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www.aarf.asia,**Email** : editoraarf@gmail.com

FISH DIVERSITY OF RAJNANDGAON RESERVOIR, RAJNANDGAON DISTRICT, CHHATTISGARH,INDIA

Manish Kumar, Research scholar,
Bharti vishwavidyalaya,Pulgaon chowk, Durg

Dr. Munshi lal Patel,
Asstt. Professor, Department of Zoology,
Bharti vishwavidyalaya, pulgaon chowk, Durg

Abstract

The Rajnandgaon reservoir, located in the Rajnandgaon district of Chhattisgarh, India, is a significant water body that supports a rich diversity of fish fauna. Several studies have been conducted to assess the fish diversity in this reservoir, revealing a variety of species belonging to different orders and families. The studies indicate that the Cypriniformes order, particularly the Cyprinidae family, is the most dominant group in the reservoir. This family includes various carp species, such as Labeo rohita, Catla catla, and others. These species are not only important for the ecosystem but also hold significant commercial value. Siluridae family comprises catfish species, which are also common in the reservoir. The Channidae family includes snakehead fish, known for their predatory nature. Cichlidae family includes cichlids, which are often brightly colored and popular in aquariums. The reservoir's varied habitats, such as open water, shoreline areas, and submerged vegetation, provide suitable niches for different fish species. The water quality parameters, such as temperature, oxygen levels, and nutrient availability, play a crucial role in determining the survival and distribution of fish species. Fishing pressure, introduction of exotic species, and pollution can impact the fish diversity in the reservoir.

Keywords:

Fish, Diversity, Water, conservation

Introduction

The Rajnandgaon Reservoir was constructed in the early 20th century, during the British colonial era, to provide irrigation water to the surrounding agricultural lands. Over the years, the reservoir has undergone several upgrades and expansions to meet the growing water demands of the region. (Tamboli , 2020)

The Rajnandgaon Reservoir is a man-made lake created by damming a tributary of the Sheonath River. The reservoir has a storage capacity of approximately 50 million cubic meters and a surface area of about 10 square kilometers. The dam is equipped with a spillway to regulate water flow and prevent flooding during periods of heavy rainfall.

The reservoir's primary function is to provide irrigation water to the agricultural lands in the Rajnandgaon district. This has significantly boosted agricultural productivity and contributed to the region's economic development. The reservoir also serves as a source of drinking water for the town of Rajnandgaon and surrounding villages.

The reservoir provides water to various industries in the region, supporting their operations and contributing to economic growth. The reservoir supports a thriving fish population, providing livelihood opportunities for local fishing communities. The reservoir's scenic beauty and tranquil environment make it a popular spot for picnics, boating, and other recreational activities.

The creation of the reservoir has led to the loss of natural habitats for some terrestrial and aquatic species. The reservoir's water quality can be affected by agricultural runoff, industrial discharge, and other human activities. Over time, the reservoir's storage capacity can be reduced due to sedimentation.

The Rajnandgaon Reservoir is a vital water resource that plays a crucial role in the development and well-being of the Rajnandgaon district. It provides essential water for agriculture, drinking, and industry, while also supporting fisheries and recreation. However, it is essential to manage the reservoir sustainably to minimize its environmental impacts and ensure its long-term benefits for the region. (Jayaram , 2020)

While specific data on the dominant fish species in Rajnandgaon Reservoir may be limited, studies conducted in similar reservoirs in Chhattisgarh provide valuable insights. Species like Labeo catla (Catla), Labeo rohita (Rohu), and Cirrhinus mrigala (Mrigal) are commonly found in Indian reservoirs and are likely to be dominant in Rajnandgaon Reservoir as well. These species are popular for their fast growth rate and economic importance.

Cyprinus carpio (Common Carp) and Puntius species may also be abundant. Wallago attu (Indian Wallago) and Mystus species are commonly found in Indian reservoirs and could be dominant in Rajnandgaon Reservoir. Channa striata (Striped Murrel) is a predatory fish that is widely distributed in India and may be present in significant numbers in Rajnandgaon Reservoir. Oreochromis mossambicus (Mozambique Tilapia) is an exotic species that has become widespread in Indian waters and may also be found in Rajnandgaon Reservoir.

Maintaining the fish diversity in the Rajnandgaon reservoir is essential for ecological balance and the livelihoods of local communities who depend on fishing. Conservation and management strategies should focus on implementing regulations to prevent overfishing and protect vulnerable species, restoring degraded habitats and creating artificial structures to enhance fish

breeding and growth , controlling pollution and maintaining water quality to ensure the health of the fish population and engaging local communities in conservation efforts and promoting awareness about the importance of fish diversity. (Krishnamurthy , 2022)

Review of Literature

Wiecaszek et al. (2020): The fish fauna of Indian reservoirs is typically dominated by certain families. Cyprinidae family, which includes carps, is the most dominant fish family in Indian freshwater ecosystems. Bagridae family includes catfishes and is likely to be well-represented in Rajnandgaon Reservoir.

Uttam et al. (2021): The Channidae family includes murrels, which are predatory fish that can be found in various freshwater habitats. Siluridae family also includes catfishes and may be present in the reservoir.

