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### RESEARCH ARTICLE

#### STUDY ON ICHTHYOFAUNAL DIVERSITY IN RELATION TO PHYSICO-CHEMICAL PARAMETERS OF MANAKONDUR FRESH WATER LAKE OF KARIMNAGAR DISTRICT, TELANGANA STATE, INDIA

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#### Abstract

Freshwater bodies are one of the most common and stable habitats of biosphere. The freshwater habitats have their own physico-chemical and biological characters which are subjected to modify by local conditions and physiographic features. The water quality parameters have a great influence on the growth and other factors of aquatic organisms. Therefore, the lentic water body gives a good source for fisheries. The present investigation deals with limnological and physico-chemical parameters and their influence on Ichthyofauna abundance in Manakondur fresh water Lake at Karimnagar District, Telangana State. The study was carried out for a period of one year i.e., from June, 2020 to May, 2021. The investigation was focused on the determination of hydro-chemical parameters such as Water temperature (19.0-31.0 C), Transparency (18.50-44.30cm), TDS (200-350mg/l), PH (7.5-8.3), DO (5.2-12.0mg/l),  $\text{CO}_2$  (3.0-9.2mg/l), TH (110-210mg/l), TA (165-300mg/l), CL (35.00-50.20mg/l),  $\text{PO}_4$  (0.02-0.16mg/l),  $\text{NO}_3$  (0.02-0.14mg/l) and BOD (2.5-7.0mg/l). The study was made to recorded fish fauna available. Total 33 species of fishes were collected and identified during the study period which belongs to 6 orders, 12 families and 18 genera. The order Cypriniformes was dominant with 15 species, followed by Siluriformes (8 species), Osteoglossiformes (2 species), Perciformes (4 species), Channiformes (3 species), Perciformes (4 species) and Antheriniformes (1 species) were identified. Order wise percentage composition is Cypriniformes (17%), Siluroformes (34%), (Osteoglossiformes (8%), Perciformes (25%), Channiformes (8%), Antheriniformes (8%) In the light of recent literature, the data has been discussed and it is concluded that limnological and physico-chemical parameters in this reservoir are most comply with suitability of human consumption and favourable for fishery. In the light of recent literature, the data has been discussed and it is concluded that limnological and physico-chemical parameters in this reservoir are most comply with suitability of human consumption and favourable for fishery.

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### Introduction:-

Pisces are the major group of vertebrates which shows an enormous diversity in shape, size, biology and habitat (Bobdey, 2014). The aquatic ecosystem is important and it has large number of economically fish which is an important source of food. Fishes are the important vertebrate group of animal's world contributing to the biodiversity of animals. Primarily fishes are used as a food source. Many vital vitamins and fatty acids are found in fishes so sometimes it is referred by doctors as a food source. Freshwater resources are used for various purposes, like agricultural, industrial, household, recreational, environmental activities etc. Reservoirs and the main resources exploited for inland fisheries and understanding the fish faunal diversity is a major aspect for its development and the sustainability management. Lakes in India support rich variety of fish species, which intern support the commercial exploitation of the fisheries potential (Krishna and Piska, 2006). Ichthyodiversity refers to variety of fish species; depending on context and scale, it could refer to alleles or genotypes within fish population to species of life forms within a fish community and to species or life forms within a fish community and to species of life forms across aqua regimes (Burton et al., 1992). India is one of the mega biodiversity countries in the world and occupies the ninth position in terms of freshwater mega biodiversity (Shinde et al., 2009). There are 450 families of freshwater fishes globally, out of which 40 families are represented from India (Keshava et al., 2013). Maharashtra is rich in freshwater reservoir fish diversity (Pawar et al., 2014). Studies on taxonomy (Ichthyofaunal diversity) have been of immense interest to researchers of all times (Hamilton, 1822; Day, 1878 and Menon, 1992). However, there are still a large number of habitats/regions for which the Ichthyofaunal diversity is still to be reported. The present investigation was under taken to study the aquatic vertebrate animals with reference to fishes from Manakondur Lake.

