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Freshwater fish fauna of Girna River, Dist. Jalgaon, Maharashtra, India

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Abstract
Present survey was undertaken to report the ichthyofaunal diversity of Girna River. The study was carry out in between January 2016 to April 2016. The fish fauna of River Girna was collected and identified in the present study. A total of 35 fish species belongs to 08 orders, 27 genera of 17 families were recorded. Order Cypriniformes was most dominant group represented by 20 (57.14) species followed by orders Perciformes with 06 (17.14) species. Siluriformes with 03 (8.57) species, Synbranchiformes 02 (5.71) species, Beloniformes 01 (2.85) species, Synodontidae 01 (2.85) species, Scorpaeniformes 01 (2.85) species and Osteoglossiformes 01 (2.85) species. Thus the Girna River has good potential for fish fauna. Out of 35 fish species 29 have least concern status, 01 are near threatened, 02 are Vulnerable, 02 are not evaluated and one is data deficient. This is considered the first study on the ichthyofaunal diversity of Girna River.

Keywords: Maharashtra, District Jalgaon, Girna River, freshwater fish fauna

Introduction
While covering less than 1% of the Earth's surface freshwater ecosystems provide humans with a wealth of goods and services, and provide a home for around 10% of the world's described species, including a quarter of all vertebrates (Strayer and Dudgeon 2010) [19]. Asia has the largest fisheries production of all the worlds' continents and many livelihoods are dependant upon freshwater biodiversity, which provides food security to the poorest of communities. India is endowed with vast and varied resources possessing river ecological heritage and rich biodiversity. Freshwater fishery sites are varied like 45,000 Km. of rivers, 126,334Km. of canals, ponds and tanks 2.36 million hectares and 2.05 million hectares of reservoirs (Ayappan *et. al*, 2004) [1]. In India 5.5 million people are employed in inland fisheries, 72% of them women (Dugan *et al.* 2010) [4]. Fish forms highest species diversity among all vertebrates and their loss is one of the world's most pressing crises as human life and livelihood largely depend on the status of biological resources. The freshwater fish is one of the most threatened taxonomic groups due to their high sensitivity to the quantitative and qualitative alteration in aquatic habitats (Sarkar *et al*. 2008) [17].
Many workers have studied Biodiversity and Distribution of fishes found in freshwater bodies of various parts of the state Maharashtra, India. (Heda 2009) [6] reported 32 species from Kathani river of Gadchiroli, Dist.- Gadchiroli. (Rankhamb 2009 and 2010) [14] reported 26 species from Godavari River at Mudgal Dist, Parbhani. (Gedekar and Tijare 2010 and 2012) [1] reported 49 species from Wainganga river, Markandadeo region Dist Gadchiroli, Maharashtra. (Jadhav, *et. al.* 2011) [7] reported 58 species of fishes from Koyna River, Western Ghat, India. (Khune 2012) [12] reported 40 fish species from Chulbundh Reservoir, Dist.- Gondia. Very rare information is available about ichthyofuana, present in lotic and lentic habitats of district Jalgaon and rare studies are available on the fish fauna of Girna River. (Shelke 2016) [16] studied the Ichthyofaunal Bioversity of Girna Dam, Dist. Nasik, Maharashtra, India and reported 24 species.
As far as Girna River is concerned poor attention has been paid towards the systematic investigation on diversity of fish fauna. So it is felt that there is a need to generate the information on diversity of fishes from Girna River. Hence, to fill this gap, the present investigation was undertaken to present fish fauna from the Girna River. It is the first effort in this direction.

