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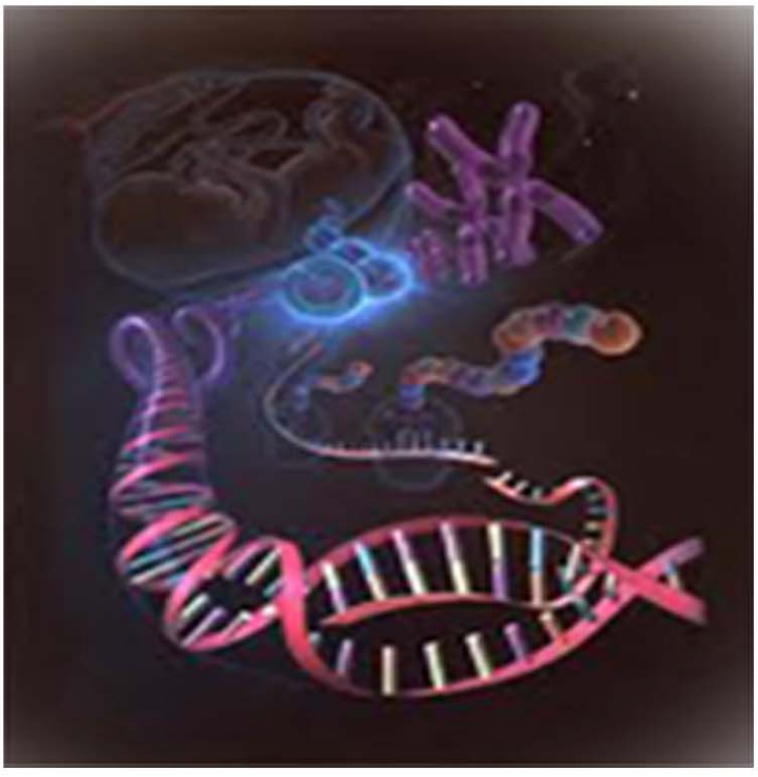

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Research Paper

STUDIES ON FRESHWATER FISH FAUNA OF DISTRICT BIJNOR IN WESTERN UTTAR PRADESH, INDIA

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Ichthyofaunal studies were undertaken during Feburary 2012 to Januray 2013 in the rivers, reservoir and ponds of district Bijnor. The aim of the paper was to assess the variety and abundance of the important fish fauna inhabiting this region. The results revealed the occurrence of 36 fish species belonging to 6 orders, 11 families and 23 genera. The order Cypriniformes was dominant with 18 species, followed by Siluriformes (10 species), Perciformes (4 species), Osteoglossiformes (2 species), Synbranchiformes and Clupeiformes (1 species each). The paper describes the detailed species composition their relative contribution and also some important points that may help to better understand the current scenario of ichthyofaunal diversity.

Keywords: Freshwater fish fauna, Ganga river, Ramganga river, Khoh river, Pili reservoir

INTRODUCTION

Ichthyodiversity refers to variety of fish species; depending on context and scale, it could refer to alleles or genotypes within fish population to species of life forms within a fish community and to species or life forms within a fish community and to species of life forms across aqua regimes (Burton *et al*., 1992). Biodiversity indicates the potential of any aquatic system and also depicts its trophic status. It is important to have an adequate knowledge of the constituent biota especially for the purpose of conservation and management of the inland water resources such as rivers, reservoirs and ponds.

Fish constitute half of the total number of vertebrates in the world and live in almost all conceivable aquatic habitats. Around the world approximately 22,000 species of fishes have been recorded out of which 11% are found in India, i.e., about 2,500 species of fishes of which, 930 live in freshwater and 1,570 are marine (Kar, 2003; Ubharane *et al*., 2011). India is one of the mega biodiversity countries in the world and occupies the ninth position in terms of freshwater mega biodiversity (Shinde *et al*., 2009). Studies on taxonomy (Ichthyofaunal diversity) have been of immense interest to researchers of all times (Hamilton, 1822; Day, 1878 and Menon, 1992).

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However, there are still a large number of habitats/ regions for which the ichthyofaunal diversity is still to be reported. Moreover, such habitats are being exploited for various resources and also they experience the natural climate change that is bound to impact its faunal diversity and abundance. One such habitat, that lacks any published scientific information on ichthyofaunal diversity and abundance, is the district Bijnor in Uttar Pradesh state of India. Therefore, this study was undertaken with the objective to explore the ichthyofauna of this region.

