CIBTech Journal of Zoology ISSN: 2319–3883 (Online)
An Open Access, Online International Journal Available at http://www.cibtech.org/cjz.htm
2019 Vol.8 (3) September-December, pp.34-37/Verma et al.
Research Article

MICROZOOBENTHIC INVERTEBRATE DIVERSITY IN RAPTI RIVER AT BALRAMPUR (U.P.)

[1]Dharm Raj Verma*, [2]Sadguru Prakash, [3]Tabrez Ahmad and [4]Priyanka Singh
[1]*Department of Zoology, Ekalavya Mahavidyalya, Jarwal Road, Bahraich, U.P.*
[2]*Department of Zoology, M. L. K. (P.G.) College, Balrampur, U.P.*
[3]*Department of Zoology, BSNV PG College Lucknow, U.P.*
[4]*Vedwati I College Bahraich, Uttar Pradesh*
**Author for Correspondence: dharmrajverma10@gmail.com*

ABSTRACT
During the present investigation twenty species of microzoobenthic invertebrate were recorded belonging to three major phyla viz: Annelida, Arthropoda and Mollusca. Among these, arthropods dominated (56.82%) and were followed by Annelids (37.14%) and Molluscans (6.04%). Presence of *Chironomus* sp. larvae *Tubifex* sp., *Vivipora* sp. and *Lymnaea* sp. indicates that water of the Rapti river has got polluted. As elsewhere, macroinvertebrate communities proved to be good indicators of water quality and should be used as bioindicators in long time monitoring of this river.

Keywords: *Micorzoobenthos, Bioindicators, Rapti River*

INTRODUCTION
Aquatic ecosystem provides a home to many species including phytoplankton, zooplankton, aquatic plants, annelids, insect, molluscans etc. They are organized at many levels from smallest building blocks of life to complete ecosystem, encompassing communities, population, species and genetic level. Benthic invertebrates occupy the bottom of water body. The functional role of benthic communities in the trophic dynamics of river ecosystem is well acknowledged. The composition, distribution of benthic organism over a period of time provides index of the ecosystem. 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 are an important and integral part of any aquatic ecosystem as they form the basis of trophic level and any negative effects caused by pollution in the community structure can in turn affect trophic relationships. These can include those that feed on them directly or indirectly such as fish and bird populations. In addition, macrozoobenthic have the ability to clean rivers as they utilize the organic and detritus matter. Macrozoobenthic are also used as potent pollution indicators, so it is utmost important to document the benthic diversity. Keeping this in view an attempt has been made to document macrozoobenthic diversity of Rapti river in Balrampur.

MATERIALS AND METHODS
The bimonthly sediment samples from the bottom from specific stations of Rapti river at Balrampur during September 2011 to August 2012 were collected by using Peterson grade mud sampler, collected samples were sieved through 0.5 mm sieve (Ankar and Elmgreen, 1976). The material which retained on sieve was collected and from it benthic organisms were sorted out with the help of forcep and brush and were collected in plastic bottle, containing 70% alcohol as preservative (Adoni, 1985). Some attached fauna from rocks, stones and macrophytes were also collected. All macrozoobenthic organisms were identified with the help of available key and manuals of Needham and Needham (1962) and Pennak (1989) under the Metzer light microscope. The population of organisms were counted species wise *i.e.* no of individuals of a species per sample and were expressed as number/m^2.

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 (Grimas, 1965). During the present investigation twenty texa of macrobenthic invertebrate fauna were recorded during September 2011 to August 2012 belonging to three major phyla viz: Annelida, Arthropoda and Mollusca. Among these, arthropods (56.82%) dominated and were followed by annelids (37.14%) and Molluscns (6.04%).

Table 1: Macrozoobenthos (no./m^2) of Rapti river during Sept. 2011 to Aug. 2012

Phylum/Genera	Spring	Summer	Autumn	Winter	Total
Annelida					
Tubifex sp.	400	802	213	451	1866
Lumbriculus sp.	2	4	0	12	18
Poecilobdella sp.	0	32	10	8	50
Glassiphonia sp.	0	20	1	0	21
Total	**402**	**858**	**224**	**473**	**1955**
Arthropoda					
Chironomous sp.	350	125	126	2113	2714
Spaniotoma sp.	0	31	23	54	108
Polycentropus sp.	0	18	0	15	33
Philopotamus sp.	0	0	0	9	9
Tinodes sp.	9	0	0	4	13
Hydroptila sp.	0	0	0	9	9
Psephenus sp.	37	0	19	35	91
Caenidae sp.	0	0	0	9	9
Gammarus sp.	0	5	0	0	5
Total	**387**	**174**	**168**	**2248**	**2991**
Mollusca					
Lymnaea sp.	5	54	10	3	74
Bellamya sp.	20	18	29	26	93
Vivipora sp.	19	8	10	17	54
Gyralus sp.	0	9	0	0	9
Thiara sp.	2	5	0	1	8
Pila sp.	5	3	6	10	24
Unio sp.	15	20	13	8	56
Total	**66**	**117**	**68**	**65**	**318**

Four species of annelids were recorded throughout the year. Their maximum density was recorded in summer and minimum in autumn season. Among the annelids, *Tubifex* sp. was most dominant followed by *Poecilobdella* sp., *Glassiphonia* sp. and *Lumbriculus* sp.. Among annelids, Oligochaeta, *Tubifex* sp., dominated and were found throughout the year showing their peak in the summer seasons. Hawkes (1979) has reported that the members of Oligochaeta are usually favored by the organic environment and remain dominant in severally polluted conditions with special emphasis on *Tubifex* sp. which inhabit areas with strong sewage pollution and anoxic waters. However, presence of good organic detritus content contributed maximum quantity of Oligochaetes observed by Takeda (1999) and Callisto *et al.* (2005).

