

Assessment of Fish Biodiversity of Tawarja Reservoir, Latur, Maharashtra (India)

Abstract

Present study deals with ichthyofaunal diversity of Tawarja reservoir, Latur, Maharashtra. Tawarja reservoir is a perennial water body used for human and livestock consumption of nearby areas. The main purpose of this reservoir is for irrigation, it is also used for culture based capture fisheries by fisherman community of Latur taluka. Tawarja reservoir was allotted to Mahadev Koli Samaj Matsyavawsay Cooperative Society Ltd. Kavaof Latur taluka. In the present study it was observed that the ichthyofauna belongs to 05 order 09 families, 19 genus and 31 species, were Cyprinidae family is dominant with 17 (54.83%) species followed by Bagridae & Siluridae 3 with (9.67 %) species contribution, Channidae with 02 (6.45%) species, contribution and the families of Notopteridae, Botiidae, Clariidae, Heteropneustidae, Pangasidae and Mastacembelidae contributing 01 (3.22%) species of each. Regarding their conservation status, 25 species were of least concern, 2 species were vulnerable, 3 species were near threatened and 1 species was in an endanger stage. (IUCN-2023).

Keywords: Ichthyofaunal diversity, Conservation status, Tawarja reservoir.

Introduction:

Among all the necessary components for life, water is essential. There is no life on Earth except from water. An essential human necessity, water is also one of the most important, ever-changing, and irreplaceable resources. It generates hydroelectric power and has several additional uses, including irrigation, water supply, industry, drinking, aquaculture, and other aquatic creatures' cultivation. According to the CIA (2008), water covers 71% of the Earth's surface. However, 96.5% of that water is salty, meaning it cannot be directly utilized for human consumption, irrigation, or household or industrial activities. The amount of freshwater found in bodies of water such as rivers, lakes, ponds, reservoirs, etc., is close to one percent. Estimates show that effluents from farms, businesses, and homes contaminate almost 70% of the water supply in our nation.

India has a vast reservoir resource, with over 3.0 million hectares of water distributed area. India is one of the world's most diversified nations. Fish species variety is now recognized globally, with 25,000 species, 10,000 of which are found in freshwater ecosystems and around 11.7% in biodiversity of conservation values (www.fishbase.se).

Latur district is located in the south-eastern region of Maharashtra. Latur town is located between 18.05° and 18.7° North latitude and 73.25° and 77.25° East longitude. It is located 636 meters above sea level. The whole district of Latur is located on the Balaghat Plateau. Tawarja reservoir is situated near Kava, which is km from Latur city. The Tawarja Dam is an earthfill dam built on the Tawarja River, which starts at Murud in Latur taluka and meets the Manjara River at Shivani on the Latur-Ausa border. The dam is 14.3 m tall and 2222 m long, with a viewing surface area of 741 Km². (478.9 heactor). The volume content is 361 km³, and the gross storage capacity is 20,520.00 km³. This dam is also known as a tourist destination for the Nereby people.

Biodiversity refers to the diversity and variability of life on Earth. It covers variations in genes, species, and ecosystems. It is usually assessed among living forms in terms of richness, evenness, and variety (Cardinale et al. 2012). Fish account for somewhat more than half of all vertebrates, and India accounts for around 7.7% of world fish diversity. India, a biologically rich nation, is home to 7.6% of all mammalian, 12.6% of all avian, 6.2% of all reptile, 4.4% of all amphibian, 11.7% of all piscine, and 6.0% of all flowering plant species (Stephen et al., 2015). Fish account for somewhat more than half of the total vertebrates, with 34300 species. According to Froese and Pauly (2020), India accounts for around 7.7% of world fish diversity, with 1,673 marine species and 994 freshwater. Coad and Murray (2006) estimated that there are about 32,000 genuine fish species on the planet, divided into 85 orders and 536 families, with freshwater fish accounting for 43% of the total. Although just a tiny portion of the Earth's surface freshwater is occupied by fish, it supports a significant number of species.

Biodiversity is crucial for the stability of ecosystems, conservation of overall quality environments, and comprehending the inherent value of all species on the planet. Ehrlich et al. (1991). The current research was conducted to investigate the ichthyofaunal variety of Tawarja dam in Latur district. Shinde et al. (2009) investigated the fish biodiversity, variety, and quantity of freshwater fishes in the Pravara River, Pravara Sangam District, Ahmednagar (M.S) India. Bhat et al. (2003) investigated the diversity and composition of freshwater fishes in river systems

in Central Western Ghats, India. Singh and Johal (2009) conducted research on the current situation of fish species diversity in the Ganga River in Allahabad, Uttar Pradesh, India. Noss (1990) identified composition, structure, and function as the primary features of biodiversity and reinforced them hierarchically into nested forms by integrating additional organizational levels: regional landscape, community-ecosystem, population species, and genetic.