### Material and Methods:-

#### Study Area:

Pedda cheruvu is located in Manakondur village, Karimnagar district, Telangana. This lake is located in longitude 79°13'30"E and latitude 18°23'53"N. Physical and chemical parameters had been expected within the laboratory by means of preferred techniques prescribed by using APHA (1985), Trivedy & Goel (1984). During the study period of one year from June 2020 to May 2021. Water Temperature, Transparency, Total Dissolved Solids, PH, Dissolved Solids, Carbon Di Oxide, Total Hardness, Total Alkalinity, Chlorides, Phosphates and Nitrates were determined.

The fish samples were also collected every month during the study period for which the help of the local fishermen. The collected fish species were preserved in 10% formalin and subsequently identified following work of Dutta and Srivastava (1988), Jhingran 1982, Jayaram 1999. Identified fish species was presented in (Table No-2).



Fig 1:- Satellite image of Pedda Cheruvu (Manakondur).

## Results And Discussion:-

The water samples were analyzed and the data presented in Table-1. The fish fauna identified were presented in Table-2 and in which 33 fish species have been identified.

The present study physico-chemical parameters data reveals that, the water temperature ranges from 19.0°C to 31.0°C is within the permissible limit of most of cultivable fishes. In the present study transparency ranges from 18.50cm to 44.30cm. In the present study TDS ranges from 200(mg/l) to 350(mg/l). The pH ranged from 7.5 to 8.3. While pH range more than 9.0 is unsuitable for fish growth (Swingle, 1967). The DO content in water is most important parameter in water quality assessment and reflects the physical and biological process prevailing water quality. High DO content is an indication of healthy system in a water body Bilgrami (1979); Fakruzzaman.M(1996). The present study In the present study DO ranges from 5.2(mg/l) to 12.0(mg/l). In the present study CO<sub>2</sub> ranges from 3.0(mg/l) to 9.2(mg/l). In the present study Total Hardness ranges from 110(mg/l) to 210(mg/l). In the present study Total Alkalinity ranges from 165(mg/l) to 300(mg/l). In the present study Chlorides ranges from 35.00(mg/l) to 50.20(mg/l). In the present study Phosphates ranges from 0.02(mg/l) to 0.16(mg/l). In the present study Nitrates ranges from 0.02(mg/l) to 0.14(mg/l). In the present study BOD ranges from 2.5(mg/l) to 7.0(mg/l) similar observations by Patki Soraj.S(2002). Various physico-chemical factors in the lake play an important role for augmenting the fish distribution and their yield capacity. Therefore, it is necessary to determine the dynamic effects of environmental factors on fish growth (Sugunan et al., 2000). The environmental variability also strongly influences the fish population. Many physico-chemical parameters of water have been implicated in the initiation of maturational and reproductive events in some fishes.

