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Study Of Diversity And Status Of Endemic Ornamental Fish Of Shivnath River Mohla- Manpur-Ambagarh Chowki District Of Chhattisgarh (India)

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Abstract

The Shivnath River in Mohla-Manpur-Ambagarh Chaowki District of Chhattisgarh, hosts a diverse array of indigenous ornamental fish species, although it remaining largely unexplored. The main aim of this investigation is to comprehensively document and analyze the assortment of these freshwater fish species found within the river system. Extensive field surveys were conducted from June 2023 to May 2024 in various habitats along the river from its source to the Mongra Dam, utilizing standardized sampling methods. Specimens were collected, classified, and their morphological characteristics documented. Additionally, aspects such as habitat preferences and feeding behavior were assessed to understand the ecological factors influencing fish distribution. Findings indicate the presence of 46 species from 15 families across 9 orders, comprising a diverse array of native ornamental fish species, underscoring the ecological significance of the Shivnath River and highlighting the need for conservation efforts. This study offers essential insights for the preservation and administration of freshwater ecosystems in the region, underscoring the importance of protecting native species and their habitats amidst escalating anthropogenic pressures. Upon close examination of these colorful fish, the observed availability and declining diversity of these species in the area appear justified, necessitating timely conservation measures. The imminent extinction of certain fish species is a concerning issue that could disrupt the ecological balance and pose significant challenges for us.

Keywords-
Indigenous,Ornamental,Freshwater,Anthropogenic,ecological,extinction.

Introduction

Chhattisgarh, nestled in the south-east part of India, is adorned with a diverse aquatic ecosystem, home to a myriad of endemic ornamental fish species that are exclusive to its fresh water bodies. These indigenous fish species not only contribute significantly to the region's ecological balance but also hold immense cultural importance. The study of these endemic ornamental fish species is crucial for understanding their diversity, distribution, habitat preferences, conservation status, and the challenges they face. This introduction provides an overview of the research conducted on the endemic ornamental fish species of Chhattisgarh,India,

highlighting their ecological significance and the need for conservation efforts. The significance of endemic ornamental fish species lies in their role as indicators of ecosystem health and contributors to freshwater biodiversity (**Ali *and* Rippon, 2010**). These unique fish species represent distinct evolutionary lineages that have adapted to the specific environmental conditions of Chhattisgarh's water bodies over time (**Sharma *and* Kumar, 2019**). Furthermore, endemic ornamental fish species are valued for their aesthetic appeal and cultural significance, often serving as symbols of local identity and heritage (**Gupta, *et al*., 2017**). Chhattisgarh's water bodies host a diverse array of endemic ornamental fish species, each adapted to specific environmental niches (**Goswami*and*Sengupta, 2018**).Endemic ornamental fish species serve as unique biological indicators of the region's freshwater biodiversity and represent distinct evolutionary lineages shaped by millennia of isolation (**Ali *and*Rippon., 2010**). These species are valued not only for their aesthetic appeal but also for their cultural significance, often symbolizing local identity and heritage (**Sharma *and* Kumar, 2019**). The dazzling world of ornamental fish captivates hobbyists and researchers alike. These vibrant underwater creatures, adorned with an astonishing array of colors, patterns, and fin shapes, not only enhance the aesthetics of our aquariums but also serve as vital indicators of freshwater ecosystem health. In this context, the Shivnath River, a ribbon of life snaking through the Mohla-Manpur-Ambagarh Chowki district of Chhattisgarh, India, emerges as a potential treasure trove of endemic ornamental fish diversity (**Rowe, D. K. *and* Smith, J. P.,. 2001**). This introductory chapter lays the groundwork for an in-depth exploration of the ornamental fish species inhabiting this unique Riverine ecosystem. The fascination with ornamental fish dates back millennia. Ancient Egyptians, Assyrians, and Chinese cultures documented their appreciation for these captivating creatures (**Englund, R. A.,. 1998**). Over time, this appreciation blossomed into a global industry, with ornamental fish keeping becoming a cherished hobby for millions worldwide. The vibrant colors and captivating behaviors of ornamental fish offer a window into the marvels of aquatic biodiversity, fostering a connection with the natural world and promoting environmental awareness. Beyond their aesthetic appeal, ornamental fish play a significant role in the scientific community. They serve as model organisms for research in various fields, including genetics, behavior, ecology, and evolution (**Whittington, R. J. *and* Chong, R., 2007**). The study of ornamental fish diversity contributes to our understanding of ecosystem health by providing valuable insights into water quality, habitat integrity, and the presence of invasive species. Furthermore, the selective breeding practices employed in ornamental fish keeping have resulted in the development of a vast array of color variations and morphological forms, making them a subject of immense interest to geneticists and aquaculturists (**Miller, M., 2004**).Endemic species, those confined to a specific geographic location, are considered the crown jewels of biodiversity. They represent the unique evolutionary history and ecological adaptations that have transpired within a particular region. The identification and conservation of endemic fish species are of paramount importance for several reasons. Firstly, endemics often serve as keystone species, playing a crucial role in maintainingtheecologicalbalanceoftheirhabitats.Theirdisappearancecantriggeradominoeffect, disrupting food webs and altering ecosystem functioning. Secondly, endemic fish species are potential bioindicators, reflecting the health and integrity of their aquatic environments (**Krishnamurthy K.V., 2003**). Decline intheir populations can serve as an early warning signal of environmental degradation, prompting timely conservation interventions. Finally, endemic fish hold immense potential for the ornamental fish trade, offering unique and commercially valuable species for aquariums. However, this economic potential necessitates sustainable practices to prevent overexploitation and ensure the long-term viability of these populations. The Shivnath River, a vital artery coursing through the heart of Chhattisgarh, presents a unique opportunity to delve into the realm of endemic ornamental fish diversity. This pristine freshwater ecosystem, characterized by its diverse habitats – from riffles and rapids to deep pools and meanders – provides a haven for a myriad of aquatic life forms (**Jayaram K.C., 2010**). While comprehensive scientific studies on the ornamental fish fauna of the Shivnath River are scarce, preliminary investigations suggest the presence of a wealth of potentially endemic species (**Badapanda H.S., 1996**).