Materials and Methods:

Members of the Mahadev Koli Samaj Matsyavawsay Cooperative Society Ltd. Kava, a recognized fishing cooperative in Latur taluka, assisted in the fish collection effort from Tawarja reservoir (Fig. 01). The traditional fishing gear used to catch the fish included hand nets, gill nets, cast nets, and bhorjal. Photographs were captured at the reservoir's fish landing location. We also shopped at the local fish market for these fish. Over the course of a year, from June 2022 to May 2023, researchers systematically examined several aspects of fish collecting and catch. The fish were transferred to the lab and placed in a 10% formalin solution for preservation. The specimens were preserved in glass jars and housed with small fish immediately in the 10% formalin. After degumming, big fish were stored in huge HDPE tubs. According to established taxonomic keys for fishes, physical features such as colour, form, scale pattern, mouth pattern, and fins were used for identification (Day, 1889; Datta Munshi and Srivastava, 1988; Jayaram, 2010).

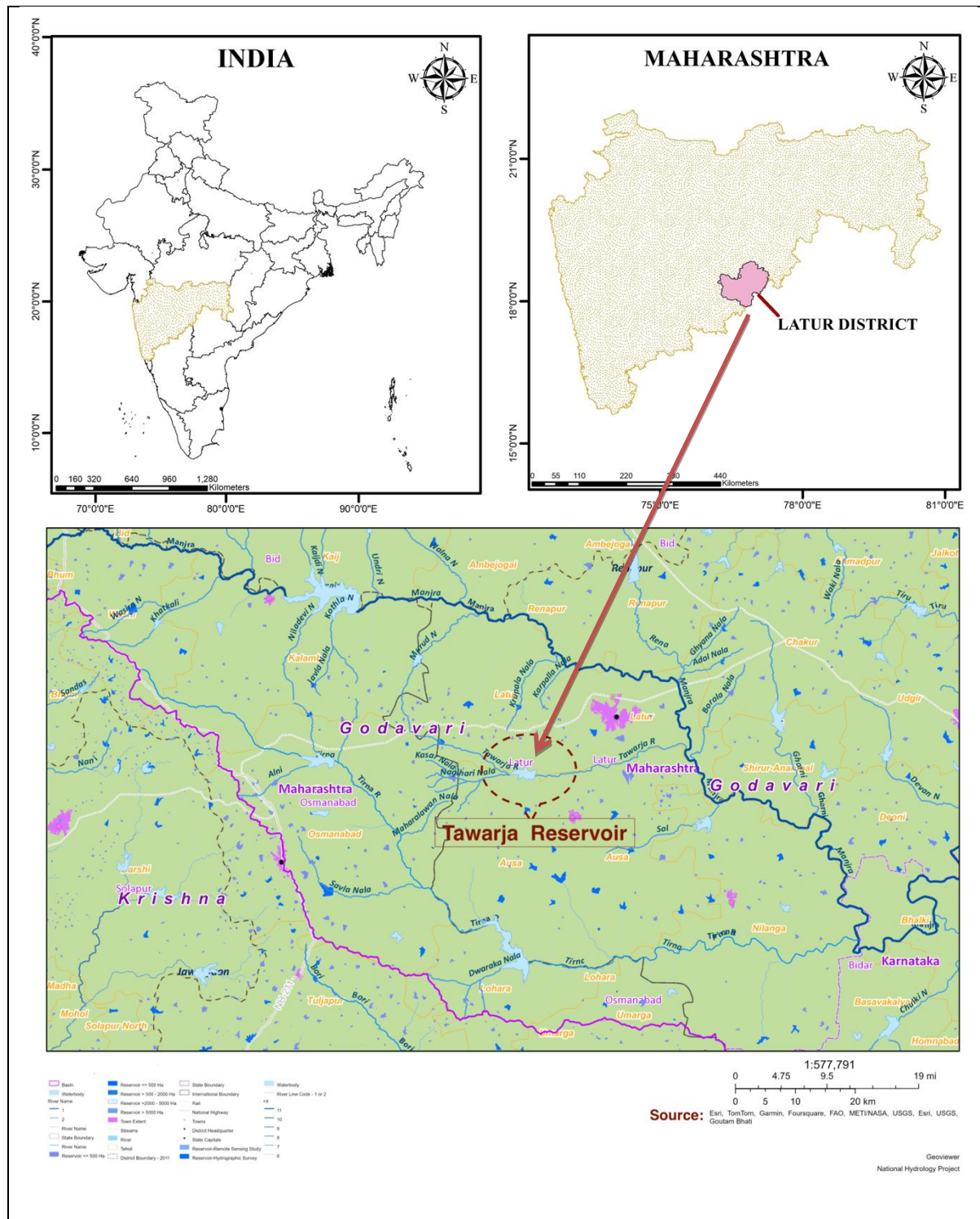


Fig. 01 Tawarja reservoir location map

Climate and Rainfall

In the Latur area, the monsoon rain starts in the middle of June and ends at the end of October. Winter lasts from November to February, and summer starts in March and ends in mid-

June. When it rains, the air stays damp. In the winter, it stays dry and cold, and in the summer, it stays dry and hot. It rains an average of 801.04 mm a year. It rains during the south-west monsoon. Between 11.9°C and 38.9°C is the normal spread of low and high temperatures.

Results and discussion:

There were 31 different species of fish identified in this research, spread throughout 5 orders (Fig. 02) and 9 families (Fig. 03). Data analysis revealed that out of all the fish orders, 17 belonged to the Cypriniformes, 9 to the Siluriformes, and 2 to the Anabantiformes. The Twawarja reservoir water body was sampled for its richness of fish and shellfish, and one species from the orders Osteoglossiformes and Synbranchiformes was found there. The conservation status of the species was as follows: 25 were of least concern, 2 were vulnerable, 3 were near threatened, and 1 was in danger. (1923, IUCN). Table 1 displays the 31 fish species that were recorded together with their conservation status over the one year of the inquiry.

