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RESEARCH ARTICLE

STUDY OF FISH FAUNA OF BUNDELKHAND REGION WITH SPECIAL REFERENCE TO DAMOH DISTRICT

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ABSTRACT

The pollutants and drastic environmental variation have also adversely effected and changed water qualities i.e. colour, hardness, turbidity, alkalinity, pH, COD, BOD and TDS etc. Aquatic life, thus, also is affected. Changes in morphology of fish like- colour, pigmentation, length, weight mass, structure of scales, finrays etc. may occur. This cannot be ignored that the afore-mention variation may be responsible to develop new varieties or sub species. Unfortunately, negligible work is done in relation to fish fauna of the area in recent-past. Though, appreciable limnological work is done, yet the fish fauna remained unexplored. The fauna study is of tremendous significance in determining population density and calculating sub specific diversity and conservation of ecosystem in Damoh District.

INTRODUCTION

The Bundelkhand region of north India is encompassed by two states, i.e., M.P. and U.P. Its greater part falls in M.P. covering 5 district viz, Damoh, Sagar, Chhatarpur, Tikamgarh and Panna. Its terrain being rocky has reduced water level, and due to this, the area has much irrigation potentiality. With a view to meet this demand of the region M.P. state irrigation department is giving greater importance to the development of irrigation projects in Bundelkhand region. Accordingly, many major, medium and minor irrigation reservoirs are constructed. Rajnagar lake, Ponds and river's (Kopra, Sunar and Viyarma), are located in Damoh district of M.P. The entire surrounding of the water bodies is covered by deciduous forest. A sparsely bushy Jungle also exists at the basin of the reservoirs. Although, the district is rich in having natural water bodies, like lake, Ponds, reservoir and rivers. Very scanty work is available on the fresh water, fish fauna. These water bodies are main source of water supply, which is utilized for drinking, bathing, washing etc. But now a days, these water bodies are highly polluted due to the Industrial effluents, insecticides, herbicides, weedicides, fungicides and other human activities, Nitrate, Calcium chloride and non soluble Phosphate have increased to alarming level and decomposition of excessive bloom releases the methane and ammonia gases in water. Study of biodiversity of fish fauna and their identification, is one of the interesting field of biological research, which gives

us an idea about the morphological variation and population diversity of fauna in polluted and non polluted site of any particular habitat. Soni and Bais; (1986) Thakur and Sharma; (1986), did limnological work on Sagar-Damoh, water bodies and reported some physical and chemical components, Jhingran (1985), described the morphological variation and population density of fish in Bangladesh and Andhra Pradesh, and Thakur; (1986), reported distribution of fresh water fishes in Madhya Pradesh, but nobody has paid any attention to their correlation with the Fish fauna.

MATERIALS AND METHODS

The water samples were collected during July 2011 to June 2012. The Method of water analysis would be adopted as per APHA standard method. Eleven Physico-chemical parameters were analyzed and Amphibian were grouped accordingly. Fish collected seasonally, from all polluted and non polluted selected sites by hand picking or fishing nets and would be preserved in 5-10% formaldehyde in glass or plastic bottle. Authentic keys for identification and classification of fish, would be used. Days fauna. (1958), fish identification by H.R. Singh, Jhingran (1985).

RESULTS AND DISCUSSION

The present investigation is planned to emphasize, the correlation of physico-chemical component with fresh water Fish fauna of Damoh.

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Table 1. Physical Features (mean value)

S. No	Name of the Water Body	Water temperature (°C)	Colour (Pt. Co. Unit)	Turbidity (FAU)	TDS (mg/l)
1	Rajnagar Lake	20.8	12	7	128
2	Purena Pond	19.8	38	12	139
3	Kopra River	20.6	52	22	156
4	Sunar River	21.1	58	21	188.6
5	Viyarma River	21.7	54	18	178.6

Table 2. Chemical Features (mean value)

S. No	Name of the Water Body	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Total Alkalinity (mg/l)	pH	Nitrate (mg/l)	Orthophosphate (mg/l)
1	Rajnagar Lake	8.8	12	42	122	8.2	1.234	0.78
2	Purena Pond	16.4	12	102	132	7.8	2.778	6.45
3	Kopra River	12.4	28	112	148	7.1	5.664	16.56
4	Sunar River	10.6	12.8	44	178	8.1	3.1.12	8.89
5	Viyarma River	10.2	22.8	78	164	8.4	4.114	7.89

Efforts would be made to find out the factors relating with the decline or increase in the biodiversity, for morphological variations and populations density, Because of pollution, human invasion and production of selective many species of fish has fallen to alarming level, because of this also the biodiversity of this region has become unaffordable. The study will provide information of water pollution and morphological variation with population density of fish fauna. The population density of fish, may help to know about the species which may be endangered, or at the verge of extinction in the locality.

