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Zooplankton Diversity in Tedhi Nadi at Godwaghat of District Gonda, Uttar Pradesh, India

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Abstract

The present investigation deals with the study of monthly variation of Zooplankton diversity in Tedhi Nadi at Godwaghat of district Gonda, Uttar Pradesh, India. The work was carried out for a period of one year from November 2019 to October 2020. A total of 21 genera and 18 families were found in Tedhi Nadi at Godwaghat. Among these 4 genera belongs to Protozoan, 5 genera belong to Rotifers, 5 genera belong to Crustacean and 7 genera belong to Meroplanktonic organisms. Zooplankton showed distinct qualitative and quantitative variations. Number of Zooplankton increased in the summer month (May) while decreased in the spring month (February). Different groups of Zooplankton exhibited their distinct peak in different months of the year. In Tedhi Nadi at Godwaghat, meroplanktonic organisms have been found to be dominant among Zooplankton groups, generally Eristalis larvae, Chironomus larvae, Culex larvae and Anopheles larvae present in water body, which indicate the polluted nature of water body of Tedhi Nadi. Thus keeping in view the importance of study steps, should be taken for conservation and maintenance of Tedhi Nadi. It is the necessarily step which have to be followed for the safety of water body of Tedhi Nadi.

Keywords: Zooplankton, diversity, Tedhi Nadi, Godwaghat and Gonda

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Introduction

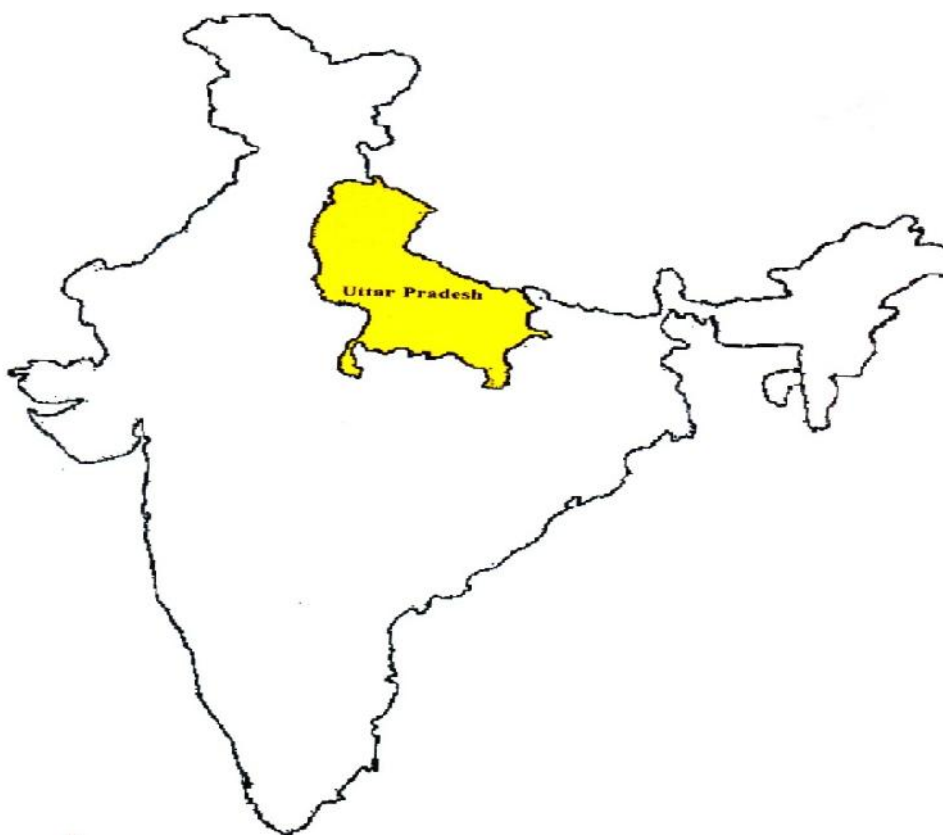
Zooplankton are a diverse group of heterotrophic organisms that consume Phytoplankton, regenerate nutrients via their metabolism and transfer energy to higher trophic level (Mishra, 1968). It plays an important role in recycling nutrients as well as cycling energy within their respective environment. These are the main sources of natural food for fish which is directly related to their survival, growth and are base of omnivorous, planktonivorous fishes and the most essential for fish larvae culture (Jha, 1968). Zooplankton vary from site to site within the same location with similar ecological conditions and as such both qualitative and quantitative studies of Zooplankton in a water bodies are of great importance in managing successful pisciculture operation (Srivastava, 1956). Zooplankton are often an important

