

# A report on indigenous freshwater fish under Order Synbranchiformes, from Paschim Medinipur and Jhargram District of West Bengal, India.

Angsuman Chanda

PG Department of Zoology, Raja N. L. Khan Women's College,  
Midnapur, Paschim Medinipur, West Bengal, India.

## Abstract

Present study reveals the existence of three species of small, indigenous fish under two genera of family Mastacembelidae of order Synbranchiformes from freshwater aquatic systems of Paschim Medinipur and Jhargram district of West Bengal. It is the first time study on the group from the study area. Taxonomy of the species as well as their geographical distribution and diversity is the prime interest of the work. A comprehensive zoogeography of the species in different revenue blocks of the districts has been recorded in details. Hence, the work is a documentation of macro faunal diversity at regional level for freshwater ecosystem of the study area.

**Key Words:** *Regional, Diversity, Small, Fish, Synbranchiformes.*

## 1. 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. They inhabit in rivers and tributaries, flood plains, 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 (Roos et al., 2007; Halwart 2008). Research has proved that the bioavailability of calcium from these small indigenous freshwater fish species is at par with that derived from milk (Ross et al., 2007). 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 (1999) has also indicated the possibility of integrating such indigenous species into freshwater culture systems. Small scale aquaculture along with Indian major carps of *Amblypharyngodon mola*, *Puntius sophore*, *Osteobrama cotio*, *Cirrihinus reba*, *Labeo bata*, *Gudusia chapra* have been reported (Ayyappan and Jena J.K.2003, Roos et al 2003, Jena et al., 2008). In the Indian region out of 2500 species, 930 are freshwater inhabitants & 1570 are marine (K.C.Jayaram 2010). 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., (2012) enlisted 422 fish species from north east India, belonging to 133 genera and 38 families. Rema and Indra (2009) have reported 667 species under 149 Genera of 35 families in southern region. 950 species of freshwater fishes have been found in India [Fishbase (ver.10/2015)]. 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, 1992. After few years there were a wide change in number of fish species has been

reported. Barman. R.P. 2007 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. (2012). 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 and Jhargram are nil. Therefore, present work is the first attempt towards the recording of small indigenous freshwater fish fauna of the study area. The results presented here provide an insight to the regional macro-faunal diversity of the study area, and have established a baseline for future studies. Present paper is restricted only on the order Synbranchiformes and recorded three species namely *Macrogathus aral* (Bloch & Schneider, 1801), *Macrogathus pancalus* Hamilton, 1822 and *Mastacembelus armatus* (Lacepède, 1800) under family Mastacembelidae from the site under studied.

## 2. Materials and Methods:

Present study is mainly based on the specimen collected from different river, pond, beells applying different commercial fishing method throughout all the blocks of undivided 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. Identification of specimens has done on the basis of literature like Talwer and Jhingran (1991), K. C. Jayaram (2010) and Fishbas (2013). The detailed synonymies have been furnished to the genera and species and also their diagnosis, distribution, taxonomic remarks 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.

## 3. Results:

### Systematic Accounts

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

Kingdom : Animalia (Linnaeus, 1758)  
 Phylum : Chordata (Haeckel, 1874)  
 Class : Actinopterygii (Klein, 1885)  
 Order : Synbranchiformes.

### Order Synbranchiformes

Literature reveals that the Order Synbranchiformes represents 3 families and all these three are also recorded from Indian water. Study area represents only family Mastacembelidae.

### Family Mastacembelidae

World literature reveals that the Family Mastacembelidae represents three valid genera and Indian water represents two out of the three, named *Mastacembelus* and *Macrogathus*. The study area also represents both the genera.

**Diagnosis of the Family:** Body eel-like, elongate and compressed. Snout pointed, rostral appendages are fleshy, posterior nostrils are present near eyes. 9-42 isolated spines present on dorsal fin with 52-131 soft rays. Two or three spines in anal fin and number of soft rays are 30-130. Scales are small. Caudal fin often connected to posterior end of dorsal & anal fin.

### Key to the genera:

Dorsal fin spines are 33 or more, rostrum relatively small, no rostral tooth plate present

*Mastacembelus*

Dorsal fin spines are 32 or less, rostrum relatively large, rostral tooth plate present

..... *Macrogathus*

## Genus *Macrogathus* Lacepède, 1800

Lacepède (1800) created the genus based on the *Ophidium aculeatum* Bloch, 1786 as type species for the genus from Indonesia. Twenty four species of Genus *Macrogathus* has been found in the world and 10 species were found in India freshwater. Study area represents only two species. A brief history of the genus with special reference to Indian contribution has been given below.

