Journal of Natural History, 1985, 19, 185-196

A new species of *Macrobrachium* from the south-west coast of India (Decapoda: Palaemonidae)

K. V. JAYACHANDRAN and N. I. JOSEPH

Department of Aquatic Biology and Fisheries, University of Kerala, Trivandrum-695 007, India

(*Accepted March 1984*)

Macrobranchium veliense sp. nov. is described from Veli lake and Kuttiyadi river, on the south-west coast of India. This species is closely related to *M. nipponense* and *M. equidens* but is separated from them by the lanceolate shape of the rostrum, number of teeth of both dorsal and ventral margins, the almost smooth nature of the carapace, the slender telson and the ratios of the fingers to the merus, carpus, propodus and palm of pereipods 1 and 2. The carpus of the second pereiopod is equal to or longer than the chela and is a diagnostic character of the new species.

Introduction

There are 36 species (including 5 subspecies) of the genus *Macrobrachium* Bate, 1868 reported from India (Holthuis 1950 and 1980, Tiwari 1952 and 1955, Ravindranath 1979), occurring in fresh and brackish waters. During a survey of the palaemonid prawns of the south-west coast of India, specimens resembling *Macrobrachium nipponese* were obtained from Veli Lake and the Kuttiyadi River which, on close examination, proved to be a new species and is described here.

Macrobrachium veliense sp. nov.

Etymology: The specific name is derived from the holotype locality.

Material: Four adult males and two berried females. *Types*: HOLOTYPE-male (89 mm), entire, registration number British Museum (Natural History), Crustacean Section-1984. 89. PARATYPES Three males: 81 mm and 86·5 mm (one second pereiopod missing), 84 mm (both the second pereiopods missing) and two berried females: 49 mm, entire; 73 mm (both the second pereiopods missing) deposited in the department of Aquatic Biology and Fisheries, University of Kerala, Trivandrum, India.

Type Locality: HOLOTYPE (89 mm) and two PARATYPES (all males) (81 mm and 86·5 mm) were collected from Veli Lake (Lat. 08°30′ and 08°32′N and Long. 76°53′ and 76°55′E) and one PARATYPE (male) (84 mm) was collected from Kuttiyadi River (Lat. 11°38′N and Long. 75°45′E). Females: HOLOTYPE (49 mm) and PARATYPE (73 mm) were collected from Veli Lake.

Description: Rostrum short, convex dorsally, reaching to the anterior end of the second segment of the antennular peduncle; tip of rostrum pointed, lanceolate in shape, upper margin of rostrum with nine teeth, of which eight teeth are prominent, distal one smaller and placed at the lanceolate tip and separated from the eighth by a space. First three rostral teeth placed behind, and fourth above, the orbit; first tooth placed at about 1/4 the length of the carapace and separated from the second. Ventral margin with one

ventral teeth. The rostral formula of the species is 9 1 of which the first three teeth are behind the orbit (fig. 1 a).

Carapace smooth, except for a few minute spinules dorsally, antennal spine and hepatic spine prominent, the latter smaller in size (fig. 1 a).

Abdomen glabrous, first to third pleurae typical; fourth and fifth backwardly directed, sixth ending in a small spine (fig. 1 b).

Telson slender, long, pointed at the distal end; ratio of width of base to length of telson 1 : 3; the ratio of width of the tip of telson to the length varies between 1 : 12 and 1 : 13. Distal end with two pairs of spines, first outer pair short and immovable, inner pair longer and movable, plumose setae present between the inner pair of spines. Two

