

## A Systematic Study on Genus *Mystus* from Paschim Medinipur, West Bengal, India

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### Abstract

Present study reveals the existence of four species under genus *Mystus* from freshwater aquatic systems of Paschim Medinipur. It is the first time study on the group from the study area. Taxonomy of the species and their geographical distribution is the prime interest of the present work. A comprehensive zoogeography of the species in different blocks has been recorded in details.

**Keywords:** Aquatic systems; Geographical distribution; Lowland areas; Ornamental fish

### Introduction

Small indigenous freshwater fish are often an important ingredient in the diet of village people who live in the proximity of freshwater bodies. Word 'indigenous' means the originating in and characteristic of a particular region or country & native area. Small indigenous freshwater fish species (SIF) are defined as fishes which grow to the size of 25-30 cm in mature or adult stage of their life cycle [1]. They inhabit in rivers and tributaries, floodplains, ponds, tanks, lakes, beels, streams, lowland areas, wetlands and paddy fields. These fish can live in a harsh environmental condition and able to reproduce and grow rapidly in favourable condition. These species are not only a source of vital protein to the rural poor but also a valuable source of micro-nutrients such as calcium, zinc, iron & fatty acids [2,3]. Research has proved that the bioavailability of calcium from these small indigenous freshwater fish species is at par with that derived from milk [2]. These species also can provide a source of supplementary income to rural households. Given the local demand for small indigenous fish species of freshwater origin, the FAO [4] has also indicated the possibility of integrating such indigenous species into freshwater culture systems. Small scale aquaculture along with Indian major carps of *A. mola*, *Puntius sophore*, *Osteobrama cotio*, *Cirrihinus reba*, *Labeo bata*, *Gudusia chapra* have been reported [5-7]. In the Indian region out of 2500 species, 930 are freshwater inhabitants & 1570 are marine [8]. ZSI has recorded 2641 Pisces in 2012. A lot of works has been done in Northern region followed by southern region of India. Recent paper of Goswami et al. [9] enlisted 422 fish species from north east India, belonging to 133 genera and 38 families. Rema and Indra [10] have reported 667 species under 149 Genera of 35 families in southern region. 950 species of freshwater fishes have been found in India. If we look for the report from West Bengal, we see that a very few works has been done on freshwater fishes from the region.

In West Bengal 171 freshwater fish species was reported by Sen [11]. After few years there were a wide change in number of fish species has been reported. Barman RP [12] recorded 239 freshwater species belonging to 147 genera, 49 families and 15 orders from West Bengal. 70 indigenous ornamental fish species belonging to 45 genera, 30 families and 9 orders were reported by Basu et al. [13]. All of these works are mostly based on indigenous ornamental freshwater fishes. But works on small indigenous freshwater fishes, other than ornamentals are scanty. So, the record of freshwater fish fauna of Paschim Medinipur is nil. Therefore, present work is the first attempt towards the recording of small indigenous freshwater fish fauna of Paschim Medinipur. The

results presented here provide an insight to the macro-faunal diversity of the study area, and have established a baseline for future studies. Present paper is restricted only on the genus *Mystus* and recorded four species namely *Mystus bleekeri*, *Mystus tengera*, *Mystus cavasius* and *Mystus vittatus* from the study area.

### Materials and Methods

Present study is mainly based on the specimen collected from different river, pond, bills applying different commercial fishing method throughout all the blocks of Paschim Medinipur (22° 25'N 87° 19'E) during May 2013 to November 2015. Collection of fish fauna was done at early morning and specimens were immediately preserved in 4-6% formaldehyde and were brought to laboratory in preserved condition. Then fish specimen were washed and finally preserved in 4-6% formaldehyde. Body parts of all the specimen have been dissected and studied for identification under stereoscopic binocular microscope. In some cases additional important diagnostic characters are included. The detailed synonymies have been furnished to the genera and species and also their diagnosis, distribution, taxonomic remarks and photograph of a representative species have been furnished. In addition an attempt has been made to include a comprehensive coverage of the references in reference section. For all citations of taxon author's name and year of publication has been given.

### Systematic Accounts

Fishes under study are belongs to the class Actinopterygii. A brief account of its systematic position is given below:

Kingdom: Animalia (Linnaeus, 1758)

Phylum: Chordata (Haeckel, 1874)

Class: Actinopterygii (Klein, 1885)

Order: Siluriformes Cuvier, 1817

Family: Bagridae Bleeker, 1858

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## Genus *Mystus Scopoli, 1777*

Scopoli [14] created the genus based on the *Bagrus haplepis* Valenciennes, 1840 as type species for the genus. 45 species of Genus *Mystus* has been found in the world and 19 species found in Indian freshwater. A brief history of the genus with special reference to Indian contribution has been given below.

