International Journal of Applied and Universal Research **E-ISSN No: 2395-0269**
Volume IX, Issue II, March – April 2022 **Available online at: www.ijaur.com**
Impact Factor- 5.908

MONTHLY VARIATIONS OF ZOOPLANKTON DIVERSITY OF ATARITAL DAM OF MAUGANJ, REWA (M.P.)

Dr. Neeta Mishra
Asst. Prof. Zoology
Govt. S.K.N. (P.G.), College, Mauganj, Rewa (M.P.)

ABSTRACT:- Zooplankton are cosmopolitan in nature and they are found to inhabit all freshwater body. The seasonal density of zooplankton observed during different seasons of one year of study period (June 2020 to May 2021) is represented in Tables and Graph 1 & 2. The average density of each species of zooplankton was determined for winter, summer and rainy seasons of Atarital dam Mauganj, Rewa (M.P.). In total 56 species of zooplankton were identified during present study. Out of 56 species of zooplankton 11 species belonged to Protozoa, 22 species to Rotifera, 14 species to Crustacea, and 09 species to Mollusca. Rotifera forms the main bulk of zooplankton comprising of species composition followed by Crustacea, Protozoa and Mollusca during study period. The average annual density of zooplankton and their percentage contribution observed during study period Rotifera were the dominant group of Zooplankton recorded with respect to diversity and species density status. They are also important as an index of productivity, eutrophication and pollution of the aquatic ecosystem.

KEYWORDS: - Atarital dam, Zooplankton diversity and density.

INTRODUCTION:-

The zooplankton consists of diverse assemblage of major taxonomic groups. Many of these forms have different environmental and physiological assemblage. The number type and distribution of these organisms present in any aquatic habitat provide a clue on the environmental condition prevailing in that particular habitat. The occurrence and abundance of zooplankton in the water body depends on its productivity which in turn is influenced by the physico-chemical parameters and level of nutrients. The zooplankton is an important group of micro-organisms which indicates the trophic status of water body. Some of them are also acting as bio-indicator of organic and inorganic pollution of water body.

STUDY AREA- Atrital Dam (stop dam) is an anthropogenic construction on the confluence of two small nallahas Garha and Atari on the right hand side of N.H.7 in Mauganj tahsil of Rewa district at 24 ^{0}43’ 13” N and 80^{0}2’53”S. Rewa has 7495 sq. Km of territory and occupies about 2.5% of total geographical area of the state. It stretches about 150 Km from north to south and 83 Km. from east to west. Rewa district comprises of seven tahsil namely Sirmaur, Teonthar, Mauganj, Hanumana Raipur karchuliyan, Gurh and Huzur. Hanumana tahsil is surrounded by the boundaries of Allahabad district of U.P. on the north, Mirzapur district on the east, Sidhi and Shahdol on the south and district Satna on the west side. Mauganj, Rewa (M.P.) is very unique tahsil of Rewa district is very rich in its natural resources, beautiful fauna and flora including many rivers, lakes pond dams’ pools tanks and water falls. The Mauganj tahsil which has chosen for the present study is situated on Rewa Mirzapur N.H.7 road.

AIMS AND OBJECTIVE OF STUDY:-

The aims and objectives of the present study are following:

- To Conservate the topography of dam.
- To check the changes in biological parameters and their temporal and spatial fluctuation.
- To improve the aquaculture and water quality of dam.

REVIEW OF LITERTURE:-

Quantitative study of zooplankton was carried out by many researchers worldwide. Bhat et al (2014),

Chatterjee et al (2014), Koli and Muley (2012), Kulkarni and Surwase (2013), Patole (2015), Pradhan (2014), Sehgal et al (2013), Watkar and Barbate (2013) studied zooplanktons quantitatively to a large extent from Indian continent. The importance of the Zooplankton is well recognized as these have vital part in food chain and play a key role in cycling of organic matter in an aquatic ecosystem Sharma et al (2010). Though numerous works on Zooplankton diversity are being reported from different parts of India but there is scarcity of report from freshwater bodies of different parts of Northeast India except some worth mentioning of Sharma and Sharma (2008); Kar and Barbhuiya (2004); Kar (2013).

