

EXOTIC FISH DIVERSITY IN THE RIVER TEESTA, WEST BENGAL, INDIA

Tapan Sarkar¹ and Prof. Joydeb Pal¹


¹Asst. Professor. Department of Zoology, Raiganj University, Raiganj, West Bengal, India

²Former Professor, Department of Zoology, North Bengal University, Siliguri, West Bengal, India

ABSTRACT: A survey was conducted in the river Teesta on the exotic fish species from March 2015 to February 2017. A total of nine exotic fish species were recorded from the river. Highest density was recorded in the monsoon season and lowest was found in winter season. Cyprinidae (56 %) was the dominant family with five species followed by claridae and cichlidae each with two species (22 %). Average abundance index (%) of each species ranged from 0.37 – 1.43 %. Exotic fish species competes with indigenous fish species for food and habitat, spreads different disease and also modify the aquatic habitat. The present scenario is warming for native fishes in near future.

Key words: Teesta, exotic fish species, density, abundance index

*Corresponding author: Tapan Sarkar, Asst. Professor. Department of Zoology, Raiganj University, Raiganj, West Bengal, India. tapan.ruzoo@gmail.com, 8942043736

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INTRODUCTION

The river Teesta is very important river of North Bengal and originates from the Pahunri Glacier, near Khangchung lake (27.59° N; 38.48°E at an elevation of 7128⁰/2173 m), Sikkim, India. The river Teesta is a trans boundary river between India and Bangladesh and is a part of Brahmaputra drainage system. Barman (2008) described North Bengal as the 'Hot Spot' of Fish. The river Teesta is originates from Eastern Himalayan biodiversity hotspot. North Bengal is rich in fish diversity but their number declined day by day due to several reasons, one of them is introduction of exotic fish species.

A species occurring outside its natural range is called exotic or alien fish. Exotic or alien fish species that are non-indigenous to a particular area or country and they are brought and introduced in to new area. So far more than 300 exotic or alien fish species have been introduced in India (Jhingran, 1989). While majority of them are as ornamental fishes some others for aqua culture. The larvicidal fish, *Gambusia affinis* was introduced for controlling the mosquito larvae.

Fishes are the cheap sources of protein and have high demand in India. There is a gap between demand and supply. In developing country like India human populations are growing exponential pattern to meet the protein supply also increasing aquaculture production, even unable to fulfill the demand (Biswas and Panigrahi, 2014). So to boost up fish production exotic fish species were introduced. Because growth and production rate of exotic fishes higher than indigenous fishes. Exotic fish species are introduced for create new fisheries, fill a 'vacant niche, control water quality, fulfill aesthetic and other reasons. Exotic species are fast growing than local species and so increased fish production (Welcomme and Chavalit Vidthayanom, 2003).

Most of the exotic fish species are restricted within the culture ponds. Accidentally exotic fish species are run off from culture ponds in natural water bodies during flood. The river Teesta is a trans boundary river between India and Bangladesh, so exotic fish species from Bangladesh enter into the Indian part of river and vice versa.

Many study had been done on fish diversity in the river by Shaw and Shebbeare (1938), Sarkar and Pal (2009), Acherjee and Barat (2013) and Dey *et. al* (20015) but no such study on exotic fish species were done. An attempt was done to study the diversity of exotic food fish species in the river Teesta, West Bengal.

MATERIALS AND METHODS

Study site- Three sampling sites were selected for sampling, such as site-1 at Gajol doba barrage, site-2 Jalpaiguri city and site-3 at Haldi Bari.

Duration of study-

The study was carried out from March 2015 to February 2017. Sampling was done at monthly interval.

Sampling methods-The fish specimens were collected with the help of fishermen by using different types of nets and counted the number individuals of every species including exotic fish species. Fish specimens were identified following Talwar and Jhingran (1991), Day (1988), Jayaram (1981, 1999) and [www. fishbase.org](http://www.fishbase.org), and photographs were taken. Then specimens were preserved in 8% formalin for further study.

Population density of each species was estimated by the following formula-

$$\text{Abundance index(\%)} = \frac{n(k)}{N} \times 100$$

Where, n(k) = number of individuals of the species k caught at each study site and
N = Number of individuals of all fish species caught at that site.

RESULTS AND DISCUSSION

A total of nine exotic fish species were recorded during the study period in the river Teesta. Cyprinidae was the dominant family with five species followed by clariidae and cichlidae each with two species. All these recorded exotic fishes were imported from different country for aquaculture but accidentally enter in to the river during flood or monsoon season. Exotic fish species found maximum during the monsoon season in the river. Similarly Bhakta and Bandyopadhyay (2007) recorded a total of eight exotic fish species from the river Churni, West Bengal, India. A total of 15 species of exotic fish species were found by Biswas and Panigrahi (2014) in the Jhenidah district , south western part of Bangladesh.

Table-1. Check list and feeding habit of exotic fish species found in the river Teesta.

