**International Journal of Pure and Applied Zoology** ISSN (Print) : 2320-9577
Vol. 1, Issue 4, pp: 315-325, 2013 ISSN (Online): 2320-9585
©2013 Rishan Publications
http://www.ijpaz.com

**Research Article**

http://zoobank.org/urn:lsid:zoobank.org:pub:0458E4D3-2713-4549-9C21-383B7CA9F6CE
http://zoobank.org/urn:lsid:zoobank.org:act:BEA93F7D-A533-4B85-A261-6A238A85D06A

# *MYSTUS MENONI*, A NEW FISH SPECIES FROM KERALA, INDIA

**Mathews Plamoottil[1*] and Nelson P Abraham[2]**

[1]Department of Zoology, Government College, Chavara, Kollam District, Kerala, India
[2]Department of Zoology, St.Thomas College, Kozhencherry, Kerala, India

**Article History:** Received 29th August 2013; Accepted 03rd November 2013; Published online 12th November 2013

**ABSTRACT**

*Mystus menoni*, a new fish species of family Bagridae, is described from Elankadu of Manimala River in Kerala, India. It is distinguished from its relatives by the following combination of characters: maxillary barbels reach anal fin; median longitudinal groove on head divided into two fontanels and reaching occipital process; the latter reaches basal bone of dorsal fin; adipose dorsal fin long and located a little behind the rayed dorsal fin; caudal lobes broad and rounded; a bluish green oval to round spot present on shoulder and a similar triangular spot on caudal base and a thick bluish green band present in between these two. The new fish is described and compared with its congeners.

**Keywords***:* Manimala River, taxonomy, new species, catfish, Mystus *armatus*

## INTRODUCTION

Catfishes constitute a large group of chiefly fresh water fishes distributed around the world. Family Bagridae is the Old World counterpart of the Pimelodid cat fishes and are economically valuable in India and eastern parts of its range. Of about two dozen valid genera known so far of the family, *Mystus* is the most common in India and adjacent countries.

The presently described fish from Manimala River bears features of the genus *Mystus* but carries enough characters to distinguish from its relative species. So it is described here as a new fish species *Mystus menoni.* The descriptions are based on six specimens of it collected from Manimala River at Elankadu of Idukki district of Kerala, India.

## MATERIALS AND METHODS

Fishes were collected using cast nets and preserved in 10% formalin. Identification of the new species and its relative species was carried out following Jerdon (1849) Day (1865, 1878, 1889), Misra (1976), Talwar and Jhingran (1991), Jayaram and Anuradha (2003) and Jayaram (2002, 2006). Methods used are those of Jayaram (2002) and measurements follow standard practices. In table, values of holotype are given first, then ranges as percentages followed by their mean values; values of holotype included in the range. Holotype of the new species was deposited in national museum of Zoological Survey of India at Kolkata, West Bengal, India and its paratypes were deposited in the museum of Zoological Survey of India at Kozhikode, Kerala. Congeners of the new species were deposited in the museum of ZSI, Kolkata, ZSI/ SRC Chennai, ZSI/WGRC, Calicut and KFRI, Peechi were examined and utilized for comparison. Fresh specimens of all relative species collected from their type localities by the first author alone are used for the morphometric analysis. Even though many preserved specimens of *M. armatus* and *M. montanus* were examined, one fresh specimen of each of it collected from its type locality alone used for biometric analysis.

*Corresponding author address: Mr. Mathews Plamoottil, Assistant Professor, Government College, Chavara-691583, Kollam District, Kerala, India. E-mail: mathewsplamoottil@gmail.com, Tel: +91 9447059690

**Abbreviations:** ZSI- Zoological Survey of India, Kolkata, West Bengal; ZSI/SRC- Zoological Survey of India, Southern Regional Centre, Chennai, Tamil Nadu; ZSI/WGRC- Zoological Survey of India, Western Ghats Regional Centre, Calicut, Kerala; KFRI- Kerala Forest Research Institute, Peechi, Kerala; SL- standard length; HD- head depth at occiput; IOW- inter orbital width; BDD- body depth at dorsal fin origin; RD- rayed dorsal fin; AD- adipose dorsal fin; DPPL- Distance from pectoral to pelvic; DPLA- distance from pelvic to anal; DRD & AD- Distance from rayed dorsal fin to adipose dorsal fin; CL- caudal lobe; DspT- Dorsal spine teeth; PspT- Pectoral spine teeth; FS- finely serrated.

***Mystus menoni*, sp. Nov.**

(Figures 1-3, 4. F, 5. F; Table 1-3)

**Type materials examined**

Holotype, ZSI/FF 4628, 101.7 mm standard length, Manimala River at Elankadu, Kerala, India; collected by Mathews Plamoottil, 10 January 2011.

Paratypes, ZSI/WGRC/IR/V 2417, 5 specimens, 96- 121 mm standard length, Manimala River at Elankadu, Kerala, India, collected by Mathews Plamoottil, 10 January 2011 and 16 October 2011.

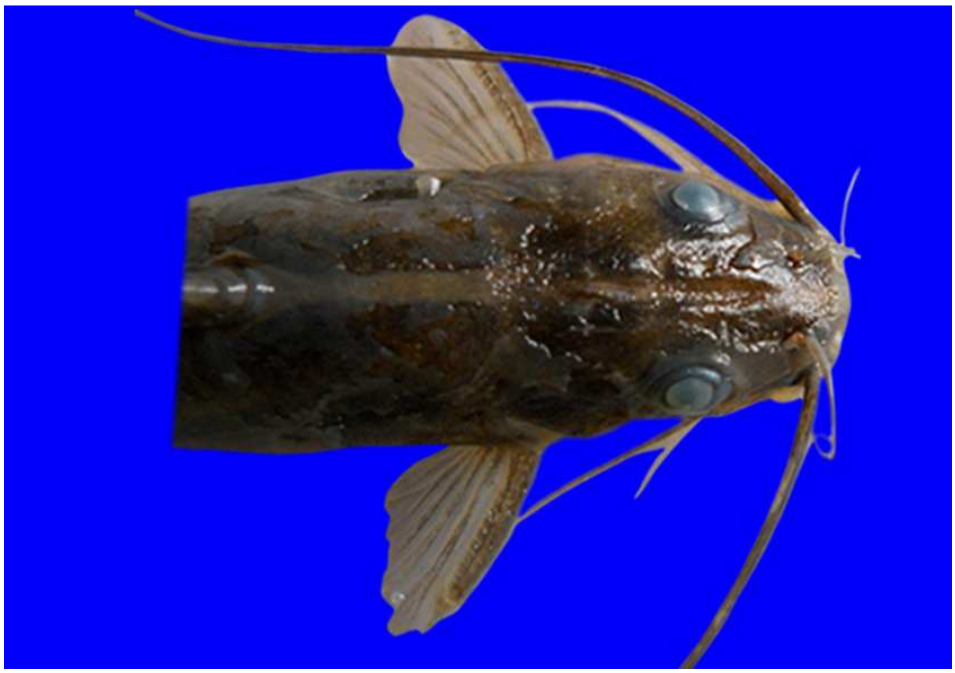

**Figure 1.** Dorsal view of anterior region of body of *Mystus armatus* showing deep and narrow cephalic fontanel which does not reach occipital process; the latter reaching basal bone of dorsal fin; occipital process covered by a thin skin.

