International Journal of Applied and Universal Research E- ISSN No: 2395-0269
Volume IV, Issue VI, December 2017 Available online at: www.ijaur.com

LIMNOLOGICAL STUDIES ON HARDIHA POND HANUMANA, REWA (M.P.)

Angesh Kumar Tripathi
1. Guest Lect. Department of Zoology
Govt. J.S.T. P.G. College Balaghat (M.P.)

ABSTRACT: Every scientific investigation is evaluated in terms of extends of its contribution to the welfare of human and other living beings. Standing water bodies have great importance as they are recharging resources for drinking, domestic and agricultural use before the civilization. Water quality of pond is important for health and economy of people. The present study is going to centralize on the Hardiha pond of Hanumana, Rewa district Madhya Pradesh. The variations in selected physico-chemical factors were investigated for two years to determine the water quality of Hardiha pond, for Agricultural, and Drinking and fish production. Four stations were chosen on the pond to reflect the effect of human activities, and lotic habitats. Temperature, pH, dissolved oxygen, nitrate, phosphate, biological oxygen demand, chemical oxygen demand, total alkalinity, were analyzed using standard methods and procedures. Unacceptable, high levels of assessment parameters were observed in many cases for other Indian fresh water bodies except for turbidity, dissolve oxygen, Alkalinity, pH, nitrogen and phosphate which were found in higher concentration above freshwater limits. During summer season when water crisis takes place, the water shrunk to the deeper place of pond. After monsoon the water is exploited by the local people and surrounding villages for various domestic and rituals practices. The cattle's, agricultural inputs, washings and other pollution creating activities have enhanced the heavy metals and altered the physicochemical and biological characteristics of the pond water. Therefore there is a need of proper assessment, monitoring and precautionary measures to overcome the pollutant load in the pond water.

KEYWORDS: - Limnology, phytoplankton, Hardiha pond.

INTRODUCTION:-

The water quality in ponds, rivers and streams may vary depending on the geological morphology, vegetation and land use (modification by human activities such as agriculture, industrialization and urbanization) in the catchment. Industries, agriculture and urban settlements produce nutrients (sewage effluent and fertilizers) and toxic substances, such as organic and inorganic pollutants, and other chemicals including heavy metals. Water pollution occurs when these substances, which degrade the water quality of river, enter the waterway and alter their natural function. Where ponds and lakes have been profoundly altered and have lost much of their value, the scientific understanding of these water bodies is being used in prescribing restoration methods (Lewis, 2000).

Present study has been carried out to assess the current status of Hardiha pond used by habitants around the pond for various domestic chores. There is no available record on the physicochemical and biological characteristics of the said pond. Present study on planktonic population in relation to water chemistry will substantiate the basic information of entire ecology and the present condition of the system.

This pond lies within geographical co-ordinates of 24°18'25"12'' N and 81°2'82.18''E at National Highway No.7. The pond has a maximum depth of 7m and minimum depth 2.5m. The pond receives water through surface run off during monsoon from surrounding upland and has regular inlet of sewage canal while the outlet is blocked on account of its chocking. The pond is regularly used mainly for, agriculture, bathing, washing of clothes and fishing by the local people besides the idol immersion. This pond is also utilized for fish culture as well. Rain is the only source of fresh water for this pond.

The present investigation involves the direction of understanding the effect of physico-chemical parameters. It is of particular interest to note that study of such aspects in one of the water bodies which fed the agricultural discharge which provides interesting materials. The present investigation is going to centralize on Hardiha pond of Hanumana Rewa district.

The present study involves the following objectives-

- Assessment of water quality.
- Suggestions to the formers for the utilization of pond.

MATERIALS AND METHODS:-

The present work is pertaining to study the permanent standing water body in Hardiha pond Hanumana district Rewa, Madhya Pradesh state, the period of study extended over a period of sex months from January to June 2012.

Laboratory Investigation:-

Physico-chemical and biological analysis of water samples were made following standard methods suggested by APHA, AWWA, WPCI (2005).

RESULT AND DISCUSSION-:

The physico-chemical parameters play an important role in the productivity of phytoplanktons. The quality of biochemical parameters results in the quality of phytoplankton. In the present study the Hardiha pond being a eutrophic pond and having number of phytoplanktons and also very much fluctuations in the phytoplankton periodicity, depending upon availability of various nutrients.

The present study physico-chemical, parameters are represented in table no. 1.

Table no.1- Monthly average values of physico-chemical parameters of Hardiha pond.