1862-*Aspidobagrus* Bleeker, *Afdeling Natuurkunde*, 14: 390-399.

1854-*Mystus* Gray [J. E.], *Catalogue of fish collected and described by Laurence Theodore Gronow, now in the British Museum*. London. i-vii+1-196.

**A) Type species:** *Bagrus haplepis* Valenciennes, 1840, *Histoire naturelle des poissons*, v. 14: 389-420.

**B) Type locality:** Not found.

**C) Diagnosis of the genus:** Body short or it can be moderately elongate. Mouth is terminal or sub terminal. Eyes situated in the anterior portion of the body. Four pairs of barbells, one pair of maxillary and nasal barbells and two pairs of mandibular barbells. Two dorsal fin, anterior with a spine and posterior is smooth. Dorsal fin with 7-8 rays. Pectoral fin with 7-11 rays and with a strong spine which is serrated on its inner edge. Pelvic fin has six rays. Anal fin 9-16 rays. Caudal fin forked with unequal lobes. Lateral line is complete.

**D) Remark:** Four species *Mystus bleekeri*, *Mystus tengera*, *Mystus cavasius* and *Mystus vittatus* has been recorded from the study area.

### E) Key to species

1. Humeral spot dark or Faint.

Humeral spot is bold, body with five bands, three dark bands and two pale lines.

2. Humeral spot dark.

Humeral spot is faint, body with five parallel longitudinal lines.

3. Body with two parallel stripes on each side of lateral line.

Body has a mid-lateral line.

## *Mystus bleekeri* (Day, 1877)

*Mystus bleekeri* was originally described as *Bagrus keletius* [15] from Bengal. A brief history of the species with special reference to Indian contributions has been given below.

1877 *Macrones bleekeri* Day, *Fishes of India*: 451, pl.101, Figure 1; Day, 1889, *Fauna Br. India*, Fishes, 1:162.



Figure 1: *Mystus vittatus*.

1970 *Mystus bleekeri* var. *Burmanicus* Jenkins, *Rec. Indian Mus*, 5(2): 138.

1977 *Mystus (Mystus) bleekeri* Misra, *Fauna of India*, Pisces (2ndedn), 3: 8.

1977 *Mystus bleekeri* Jayaram, *Rec. Zool. Surv. India occ. Paper*, (8): 29.

**A) Type species:** *Macrones bleekeri* Day, 1877, *Fishes of India*: 451, pl. ] 01, Figure 1.

(Replacement name for *Bagrus keletius* Blecker 1846): Day, 1889 *Fauna of India*, Fishes, 1: 162.

**B) Type locality:** Jumna [Yamuna] river, India.

**C) Materials Examined:** 2 female (8 cm-9.4 cm), 3 male (8.6 cm-9.7 cm), Keshiary (Bhasra), Paschim Medinipur, West Bengal, 26.10.2013, B. Paul; 4 female (7.5 cm-10.9 cm), Pingla (Khamarkusumda, Churchara, Mundamari, Gobordhanpur), Paschim Medinipur, West Bengal, 28.05.2013, B. Paul; 1 female (9.5 cm), 4 male (8.6 cm-10.5 cm) Debra (Kethar, Panchgeria), Paschim Medinipur, West Bengal, 23.05.2013, A. Chanda & B. Paul.

**D) Diagnosis of the species:** Body compressed. Body depth is 3.8 to 4.2 times in SL. Mouth terminal. Barbels four pair maxillary pair reach beyond the base of anal fin. Median longitudinal groove reach the base of occipital process. Eye diameter is 4-4.5 times in HL. Adipose fin is long and inserted just after rayed dorsal fin. Humeral spots boldly present. D I 7-8; P I 9-10; V i 5; A iii 6-7.

**E) Distribution: India:** It has been found in India (Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Tripura, Uttar Pradesh, and West Bengal).

**F) Paschim Medinipur:** During the present study the species has been found in Pingla, Debra blocks of Paschim Medinipur.

**G) Elsewhere:** Nepal; Pakistan; Bangladesh.

## *Mystus cavasius* (Hamilton, 1822)

*Mystus cavasius* was originally described as *Pimelodus cavasius* [16] from Gangetic provinces. A brief history of the species with special reference to Indian contributions has been given below.

