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Research Article

ICTHYOFAUNAL DIVERSITY OF PEDDAGEDDA RESERVOIR AT PARVATIPURAM MANYAM DISTRICT, ANDHRA PRADESH, INDIA

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ABSTRACT

The Study of Ichthyofaunal Diversity observed in Peddagadda Reservoir from June 2021 to May 2022. The study results revealed that the occurrence of forty one species belongs to seven orders, 17 families, and 27 genera, including three exotic species. The order Cypriniformes accounted for 46.34% of all species, followed by Siluriformes (21.95%), Perciformes (17.07%), Channiformes (7.31%), Osteoglossiformes (2.43%), and Anguilliformes (2.43%). According to the IUCN, 82.93% of species are classified as least concern (LC), while 9.75% are classified as near threatened (NT), not evaluated (NE), data deficient (DD), and vulnerable (VU). The Shannon-Wiener diversity index of fish species in Peddagadda Reservoir was higher in the post-monsoon and monsoon seasons. The number and composition of population status and CAMP status have been thoroughly studied. Derelict fishing is being observed and raised awareness among fisher flocks.

INTRODUCTION

The manmade reservoir resources cover more than 3.0 million ha of water spread area and are mostly distributed in a varied climatic environment conducive to fish growth. The fishery potential has 19370 small reservoirs with a total water surface area of 3153 366 ha. Habitat variables responsible for a reservoir's productivity can be summed up into climatic, morphometric, and hydro-edaphic factors. A maximum number of small reservoirs are in the state of Tamil Nadu, which accounts for the maximum number (8 895) and area (315 941 ha) of small reservoirs, followed by Karnataka (4 651 units and 228 657 ha) and Andhra Pradesh (2 898 units and 201 927 ha). Peddagedda Reservoir is a Medium Irrigation Project that covers Gadivalasa, Karivalasa, Kesali, Pachipenta, Padmapuram, and Panasapeddikonavalasa at 18°27'21"N 83°5'59"E. It is proposed across Peddagedda, a tributary to the River Suvarnamukhi, which itself is a tributary to the River Nagavali, to irrigate an area of 12,000 acres in Pachipenta, Salur, and R.B.Puram mandals of Vizianagaram District. This study contributed to a wider action-research effort by investigating for the first time. The present study aimed to provide information on fish species present in this reservoir. There is no data available from this reservoir from the construction of the reservoir (2003) to till data.

MATERIALS AND METHODS

The Ichthyofaunal study was done at Peddagadda Reservoir from June 2021 to May 2022. The fish were collected from various landing centres and their surrounding areas (Fig 1, 2, 3). Collected fish are washed thoroughly and photographed in fresh condition. These fish were brought to the laboratory for fixing in glass jars and preserved in 10% formalin solution (Jayaram, 1999). Identification of the species was based mainly on morphometric and meristematic characters (Day 1958, Jayaram 2011, Talwar and Jhingran 1991, Menon 1999, Munro 2000). The conservation status was represented based on the IUCN of the fish species that have been listed.

Data analysis

The mathematical expression of Shannon - Wiener Diversity Index is Shannon-Wiener Index denoted by

$H = -SUM [(p_i) \times \ln(p_i)]$

SUM = summation

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p_i = proportion of total sample represented by species *i*
Divide no. of individuals of species *i* by total number of samples
S = number of species, = species richness
H_{max} = ln(S) Maximum diversity possible
E = Evenness = H/H_{max}

Fig. 1 Peddagadda Reservoir (Pachipenta)

Fig. 2 Peddagadda Reservoir outlet (Pachipenta)

Fig. (3) Foundation stone

Fig. (4) Thermocol and Fibre boat

Fig. 5 Ghost fishing awareness

RESULTS

Ichthyofaunal diversity of Peddagadda Reservoir was studied from June 2021 to May 2022. The study results revealed that the occurrence of forty-one species belongs to seven orders, 17 families, and 27 genera, including three exotic species. The list of Peddagadda Reservoir fishes, including their order, family, genus, species, IUCN and CAMP status, was recorded in the present investigation and is given in Table 1. In the present investigation, the number and percentage composition of families, genera, and species under different orders are shown in Table 2 and Fig 6. The order Cypriniformes accounted for 46.34% of all species, followed by Siluriformes (21.95%), Perciformes (17.07%), Channiformes (7.31%), Osteoglossiformes (2.43%), and Anguilliformes (2.43%). Recorded genera out of 27, Cypiniformies contributed 40.74% of species, followed by Siluriformes and Perciformes each with 22.22%, and Osteoglossiformes, Cyprinodontiformes, Anguilliformes, and Channiformes each with 3.70%. Out of 17 recorded families, Siluriformes and Perciformes contributed the highest each with 29.41%, followed by Cypiniformes with 17.65%, and Osteoglossiformes, Cyprinodontiformes, Anguilliformes, and Channiformes each with 05.88%.

