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A study on diversity of ornamental fish species available in Bokaro district of Jharkhand, India

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Abstract
This current work based on an extensive survey on the indigenous ornamental fishes available in the Bokaro district, Jharkhand, India over a period of seventeen months from April 2016 to August 2017.Study reveals that a total forty one species of ornamental fishes were found under nineteen family and six order. Among the all families Cyprinidae was the most dominant and diversified fish group which contains fifteen species of fishes followed by Channidae with four species, Cichlidae and Bagaridae with three species, Ambassidae and Mastecembelidae with two species of fishes and one species of each Allidae, Anabatidae Sisoridae, Claridae, Heteropnustidae, Siluridae, Mugilidae, Notopteridae, Belonltidae, Gobiidae, Botiidae, Belitoridae and Cobitidae. Further it is found that Cypriniformes has the most dominant order contains eighteen species followed by Perciformes with twelve species, Siluriformes with eight species, Synbranchiformes with two species and one species of each Mugilliformes and Oesteoglossiformes. Present study shows that there is very good population of ornamental fish species present in the Bokaro district of Jharkhand .Many of these fish species regarded as a good domestic as well as export market since few years so these fishes are very important for ornamental point of view. But due to some anthropogenic and natural reason the availability of these fishes decline day-by-day. Now, it is need for present time to conserve these fishes for their long term sustainability.

Keywords: Bokaro district, biodiversity, Jharkhand, ornamental fishes

Introduction
Fishes are invariable living organisms of our aquatic system which are very important for food resources as well as good indicator of the ecological health of the water where they inhabits (P. Chakravartty *et al*, 2012). Ornamental fishes are characterised by a very wide diversity of colour, shape and colour pattern which attracts the mankind towards these most important aquatic organisms (C.S. Rao, 2013). India share less than one percent of total global ornamental fish population. About 90% of ornamental fish trade from Kolkata port followed by 8% from Channai which are very less than the other country of the world (Ghosh, 2003) [8].
India has recorded a total 15 commercial important ornamental fish species collected from the Indian rivers. (K. Madhu, 2009) [12]. Ornamental fishes of India are contributing about 1% of the total ornamental fish trade. These fishes are exported approximately 69.26 tons having the value of rupees 566.66 corers in 2014-15 on an average grown rate of about 11 % has been recorded during the period 1995 to 2014.Due to presence of rich biodiversity of species, favourable climatic condition and availability of cheap labour India has a great potentials in production of ornamental fish. The ornamental fishes are categorized into indigenous and exotic. (Online e-learning).
The culture of ornamental fishes is called anaquariculture. Ornamental fish culture is the culture of attractive colourful fishes of various characteristics which are reared in a confined aquatic system. There are more than 30000 fish species reported around the word among them 800 considered as an ornamental fish species. Aquariums fishes are mainly categorized into two groups namely, egg layer (oviparous) and live bearers (Ovo-viviparour) (Wikipedia).

Materials and methods
Study area
Bokaro district was created was on 1st April 1991 by taking out Chas and Chandankayeri C.D... blocks of Dhanbad district and the entire Bermo subdivision of Giridih district and then merging them to form a new district .Bokaro district is bounded on the east by Dhanbad district and some portion of west Bengal state on the west by Ramgarh district on the south by Purulia district of west Bengal and on on the north by parts of Giridih, Hazaribagh and Dhanbad district. The district extends between 23°26 “to 23°57 north latitude and 85°34 to 23°57“east latitude. The district is located at an elevation of 200-546 m from sea level.

Fig 1: Satellite picture of Bokaro district.

Collection of Fish Sample

Fishes wear collected from 3 different ecological Habitat identified as Damodar River, Tenughat dam and some Hill Stream area of Bokaro district with the help of fisherman and local fish market. Fishing was carried out by the help of local fisher man using gill net, cast net, drag net, scoop net including hook and line (Bose *et al*, 2013) [1].

Preservation

Fishes wear preserve in 8% Formalin solution (Bagra, 2010) [2].

Identification

The sample were identified by using is keys for fishes of Indian subcontinent (day, 1996, Talwar and Jhingran, 1991) [20] and classification has done with the help of Jayaram, 1999 [10]. Fishes were also identified by help of fish base.

