



STUDY OF FRESHWATER FISH DIVERSITY DURING MONSOON SEASON IN THE SELECTED MARKET OF BARASAT, WEST BENGAL

Environmental Science

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ABSTRACT

The present study was attempted to know fish diversity by qualitative and quantitative assessment in local market during monsoon season and comparative evaluation indigenous and exotic species at Barasat, West Bengal. For assessment, a maximum 10 fish sellers were randomly selected in each fish market weekly once a day for the period of one month during monsoon in 2021. Different biodiversity indices were compared between the sites. In the present study, qualitative and quantitative assessment indicated that the variety of freshwater fish species were observed in numbers in site B compared to site A. Common fish species were *Labeo bata*, *Oreochromis mossambicus*, *Hypophthalmichthys molitrix*, *Amblypharyngodon mola*, *Mystus gulio*, *Labeo rohita*, *Labeo catla*, *Oreochromis niloticus*, *Puntius chola* and *Heteropneustes fossilis*. Higher value of the number of total organisms of about 3022 in site B when compared to site A (770). The value of different indices such as Shannon diversity index (2.165 and 2.715), Index of Dominance (0.8824 and 0.9240), and Margalef's species richness index (1.204 and 1.990) were reported in site A and site B, respectively and it was lower in site A compared to site B. In the case of Berger-Parker Dominance Index value, it was observed higher in site A (0.1753) compared to site B (0.1753). This preliminary study indicates that the rich diversity of fish during monsoon in the study sites is a combination of indigenous and exotic fish species availability. It is suggested to know seasonal variations of fish diversity as well as the preparation of fish database and comparison with the earlier studies for future threat.

KEYWORDS

Fish diversity; Urban area; Suburban area; Biodiversity indices; Freshwater fish

1. INTRODUCTION

The study of diversity of freshwater fish helps to determine the status of aquaculture growth. Fish is an important diet for human beings, as well as for other animals. In pisciculture, it is targeting maximum fish production to optimize the profitability.^[1] In this context, introduction of exotic fish can be introduced to maintain the productivity.^[2] While indiscriminate and non-judicious introduction of exotic fish in our country has brought a wide array of problems including extirpation of indigenous fish species ultimately leading to biodiversity loss.^[3,4] In West Bengal, North 24-Parganas district is endowed with major open water resources of about 31872.19 ha, which included impounded freshwater area of 26007.75 ha.^[5] During 2014-15 the inland fish production of this district was 194380 tons covering 13.51% of the state inland production having first position of rich fish production.^[6] Dhara et al.^[5] reported that freshwater exotic fish is an alarming threat to the indigenous fish species and they suggested to prepare a zone wise database on their distribution or population dynamics. It is necessary for planning of conservation and management of endangered indigenous fish species under conventions on biological diversity with special reference to Articles 6 and 8 of UNEP.^[7]

Beside species introductions, several factors viz. habitat loss, water pollution, etc. cause the declining of native fish species.^[8,9] Moreover, earlier studies have been reported fish diversity in different parts of West Bengal.^[5,8-16] But the availability of fish species and their diversity in the selected market at Barasat is lacking.

The present study was attempted to know the fish diversity by qualitative and quantitative assessment in two different local markets during monsoon season at Barasat, West Bengal.

2. MATERIALS AND METHODS

2.1 Selection of study area

The study sites were selected as per three categories viz. medium (site A) and large (site B) fish markets of urban area and suburban area Barasat, West Bengal (latitude = 22° 43' N and longitude = 88° 28' E). The study was carried out in these two habitats for qualitative and quantitative assessment.

2.2 Study design

A maximum 10 fish sellers were randomly selected in each fish market from above-mentioned study area weekly once a day for the period of one month during monsoon. Fish photographs were taken from each seller by using camera and species were identified as per Talwar & Jhingran,^[17] Jayaram,^[18] and Vishwanath et al.^[19] All the data were collected as per local name of fish species.

2.3 Qualitative and quantitative assessment of freshwater fish species

Fish diversity indices such as total specimens (N), Shannon diversity index (H'), Index of Dominance (C), Berger-Parker Dominance Index, and Margalef's species richness index (S) were calculated.^[20-24] The formulae were used as per earlier study by Sengupta & Talapatra^[25]

3. RESULTS

In the present study, qualitative and quantitative assessment indicated that the variety of freshwater fish species were observed in numbers in site B compared to site A (Table 1). It was observed that common fish species were *Labeo bata*, *Oreochromis mossambicus*, *Hypophthalmichthys molitrix*, *Cyprinus carpio*, *Mystus gulio*, *Labeo rohita*, *Catla catla*, *Oreochromis niloticus*, and *Heteropneustes fossilis*. As per quantitative analysis higher number of total organisms were found higher in site B compared to site A.

