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Original Article

Qualitative and Quantative Analysis of Macrozoobenthos of Baghel Taal, A Wetland of U.P.

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Abstract

The present study was conducted on Baghel Taal of Baharaich district of U.P., dealing with the qualitative and qualitative analysis of macrozoobenthic diversity. During the present investigation 36 genera were recorded which belonged to phyla Annelida, Arthropoda and Mollusca. During the present study molluscs show rich diversity contributing about 42%, to the total benthic population as shown in table, arthropods also shoes good diversity contributing about 30% while as annelids contributing only 28% of the total population. The overall benthic population was estimated to be 1712 nos/m². Highest diversity (15 genera) and population density (752 nos/m²) was contributed by molluscs followed by arthropods (11 genera and 472 nos/m²) and annelids (10genera and 488 nos/m²).

Keywords: Macrozoobenthos; Baghel Taal; Wetland.

Introduction

Wetlands are considered to be one of the richest sources of biological diversity. Due to urbanization and anthropogenic pressure most of the wetlands are succumbed to greater degree of biologically active nutrient accumulation.

Benthic invertebrates occupy the bottom of the water body. The functional role of benthic communities in the trophic dynamics of aquatic ecosystem is well acknowledged. The composition, distribution of benthic organisms over a period of time provide index of the ecosystem. In recent years, there is greater emphasis world over for better understanding of benthic environment.

The present study was conducted on Baghel Taal of Bahraich, U.P., with special reference to macrozoobenthic diversity. The benthic communities composed of a wide range of flora, fauna and bacteria from all levels of food web and inhibit different types of habitat such as mud, sand attached to rocks, stones, macrophytes and other solid organic matter. As we know that each species is important component of food chains and food webs which helps in transfer of energy to trophic levels and cycling of nutrients in any ecosystem. Macrozoobenthic organisms act as food for many aquatic birds and fishes also benthic organisms are used as potent pollution indicators, so it is utmost important to document the benthic diversity. On these aspects, Benthic diversity of lentic waterbodies were studied by many ecologists in India (Gupta, 1976; Dutta *et al.*,1887; Shrivastava, 1997; Pani and Misra, 2000; Kumar, 2001; Sisodia, 2001; Pani and Misra, 2005; Srinivasan and Hamlatha, 2006; Bhat and Pandit, 2009; Vyas and Bhat, 2010) but no such information is available in fresh water body of North-Tarai region of U.P. Keeping this mind an attempt has been made to document macrozoobenthic diversiy of Bhagel Taal and their composition as well as to know the variation of the macrozoobenthic diversity with depth.

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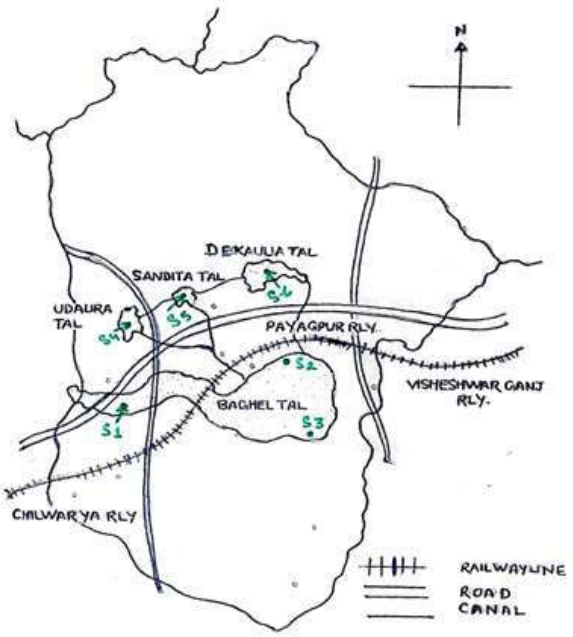
Study Area