STUDY AREA

The Bijnor district lies between north latitude 29^0 2' N and 29^0 58' N, and of longitude 78^0 0' E and 78^0 59' E. Its maximum length from north to south is about 102 km., and from east to west about 90 km. In the west, it is bounded by the districts of Saharanpur, Muzaffarnagar and Meerut. Separated by the river Ganga on its extreme northern tip, it touches upto Dehra Dun district. To its north and north-east lies the hill district of Garhwal. On the south-east, it touches Naini Tal district, from where it is separated by the river Phika. District Moradabad bounds the remaining south-eastern part of the district. According to the Statistical Abstract 2003 of Uttar Pradesh, the district covers an area of 4561 sq. km, in which the rural and urban areas comprise 4422.50 and 138.50 sq. km., respectively. Due to changing course of flow of Ganga river, the adjoining area of the district changes frequently. The rivers of the district include the Ganga, Ramganga, Khoh, Ban, Gangan, Karula, Malin, Ekra, Chhoiya, Pili, Dhara, Panili and Phika.

Presently, there are approximately 2938 ponds (Total area = 2980.9972 ha) available for fish culture in the district. However, only 442.822 ha water area is being utilised for fish culture thereby leaving vast scope for the expansion of fish farming.

MATERIALS AND METHODS

A survey of fish fauna inhabiting the important water resources of district Bijnor was made for a period of one year during February 2012 to January 2013. Fishes were collected from the rivers, reservoir and ponds with the help of local fishermen using different types of nets, viz., gill nets, cast nets and drag nets.

Fish identification was done with the help of standard taxonomic references (Day, 1986; Talwar and Jhingran, 1991 and Jayaram, 2010).

RESULTS AND DISCUSSION

A total of 36 fish species belonging to 6 orders were collected from various water resources of the Bijnor district (Table 1). On the basis of percentage composition and species richness, order Cypriniformes was dominant (18 species) followed by Siluriformes (10 species), Perciformes (4 species), Osteoglossiformes (2 species), Synbranchiformes and Clupeiformes (1 species each) (Figure 1).

Cypriniformes > Siluriformes > Perciformes > Osteoglossiformes > Synbranchiformes = Clupeiformes

Ichthyofaunal diversity comprised of 11 families namely Cyprinidae (50%), Bagridae (13.89%), Channidae (8.33%), Clariidae (5.55%), Notopteridae (5.55%), Siluridae (2.78%), Sisoridae (2.78%), Heteropneustidae (2.78%) Osphronemidae, (2.78%) Mastacembelidae (2.78%) and Clupeidae (2.78%) (Table 2 and Figure2).