Reports of vibrant danio, shimmering barbs, and elusive catfish species highlight the potential for exciting discoveries in this relatively unexplored river system. Understanding the ornamental fish diversity of the Shivnath River necessitates a multi-pronged approach. Field surveys employing various capture techniques, such as cast nets, seine nets (with proper permits and safety protocols), are essential to document the presence and distribution of ornamental fish species. Morphological and genetic analyses will be crucial for accurate identification and the potential discovery of new, undescribed species; furthermore, ecological studies that examine habitat preferences, dietary habits, and reproductive strategies of these ornamental fish will provide valuable insights into their conservation needs (**Rasid A. *and*Tripathy P.K., 2005**). The sustainable management of the Shivnath River's ornamental fish resources is paramount. Unregulated fishing practices and habitat degradation pose significant threats to the survival of these captivating creatures,

Community engagement and education programs are crucial for promoting responsible fishing practices and fostering a sense of stewardship towards the river ecosystem, the establishment of protected areas and the implementation of regulations on fishing gear and quotas can help ensure the long-term viability of ornamental fish populations. The sustainable development of ornamental fish aquaculture presents a promising avenue for local communities. By promoting captive breeding programs that prioritize the well-being of the fish and minimize environmental impact, local communities can generate income while contributing to the conservation of these precious aquatic resources (**Chandanshive N.E., 2013**).

MaterialsandMethods:

Study Area: The Shivnath River is a major tributary of the Mahanadi River, flowing through Chhattisgarh state in Central India. The present study will focus on a specific stretch of the Shivnath River encompassing Mohla, Manpur and Ambagarh-Chowki district. (20.5839° N, 80.7492° E; 20.3737° N, 80.7268° E; 21.9687° N, 81.0941° E). This section of the river encompasses a variety of habitats, including pools, riffles, runs, and glides, which provide niches for a diverse fish fauna.

Table–01ImageofStudyArea

Fig01:ThisimageshowingtribalareaMohla, ManpurAmbagarh-Chowki.

Fig02:Thisimageshow flowingofShivnath Riverintribalarea.

Fish Collection Methods: To catch fish, local experienced fishermen used cast net, Seine net, Gill net and other traditional methods of netting. Cast net for shallow (lotic) and slow moving parts of river (glides) to catch a variety of small size ornamental fish species, mid water and bottom and bank fish Seine nets were used to collect. Gill nets were also used to catch fish of different species in a mixed manner.

