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Seasonal Periodicity and Pollution Level of Murali Manohar Pond of Madhubani, Bihar

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Abstract

The paper deals with the study of seasonal periodicity and pollution level in respect to physico-chemical profile and plankton status of Murali Manohar pond of district Madhubani (Bihar) situated in the Babu Saheb Deorhi campus.The study was made from February 2009 to January 2010.
Key words : Murali Manohar pond, Water quality, Planktons, Physico-chemical profiles.

Madhubani is one of the boon cities of Mithilanchal of Bihar State, rich in ponds, fish, makhana and singhara culture including Mithila painting or Madhubani painting. Besides these, rain and flood affect the ponds of the whole Mithilanchal region and the fish culture ponds of Madhubani including this pond, get polluted which compels one to study this popular pond of Babu Saheb Deorhi. Numerous researchers have investigated several ponds and rivers (1—4).

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Methods

Random grab samples were collected in multiples from the pre-selected sites of the pond seasonally using propylene water samples, whereas population density of phytoplanktons and Zooplanktons were made by standard methods (5).

Results and Discussion

The results of plankton population and physico-chemical profiles are shown in Tables 1 and 2. During study, high temperature was found in summer, lower in winter and medium in rainy season. The range was between 18.5—34.6 (January—May). It has been observed that an indirect effect of toxicity intensifying deoxygenating and finally increasing the

Table 1. Population density of planktons of Murali Manohar pond of Madhubani.

Phytoplanktons	Class	Zooplanktons	Phylum
Pediatrum tetras	Chlorophyceae	*Amoeba* sp.	Protozoa
Pinnularia sp.	Bacillario phyceae	*Paramecium aurelia*	Protozoa
Diatoma sp.	Bacillario phyceae	*Euglina* sp.	Protozoa
Chlorella	Chlorophyceae	*Cyclops* sp.	Arthropoda
Spirogyra sp.	Chlorophyceae	*Moina* sp.	Arthropoda
Eudornia sp.	Chlorophyceae	*Nauplius larvae*	Arthropoda
Closterium sp.	Chlorophyceae	*Bosmania* sp.	Arthropoda
Oscillotaria sp.	Cyanophyceae	*Monostyla* sp.	Arthropoda
Rivularia aquatica	Cyanophyceae	*Verticella campanula*	Arthropoda
Nostoc	Cyanophyceae	*Lacane* sp.	Rotifera
Gramphonema sp.	Bacillario phyceae	*Brachionus* sp.	Rotifera

Table 2. Performance of water quality of Murali Manohar pond during different seasons (February 2009—January 2010). A_T = Atmospheric Temperature, W_T — Water Temperature, T_R= Transparency, TDS = Total Dissolved Solids, DO_2 = Dissolved Oxygen, FCO_2 = Free Carbon Dioxide, Ca = Calcium, Mg = Magnesium, Cl = Chlorine.

Seasons/ Months/ Parameters	Summer season			Rainy season					Winter season			
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
A_T (C)	21.9	24.2	28.5	34.6	32.5	28.4	26.2	25.8	23.5	21.0	18.3	18.5
W_T (C)	18.5	23.0	26.2	28.2	29.5	25.7	24.0	24.2	21.5	21.1	20.5	16.2
T_R (C)	25.0	27.2	30.6	36.6	32.3	28.2	22.8	14.2	17.9	20.3	19.9	21.5
pH	8.7	8.3	8.3	8.6	8.7	8.1	7.3	7.1	7.4	7.7	7.8	7.8
TDS (ppm)	485	460	600	670	835	995	700	625	400	415	570	555
DO_2 (ppm)	11.7	8.9	5.9	3.8	6.2	7.0	7.9	8.2	9.5	10.1	12.5	14.2
FCO_2 (ppm)	7.04	5.62	4.30	4.10	4.70	6.75	6.10	4.8	3.76	4.14	2.86	6.0
Ca (ppm)	34.5	36.0	40.1	46.5	45.2	42.5	30.3	26.6	26.8	25.5	28.0	32.2
Mg (ppm)	12.4	14.5	20.6	20.5	24.0	17.6	6.4	3.8	7.5	9.2	10.8	10.5
Cl (ppm)	42.0	50.2	64.2	65.6	70.4	78.6	76.5	60.2	55.5	52.2	46.1	43.0

biomagnifications. That is why the dissolved oxygen depletion and plankton community intensify their span in summer. Eutropic waters are characterized by cyanobacterial algal blooms (6—8). In the present studied Murali Manohar pond of Madhubani, *Nostoc, Rivularia aquatica, Oscillatoria* sps. including none more common phytoplanktons were found, whereas eleven zooplanktons of phylum Arthropoda, Protozoa and Rotifera were observed. The studied pond was observed alkaline throughout the initial phase of study period (pH 7.1 —8.7 i.e. September —June). The alkalinity was lower in September, highest in summer and winter seasons. In this way, the observation showed that the pond was under initial eutrophication. The literature regarding eutrophication trends or developing polluted ponds were studied also (9—12).

References

1. Fotedar A. and B. K. Fotedar. 2009. A note on waterchemistry of Ranbir canal flowing from Akhnoor to Jammu. *Curr. Sci.* 14 : 37—46.
2. Jha V., S. B. Shashi and T. Singh. 2004. Inland water resources of North Bihar : an environmental appraisal. *Proc. 3rd Nat. Sem. on Inland Water Resources and Environment.* Univ. Kerala. 2—4 Feb Thiruvananthpuram, India. 63—66 pp.
3. Shashi S. B.and A. Kumar. 2007. Seasonal periodicity of toxic cyanobacteria in a fish culture pond with reference to its controlling factors. *Int. Symp. on Recent advances in contemporary biology, environmental issue and sustainable development.* 29—30 Sep. SKM Univ., Dumka, Jharkhand, India. 63 pp.
4. Kumari A. and S. B. Shashi. 2010. Water quality and plankton status of a pond of Sunderpur area of district Darbhanga (Bihar). *Curr. Sci.* 15 : (In press).
5. APHA, AWWA and WPCF. 1998. *Standard method for water and wastewater*. 20th Am. Publ. Hlth. Assoc., Washington, USA.
6. Khare P. K. 1999. Phytoplankton as indicator of water quality and pollution status of Jagat Sagar pond, Chhatarpur (MP). *Geobios News Reports*. 18 : 107—110.
7. Khare P. K. 2002. Assessment of organic pollution and water quality of Satri tank, Chhatarpur (MP). *Ind. J. Environ. Ecoplan.* 6 : 85—88.
8. Jha V., S. B. Shashi and T. Singh. 2006. Management strategies in Makhana based inegrated aquaculture. Fishing Chimes. 26 : 16—19.
9. Dwiwedi B. K. and G. C. Pandey. 2001. Seasonal dynamics of cyanbacterial toxin producing algal species water ponds. Aquacult. 2 : 141—146.

10. Brautigam A. 1999. The freshwater diversity crisis. *World Cons.* 30 : 4—5.
11. Romeo M. S., K. Beeteshwari and A. Gupta. 2009. Water quality status of the Iril river, Manipur. *Curr. Sci.* 14 : 173—180.
12. Yadav R. P. and S. B. Shashi. 2010. Seasonal changes and diversity of a Dharampur pond of district Darbhanga. *Curr. Sci.* 15 : (In press).