Cyprinidae > Bagridae >Channidae >

Table 1: Fish Fauna of the District Bijnor

S. No.	Taxonomic Position and Scientific Name	Local Name	Source	Frequency
	Order : Cypriniformes **Family – Cyprinidae**			
1.	*Catla catla* (Ham.)	Katla	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Common
2.	*Cirrhinus mrigala* (Ham.)	Naini	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Plenty
3.	*C. reba* (Ham.)	Narain, Nain	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Rare
4.	*Cyprinus carpio*(Linnaeus)	Common Carp	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Common
5.	*Labeo rohita* (Ham.)	Rohu	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Plenty
6.	*L. calbasu* (Ham.)	Kalmouch	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Rare
7.	*L. gonius* (Ham.)	Kheri	Ganga, Ramganga, Khoh river and Pili reservoir	Rare
8.	*L. bata* (Ham.)	Bata	Ganga, Ramganga, Khoh river and Pili reservoir	Rare
9.	*Puntius sarana* (Ham.)	Puthi	Ganga, Ramganga, Khoh river and Pili reservoir	Common
10.	*P. ticto* (Ham.)	Sahari	Ganga, Ramganga, Khoh river and Pili reservoir	Common
11.	*P. sophore (Ham.)*	Bhoor	Ganga, Ramganga, Khoh river and Pili reservoir	Common
12.	*Chela bacaila (Ham.)*	Chaal	Ganga, Ramganga, Khoh river and Pili reservoir	Common
13.	*Ctenopharyngodon idella*	Grass carp	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Rare
14.	*Hypophthalmichthys molitrix*	Silver carp	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Rare
15.	*Esomus danricus (Ham.)*	Derwa	Ganga, Ramganga, Khoh river and Pili reservoir	Common
16.	*Amblypharyngodon mola*(Ham.)	Murla	Ganga, Ramganga, Khoh river and Pili reservoir	Common
17.	*Oxygaster bacaila* (Ham.)	Chilwa	Ganga, Ramganga, Khoh river and Pili reservoir	Rare
18.	*O. gora* (Ham.)	Chilwa	Ganga, Ramganga, Khoh river and Pili reservoir	Rare
	Order: Siluriformes **Family – Siluridae**			
19.	*Wallago attu*(Bloch and Schneider)	Lanchi	Ganga, Ramganga, Khoh river and Pili reservoir	Common
	Family – Bagridae			
20.	*Sperata seenghala (Sykes)*	Singhara, malli	Ganga, Ramganga, Khoh river and Pili reservoir	Common
21.	*S. aor (Ham.)*	Chongna	Ganga and Khoh river	Common
22.	*M. cavasius (Ham.)*	Teenghara	Ganga, Ramganga, Khoh river and Pili reservoir	Rare
23.	*M. vittatus (Bloch)*	Teenghara	Ganga, Khoh river and Pili reservoir	Common
24.	*M. tengra (Ham.)*	Teenghara	Ganga, Khoh river and ponds	Rare
	Family – Sisoridae			
25.	*Bagarius bagarius (Ham.)*	Gonch	Ganga, Ramganga, Khoh river and Pili reservoir	Common

Table 1 (Cont.)

S. No.	Taxonomic Position and Scientific Name	Local Name	Source	Frequency
	Family – Saccobranchidae/Heteropneustidae			
26.	*Heteropneustes fossilis (Bloch)*	Singhi	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Common
	Family – Clariidae			
27.	*Clarias batrachus* (Linnaeus)	Magur	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Rare
28.	*C. gariepinus*	Thai Magur	Ganga, Ramganga, Khoh river, Pili reservoir and Ponds	Rare
	Order : Perciformes **Family – Channidae**			
29.	*Channa marulius (Ham.)*	Guldar Sawl	Ganga, and Khoh river	Rare
30.	*Channa srtiatus*	Sawli	Ganga, Ramganga, Khoh river and Pili reservoir	Common
31.	*Channa punctatus*	Sawli	Ganga, Ramganga, Khoh river and Pili reservoir	Common
	Family – Anabantidae/Osphronemidae			
32.	*Trichogaster fasciata (Bloch Schn.)*	Khurda	Ponds	Plenty
	Order : Synbranchiformes			
	Family – Mastacembelidae			
33.	*Mastacembelus armatus (Lacepede)*	Bamcha	Ganga, Khoh river and Pili reservoir	Common
	Order : Clupeiformes			
	Family – Clupeidae			
34.	*Gudusia chapra (Ham.)*	Khurda	Ganga river	Rare
	Order : Osteoglossiformes			
	Family – Notopteridae			
35.	*Notopterus notopterus (Pallas)*	Patra	Ganga, Khoh river, Pili reservoir and ponds	Rare
36.	*Chitala chitala (Ham.)*	Cheetal	Ganga, Khoh river, Pili reservoir and ponds	Common

Figure 1: Percentage Composition of Different Orders of Fishes in Bijnor District

