

**Research Article**

## Study on threatened category of freshwater fish availability in the fish market at Burdwan, West-Bengal with special reference to their conservation status

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**ABSTRACT****ARTICLE INFO**

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The present study was carried out to make a market-based survey to assess the threatened category of freshwater fish available in the selected fish market of Burdwan district, West Bengal. Three markets namely Parulia fish market, Teleniopara fish market and Purbasthali fish market of Burdwan were surveyed for a period of six months from February-July, 2017. A total of 37 freshwater fish species were recorded during the survey period from the three markets. According to National Bureau of Fish Genetic Resources diversity criteria, it has been observed that among these fishes, 54% species was the least concern, 16% species was not evaluated, 11% species were vulnerable, 13% species was near threatened, 3% species as endangered and 3% species was data deficient category. The main aim of this study is to build local awareness among the people that will help in the conservation of this threatened category fishes and may regenerate the species in the natural environment.

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**INTRODUCTION**

West Bengal is the only state of India that extends from the Himalaya to the Bay of Bengal and located between latitude 21°38' N to 27°10' N and longitude 85°38' E to 89°50' E (Bandyopadhyay *et al.* 2014). West-Bengal is blessed with a very rich and diverse natural water resource in the form of rivers, streams, estuaries, backwaters, impoundments, mangroves, floodplain wetlands, reservoirs and ponds. The state is enriched with 6.08 lakh ha of freshwater fisheries resources in the form of Ponds and Tanks (2.88 lakh ha), Beels (0.41 lakh ha), Reservoirs (0.27 lakh ha), 22 river drainage basins (1.72 lakh ha) and Canals (0.80 lakh ha) (Fisheries Department, Government of West Bengal, 2016). Many authors have studied about Ichthyofaunal Diversity in the various regions in India. Arunachalam *et al.* (2002) recorded 14 species of freshwater fish from Dhom reservoir, Kumar *et al.* (2015) studied 41 species belong to 6 orders, 12 families and 27 genera in River Krishna at Vijayawada Region, Saha and Patra (2013) observed 46 fish species belonging to 7 orders, 18 families and 26 genera. Nagma and Khan (2013) noticed 36 fish species belonging to 6 orders, 11 families and 23 genera at Bijnor district in western Uttar Pradesh, Reddy and Parameshwar (2015) mentioned 19 fish species belongs to 3 orders, 16 genera of 8 families were recorded in Chandrasagar and 32 species belong to 6 orders, 21 genera

of 11 families in Ramanpad reservoir. It is hard to believe that freshwater environments are facing threats as regard to both ecosystem stability, biodiversity and many strategies have been proposed to solve this crisis. During the recent past years fish diversity is reducing due to natural and anthropogenic stresses, mainly habitat alteration, over exploitation, reduction of natural habitat, construction of dams, diversion or reclamation of river beds for urbanization, unsustainable fishing, introduction of exotic fishes, global climate variation etc. As a result India's germplasm is getting depleted and many fishes become threatened. For the conservation and sustainable utilization of these natural resources, proper knowledge of species and communities are one of the important factors (Ghosh *et al.* 2002). Present study revealed that threatened category listed fishes, which was prepared by NBFGR for India (The IUCN Red List of Threatened Species, October 2016) many of them are available in local market in West Bengal without consider their conservation measure. Study related to availability of fish species and their biodiversity status through market based survey in the state of West Bengal is very rare. For that reason the present study was undertaken by surveying the availability of freshwater threatened fish species in selected markets of Burdwan, West Bengal and finding the conservation measure of this threatened species.

## MATERIALS AND METHODS

### Collection of Fish samples

Present study was conducted by personal survey of three selected fish markets (Parulia fish market, Teleniopara fish market and Purbasthali fish market) of district Burdwan for a period of 6 months (February-July, 2017). Fish species was observed at the survey area and noted their abundance in each fish market on an alternative day basis (Fig. 2 a, b and c). The samples were photographed, immediately prior to preservation as formalin decolorizes the fish color on long preservation (Fig. 3 a, b, c, d, e, f and g).