**Figure 2.** A fresh specimen of *Mystus menoni*, ZSI/WGRC/IR/V 2417, Paratype.

**Figure 3.** A formalin preserved specimen of *Mystus menoni*, ZSI/FF 4628, Holotype.

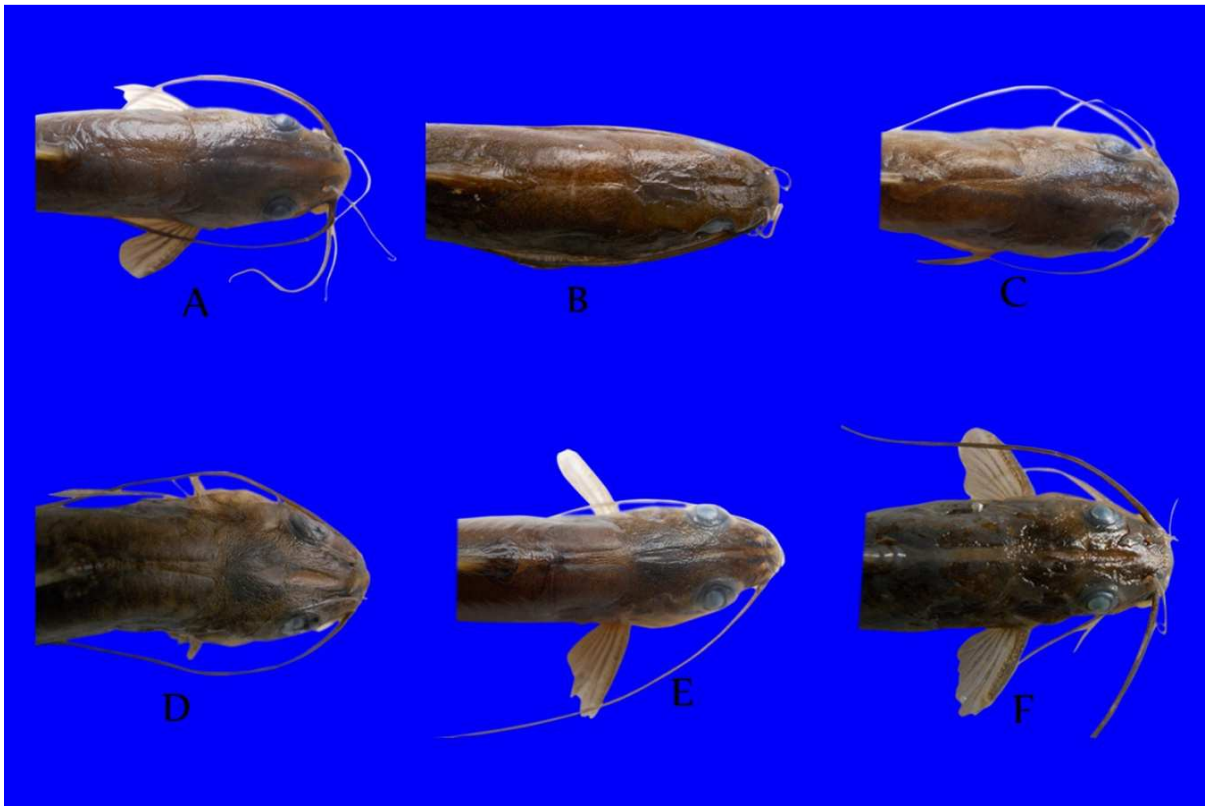


**Figure 4.** Dorsal view of head of *Mystus menoni* and its relative species; A. *Mystus malabaricus*; B. *M. canarensis*; C. *M. montanus*; D. *M. armatus*; E. *M. oculatus*; F. *M. menoni*.

