



ICHTYODIVERSITY OF INDIRA SAGAR DAM IN VIDARBHA REGION OF MAHARASHTRA

Swapnil S. Ghatge¹, Sachin W. Belsare² and Shrikant S. Jadhav³

¹Department of Fisheries Biology, College of Fishery Science, Nagpur- 440001

²Department of Fisheries Hydrography, College of Fishery Science, Nagpur - 440001

³Zoological Survey of India, Western Regional Centre, Vidyanagar, Akurdi, Pune, Maharashtra 411044
sacmax_aqua@yahoo.com

ABSTRACT :

Information on fish diversity and its distribution is vital for sustainable utilisation of the resources and its conservation. Indira Sagar dam (major irrigation project) which is also commonly known as Gosi Khurd dam is constructed on Wainganga River, a major tributary of Godavari River near Pauni in Bhandara district in the state of Maharashtra in India. The fish fauna of Indira Sagar dam is yet not been documented. The present work was undertaken to study fish biodiversity and to present a comprehensive report on the diversity and threats to the fish fauna of the Indira Sagar dam. The survey and documentation was carried out during January, 2013 to March, 2015.

A total of, 54 fish species under 10 orders, 20 families and 42 genera were recorded from the Indira Sagar dam. The family Cyprinidae has the highest number of fish species (24) followed by Channidae (4), Bagridae (3), Siluridae, Schilbeidae, Ambassidae and Mastacembelidae were represented by two species each and 13 other families with one fish species each. The present study revealed that, as per IUCN Red List criteria, out of the 54 fish species, 04 species belong to the Near Threatened (NT), 01 to the Vulnerable (VU), 01 to the Endangered (EN) category, 04 species under Data Deficient category (DD), one species Not Evaluated (NE) and 33 species under Least Concerned (LC) category. The present study also validates the distribution range of *Hyselobarbus kolus* in Wainganga River. The Indira Sagar dam is rich in fish biodiversity but, it is facing anthropogenic pressure.

Key words: : Fish biodiversity, Indira Sagar dam, Gosi Khurd dam, Wainganga River,

INTRODUCTION

The North Eastern part of Maharashtra is situated between latitude 17° 57'N to 21° 46'N and longitude 75°57'E to 80°59'E is commonly referred to as Vidarbha region and comprises eleven districts viz; Nagpur, Amaravati, Akola, Yavatmal, Buldhana, Chandrapur, Wardha, Gadchiroli, Bhandara, Gondia, and Washim. By virtue of its geographical situation in monsoon belt, eastern parts of Vidarbha region are endowed with fairly good rainfall and consequently extensive water bodies especially in the districts of Bhandara, Gondia (Lake District) and Nagpur.

The Vidarbha region is drained by the tributaries of Tapti River in the northern parts and rest by the Wainganga, Wardha and Penganga Rivers, which are tributaries of Pranhita sub basin under Godavari basin.

The fish fauna of Vidarbha region is studied at few localities only at Wardha River basin, Pradhan (1997), Pench National Park, Yadav (2004), Melghat tiger reserve, Yadav (2005), Tadoba National Park, Yadav (2006) and Chandrapur district, Nagpur district and Akola district and Tadoba National Park, Karmakar *et al*, (2012). There is no literature available on Wainganga River on which the Gosi Khurd dam is constructed. Heda (2009) surveyed the River Kathani a tributary of Wainganga which lies more than 80Km south of Gosi Khurd dam and River Adan a tributary of River Painganga (Penganaga) in West Vidarbha region.

The review of literature suggests that the River Godavari has not been surveyed extensively for its fish fauna and checklists for individual Rivers are not available (Jadhav *et al.*, 2011). Similarly, no fish faunal survey has been carried out in Wainganga River and also on Gosi Khurd dam which is built on the mainstream of this river. Hence the present work was undertaken to study fish biodiversity and to present a comprehensive report on the diversity and threats to the fish fauna of the Indira Sagar dam.

