

Rediscovery of *Mastacembelus malabaricus* after one and Half Century

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Abstract

Mastacembelus malabaricus Jerdon has long been placed in synonymy with *Mastacembelus armatus* and *Macrognothus guentheri*. An examination of the specimens of *M. malabaricus* collected recently from its type locality in Kerala shows however, that it exhibits many valid differences from its congeners. Jerdon's spiny eel is distinguished from its relative species by having eleven large and conspicuous "X" marks on the mid lateral sides, 39- 40 dorsal spines, shorter head, shorter dorsal fin, lengthy base of dorsal fin, lesser pre dorsal and pre anal length and shorter dorsal and anal spines. Meristic and morphometric characters are analyzed well based on the topotypic materials.

Keywords: Mananthavady River, spiny eel, *Mastacembelus armatus*, redescription.

Introduction

Spiny eels, belonging to the family Mastacembelidae, are eel-like fishes with elongated and compressed body. *Macrognothus* and *Mastacembelus* are the two genera included in this family. Both these genera are distributed throughout India. Day¹ recognized two genera of spiny eels, namely *Mastacembelus* and *Rhynchobdella* under the family Rhynchobdellidae of the order Acanthopterygii. He recorded a single species, *Rhynchobdella aculeata* under the genus *Rhynchobdella* and five species under the genus *Mastacembelus*. Jayaram^{2,3} recognized two genera under Mastacembelidae viz., *Macrognothus* Lacepede with six species and *Mastacembelus* Scopoli with five species.

Some taxonomists consider *Mastacembelus malabaricus* as a synonym of *Macrognothus guentheri* and some others as a synonym of *Mastacembelus armatus*. Recently the first author could collect a few specimens of *Mastacembelus malabaricus* from its type locality, examination of which revealed that it is a different species from its closely related species.

Material and Methods

Fishes were collected using gill net and preserved in 10% formalin. Methods used are those of Jayaram⁴ and measurements follow standard practices. Identification of the species and its comparison with the new species was carried out following Jerdon⁵ Day^{1,6,7}, Yazdani⁸, Talwar and Jhingran⁹ and Jayaram⁵. In the table, values of holotype are given first, then ranges followed by their mean values. Body depth and body width are taken at the level of first dorsal spine; length of the longest dorsal and anal spine is counted as dorsal and anal spine lengths respectively. Abbreviations used: BDD- body depth at first dorsal spine; LDS- length of longest dorsal spine; DD & P- distance between first dorsal spine and pectoral base.

Results and Discussion

Diagnosis: *Mastacembelus malabaricus* can be distinguished from its congeners in having 39- 40 dorsal spines, an elongated body, shorter head, short dorsal fin, lengthy base of dorsal fin, lesser pre dorsal and pre anal length and shorter dorsal and anal spines. Unlike its relatives, body of *M. malabaricus* has eleven large and conspicuous "X" marks on the mid lateral sides.



Figure-1
Mastacembelus malabaricus collected from Mananthavady River

Description: An eel shaped fish tapering to head and tail (figure 1- 4). Head length 15.1- 17.0, body depth 5.8- 6.8 as % of standard length. Eyes small, 7.4- 10.6, interorbital space 5.3- 7.5, length of snout 34.7- 38.3 as % of head length. The short snout has a trilobed extremity with a concave but unstriated lower surface. Length of gape of mouth, 11.3- 14.7 % of head

length, gape extending below to anterior margin of posterior nostril; a moderately strong spine present forwards and downwards of orbit and in between it and the angle of jaws. Length of lower jaw 13.2- 17.7 as % of head length. Sharp teeth in bands in both jaws. Dorsal and anal fins confluent with the caudal.



Figure-2
Anterior region of *Mastacembelus malabaricus*



Figure-3
Middle region of *Mastacembelus malabaricus*



Figure-4
Posterior region of *Mastacembelus malabaricus*

Spines of dorsal fin originating above middle of pectoral fin, second last spine the longest, last spine small and hidden beneath the skin. Anal spines close together, second the largest, last small and hidden beneath the skin; soft anal fin originating slightly in advance of soft dorsal fin. Pectoral fin length 4.3-5.3 as % of standard length. Vent nearer to base of caudal than to snout. Caudal fin confluent with dorsal and anal fins; no notch at the point of its confluence. Top of snout, inter nasal space, inter orbital space and top of head as far as hind edge of pre operculum scale less. Two to three small and inconspicuous pre opercular spines or serrations present. Lateral line roughly straight but at above the origin of soft anal it is concave.