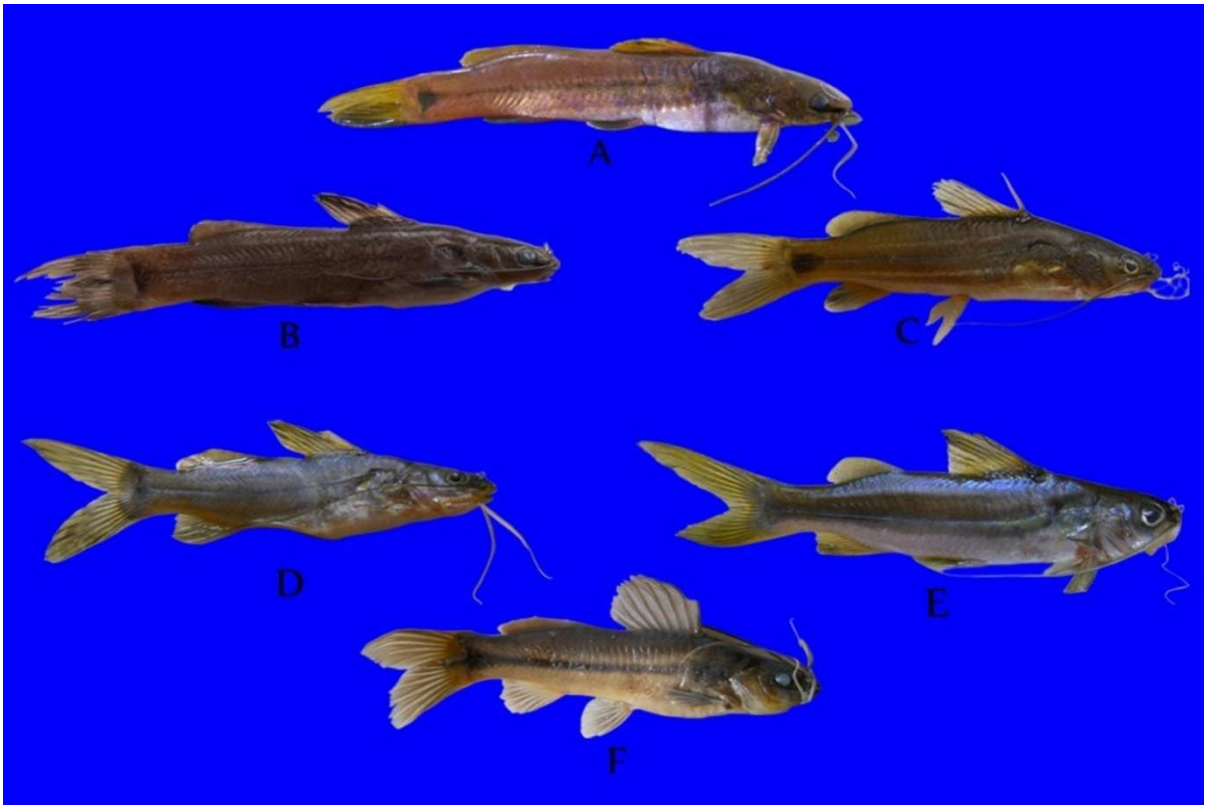


**Figure 5.** Freshly collected specimens of *Mystus menoni* and its relative species collected by Mathews Plamoottil from their type localities; A. *Mystus malabaricus* (ZSI FF 4931); B. *M. canarensis* (ZSI FF 4939); C. *M. montanus* (STC/DOZ 11); D. *M. armatus* (STC/DOZ 10); E. *M. oculatus* (ZSI FF 4933); F. *M. menoni* sp. nov (ZSI/WGRC/IR/V 2417).

## RESULTS AND DISCUSSION

**Diagnosis:** *Mystus menoni* can be diagnosed from all its congeners in having an elongated snout (34.6- 41.7 % HL), widely set eyes (IOW 36.0- 40.4 % HL), short inter dorsal distance (DRD & AD 7.3- 8.4 % SL) and a thick bluish green band present in the mid lateral line. The new species can be differentiated from *Mystus montanus* in having a shorter head (22.9- 24.3% SL vs 28.1 in *M. montanus*), moderately deep median longitudinal fontanel (vs. shallow cephalic fontanel), longer snout (34.6- 41.7 % HL vs. 30.5), a thick bluish green band present on mid lateral line and no bands above and below it (vs. no distinct color band on mid lateral line and two narrow whitish yellow lines present one above and one below lateral line), a bluish green triangular caudal spot present (vs. a distinct black oval caudal spot present) and base of adipose dorsal fin longer (27.3- 30.5 % SL vs. 21.5). The new species differs from *Mystus armatus* in having no black spot on the base of dorsal fin (vs. a black spot present at the front base of dorsal fin), dorsal surface of head covered with a thin layer of skin (vs. dorsal surface of head rugose), eyes comparatively smaller, 22.9- 25.0 % HL and are located comparatively away, IOW 36.0- 40.4 % HL (vs. eyes larger, 30.0 % HL and they are located more closely, IOW 28.6 % HL), snout longer (34.6- 41.7 % HL vs. 31.8) and maxillary barbels reach only to anal fin base (vs. maxillary barbels reach to caudal fin base). *Mystus menoni* can be differentiated from *M. oculatus* in having smaller eyes (22.9- 25.0 % HL vs. 33.0- 40.0), pectoral fin with 7 branched rays (vs. 8- 9), shorter rayed dorsal fin (16.7- 20.8 % SL vs. 21.1- 23.6), longer base of adipose dorsal fin (27.3- 30.5 % SL vs. 17.2- 19.0) and anal fin with 8 branched rays (vs. 9-10). The new species can be differentiated from *Mystus malabaricus* in having widely set eyes (IOW 36.0- 40.4 % HL vs. 26.8- 30.0 in *M. malabaricus*) a deeper body (BDD 21.1- 23.6 % SL vs. 19.0- 20.5) and longer occipital process which reach dorsal fin front (vs. shorter occipital process which does not reach dorsal fin). *Mystus menoni* can be differentiated from *M. canarensis* in having a thick bluish green mid lateral band (vs. no mid lateral color band in *M. canarensis*),

occipital process long, fairly greater than eye diameter and it reach dorsal fin (vs. occipital process short, a little less than orbit diameter and never reach dorsal fin front), pectoral fin with 7 branched rays (vs. 9) and caudal fin with15- 17 rays (vs. 18).

**Description:** For general appearance see Figures 1-3, 4. F and 5. F. Biometric data are provided in Table 1 and meristic counts are presented in Table 2. Body elongate and compressed. Head compressed, greatest width of head generally greater than its height at occiput or the head length excluding snout; upper surface of head smooth. Median longitudinal groove on head moderately deep and it is divided into two fontanels, reaching an eye diameter or a little more behind the level of orbit, not reaching occipital process; occipital process reaches basal bone of dorsal fin; but the former is covered by a thin layer of skin. Shoulder bone moderately roughened in lines. Nasals longer, extend to occiput, but never reach opercle; maxillaries reach anal fin; outer mandibulars reach considerably behind the end of pectorals, extend behind half way between pectoral and pelvic, and sometimes reach near the base of ventral; inner mandibulars reach behind posterior base of pectoral. Mouth sub terminal, transverse, upper jaw longer.

Rayed dorsal fin shorter than the body below it and originate above the middle of pectoral fin in smaller ones and at ¾ of the length of the pectoral fin from its base in larger ones, nearer to adipose dorsal origin than to snout tip; its posterior base just reach above the front base of pelvics; its outer margin convex. First dorsal fin with a spine let, spine and seven branched rays; spine is osseous, moderately strong, rigid, not flexible and finely serrated behind on the upper half. A fleshy ridge present at the base of rayed dorsal fin. Adipose dorsal fin originates a little behind the rayed dorsal and also above a little behind the front base of ventral; its base length considerably greater than that of rayed dorsal and the inter space between the two; posterior base of AD reach considerably behind that of anal and its posterior tip nearly round and reach at the level of or just behind that of anal fin.

