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Ichthyofaunal diversity and conservation status of the fishes in the tropical wetland of Bundelkhand region, India

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ABSTRACT

The Ioni wetland is an important habitat for the different fishes such as IMC, Catfishes, Notopterus and other small indigenous fishes. The evaluation of conservation status of fish diversity will depict a picture of wetland ecosystem for sustainable production, ecosystem health and enhanced productivity ultimately addressing the social issues like livelihood, malnutrition and food security. Seasonal sampling was done, i.e. pre-monsoon; Monsoon and post-monsoon during 2018-2020 and collected fish samples from Ioni wetland by using cast and drag nets. Fishes were brought to the laboratory after preserving in 5% formalin for further detailed identification. The diversity indices were calculated and assessed the conservation status of fishes. In the present investigation a total of 32 fish species, representing 24 genera, 7 orders, and 13 families were recorded for the first time. Order Cypriniformes (47%) contributed significantly among all followed by Perciformes (25%), Siluriformes (13%), Clupeiformes (6%), Beloniformes (3%), Mastacembeleformes (3%) and Osteoglossiformes (3%). The maximum fish diversity was observed in monsoon season ($H' = 3.001$) as compared with pre monsoon ($H' = 2.918$) and Post Monsoon ($H' = 2.866$). Out of 32 species there are 29 under Least Concern (LC), 2 under Near Threatened (NT), 1 under Vulnerable (VU) category.

Key words: Conservation, IUCN, wetland, Near threatened and diversity

Introduction

The wetland ecosystem had occupied about 917 million Hectares to more than 1275 million hectares of area worldwide (Lehner and Doll, 2004). India is bestowed with vast freshwater wetland resources (0.55 million ha), locally known as beels, mauns, chauras, pats, tals and jheels in various states of the country. The wetland ecosystem is a separate ecosystem which is inundated by water either permanently or seasonally (Keddy, 2010) and shows vast

diversity as per their origin, terrestrial locality, water structure and interaction, prevailing species, and soil features (SAC, 2011). The important feature having vegetation of aquatic plants is the key element that differentiates wetlands from water bodies (Butler, 2010). It is considered that wetlands are having inimitable ecological characters which are providing several food stuffs and amenities to the people (Prasad *et al.*, 2002). In India wetlands are categorised in two types such as natural wetland and manmade wetlands. The natural wetlands in-

volve mainly the water bodies of the Himalayan freshwater as well as jheels (taal) present in the inundated area of the key rivers in India. The manmade wetlands can be freshwater lake of inland water and village ponds created mainly for irrigation and water supply. Wetlands mainly provide water for fisheries, irrigation, non-timber produces; also water supplied to the villages and tourism. Foremost amenities provided by the wetlands include carbon confiscation, as flood regulator, helps in recharge of groundwater and also helps in biodiversity conservation (Turner *et al.*, 2000). India is one of the regions that support unique and immense aquatic diversity and it's projected that 20% of recognized biodiversity in India is supported by the wetlands (Deepa and Ramchandra, 2000). In particular, India has rich fish diversity and is endowed with 3231 finfish, i.e. 788 freshwater and 2443 marine species (Gopi and Mishra, 2015). Worldwide biodiversity of aquatic ecosystems is under threat (Gibbs, 2000; Saunders *et al.*, 2002; Dawson *et al.*, 2003). The state of Madhya Pradesh is one of the important aquatic biodiversity hotspots of the country, have bestowed a number of water bodies and having ample number of wetlands also. The Loni wetland is an important habitat for the different fishes such as IMC, Catfishes, Notopterus and other small indigenous fishes. However there are no works on fish diversity studies from this wetland. In this backdrop present study has been framed to study the fish diversity and conservation status of fishes from Loni wetland situated in the Bundelkhand region of Madhya Pradesh.

Materials and Methods

The present study was undertaken in the tropical wetland named as Loni wetland, which is a seasonal and open type of wetland spread over a 129 ha with a mean depth 3.6 m. Which is located in the Suti Village of Rewa District in Bundelkhand region, (25°08'18" N and 81° 34'14" E) Madhya Pradesh, India (Fig. 1). Seasonal sampling was done, i.e. pre-monsoon; Monsoon and post-monsoon during 2018-2020 and collected fish samples from Loni wetland by using cast and drag nets. Some fishes have been identified in the field and released back after identification and those fish sample was confusing were brought to the laboratory after preserving in 5% formalin for further detailed identification with the help of identification keys as given by Talwar and