Table 1: List of freshwater fish species in the study sites

Site A				Site B			
Sl. No.	Common Name	Scientific Name	Total No.	Sl. No.	Common Name	Scientific Name	Total No.
1.	Bata	<i>Labeo bata</i>	109	1.	Koi	<i>Anabas testudineus</i>	161
2.	Tilapia	<i>Oreochromis mossambicus</i>	100	2.	Bata	<i>Labeo bata</i>	499
3.	Silver carp	<i>Hypophthalmichthys molitrix</i>	68	3.	Lylantika	<i>Oreochromis niloticus</i>	201
4.	Mourola	<i>Amblypharyngodon mola</i>	72	4.	Singhi	<i>Heteropneustes fossilis</i>	301
5.	Gulse tengra	<i>Mystus gulio</i>	67	5.	Tilapia	<i>Oreochromis mossambicus</i>	251
6.	Rui	<i>Labeo rohita</i>	75	6.	Silver carp	<i>Hypophthalmichthys molitrix</i>	121
7.	Katla	<i>Labeo catla</i>	73	7.	Mourola	<i>Amblypharyngodon mola</i>	142

8.	Lylantika	<i>Oreochromis niloticus</i>	135	8.	Punti	<i>Puntius chola</i>	145
9.	Singhi	<i>Heteropneustes fossilis</i>	71	9.	Kholse	<i>Colisa fasciata</i>	219
				10.	Gulsetengra	<i>Mystus gulio</i>	107
				11.	Rui	<i>Labeo rohita</i>	111
				12.	Katla	<i>Labeo catla</i>	103
				13.	Magur	<i>Clarias batrachus</i>	118
				14.	Kalbose	<i>Labeo kalbasu</i>	121
				15.	Tara baim	<i>Macrogynathus pancalus</i>	155
				16.	Pankal	<i>Macrogynathus aculeatus</i>	165
				17.	Foli	<i>Notopterus notopterus</i>	102

Table 2 determines different indices of biodiversity in comparison between site A and site B. Higher value of the number of total organisms of about 3022 in site B when compared to site A (770). The value of different indices such as Shannon diversity index (2.165 and 2.715), Index of Dominance (0.8824 and 0.9240), and Margalef's species richness index (1.204 and 1.990) were reported in site A and site B, respectively and it was lower in site A compared to site B. In the case of Berger-Parker Dominance Index value, it was observed higher in site A (0.1753) compared to site B (0.1753).

Table 2: Diversity indices compared between the site A and B

Indices	Site A	Site B
Total No. of species	9	17
Total No. of organisms	770	3022
Shannon-Wiener diversity index	2.165	2.715
Index of Dominance	0.8824	0.9240
Berger-Parker Dominance Index	0.1753	0.1651
Margalef's species richness	1.204	1.990



Labeo bata (Hamilton, 1822)



Anabas testudineus (Bloch, 1792)



Hypophthalmichthys molitrix (Valenciennes, 1844)



Oreochromis niloticus (Linnaeus, 1758)



Oreochromis mossambicus (Peters, 1852)



Mystus gulio (Hamilton, 1822)



Labeo catla (Hamilton, 1822)



Trichogaster fasciata (Bloch and Schneider, 1801)



Heteropneustes fossilis (Bloch, 1794)

*Macrogynathus aculeatus* (Bloch, 1786)*Notopterus notopterus* (Pallas, 1769)*Macrogynathus pancalus* (Hamilton, 1822)*Labeo rohita* (Hamilton, 1822)*Amblypharyngodon mola*, (Hamilton, 1822)*Puntius chola* (Hamilton, 1822)**Fig 1: Different types of fish species studied in the market**

4. DISCUSSION

Fish fauna is an important food item especially in West Bengal there is a high demand of fish due to edible in nature. But there is a great concern that loss of biodiversity of indigenous fish, which is replaced by exotic fish. In an earlier study, Dhara et al.^[5] reported that silver carps were found to have highest abundance (10.45%) and climbing perch (Vietnam strain) have the lowest abundance (0.20%) in the total catch in north 24 Parganas, West Bengal. In the present study, few fish species were found exotic in nature. However, the rich diversity of fish species in Barasat is due to the presence of exotic species and still few indigenous species are supporting the present status of biodiversity as more than 2 index values in both study sites. Datta & Ghosh^[26] reported that 6 types of fish species such as Silver carp, Big head carp, Grass carp, Common carp, Nilotica tilapia and Pangas are widely cultured for commercial purpose as well as Thai and Vietnam strains of *A. testudineus* is developed in the district for substituting to low cost for indigenous variety due to growth is faster. It is well established that the threat to fish biodiversity occurs when majority of exotic fish species are introduced and habitat destruction.^[27] In previous report, Saha et al.^[28] mentioned that 277 fish species are available in the North 24-Parganas district in which 54 are found threatened, which should be studied in future. This is a preliminary study during monsoon period, but it is suggested to know seasonal variations of fish diversity as well as the preparation of fish database for future threat.

5. CONCLUSION

This preliminary study indicates that the rich diversity of fish during monsoon in the study sites is a combination of indigenous and exotic fish species availability. It is suggested to know seasonal variations of fish diversity as well as the preparation of fish database and comparison with the earlier studies for future threat.

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Conflict of interest

No conflict of interest

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