



FISH DIVERSITY AND ABUNDANCE OF BABRIYA POND SEONI DISTRICT (M.P.)**Smt. Manisha Telase¹ and Dr. M. K. Tiwari²**¹Research Scholar Department of Zoology, Swami Vivekanand University, Sagar (M.P.)²Prof. Department Zoology, Swami Vivekanand University, Sagar (M.P.)**ABSTRACT:**

The present study deals with the fresh water fish diversity of Babriya pond which is located at the Seoni district of Madhya Pradesh. The goal of the current study was to determine the variety and abundance of fishes in the Babriya Pond Seoni (M.P.), for the period of June 2022 to May 2023. Fish fauna of fresh water basically represent the diversity and their abundance. Fishes play a very significant role in the human economy by providing nutritious food. India has got vast potential for development of inland fisheries. The Babriya pond in district Seoni. It is situated 22.08°N 79.53°E. It has an average elevation of 611 meters (2004 feet). The city is 2,043 ft. above sea-level, half-way between Nagpur and Jabalpur. The pond water use is domestic purposes, irrigation, aquaculture etc. Present research fish diversity results reveal the occurrence of 20 species of fish belonging to six orders, 10 families and 17 genera. The species of order Cypriniformes were most dominant by eleven species were observed.

**KEYWORDS:** Fish diversity, Abundance, Babriya Pond, Seoni.**INTRODUCTION**

Freshwater habitats have the greatest diversity and wealth. Freshwater habitats are home to more than 10% of animal species, 25% of all vertebrates, and 6% of all species. Fish are the primary source of protein for more than a billion people and the fifth-largest agricultural resource among vertebrates. There are 32,500 species of fish in the world, according to estimates. When you consider that freshwater may make up less than 0.3% of the total amount of water on Earth, it is astounding that there are about 15,000 different types of freshwater fish. Even while marine communities have a greater overall diversity of species; freshwater ecosystems are far more diverse per unit of habitat volume. Freshwater fish species are found here at a rate of one every 15 km³ of water, as opposed to one per 100,000 km³ of seawater. This is a sign of freshwater ecosystems' productivity, physiographic diversity, and isolation. According to Pir et al. (2019), freshwater fish, which make up about 25% of all vertebrates, are an important component of the world's biodiversity. Only 6 of the 515 taxonomic families, or 30% of the total, contain 7,956 fish species. Unexpectedly, 6,100 (77%) of the species in these representative families are freshwater-based. India is home to 868 of the 15000 freshwater fish species that are known to exist worldwide (Leveque et al. 2008), or 5.75% of the total number of freshwater fish species. It contains 192 indigenous species and the 327 species listed by the IUCN as endangered in India. With freshwater fisheries, India has 45,000 kilometers of rivers, 1,26,334 kilometers of canals, ponds, and tanks, 2.36 million hectares, and 2.05 million hectares of reservoirs.

Aquatic ecosystems are reportedly particularly concerned about biodiversity loss, especially those brought on by human activity.

Freshwater fishes are one of the taxonomic groups that are most at danger because to their high sensitivity to qualitative and quantitative changes in aquatic habitats as well as limits in the physiology, morphology, and life history of species brought on by environmental constraints. Fish communities and particular species serve as reliable indicators of the biological and ecological integrity of an area since they are constantly exposed to water conditions. Fish show a variety of biotic reactions, such as changes in growth, distribution, and abundance in response to water pollution, the destruction of important habitats, eutrophication, organic enrichment, chemical toxicity, thermal changes, and food availability, all of which can cause forced extinction. Programs for monitoring ecosystems should put a lot of emphasis on these reactions. Due to the characteristics of their life cycle, fish are also suited as indicators of the resilience and recovery of natural ecosystems and as early-warning indications of anthropogenic stress on their dynamics. Poor and insufficient conservation efforts to decrease the impact of pressures on today's fish variety and associated habitats are leading to the rapid extinction of many species. The introduction of exotic species, unauthorized and unreported fishing, irrigation needs, industrial and private use, pollution, habitat fragmentation and destruction, land-use patterns (such as abandonment and intensified use of natural resources), habitat fragmentation and destruction, and effects of global climate change are the main causes of the decline. Freshwater species have decreased more quickly during the past 30 years than terrestrial or marine species. Sadly, mounting data point to the likelihood that this tendency will persist in the future. To enable efficient management of freshwater biodiversity and ultimately reverse its decline, it is necessary to develop accurate estimates of fish species losses under plausible climate change, distribution patterns, and water consumption scenarios.

