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Research Article

Studies on population dynamics an assessment of freshwater fishes in different seasons collected from Godavari river near Kaygaon village (MS) India

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ABSTRACT

The present study was carried out to study the Ichthyofauna of collected from godavri river near Kaygon toka. The evaluation was based on the study of fish diversity from July 2020 to June 2021. During the study period altogether 21fish species belonging 06 families and 5 orders were found in the Godavari river. Cypriniformes was the dominated order with 11 species followed by Siluriformes4 species, Synbranchiformes 2 species, Channiformis3 species and Osteoglassiformes with 1 species. Fish diversity was assessed by calculating the various diversity indices such as 1.Shannon - Wiener diversity index (H), 2.Simpson's Dominance index (D), 3.Simpson's diversity index (1- D).

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1. Introduction

In the last few years much attention is being paid to inland fishery as a source of food to the fulfill the need of growing population of the India. Fishes constitute the most conspicuous component of inland aquatic fauna and rank very high as a source of natural proteins. Fishes are one of the important elements in the economy of many nations as they have been a regular food in the diet of many people. Fish diversity is also a good bioindicator of water quality like zooplankton species considered as biological tool for further bio-monitoring and assessing tropic status of water bodies (Kawade and Pandarkar, 2015). An aquatic ecosystem consists of physicochemical and biotic components which directly affect the diversity of flora and fauna of water bodies (Borane, 2015). Fishes are the only major group of vertebrate which affect the human civilization from ancient time. The study of fish diversity in reservoir is used for fish cultivation and it becomes an essential tool for better fish production. In the field of fish diversity of different freshwater bodies earlier contributions were made by many workers (Khedkar, 2005; Rao *et al.*, 1998; Sharma and Nayak, 2001; Soni*et et al.*, 2008; Srivastava *et al.*, 2008; Pawar and Pandarkar, 2010; Pawar *et al.*, 2011).

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India occupies 9th position in the world in provisions of freshwater larger biodiversity. There are about 450 families of freshwater fishes globally. In India there are 2,500 species of fishes of which 930 lives in freshwater and 1,570 are marine (Ubarhande *et al.*, 2011 and Das B. K. *et al.*, 2014). Godavari river near Kaygon toka is selected as freshwater body for the present study, where several edible fish species occur and fishing is done regularly. There is tremendous scope for enhancing inland fish production in this water body through scientific management. no more attempt so far is been made to study fish diversity from this Kaygon toka village .

Materials and method

Study area

Godavari River near Kaygon toka ($21^0$56' 22 "N Latitude and 74^0 27' 22"E longitude) is located near about 35 k. m. west of Dhule city. River water basically utilized for supply of agriculture, irrigation, fisheries, Industries and drinking water for animals nearby villages. Fish were also collected throughout the year by local fisher man.

Collection of sample

Fish were collected from local fisherman, photography was made by Nikon Photography camera and fishes were preserved in 4% formalin and brought to the laboratory. Labels indicating serial number, exact locality, date and time of collection were tagged to each specimen. During July 2020 to June 2021 from water of Godavari river near Kaygon toka village using casting nets. by local fisher man. On the basis of standard identification keys for fish (Jayaraman, 1981; Jhingran, 1991 Talwar and Jhingran, 1991) and (Day, 1978) information collected from local fishermen and extended cooperation from local researchers and Western Region Office of Zoological Survey of India, Pune, and every fish specimen was characterized, identified with its class, subclass, family, genus and species. One widely used measure of diversity that combines species richness with equitability is the Shannon-Weiner index. Simpson diversity index is also an important index, used widely for water quality monitoring. For determination of diversity indices, total number of species, total number of individuals in a sample and total number of individuals of a species were determined. From these data Shannon -Weiner Index (H), Simpson's Dominance Index (D),

Simpson's Index of Diversity (1-D), Pielou's evenness Index (J) was determined using the following equations.

1. **Shannon - Weiner Index (H)**

It depends on both the number of species present and the abundance of each species.

H = -ΣPi (lnPi), where **Pi** is the proportion of each species

Pi = A/T,

Where **A** is number of each species in the sample,

and **T** is the total number of individuals of all species in the sample.