Nine species of arthropods were recorded throughout the year. Their maximum density was recorded in winter and minimum in autumn season. Among the arthropods, *Chironomous* sp. was most dominant followed by *Spaniotoma* sp., *Psephenus* sp., *Polycentropus* sp., *Tinodes* sp., *Philopotamus* sp.,

Hydroptila sp., *Caenidae* sp. and *Gammarus* sp.. Numerical abundance of Chironomous throughout the year indicates the pollution status of the river as chironomids are the common inhabitants of polluted waters, rich in nutrients and poor oxygen as also observed by Callisto *et al.* (2005). *Chironomous sp.* larvae showed its peak during summer seasons which could be attributed to low water level in the river, less oxygen content along with sluggish movement of water during these months as suggested by Sunder and Subla (1986).

Seven species of molluscans were recorded throughout the year. Their maximum density was recorded in summer and minimum in winter season. Among the molluscans, *Bellamya* sp. was dominant followed by *Lymnaea* sp., *Unio* sp., *Vivipora* sp., *Pila* sp., *Gyralus* sp. and *Thiara* sp. The availability of maximum molluscs during summer months could be related to two important ecological phenomenons. (a) the maximum abundance of decomposers settled organic matter and macrophytes on the bottom of water body and (b) increased water temperature, activating the process of decomposition of these organic sediments (Malhotra *et al.,* 1996). It seems true that the fluctuation brought about by these process in that water body study, create a very conductive micro as well as macro environment for the health growth and multiplication of the molluscan fauna. Higher abundance of Molluscans with increased water, temperature and decomposed organic matter has been also reported by Bath *et al.* (1999).

CONCLUSION

The river shows twenty species, out of them arthropods were well dominant at whole study area, because of their potency to tolerate the organic pollution. The present study concludes that the presence of some pollution bioindicator species such as *Chironomus* sp. larvae *Tubifex* sp., *Vivipora* sp. and *Lymnaea* sp. (Callisto *et al.,* 2005) directly points to the shifting status of the river from non-polluted to polluted. Industrial effluents, municipal sewage and domestic waste showed alarming shift or total elimination of sensitive biotic community form the habitat. As the human population continues to grow, it will contribute significantly towards the process of river biodegradation. This biosurvey of the macrobenthic invertebrate fauna gives an important insight into the health of the river and appends the knowledge and understanding of the management strategies involving biomonitoring as a significant tool in the restoration studies.

REFERENCES

Adoni AD (1985). Work book of Limnology, Pratibha publication Sagar, M. P. India. p. 1-213.

Ankar S and Elmgreen (1976). The benthic macro and meiofauna of the Askolandsort area (northem Beltic Proper). A stratified random sampling survey. *Get this from a library! Contributions from the Askö Laboratory, University of Stockho* **11** 1-115.

Bath KS, Kaur H and Dhillon SS (1999). Correlation of molluscs with physico-chemical factors at Harike reserviour (Punjab). *Indian Journal of Environment* **3** 159-163.

Callisto M, Goulart M, Barbosa FAR and Rocha O (2005). Biodiversity assessment of benthic macroinvertebrates along a reservoir cascade in the lower Sao Francisco river (Northeastern Brazil). *Journal of Biology* **65(2)** 1-6.

Grimas U (1965). Effect of impoundments on the bottom fauna of high mountain rivers. *Acta University Uppasaliensis,* **51** 5-24.

Hawkes HA (1979). Invertebrates as indicator of river water quality in biological indication of water quality. *John Wiley and Sons*, New York.

Malhotra YR, Sharma KK, Thakial MR (1996). Ecology of macroinvertebrates from a fish pond. *Proceedings of National Academy of Sciences, India* **66** 53-59.

Needham JG and Needham PR (1962). A guide to study the freshwater biology. *Halden-Daylnc San Francisco* p. 1-232.

Pennak RW (1989). Fresh invertebrates of the United States. Protozoan to mollusca. *John Wiley and Sons, NY*.
Sunder S and Subla BA (1986). Macrobenthic Fauna of a Himalayan river. *Indian Journal of Ecology* **13(1)** 127-132.
Takeda AM (1999). Oligochaete community of alluvial upper Parana river, Brazil: Spatial and Temporal distribution (1987-1988). *Maring PR-CEP:* 87 020-900, Brazil.