Present study fish diversity of Babariya pond in district Seoni. The Babriya pond in Seoni, Madhya Pradesh, supports a rich variety of fish species, making it an ecologically important habitat for aquatic biodiversity. Fish diversity is vital for maintaining ecological balance and sustaining local fisheries, which play a key role in the socio-economic well-being of nearby communities. The composition and distribution of fish species are shaped by several ecological factors, including water quality, habitat structure, and food availability. A thorough understanding of fish diversity in this reservoir offers valuable insights into its ecological health and helps guide sustainable management strategies.

MATERIAL AND METHODS:-

Study Area

The Babriya pond in district Seoni. It is situated 22.08°N 79.53°E. It has an average elevation of 611 meters (2004 feet). The city is 2,043 ft. above sea-level, half-way between Nagpur and Jabalpur. It is bordered by Jabalpur, Narsinghpur and Mandla districts to the north, Balaghat to the east and Chhindwara to the west and the shares its southern boundary with Nagpur (Maharashtra). National Highway No. 7 connects the Kanyakumari-Banaras passes through the district from north to south. Fair weather roads connect the major towns in the district. The narrow-gauge Chhindwara- Nainpur Central Railway passes through Seoni connecting Jabalpur, Nagpur, Chhindwara, Balaghat, Katangi, Keolari and Nainpur Prateet.

The fishes were collected from the Babriya pond every month by repeated netting for the period of June 2022- May 2023. The fish specimens were preserved in a 10% formaldehyde solution for taxonomic analysis. Diversity indices were utilized, including the ones listed below. Index Shanon-Weiner Simpson index: $D = 1/\sum p_i^2$ $H = -\sum p_i \ln p_i$ Results A total of 20 species from 6 orders and 10 families were seen during the current investigation. Fishes were identified with the help of Day (1889), Qureshi and Qureshi (1983), Talwar and Jhingran (1991), Jayram (1999).



Fig.1 View of study site Babriya Pond

RESULT AND DISCUSSION:-

India's fisheries offer a lot of potential to improve the nation's food security. (Lauria V et al., 2018; Mohanty BP et al., 2017) The primary resources used for inland fisheries are ponds, reservoirs and lakes, and an important factor in their development and sustainability management is an understanding of fish faunal diversity. The composition of has changed Fish assemblage is a sign of water fluctuation (Jhingran 1983; Kumar and Paul 1990). Nearly half of the vertebrate species that may be found worldwide are fish. (Pradeep Kiran JA, 2019).

The Fish fauna is an important aspect of fishery potential of a water body. It is observed that the distribution of fish species is quite variable because of geographical and geological conditions. In the present investigation results reveal the occurrence of 20 species of fish belonging to six orders, 10 families and 17 genera. The species of order Cypriniformes were most dominant by ten species were observed. (Table no. 1&2). Out of twenty species having high economic value these are *Labeo rohita*, *Catla catla*, *Cirrhinus mrigala*, *Walago attu*, and *Channa marulius*, and others have moderate economic value. During this study we also found exotic species namely *Cyprinus carpio* (common carp), *Ptenopharyngodon idella* (grass carp), *Hypophthalmichthys molitrix* (silver carp).

Fish Diversity Indices-

Two diversity indices—the Shannon and Simpson index—were combined to measure diversity. Table No. 2 & graph 1 depicted the Shannon-Weiner index for fish diversity in Babriya pond. Its values are ranging from 2.2 to 4.10. The species diversity was at its peak in post monsoon ($H' = 4.1$) coinciding with the favorable post monsoon conditions such as sufficient water and ample food resources. The diversity was low in pre monsoon ($H' = 2.2$) probably due to the shrinkage of water spread of the reservoir. Species richness was at its best in the month of July while species evenness ($J' = 0.99$) was highest in late monsoon indicating on evenly distributed and rich fauna in the monsoon and post monsoon, respectively.

One of the key challenges to permitting sustainable use of natural resources is its conservation. (Preena PG et al., 2020; Shao F, Han M, Peng Z, 2019) We attempt to quantify the species and their occurrences in the current study, which is the first of its sort for Satpura Dam on Tawa River. A total of 52 species from 10 orders and 16 families were seen during the current investigation. From the Middle Stretch of the River Tawa, 57 species from 35 genera, 13 families, and 6 orders have been reported by (Siqueira AC et al., 2021; Bose et al., 2013). In the western section of the Narmada River, 58 different species of fish were found by (Pathak et al., 2014). In the Hoshangabad section of the Narmada, 47 species of fish from 29 genera, 15 families, and 6 orders were discovered, according to (Vyas et al., 2007). (Chouhan et al., 2013) identified 59 fish species at the Narmada's Maheshwar, Khalghat, and Barwani sites, representing 34 genera, 17 families, and 7 orders. 25 species were found in the family Cyprinidae, followed by 4 in each of the Bagridae, Siluridae, and Ophiocephalidae families. The huge

fecundity and tolerance to changes in the physical and biological properties of water body may be the reasons why the cyprinidae family has the most species diversity. (Shi Z et al., 2020) According to (Sharma, et al., 2008), the substantially larger population density of Cypriniformes is due to the greater fertility of big carps and favorable environmental conditions. (Manel S et al., 2020)

