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MACROGNATHUS ALBUS (ORDER: SYNBRANCHIFORMES; FAMILY: MASTACEMBELIDAE), A NEW FISH SPECIES FROM KERALA, INDIA

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ABSTRACT

Taxonomic analysis of three specimens of *Macrognathus* collected from Manimala River reveals that they present several morphological differences from their congeners. The new species is diagnosed by a combination of the following characters: body dirty white without any bands or bars, eyes are closely set, spinous part of dorsal fin originating considerably behind the end of pectoral fin; pre orbital spine absent, 29 irregular blotches present on mid dorsal line from top of operculum to base of caudal. The new species is described and compared with its relatives.

Keywords: Manimala River, new species, spiny eel, *Macrognathus fasciatus.*

INTRODUCTION

Family Mastacembelidae contains spiny eels with elongate body, 7 to 40 detached depressible strong dorsal spines, one to three spines on anal fin, small scales covering the body, pelvic fins and girdles absent, gill openings located on lateral sides, tail fin short and caudal region laterally compressed.

The presently described fish from Manimala River possesses features of *Macrognathus* but carries enough characters to distinguish it from its relative species. So it is described here as a new species *Macrognathus albus.* The descriptions are based on three specimens collected by Mathews Plamoottil from main stream of Manimala River at Chenappady.

MATERIALS AND METHODS

Fishes were collected using cast nets and preserved in 10% formalin. Identification of the species was carried out following Yazdani (1990), Talwar and Jhingran (1991) and Jayaram (2010). Methods used are those of Jayaram (2002) and measurements follow standard practices. The values of holotype are given first, then in parenthesis by ranges as percentages followed by their mean values. Type specimens of the new fish are deposited in the fresh water fish museum of Zoological Survey of India, Kozhikode, Kerala.

Abbrevations: ZSI/WGRC- Zoological Survey of India, Western Ghats Regional Centre, Kozhikode, Kerala, India; PCMP- Personal Collections of Mathews Plamoottil.

RESULTS AND DISCUSSION

Macrognathus albus, sp. nov

(Figures 1- 4 and Table 1)

Materials Examined. - Holotype, ZSI/WGRC/IR/2386, 211.50 mm SL, Chenappady, Manimala River, Kerala, India; collected by Mathews Plamoottil, 12 March 2011.

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Paratypes, 2 specimens, ZSI/WGRC/IR/2387, 174 & 178 mm SL, Chenappady, Manimala River, Kerala, India; collected by Mathews Plamoottil, 16 April 2011 and 03 October 2011.

Diagnosis

Body without any bands or bars; 26- 29 irregular blotches occur on mid dorsal line from top of operculum to base of caudal; pre orbital spine absent; spinous part of dorsal fin originating considerably behind the end of pectoral fin; head longer and deeper, eyes located closely, body width lesser, pre dorsal and pre anal distances greater.

Description

Dorsal fin spines- xxvi-xxx; Dorsal fin soft rays- 62-65; Pectoral fin rays- 14-16; Anal fin spines- III; Anal fin soft rays- 56- 62; Caudal fin rays- 11.

Body eel shaped, slightly compressed, tapering to head and tail. Mouth inferior, cleft narrow, gape not extending to below posterior nostril. Snout long, fleshy, accommodating a concave prolongation of the upper jaw consisting of a paired series of tooth plates. Rostrum roughly triangular in cross section. Teeth present in bands on both jaws. Lips thin, jaws sub equal; no spines on either pre orbital or pre operculum; eyes comparatively small, located on dorso-lateral side and significantly projecting above the general profile of the head but cannot be seen from below ventral surface. Anterior nostrils in the form of elongated tubes; rim of it guarded by six fimbriae. Spinous part of dorsal fin originating considerably behind the end of pectoral fin, the last spine long, developed and not hidden beneath the skin. Anal spines close together, second the largest, last small and hidden beneath the skin. Soft part of anal fin originating slightly in advance of the soft dorsal fin. Caudal fin united with dorsal and anal fins at its proximal half, distal half project out, therefore can be seen distinctly separated from dorsal and anal fin. Top of snout, inter orbital and inter nasal spaces not scaly; scales small, absent around eyes and posterior nostril and not extending from latter to maxilla. Genital papilla large. Vent nearer to base of caudal fin than to snout.

