



ORIGINAL RESEARCH PAPER

Zoology

WATER QUALITY OF SOME RURAL PONDS OF MUZAFFARPUR (BIHAR)

KEY WORDS: Trophic status, Water quality, Plankton, Pond, Indices.

S.K. Sinha

Department of Zoology, L.P. Shahi College, Patna, Bihar, India.

ABSTRACT

Water quality of Susta and Madhaul ponds were investigated for two years. Their physico-chemical quality and trophic status were discussed. It is concluded that both these ponds showed a tendency To move towards eutrophy. Their water quality is also deteriorating fast due to increasing human activities.

INTRODUCTION

The population explosion and agricultural advancement are bound to make the water bodies unfit for bathing and drinking. Man is the main culprit in polluting these natural resources to the point of No return. With the development of science and plant nutrition as well as the introduction of high yielding varieties of seeds, the use of chemicals and fertilizers has progressed. If the soil has need for nitrogen fertilizer is used, obviously, the pollutants, provided by plant nutrients came from the run off of heavily fertilized farmland as well as from detergent and animal waste. They fertilize the growth of aquatic plants such as algae and phytoplankton which become so abundant that their eventual decomposition depletes the oxygen in the surrounding water and kill animals. Several indices based on limnobiologic parameters have been suggested by Sawyer(1966) and Zafer(1959) to assess the trophic status of water bodies. The review of literature reveals that there is no published Account of trophic status of Susta and Madhaul ponds of Muzaffarpur (Bihar). The study included physico-chemical and biological

approaches to have an integrated assessment of water quality.

MATERIAL AND METHODS

Monthly samples were collected from both ponds. Physico-chemical analysis of water was done following the standard methods (APHA,1985) and Trivedy and Goel (1986). Planktons were sampled With a conical plankton net made up of bolting cloth(No-21) and were counted with the help of plankton counting cell.

RESULTS

The data recorded on physico-chemical analysis of water has been summarised in table-1. Both ponds were alkaline. The concentration of zinc, hardness and conductivity were more in Madhaul Pond. Potassium, iron and chloride were however, more in Susta pond during the period of investigation, Where as the value turbidity, dissolved oxygen, free carbon dioxide and pH were showing near about equal for both the ponds.

About equal for both the ponds.

Table-1 Physico-chemical characteristics of the water(meal value)

S.No	Parameters	Susta Pond		Madhaul Pond	
		First year	Second year	First year	Second year
1	Turbidity(mg/L)	17.5	20	21	20
2	Conductivity	0.34	0.35	0.43	0.43
3	Dissolved oxygen	5.8	6.5	6.2	6.1
4	Free carbon dioxide	30	30	29.5	30
5	pH	7.85	7.9	7.85	7.95
6	Sodium(mg/L)	5.2	5.8	5.35	5.6
7	Potassium(mg/L)	6.25	6.4	5.75	5.9
8	Zinc(mg/L)	0.095	0.095	2.6	2.5
9	Iron(mg/L)	0.23	0.155	0.2	0.14
10	Chloride(mg/L)	60.37	54.75	45.35	52.11
11	Hardness(mg/L)	60	63.5	63.6	64

Table-2a Nygaard's trophic status indices(1949)

Index	Oligotrophic range	Eutrophic range	Susta Pond	Madhaul pond
Bacillariophycean	0-0.3	0-1.8	0.25	0.
Euglenophyta	0-0.2	0-1	0.3	-
Chlorophycean	0-0.7	0.2-9	-	-
Compound	0.01-1	1.1-2.5	-	-

Table-2b Planktons

S.No	Phytoplankton	Susta Pond		Madhaul Pond	
		Number of species		Number of species	
1	Chlorophyceae	4		3	
2	Euglenae	1		-	
3	Bacillariophyceae	5		4	
4	Cynophyceae	2		3	
Zooplankton					
1	Protozoa	3		3	
2	Rotifera	3		2	
3	Cladocera	3		2	
4	Copepoda	3		2	

Biological quality of water were evaluated in terms of Nygaard's trophic status indices. Nygaard(1949) proposed five indices mentioned in table-2a. Nygaard's trophic status indices were based on specific taxon (species level),So Chlorophycean,Cynophycean and compound could not be applied in the present case.

DISCUSSION:

Most of the physico-chemical parameters in the second year of the study as compared with first year showed a marked increase indicating that the input of nutrients is more in both the Ponds than its, assimilating capacity hence has resulted into the accumulation as suggested by Odum(1971) such accumulation of nutrients is the over fertilization of water body i.e. eutrophication which gradually becomes destructive to the system. Sharma et al(1978) has pointed out that chloride content also increase with the degree of eutrophication. The increase in chloride content of Madhaul pond corroborating the findings of Sharma et al (1978) and Krishnamurthy et al (1995) and Dutta et al(2019).

Hardstedt et al (1980) observed zinc and iron concentration in Zooplankton and it may be that the higher concentration of iron in Susta pond may be attributed to the greater abundance of Zooplankton(table-2b).In the present case only two indices proposed by Nygaard(1949) could be applied viz the Bacillariophycean and the Euglenophycean(table-2a). On the basis of Bacillariophycean index Susta pond fell under oligotrophic status where as Madhaul pond indicated mesotrophic status.Similarly on the basis of Euglenophycean index, Susta pond fell under mesotrophic and Madhaul pond indicated Oligotrophic status.It is indicative therefore that both these ponds showed a tendency to move towards eutrophy.

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