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Physicochemical Characteristics of Foysagar Lake With Reference To Water Pollution and Fish Fauna

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Abstract

Ecological studies of a Foy Sagar Lake with reference to physico-chemical characteristic and pollution have been studied. In this lake total solids, chloride, nitrates, BOD, indicating the intense human activities and infusion of pollution from the surroundings. The different types of diseases present in fishes also point out towards the polluted nature of the lake water.

Keywords: Aquatic Organism, Foy Sagar Lake, Physicochemical Analysis.

Introduction

Physico chemical properties strongly influence the aquatic organisms and many of them serve as good ecological indicators of water quality (Mishra1999). Hence physicochemical and biological parameters serve as good index in providing a complete and reliable picture of conditions prevailing in a water body.

The quality of urban water bodies in India is deteriorating rapidly due to the increase in population industrialization. A great pressure has been put on the existing water resources due to lack of sanitary facilities and improper waste water treatment. About 80% of urban water supply finds its way back into the drainage system as domestic and industrial waste (Gautam 1990)

The survival, reproduction, growth, production or management of fish depend mainly on the water quality hence analysis of water body and effect on fish fauna, this research programme was contemplated.

Material and Methods

Foy Sagar lake is freshwater lake and a recreation centre for the locals of Ajmer. The lake was constructed by Col. Foy in 1878, and is now under the care of Municipal Council of Ajmer.

The samples were analysed chemically with of standard methods {APHA 1989, Trivedi & Goel1986}.The species of Fishes were identified by Taxonomy key [.Day's volume] Fish diseases studied by [V.G. Jhingran]

Results and Discussion

The result of the physicochemical analysis of water are given in table 1 and Fish fauna in Table 2.

Water Temperature

Temperature has a more profound direct and indirect influence on all life processes than any other factor (Welech1952). It is a important in controlling both quality and quantity of fish fauna. The temperature of the lake were ranged between 17.05C and 32.20C. The highest temperature was recorded during the month of June and lowest during month of January.

Free Carbon dioxide

The values of free carbon dioxide ranged from1.9 mg/L to 5.92mg/L. The minimum amount was recorded during the month of June and maximum during September. The increase of free carbon dioxide during monsoon indicates the influx through rain water in the form of carbonic acid.

pH

The pH values ranged from 5.10 to 8.45 during the study period. Minimum pH was recorded during monsoon and the Maximum values were recorded during summer. Robert et al (1947) suggested that pH 5.0 to8.5 is ideal for phytoplankton growth. pH decrease in monsoon may be due to inflow of rain water.(Badge &Verma1985).

Aim of the Study

The present work highlights the studies of pollution on Fishes in Foysagar lake. The pollutants inter-influence in the lake affected the water quality, bringing changes in the physico-chemical parameters which influence the biotic composition of Zooplankton and fish fauna. Abiotic and biotic factors affect in particular to fish growth, metabolism, disease food consumption, reproductive success and habitat range. Disease in Fishes will undoubtedly affect communities of human who harvest their stocks. Harvesters may be impacted by changes in fish stocks due to pollution. The evidence on hand still includes many uncertainties about the future of affected fish species and their harvesters. So there should be a general strategy for protection of watershed areas.

Dissolved Oxygen

The dissolved oxygen of water body indicates the health of the aquatic ecosystem. In the present investigation the value of dissolved oxygen ranged from 2.75mg/L to6.25mg/L. Lowest value was recorded during summer due to higher catabolic rate of aquatic organism acceleration decomposition and decrease in oxygen solubility at higher temperature.

Nitrate

In Foy Sagar lake the nitrate values fluctuated from 0.10mg/L to0.38mg/L. The high value of Nitrates during monsoon may be due to addition of Nitrates in to the water by run off water from agricultural fields. Low concentration of nitrates during Summer due to their utilization by phytoplankton. Similar observations were reported by Takahashi and Saigo{1981),Mittal and Sengar(1990).

Chloride

The values of chloride were recorded minimum 40.10mg/L during early winter and maximum 85.50mg/L during summer. Decrease in the water level of the lake during spring, summer and pre-monsoon may be the reason for the increase of the chloride concentration. The low chloride in monsoon naturally happened with the addition of rain water. similar results obtained by Jindal Sunita (2002).

Alkalinity

Total alkalinity ranged between 110mg/L to 260mg/L .Total alkalinity was minimum during winter and maximum during summer. This may also be due to decreased water level, raised temperature and increased productivity. Similar suggestions have been given by seenayya {1971} and Harshey et al{1982}.