Materials and Methods
Study area and sampling sites
The Girna is a River in Maharashtra state of southern India. It originates at Kem Peak in the Western Ghats range of Nashik district, and flows east across Nashik district where Mausam River joins Girna River and then east into Jalgaon district where it then swings north to join the Tapti River. The biggest dams on the Girna are Chankapur Dam built by British near Abhona in Kalwan tehsil, where sarpganga River joins to Girna River. Girna Dam was built in 1969. Total length of dam is 963.17 meter, maximum height of dam is 54.56 meter and surface area is 60,040 KM^2**.** The name Girna derives from the name of the goddess Giraja (Parvati). The basin of the Girna lies on the Deccan Plateau and its valley has fertile soils which are intensively farmed.
The Gazetteer of the Bombay presidency describes the river as "Rising in the western hills of the Kalvan sub-division of Nasik, and fed by streams from the northern slopes of the Chandor or Saptashring range, after a course of about 150 miles, falls into the Tapti near Savda-Nanded. Its course lies in nearly equal parts in Nasik and Khandesh. Passing through Nasik almost in a straight line eastwards, in Khandesh its

course changes to north-east, till, near Jalgaon, it bends north and then north-west flowing for several miles with many windings almost parallel to the Tapti. In Khandesh, except in one or two places where it is hemmed in by rocky hills, the Girna, over a broad sandy bed, flows through a well tilled valley gradually spreading into the great central plain. Its waters, both in Nasik and Khandesh, are much used for irrigation. In Nasik lately repaired dams and channels water many of its upland valleys, and in Khandesh, from Eahal about ten miles north of Chalisgaon, the Jamda canals stretch east for about twenty-seven miles on the left and twelve miles on the right bank.

Objectives

To Report the freshwater fish diversity from Girna River, District Jalgaon, Maharashtra.

To analysis the present status, categories of freshwater fish from Girna River, District Jalgaon, Maharashtra.

To make data available for future conservation policies related to freshwater fish fauna.

Collection of fish species

Monthly survey was conducted from January 2016 to April 2016 and fishes were collected at different sites of the Girna River with the help of local fishermen using different type of nets namely gill nets, cast nets, dragnets and Bharjal. Immediately photographs were taken with help of digital camera prior to preservation for the identification.

Preservation of fish species

Fish were brought to the laboratory were fixed in 10% formalin solution in separate jars according to the size of species. Smaller fishes were directly placed in the formalin solution, while larger fishes were given an incision on the abdomen before they were fixed.