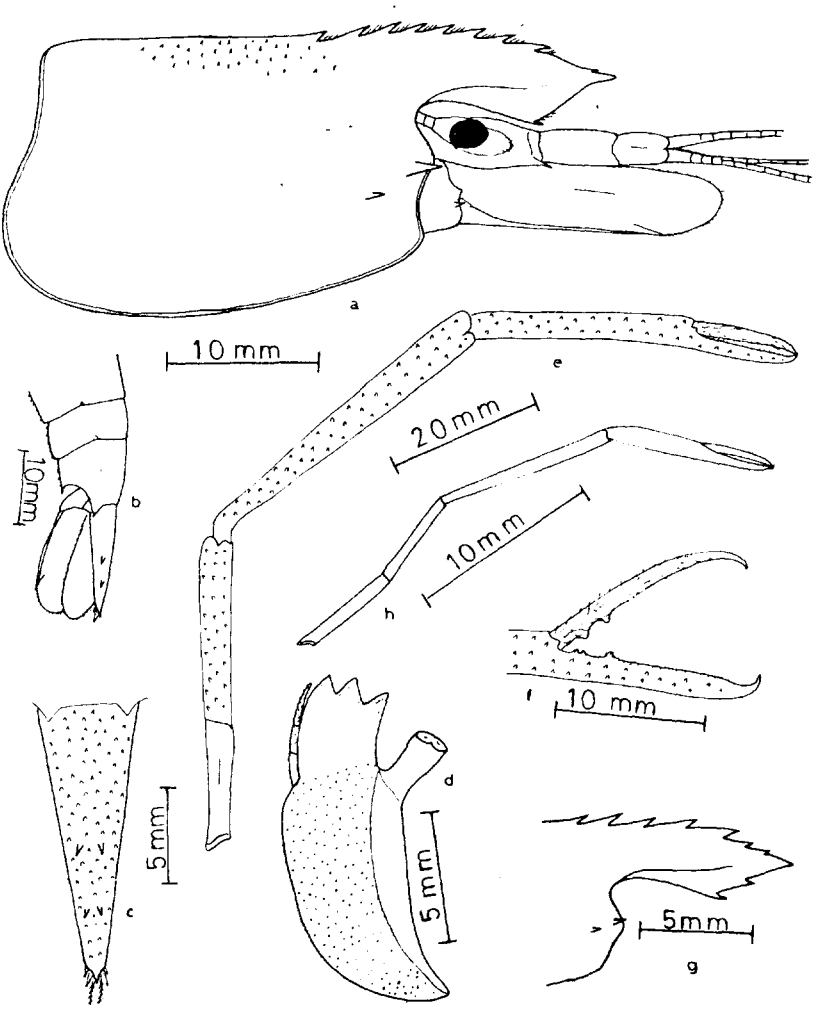

FIG. 1. *Macrobrachium veliense* sp. nov. Holotype male. a. Cephalothorax b. Posterior of abdomen c. Telson d, Mandible e. 2nd chelate leg f. Part of chela of the 2nd leg showing denticles on cutting edges of fingers. Berried female (49 mm) g. Anterior region of cephalothorax h. 2nd chelate leg.

pairs of spines dorsally, proximal pair about halfway and the distal pair about three-quarters the way along the telson. Entire dorsal surface of the telson covered with tubercles and the tip reaches beyond the level of the outer spine of uropod (fig. 1 c).

Antennules typical, peduncle three segmented, the ratio being 7·5 : 3 : 3·5, basis bears two prominences, each with a flagellum, the outer flagellum of two unequal branches. Antennae typical, antennal scale with the outer distal spine about four fifths of its length.

Mandibles with apophysis longer than the incisor process; the ratio between apophysis and incisor process being 3·5 : 2; incisor process tridentate, mandibular palp three segmented, proximal and middle segments equal sized and smaller than the distal segment (fig. 1 d).

First and second maxillae, first and second maxillipeds typical. Third maxillipeds also typical, endopod consisting of three segments, in the ratio 10 : 7 : 5·5. The second segment reaches antennal flagellar peduncle.

First pair of chelate legs slender, five segmented; ischium longer than propodus and dactylus; merus smaller than carpus; palm equal to fingers.

Second pair of chelate legs also slender, 1·4 1·8 times the length of the body, ischium longer than dactylus, shorter than the other segments; merus longer than ischium and dactylus but shorter than carpus and propodus; carpus equal to propodus in the holotype, but longer than propodus in the paratypes; palm twice as long as fingers, latter with two denticles present on the cutting edges; fixed finger with very short hairs present on the cutting edge only, movable finger pubescent. All podomeres bear very small tubercles (fig. 1 e, f).

Pereiopod 3 is longest (first pair longest in the paratypes); ischium shorter than carpus; merus equal to or slightly longer than propodus.

Pleopods and uropods typical of the genus.

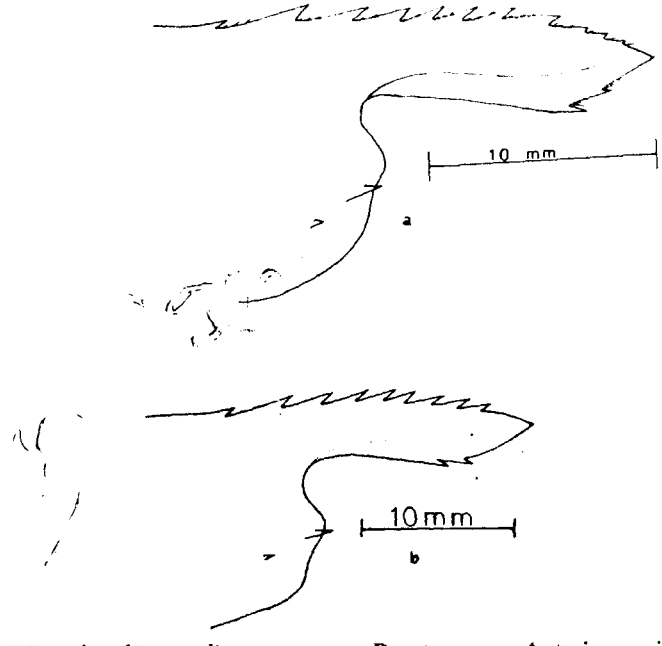

FIG. 2. *Macrobrachium veliense* sp. nov. Paratypes. a. Anterior region of cephalothorax (86·5 mm specimen) b. Anterior region of cephalothorax (81 mm specimen).