1980 *Macrogathus* Roberts,; Travers, 1984; Roberts, 1986, *Japanese Journal of Ichthyology* v. 33 (no. 2): 95-109.

1801 *Rhynchobdella* Bloch and Schneider, *Sumtibus Auctoris Impressum et Bibliopolib* 1975 *Sanderiano Commisum*. i-lx + 1-584, Pls. 1-110.

**Type species:** *Ophidium aculeatum* Bloch, 1786, *Naturgeschichte der ausländischen Fische*. Berlin. v. 2:145-180.

**Type locality:** Kali Brantas basin, channelled stream through drained area at Campurdarat south to Tulungagung, Java Timur, Java, Indonesia.

**Diagnosis of the Genus:** Body elongated and compressed. Rostrum is relatively larger & fleshy. In some species rostrum with concave ventral surface lined with tooth plates. Pre-orbital and preopercular spines are absent. In anterior nostrils rim with six fingers like projections are present. Dorsal fin with 13-32 spines, Anal fin with 47-93 rays and Pectoral fin with 17-27 rays are the characteristic features.

**Remark:** Two species *Macrogathus aral* and *Macrogathus pancalus* has been recorded from the study area.

### Key to the species:

- Dorsal fin with 16-23 spines and 44-45 soft rays  
..... *Macrogathus aral*  
Dorsal fin with 24-26 spines and 30-42 soft rays  
..... *Macrogathus pancalus*

## *Macrogathus aral* (Bloch & Schneider, 1801)

*Macrogathus aral* was originally described as *Rhynchobdella aral* (Bloch & Schneider, 1801) from Tranquebar, Tamil Nadu. Roberts (1986) treated it under the genus *Macrogathus*. A brief history of the species with special reference to Indian contributions has been given below.

1801 *Rhynchobdella aral* Bloch and Schneider, 1801, *Syst. Ichth.*: 479, pl. 89.

*Rhynchobdella aculeate* Day, *Fishes of India*: 338, pl. 72, fig. 1; Day, 1889, *Fauna Br. India*, Fishes, 2:331, fig. 110.

*Macrogathus jammuensis* Malhotra and Singh Dutta, *Proc. Nat. Acad. Sci. India*, 45(B) (3): 156, fig. 2. (Talwar, P.K. and A.G. Jhingran. 1991. *Inland Fishes of India and adjacent countries*, Vol. 1 & 2.)

**Type species:** *Rhynchobdella aral* Bloch & Schneider, 1801, *Syst. Ichth.* : 479, pl. 89.

**Type locality:** India: rivers of Tranquebar, Tamil Nadu.

**Materials Examined:** 2 female (10.8cm-11.4 cm), 1 male (10.7cm), Keshiary (Bhasra), Paschim Medinipur, West Bengal, 26.10.2013, A. Chanda and B. Paul.

**Diagnosis of the species (Fig. 1):** Body elongate, rostrum large with concave ventral surface lined with 14-28 paired tooth plates. Mouth large and its gape is about 8.7-11% of HL. Teeth are small and pointed. Dorsal fin inserted behind the tip of pectoral fin. Caudal fin separated from dorsal and anal fin. Fin formula- D XVI-XXIII 44-45; P 19-24; A III 44-52; C 15.



Fig. 1: *Macrogathus aral* (Bloch & Schneider, 1801)

**Distribution: India:** It has been found in India (West Bengal, Assam, Tamil Nadu and Odisha).

**Paschim Medinipur:** During the present study the species has been found in Keshiary block of Paschim Medinipur.

**Elsewhere:** Nepal; Pakistan, Sri Lanka, Bangladesh and Myanmar.

### ***Macrogathus pancalus* Hamilton, 1822**

*Macrogathus pancalus* was originally described as *Macrogathus pancalus* (Hamilton, 1822) from Gangetic Province. A brief history of the species with special reference to Indian contributions has been given below.

1876 *Mastacembelus pancalus* Day, *Fishes of India*: 340, pl. 72, fig. 4; Day, 1889, *Fauna Br. India*, *Fishes*, 2:333; Sufi, 1956, *Bull. Raffles Mus.*, (27): 120, pl. 22, fig. 20.

