of fishes and prawns were collected. One species of prawn was found undescribed and hence is described below. There have been detailed studies on the taxonomy and diversity of palaemonid prawns of India (Henderson 1893; Henderson and Matthai 1910; Kemp 1917, 1924, 1925; Tiwari 1947, 1949, 1955, 1963; Ravindranath 1979; Jayachandran 1984, 2001, 2005; Jalihal et al. 1988; Jayachandran and Raji 2004a, b). This study is an additional contribution to Indian carcinology.

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## 2. Materials examined

Ten specimens (1 male, 9 females), collected from the Kuls River on 17.11.95 at a depth of 0.8–6.0 m. The Holotype and paratypes are deposited in the referral Museum of the College of Fisheries, KAU, Reg. No. Fb. Cr. Dec. Pal. Macro. 48, 48a.

*Holotype*: (female) total length – 34.5 mm; carapace length – 12.5 mm; post-ocular length – 7.0 mm; rostrum length – 5.5 mm; length of telson – 5.0 mm; second chelate leg : ischium – 3.0 mm; merus – 3.5 mm; carpus – 3.0 mm; propodus – 4.5 mm; palm – 2 mm; dactylus – 2.5 mm. *Paratypes*: 9 specimens (8 females, 1 male – 17.0 to 29.0 mm in total length).

The species has been identified on consulting with relevant literature (Henderson 1893; Kemp 1917; Holthuis 1950; Chace and Bruce 1993; Jayachandran 2001, 2005; Phone and Suzuki 2004) and comparing with a *Macrobrachium mirabile* specimen. Morphometric measurements of 10 specimens collected are given in Table 1.

## 3. Description

Rostrum long, extending as far as the distal end of antennal scale; upper margin of rostrum highly elevated throughout, apex directed forwards, upper margin with 9–12 teeth of which two or three post-orbital; space between the teeth gradually decreasing towards the distal end. Ventral margin with one tooth placed behind the level of antepenultimate dorsal tooth; elevated shape of rostrum characteristic. Small setae present in between the teeth of dorsal margin (Figs. 1A, 3).

Carapace smooth, antennal spine slightly below the orbital border; hepatic spine below and behind the level of the antennal spine (Fig. 1A).

Abdomen smooth; pleura typical in structure that of fifth directed backwards; sixth ending in a sharp spine, about 1.5 times longer than the fifth.

Telson slender; tip spiniform, with two pairs of movable spines; inner pair of spines highly slender and elongated, extending much beyond the tip of telson; dorsal two pairs of spines situated at 60% and 70% of telson length; 6–8 setae present between inner pair of spines (Fig. 1B).

Cornea much broader than the distal end of peduncle; segments of the antennular peduncle in ratio 3.0:0.9:1.75; outer lateral spine extending beyond middle of second segment; stylocerite long, slender, sharp; second segment of peduncle with narrow base and broad distal end; third segment narrow; upper antennular flagellum bifid, inner branch very short, with nine segments (Fig. 1C). Epistome as figured (Fig. 1E). Outer lateral spine of antennal scale sharp, overreached by the tip of antennal scale (Fig. 1D).

First cheliped slender, ischium, merus, carpus, palm and dactylus length ratio: 19.05:28.57:33.33:09.52:09.52; fingers equal sized (Fig. 2C). Second cheliped also slender, less than half as long as the total body length, ischium, merus, carpus, palm, and dactylus length ratio: 21.43:25.00:21.43:14.28:17.86; merus longer than carpus (equal in smaller specimens); propodus longer than carpus and merus; ischium equal to carpus; palm shorter than fingers; cutting edges of fingers with row of setae (Fig. 2B).

Pereopods 3–5 almost equal sized, long and slender, ischium, merus, carpus, propodus and dactylus length ratio 10.7:28.6:17.8:28.6:14.3; merus and propodus equal; dactylus slender and elongate (Fig 2A).

Pleopods normal in shape. Appendix masculina of the second pleopod with six lateral and three distal long setae.