### Preservation

The majority of the fish specimen observed in the market was identified at the sites itself. The unidentified specimen was placed in a wide mouth jar having 2 liter capacity with 8% formalin solution by obeying Bagra and Das (2010) preservation method. Separated jar was used for

preserving individual species and brought to the Laboratory, Department of Fisheries Resources Management, Faculty of Fishery Sciences, WBUAFS, Kolkata, West-Bengal for identification.

### Identification

The samples were identified based on keys for fishes of the Indian subcontinent (Dey 1996; Talwar and Jhingran, 1991), classification were carried out on lines of Jayaram (1981).

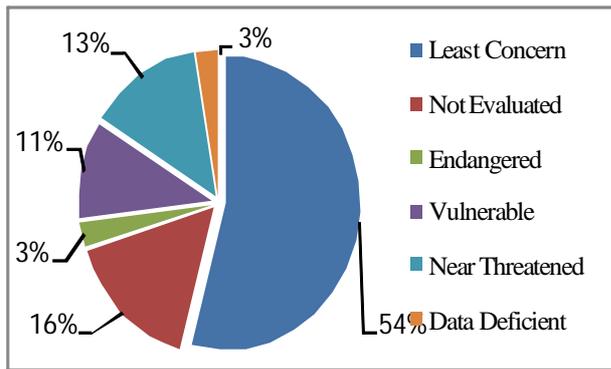
## RESULTS AND DISCUSSION

The fish specimen recorded from all the three markets was provided in the Table 1 with dominance of availability. Information on the conservation status of all taxa in this paper was retrieved from the International Union for Conservation of Nature and Natural Resources (IUCN) Red List Categories and criteria.

**Table 1:** Recorded freshwater fish species from three selected fish markets of Burdwan, West Bengal and their diversity status.

Sl. No.	Name of the species	Parulia fish market	Teleniopara fish market	Purbasthali fish market	IUCN Status
1.	<i>Notopterus notopterus</i>	++	+++	+++	Least Concern
2.	<i>Amblypharyngodon mola</i>	-	+	-	Least Concern
3.	<i>Catla catla</i>	++++	+++	++++	Not Evaluated
4.	<i>Labeo calbasu</i>	+++	+++	++	Least Concern
5.	<i>Nandus nandus</i>	++	+	-	Least Concern
6.	<i>Chitala chitala</i>	+++	+++	++	Endangered
7.	<i>Xenentodon cancila</i>	++	+++	-	Least Concern
8.	<i>Bagarius bagarius</i>	+++	+	++	Vulnerable
9.	<i>Clarias batrachus</i>	++++	++	+	Least Concern
10.	<i>Labeo bata</i>	+++	+++	+	Least Concern
11.	<i>Heteropneustes fossilis</i>	++	+++	++	Vulnerable
12.	<i>Macrornathus armatus</i>	+	-	+	Least Concern
13.	<i>Puntius ticto</i>	++	-	+	Least Concern
14.	<i>Cirrhinus mrigala</i>	++++	++++	+++	Least Concern
15.	<i>Labeo rohita</i>	++++	++	+++	Least Concern
16.	<i>Ompok pabda</i>	+++	+	++	Vulnerable
17.	<i>Rita rita</i>	++	+	+++	Least Concern
18.	<i>Channa gachua</i>	-	+	-	Least Concern
19.	<i>Chanda ranga</i>	++	+	-	Not Evaluated
20.	<i>Wallago attu</i>	+++	+	++	Near Threatened
21.	<i>Channa punctata</i>	+++	++	+	Least Concern
22.	<i>Channa marulias</i>	+	+	-	Least Concern
23.	<i>Clarias gariepinus</i>	++	+	+++	Least Concern
24.	<i>Ctenopharyngodon idella</i>	++	+++	++++	Not Evaluated
25.	<i>Hypophthalmichthys molitrix</i>	++++	+++	++	Near Threatened
26.	<i>Cyprinus carpio</i>	++++	+++	++	Vulnerable
27.	<i>Oreochromis mossambicus</i>	+++	++	+	Near Threatened
28.	<i>Oreochromis niloticus</i>	++++	+++	++	Near Threatened
29.	<i>Anabas testudineus</i>	++++	+++	+++	Data Deficient
30.	<i>Macrobrachium rosenbergii</i>	+++	+++	++	Least Concern
31.	<i>Macrornathus pancalus</i>	++	+	++	Near Threatened
32.	<i>Pungasius pungasius</i>	+++	++	+	Not Evaluated
33.	<i>Mystus seenghala</i>	+++	++++	++	Not Evaluated
34.	<i>Mystus tengara</i>	+++	++	++	Least Concern
35.	<i>Colisa lalia</i>	++	+	+	Not Evaluated
36.	<i>Colisa fasciata</i>	+	-	-	Least Concern
37.	<i>Puntius sophore</i>	++	+	-	Least Concern