Study Area:

Indirasagar dam, also commonly referred as Gosi Khurd dam and it is one of the ambitious project in Vidarbha region, was established with an aim of offering irrigation facilities to the villages of Nagpur, Bhandara and Chandrapur districts. The dam wall has been built near Gosi Khurd village located in Pauni tahsil of Bhandara district on Wainganga River at Latitude 20° - 52' - 15"N and Longitude 79° - 37' - 00"E. The dam has a total catchment area of 34,863 km² out of which, 24,243 km² lies in Madhya Pradesh and 10,619 km² lies in Maharashtra. The gross storage capacity of Indira Sagar dam is around 1,146.075 Mm³ with a total area of around 22258 10³m².

Materials and Methods

Quarterly samplings were carried out (January, 2013 to March, 2015) with the help of local fishermen and fishes were observed and collected from the fishermen catches. During the study period the local fish landing centres and markets at Bhandara, Pathari Village, Ambhora Village and dam wall near Gosi Khurd village were surveyed to monitor and ascertain the fish species which were not available in local fishermen catches (Table. 1). The timeline PRA was carried out with the local fishermen's in the vicinity of Indirasagar dam. Representative fish samples were collected from the fishermen catches and were preserved in 10% formaldehyde and brought back to laboratory. The taxonomical identification was carried out with help of available literature of Day (1889), Talwar and Jhingran (1991), Jayaram (2006, 2010). Taxonomic status is given as per Eschemeyer *et al.* 2018. The threat status of fish native species documented during the present study is given and was adapted from IUCN Red List of Threatened species version 2018 (IUCN 2018).

Table 1. Geographical co-ordinates of sampling localities

Sr. No.	Sampling Site	Latitude	Longitude
1.	Bhandara,	21° - 09' - 01"N	79° - 39' - 06"E
2	Pathari Village,	20° - 54' - 14"N	79° - 38' - 39"E
3.	Ambhora Village	21° - 02' - 04"N	79° - 36' - 17"E
4.	Dam wall near Gosi Khurd	20° - 52' - 65"N	79° - 36' - 43"E

Results and discussion:

A total of, 54 fish species under 10 orders, 20 families and 42 genera along with one hybrid species were recorded from the Indira Sagar dam (Table 2). The family Cyprinidae has the highest number of fish species (24) followed by Channidae (4), Bagridae (3), Siluridae, Schilbeidae, Ambassidae and Mastacembelidae were represented by two species each and 13 other families with one fish species each. Voucher specimens of all the 54 fish species have been preserved and exhibits in the laboratory of Department of Fisheries Biology, College of Fishery Science, Nagpur.

