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Study of biodiversity of zooplanktons and other animal in ponds

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Abstract
In this study we know that species composition and diversity of planktonic Rotifera, Copepoda, Crustacea, Protozoa, Benthoms, Arthropoda, Mollusca between pond. Average total diversity of zooplankton tended to be the highest in river (24 species) and the lower in rice field (19 species). The zooplankton abundance was influenced by physical factors of the water bodies. Correlation analysis revealed a strong positive relationship between zooplankton abundance and water transparency while there exist a weak negative correlation with dissolved oxygen and temperature. The finding of the present study provide useful knowledge on the spatial organization of zooplankton diversity in different type of freshwater ecosystem as well as can be used as management strategies to protect the aquatic biodiversity in the agricultural area.

Keywords: Rotifera, copepoda, benthoms, crustacea

Introduction
Biodiversity is the variety and variable of life on Earth. Biodiversity is typically a measure of variation at the genetic, species and ecosystem level. Terrestrial biodiversity is usually greater near the equator which is the result of the warm climate and high primary productivity. Biodiversity is not distributed evenly on Earth and is richest in the tropics. These tropical forest ecosystems over less than 10 percent of earth's surface and contain about 90 percent of the world's species. Marine biodiversity is usually along coasts in the western pacific where sea surface temperature is highest and in the mid latitudinal band in all oceans. Biodiversity generally tends to cluster in hotspots and has been increasing through time but will be likely to slow in the future.
Zooplankton are microscopic animals that act as primary and secondary links in the food webs of all aquatic ecosystems. They feed on plankton which directly provide food source for larval vertebrate and invertebrate as well as related to the growth of juvenile and large fish. They are also important component in the transfer of energy from primary producers of phytoplankton to higher trophic level such as fish. The present study has been undertaken to determine the zooplankton diversity.

Material and Method
Study Area: These ponds are located in Laheriasaria (Bihar). The study was carried out in ponds located in different parts of Laherisarai on the basis of their economic outpour as assessed from the elementary investigation.

Phytoplankton and zooplankton
Collection: The plankton were collected with the help of a plankton net made up of bolting Silk (No-25) by the hauling method. The plankton from the two shallower zones were collected by filtering water through the plankton net with the help of a one litre capacity beaker, as in these areas it was difficult to apply the hauling method. The volume of water filtered was calculated in both the above cases.

Preservation: The collected and concentrated plankton sample was preserved in 5% formalin.

Qualitative Analysis: The qualitative analysis of plankton was done under a compound microscope with the help of available monograph and literature (Ward and whipple, 1959; Needham and Needham, 1966; Tonapi, 1980; Sehgal, 1983; Adoni et.al., 1985 and APHA, 1989) [7, 2].

Quantitive Analysis: Lackey drop micro-transect method subsequently modified by Edmondson (1974) was used to enumerate plankton density quantitatively.
This method involves the plankton enumeration in one drop of the concentrated sample taken on a slide. The concentrated sample was shaken thoroughly and a drop of it was put quickly on a clear microslide with the help of a dropper holding it vertically. The whole drop was covered carefully under the cover slip. The slide was kept under the microscope and one edge of the cover slip was focused. The phytoplankton and zooplankton were counted while moving the slide with the help of a movable stage to the other edge. The slide was shifted to the next field and the above process was repeated on the path parallel to the earlier one in reverse direction. Number of transect was counted. Five drops of the concentrated sample was examined to get average plankton density.

Calculation

Organism per drop = $\frac{Area\ \ of\ \ Slip}{Area\ \ of\ \ tran\ \sec\ t} \times$ Individual count recorded per transect

Area of cover slip =π^2 (for round cover slip)
Area of transect was measured with the help of stage and ocular micrometer. Total organism/ml=Total Number of organism per drop×Number of drops per ml.

$$\text{Density}\left(\frac{Organism}{Litre}\right) = \frac{a \times V}{L}$$

Where,
A = Number of organism
V = Volume of concentrate
L = Water Filtered in liters

Macrophytes collections, preservarion, identification and biomass estimation
The submerged and emergent, macrophytes from the pond were collected using indigenously designed hollow cube shaped apparatus, made up of galvanized sheet of 1×1×4m^3 size. The sides of the cube interfacing towards surface and bottom when immersed in water were open. The entire sample present in this area were collected and transferred in a bucket to the bank of the pond. Species-wise sorting of microphytes were done and then their wet weight were taken on double pan Balance. Each species was transferred in separate polythene bags and transported to the laboratory.
The wet samples were drived overnight at 105^0c till a constant dry weight is measured. The biomass was expressed as dry weight present in a unit area (g/m^3).
Weeds and macrophytes were identified with the help of available literature (Needham and Needham, 1996; Pennak, 1978; Adoni et.al., 1985 and APHA, 1989) [6, 2].

Analysis of benthic biota
Collection
Bottom biota were collected with the help of Ekman's dredge (15×15×7.5 cu cm) from the different sites of the pond. The bottom biota were separated from the mud by sieving through sieves of different sizes (1mm, 0.5mm and 0.25mm) supplied by I.C.T., Calcutta the help of water.

