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Exploring The Rich Tapestry Of Fish Diversity In Koilsagar Reservoir, Mahabubnagar District, Telangana

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Abstract

Koilsagar Reservoir, a pivotal water source in the district of Mahabubnagar, Telangana, India, plays a significant role in local ecosystems and community well-being. This research addresses the critical need to comprehend and document fish diversity within the reservoir, emphasizing its ecological and socio-economic importance.
The results of the study, conducted from January to December 2022, indicate a diverse fish community comprising 30 species distributed among 7 orders, 12 families, and 22 genera. Cypriniformes and Siluriformes dominate, exhibiting ecological significance. Analysis reveals a hierarchical structure in the fish community, with Oreochromis mossambicus as the predominant species, constituting over 50 per cent of the total population. *Labeo rohita* follows as the second most prevalent species, contributing to overall diversity. Despite the presence of approximately 30 fish species, a few dominant species, including *Catla, Channa marulius,* and *Cyprinus carpio communis,* stand out.

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Keywords: Fish diversity, Koilsagar reservoir, Ichthyofauna, reservoir ecology

1. Introduction

Fish diversity is crucial for ecological balance, sustaining fisheries, ensuring food security, advancing scientific research, and preserving cultural heritage. Telangana ranks third in India for inland water resources for fisheries. (Source: Dept of Fisheries, Telangana, 2021)

In the investigation led by Laxmappa on the Ichthyofaunal diversity of Koilsagar reservoir in the district of Mahbubnagar, a comprehensive survey revealed a total of 30 fish species across 6 orders, 12 families, and 22 genera. (Laxmappa et al., 2015). The present study aims to understand changes in fish diversity over the last decade, building upon existing research in the region.

2. Materials and Methods

Field surveys are conducted using various fishing gears and assessed environmental parameters. Sampling across different locations ensured a representative study, with taxonomic identification using standard ichthyological manuals, “Freshwater Fishes of India” (Jayaram, 1984, Zoological Survey of India), “Inland

Fishes of India and Adjacent Countries." (Talwar, and Jhingran, 1991), The study spanned during different seasons from January, 2022 to December, 2022, to account for potential seasonal variations in fish composition allowing a seasonal analysis of fish diversity.

2.1. Study Area

Koilsagar Reservoir holds a significant status as one of the key reservoirs in Mahabubnagar district, Telangana, India. This paper addresses the knowledge gap on fish diversity in Koilsagar Reservoir, and looks into the changes if any over the last ten years, aiming to unravel relationships between resident species, habitats, and the environment.

2.2 Sample Collection

This study on fish diversity in Koilsagar Reservoir employed a systematic and comprehensive approach. Sampling was conducted at multiple sites across the reservoir, Koilsagar dam, Kondapur, Ankilla, Ibrahimnagar (Veeranagur), Ayyavaripally (Mustipally), Chandapur ensuring representation of diverse.

Sampling was conducted during different seasons from January, 2022 to December, 2022. Upon capture, each fish was carefully identified to the species level using morphological techniques, and relevant morphometric measurements were recorded. The fish are preserved in 4% formalin and taken to the Departmental Lab of Zoology, BRR Govt. Degree College, Jadcherla for further confirmation. The identification is verified against the manuals, handbooks "Freshwater Fishes of India" (Jayaram, 1984, Zoological Survey of India), "Inland Fishes of India and Adjacent Countries." (Talwar and Jhingran, 1991),

3.Results and Discussion

3.1 Abundance and Distribution

The total fish species found in the Koilsagar Reservoir, along with their habitat, fisheries information, IUCN conservation status have been presented. A list of the fish species of Koilsagar Reservoir of the district Mahabubnagar in Telangana consisting of about 30 fish species. These species were identified to fitting in 7 orders, 12 families, and 22 genera. (Table 1) and the images of the fishes are shown in the Figure 2.

