



Indigenous Ornamental Fish Faunal Diversity in Paschim Medinipur, West Bengal, India

Paul Bidisha and Chanda Angsuman

PG Department of Zoology, Raja N.L. Khan Women's College, Midnapur, Paschim Medinipur, Westbengal, INDIA

Available online at: www.isca.in, www.isca.me

Received 25th April 2014, revised 10th May 2014, accepted 2nd June 2014

Abstract

Ornamental fishes are very sweet in their colour, peculiar and playful behaviour for which they are called 'living jewels'. At present ornamental fish industry is growing rapidly. India has a good resource of natural ornamental fishes. West Bengal is also a wide repository of indigenous ornamental freshwater as well as marine water fish resources having both commercial as well as biological important. Paschim Medinipur is a districts where there is no marine zone. Therefore, it represents only it's freshwater indigenous fish resources. In the present study, different rivers and water bodies of Paschim Medinipur have been surveyed thoroughly for natural indigenous ornamental fish diversity. A total number of 48 indigenous ornamental freshwater species belonging to 32 genera, 18 families and 7 order were collected and identified according to the existing literature, during the survey period. Among all the collected specimens family Cyprinidae shows maximum number of species followed by Bagridae and Ambassidae. Present study shows that a good number of ornamental ichthyofauna are under IUCN category and needed to be conserved.

Keywords: Indigenous, Ornamental fish, Fish diversity, Paschim Medinipur.

Introduction

Word 'Ornamental' means anything which is visually attractive and pleasant. So, ornamental fish are those fishes which give a house or a place more beautiful. Ornamental fishes are delightful colour in nature. These are rear as a pet which pleasant us. Aquarium fishes are as visually exciting objects¹. Certain fishes are not so beautiful colour but their character and their peculiar shape and size and behaviour attract people. In past, aquarium fish keeping is a great hobby in many countries. After Second World War, introduction of civil aviation prolonged the hobby to a global industry². The increasing demand of aquarium fishes has resulted in steady increase in aquarium fish marketing throughout globe³. It shows 8% annual growth rate globally. But from Indian scenario it is about 0.008% which offers a lot of scope for development in this sector. Aquarium keeping of fishes began in 1805. The first public aquarium display opened at Regent's Park in England in 1853⁴. 95% of our ornamental fish export is based on wild collection. In India, maximum number of ornamental fish species were marketed from North Eastern states and rest from Southern states of the country which are the hot spots of fish biodiversity in India⁵. Out of the 800 ornamental fish species from various aquatic environments seen in the world, it is estimated that more than 100 varieties of indigenous ornamental fishes are available in our freshwater ecosystem in addition to an equal number of exotic species that are breed in captivity. Kumar et al., recorded 51 ornamental fish species from Mahanadi river system⁶. Goswami et al., recorded 291 ornamental fishes in North East India⁷. A lot of work has been done on freshwater fishes of India⁸⁻¹⁶

In West Bengal, Kolkata and its adjoining areas are the one of the major ornamental fish producing zone of India. About 90% of Indian's exports go from Kolkata followed by 8% of Mumbai and 2% from Chennai¹⁷. West Bengal state Fishermen's Co-operative Federation LTD took up a project on Ornamental fish culture through Fisherwomen coop¹⁸. Work on ornamental fish diversity in West Bengal is very few and scattered¹⁹⁻²¹. But in case of Paschim Medinipur, studies on the freshwater ornamental fish remain untouched. So, during the present study an attempt has been made to explore hitherto unexplored habitat of the indigenous ornamental freshwater fish fauna of Paschim Medinipur.

Material and Methods

Specimen were collected from different river, pond, bill, market throughout the district, Paschim Medinipur using traditional fishing methods during April 2013 to March 2014. Collection of fish fauna was done at early morning and specimens were immediately preserved in 4-6% formaldehyde and were brought to laboratory in preserved condition. Identifications were made after existing literatures and documents²²⁻²⁵. Some of the identifications, which became confusing, were confirmed by the help of Zoological Survey of India, Kolkata. Red list status of the available indigenous ornamental fishes was determined according to the IUCN²⁶.

