

Exploring the Faunal Diversity of River Narmada, Jabalpur Region (M.P) India

Deepika Saini¹, K K Dube²

¹Department of Zoology, Govt. M.H college of Home Science For Women, Jabalpur, (M.P)

²Department of Zoology, Retired Professor, Govt. Science College, Jabalpur (M.P)

Abstract: *The current studies intend to provide an overview of species richness of Narmada river. The studies are carried out in 5 prefix sampling stations of river Narmada from October 2011 to September 2012. The water samples were collected every month for the qualitative and quantitative analysis of planktons. Ichthyofauna of river Narmada is very rich. 29 species of fishes were recorded belonging to 5 orders (Cypriniformes, Beloniformes, Ophiocephaliformes, Perciformes and Siluriformes) where, Cypriniformes was observed to be the most dominating group with 22 species. In Phytoplanktons, 19 species belonging to 4 different groups (Chlorophyceae, Bacillariophyceae, Cyanophyceae, Euglenophyceae) was recorded. Chlorophyceae was observed to be the most dominant group with 8 species and Chlorella as the most dominating species. In Zooplanktons, 13 species were recorded belonging to 5 different groups (Protozoa, Copepoda, Ostracoda, Cladocera and Rotifer). Copepoda was observed to be the most dominating group with 4 species and Cyclops as the most dominating species. Planktonic abundance was observed to be in peak during Summer season whereas declined in monsoon and remained intermediate in winters.*

Key words: Phytoplanktons, Zooplanktons, Narmada River, Jabalpur Region, Ichthyofauna

1. Introduction

Water is one of the most precious natural resources. Without it, there would be no life on the earth. Water is an indispensable requirement for all living organisms and any alterations in water may lead to the issues of survival for these organisms. The river Narmada is third holy and the fifth longest westward flowing river of central India as well as Madhya-Pradesh state. It originates from the Maikal ranges at Amarkantak in Madhya-Pradesh at an elevation of 900 meters. It flows

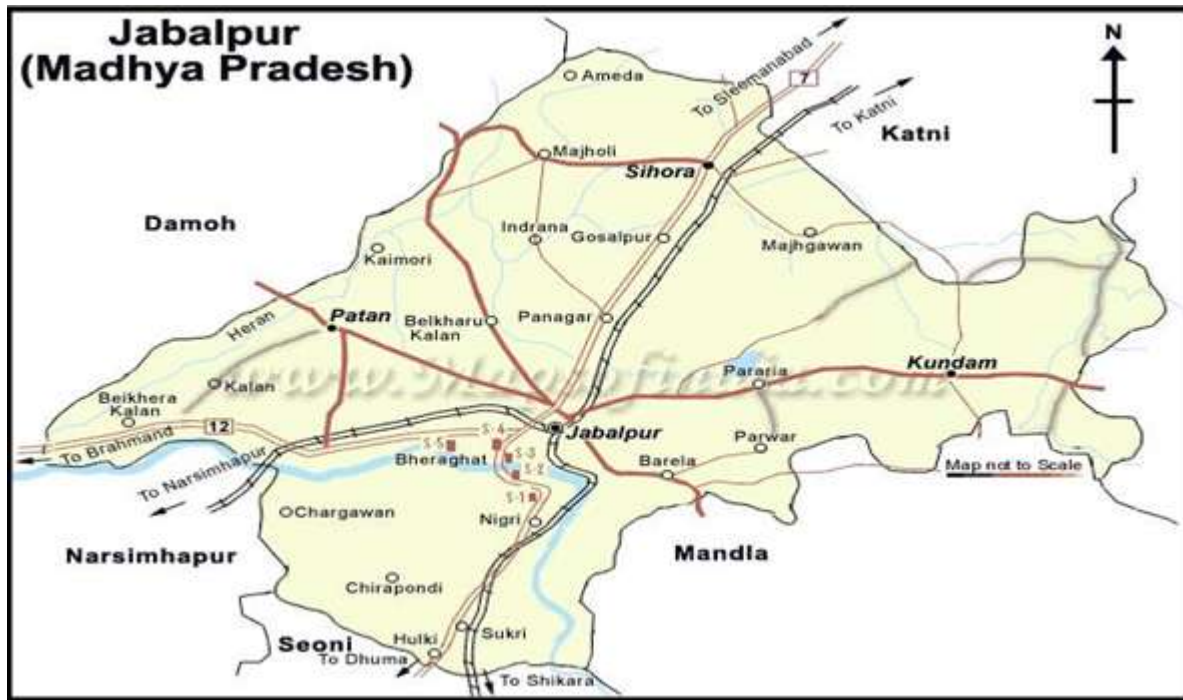
over a length of 1312 km before draining into a Gulf of Cambay, 50 Kilometres west of Bharuch. The river is also known as the "Life line of Madhya Pradesh". It runs 112Kms in M.P. Narmada flows in numerous big cities of Madhya-Pradesh including Jabalpur Shukla[1] and Azad[2]. Jabalpur or Sanskardhani is the main city of Central India and traditionally known as Mahakousahal. It is situated almost in the centre of India (between the coordinates 23°10' latitude and 79°57' E longitude and with a great elevation of about 393 meters above MSL. The climate of Jabalpur is humid subtropical which is quite typical to North-Central India that favours species richness. The fauna of Jabalpur district is rich and diverse. Life on the earth is diverse at many levels, beginning with genes and extending to the wealth and complexity of species, life forms and functional roles, organized in spatial patterns from biological communities and ecosystems.

