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Diversity of indigenous ornamental fishes of Purba Medinipur, West Bengal, India

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ABSTRACT

Present study has been conducted on indigenous ornamental fish diversity of Purba Medinipur district, West Bengal, India. During the 21 months of study period we have identified 44 indigenous ornamental fish species under 17 families of 7 orders from area under study. On the basis of overall survey the order Cypriniformes represented the largest diversity including 15 species under 2 families. Cyprinidae is the most dominant family, contributing 29.45% species among total species. According to IUCN (2020.1) status of the fishes are included 86.37% Least Concern, 4.54% Vulnerable, 4.45% Near Threatened, 2.27% Not Evaluated& 2.27% are Data Deficient. Locally a good number of species have been detected very low in density from the study area is an alarming condition, needed immediate conservation strategies to safeguard these valuable natural resource.

INTRODUCTION

Ornamental fishes can be defined as attractive colourful fishes of peaceful nature, that are kept as pets in confined spaces of an aquarium or a garden pool with the purpose of enjoying their beauty for fun and fancy (Dey, 1996). Since ornamental fishes are usually kept in glass aquarium, these are also popularly known as aquarium fishes. Ornamental fishes are the most popular pets in the world (Singh, 2005). Aquarium keeping has emerged as the second most popular hobby in recent years next to photography (Chapman, 1997). It offers a feast to our eyes and relaxation to the mind especially when we feel tired or depressed. Ornamental fishes are also called 'living jewels' for their beautiful colours and playful behaviour. Ornamental fishes are typically small sized, colourful and most often bizarre shaped in appearance (Dey, 1996). However, these fishes need not necessarily be always colourful. In fact, certain fish species loved by aquarist are quite ugly, in such cases the peculiar appearance is a source of attraction for the aquarium lovers and naturalists (Dey, 1996). With the inspiring popularity of aquarium keeping in households in many parts of the world ornamental fish has become an important part in international trade and has become a global industry (Tlusty et al., 2013). About 288 exotic varieties of ornamental fishes are popular in West Bengal (Bhaskar et al., 1989). Not only do exotic fish have ornamental values, many of our inland fish also have ornamental values such as their various attractive colours, spots, shapes, transparent bodies, behaviours such as their shaking, sudden rise and fall, crawl down, wagging the tail

excessively change colour at different time and seasons etc., which will attract the eyes of aquarist.

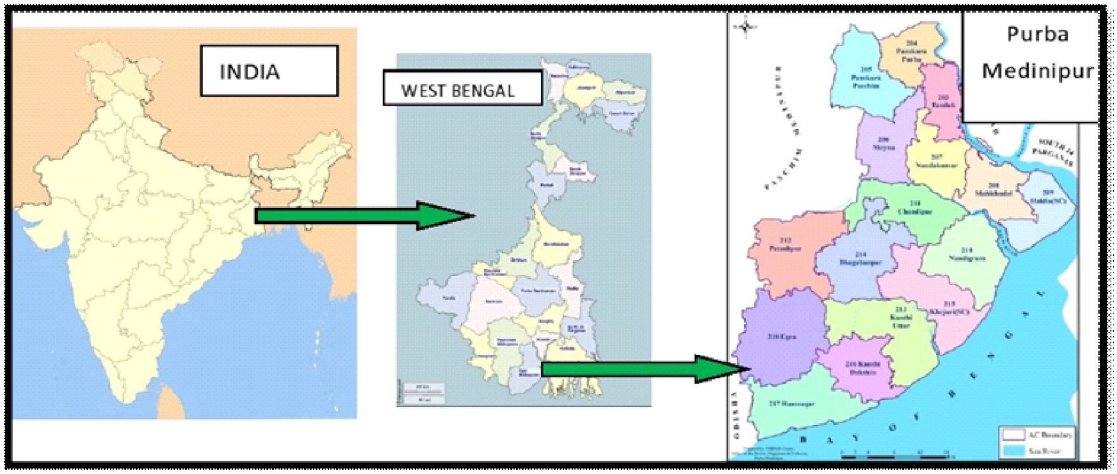
Basu et al (2012) enlisted 70 indigenous ornamental fishes from West Bengal. Purba Medinipur district is an important district of West Bengal, India. Purba Medinipur district was formed on 1st January, 2002 from undivided historical Midnapore. Another part is designated as Paschim Medinipur. It is part of the lower Indo-Gangetic Plain and Eastern Coastal plain. The major rivers are Haldi, Rupnarayan, Rasulpur, Bagui and Keleghai, flowing in north to south or south-east direction of Purba Medinipur district. Various indigenous ornamental fish found in the rivers of Purba Medinipur districts. Paul & Chanda (2014) enlisted 48 numbers of indigenous ornamental fishes from Paschim Medinipur district. Sit et al. (2020) enlisted total 9 *Puntius* species as an ornamental fish from Purba Medinipur, Paschim Medxinipur & Jhargram district. Dutta *et al.*, (2013) reported 21 species of ornamental fishes from coastal region Digha to Talpati as well as Purba Medinipur, West Bengal. During present study a thorough survey has been conducted in all 25 blocks of Purba Medinipur district.The objective of the present study is to report the diversity of indigenous ornamental fish, their distribution & conservation status in Purba Medinipur district. Present study will be a base line for conservation planning of the aquatic environments of these river as well as Purba Medinipur district. Present study follows the work of Mishra *et al.* (2003), R. P. Barman (2007), Goswami *et al.* (2012), Patra *et al.*(2017), Moglekar *et al.* (2017) & Benerjee *et al.* (2019).