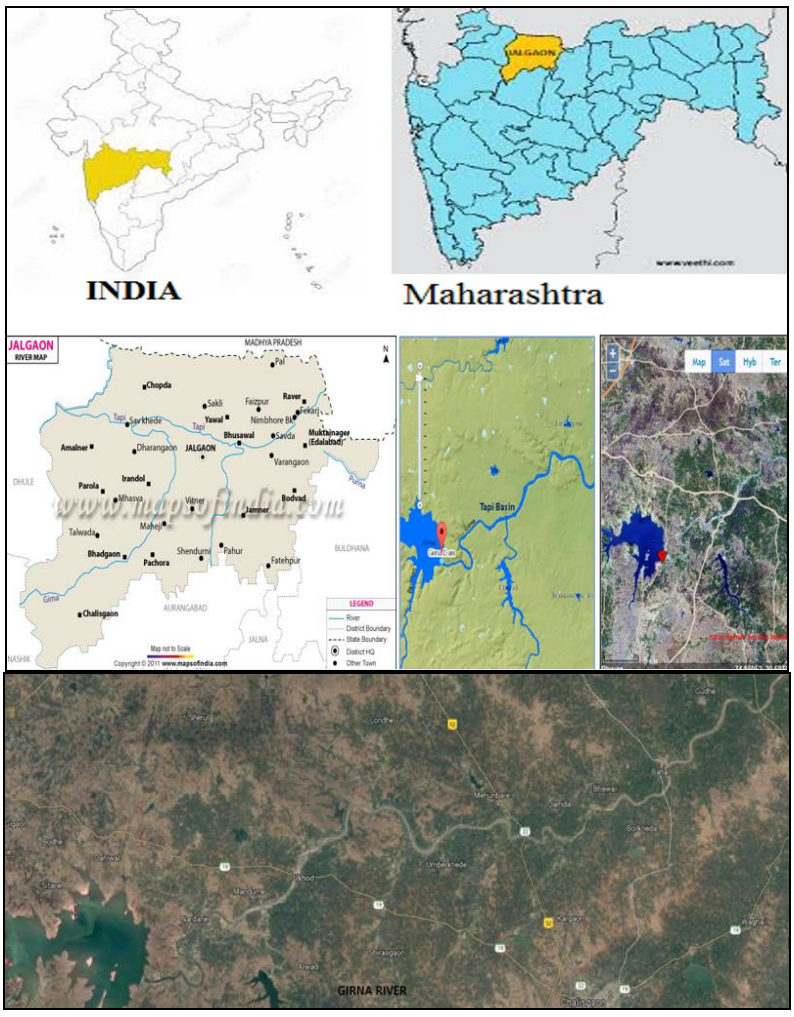

Fig 1: Location Maps and Satellite image of Girna River, Dist. Jalgaon, Maharashtra, India. Latitude: 21° 8' 32.7" (21.1424°) north, Longitude: 75° 18' 59.6" (75.3166°) east.

Labeling of fish species

The fish collected and fixed were labeled giving serial numbers and date of the collection. The common local name of fish used in this region was labeled in each jar containing the fish.

Laboratory Work

Various morphometric measurements of fish were made by ruler and Vernier caliper. Different instruments used in laboratory work are light microscope, dissecting microscope, magnifying glass, counting needle, forceps.

Identification of fish species

The identification of the species was done mainly on the basis of the colour pattern, specific spots or marks on the surface of the body, shape of the body, structure of various fins etc. The identification of fishes was based on fresh specimens. Fishes were identified by using standard taxonomic keys viz. Fishes of India, FAO identification sheets, ITIS (Integrated Taxonomic Information System) standard report (http://www.itis.gov), Fish Base (http://fishbase.org) and other reference books [2-17]. The collected fish were identified up to species level.

Results and Discussion

During the present study a total of 35 species of primary freshwater fishes belonging to 17 families and 27 genera were recorded from the study sites Girna River. On the basis of percentage composition and species richness, order Cypriniformes was most dominant group represented by 20 (57.14) species followed by orders Perciformes with 06 (17.14) species. Siluriformes with 03 (8.57) species, Synbranchiformes 02 (5.71) species, Beloniformes 01 (2.85) species, Synodontidae 01 (2.85) species, Scorpaeniformes 01 (2.85) species and Osteoglossiformes 01(2.85) species. Shown in Table.1, Figure. 2 and 3.

Table 1: List of Freshwater fish fauna of Girna River, Dist. Jalgaon, Maharashtra, India.

