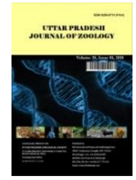
UTTAR PRADESH JOURNAL OF ZOOLOGY

41(15): 12-21, 2020
ISSN: 0256-971X (P)



DISTRIBUTION AND ABUNDANCE OF MACROINVERTEBRATES WITHIN TWO PONDS OF LNMU CAMPUS, DARBHANGA, BIHAR

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Author KS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SK and NKP managed the analyses of the study. Authors SK and NKP managed the literature searches. All authors read and approved the final manuscript.

Article Information

Editor(s):
(1) Dr. Golam Mustafa, Center for Resource Development Studies Ltd., Bangladesh.
Reviewers:
(1) Carlos Otávio Rodrigues dos Santos, Brazilian Institute of Geography and Statistic, Brazil.
(2) Paola Turienzo, Universidad Nacional de Cuyo and Universidad Juan Agustín Maza, Argentina.

Received: 10 August 2020
Accepted: 17 October 2020
Published: 22 October 2020

Original Research Article

ABSTRACT

Macroinvertebrates serve several important functions within the aquatic environment: They provide a valuable "cleaning" service by scavenging dead or decaying bacteria, plants, and animals, which helps recycle nutrients back into the system. They are an important food for fish, birds, amphibians and reptiles. The sample of macroinvertebrates were taken at three points characterized by different kinds of vegetation of both the investigating sites i.e. Anandbag Pond (P1) and Manokamana Temple pond (P2). Microbenthic sample for selections were collected monthly during study period. The Collected sample were washed and microbenthic invertebrates were transferred to vials containing 5% formalin for further identification. The organisms were segregated and their abundance was calculated as no. per square meter. Preserved sample of macro benthic invertebrates were identified.The qualitatively microbenthic invertebrates analysis showed the presence of three species of phylum Annelida belonging to class Hirudinea (*Poecilobdella granulosa, Savigny 1822*) and Oligochaete (*Pheretima posthuma*), six species of phylum Arthropoda belonging to three orders, Decapoda (*Palaemon malcolmsonii*), Diptera (*Chironomus sp.,Culicoides sp., Tabanus sp.*) and *Colepteran (Berosus sp. Hydroglyphus sp.*) and only one species of Mollusca belonging to family *Ampullariidae* (*Pila globosa*).During the course of study, 9 taxa were collected from the study area, of these, phylum Arthropoda contributed the largest share constituting 56.9% in p1 pond and 56.2% in P2 pond during 2012 and 56.7% and 55.6% in P1 and P2 pond respectively during 2013 and 27.7% in P1 pond and 27.8% in P2 pond of the total macroinvertebrates

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respectively. Phylum Mollusca was found in very less amount, it is contributed to share 14.9% in P1 pond and 16.0% in P2 pond during 2012 and 15.06% in P1 pond and 16.9% in P2 pond during 2013, of the total macroinvertebrates respectively. For statistical analysis, the microbenthic invertebrate fauna were analyzed species diversity, species richness, dominance and evenness which showed great variations. Manokamana Temple pond was more rich macroinvertbrates in comparison to Anandbag pond. The total no. of macroinvertebrates in P1 pond was 1154 and P2 was 1188 (year2012) and p1 was 1188, P2 pond was 1195 (2013). In Year 2012, phylum Annelida was varied from 8 to 50 in P1 pond and 7 to 52 in P2 pond, phylum *Arthropods* was varied from 30 to 78 in p1 pond and 32 to 75 in P2 pond while phylum Mollusca was varied from 4 to 32 in P1 pond and 6 to 34 in p2 pond. During 2012 the total number of Annelida, *Arthropods* and Mollusca was 324, 657 and 173 in P1 pond and 328, 664 and 189 in P2 pond found respectively. Similarly in year 2013, phylum Annelida was varied from 8 to 50 in P1 pond and 9 to 35 in P2 pond, phylum Arthropoda was varied from 32 to 79 in P1 pond and 7 to 35 in P2 pond respectively. During 2013 the total no. of Annelida, *Arthropods* and Mollusca was 329, 674 185 in P1 pond while 329, 664 and 202 pond recorded respectively. The contribution of arthropods were highest in both representative ponds and least number of molluscans in both ponds during (year 2012 and 2013) course of study. The application of diversity indices has revealed considerably high diversity of P2 pond fauna than p1 pond fauna. Very little differences were found between the both ponds with reference to macroinvertebrates.
Moreover, our study confirms the role of distribution and abundance of Macro-invertebrates and in maintaining high biodiversity and suggests that both ponds should be considered to provide both an exhaustive collection of species for pond management and conservation and basic insights into the functioning of pond communities.