2. Simpson's Dominance Index (D) is determined using the following equations.

D = n1(n1 − 1) + n2 (n2 – 1) + − − + n20 (n20 – 1) N (N – 1)

Where **n** is the total number of individual of a particular species and **N** is the total number of Individuals of all species.

2. **Simpson's Index of Diversity = 1- D H**

Table 1: Systematic fish diversity, feeding habits and relative abundance of fish species of Godavari river near Kaygon toka village

Order	Family	Species	Occurrence	No. of species specimens
Cypriniformes	Cyprinidae	*Catlacatla*(Ham.)	+++	**09**
		Cyprinus carpeo(Linn.)	++++	**12**
		Cirrhinusmarigala(Ham.)	++++	**14**
		Labeorohita(Ham.)	+++	**12**
		Labeocalbasu(Ham.)	++	**06**
		Labeobata(Ham.)	+++	**07**

		Labeofimbriatus(Bloch.)	++	**06**
		Puntius sarana(Ham.)	+++	**12**
		Puntius sophore(Ham.)	+++	**12**
		Amblypharyngodon mola,Ham	+	**02**
	Claridae	*Clariusbatrachus*(Linn.)	+	**02**
Siluriformes	Siluridae	*Ompokbimaculatus*(Bloch)	+	**02**
		Wallago attu(Bloch&Schn)	+	**02**
		Mystusbleekeri(Day.)	++	**05**
		Mystusvittatus(Bloch.)	++++	**10**
Channiformis/ Channidae/	Channidae	*Channa punctatus* (Bloch.)	++	**04**
		Channa striatus (Bloch.)	+++	**11**
		Oreochromis mossambicus(T)	++++	**18**
Synnbranchiformes	Mastacimbalidae	*Mastacimbelusarmatus*	++	**05**
		Mastacimbeluspuncallus	+	**02**
Osteoglossifomes	Notopteridae	*Notopterusnotopterus*	++	**04**

(Abundantly Found +++ + Less Abundantly Found+++ Moderately Found ++ Rarely Found +)

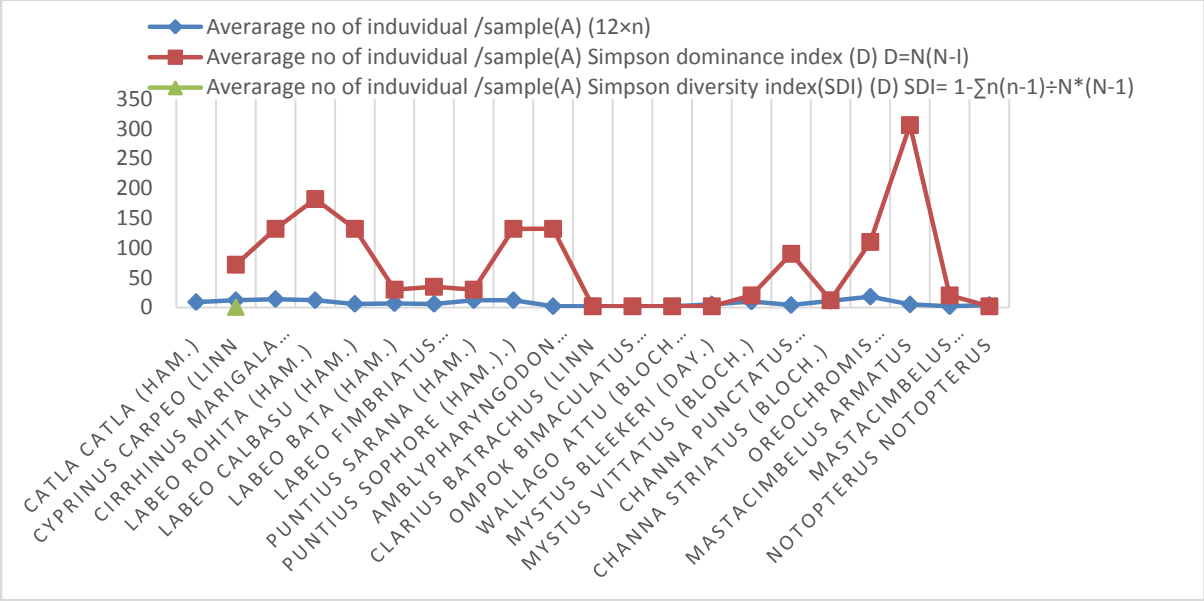

Figure 1: Show the average no of species Simpson dominance index and diversity index of Godavari river near Kaygon toka village