S. No	Order	Family	Scientific name	Common name	Abundance	IUCN status
1.	Cypriniformes	Cyprinidae	*Labeo boggut (Skyes, 1839)*	Ger	A	LC
2.			*Labeo bata (Ham., 1822)*	Bata	A	LC
3.			*Hypophthalmichthys nobilis (Richardson 1845).*	Bighead carp	R	LC
4.			*Aspidoparia morar (Hamilton, 1822)*	Harda	R	LC
5.			*Ctenopharyngodon idellus (Valenciennes,1844)*	Grass carp	M	NE
6.			*Barbodes lindog (Herre, 1924)*	lindog	M	LC
7.			*Cyprinus carpio (Linn,. 1758)*	Common carp	C	VU
8.			*Garra kalpangi (Nebeshwar, Bagra & Das, 2012)*	kalpangi	M	LC
9.			*Labeo rohita(Ham., 1822)*	(Rohu)	M	LC
10.			*Amblypharyngodon mola (Ham., 1822)*	Dhawai	C	LC
11.			*Cirrhinus mrigala (Ham.,1822)*	Mrigal	C	LC
12.			*Crossocheilus latius latius (Ham., 1822)*	Regadi	M	LC
13			*Catla Catla (Ham., 1822)*	Catla	M	LC
14			*Puntius conchonius (Hamilton 1822)*	Gulabi Khavali	A	LC
15			*Puntius stigmata*	Pothi	A	LC
16			*Labeo fimbriatus (Bloch., 1795)*	Fringed lipped carp	C	LC
17			*Cirrhinus reba (Ham., 1822)*	Rewah	M	LC
18		Parapsilorhynchidae	*Parapsilorhynchus discophorus (Hora, 1921)*	Ratnagiri minnow	R	VU
19		Psilorhynchidae	*Psilorhynchus nudithoracicus (Tilak & Husain, 1980)*	Sucatio minnow	R	LC
20		Cobitidae	*Lepidocephalichthys guntea (Hamilton, 1822)*	Guntea loach	R	LC
21	Perciformes	Nandidae	*Nandus nandus (Hamilton 1822)*	Mottled Nandus	M	LC
22		Anabantidae	*Anabas testudineus (Bloch 1792)*	Climbing perch	M	DD
23		Ambassidae	*Chanda nama (Ham., 1822)*	Glass perch	C	LC
24		Channidae	*Channa punctata (Bloch,1793)*	Spotted Snake head	R	LC
25		Channidae	*Channa striata (Bloch, 1793)*	Striped Snake head	R	NE
26		Cichlidae	*Oreochromis mossambicus (Peters, 1852)*	Tilapia	M	NT
27	Siluriformes	Schilbeidae	*Eutropiichthys vacha (Ham-Buch)*	Vacha	R	LC
28		Claridae	*Clarias batrachus (Linnaeus 1758)*	Magur	R	LC
29		Bagridae	*Macrones seenghala*	Shingta	R	LC
30	Beloniformes	Belonidae	*Xenentodon cancila (F. Hamilton, 1822)*	Gar	R	LC
31	Synodontidae	Aulopiformes	*Harpadon nehereus (Hamilton, 1822)*	Bombay duck	R	LC
32	Synbranchiformes	Mastacembelidae	*Mastacembelus armatus, (Lacepède, 1800)*	Vam	R	LC
33		Mastacembelidae	*Mastacembelus favus (Hora, 1924)*	Vam	R	LC
34	Scorpaeniformes	Platycephalidae	*Platycephalus indicus (Linnaeus, 1758)*	Belle	R	LC
35.	Osteoglossiformes	Notopteridae	*Notopterus notopterus (Pallas 1769)*	Feather back	C	LC

A: Abundant; C: Common; M: Moderate; R: Rare.
LC: Least Concern; NE: Not Evaluated; VU: Vulnerable; NT: Near Threatened; DD: Data Deficient.

The family Cyprinidae was the largest, most dominating and was represented by 20 species, *Labeo boggut, Labeo bata, Hypophthalmichthys nobilis, Aspidoparia morar, Ctenopharyngodon idellus, Barbodes lindog, Cyprinus carpio, Garra kalpangi, Labeo bata, Amblypharyngodon mola, Cirrhinus mrigala. Crossocheilus latius latius, Catla catla, Puntius conchonius Puntius stigmata, Labeo fimbriatus, and Cirrhinus reba.* Among these Cyprinids *Labeo boggut, Labeo bata, Puntius conchonius and Puntius stigmata* were found abundant *Cyprinus carpio, Amblypharyngodon mola, Cirrhinus mrigala* and *Labeo fimbriatus* were common. *Ctenopharyngodon idellus, Barbodes lindog, Garra kalpangi, Labeo bata, Crossocheilus latius latius, Catla catla, Cirrhinus reba,* were found moderate. *Hypophthalmichthys nobilis* and *Aspidoparia mora,* were found rare.

1. *Labeo boggut.* 2. *Labeo bata* 3. *Hypophthalmichthys nobilis.*

4. *Aspidoparia morer* 5. *Ctenopharyngodon idellus* 6. *Barbodes lindog*

7. *Cyprinus carpio* 8. *Garra kalpangi* 9. *Labeo rohita.*

10. *Amblypharyngodon mola.* 11. *Crrhinus mrigala.* 12. *Crossocheilus latius latius*

13. *Catla catla.* 14. *Puntius conchonius.* 15. *Puntius stigmata*

16. *Labeo fimbriatus* 17. *Cirrhinus reba.* 18. *Parapsilorhynchus discophorus*

Fig 2: The representative fish species encountered in the present study.