MATERIAL AND METHODS:-

Samples were collected monthly from five different sampling stations namely A, B, C, D & E for one year (June 2020 to May 2021). Then the sample were filtered and placed in Tarson (100 ml) container, subsequently fixed in Lugol's solution and stored in cool and dark place. For studying the diversity of Zooplankton, sample were taken in a Sedgwick-Rafter counting chamber and observed under a light microscope under required magnification (X 10 initially , followed X 40) and the specimens were identified following standard literature of Battish (1992); Edmondson (1959); Michael and Sharma (1998); Sharma (1998); Sharma and Sharma (2008).

RESULT AND DISCUSSION:-

The seasonal density of zooplankton observed during different seasons of one year of study period (June 2020 to May 2021) are represented in Tables and Graph 1 &2 . The zooplanktons were representing by the Protozoa, Crustace, Rotifers and Mollusk. The Crustaceans was dominating group, following by Rotifers and then protozoa. Zooplanktons are the smallest, acellular or metazoans and Mollusca in water bodies, ranging in size from about 0.05 to 10 mm. Protozoans, Rotifers, Crustaceans (i.e. Cladocera; Rotifers and ostracoda) and small insects constitution most zooplankton communities. They provide food for many species of fish and are therefore, vital in the food web of ponds; dams are rivers. They are also used as an index of productivity, eutrophication and pollution of the water. In present study zooplankton composition was represented by several phyla of the invertebrates (Table No. 1).

During the present investigations; the representatives of protozoa, rotifer, crustacean and Mollusca were abundant in the reservoir water. The protozoa represented 11 species, rotifers 22 species, crustacean 14 species and Mollusca 09 species.

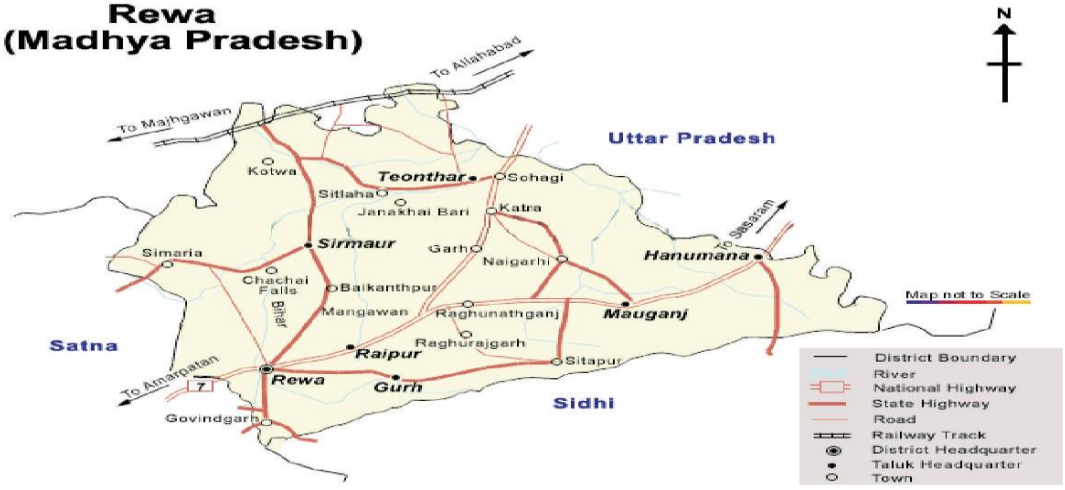


FIG. No. 1. MAP OF STUDY AREA

Table No 1 - Showing the species composition of zooplanktons species in Atarital Dam.