**Table 1.** Morphometric measurements of 10 specimens of *M. kulsense* sp. nov.

Sl no.	TL	CL	POL	RL	LT	Second cheliped						Sex	Rostral formula	
						I	M	C	Pr.	Palm	Dact.			
1	34.5	12.5	7.0	5.5	5.0	3.0		3.5	3.0	4.5	2.0	2.5	F(B)	(3) 8/1
2	29.0	11.5	6.5	5.5	4.0	Second cheliped lost							F	(3) 8/1
3	25.5	9.0	5.0	4.0	3.0	Second cheliped lost							F	(3) 9/1
4	23.5	7.5	4.5	3.0	3.0	1.5		2.5	1.5	3.0	1.75	1.25	F	(3) 6/1
5	23.0	8.0	4.0	4.0	3.5	2.0		3.0	2.0	3.5	1.75	2.0	M	(3) 7/1
6	19.0	7.5	4.0	3.5	3.0	Second cheliped lost							F	(3) 9/1
7	18.0	7.0	4.0	3.5	2.75	Second cheliped lost							F	(2) 8/1
8	20.0	7.0	4.0	3.25	3.0	Second cheliped lost							F	(2) 10/1
9	17.0	6.0	3.0	2.5	2.5	1.5		1.5	1.5	2.0	0.90	1.0	F	(2) 8/1
10	21.0	8.0	4.5	3.5	3.5	1.5		2.5	2.0	2.0	1.25	0.75	F	(2)10/1

TL, total length; CL, carapace length; POL, post-ocular length; RL, rostrum length; LT, length of telson; I, ischium; M, merus; C, carpus; Pr., propodus; Dact., dactylus; F(B), berried female.

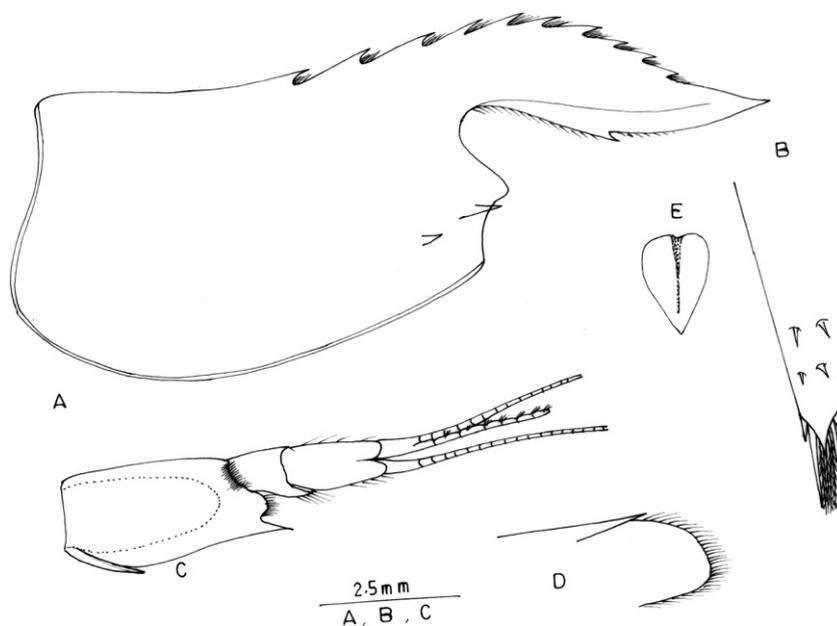


Fig. 1. *Macrobrachium kulsense* sp. nov.: (A) carapace, (B) telson, (C) antennule, (D) distal part of antennal scale, and (E) epistome.

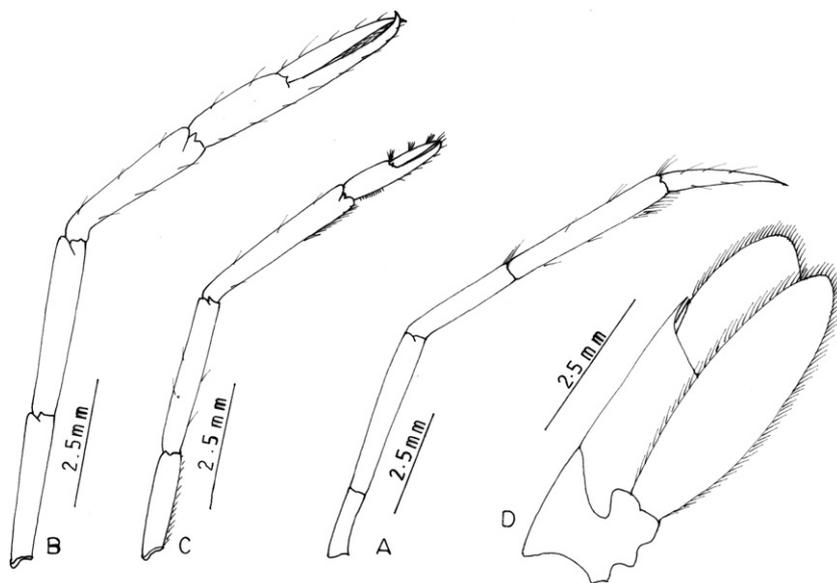


Fig. 2. *Macrobrachium kulsense* sp. nov.: (A) 3rd non-chelate leg, (B) 2nd chelate leg, (C) 1st chelate leg, and (D) uropod.

