

Indigenous ornamental fishes of west Bengal

Abhisek Basu, Dibyendu Dutta and Samir Banerjee*

Aquaculture Research Unit, Department of Zoology, University of Calcutta, 35-Ballygunge Circular Road, Kolkata- 700019, West Bengal, India.

Abstract

Ornamental fishes are attractive colourful fishes of peaceful nature that are kept as pets in aquarium for recreation purpose. Ornamental fish keeping is the second most popular hobby next to photography. And the ornamental fish industry is one of the most booming one among the World; India having a good share of it. India is blessed with a great resource of different natural ornamental fishes. West Bengal is also sanctified with a wide range of indigenous ornamental fishes of biological as well as commercial importance. Due to lack of information and proper conservation strategy many of them are on the verge of extinction. In the present study, different rivers and water bodies of all the districts of West Bengal have been surveyed thoroughly for natural ornamental fishes. A total number of 70 indigenous ornamental fish species belonging to 45 genera, 30 families and 9 orders were collected and identified during the survey period. Among all the collected fishes order cypriniformes shows the maximum species variation, followed by perciformes and siluriformes. The study shows that a lot of the available ornamental ichthyofauna are endemic to some region and needed to be conserved. Among the fish specimen available many have a huge commercial value. But habitat destruction, unregulated fishing practice, water pollution, lack of proper awareness and introduction of exotic fishes are some potent reasons of declining fish population of this region.

Keywords: Indigenous, Ornamental fish, Fish diversity

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 [1]. Since ornamental fishes are usually kept in glass aquarium, these are popularly also known as aquarium fishes. Ornamental fishes are the most popular pets in the World [2]. Aquarium keeping has emerged as the second most popular hobby in recent years next to photography [3]. Aquarium fishes are as visually exciting objects [4]. They may have unique shapes, colouration, body forms and movements. 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 [1]. However, these fishes need not necessarily be always colourful. In fact, certain fish species loved by aquarists are quite ugly, in such cases the peculiar appearance is a source of attraction for the aquarium lovers and naturalists.

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. The world trade of ornamental fish is valued at about US \$ 9.0 billion [5] with an annual growth rate of 6 percent. The USA is the largest

market for importing ornamental fishes valued at US \$ 60.0 million annually, followed by Japan (US \$ 32.9 million) and Germany (US \$ 21.0 million). Singapore is the top exporter. In the international trade of aquarium fish, the freshwater fish species represent about 90 percent in terms of value, against 10 percent for marine species [6]. The trade in ornamental fishes comprises about 2 percent cold water and about 98 percent tropical fish. About 600 freshwater fish species of ornamental value have been reported worldwide from various aquatic environments.

Indian domestic trade in ornamental fish is conservatively estimated at Rs. 10 crores. It is growing at the rate of 20 percent annually and the present domestic demand is higher than the supply. By virtue of possessing vast and varied aquatic and ichthyofaunistic resources and favourite climate, the country has great potential to increase the present level of export to about US \$ 30 million every year [7, 8]. The climate of India is almost similar to that of the other countries in Eastern Asia and several varieties of Indian freshwater ornamental fishes are well known in the international market. India can make significant progress in commercial breeding of indigenous ornamental fishes on a large scale. The later holds more promise since newer varieties of ornamental fishes have greater demand in overseas market and attract higher prices than established ones.

India is considered as one of the gold mines for indigenous ornamental fishes and it possesses two global hot spots of freshwater fish bio-diversity viz. the Northeastern region and the Western Ghats. Out of the approximately 806 fish species inhabiting freshwaters of India [9], the North East is reported by 266 species (recorded and reported) belonging to 114 genera under 38 families and 10 orders [10]. This is approximately 33.13 percent of total Indian freshwater fishes

Received: May 04, 2012; Revised: Oct 17, 2012; Accepted: Nov 24, 2012.

*Corresponding Author

Samir Banerjee

Aquaculture Research Unit, Department of Zoology, University of Calcutta, 35-Ballygunge Circular Road, Kolkata- 700019, West Bengal, India.

Email: samirbanu@gmail.com

and as many as 52 indigenous ornamental fish species occurring in the North East reportedly have overseas demand [11].

But in case of West Bengal, the survey and enlistment of indigenous ornamental fishes is fragmentary represented by a few works [12, 13, 14].

So in the present study an attempt has been made to explore the available indigenous ornamental fish fauna of West Bengal.

MATERIALS AND METHODS

An extensive survey work has been carried out regarding the natural ornamental fish species available in the several districts of West Bengal during January, 2009 to December, 2011. For proper documentation, fish species were collected from different water bodies at the selected locations throughout all the districts using available fishing methods. Collection of fish fauna was done at early

morning and sample specimens were immediately preserved in 4-8% formaldehyde and were brought to laboratory in preserved condition.

Identifications were made after Day [15], Talwar-Jhingran [9] and Jayaram [16]. Identifications were confirmed by the help of Zoological Survey of India, Kolkata.

Endemic status of the available ornamental fishes were determined according to the Threatened freshwater fishes of India, National Bureau of Fish Genetic Resources [17] and IUCN Red list of Threatened Species[18].

RESULTS AND DISCUSSION

A total number of 70 indigenous ornamental fish species belonging to 45 genera, 30 families and 9 orders were collected and identified during this survey period from different districts of West Bengal (Chart 1).

Chart 1. Indigenous ornamental fishes of West Bengal with their district wise distribution and endemic status (CR: Critically endangered, EN: Endangered, VU: Vulnerable, LR-nt: Lower risk-near threatened, LR-lc: Lower risk-least concern, DD: Data deficient, NE: Not evaluated)