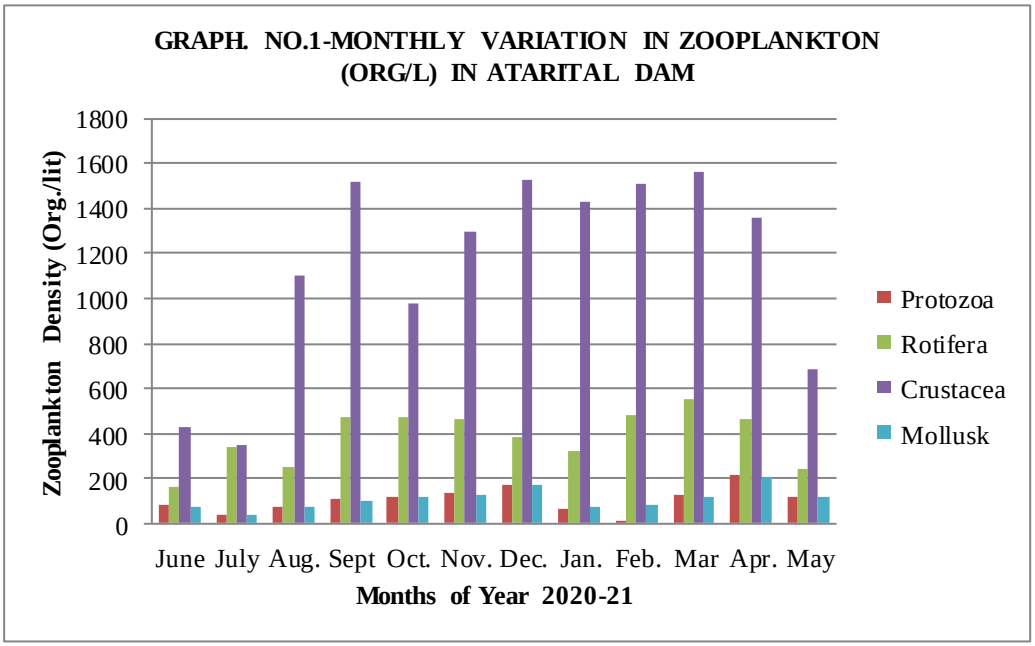
S.N.	Group	Genus	Species
1.	Protozoa	07	11
2.	Rotifera	18	22
3.	Crustacea	11	14
4.	Mollusca	06	09
Total		42	56

Table No 2 - Showing the composition of zooplanktons species in Atarital Dam.

Group	Name of Species	Sampling Station				
		A	B	C	D	E
1. Protozoa	1. *Arcella sp.*	+	+	-	+	+
	2. *Centropyxis sp.*	+	+	+	-	+
	3. *Ceracium sps.*	+	-	+	+	+
	4. *Difflugia corona*	+	-	+	+	+
	5. *Diffusia sps*	+	+	-	+	+
	6. *Euglena viridis*	+	+	+	-	+
	7. *Euglena gracilis*	+	-	+	+	+
	8. *Pramaecium cardatum*	+	-	+	+	+
	9. *Vorticella nebulifera*	+	+	-	+	+
	10. *Vorticella convallaria*	+	+	+	-	+
	11. *Vorticella patellina*	+	-	+	+	+
2. Rotifera	1. *Asplanchna brightwelli*	-	+	+	+	+
	2. *Asplanchnopus multiceps*	+	+	+	-	+
	3. *Brachionue angularis*	+	-	+	+	+
	4. *B. Caudatus*	-	+	+	+	+
	5. *B. haranaesis*	+	+	+	-	+

	6. *Chromogaster ovalis*	-	+	+	+	+
	7. *Cyclops bicuspidatus*	+	+	+	-	+
	8. *Filinia sp.*	+	-	+	+	+
	9. *Keratella cochlearis*	-	+	+	+	+
	10. *K. tropica*	+	+	+	-	+
	11. *Lecane sp.*	+	-	+	+	+
	12. *Lacane luna*	-	+	+	+	+
	13. *Monostyla bulla*	+	+	+	-	+
	14. *Nauplius larvae*	+	-	+	+	+
	15. *Notholca acuninata*	-	+	+	+	+
	16. *Polyarthra vulgaris*	+	+	+	-	+
	17. *Platyias quandricornis*	+	-	+	+	+
	18. *Rhinocolanus nasutus*	-	+	+	+	+
	19. *Scaridium longicaudum*	+	+	+	-	+
	20. *Synchacta pectinata*	+	-	+	+	+
	21. *Trichocerca similes*	-	+	+	+	+
3.Crustacea	1. *Alona sps.*	+	+	+	+	-
	2. *Alonella sps.*	+	-	+	+	+
	3. *Ceriodaphnia sps.*	+	+	-	+	+
	4. *Cypris sp.*	+	+	+	-	+
	5. *Daphnia pulex*	+	-	+	+	+
	6. *Daphnia carinata*	-	+	+	+	+
	7. *Daphnia lumholtizi*	+	-	+	+	+
	8. *Diaphanosoma brachyurum*	+	+	-	+	+
	9. *Diaphanosoma sps.*	+	+	+	-	+
	10. *Leydigia sps*	+	-	+	+	+
	11. *Monia sps.*	-	+	+	+	+

