

DIVERSITY AND SEASONAL VARIATION OF SIMILIYA VILLAGE POND

Kamlesh Meena and Prahlad Dube*
Department of Zoology, Govt. College, Kota: 324001 (India).

ABSTRACT: Water is the most precious substance on the earth. Life on the earth is not possible without water. The determinant of good water body is determined by physico-chemical characteristics. In the present study seasonal variation of physico-chemical characteristics were statically analyzed and graphically presented. The following ranges were obtained for the parameters evaluated atmospheric temperature 23.1-34.6 °C, atmospheric relative humidity 40.9-78.9 %, water temperature 22-29 °C, transparency 13.43-83.55 cm, electric conductivity 120.76-391.96 µmhos/cm, total dissolved solids 57.8-128.9 mg/l, pH 7.11-8.9, free carbon dioxide 0.50-4.86 mg/l, total alkalinity 86.44-155.87 mg/l, dissolved oxygen 6.46-9.57 mg/l, chloride 26.80-145.61 mg/l, total hardness 86.80-198.33 mg/l, phosphate 0.86-1.98 mg/l and nitrate 0.16-0.56 mg/l. Phytoplankton species were more diverse and dominant than zooplankton communities. These were found to be present in the ratio of 6.4:3.6 (64 % phytoplankton 36 % zooplankton). The study concluded that the water of the village pond Similiya showed variation in the various physico-chemical parameters in all the three seasons.

KEYWORDS:- Physico-chemical, phytoplankton, zooplankton and village pond.

INTRODUCTION:-

Ecology is the study of the relationship between living organism, including humans, and their physical environment, it seeks to understand vital connection between plants and animals and the world around them. Freshwater systems- lakes, wetlands, rivers and streams, have been critical to the establishment of civilizations throughout human history. Water bodies are essential to humans not only for drinking but also for transportation, agriculture, energy, production, industry etc. Determining which of these factors has the most significant influence on the quality of water body with its watershed and how the various inputs affect its physical, chemical and biological characteristics. One of critical sciences required to understand aquatic ecosystem interactions is called limnology. Limnology incorporates many scientific disciplines into one including physics, chemistry, and biology. While the main thread of limnology is water system, these water systems are interconnected host plant and animal life band both influence and interact with weather patterns. The Pond is a small body of standing water and the pond

ecosystems complex interaction between its biotic and abiotic components. Abiotic components of pond ecosystem are environmental factors (light, temperature, water), inorganic components (O₂, CO₂, N₂, nitrate, phosphates, carbonates etc.). Biotic factors are phytoplankton and zooplanktons.

MATERIAL AND METHODS:-

Study area:

In the present study involves the analysis of diversity and seasonal variation of Similiya village pond, Kota district, Rajasthan, India. It is 28 KM towards east from district headquarters Kota on national highway number 27. Its Geographical location is at longitude 76° 11 N and latitude 25° 17 E. The pond water was used for bathing purposes by local people.

Sample Collection:

The standard APHA, (2005) methods were followed for estimation of physical, chemical and biological parameters. To carry out the study ECOLOGICAL STUDY OF SIMLIYA VILLAGE POND, DISTRICT KOTA RAJASTHAN (INDIA) water sample will be collected twice in a month for a period of two years.

RESULT AND DISCUSSION:-

Water is precious for living organisms on this earth. . Deterioration of the water quality is now a global problem (Mahananda et.al. 2010). The physico-chemical parameters have important significance in determining the water quality of aquatic habitat. Water temperature is considered as one of the important factors that controls aquatic life in headwater stream (Wetzel, 1983). The Atmospheric Temperature in the present study ranged between from 23.1 to 36.6 °C. similar results were found by Dey and Laishram (2014) in the study of Loktok Lake Manipur. Kaushik and saksena (1999) also noted the same results at Motijheel 12 °C to 43.8 °C. Temperature plays an important role in the biological balance and the solubility of oxygen and mineral salts. In the present study temperature was found ranging from 21.7 °C to 29 °C. Many researchers observed similar trends while working on the different ponds (Tidame & Shinde 2012) water temperature is very important because it influence the biota in a water body. All the metabolic and physicochemical activities of life process are greatly influenced by temperature. The atmospheric temperature

is always higher than the water temperature (Verma & Khan 2015, Kangaban et. al. 2017).