19. *Psilorhynchus nudithoracicus* 20. *Lepidocephalichthys guntea* 21. *Nandus nandus*

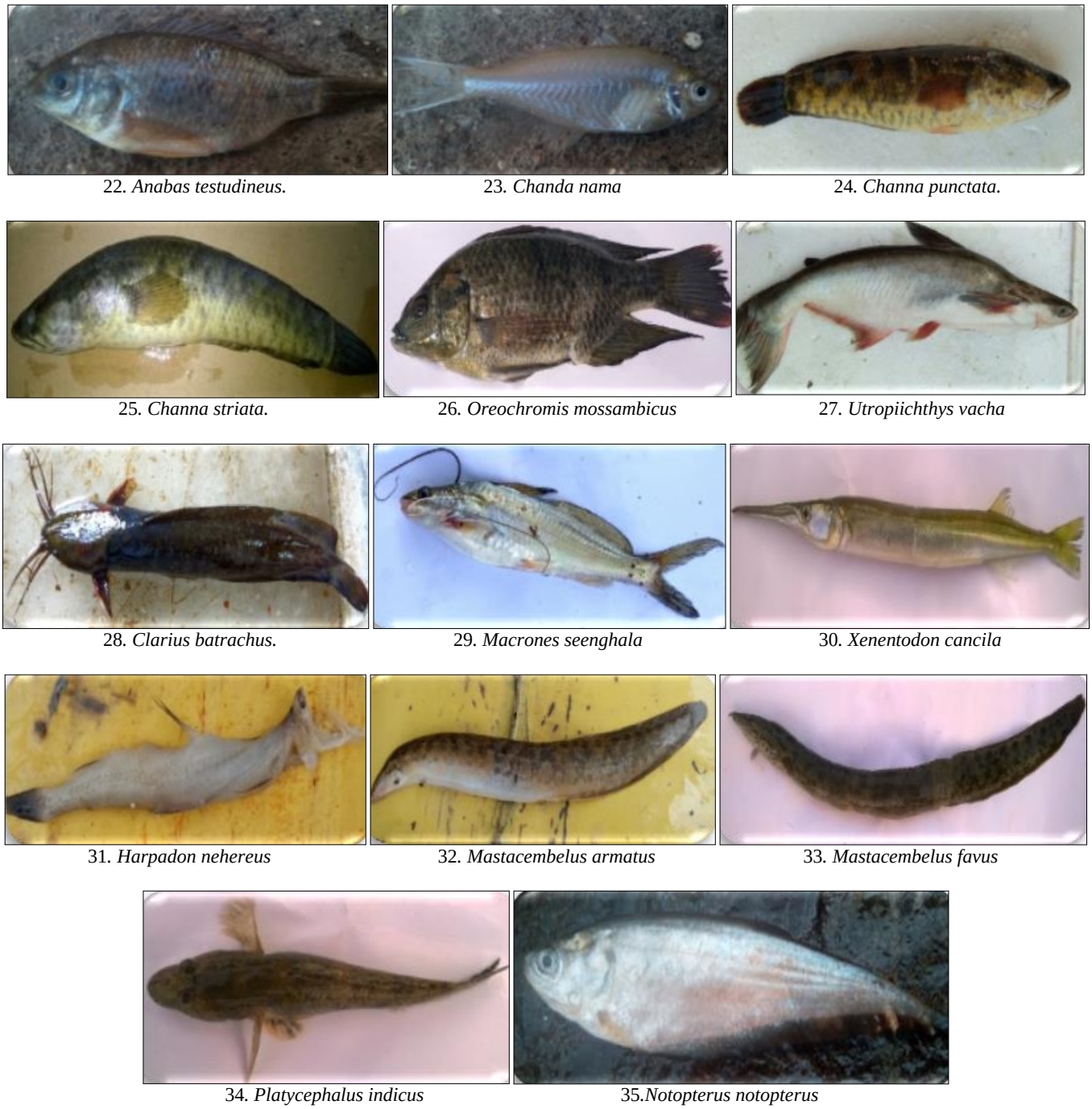

Fig 3: The representative fish species encountered in the present study.