Table 2. List of Fishes Collected from Indira Sagar Dam

Particulars	Remark
A. Osteoglossiformes	
I. Notopteridae	
<i>Notopterus notopterus</i> (Pallas, 1769)	LC
B. Anguilliformes	
I. Anguillidae	
<i>Anguilla bengalensis</i> (Gray, 1831)	NT
C. Cypriniformes	
I. Cyprinidae	
<i>Catla catla</i> (Hamilton, 1822)	T
<i>Cirrhinus mrigala</i> (Hamilton, 1822)	T
<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	Exotic / I
<i>Cyprinus carpio</i> Linnaeus, 1758	Exotic / I
<i>Hypophthalmichthys nobilis</i> (Richardson, 1845)	Exotic / I
<i>Hypophthalmichthys molitrix</i> (Valenciennes, 1844)	Exotic / I
<i>Hypselobarbus kolus</i> (Sykes, 1839)	VU
<i>Labeo boggut</i> (Sykes, 1839)	LC
<i>Labeo calbasu</i> (Hamilton, 1822)	LC
<i>Labeo fimbriatus</i> (Bloch, 1795)	LC
<i>Labeo rohita</i> (Hamilton, 1822)	T
<i>Osteobrama peninsularis</i> Silas, 1952	DD
<i>Osteobrama vigorsii</i> (Sykes, 1839)	LC
<i>Puntius chola</i> (Hamilton, 1822)	LC
<i>Systemus sarana</i> (Hamilton, 1822)	LC
<i>Puntius sophore</i> (Hamilton, 1822)	LC
<i>Pethia ticto</i> (Hamilton, 1822)	LC
<i>Tor tor</i> (Hamilton, 1822)	DD
<i>Salmophasia balookee</i> (Sykes, 1839)	LC
<i>Salmophasia boopis</i> (Day, 1874)	LC
<i>Amblypharyngodon mola</i> (Hamilton, 1822)	LC
<i>Brachydanio rerio</i> (Hamilton, 1822)	LC
<i>Rasbora daniconius</i> (Hamilton, 1822)	LC
<i>Garra mullya</i> (Sykes, 1839)	LC
II. Cobitidae	
<i>Lepidocephalus thermalis</i> (Valenciennes, 1846)	LC
III. Balitoridae	
<i>Indoreonectes evezardi</i> (Day, 1872)	LC
D. Siluriformes	
I. Bagridae	
<i>Mystus cavasius</i> (Hamilton, 1822)	LC
<i>Mystus vittatus</i> (Bloch, 1794)	LC
<i>Rita gogra</i> (Sykes, 1839)	LC
<i>Sperata seenghala</i> (Sykes, 1839)	LC
II. Siluridae	
<i>Ompok bimaculatus</i> (Bloch, 1794)	NT
<i>Wallago attu</i> (Bloch and Schneider)	NT

III. Schilbeidae	
<i>Eutropiichthys cf. goongwaree</i> (Sykes, 1839)	DD
<i>Clupisoma bastari</i> Datta & Karmakar, 1980	DD
IV. Pangasiidae	
<i>Pangasianodon hypophthalmus</i> (Sauvage, 1878)	Exotic / I
V. Sisoridae	
<i>Bagarius yarrelli</i> (Sykes, 1839)	NT
VI. Clariidae	
<i>Clarias maqur</i> (Hamilton, 1822)	EN
VII. Heteropnustidae	
<i>Heteropneustes fossilis</i> (Bloch, 1794)	LC
E. Beloniformes	
I. Belonidae	
<i>Xenentodon cancila</i> (Hamilton, 1822)	LC
F. Perciformes	
I. Ambassidae	
<i>Parambassis ranga</i> (Hamilton, 1822)	LC
<i>Chanda nama</i> Hamilton, 1822	LC
J. Cichliformes	
I. Cichliidae	
<i>Oreochromis niloticus</i> (Linnaeus, 1758)	Exotic / I
<i>Oreochromis mossambicus</i> (Peters, 1852)	Exotic / I
H. Gobiiformes	
I. Gobiidae	
<i>Glossogobius giuris</i> (Hamilton, 1822)	LC
H. Anabantiformes	
I. Nandidae	
<i>Nandus nandus</i> (Hamilton, 1822)	LC
II. Badidae	
<i>Badis badis</i> (Hamilton, 1822)	LC
III. Channidae	
<i>Channa marulius</i> (Hamilton, 1822)	LC
<i>Channa gachua</i> Bloch & Schneider, 1801	NE
<i>Channa punctata</i> (Bloch, 1793)	LC
<i>Channa striata</i> (Bloch, 1793)	LC
I. Synbranchiformes	
I. Mastacembelidae	
<i>Macrognathus aral</i> (Bloch & Schneider, 1801)	LC
<i>Mastacembalus armatus</i> (Lacepede)	LC

Taxonomic status as per Eschemeyer et al. 2018, T = Transplanted; I = Invasive, IUCN (2018). EN = Endangered, NT = Near Threatened, VU = Vulnerable, LC = Least Concern, NE = Not Evaluated, DD = Data Deficient. Statuses for introduced/transplanted species are not provided.