Pectoral fin triangular, low, originate considerably in front of dorsal fin front, its tip never reach ventral fin and its outer margin straight. Pectoral fin with a spine and seven branched rays; spine strong with 13- 18 strong retrorse teeth on inner edge. Ventral fin located just behind the dorsal fin and considerably behind pectoral tip and its tip never reach anal front. It is triangular and its outer margin straight. Ventral fin origin nearer to anal origin than to pectoral base. Ventral fin with one unbranched and five branched rays. Anal fin located considerably behind pelvic fin on vertical below 1/3 of the length of adipose dorsal from front, nearer to pelvic origin than caudal base and its tip never reach caudal base. Posterior margin of anal fin roughly straight. An anal papilla present. Anal fin with three unbranched and eight branched rays. Caudal lobes bifurcated, broad and rounded; upper lobe the longer. Caudal fin with 15- 17 rays.

Sensory organs distinctly seen on lateral line; muscle bands clear on lateral sides above and below lateral line and also meet together on lateral line. Skin smooth; upper surface of head smooth but shoulder bone rugose.

**Coloration:** Upper lateral side bluish green; lower lateral side paler; ventral side brownish white. Fins hyaline to light green. A bluish green oval to round spot present on shoulder and a similar triangular spot on caudal base and a thick bluish green band in between these two. Eyes bluish. Pectoral, pelvic and anal fins become dusky after preservation.

**Distribution:** Currently known only from its type locality in Kerala, India.

**Habitat:** Manimala River at Elankadu, the type locality of *Mystus menoni*, is floored generally by rocky substratum; patches of cobbles, boulders and gravelly sand occur at certain places. This area is characterized by intermittent occurrence of moderately dense riparian vegetation**.** *Ficus exasperata, F. glomerata, Gmelina arborea, Bambusa bambos* and *B. vulgaris* are major trees. Wood trees such as *Teaks* and *Albizia*, herbaceous plants such as *Maranta arundinacea, Colocasia esculenta* and *Eclipta prostrata* are infrequently seen. *Anguilla bengalensis bengalensis, Danio malabaricus, Rasbora daniconius, Garra mullya, Dawkinsia filamentosa, Haludaria fasciatus, Pristolepis malabaricus, Etroplus suratensis, E. maculatus, Mesonoemacheilus triangularis, Xenentodon*

*cancila, Mastacembelus armatus, Macrognathus guentheri* etc are the co- occurring fish species.

**Etymology:** The specific epithet "*menoni"* is named after Dr. A. G. K. Menon, the eminent Scientist of Zoological Survey of India, who contributed much to the taxonomy of fresh water fishes of India.

**Comparison:** *Mystus menoni* shows some similarities to *Mystus montanus, M. armatus, M. oculatus M. malabaricus* and *M. canarensis. Mystus montanus* (Fig. 4.C and 5.C), described firstly by Jerdon from Mananthavady River of Wayanad in Kerala, differs from the present species in many characters. In *Mystus montanus* head is longer (28.1 % SL vs. 22.9- 24.3 in *M. menoni*), median longitudinal groove on head is shallow (vs. moderately deep), snout shorter (30.5 % HL vs. 34.6- 41.7), adipose dorsal fin originates fairly behind rayed dorsal fin, above middle of ventral and anal fins (vs. adipose dorsal fin originates a little behind the rayed dorsal fin and also above a little behind the front base of ventral), length of base of adipose dorsal fin shorter (21.5 % SL vs. 27.3- 30.5), posterior tip of outer margin of dorsal spine with 3 small serrations (vs. not serrated), anal fin longer (15.6 % SL vs. 11.2- 12.9), no distinct color band on mid lateral line and two narrow whitish yellow lines present one above and one below lateral line (vs. a thick bluish green band present on mid lateral line and no bands above and below it) and a distinct black oval caudal spot present (vs. a bluish green triangular spot).

The present species differs from *M. armatus* (4. D and 5.D) described firstly by Day from Karavannoor River (Easa and Shaji, 2003) of Malabar in Kerala. In *Mystus armatus* a distinct, deep black spot present at the front base of dorsal fin (vs. absent in *M. menoni*), dorsal surface of head rugose (vs. not rugose), eyes larger, 30.0 % HL and they are located closely, IOW 28.6 % HL (vs. eyes comparatively smaller, 22.9- 25.0 % HL and are located comparatively away, IOW 36.0- 40.4 % HL), ventral fin longer, 18.3 % SL and reach anal fin (vs. ventral fin comparatively shorter, 13.0- 15.8 % SL and never reach anal fin), maxillary barbels reach to caudal fin base (vs. reach only anal fin base), snout shorter (31.8 % HL vs. 34.6- 41.7), mid lateral line thin (vs. a thick mid lateral band present), no distinct color spots on caudal and humeral regions (vs. distinct colored humeral and caudal spots present) and caudal lobes pointed (vs. rounded). In *Mystus armatus* length of rayed dorsal fin equal to body depth at dorsal fin origin (vs. length of dorsal fin shorter than body depth in *M. menoni*), width of caudal peduncle lesser, (3.5 % SL vs. 5.4- 6.4 % SL), inter dorsal distance equal to snout length (vs. shorter than snout length) and 19 rays present in caudal fin (vs. 15- 17).

*Mystus menoni* shows similarities to *M. oculatus* (4. E and 5. E), described firstly by Valenciennes (1839) from Malabar, in the possession of a median longitudinal groove formed of two fontanels and in having an occipital process which reaches to base of dorsal fin. But some scientists such as Grant (2004) are of opinion that *M. oculatus* is a synonym of *M. armatus. Mystus oculatus* is similar to *M. armatus* in having a black spot on the front of dorsal spine, median longitudinal groove formed of two fontanels and occipital process reaches the basal bone of dorsal fin. But *Mystus oculatus* shows many taxonomical differences to *M. armatus.* In *M. oculatus*, anal fin rays are iii, 9-10 (vs. iii, 8 in *M. armatus),* caudal fin with 17 rays (vs. 19), height of adipose dorsal fin is greater (5.5- 6.7 % SL vs. 4.7), length of base of adipose dorsal fin shorter (17.2- 19.0 % SL vs. 28.9), inter dorsal distance greater (16.5- 18.2 % SL vs 8.3), dorsal spine longer (14.4- 16.5 % SL vs. 11.8), median cephalic fontanel starts from in front of base of nasals and it reach occipital process (vs. median fontanel starts from behind the base of nasal barbels' origin and it never reach occipital process), nasal barbels reach half way between posterior margin of orbit and occiput (vs. reach occipital process), maxillary barbels reach posterior most base of anal fin (vs. reach to caudal base), posterior tip of adipose dorsal fin never reach tip of anal fin (vs. reach behind anal fin tip ), posterior base of adipose dorsal is at the level of posterior base of anal fin (vs. considerably behind posterior base of anal fin), ventral fin tip never reach anal fin origin (vs. reach anal fin origin), tip of pectoral fin never reach anterior base of adipose dorsal (vs. pectoral tip reach fairly behind the adipose dorsal origin) and no spine let present before dorsal fin ( vs. a spine let present).