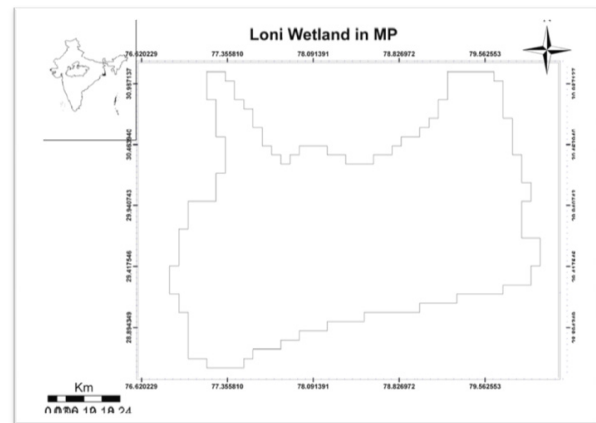


Fig. 1. Location of Loni wetland in Madhya Pradesh, India

Jhingran (1991) and Jayaram (1999). The diversity indices were calculated as per the formula given by Shannon (1948). The conservation status of the fishes was evaluated according International Union for Conservation of Nature and Natural Resources (IUCN, 2022)

Results and Discussion

In the present investigation to date 32 fish species, representing 24 genera, seven orders, and 13 families were recorded. The maximum fish diversity was observed in monsoon season ($H' = 3.001$) as compared with pre monsoon ($H' = 2.918$) and Post Monsoon ($H' = 2.866$). It was observed that order Cypriniformes (47%) contributed significantly among all followed by Perciformes (25%), Siluriformes (13%), Clupeiformes (6%), Beloniformes (3%), Mastacembeleformes (3%) and Osteoglossiformes (3%) represented in Fig. 2. Family wise Cyprinidae contributed (46.9%) followed by Ambassidae (6.3%), Channidae (6.3%), Clupidae (6.3%), Osphronemidae (6.3), Siluridae (6.3%), Bagridae (3.1%), Belonidae (3.1%), Gobidae (3.1%), Heteropneustidae (3.1%), Mastacembelidae (3.1%), Nandidae (3.1%) and Notoptiridae (3.1%). The present study revealed the dominance of the Cypriniformes was highest with 15 species as compared to other orders followed by Perciformes with eight species from the Loni wetland which is in agreement with the study of Bose *et al.*, 2013 in Tawa River Madhya Pradesh. Also several studies observed in rivers and wetlands in India (Shinde *et al.* 2009; Jaiswal and Ahirrao, 2012; Yousuf *et al.*, 2012; Napit, 2013; Prakash, 2015; Saini and Dube, 2017;

Bhat and Rao, 2018) about the dominance of Cypriniformes. In the present investigation Cyprinidae dominated with 15 species out of 32 species recorded from the Loni wetland. Similarly several others also documented the dominance of Cyprinidae such as Devi Prasad *et al.* (2002) have observed 45 species out of 22 belonging family Cyprinidae from wetlands of Mysore. Similarly study from Ujani wetland recorded 60 species and family Cyprinidae dominated with 36 species (Sarwade and Khillare, 2010). Workers from different parts of Madhya Pradesh also recorded the dominance of Cyprinidae from water bodies, i.e. Yousuf *et al.* (2012) reported 12 species from Cyprinidae out of 29 species from Halali reservoir. A total of 51 species has been recorded from Harshi reservoir of which 29 repre-

sented by Cyprinidae alone (Prakash, 2015). Similarly Bhat and Rao (2018) also reported 40 species from Tighra reservoir, Gwalior and family Cyprinidae dominated with 22 species. Furthermore studies from River Tawa (Bose *et al.*, 2013) and River Narmada (Saini and Dube, 2017) from Madhya Pradesh revealed the dominance of family Cyprinidae among sampled species.

The conservation status of the fishes from Loni wetlands of 32 species shown that, the 29 species is under least Concern (LC), 2 under Near Threatened (NT) and 1 under vulnerable (VU) category has been shown in Table 1. Worldwide, freshwater environments are extremely threatened besides about 36% of freshwater fishes are considered as endangered, however efforts for protection freshwater ecosys-