In the present study, 33 species of 18 different genera 12 families and 6 orders were recorded from Manakondur Lake. Cypriniformes 15 species i.e. *Catla catla*, *Cirrhinus mrigala*, *Cirrhinus reba*, *Labeo calbasu*, *Labeo rohita*, *Labeo potial*, *Labeo gonitu*, *Cyprinus carpio carpio*, *Punctius chola*, *Punctius titius*, *Punctius sophore*, *Punctius sarana sarana*, *Amplypharygodon microlepis*, *Salmostoma bacaila*, *Lepidocephalius guntea*. Then the order Siluriformes consists of 8 species i.e. *Mystus bleeker*, *Mystus cavasius*, *Mystus vittatus*, *Wallago attu*, *Ompok bimaculatus*, *Ompokpabda*, *Clarius batracus*, *Heteropneustes fossils*. Order Osteoglossiformes consists of 2 species i.e. *Notopterus Notopterus*, *Notopterus chitala*. Order Channiformes consists of 3 species i.e. *Channa punctatus*, *Channa striatus*, *Channa orientalis*. Order Perciformes consists of 4 species i.e. *Glosobius giuris giuris*, *Anabas testudineus*, *Mastacembelus armatus*, *Mastacembelus panclus*. Order Anthriformes consists of 1 species i.e. *Xenentodon cancilla* (Table-1). Order wise percentage composition is Cypriniformes (17%), Siluroformes (34%), (Osteoglossiformes(8%), Perciformes (25%), Channiformes (8%), Anthriformes (8%) (Table-3, Fig-2). In these reported fishes, Cypriniformes was more dominant. Many researchers have reported the strong dominance of Cyprinidae family. Khedkar and Gynanth (2005) reported 37 species in Issapur Reservoir District Yeotmal, Maharashtra State India; Pawar et al.(2007) were recorded 26 fish species from Pethwadad dam Talukandhar in Nanded District, Maharashtra, India. Sharma (2008) reported 87 species in Issapur dam in district Yavatmal, Srikant. K, Ramu. G, Benarjee. G (2009) reported 31 species in Ramappa Lake Warangal, A.P; Srikanth, K. (2009). Mokappa Naik and Hina Kousar(2012) reported 23 species in Talagappa Tank, Sagara Taluk, Karnataka; Ahirrao (2014) reported 39 species in Bori dam at Tamaswadi, Parola Dist. Jalgaon; Thirupathaiiah M, Samatha Ch, Sammaiah.Ch(2014) reported 25 species in Diversity and Conservation Status of Fish Fauna in Freshwater Lake of Kamalapur, Krimnagar District; Laxmappa and Ravindar Rao (2015); Surender Reddy. K, Balabrishna. D, Swarna Latha. U, Ravinder Reddy (2015) Renuka Yellamma Lake, Peddapally, Karimnagar District; Seema Jain (2017) listed 61 fish species belonging to 38 genera from various water sources of Western Uttar Pradesh, India; Pavan (2017) has studied on the evaluation of toxicants, eutrophication and bio-monitoring of tropical lakes with special emphasis on the bio-diversity of fish fauna in Warangal District; Verma et.al. (2018) listed 45 fish species belonging to 32 genera from Bakhira Lake (U.P.), India. Bhattacharya (2018) identified 102 freshwater fish species belonging into total 10 orders and 27 families in Bankura district. Khartade et al. (2019); Prasad et al. (2020a) reported the checklist of freshwater fish fauna in the Udayasamudram and Manjeera reservoirs.

## Conclusion:-

In the present study, the physico chemical parameters values of manakondur lake water are within the permissible limits as per prescribed standards. It can also be stated that the productivity of it may be concluded that the lake is found more suitable for fish culture. The lake has largest catchment area. Hence, this lake water can be utilized for the fish productive in large scale and variety of species can be cultural. Finally it appears that the Manakondur fresh water lake is rich in fish diversity and a good potential for conservation of fish germplasm.

**Table 1:-** Physico-Chemical Parameters of Manakondur fresh water lake during June, 2020 to May, 2021.

S.no	PARAMETER	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
1	TEM	27.0	26.2	25.0	26.5	27.5	26.0	19.0	22.5	26.0	28.0	29.0	31.0
2	TRS	20.10	19.30	18.50	21.50	25.70	35.20	40.20	44.30	32.0	30.60	29.40	27.60
3	TDS	280	250	260	242	235	230	220	200	320	350	340	300
4	PH	8.0	8.2	8.3	7.6	8.0	8.2	7.7	7.5	7.7	7.6	7.6	7.7
5	DO	7.9	12.0	11.0	10.0	7.5	7.8	7.5	7.6	7.0	6.2	6.0	5.2
6	CO2	3.5	4.0	3.5	8.5	9.2	7.5	7.9	7.2	6.0	5.5	5.3	3.0
7	TH	210	140	142	150	140	130	121	110	170	180	190	195
8	TA	175	180	195	210	300	285	250	232	200	190	165	180
9	CL	34.00	36.10	33.00	30.00	36.20	36.50	36.70	36.80	36.00	40.00	50.20	48.10
10	Po <sub>4</sub>	0.07	0.03	0.04	0.06	0.02	0.03	0.04	0.05	0.05	0.03	0.15	0.16
11	No <sub>3</sub>	0.04	0.05	0.06	0.02	0.04	0.02	0.02	0.03	0.05	0.08	0.13	0.14
12	BOD	2.0	3.0	2.2	3.5	3.0	4.0	3.5	3.0	6.0	4.5	7.0	4.0