Keywords: Ponds; annelida; arthropods; mollusca; *Pila globosa*; microinvertebrates; oligochaetae.

1. INTRODUCTION

Macroinvertebrates are small animals without a backbone that can be seen without a microscope. They live around living or dead vegetation, on the surface or in the sediments of water bodies. They include many larvae of insects such as mosquitoes, dragonflies and caddis flies that begin their lives in the water, before becoming land dwelling insects when they mature. Common macroinvertebrates include crustaceans (such as crayfish), snails, worms and leeches. Macroinvertebrates populate ponds, or streams in amazing numbers, some of them up to thousands in a square meter. They are an important part of food chain and food web. Many macroinvertebrates are sensitive to changes in P^H, dissolved oxygen, temperature, salinity, turbidity and other changes in their habitat. Habitats include rocks, sticks, dead and decaying vegetation. Macroinvertebrates record the history of a water body because many are sessile, or stay within a small area and live one or more years while the water flows by changes in the habitats (including water chemistry) most likely will cause changes in the macroinvertebrates assemblage. If a pollutants entering the water, or a change in the flow downstream of a dam, then the macroinvertebrates communities vary across the state and different water bodies when have their own characteristics communities. Macroinvertebrates are significant within the food and birds rely on them as food source. The most common types of aquatic macroinvertebrates are insects. As insects grow from an egg to an adult they change their body shape (metamorphosis). Macroinvertebrates are an important part of the aquatic food chain and can characterized by what the animal feeds on and how it acquires it. The categories are referred to as functional feeding groups and help describe the role each macroinvertebrates in an aquatic system. Macroinvertebrates live in many different places in a water bodies. Some live on the water's surface, some in the water itself, others in the sediment or on the bottom or on submerged rocks and leaf little. Each type of habitat provides a surface or spaces on or within each macroinvertebrates can live. The most important feature around a waterbody in vegetation, aquatic plant, particularly rushes and sedges, provide a surface on which macroinvertebrates can live. In addition, they balance the water flow, light facility and temperature around them. Shade by native trees and shrubs, protect banks form erosion, help to control the water flow, and nutrient filters, longs branches, bark and leaves that fall into water provide habitat for aquatic organisms. Leaf litter forms an important part of a food web for macroinvertebrates which feed on this material, or on the bacteria and fungi which cause it to decay. Environmental modifications or pollution can alter macroinvertebrates communities. Poor catchment management can exaggerate the turbidity of water. In highly turbid water, the light penetrating is reduced affecting photosynthesis of plant and increase the temperature of the water. High levels of suspended solids may begin to settle and change the composition of the bed of their waterbody as it coats, rocks and vegetation. This affect movement, feeding habitat and reproduction of some macroinvertebrates.

Macroinvertebrates are sampled in waterbodies because they are useful biological indicators of changes in the aquatic systems. The main advantages of using macroinvertebrates is that some have life span of up to a year and greater, they relatively sedentary have varying sensitivities to changes in water quality and they are easily collected and identified. Macroinvertebrates are best indicators for bio-assessment. The biotic environment of the water body directly affects in the distribution, population density and diversity of the macroinvertebrates community. Benthic fauna especially of great significance for fisheries that they themselves act as food of bottom feeder fishes. The littoral region is an important interface between land and pelagic zone of water body. Various researchers reported that energy content of macroinvertebrates and their seasonal changes in sub-tropical lake/pond water body, which explain rich biodiversity of the region. I one creates links between existing aquatic habitats, but also provide ecosystem services such as nutrient intercepting, hydrological regulation etc.