Sample Handling and Identification: The captured fish was carefully managed to reduce stress and injury to a minimum. The fish was promptly euthanized using clove oil or a comparable anesthetic in accordance with ethical protocols. Subsequent to euthanasia, the fish will be stored in a 10% formalin solution for subsequent identification and analysis in the laboratory.

In the laboratory, preserved fish will be identified to the species level using standard taxonomic keys and reference materials. Relevant Morphometric measurements (e.g., total length, standard length, body depth) will be taken foreach specimen. Fish will be photographed for documentation purposes.

Sampling Period and Effort: The study will be conducted over a period of one year (June 2023 to may 2024), encompassing all seasons (winter, summer, and monsoon) to account for seasonal variations in fish assemblage. Sampling will be conducted tri-monthly (every three months) for a total of four sampling events throughout the year.

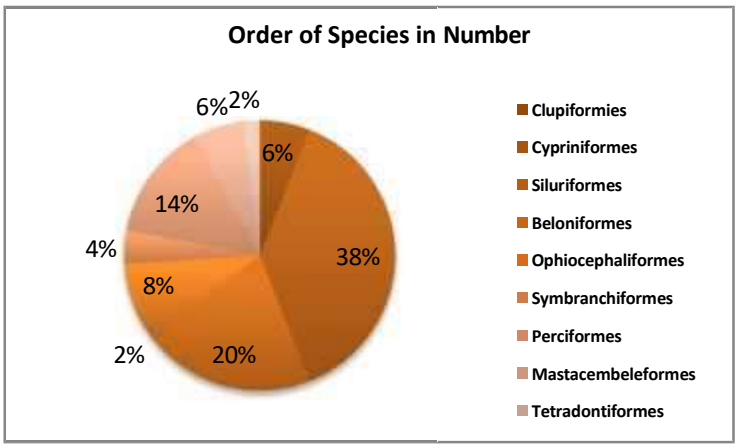
Result and Discussion: This research provides primary details of the endemic ornamental fish species of Shivnath River Chhattisgarh. The study identifies a diverse array of species, including the Glassfish (*Chanda nama & ranga*),Bronze featheback *(Notopterus notopterus)*.Mola carpet *(Amblypharyngodon mola),Indian Flying Barb (Esomus danrica),*Ray finned fish *(Garra mullya)and* Oscillated puffer Fish *(Tetradon cutcutia)* among others endemic ornamental fish species is recorded. In this maximum species is not cradle by Local peoples. Since most of these fish are very small in size, the amount of edible meat in them is less, yet they are eaten. This research serves as a foundational resource for understanding the unique fish fauna of this region. Understanding the habitat preferences of endemic ornamental fish species is essential for their conservation and management. However, these species face numerous threats, including habitat degradation, pollution, overexploitation, and climate change, which pose significant challenges to their survival (**Devi, *et al*., 2019**).

During the study 46species from 15 families across 9 orders, Oscillated puffer Fish *(Tetradoncutcutia)* is first time recorded in Shivnath River, this would require proper management plans and enforcement to ensure the effectiveness of these areas. Encouraging captive breeding programs for endemic ornamental fish species can help reduce pressure on wild populations. This would require developing sustainable aquaculture practices that prioritize the well-being of the fish and minimize environmental impact. Raising awareness among local communities about the importance of conserving endemic fish species is essential. Educational programs and outreach initiative can help foster a sense of stewardship towards the river ecosystem. Detailed studies are needed to determine the population sizes and trends of the identified endemic ornamental fish species Local people do not rear these colorful ornamental fish found in Shivnath River in aquariums. Due to lack of information, people do not even try to rear them in aquarium. Most of these fish can be easily reared in a glass aquarium for a long time. They are abundant in natural sources but their population is being affected due to fishing during the breeding season. If attention is paid to their conservation in time, they can be preserved in large water sources connected to the river.

TableNo.03:SomeOrnamentalFishesPresentinStudyArea

Bhunda	**Butuva**	**Chandeni**	**Chilati**
			
Kotra	**Tengana**	**Tudum**	**Khsadda**
			

Boliya	**Kevai**	**Khekhda**	**Jhaii**
			
JarhiKotri	**Sarangi**	**Kari**	**Singhala**
			
Fulhi	**Bhadai**	**Rudva**	Maini
			



This information is critical for assessing their conservation status and prioritizing conservation efforts. Understanding the ecological roles of endemic fish species within the Shivnath River ecosystem is important. This may involve studying their feeding habits, breeding ecology, and interactions with other fish species. Genetic analysis of the endemic fish populations can provide valuable insights into their evolutionary history and level of genetic variation. This information can be used to identify potential threats like in breeding and develop strategies for genetic conservation. Studies to assess the economic value of the endemic ornamental fish species, both for the aquarium trade and for potential ecotourism opportunities, can help strengthen the case for their conservation.