MATERIAL & METHODS

Study Site:

The geographical position of the study site (21° 38´N- 22° 31´N; 87° 17´E-88° 12´E) is shown in figure 1.Climatic conditions of Purba Medinipur are under the influence of South-West and North-East monsoon.

Fig 1: Geographical position of Purba Medinipur District.



Collection& preservation of specimens:

The study has been conducted over a period 21 months (June 2018 to February 2020). Specimens have been collected from all the blocks of Purba Medinipur districts. Specimens were immediately preserved in 4% formaldehyde and brought to laboratory of PG Dept. of Zoology, Raja N. L. Khan Women's College (Autonomous). Then the fish specimens have been washed, identified and finally preserved in 5-6% formaldehyde in separate container for each species.

IDENTIFICATION

The specimens have been identified morphologically & meristimatrically such as body length, depth, colour, colour band, shape, size, fin number, fin shape, fin rays number, lateral line scale etc. on the basis of existing literature such as Talwar and Jhingran, 1991; Jayaram, K. C,1999 & 2010, www.fishbase.org.ver 2020.

DATA ANALYSIS

The identified fish species have been categorized as different levels of threatened condition such as Least concern (LC), Vulnerable (VU), Near threatened (NT), Not evaluated (NE), Data deficient(DD) on the basis of IUCN Red list (IUCN, 2020.1). All the statistical graphs have been done with the help of Microsoft Excel 2007.

RESULT & DISCUSSION

During the study period we enlisted 44 species of indigenous ornamental fish under 26 genera, 17 families and 7 orders from Purba Medinipur district of West Bengal that has been given in the table no-1. Among the collected species order Cypriniformes is the most dominant group contributing 34.09%, followed by Perciformes 29.60%, Siluriformes 20.45%, Synbranchiformes 9.09%, Cyprinidontiformes, Osteoglossiformes, Beloniformes, each with 2.27% of the total species (Fig.3&4). Order Perciformes contributed 6 families to the total families, followed by Siluriformes 4, Synbranchiformes & Cypriniformes each with 2, Cyprinidontiformes, Osteoglossiformes & Beloniformes each with 1 family (Fig.2). Cyprinidae is the most dominant family contribute 29.45% species followed by Bagridae 11.36%, Ambassidae 9.09%, Mastacembelidae 6.81%, Channidae 6.81%, Gobioidei 4.54%, Siluridae 4.54%, Cobitidae 4.54%, Osphronemidae 4.54% and Anabantidae, Notopteridae, Claridae, Heteropneustidae, Belonidae, Aplocheilidae, Branchidae, Badidae each with 2.27% among total species (Fig.5). A comparison between observation of Dutta *et al.* (2013) and present study reveals that there is a probability to found 53 species of ornamental fish from Purba Medinipur district as because 12 species are common with the record of Dutta *et al.* and there is a gap of 41 species (32 in record of Dutta *et al.* and 9 in present study) between two reports.

