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ECOLOGICAL AND SEASONAL CHANGES IN PHYSICO-CHEMICAL PARAMETERS IN RUI LAKE, DIGRAS. DIST.- YAVATMAL (M.S.)

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ABSTRACT

The Rui lake [situated 9 km away from Digras Tahsil Dist.- Yavatmal (M.S.)] is a life line for the people in these area because the lake is source of water for household and drinking purpose. Lake is major source of water supply for domestic purpose in the villages as well as many rural areas of India. In many instance lake water is used directly for drinking and other household purposes and hence the quality of lake water is extremely important (Garode et al). Lake play an important role in development of nation and sustenance of life which are being disturb due to the developmental activities (Mohammad Alam & Pathak J.K. 2010). Various physico-chemical factors governs lakes & aquatic bodies in nature. The parameters studied such as air temperature, water temperature, pH, total dissolved solid, dissolved oxygen, total hardness, chloride. Attempt to study the ecology of specific dam or lake over a period of one year or more to evaluate the seasonal changes, Arber (1920) has emphasized the necessity of such study. The present study is devoted particularly to focus the physico-chemical parameters & seasonal changes in the growth of phytoplankton available in Rui lake of Digras Tahsil Dist.- Yavatmal, studied during June-2010 to May-2011.

KEY WORDS: Physio-chemical parameters, Digras, Rui lake, seasonal changes.

INTRODUCTION

Earth is the only planet where water is available in liquid form, due to this the life evolved on this planet. Lake is one of the source of water supply for domestic purpose in the villages as well as many rural areas of India. The water quality of lake varies from time to time due to interaction of local factors. To the safeguard the long term sustainability of lake water resources, the quality of the water needs to be continuously monitored. The field of ecology focuses on the relationship between organism and their related environment (Murray, 2005). Water quality is crucial factor for its conservation. Water quality thus acts as a limiting factor that in turn regulates biotic diversity, energy and material cycles & succession. The hydrologic cycle is depend upon the environmental and physico-chemical parameters of lake.

In India many scientist concentrate their studies on this field (Gautam, 1990) Deshmukh (1964) studied the physico-chemical characteristic of Ambazari lake, Nagpur, Maharashtra; while Dr. Kodarkar (1995) studied water quality & conservation aspect of five water bodies in and around Hydrabad (A.P.).

The correlation between seven chemical parameters has been calculated such as air temperature, water temperature, pH, total dissolved solid, dissolved oxygen, total hardness, chloride.& regression analysis carried out. The phytoplankton has a great significance in the biology of an estuary as they provide the food for other organisms, especially the zooplankton. Further, physico-chemical factors of water are directly related to their production. Though few research papers are available on hydrobiological studies of lakes in relation to phytoplankton, however, the knowledge regarding ecological sapects

of phytoplanktons is scanty and to fill this gap resent study was carried out in the Rui lake of Digras Tahsil Dist.- Yavatmal (M.S.)

METHODS

The study was conducted for one year from June-2010 to May-2011. In this period the water samples were analysed monthly for important physic-chemical properties (APHA, 1998). The samples were collected from different stations of lake (Unni, 1971). For phytoplankton, 500 ml water sample was collected in a separate container and for immediate fixation, Leguol's iodine solution was used in the field and later 4% formaldehyde was used for long term preservation. The phytoplankton was concentrated and identified up to genera level using standard key. In physico-chemical parameters the pH, temperature and dissolved oxygen were analyzed immediately and remaining parameters like total hardness, chloride, total dissolved solid were analyzed in the laboratory, APHA (1998).

Table 1 : Monthly variation in physico-chemical parameters of Rui lake.

Month	Air temp. (^oC)	Water temp. (^oC)	T.D.S. (mg/l)	Dissolved O_2 (mg/l)	pH	Total hardness (mg/l)	Chloride (mg/l)
JAN	13.2	11.7	81.6	9.1	7.3	155.7	79.4
FEB	20.4	19.3	75.8	7.2	7.4	169.4	85.7
MAR	28.7	25.1	68.5	6.8	7.7	182.1	87.9
APR	32.9	29.7	61.2	5.5	7.9	196.8	91.6
MAY	34.5	30.1	59.7	4.3	8.2	215.9	98.7
JUN	33.6	28.8	73.4	4.9	5.3	188.6	77.1
JUL	27.5	26.3	84.7	5.9	5.8	168.1	59.4
AUG	22.1	21.7	95.8	6.7	7.2	161.3	62.7
SEP	20.8	18.9	112.7	7.2	7.1	154.7	66.9
OCT	19.1	17.5	91.4	8.4	7.3	152.6	71.5
NOV	15.3	13.7	87.3	8.9	7.3	149.2	67.3
DEC	12.7	11.2	83.5	9.9	7.4	148.3	72.8