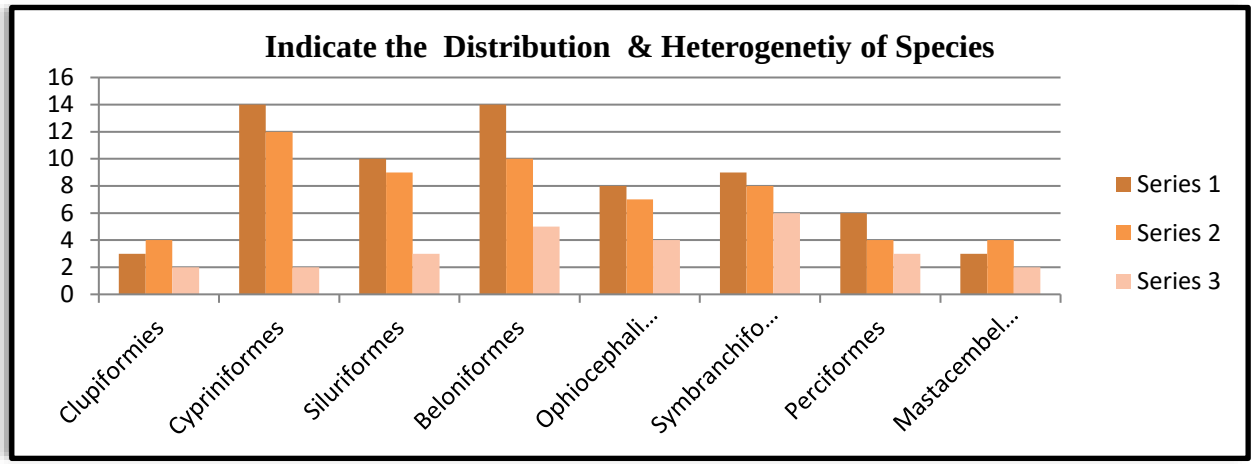


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Table No. 04 : List of the endemic ornamental fish Species of study area

S.No.	Order	Family	Scientific name	Local Name	IUCN Status
1.	*Clupiformies*	*Notopteridae*	*Notopterusnotopterus (Pallas, 1769)*	Patola	LC
			Notopteruschitala (Hamilton, 1822)	Patola	LC
			Notopterusatherinoides Pallas, 1769	Potasi	LC
2.	*Cypriniformes*	*Cyprinidae*	*Aspidopariamorar (Hamilton, 1822)*	Baniyal	LC
			Amblypharyngodonmola (Hamilton, 1822)	Dhavai	LC
			Amblypharyngodonmicrolepis (Bleeker, 1853)	Dhavai	LC
			Devariodevario (Hamilton, 1822)	Dadhai	LC
			Garramullya (Sykes, 1839)	Butuva	LC
			Esomusdanrica (Hamilton, 1822)	Jhaii	LC
			Osteobramacotio (Hamilton, 1822)	Chilati	LC
			Puntius chola (Hamilton, 1822)	Kotra	LC
			Labeo calbasu (Hamilton, 1822)	Kamach	LC
			Puntius sophore (Hamilton, 1822)	Jarhi Kotri	LC
			Salmostomabacaila (Hamilton, 1822)	Sarangi	LC
			Oxygastergora (Hamilton, 1822)	Sarangi	LC
			Rasboradaniconius (Hamilton, 1822)	Darai/ Jilo	LC
			Rasboraelanga (Hamilton, 1822)	Dhedua	LC
		Cobitidae	*Lepidocephalicthysguntea (Hamilton, 1822)*	Nakti	LC
			Lepidocephalicthysthermalis(Valenciennes, 1846)	Nakti	LC
		Nemachelidae	*Acanthocobitispavanacea*(McClelland, 1839)	Turi/ Rudni	LC
			Acanthocobitisbotia (Hamilton, 1822)	Botiya/ Rudwa	LC
			Nemacheliusaureus(Valenciennes, 1846)	Baluari	LC
3.	*Siluriformes*	*Bagridae*	*Mystustengara (Hamilton, 1822)*	Tengana	LC
			Mystuscavasius(Hamilton, 1822)	Tengana	LC
			Mystusvittatus(Bloch, 1794)	Tengana	LC
			Mystusaoar(Hamilton, 1822)	Singhari	LC
			Mystusseenghala(Hamilton, 1822)	Singhala	LC
			Mystusbleekeri(Solander, 1794)	Tengana	LC
			Rita rita(Hamilton, 1822)	Kotiya	LC
		Siluridae	*Wallago attu* (Bloch & Schneider, 1801)	Padhina	NT
			Ompakpabda(Bloch, 1794)	Pabda	NT
			Ompokbimaculatus(Bloch, 1794)	Boliya	
4.	*Beloniformes*	*Belonidae*	*Xenentodoncancila*(Hamilton, 1822)	KauwaMachali	LC
5.	*Ophiocephaliformes*	*Ophiocephalidae*	*Channa gachua*(Hamilton, 1822)	Bijlu/ Bijlva	LC
			Channa Marulus(Hamilton, 1822)	Sanwal	LC
			Channa punctatus(Bloch, 1794)	Khoksi	LC
			Channa striata(Bloch, 1794)	Bhunda	LC
6.	*Symbranchiformes*	*Amphipnoidae*	*Amphipnous cuchia*(Hamilton, 1822)	Tudum	LC
7.	*Perciformes*	*Centropomidae*	*Chandanama*(Hamilton, 1822)	Chandeni	LC
			Chandaranga(Hamilton, 1822)	Chanri	LC