As per the IUCN Red List criteria (IUCN, 2018) out of the 54 fish recorded in the Indira Sagar dam, 04 species (*Anguilla bengalensis*, *Ompok bimaculatus*, *Wallago attu* and *Bagarius yarrelli*) belong to the Near Threatened (NT) category, 01 species *Hypselobarbus kolus* to the Vulnerable (VU) category and 01 (*Clarias maqur*) to the Endangered (EN) category, 04 species are found to be in Data Deficient category (DD), one species Not Evaluated (NE) and 33 species under Least Concerned (LC) category.

Further, it is to state that *Tor tor* and *Hypselobarbus kolus* was recorded for the first time from the Indira Sagar dam on Wainganga River system. *H. kolus* is an endemic species to Western Ghats and reported from the states of Kerala, Karnataka, Tamil Nadu and Maharashtra. In Maharashtra it is reported from Bhima–Sina–Man River basins in Solapur district and Adan a tributary of River Painganga under Godavari River basin in Washim district West Vidarbha (Head, 2009; Raghavan and Ali, 2013). The review of literature evoke that there is no distributional records of *Hypselobarbus kolus* and *Tor tor* from the mainstream of Wainganga River from East Vidarbha. Therefore, based on the sample collections in the present study authors are of opinion that the distributional range of *Hypselobarbus kolus* and *Tor tor* is extended in Wainganga River from East Vidarbha. A detailed study in this regards will be published elsewhere.

The Indira Sagar dam harbours a rich diversity of fishes including some of the threatened fish species. But, the fish fauna of the Indira Sagar dam is under threat due to several anthropogenic activities. The 03 species of transplanted Indian major carps *Catla catla*, *Cirrhinus mrigala* and *Labeo rohita* are dominating the fishermen catches. The authors are of firm opinion that the exotic species are posing competition for food and space to the native species.. To certain extend even hybrid of catla and rohu are available in the fish catches. The present study also validate 07 exotic species from the Indira Sagar dam and for first time from Wainganga basin. The author firmly believe that 02 exotic species *Pangasianodon hypophthalmus* and *Oreochromis niloticus* might have escaped from the cage culture which is currently being practiced in the Gosi Khurd dam waters. Further the 04 exotic species *Ctenopharyngodon idella*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Oreochromis mossambicus* which are being regularly stocked in the reservoir and ponds of Nagpur district might have escaped along with *C. catla*, *L. rohita* and *C. mrigala* from the overflow waters of the reservoirs built on the tributaries of Wainganga. Heda (2009) has also reported *Oreochromis mossambicus* in Kathani River which is approximately 80Km downstream from present study location. Subsequently, *Hypophthalmichthys nobilis* was also recorded in the fish catches, which is a banned fish species in India for culture but might have washed away from reservoir overflows.

Further, the untreated municipal sewage of Nagpur city dumped in Nag River is carried by Kanhan River further to Indira Sagar dam adding to organic load and increasing pollution in the dam waters. The water hyacinth, *Eichhornia crassipes* (C. Mart.) Solms (1883) occurrence is increasing in the Gosi Khurd dam waters. The specimen samples of *E. crassipes* was also collected from all the sampling sites

At the same time juvenile fishing practice by using small mesh size fishing gears and as a result of this the fish fauna of Indira Sagar dam is subjected to growth overfishing. During the monsoon season, reproductive overfishing is also evident below the dam walls of Indira Sagar dam. All along the reverse spawning migration the adult fishes get strangled at the dam wall and get easily captured. A *Bagarius yarrelli* (22Kg) which is considered as under Near Threatened species is also observed being strangled in the shallow water below dam wall and captured by fishermen.

It is to conclude that, the Indira Sagar dam is rich in fish biodiversity but, is facing anthropogenic pressure. It harbours a number of freshwater fish species as well as globally threatened fish species. However, the fish fauna in Indira Sagar dam is threatened due to several anthropogenic activities including introduced exotic fish species, growth overfishing, municipal sewage pollution, aquatic weed infestation. The native fish fauna which supports the livelihood of local fishing community has to be sustainably utilised by proper planning, conservation and local awareness on impacts of introduction of exotics, growth overfishing is necessary.

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