Over the last century, Riverine ecosystem have suffered from intense human intervention resulting in habitat loss and degradation, as a result of which many fishes have become endangered particularly in those areas where heavy demand is placed on freshwaters. Habitat destruction and defragmentation, introduction of exotic species, global climate and industrialisation adds up to the faunal loss in river, Azad [1] and Shukla[2]. The aim of the present study is to study diversity of river Narmada and provide further scope for its betterment.

2. Material and Methods

2.1 Sampling Sites

The present studies are carried out from October 2011 to September 2012 in 5 different sampling stations of river Narmada at Jabalpur region (M.P), India, namely (S-1) Lamhetaghat (16 km away from the city headquarters), (S-2) Laxminarayanghat (17^{1/2} km away from the city headquarters), (S-3) Gograghat (19 km away from the city headquarters), (S-4) Saraswatighat (20 km away from the city headquarters) and the last one (S-5) Bhedaghat (21 km away from the city headquarters). These all sampling sites are situated at the bank of river Narmada and are surrounded by large number of small villages. Hence, dumping wastes and ritual performances can be seen here frequently.



Map 1: Jabalpur District Showing Sampling Stations

Photographs



(A) Station-1: Lamhetaghat



(B) Station-2: Laxmi Narayan Ghat



(C) Station-3: Gograghat



(D) Station-4: Saraswati Ghat



(E) Station-5: Bhedaghat



(F) Sample Collection at Gograghat

2.2 Sample Analysis

1) Fish Sampling: The fish were collected by hand nets, cast nets and from local fishermen and local markets. Collected fish samples were preserved in 4% formalin and identified following Talwar and Jhingaran [3] and Jayaram [4].

Plankton Sampling (Phytoplanktons and Zooplanktons): Planktons samples were collected between 8:00 AM to 9:30 AM at every selected sampling stations. Plankton net of bolting silk no.25 was used for sampling purpose. Samples were taken out at mid stream 0.5 to 1m below the surface of water. Collected concentrated plankton samples (10ml) were examined under a high power microscope and identified up to genus and species level with a help of standard books of Monographs (Prescott, 1962[5], Adoni, 1985[6]) for phytoplankton and Battish, 1992[7] for Zooplanktons.

3. Results and Discussion

3.1 Ichthyofaunal Studies

Ichthyodiversity refers to the diversity of fish species. The fish is one of the most important vertebrate provide rich

protein source in human diet. In the present studies an attempt have been made to collect, classify and identify the fish of river Narmada. In the current research work 29 species of fishes were recorded from five different sampling stations. The several species of fish belonging to order *Cypriniformes*, *Beloniformes*, *Ophiocephaliformes*, *Perciformes* and *Siluriformes* are recorded. *Cypriniformes* was observed to be the most dominant group with 22 species. Diversity was observed to be lowest in March 2012 whereas highest in November 2011. Low diversity in summer months is due to extreme reduction of depth which ultimately increases salinity, free CO₂ and hardness of water and decrease in dissolved oxygen, transparency and P^H leading to reduction in fish diversity whereas it is vice-versa in winters. In winters conditions are entirely different hence providing accurate conditions which are favorable for maximum species diversity. Similar studies are carried out by Suita Bakwale et.al., (2013)[8] in Narmada river where Suita reported 51 species of fishes belonging to 7 orders and 15 families, along with higher diversity in winters and lower diversity in summers. Dominance of *Cypriniformes* was also recorded by Vipin Vyas et.al., (2013)[9].