Color: Body greenish brown or greenish yellow; eleven large and conspicuous “X” marks present on the mid lateral sides on the middle region of the body; in front of it in the anterior region four large, round and conspicuous black spots; a number of brownish black dots present above and below ‘X’ marks. Three rows of large and conspicuous black spots present on the

caudal region; twenty large and conspicuous round spots present on the dorso- lateral side just below mid dorsal line; pectoral fin with three dots of black dots in the form of lines; below it at the base of pectoral a large round black spot present. From the eyes three brownish black lines in the form of elongated dots up to opercle. One or two lines may go to ventral side of opercle, but not united with those on the other side. A brownish black line in the form of dots originate from the middle of pectoral fin considerably below lateral line and reach below up to 15th dorsal spine; it is distinct but in the form of scattered dots. Another brownish black line formed by the joining of 2 or 3 elongated dots starts from below pectoral and reach up to a little behind posterior tip of pectoral. These two lines are in the form of dots and not in the form of line in young specimens. Basic color pattern is constant in all the fishes of the species.

Distribution: Currently known only from Mananthavady River, Wayanad, Kerala, India.

Table-1
Morphometric characters of *Mastacembelus malabaricus*

SL. No	Characters	Range	Mean	SD
1	Total length	297.5- 419.0	345.1	57.4
2	Standard length	285.0- 400.0	330.8	55.0
Percentage of Standard Length				
3	Head Length	15.1- 17.0	16.4	0.8
4	Body depth	5.8- 6.8	6.3	0.4
5	Body width	4.6- 5.3	4.8	0.3
6	Length of pectoral	4.3- 5.3	4.8	0.5
7	Height of soft dorsal fin	1.4- 2.0	1.7	0.4
8	Length of dorsal spine	1.5- 2.3	1.9	0.3
9	Height of soft anal fin	1.1-1.3	1.2	0.1
10	Height of anal spine	2.3- 3.5	2.8	0.4
11	Length of caudal fin	3.4- 4.9	4.4	0.7
12	Length of base of soft dorsal fin	35.8- 39.1	37.1	1.5
13	Length of base of spinous dorsal fin	43.0- 45.6	44.2	1.3
14	Length of base of soft anal fin	36.8- 41.3	38.9	2.4
15	Length of base of spinous anal fin	2.5- 3.8	3.1	0.6
16	Length of base of pectoral	1.9- 2.1	2	0.1
17	Pre dorsal length	17.1- 19.0	18.3	0.8
18	Pre anal length	56.6- 58.8	58	0.9
19	Head length (mm)	47.0-68.0	54.25	9.5
Percentage of head length				
20	Head depth	37.2- 39.2	38.2	0.9
21	Head width	25.3- 29.8	28.2	1.9
22	Eye diameter	7.4- 10.6	9.4	1.4
23	Snout length	34.7- 38.3	36.6	1.7
24	Inter orbital width	5.3- 7.5	6.4	0.9
25	Width of gape of mouth	11.3- 14.7	12.8	1.4
26	Length of lower jaw	13.2- 17.7	15.5	1.9
27	Length of pectoral fin	25.0- 32.0	29.2	3.0

Comparisons: *Mastacembelus malabaricus* Jerdon⁵ was described firstly from ‘Malabar’ of Kerala. Jerdon’s ‘Malabar’ confines to northern parts of Kerala, mainly Rivers of Wayanad such as Mananthavady River as he described many new species of fishes from it. Many taxonomists consider *Mastacembelus malabaricus* as a synonym of *Macrogathus guentheri* described by Day⁶ from Karuvannoor River of Thrissur, Kerala^{1,9,3}. However Menon¹⁰ considered *guentheri* as a synonym of *malabaricus* on priority basis. Even though many taxonomists included *Mastacembelus malabaricus* along with the species of the genus *Macrogathus*^{1,3,10}, spiny eel expert Yazdani⁸ included it in the genus *Mastacembelus* and considered it as a synonym of *Mastacembelus armatus*. The first author of this paper could examine many specimens of *Mastacembelus malabaricus* from Mananthavady River of Wayanad, of Kerala; from the analysis of taxonomical aspects it was revealed that there is no reason to include this Jerdon’s *Mastacembelus* species in *Macrogathus*. As any other *Mastacembelus* species, and unlike *Macrogathus*, its caudal fin is smoothly confluent with dorsal and anal fins (vs. dorsal and anal fins united with caudal up to the middle of caudal and the latter can be seen separately in *Macrogathus*), spines of dorsal fin originating above middle of pectoral fin (vs. spines of dorsal fin originating behind the end of pectoral fin), body depth lesser (vs. greater), snout without a striated lower surface (vs. striated), gape of mouth extending to below posterior nostril (vs. never