Baghel Tal is a large shallow perennial lentic waterbody with irregular margins and dense growth of macrophytes. It is situated in village Baghel, Payagpur block of district Bahraich at a distance of about 1.60 km. to the south-east of Payagpur Railway station. It is about 31 km. away from Gonda, 39km. from Bahraich and 45 km. from Balrampur. It is half oval in shape with maximum diameter of 3800m and connected with three small waterbodies namely Udavra Tal, Sandita Taal and Dekaulia Taal. It receives water from three main streams, Babia Nallah from north-west side, Jamvar Nallah from north and Sakarpatti Nallah from north-east side during rainy season. It is also a Bird sanctuary extending around 32 km. with total catchment area of reservoir 441.5575 acre. Out of this only 121.22 acre is water body. In rainy season but in summer its area becomes limited to 438 ha. Its maximum depth in summer season was found 3.6m. It is habitat of rich micro- and macro living organisms including *Nymphaea, Nelumbo*, Narkul, Tinna Rice, vegetation as well as snails, fishes and frogs. This abundant food attracts hundreds of resident and migratory birds including Siberian crane during winter season. Five stations were selected throughout the water body on the basis of habitat, nutrient type and supply which are as S_1, S_2, S_3, S_4 , S_5 and S_6. Sites S_1 , S_2 and S_3 are located in inshore region of Baghel Taal receiving organic nutrients which act as food for growth of benthos. Sites S_4 , S_5 and S_6 are located in deepest region of Udavra Taal, Sandita Tal and Dekaulia Taal respectively.

Materials and Methods

The sediment sample from the bottom at all station were collected during morning time by using Peterson Grabe mud sampler, collected samples were sieved through 0.5 mm sieve (Ankar and Elmgreen, 1976) the material which retained on sieve were collected and from it benthic organisms were stored out with the help of forceps and brush and were collected in narrow mouthed plastic bottle, containing 4% formalin and 70% alcohol as preservative depending upon the type of organisms to be preserved. The soft-bodied organisms were preserved in 70% alcohol while the shelled organisms like mollusks in 4% formalin (Borror *et al.,* 1976) . All macro fauna of bottle were identified with the help of available key and manuals Neetham and Needham (1962), Borror *et al.* (1976) and Pennak (1989) under the light microscope. The population of organisms was counted and number of individuals of a species per sample and was expressed as number/m² .



Location of Baghel Tal

Results and Discussion

In normal condition the distribution of macro benthos fauna has been reported to be dependent on the availability and distribution of preferably food items. In fact, their capacity to exploit areas with optimum food supply might be explained by their abundance (Zahoor *et al.*, 2010). The benthic population of the water body was estimated to be 1712 nos/m² during twelve month study period in bimonthly sampling. Vyas and Bhat (2010) and Shrivastava (1997) reported 1782 nos/m² 845nos/ m² intropical water body and Ravishankar reservoir, respectively. Benthic diversity of all the stations is given in the table; during the present investigation 36 genera were identified throughout the study period. Out of 36, 10 species belonged to annelids, 11 belonged to arthropods and 15 belonged to molluscs. Among the macrobenthos, *Tubifex* sp., *Aumbriculus* sp., *Lumbriculus* sp. and *Nais* sp. of annelid; *Chironomus* sp, *Spaniotoma* sp. and *Cyclops* sp. of arthropods where as *Bellamya* sp, *Vivipara* sp, *Pila* sp, and *Pissidium* sp. of molluscs were most dominant forms being present in all the six stations of Baghel Tal.

During the present study molluscs show rich diversity contributing about 42%, to the total benthic population as shown in table, arthropods also shoes good diversity contributing about 30% while as annelids contributing only 28% of the total population. Molluscs performs key role in functioning the aquatic ecosystems. In the present study it was observed that diversity as well as density of macrobenthos was maximum in spring months followed by summer months due to maximum decomposition of macrophytes leaf litters on the bottom of waterbody. These leaf litter decomposed by decomposers because the increased water temperature, activating the process of decomposition of these organic sediments.