Fish Biodiversity

The previous 12years (2000-01 to 2011-12) data of Fish Fauna diversity and their decline population obtained from the Department of Central Fisheries and Zoological Survey of India, bears the following facts :

In present observation 66 species among them 40 species were most popular as food as well as game fishes and posses high economical value. Identified fishes including 3 exotic, 32 species belonging to family Cyprinidae, 8 species belonging to family Bagridae, 4 species belonging to family Channidae, 3 species belonging to family Siluridae, 2 species belonging to each family Notopteridae, Cobitidae, Ambassidae, Anabantidae, and Mastacembelidae, 1 species belonging to each family Sisoridae Schilbeidae, Saccobranchidae, Claridae, Beloridae, Nandidae, Gobioidae, Cichilidae, and Osphronemidae, etc.

The maximum population of *Labeo rohita* (Ham.) has been recorded in winter while the maximum population of *Catla catla* (Ham.) was noted in the rainy season. However, the maximum population of *Cirrhinus mrigla* (Ham.) and *Cyprinus Carpio* (L.) has been found during the summer months. The population study of major carps fishes also revealed that *Labeo rohita* (Ham.) and *Catla catla* (Ham.) were observed higher in limnetic zones than in littoral zones of the water bodies, throughout the period of study except in the rainy season, while the population of *Cirrhinus mrigla* (Ham.) was higher at limnetic zones except in summer months and the population of *Cyprinus Corpio* (L.) has been observed to be higher only at littoral zones during summer and the rainy season. Analysis of variance of the population of *Cirrhina mrigla* (Ham.) was higher at limnetic zones except in summer months and the population of *Cyprinus corpio* (L.) has been observed to be higher only at littoral zones during summer and the rainy season.

Analysis of variance of the population of *Cirrhina mrigla* (Ham.) *Cyprinus carpio* (L.) shows significant F value with zones. Population of *Labeo rohita* (Ham.) shows positive correlation with transparency, dissolved oxygen and exchangeable calcium contents of the water bodies, while the population of *Catla catla* (Ham.) shows positive correlation with pH of the water and exchangeable calcium contents of water or soil. However, statistical positive correlation of the population of *Cirrhina mrigala* (Ham.) has been found with temperature, total dissolved solids of the water bodies, water. The population of *Cyprinus carpio* (L.) shows positive correlation with temperature, Total Dissolved Solid (TDS), zooplankton population and also with exchangeable calcium contents. The population of *Labeo rohita* (Ham.) shows negative correlation with air and water temperature, specific turbidity, magnesium hardness, total hardness, TDS of the water bodies water and with zooplankton population. The population of *Catla catla* (Ham.) shows negative correlation with dissolved oxygen, specific turbidity magnesium hardness, TDS and zooplankton population. The population of *Cirrhinus mrigala* (Ham.) shows negative correlation with turbidity, pH, Dissolved oxygen, calcium hardness, magnesium hardness, TDS. In the case of population of *Cyprinus carpio* (L.) negative correlation with turbidity PH, dissolved oxygen, total hardness and TDS of the water of water bodies has been noted. In the fresh water bodies (Purena pond, Rajnagar pond, Kopra river and Sonar river) of Damoh district, there is no proper place for breeding of fishes. Seed culture of the fishes is carried out five miles away from the selected water bodies in an entirely different environment.