Name of the fish	Family	Distribution
<i>Amblypharyngodon mola</i> (Hamilton, 1822) LRlc	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri, Uttardinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhamn, Bankura , Puruliya, Hooghly, Howrah , Medinipur, North 24 parganas, South 24 parganas.
<i>Amphipnous cuchia</i> (Hamilton, 1822) LRnt	Synbranchidae	Coachbehar ,Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia Bardhaman Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas.
<i>Anabas testudineus</i> (Bloch, 1792) VU	Anabantidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia Bardhaman Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Anguilla bengalensis bengalensis</i> (Gray, 1831) EN	Anguillidae	North 24 parganas, Nadia South 24 parganas, Howrah ,Hooghly, Bardhaman
<i>Alia coila</i> (Hamilton, 1822) VU	Schilbeidae	Maldah, Nadia, Bardhaman, Hooghly, Howrah, North 24 parganas ,South 24 parganas
<i>Aplocheilus panchax</i> (Hamilton, 1822) DD	Aplocheilidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar Dinajpur, Dakshin Dinajpur , Maldah , Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Barilius vagra</i> (Hamilton, 1822) VU	Cyprinidae	Coachbehar, Jalpaiguri
<i>Barilius shacra</i> (Hamilton, 1822) LRnt	Cyprinidae	Coachbehar, Jalpaiguri
<i>Badis badis</i> (Hamilton, 1822) VU	Nandidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar Dinajpur, Dakshin Dinajpur Maldah, Murshidabad, Birbhum, Nadia Bardhaman Bankura, Puruliya, Hooghly, Howrah Medinipur, North 24 parganas South 24 parganas
<i>Brachydanio rerio</i> (Hamilton, 1822) LRnt	Cyprinidae	Darjeeling, Coachbehar ,Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad ,Birbhum, Nadia ,Bardhaman, Hooghly, Howrah, Medinipur ,North 24 parganas ,South 24 parganas
<i>Bagarius bagarius</i> (Hamilton, 1822) VU	Sisoridae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Maldah ,Murshidabad, Nadia, Bardhaman, Hooghly, Howrah, North 24 parganas, South 24 parganas
<i>Botia derio</i> (Hamilton, 1822) VU	Cobitidae	Darjeeling, Jalpaiguri
<i>Boleophthalmus boddarti</i> (Pallas, 1770) NE	Gobiidae	North 24 parganas, South 24 parganas, Medinipur
<i>Chanda ranga</i> (Hamilton, 1822) NE	Ambassidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur , Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Hooghly, Howrah, Medinipur ,North 24 parganas, South 24 parganas
<i>Chanda nama</i> (Hamilton, 1822) LC	Ambassidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur , Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Hooghly, Howrah, Medinipur ,North 24 parganas, South 24 parganas
<i>Channa punctata</i> (Bloch, 1793) LRnt	Channidae	Darjeeling, Coachbehar Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Medinipur, North 24 parganas, Hooghly, Howrah, South 24 parganas
<i>Channa striata</i> (Bloch, 1793) LRlc	Channidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur , Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Channa marulias</i> (Hamilton, 1822) LRnt	Channidae	Uttar dinajpur, Dakshin dinajpur , Maldah, Murshidabad, Birbhum, Bardhaman, Nadia Bankura, Hooghly, Howrah , Medinipur , North 24 parganas, South 24 parganas
<i>Channa gachua</i> (Hamilton, 1822) VU	Channidae	Darjeeling, Coachbehar, , Jalpaiguri, Uttar Dinajpur, Dakshin Dinajpur ,Maldah, Murshidabad, Nadia, Bardhaman, Hooghly, Medinipur ,North 24 parganas, South 24 parganas
<i>Colisa fasciata</i> (Bloch & Schneider, 1801) LRnt	Osphronemidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Colisa lalia</i> (Hamilton, 1822) NE	Osphronemidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North and South 24 parganas
<i>Colisa chuna</i> (Hamilton, 1822) NE	Osphronemidae	Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas.

<i>Chela laubuca</i> (Hamilton, 1822) LRlc	Cyprinidae	Darjeeling ,Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin, dinajpur , Maldah, Murshidabad, Birbhum, Nadia, Bankura, , Howrah , Hooghly Medinipur, Bardhaman, North 24 parganas, South 24 parganas
<i>Chagunius chagunio</i> (Hamilton, 1822) EN	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri
<i>Chaca chaca</i> (Hamilton, 1822) EN	Chacidae	Darjeeling, Coachbehar, Jalpaiguri Nadia, Bardhaman
<i>Danio devario</i> (Hamilton, 1822) LRnt	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Esomus danricus</i> (Hamilton, 1822) LRlc	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur , Maldah, Murshidabad, Birbhum, Nadia Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur , North 24 parganas, South 24 parganas
<i>Glossogobius giuris</i> (Hamilton, 1822) LRnt	Gobiidae	Darjeeling, Coachbehar, Jalpaiguri, , Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum ,Nadia Bardhaman, Bankura, Puruliya, North 24 parganas, South 24 parganas, Hooghly, Howrah, Medinipur
<i>Gagata cenia</i> (Hamilton, 1822) LC	Sisoridae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Daksin Dinajpur, Maldah, Bardhaman
<i>Garra annandalei</i> (Hora, 1921) LC	Cyprinidae	Darjeeling, Jalpaiguri
<i>Glyptothorax telchitta</i> (Hamilton, 1822) LRnt	Sisoridae	Darjeeling, Coachbehar, Jalpaiguri, Maldah, Bardhaman
<i>Hara hara</i> (Hamilton, 1822) EN	Sisoridae	Darjeeling, Coachbehar, Jalpaiguri, Bardhaman, Nadia
<i>Lepidocephalichthys guntea</i> (Hamilton, 1822) LC	Cobitidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bankura, Puruliya, Hooghly, Bardhaman Howrah Medinipur North 24 parganas South 24 parganas
<i>Lepidocephalus thermalis</i> (Valenciennes, 1846) LC	Cobitidae	Darjeeling, Coachbehar, Jalpaiguri
<i>Mystus cavassius</i> (Hamilton, 1822) LC	Bagridae	Nadia, Bardhaman, Hooghly, Medinipur, Howrah, North 24 parganas, South 24 parganas
<i>Mystus aor</i> (Hamilton, 1822) VU	Bagridae	Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin Dinajpur Maldah, Murshidabad , Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Howrah, Hooghly, Medinipur, North 24 parganas, South 24 parganas
<i>Mystus gulio</i> (Hamilton, 1822) LC	Bagridae	Nadia, Bardhaman , Bankura, Puruliya, Hooghly, Howrah Medinipur, North 24 parganas, South 24 parganas
<i>Mystus tengara</i> (Hamilton, 1822) LC	Bagridae	Nadia, Bardhaman, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 pargana
<i>Moringua raitaborua</i> (Hamilton, 1822) NE	Moringuidae	North 24 parganas, South 24 parganas
<i>Mastacembelus armatus</i> (Lacepède, 1800) LC	Mastacembelidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur , Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura , Puruliya, Hooghly, Howrah, Medinipur , North 24 parganas , South 24 parganas
<i>Macrognathus pancalus</i> (Hamilton, 1822) LRnt	Mastacembelidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar Dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Howrah, Medinipur, Bankura, Puruliya, Hooghly, North 24 parganas, South 24 parganas
<i>Macrognathus aral</i> (Bloch & Schneider, 1801) DD	Mastacembelidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Midnapur North 24 parganas, South 24 parganas
<i>Muraenesox cinereus</i> (Forsskal, 1775) VU	Muraenesocidae	North 24 parganas, South 24 parganas
<i>Nandus nandus</i> (Hamilton, 1822) LRnt	Nandidae	Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North and South 24 parganas
<i>Notopterus notopterus</i> (Pallas, 1769) LRnt	Notopteridae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Notopterus chitala</i> (Hamilton, 1822) EN	Notopteridae	Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Nemacheilus beavani</i> (Günther, 1868) NE	Balitoridae	Darjeeling, Coachbihar, Jalpaiguri
<i>Ompok pabo</i> (Hamilton, 1822) EN	Siluridae	Uttar Dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Ompok bimaculatus</i> (Bloch, 1794) EN	Siluridae	Uttar Dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Puntius ticto</i> (Hamilton, 1822) LRnt	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Bankura, Bardhaman, Puruliya, Hooghly, North 24 parganas, South 24 parganas, Howrah, Nadia, Medinipur
<i>Puntius sophore</i> (Hamilton, 1822) LRnt	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Bankura, Bardhaman, Puruliya, Hooghly, North 24 parganas, South 24 parganas, Howrah, Nadia, Medinipur
<i>Puntius phutunio</i> (Hamilton, 1822) LRlc	Cyprinidae	Jalpaiguri, Uttar dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Puntius terio</i> (Hamilton, 1822) LRnt	Cyprinidae	Uttar dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Howrah, Hooghly, Medinipur, North 24 parganas, South 24 parganas
<i>Puntius conchoniuis</i> (Hamilton, 1822) VU	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Puntius sarana sarana</i> (Hamilton, 1822) VU	Cyprinidae	Darjeeling ,Coachbehar, Jalpaiguri, Maldah, Birbhum, Uttar dinajpur, Dakshin Dinajpur, Murshidabad, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Scatophagus argus</i> (Linnaeus, 1766) LC	Scatophagidae	Nadia, Bardhaman, Bankura, Hooghly, Howrah, Medinipur, North 24 parganas , South 24 parganas
<i>Somileptes gongota</i> (Hamilton, 1822) LRnt	Cobitidae	Darjeeling, Coachbihar, Jalpaiguri
<i>Salmostoma bacalia</i> (Hamilton, 1822) LRlc	Cyprinidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar Dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia Bardhaman Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas,

