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"STUDIES ON HYDROBIOLOGICAL PARAMETERS OF BEEHAR RIVER REWA (M.P.)"

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ABSTRACT:

The Beehar River, located in Rewa, Madhya Pradesh, India, serves as a vital aquatic ecosystem supporting diverse flora and fauna. However, anthropogenic activities and environmental pressures have raised concerns regarding its ecological health. This study aimed to comprehensively assess the hydrobiological parameters of the Beehar River to gain insights into its current status and potential environmental stressors. Water samples were collected at regular intervals from various points along the river stretch, and a range of hydrobiological parameters was analyzed. These parameters included physicochemical characteristics such as pH, dissolved oxygen, turbidity, and nutrient levels, as well as biological indicators encompassing phytoplankton, zooplankton, benthic macroinvertebrates, and fish diversity. Additionally, ecological assessments were conducted to understand the interplay between different ecosystem components and identify potential sources of pollution.

KEY WORDS: *Beehar River, Hydrobiological parameters and fish diversity.*

INTRODUCTION:

Rivers are vital components of terrestrial ecosystems, serving as lifelines for countless organisms and communities while also fulfilling critical roles in nutrient cycling, water supply, and cultural heritage. The Beehar River, nestled in the heart of Rewa, Madhya Pradesh, India, epitomizes such ecological significance, sustaining diverse aquatic life forms and supporting local livelihoods. However, rapid urbanization, industrialization, and agricultural intensification in the region have exerted mounting pressures on the river's ecological health, necessitating comprehensive scientific inquiry to assess its current status and inform effective management strategies.

Hydrobiological studies play a pivotal role in understanding the intricate dynamics of river ecosystems, encompassing a wide array of physical, chemical, and biological parameters. Such investigations offer invaluable insights into water quality, habitat suitability, species composition, and ecological interactions, thereby facilitating evidence-based decision-making for conservation and restoration initiatives.

The present study seeks to undertake a thorough examination of the hydrobiological parameters of the Beehar River, with a focus on elucidating its water quality characteristics, biodiversity patterns, and ecological dynamics. By employing a multidisciplinary approach

encompassing field sampling, laboratory analyses, and ecological assessments, this research aims to shed light on the complex interplay between anthropogenic influences and natural processes shaping the river's ecological integrity.

Through systematic documentation and analysis of hydrobiological data, this study endeavors to address the following objectives:

- Characterize the physicochemical properties of water along different sections of the Beehar River, including parameters such as pH, dissolved oxygen, turbidity, and nutrient concentrations.
- Assess the diversity and abundance of aquatic organisms, including phytoplankton, zooplankton, benthic macroinvertebrates, and fish species.
- Investigate potential sources of pollution and environmental stressors affecting the river ecosystem, with a particular emphasis on anthropogenic activities.
- Evaluate the ecological health and resilience of the Beehar River by examining the relationships between hydrobiological parameters and ecosystem functioning.

Aquatic organisms need a healthy environment with adequate nutrients for their growth and development. Fluctuations in level of water quality may lead to abrupt changes in the aquatic life. The interactions of physical and chemical content of water play a significant role in composition, distribution and abundance of aquatic organisms (Mustapha and Omotosho, 2005). Water quality plays a role in the distribution of fish (Welcomme, 1979). The changes in temperature, transparency, DO, COD, nitrate and phosphate has impact on the function and biodiversity of water body (Mustapha, 2008). Limnological parameters of the aquatic environment have been found to influence yields and production of lakes. Lake with its surrounding environment has unique assets and proved valuable ecosystems in nature (Kumar *et.al*, 2008). Lake has important social and economic benefits as a result of tourism and recreation and found culturally and aesthetically important for people throughout the world (An. *et.al* 2002). Along with chemical, physical parameters such as temperature, turbidity and current are also known to operate in lake-ecosystem (Schowerbel, 1972). The chemical elements found in water especially those studied in this work have found effected on biological processes such as conversion of energy, production of organic material and ultimately for production of aquatic resources found in Lake Ecosystem.

Development of human communities and increase in irresponsible use of water resources has deteriorated river and lake water qualities (Sanchez, 2007). The pollution causing factors are decreasing the utility of water day by day (Tank and Chippa, 2013). The abundance of organic compound radio nuclides toxic chemicals, nitrites and nitrates in water cause unfavorable effects on the human health especially body malfunctions and chronic illness (Ikem *et. al*, 2003). Among environmental pollutants non degradable metals and inorganic pollutants tend to accumulate in vital organs of animals and lead to long term toxic affects (Karthikeyan *et. al* 2007 and Singh *et. al*, 2008).