1877 *Macrones cavasius* Day, *Fishes of India*: 447, pl.100, Figure 1; Day, 1889, *Fauna Br. India*, Fishes, 1:155.

1975 *Mystus mukherjii* Ganguli and Datta, *Zoological Society of India, Odisha*: i-viii, 1-439; *Zoological Society of India*: 293-298.

1976 *Mystus (Mystus) cavasius* Misra, *Fauna of India*, Pisces (2ndedn), 3: 87. *Mystus cavasius* Jayaram, 1976 *Rec. Zool. Surv. India occ. Paper*, (8): 29.

**A) Type species:** *Pimelodus cavllsius* Hamilton-Buchanan, 1822, *Fishes of Ganges*: 203, 379, pl. II.

**B) Type locality:** Gangetic provinces.

**C) Materials examined:** 3 female (8.1 cm-9.6 cm), 6 male (7.6 cm-9.5 cm), Gopiballavpur I (Gopiballavpur), Paschim Medinipur, West Bengal, 07.03.2014, A. Chanda & B. Paul; 5 female (8.0 cm-8.7 cm), 4 male (7.9 cm-9.1 cm), Gopiballavpur II (Tapsia, Andharia), Paschim Medinipur, West Bengal, 29.10.2013, B. Paul; 2 female (8.2 cm-8.6 cm), 6 male (8.4 cm-9.4 cm), Jhargram (Lodhasuli, Sardhia), Paschim Medinipur, West Bengal, 09.09.2013, B. Paul; 7 female (8.3 cm-10.2 cm), 1 male (8.9 cm), Sabong (Mohar, Kundara), Paschim Medinipur,

21.05.2013, B. Paul; 4 female (8.5 cm-11.9 cm), 2 male (9.4 cm-10.5 cm), Pingla (Churchara, Gobordhanpur), Paschim Medinipur, West Bengal, 28.05.2013, B. Paul; 3 female (8.6 cm-9.9 cm), 4 male (7.8 cm-9.6 cm), Debra (Kethar, Panchgeria), Paschim Medinipur, West Bengal, 23.05.2013, B. Paul; 3 female (9.8 cm-11.2 cm), 1 male (10.1 cm), Binpur II (Belpahari), Paschim Medinipur, West Bengal, 13.09.2013, A. Chanda & B. Paul.

**D) Diagnosis of the species:** Body elongate and compressed. Occipital process is narrow. Maxillary barbells in adults extend posteriorly beyond the caudal fin base. In young specimen, do not extend beyond the anal fin. Dorsal spine weak, often feebly serrated. Colour is greyish with a more or less well-defined mid lateral longitudinal stripe. A dark spot emphasized by a pale area along its ventral margin is just anterior to the first dorsal spine. Dorsal, adipose and caudal fins shaded with melanophores. Fin formula-D I 7; P I 8; V i 5; A 10-11.

**E) Distribution: India:** It has been found in India (Assam, Bihar, Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Tripura, Uttaranchal, Uttar Pradesh, and West Bengal).

**F) Paschim Medinipur:** During the present study the species has been found in Pingla, Debra, Binpur II, Garbeta I, Gopiballavpur I, Gopiballavpur II, Jhargram blocks of Paschim Medinipur.

**G) Elsewhere:** Nepal; Bangladesh.

### *Mystus vittatus*

*Mystus vittatus* was originally described as *Silurus vittatus* [16] from Tranquebar, Tamil Nadu. A brief history of the species with special reference to Indian contributions has been given below.

1877-*Macrones vittatus* Day, Fishes of India: 448, pl.98, Day, 1889, Fauna Br. India, Fishes, 1:157.

1976-*Mystus (Mystus) vittatus vittatus* Misra, Fauna of India, Pisces (2nd edn), 3: 105.

**A) Type species:** *Silurus vittatus* Bloch [17], 1794, *Ichthyol. Hist. Nat.* 11: 40, pl.371, [18], Inland Fishes of India and adjacent countries, Vol. 1 & 2).

**B) Type locality:** Tranquebar, South India.

**C) Materials examined:** 4 female (10.1 cm-12.6 cm), 2 male (9.8 cm-10.7 cm), Gopiballavpur I (Gopiballavpur), Paschim Medinipur, West Bengal, 07.03.2014, B. Paul; 2 female (9.3 cm-9.7 cm), 3 male (8.9 cm-9.6 cm), Gopiballavpur II (Tapsia, Andharia), Paschim Medinipur, West Bengal, 29.10.2013, B. Paul; 2 female (9.7 cm-11.7 cm), 1 male (10.7 cm), Sankrail (Paradiha), Paschim Medinipur, West Bengal, 25.10.2013, B. Paul.