Results and Discussion

Total number of 48 indigenous ornamental fish species belonging to 32 genera, 18 families and 7 order were identified

during the survey period (01.04.2013 to 31.03.2014) of one year from different blocks of Paschim Medinipur table-1. The result shows that the family *Cyprinidae* under order *Cypriniformes* has the maximum species diversity which is consistent with the report of Basu et.al.,(2012) and with the world data as family *Cyprinidae* is the biggest family of freshwater fish and found a wide distribution on earth³. Family *Bagridae* under order *Siluriformes* and *Ambassidae* under *Perciformes* also exhibits a considerable number of attractive species of ornamental fishes figure-1 and 2. During the survey and investigation an interesting distributional pattern of ornamental fish has been found table-1 in Paschim Medinipur. As for example, *Notopterus notopterus* under family *Notopteridae*; *Amblypharyngodon mola*, *Esomus danricus* and *Puntius sophore* under family *Cyprinidae*; *Lepidocephalichthys guntea* under family *Cobitidae*; *Macrognehus pancalus* under family *Mastacembelidae*; *Chanda nama* under family *Ambassidae* and *Trichogaster fasciata* under *Osphronemidae* exhibits a wide range of distribution throughout the Districts. Some species shows a restricted distribution such as *Neotropius atherinoides* and *Channa orientalis* are found only in Debra block; *Parambassis baculis* is found only in Sabong block; *Ompok pabo* only in Midnapur sadar; *Macrognehus aral* only in

Keshiary block; *Amblyceps mangois* only in Garbeta III; *Sperata aor* only in Garbeta I and *Osteochilichthys thomassi* found only in Binpur II. Present study also reveals that out of 48 species 41 species of ornamental freshwater fish of Paschim Medinipur belonging to least concern category; 4 species belongs to Near Threatened category, two are under Data Deficient and only one under Not Evaluated category table-1 and figure-3 as per IUCN¹⁶.

An attempt has been made to compare between the recent work done by Basu et al., and the present study table-2. Basu et al., mentioned 48 species of ornamental fishes belonging to 34 genera, 18 families and 8 order from Medinipur Table-1. But at that time (January, 2000) Medinipur was divided in two district – Paschim Medinipur and Purba Medinipur. So, according to their report there is some ambiguity regarding the species composition of ornamental fish fauna found in the Paschim Medinipur District. Present study reveals that 48 species belonging to 32 genera under 18 families of 7 order were found throughout the District and 27 species are common in both studies table-2. Purba Medinipur is a maritime district, so, it is obvious that there must be some difference between ornamental fish faunal composition of two districts.

Table-1
Small Indigenous Freshwater fishes of Paschim Medinipur, West Bengal with their block wise distribution and endemic status (NT: Near threatened, LC: Least concern, DD: Data deficient, NE: Not evaluated)

Name of the order	Name of the family	Name of the species	IUCN	Distribution in Paschim Medinipur (blockwise)
<i>Osteoglossif-ormes</i>	<i>Notopteridae</i>	<i>Notopterus notopterus</i> (Pallas,1769)	LC	All blocks
<i>Cypriniforme-s</i>	<i>Cyprinidae</i>	<i>Amblypharyngodon mola</i> (Hamilton,1822)	LC	All blocks
		<i>Barilius barna</i> (Hamilton,1822)	LC	Gopiballavpur I, Gopiballavpur II
		<i>Barilius vagra</i> (Hamilton,1822)	LC	Gopiballavpur I, Gopiballavpur II
		<i>Cabdio morar</i> (Hamilton,1822)	LC	Gopiballavpur I, Gopiballavpur II, Nayagram, Keshiary
		<i>Danio rerio</i> (Hamilton,1822)	LC	Gopiballavpur I, Gopiballavpur II, Keshiary, Jhargram
		<i>Esomus danricus</i> (Hamilton,1822)	LC	All blocks
		<i>Laubuca laubuca</i> (Hamilton,1822)	LC	Nayagram, Keshiary, Gopiballavpur I, Gopiballavpur II
		<i>Osteobrama cotio cotio</i> (Hamilton,1822)	LC	Debra, Chandrakona II, Binpur II, Gopiballavpur I, Gopiballavpur II, Chandrakona I, Keshiary,
		<i>Osteochilichthys thomassi</i> (Day,1877)	LC	Binpur II
		<i>Pethia ticto</i> (Hamilton,1822)	LC	Gopiballavpur I, Gopiballavpur II,
		<i>Puntius chola</i> (Hamilton,1822)	LC	Pingla, Sabong
		<i>Puntius sophore</i> (Hamilton,1822)	LC	All blocks
		<i>Puntius terio</i> (Hamilton, 1822)	LC	Gopiballavpur I, Gopiballavpur II,