Few Fishes Recorded in River Narmada



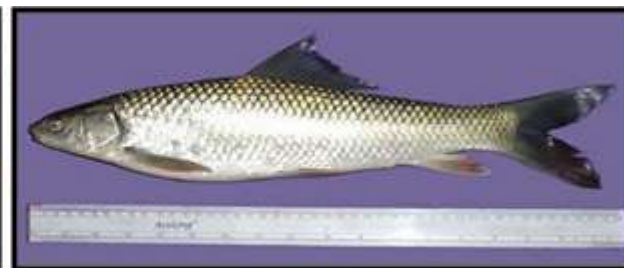
Catla catla



Labeo rohita



Labeo calbasu



Cirrhinus mrigala



Cyprinus carpio



Labeo fimbriatus



Cirrhinus reba



Labeo bata



Mystus seenghala



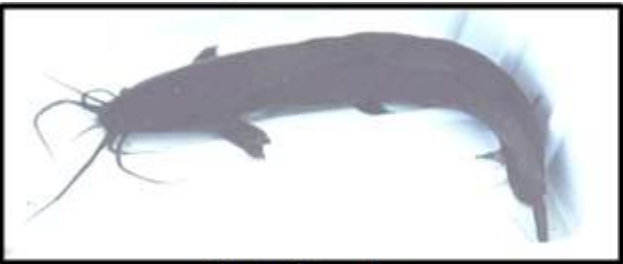
Wallago attu



Ompok bimaculatus



Heteropneustes fossilis



Clarias batrachus



Channa punctatus



Anabas testudinens



Notopterus chitala

3.2 Phytoplankton Studies

In the research period from October 2011 to September 2012, a deep research is carried on phytoplanktons. Phytoplanktons of freshwater habitat as green algae, blue algae, diatoms etc. are important among aquatic flora. They are ecologically significant as they form the primary link in food chain for all aquatic animals. The present studies showed five groups of phytoplanktonic population as *Chlorophyceae*, *Bacillariophyceae*, *Cyanophyceae* and

Euglenophyceae. Comparatively, *Chlorophyceae* was dominating with 8 species and *Chlorella* to

be the most dominating species. Whereas, *Euglenophyceae* was the least dominating group with *Euglena* as the most dominating species. *Chlorophyceae* dominance was also observed by Sarwade et al., (2014) [10]. Phytoplanktonic population in the working area showed order of dominance among the species with regards to number as follows: *Chlorophyceae* > *Bacillariophyceae* > *Cyanophyceae* > *Euglenophyceae*.

Few Phytoplanktons Recorded in River Narmada



Anabaena sp.