Month	Rain Fall (m.m.)	Temp. (^{0}C)		pH	CO_2 mg/l	Total Alk. (mg/l)	D.O (mg/l)	Cl_2 (mg/l)	TDS (mg/l)	NO_3-N (mg/l)	PO_4-P (mg/l)	Total Hard Ness (mg/l)	Ca (mg/l)	Mg (mg/l)	SO_4 (mg/l)	BOD (Mg/l)
		Air Temp.	Water Temp.													
Jan.	Nill	22.5	23.8	8.5	26.5	171.5	9.0	65.4	400	3.5	0.042	205	60.2	12.5	25.2	1.0
Feb.	Nill	26.4	25.4	8.2	8.6	116	8.5	60.5	240	2.2	0.004	125	33.2	9.50	12.6	6.5
March	22.2	26.8	25.6	8.7	8.7	102	7.3	50.5	232	4.1	0.003	95	12.4	14.5	10.2	2.2
April	Nill	26.9	26.8	7.5	30.5	105	5.4	22.1	300	4.7	0.022	116	265.0	11.5	45.2	3.4
May	33.3	27.0	25.4	8.9	50.0	58	9.3	36.5	750	1.8	0.001	355	125.2	34.6	21.5	9.5
June	344.0	26.9	25.2	8.3	22.2	125.5	4.0	50.5	360	5.2	0.002	205	48.0	20.2	11.5	3.8

CONCLUSION:-

The analysis of above results we can conclude that the Hardiha pond is heavily polluted water body, pollution being of organic origin. This pond needs to be protected from animals and human activities. In order to maintain the purity and portability of water, the inflow of sewage and discharge of agriculture waste is avoided and phytoplankton growth is controlled either manually or by any other means. To minimize the pollution some measures should be taken i.e. preventing washing cloths, bathing of cattle, dumping of agricultural waste, avoiding the use of chemical fertilizers and other human activities. Thus the purity of this pond can be maintained.

At this critical juncture the local representatives, Government and Non-Government bodies, the educated bodies, the village heads and the reputed figures of the society should come forward and formulate conservational model for the sustainability of this beautiful water body.

REFERENCES:-

1. Anderson, R.S. and R.B. Green (1974) - Limnological and planktonic studies in the water on lakes. Alberta. Canadian wild life service.27:271-41.
2. Adoni, A.D. and Joshi, G. (1987) – Physico-chemical regime of three fresh water bodies in and around Sagar (M.P.). Geobios. News Reo., 6:43-46.
3. APHA (1995) – Standards methods for the examination of water and wastewater. American Public Health Association, Washington, D.C.
4. Bhatt, L.R., Lacoul., Lekhak,H.D. and Jha, P.K. (2001) – Physico-chemical characteristics and phytoplanktons of Taudaha Lake, Kathamandu Poll.Res18(4):353-358.
5. Christer N, Catherine AR, Dynesius M, Revenga C (2005) – Fragmentation and Flow Regulation of the world's Large River Systems, science 15 April, 308(572o):405-408.
6. Dyson M, Bergkamp G, Scanlon J (2008) – The essential flow of environmental flows, 2nd Edition. Grand, Switzerland: IUCN. Reprint, Gland, Switzerland:IUCN, 2008.
7. Gawas et al. (2006) – "Studied assessment of physico-chemical parameters of water of streams of Mahad industrial area.
8. Kamal, M., Ghaly, A. E., Mohmud, N., & Cote, R. (2004) – Phytoaccumuation of heavy metals by aquatic plants. Environmental International,29,1029-1039

9. Kohler, J.(1994)- Origin and succession of phytoplankton in a river, lake (spree, Germany). Hydrobiologia 289:73-83
10. Lewis WM. (2000). Basis for the protection and management of tropical lakes. Lakes Reserv. Res. Manage. 5:35-48.
11. Lund J.W.G. (1964) – Primary production and periodicity of phytoplankton Verh. Int. Ver. Limnol. 15:37-56
12. Munawar, M. (1972) – Limnological studies on Euglenaceae in certain polluted and unpolluted environments Hydrobiol. 39, 307-30.
13. Odum, E.P. (1961) – Fundamental of ecology, W.B. Saunders, Co. London.
14. Rosso J.J., Sosnovsky A., Rennella A.M., Quiros R. (2010) – Relatioships between fish species Abundances and water Transparancy in Hypertropic Turbid waters of Temprate Shallow lakes. International Review of Hydrobiology 95(2)142-155.
15. Snow, A.M., & Ghaly, A.E. (2008) – Assessment of hydroponically grown macrophytes for their suitability as fish feed. American Journal of Biochemistry and Biotechenology, 4(1), 43-56.
16. Solanki V.R., Hussain M.M. and Raja S.S. (2009)- Water quality assessment of Lake Pandu Bodhan, Andhra Pradesh State, India. Environmetal Monitoring and Assessment 163 (1-4) 411-419.
17. Thakur S.S. and Bais V.S. (2006) – Seasonal variation of Temeprature, Alklinity and Dissolved oxygen in the Sagar Lake. Acta hydrochimica et hydrobioliogia 15(2), 143-147.
18. Vaidya, S., Dhilipkumar, Radgakrishan, Swanin Kishor (2007) – "Factors influencing primary productivity in Panshet and Ujjani Reservoirs, India." Lakess & Reservoir: Research and Management 12 (203-208).
19. Zutshi. D.P. and Khan. M.A. (1978) – Limnological investigations of two subtropical lakes.contd.4:45-48