Table 2. Diversity indices of fishes from Godavari river near Kaygon toka village

Sr. No	**Name of fish species found in study area**	**Averarage no of induvidual /sample(A) (12×n)**	**Total no. of species found in study area(T)**	**Sannonweiner index (H) H=∑PI Pi= A/T**	**Simpson dominance index (D) D=N(N-I)**	**Simpson diversity index(SDI) SDI= 1-∑n(n-1)÷N*(N-1)**
1	*Catlacatla,Ham.*	09	21 (n)	0.428	72	0.594
2	*Cyprinus carpeo,Linn*	12		0.571	132	
3	*Cirrhinusmarigala Ham*	14		0.666	182	
4	*Labeorohita, Ham.*	12		0.571	132	
5	*Labeocalbasu, Ham.*	06		0.284	30	
6	*Labeobata,Ham.*	07		0.333	35	
7	*Labeofimbriatus,Bloch*	06		0.284	30	
8	*Puntius sarana, Ham.*	12		0.571	132	
9	*Puntius sophore,Ham.*	12		0.571	132	
10	*Amblypharyngodon mola Ham*	02		0.095	02	
11	Clariusbatrachus (Linn	02		0.095	02	

12	*Ompokbimaculatus Bloch*	02		0.095	02	
13	*Wallago attu Bloch*	02		0.095	02	
14	*Mystusbleekeri, Day.*	05		0.238	20	
15	*Mystusvittatus, Bloch.*	10		0.476	90	
16	*Channa punctatus,Bloch.*	04		0.190	12	
17	*Channa striatus,Bloch.*	11		0.523	110	
18	*Oreochromis mossambicus*	18		0857	306	
19	*Mastacimbelusarmatus*	05		0.238	20	
20	*Mastacimbeluspuncallus*	02		0.095	02	
21	*Notopterusnotopterus*	04		0.190	12	
	TOTAL	**157**(N)		**7.476**	**1457**	

Results and discussion

In the present study, different fish species were observed in the Godavari river near Kaygon toka village (MS) India. Fishes belonging to 14 genera, 06 families and 5 orders were collected during the study period. Many fishes have economic importance and sold after collection in the local fish market. In the study period 21 fish species of 14 different genera, 06 families and 5 orders were recorded from the Godavari river near Kaygon toka village, during July 2020 to june 2021 Study showed that, the members of order Cypriniformes dominated by 11species followed by Siluriformes with 4 species order Synbranchiformes with 2 species, order Channiformis with 2 and Osteoglossiformes order with 1 species. The above study reveals that there is dominance of fish species belonging to family Cyprinidae. Dominance of fish species belonging to family Cyprinidae which was also reported from other fresh water bodies (Ahirrao and mane, 2000; Khedkar, 2005; Kadam and Gaikwad 2006; Mishra and Gupta, 2007; Shrikant *et al.*, 2009; Rankhamb S.V., 2011, Jaiswal and Ahirrao 2012, Ubharhande and Sonwane 2012). Mishra *et al.*, 2012; Khara*et al.*, 2012; Jaybhaye*et al.*, 2013; Pandarkar*et al.*, 2014; Khodake*et al.*, 2014; In the present study, the occurrence of 28 fish species indicates good fish diversity and their production in Godavari river near Kaygon toka village due to the suitable water quality of the River that provides proper breeding ground for fish. The collected fish species,**(**Table 1) were also classified on the basis of their relative abundance into abundant, moderate and rare.**(**Table 2) were also classified on the basis of their relative abundance into abundant, moderate and rare. Column 5 shows fish species richness and various diversity indices. It is observed that, in present study species abundance was 1001, Shannon - Weiner Index (H) recorded 7.476 The Simpson's Dominance Index (D) was recorded 1457and the Simpson's Index of Diversity (1-D) was recorded 0.594.

Conclusion

There is a rich diversity of fish in Godavari river near Kaygon toka village, it is suggests that a major part of this is threatened due to human activities. Fish diversity and distribution is useful for designing and implementing conservation strategies for to make fishermen aware of fishing, to avoid immature fishing to give scientific training, to provide facilities to the fisherman may help in high yield**.**

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