		Nandidae	*Nandusnandu s* (Hamilton, 1822)	Bhadai	LC
		Anabantidae	*Anabas testidineus*(Bloch, 1792)	Kewai	LC
			Anabas cobojius(Hamilton, 1822)	keoo	LC
		Gobiidae	*Glossogobiusgiuris*(Hamilton, 1822)	Khsdda	LC
8.	*Mastacembeleformes*	*Mastacembelidae*	*Macrognathusaculetus*(Bloch, 1786)	Bamar	LC
			Mastacembleusarmatus(Lacepède, 1800)	Bami	LC
9.	*Tetradontiformes*	*Tetradontidae*	*Tetradoncutcutia*(Hamilton, 1822)	Fulhi	LC

Conclusion: The Shivnath River has emerged as a significant habitat for endemic ornamental fish species, contributing to the biodiversity of Mohla-Manpur-Ambagarh Chawki District, Chhattisgarh, India. This study aimed to assess the heterogeneity of ornamental fish within the river, providing valuable insights into the ecological health and potential conservation needs of this ecosystem. Identify the assemblage of ornamental fish species inhabiting the Shivnath River. Employ appropriate methods (e.g., net sampling, visual surveys) to capture and document species diversity. Utilize relevant tools (morphological analysis, genetic markers) for accurate species identification. Evaluate factors influencing fish distribution and abundance within the river (e.g., habitat type, water quality parameters), assess potential threats to the sustainability of ornamental fish populations (e.g., habitat degradation, overfishing, invasive species). Highlight the economic and cultural value associated with the ornamental fish trade. Emphasize the role of endemic fish species in maintaining a healthy aquatic ecosystem, address potential ecological consequences of ornamental fish population decline. Propose evidence-based management practices for the sustainable conservation of ornamental fish species. Advocate for habitat protection measures to ensure the long-term viability of the Shivnath River ecosystem, encourage responsible fishing practices to minimize overexploitation of ornamental fish populations. Promote community awareness about the importance of conserving endemic fish biodiversity, outline recommendations for further studies on the biology, ecology, and conservation needs of identified ornamental fish species. Suggest the exploration of sustainable captive breeding programs for vulnerable or threatened species, propose long-term monitoring plans to track population trends and assess the effectiveness of conservation efforts. This study contributes to a deeper understanding of the ornamental fish diversity within the Shivnath River, the findings can inform future conservation strategies and promote the sustainable management of this valuable aquatic resource. By protecting the unique assemblage of ornamental fish in the Shivnath River, we can ensure the ecological health of the ecosystem and preserve its economic and cultural significance for generations to come.

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