	12. *Macrothrix rosea*	+	-	+	+	+
	13. *Simocephalus*	+	+	-	+	+
	14. *Scapholeberis sps.*	+	+	+	-	+
4. Mollusca	1. *Limnaea auricularia*	+	-	+	+	+
	2. *L. acumainata*	-	+	+	+	+
	3. *Lamellidens marginalis*	+	-	+	+	+
	4. *Limnaea sp.*	+	+	-	+	+
	5. *L.consobrinus*	+	+	+	-	+
	6. *Pila globosa*	+	-	+	+	+
	7. *Planorbis sp*	-	+	+	+	+
	8. *Vivipara bengalenis*	+	-	+	+	+
	9. *V. oxytropsis*	+	-	+	+	+



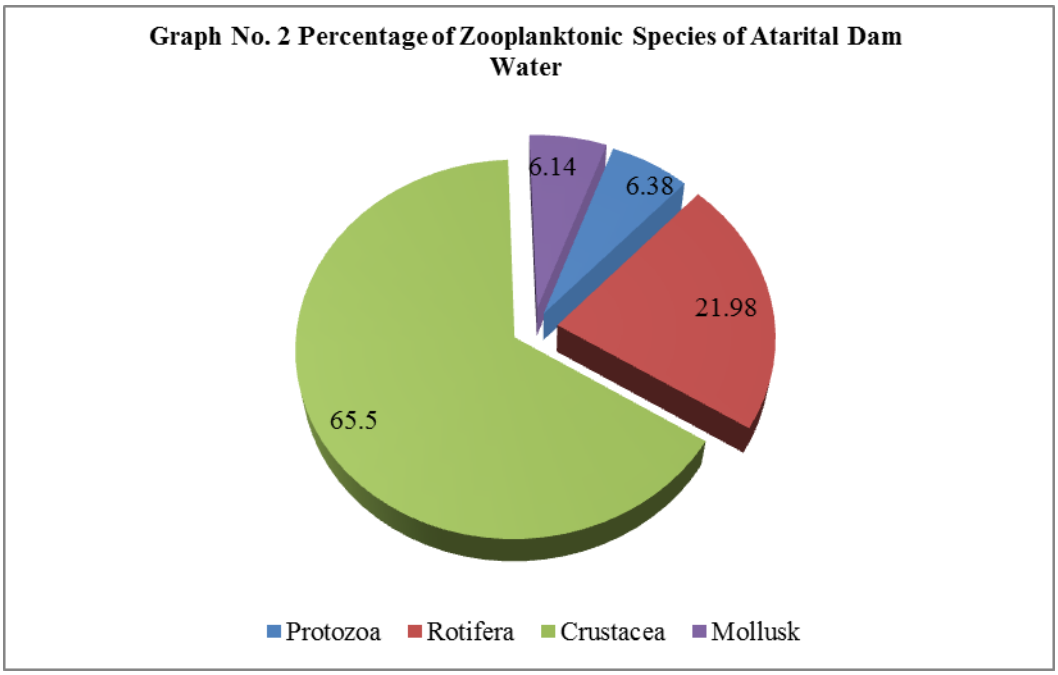


TABLE NO. 3 MEAN OF MONTHLY VARIATION IN ZOOPLANKTON (ORG/L) IN ATARITAL DAM WATER

Organism	June 2020	July 2020	Aug 2020	Sept 2020	Oct. 2020	Nov. 2020	Dec. 2020	Jan. 2021	Feb. 2021	Mar 2021	Apr. 2021	May 2021	Min	Max	Mean Value	Grad total	Perc. (%)
PROTOZOA	80	35	75	110	120	140	172	65	8	125	215	121	65	215	111.67	1340	6.38
ROTIFERA	160	340	255	470	475	460	385	320	485	556	465	245	160	556	384.67	4616	21.98
CRUSTACEA	425	350	1105	1520	980	1295	1530	1430	1510	1560	1358	690	350	1560	1146.08	13753	65.50
MOLLUSK	70	40	72	98	115	125	170	70	80	120	210	118	40	210	107.33	1288	6.14
Total	735	765	1507	2198	1690	2020	2257	1885	2157	2361	2248	1174	615	2541	1749.75	20997	100

The zooplankton population clearly showed seasonal periodicity during the course of present study, showing the two peak one during November and December and the second in March and April. The protozoan population did not very significantly with month as well a site, but the rotifers, crustaceans and Mollusca showed variations with respect to months but not with sites.