		<i>Salmophasia bacaila</i> (Hamilton,1822)	LC	Narayangarh, Debra, Binpur II, Gopiballavpur I, Gopiballavpur II, Jhargram
		<i>Salmophasia phulo</i> (Hamilton,1822)	LC	Sankrail, Gopiballavpur I, Gopiballavpur II
	<i>Botiidae</i>	<i>Botia almorhae</i> (Gray,1831)	LC	Gopiballavpur I, Gopiballavpur II
	<i>Cobitidae</i>	<i>Lepidocephalichthys guntea</i> (Hamilton,1822)	LC	All blocks
		<i>Lepidocephalichthys manipurensis</i> (Arunkumar,2000)	LC	Binpur I, Garbeta III
		<i>Lepidocephalichthys thermalis</i> (Valenciennes,1846)	LC	Gopiballavpur I, Gopiballavpur II
<i>Siluriformes</i>	<i>Bagridae</i>	<i>Mystus bleekeri</i> (Day,1877)	LC	Pingla, Debra
		<i>Mystus cavasius</i> (Hamilton,1822)	LC	Pingla, Debra, Binpur II, Garbeta I, Gopiballavpur I, Gopiballavpur II, Jhargram
		<i>Mystus vittatus</i> (Bloch,1794)	LC	Sankrail, Gopiballavpur I, Gopiballavpur II
		<i>Mystus tengara</i> (Hamilton, 1822)	LC	Midnapur, Jhargram
		<i>Sperata aor</i> (Hamilton,1822)	LC	Garbeta I
	<i>Schilbeidae</i>	<i>Neotropius atherinoides</i> (Bloch,1794)	LC	Debra
	<i>Amblycipitidae</i>	<i>Amblyceps mangois</i> (Hamilton,1822)	LC	Garbeta III
	<i>Sisoridae</i>	<i>Bagarius bagarius</i> (Hamilton,1822)	NT	Binpur I, Gopiballavpur I, Gopiballavpur II
	<i>Siluridae</i>	<i>Wallago attu</i> (Bloch and Schneider, 1801)	NT	Pingla, Debra, Sankrail, Jhargram, Sabong
		<i>Ompok pabo</i> (Hamilton,1822)	NT	Midnapur
<i>Beloniforme-s</i>	<i>Belonidae</i>	<i>Xenentodon cancila</i> (Hamilton,1822)	LC	Sabong , Debra, Binpur I, Gopiballavpur I, Gopiballavpur II, Keshiary, Narayangarh
<i>Cyprinodontiformes</i>	<i>Aplocheilidae</i>	<i>Aplocheilus panchax</i> (Hamilton,1822)	LC	Keshiary, Gopiballavpur I, Gopiballavpur II, Sabong, Debra, Binpur-III
<i>Synbranchif-ormes</i>	<i>Mastacembelid-ae</i>	<i>Macrognathus aral</i> (Bloch andSchneider,1801)	LC	Keshiary
		<i>Macrognathus pancalus</i> (Hamilton,1822)	LC	All blocks
		<i>Mastacembelus armatus</i> (Lacepède, 1800)	LC	Chandrakona II, Binpur I, Keshiary, Gopiballavpur I, Gopiballavpur II
<i>Perciformes</i>	<i>Ambassidae</i>	<i>Chanda nama</i> (Hamilton,1822)	LC	All blocks
		<i>Parambassis baculis</i> (Hamilton,1822)	LC	Sabong
		<i>Parambassis lala</i> (Hamilton,1822)	NT	Chandrakona II, Keshiary, Jhargram Gopiballavpur I, Gopiballavpur II, Garbrta III, Binpur II
		<i>Parambassis ranga</i> (Hamilton, 1822)	LC	Gopiballavpur I, Gopiballavpur II, Pingla
	<i>Badidae</i>	<i>Badis badis</i> (Hamilton,1822)	LC	Gopiballavpur I, Gopiballavpur II
	<i>Gobiidae</i>	<i>Glossogobius giuris</i> (Hamilton,1822)	LC	Narayangarh, Binpur II, Gopiballavpur I, Gopiballavpur II, Pingla, Jhargram