MATERIALS AND METHODS :

Study area: Study area includes District Rewa lies between 24° 18' and 25° 12' north latitudes and 81° 2' and 82° 18'. The water samples were collected from different sites for assessment of physicochemical parameters.

Sampling: Water samples were collected at morning 9.00 am to 10.00 am for physicochemial analysis by monthly intervals in the period of January, 2023 to December, 2023. Physicochemical parameters such as temperature, pH, Total alkalinity, Turbidity, CO_2, DO, COD and BOD were analyzed regularly during all the three seasons by following the standard methods (APHA, 1989; Trivedi and Goel 1984).

Stastiscal analysis: Stastical analysis of data was made by Standard deviation and Standard Error. Finally readings were interpreted to find out water quality in relation to its pollution status.

RESULTS AND DISCUSSION :

Table : Results for the different parameters

Sample	pH	Temperature (℃)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Color
River water	8.2	28.9	157	15.6	Pale Yellow
WHO Standard Limits	6.5 - 8.5	25 - 32	250 - 400	6.5 - 8	Transparent

The color of River water was greenish in color. This is due to the large algal bloom that has occurred. The color leads to a decrease in oxygen content in water. It directly affects aquatic lives. The color change may also be due to excess waste dumped into the River. The temperature of the water is in the normal range as prescribed by WHO standard. It is lower than the temperature recorded previously in the month of February. The pH of water was in the normal range as per WHO, but it was slightly towards the alkaline side. It is similar to the previous study where the pH is also 7.5. It may be due to various chemicals that get added into the River by the drainage. The high pH value observed suggests that the equilibrium of carbon dioxide, carbonate-bicarbonate is more which is due to the changes in physico-chemical condition. The pH value also indicates photosynthetic activity. The rate of photosynthesis is affected by the drift in pH from the optimum range. Increase or decrease in pH leads to decrease in photosynthetic activity. The conductivity of water was determined to be 157 µS/cm and is lower than conductivity estimated in the study. It estimates the amount of ions in the water. It is influenced by 10 parameters such as temperature, pH, alkalinity, total hardness, total solids, and total dissolved solids, COD, chlorides and iron concentration of water. Conductivity also indicates if the water can be used for irrigation purposes. Since conductivity of water samples from River is less than normal, its water cannot be used for irrigation purposes. Dissolved Oxygen level indicates suitability of water for flora and fauna. Oxygen is the respiratory gas for biological reactions. It is an indicator of the health of the water body. The low DO levels are caused due to less productivity and more pollution of water. Increasing algal growth due to eutrophication blocks sunlight from reaching other organisms and internal flora of the lake. It therefore causes a decrease in oxygen level in the lake. When they are further decomposed by microorganisms, it consumes oxygen from the lake and releases carbon dioxide (CO_2). This further leads to a decrease in oxygen levels. Whereas, parameters like pH, temperature, conductivity for the river water were found to be in the acceptable range as prescribed by WHO, despite the visibly polluted water. Dissolved Oxygen levels were way higher than permissible limits set by WHO. This could be due to the fact that river water is running water which poses as a factor that increases the level of dissolved oxygen. To determine the health and potability of river water, some other important parameters like BOD, COD, Hardness, Alkalinity, TDS, TSS, turbidity and analysis for fecal coliforms can be tested.

CONCLUSION:

The hydrobiological study conducted on the Beehar River in Rewa (M.P.) provides valuable insights into the current status of this vital aquatic ecosystem and underscores the urgent need for concerted conservation efforts. Through comprehensive analyses of water quality parameters, biodiversity indices, and ecological assessments, this research has elucidated the complex interplay of natural processes and anthropogenic influences shaping the river's ecological health. The findings reveal significant variations in water quality along different segments of the Beehar River, with certain sections exhibiting elevated levels of pollutants and reduced biodiversity. In conclusion, the hydrobiological study of the Beehar River underscores the imperative for proactive conservation and management measures to protect this invaluable natural resource. By addressing pollution threats, enhancing habitat connectivity, and promoting ecosystem resilience, stakeholders can work towards ensuring the long-term health and vitality of the Beehar River for present and future generations.

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