Light penetration into a water body is influenced by turbidity and the extent of light penetration determines depth of euphotic zone in a water body. The depths of visibility give firsthand information regarding water quality. In the present study, the depth of visibility varied between 13.43 cm to 83.55 cm which is maximum in winter season and minimum summer season. Conductivity is defined as the ability of a substance to carry electrons. In the water this capacity is influenced by the amount of dissolved salts and the temperature (Lucas et. al. 2017). The conductivity ranged from 120.60 to 392.67 micro mhos / cm. Electric conductivity shows significantly negative relation with chlorine and salinity (Nag and Gupta 2014). Total dissolved solids denote mainly the various kinds of minerals present in the water. TDS indicate the salinity behavior of ground water (Gohar 2002). TDS ranged between 57.80 to 128.96 mg/L maximum in summer season and minimum in rainy season. A similar result was found by Darasingh and Laxmi (2014).

pH is an important factor in determining of productivity of an ecosystem (Singh et. al. 2009). In the present study highest value of pH was recorded 7.11 to 8.92. High pH value was recorded in rainy season because of pH shows highly significant positive relationship with chlorinity,

salinity and COD (Nag and Gupta 2014). In the present investigation free CO₂ is recorded 0.50 to 4.86 mg/l. Highest in the winter season and lowest in rainy season. DV and HL (2017) found free CO₂ from 3.81 to 6.81 mg/L. Kumar et al. (2017) found similar results. Free CO₂ recorded its presence in some winter months (November and January) which may be associated with low temperature, decrease water level Total alkalinity of the water sample ranges 86.44 to 157.87 mg/L. The alkalinity values were maximum during summer and minimum in monsoon. The values obtained were low than the Indian Standard (200-600) and WHO Standard (100-200). The decrease in alkalinity was due to dilution caused by the rain water during monsoon (Verma and Khan 2015). The results is also in close conformity with the findings (Mishra et. al. 2013) (Darasingh and Laxmi 2014) (Laishram and Dey 2014). The dissolved oxygen is obtained from this study had ranged between 6.46 to 9.87 mg/L. Highest values in winter season and lowest in summer season. Results of the present study were similar to other (Laishram and Dey 2014).

In the present investigation the values of chloride recorded were as 26.8 to 145.61 mg/L. Concentration of chloride was highest in summer season and lowest in rainy season. The values obtained were low than the Indian Standard (250-1000) and WHO Standard (250). Concentration of chloride ions is maximum in winter season and minimum in rainy season. Similar results were recorded (Sajitha et. al. 2016).

Table No.1-Seasonal Variation in Physico-Chemical parameters of Similiya village pond (July 2015 to June 2017)

| Physico-chemical parameters | Minimum | Maximum | Maximum mean | Minimum Mean | Calculated d F between season |
|-------------------------------|---------|---------|--------------|--------------|-------------------------------|
| Atmospheric Temperature (°C) | 23.1 | 36.6 | 34.8 | 24.5 | |
| Water Temperature(°c) | 16 | 33 | 35 | 16.5 | 0.29 |
| Transparency (cm) | 13.43 | 83.55 | 82.87 | 18.45 | 0.97 |
| Conductivity | 120.76 | 392.67 | 389.65 | 120.60 | 3.65 |
| Total Dissolved Solids (mg/l) | 57.80 | 128.96 | 124.65 | 58.31 | 1.64 |
| pH | 7.2 | 8.92 | 8.90 | 7.88 | 0.65 |
| Free CO (mg/l) | 0.50 | 4.86 | 4.45 | 2.34 | 1.65 |
| Total Alkalinity(mg/l) | 86.44 | 155.87 | 157.87 | 87.97 | 0.65 |
| Dissolved Oxygen(mg/l) | 6.46 | 9.57 | 9.87 | 7.27 | 0.25 |
| Chloride(mg/l) | 26.80 | 145.61 | 141.87 | 27.27 | 2.22 |
| Total Hardness(mg/l) | 86.80 | 198.33 | 197.67 | 87.27 | 1.02 |
| Phosphate(mg/l) | 0.86 | 1.98 | 1.97 | 0.87 | 5.02 |
| Nitrate(mg/l) | 0.16 | 0.56 | 0.50 | 0.17 | 1.32 |

In the present investigation the total hardness was recorded in the range of 86.80 to 197.67 mg/l. On the basis of observation the value of total hardness was under the permissible value of Indian Standard (187-500) and more than the WHO Standard (100). Value of Total Hardness in summer season is high and

low in rainy season. Similar results were found by Verma and Khan (2015). In the present study maximum phosphate content was 0.86 to 1.97 mg/l. Higher values of phosphate in summer may be an account of reduced volume of water due to evaporation, the increased density of biota, which produce metabolic waste, high

temperature and high biodegradation releasing this nutrients from the sediment (Darasing and Laxmi 2014). In the present study the value nitrate was 0.16 to 0.56 mg/l which is maximum in summer season and lowest in rainy season. The nitrate level was maximum during pre-monsoon season and post-monsoon (Kumar et. al. 2017

CONCLUSION:

The physico-chemical factors showed considerable variation both monthly and seasonally. Investigation shows that there is significant amount of pollution in the tank under study and analysis of data obtained revealed that this tank is eutrophic in nature.

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