	<i>Anabantidae</i>	<i>Anabas testudineus</i> (Bloch,1792)	DD	Debra, Jamboni
		<i>Anabas cobojius</i> (Hamilton,1822)	DD	Debra, Jamboni, Pingla, Jhargram
	<i>Osphronemidae</i>	<i>Trichogaster fasciata</i> (Bloch and Schneider,1801)	LC	All blocks
		<i>Trichogaster lalius</i> (Hamilton,1822)	LC	Pingla, Binpur II, Gopiballavpur I, Gopiballavpur II
	<i>Channidae</i>	<i>Channa punctata</i> (Bloch, 1793)	LC	Debra,Binpur I,Jamboni, Keshiary, Jhargram
		<i>Channa gachua</i> (Hamilton,1822)	LC	Binpur II, Jhargram
		<i>Channa orientalis</i> (Bloch and Schneider,1801)	NE	Debra

Table-2
A comparison between work of Basu et al. (2012) and present study (2014)

S.L.	Name of the species	IUCN	Basue et.al. (2012)	Present study (2014)
1	<i>Amblypharyngodon mola</i> (Hamilton,1822)	LC	+	+
2	<i>Amblyceps mangois</i> (Hamilton,1822)	LC	-	+
3	<i>Anabas testudineus</i> (Bloch, 1792)	DD	+	+
4	<i>Anabas cobojius</i> (Hamilton,1822)	DD	-	+
5	<i>Aplocheilus panchax</i> (Hamilton, 1822)	LC	+	+
6	<i>Badis badis</i> (Hamilton, 1822)	LC	+	+
7	<i>Bagarius bagarius</i> (Hamilton, 1822)	NT	-	+
8	<i>Barilius barna</i> (Hamilton,1822)	LC	-	+
9	<i>Barilius vagra</i> (Hamilton, 1822)	LC	-	+
10	<i>Boleophthalmus boddarti</i> (Pallas, 1770)	LC	+	-
11	<i>Botia almorhae</i> (Gray,1831)	LC	-	+
12	<i>Cabdio morar</i> (Hamilton,1822)	LC	-	+
13	<i>Chanda nama</i> (Hamilton, 1822)	LC	+	+
14	<i>Channa punctata</i> (Bloch, 1793)	LC	+	+
15	<i>Channa striata</i> (Bloch, 1793)	LC	+	-
16	<i>Channa marulias</i> (Hamilton, 1822)	LC	+	-
17	<i>Channa gachua</i> (Hamilton, 1822)	LC	+	+
18	<i>Channa orientalis</i> (Bloch and Schneider, 1801)	NE	-	+
19	<i>Chitala chitala</i> (Hamilton, 1822)	NT	+	-
20	<i>Danio devario</i> (Hamilton, 1822)	LC	+	-
21	<i>Danio rerio</i> (Hamilton, 1822)	LC	+	+
22	<i>Esomus danricus</i> (Hamilton, 1822)	LC	+	+
23	<i>Glossogobius giuris</i> (Hamilton, 1822)	LC	+	+
24	<i>Lagocephalus inermis</i> (Hamilton, 1822)	NE	+	-
25	<i>Laubuca laubuca</i> (Hamilton, 1822)	LC	+	+
26	<i>Lepidocephalichthys guntea</i> (Hamilton, 1822)	LC	+	+
27	<i>Lepidocephalichthys manipurensis</i> (Arunkumar,2000)	LC	-	+
28	<i>Lepidocephalichthys thermalis</i> (Valenciennes,1846)	LC	-	+
29	<i>Macrognathus pancalus</i> (Hamilton, 1822)	LC	+	+
30	<i>Macrognathus aral</i> (Bloch and Schneider, 1801)	LC	+	+
31	<i>Mastacembelus armatus</i> (Lacepède, 1800)	LC	+	+
32	<i>Monopterus cuchia</i> (Hamilton, 1822)	LC	+	-
33	<i>Mystus cavasius</i> (Hamilton, 1822)	LC	+	+
34	<i>Mystus tengara</i> (Hamilton, 1822)	LC	+	+
35	<i>Mystus bleekeri</i> (Day,1877)	LC	-	+
36	<i>Mystus gulio</i> (Hamilton, 1822)	LC	+	-