Table 1. Checklist of the Ichthyofauna of the Loni wetland

| S.No | Order | Family | Scientific Name | Local Name | IUCN Status | | | |
|------|------------------------------|-----------------|--------------------------------|------------------|--------------------------------|------------------------|---------|----|
| 1 | Beloniformes | Belonidae | <i>Xenentodon cancila</i> | Kauwa | LC | | | |
| 2 | Clupeiformes | Clupidae | <i>Gudusia chapra</i> | Suiya | LC | | | |
| 3 | | | <i>Gonialosa manmina</i> | Suhia | LC | | | |
| 4 | Cypriniformes | Cyprinidae | <i>Catla catla</i> | Bhakur | LC | | | |
| 5 | | | <i>Cirrhinus mrigala</i> | Nain | LC | | | |
| 6 | | | <i>Cirrhinus reba</i> | Rewa bata | LC | | | |
| 7 | | | <i>Osteobrama cotio</i> | Gurda | LC | | | |
| 8 | | | <i>Labeo rohita</i> | Rohu | LC | | | |
| 9 | | | <i>Labeo boggut</i> | Rohu | LC | | | |
| 10 | | | <i>Pethia conchoniuis</i> | Lal Putiya | LC | | | |
| 11 | | | <i>Pethia jelius</i> | Puthi | LC | | | |
| 12 | | | <i>Pethia ticto</i> | Titlaputi | LC | | | |
| 13 | | | <i>Systemus sarana</i> | Sarputi | LC | | | |
| 14 | | | <i>Puntius sophore</i> | Desiputi | LC | | | |
| 15 | | | <i>Salmophasia phulo</i> | Phulo | LC | | | |
| 16 | | | <i>Salmophasia bacaila</i> | Chela | LC | | | |
| 17 | <i>Amblypharyngodon mola</i> | Mola | LC | | | | | |
| 18 | <i>Rasbora daniconius</i> | Darai | LC | | | | | |
| 19 | Mastacembeliformes | Mastacembelidae | <i>Macrogynathusa culeatus</i> | Bam | LC | | | |
| 20 | Osteoglossiformes | Notoptiridae | <i>Chitala chitala</i> | Pholui | NT | | | |
| 21 | Perciformes | Ambassidae | <i>Parambassis ranga</i> | Chanari | LC | | | |
| 22 | | | <i>Chanda nama</i> | chanda | LC | | | |
| 23 | | | <i>Channa marulius</i> | Souri | LC | | | |
| 24 | | | <i>Channa punctata</i> | Girohi | LC | | | |
| 25 | | | <i>Nandus nandus</i> | Dhebari | LC | | | |
| 26 | | | <i>Glossogobius giuris</i> | Bula | LC | | | |
| 27 | | | <i>Trichogaster fasciata</i> | Khosti | LC | | | |
| 28 | | | <i>Trichogaster lalia</i> | Khosti | LC | | | |
| 29 | | | Siluriformes | Heteropneustidae | <i>Heteropneustes fossilis</i> | Singi | LC | |
| 30 | | | | | Bagridae | <i>Mystus vittatus</i> | Tengra | LC |
| 31 | | | | | Siluridae | <i>Wallago attu</i> | Padhani | VU |
| 32 | | | <i>Ompok bimaculatus</i> | Jalkapoor | NT | | | |

LC- Least Concern, NT-Near Threatened, VU-Vulnerable

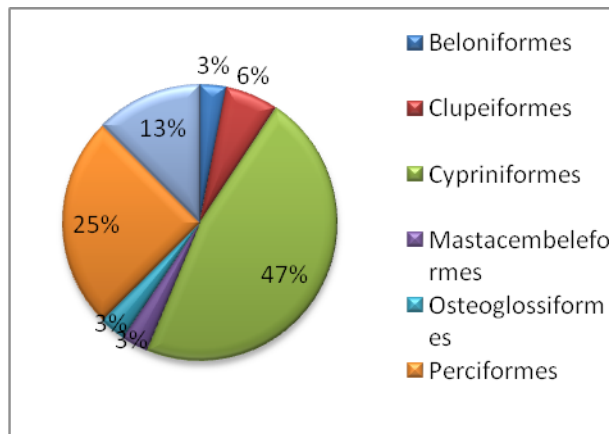


Fig. 2. Representation of fishes at order level in Loni wetland (%)

tems are not developed properly (Cutler, 2019). Excessive human uses, as well as modification of freshwater structures, remain the principal drivers of extinctions to the biodiversity of the freshwater (Brummett *et al.*, 2013 and Phang *et al.*, 2019) all over. Therefore, it is of utmost importance to conserve the biodiversity of wetlands because they are essential part of numerous economic, social, cultural and environmental activities, mainly in rural India. Devastation of habitat of numerous vital fish species is the current disturbing issue consequently conservation of the diversity, awareness and management is required to overcome this issue.

Conclusion

Current exercise advocated certain recommendations, i.e. the unlawful fishing must be banned from the wetland, the members of the wetland Co-operative should not to catch juvenile and brood fishes, the wetland should be stocked with economically important fish species such as Catla, rohu, Mrigal and also locally preferable species, modelling of wetland can be done in order to create ecotourism, public awareness is very much required for making them aware of existing fishing laws and regulations to be followed. Further funding from government bodies is required to create alternative livelihood opportunities for the fishers which ultimately moderate fishing burden on wetland. Subsequently the fish and fisheries of the studied region having key role in the livelihood of the large number of fishermen, it is need of hour to conserve the fish diversity for sustainable production, to maintain the wetland

ecosystem and livelihood enhancement from the wetland.

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Conflict of interest

There are no conflicts of interest

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