Females: In paratype I, upper margin of rostrum with eight prominent and three smaller teeth. Ventral margin with two teeth (fig. 2 a). In paratype II, upper margin of rostrum with nine prominent teeth. Ventral margin with two teeth (fig. 2 b).

Berried female: Rostrum short reaches beyond second segment of the antennular peduncle; upper margin with five prominent teeth and two smaller teeth; lower margin with two teeth (fig. 1 g).

Telson slender, ending in a spine, posterior margin with two pairs of spines, outer pair immovable and shorter, while the inner pair is movable and longer with a few plumose setae between. Dorsal margin with two pairs of spines, similar to that of males.

Second chelate legs equal-sized, very slender, shorter than the total length of the body; ischium almost equal to merus; carpus almost equal to propodus; palm swollen; fingers slender and almost equal to or slightly longer than the palm (fig. 1 h).

Pleopods and uropods typical. A specimen 73 mm in length carried 4588 fertilized eggs.

Measurements of *Macrobrachium veliense* sp. nov. (mm).

Total length	Carapace	Rostrum	Telson	Second chelate leg				
				ischium	merus	carpus	propodus	dactylu
Males								
81·0	22·0	13·0	15·0	14·0	22·5	41·0	41·0	13·0
84·0	23·0	13·0	15·0	broken				
86·5	24·0	14·5	15·0	17·0	26·0	48·5	47·0	16·0
89·0	23·0	13·0	15·0	17·0	25·0	48·0	48·0	15·0
Berried females								
49·0	13·0	12·5	8·0	7·0	6·0	10·5	9·5	5·0
73·0	20·5	10·0	11·0	broken				

Discussion

The species is closely related to *Macrobrachium nipponense* and to a lesser extent to *Macrobrachium equidens*, but differs from both in important diagnostic characters. The most striking difference between *M. nipponense* and the present species is in the shape of the rostrum. In *M. nipponense* it is typical but in the present form it is lanceolate. This rostral shape has been reported in *Macrobrachium yeti* Đang (1975). In *M. nipponense* the rostrum extends in front of the antennular peduncle (Kubo 1940) and in *M. equidens* it reaches to or just in front of the antennal scale (Henderson and Matthai 1910), but in the present species it reaches only to the antennular peduncle or falls short of it. Dorsal rostral teeth vary from 12–14 in *M. nipponense*, 11–12 in *M. equidens* but in the present species there are only eight or nine prominent and one to three smaller teeth. In *M. nipponense* and *M. equidens*, there are no small teeth at the tip of the rostrum. There are invariably three dorsal rostral teeth behind the orbit in *M. nipponense* but two or three in *M. equidens* and in the present species.

The number of ventral rostral teeth also varies. *M. nipponense* has two or three teeth, *M. equidens* four to seven teeth, while in the present species there are only one or two teeth. The carapace is scabrous in *M. nipponense*, and smooth in *M. equidens*. In

M. veliense there is a combination of these two characters with a few inconspicuous spinules restricted on the dorsal aspect of the otherwise scabrous rostrum.

The second chelate legs of the new species show some differences from *M. nipponense*. In the latter the second perciopod is 1·0–1·3 times as long as the body. In the present species it is longer than *M. nipponense* being 1·4–1·8 times the body length. In *M. equidens* it ranges from 1·1–1·7 times the body length and thus shows a close relationship to the present new species.

In those species of *Macrobrachium* which have the second leg of the adult male with many distinct tubercles and fingers of the large chela with at most one or two denticles placed on the cutting edges (rest of the cutting edge entire), the relationship between carpus and chela is an important diagnostic character. Only three species with the above character—*M. minutum*, *M. idae*, *M. idella*—have the carpus longer than the chela, all the other species such as *M. mammillodactylus*, *M. rude*, *M. sintangense*, *M. lanceifrons*, *M. novae-hollandiae*, *M. venustum*, *M. formosense*, *M. bainanense*, *M. equidens* and *M. nipponense* have the carpus shorter than the chela.