link in the transfer of energy from producers to aquatic carnivores (Singh, 2000). Zooplankton is a good indicator of changes in water quality because it is strongly affected by environmental conditions and responds quickly to changes in water parameters as well as environmental conditions. Zooplankton communities respond to a wide variety of disturbances including nutrient loading, acidification, sediment input etc. It is a well suited tool for understanding water pollution status (Sahai, 1969). The studies of Zooplankton diversity in our country were undertaken by investigators like Battish (1992), Chaturvedi (1999), Sharma and Hussain (2001) Tripathi (2006,a), Lalita Sukhija (2007), Sharma and Sharma(2008), Ahmad (2012), Singh (2012), Goswami and Mankodi (2012), Negi and Sheetal(2013), Shashikant (2014), Tripathi (2016), Singh (2019), Tripathi (2019) and Tripathi (2020).

But still the studies on qualitative and quantitative assessment of Tedhi Nadiat Godwaghat ecosystem of district Gonda ,Uttar Pradesh State region is not taken for research by any investigator. Looking from this point of view the Zooplankton diversity in Tedhi Nadi at Godwaght of district Gonda studies was undertaken to know the types of Zooplankton present during the study period.

Materials and Methods

Location of study area: Tedhi Nadi at Godwaghat is one of the important sites of the district Gonda, Uttar Pradesh .It is situated 8 km from the district head quarter. The district Gonda lies between 26°47'and 27°20' north latitude and 81°30', 82°46' east longitude (Map-1, 2&3). Tedhi Nadi originated from Chittaura Jheel and join river Ghaghara. Flows in the range about 269 km from Chittaura Jheel to river Ghaghra (Fig.-1).