S.no.	Family	Exotic Fish species found	Feeding habit
1.	Clariidae	<i>Clarias gariepinus</i> (Burchill)	Omnivorous
2.		<i>Pangasius sutchi</i> (Fowler)	Carnivorous
3.	Cyprinidae	<i>Hypophthalmichthys molitrix</i> (valenciennes)	Omnivorous
4.		<i>Hypophthalmichthys nobilis</i> (Richardson)	Plankton feeder
5.		<i>Puntius javanicus</i> (Bleeker)	Herbivorous
6.		<i>Ctenopharyngodon idella</i> (valenciennes)	Herbivorous
7.		<i>Cyprinus carpio</i> (Linnaeus)	Omnivorous
8.	Cichlidae	<i>Oreochromis mossambica</i> (Peter)	Omnivorous
9.		<i>Oreochromis nilotica</i> (Linnaeus)	Omnivorous

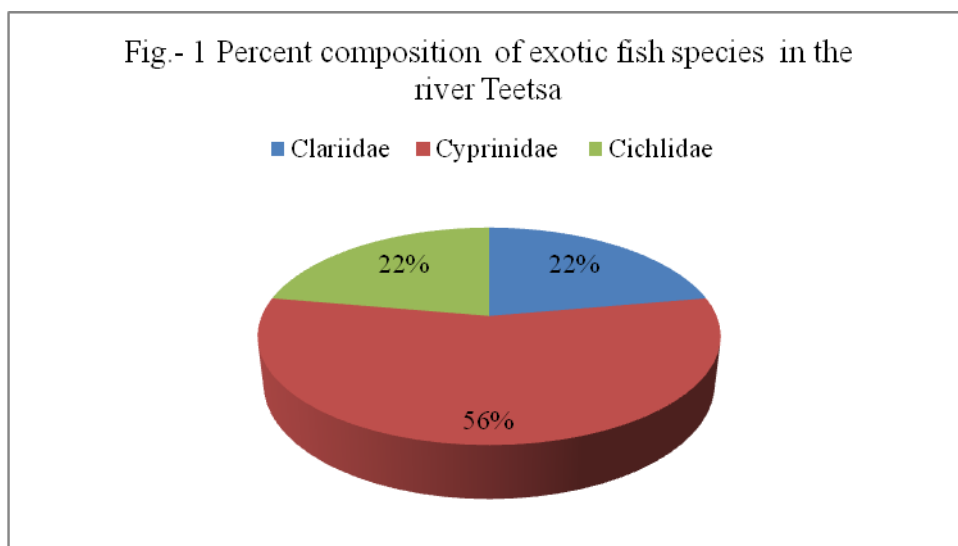


Table-2 Average monthly abundance index (%) of exotic fish species.

Month	Average abundance index (%)											
	Feb.	Mrch.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov	Dec.	Jan
Exotic Fish species found												
<i>Clarias gariepinus</i> (Burchill)	×	1.29	×	×	×	×	×	×	0.74	×	×	×
<i>Pangasius sutchi</i> (Fowler)	0.48	×	×	1.25	×	1.04	×	1.22	×	×	×	×
<i>Hypophthalmichthys molitrix</i> (valenciennes)	×	×	1.18	×	0.82	×	1.07	×	1.11	0.47	×	×
<i>Hypophthalmichthys nobilis</i> (Richardson)	×	×	0.78	×	×	×	1.43	×	×	×	×	×
<i>Puntius javanicus</i> (Bleeker)	1.42	×	×	1.25	×	0.70	×	1.22	×	×	×	×
<i>Ctenopharyngodon idella</i> (valenciennes)	×	×	×	×	0.82	×	0.72	×	×	×		×
<i>Cyprinus carpio</i> (Linnaeus)	×	×	×	×	×	×	×	1.22	×	×	×	×
<i>Oreochromis mossambica</i> (Peter)	×	1.94	0.78	×	×	0.70	×	×	0.37	×	×	×
<i>Oreochromis nilotica</i> (Linnaeus)	×	×	×	×	×	×	0.72	×	×	0.47	×	×
Total monthly abundance index (%)	1.9	3.23	2.74	2.5	1.64	2.47	3.94	3.66	2.22	0.94	00	00

× indicates= not found

Average highest exotic fish species were recorded in August (4 species). No exotic fishes were recorded in the month of December and January. Abundance index of each exotic fishes ranged from 0.37 – 1.43 %. Highest average index was found in August (3.94%). Though the average abundance index (%) is very low but alarming for future. Because most of the exotic fish have high growth and production rate.

The introduction of *Clarias gariepinus* causes considerable damage to the indigenous fishes. It is a carnivorous and residing at the bottom layer and threat to our native bottom dweller fish species. Silver carp (*Hypophthalmichthys molitrix*) competes with Catla (*Catla catla*) because both are surface feeder. As a result the production of Catla has been found decreased. Common carp (*Cyprinus carpio*) has been observed threatening the existence of *Cirrhinus mrigala* and *Cirrhinus reba* because both are bottom feeder. Where Tilapia feeds on the eggs of *Labeo rohita*, which is very important commercial major carps (Barman, 2008). Exotic fish species sometimes spreads many diseases among native species (Prenter *et al.* 2004). The *Cyprinus carpio* modifies aquatic habitat directly through herbivory or uprooting of vegetation and indirectly through making clear water to turbid (Roberts *et al.* 1995; Matsuzaki *et al.* 2009

CONCLUSION

The river Teesta is rich in fish diversity but the presence of exotic fish species is alarming. If we immediately don't take any steps to prevent introduction exotic fish species in the river, in near future many of indigenous fish will be disappeared.

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