The presence of diverse fish species demonstrated the variation at distinct study sites. Site 4 displayed the most species, 50, whereas Site 2 displayed the fewest species. The variation in habitat, or the depth and rate of flow, as well as the presence of food availability, account for the difference in the number of species. (Zeiringer, B. et al., 2018) Downstream, habitat heterogeneity—including depth and flow heterogeneity—increases, creating a variety of niches that may be occupied by a wide range of species (Paudel S et al., 2020). According to (Sarkar and Bain, 2007), the deep depositional habitats of the Gerua River (Uttar Pradesh) were home to the most numerous and diversified group of fish, and the species and life stages discovered occupied a statistically separate subset of the river habitats. Water flow in rivers typically depends on the volume of water present and the depth of the water, and it can affect water chemistry, habitat, population dynamics, and water temperature. According to (Jesse WAM et al., 2018) the habitat structure determines the abundance and diversity of organisms.

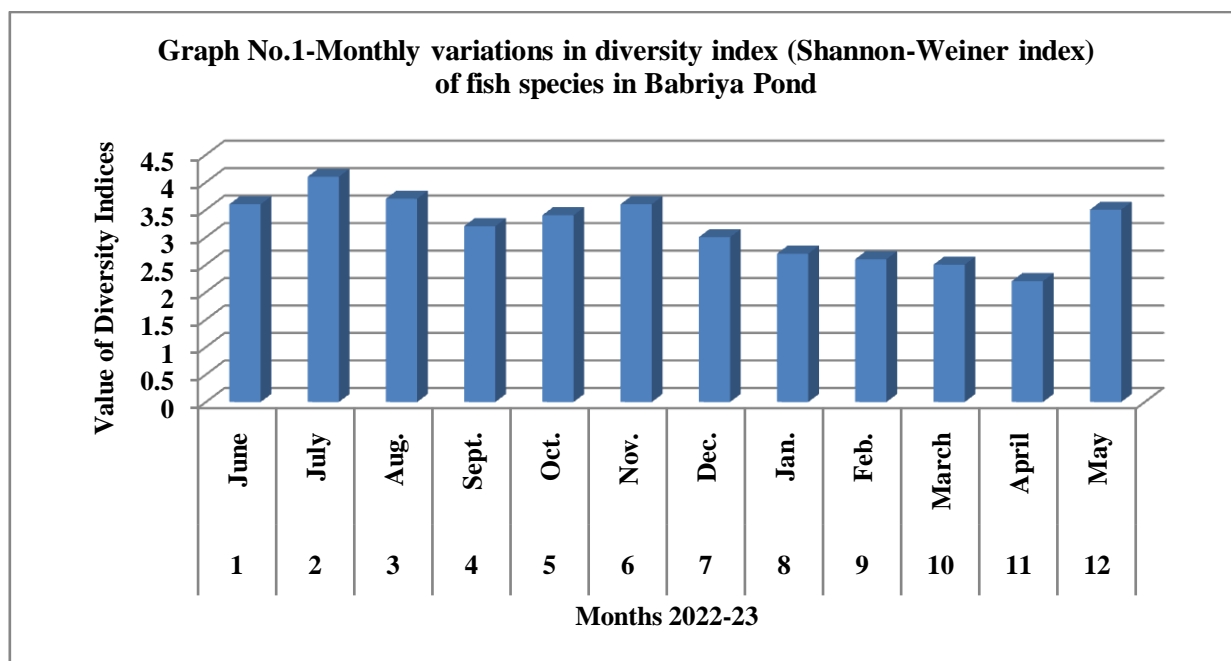
The number of people present at various locations likewise showed wide changes, with the biggest number occurring in November and December and the lowest number occurring in May and June. The following factors may be to blame for the pattern of variation in the number of people. Low diversity in the summer is caused by extreme depth reduction, which ultimately causes an increase in salinity, free CO₂, and hardness of the water, a decrease in dissolve oxygen, clarity, and pH of the water, and a loss in fish diversity. (Sarkar C, Saha N. C., 2021) In the winter, the situation is the opposite.