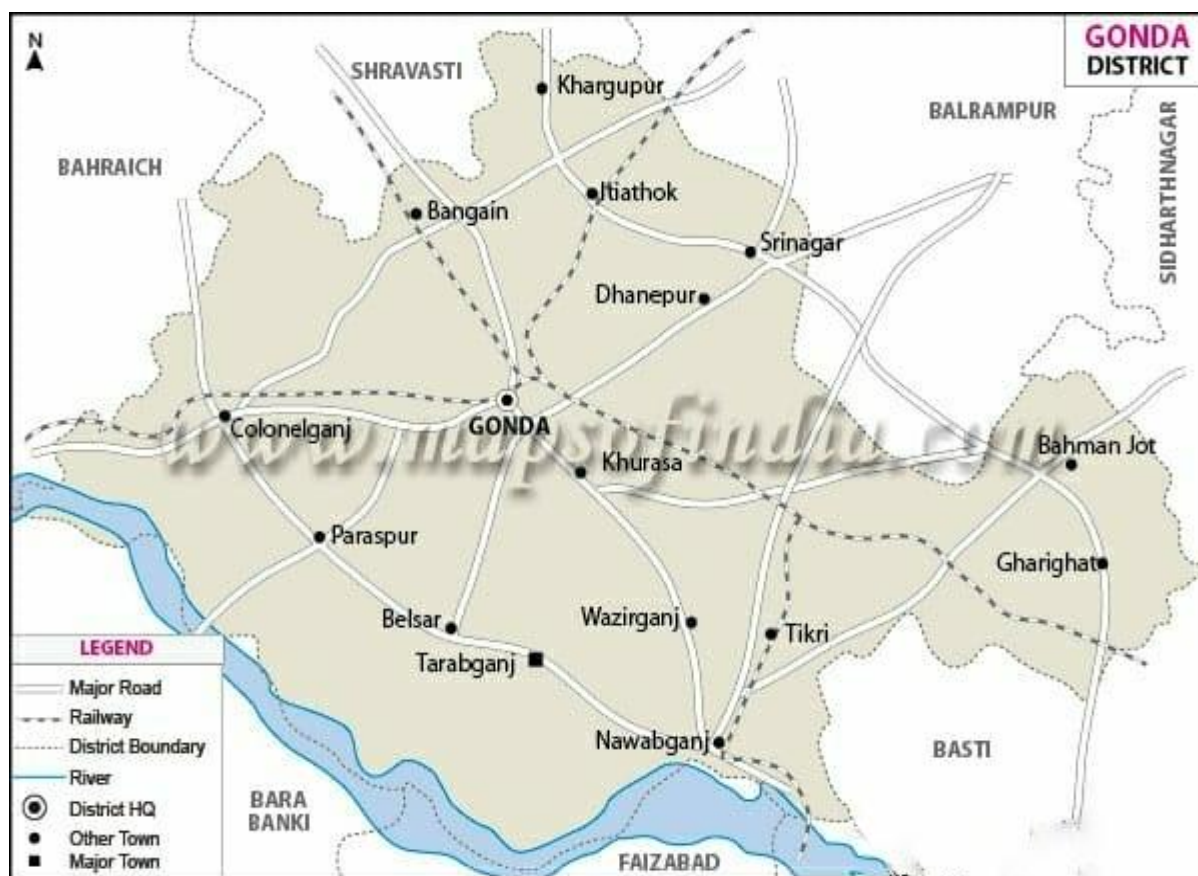
Map-1:Location of the study area in India

Sampling and preservation: Zooplankton samples in Tedhi Nadi at Godwaghat were collected during second week of each month between 08.30 AM 10.30 AM. They were taken from different sampling station fixed up in littoral region, pelagic region and polluted region were transported to the laboratory of P.G. Department of Zoology, M.L.K.P.G. College, Balrampur, Uttar Pradesh, India .

For the collection of Zooplankton, plankton net which is a ring type terricot net (24mesh/mm2) was used. Total of 10 litres of water was filtered through plankton net and the filter water was collected in 125 ml reagent bottle. The Zooplankton were preserved in 5% formaldehyde solution on the spot and were brought to laboratory for identification. For the identification of zooplankton using standard taxonomic literatures (Ward and Whipple, 1959). Zooplankton community composition, abundance and diversity worked out according to Mishra (1968).