The present investigation reveals that the number and percent composition of genera and species under various families were recorded in Fig 7. The generic composition of fishes belonging to different families shows that Cyprinidae contributed to 22.22%, followed by Danionidae at 14.81%, Ambassidae at 7.40%, Notopteridae, Cobitidae, Aplocheilidae, Bagridae, Siluridae, Schilbeidae, Clariidae, Heteropneustidae,

Anguillidae, Channidae, Gobiidae, and Cichlidae contributed to 3.70%. The species composition of fishes belonging to different families has revealed that the family Cyprinidae made up of 29.26%, followed by Danionidae that contributed to 14.63%, Bagridae that contributed to 9.75%, Channidae contributed to 7.31%, Siluridae, Mastacembelidae and Ambassidae each contributed to 4.87%, Notopteridae, Cobitidae, Aplocheilidae, Schilbeidae, Clariidae, Heteropneustidae, Anguillidae, Anguillidae, Gobiidae, Anabantidae, and Cichilidae each with 2.43% of total fish (Table. 3, Fig 8). According to the IUCN, 82.93% of species were classified as least concern (LC), while 9.75% were classified as near threatened (NT), not evaluated (NE), data deficient (DD), and vulnerable (VU) (Table 3, Fig.9). According to CAMP status, not evaluated (NE) contributed 29.26%, low risk near threatened (LR nt) contributed 34.14%, vulnerable (VU) 21.65%, data deficient (DD) 7.31%, endangered (EN) 4.87%, and low risk least concerned (LRlc) contributed 2.43% (Table 3, Fig. 10).

The Shannon-Wiener index of fish species in Peddagadda

Table 1 List of fishes and their order, family, genus, species, population status, IUCN and CAMP status

Order / Family	No.	Scientific Name	Population Status	IUCN Status (2022)	CAMP Status
Osteoglossiformes/	I				
1. Notopteridae (1)	1	*Notopterus notopterus*	C	LC	LRnt
Cypriniformes/	II				
2. Cyprinidae (20)	2	*Catla catla*	A	LC	LRnt
	3	*Labeo ariza*	C	LC	NE
	4	*Labeo calbasu*	C	LC	LRnt
	5	*Labeo rohita*	A	LC	LRnt
	6	*Cirrhinus mrigala*	A	LC	LRnt
	7	*Cirrhinus reba*	C	LC	VU
	8*	*Ctenopharyngodon idella*	C	LC	NE
	9*	*Cyprinus carpio*	M	VU	NE
	10	*Puntius chola*	A	LC	VU
	11	*Puntius ticto*	A	LC	LRnt
	12	*Puntius sarana*	C	LC	VU
	13	*Puntius sophore*	A	LC	LRnt
3. Danionidae	14	*Amblypharyngodon microlepis*	A	LC	NE
	15	*Amblypharyngodon mola*	A	LC	LRlc
	16	*Danio devario*	C	LC	NE
	17	*Salmostoma bacaila*	A	LC	DD
	18	*Salmostoma phulo*	C	LC	NE
	19	*Rasbora daniconius*	C	LC	LRnt
4. Cobitidae (1)	20	*Lepidocephalichthys guntea*	R	LC	NE
Cyprinodontiformes/	III				
5. Aplocheiidae (1)	21	*Aplocheilus panchax*	C	LC	DD
Siluriformes/	IV				
6.Bagridae (4)	22	*Mystus bleekeri*	C	LC	VU
	23	*Mystus cavasius*	C	LC	LRnt
	24	*Mystus tengara*	A	LC	NE
	25	*Mystus vittatus*	A	LC	VU
7. Siluridae (2)	26	*Ompok bimaculatus*	C	NT	EN
	27	*Wallago attu*	R	NT	LRnt
8. Schibeidae (1)	28	*Eutropiichthys vacha*	C	LC	VU
9. Claridae (1)	29	*Clarias batrachus*	C	LC	NE
10. Heteropneustidae (1)	30	*Heteropneustes fossilis*	C	LC	VU
Anguilliformes/	V				
11. Anguillidae (1)	31	*Anguilla bengalensis bengalensis*	R	NT	EN
Channiformes/	VI				
12. Channidae (4)	32	*Channa orienalis*	C	NE	VU
	33	*Channa panctata*	A	LC	LRnt
	34	*Channa striatus*	C	LC	LRnt
Perciformes/	VII				
13. Gobiidae (1)	35	*Glossogobius giuris*	C	LC	LRnt
14. Mastacembelidae (2)	36	*Mastacembelus armatus*	M	LC	VU
	37	*Mastacembelus pancalus*	C	LC	LRnt
15. Anabantidae (1)	*38*	*Anabas testudineus*	M	DD	DD
16. Cichlidae (2)	*39**	*Oreochromis mossambicus*	M	NT	NE
17. Ambassidae (2)	*40*	*Chanda nama*	C	LC	NE
	41	*Ambassis ranga*	C	LC	NE

