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"STUDIES ON AQUATIC PLANKTONIC BIODIVERSITY : A REVIEW"

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ABSTRACT:

Aquatic planktonic biodiversity is a critical area of study that is essential for understanding the health and functioning of aquatic ecosystems. In this review, we explore the current state of knowledge on planktonic biodiversity, including the various organisms that make up the planktonic community, their distribution and abundance in different aquatic environments, and the factors that affect their diversity and ecological function. We also discuss the latest research techniques and methodologies used to study planktonic biodiversity, such as microscopy, DNA sequencing, and ecological modeling. Overall, this review highlights the importance of continuing research in this field to better understand the complexities of aquatic ecosystems and to develop effective strategies for their management and conservation.

KEYWORDS: *Aquatic, Planktonic, Biodiversity and Distribution.*

INTRODUCTION:

Aquatic planktonic biodiversity is a complex and dynamic field of study that explores the diversity of microscopic organisms that inhabit freshwater and marine ecosystems. Planktonic organisms play a critical role in the global ecosystem, as they are primary producers and form the base of the food chain for many aquatic organisms. Understanding the biodiversity of these organisms is essential for managing and conserving aquatic ecosystems, as well as predicting the impact of environmental changes such as climate change and pollution. This field of study involves a wide range of techniques and methodologies, including microscopy, DNA sequencing, and ecological modeling, and is a rapidly evolving area of research with new discoveries being made all the time.

Planktons are poor swimming but most drifting small organism that inhabit called the water column of ocean and fresh water bodies the name comes from the Greek term, plankton-meaning "wanderer" and drifter plankton is composed of tiny plant called Phytoplankton and animal called Zooplankton, as well as organism that are not easily classified in to those two groups (such as protozoa and bacteria), Planktonic organism are suspended in water and are also small fat even slight current move them about, the occurrence and abundance of Zooplanktons depend on its productivity, which in turn is flow by abiotic factors and the level of nutrients in the water. In a fresh water system, the Zooplanktons from and important faunal group, are most of them life on primary producer and make themselves available to be eat in by higher organism IN FOOD chains including fish and contribute significantly to the biological productivity of this ecosystem (Michael 1973). The Phytoplankton are the

primary producers as they trap solar energy and produces organic molecules by consuming CO2, phytoplankton are not only primary producers but also brings out biogenic oxygenation of the water during they time (Welch 1953), (Wetzell, R. G. (2001).

MATERIALS AND METHODS:

Planktonic study is carried out seasonally, for which sampling were done 3-4 times in a month and in each day 2 times sample were taken. In each study site sample taken from 3 places. (The selected study sites in Nebuha Dam, Sidhi, Madhya Pradesh) sample taken from 2m. Depth below the surface water.

BIOLOGICAL ESTIMATION:

The plankton samples are collected following lind (Welch 1953), (Wetzell, R. G. (2001) by filtering 40 liters of water through plankton not having pure size 64 u. concentration plankton samples are fixed in 4%formalin. Zooplankton are identic with the help of keys provided by pennak (1978), sehgal (1083), Needham (1962), tonapi (1980), A.P.H.A. (1985). The phytoplankton will identify with the help of keys given by Presscott (1962), smith (1950), Edminson (1959).

Counting of the individual plankton will be done by "lac keys" dropping method (1935) using the formula.

$$\text{Plankton units /liter} = N \times C \times 10 / Y$$

N =Number of phytoplankton counted 0.1 ml concentrate. C = Total volume of concentrate in ml. Y = total volume of water filtered for sample in liters

The phytoplankton density was expressed on units / liter and Zooplankton density will expressed in individuals / liter. During the period of study the range of variation in different physico-chemical parameters is as: On the basis of the observations that Nebuha Dam are entropic in nature

S.No.	Parameter	Nebuha Dam
1	PH	7.3-9.3
2	Water Temperature	13-22.6 c
3	Transparency	22-62.0 cm
4	Dissolved Oxygen	2.4-11.5 mg/Lit.
5	Free CO_2	Nil-17.0 mg/Lit.
6	Alkality	125-274 mg/Lit.
7	Total Hardness	103-225 mg/Lit.
8	Chloride	27-90.6 mg/Lit.
9	B.O.D.	8.2-26.5 mg/Lit.
10	Nitrate	0.7-2.1 mg/Lit.