**Type species:** *Macrogathus pancalus* Hamilton Buchanan, 1822, *Fish. Ganges*: 30, 364.

**Type locality:** The tanks of the Gangetic Provinces.

**Materials Examined:** 4 female (6.1cm – 9.6 cm), 2 male (7.4cm- 9.2cm), Gopiballavpur I (Gopiballavpur) , Jhargram, West Bengal, 07.03.2014, A. Chanda; 2 female (9.3cm – 10.7 cm), 3 male (8.1cm- 10.4cm), Gopiballavpur II (Tapsia, Andharia) , Jhargram, West Bengal, 29.10.2013, A. Chanda; 3 female (7.8cm-9.4cm), 5 male (7.4cm-10.4cm), Keshiary (Bhasra), Paschim Medinipur, West Bengal, 26.10.2013, A. Chanda; 2 female

(8.4cm-9.2cm), 3 male (7.6cm- 8.9cm), Jhargram (Lodhasuli, Sardhia), Jhargram, West Bengal, 09.09.2013, A. Chanda; 3 female (11.3cm– 12.2 cm), 4 male (9.7cm- 11.7cm), Sabong (Mohar), Paschim Medinipur, 21.05.2013, A. Chanda; 1 female (11.9 cm), 2 male (10.5cm- 11.0cm), Pingla (Gobordhanpur), Paschim Medinipur, West Bengal, 28.05.2013, A. Chanda; 9 female (9.6cm-13.9 cm), 4 male (8.7cm- 12.6cm), Debra (Patna, Panchgeria), Paschim Medinipur, West Bengal, 23.05.2013, A. Chanda; 5 female (10.2cm-16.1 cm), 3 male (10.4cm-15.6cm), Narayangarh (Murakata), Paschim Medinipur, West Bengal, 20.05.2013, A. Chanda; 4 female (9.8cm-12.2 cm), 1 male (11.7cm), Binpur I (Lalgarh), Jhargram, West Bengal, 14.09.2013, A. Chanda.

**Diagnosis of the species (Fig. 2):** Body eel like and compressed. Rostrum rounded in cross section and absent of tooth plates. 2-5 spines present on the preopercle, preorbital spines strong and it pierces skin. Mouth is small. Dorsal fin inserted opposite of the anal fin. Caudal fin is separated from dorsal and anal fin. Fin formula- D XXIV-XXVI 30-42; P 17-19; A III 31-46 C 12.



Fig.2 *Macrogathus pancalus* (Hamilton, 1822)

**Distribution: India:** It has been found in India (Manipur, Uttaranchal and West Bengal).

**Paschim Medinipur:** During the present study the species has been found in all blocks of Paschim Medinipur and Jhargram Districts.

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

## Genus *Mastacembelus* Scopoli, 1777

Scopoli (1777) created the genus based on the *Ophidium mastacembelus* as type species for the genus. 64 species of Genus *Mastacembelus* has been found in the world literature and 1 species has been found in India as well as in the study area. A brief history of the genus with special reference to Indian contribution has been given below.

1956 *Mastacembelus* Sufi, *Bulletin of the Raffles Museum No. 27*: 93-146, Pls. 13-26

; Travers, 1984, *Bulletin of the British Museum (Natural History) Zoology* v. 47 (no. 2): 83-150; Roberts, 1986, *Japanese Journal of Ichthyology* v. 33 (no. 2): 95-109.

**Type species:** *Ophidium mastacembelus* Banks [J.] & Solander [D. C.], 1794, *Natural History of Aleppo. Second Edition* v. 2: 209.

**Type locality:** Quwayq River, Halab, Syria.

**Diagnosis of the Genus:** Body eel like and compressed. Preopercular spine is usually present. Preorbital spine may occasionally present. In rostrum tooth plates are absent. In the anterior nostril, rim with two finger like projection and two flaps are present. Dorsal fin possess 32-40 spines. Dorsal fin rays are 67-90 in number.

**Remark:** Only one species *Mastacembelus armatus* has been recorded from the study area.

## *Mastacembelus armatus* (Lacepède, 1800)

*Mastacembelus armatus* was originally described as *Macrogathus armatus* (Lacepède, 1800). Dey (1876) placed the species under genus *Mastacembelus*. A brief history of the species with special reference to Indian contributions has been given below.

1876 *Mastacembelus armatus* Day, *Fishes of India*: 340, pl. 73, fig. 3; Day, 1889, *Fauna Br. India, Fishes*, 2:334; Sufi, 1956, *Bull. Raffles Mus.*, (27): 134, pl. 25 & 26, fig. 29-32.

1921 *Mastacembelus manipurensis* Hora, *Rec. Indian Mus.*, 22: 206, pl. 9, fig. 3; Sufi, 1956, *Bull. Raffles Mus.*, (27): 142.