		South 24 parganas
<i>Stigmatogobius sadanundio</i> (Hamilton, 1822) NE	Gobiidae	Medinipur , North 24 parganas, South 24 parganas
<i>Terapon jarbua</i> (Forsskal, 1775) LC	Terapontidae	Hooghly, Medinipur, North 24 parganas, South 24 parganas
<i>Tetraodon cutcutia</i> (Hamilton, 1822) LRnt	Tetraodontidae	Uttar Dinajpur, Dakshin Dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Tetraodon fluviatilis</i> (Hamilton, 1822) LRnt	Tetraodontidae	Nadia, Bardhaman, Hooghly, Medinipur, North 24 parganas, South 24 parganas
<i>Tetraodon inermis</i> (Hamilton, 1822) NE	Tetraodontidae	Medinipur , North 24 parganas, South 24 parganas
<i>Wallago attu</i> (Bloch & Schneider, 1801) LRnt	Siluridae	Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas
<i>Xenentodon cancila</i> (Hamilton, 1822) LRnt	Belonidae	Darjeeling, Coachbehar, Jalpaiguri, Uttar dinajpur, Dakshin dinajpur, Maldah, Murshidabad, Birbhum, Nadia, Bardhaman, Bankura, Puruliya, Hooghly, Howrah, Medinipur, North 24 parganas, South 24 parganas

The results show that order cypriniformes has the maximum species variation (under family cyprinidae) which is consistent with the reports of Panigrahi, et. al [14] and with the World scenario as Cyprinidae is the largest family of freshwater fish and is widely distributed on Earth [19, 20]. Order perciformes and siluriformes also exhibit quite a good number of attractive ornamental fishes (Fig. 1 to 19).

During the survey an interesting endemic scenario prevailing in West Bengal was observed. This involves the restricted distribution of various species of ornamental fishes to some specific districts (Chart 1); for example the loaches belonging to family

cobitidae (*Somileptes gongota*, *Lepidocephalus thermalis*) and family balitoridae (*Nemacheilus beavani*), some cyprinid fishes (*Chagunius chagunio*, *Garra annadalei*, *Barilius vagra*, *Barilius shacra*) are only found in North Bengal (Darjeeling , Coachbehar, Jalpaiguri; Chart 1) where as some goby fishes (*Boleophthalmus boddarti*, *Stigmatogobius sadanundio*), some eels (*Muraenesox cinereus*, *Moringua raitaborua*), *Terapon jarbua*, *Tetraodon inermis* are only seen in South Bengal (South 24 parganas, North 24 parganas) (Chart:1) . The basic reason behind this endemic situation may be related to specific habitat preferences and ecological requirements of these fishes.

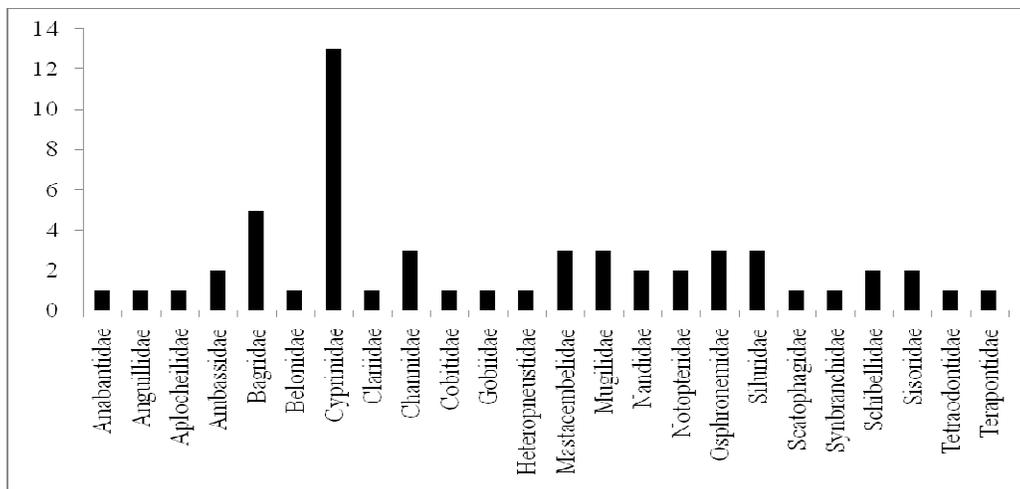


Fig 1. Fish families showing different number of fish species available in Howrah district

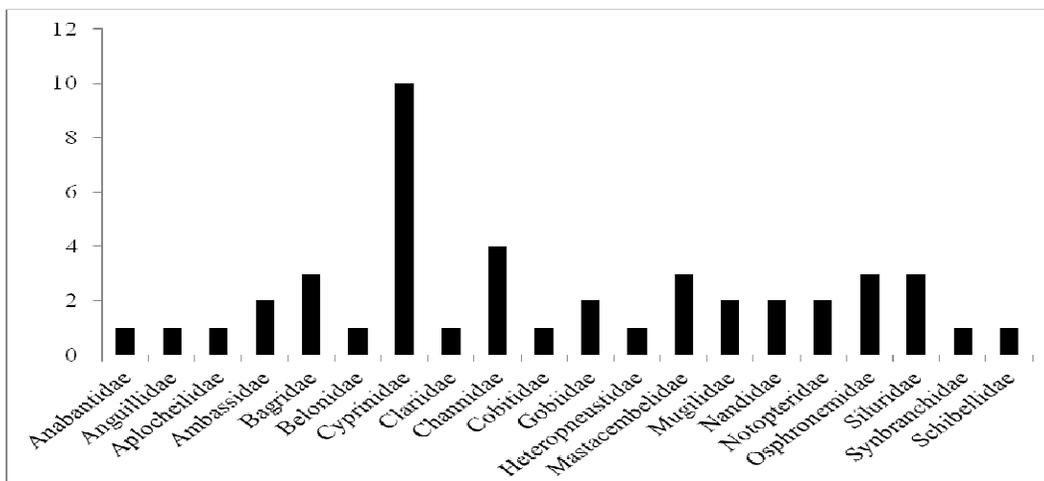


Fig 2. Fish families showing different number of fish species available in East Medinipur district