Map-2: Location of the study area in Uttar Pradesh



Map-3: Location of the study area in district Gonda



Fig-1: Tedhi Nadi at Godwaghat of district Gonda, Uttar Pradesh

Results and Discussion

During present investigation, total 21 genera and 18 families of Zooplankton belonging to four major groups viz. Protozoan, Rotifers, Crustacean and Meroplanktonic organisms have been reported from three different site at Tedhi Nadi at Godwaghat of district Gonda for a period of about one year November 2019 to October 2020. Monthly variation of Zooplankton community is documented in Table-1. The maximum Zooplankton genera recorded at polluted region followed by littoral and polluted region respectively. In the Tedhi Nadi at Godwaghat among Protozoan: *Amoeba* sp. (Amoebidae), *Euglena* sp. (Euglenaceae), *Loxodes* sp. (Loxodidae) and *Trichodina* sp. (Trichodinidae) were recorded from all sites. Among Rotifers: *Epiphanus* sp. (Epiphanidae), *Colurella* sp. (Colurellidae), *Scardium* sp. (Notommatidae), *Polyartha* sp. (Synchaetidae) and *Asplanchna* sp. (Asplanchnidae) were recorded from all sites. Among Crustaceans: *Alona* sp. (Chydoridae), *Bosmina* sp. (Bosminidae), *Daphnia* sp. (Daphniidae), *Moina* sp. (Moinidae) and *Cyclops* sp. (Cyclopidae) were recorded from all sites. Among Meroplanktonic organisms: *Anopheles* larvae (Culicidae), *Culex* larvae (Culicidae), *Chironomus* larvae (Chironomidae), *Eristalis* larvae (Syrphidae), *Tanytus* larvae (Chironomidae), *Hydrophilus* larvae (Hydrophilidae) and *Regimbertia* larvae (Hydrophilidae) were recorded from all sites. Zooplankton showed distinct qualitative and quantitative

variations. Number of Zooplankton increased in the summer months (May) and decreased in the winter month (February) is documented in (Table-1).

During the study period, the presence of Zooplankton was maximum in the Summer month (May) and minimum in the spring month (February). This is not conformity to the finding of Eggleton (1931) and Devey (1945), who observed the maximum Zooplankton in the month of April and minimum in the month of September in an American lake, while Srivastava (1956) and Tripathi (2006,b) observed maximum in the month of May and minimum in the month of February from lake of Lucknow, Uttar Pradesh and Seetadwar lake of district Shravasti, Uttar Pradesh state, India. Michael (1969) concluded the peak period in the month of January and April but Mandal and Moitra (1975), Jana and Manna (1975), Bose and Lakara (1994) found maximum peak during summer months which is quite in conformity to the findings of this investigation. The differences in the occurrence of peak in Zooplankton might be due to different nature of the water bodies, difference in composition of abiotic factors of water, soil and variation in productivity of water bodies. Some workers such as Bhati and Rana (1987), Chaurasia (1996) and Singh (2000) correlated bottom community with the Fish productivity and accordingly this water body is most suitable for fish culture.

Table-1: Monthly fluctuations of Zooplankton in Tedhi Nadi at Godwaghat of district Gonda (U.P.), India (Data of November 2019 to October 2020)

S.No.	Zooplankton Genera	Months											
		Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	Protozoan												
1	<i>Amoeba</i> sp. Family-Amoebidae	++	++	++	+	++	++	+++ +	++	++	++	++	++
2	<i>Euglena</i> sp. Family- Euglenaceae	++	++	++	+	++	++	+++	++	++	++	++	++
3	<i>Loxodes</i> sp. Family-Loxodidae	++	++	++	-	++	++	+++	++	++	+	++	++
4	<i>Trichodina</i> sp. Family-Trichodinidae	++	++	++	-	++	++	+++	++	++	++	++	++
	Rotifers												
5	<i>Epiphanus</i> sp. Family-Epiphanidae	++	++	+	-	++	++	+++	++	++	++	++	++
6	<i>Colurella</i> sp. Family- Colurellidae	++	++	+	-	+	++	+++	++	++	++	++	++

