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Exploring Fish diversity of Pond ecosystems of Bathinda, Punjab, India

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Abstract

Freshwater lentic water bodies such as pond support a diverse array of fish species. Despite their importance, these lentic freshwater ecosystems are facing numerous threats including habitat deterioration, invasive species and climate change. Fish diversity in these ecosystems has been shaped by a complex interplay of local and regional factors. Fish diversity is considered as a diagnostic tool to highlight the impact of environmental changes. This paper describes the analysis of fish diversity in freshwater ponds of Bathinda, Punjab, India, where the studies on fish diversity were conducted during the different months of study i.e (January 2024-June 2025). The factors like water quality, habitat heterogeneity and trophic interactions influencing fish diversity has been examined. A total of five fishes belonging to Cyprinidae family were identified. Very low fish diversity has been observed in Bathinda. Loss of fish species diversity determines the severity of habitat degradation of an aquatic ecosystem. There is needed to take conservation and management efforts to save fish diversity of this area.

Key words : Pond, Fish, Diversity, Bathinda.

Biodiversity is defined as the variety and variability of life on earth that includes variation among genes, species and functional traits and commonly measured in terms of richness, evenness and heterogeneity[2]. The lentic water bodies characterized by stagnant

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or slow moving water support fish diversity. These freshwater ecosystems, encompassing lakes, ponds and resevoirs provide a unique environment that fosters the co-existence of various fish populations Fishes are poikilo-thermic aquatic vertebrates which breathe by means of pharyngeal gills, compelling and compounding themselves by means of fins. Fishes have great significance in the life of mankind as it provide good protein source in diet of many consumers throughout the world. Fish diversity is considered as a diagnostic tool to highlight the impact of environmental changes[3]. Loss of fish species diversity determines the severity of habitat degradation of an aquatic ecosystem[3]. The study of fish diversity in pond freshwater ecosystem is essential for conservation and management efforts, as it provides valuable insights into the health and resilience of these aquatic ecosystems[3]. Therefore, the fish species richness and diversity in freshwater environments has assumed great importance and so is their study on various aspects.

The objective of the present study was to documented Fish diversity from different ponds of district Bathinda, Punjab, India.

Study area :

The research area is focused on Bathinda, a municipal corporation in Punjab, India. Situated in the Malwa Region of northwestern India, Bathinda lies 227 km west