**Table 2:-** The Fresh Water fishes in Manakondur Lake during June 2020 to May 2021.

ORDER	FAMILY	GENUS	SPECIES	LOCAL NAME			
1. Cypriniformes	Cyprinidae	<i>Catla</i>	1. <i>Catla Catla</i> (Hamilton-Buchanan, 1822)	Botcha			
		<i>Cirrhinus</i>	2. <i>Cirrhinus mrigala</i> (Hamilton Buchanan, 1822)	Merige			
			3. <i>Cirrhinus reba</i> (Hamilton Buchanan, 1822)	Arju			
			4. <i>Labeo calbasu</i> (Hamilton Buchanan, 1822)	Kakibotcha			
			5. <i>Labeo rohita</i> (Hamilton-Buchanan, 1822)	Rohu			
			6. <i>Labeo potail</i> (Sykes, 1839)	Bocche			
			7. <i>Labeo goni</i> (Hamilton, 1822)	Kursi			
			<i>Cyprinus</i>	8. <i>Cyprinus carpio carpio</i> (1758)	Bangaruthiga		
			<i>Punctius</i>	9. <i>Punctius chola</i> (Hamilton Buchanan, 1822)	Parka		
				10. <i>Punctius titius</i> (Hamilton Buchanan, 1822)	Budda parka		
				11. <i>Punctius sophore</i> (Hamilton Buchanan, 1822)	Parka		
				12. <i>Punctius sarasara</i> (Hamilton Buchanan, 1822)	Gundu parka		
			<i>Amblypharygodon</i>	13. <i>Amblypharygodon microlepis</i> (Bleeker, 1854)	Kodipe		
			<i>Salmostoma</i>	14. <i>Salmostoma bacaila</i> (Hamilton, 1822)	Chandamama		
			Cobitidae	<i>Lepidocephalus</i>	15. <i>Lepidocephalus guntea</i> (Bleeker, 1822)	Ulshe	
2. Siluriformes	Bagridae	<i>Mystus</i>	16. <i>Mystus bleeker</i> (Day, 1877)	Jella			
			17. <i>Mystus cavasius</i> (Hamilton, 1822)	Guddijella			
			18. <i>Mystus vittatus</i> (Bloch, 1822)	Errajella			
	Siluridae	<i>Wallago</i>	19. <i>Wallago attu</i> (Schneider, 1839)	Waaluga			
		<i>Ompok</i>	20. <i>Ompok bimaculatus</i> (Bloch, 1974)	Teduva			
			21. <i>Ompok pabda</i> (Hamilton, 1822)	Buggadamma			
	Clariidae	<i>Clarius</i>	22. <i>Clarius batracus</i> (Linnaeus, 1758)	Marphoo			
		Heteropneustidae	<i>Heteropneustes</i>	23. <i>Heteropneustes fossilis</i> (Bloch, 1794)	Inglikam		
		3. Osteoglossiformes	Notopteridae	<i>Notopterus</i>	24. <i>Notopterus Notopterus</i> (Pallas, 1769)	Vollenka	
	25. <i>Notopterus chitala</i> (Hamilton)			Vollenka			
	26. <i>Channa punctatus</i> (Bloch, Day-1878)			Mottapilla			
4. Channiformes	Channidae	<i>Channa</i>	27. <i>Channa striatus</i> (1793)	Korramatta			
			28. <i>Channa orientalis</i> (Bloch & Schneider, 1801)	Malapankidi			
		5. Perciformes	Gobiidae	<i>Glosogobius</i>	29. <i>Glosogobius giuris giuris</i> (Hamilton, 1822)	Ushkedhanthi	
				Anabantidae	<i>Anabas</i>	30. <i>Anabas testudineus</i> (Bloch, 1792)	Burka
				Mastacembelidae	<i>Mastacembelus</i>	31. <i>Mastacembelus armatus</i> (Lecepede, 1800)	Paapera
	32. <i>Mastacembelus panclus</i> (Lecepede, 1800)	Chinni paapera					
	33. <i>Xenentodon cancilla</i> (Hamilton, 1822)	Nayanikuntha					
6. Antheriniformes	Belonidae	<i>Xenontodon</i>					