Results

Altogether a total 42 ornamental fishes species belonging to 6 orders, 19 families. List of ornamental fish including their order, family, species, common name and local name was recorded which has given in table 1 and family wise and order wise fish distribution has given in table 2. The result of present study revealed that the cyprinidae family was the most diversified and dominant fish species group having a total number of 18 fish species followed by Channidae with four species, Cichlidae and Bagaridae with three species, Ambassidae and Mastecembelidae with two species of fishes and one species of each Allidae, Anabatidae Sisoridae, Claridae, Heteropnustidae, Siluridae, Mugilidae, Notopteridae, Belonltidae, Gobiidae, Botiidae, Belitoridae and Cobitidae. Further it is found that Cypriniformes has the most dominant order contains eighteen species followed by Perciformes with twelve species, Siluriformes with eight species, Synbranchiformes with two species and one species of each Mugilliformes and Oesteoglossiformes.

Table 1: Fish distribution orde wise, family wise, Scientific name, common name and local name

Order	Family	Scientific Name	Common Name	Local Name
Cypriniformes	Cyprinidae	*Amplypharyngodom mola(Ham-Buch)*	Mola Carplet	Mola
		Catla catla(Ham-Buch)	Catla	Catla
		Cirrhina mrigala(Ham-Buch)	Mrigal	Mrigal
		Labeo bata(Ham-Buch)	Bata	Bata
		Lasbeo calbasu(Ham-Buch)	Black Rohu	Kalbasu
		Labeo rohita(Ham-Buch)	Rohu	Rui
		Puntius conchonius(Ham-Buch)	Rosy Barb,Red Barb	Pothi
		Puntius sarana(Ham-Buch)	Olive Barb	Pothi
		Puntius sophore(Ham-Buch)	Spot fin swamp barb	Pothi
		Puntius ticto(Ham-Buch)	Ticto Barb,Two spotted barb	Pothi
		Salmostoma bacaila(Ham-Buch)	Large scale razor belly minnows	Chela
		Salmostoma phulo(Ham-Buch)	Fine scale razor belly minnows	Sai
		Barilus barna(Ham-Buch)	Boroli	Bhola
		Garra lamta(Ham-Buch)	Kali,Gadhira	Patharchatta
		Rosbara rosbara	Slender barb	Not known
	Botiidae	*Botia dario(Ham-Buch)*	Queen loach	Naitai
	Belitoridae	*Nemacheilus botia*	Mottled loach,Sand loach	Gaitai
	Cobitidae	*Lepidocephalus guntea(Ham-Buch)*	Guntea loach,Peppered loach	Gunti

Perciformes	Anabantidae	*Anabas testudineus(Bloch)*	Climbing Perch	Kaji
	Channidae	*Channa marulius(Ham-Buch)*	Giant snakehead	Sal
		Channa punctatus(Bloch)	Spotted snakehead	Garai
		Channa gachua(Bloch and Schneider)	Asiatic snakehead	Chang
		Channa striatus(Bloch)	Banded snakehead	Shol
	Gobiidae	*Glossogobius giuris(Ham-Buch)*	Tank goby	Bulla
	Belontiidae	*Colisa lalia(Ham-Buch)*	Dwarf gourami	Cheli
	Ambassidae	*Chanda nama (Ham-Buch)*	Elongated glass perchlet	Chanda
		Chanda ranga(Ham-Buch)	Indian glass fish	Chanda
	Cichilidae	*Oreochromis aureus*	Blue tilapia	Tilapia
		Oreochromis niloticus(Peter's)	Nile tilapia	Tilapia
		Oreochromis mozambique	Mozambique talipia	Tilapia
Osteoglossiformes	Notopteridae	*Notopterus notopterus(Pallas)*	Grey feather back	Phalat
Siluriformes	Bagaridae	*Mystus cavasius(Ham-Buch)*	Gangetic mystus	Tengra
		Mystus vittatus(Bloch)	Stripped dwarf catfish	Tengra
		Mystus seenghala(Skyes)		Tengra
	Aillidae	*Alia colia(Ham-Buch)*	Gangetic alia	Jal kapoor
	Sisoridae	*Bagarius bagarius(Ham-Buch)*		Kana
	Claridae	*Clarius batrachus(Linnaeus)*	Mangur	Mangur
	Heteropneustidae	*Heteropneustus fossilis(Bloch)*	Stinging catfish	Singhi
	Siluridae	*Wallago attu(Schneider)*	Helicopter catfish	Buwar
Mugliformes	Mugilidae	*Rhinomugil corsula(Ham-Buch)*	Four eyed fish	Hundra
Synbranchiformes	Mastacembelidae	*Macrognathus pancalus(Ham-Buch)*	Striped spinyeel	Tur
		Mastacembelus armatus(Lecepede)	Tire trackeel	Bami