According to IUCN (2020.1) status of the fishes has been included 86.37% Least Concern, 4.54% Vulnerable, 4.54% Near Threatened, Not Evaluated and Data Deficient each with 2.27% (Fig.6). On the basis ofblock wise availability (High e" 70% Blocks; Medium= 40%-69% Blocks; Low=20%-39% Blocks; Very Low d" 20% Blocks) local status of fish species have

been determined for their conservation.The local status of fish species contributes 36.36% very low, 25% low, 13.63% medium & 25% high amount in Purba Medinipur district (Table-1). It is found that maximum number of fish species have been low amount into the study area. Several anthropogenic factors damaged the fish population mainly culture of Indian major carp, effluence of different industrial waste, surface runoff containing various pesticides from nearby agriculture fields and also over fishing are somefactors for fish diversity loss in the Purba Medinipur district. From the above factors, we can conclude the necessary of the conservation of indigenous ornamental fishes of Purba Medinipur district is essential.

Table 1: Indigenous Ornamental fishes of Purba Medinipur with their block wise distribution

Name of the order	Name of the family	Name of the species	Local name	IUCN Status	Local Status	Distribution (blockwise)
1.Osteoglossiformes	1.Notopteridae	**1.***Notopterus notopterus*(Pallas,1769)	pholui	LC	M	Egra-I & II, Contai-I & III, Mahisadal, Moyna, Panskura, Potaspur-I & II, Bhawanpur-I & II, Tamluk,Nandigram-I&II,Chandipur
2.Cypriniformes	2.Cyprinidae	**2.***Amblypharyngodon mola*(Hamilton,1822)	mourla	LC	H	Egra-I&II, Contai-I&II, Mahisadal, Moyna, Nandigram-I , Panskura, Potaspur-I&II,BhawanpurI&II,Tamluk, SahidMatangini, Nandigram-II,Kolaghat,Chandipur.Deshopran ,Nandakumar, Haldia, Khejuri-I & II, Ramnagar-I & II, Sutahata
		3.*Danio rerio*(Hamilton,1822)	nirali	LC	L	Mahisadal, Moyna, Potaspur-I, Potaspur-II, Bhawanpur-I,Nandigram-I&II
		4.*Esomus danricus*(Hamilton,1822)	darke	LC	M	Egra-I&II, Contai-I&II, Mahisadal, Moyna, Nandigram-I&II, Panskura, Potaspur-I&II,BhawanpurI&II,Tamluk, Chandipur, Deshopran
		5.*Puntius chola*(Hamilton,1822)	punti	VU	H	Egra-I&II, Bhawanpur-I & II, Contai-I&III, Mahisadal, Moyna, Nandigram-I&II, Panskura, Potaspur-I, Potaspur-II, , Tamluk, SahidMatangini, Chandipur.Deshopran,Nandakumar, Khejuri-I & II, Ramnagar-I & II, Sutahata