A= Abundant (76-100%); C = Common (51-75%); M = Moderate (26-50%); R = Rare (1-25%) of the total catch.
EN- Endangered; VU- Vulnerable: LRnt- Lower risk near threatened; LRlc- Lower risk least concern; LC- Least concern; DD- Data deficient; NE- Not evaluated, NT: Near threaten.
*Exotic fishes No.s: 9, 10, 11, 37, 39, 40

species.

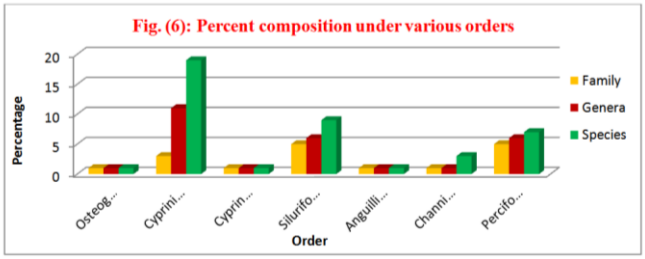
The number and percentage composition of population status is highest for common, which contributed to 53.65%, followed by abundant, which contributed to 29.29%, moderate, which contributed to 9.75%, and rare, which contributed to 07.31%

Reservoir was higher in the post-monsoon and monsoon. The Diversity Index (H) ranged from 1.72 to 2.26. The maximum possible ln (S) diversity ranged from 3.33 to 3.61, while the evenness ranged from 0.51 to 0.64. These results indicated that

a good diversity index was found at Peddagadda Reservoir (Table. 4, Fig. 11).

Table 2 Percent composition of families, genera and species of fishes under various orders

S. No	Orders	% of families in an order	% of genera in an order	% of species in an order
1	Osteoglossiformes	5.88	3.70	2.43
2	Cypriniformies	17.65	40.74	46.34
3	Cyprinodontiformes	5.88	3.70	2.43
4	Siluriformes	29.41	22.22	21.95
5	Anguilliformes	5.88	3.70	2.43
6	Channiformes	5.88	3.70	7.31
7	Perciformes	29.41	22.22	17.07



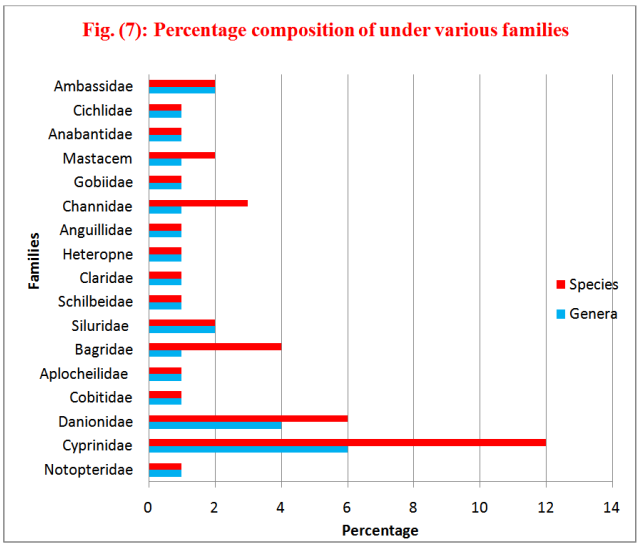
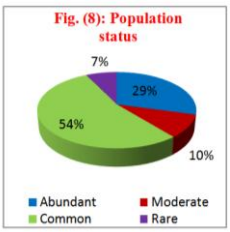
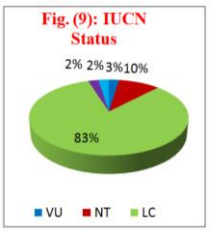


Table 3 Number and Percentage composition of Population Status, IUCN and CAMP status in the total catch.