The new species, though clearly related to *M. nipponense*, (with the carpus shorter than the chela) has a carpus almost equal to or distinctly longer than the chela and resembles *M. minutum*, *M. idae* and *M. idella*.

There are differences in meristic characters in between the species. The ratio between merus and fingers is 1·1 : 1 in *M. nipponense*, 1·25–1·3 : 1 in *M. equidens* but 1·5–1·6 : 1 in the present species. The ratio between carpus and fingers is 1·8 : 1 in *M. nipponense*, 1·7–2·2 : 1 in *M. equidens*, but it is 3·0–3·1 : 1 in *M. veliense* sp. nov. Similarly, the ratio between propodus and fingers in *M. nipponense* is 1·4 : 1, in *M. equidens* 2·5–3·0 : 1 but in the present species 2·8–3·1 : 1. The ratio between palm and fingers is quite characteristic. In *M. nipponense* it is 1·0–1·5 : 1 and 1·3–2·0 : 1 in *M. equidens* whereas it is 1·9–2·1 : 1 in the present species.

The new species shares some features with *M. sintangense*. The latter has 6–11 dorsal rostral teeth and the dactylus of the second chela of the adult male is more than three-quaters the length of the palm. The present species with eight or nine rostral teeth therefore falls within the range of *M. sintangense*, but, the dactylus is only one-half the length of the palm.

In common with *M. niloticum*, the new species has one or two teeth on the lower margin of the rostrum, but it differs in the number of dorsal rostral teeth: *M. niloticum* has 9–13 and the present species eight or nine. In *M. niloticum* the fingers of the second chelate leg of the adult male are distinctly longer than the palm and the carpus is as long as the palm. The fingers of the second chelate leg of the present form are shorter than the palm and the carpus distinctly longer.

M. japonicum also shows some affinity with the present species i.e., the fingers are shorter than the palm. It differs in that the carpus is shorter than the palm—both important taxonomic characters. Another diagnostic character of *M. japonicum* is that the merus is equal in length to the palm. In the present form the merus is distinctly shorter.

M. hendersoni shows some similarity in the nature of the dorsal rostral teeth (seven to ten) but differs from the present species in having the carpus shorter than the merus.

Though the present species shows some similarities with both *M. nipponense* and *M. equidens*, it may be separated from them by the lanceolate shape of the rostrum, number of dorsal and ventral rostral teeth, number of teeth behind the orbit, the almost smooth nature of the carapace, the slender telson and the ratios of the fingers to the merus, carpus, propodus and palm of pereiopods 1 and 2. In the present species the

carpus is equal to or longer than the chela and this character alone serves to separate *M. veliense* from the other two species.

Acknowledgments

The authors wish to thank Dr. A. A. Fincham, British Museum (Natural History), London, for critically reading the manuscript. They are grateful also to Dr. M. J. George, Scientist, CMFRI, Cochin, for advising on the identification of the species and to Miss Ann Gurney, British Museum (Natural History), London, for providing the relevant literature. One of us (K. V. J.) wishes to thank the U.G.C. for awarding a senior Research Fellowship during the tenure of which the work was carried out.

References

ĐẶNG, N. T., 1975. Phân Loại Tôm Cua Nu'ó'c Ngọt Miền Bắc Việt Nam, *Tập san SINH VẬT-ĐỊA HỌC*, **13** (3), 65–78.

HENDERSON, J. R., and MATTHAI, G., 1910, On certain Species of *Palaemon* from South India, *Record of the Indian Museum*, **5**, 277–305.

HOLTHUIS, L. B., 1950, Subfamily Palaemoninae. The Palaemonidae collected by the Siboga and Snellius Expeditions with Remarks on other Species. I. The Decopods of the Siboga Expedition. Part X, *Siboga Expeditie, mon.*, **39**, (a^9), 1–268.

—— 1980, FAO species catalogue. Vol. 1. Shrimps and prawns of the world. An annotated catalogue of species of interest to fisheries, *FAO Fisheries Biology Synopses*, (125) **1**, 261 p.

KUBO, I., 1940, *Palaemon*. Studies on Japanese Palaemonid Shrimps. I, *Journal of the Imperial Fisheries Institute Tokyo*, **34**, 5–30.

RAVINDRANATH, K., 1979, A new Species of *Macrobrachium* (Decapoda, Caridea, Palaemonidae) from India, *Crustaceana*, **37** (2), 184–190.

TIWARI, K. K., 1952, Diagnosis of New Species and Subspecies of the genus *Palaemon* Fabricius (Crustacea: Decapoda), *Annals and Magazine of Natural History*, **5**, ser. 12, 27–32.

TIWARI, K. K., 1955, New Species and subspecies of Indian freshwater prawns, *Record of the Indian Museum*, **53**, 297–300.