A large number of predatory fishes spoil the fingerlings of cultivable fishes. The physico-chemical and biological parameters do not show favourable effect on the production of cultivable fishes but decline of fish population is also marked due to pollution and progressive eutrofication of the water bodies. Thus the water bodies is not suitable for the good production of cultivable fishes. The Fisheries Department has also stopped the cultivation of major carps in the water bodies since 1982. Species of Notopteridae, overall seem to be doing well. *N. notopterus* is very common, while *N. chitala* is perhaps the next common fish species. *N. notopterus* was found in the fourteenth collection sites, but *N. chitala* was collected only ten localities except the evergreen forest patch near water bodies. It was commonly encountered species and showed high relative abundance near human habitation. *B. bendelisis* and *B. bola* was less distributed in the study area.

Threatned Fish Fauna Biodiversity

Though the introduction of the African Cichlid, *Oreochromis mossambicus* (*Tilapia*) in this region has been claimed as a success story by fishery experts, the species seem to have caused unanticipated impact on the fresh water bodies of this region. Though it is a species adapted for riverine life, it was introduced extensively in lentic and lotic water bodies (Purana pond, Ragnagar pond, Kopra river and Sonar river) in Damoh district. Being a prolific breeder and a hardy fish, *Tilapia* now dominates indigenous ichthyofauna in many water bodies of Damoh district. Studies on fish diversity of the study area in Damoh district, showed abundant population of *Tilapia*, replacing native fish fauna in many areas. In Damoh district, the endemic species, *C. chagunia*, *G. gotyla*, *Oxygaster bacaila*, *L. guntea*, *O. bimaculatus*, *O. pabo*, *R. rita* and *R. pevimentata* etc, was found in patchy distribution in different localities of the water bodies, its occurrence was mostly rare and occasional is facing extinction due to the introduction of *O. mossambicus*. *O. mossambicus*, because of similar ecological requirements may challenge their very survival. *Garra gotyala* is collected from Narsingarh area. According to the original description this species can be readily distinguished from the other species of the genus by its elongated body form, broad head, broadly rounded snout without tubercles, absence of proboscis and lateral lobes, and total absence of scales on ventral surface and mid dorsal streak.

The specimens collected in the present study indicate that all the above mentioned characters are present, except one. The specimens collected during the present study had scales on the mid dorsal streak. During the present study it is concluded that the species with narrow range of temperature tolerance are *Nemachelius botia*, *Bagarius bagarius* and *Cyprinus corpio*, *Osphronemus goramy*, collected Brown Trout from Nidan water bodies of Veerangana Ranidurgawati Sanctuary, where the temperature is very low, also indicates their narrow range. *T. Pituitiora* and *T. Khudree* have brought me surprise after identification which was abolished by the report of the presence in Narmada, Betwa and in Bundelkhand region by threatened Ichthyofauna of the river Narmada in western zone (Verma and Kanhere-2007). These two fishes were reported to be inhabitants of cold region, their presence in sanctuary region of Tejgarh, which is surrounded by deep forest and where water is deep. Though their population is not very high, yet their presence is made in Damoh district. It seems that either these fishes have got shelter by having in Narmada Betwa, so this region or put in the water body by some people or Agency. State Fisheries Department of Damoh district did not say anything about it. *Nandus nandus* the only representative of the family nandidae since to be biomarker.

Large number of depth have been observed during the month of August-September of this specimen probably because of like *C. chagunia*, *R. daniconius*, *T. Putuitora*, *T. Khudree*, *R. rita*, *B. bagarius*, *A. testudineus* and *O. goramy* are found in Katarw region in Ranidurgabati sanctuary of Singourgarh is reported perhaps the first time. The population of these fishes are very thin and is to speculate that the fishes have been introduced first time in this region during study period. Ecosystem functioning is dictated to a large extent by diversity and the community structure that results from factors such as richness and evenness of diversity. Thus, recent studies in biology focus more on the quantitative aspects of biodiversity that can be used to understand fluctuations in ecosystem functioning and help in prioritization of areas for conservation.

Conclusion

Though I have done hard efforts to collect and identify the fish of this locality. Still I feel like there is a big gap in study of biodiversity of this region. Feeding and reproduction behavioral study of many such animals are still to be done. Many morphological changes occur in males and female which will help other biologists. The depleting population of many species of the groups studied is very alarming and to prevent further loss of species it is the need of the time to awaken the villagers, tribal and citizens.

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