Table 1. Fish Diversity of Babriya Pond Seoni (M.P.) during the June 2022 to May 2023.

S. No.	Order	Family	Genus	Species	Local Name
1.	Clupeiformes	Notopteridae	Notopterus	<i>notopterus</i>	Chamari
2.	Cypriniformes	Cyprinidae	Catla	<i>catla</i>	Catla
3.			Cirrhinus	<i>mrigala</i>	Mrigal
4.			Labeo	<i>rohita</i>	Rohu
5.			Labeo	<i>bata</i>	Rohu
6.			Oxygaster	<i>bacaila</i>	Chela
7.			Puntius	<i>sarana</i>	Punti
8.			Puntius	<i>ticto</i>	Pothia
9.			Cyprinus	<i>carpio</i>	Gowri
10.			Hypthalmichthys	<i>molitrix</i>	Belli Gende
11.			Ptenopharyngodon	<i>idellus</i>	Hullugende menu
12.			Siluriformes	Siluridae	Wallago
13.	Claridae	Clarias		<i>batrachus</i>	Magur
14.	Saccobranchidae	Heteropneustes		<i>fossilis</i>	Singee
15.	Bagridae	Mystus		<i>aor</i>	Tengara
16.		Mystus	<i>vitatus</i>		
17.	Ophiocephaliformes	Ophicephalidae	Channa	<i>marulius</i>	Padam Saur
18.	Mastacabeliformes	Mastacembelidae	Mastacembelus	<i>armatus</i>	Bam
19.	Percimocuchia	Anabantidae	Anabas	<i>testudineus</i>	Kabai
20.		Nandidae	Nandus	<i>nandus</i>	

Table No. 2. Monthly variations in diversity index (Shannon-Weiner index) of fish species in Babriya Pond

S. No.	Months 2022-2023	Diversity index (Shannon-Weiner index) of fish species
1.	June	3.6
2.	July	4.1
3.	Aug.	3.7
4.	Sept.	3.2
5.	Oct.	3.4
6.	Nov.	3.6
7.	Dec.	3.0
8.	Jan.	2.7
9.	Feb.	2.6
10.	March	2.5
11.	April	2.2
12.	May	3.5
Range	Min	2.2
	Max	4.1



Due to more fecundity of major carps and suitable environmental conditions, relatively higher population density of cypriniformes was evident in the dam similar observations were earlier made by Talwar and Jhinran (1991), Das and Chand (2003), Pathak and Mudgal (2005) Sharma (2003). In a study on similar lines, Valsangar (1993) recorded 17 indigenous and 5 introduced fish species from Shivaji Sagar reservoir a cross koyana river in Maharashtra. Sakhare and Joshi (2002) observed 28 fish species including a species of craps, 5 of cat fishes, 2 of Feather bace, 5 of Live Fishes in Hirakud reservoir. Hiware and Pawar (2006) recorded 43 fish species from Nathsagar dam paithan in Aurangabad district Krishna and Piska (2006) reported 31 Ichthyofaunainsecret lake, Durgamcheru, Rangareddy District. Jayabhaye & Khedkar (2008) recorded 25 fish species belonging to 14 genera, 8 families and 6 orders from Sawana dam. A perusal of literature reveals that Shukla and Pandey (2019)

while studying a lake in Rewa district recorded a maximum diversity of Cyprinidae followed by Channidae, Anabantidae and Bagridae while S. Krishna (2023); Saket and Pandey (2019), recorded maximum fish diversity reported in Cyprinidae.

CONCLUSION

Babriya pond is discovered to support remarkably rich fish diversity and serves as a possible source of income for the local population and the Indian government. There were 20 species in total, distributed across six orders and 10 families. The diversity indices—the Shannon and Simpson index—were combined to measure diversity. While the Simpson index ranged from Shannon-Weiner index for fish diversity in Babriya pond. Its values are ranging from 2.2 to 4.10. By all this it is quite evident to recommend here that proper scientific management of the aquatic resource, implementation of laws for illegal fishing, further study regarding the activities effecting the diversity and implementation of new methods and protocols for their sustainable conservation is at crying need. The present investigation concluded that Babriya pond is a healthy water body supporting a diverse range of freshwater fish species. However, the fish population faces constant threats from eutrophication and illegal fishing activities. Further studies should be conducted to gather detailed information on the seasonal production and ecology of fishes. In light of the findings from this study, it is imperative to formulate proper policies and take necessary measures to ensure the conservation of fish populations, so future generations can continue to benefit from this vital resource.

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