37	<i>Mystus vittatus</i> (Bloch,1794)	LC	-	+
38	<i>Nandus nandus</i> (Hamilton, 1822)	LC	+	-
39	<i>Neotropius atherinoides</i> (Bloch,1794)	LC	-	+
40	<i>Notopterus notopterus</i> (Pallas, 1769)	LC	+	+
41	<i>Osteobrama cotio cotio</i> (Hamilton,1822)	LC	-	+
42	<i>Osteochilichthys thomassi</i> (Day,1877)	LC	-	+
43	<i>Ompok pabo</i> (Hamilton, 1822)	NT	+	+
44	<i>Ompok bimaculatus</i> (Bloch, 1794)	NT	+	-
45	<i>Parambassis baculis</i> (Hamilton,1822)	LC	-	+
46	<i>Parambassis lala</i> (Hamilton,1822)	NT	-	+
47	<i>Parambassis ranga</i> (Hamilton, 1822)	LC	+	+
48	<i>Pethia conchoniuis</i> (Hamilton, 1822)	LC	+	-
49	<i>Pethia ticto</i> (Hamilton, 1822)	LC	+	+
50	<i>Pethia phutunio</i> (Hamilton, 1822)	LC	+	-
51	<i>Puntius sophore</i> (Hamilton, 1822)	LC	+	+
52	<i>Puntius chola</i> (Hamilton,1822)	LC	-	+
53	<i>Puntius terio</i> (Hamilton, 1822)	LC	+	+
54	<i>Scatophagus argus</i> (Linnaeus, 1766)	LC	+	-
55	<i>Salmophasia bacaila</i> (Hamilton, 1822)	LC	+	+
56	<i>Salmophasia phulo</i> (Hamilton,1822)	LC	-	+
57	<i>Sperata aor</i> (Hamilton, 1822)	LC	+	+
58	<i>Stigmatogobius sadanundio</i> (Hamilton, 1822)	NE	+	-
59	<i>Systemus sarana</i> (Hamilton, 1822)	LC	+	-
60	<i>Terapon jarbua</i> (Forsskål, 1775)	LC	+	-
61	<i>Tetraodon cutcutia</i> (Hamilton, 1822)	LC	+	-
62	<i>Tetraodon fluviatilis</i> (Hamilton, 1822)	NE	+	-
63	<i>Trichogaster chuna</i> (Hamilton, 1822)	LC	+	-
64	<i>Trichogaster fasciata</i> (Bloch and Schneider, 1801)	LC	+	+
65	<i>Trichogaster lalius</i> (Hamilton, 1822)	LC	+	+
66	<i>Wallago attu</i> (Bloch and Schneider, 1801)	NT	+	+
67	<i>Xenentodon cancila</i> (Hamilton, 1822)	LC	+	+
			48	48