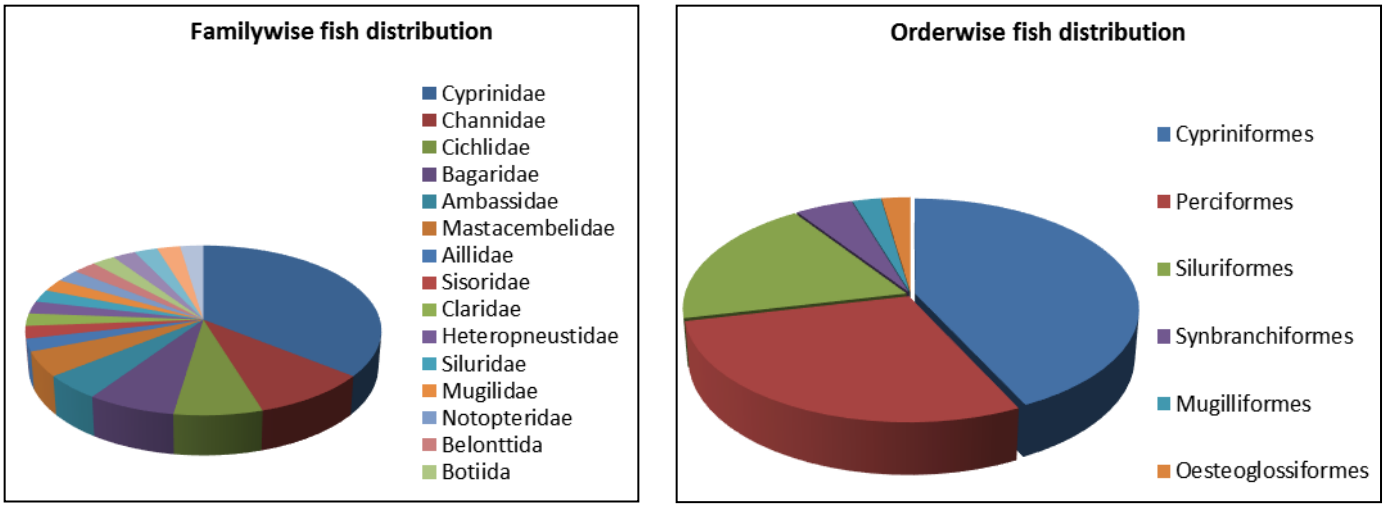

Fig 2: Distribution of fish species familywise and orderwise

Discussion

It is essential to study the fish biodiversity of our water ecosystem because maintaining the biodiversity essential for overall environmental quality and for understanding intrinsic worth of all species on the earth (ehrlich *et al*, 1991). Cypriniformes was found to most dominant group among all others group as per as previous research by Shinde *et al* 2009, [18] Pramod Kumar *et al* 2011, [11] Chatoan Tesia and Savitry Bardoloi 2012 [3] and D.P. Jaiswal and K.D. Ahirrao, 2012 [9]. Study was conducted on Jharkhand prospective by Ravi Ranjan and Anjana Verma, at Tenughat dam and reported 13 species of fishes are under cypriniformes order. Study has carried out by D Sarkar *et al*, 2015 [5] and report 26 indigenous ornamental fish species from Torsa and gharharia. 46 species of ornamental fish was reported by Arpita day *et al*, 2015 [17] from Coochbehar district of West Bengal. All the recorded above ornamental fish species have high food as well as market value. During the study period it has been reported that in the post monsoon and retreating monsoon season highest number of fish was recorded compared to pre monsoon season because receding water level which enhance the fish catching intensity. *Oreochromis mossambicus*, *oreochromis niloticus*, and *oreochromis aeurus a*re the exotic ornamental fishes which are also reported in the study.

Conclusion

In conclusion, Bokaro District of Jharkhand, India has hosts a number of freshwater ornamental fish biodiversity, including other fishes. However the fish fauna of the district has been declined due to different kind of anthropogenic activities as well as introduction of exotic fish species, Habitat degradation, pollution, irrational fishing etc. Now there is a need to develop a strong and a very positive effort to save these ornamental fishes as well as indigenous fish species of

our riverine system. To conserve our riverine biodiversity a long term management plan should be adopted. Effective management including developing public awareness programme are the way by that we can save these most primitive vertebrate in our society for long term sustainability. This study serve as a frame of reference for the future initiative for studying fish biodiversity and develop proper conservation techniques.

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