Kurup (1994), Easa and Shaji (1995), Biju et al. (2008), Radhakrishnan and Kurup (2010), and Ali et al. (2011) are among the past research that have examined the freshwater fish fauna of Kerala. Zacharias et al. (1996) and Kurup (2001, 2002) are only two of the numerous researchers that have documented challenges to freshwater fish biodiversity.

The findings corroborate previous research on the fish richness in this area. Eleven different species of fish from five different orders have been discovered in the Sirur Dam in the Nanded District. In the Palas-Nilegaon reservoir in the Osmanabad district, about 28 different species of fish were found. These included 9 species of carps, 5 species of catfish, 2 species of featherbacks, 5 species of live fish, and 7 species of other fish. Twenty species were documented from the Ghogaon reservoir in Satara district. These species belonged to thirteen genera and seven families, spanning four orders. Fish life at Hyderabad's Himayasgar Lake was studied, and 32 species from 11 families and 6 orders were identified.

Also, between May 2007 and April 2009, Jadhav et al. (2011) documented 58 fish species from 16 families and 38 taxa in their two-year study of freshwater fish fauna. Thirty species from fifteen genera belonged to the Cyprinidae, making it the most numerous family. Out of the 58 species of fish found in the Koyna River, 22 are native to the western Ghats and 11 are exclusive to the Krishna River system. In the research region, 8 species were plentiful, 21 were common, 19 were moderate, and 10 were uncommon. According to Ubharhande and Sonawane

(2012), the ichthyofauna in Pantakli dam from Buldhana district, (M.S.) India, belongs to seven orders, ten families, nineteen genera, and twenty-one species. The Cyprinidae family has the most representation, with ten species (47.63%), followed by the Channidae and Mastacembelidae families, each with two species (9.52%). Balitoridae, Bagridae, Clariidae, Belonidae, Notopteridae, Cichlidae, and Poecilidae each make up one species (4.76%).