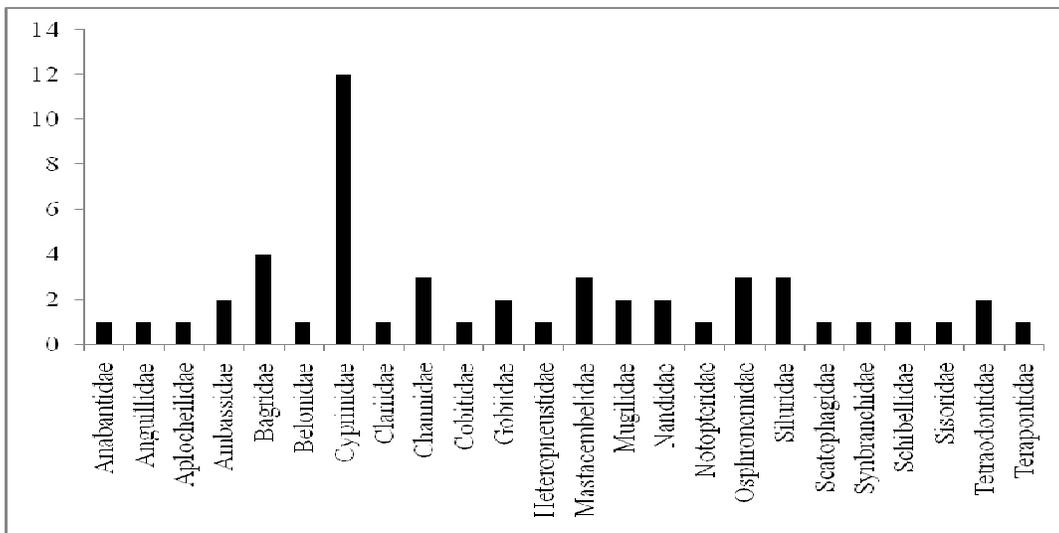


Fig 3. Fish families showing different number of fish species available in West Medinipur district

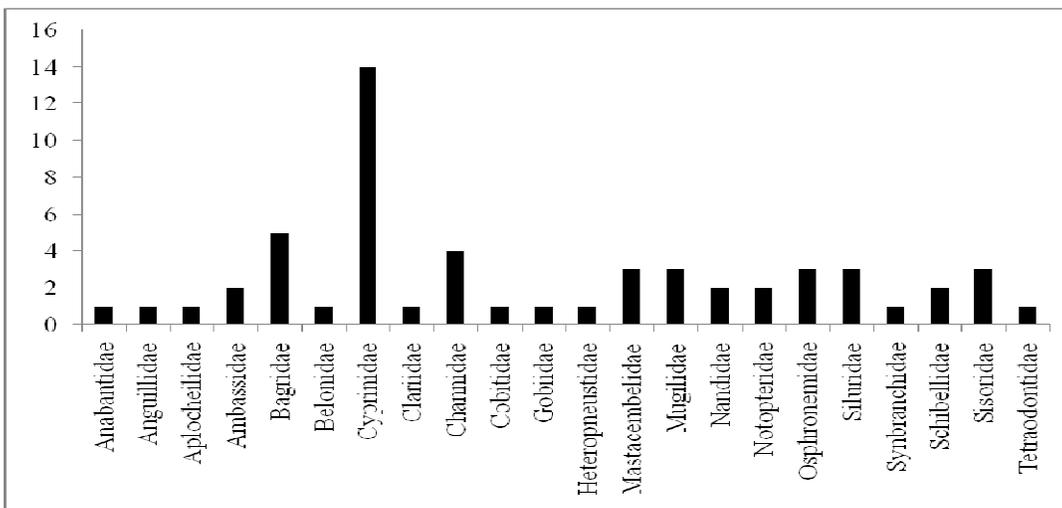


Fig 4. Fish families showing different number of fish species available in Burdwan district

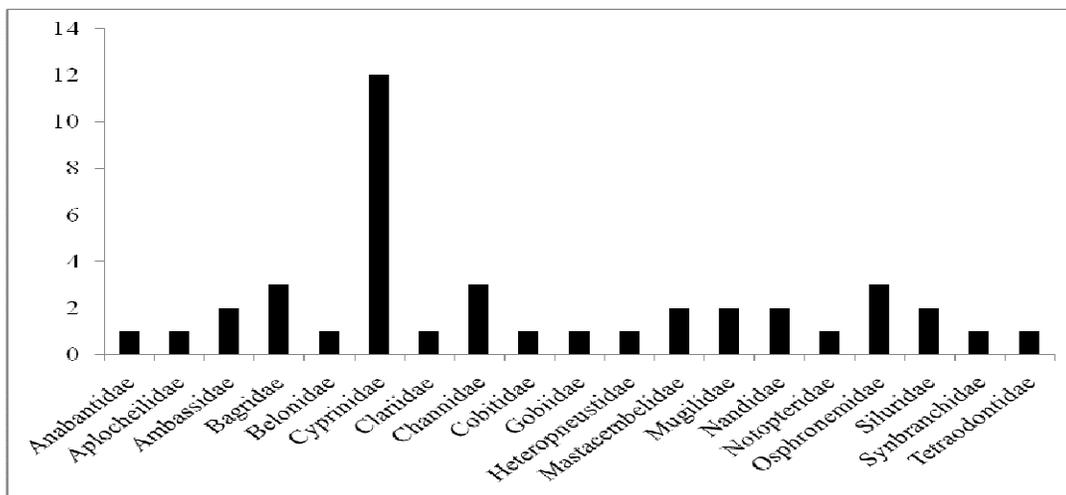


Fig 5. Fish families showing different number of fish species available in Bankura district

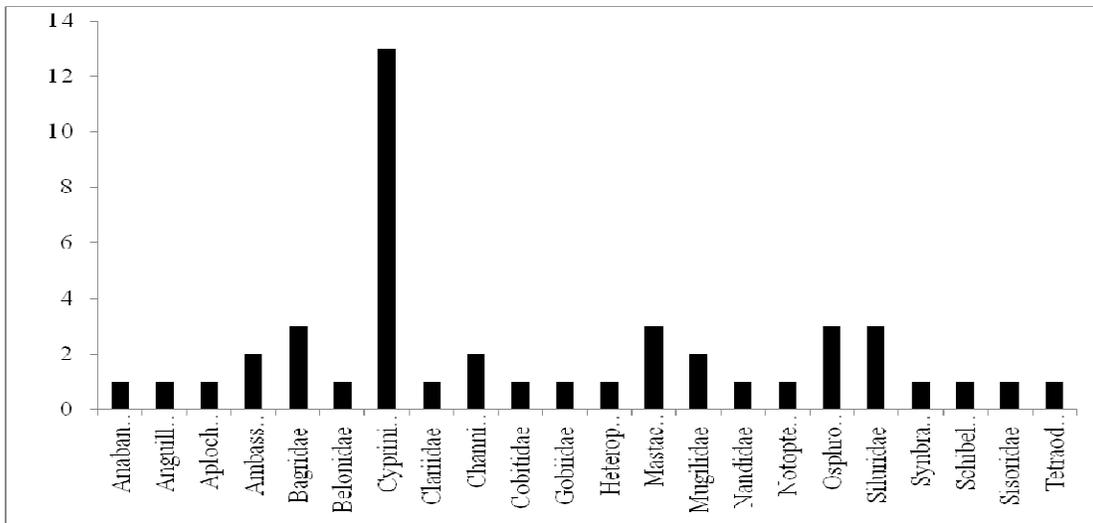


Fig 6. Fish families showing different number of fish species available in Purulia district