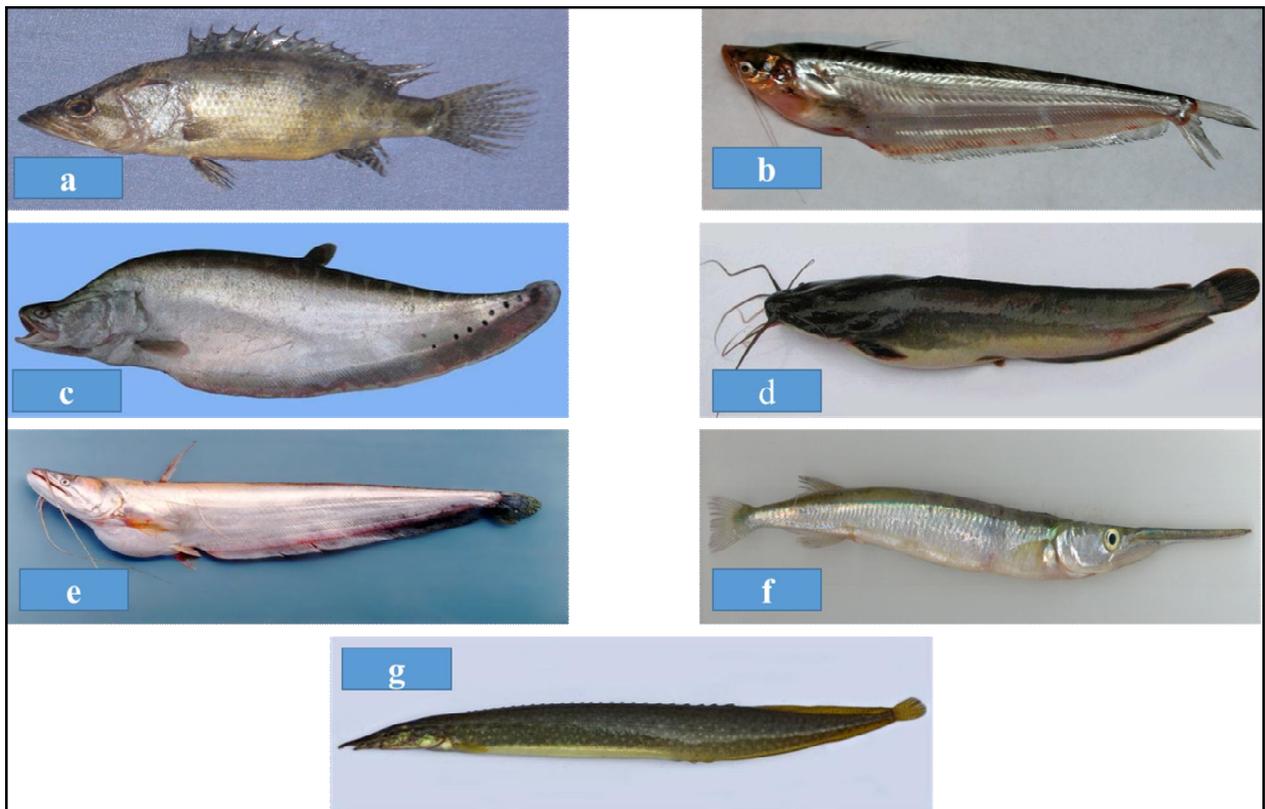
\*\* Symbol used: '++++'- highly dominant, '+++'- dominant, '++'- moderately dominant, '+'- less dominant, '-'- not available.