Fig. 02 Percentage contribution of 31 species in five orders

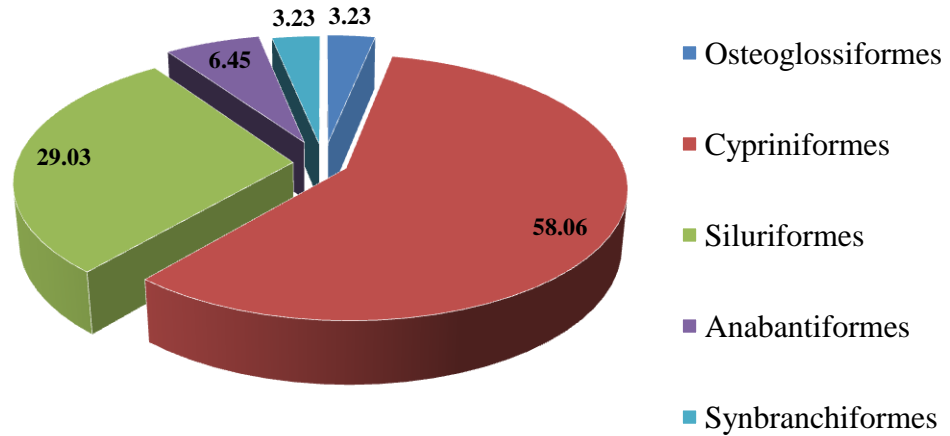


Fig. 03 Percentage contribution of 31 species in nine families

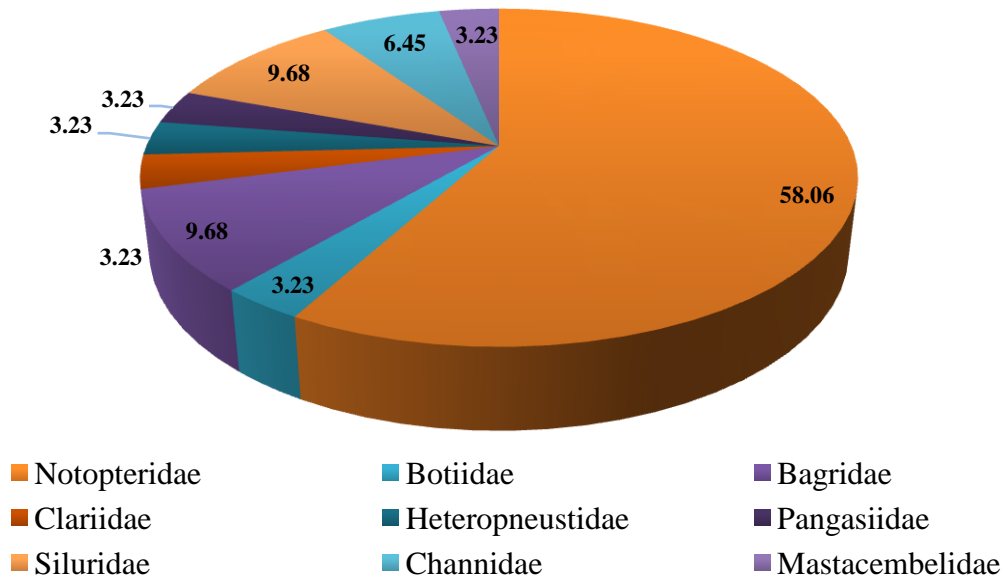


Table: 1. Fish species observed in the Tawarja reservoir, Latur

| S.N. | Order | Family | Genus | Species | Conse rvatio n Status | Econo mic value | Status |
|-----------------------------|-----------------------------|----------------------------|-------------------------|------------------------------------|--------------------------------|-----------------------|--------|
| Class: Actinoptregii | | | | | | | |
| 1 | 1. Osteoglossiformes | 1. Notopteridae | <i>Notopterus</i> | <i>notopterus</i> (Pallas, 1769) | LC | PF, MD | + |
| 2 | 2. Cypriniformes | Cyprinidae | <i>Catla</i> | <i>catla</i> (Hamilton, 1822) | LC | FD | +++ |
| 3 | Cypriniformes | Cyprinidae | <i>Labeo</i> | <i>rohita</i> (Hamilton, 1822) | LC | FD | +++ |
| 4 | Cypriniformes | Cyprinidae | <i>Labeo</i> | <i>boggut</i> (Sykes, 1839) | LC | FD | ++ |
| 5 | Cypriniformes | Cyprinidae | <i>Labeo</i> | <i>fambriatus</i> (Bloch, 1795) | LC | FD | ++ |
| 6 | Cypriniformes | Cyprinidae | <i>Labeo</i> | <i>calbasu</i> (Hamilton, 1822) | LC | FD | ++ |
| 7 | Cypriniformes | Cyprinidae | <i>Labeo</i> | <i>gonius</i> (Hamilton, 1822) | LC | FD | ++ |
| 8 | Cypriniformes | Cyprinidae | <i>Cirrhinus</i> | <i>mrigala</i> (Hamilton, 1822) | LC | FD | +++ |
| 9 | Cypriniformes | Cyprinidae | <i>Cirrhinus</i> | <i>reba</i> (Hamilton, 1822) | LC | FD | ++ |
| 10 | Cypriniformes | Cyprinidae | <i>Cirrhinus</i> | <i>cirrosus</i> (Bloch, 1795) | VU | FD | + |
| 11 | Cypriniformes | Cyprinidae | <i>Osteobrama</i> | <i>cotio</i> (Hamilton, 1822) | LC | | + |
| 12 | Cypriniformes | Cyprinidae | <i>Ctenopharyngodon</i> | <i>idella</i> (Valenciennes, 1844) | LC | FD | + |
| 13 | Cypriniformes | Cyprinidae | <i>Rasbora</i> | <i>daniconius</i> (Hamilton, 1822) | LC | LV | + |
| 14 | Cypriniformes | Cyprinidae | <i>Garra</i> | <i>mullya</i> (Sykes, 1839) | LC | FD | +++ |
| 15 | Cypriniformes | Cyprinidae | <i>Osteobrama</i> | <i>vigoris</i> (Sykes, 1839) | LC | FD | + |
| 16 | Cypriniformes | Cyprinidae | <i>Puntius</i> | <i>sophore</i> (Hamilton, 1822) | LC | BT,L V,W F,FD | + |
| 17 | Cypriniformes | Cyprinidae | <i>Puntius</i> | <i>ticto</i> | LC | FD | + |
| 18 | Cypriniformes | Cyprinidae | <i>Puntius</i> | <i>vittatus</i> (Day, 1986) | LC | FD | + |
| 19 | Cypriniformes | 2. Botiidae | <i>Botia</i> | <i>striata</i> (Narayan Rao, 1920) | EN | FD | + |
| 20 | 3. Siluriformes | 3. Bagridae | <i>Mystus</i> | <i>seengtee</i> (Sykes, 1839) | LC | FD | + |
| 21 | Siluriformes | Bagridae | <i>Mystus</i> | <i>covasius</i> (Hamilton, 1822) | LC | FD | + |