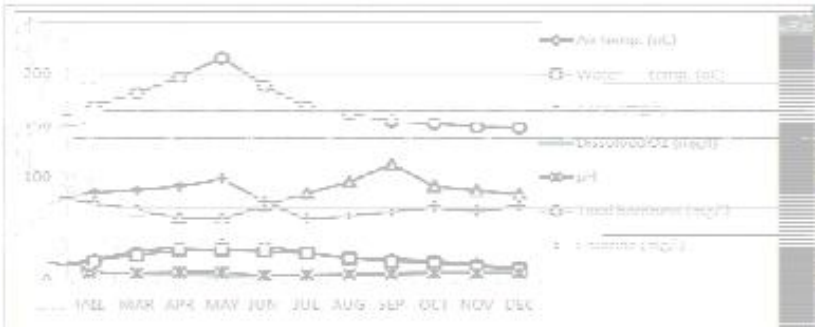

Figure 1 : Showing the monthly variation in various physico-chemical parameters studied in Rui lake

RESULT

The study of physico-chemical characteristics indicate that the magnitude of various parameter is partially or whole associated with the seasons and level of water in the lake. In Rui lake the chlorophyceae was most dominant class of phytoplankton and it contributed 35% of total phytoplankton diversity. The class was represented by 14 genera. Maxima of chlorophyceae population was observed in the month of February and March 2011. It was followed by drastic fall in density immediately in the next month i.e. May 2011 (*Pediastrum spp*. was observed to be the consistent and the dominant genera in chloroclccales contributing to the peak of chlorophyceae). It exhibited high positive correlation with temperature, dissolved oxygen, total dissolved solid, etc. *Cosmarium spp*. was other genera found in lake.

Temperature:- The temperature of Rui lake varies throughout the study period, it is clear from the observation table. The temperature includes air temperature & water temperature. The parameter of water temperature varies in accordance with air temperature. It was found that the temperature is high in summer while low in winter season. It was observed that the period of high temperature coincides with low oxygen content in water. Similar observations

made by Rao (1955) & Singh (1960). At a period of low temperature the total hardness of water is also low & other parameters are in acceptable range.

Total Dissolved Solid:- The total dissolved solid in lake water was very low during summer period while the parameters show very high peak after monsoon season due to run off water of rain from nearby hilly slopes. Bais & Agrawal (1995) have also reported the same.

Dissolved Oxygen:- During winter season the total dissolved oxygen content in lake water is high whereas it becomes low in the summer season. During winter season the low water temperature, high photosynthetic activity might have been increased the amount of dissolved oxygen in lake water, this is in accordance with the view of Ganpati (1964), Shardendu & Ambasht (1988).

pH:- Cole (1973) considered pH as a factor important for metabolic activity. The pH values are low in winter season and high in summer. This in accordance with the view of Welch (1935). The pH of the lake is in alkaline range throughout the study period. The alkaline pH of Rui lake suitable for growth of phytoplankton.

Total Hardness:- The total hardness of water was found to be very high in summer season while becoming low at winter season. Total hardness of water is high in summer as there is decrease in dissolved oxygen content of lake water. In summer the hardness is more as water quality of lake decreases. Hardness of water is governed by calcium & magnesium.

Chlorides:- Chlorides in lake water was observed high during summer and low in winter season. The present observation was similar to that of Munawar (1970) & Hararika (1994). The chloride occur in water as the salt of Na+, Ca++ or Mg+.

CONCLUSIONS

Water quality is crucial factor that in turn regulates biotic diversity, energy and material cycles & succession. The present study indicate that there was significant seasonal variation in physico-chemical parameters of Rui lake of Digras tahsil Dist.- Yavatmal (M.S.)

DISCUSSION

The results revealed that there was variation in physico-chemical parameters of lake and therefore the lake must be monitored regularly to prevent the changes that are occurred day by day.

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