The family Parapsilorhynchidae was represented by 1 species, *Parapsilorhynchus discophorus* and was found rare. The family Psilorhynchidae was represented by 1 species, *Psilorhynchus nudithoracicus* and was found rare. The family Cobitidae was represented by 1 species, *Lepidocephalichthys guntea* and was found rare. The family Nandidae was represented by 1 species, *Nandus nandus* and was found moderate. The family Anabantidae was represented by 1 species, *Anabas testudineus* and was found moderate. The family Ambassidae was represented by 1 species, *Chanda Nama* which was found common. The family Channidae was represented by 2 species, *Channa punctata and Channa striata* and were found rare. The family Cichlidae was represented by 1 species, *Oreochromis mossambicus* and was found moderate.

The family Schilbeidae was represented by 1 species, *Eutropiichthys vacha*, the family Claridae was represented by 1 species, *Clarias batrachus*, the family Bagridae was represented by 1 species, *Macrones seenghala*, the family Belonidae was represented by 1 species, *Xenentodon cancila*, the family Aulopiformes was represented by 1 species, *Harpadon nehereus* and all were found rare. The family Mastacembelidae was represented by 2 species, *Mastacembelus armatus* and *Mastacembelus favus* and were found rare. The family Platycephalidae was represented by a single species, *Platycephalus indicus* and was found rare. The

family Notopteridae was represented by a single species, *Notopterus notopterus* and was found common. Shown in Figure.4 and 5.