RESULTS AND DISCUSSION:

On the basis of different physico-chemical and biological parameters, the status of Nebuha Dam, Sidhi is eutrophic in nature and during period under study 28 Zooplanktons (08 Rotifera, 02 Crustacea, 10 Protozoa, 05 Copepoda, 03 Ostracoda) Genera have been recorded. In future with increasing human interference at the same rate, it is possible that the Nebuha Dam will further be polluted. The current prevailing condition of physico chemical parameters of Nebuha Dam, Sidhi and Aquatic diversity besides acting as potential bio indicators of tropic status requires the management strategies for the conservation.

Recently, many workers have studied the hydrobiology of different aquatic resources of India, i.e. Nagamani *et al*. (2015) analysed the physico-chemical factors of water samples of urban and rural area of Bangalore. Sagar *et al*. (2015) reported the physico-chemical parameters for testing water. Shrivastava *et al*. (2015) reported the water quality management plan for Patalganga River for drinking purpose and human health safety, which is located 60 km from Mumbai and is a significant source of

water supply for Panvel, Alibaug and Rasayani. Various technical research papers on the assessment of water quality of different areas have been presented Danha *et al*. (2015) worked on physico-chemical analysis and fish pond conservation in Kano State, Nigeria, Elegbede *et al*. (2015) reported the effect of water quality characteristics of fish population of the lake Volta, Ghana, Zafar *et al*. (2015) analysed water and soil quality parameters of shrimp and prawn farming in the southwest region of Bangladesh. Sandhya and Benarjee (2016) worked on physico-chemical properties of some selected fresh water fish ponds in relation to fish production in Warangal area, Telangana State, India. Reda (2016) studied the physico-chemical properties of drinking water quality of Arbamich Town, Ethiopia. Querijero and Mercurio (2016) worked on water quality in aquaculture and non-aquaculture sites in Taal lake, Batangas, Philippines. Kashyap (2016) worked on physico-chemical analysis of various water samples of Rewa district (M.P.) India. Chakravarty *et al*. (2016) studied on spatial variation of water quality parameters of pond at East Godavari district, Anadhra Pradesh, India and Younas *et al*. (2017) worked on the physico-chemical parameters of water and soil of three dams of district Karak, KP, Pakistan.

The Indian inland freshwater ecosystems harbor a rich wealth of primary producer component. Depending on the quality and quantity of these primary producers the quality and quantity of life forms belonging to different trophic levels of the food chain of the water body are determined. Every organisms of a water body whether plant of food chain and/or food web and thus plays an important role in flow of every in the system and as such the present study will remain incomplete without having a complete picture of biotic parameters. Hence an attempt was made to evaluate the biotic parameters of Narmada river under following heads.

According to Bais and Agrawal (1995), a progressive increase in the alkalinity of water also increased the zooplankton population. The simultaneous presence of dissolved oxygen and hard water also favored the production of zooplanktons during the summer in both lakes. Similar results have also been suggested by a number of workers (Bhati and Rana 1987 and Kumar and Datta 1994). Normally the monsoon is associated with lower population densities due to its dilution effect and decreased photosynthetic activity by primary producers. Similar results have been shown by Bais and Agrawal (1995). The summer population of total zooplankton falls during the monsoon due to a dilution effect. The population rises to a higher level in the winter as a result of favorable environmental conditions, including temperature, dissolved oxygen and the availability of abundant food in the form of bacteria, nanoplankton and suspended detritus. The physiochemical parameters such as temperature, light, pH, organic and inorganic constituents and the interrelationship with their organisms play an important role in determining the nature and pattern of fluctuation of population densities of zooplanktons in an environmental unit. The importance of these factors has been stressed by several workers including Arora (1966), John *et al*.(1980), Rajendra (1992), Kumar and Datta (1994), Kodarkar (1992). However these parameters are extremely variable from place to place and from time to time. These parameters also interact with each other in a variety of ways.

CONCLUSION:

Aquatic planktonic biodiversity is an important component of the Earth's aquatic ecosystems. Planktonic organisms, such as phytoplankton and zooplankton, play critical roles in nutrient cycling, food webs, and global biogeochemical processes. Studies on aquatic planktonic biodiversity have focused on understanding the diversity, distribution, and ecological roles of planktonic organisms. Recent advances in molecular biology and imaging technologies have enabled researchers to study the genetic diversity of planktonic organisms and the interactions between different species. Studies have also been conducted on the impact of environmental factors such as climate change, nutrient loading, and pollution on planktonic communities. Research on aquatic planktonic biodiversity has significant implications for the management and conservation of aquatic ecosystems. By understanding the ecological roles of planktonic organisms, it is possible to develop more effective management strategies to protect and conserve these critical components of aquatic ecosystems.

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