extends to below the posterior nostril) and in possessing 39- 40 dorsal spines (vs. 27- 30). The spiny eel currently collected from Mananthavady River can be diagnosed as *Mastacembelus malabaricus* because of the similarities with Jerdon’s original description. Jerdon’s species’ colour is very similar to the fish currently collected from Mananthavady River, “green above, yellowish beneath, tinged with yellow under throat, spots present on the back” (colour of *M. malabaricus* match with it) and “body depth less than 12 or 13 in body length” (BDD 15.1- 17.8 in TL and 14.4- 17.0 in SL in the presently collected *M. malabaricus*). But dorsal fin spines were stated as 37 in *M. malabaricus*; but in the presently collected *malabaricus* it is 39-40. As the first and last dorsal spines are very small and hidden under the skin, Jerdon might have counted it as 37 instead of 39.

The presently collected *M. malabaricus* can be distinguished from its only one relative species from Kerala namely *Mastacembelus armatus* (figure 5) in having different colour pattern and dorsal spine count. In the presently collected *M. malabaricus*, unlike *M. armatus*, eleven “X” marks present on the mid lateral sides; in front of it in the anterior region four large, round and conspicuous black spots present; a number of brownish black dots present above and below ‘X’ marks, twenty large round spots present on the dorso- lateral side just below mid dorsal line, dorsal fin spines are 39-40.



Figure-5
Mastacembelus armatus collected from Manimala River

Table-2
 Morphometric differences in *Mastacembelus malabaricus* and *M. armatus*

Sl. No	Characters	<i>Mastacembelus malabaricus</i>	<i>Mastacembelus armatus</i>
Percentage of standard length			
	Head length	15.1- 17.0	17.7- 20.0
	Body depth	5.8- 6.8	7.2- 12.9
	Length of soft dorsal fin	1.4- 2.0	2.5- 3.2
	Length of base of soft dorsal fin	35.8- 39.1	33.8- 34.3
	Pre dorsal length	17.1- 19.0	20.1- 21.8
	Pre anal length	56.6- 58.8	62.5- 64.0
Percentage of head length			
	Head width	25.3-29.8	30.3- 31.0
	Width of gape of mouth	12.2-14.7	16.0-20.0
	Length of dorsal spine	11.7- 13.3	15.2- 16.8
	Length of anal spine	15.1- 16.3	20.0- 21.2

(vs. 32- 40 in *M. armatus*), head shorter (15.1- 17.0 % SL vs. 17.7- 20.0), body depth lesser (5.8- 6.8 % of SL vs. 7.2- 12.9), pre anal distance shorter (56.6- 58.8 % SL vs. 62.5- 64.0), width of mouth gape shorter (12.2- 14.7 % HL vs. 16.0- 20.0), dorsal spines shorter (LDS 11.7- 13.3 % HL vs. 15.2- 16.8), spines on the pre operculum not conspicuous (vs. conspicuous) and anal spines shorter (15.1- 16.3 % HL vs. 20.0- 21.2).

Eventhough *Mastacembelus malabaricus* and *Macrogathus guentheri* are spiny eels from different genera, they have to be distinguished from each other as a synonymy has been created between these two at present. In most of the meristic counts *M. guentheri* differs from *M. malabaricus* as shown in table 3.

In *Macrogathus guentheri* (figure 6) body depth is greater (11.1- 12.0 % SL vs. 5.8- 6.8 in *Mastacembelus malabaricus*), dorsal fin longer (3.2- 4.7 % SL vs. 1.4- 2.0), head width greater (29.3- 35.0 % HL vs. 25.3- 29.8) and eyes are widely set (IOW

10.5- 12.0 % HL vs. 5.3- 7.5). Major morphometric differences between *Macrogathus guentheri* and *Mastacembelus malabaricus* are shown in table 4.