Table 1. Fish species and IUCN status of Ichthyofauna Koilsagar Reservoir

S.No.	Common Name	Local Name	Scientific Name	Family	Order	Genus	IUCN Status
1	Catla	Boche	*Catla catla*	Cyprinidae	Cypriniformes	*Catla*	NE
2	Rohu	Rohu	*Labeo rohita*	Cyprinidae	Cypriniformes	*Labeo*	NE
3	Bombay Duck	Vanamatta or Ullem	*Labeo boggut*	Cyprinidae	Cypriniformes	*Labeo*	DD
4	Mrigal	Mosu	*Cirrhinus mrigal*	Cyprinidae	Cypriniformes	*Cirrhinus*	NE
5	Common Carp	Bangaru Teega	*Cyprinus carpio communis*	Cyprinidae	Cypriniformes	*Cyprinus carpio*	NE
6	Grass Carp	Gaddi bochche	*Ctenopharyngodon idella*	Cyprinidae	Cypriniformes	*Ctenopharyngodon*	NE
7	Amphibious Barb	Budda Paraka	*Puntius amphibius*	Cyprinidae	Cypriniformes	*Puntius*	NE
8	Chola Barb	Gechchu	*Puntius chola*	Cyprinidae	Cypriniformes	*Puntius*	LC
9	Ticto Barb	-	*Puntius ticto*	Cyprinidae	Cypriniformes	*Puntius*	NE
10	Dwarf Danio	Gidasa noolu	*Rasbora daniconius*	Cyprinidae	Cypriniformes	*Rasbora*	NE
11	Bengal Barb	-	*Barilius barila*	Cyprinidae	Cypriniformes	*Barilius*	DD
12	Slender Dwarf Snakehead	Matta	*Amblypharyngodon microlepis*	Cyprinidae	Cypriniformes	*Amblypharyngodon*	DD
13	Olive Barb	Bedisha	*Salmostoma bacaila*	Cyprinidae	Cypriniformes	*Salmostoma*	NE
14	Gangetic Mystus Catfish	Jella	*Mystus cavasius*	Bagridae	Siluriformes	*Mystus*	NE
15	Tengara Catfish	Natu jella	*Mystus tengra*	Bagridae	Siluriformes	*Mystus*	NE
16	Striped Dwarf Catfish	-	*Mystus vittatus*	Bagridae	Siluriformes	*Mystus*	NE
17	Butter Catfish	Teduva	*Ompok bimaculatus*	Siluridae	Siluriformes	*Ompok*	NE
18	Walking Catfish	Maarpu	*Clarias batrachus*	Clariidae	Siluriformes	*Clarias*	NE
19	Stinging Catfish	Imlika	*Heteropneustes fossilis*	Heteropneustidae	Siluriformes		NE
20	Dwarf Snakehead	Kanche	*Channa gachua*	Channidae	Anabantiformes	*Channa*	NE
21	Spotted Snakehead	Kanche	*Channa punctatus*	Channidae	Anabantiformes	*Channa*	NE
22	Bullseye Snakehead	Korameenu	*Channa marulius*	Channidae	Anabantiformes	*Channa*	NE
23	Striped Snakehead	Kanche	*Channa striatus*	Channidae	Anabantiformes	*Channa*	NE
24	Mozambique Tilapia	Doobechche	*Oreochromis mossambicus*	Cichlidae	Perciformes	*Oreochromis*	NE
25	Green Chromide	Duvvena chepa	*Etroplus suratensis*	Cichlidae	Perciformes	*Etroplus*	NT
26	Indian Glassy Fish	Addam chepa	*Chanda nama*	Chandidae	Perciformes	*Chanda*	NE
27	Estuarine Goby	-	*Glossogobius giuris*	Gobiidae	Perciformes	*Glossogobius*	NE
28	Bronze Featherback	Chapata	*Notopterus notopterus*	Notopteridae	Osteoglossiformes	*Notopterus*	NE
29	Indian Swamp Eel	paamu chepa	*Anguilla bengalensis*	Anguillidae	Anguilliformes	*Anguilla*	NE
30	Zigzag Eel	-	*Mastacembelus armatus*	Mastacembelidae	Mastacembeliformes	*Mastacembelus*	NE