**Table 3:-** Number of families, genera and species under various orders.

S.no	Order	Families	Percentage	Genera	Percentage	Species	Percentage
1.	Cypriniformes	2	17%	7	39%	15	46%
2.	Siluriformes	4	34%	5	28%	8	24%
3.	Osteoglossiformes	1	8%	1	5%	2	6%
4.	Channiformes	1	8%	1	5%	3	9%
5.	Perciformes	3	25%	3	17%	4	12%
6.	Antheriniformes	1	8%	1	6%	1	3%

Fig 2:- Showing percentage of families to the orders.

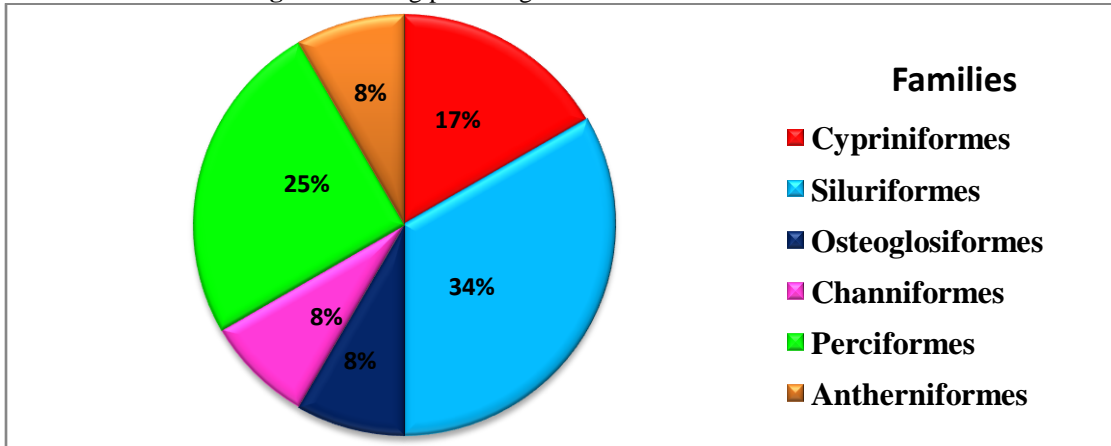


Fig 3:- Showing percentage of genera to the orders.

