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Effect of water Temperature on Plankton Growth in the Patella Pond, Banswara (Rajasthan)

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Abstract

Water temperature affects plants in many ways. A change of temperature alters metabolic activity and even affects aquatic ecosystems. From houseplants to aquatic plants, water temperature plays a part in growth and development. Water temperature has a direct effect on the growth of aquatic plants. An unnatural introduction of warm water into a water body is called thermal pollution. Thermal pollution alters the population dynamics of aquatic plants. Also, some aquatic plants float to the surface in warm water. In this study we strongly explained that water temperature can fluctuate in every season which directly affect aquatic ecosystem. Water temperature is taken from the month Jan 16 to June 16 which ranges from 28°C-42°C that shows large variation in plankton growth.

Key words: Temperature, Thermal pollution, dynamic.

Introduction

Temperature is one of the most important factor and all life processes are accelerated or slowed down by temperature changes in the environment, it influences the solubility of gases and salts in water. The volume as well as density of the water depends upon temperature.

Measurement of surface water temperature is usually very important. Temperatures often differ with depth and positions at which temperature is to be measured are remote from the observer.

Water temperature may depend on the seasons, geographic location and sampling time¹⁰. The results

are in agreement with other workers¹¹.

Temperature is the measurement of hotness of any material. It affects the physical and chemical properties of water and also affects the aquatic vegetation, organisms and their biological activities.

During this study, temperature of the samples ranged from 27°C to 29°C. Maximum temperature was observed in sample B and minimum was observed in sample C.¹³ and Shyamala et al, (2008) also reported the range of temperature in between 24.75 to 28.5°C and 26.3 to 27.2°C respectively.

Temperature is one of the most important and essential parameter of aquatic habitats because almost all the physical, chemical, and biological properties are governed by temperature².

The basis of all life functions is a complicated set of biochemical reactions that are influenced by physical factors such as temperature. The temperature was basically important for its effects on the chemical and biological activities of organisms in water¹⁶.

Temperature influences the oxygen contents of water, quantity and quality of autotrophs, while affecting the rate of photosynthesis and also indirectly affecting the quantity and quality of heterotrophs⁴. The water temperature varies throughout the year with seasonal changes in air temperature, day length, and solar radiations¹.

The surface water of the reservoir is within the favourable temperature range of 16°C -30°C in Dabera reservoir of Nigeria⁵. The normal range of temperature in the tropics to which fish is adapted is between 8°C and 30°C and these make the critical thermal minimum and maximum respectively³.

All the results obtained sustain survival of both fish and other aquatic fauna in the reservoir⁸.

Temperature is one of the most important factor in an aquatic environment. Temperatures below 16.7°C and above 39.5°C prove fatal to most fishes including carps¹⁴.

The high temperature of 30°C and 27°C recorded for water body of Nigeria respectively might have resulted in good feeding and food conversion for the fish growth⁷.

Water clarity has seen both increases and decreases since the early 1990s due to which precipitation playing a critical role in year-to-year variability¹². In recent years, our understanding of the effects of air temperature and wind speed and its changes in water temperature and stratification has improved^{6,9,15,18}.

Temperature is one of the most important factor and all life processes are accelerated or slowed down by temperature changes in the environment, it influences the solubility of gases and salts in water. The volume as well as density of the water depends upon temperature therefore measurement of surface water temperature is usually very important.

The physicochemical parameters like water temperature, air temperature, BOD, DO, free oxygen plays very important role in aquatic life due to which we can find out the planktonic diversities and their growth.

Geography of Patella Pond :

Planktons sampling were collected from the patella pond, Banswara district. The patella pond is located near old temples of Talwara in Banswara and is mainly used for fish culture, irrigation and drinking water supply. Tripura sundari famous temple is also situated near this pond.

Material and Methods

Planktons sampling were collected from the ponds Talwara district Banswara in six months. Summer extends from January to June. Water samples were collected for the identification for planktons identification. Water temperature is directly measured by thermometer. Samples were preserved in 10% formalin and were identified with the help of as per eminent workers. (APHA, 1985)¹⁷.

Result And Discussion

Due to high temperature of Banswara district the water temperature is also affected. as compare to the various ponds patella ponds water temperture is high .Its ranges from 28°C to 42°C. due to temperature ranges, Planktons diversities were less found as compare to other ponds. Here the table is given in which six month temperature fluctuation is mentioned.

Month	Temperature
Jan	28 ^o c
Feb	29 ^o c
March	32 ^o c
April	34 ^o c
May	41 ^o c
June	42 ^o c

Conclusion

Water quality is an important part of environmental monitoring which is essential part of keeping the planet healthy and sustainable. When water quality is poor, it affects not only aquatic life but the surrounding ecosystem as well which were carried out in this study. Findings from this work revealed that regularly monitoring water parameter such as temperature, pH, DO, BOD, COD, etc provide insight to the health of the aquatic ecosystems. In this study, we strongly conclude that there are fluctuations during seasons. The physico-chemical parameters of the water samples from pond and WHO standard indicate that the water can be classified as a good, stable and healthy aquatic ecosystem and also increased planktons productivity.

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