7	Scaridium sp. Family-Notommatidae	++	++	+	-	++	++	+++	++	++	++	++	++
8	Polyartha sp. Family-Synchaetidae	++	+	+	-	++	++	+++	++	++	++	++	++
9	Asplanchna sp. Family-Asplanchnidae	++	++	+	-	++	++	+++	++	++	++	++	++
Crustacea													
10	Alona sp. Family-Chydoridae	++	+	+	-	++	++	+++	++	++	++	++	++
11	Bosmina sp. Family-Bosminidae	++	+	+	-	+	++	+++	++	++	++	×+	++
12	Daphnia sp. Family- Daphniidae	++	+	+	+	++	++	+++	++	++	++	++	++
13	Moina sp. Family-Moinidae	++	++	+	-	++	++	+++ +	++	++	++	++	++
14	Cyclops sp. Family-Cyclopidae	++	++	+	+	++	++	+++ +	++	++	++	++	++
Meroplankton													
15	Anopheles larvae Family-Culicidae	+++ +	+++ +	+++ +	++	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +
16	Culex larvae Family-Culicidae	+++ +	+++ +	+++ +	+	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +
17	Chironomus larvae Family-Chironomidae	+++ +	+++ +	+++ +	+	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +
18	Eristalis larvae Family-Syrphidae	+++ +	+++ +	+++ +	+	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +
19	Tanytus larvae Family-Chironomidae	++	++	++	+	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +	+++ +
20	Hydrophilus larvae Family- Hydrophilidae	++	+++	+	+	+++	+++	+++ +	+++	++	++	++	++
21	Regimbertia larvae Family-Hydrophilidae	++	++	+	+	+++	+++	+++ +	+++	++	++	++	++

Note :

++++ =Abundant(51-100%); +++=Common(26-50%); ++= Frequent(11-25%); +=Rare (0-10%); - =Absent(Nil)

Conclusion

The present contribution is the result of the extensive and intensive studies on Zooplankton diversity in Tedhi Nadi at Godwaghat of district Gonda, Uttar Pradesh State carried out during November 2019 to October 2020. During present investigation in Tedhi Nadi at Godwaghat, meroplanktonic organisms have been found to be dominant among Zooplankton groups

and generally Eristalis larvae, Chironomus larvae, Culex larvae and Anopheles larvae present in water body of Tedhi Nadi at Godwaghat which indicate the polluted nature of water body of Tedhi Nadi. Thus keeping in view the importance of study, steps should be taken for conservation and maintenance of water body of Tedhi Nadi. It is the necessarily step which have to be followed for the safety of Tedhi Nadi.