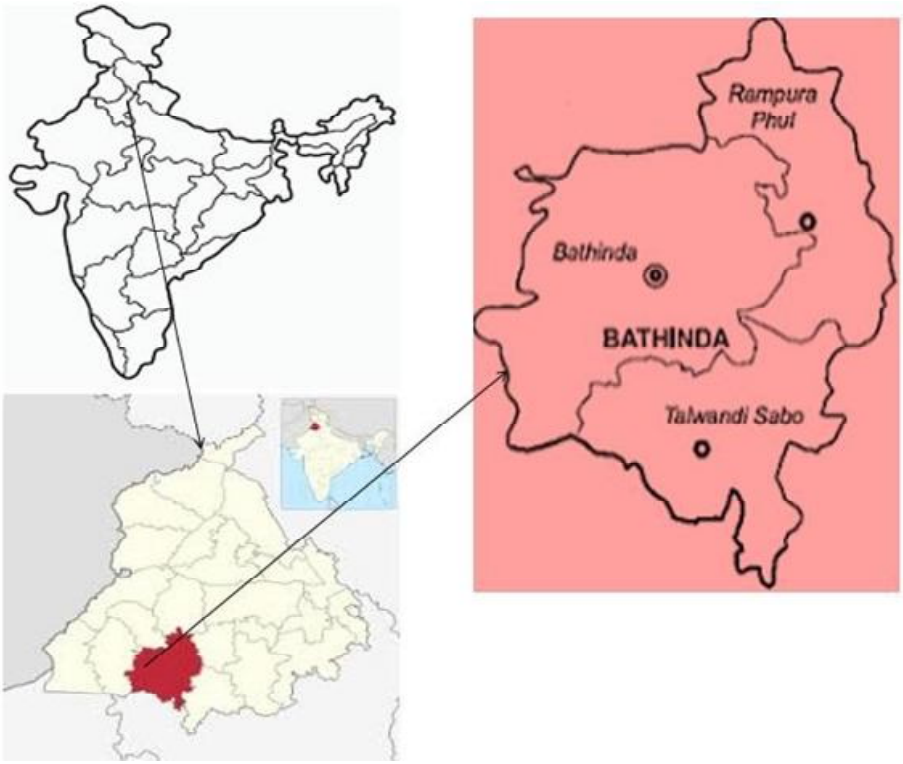

Fig. 1. Location of study area in Bathinda, Punjab, India

of Chandigarh. This study will focus on twenty ponds across four tehsils in Bathinda Punjab's fifth-largest city. Geographically, it is positioned at 30.20°N 74.95°E, with an average elevation of 201 m. The region experiences a semi-arid climate, characterized by significant temperature fluctuations between summer and winter, and receives relatively low annual rainfall (20-40 cm). The city is home to two modern thermal power plants, a fertilizer plant, and two cement factories, leading to industrialization and consequent water pollution. This has drawn researchers to investigate the water quality of various water bodies in the area. Fish sampling was done randomly during the different months of study *i.e* (January 2024-June 2025) from ponds of different villages such as Teona Pujarian (P1), Behman Kaur Singh (P2), Behman Kaur Singh (P2), Jajal (P3), Lehri (P4), Behman Jassa Singh (P5), Jassi Pau Wali (P6), Katar Singhwala (P7), Kot Shamir (P8), Jodhpur Romana (P9), Jhumba (P10), Gill Kalan (P11), Dhade (P12), Balianwali (P13) Balloh (P14), Kararwala (P15), Mari (P16), Sandoha (P17), Maisar Khana (P18), Ramgarh Bhunder (P19), Kutiwal Kalan (P20).

Identification of fishes was done with the help of standard literature by from Day[4], Johal and Tandon[8,9], Talwar and Jhingran[7], and Jayaram[8].

The present study revealed that out of twenty ponds only sixteen ponds showed the presence of fish species that too only five indicating a markedly limited community structure.

Table-1. List of various fish species collected from ponds of Bathinda, Punjab (India) during the study period

S.No.	Order	Family	Genus/Species
1.	Cypriniformes	Cyprinidae	*Cirrhinus mrigala* (Hamilton)
			Labeo rohita (Hamilton)
			Labeo catla (Hamilton)
			Cyprinus carpio (Common carp)
			Ctenopharyngodon idella (Grass Carp)

A low fish diversity have been observed in different ponds of Bathinda. However, no fish species was found in ponds of villages namely: Behman Kaur Singh (P2), Kot Shamir (P8), Dhade (P12) and Ramgarh Bhunder (P19). Cypriniformes has been found to be dominant with 5 genera all belonging to a single family *i.e*. Cyprinidae (Table-1).

India is one of the megadiverse countries in the world enriched with diversity and endowed with different lakes, ponds, and reservoirs etc. that are rich in fish. The various Ichthyofaunal studies were carried out in various lakes, ponds and reservoir of India.

The very first documentation on Indian fish species were done by Hamilton–Buchanan (1822). Hora[6] made notable contributions on fish systematics which was further extended

by many researchers[14,17].

In present study on various ponds in Bathinda, out of various orders, Cypriniformes has been found to be dominant. Similar results have been observed by various researchers as given below.

Korai *et al*.[10] studied fish biodiversity of Keenjhar Lake, Sindh, Pakistan in relation to its physico-chemical characteristics. 51 fish species were recorded, of which family Cyprinidae dominated represented by 19 species followed by Family Bagridae, Family Channidae, Family Mastacembelidae, Family Clupiedae, Family Notopteridae, Family Siluridae, Family Schilbeidae, Family Channidae, Family Nandidae, Family Gobidae, Family Claridae, Family Heteropneusitidae, Family Belonidae and Family Cichlidae.

Kumar[11] estimated fish diversity of Turkaulia Lake, Bihar, India for period of one year and identified 9 orders, 18 families, 27 genera and 40 species and family Cyprinidae was found to be dominant and also reported that Turkaulia Lake sustains high productivity and diversity in fish species.

Yousuf *et al*.[18] studied icthyofaunal diversity of Halali Reservoir, Vidhisha, Madhya Pradesh and reported 29 fish species belonging to 7 orders, 10 families and 15 genera of which order Cypriniformes was dominant.

Singh *et al*.[16] conducted study on fish diversity of Pumlen Lake in Manipur and reported 40 species of fishes belonging to 14 Families and 7 Orders and observed Order Cypriniformes to be most dominant with maximum number of fish species followed by Perciformes and then Order Beloniformes.