**Type species:** *Macrogathus armatus* Lacepède, 1800, *Hist. nat. Po iss*, 2 : 286.

**Type locality:** Not mentioned.

**Materials Examined:** 4 female (11.1cm – 12.6 cm), 2 male (10.9cm- 11.7cm), Gopiballavpur I (Gopiballavpur) , Jhargram , West Bengal, 07.03.2014, A. Chanda; 2 female (10.3cm – 11.7 cm), 3 male (13.8cm- 16.4cm), Gopiballavpur II (Tapsia, Andharia) , Jhargram, West Bengal, 29.10.2013, A. Chanda; 3 female (11.8cm-14.4cm), 5 amle (11.4cm- 15.4cm), Keshiary (Bhasra), Paschim Medinipur, West Bengal, 26.10.2013, A. Chanda; 5 female (19.8cm-21.2 cm), 3 male (17.6cm- 19.7cm), Binpur I (Lalgarh), Jhargram, West Bengal, 14.09.2013, A. Chanda. 2 female (18.9cm-20.2cm), 1 male (17.2cm), Chandrakona II (Baburber), Paschim Medinipur, West Bengal, 14.09.2013, A. Chanda.

**Diagnosis of the species (Fig.3):** Body slender, dull brown colour ,with 1-3 darker, longitudinal zigzag lines to form a reticulated pattern. It is restricted to the dorsal two thirds of the body . Preopercle with 2-3 spines, embedded in the skin. Preorbital spine strong and piercing the skin. Mouth is small, its gape is about 16.1-20.9% of HL. Sharp teeth present on both jaws. Dorsal fin and anal fin joined with caudal fin. Fin formula- D XXXIII-XXXX 64-82; P 21-27; A III 64-83; C 14-17.



Fig. 3: *Mastacembelus armatus* (Lacepede, 1800),A: preserve specimen; B: fresh specimen

**Distribution: India:** It has been found in India (Arunachal Pradesh, Jharkand, Uttaranchal and West Bengal).

**Paschim Medinipur:** During the present study the species has been found in Chandrakona II, Binpur I,

Keshiary, Gopiballavpur I, Gopiballavpur II blocks of Paschim Medinipur.

**Elsewhere:** Myanmar; Nepal; Pakistan; Sri Lanka; Thailand; Viet Nam; Bangladesh; Cambodia; China.

### Conclusion:

These three indigenous fishes under study are regarded as food fish as well as ornamental fish and its market demand is high for its flavour and body imprinted decoration respectively. They are least concern category as per IUCN (2010 ver. 3.1). It is difficult to estimate the population density of such fishes as these are not commercially marketed. Local survey reveals that the population is rapidly depleted. Research on the group is urgently needed to rescue these valuable natural resources. Captive breeding is being suggested as an effective measure for sustainability of these species.

### Acknowledgements:

Author is grateful to the UGC, New Delhi for granting a Major Research Project [Ref. F. No. 42-610/2013 (SR)], under which the present work has been completed. Author is also grateful to Principal, Dr. Jayasree Laha and Head of the Department of Zoology, Dr. Partha Pratim Chakravorty for providing necessary laboratory facilities and supports during the course of studies.