Population status						
	Abundant	Moderate	Common	Rare		
No. of species	12	4	22	3		-
% contribution	29.29	9.75	53.65	7.31		
IUCN Status						
	VU	NT	LC	DD	NE	
No. of species	1	4	34	1	1	-
% contribution	2.43	9.75	82.93	2.43	2.43	
CAMP Status						
	LRnt	VU	EN	DD	NE	LRlc
No. of species	14	9	2	3	12	1
% contribution	34.14	21.65	4.87	7.31	29.26	2.43





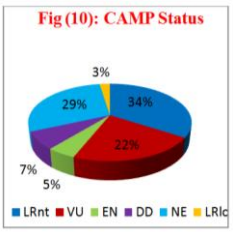
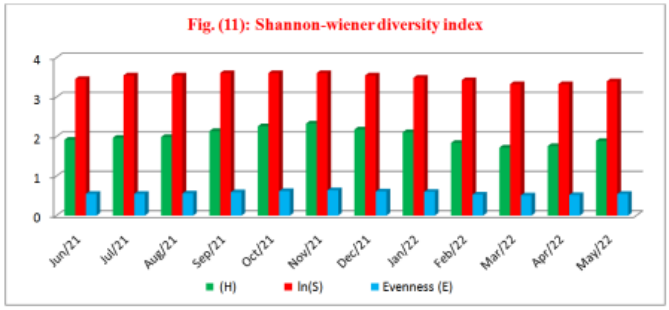


Table 4 shannon-wiener diversity index for fish population

Season	Monsoon				Post-monsoon				Pre-monsoon			
Population / Monthly	Jun-2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan-2022	Feb 2022	Mar 2022	April 2022	May 2022
Diversity Index (H)	1.92	1.97	1.99	2.14	2.26	2.33	2.18	2.11	1.84	1.72	1.76	1.89
Maximum diversity possible ln(S)	3.46	3.55	3.55	3.61	3.61	3.61	3.55	3.49	3.43	3.33	3.33	3.40
Evenness (E)	0.55	0.55	0.56	0.59	0.62	0.64	0.61	0.60	0.53	0.51	0.52	0.55



DISCUSSION

The study results were revealed that the occurrence of Forty one species belong to seven orders, 17 families and 27 genera including three exotic species in the peddagadda Reservoir. The similar results were found at various reservoirs in this region. Rama Rao (2018) recorded 57 fish species belong to seven orders, 18 families and 34 genera were reported including four are exotic species at Kalingadal reservoir, Sharmila Sree and Shameem (2016) reported 55 fish species belonging to 9 orders, 19 families and 34 genera. Meghsdrigedda reservoir. The present study raveled that the generic composition of fishes belonging to different families shows that Cyprinidae contributed to 22.22%. The number of researchers represented to Cyprinidae family most dominate in the reservoir Ichthyofauana at different regions of India. Recorded genera out of 27, Cypiniformies contributed 40.74% followed by by Siluriformes and Perciformes in the Peddagadda Resevoir. The homogeneous percentage of Order Cypriniformes was contributed to 42.86% of the total species observed in Narayana puram anicut at Nagavali River (Rama Rao and Ramachandra Rao 2021, Bagra Kand and Das, 2010, Chatoan and Sabitry, 2012, Sheikh, 2014). In the present investigation the number and percentage composition of Population Status is highest of common followed by abundant, these results close related data observed by various author. According to IUCN, CAMP status the percentage composition exhibit to alike in the reservoir fishery at Indian waters to comparison of present investigation. Shannon-Wiener Index of fish species (Chandra Sekhara Rao et al., 2013, Rama Rao 2014)

CONCLUSION

Derelict fishing gear entraps small quantities of freshwater organisms. Efforts to combat ghost fishing generally focus

on prevention and removal. Prevention strategies aim to avoid the loss or abandonment of fishing gear.

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