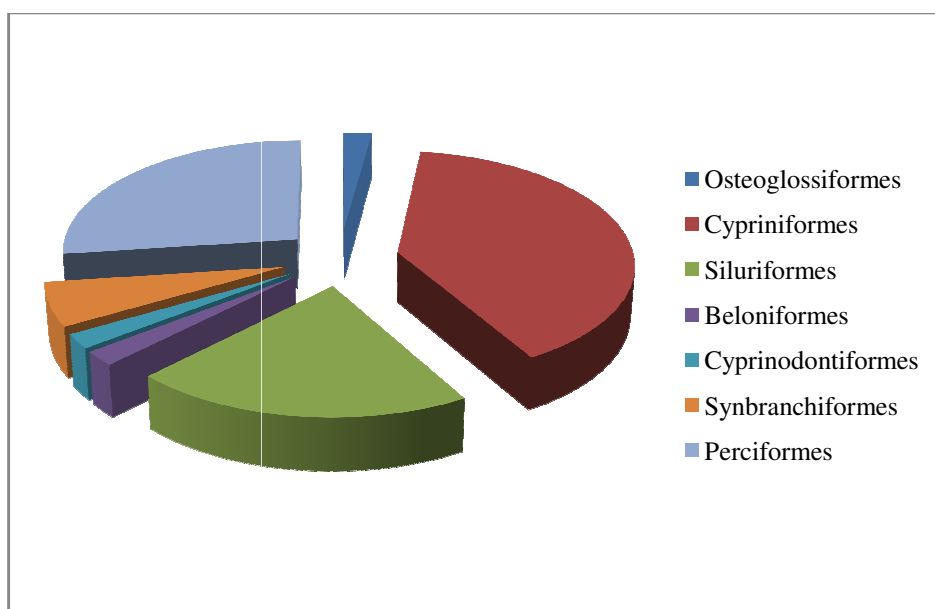


Figure-1
 Order wise distribution of Ornamental fishes in Paschim Medinipur district

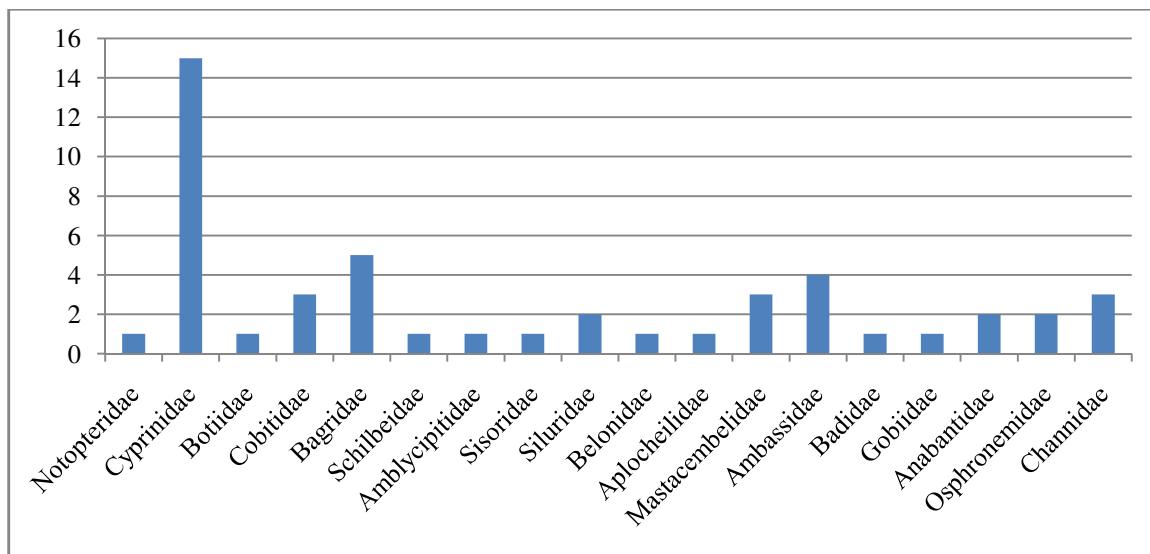


Figure-2
 Family wise distribution of Ornamental fishes in Paschim Medinipur district