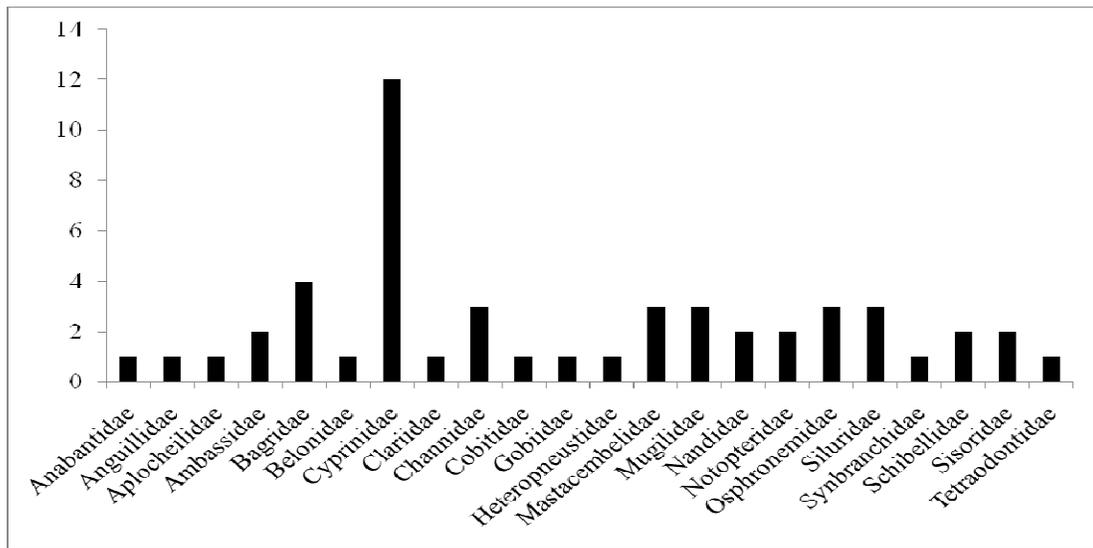


Fig 7. Fish families showing different number of fish species available in Birbhum district

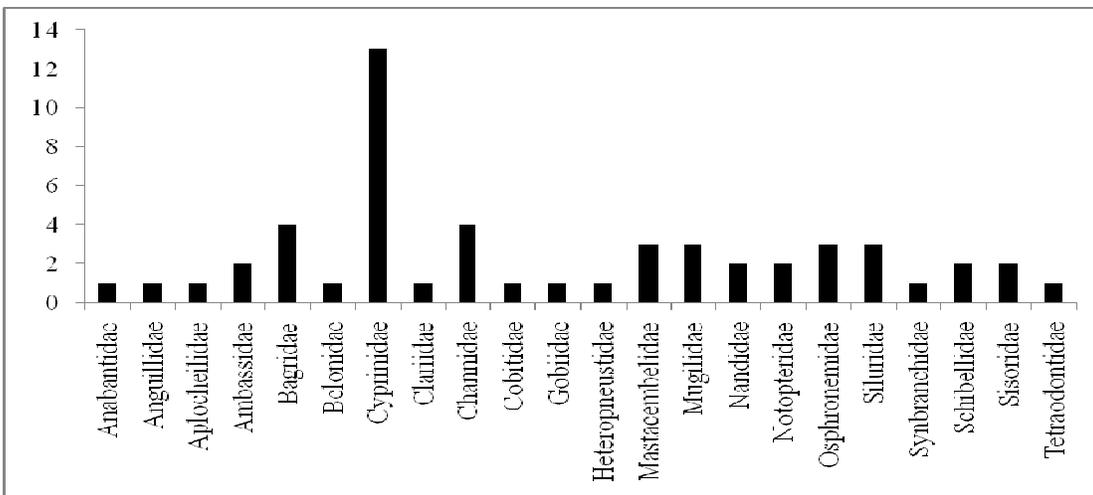


Fig 8. Fish families showing different number of fish species available in Maldah district

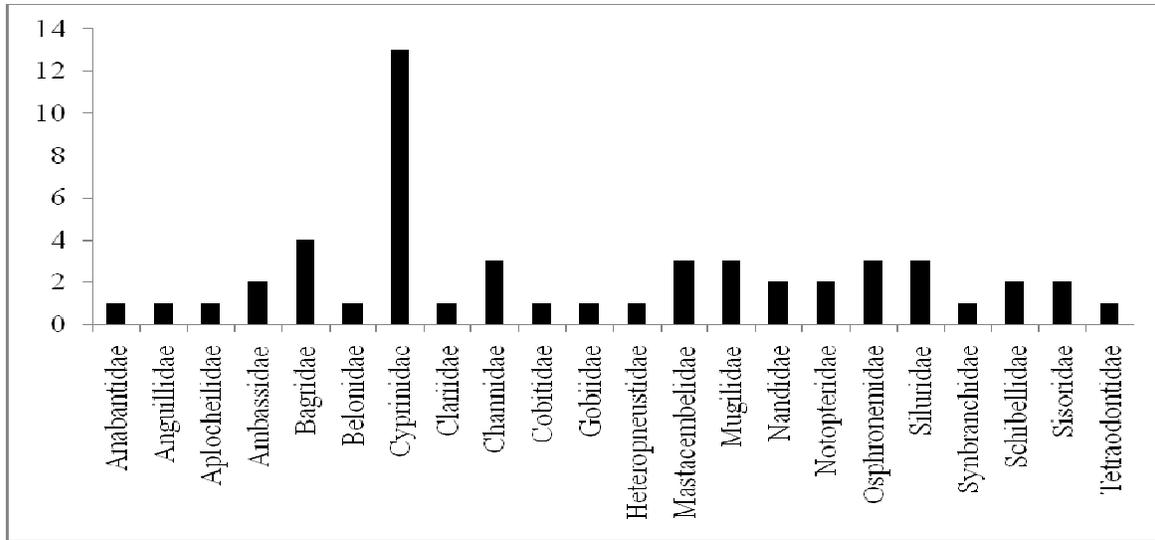


Fig 9. Fish families showing different number of fish species available in Murshidabad district

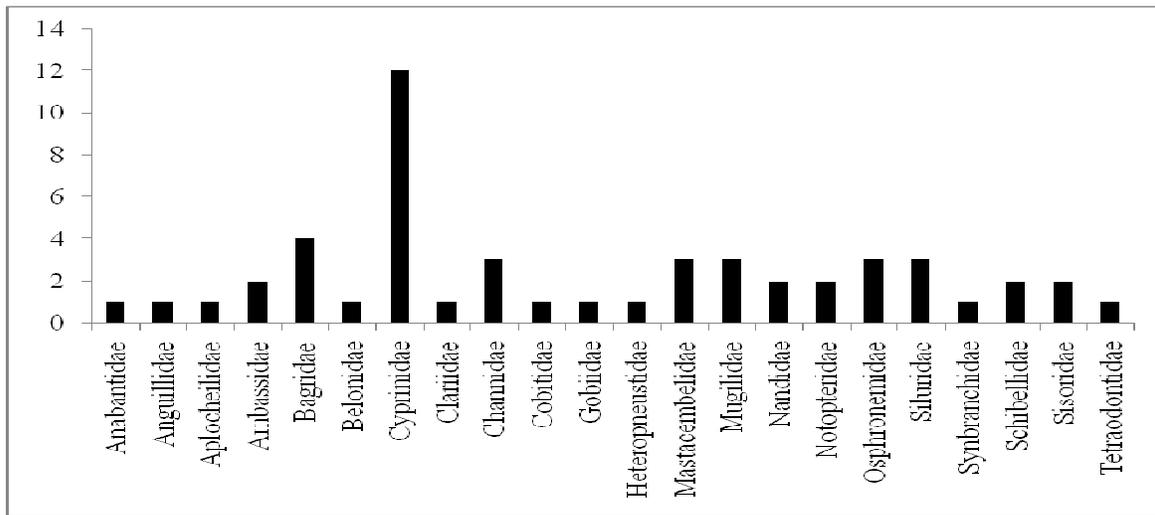


Fig 10. Fish families showing different number of fish species available in North Dinajpur district