Name of the order	Name of the family	Name of the species	Local name	IUCN Status	Local Status	Distribution (blockwise)
		6.*Puntius conchonius* (Hamilton, 1822)	punti	LC	VL	Bhawanpur-I, Mahisadal, Moyna, Nandigram-I&II
		7.*Puntiusticto*(Hamilton,1822)	punti	LC	VL	Mahisadal, Moyna
		8.*Puntius sophore*(Hamilton,1822)	punti	LC	H	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I &II, Panskura, Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk, Haldia,SahidMatangini,Kolaghat,Chandipur,Deshopran, Nandakumar
		9.*Puntius phutunio*(Hamilton,1822)	punti	LC	L	Mahisadal, Nandigram-I&II, Bhawanpur-I &II,Tamluk
		10.*Puntius gelius(*Hamilton-Buchanan,1822)	punti	LC	VL	Nandigram-I &II
		11.*Puntius sarana* (Hamilton-Buchanan,1822)	punti	VU	VL	Tamluk, SahidMatangini, Nandigram-II,Kolaghat, Deshopran
		12.*Salmophasia bacaila*(Hamilton,1822)	chela	LC	L	Mahisadal,Moyna, Bhawanpur-I & II, Potaspur-I, Nandigram-I,Potaspur-II
		13.*Salmophasia phulo*(Hamilton.1822)	chela	LC	VL	Bhawanpur-I , Mahisadal, Moyna, Potaspur-I, Potaspur-II
		14.*Osteobrama cotiocotio*(Hamilton, 1822)	gobinda	LC	VL	Mahisadal, Nandigram-I, Bhawanpur- II
	3.Cobitidae	**15.***Lepidocephalichthys guntea*(Hamilton,1822)	gunte	LC	L	Mahisadal, Moyna, Nandigram-II, Potaspur-I, Potaspur-II, Bhawanpur-I &II

Name of the order	Name of the family	Name of the species	Local name	IUCN Status	Local Status	Distribution (blockwise)
	3.Cobitidae	**15.***Lepidocephalichthys guntea*(Hamilton,1822)	gunte	LC	L	Mahisadal, Moyna, Nandigram-II, Potaspur-I, Potaspur-II, Bhawanpur-I &II
		16.*Lepidocephalichthys thermalis*(Valenciennes,1846)	gunte	LC	VL	Mahisadal, Moyna, Potaspur-I, Bhawanpur-I
3.Siluriformes	4.Bagridae	**17.***Mystus cavasius*(Hamilton,1822)	tengra	LC	H	Egra-I & II, Bhawanpur-I & II, Contai-I & III, Mahisadal, Moyna, Nandigram-I&II, Panskura, Potaspur-I, Potaspur-II, Haldia,SahidMatangini,Kolaghat,Chandipur,Deshopran, Nandakumar, Khejuri-I & II, Ramnagar-I & II, Sutahata
		18.*Mystus vittatus*(Bloch,1794)	tengra	LC	H	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I, Panskura, Bhawanpur-I & II, Potaspur-I, Potaspur-II, Tamluk, SahidMatangini,Chandipur,Deshopran,Nandakumar
		19.*Mystus tengara*(Hamilton, 1822)	tengra	LC	VL	Potaspur-I&II, Tamluk, Chandipur, Nandakumar
		20.*Mystus bleekeri (Day, 1877)*	tengra	LC	VL	Potaspur-I&II, Tamluk, Deshopran
		21.*Mystus gulio (Hamilton-Buchanan, 1822)*	tengra	LC	M	Egra-I&II, Contai-I&II, Mahisadal,Tamluk, Haldia,SahidMatangini,NandigramII,Kolaghat,Chandipur, Deshopran, Nandakumar
	5.Claridae	**22.***Clarias batrachus*(Linnaeus, 1758)	magur	LC	L	Moyna, Nandigram-I, Potaspur-I, Potaspur-II,Bhawanpur-I , Nandakumar, SahidMatangini, Chandipur
	6.Siluridae	**23.***Ompok pabo*(Hamilton,1822)	pabda	NT	L	Bhawanpur-I & II, Panskura, Potaspur-I, Potaspur-II,Tamluk