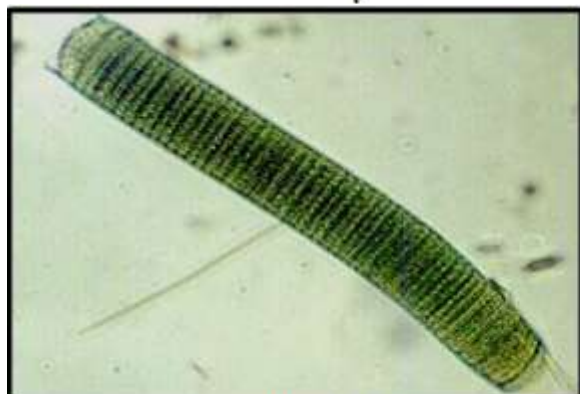
Merismopedia



Microcystis

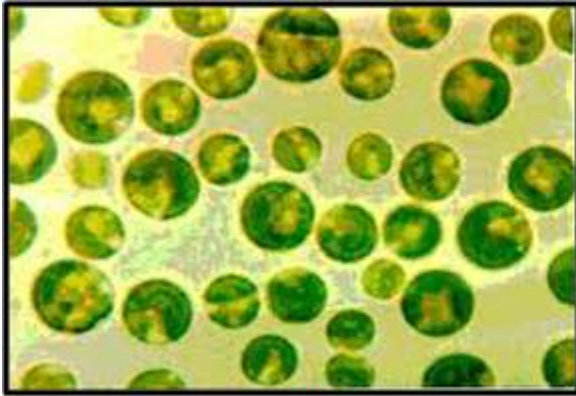


Ankistrodesmus

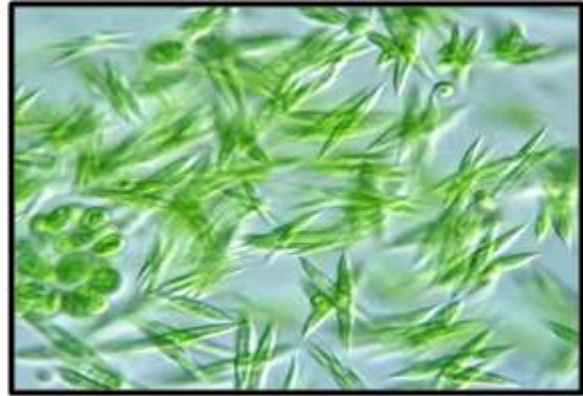


Oscillatoria

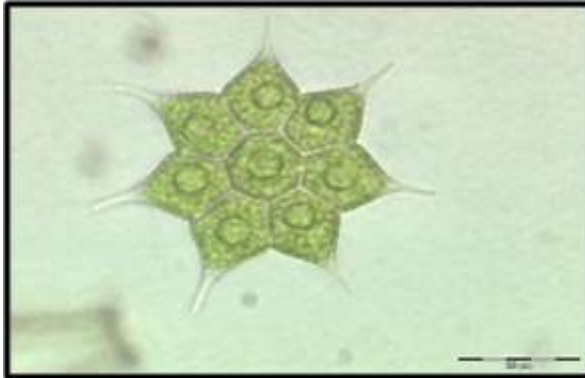




Chlorella



Eudorina



Pediastrum Simplex



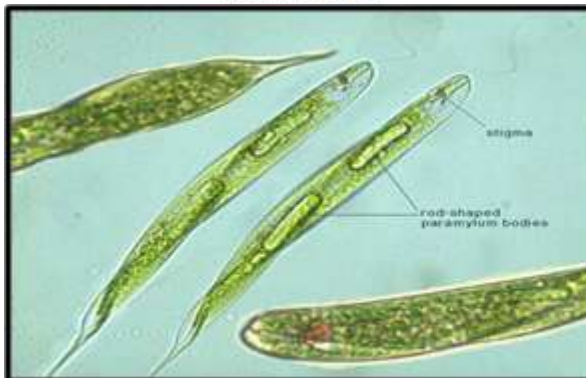
Spirogyra Sp.



Scenedesmus



Ulothrix



Euglena



Phacus

3.3. Zooplanktonic Studies

In the research period of one year i.e, October 2011 to September 2012, Zooplanktons are cellular metazoans in the water bodies ranging in size from about 0.05µmm to 0.1µmm. They provide food for many fishes and therefore,

play a vital role in the food chain of ponds, tanks and rivers. In Zooplanktons, 13 species were recorded belonging to 5 different groups (Protozoa, Copepoda, Ostracoda, Cladocera and Rotifera). Copepoda was observed to be the most dominating group with 4 species and *Cyclops* as the most dominating species. Whereas, protozoa was observed to be

the least dominating group with 3 species and *Vorticella* as the most dominating species. Zooplanktonic abundance was recorded to be in peak during Summer season whereas declined in monsoon and remained intermediate in winters. In the seasonal studies of zooplanktonic species, the order of dominance (as per total density) was observed to be as, Copepoda>Cladocera>Rotifera>Ostracoda>Protozoa.

From the data recorded in this research duration of October 2010 to September 2011, it is clear that the Copepoda is the most dominating group with *Cyclops* as the most dominating species in river Narmada. The total plankton count/ml is

minimum in rainy season whereas higher in summers. This data is further supported by taking a reference of data collected by Jyoti Sharma et. al., [11] Taylor and Deepti[12] also reported that Zooplanktons grows and multiply best during summer months, when the temperature is high and having longer photoperiod. High summer growth of Zooplanktons may also be due to progressively increasing water temperature and nutrients in water that are responsible for high amount of Zooplanktons growth during summer seasons. Similar studies are reported by Sudha Summarwar[13].

