OCCURRENCE AND DISTRIBUTION OF CYPRINID FISHES IN THREE LENTIC WATER BODIES OF SHIVAMOGGA DISTRICT, KARNATAKA: A COMPARITIVE STUDY

Dr. S. Thirumala[1], Dr. B. R. Kiran[2]

[1] Assistant Professor, Department of Environmental Science, Government First Grade College and P.G.Center, Davangere, Karnataka

[2] Research & Teaching Assistant in Environmental Science, DDE, Kuvempu University, Shankaraghatta, Karnataka, India

Abstract: The cyprinid fish diversity of three lentic water bodies in relation to physico-chemical parameters was studied during the year 2008-09. These tanks are located in Shivamogga district of Karnataka. The water of these tanks are used for fishery and irrigation purpose. Fish collections were done with gillnets of standardized dimensions with several mesh sizes. 15 cyprinid fish fauna identified during the study. As far as biodiversity status (IUCN), is concerned, out of 15species, 5 species are LR-nt (33.33 %), 2 species as LR- Ic (13.33 %) and NA and VU each with 26.67 % respectively. It has been shown that physico-chemical variables influence the distribution and abundance of fishes. All fishes are useful as food fishes except *Puntius* species which are useful as ornamental fishes. To save fish diversity and to develop a sustainable fishery practices and proper documentation leading to diversity information system is an urgent need.

Keywords: Biodiversity status, Cyprinid fishes, Lentic water bodies, Shivamogga district, Water quality.

INTRODUCTION:

There are about 450 families of freshwater fishes globally. Roughly 40 are represented in India (warm freshwater species). About 25 of these families contain commercially important species. Number of endemic species in warm water is about 544. Freshwater fishes are a poorly studied group since information regarding distribution, population dynamics and threats is incomplete, and most of the information available is from a few well-studied locations only (Zooreach organization 2010; Sabuj Kumar Chaudhuri 2010).

Fish protein has high digestibility and growth promoting value for human consumption. Nutritional studies have shown that fish proteins rank in the same class as chicken proteins and are superior to milk, beef protein and egg albumen. Inland fisheries in India have great potential of contributing to the food security of country. Wetlands are the main resources exploited for inland fisheries and understanding of fish faunal diversity which is a major aspect for its development and the sustainability management. Wetlands in India support rich variety of fish species, which in turn support the commercial potential of the fisheries (Krishna and Piska, 2006). Thus, there is a wide scope for study in the fisheries sector of the country. No study have been carried out so for on the comparative study on fish diversity of lentic water bodies of Shivamogga district in Karnataka ,hence fish specimen were collected by using gill nets of various sizes with the help of local fishermen.

MATERIALS AND METHODS:

Hosur and Shivaji tanks are located in Bhadravathi taluk , in Shimoga district of Karnataka state (13^{O}45' N & 75^{O} 30' E). These tanks are perennial ones and receives water from left bank channel of Bhadra reservoir and as well as rain water covering an area of 5-10 Acres and depth of 4-5 mts. The water is used for agriculture and fishery purposes. While, Santhekadur tank is situated at Latitude of 13°,52' N, Longitude 75°, 45' E in the Shivamogga at the distance of 5 km away.

Cyprinid fishes were collected with the help of local fishermen during the year 2008 to 2009. The fishes were preserved in 10% formaldehyde solution for taxonomic analysis. Identification of fishes was carried out with the

help of standard literature (Jayaram, 1999; Talwar and Jhingran, 1991). Water samples were collected between 8 AM to 10 AM and further transported to the laboratory immediately for further analysis. Water temperatures was measured at the spot using mercury thermometer, pH was measured with pH meter , while other parameters were analyzed in the laboratory according to the methods suggested by Trivedy and Goel (1986) and APHA (1998).

RESULTS AND DISCUSSION:

Cyprinid fishes collected from lentic water bodies of Shivamogga district showed 15 species of which the genera *Labeo* and *Cirrhinus* consists of 3 species and *Puntius* having 4 species and rest of the genera consists of single species each. Two species such as *Ctenopharyngodon idella* (Valenciennes) and *Cyprinus carpio*(Linnaeus) were introduced species. The checklist of fishes is given in Table 1 and Table 2 depicts the abundance of fishes in the present water bodies. In the current study, we have recorded 11 species of cyprinid fishes in Hosur tank followed by 10 species in Shivaji tank and 09 species in Santhekadur tank.