Table-3
Differences in meristic counts of *Mastacembelus malabaricus* and *Macrogathus guentheri*

SL. No	Characters	<i>Mastacembelus malabaricus</i>	<i>Macrogathus guentheri</i>
1	Dorsal rays	84- 94	62- 65
2	Dorsal spines	39- 40	30- 31
3	Pectoral rays	22- 28	16- 20
4	Anal rays	75- 82	64- 68
5	Caudal rays	14- 15	10- 13



Figure-6
Macrogathus guentheri collected from Karuvannoor River

Table-4
Differences in morphometric characters of *Mastacembelus malabaricus* and *Macrogathus guentheri*

SL. No	Morphometric characters	<i>Mastacembelus malabaricus</i>	<i>Macrogathus guentheri</i>
Percentage of standard length			
1	Body depth	5.8- 6.8	11.1- 12.0
2	Body width	4.6- 5.3	7.0- 7.5
3	Length of dorsal fin	1.4- 2.0	3.2- 4.7
4	Length of anal fin	1.1- 1.3	3.1- 3.7
5	Length of caudal fin	3.4- 4.9	5.8- 7.0
6	Pre dorsal length	17.1- 19.0	21.1- 24.0
Percentage of head length			
7	Head depth	37.2- 39.2	39.5- 42.2
8	Head width	25.3- 29.8	29.3- 35.0
9	Interorbital width	5.3- 7.5	10.5- 12.0
10	Width of gape of mouth	12.2- 14.7	10.9- 12.0
11	Length of lower jaw	14.9- 17.7	12.0- 13.3
12	Length of pectoral fin	25.0- 32.0	32.6- 36.1
13	DD & P	21.0- 23.0	37.8- 41.0
14	Distance from anal to vent	6.0- 8.0	15.6- 17.0
15	Length of dorsal spine	11.7- 13.3	14.0- 17.8
16	Length of anal spine	15.1- 16.3	20.0- 21.0

Conclusion

Mastacembelus malabaricus is a rare and endemic species of spiny eel found in Kerala. Native fishermen catch them using gill net and hook and line. It is consumed as a delicious dish by many local people; they believe it to have medicinal values. April- may is the main fishing season of this spiny eel.

Comparative Material: *Mastacembelus armatus*: STC/DOZ 19, 4 examples, 232- 283 mm SL, Manimala River at Chenappady, Kerala, coll. Mathews Plamoottil, 10.02.2010; ZSI/F 2003, 1 example, Sung River, Satnarain, Dehra Dun, coll. S. L. Hora; ZSI/SRC F 130, 2 examples, Erodu, Bhavani River, coll. K. C. Jayaram, 17.02.1974; *Macrogathus guentheri*: STC/DOZ 20, 4 examples, Karuvannoor River, Thrissur, Kerala, coll. Mathews Plamoottil, 10.01. 2013; *Mastacembelus malabaricus*: STC/DOZ 21, 4 examples, Valloorkkavu, Mananthavady River, Wayanadu, Kerala, India, coll. Mathews Plamoottil, 12.03.2013.

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References

1. Day F., Fauna of British India including Ceylon and Burma, Taylor and Francis, London, **334 (1889)**
2. Jayaram K.C., The fresh water fishes of India: A hand book. Zoological Survey of India, Kolkata, i- viii, **1- 475 (1981)**
3. Jayaram K. C., Fresh water fishes of the Indian region, Narendra publishing House, Delhi, **415- 419 (2010)**
4. Jayaram K. C., Fundamentals of fish taxonomy, Narendra publishing House, Delhi, **53-65 (2002)**
5. Jerdon T. C., The fishes of Southern India, *Madras Journal of Literature and Science* xv, **147 (1849)**
6. Day F., The Fishes of Malabar, Bernard Quaritch, London, **153- 155 (1865)**
7. Day F., The fishes of India: being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma, and Ceylon, London, **340 (1878)**
8. Yazdani G. M., Contribution to the fish fauna of India: Order Mastacembeliformes, Records of zoological survey of India, Occasional paper No. **124, 1- 127 (1990)**
9. Talwar P. K. and Jhingran. A., Inland fishes of India and adjacent countries, Oxford and IBH publishing Co. Pvt. Ltd, **1025- 1033 (1991)**
10. Menon A. G. K., Check list of fresh water fishes of India, Zoological Survey of India, Occasional Paper No. **175, 366 (1999)**