| 22 | Siluriformes | Bagridae | <i>Mystus</i> | <i>vittatus</i> (Bloch, 1794) | NT | FD | - |
| 23 | Siluriformes | 4. Clariidae | <i>Clarias</i> | <i>batrachus</i> (Linnaeus, 1758) | LC | FD | + |
| 24 | Siluriformes | 5. Heteropneustidae | <i>Heteropneustes</i> | <i>fossilis</i> (Bloch, 1794) | LC | FD | + |
| 25 | Siluriformes | 6. Pangasiidae | <i>Pangasius</i> | <i>pangasius</i> (Hamilton, 1822) | LC | FD | ++ |
| 26 | Siluriformes | 7. Siluridae | <i>Ompok</i> | <i>bimaculatus</i> (Bloch, 1794) | NT | FD | + |
| 27 | Siluriformes | Siluridae | <i>Ompok</i> | <i>pabda</i> (Bloch, 1794) | NT | FD | + |
| 28 | Siluriformes | Siluridae | <i>Wallago</i> | <i>attu</i> (Bloch and Schneider) | VU | FD | + |
| 29 | 4. Anabantiformes | 8. Channidae | <i>Channa</i> | <i>marulius</i> (Hamilton, 1822) | LC | FD | ++ |
| 30 | Anabantiformes | Channidae | Channa | punctate (Bloch, 1793) | LC | FD | ++ |
| 31 | 5. Synbranchiformes | 9. Mastacembelidae | <i>Mastacembelus</i> | armatus (Lacepede, 1800) | LC | FD | + |

+++ Most abundant, ++ Abundant, + Less abundant, - Rare.

1) LV-Larvivorous fish. 2) BT-Bait. 3) PF-Predatory Food Fish. 4) WF-Weed Fish. 5) MD-Medicinal Value. 6) FR-Forage Fish. 7) FD- Food Fish.

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.

Summary:

The examination found the presence of thirty-one (31) fish species belonging to five orders and nine families. The data analysis revealed that the order Cypriniformes has the most fish species (17), followed by Siluriformes (9), and Anabantiformes (02). The orders Osteoglossiformes and Synbranchiformes have one species documented from the Tawarja reservoir, which is being studied for Ichthyofaunal diversity. In terms of conservation status, 25 species were classified as least concern, two as vulnerable, three as near threatened, and one as endangered. (IUCN-2023).

Conclusions:

With the changing conditions of progressive habitat destruction, the conservation of fish diversity becomes the top concern. Some fish species are either not present at all or are very few, which points to a worrying decrease in fish diversity in the studied region. Exotic species have mostly supplanted the native flora and fauna. This means that a wide range of approaches is required to ensure the survival of these fish species. Thus, it is critical to comprehend the conservation priorities via fish killing, protecting juveniles, eggs, fry, fingerlings, and the construction of fish sanctuaries from poaching, sale, and the closure period. Tawarja Reservoir's administration and planners want to use the study's results to create more environmentally friendly fishing and conservation initiatives.

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