Preservation: Preservation of bottom biota were done in 5% formalin.

Identification: It was done with the help of available literature (Ward and Whipple, 1959; Needham and Needham, 1966; Tonapi, 1980; APHA, 1989) [7, 3].

Productivity
Primary productivity of phytoplankton
The light and dark bottom method of Gaarder and Gran (1927) [4] was employed to determine the primary productivity of phytoplankton with the incubation of 4 hours in situ.

Method
Two BOD bottles of 300 ml capacity were selected of which one was painted with dark colour representing the dark bottle while the other represents the light bottle. Both bottles were suspended in the pond at the same depth filled with water of that very depth. Both bottles were tied with the help of bamboo poles. The initial concentration of oxygen in the water was estimated separately by filling one more bottle (initial bottle) from that depth. After the incubation of 4hours light and dark bottle were taken out and then oxygen contents were determined with the help of winkler's volumetric method. The dark bottle gives the oxygen used up in respiration (by planktons, bacteria etc.) While the little bottle gives the amount of oxygen added due to photosynthesis.

Calculation

Net primary productivity = $\frac{Dl \times Di}{h}$ O_2 mg/l/hr

Gross Primary productivity = $\frac{Dl - Dd}{h}$ O_2 mg/l/hr

Community Respiration = $\frac{Dl - Dd}{h}$ O_2 mg/l/hr

Where,
Di = Dissolved oxygen in the initial bottle in mg/l
Dl = Dissolved oxygen in the light bottle in mg/l
Dd = Dissolved oxygen in dark bottle in mg/l
h = Duration of exposure hours
The values were converted to carbom by using the following formula:
GPP, NPP or CR, gc /m^3 /hr=GPP, NPP or CR in mg O_2/hr×0.375

Result
A checklist of zooplankton species occurred in the study sites are shown in Table-1 and biotic status of pond in Table-2.
Zooplankton abundance was strong positively with water transparency while negative correlations were found with dissolved oxygen and temperature.

Table 1: Biodiversity of Zooplankton and other animal, recorded from the three Ponds under investigation.

Zooplanktons Protozoa	Arcella Ceutropyxis Actinosphaerium
Rotifera	Asplanchna Brachionus Filinia Monostyla Nothalca
Copepoda	Cyclops Diphanosoma
Crustacea	Ceriodaphnia Daphnia Moina
Benthoms Arthropoda	Platycentropus sp. Chironomus sp. Corika sp.
Mollusca	Pila globosa Viviparous bengalensis Viviparous Varialus Indoplanorbis sp. Orbicula sp. Lymnea sp. Gyraulus sp. Gobula sp.

Table 2: Biotic Status of Pond.

Parameter	Unit	Value	
		Minimum	Maximum
Phytoplanktons	µ/l	1210	1700
Zooplanktons	µ/l	90	470
Aquatic Weeds			
Wet Weight	Kg/m^2	6.00	13.00
Dry Weight	Kg/m^2	0.50	2.25
Fishery	Nos/m^2	40	128
Major Carps	%bundance	2.0	9.0
Minor Carps	%bundance	3.0	7.00
Cat Fisher	%bundance	30.0	45.00
Minnows	%bundance	12.0	18.00
Miscellaneous	%bundance	14.0	20.00
Shrimp	%bundance	2.0	3.00
Mollusc	%bundance	0.5	1.00
Crab	%bundance	0.4	1.2

Discussion

The present study showed that rotifra dominated all these types of water body in terms of species richness and abudance. This finding is in accord with work and who reported that rotifers are the dominant group in their study sites. Copepoda was observed in lower species richness and abudance compared to Rotifra.

In the present study zooplankton abudance was strong positively correlated with water transparency. This is the good evidence that an increase in the water transparency leads to an increase in the zooplankton communities.

Conclusion

The qualitative analysis of zooplankton from all these aquatic ecosystem revealed the presence of these taxonomic groups Rotifra, Copepoda, Protozoa, Crustacea, Benthoms, Arthropoda, Mollusca etc. The dominance of zooplankton species is highly variable in different types of water body according to nutrient level, Predator and other environmental factor which then affects the other biotic component of the ecosystem.

References

1. Adoni AD. Studies on microbiology of sagar Lake. Ph.D. Thesis. Univ. of Sagar, 1975, 254-p.
2. APHA. Standard method for the examination of water and waste water. 17th Ed. Amer. Pubi. Health. Assoc. Washington D.C, 1989.
3. APHA. Standard method for the examination of water and waste water. American Public Health. Association. Washington D.C.P.1000, 1989.
4. Garrder T, Gram HH. Production of plankton in Oslo fiored. RAPP>Proc.Verb. Cons. Perm. Inst. Explor. Mer 1927;42:9-48.
5. Needhan JG, Needhan PR. A guide to study of freshwater Biology. Holden-Day, Inc. Sgn. Francisco, 1966, 108.
6. Pennak RW. Freshwater invertebrates of the United State. John Wiley and sons, New York, 1978,
7. Tonapi GT. Freshwater Animal of India. Oxford and IBH publishing co., New Delhi, 1980.