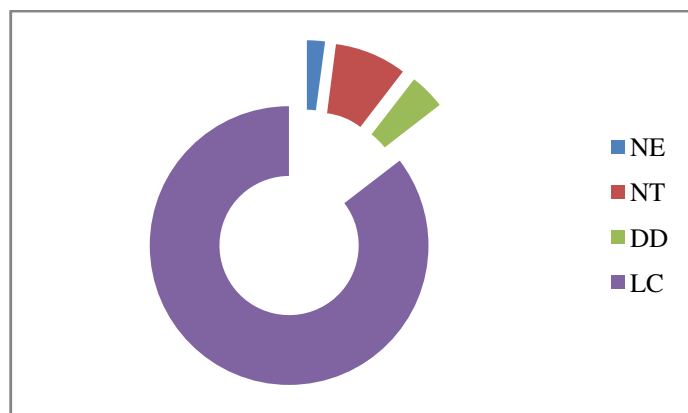


Figure-3
 Biodiversity assessment of the Species (Acc. to IUCN, 2012) In Paschim Medinipur district

Conclusion

Paschim Medinipur is a geographically arid zone of West Bengal. Most of the small indigenous fish remain confined within the pond and rivers during summer season. Most of the rivers in Paschim Medinipur are largely depend on the annual rain fall and during summer season flow of water through river basin is stagnated into sum restricted zones of the river. Therefore, most of the freshwater indigenous fishes are over harvested by the local people. Due to over exploitation in these confined water body a lot of indigenous species either become reduced in number or extincted very rapidly from this part of the state. Therefore, a thorough investigation and conservation measures have to be enacted for proper protection and conservation of these highly risked groups of animals. We can suggest, captive breeding of specific nutrient riched species of small indigenous fishes as a suitable process for future protection and conservation as well as food security of local people.

Acknowledgement

We are grateful to UGC for sanctioning a Major Research Project [Ref. No. 42-610/2013 (SR)] under which the present work has been done.

References

1. Mills M., An overview of ornamental fishes- Fresh and Marine water, Tomey W.A. (Ed), International Seminar of Ornamental Fishes, 25 July1990, Abstract, **36 (1990)**
2. Tissera K., Global trade in ornamental fishes- 1998 to 2007, International Aquashow 12-14 February, Cochin, Kerala, India (**2010**)
3. Manab Kumar Saha and Bidhan C. Patra, Customers Preference for Aquarium Keeping: Market survey, Special Emphasis on Indigenous Ornamental Fishes in four District