In addition, ponds are powerful model systems for studies in ecology, evolutionary biology and conservation biology, and can be use as sentinel systems in the monitoring of global change [1]. Pond were defined as waterbodies which may be permanent or seasonal, including both man-made and natural waterbodies with a maximum depth of no more than 8 m. offering water plants the potential to colonize almost the entire area of the pond [2].

Aquatic macroinvertebrates constitute an important part of animal production within wetlands. Among wetland inhabitants, macroinvertebrates have the potential to be relevant ecological indicators, being widely used to reveal short-and long terms environmental changes in both running and still water [1]. The EU water Framework Directive (WFD) demands for an integrated biological assessment of surface water bodies. Among the biological communities present in these ponds, benthic invertebrates are excellent indicators of pond as well as global temperature changes [3] and they are one of the most common groups of organism used to access the health of aquatic ecosystems. On the other hand, these small aquatic systems are rich and divers habitats and play a key role in safeguarding aquatic biodiversity [4]. These systems are considered to support a high richness of organisms, particularly macroinvertebrates [5], both on a local and regional scale [6]. Therefore, it is crucial to achieve a good understanding of the richness patterns in these systems, especially the environmental factors influencing their diversity, Several studies document clear relationships between composition and richness of macroinvertebrates communities and a variety of ecologically relevant gradients in ponds, such as hydro period, surface area, water chemistry, pond connectivity, habitat heterogeneity, presence of large predators and altitude.

The effect of ecological factors on macroinvertebrates communities are complex difficult to disentangle, partially because richness-environment relationship are typically marked by other physical, or geometric constraints. Benthic macroinvertebrates present great importance in some ecological process, such as fluxes and nutrient cycling [7]. Bioturbation of sediment surface and fragmentation of leaves from riparian vegetation are some of the processes of nutrients release to water carried out by benthic organisms [8]. The benthic macroinvertebrates, inserts are the predominant taxonomic group in abundance and biomass in the majority of tropical lakes. The distribution, composition and diversity of macroinvertebrates well as of biotic factors and also by mutual interactions among the organisms. This benthic macroinvertebrates community clearly indicate the ecological conditions of inhabited aquatic ecosystems. Benthic fauna composition in aquatic environment depends mainly on factors such as substratum type water topic environments depends mainly on factors such as substratum type water tropic status and hydro-period. Oxygen and depth also constitute essential factors to macroinvertebrates distribution, density of these organisms is remarkable lower at great depths, but the existence of some species tolerant to low oxygen concentrations is evidenced at these sites.

Other important factors for macroinvertebrates species disturbing are the availability of food resource and the inter specific trophic interactions, such as competition and predation. Habitat complexity can determine the composition of local community. Diversity of biological communities in more complex sites tends to increase due to the presence of environment with minor sires, ample availability of shelter against predators, and protection against physical disturbances, which sever to assist in survival, recovery and persistence of the organisms. Therefore, communities in habitats with low complexity usually present great temporal variation, as compared with the organisms in environments with high structural complexity, which can persist for a longer time.

According to different scientific studies, composition and density of macroinvertebrates communities are relatively stable from one year to the next in non-perturbed systems. However, seasonal fluctuations linked to the dynamics of vital cycles of each species can result in extreme variation in community structure in some environments. In lakes marginal to tropical rivers, as those located in flood plains, aquatic biota is mainly influenced by the regime of flood pulses, it was observed in the high Parana river [9] and in the high Paranapanema river.

The sample of macroinvertebrates were taken at three points characterized by different kinds of vegetation of both the investigating sites i.e. Anandbag Pond (P1) and Manokamana Temple pond (P2). Microbenthic sample for selections were collected monthly during January 2012 to December 2013.

However, there is a dearth of literature related to the macroinvertebrates diversity of Darbhanga district pond especially those related to LNMU, Campus, of Darbhanga, Bihar. The present study has been undertaken to assess the quantitative and qualitative diversity in macroinvertebrates of two representative ponds of LNMU, Campus, Darbhanga, Bihar.

1.1 Aim of the Study

The aim of the present study was to examine diversity of macroinvertebrates in different sites of Anandbag Pond (P1) and Manokamna Temple Pond (P2). Relationship among both ponds of macroinvertebrates due to the structural homogeneity of the both ponds.