The monthly fluctuation of total zooplankton are presented in table no. 1&2 (Graph. no.1 &2). The Atarital dam for the period of study June 2020 to May 2021 were found Protozoa species mean values have been ranged between 65 org/l in the month of January 2021 and 215 org/l in the month of April 2021, Rotifera species mean values have been ranged between 160 org/l in the month of June 2020 and 556 org/l in the month of March 2021 Crustacean, species mean value have been ranged between 350 org/l in the month of July 2020 and 1560 mg/l in the month of March 2021and Mollusca species mean values range 40 org/l in the month of July 2020 and 210 org/l in the month of April 2021 .

The presence of Zooplanktons in Atarital Dam water for the total species, their units, percentage in various

months have been presented Table no.1. and 2 and Four major group of zooplankton species have been taken in notice as Protozoa total unit counting is 1340 org/l, its amounting 6.38%, Rotifers 4616 org/l with the percentage of 21.98%, crustacean species 13753 org/l with the percentage of 65.50% and Mollusca species 1288 org/l with the percentage of 6.14%. In this way the total unit of zooplanktons in Atarital dam water is 20997 in the 100% organisms/liter.

Zooplanktons are considered to be the ecological indicators of water bodies (Gajbhiye and Desai 1981). Factors such as light intensity, food availability, dissolved oxygen and predation effect the population dynamics of zooplankton. Low pH or higher salinity can reduce their diversity and density (Horn and Goldman, 1994). The zooplankton assemblage of this dam consists primarily of rotifer followed by crustaceans and protozoa. Seasonal variation of the zooplankton populations of Atarital dam correlate to changes in environmental factors.

Similar observation was made by many researchers throughout the country Kar and Kar (2013) reported 26 species of Zooplankton from an oxbow lake of Cachar, Assam; Tyor et al. (2014) studied Zooplankton diversity in a shallow lake of Gurgaon, Haryana revealing Rotifera with highest diversity followed by Cladocera and then Copepoda showing least diversity; Pawar (2014) reported 66 species of Zooplankton in some freshwater bodies around Satara district of Maharashtra, India.

Pahwa and Mehrotra (1966) reported rotifer population from Ganga river, where they constituted 61.5 to 94.4% of population. Govind (1969) reported a rotifer peak in February (24.7%) out of the total zooplankton from shallow zone of Tungbhadra reservoir. Gupta (1989) reported a major rotifer peak in August and in February from two ponds near Jodhpur. Sheeba et. al. (2004) Qualitative and quantitative study of zooplankton in Ithikkara river, Kerala. These exhibited a bimodal pattern with a major peak in December and a minor peak in August. The second group of zooplankton, Copepoda, also exhibited two maxima (April & August) and two minima (February, March and September).

CONCLUSION:-

The qualitative analysis of zooplankton from Atrital dam aquatic ecosystems revealed the presence of three taxonomic groups: Rotifera, Crustceans, Cladocera. The dominance of zooplankton species is highly variable in different types of water body according to nutrient levels, predator and other environmental factors which then affects the other biotic components of the ecosystems. The rapid increase of human activities and assemblage of livestock are creating pollution in the dam water and needs immediate measure. At this critical juncture the local representatives, Government and Non-Government bodies, the educated bodies, the village heads and the reputed figures of the society should come forward and formulate conservational model for the sustainability of this beautiful water body.

