Benthic macro invertebrates indicator as indication of water quality in River.

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Abstract

The Present study was carried out in the lotic water of Chhapra district of Bihar. The description of the study are includes the geography and climate of the selected areas as such river Saryu and river Gandak. The sampling station were identified for collecting samples from all the selected sites. Since river Saryu and river Gandak are large river which flow from Chhapra district along its course hence sample stations were identified a such catchments which can easily be traced and used for collection.

Key words :- Lotic geography climate catchments , traced collection.

Introduction

The tern benthos comes from a Greek nouch which means depth of the sea-Benthos is also used in fresh water biology to refer to organism at the bottom of fresh water bodies of water such as lakes, river and streams fresh water Benethic macro invertebrates water or more simply benthos are animals without backbones that are larger than 1/2 millimeter (the size of pencil dot) The animals live on rocks logs sediment debris and aquatic plants during their life period. Benthic macro invertebrates commonly used as indicators of the biological condition of water bodies They are reliable indicators because they spend all as most of their lives in water are easy to collect and differ in their tolerance to pollution.

Method and Materials

The present study was carried out in the lotic water of Chhapra district of Bihar The description of the study are includes the geography and climate of the selected area Bihar is located in the eastern part of India between latitude 21-58 - 10'' N- 27-31 -15 N and longitude 82-19-50E-88 -17- 40-E It is an entirely land locked state.

Chhapra is a city and headquarter of Saran district in the state of Bihar India It is situated near the Junction of the Ganga rivers. We study many benthic fauna but in present study I am continuing with detail study of Phylum Mollussca.

The samples were collected from two stations at Dahiyawan Ghat and Riwilganj Ghat of river Saryu and river Gandak four times a year for two years The Physico-chemical properties of water were tested. The sampling station were identified for collecting samples from all the selected sites. Since The river Saryu and river Gandak are large river which flow from Chhapra district along its course hence sample stations were identified at such catchments which can easily be traced and used for collection . The sampling stations for the rivers are as follows

Source	Sampling station
River Gandak	Godna Smariya (ghat) ami (ghat) catchment area
River Saryu	Riwilganj Ghat

The sampling frequency was kept quarterly for a total period of over 12 month for two years (December 2009-November 2011) Samples were collect in winter month summer months pre-monsoon and post monsoon periods hence total 8 samples were collected in 24 months.

The samples were collected with the use of an ekman dredge and secured in bucket using US standard sieve No 40. The whole samples were sieved from the plankton net made up of nylon bolting silk mesh size 0.03 mm to 0.04 mm to obtain the benthos with the help of forceps or brush for preserving the same in 4% formalin. The residual organic matter retained in the sieve was transported to the laboratory for further collection of benthos. To this 5mg of sucrose was added for easy collection of benthos. In addition to this 0.1-02 percent eosin dye was also used to statin the benthos. Sample were preserved in 70 percent of ethanol For qualitative analysis animals were examined using microscope and identified using standard keys. The sample counting was done with the help of Lackey's drop method where a known volume of water which fits below a 22 mm cover glass is placed over a glass slide. The volume is drop taken by a dropper organism in this drop are counted in a high power micro field of a compound light microscope one micro field can be taken as one sampling unit.

The number of benthos per unit area were calculated as

No of organism / drop = area of cover glass / area of one micro field = Average count per field=

22/0.01 x no of organism. If there are x drop in one ml than organism/ml x = 22/0.01 x no of organism X x

Result and discussion

In present study I found the benthic macro invertebrates fauna of the main channel of river Saryu comprises 70 identified taxa with high diversity of 22 species of Annelids 30 species of Mollusca 18 families of species of Arthropoda the benthic fauna of river Gandak was found almost similar to river Saryu with minor differences. In this case about 60 diverse taxa were recorded with 24 species of Annelids, 16 species of Mollusca and 20 families genera or species of Arthropoda. In present study I found many fauna but I continued with detail study of fauna Mollusca. After study I found that in river Saryu the Mollusca included class gastropoda with 16 species (53.3% Mollusca) by class Bivalvia with 14 species (46.6% of Mollusca) with maximum species belonging to family Amblemidae (16.66) followed by family Thiaridace (13.33%) family Planorbidae and Corbiculidae (10% each) family unionidae, Sphaeridae , Arcidae, Stenothiridae and Vivipiridae (6.66% each) followed by Bithy Ridae Pleuroceridae , Lymacidae , Physidae, Succineidae (3.33% each).