Table 1. Occurrence of Fish fauna in three lentic waterbodies of Shivamogga District, Karnataka

Name of the fish	Hosur tank	Shivaji tank	Santhekadur tank	Biodiversity status
Labeo rohita	+	+	+	LR-nt
Labeo calbasu	+	-	+	LR-nt
Labeo fimbriatus	+	-	-	LR-lc
Catla catla	+	+	+	VU
Cirrhinus mrigala	+	+	+	LR-nt
Cirrhinus fulungee	+	+	+	LR-nt
Cirrhinus reba	-	-	+	VU
Cyprinus carpio	+	+	+	LR-lc
Ctenopharyngodon idella	-	+	-	NA
Salmostoma untrahi	+	+	-	NA
Puntius sarana	+	-	-	VU
Puntius chola	-	-	+	VU
Puntius sophore	-	+	-	LR-nt
Puntius sp	+	+	+	NA
Osteobrama cotio cunma	+	+	-	NA

* Introduced species LR- Ic=Lower risk least concern; LR- nt = Lower risk-near threatened; VU= Vulnerable; NA = not assessed

Table 2. Abundance of Fish fauna in Few lentic waterbodies of Shivamogga District, Karnataka

Name of the fish	Abundance
Labeo rohita	+++
Labeo calbasu	++
Labeo fimbriatus	+
Catla catla	++++
Cirrhinus mrigala	+++
Cirrhinus fulungee	++
Cirrhinus reba	+
Cyprinus carpio	++
Ctenopharyngodon idella	+
Salmostoma untrahi	+
Puntius sarana	+
Puntius chola	+
Puntius sophore	++
Puntius sp	+++
Osteobrama cotio cunma	++

+++ = Most abundant ++ = Abundant

+ = Less abundant

Table 3:Physico-chemical characteristics of three lentic water bodies of Shivamogga district, Karnataka

Parameters	Hosur tank	Shivaji tank	Santhekadur tank
Water temperature (^{O}C)	27-31	26-32	24-29
pH	7.4-7.8	7.7-7.9	7.3-8.5
Dissolved Oxygen , mg/l	5.83-8.64	5.03-6.61	8.2-8.64
Total hardness, mg/l	34-50	40-60	30-64
Nitrate ,mg/l	0.3-0.4	0.5-0.6	0.4-0.6
Phosphate , mg/l	1.4-3.2	1.6-5.2	1.8-4.2

The physico-chemical properties of present water bodies are summarized in Table 3. pH of water was alkaline in all the three tanks. Water temperature fluctuated from 24 to 32^{O}C respectively, Total hardness was above 30 mg/l and the water bodies are included under soft category. Nitrate and phosphate contents fluctuated from 0.3-0.6 mg/l and 1.4-5.2 mg/l respectively. Dissolved oxygen content ranged from 5.03-8.64mg/l. Based on water quality parameters the tanks are mesotrophic in nature.

In Shivaji tank fish species like *Cirrhinus , Salmostoma and Puntius* groups were dominant. Therefore, the present investigation revealed that Cyprinid fishes are found to be the more dominant group than others which is supported by Singh et al. (2006).

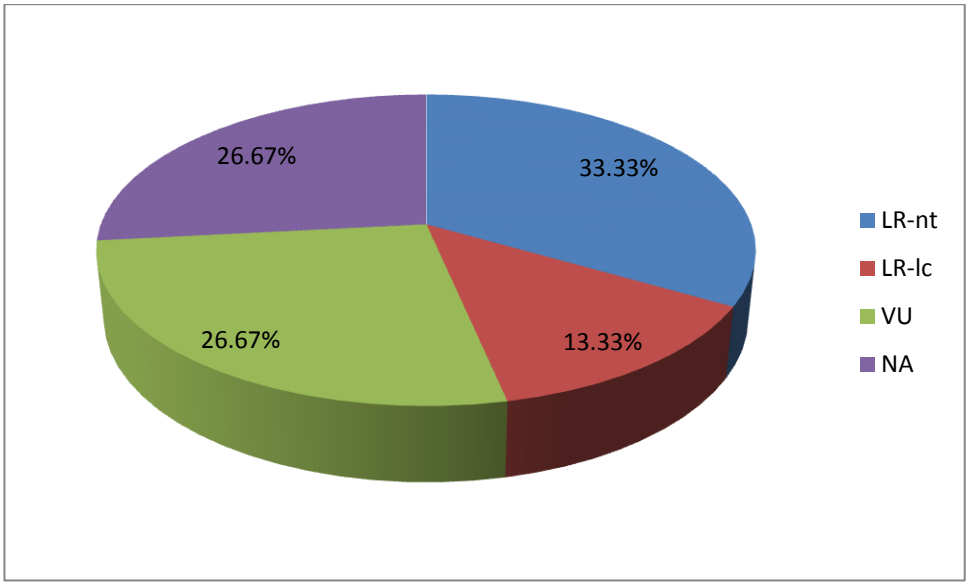

Fig 1: Biodiversity status (IUCN) of fishes in three lentic water bodies of Shivamogga district,Karnataka