References

- 1: Ahmad, U., Parveen, S., Mola, H.R.A., Kabir, H.A. and Ganai, A.H. (2012): Zooplankton population in relation to physico-chemical parameters of Laldiggi pond in Aligarh, India. *J. Environ. Biol.*, 33:1015-1019.
- 2: Battish, S.K. (1992): Fresh water Zooplankton of India. Oxford and IBH Publishing Co., New Delhi.
- 3: Bhati, D.P.S. and Rana, K.S.(1987): Zooplankton in relation to abiotic components in the Fortmoat of Bharatpur. *Proc. Nat. Acad. Sci., India*, 57(B) III:237-242.
- 4: Bose, S. K. and Lakra, M.P. (1994): Studies on macrozoobenthos of two freshwater ponds of Ranchi, Bihar. *J. Freshwater Biol.*, 6(2):135-142.
- 5: Chaurasia, S.(1996): Seasonal fluctuations of Zooplankton in Burha tank water, Raipur, India. *J. Environ. Prot.*, 16(2):140-142.
- 6: Devey, E.(1945): Limnological studies Connecticut, VI.The quantity and composition of bottom fauna of 36 Connecticut and New York lakes. *Ecol. Mongr.*, 21:7-92.
- 7: Eggleton, F.E. (1931): A limnological study of profound bottom fauna of certain freshwater lakes. *Col.Mon.*, 1:231-232.
- 8: Goswami, A.P. and Mankodi, P.C. (2012):Study on Zooplankton of freshwater reservoir Nyari II Rajkot district Gujarat, India, *ISCA, J. Biol. Sci.* 1(1):30-34.
- 9: Jana, B.B. and Manna, A. K. (1975): Seasonal changes of benthic invertebrates in two tropical fish ponds. *J. Freshwater Biol.*, 7:129-136.
- 10: Jha, U.N. (1968): Productivity of pond ecosystem, Ph.D. Thesis of B.H.U. Varanasi (U.P.), India.
- 11: Lalita Sukhija(2007): Seasonal variation in Zooplankton population in relation to physico-chemical characteristics of water of Kayad lake near Ajmer (Rajasthan). *Nat. Env. Poll. Tech.*, 6(2):299-302.
- 12: Mandal, B.K. and Moitra, S. K. (1975): Studies on bottom fauna of a fresh water pond at Burdwan. *J. Inland. Fish. Soc.*, 8:34-38.
- 13: Michael, R.G. (1969): Studies on bottom fauna in a tropical freshwater pond. *Hydrobiologia*, 31(1): 203-229.
- 14: Mishra, R.(1968): Ecology work book, Oxford and IBH Publ.Co. Calcutta.
- 15: Negi, R.K. and Sheetal, M.(2013): Zooplankton diversity of tons river of Uttarakhand state, India. *Int. J. of Zoology & Res.*, 3(2):01-08.
- 16: Sahai, A.B.(1969): Investigation on the ecology of Ramgarh lake, Gorakhpur. Ph.D. Thesis of Gorakhpur University, Gorakhpur (U.P.), India.
- 17: Shashikant, R. Sitre (2014): Zooplankton fauna of a freshwater pond in Bhadrawati Town of Chandrapur district in Maharashtra state (India). *Int. Interdisciplinary Res. Journal*, Vol. IV, March (2014): 219-226.
- 18: Sharma, U.P. and Hussain, M.D. (2001): Abundance, ecology and Zooplankton in a tropical flood plain lake, Assam, India. *Evil. Env. Conser.*, 7(4):397-407.
- 19: Sharma, B.K. and Sharma, S.(2008): Zooplankton diversity in flood plain lakes of Assam. *Records of Zoological Survey of India: Occasional paper* No.290:01-307.
- 20: Singh, D.N.(2000):Seasonal variation of Zooplankton in a tropical lake.*Geobios*,27:97-100.
- 21: Singh, R.K., Pandey, M.K., Kumari, R. and Ranjan, P.(2012): Study on the diversity and seasonal variation of Zooplankton in Mahendra Nath pond, Siwan, Bihar. *Int. J. Pharm. Biol. Arch.*3(4):867-870.
- 22: Singh, K., Tripathi, R.B. and Singh,I.(2019): Study of Zooplankton population in Baghel Talab of district Bahraich (U.P.), India. *Int. J. Recent Sci.Res.*, 10(07):33847-33849.
- 23: Srivastava, V. K.(1956):Bottom organisms of a freshwater fish tank .*Curr.Sci.*,23:158-159.
- 24: Tripathi, R.B., Singh, I. and Tewari, D.D. (2006,a): Qualitative and quantitative study of Zooplankton in Seetadwar lake of Shravasti (U.P.), India. *J. Flora and Fauna*, 12(1):37-40.
- 25: Tripathi, R.B., Singh, I., Tewari, D.D. and Pathak, M. (2006, b): Composition, abundance and distribution of Zooplankton in Seetadwar lake of Shravasti (U.P.), India. *J. Bioved*, 17(1, 2):135-137.
- 26: Tripathi, R.B., Shukla, A .and Singh, I. (2016): Water quality of Seetadwar lake of Shravasti U.P. in relation to physico-chemical characteristics of Zooplankton. *J. Flora and Fauna* 22(2):257-262.
- 27: Tripathi, R.B., Shukla, A. And Singh, I. (2019): Study of Zooplankton diversity in Chittaura Jheel of district Bahraich (U.P.), India. *Int.J . Recent Sci.Res.*, 10(07): 33497-33499.

28: Tripathi, R.B. (2020): Study of water parameters and diversity in larvae of aquatic insects at Sagratalab of district Gonda (U.P.), India. Int. J. Adv. Res. Biol. Sci., 7(12): 96-105.

29: Ward, H.B. and Whipple, G.C. (1959): Freshwater Biology, 2nd Edn. John Wiley & Sons, New York, 1248.

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