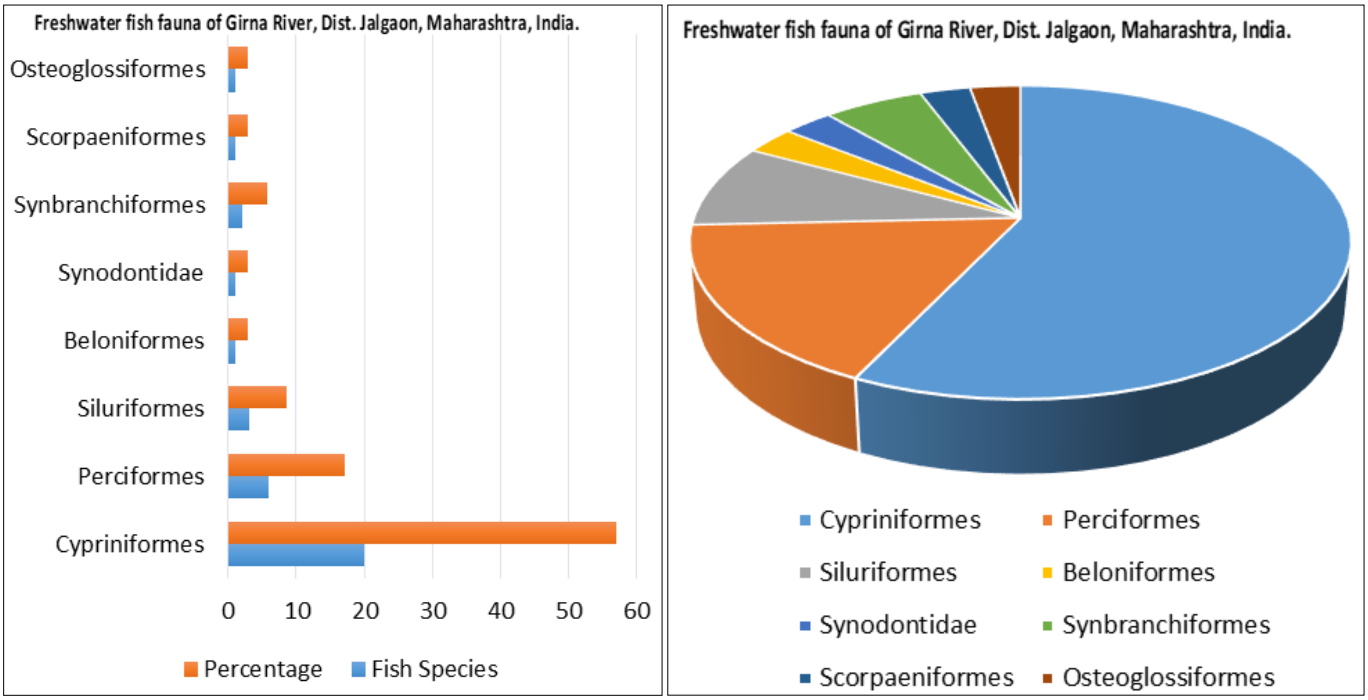

Fig 4: Relative dominance of Freshwater fish families of Girna River, Dist. Jalgaon, Maharashtra, India.