Almost all fishes recorded are useful as food fishes. As far as the feeding ecology of fishes is concerned, the fishes in the water bodies could be categorized in to herbivores, carnivores and omnivores. Herbivores fishes include *Labeo rohita, Labeo calbasu*, and omnivores includes *Cirhinus mrigala* etc. As far as biodiversity status (IUCN), is concerned, out of 15 species, 5 species are LR-nt (33.33 %), 2 species as LR-Ic (13.33 %) and NA and VU each with 26.67 % respectively (Fig. 1).

Jaya Raju et al.(1994), Rajaram et al.(2004), Mawhoob Noman Alkadasi et al (2010) and Shivashankar and Venkataramana (2012) have studied fish diversity in relation to physico-chemical variables. Our studies have shown that water quality parameters including DO are the factors for the distribution of fishes. Our results are in confirmatory with above researchers.

Since, the fish fauna of these tanks supports the livelihood of several fish farmers in these areas. The Conservation measures suggested to protect the biodiversity of fish fauna in these water bodies include strict control over encroachment, regulations on the mesh sizes , control of soil and water pollution, removal of exotic

species, establishment of protected areas. There is a need to implement laws which prevent over fishing, introduction of alien species and habitat degradation.

CONCLUSION:

The present study showed the record of 15 freshwater cyprinid fish species from lentic water bodies in Shivamogga district of Karnataka. This investigation indicates that these water bodies have low fish diversity due to human activities , surface run off and encroachment, which needs to formulate sustainable strategies to explore and save fish species of these tanks as a whole. However, in recent days the water holding capacity in the tanks are decreasing, which might affect the survival of fish species. Therefore, appropriate control measures are required to conserve the fish diversity .

REFERENCES:

1. APHA.: Standard Methods for the Examination of Water and Wastewater. 20th Edition. American Public Health Association, Washington, USA. 1998.
2. Jaya Raju, P. B., G. D. V. Prasad Rao and S. V. Sharma. : Seasonal variations in physicochemical parameters and diversity in the flora and fauna of the river Munneru, a tributary to river Krishna, Andhra Pradesh, India. J. Aquatic Biol., 9 (1 & 2): 19-22. 1994.
3. Jayaram, K.C. : The Freshwater Fishes of the Indian Region. Narendra Publishing House, Delhi, 551pp+18pls. 1999.
4. Krishna, M and Piska, R. S. : Ichtyofaunal diversity in secret lake Durgamcheruvu, Ranga Reddy District, Andhra Pradesh, India. J.Aqua. Biol, vol. 21 (1): 77-79, 2006.
5. Mawhoob Noman Alkadasi, E. T. Puttaiah and A. Shahnawaz.2010. Fish fauna of Lakkavalli Lake, Karnataka with respect to environmental variables. Current Biotica 4(1):103-110.
6. Rajaram, R., M. srinivasan, S. Ajmal Khan and L. Kannam, : Ichthyofaunal diversity of Great Nicobar Islands, Bay of Bengal. J. Ind. Fish. Ass., Vol. 31: 13-26. 2004.
7. Sabuj Kumar Chaudhuri. 2010. Fresh water fish diversity information system as a basis for sustainable fishery. Department of Library and Information Science, Jadavpur University, Kolkata-32.
8. Shivashankar. P and G. V. Venkataramana. : Ichthyodiversity status with relation to water quality of Bhadra River, Western Ghats, Shimoga District, Karnataka. Annals of Biological Research, 2012, 3 (10):4893-4903. 2012.
9. Singh S., M. Omprakash, S. Chari and H. K. Vardia . Environment & Ecology, 24 (1), 165-169, 2006.
10. Talwar, P.K. and A.G. Jhingran : Inland Fishes of India and Adjacent Countries. Vol. 1&2. Oxford and IBH Publishing Co. Pvt. Ltd.,1158pp. (1991).
11. Trivedy R.C.and Goel P.K. : Practical methods in ecology and Environment sciences. Environmental Publications, Karad, 1986.

WEB REFERENCE:

www.zooreach.org/conservation/CAMP/CAMP-freshfish.html 2010