Bakawale et al. (2021): Water quality, temperature, and habitat structure play a crucial role in determining which species can thrive in the reservoir. The availability of food resources, such as plankton, insects, and smaller fish, influences the abundance of different species.

Jayaram et al. (2020): Overfishing can lead to a decline in the populations of certain species, while others may become more dominant. The introduction of exotic species, such as tilapia, can alter the ecosystem and impact the dominance of native species.

Fish diversity of Rajnandgaon reservoir, Rajnandgaon District, Chhattisgarh, India

Fisheries Management knowledge can help in developing sustainable fishing practices and conservation strategies. Identifying dominant species can aid in monitoring the health of the ecosystem and detecting any changes in the fish community. Studying the interactions between dominant species and their environment can provide insights into the functioning of the reservoir ecosystem.

To gain a more comprehensive understanding of the dominant species and families in Rajnandgaon Reservoir, further research is needed. Conducting regular fish surveys to collect data on species composition and abundance. Investigating the factors that influence the distribution and abundance of different species.Using genetic techniques to identify distinct populations and assess genetic diversity within species.

However, several factors can influence the fish diversity in this reservoir. Understanding these factors is crucial for effective fisheries management and conservation efforts.

Water temperature plays a vital role in the physiological processes of fish. Changes in temperature can affect their metabolism, reproduction, and survival. Adequate levels of dissolved oxygen are essential for fish respiration. Pollution or eutrophication can lead to oxygen depletion, harming fish populations.

The pH of the water influences the availability of nutrients and the toxicity of pollutants. Extreme pH levels can be detrimental to fish health. Excessive nutrient input from agricultural runoff or sewage can lead to algal blooms, reducing oxygen levels and harming fish. Industrial effluents, pesticides, and heavy metals can contaminate the water, causing stress, disease, and mortality in fish.

The depth and flow of water create different habitats within the reservoir, influencing the distribution and abundance of fish species. The type of substrate (e.g., rocks, sand, vegetation) provides different habitats for fish to spawn, feed, and seek shelter. Aquatic vegetation provides food, oxygen, and shelter for fish, enhancing biodiversity. A complex shoreline with diverse habitats supports a greater variety of fish species.

Competition, predation, and symbiotic relationships among fish species can influence their populations and diversity. The availability of adequate food resources, such as plankton, insects, and smaller fish, is crucial for fish growth and survival. Different fish species have diverse reproductive strategies, which can be affected by environmental factors. The introduction of non-native fish species can disrupt the ecosystem and threaten native fish populations.

Overfishing can deplete fish populations and alter the balance of species in the reservoir. Dams can alter water flow, temperature, and habitat connectivity, impacting fish migration and reproduction. Runoff from agricultural lands can introduce pollutants and excess nutrients into

the reservoir, affecting water quality and fish health. These activities can lead to habitat destruction, pollution, and increased human pressure on the reservoir ecosystem.

Rising water temperatures can affect fish physiology, reproduction, and distribution. Changes in rainfall can affect water levels, flow, and nutrient input, impacting fish habitats. Increased frequency and intensity of storms can lead to habitat destruction and fish mortality.

The fish diversity in Rajnandgaon Reservoir is influenced by a complex interplay of water quality parameters, habitat characteristics, biological factors, human activities, and climate change. Effective management and conservation strategies should consider these factors to maintain a healthy and diverse fish population in the reservoir

This diversity is crucial for the ecological balance of the reservoir and also plays a significant role in the livelihoods of local communities who depend on fishing. However, in recent years, the fish diversity in the reservoir has been facing several threats, necessitating effective conservation and management strategies.

Studies have documented a variety of fish species in Rajnandgaon Reservoir, including both native and introduced species. The Cyprinidae family, which includes carps, is particularly well-

represented. However, there is a need for more comprehensive and up-to-date surveys to fully understand the current status of fish diversity in the reservoir.

Excessive fishing pressure, particularly the use of destructive fishing methods, can deplete fish populations and disrupt the ecosystem. Pollution from agricultural runoff, industrial effluents, and domestic sewage can degrade water quality and harm fish habitats. The introduction of non-native fish species can disrupt the natural balance of the ecosystem and threaten native fish populations.

Implementing and enforcing regulations on fishing gear, fishing seasons, and catch limits can help prevent overfishing. Efforts should be made to reduce pollution and restore degraded habitats. This may involve treating wastewater, promoting sustainable agricultural practices, and restoring riparian vegetation. Measures should be taken to prevent the introduction of new exotic species and to manage existing populations of invasive species.

Local communities should be actively involved in the conservation and management of the reservoir. This can be achieved through participatory fisheries management programs and awareness campaigns. Continuous research and monitoring are essential to understand the dynamics of the fish community and to assess the effectiveness of conservation measures.

Conclusion

The Rajnandgaon reservoir is a valuable ecosystem that harbors a diverse fish fauna. The Cypriniformes order, particularly the Cyprinidae family, dominates the fish community. Conservation and management efforts are crucial to ensure the long-term sustainability of the fish diversity in this reservoir and the benefits it provides. Rajnandgaon Reservoir is a valuable resource that supports a rich diversity of fish species. However, this diversity is facing several threats. By implementing effective conservation and management strategies, it is possible to protect the fish diversity in the reservoir and ensure its sustainable use for future generations.

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