*Mystus oculatus* differs from *M. menoni* in many meristic and morphometric features. In *Mystus oculatus* eyes larger (33.0- 40.0 % HL vs. 22.9- 25.0 in *M. menoni*), orbits are closely located (IOW 23.6- 27.5 % HL vs. 36.0- 40.4), head comparatively deeper (HD 16.0- 18.2 % SL

vs. 13.9- 15.7), head width lesser (65.0- 71.7 % HL vs. 73.1- 80.0), pectoral fin with 8- 9 branched rays (vs. 7), body width lesser (15.5- 16.7 % SL vs. 17.3- 19.6), rayed dorsal fin longer (21.1- 23.6 % SL vs. 16.7- 20.8), outer half of rayed dorsal fin black (vs. not black), dorsal spine elongated (14.4-16.5 % SL vs. 10.7- 13.9), a deep black spot present in front of base of rayed dorsal fin (vs. black spot absent), length of base of adipose dorsal fin considerably shorter (17.2- 19.0 % SL vs. 27.3- 30.5) and anal fin with 9- 10 branched rays (vs. 8).

*Mystus malabaricus* (Fig. 4. A and 5. A), described firstly by Jerdon from mountain streams of Malabar, can be easily differentiated from the present species. In *Mystus malabaricus* body depth lesser (19.0- 20.5 % SL vs. 21.1- 23.6 in *M. menoni*), head width lesser (68.3- 72.2 % HL vs. 73.1- 80.0), eyes set closely (IOW 26.8- 30.0 % HL vs. 36.0- 40.4), occipital process short and it never reaches the basal bone of dorsal fin (vs. occipital process comparatively longer and it reaches basal bone of dorsal fin), pectoral spine shorter (12.0- 13.3 % SL vs. 15.6- 16.8), pre dorsal region from dorsal front to occiput is covered by a thick layer of flesh (vs. lacking), dorsal spine shorter (9.8- 10.8 % SL vs. 10.7- 13.9) and caudal peduncle deeper (13.3- 15.5 % SL vs. 10.4- 11.4).

The present species can be distinctly separated from '*Hara malabarica'* Day in many characters. '*Hara malabarica'* was described originally by Day (1865) from Mundakkayam of Travancore Hills in Kerala state. *Mystus canarensis* (4.B and 5. B) is a replacement name suggested for *Hara malabarica* by Grant (1999). It was based on a specimen from Canara (AMS B.7624) and Grant considers it was from Mangalore of Karnataka state. But Day (1865) described *Hara malabarica* from 'Travancore'- "I received some specimens of this fish from Rev. H. Baker (junior) from the mountain streams of Travancore". Day described many other new species of fishes,(*Haludaria melanympyx*, *Mesonemacheilus triangularis*, *Puntius denisoni*) all of which were ''received from Rev. H. Baker, jun…obtained in the stream at Mundakkayam, in the hill ranges of Travancore''. *Hara malabarica* also might have been received from Mundakkayam of Kottayam district. Moreover the five specimens collected by the first author of this paper from Mundakkayam match in all taxonomical characters to Day's description (Day, 1865) of *Hara malabarica.* Similar to Day's description, the color of the presently collected specimens is deep leaden, a dark brown spot on shoulder surrounded by a lighter margin, bases of pectoral and anal yellowish, no distinct colour band on lateral line, occipital process never reaches basal bone of dorsal fin, lateral line with sensory organs in the form of short parallel tubes, pectoral fin with 8 teeth on inner margin and outer margin finely serrated externally and caudal lunated. As the *Mystus canarensis* of Grant does not possess many of the above mentioned characters and also because it was not collected from its type locality in Kerala, the neotype designation cannot be accepted here and the replacement name is considered as invalid. (Wayanad, the locality of Rahul kumar's photo of *Mystus canarensis* in Grant's paper is 245 miles away and Mangalore, the type locality of Grant's species (AMS B.7624) is 314 miles away from Mundakkayam, the type locality of *Hara malabarica*). But the name *Mystus canarensis* is used here tentatively. The fresh specimens of *'Mystus canarensis'* from Wayanad by Rahul Kumar given in Grant's paper are undoubtfuly of young ones of *Mystus malabaricus*. The first author collected many specimens of the latter species from Mananthavady of Mananthady River at Wayanad; young ones of it are very similar to the photos of fresh specimens given by Grant and they have distinct no mid lateral colour band similar to *Hara malabarica*.

In *Mystus canarensis* a dark brown spot surrounded by a white ring present on humeral region (vs. no such humeral spot), no mid lateral color band (vs. thick bluish green mid lateral band present), occipital process short, a little less than orbit diameter and never reach dorsal fin front (vs. occipital process long, fairly greater than eye diameter and it reach dorsal fin), pectoral fin with 9 branched rays (vs. 7), upper half of rayed dorsal fin and outer half of anal fin black (vs. hyaline to light green), tip of rayed dorsal fin never reaches adipose dorsal front (vs. tip of rayed dorsal fin reach behind the origin of adipose dorsal fin), length of base of adipose dorsal fin shorter (22.8- 25.1% SL vs. 27.3- 30.5) and caudal fin with 18 rays (vs. 15- 17).