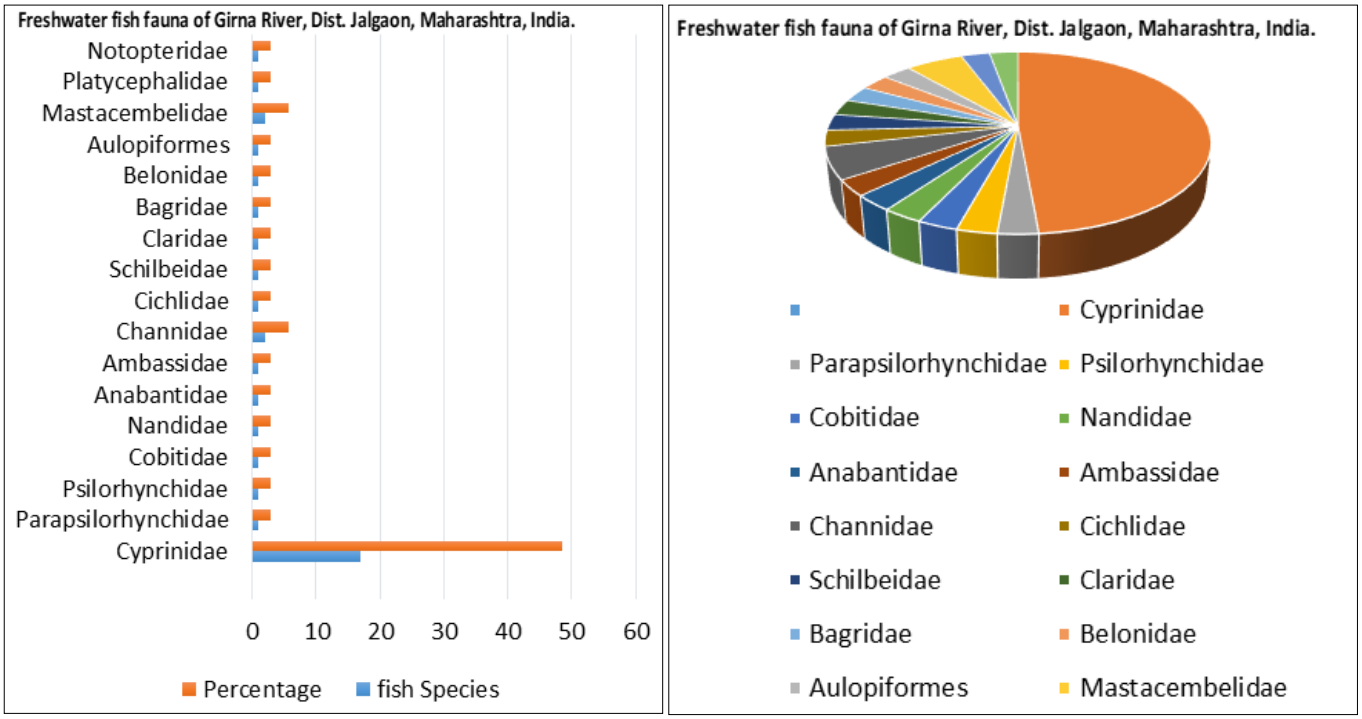

Fig 5: Relative dominance of Freshwater fish orders of Girna River, Dist. Jalgaon, Maharashtra, India.

Almost all the fish species present in the Girna River are included in the IUCN Red List of Threatened species and most of them were given the least concern status, a few are near threatened, very few are vulnerable, few are data deficient and not evaluated. Out of 35 fish species found in the Girna River, 29 species were found least concern. One species was found near threatened and two species were found vulnerable. One was data deficient and two were found not evaluated.

(Sakhare 2001) [15] investigated the occurrence of 23 fish species belonging to 7 orders in Jawalgaon reservoir in Solapur district of Maharashtra. The fishes belonging to order

Cypriniformes were dominant with 11 species followed by order Siluriformes with 4 species, while orders like Osteoglssiformes, Perciformes and Channiformes were represented by 2 species and the rest of the orders by single species. (Yazdani and Singh 2002) [23] have given an account of fish resources of Bhima River at Indapur and found 54 species belonging to 15 families. (Wagh and Ghate 2003) [22] noticed 62 species from Mula and Mutha River in Pune.

(Khedkar 2005) [11] observed 67 fish species belonging to 7 orders and 19 families from Nathsagar reservoir from Paithan, Dist. Aurangabad, out of the total 58 species, 8 were abundant, 21 common, 19 moderate and 10 rare in the study area. (Shahnawaz *et al*. 2010) [18] recorded 56 species of fish representing 39 genera and 15 families from Bhadra river of Western Ghats. (Supugade *et al*. 2009) [20] recorded 20 species from 13 genera and 7 families included in 4 orders from Ghogaon reservoir of Satara district. (Joshi *et al*. 2012) [10] recorded 20 species belonging to 7 families from Purna River at Buldhana District. (Pawar 2014) [13] has reported 42 fish species belonging to 29 genera, 15 families and 9 orders from Majalgaon reservoir from Beed district.

(Shelke 2016) [16] studied the ichthyofaunal biodiversity of Girna Dam and he was recorded 24 species that the ichthyofauna belong to 05 order 11 families, 18 genus. The members of order Cypriniformes were dominated by 13 species followed by Perciformes with 05 species, Siluriformes with 03 species, Osteoglossiformes, Parapsilorhynchidae and Scorpaeniformes with 01 species each.

Recent study aiming to contribute a better knowledge of the fish fauna of Girna River, Dist-Jalgaon, Maharashtra India and a tool for conservation planning of aquatic environments in this fisheries. It is, however, essential that conservation efforts should ensure that the current status of the fish fauna is maintained by minimising anthropogenic impacts and the introduction of exotic species. The use of illegal methods to catch fish should be banned to prevent depletion of freshwater fish diversity. The conservation of ichthyofuana of this ecosystem can be achieved by introducing scientific fish faunal conservation. To maintain healthy fish biodiversity and abundance of fish,

As per the my observation during the study of fish fauna of Girna River, I have to suggest some recommendations or conservation approaches in every freshwater reservoirs were fishing activities taking place i) To educate fisherman's and local about the life cycle of freshwater fish. ii) Do not harvest fish during spawning periods. iii) Do not harvest juveniles. iv) Do not allow the introduction of invasive species. (v) To give scientific training to fisherman's and local on industrial fish and fisheries and its management and negative impact of pollution with sewage, fertilizers, pesticides and other chemicals on the life of fishes. Hence purpose is that we can achieve Mainstreaming Biodiversity; sustainable people and their livelihood.

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