Uropodal exopod with accessory spine (Fig. 2D).

Sexual dimorphism: Females larger than males (total length: female – 34.5 mm, male – 29.0 mm). Eggs: large, oval shaped; size: length 1.2 mm and width 0.9 mm; number of eggs: 15–20.

#### 4. Remarks

*Macrobrachium kulsense* sp. nov. is closely related to *M. mirabile* (Kemp 1917). In common, both species

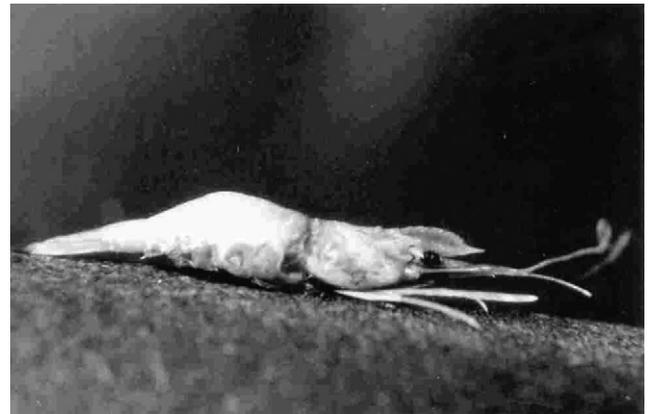
possess a highly elevated rostrum; a single ventral rostral tooth; presence of antennal carina; a smooth carapace; the second cheliped with the merus longer than both the ischium and carpus; the chela longer than the carpus; the palm shorter than the fingers; and the fingers entire, without denticles. The two species, however, can at once be separated based on the characters given in Table 2. In *M. mirabile* the rostrum is very short and does not extend to the distal end of the antennular peduncle, whereas it is moderately long and extends to the distal end of antennal scale in the new species. In *M. mirabile* the dorsal margin is

**Table 2.** Comparison of characters between *M. mirabile* (Kemp) and *M. kulsienne* sp. nov.

Characters	<i>M. mirabile</i> (Kemp 1917)	<i>M. kulsienne</i> sp. nov.
Extension of rostrum	Short, does not extend to the distal end of antennular peduncle (rarely reaches tip of peduncle)	Moderately long, extends usually up to the tip of antennal scale.
Elevation of rostrum	Highly elevated; consists of a thin lamella. In front of eye it steeply descends to the apex, distal end straight; narrow. The margin between the highest elevation and apex is concave	Highly elevated and gradually descending to the apex, distal end gradually narrowing to the apex. The upper margin is convex throughout
Dorsal rostral teeth	13–16; 4–6 post-orbital (4–5 usually)	9–12 (10–12 usually) 2–3 post-orbital (usually 3)
Ventral teeth	1–2 (usually 1)	1
Dorsal carina	Rostrum begins as a carina in the middle of carapace	Carina absent
Antennal carina	Antennal carina prominent and runs backwards and downwards to the base of hepatic spine	Antennal carina prominent and runs backwards to the base of hepatic spine
Carapace	Smooth, faint grooves on the cardiac region	Smooth, no grooves on cardiac region
Non-chelate legs	The size increase drastically from 1st to 3rd; 3rd pair excessively long	The size increases slightly from 1st to 3rd; 3rd pair slightly longer
Telson	Telson shorter than the inner uropod; two pairs of minute dorsal spines; the apex is very narrow and consists of a small median point, flanked on each side by spinules; two plumose setae present between the inner spinules	Telson slender, two pairs of dorsal spines situated at 60% and 70% levels; tip highly pointed; flanked on each side by a pair of spinules; inner pair extends much beyond the tip of telson; a few plumose setae (6–8) present between the inner pair of spinules.
Egg size	Small, numerous (0.56 × 0.43 mm in size)	Large, a few in number (1.20 × 0.90 mm in size)
Maximum size	55.0 mm	34.5 mm