**Table 1.** Morphometric features of *Mystus menoni* (n=6).

| No. | Characters | Holotype ZSI 4628 | Range (ZSI FF 4628, ZSI/WGRC2417) | Mean | **SD** |
|---|---|---|---|---|---|
| 1 | Total length (mm) | 128.7 | 128.5- 139.0 | 132.0 | 9.5 |
| 2 | Standard length(mm) | 101.7 | 101.0- 109.0 | 105.0 | 8.5 |
| | | Percentage of standard length | | | |
| 3 | Head length | 23.6 | 22.9- 24.3 | 23.4 | 0.6 |
| 4 | Head depth | 15.7 | 13.9- 15.7 | 14.6 | 0.74 |
| 5 | Head width | 18.2 | 17.8- 18.4 | 18.1 | 0.5 |
| 6 | Body depth at dorsal origin | 23.6 | 21.1- 23.6 | 22.5 | 1.7 |
| 7 | Body depth at anal origin | 17.7 | 16.8-18.8 | 17.7 | 0.9 |
| 8 | Body width at dorsal origin | 19.2 | 17.3- 19.6 | 18.5 | 1.3 |
| 9 | Body width at anal origin | 10.8 | 10.4- 11.2 | 10.9 | 0.6 |
| 10 | Pre dorsal length | 36.9 | 33.0- 36.9 | 34.8 | 1.4 |
| 11 | Post dorsal length | 67.9 | 59.8- 67.9 | 63.4 | 2.8 |
| 12 | Pre pectoral length | 21.1 | 20.6- 22.9 | 21.5 | 0.9 |
| 13 | Pre pelvic length | 49.2 | 46.3- 51.4 | 48.3 | 1.8 |
| 14 | Pre anal length | 67.3 | 66.9- 68.2 | 67.6 | 0.6 |
| 15 | Length of rayed dorsal fin | 16.7 | 16.7- 20.8 | 18.6 | 2.1 |
| 16 | Length of adipose dorsal fin | 6.4 | 4.7- 6.4 | 5.3 | 0.6 |
| 17 | Length of pectoral | 17.7 | 16.5- 18.3 | 17.5 | 2.1 |
| 18 | Length of pelvic | 14.8 | 13.0- 15.8 | 14.2 | 1.0 |
| 19 | Length of anal | 12.8 | 11.2- 12.9 | 11.8 | 1.9 |
| 20 | Length of dorsal spine | 13.8 | 10.7- 13.9 | 12.2 | 1.9 |
| 21 | Length of pectoral spine | 16.7 | 15.6-16.8 | 16.2 | 0.7 |
| 22 | Length of base of RD | 16.7 | 14.9- 18.4 | 16.6 | 1.2 |
| 23 | Length of base of AD | 30.3 | 27.3- 30.5 | 28.3 | 2.0 |
| 24 | Length of base of pectoral | 4.9 | 4.4- 5.9 | 4.9 | 0.6 |
| 25 | Length of base of pelvic | 4.4 | 4.0- 4.5 | 4.3 | 0.5 |
| 26 | Length of base of anal | 12.4 | 12.2- 13.8 | 13.1 | 1.2 |
| 27 | DPPL | 28.5 | 26.6- 32.7 | 29.4 | 2.1 |
| 28 | DPLA | 21.6 | 19.2- 21.6 | 20.2 | 1.3 |
| 29 | Length of caudal peduncle | 17.7 | 15.1- 17.8 | 16.2 | 1.2 |
| 30 | Depth of caudal peduncle | 10.8 | 10.4- 11.9 | 10.7 | 0.6 |
| 31 | Width of caudal peduncle | 5.6 | 5.4-6.4 | 6.1 | 0.5 |
| 32 | DRD & AD | 7.9 | 7.3- 8.4 | 7.9 | 1.6 |
| 33 | Head length (mm) | 24.0 | 24.0- 26.0 | 25.2 | 1.5 |
| | | Percentage of head length | | | |
| 34 | Head depth | 66.7 | 58.3- 68.0 | 63.4 | 3.3 |
| 35 | Head width | 77.1 | 73.1- 80.0 | 76.5 | 2.6 |
| 36 | Eye diameter | 23.2 | 22.9- 25.0 | 23.4 | 1.3 |
| 37 | Inter orbital width | 37.5 | 36.0- 40.4 | 38.3 | 2.2 |
| 38 | Inter narial width | 20.8 | 19.2- 23.0 | 20.5 | 1.7 |
| 39 | Snout length | 40..0 | 34.6- 41.7 | 37.6 | 2.4 |
| 40 | Width of gape of mouth | 49.5 | 42.3- 50.0 | 46.4 | 3.2 |
| 41 | Length of maxillary barbels | 304 | 280- 312 | 296 | 13.1 |
| 42 | Length of nasal barbels | 63.0 | 62.5- 83.0 | 71.6 | 8.3 |
| 42 | Length of outer mandibulars | 141.7 | 124.0- 148.0 | 136.4 | 10. 7 |
| 43 | Length of inner mandibulars | 85.0 | 83.0- 104.0 | 93.5 | 6.6 |
| 44 | Length of upper CL | 112.0 | 111.0- 120.0 | 115.3 | 4.2 |
| 45 | Length of lower CL | 95.8 | 88.0- 102.0 | 95.4 | 6.2 |

**Table 2.** Meristic counts of *Mystus menoni* and its relative species.

| Characters | *M. menoni* | *M.montanus* | *M.armatus* | *M.malabaricus* | *M.canarensis* | *M. oculatus* |
|---|---|---|---|---|---|---|
| D | I-II, 7 | I, 7 | II, 7 | I, II, 6-7 | I, 7 | I,7 |
| P | I, 7 | I, 6 | I, 9 | I, 7-8 | I, 8-9 | I, 8-9 |
| V | i, 5 | i, 5 | i, 5 | i, 5 | i, 5 | i, 5 |
| A | iii, 8 | iii, 8 | iii, 8 | iii,8 | iii, 8 | iii, 9-10 |
| C | 15- 17 | 15 | 19 | 17 | 18 | 17 |
| DspT | F S | 8 | 6 | 0 | 0 | 2-8 |
| PspT | 13-18 | 14- 15 | 10-14 | 7-13 | 8 | 12-14 |