### References:

- [1] Ayyappan, S., Jena, J. K., 2003. Grow- out production of Carps in India. In Sustainable Aquaculture: Global Perspectives. Eds. B. B. Jana and Carl D. Webster. New York, USA: Food Product Press. p-365.
- [2] Banks, J. & Solander, D. C. 1794, *Natural History of Aleppo. Second Edition* v. 2: 209.
- [3] Barman, R. P. 2007. A review of the freshwater fish fauna of West Bengal, India with suggestions for conservation of the threatened and endemic species. *Rec. Zool. Surv. India*, Occ. Paper No., 263: 1-48.
- [4] Basu A., Dutta D. and Banerjee S. 2012, Indigenous ornamental fishes of west Bengal, Aquaculture Research Unit, Department of Zoology, University of Calcutta, West Bengal, India. *Recent Research in Science and Technology*, 4 (11): 12-21.
- [5] Bleeker, 1858. *Natuurkundig Tijdschrift voor Nederlandsch Indië*. 16(2):302-304.
- [6] Bleeker, P. 1862 Notice sur les genres *Parasilurus*, *Eutropiichthys*, *Pseudeutropius*, et *Pseudopangasius*. Verslagen en Mededeelingen der Koninklijke Akademie van Wetenschappen. *Afdeling Natuurkunde*. 14: 390-399.
- [7] Bleeker, P. 1863 Description de quelques espèces de poissons, nouvelles ou peu connues de Chine, envoyées au Musée de Leide par M.- G. Schlegel. *Nederlandsch Tijdschrift voor de Dierkunde*. 1: 135-150.
- [8] Bloch, 1786, *Naturgeschichte der ausländischen Fische*. Berlin, J. Morino, 2:145-180.
- [9] Bloch, M. E. and J. G. Schneider 1801. M. E. Blochii, *Systema Ichthyologiae Iconibus ex Illustratum. Post obitum auctoris opus inchoatum absolvit, correxit, interpolavit Jo. Gottlob Schneider, Saxo. Berolini. Sumtibus Auctoris Impressum et Bibliopolio Sanderiano Commissum*. i-ix + 1-584, Pls. 1-110.
- [10] Day, F. 1867. On the fishes of the Neilgherry Hills and rivers around their bases. *Proceedings of the Zoological Society of London*, (pt 2): 281-302.
- [11] Day, F. 1889. The fauna of British India, including Ceylon and Burma. *Fishes*, 1, 548 pp; 2, 509 pp. London ; Taylor and Francis.
- [12] FAO 1999. The State of Food Insecurity in the World 1999, Rome.
- [13] FAO. 2012. The State of World Fisheries and Aquaculture 2012. *Food and Agriculture Organization of the United Nations. Fisheries and Aquaculture Department*. Rome, Italy.
- [14] Felts, A. A., F. Fajts and M. Akteruzzaman, 1996. Small Indigenous fish species culture in Bangladesh (Technical brief ), IFADep Sub Project 2, Development of Inland Fisheries, p-41.
- [15] Goswami U. C., Basistha S. K., Bora D., Konthoujam Shyamkumar, Saikia B. and

- Kimneilam Changsan (2012), Fish diversity of North East India, inclusive of the Himalayan and Indo Burma biodiversity hotspots zones: A checklist on their taxonomic status, economic importance, geographical distribution, present status and prevailing threats. *International Journal of Biodiversity and Conservation*. **4**(15), pp. 592-613
- [16] Gray, J. E. 1831. Description of twelve new genera of fish, discovered by Gen. Hardwicke, in India, the greater part in the British Museum. *Zoological Miscellany*: 7-9.
- [17] Hamilton, F. 1822. *An account of fishes found in the River Ganges and its branches*. Constable Edinburg & Richardson & Co., London, VII + 405 pp, 39 pls.
- [18] Hora, S.L. 1921a. Fish and fisheries of Manipur with some observations on those of Naga Hills. *Rec. Indian Mus.*, **22**(3): 165-214.
- [19] Jayaram, K.C. 2010. *The Freshwater Fishes of the Indian Region* (Revised second edition). Delhi, *Narendra Publishing House*, New Delhi, India.
- [20] Jena, J. K., Das, P. C., Kar, S. and Kumarsingh, T. (2008). Olive barb, *Puntius sarana* (Hamilton) is a potential candidate species for introduction into the grow-out carp polyculture system. *Aquaculture*. **280** (1-4): 154-157.
- [21] Lacépède, 1800, *Histoire naturelle des poissons*. **2**: i-lxiv + 1-632, Pls. 1-20.
- [22] Roberts, T. R. 1980. A revision of the Asian mastacembelid fish genus *Macrognathus*. *Copeia*: 385-391.
- [23] Scopoli, J. A. 1777. *Introductio ad historiam naturalem, sistens genera lapidum, plantarum et animalium hactenus detecta, characteribus essentialibus donata, in tribus divisa, subinde ad leges naturae*. Prague. i-x + 1-506.
- [24] Sufi, S. M. K. 1956 Revision of the Oriental fishes of the family Mastacembelidae. *Bulletin of the Raffles Museum* No. **27**: 93-146, Pls. 13-26.
- [25] Travers, R. A. 1984 A review of the Mastacembeloidei, a suborder of synbranchiform teleost fishes. Part II: Phylogenetic analysis. *Bulletin of the British Museum (Natural History) Zoology*, **47** (no. 2): 83-150.
- [26] Talwar, P.K. and A.G. Jhingran. 1991. *Inland Fishes of India and adjacent countries*, Vol. **1 & 2**. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- [27] [www.fishbase.org](http://www.fishbase.org)
- [28] [www.iucnffsg.org](http://www.iucnffsg.org)
- [29] Catalogue of fishes, 2016
- [30] Acc.to IUCN ver.2014.3 & NBFGR (2010).