Organic matter present in the water was directly consumed by decomposers and detritus feeders, which consume oxygen of water for their respiration. This further reduced dissolved oxygen rendering water unsuitable for fish and aquatic life. Water becomes unsuitable due to bad odour, also caused by sewage. Fishes did not live for longer because of diminished dissolved oxygen and lack of food items. Water of the lake was used for bathing and washing of clothes by human and also the pathway traversed regularly by the village cattle specially the cow, buffaloes and goat. Pollution occurred from activities such as open defecation, bathing and washing.

Studies have shown that large scale fish mortality was occurred due to discharge of toxic water in the lake .Chemical fertilizers like Urea and phosphate were used in large quantities in agricultural fields and washed down in to Foysagar lake causing harm to fishes, which were responsible for eutrophication of the lake. Various pesticides and insecticides were used to control pests of crops and disease causing insects. These chemicals were poisonous and were washed with rain water, which resulted in pollution of the lake.

Diseases also observed in fishes due to pollution were:

Gill disease, Oxygen starvation,. Fin rot, White spot, Dropsy.

Table 1 : Physiochemical characteristics of Foy Sagar lake water :

Months	Temp. (^oC)	pH	DO (mg/L)	FCO_2 (mg/L)	Nitrate (mg/L)	Chloride (mg/L)	Alkalinity
January	17.05	7.68	6.25	4.30	0.19	40.10	110
February	20..06	7.00	5.55	4.00	0.10	50.25	115
March	21.25	7.75	4.75	3.56	0.10	68.75	160
April	25.20	7.75	4.85	4.51	0.11	62.35	190
May	27.00	8.20	5.00	2.00	0.29	70.00	200
June	32.20	8.45	2.75	1.90	0.20	85.50	260
July	28.00	7.10	2.84	2.56	0.38	60.20	240
August	27.50	6.70	3.09	5.52	0.34	54.50	160
September	27.70	5.10	3.20	5.92	0.30	50.50	150
October	26.30	6.40	4.10	5.50	0.25	46.06	130
November	25.10	7.00	4.90	5.00	0.23	43.40	125
December	22.25	7.23	5.65	4.45	0.21	42.45	119

Table2: Disease observed in Fishes

Name of Fishes	Gill disease	Oxygen starvation	Fin rot	White spot	Dropsy
Labio rohita	++	+++	+	+++	+
Catla catla	+	++	+	++	+
Mrigal carp	+	++	+	+	+++

+{Rare},++{Common},+++{Abundant}

References

1. *Devraj, M.B. 1997, The need for promoting eco-friendly mariculture pp.22-27.In Afi/ICAR,1997 National Aquaculture Week Souvenir, Aquaculture foundation of India, Madras*
2. *Goutam,A,1990. Ecology and pollution of mountain water: A case study of Bhagirathi river. Ashish Publishing House, New Delhi: pp209.*
3. *Hota.S.1996. Arsenic toxicity to the brain, liver and intestine on a freshwater fish, Channa punctatus9Bloch) Geobios,23(2-3).154-156.*
4. *Jindal Sunita, 2002. Limnological studies of Bicherli pond, Bewar.PH.d.. Thesis. M.D.S. University, Ajmer*
5. *Quasim,S.Z. and Quyyum 1961 Spawning frequencies and breeding seasons of some freshwater fishes with special reference to those occurring in the plains of northern India. Indian. J.Fish.,8(1):24*
6. *Sharma L.L. 1980. Some limnological aspects of Udaipur waters in comparison to selected water of Rajasthan.Ph.D. Thesis, University of Udaipur, Udaipur.*
7. *Sharma B.K. 1986. Assessment of pollution indicates in India Rotatoria. J. Meghalaya Sci. Soc. 47-49.*
8. *Sharma S.1991 Pollution studies of Morar (Kalpi) river, Gwalior, India Environ. Series V: 277-183.*
9. *Tonpai G.T. 1980. Fresh water animals of India. An ecological approach. Oxford and IBH publishing Co. Pvt. Ltd. New Delhi, Bombay, Calcutaa:pp.341*
10. *Triphati. A.K. and Pandey. S.N. 1989. Studies on Algac of polluted ponds of Kanpur II, Qualitative, Quatntitative and periodical occurrence of the blue green algae of chandori pond. Res.J Pl. Environ. 5(I):89-93.*
11. *Vasisht, H.S. and KapoorN.K.1981. The ecology of Polluted waters in Yamunanagar (Haryana) India J. Ecol.8(1):134-135*
12. *Verma S.M. and Shukla G.R.1969, Pollutionin perennial stream Khala by the sugar factoryeffulent near Laksar (Distt. Aharnpur) U.P. India. J.Hith, 11(2) 145-162.*