**Table 3.** Biometric characters of relative species of *Mystus menoni.*

| Characters | *M.menoni* ZSI/WGRC2 417, ZSI 4628 | *M. malabaricus* ZSI 4931 | *M. oculatus* ZSI 4933 | *M.armatus* STC/DOZ 10 | *M. montanus* STC/DOZ 11 | *M. canarensis* ZSI 4939 |
|---|---|---|---|---|---|---|
| Total length (mm) | 128.5- 139.0 | 92.0-127.0 | 111.0-122.0 | 112.8 | 86.3 | 107.0-126.0 |
| Standard length(mm) | 101.0- 109.0 | 71.5- 102.0 | 85.0-91.0 | 84.8 | 67.5 | 87.0-101.0 |
| Percentage of standard length | | | | | | |
| Head length | 22.9- 24.3 | 23.8- 24.7 | 23.3-25.6 | 26.0 | 28.1 | 22.8-24.3 |
| Head depth | 13.9- 15.7 | 13.2- 14.4 | 16.0-18.2 | 16.0 | 17.0 | 11.2-13.0 |
| Head width | 17.8- 18.4 | 16.7- 17.8 | 15.1-18.3 | 19.5 | 20.7 | 15.0-17.8 |
| Body depth at dorsal origin | 21.1- 23.6 | 19.0- 20.5 | 20.9-23.0 | 22.4 | 23.0 | 17.2-20.8 |
| Body depth at anal origin | 16.8-18.8 | 16.8- 17.8 | 17.4-19.2 | 18.9 | 19.3 | 16.6-18.1 |
| Body width at dorsal origin | 17.3- 19.6 | 15.2- 16.8 | 15.5-16.7 | 17.7 | 17.0 | 14.7-16.8 |
| Body width at anal origin | 10.4- 11.2 | 9.6- 10.9 | 10.0-11.6 | 10.6 | 10.9 | 10.6-12.4 |
| Pre dorsal length | 33.0- 36.9 | 34.8- 37.1 | 37.2-37.8 | 36.0 | 40.0 | 36.2-38.1 |
| Post dorsal length | 59.8- 67.9 | 64.8- 67.1 | 63.1-66.2 | 66.0 | 64.4 | 62.0-65.8 |
| Pre pectoral length | 20.6- 22.9 | 20.4- 22.3 | 22.0-26.1 | 23.6 | 23.7 | 18.7-21.3 |
| Pre pelvic length | 46.3- 51.4 | 49.0- 51.0 | 47.1-51.2 | 49.5 | 50.4 | 48.7-49.7 |
| Pre anal length | 66.9- 68.2 | 67.1- 69.4 | 68.1-75.6 | 67.8 | 72.6 | 66.3-70.7 |
| Length of rayed dorsal fin | 16.7- 20.8 | 17.6- 19.8 | 21.1-23.6 | 22.4 | 20.4 | 15.8-17.8 |
| Height of adipose dorsal fin | 4.7- 6.4 | 4.1- 5.7 | 5.5-6.7 | 4.7 | 6.0 | 3.8-4.9 |
| Length of pectoral | 16.5- 18.3 | 15.7- 17.8 | 18.0-20.0 | 20.0 | 17.8 | 16.6-17.2 |
| Length of pelvic | 13.0- 15.8 | 13.7- 15.3 | 13.9-15.6 | 18.3 | 13.3 | 14.0-16.1 |
| Length of anal | 11.2- 12.9 | 11.2- 15.1 | 13.0-15.1 | 18.2 | 15.6 | 11.3-13.6 |
| Length of dorsal spine | 10.7- 13.9 | 9.8- 10.8 | 14.4-16.5 | 11.8 | 10.4 | 8.1-9.4 |
| Length of pectoral spine | 15.6-16.8 | 12.0- 13.3 | 15.1-17.2 | 15.3 | 16.2 | 11.2-13.0 |
| Length of base of RD | 14.9- 18.4 | 15.3- 16.2 | 14.0-15.3 | 17.1 | 16.3 | 13.0-15.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Length of base of AD | 27.3- 30.5 | 27.3- 30.7 | 17.2-19.0 | 28.9 | 21.5 | 22.8-25.1 |
| Length of base of pectoral | 4.4- 5.9 | 4.1- 5.4 | 4.7-5.6 | 4.0 | 5.6 | 3.4-4.3 |
| Length of base of pelvic | 4.0- 4.5 | 3.6- 4.8 | 3.3-4.1 | 4.1 | 4.4 | 3.2-3.5 |
| Length of base of anal | 12.2- 13.8 | 13.6- 15.3 | 12.8-14.0 | 12.8 | 11.1 | 9.8-12.4 |
| DPPL | 26.6- 32.7 | 28.3- 31.7 | 25.9-30.8 | 28.3 | 28.1 | 28.7-32.4 |
| DPLA | 19.2- 21.6 | 19.6-20.1 | 19.8-22.2 | 18.2 | 22.2 | 18.7-22.4 |
| Length of caudal peduncle | 15.1- 17.8 | 16.4- 18.5 | 15.6-19.2 | 18.9 | 14.8 | 18.2-20.1 |
| Depth of caudal peduncle | 10.4- 11.9 | 13.3- 15.5 | 10.6-11.6 | 11.8 | 11.9 | 11.9-14.1 |
| Width of caudal peduncle | 5.4-6.4 | 3.0- 4.7 | 4.7-6.1 | 3.5 | 5.6 | 4.0-5.4 |
| DRD & AD | 7.3- 8.4 | 8.2- 11.3 | 16.5- 18.2 | 8.3 | 8.9 | 11.8-15.5 |
| Head length (mm) | 24.0- 26.0 | 17.5- 24.5 | 20.0-23.0 | 22.0 | 19.0 | 20.0—24.5 |
| Percentage of head length | | | | | | |
| Head depth | 58.3- 68.0 | 53.7- 60.0 | 66.0-71.3 | 61.4 | 60.5 | 48.8-56.1 |
| Head width | 73.1- 80.0 | 68.3- 72.2 | 65.0- 71.7 | 75.0 | 73.7 | 65.1-74.1 |
| Eye diameter | 22.9- 25.0 | 23.7- 29.3 | 28.3- 40.0 | 30.0 | 26.3 | 20.4-27.5 |
| Inter orbital width | 36.0- 40.4 | 26.8- 30.0 | 23.6- 27.5 | 28.6 | 33.2 | 30.2-35.0 |
| Inter narial width | 19.2- 23.0 | 18.4- 22.2 | 16.0-17.5 | 22.7 | 18.4 | 18.6- 25.0 |
| Snout length | 34.6- 41.7 | 29.3- 34.7 | 26.1-28.3 | 31.8 | 30.5 | 31.7- 36.3 |
| Width of gape of mouth | 42.3- 50.0 | 40.0- 44.4 | 35.0- 41.3 | 40.0 | 44.7 | 39.0- 40.8 |
| Length of maxillary barbels | 280- 312 | 253.2- 291.7 | 308.7- 322.7 | 363.6 | 226.3 | 228.6- 265.9 |
| Length of nasal barbels | 62.5- 83.0 | 61.2- 75.0 | 66.0-70.0 | 77.3 | 57.9 | 59.2- 85.4 |
| Length of outer mandibulars | 124.0- 148.0 | 110.2- 126.7 | 122.6- 145.7 | 170.5 | 100.0 | 92.7- 132.1 |
| Length of inner mandibulars | 83.0- 104.0 | 78.8- 88.6 | 72.7-90.0 | 100.0 | 63.2 | 65.3- 75.0 |

## CONCLUSIONS

After the discovery of *Mystus armatus* by Day in 1865 from Thrichur, no other species of the genus *Mystus* were described from Kerala. Even though many catfishes of different characters were collected by many scientists from various parts of Kerala, they all were included along with the existing species; it was due to lack of a clear picture and sufficient knowledge about the existing species. By the current description of *Mystus menoni*, a new cat fish of this genus reaches to scientific world from Kerala. It is expected that genuine taxonomic research works lead to find more species of this genus from the state.