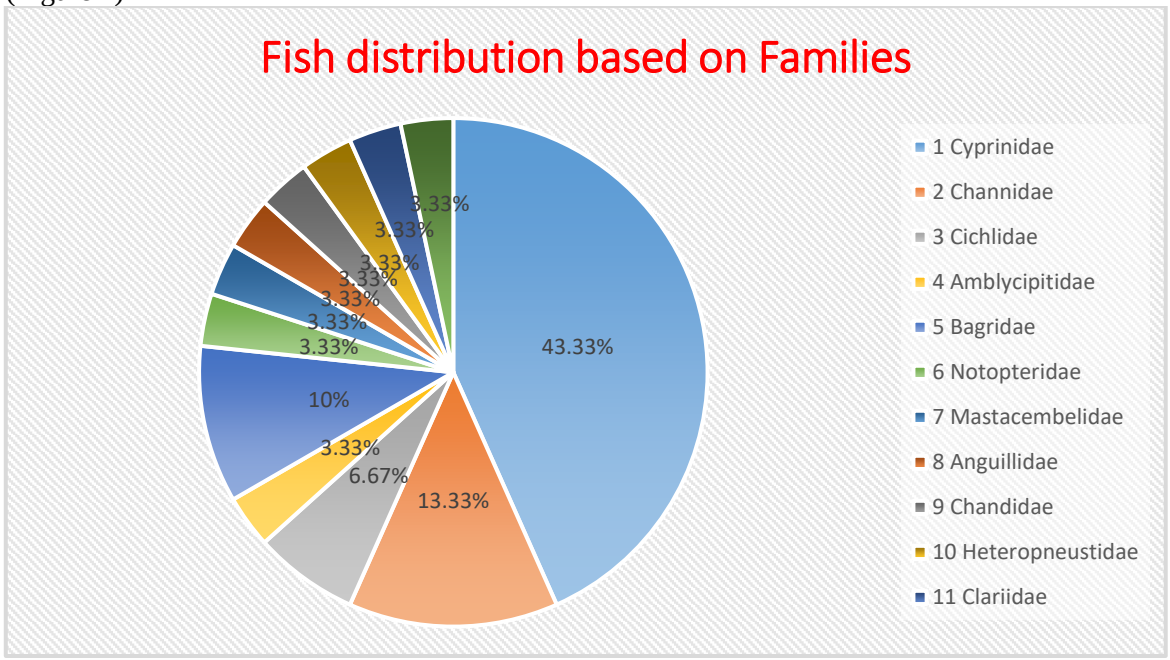
(LC=Least Concerned, NT=Near threatened, NE=Not Evaluated, DD=Data Deficient, VU=Vulnerable, EN=Endangered, CE=Critical Endangered, IUCN=International Union for Conservation of Nature)

3.2. Distribution of fish species

The investigation into the fish diversity of Koilsagar Reservoir, in the district of Mahabubnagar, Telangana, has provided a comprehensive understanding of the fish species distribution across different orders and families.

3.2.1. Distribution based on Families:

The fish distribution in the studied ecosystem reveals a diverse composition across families. Dominated by Cyprinidae with 13 species, notable contributions come from Channidae (4 species), Cichlidae (2 species), and Bagridae (3 species). Various other families, including Amblycipitidae, Notopteridae, Mastacembelidae, Anguillidae, Chandidae, Heteropneustidae, Clariidae, and Siluridae, are each represented by one species, collectively highlighting the diverse and intricate ecological interactions within the studied environment. (Figure 1)