REFERENCES:-

1. Battish, S.K. (1992). Freshwater zooplankton of India. Oxford and IBH publishing Co., New Delhi.
2. Bhat N., A. Wanganeo A.and R.Raina(2014): The composition and diversity of net zooplankton species in a tropical water body (Bhoj wetland) of Bhopal,India: International journal of biodiversity and conservation,Vol.6(5): 373-381.
3. Edmondson, W.T. (1959). Rotifera, in W.T. Edmondson (ed.). Fresh-water Biology, 2nd edn. New York: John Wiley.
4. Gajbhiy, S.N. and B.N. Desai. 1981. Zooplankton variability in polluted and unpolluted waters of Bombay. Mahasagar.Bull. Nat. InstOceangr.,4: 173-182.
5. Govind, B. V. 1969. Bottom fauna and macrovegetation in the Tugabhadra reservoir and their role in the food chain of fish communities.Proc. Sem Ecol. Fish., pp 27-29.
6. Gupta, S 1989.Pollution Ecology of some ponds in urban vicinity of Jodhpur.Ph. D. Thesis University of Jodhpur, p. 234.
7. Kar, D. and Barbhuiya, M.H. (2004). Abundance and diversity of zooplankton in Chatla Haor, a floodplain wetland in Cachar district of Assam. Environment and Ecology, 22 (1):247-248.

8. Kar, D. (2007). Fundamentals of Limnology and Aquaculture Biotechnology. Daya Publishing House, xiv+609.

9. Kar, S. and Kar, D. (2013). Studies on zooplankton diversity of an oxbow lake of South Assam, India. International Journal of Current Research, 5(12):3652-3655.

10. Koli K.B.and D.V.Muley (2012): studied on zooplankton diversity and seasonal variation with special reference to physicochemical parameters in Tulshi reservoir of Kolhapur district (M.S.): India: International scientific research journal, Vol.4(1): 38-46.

11. Kulkarni D.A. and S.S.Surwase(2013):Studies on Occurance, Richness and Composition of Zooplankton in Seena river water at, Mohal, Dist-Solapur, MS, India:International Research Journal of Biological Sciences,Vol.2(2):25-28.

12. Michael, R.G. and Sharma, B.K. (1998). Indian Cladocera (Crustacea: Branchiopoda: Cladocera). Fauna of India and adjacent countries Series – Zool. Surv. India, Calcutta.

13. Pahwa, D.V. and S.N. Mehrotra 1966.Observations on fluctuations conditions of river Ganga.Proc. Nat. Acad. Sci. India, 36 (2): 157-189.

14. Patole P.D (2015): Study of zooplankton population in a freshwater Nakane dam in Dhule(MS):Indian Streams Research Journal, Vol.4 (12).

15. Pawar, S.M. (2014). Zooplankton Diversity and Density in Some Freshwater Bodies around Satara (M.S) India. Journal of Environments, 1(2): 64-67.

16. Pradhan V.P (2014): Zooplankton diversity in fresh water Wunna lake: Int. J. of Life Sciences, Vol.2 (3): 268-272.

17. Sehgal K., Phadke G.G., Chakraborty S.K. and S. V. Reddy (2013): Studies on Zooplankton Diversity in Dimbhe Reservoir, Maharashtra, India:Advances in Applied Science Research, Vol.4(1):417-420.

18. Sharma, B.K. and Sharma, S. (2008). Zooplankton diversity in floodplain lakes of Assam. Records of Zoological Survey of India. Occasional paper no 290: 1-307.

19. Sharma S., Siddique A., Singh K., Chouhan M., Vyas A., Solnki C., Sharma D., Nair S. and T. Sengupta (2010): Population Dynamics and Seasonal Abundance of Zooplankton Community in Narmada River (India):3741 researcher0209, Vol.2 (9): 1-9.

20. Sheeba, S., Ramanujan, N. and Santosh, S. 2004. Qualitative and quantitative study of zooplankton in Ithikkara river, Kerala Ecology, Environment and Conservation 10(3): 249-292.

21. Tyor, A.K., Chopra, G. and Kumari, S. (2014). Zooplankton diversity in shallow lake of Sultanpur National Park, Gurgaon (Haryana). International Journal of Applied Biology and Pharmaceutical technology, 5(1): 35- 40.

22. Watkar A.M and M.P.Barbate (2013): Studies on Zooplankton Diversity of River Kolar, Saoner, Dist. Nagpur, Maharashtra: Journal of Life Sciences and Technologies, Vol.1(1) : 26-28