Stations S_1 (33 genera & 448nos/m²), S_2 (31 genera & 445 nos/m²), and S_3 (29 genera & 433 nos/m²)are rich in diversity and population density as compared to stations S_4 (19 genera & 140 nos/m²),S_5 (18 genera & 133 nos/m²), and S_6 (16 genera & 113 nos/m²) supporting less benthic diversity and population density due to inadequate nutrients supply because S_1, S_2 and S_3 are inshore stations of main waterbody where as S_4 , S_5 and S_6 are deepest

Table 1: Macrozoobenthos diversity of Baghel Taal during 2016 – 2017

Phylum/Genera	Number of Macrozoobenthos (number/m²)					
	S_1	S_2	S_3	S_4	S_5	S_5
Annelida						
Tubifex sp.	32	34	23	5	9	6
Aumbriculus sp.	19	25	12	10	4	5
Lumbriculus sp.	34	4	9	16	12	15
Poecilobdella sp.	6	-	8	12	8	-
Glassiphonia sp.	7	4	8	-	-	-
Batracobdella sp.	12	6	1	1	-	-
Branchiura sp.	6	8	2	-	4	3
Limnodrillus sp.	11	14	9	2	-	-
Nais sp.	26	15	19	3	7	2
Hemiclepsis sp.	5	6	-	-	-	-
Diversity / Density	10/158	9/116	8/90	7/49	6/44	5/31
Arthropoda						
Chironomus sp.	37	32	42	12	11	16
Spaniotoma sp.	18	13	15	8	1	9
Polycetropus sp.	6	3	11	-	-	-
Philopotamus sp.	8	15	10	-	-	-
Tinodes sp.	6	6	11	-	-	-
Hydroptila sp.	2	-	-	-	-	-
Psphenus sp.	33	10	35	-	-	-
Caenidae sp.	-	-	-	6	8	-
Gammarus sp.	-	12	-	-	-	-
Cyclops sp.	12	11	19	2	8	4
Atydae sp.	3	-	9	-	-	8
Diversity / Density	9/125	8/102	8/152	4/28	4/28	4/37
Mollusca						
Lymnaea sp.	12	-	10	7	-	-
Bellamya sp.	32	25	26	11	15	14
Vivipara sp.	4	6	9	2	5	2
Gyraulus sp.	3	9	-	-	-	-
Thiara sp.	29	24	27	-	-	-
Pila sp.	24	29	38	11	12	18
Unio sp.	11	14	12	-	8	2
Planorbis sp.	2	31	14	-	-	-
Gibbia sp.	7	14	4	8	-	-
Corbicula sp.	12	14	11	7	9	4
Lymnaea sp.	11	15	15	-	5	2
Perreysia sp.	4	12	7	4	3	-
Pissidium sp.	11	15	14	13	2	3
Melanoides sp.	3	8	4	-	-	-
Planorbis sp.	-	11	-	-	2	-
Diversity / Density	14/165	14/227	13/191	8/58	9/66	7/45
Total	33/448	31/445	29/433	19/140	19/133	16/113

stations of small waterbodies connected with Baghel Taal. Due to low depth, transparency increases which helps in penetration of sunlight to the bottom layer by which process of decomposition get accelerated resulting increase in benthic diversity.

The findings of the present study agreed with the findings of Efitre *et al.* (2001), Pani and Misra (2005), Srinivasan and Hamlatha (2006) and Vyas and Bhat (2010). Thus it can be concluded that shallow inshore area of water bodies are suitable for growth of benthic organisms because these zones are rich in macrophytes and solid organic wastes.

Conclusion

Macrozoobenthos function in different ways that are important to maintaining ecosystem functions such as energy flow in food webs. In the process of maintaining energy flow, these benthic species simultaneously provide essential ecosystem services, such as nutrient cycling and aeration of sediments. Different species comprise distinct functional groups that provide ecological integrity . The present study shows that benthic organisms grow easily in shallow zones. Thus the present water body is cradle for benthic organisms especially shallower regions were macrophytes are abundant from diversity point of view habitat i.e. bottom of the body showed posses mud, sand, rocks, stones, macrophytes and solid organic wastes to which benthic organisms get attached and act as on organic debris.

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