concave between the highest elevation and apex, whereas it is convex throughout in the present new species. The number of dorsal teeth ranges from 13 to 16 with 4–6 postorbital teeth in *M. mirabile*, in comparison to 9–12 dorsal with 2–3 postorbital teeth in *M. kulsienne* sp. nov. The shape of the rostrum of the two species differs very much and is species specific. In addition to the above, the two species differ considerably in their dorsal carina and antennules, the relative proportions of the merus and carpus of the second cheliped, the chela and carpus, and the palm and fingers. The third pereopod of *M. mirabile* is highly slender and considerably longer than in the present species. The shape and nature of the inner distal spines of the telson of the two species also differ. There is only a single pair of setae in between the inner pair of spines in *M. mirabile* whereas there are 6–8 setae in the present species. In *M. mirabile* the eggs are smaller (0.56 × 0.43 mm) than in the present species (1.20 × 0.90 mm) (Kemp 1917; Jayachandran 2001). The present species is relatively very small in size (up to 34.5 mm total length) (Fig. 3).

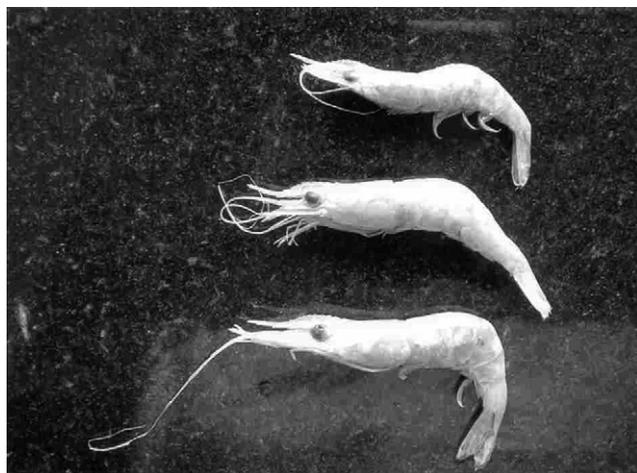
*M. kulsienne* could be confused with the juveniles of *M. gangeticum* Bate, 1868. In *Macrobrachium gangeticum*, however, the rostrum is very long and less elevated with an edentulous distal end and four ventral teeth, whereas the new species has distinctly elevated rostrum with one ventral tooth (Fig. 4).



**Fig. 3.** *Macrobrachium kulsienne* sp. nov., holotype 34.5 mm (female).

Recently Phone and Suzuki (2004) described a new species, *Macrobrachium patheinense*, from Myanmar. According to the authors *M. patheinense* is similar to the Palaemon-like *Macrobrachium* species, that have slender and delicate pereopods, especially *M. mirabile* (Kemp 1917). The present new species also shares this character with the above species.

*M. kulsienne* resembles *Macrobrachium altifrons* (Henderson 1893) in the general shape of the rostrum. *M. altifrons*, however, differs in the characteristic number of 7–9 teeth on the upper and 1–3 teeth on



**Fig. 4.** Juveniles of *Macrobrachium gangeticum* Bate, 1868, different sizes showing rostral characters.

the ventral margins of the rostrum, the rough carapace and the highly elongated rough chelipeds with a number of denticles on the cutting edges. *M. altifrons* reaches a larger size (60 mm).

Motwani et al. (1962), Yadav and Sugunan (1992) and Mohan et al. (1998) have reported that 225 species of fishes inhabit the Brahmaputra River. Mohan et al. (1998) also reported four species of *Macrobrachium*, namely, *Macrobrachium choprai* (= *M. gangeticum*), *Macrobrachium lamarrei lamarrei*, *Macrobrachium naso* and *Macrobrachium birmanicum*. Among the fishes, species such as *Chela laubuca*, *Puntius sophore*, *Puntius ticto*, *Colisa fasciata*, *Glossogobius giuris*, *Mastacembelus punctatus*, *Wallago attu*, *Ompok* sp. and *Bagarius bagarius* constitute the food of the river dolphin. Mohan et al. (1998) also reported that the ecosystem was rapidly deteriorating due to heavy sand mining (12,500 MT annually). This has caused silting, smothering of the bottom fauna and a lowering of productivity. Moreover, around 300–800 kg of fish were caught at a time from a 1.5 km area of the collection station of the river. All of these factors will seriously affect the fish and prawn faunas. The present new species is relatively very small in size and apparently low in numbers. The above factors may pose a great threat to its survival.

**Etymology:** The specific name is after Kushi River.

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