**Comparative material:** ***Mystus armatus***: STC/DOZ 10, 1 ex, 84.8 mm SL, Arattupuzha, Karuvannoor River, Trichur, collected by Mathews Plamoottil, 13.01. 2013; ZSI/WGRC 7886, 2 ex, Kuniyanpuzha, Kazargod dt, coll. Jafer Sherif, identified by K. C. Gopi, 01.07.1995; ZSI/SRC 1260, 1 ex, Meenachil River, coll. E. Ahlander, 06.12. 1987; ZSI/WGRC 7425, 1 ex, Bhavani River, Wayanadu, coll. P. M. Suresh, 02.02. 1995; ZSI/WGRC/IR/V 8470, 3 ex, Thoonacadavu dam, Parambikkulam WLS, Palakkadu, coll. P. M. Sureshan, Det. By. K. C. Gopi, 27.10.95; ZSI uncat. 10 ex, 60- 84 mm SL, Puzhakkal, 15 km north of Trichur, Kerala, coll. K. C. Jayaram and Anuradha Sanyal, 20. 02. 1985; ZSI uncat. 6 ex,

56- 77 mm SL, Muppinipotti on Punnanpuzha, Kerala, coll. K. C. Jayaram and Anuradha Sanyal, 18.02. 1985. ***Mystus malabaricus*:** ZSI FF 4931, 5 ex, 71.5-102 mm SL, Kallodi, Mananthavady River, Wayanad, Kerala, collected by Mathews Plamoottil, 20.03.2013; ZSI/SRC 313, 2 ex, Muthanga, coll. R. S. Pillai, 12.10.1976; ZSI/WGRC 9395, 1 ex, Ranipuram, Kazargod Dt, coll. M. madhavan, idenfified by K.C. Gopi, 07.07.1996; ZSI unreg. 7 ex, Mananthavady River at Choothakadavu near Kaniyaram, coll. K. C. Jayaram, 14.02.1985; ZSI uncat, 2 ex, 94.8 & 100.3 mm SL, Travancore, ZSI uncat, 3 ex, Cauvery River, Kerala, coll. G. M. Natarajan, 1984; ZSI uncat, 5 ex, 81- 100 mm SL, Travancore, 1946. ***Mystus montanus*:** STC/DOZ 11**,** 1 ex, 67.5 mm SL, Koodal kadavu, Mananthavady River, Wayanad, collected by Mathews Plamoottil, 16.03.2013; KFRI/88, 1 ex, Noolpuzha, coll. Shaji, C. P, 11.06.1996; ZSI/SRC/654, 2 ex, Pachiyaru, coll. M. Vasanth, 12.02. 1986; ZSI uncat, 8 ex, 65- 76 mm SL, Chittoorpuzha at Thathamangalam road bridge about 17 km south of Palaghat town, coll. K. C. Jayaram Jayaram and Anuradha Sanyal, 18.02. 1985. Anuradha Sanyal, 20. 02. 1985; ZSI uncat, 7 ex, 59- 78 mm SL, Malampuzha dam, Kerala, coll. K. C. Jayaram Jayaram and Anuradha Sanyal, 18.02. 1985. Anuradha Sanyal, 22.02. 1985; ZSI/ SRC 5715, 1 ex, 75 mm SL, Thirumurhty Dam, Indira Gandhi Wild Life Sanctuary, coll. M.S. Ravichandran, 27.02.1998; ***Mystus oculatus*:** ZSI FF 4933, 5 ex, 85- 91 mm SL, Arattupuzha, Karavannoor River, Trichur, Kerala, collected by Mathews Plamoottil, 10.01.2013; ZSI 487, I ex, India, purchased from Francis Day; ZSI, unreg, 4 ex, 78.0- 86.8 mm SL, Chaliyar River at Edavanna, 2 km from Manjeri, Kerala, coll. K. C. Jayaram and Anuradha, 18.02. 1985; ***Mystus canarensis:*** ZSI FF 4939, 1 ex, 88.5 mm SL, Manimala River at Mundakkayam, Kerala, coll. Mathews Plamoottil, 10.02.12; STC/DOZ 12, 4 ex, 87- 101 mm SL, Manimala River at Mundakkayam, Kerala, coll. Mathews Plamoottil, 10.02.12.

## CONFLICT OF INTERESTS

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

## ACKNOWLEDGMENTS

First author acknowledges the University Grants Commission of India for sanctioning Faculty Development Programme to undergo research. Both authors acknowledge Principal, St. Thomas College, Kozhencherry, Kerala for providing the facilities.

## REFERENCES

Day, F., 1865. The Fishes of Malabar. Bernard Quaritch., London.

Day, F., 1878. 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, pp. 169-368.

Day, F., 1889. Fauna of British India including Ceylon and Burma. Taylor and Francis., London, p: 509.

Easa, P.S. and Shaji, C.P., 2003. Biodiversity documentation for Kerala. Kerala Forest Research Institute, Peechi, p: 127.

Grant, S., 1999. A replacement name and neotype designation for *Hara malabarica* Day, 1865, with notes on related species (Siluriformes). *Aqua. J. Ichtyol. Aquatic ziol.*, 3(4): 169-174.

Grant, S., 2004. The striped cat fishes of the genus *Mystus* Scopeli 1777 (Siluriformes: bagridae). *J. Catfish study Group*, 5(2): 5-17.

Jayaram, K.C., 2002. Fundamentals of fish taxonomy. Narendra publishing House., Delhi

Jayaram, K.C. and Anuradha, S., 2003. Revision of the fishes of the genus *Mystus* Scopoli. Records of Zoological Survey of India, Occasional Paper, 207:1-136.

Jayaram, K.C., 2006. Cat fishes of India. Narendra Publishing House, Delhi.

Jerdon, T.C., 1849. On the fresh water fishes of Southern India. *Madras J. Lit. Sci.*, 15: 302-345.

Misra, K.S., 1976. The fauna of India and Adjacent countries. *Zool Sur. India.*, Kolkata, p. 367.

Talwar, P. K. and Jhingran, A., 1991. Inland fishes of India and adjacent countries. Oxford and IBH publishing Co. Pvt. Ltd., New Delhi, p. 541.

Valenciennes, M.A., 1839. Histoire naturelle Poissons, Paris, p. 540.