- of West Bengal, India, *Res. J. Recent Sci.*, **2(12)**, 43-53 (2013)
4. Winfield I.J. and J.S. Nelson, Cyprinid fishes. Systematics, biology and exploitation, Chapman and Hall, London (1991)
 5. Radhakrishnan K.V., Kurup B.M., Murphy B.R. and Xie S.G., Status of alin fish species in the Western Ghat (India) as revealed from 2000-2004 surveys and literature analyses, *Journal of Applied Ichthyology*, (2012)
 6. Kumar S.T., Charan G.B. and Kumar S.S., Review of the Research on the Fish Diversity in the River Mahanadi and Identifying the Probable Potential Ornamental Fishes among them with reference to Threats and Conservation Measures, *Research Journal of Animal, Veterinary and Fishery Sciences*, **1(3)**, 16-24 (2013)
 7. Goswami U.C., Basistha S.K., Bora D., Shyamkumar K., Saikia B. and Changsan K., Fish diversity of North East India, inclusive of the Himalayan and Indo Burma biodiversity hotspots zones: A Checklist on their taxonomic status, economic importance, geographical distribution, present status and prevailing threats, *International Journal of Biodiversity and Conservation*, **4(15)**, 592-613 (2012)
 8. Barbhuiya Anjam Hussain, Mahseer Fishes of River Barak, Jatinga, Dholeswari and Ganol in North East India, *Res. J. Recent Sci.*, **1(ISC-2011)**, 7-16 (2012)
 9. Shinde Deepak and Ningwal Uday Singh, The Relationship between Physico-chemical Characteristics and Fish Production of Modugar Reservoir of Jhabua District, MP, India, *Res. J. Recent Sci.*, **3(ISC-2013)**, 82-86 (2014)
 10. Karpagam B. and Krishnaveni N., Effect of Supplementation of Selected Plant Leaves as Growth Promoters of Tilapia Fish (*Oreochromis Mossambicus*), *Res. J. Recent Sci.*, **3(ISC-2013)**, 120-123 (2014)
 11. VDeivamarudachalam Teepica Priya Darsini, Vellingiri Maheshu, Ponnuraj Srinivasan, Jaganathan Dinesh Babu, J Castro and Jagathala Mahalingam Sasikumar, Growth efficacy and Feed utilization of fresh water Fishes *Cirrhinus mrigala* (Ham.) and *Cyprinus carpio* L. fed with *Limonia acidissima* L., *Res. J. Recent Sci.*, **3(ISC-2013)**, 127-131 (2014)
 12. Choubey K. and Qureshi Y., Study of Ichthyofaunal Biodiversity of Rajnandgaon town, CG, India, *Int. Res. J. Biological Sci.*, **2(2)**, 21-24 (2013)
 13. Emma L. Dorado, Mark Anthony J. Torres and Cesar G. Demayo, Describing body shapes of the white goby, *Glossogobius giuris* of Lake Buluan in Mindanao, Philippines using landmark-based geometric morphometric analysis, *Int. Res. J. Biological Sci.*, **1(7)**, 33-37 (2012)
 14. Bhalerao S.N., Study of Fish Diversity and Water Quality at Kasar Sai Dam, Hinjewadi, Pune, MS, India, *Int. Res. J. Biological Sci.*, **1(4)**, 51-55 (2012)
 15. Anandhi Usha D. and Sharath Y.G., Ornamental Fish Fauna of Adda Hole: Kabbinala Forest Range, Southern Western Ghats, Karnataka, India, *Int. Res. J. Biological Sci.*, **2(11)**, 60-64 (2013)
 16. Tamboli R.K. and Jha Y.N., Status of Cat Fish Diversity of River Kelo and Mand in Raigarh District, CG, India, *Int. Res. J. Biological Sci.*, **1(1)**, 71-73 (2012)
 17. Sarkar U.K. and Lakra W.S., Small indigenous freshwater fish species of India: Significance, conservation and utilisation, *National Bureau of Fish Genetic Resources, Aquaculture Asia Magazine*, **XV(3)**, 34-35 (2010)
 18. Mukherjee M., Datta S. and Datta A. The present status of ornamental fish industry in West Bengal – Its natural resource and marketing, Office of the Deputy Director of fisheries (MandP), Govt. of West Bengal, Captain Bhery, E.M.Bypass, Kolkata – 700 039, India, **VII(2)**, 8-11 (2002)
 19. Saha M.K. and Patra B.C., Present Status of Ichthyofaunal Diversity of Damodar River at Burdwan District, West Bengal, India; *International Journal of Scientific and Research Publications*, **3(6)**, 1-11 (2013)
 20. Panigrahi A.K., Dutta S. and Ghosh I., Selective study on the availability of Indigenous fish with ornamental value in some district of West Bengal, *Sustainable Aquaculture Asia*, **XIV(4)**, 13-15 (2009)
 21. Basu A., Dutta D. and Banerjee S., Indigenous ornamental fishes of west Bengal, Aquaculture Research Unit, Department of Zoology, University of Calcutta, West Bengal, India, *Recent Research in Science and Technology*, **4(11)**, 12-21 (2012)
 22. Talwar P.K. and A.G. Jhingran, Inland Fishes of India and adjacent countries, Vol. 1 and 2. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi (1991)
 23. Jayaram K.C., The Freshwater Fishes of the Indian Region. Delhi, Narendra Publishing House, New Delhi, India (1999)
 24. Jayaram K.C. The Freshwater Fishes of the Indian Region (Revised second edition), Delhi, Narendra Publishing House, New Delhi, India (2010)
 25. www.fishbase.org (2014)
 26. IUCN Red List of Threatened Species. Version 2012.1. IUCN 2012. IUCN Red List of Threatened Species, Downloaded in June 2012. Ref. No. 90363 (2012)