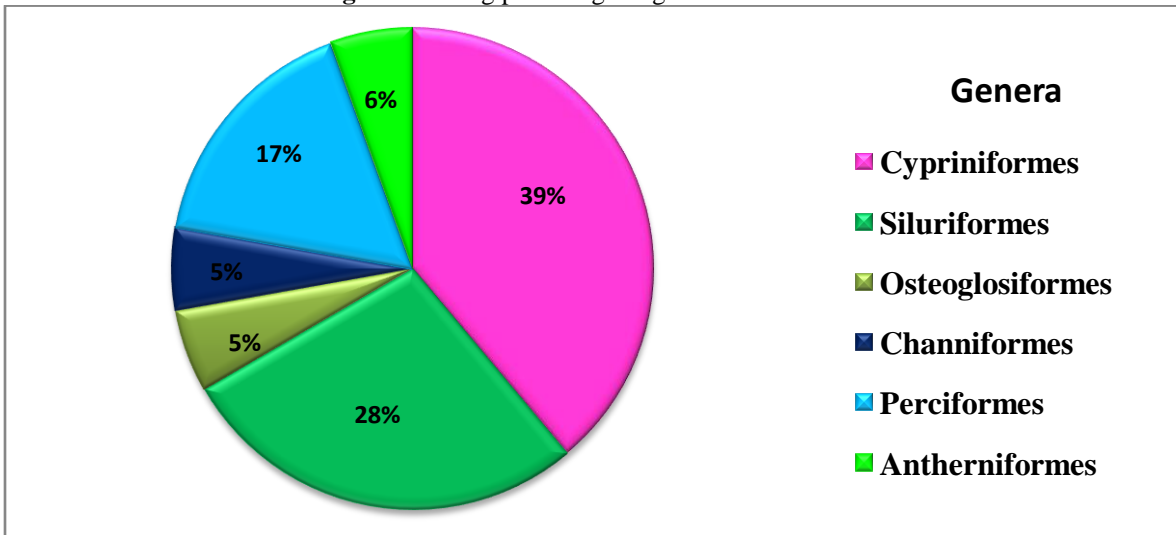
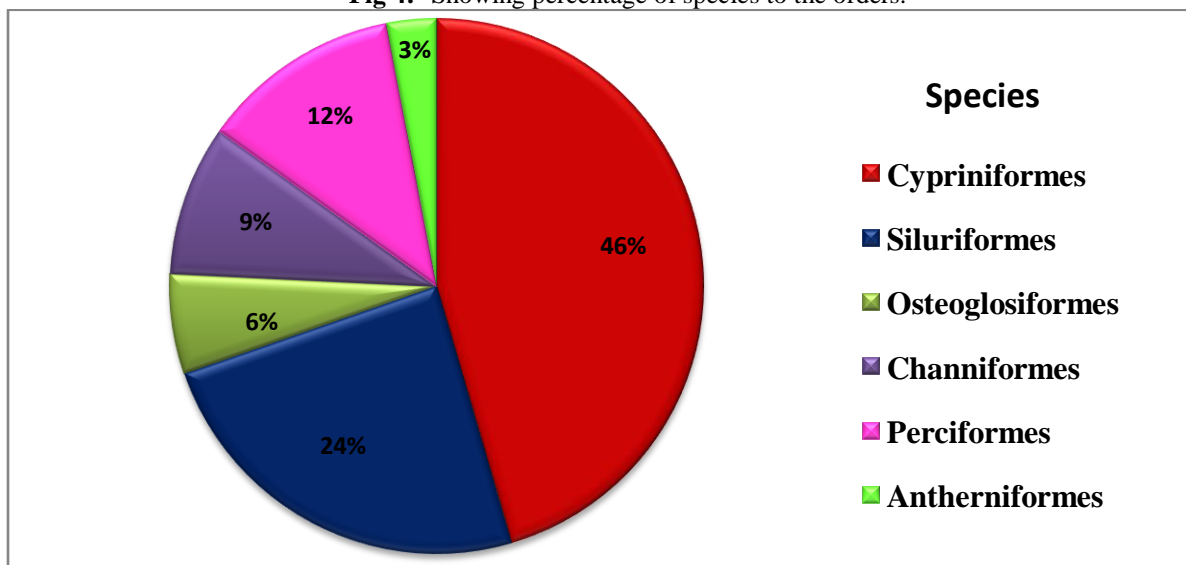


Fig 4:- Showing percentage of species to the orders.



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