Because different types of macroinvertebrates tolerate different stream conditions and levels of pollution, their presence or absence is used to indicate clean or polluted water. The absence of these organisms in a water body, indicate that the water quality is poor. After successful study of distribution and abundance of Macro-invertebrates of both ponds, to examine the fish farming values of ponds.

2. MATERIALS AND METHODS

2.1 Description of Study Area

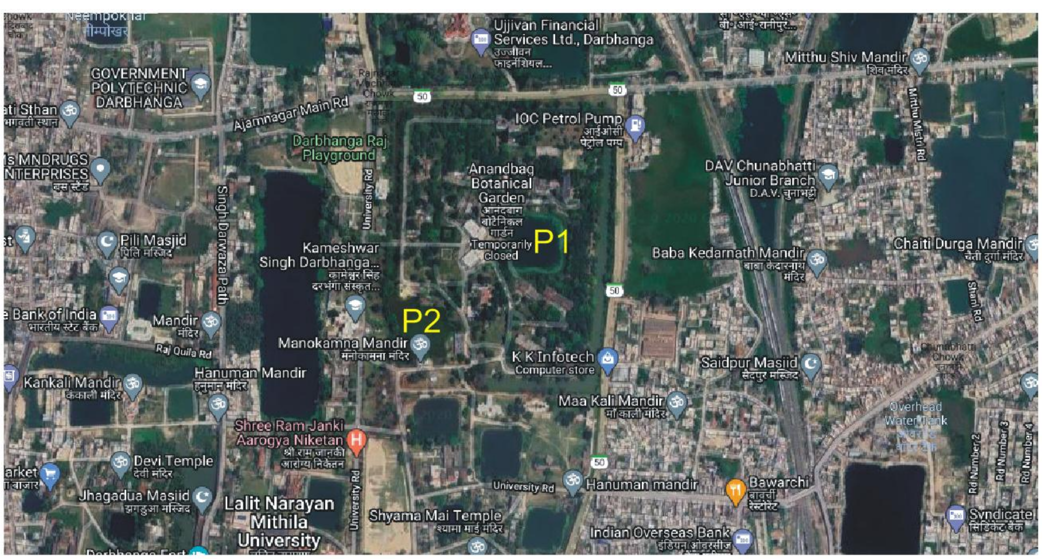
Darbhanga is situated in 25.53° to 26. 27°.(North) latitude and 85.45 °.(east) longitude and average of temperature variations in this area are 12° to 38°**C**. With average rainfall of 1638 mm.

The sample of macroinvertebrates were taken at three points characterized by different kinds of vegetation of both the investigating sites i.e. Anandbag Pond (P1) and Manokamana Temple pond (P2). Microbenthic sample for selections were collected monthly during January, 2012 to December, 2013.

The Collected sample were washed through sleeve no.40 (256 meshes/cm2) and microbenthic invertebrates were transferred to vials containing 5%formalin for further identification. The organisms were segregated and their abundance was calculated as no. per square meter according to Welch [10]. Preserved sample of macro benthic invertebrates were identified according to Pennak [11].

2.1.1 The microbenthic invertebrate of each sample were calculated with this method

No of macroinvertebrates/cm2 of sediment = $\frac{\text{No.of organisms counted}}{\text{No.of Macrotoinvertebrates.}}$



(Satellite Image of P1 & P2 Pond of LNMU Campus, Darbhanga, Bihar)

The net result as percentage frequency was calculated after following RaunKiaer [12] formula as:-

$$\text{Frequency} = \frac{\text{No.of sampling until in which the species occured}}{\text{Total no.of unitl studied}} X100$$

3. RESULTS AND DISCUSSION

Present results confirms the role of distribution and abundance of Macro-invertebrates and in maintaining high biodiversity in both ponds communities. Biodiversity are derived through mathematical quantifications of Community similarity index and values got above 1, that indicates highly completely overlapping in both ponds communities.

The qualitatively microbenthic invertebrates analysis showed the presence of three species of phylum Annelida belonging to class Hirudinea (*Poecilobdella granulosa, Savigny 1822*) and Oligochaete (*Pheretima posthuma*), six species of phylum Arthropoda belonging to three orders, Decapoda (*Palaemon malcolmsonii*), Diptera (*Chironomussp, Culicoides sp., Tabanus sp.*) and Colepteran *(Berosus sp., Hydroglyphus sp.*) and only one species of Mollusca belonging to family Pilidae (*Pila globosa*).