In river Gandak the Mollusca included major class Gastropoda which comprised 68.66 of Mollusca and smaller class Bivalvia which comprised 31.33 % of Mollusca. The class Gastropoda included 2 species each belonging to family Thiaridae, Viviparidae, and Stenothyridae (12.5% each) and one species each belonging to family Pleuroceridae, Lymneacdidae, Plaonrbidae, Physidae and Succineidae (6.25% each) the class Bivalvia Comprised 2 species belonging to family uniondae (12.5) and one species each belonging to family Arcidae, Corbicalidae, Spharidae (6.255%)

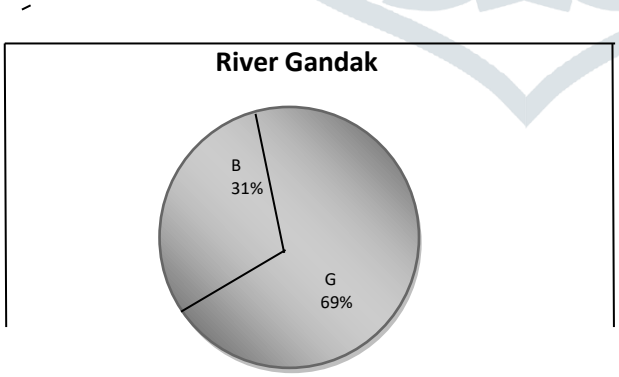

Figure- Relative Abundance of Mollusca in the River Gandak

G= Gastropoda ; B= Bivavlia

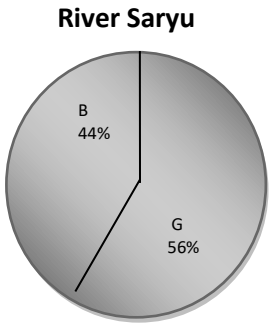

Figure -Relative Abundance of Mollusca in the River Saryu

G= Gastropoda ; B= Vivavlia

Table- Macro-invertebrate fauna of River Saryu		
Phylum Mollusca	**No./m²**	**Relative Abundance**
Class Gastropoda **Family Bithyniidae** **1. Digoniostoma pulchell (Benson,1836)**	**13**	**2.9%**
Family stenothyridae **2. Stenothyra ornata Prasad, 1921** **3. Gangetia miliacea (Nevill, 1880)**	**10** **9**	**1.68%** **1.51%**
Family Thiaridae **4. Thiara (tarebia) Lineata Gray. 1828** **5. Thiara (Tarebia) Scabra (O.F. Miiller,1774)** **6. Thiara (Tarebia) granifera (Lamarck,1822)** **7. Melanoides tuberculatus** **8. (O.F. Miiler, 1774)**	**4** **5** **9** **12**	**0.67%** **0.84%** **1.51%** **2.02%**
Family plenroceridae **9. Brotia costula (Rafinesque,1833)**	**9**	**1.51%**

Family Viviparidae **9. Bellamya (Filopaludina) Bengalensis (Lemarek, 1822)**	**14**	**2.36%**
10. Mekongia crassa (Benson, 1836) (=Bellamya crassa)	**12**	**2.02%**
Family Lymnaeidae **11. Radix Persica (Issel, 1865)**	**9**	**1.51%**
Family Planorbidae **12. Ferrissia baconi uv (Bourguignat, 1853)**	**1**	**0.16%**
13. Indoplanorbis exustus (Deshaayes, 1834)	**12**	**2.02%**
14. Gyraulus convexiusculus (Hutton 1849)	**14**	**2.36%**
Family Physidae **15. Haitia mexicana Phillipi, 1889**	**11**	**2.19%**
Family Succineidae **16. Quickia bensori (Pfieffer)**	**4**	**0.67%**
Class Bivalvia (=Peleey poda family Arecidae		
17. Scaphula celox (Benson 1836)	**9**	**1.51%**
18. Scaphula deltae (Blanford, 1867)	**8**	**1.34%**
Family Corbieulidae **19. Corbicula bensoni (Deshayes, 1854)**	**5**	**0.84%**
20. Corbicula assemensis (Prashad, 1828)	**8**	**1.34%**
21. Corbicula aurea (NASEMANN & Sharma, 2007)	**1**	**0.16%**