Few Zooplanktons Recorded in River Narmada



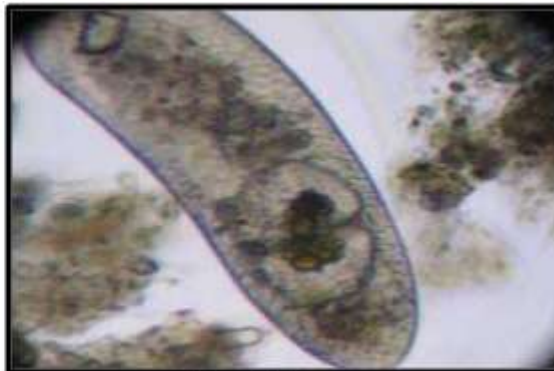
Amoeba sp.



Paramecium



Vorticella sp.



Branchionus sp.



Asplanchna sp.



Keratella tropica



Daphnia sp.



Eurycerus sp.



Diaptomus sp.



Cyclops sp.



Nauplius larva



Cypris sp.

4. Conclusion

The review summarizes to reveal the studies done in the research duration of October 2011 to September 2012. This review provides an overview of diversity of river Narmada. The study reveals that there is an urgent need to create an awareness among the local people on the importance of the riverine habitat and its fauna and the need to conserve them for future generations. Studies also clearly indicate that Narmada river is rich in species diversity.

5. Acknowledgement

Authors are highly obliged to the principal Govt. M.H college of Home Science and Science for Women, Jabalpur (M.P) for providing laboratory facilities in the college.

References

- [1] Shukla A, Sharma S. Overview of Ichthyofaunal Diversity of River Narmada in Jabalpur Region. 2015;9:25-28. *Anusandhan*. ISSN-0975-3443.
- [2] Azad Z, Shukla A: Ichthyofaunal diversity, habitat ecology and their conservation issues of River Narmada in Jabalpur Region (M.P). *International journal of current research*, 2015;7(12):24044-24047.
- [3] Talwar, P.K and A.G.Jhingram, 1991. Inland fishes of India and Adjacent Countries. Vol.1 and 2. *Oxford and IBH Publishing Co .Pvt. Ltd.*, pp:1158 .
- [4] Jayaram, K.C., 1991. Revision of the genus *Puntius* Hamilton from India Region. *Record of Zoological Survey Of India* .Occasional paper, 135:1-178.
- [5] Prescott, G.W(1962). *Algae of the Western Great Lakes Area*, W.M.C.
- [6] Adoni, A.D.(1985). *Workbook on Limnology*, Pratibha Publications, Sagara (M.P)
- [7] Battish, S.K(1992): *Freshwater Zooplanktons Of India*, *Oxford and IBM Publications*.

- [8] Sunita Bakwale and Kanhere R.R. Study on the Fish Species Of Diversity Of The River Narmada In Western Zone. *Res p. Anion Veter. And Fishes Sci*(2013),Vol.1(18-20)
- [9] Vipin Vyas et.al., Limnological Studies Of River Narmada *.J. Chems. Bio .Phy.Sci*(2013)Vol.3,No.4;2722-2730
- [10] Sarwade A.B. and N.A. Kamble. Plankton Diversity In Krishna River, Sangli, Maharashtra *.Journal Of Ecology and the Natural Environment*,2014.,Vol.614,pp:174-181.
- [11] Jyoti et. al., 2014: Phytoplanktonic Diversity and its relation to physico-chemical parameters of water at Dogarwadaghat of river Narmada (*International Research Journal of Environment*).
- [12] Tyor, A.K and Deepti C.2012: Survey and study of phytoplankton ecology in sukhna lake, Chandigarh, (India) *International Journal of Applied Biology and Pharmaceutical Technology*. 3(2): 22 9-238.
- [13] Sudha Summarwar,(2012):Studies on plankton diversity in Bisalpur reservoir *,Int. J. Life Sc. Bt and Pharm. Res.*,Vol.1,No.4, pp.65-72.

Table1: Fauna Recorded In River Narmada in the Year 2011-2012

S. No.	Fauna Recorded in River Narmada	Dominance Status	Number of species
1.	Fish		29
		Most Dominant-Cypriniformes	
		Least Dominant-Siluriformes	
2.	Planktons-		
	Phytoplanktons	Most Dominant-Chlorophyceae	19
		Least Dominant-Euglenophyceae	
	Zooplanktons	Most Dominant-Copepoda	14
		Least Dominant-Protozoa	