Name of the order	Name of the family	Name of the species	Local name	IUCN Status	Local Status	Distribution (blockwise)
		24.*Wallago attu* (Bloch & Schneider, 1801)	boal	NT	VL	Mahisadal, Potaspur-I
	7.Heteropneustidae	**25.***Heteropneustes fossils* (Bloch,1794)	singhi	LC	H	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I, Panskura, Potaspur-I, Potaspur-II, BhawanpurI&II,Tamluk,Chandipur,Deshopran,Nandakumar, Haldia, Deshopran, Khejuri-I & II, Ramnagar-I & II, Sutahata
4.Beloniformes	8.Belonidae	**26.***Xenentodon cancila*(Hamilton,1822)	gangtur	LC	VL	Moyna, Potaspur-I, Potaspur-II, Bhawanpur-I
5.Cyprinodontiformes	9.Aplocheilidae	**27.***Aplocheilus panchax*(Hamilton,1822)	techokha	LC	L	Bhawanpur-I & II, Mahisadal, Moyna, Nandigram-I, Potaspur-I, Potaspur-II, Bhawanpur-I &II, Nandakumar
6.Synbranchiformes	10.Mastacembelidae	**28.***Macrognathus aral*(Bloch &Schneider,1801)	pankal	LC	L	Panskura, Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk
		29.*Macrognathus pancalus*(Hamilton,1822)	pankal	LC	H	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I&II, Panskura, Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk, SahidMatangini,Chandipur,Deshopran,Nandakumar
		30.*Mastacembelus armatus*(Lacepède, 1800)	pankal	LC	L	Mahisadal, Nandigram-I,Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk
	11.Branchidae	**31.***Monopterus cuchia*(Hamilton,1822)	cuchia	LC	VL	Moyna, Potaspur-I, Potaspur-II,Bhawanpur-I
7.Perciformes	12.Ambassidae	**32.***Chanda nama*(Hamilton,1822)	chanda	LC	M	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I, Panskura, Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk

Name of the order	Name of the family	Name of the species	Local name	IUCN Status	Local Status	Distribution (blockwise)
		33.*Parambassis baculis*(Hamilton,1822)	chanda	LC	VL	Mahisadal, Moyna, Potaspur-I, Potaspur-II, Bhawanpur-I
		34.*Parambassis lala*(Hamilton,1822)	chanda	LC	L	Mahisadal, Moyna, Nandigram-I&II, Potaspur-I, Potaspur-II, Bhawanpur-I
		35.*Parambassis* ranga (Hamilton, 1822)	chanda	LC	L	Contai-I&III, Moyna, Nandigram-I, Potaspur-I, Potaspur-II
		33.*Parambassis baculis*(Hamilton,1822)	chanda	LC	VL	Mahisadal, Moyna, Potaspur-I, Potaspur-II, Bhawanpur-I
		34.*Parambassis lala*(Hamilton,1822)	chanda	LC	L	Mahisadal, Moyna, Nandigram-I&II, Potaspur-I, Potaspur-II, Bhawanpur-I
		35.*Parambassis* ranga (Hamilton, 1822)	chanda	LC	L	Contai-I&III, Moyna, Nandigram-I, Potaspur-I, Potaspur-II
	13.Badidae	**36.***Badis badis*(Hamilton,1822)	dhobachi	LC	VL	Moyna, Nandigram-I,Potaspur-I, Bhawanpur-I,Tamluk
	14.Anabantidae	**37.***Anabas testudineus* (Bloch,1792)	koi	DD	H	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I&II, Panskura, Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk, Chandipur, Deshopran, Nandakumar, Khejuri-I & II, Ramnagar-I & II, Sutahata
	15.Osphronemidae	**38.***Trichogaster fasciata*(Bloch & Schneider,1801)	kholse	LC	H	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I, Panskura, Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk, Haldia, Chandipur, Deshopran, Khejuri-I & II, Ramnagar-I & II, Sutahata
		39.*Trichogaster lalius*(Hamilton,1822)	kholse	LC	M	Egra-I&II, Contai-I&III, Mahisadal, Moyna, Nandigram-I, Panskura, Potaspur-I, Potaspur-II, Bhawanpur-I &II,Tamluk, Khejuri-I & II, Ramnagar-I & II