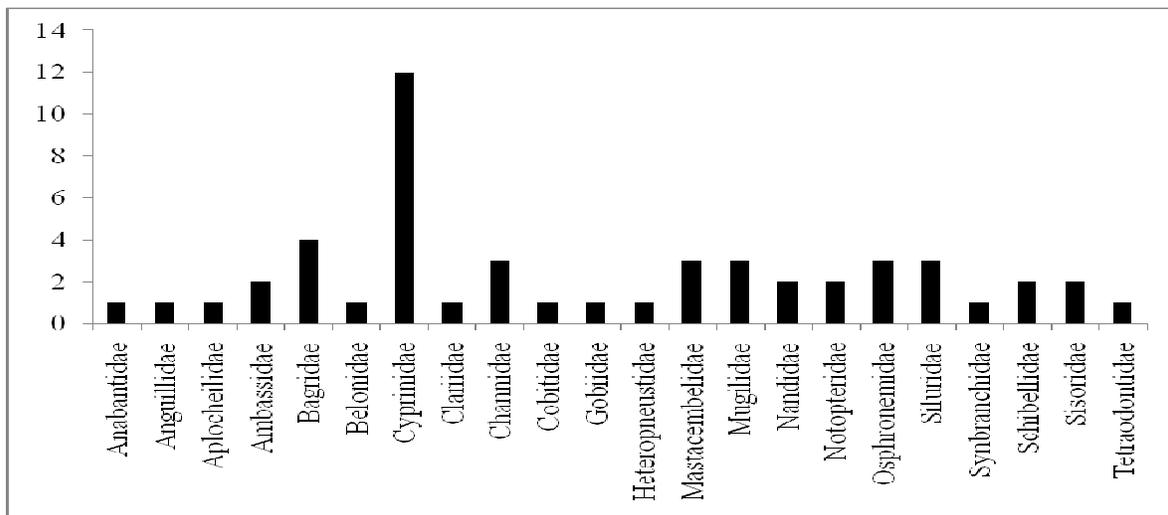


Fig 11. Fish families showing different number of fish species available in South Dinajpur district

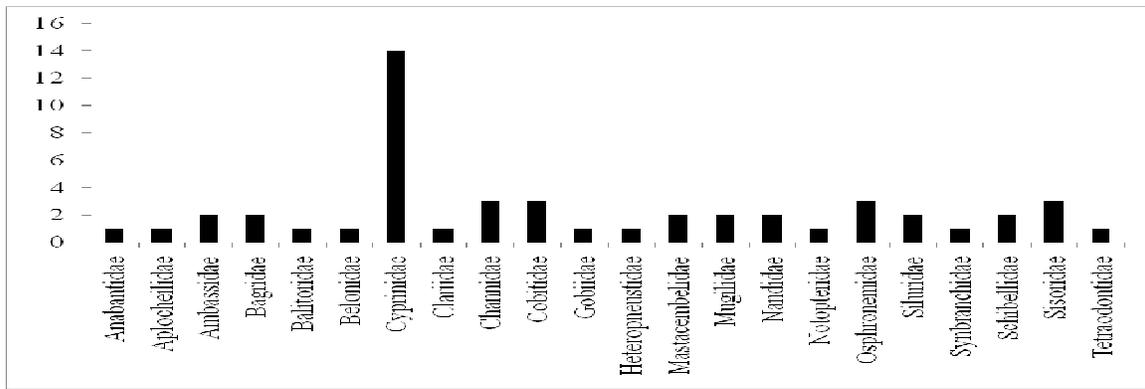


Fig 12. Fish families showing different number of fish species available in Darjeeling district

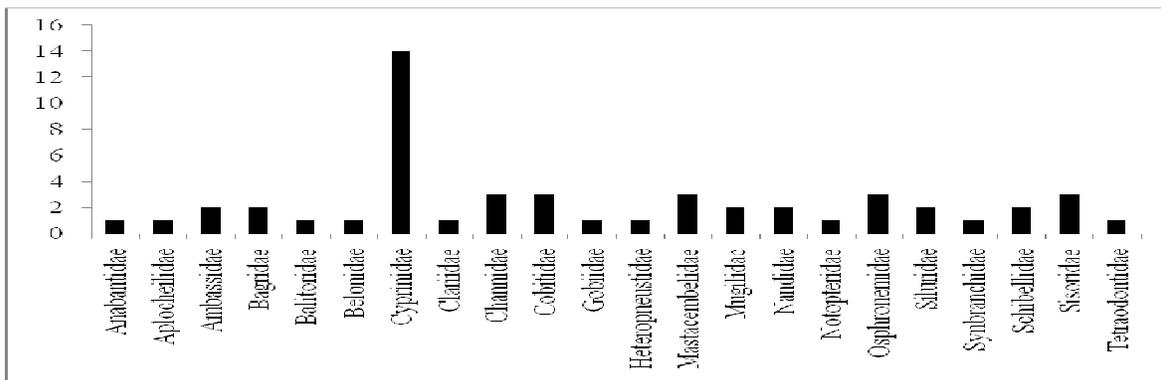


Fig 13. Fish families showing different number of fish species available in Jalpaiguri district

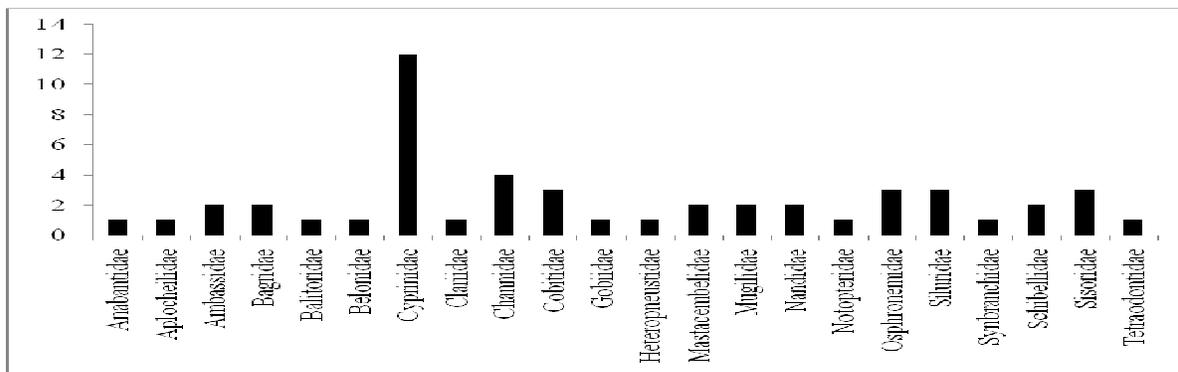


Fig 14. Fish families showing different number of fish species available in Coachbihar district