Colour: Dorsal and lateral sides dirty white; ventral side light brownish yellow. 26- 29 irregular blotches present on mid dorsal line from top of operculum to base of caudal; those on the base of soft dorsal small, distinct and nearly round; in front of it present some irregular diffuse, brownish black blotches, sometimes formed as aggregation of brownish black dots, from mid dorsal line to a little below it on lateral side. Some black bands radiate from the eye and dorsal surface of snout and cross the under surface of the jaws. A small round black spot present at the base of pectoral fin; pectorals, dorsal, anal and caudal with 4-6 rows of brownish black dots. A light narrow streak from above the eye passes along the lateral line to the base of the caudal.

Etymology: The specific epithet '*albus*' was taken from Latin language meaning 'white' refers to the color of the new fish.

Figure 1. *Macrognathus albus*, Holotype, ZSI/WGRC/IR/2386, 211.50 mm SL.

Figure 2. *Macrognathus albus,* Paratype, ZSI/WGRC/IR/2387, 178 mm SL.

Figure 3. Head region of *Macrognathus albus.*

Figure 4. Posterior region of *M. albus.*

Distribution: Currently known to occur only at Chenappady of Manimala River.

Habitat

The River stretch of Manimala River at Chenappady, the type locality of *Macrognathus albus,* is highly sinuous and generally rocky with deep pools at certain locations. Sand deposit occurs as sporadic patches or fillings in the pools. The bed materials are generally of coarser grade and the sand content is very low. The width of the River channel varies between 45 m and 110 m. The water depth in the active channel during summer seasons ranges from 0.5 m to 3 m. The riparian vegetation is more or less scanty; the common plant species along the bank includes *Bambusa bambos, B. vulgaris, Homonoia riparia, Ficus glomerata, Gmelina arborea, Hydnocarpus pentandra etc*. *Anguilla bengalensis, Salmostoma boopis, Danio malabaricus, Barilius bakeri, Gonoproktopterus kurali, Rasbora daniconius, Puntius mahecola, Haludaria fasciatus, Pethia ticto, Dawkinsia filamentosa, Systomus subnasutus, Batasio travancoria, Ompok malabaricus, Clarias dussumieri, Heteropneustes fossilis, Mesonoemacheilus triangularis, Bhavania australis, Xenentodon cancila, Aplocheilus lineatus, Parambassis thomassi, Etroplus maculatus, Etroplus suratensis, Anabas testudineus, Pristolepis malabaricus, Mastacembelus armatus, Macrognathus guentheri,* etc. are some of the co-occurring fish species.

Comparisons

Day (1889) recognized two genera of spiny eels, namely *Mastacembalus* and *Rhynchobdella* under the family Rhynchobdellidae of the order Acanthopterigii. Jayaram (1981, 2010) recognized two genera under Mastacembelidae viz., *Macrognathus* Lacepede with six species and *Mastacembelus* Scopoli with five species. According to the present records, only eight spiny eels namely *Mastacembalus armatus*, *M. malabaricus, Macrognathus guentheri*, *M. aral, M. morehensis, M. puncalus, M. lineatomaculatus* and *M. fasciatus* are residing in the inland water bodies of India (Jerdon, 1849; Datta and Srivastava, 1988; Yazdani, 1990; Talwar and Jhingran, 1991; Arun Kumar and Tombi, 2000; Nath and Dey, 2000; Britz, 2010:

Plamoottil and Abraham, 2013, 2014); of these *Mastacembelus armatus, M. malabaricus, Macrognathus guentheri* and *M. fasciatus* are found in the aquatic bodies of Kerala.

Table 1. Morphometric characters of *Macrognathus albus* and congeners.