During the course of investigation individuals representing 9 taxa were collected from the study area as shown in Table 1 and Table 2 of these, phylum Arthropoda contributed the largest share constituting 56.9% in p1 pond and 56.2% in P2 pond during 2012 (Table 4) and 56.7% and 55.6% in P1 and P2 pond during 2013 Table 4) and 27.7% in P1 pond and 27.8% in P2 pond (Table 5) of the total macroinvertebrates respectively. Phylum Mollusca was found in very less amount, it is contributed to share 14.9% in P1 pond and 16.0% in P2 pond during 2012 (Table 4) and 15.06% in P1 pond and 16.9% in P2 pond during 2013 (Table 5) of the total macroinvertebrates diversity respectively.

For statistical analysis, the microbenthic invertebrate fauna were analyzed species diversity, species richness, dominance and evenness which showed great variations (Table 4 and Table 5). Manokamana Temple pond was more rich macroinvertbrates in comparison to Anandbag pond. The total no of macroinvertebrates in P1 pond was 1154 and P2 was 1181 during, 2012and 1188 in P1 pond and 1195 in p2 pond during the 2013.

In Year 2012, phylum Annelida was varied from 8 to 50 in P1 pond and 7 to 52 in P2 pond, phylum Arthropods was varied from 30 to 78 in p1 pond and 32 to 75 in P2 pond while phylum Mollusca was varied from 4 to 32 in P1 pond and 6 to 34 in p2 pond (Table 2). During 2012 the total number of Annelida, Arthropods and Mollusca was 324,657 and 173 in P1 pond and 328, 664 and 189 in P2 pond found respectively (Table 2)

Similarly in year 2013, phylum Annelida was varied from 8 to 50 in P1 pond and 9 to 53in P2 pond, phylum Arthropoda was varied from 32 to 79 in P1 pond, 30 to 76 in P2 pond, and 5 to 33 in P1 and7 to35 in P2respectively (Table 3) During 2013 the total no. of Annelida, Arthropods and Mollusca was 329,674,185 in P1 pond while 329,664,202 in p2 pond recorded respectively.

In both P1 and P2 pond the presence of oligochaetes reveals that P1 and P2 pond water always exists form mildly polluted to heavily Polluted condition and with rise of temperature, the pollution level goes up. During this study it was observed that an increase in the decaying matter during summer that enhances the growth of oligochaetes.

It was also observed that some species of macroinvertebrates were found to decrease in number of disappeared from pond due to pollution in both ponds, This could be attributed to the intolerant nature of concerned benthic fauna was recorded in summer and winter. This might be due to input of large quantity of leaf litter from surrounding areas into the both representative pond of LNMU, Campus, Darbhanga by wind action. The available food might have possibly accelerated the growth of macroinvertebrates during summer periods.

Benthic fauna is the food for bottom feeding fishes and indicates the status of water body. In the, presence of some microbenthic invertebrate*s such as Chironomus sp, Tetanus sp. etc. along with alarm*ing range that interfere the water is getting polluted and this pond is in the initial stages of eutrophication. So, there is a pressing need to gain ecological knowledge about this pond from properly recorded water quality data and improve the management in such a way that it may be utilized not only by present generation but it made available to future generations also.

There are number of biological indicators reported by Researchers, amongst them the benthic macroinvertebrates are most commonly used as biological indicators [13,14].

Macroinvertebrates in any water bodies clearly indicate about water quality and polluting level has been reported by [15]. Macroinvertebrates are sensitive to hydrological parameters like dissolved oxygen, pH, salinity, temperature and turbidity documented by Water and River Commisssion, 2021. Due to major disturbances the impact on macro-invertebrate's drift was critical in downstream had not been documented [16].