Name of the order	Name of the family	Name of the species	Local name	IUCN Status	Local Status	Distribution (blockwise)
	16.Channidae	**40.***Channa punctata*(Bloch, 1793)	latha	LC	H	Egra-I&II, Contai-I&II, Mahisadal, Moyna, Nandigram-I, Panskura, Potaspur-I&II,BhawanpurI&II,Tamluk, Haldia, Kolghat, Chandipur, Khejuri-I & II, Ramnagar-I & II, Sutahata
		41.*Channa orientalis*(Bloch & Schneider,1801)	chang	NE	VL	Moyna, Potaspur-I
		42.*Channa striata*(Bloch, 1793)	shol	LC	VL	Panskura, Potaspur-I, Potaspur-II, Moyna
	17.Gobioidei	**43.***Glossogobius giuris*(Hamilton, 1822)	bele	LC	H	Mahisadal, Moyna, Nandigram-I, Potaspur-I, Potaspur-II, Bhawanpur-I &II, Haldia, Khejuri-I & II, Ramnagar-I & II, Sutahata, Egra-I&II, Contai-I&II,Tamluk, Panskura,Chandipur, Deshopran
		44.*Stigmatogobius sadanundio (*Hamilton-Buchnan,1822)	Vacha	LC	M	Nandigram-I, Tamluk,Haldia, Khejuri-I & II, Ramnagar-I & II, Sutahata, Egra-I&II, Contai-I&II,Tamluk

Abbreviations: IUCN = International Union for Conservation of Nature; VU = Vulnerable; NE= Not Evaluated; NT = Near Threatened; LC = Least Concern; DD = Data Deficient; VL= very Low; L = Low; M = Medium; H = High

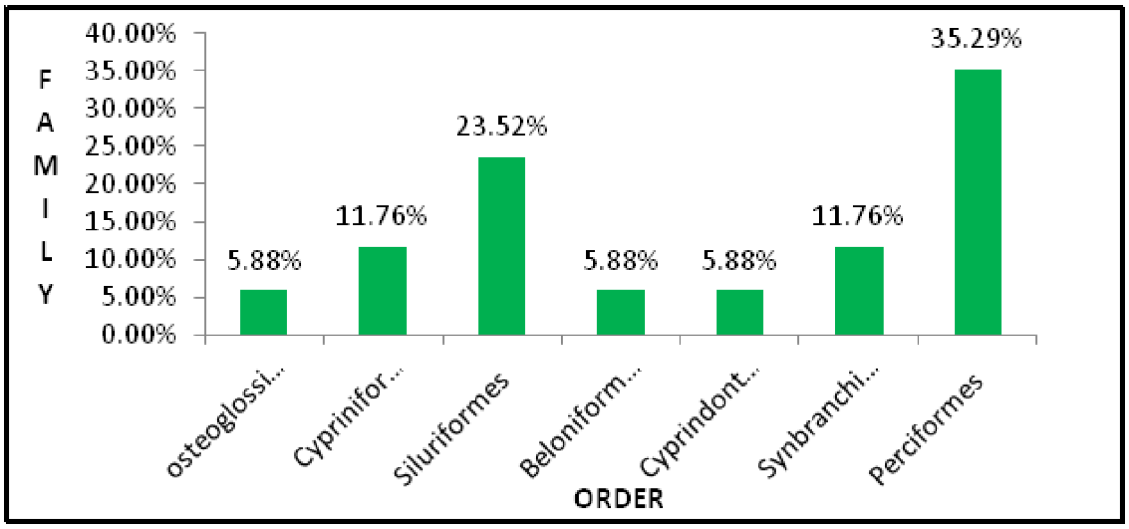


Fig 2: Orderwise family distribution of indigenous ornamental fishes in Purba Medinipur district