No.	Characters	Holotype	Range	Mean	*M. fasciatus*	*M. guentheri*
1	Total Length(mm)	225	185-225	200	244- 323	281- 319
2	Standard Length(mm)	211.5	174-211.5	187.83	230- 306.5	263- 299
	Percentage of Standard Length					
3	Head Length	16.6	16.6-17.4	16.8	14.8- 16.5	14.1-16.3
4	Body depth	13.00	10.3- 13.2	12.2	11.2- 12.6	11.1-12.0
5	Body width	7.1	5.7- 7.1	6.5	7.5- 8.3	7.0-7.5
6	Length of pectoral	5.67	5.2-5.7	5.5	4.3- 5.2	4.4-5.3
7	Height of dorsal fin	3.40	3.4-4.0	3.8	2.2- 2.9	3.2- 4.7
8	Height of anal fin	2.84	2.8-3.4	3.0	1.7- 2.6	3.1-3.7
9	Length of caudal fin	5.67	5.7-6.3	5.9	5.5- 6.9	5.8-7.0
10	Length of base of soft dorsal fin	42.6	34.8- 42.6	37.9	36.1- 39.2	37.0-38.0
11	Length of base of soft anal fin	44.4	37.1- 44.4	40.8	37.8- 40.8	39.0-40.7
12	Length of base of pectoral	2.1	1.9-2.30	2.1	1.6- 2.2	1.7-1.9
13	Pre dorsal length	28.4	26.9-28.4	27.6	22.2- 26.1	21.1-24.0
14	Pre anal length	61.5	61.5-67.4	64.4	53.0- 59.4	56.0-61.6
15	Head length (mm)	31.0	29-35	31.7	35.0- 45.5	56.0-61.6
	Percentage of Head length					
16	Head depth	48.6	43- 48.6	45.4	36.8- 41.8	39.5- 42.2
17	Head width	38.6	31.0-38.7	36.1	28.9- 37.1	29.3-35.0
18	Eye diameter	8.6	8.6-10.3	9.5	3.7- 4.8	7.3-10.0
19	Snout length	42.8	42.8-48.4	45.6	38.6- 43.6	37.2- 41.1
20	Inter orbital width	6.3	6.3-6.8	6.5	10.0- 10.9	10.5-12.0
21	Width of gape of mouth	11.4	9.7-11.4	10.5	7.7- 9.7	10.9-12.0
22	Length of pectoral	34.3	31.0-34.3	32.5	28.6-32.1	32.6-36.1

The present fish can be included in the genus *Macrognathus* due to the possession of an elongated snout accommodating a concave prolongation of the upper jaw consisting of a paired series of tooth plates, rim of anterior nostril guarded by a six fimbriae, dorsal fin, with 26- 30 dorsal fin spines, inserted fairly behind the end of pectoral fins and caudal fin distinctly separated from dorsal and anal fins. Similar to *Macrognathus* no scales on the top of snout, inter orbital space, inter nasal space and top of head as far as hind edge of pre operculum.

The new species differs from *Macrognathus fasciatus* Plamoottil and Abraham (Figure 5) in many significant taxonomic features. In *Macrognathus albus* head is longer (16.6-17.4 % SL vs. 14.8-16.5 in *M. fasciatus*) and deeper (43.0-48.6 % HL vs. 36.8-41.8), eyes larger (8.6-10.3 % HL vs. 3.7-4.8) and are closely located (inter orbital width 6.3-6.8 % HL vs. 10.0-10.9), body less wide (5.7-7.1 % SL vs. 7.5-8.3), pre dorsal distance greater (26.9-28.4 % SL vs. 22.2-26.1), soft dorsal fin (3.4-4.0 % SL vs. 2.2-2.9) and soft anal fin (2.8- 3.4% SL vs. 1.7-2.6) are longer, pre anal distance greater (61.5-67.4 % SL vs. 53.0-59.4) and anal fin with lesser soft rays (56-62 vs. 65-67). In *Macrognathus fasciatus* body is dark brown (vs. dirty white), distinct vertical bands present on the body (vs. absent), pre orbital spine present (vs. absent) and spinous part of dorsal fin originating at vertical through the level of or slightly behind the end of pectoral fin (vs. spinous dorsal fin originating considerably behind the end of pectoral fin).

The present species differ from *Macrognathus guentheri* Day (Figure 6) in a number of features. In *Macrognathus guentheri*, body with distinct bars or marblings (vs. absent in *M. albus*), head shorter (14.1-6.3 % SL vs. 16.6- 17.4) and less deep (39.5-42.2 % HL vs.