Family Sphaeriidae **22. Pisidium (Afropisidium) darkeanum (G.& H. Nevill,1871)** **23. Pisidium (Afropisidium) Nevillianum (Theobald, 1876)**	**15** **10**	**2.52%** **1.68%**
Family Unionidae **24. Lamellidens corrianus (Lea, 1834)** **25. Lamellidens consobrinus (Lea 1859)**	**9** **9**	**1.51%** **1.51%**
Family Amblemidae **26. Radiatula caerulea (Lea, 1831)** **27. Rediatula occata (Lea, 1860** **28. Radiatula lima (Simpson, 1900)** **29. " Radiatula" olivaria (Lea, 1831)** **30. Parreysia favidens chrysis (Benson, 1862)**	**7** **8** **11** **8** **8**	**1.18%** **1.34%** **1.85%** **1.34%** **1.34**
Total	**264**	

Table- Macro- invertebrate fauna of River Gandak.

Phylum Mollusca	No./m²	Relative Obundance
Class Gastropoda		
Family Stenothyridae stenothyra ornata (Prashad 1921)	11	1.84%
Gangetia milliacea (Nevill,1880)	8	1.34%
Family thiaridae Thiara (Tarebia) lineata (Gray, 1828)	9	1.51%
Thiara (Thiara) scabra (O.F. Miiler, 1774)	10	1.68%
Family Pleuroceridae Brotia costula costula (Rafinesque,1833)	8	1.34%
Family Viviparidae bellayama Filopaludina) bengalensis (Lamarek, 1822)	11	1.84%
Mekongia crassa (Benson 1836) (=bellayama crassa)	13	2.18%
Family Lymnaeidae RadixPersica (Issel, 1865)	8	1.34%
Family planorbidae		
Feerrissia baconi (Bourguignat, 1853)	6	1.008%
Family Physidae 10. Haitia mexicana (Phillipi, 1889)	10	1.68
Family Succineidae 11. Quickia bensoni (Pfeiffer)	9	1.51%

Class Bivalvia (=Pelecypoda) Family Arcidae **12. Scaphula deltae (Blanford , 1867)**	**11**	**1.84%**
Family Corbiculidae **13. Corbicula bensoni (Deshayes, 1854)**	**11**	**1.84%**
Family Sphaeriidae **14. Pisidium (Afropisidum) clarkeanum (G.&H.Nevill 1871)**	**11**	**1.84%**
Total	**132**	

Conclusion

Result from the present study revealed that benthic macro invertebrates are best indicators for bio-assessment. The abundance of benthic fauna is a biological parameter that may indicator overall aquatic productivity of the bottom sediments more over benthic communities are widely used in monitoring the effect of marine population as the organism are mostly sessile and readily integrate the effect of pollutants. Molluscans usually do not tolerate pollution as high as do fubifes and chiromonids but a few like lymnea can tolerate very low oxygen condition according to Pandey et al. Tubifes occurred in strongly sewage polluted ad anoxic condition Gastropoda ie Melanoides tubrilate M. scahra vivipara bengalensis converusculas were found in non polluted water rich with dissolved oxygen and is good water quality on the basis of above discussion it can be concluded that all the studied ecosystems can be categorized as polluted and moderately polluted on the basis of relative abundance of benthos. It has been suggested that benthic fauna might be used as and integrating indication of water quality within an area. Any fluctuation in their quantity and quality will directly affect the abundance of other aquatic organism. Therefore a benthic study may be used as baseline information to evaluate the prevailing condition and serve as a baseline study of future investigation on investigation changes in an area.

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