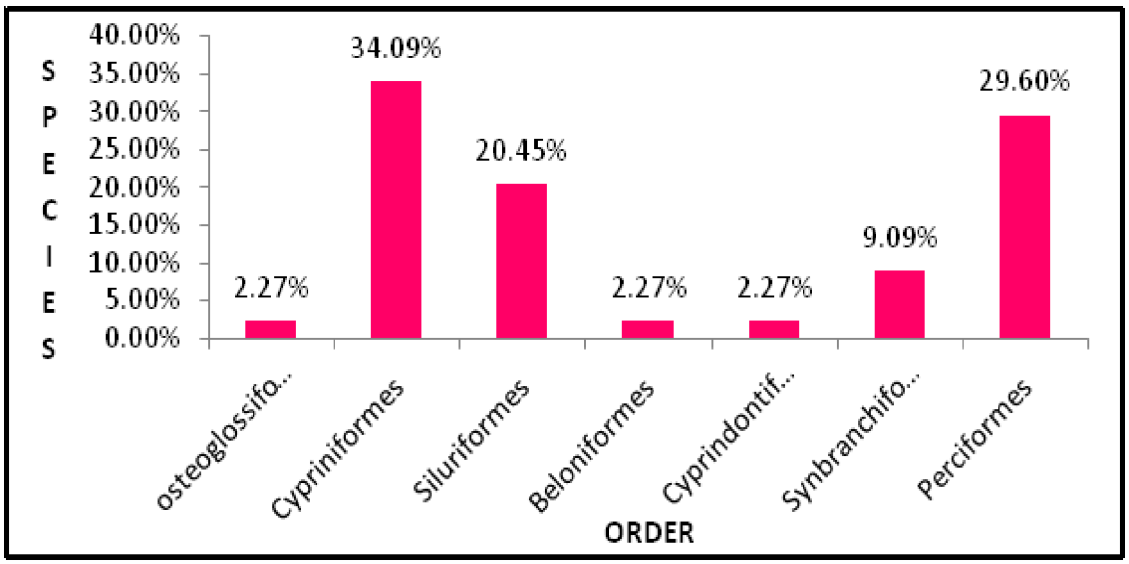


Fig 3: Orderwise species distribution of indigenous ornamental fishes in Purba Medinipur district

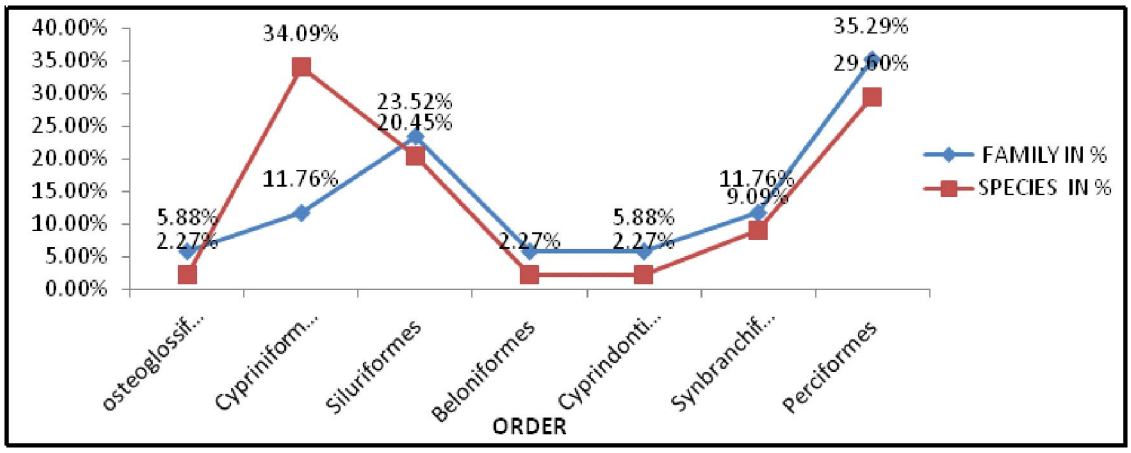


Fig 4: Relationship among family & species of indigenous ornamental fishes in various orders