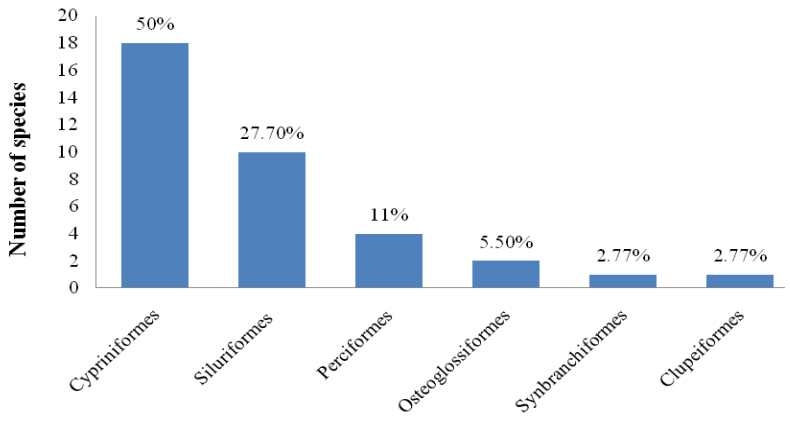
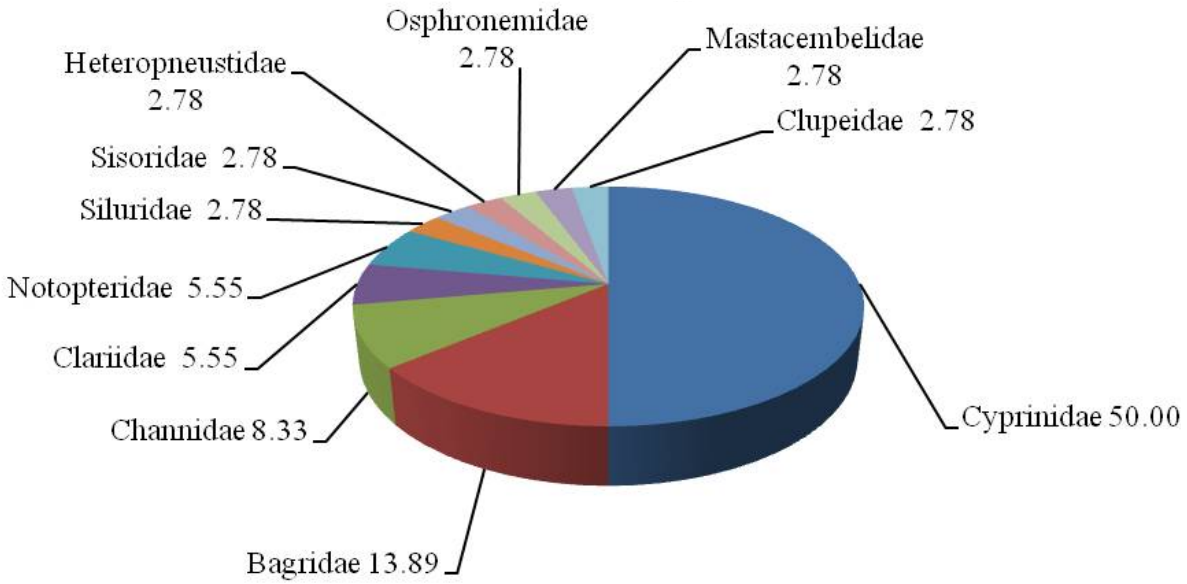


Table 2: Family Wise Contribution of the Fish Fauna in the District Bijnor

S. No.	Families	No. of Genus	No. of species	% contribution
1.	Cyprinidae	11	18	50.00
2.	Bagridae	02	05	13.89
3.	Channidae	01	03	8.33
4.	Clariidae	01	02	5.55
5.	Notopteridae	02	02	5.55
6	Siluridae	01	01	2.78
7.	Sisoridae	01	01	2.78
8.	Heteropneustidae	01	01	2.78
9	Osphronemidae	01	01	2.78
10.	Mastacembelidae	01	01	2.78
11.	Clupeidae	01	01	2.78
	Total	**23**	**36**	**100**

Figure 2: Percentage Contribution of Different Families of Fishes in District Bijnor



Notopteridae = Clariidae >Siluridae = Sisoridae = Heteropneustidae = Osphronemidae = Mastacembelidae = Clupeidae

Family Cyprinidae was represented by four species of genus *Labeo,* three species of genus *Puntius,* two species each of genus *Cirrhinus*, and *Oxygaster* and one species each of genus *Catla*, *Cyprinus, Chela, Hypophthalmichthys, Ctenopharyngodon, Esomus* and *Amblypharyngodon* respectively, while family Bagridae showed their presence with three species of genus *Mystus* and two species of *Sperata* and family Channidae showed three species of *Channa* while two species of *Clarias* to family Clariidae. *Notopterus* and *Chitala* were reported as member of family Notopteridae. *Wallago attu* belonged to family Siluridae; *Bagarius bagarius* to Sisoridae; *Heteropneustes fossilis* to Heteropneustidae; *Trichogaster fasciata* to Osphronemidae; *Mastacembelus armatus* to Mastacembelidae and *Gudusia chapra* to Clupeidae.