**Fig 1:** Diversity Status of freshwater fish species



**Fig 2:** Survey area- a) *Parulia* fish market b) *Teleniopara* fish market c) *Purbasthali* fish market



**Fig 3:** Species found in survey area- a) *Nandus nandus* b) *Ompok pabda* c) *Chitala chitala* d) *Clarias batrachus* e) *Wallago attu* f) *Xenentodon cancila* g) *Macrognathus pancalus*

On the basis of this market based survey nearly 37 fishes from three selected fish markets of Burdwan were recorded. Among all these fishes, 54% species was least concern, 16% species was not evaluated, 11% species was vulnerable, 13% species was near threatened, 3% species was endangered and 3% species was data deficient category that all are categorized by National Bureau of Fish Genetic Resources (Fig. 1). Several authors reported fish diversity from water resources of West Bengal *i.e.* Mukherjee and Sarkar (2005) mentioned 125 species from Darjeeling Himalayan upland, Bhakta and Bandyopadhyay (2008) documented 46 fish species from freshwater water bodies in the east Midnapore District, Das *et al.* (2011) recorded total 52 fin and shellfish species from the three markets in Kolkata, Mogalekar *et al.* (2017) recognized 267 species of freshwater fishes. In the present study, availability of fish species in this district of West Bengal revealed that though

different water resources comprise wide varieties of fish species but all the species does not reach to these mentioned markets. The present work is similar with the findings of (Das *et al.* 2011; Mogalekar *et al.* 2017) where moreover same species are noted down which would be threatened in near future. Fish species is threatened due to several factors including heavy harvesting of fish resources, competition and predation by introducing species and habitat degradation due to pollutants. Ghate *et al.* (2002); Khar *et al.* (2003); Dahanukar *et al.* (2012) reported that the suspected pollution of the river and heavy harvest of the fish resources as possible causes for decline of the species from other fishes. The information collected from the local fish seller of the area reveals high decline in the fish population in the last few years. We were informed that some species of *Puntius*, *Macrognathus armatus*, *Mystus tengara*, *Channa punctata*, *Anabas testudineus* and *Macrobrachium*

*rosenbergii* which were seen and collected by fishermen before 2009, rarely/do not appear in fishing operations these days. This may be due to uncontrolled fishing to meet the high market demand of the local fishes. In addition, the fishing activities were intensified with the introduction of modern fishing gear and techniques. In view of the unscientific practices there is need to take care certain conservation and approach to control of drastic change in fishery and to save some of the valuable species from wiping out of the region. The use of indigenous fishing gears which are eco friendly as well as sustainable need to be encouraged instead of modern gears (Shinde *et al.*, 2009). To this may all concerned, conservationists, government and NGO organizations have a major role to play in creating awareness and support for the conservation mechanism of the fish species. The Department of Fisheries, Government of West Bengal is trying to conserve these threatened fish species by regulating several measures like fishing ban, closed season, regulate fishing, gear selectivity, consumers' awareness regarding buying of threatened fish species from the market is prerequisite to conserve the threatened resources in better way.

Destructive fishing methods, entry of exotic species, use of poison, habitat alteration and water diversion, poor vegetation cover in the river banks, siltation, water abstraction and low water velocity have affected the overall fish diversity to large extent (Kumar and Pandey, 2013). During the last few decades, the fish biodiversity of the country are declining rapidly due to anthropogenic environmental degradation like urbanization, damming, abstraction of waters for irrigation and power generation and pollution, which have subjected the natural water bodies in general and rivers, in particular to severe stress with devastating effects on freshwater fish diversity (Kumar *et al.*, 2013; Verma *et al.*, 2015; Kumar and Pandey, 2013; Naik *et al.*, 2013, 2014, 2015). However, more awareness and motivation is required on the value of indigenous fish diversity and conservation of aquatic resources.

## CONCLUSION

Appropriate management and conservation policy of this area could play a significant role in the conservation of freshwater piscine diversity of West Bengal. The water bodies of District Burdwan have undergone several major changes during the past few years by anthropogenic activities like deforestation, flood, overfishing, sand mining, recreational activities, organic and inorganic pollution and other activities. These changes have attributed to the changes in the composition of the fish fauna. Several species may have become extinct from this area. Conservation status of the freshwater fishes of this district is very poor. Sustainable management by taking appropriate steps for sustaining diversity is necessary to conserve these resources. By discriminating this study, it can be concluded that proper management plan has to be made for the conservation of this locally available endangered fish species, if not then all of these species will be extinct in the world in near future.

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