**D) Diagnosis of the species (Figure 1):** Body elongate and compressed. Body depth is 3.8-4.2 times in SL. Median longitudinal groove of head reaching base of occipital process. Eye diameter 4.5-6 times in head length. Barbels four pairs, from which maxillary pair reach beyond the pelvic fin, sometimes it reaches the anal fin. Dorsal fin with a weak spine which is serrated on its inner edge. Adipose fin inserted between the dorsal fin and anal fin. Body with grey silver color. Fin formula-D I 7; P I 9; V i 5; A 9-12.

**E) Distribution: India:** It has been found in India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Dadra-Nagar-Haveli, Daman, Delhi, Diu, Goa, Gujarat, Haryana,

Himachal Pradesh, Jharkand, Karaikal, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mahé, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Pondicherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttaranchal, Uttar Pradesh, West Bengal) [19-25].

**F) Paschim Medinipur:** During the present study the species has been found in Sankrail, Gopiballavpur I, Gopiballavpur II blocks of Paschim Medinipur.

**G) Elsewhere:** Nepal; Pakistan; Sri Lanka; Bangladesh.

### *Mystus tengara*

*Mystus tengara* was originally described as *Pimelodus tengara* [16] from a pond located in India. A brief history of the species with special reference to Indian contributions has been given below.

1877-*Macrones tengara* Day, Fishes of India: 447, pl.101; Day, 1889, Fauna Br. India, Fishes, 1:156.

1976-*Mystus (Mystus) tengara* Misra, Fauna of India, Pisces (2nd ed.), 3: 104.

**A) Type species:** *Pimelodus tengara* Hamilton, 1822, *Fishes of Ganges*: 183, 377, pl. 23.

**B) Type locality:** Northern parts of Bengal.

**C) Materials examined:** 2 female (8.9 cm-10.2 cm), 5 male (8.1 cm-10.1 cm), Jhargram (Lodhasuli, Sardhia), Paschim Medinipur, West Bengal, 09.09.2013, B. Paul; 3 female (10.3 cm-11.2 cm), 2 male (10.5 cm-10.8 cm), Sabong (Kundalpal, Harirhat), Paschim Medinipur, 21.05.2013, B. Paul; 7 female (7.9 cm-10.1 cm), 5 male (6.9 cm-9.7 cm), Pingla (Khamarkusumda, Churchara, Mundamari, Gobordhanpur), Paschim Medinipur, West Bengal, 28.05.2013, B. Paul; 1 female (6.9 cm), 3 male (6.8 cm-7.9 cm), Debra (Kethar, Panchgeria), Paschim Medinipur, West Bengal, 23.05.2013, B. Paul; 7 female (9.3 cm-12.4 cm), 3 male (9.7 cm-11.2 cm), Narayangarh (Murakata), Paschim Medinipur, West Bengal, 20.05.2013, B. Paul; 4 female (9.1 cm-11.7 cm), 3 male (8.9 cm-11.8 cm), Salboni (Gaighata), Paschim Medinipur, West Bengal, 27.09.2014, B. Paul; 2 female (7.8 cm-8.2 cm) KGP I (Barkola), Paschim Medinipur, West Bengal, 21.05.2014, B. Paul.

**D) Diagnosis of the species:** Body elongated and slightly compressed. Head depressed with terminal mouth. Barbels four pairs. Dorsal spine long and extend up to head. Pectoral spine is strong than dorsal spine with 1-13 denticulation. Pectoral spine is defensive organ and when the injury occurred it is very painful. Inside 4-5 longitudinal bands present. Adipose fin is short. Upper lobe of caudal fin is longer. Body colour is brown or yellow, with a dark spot on the shoulder. Fin formula-D I 7; P I 8; V i 5; A 10-13; C-19 [26-30].

**E) Distribution: India:** Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Darjeeling, Delhi, Haryana, Himachal Pradesh, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, Tripura, Uttaranchal, Uttar Pradesh, West Bengal.

**F) Paschim Medinipur:** During the present study the species has been found in Sankrail, Gopiballavpur I, Gopiballavpur II blocks of Paschim Medinipur.

**G) Elsewhere:** Bangladesh, Pakistan, Nepal, Afghanistan.

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