In these reported fishes, Cyprinidae family was more dominant. Many researchers have reported the strong dominance of Cyprinidae family in their investigations on ichthyofaunal diversity.

Sakhare (2001) reported 23 species belonging to 07orders where Cyprinidae family was dominant with 11 species from Jawalgaon reservoir Solapur district Maharashtra. Battul *et al*. (2007) reported 18 species from Ekruckh lake Solapur district where Cyprinidae family was dominant with 8 species. Khedkar and Gynanath (2005) reported 37 species from Issapur dam in district Yavatmal where Cyprinidae family was dominant with 20 species. Sharma (2008) reported 87 species under 36 genera belonging to Cyprinidae family from freshwaters of Nepal. Shinde (2009) observed 11 species under 10 genera under the Cyprinidae family from Harsul Savangi dam in the district Aurangabad (Maharashtra). Ubharane *et al*. (2011) observed 27 species belonging to 11 families where Cyprinidae family was dominant with 13 species from Ambadi dam in the district of Aurangabad (Maharashtra).

Three species of major carps namely *Catla catla, Labeo rohita* and *Cirrhinus mrigala* are being cultivated in the perennial ponds spread over 11 blocks of the district Bijnor. At times, exotic carps namely common carp, *Cyprinus carpio*, silver carp, *Hypophthalmichthys molitrix* and grass carp, *Ctenopharyngodon idella* are also cultivated along with the Indian major carps.

Inland fishes are treasured resources both in terms of utility as food and materials for scientific study. The information on the fish fauna and its distribution and habitat is of great importance in assessing the ecosystem dynamics, in planning and implementing sustainable development programmes and for proper management and utilization of natural resources.

Abundance-wise distribution suggests three plenty (*Cirrhinus mrigala, Labeo rohita and Trichogaster fasciata*), eighteen common (*Catla catla, Cyprinus carpio, Puntius sarana, P. ticto, P. sophore, Chela bacaila, Esomus danricus, Amblypharygodon mola, Wallago attu, Sperata seenghala, S. aor, Mystus vittatus, Bagarius bagarius, Heteropneustes fossilis, Channa striatus, C. punctatus, Mastacembelus armatus and Chitala chitala*), and fifteen rare (*Cirrhinus reba, L. calbasu, L. gonius, L. bata, Ctenopharygodon idella, Hypophthalmichthys molitrix, Oxygaster bacaila, O. gora, M. cavasius, M. tengra, Clarias batrachus , C. gariepinus*

Channa marulius, Gudusia chapra and Notopterus notopterus) fish species. Discussion with fisheries officers, fish farmers and fishermen in this area indicate that the capture production of fishes have declined sharply in the last one decade. We were informed that some species of *Puntius, Mastacembelus, Mystus, Channa, Anabas and Macrobrachium* (species name not confirmed), which were seen and collected by fishermen before 2005, rarely/do not appear in fishing operations these days. (Per. Com.) Habitat loss, environmental degradation and indiscriminate fishing have seriously affected the fish fauna of the entire region. Decline in wild fish catch has compelled many fishermen to change their profession.

CONCLUSION

It may be concluded that the rivers, reservoirs and ponds of the region hosts a number of freshwater fish species. However, the fish fauna in Bijnor district is at risk due to several anthropogenic activities like deforestation, over-fishing, sand mining, recreational activities and organic and inorganic pollution. It is suggested that more studies should be undertaken to generate the basic biological information on the ichthyofauna of the region. Such information may be utilized to (i) develop scientifically sound management strategies for rational exploitation and conservation of the ichthyofauna, and (ii) identify new culturable fish species and develop its culture technology.

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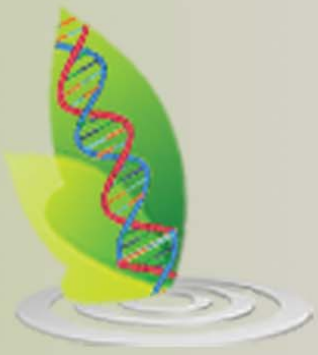

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