Bobdey[1] conducted study on fish diversity and its conservation aspects in a lake and river ecosystems in Bhandara, Maharashtra, India and recorded 63 species of 8 orders and 17 families and data also indicated the dominance of species of family Cyprinidae over all other families.

Londhe and Sathe[12] studied fish diversity of Maharashtra namely Kalleshwar Lake, Vadanage Lake, Gavse Lake and Arjunwada Lake and reported 28 species belonging to 3 orders and 17 genera and in all lakes order Cypriniformes was dominant.

Maibam *et al*.[13] studied fish diversity of Loktak Lake, Manipur and recorded 48 species and also observed decline in fish species as compared to earlier fish species number which might be due to physico-chemical properties of water, human civilization etc.

Sahu *et al*.,[15] studied fish diversity in over 600 ponds and water bodies, highlighting the dominance of order Cypriniformes.

However such low species richness suggests that ponds may be subject to same environmental constraints or limited colonization sources.

Freshwater ponds support rich fish diversity which is integral to maintain the health of these aquatic environments. But the industrial and domestic pollution, acidification, fishing and land use practices greatly impact the fish diversity. The preservation of ponds

and their associated fish diversity is essential for maintaining the health of our planet. In present study there is need of conservation efforts that might focus on enhancing habitat heterogeneity to encourage the arrival and persistence of additional native species.

References :

1. Bobdey, A.D. (2014). *Online International Interdisciplinary Research Journal*. *4*(2): 103-112.
2. Cardinale, B.J., J.E. Duffy., A. Gonzalez., D.U. Hooper., C. Perrings., P. Venail., A. Narwani., G.M. MacE., D. Tilman., D.A. Wardle., A.P. Kinzig., G.C. Daily., M. Loreau., J.B. Grace., A. Larigauderie., D.S. Srivastava and S. Naeem (2012). *Nature. 486*(7401): 59–67.
3. Das, S.K. and D. Chakrabarthy (2007). *Biosystem*. *90:* 188-196.
4. Day, F. (1875-1878). *The Fishes of India-Being a Natural History of Fishes Known to Inhabit the Seas and Freshwaters of India, Burma and Ceylon.* Text and Atlas in 2 parts. London XX + 778,195 Reprinted in 1994 by Jagmander Book Agency, New-Delhi, India.
5. Ganesan, V. and R.M. Hughes (1998). *Freshwater Biology. 40:* 367-383.
6. Hora, S.L. (1956). *Memorial Indian Museum*. *14*(2): 78-84.
7. Jayaram, K.C. (2010). *The Fresh Water Fishes of Indian Region*. Narendra Publishing House, New Delhi, India.
8. Johal, M.S. and K.K. Tandon (1979). *Punjab Fisheries Bulletin. 3*(2): 1-44.
9. Johal, M.S. and K.K. Tandon (1980). *Punjab Fisheries Bulletin. 4*(1): 39-70.
10. Korai, A.L., G.A. Sahato and K.H. Lashari (2008). *Research Journal of Fisheries and Hydrobiology*. *3*(1): 1-10.
11. Kumar, N. (2012). *International Research Journal of Environment Sciences*. *1*(2): 21-24.
12. Londhe, S.D. and T.V. Sathe (2015). *Biolife*. *3*(2): 437-441.
13. Maibam, S., R.S. Ngasepam., I.D. Ningthoukhongjam., B.D. Chabungbam., T. Ranibala and D. Kar (2015). *International Journal of Biological Forum*. *7*(1): 171-179.
14. Misra, K.S. (1962). *Records of Indian Museum*. *57*(1-4): 1-320.
15. Sahu, P.K., H. Nishad and R.K. Singh (2023). *European Chemical Bulletin*. *12*(Special Issue 4): 9284-9299
16. Singh, A.T.H., N.S. Meetei., and L.B. Meitei (2013). *Current World Environment. 8*(1): 93-102.
17. Talwar, P.K. and A.G. Jhingran (1991). *Inland Fishes of India and Adjacent Countries (Vol. I & II)*. Oxford and IBH Publications Co. Pvt. Ltd., London.
18. Yousuf, T., M. Ibrahim., H. Majid., J. Ahmad and V. Vyas (2012). *International Journal of Scientific and Research Publications*. *2*(12): 1-7.