Table 1. Distribution and diversity of Macroinvertebrates in Anandbag Pond (P1) and Manokamna Temple Pond (P2) of L.N.M.U. Campus, Darbhanga during 2012 to 2013

Phylum	**Class**	**Order**	**Family**	**Organism**	**Distribution (+/-) 2012**		**Distribution (+/-) 2013**	
					P_1	**P_2**	**P_1**	**P_2**
Annelida	Hirudinea	Gnathobdellida	*Hirudinidae*	*Poecilobdella granulosa (savigny, 1822)*	+	+	+	+
	Oligochaeta	*Opisthopora*	Megascolecidae	*Pheretima posthuma*	+	+	+	+
Arthropod	Crustacea	Decapoda	Palaemonidae	*Palaemon malcolmsonii*	+	+	+	+
	Insecta	Diptera	Chironomidae	*Chironomus sp*	+	+	+	+
			Ceratopgonidae	*Culicoides sp.*	+	+	+	+
			Tabanidae	*Tabanus sp.*	+	-	+	+
		Coleoptera	Hydropilidae	*Berosus sp.*	_	+	_	+
			Dytiscidae	*Hydroglyphus* sp.	+	_	+	_
Mollusca	Gastropoda	Mesogastrapoda	Pilidae	*Pila globosa*	+	+	+	+
Total				9	8	7	8	8

Table 2. Monthly variation of macroinvertebrates (Per cm^2 of sediment) in anandbag pond (P1) and manokamna temple pond (P2) of L.N.M.U Campus, Darbhanga during January, 2012 to December 2012

S. No.	Monthly (2012)	Macro --Invertebrates					
		Annelida		Arthropoda		Mollusca	
		P1	P2	P1	P2	P1	P2
1	January	26	24	56	58	16	18
2	February	21	20	50	52	25	27
3	March	8	7	48	49	29	30
4	April	23	24	30	32	32	34
5	May	24	26	45	46	15	16
6	June	50	52	40	42	4	6
7	July	34	35	38	40	11	13
8	Aug	43	44	56	60	9	10
9	September	22	24	66	65	8	9
10	October	26	25	74	72	7	8
11	November	25	24	76	73	7	8
12	December	22	23	78	75	10	10
.	Total no.	324	328	657	664	173	189

Table 3. Monthly variation of Macroinvertebrates (Per cm^2 of sediment) in Anandbag Pond (P1) and Manokamna Temple pond (P2) of L.N.M.U Campus, Darbhanga during January 2013 to December 2013

S. No.	Monthly (2013)	Macro --Invertebrates					
		Annelida		Arthropoda		Mollusca	
		P1	P2	P1	P2	P1	P2
1	January	25	26	58	56	18	20
2	February	22	24	53	52	26	26
3	March	8	9	50	49	28	31
4	April	24	22	32	30	33	35
5	May	25	24	46	47	16	17
6	June	50	53	42	43	5	7
7	July	33	34	36	38	12	15
8	Aug	44	43	58	60	10	12
9	September	22	23	68	66	8	10
10	October	26	25	75	73	8	7
11	November	26	25	77	74	9	10
12	December	24	24	79	76	12	12
.	Total no.	329	329	674	664	185	202

Table 4. Monthly variation of Macroinvertebrates (Per cm^2 of sediment) in Anandbag Pond (P1) and Manokamna Temple pond (P2) of L.N.M.U Campus, Darbhanga during January 2012 to December 2012

S. No.	Phylum	Total Number		Percentage	
		P1	P2	P1	P2
1.	Annelida	324	328	28.2%	27.8%
2.	Arthropoda	657	664	56.9%	56.2%
3.	Mollusca	173	189	14.9%	16.0%
	Total	1154	1181	100%	100%

However, these studies overlooked the downstream export of macroinvertebrates. Whenever this is the fact that more organism drift over a unit of stream bottom are actually present in the area as benthic community and the fact was recognized by [17,18,19]. Several biotic and abiotic factors have been recognized major cause to influence macroinvertebrates drift in any water bodies.

Besides, benthic macroinvertebrates exhibit increase drift with raised stress due to heavy discharge [20, 21]. According to different scientific experiment it has

Table 5. Monthly variation of Macroinvertebrates (Per cm^2 of sediment) in Anandbag Pond (P1) and Manokamna Templepond (P2) of L.N.M.U Campus, Darbhanga during January 2013 to December 2013

Sl. No.	Phylum	Total Number		Percentage	
		P1	P2	P1	P2
1.	Annelida	329	329	27.7%	27.5%
2.	Arthropoda	674	664	56.7%	55.6%
3.	Mollusca	185	202	15.6%	16.9%
	Total	1188	1195	100%	100%

found that there was positive relationship between scientific rate and discharge in river herein during a short drought period. Temperature is not a primary factor for change in drift of a river but is cause change in activates of insect which may increase the risk of an accidental drift [22].