43.0- 48.6), body wider (7.0-7.5 % SL vs. 5.7-7.1), pre dorsal (21.1-24.0 % SL vs. 26.9-28.4) and pre anal (56.0-61.6 % SL vs. 61.5-67.4) distances shorter, eyes are widely set (inter orbital width 10.5- 12.0 % HL vs. 6.3- 6.8), snout shorter (37.2- 41.1 % HL vs. 42.8- 48.4) and anal fin with 62-75 soft rays (vs. 56-62). In *Macrognathus albus*, a row of 26-29 irregular blotches present on the mid dorsal side and extending a little to upper lateral side stretching from the opercle to caudal base (vs. absent in *Macrognathus guentheri),* dorsal spines are short and partly hidden under skin (vs. comparatively longer and prominent), spinous part of dorsal fin originating considerably behind the end of pectoral fin (vs. just behind the end of pectoral fin) and pre orbital spine absent (vs. present).

Figure 5. *Macrognathus fasciatus,* ZSI/WGRC 2422.

Figure 6. *Macrognathus guentheri.* PCMP 20.

In *Macrognathus cardiocellatus* (Boulenger, 1912; Yazdani, 1990) dorsal spines are 31-34 (vs. 26-30 in the new species), anal soft rays 60-65 (vs. 56-62), pectoral fin rays 19-22 (vs. 14-16) and caudal fin rays are 15-18 (vs. 11). In *Macrognathus pancalus* (Buchanan, 1822; Day, 1878, 1889, Sundaraj, 1916; Sufi, 1956; Datta and srivastava, 1988; Arun Kumar and Tombi; Nath and Dey, 2000) dorsal fin spines are 24-26 (vs. 26-30 in the new fish), dorsal fin rays 30-42 (vs. 62-65), anal fin rays 31- 46 (vs. 56- 62) and pectoral fin rays are 17-19 (vs. 14-16). In *Macrognathus zebrinus* (Gunther, 1861; Day, 1878, 1889; Sufi, 1956; Yazdani, 1990; Talwar and Jhingran, 1991) spinous portion of dorsal fin originating above the middle of pectoral fin (vs. spinous part of dorsal fin originating considerably behind the end of pectoral fin in *M. albus*), body with dark brown vertical bars, edged with yellowish bars (vs. vertical bands absent), dorsal fin spines are 28- 31(vs. 26-30), dorsal fin rays are 49- 55 (vs. 62-65) and caudal fin rays are 17-19 (vs. 11). In *Macrognathus aral* (Day, 1878, 1889; Arunkumar and Tombi, 2000) dorsal spines are 16-23 (vs. 26-30), dorsal fin rays 44-45 (vs. 62-65), pectoral fin rays 19-24 (vs. 14-16), caudal fin rays 15 (vs. 11) and caudal fin distinctly separated from dorsal and anal fins (vs. united with dorsal and anal). *M. morehensis* (Arunkumar and Tombi, 2000) can be easily distinguished from the present species in having 11-16 dorsal fin spines (vs. 26-30), 39-51 dorsal fin rays (vs. 62-65), anal fin soft rays 40-54 (vs. 56-62), pectoral fin rays 15-20 (vs. 14-16) and caudal fin rays (vs. 11).

Comparative material

Macrognathus fasciatus: Holotype, ZSI/WGRC/IR 2422, 250 mm SL, Karuthavadasserikkara, Manimala River, Kerala, India; collected by Mathews Plamoottil, 14 January 2012; Paratypes, 3ex, ZSI/WGRC/IR 2423, 230- 306.5 mm SL, Karuthavadasserikkara, Manimala River, Kerala, India; collected by Mathews Plamoottil, 20 April 2012. ***Macrognathus guentheri,*** PCMP 20, 4 exs, Karuvannoor River, Thrissur, Kerala, collected by Mathews Plamoottil, 10.01.2013.

CONCLUSION

Macrognathus albus is an edible fish residing in high level regions of Manimla River. These spiny eels can be collected easily during summer season. It is expected that more biological features of this fish may be unveiled in future by collecting more specimens of it.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest associated with this article.

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