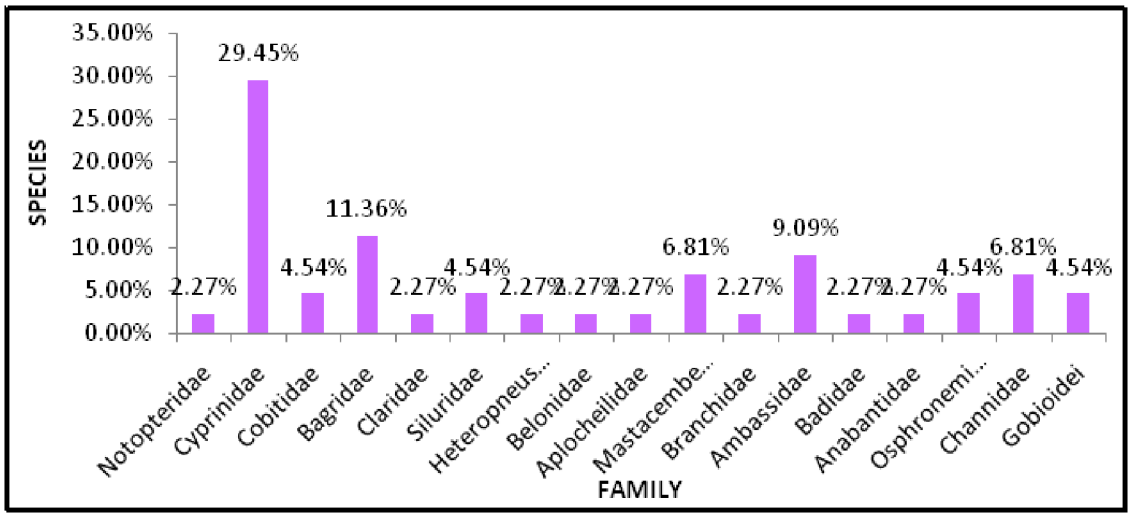


Fig 5: Family wise species distribution of indigenous ornamental fishes Purba Medinipur district

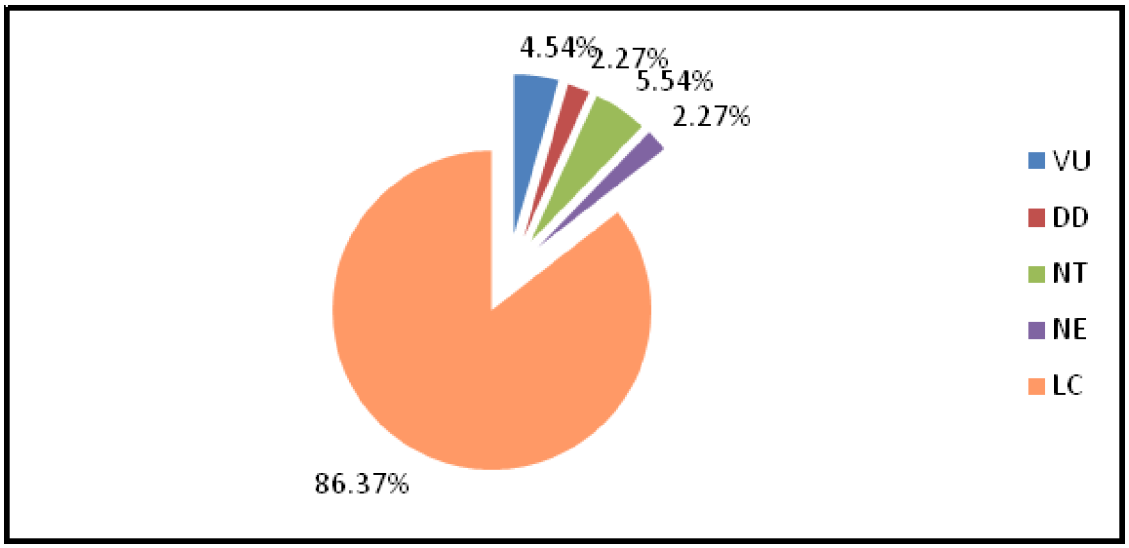


Fig 6: Percentage contribution of species under IUCN (2020.1) categories

Conclusions

A total number of 44 indigenous ornamental fish species has been found in Purba Medinipur district. During present study it has been observed that maximum number of species is available in very low amount in the study area indicates the urgency of conservation to the sustainability of these valuable aquatic resources. Captive breeding fish ranching is being suggested to save this indigenous ornamental fish in its natural water bodies.

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