O'ttop and Wallace [23] have documented a positive relationship between macroinverbrates drift and drifting detritus and revealed part detritus act as disturbance agent. However, this increase may have been more related to increase is discharge than physical disturbance of the streambed detritus.

Rincon and Lobon cervia has reported variation in macro invertebrates drift in Iberian system in 1997. They have documented that low drift period for macroinvertebrates in January and high drift pattern in July. Researchers have also reported that nocturnal drift pattern with epuschualr pack during most of the month among macroinvertebrates in tropical Australian stream.

Shubina and Martynov [24] have revealed that macroinverates drift in two ice covered salmon stream during the month of March and April in Northern European USSR and found to be significant macroinverbrates drift. Various researchers have reported that in winter riffing of organisms was generally found low in comparison to summer. A number of authors agree that there is correlation between peak drift of macroinverates system with peak productivity of the ecosystem in terms biomass productivity [24, 25, 26, 27, 28] Maximum drift in macroinvertebrates was reported in summer and minimum in winter. Current research findings are accord with finding discussed above. Macro benthos are greater than 0.5mm size, exhibit variety of body shapes, feeding styles, reproductive modes and perform varieties of ecological function. They act as connecting link between the biotopes of substratum and water column in the aquatic systems. They take part in breakdown of particulate organic material and export emery to higher trophic level and can potentially support off shore and pelagic communities. The developmental stages of microbenthic organisms are pelagic, forming important components of plankton community that in turn is consumed by fish and thus having her influence on pelagic fisheries. Thus, the estimation of benthic production is useful to assess the fishery production of particular area. Macroinvertebrates are particularly favored because they are relatively sedentary and therefore representative of local conditions. Thus in fresh water ecosystems, macroinvertebrates indicator taxa are widely used to assess the quality and pollution status of a water body.

The studies on benthic communities of shallow tropical lakes of India are reported by several authors [29]. According to different research, it has reported the energy content of macroinverbrates and their seasonal changes in Indian Sub-tropical water body which explains rich biodiversity of the region. As benthic invertebrates die, they decay, leaving behind nutrients that are used by aquatic plants and other animals as food chain and food web. They also help in assessment of water quality. As like many types of benthos are sensitive to pollutant such as metal and organic wastes. Mayflies, stoneflies and caddisflies are generally intolerant of pollution of pond water. If a large number of these insect species are collected in a sample, the water quality in the stream is likely to be good. If only pollution tolerant organisms such as non-bathing modes and worms are found the water is likely to polluted. They help in water purification. It is well known that he benthos is the best indicators of water pollution in water bodies. The present investigation deals with the population density and species diversity of aquatic macroinvertbrates fauna have discussed. Macroinvertebrates biodiversity raced in Sabarmati river during Jan-Dec, 2010. During the present investigation, it was observed that Anandbag Pond (P1) and Manokamana Temple pond (P2) having rich biodiversity of macroinvertebrates Communities.

In Summary, the contribution of arthropods were highest in both representative ponds and least number of molluscans in both ponds during (year2012 and 2013) the course of study. The diversity revealed considerably high diversity of P2 pond fauna than p1 pond fauna. Very little differences was found between the both ponds. Future study aiming to evaluating the macroinvertebrates dynamics with relation to fish diversity and their numbers.

5. CONCLUSION

The contribution of arthropods were highest in both representative ponds and least number of Molluscans in both ponds during (year2012 and 2013) the course of study. The diversity revealed considerably high diversity of P2 pond fauna than p1 pond fauna. Very little differences was found between the both ponds. On the basis of this study and findings, helps the people of this region for fish farming.

ACKNOWLEDGEMENT

The authors are thankful to the Head, University Department of Zoology, Lalit Narayan Mithila University, Darbhanga, for kindly providing necessary laboratory and field facilities.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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