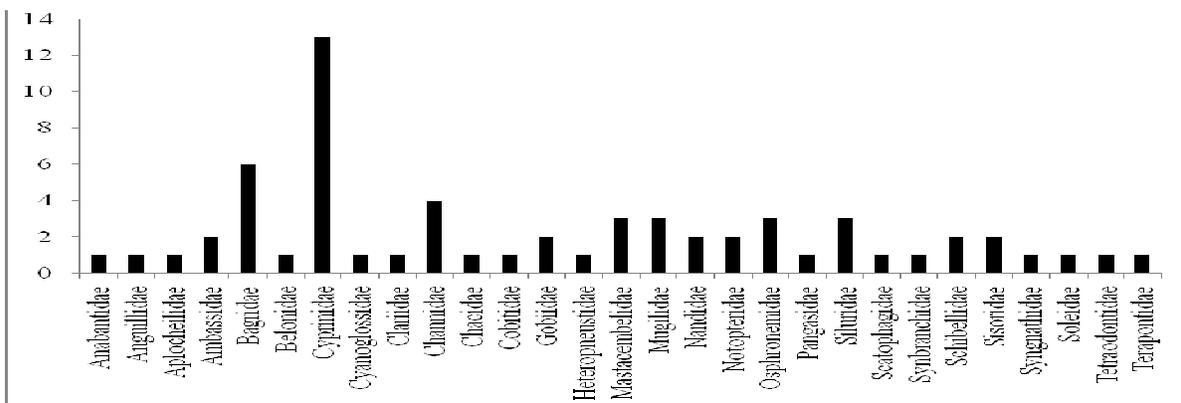


Fig 15. Fish families showing different number of fish species available in Hooghly district

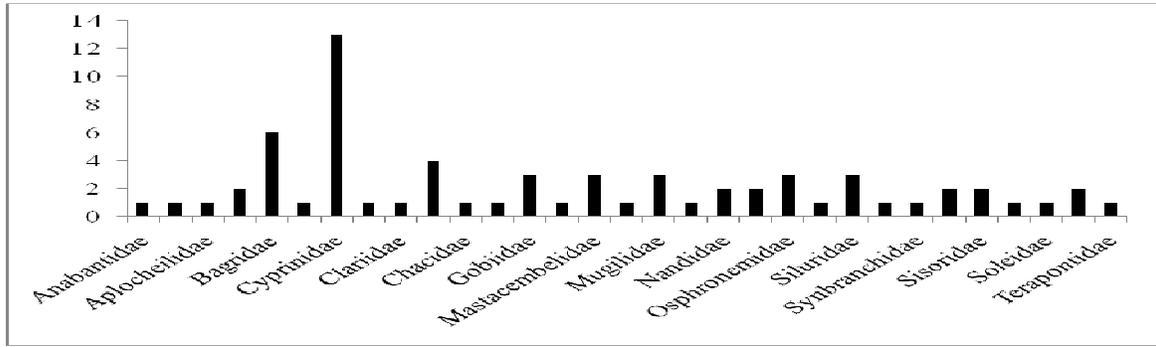


Fig 16. Fish families showing different number of fish species available in North 24 Parganas district

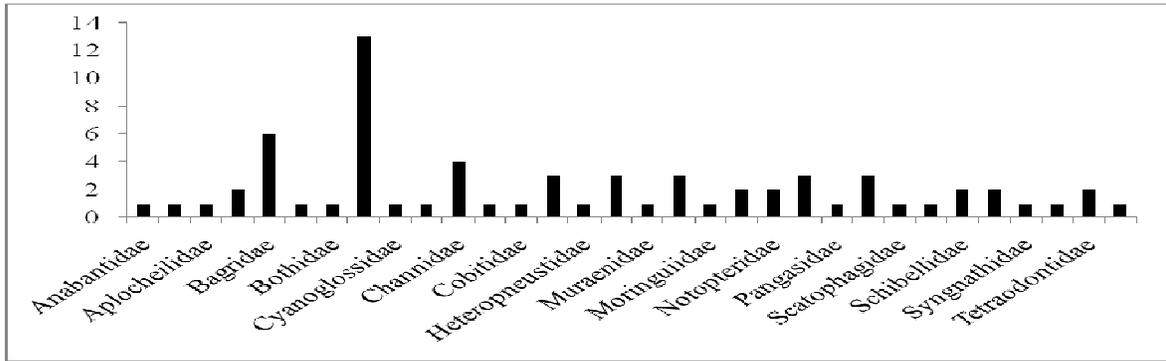


Fig 17. Fish families showing different number of fish species available in South 24 Parganas district

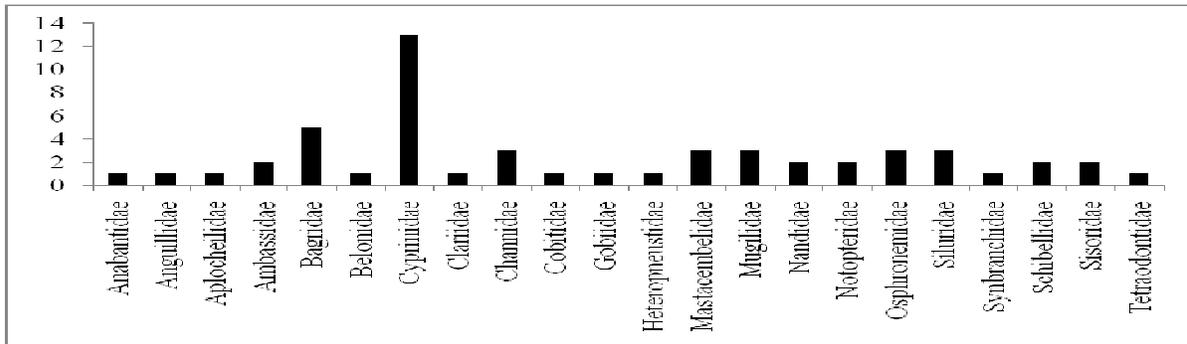


Fig 18. Fish families showing different number of fish species available in Nadia district

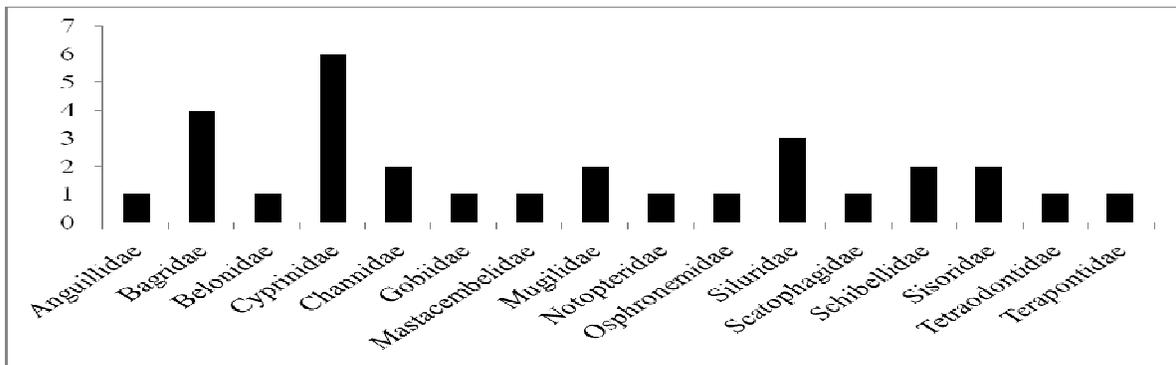


Fig 19. Fish families showing different number of fish species available in Kolkata district

Quite a few numbers of native ornamental fishes inhabit wetlands such as paddy fields and associated canals. *Colisa fasciata*, *Aplocheilus panchax*, *Badis badis*, *Colisa lalia*, *Puntius ticto*, *Esomus*

danicus are some of the important species among them. But in recent times the over use of chemical fertilizers and toxic pesticides are causing serious damage to the natural habitat of these fishes.