Graph 1: Fish distribution in families

Figure 2(1) – *Catla catla*

Figure 2(2) – *Labeo rohita*

Figure 2(3) - *Labeo boggut*

Figure 2(4) - *Cirrhinus mrigal*

Figure 2(5) - *Cyprinus carpio communis*

Figure 2(6) - *Ctenopharyngodon idella*

Figure 2(7) - *Puntius amphibius*

Figure 2(8) – *Puntius chola*

Figure 2(9) – *Puntius ticto*

Figure 2(10) - *Rasbora daniconius*

Figure 2(11) - *Barilius barila*

Figure 2(12) - *Amblypharyngodon microlepis*

Figure 2(13) - *Salmostoma bacaila*

Figure 2(14) - *Mystus cavasius*

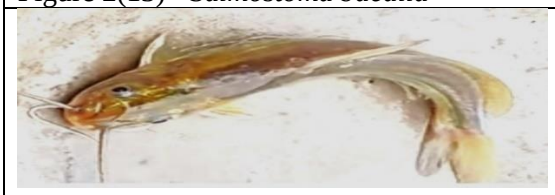


Figure 2(15) - *Mystus tengra*

Figure 1(16) - *Mystus vittatus*

Figure 2(17) - *Ompok bimaculatus*

Figure 2(18) - *Clarias batrachus*

Figure 2(19) - *Heteropneustes fossilis*

Figure 2(20) – *Channa gachua*

Figure 2(21) - *Channa punctatus*

Figure 2(22) - *Channa marulius*

Figure 2(23) - *Channa striatus*

Figure 2(24) - *Oreochromis mossambicus*

Figure 2(25) - *Etroplus suratensis*

Figure 2(26) - Chanda nama

Figure 2(27) - *Glossogobius giuris*

Figure 2(28) - *Notopterus notopterus*

Figure 2(29) - *Anguilla bengalensis*

Figure 2(30) - *Mastacembelus armatus*

Figure 2: Showing the Fish species found in the Koilsagar Reservoir of Mahabubnagar Dist.,

Discussion

The fish diversity in Koilsagar Reservoir emphasizes the economic significance of specific species. Carp species, including *Catla catla* and *Labeo rohita*, as well as catfishes like *Mystus cavasius,* are highlighted for their high commercial value. Murrels such as *Channa stiatus* and *Channa marulius* are also economically important. Certain families, including Heteropneustidae and Cichlidae, contribute to the local economy, underscoring the overall economic importance of the reservoir's diverse fish community. (Laxmappa, et.al., 2015)

The prevalence of Cypriniformes and Siluriformes in terms of species richness highlights their ecological significance within the reservoir. The substantial diversity within Cypriniformes underscores its adaptability and success in the ecosystem. While Siluriformes exhibit lower numbers, their unique contributions suggest potential roles in shaping the dynamics of the ecosystem.

The balanced representation of Anabantiformes and Perciformes adds to the overall diversity, signifying a rich ecological niche accommodating various species preferences. However, the presence of only one species in Osteoglossiformes, Anguilliformes, and Mastacembeliformes suggests specialized roles or specific environmental requirements for these particular species.

Oreochromis mossambicus stands out as the dominant species, constituting over 50 percent of the total fish population in the reservoir. This dominance underscores its pivotal role in shaping the aquatic ecosystem and suggests potential influences on food webs and ecological processes. Oreochromis mossambicus is recognized for its adaptability to diverse ecological conditions, broad dietary preferences, and swift reproductive capabilities with maternal care. (Regi, et.al., 2018)

Labeo rohita emerges as the second most prevalent species, contributing significantly to the overall diversity and ecological balance of the reservoir. The remaining quantities are shared among other prominent species such as *Catla, Channa marulius, and Cyprinus carpio communis*, reflecting the diverse composition of fish populations within the reservoir. This diversity, while contributing to overall richness, implies a stratified distribution with certain species being more abundant than others.

Notably, all species are present throughout the year in the reservoir, indicating a resilient and stable ecosystem. However, the observed significant increase in the abundance of *Catla, Channa marulius*, and *Cyprinus carpio*

communis from February to May suggests potential breeding or seasonal patterns influencing their population dynamics.
The Koilsagar Reservoir shows seasonal variations in fish diversity, influenced by environmental factors. Favorable water temperatures ranging from 25.6°C to 28.2°C are consistent across premonsoon and postmonsoon seasons. pH levels indicate alkaline conditions in premonsoon (8.7 - 9.5) and moderate levels in postmonsoon (8.1 - 8.8), while dissolved oxygen levels remain satisfactory in both seasons, slightly improving in postmonsoon (1.8 - 2.3 mg/l).

Conclusion

The study highlights the dominance of Cyprinidae and diverse fish distribution in Koilsagar Reservoir, stressing the need for targeted conservation efforts, especially for Cyprinidae. Quantitative percentages offer insights for conservation and management practices. Further systematic investigations are necessary to deepen understanding of the reservoir's fish diversity and support sustainable conservation efforts.

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