Habitat loss and habitat destruction may play a role in declining fish population [21].

North and South 24 parganas exhibit a large estuarine area at their southern parts. This estuarine area is a much enriched source of prawn seeds. Capturing prawn seeds is one of the main professions of the local people. But the local fishermen are not equipped with proper nets and fishing gears for scientific method of prawn seed collection. As a result, a huge number of several species of estuarine ornamental fishes (eg. *Stigmatogobius sadanundio*, *Terapon jarbua*, *Scatophagus argus*) are being wasted daily as by-catch due to irrational practice of prawn seed collection.

During the disastrous Aila storm (25th May, 2009) the rivers of South Bengal (Ichhamati, Saptamukhi, Buriganga, Matla, Bidya) were over flooded with incoming sea water resulting in huge intrusion of saline water in local fresh water reservoirs (beels, canals ponds) causing heavy mortality of fresh water fishes. Quite a few numbers of ornamental fishes like *Puntius ticto*, *Puntius sophore*, *Colisa fasciata*, *Colisa lalia*, *Channa punctata*, *Channa striata*, *Macrogathus aral*, *Macrogathus pancalus*, *Lepidocephalichthys guntea* etc. faced mass destruction due to this factor.

In addition to that introduction of exotic fishes, as a part of aquaculture for commercial gains, has also resulted in loss of indigenous ichthyofaunal diversity [22].

In North Bengal heavy levels of pesticides are being regularly applied in tea fields. During the rainy seasons, agricultural run offs containing lethal pesticides, coming from the Tea garden, pollute the rivers of North Bengal (Teesta, Jaldhaka, Mahananda). This is leading to a severe water pollution causing serious damage to natural habitat of the hill stream fishes. In addition to that ill fishing practice (such as use of toxic material) and lack of proper awareness and ignorance among rural masses, deficiencies of infrastructure and inadequate policies of the concerned authorities are also responsible for decline of fish population in this region.

ACKNOWLEDGEMENT

We are thankful to Biodiversity Board of West Bengal, Department of Environment, Government of West Bengal, for their financial assistance.

REFERENCES

- [1] Dey, V.K. 1996. Ornamental fishes and Hndbook of Aqua farming. The Marine Products Export Development Authority, Cochin.
- [2] Singh, T. 2005. Emerging trends in world ornamental fish trade. *Infofish Intrenational*. 24(3): 15-18.
- [3] Chapman, P.S.J., 1997. Ecology- Principle and Application. Cambridge University Press, Cambridge, U.K. 25P.
- [4] Mills, M. 1990. An overview of ornamental fishes- Fresh and Marine water, Tomey W.A.(Ed), International Seminar on Ornamental Fishes. 25 July 1990, Abstract, 36 P.
- [5] FAO. 2004. Food and Agricultural Organization, Fisheries Information. No.62, Vol.91, FAO, 2004, Rome, Italy.
- [6] Lem, A. 2001. Marine Ornamentals:Collection, Culture and Conservation. Proceedings of the International Seminar on Marine Ornamentals. 6-8 th June, 2001, lake Buena Vista, USA.
- [7] Vinci, G.K. 1998. Introduction to aquarium fishes. *Fishing Chimes*. 2(3): 25.
- [8] Swain, S.K. and J.K. Jena. 2002. Ornamental fish farming: A new dimension in aquaculture entrepreneurship. In: S.K. Swain (Ed.). Ornamental Fish Breeding and Culture for Entrepreneurship Development. Pp.1-6. Central Institute of Freshwater Aquaculture, Bhubaneshwar.
- [9] Talwar, P.K. and A.G. Jhingran. 1991. Inland Fishes of India and adjacent countries, Vol. 1 & 2. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- [10] Sen, N. 2000. Occurrence, Distribution and Status of Diversified fish fauna of Northeast India: In A.G Poniah and U.K. Sarkar (Eds). Fish Biodiversity of Northeast India. Proc. National workshop, Abstracts NATP Publication I, NBFGR, Lucknow, Pp. 31- 48.
- [11] Bhattacharya, B.K., V.V. Sugunan and M. Coudhury. 2003. Ichthyofaunistic resources of Assam with a note on their sustainable utilization. In : Integration of Fish-Biodiversity Conservation and Development of fisheries in North-Eastern Region through Community participation. Proc. Nat. Workshop, December, 12-13, 2001, NBFGR, Lucknow.
- [12] Shaw, G.E. and E.O. Shebbeare. 1937. The fishes of Northern Bengal. *J. Ryoal Asi. Soc. of Beng. Sc.* 3:1-128.
- [13] Jha, P., A. Mandal and S. Barat. 2004. Mahananda Reservoir, W.B.: Its Ichthyofauna, Fishery and Socio- Economic Profile of Fish Production. *Fishing Chimes*. 24(6): 14- 17.
- [14] Panigrahi, A.K., S. Dutta and I. Ghosh. 2009. Selective study on the availability of indigenous fish species having ornamental value in some districts of West Bengal. *Sustainable aquaculture*. 14(4): 13-15.
- [15] Day, F. 1878. The fishes of India; being a natural history of the fishes known to inhabit the seas and freshwaters of India, Burma and Ceylon. William Dawson & Sons Ltds., London.
- [16] Jayaram, K.C. 1999. The Freshwater Fishes of the Indian Region. Delhi, Narendra Publishing House, New Delhi, India.
- [17] Threatened freshwater fishes of India. 2010. National Bureau of Fish Genetic Resources. ICAR. Lucknow, India. [<http://www.nbfgr.res.in/PDF/ThreatenedFreshwaterFishes.pdf>]
- [18] IUCN. 2011. IUCN Red List of Threatened Species. Version 2011.2. [<http://www.iucnredlist.org/apps/redlist/search>].
- [19] Banarescu, P. 1990. Zoogeography of fresh waters: General distribution and dispersal of freshwater animals. Volume 1. *AULA-Verlag*, Wiesbaden.
- [20] Winfield, I.J. and J.S. Nelson. 1991. Cyprinid fishes. Systematics, biology and exploitation. Chapman & Hall, London.
- [21] Gilmore R. G. 1995. Environmental and biogeographic factors Influencing ichthyofaunal diversity: Indian river lagoon. *Bulletin of marine scienc*. 57(1): 153-170.
- [22] Kar, D., A.V.Nagarathna , T.V. Ramachandra and S.C. Dey. 2006. Fish diversity and conservation aspects in an aquatic ecosystem in Northeastern India. *Zoo's print journal*. 21(7): 2308-2315.