JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

DIVERSITY OF FRESH WATER ZOOPLANKTON AND PHYTOPLANKTON FROM JUNEWANI DAM, PANDHURNA

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Abstract

A wide diversity of zooplankton and phytoplankton can be found in the water body. Because of the organisms' capacity for adaptation, not only are they found in every conceivable environmental situation, but they are also utilized as an indicator of contamination. Many physico-chemical characteristics in an aquatic ecosystem are responsible for determining the community of phytoplankton, as well as its structure, composition, and species diversity. The hydro chemical and physical elements have a significant impact on the spatial and temporal fluctuations that occur in the phytoplankton dispersion. The effect that these factors have on the phytoplankton community has the effect of changing the species composition as well as the variety of those species in the marine ecosystem. The diversity of zooplankton is one of the ecological parameters that is considered most essential when evaluating water quality. the variety of zooplankton in water bodies displays a link with reference to their physicochemical variables demonstrates, the endeavor has been made to analyze the diversity of zooplankton at Junewani Dam in the Pandhurna District of Chhindwara.

Key words-Water, Junewani Dam, Zooplantons , Phytoplantons, Physico-Chemical Parameters

Introduction

One of the primary factors necessary for the maintenance of life on earth is the presence of water. It is generally agreed upon that drinking ground water is the safest option available among the many different sources of water. The

ultimate and most suitable fresh water resource for human consumption, ground water has a virtually ideal percentage of salt. This makes it the most desirable fresh water resource. The quality of the drinking water is critical to the health and wellbeing of every individual. Yet in modern times, there has been a rise in population, which has led to an increase in industrial activity, which has made the problem of dirty water worse. At the moment, the quality of our water is deteriorating, and to make matters even worse, we are experiencing a shortage of it despite the fact that it is becoming increasingly polluted. That has caused some fundamental issues to arise in our environment, and as a result, we are currently dealing with concerns related to the amount as well as the quality of the water. When the overarching goal is to achieve sustainable growth while maintaining people as the primary emphasis, one of the most important parameters to investigate is water quality. Researchers from a variety of fields have each conducted exhaustive research in their own specialized fields. Dohare et al. (2014) conducted an investigation into the quality of the ground water in various wards of the city of Indore in India. Based on their findings, the researchers recommended that assessments of water quality parameters and water quality management practices be carried out on a regular basis in this region in order to safeguard the city's water resources. According to the findings of their study on the quality of the water, the majority of the water quality metrics were found to be moderately elevated during the rainy season in comparison to the dry season. Using a water quality index, Eugene et al. (2014) evaluated the ground water quality of dug wells in the west Jaintia hills district of Meghalaya, India. They discovered that despite the fact that dug well water samples were found to be acidic and rich in iron content, the water samples still fall under the category of having good water characteristics when other parameters are considered. Research conducted by Gyampo et al. (2014) on the drinking water quality of ground water in the Bunpkurugu-Yunyo district of Ghana revealed remarkable variation in water quality with respect to climatic conditions. The researchers found that during the rainy season, 94.7% of the samples fell into the "Excellent" and "Good" categories, whereas during the dry season, approximately 89.5% of the samples fell into the "Poor" and "Unsuitable" categories. In the Najaf Governorate of Iraq, Hussain et al. (2014) conducted an investigation to determine whether or not the ground water was suitable for use in irrigation. Umar et al. (2014) evaluated the quality of the surface water as well as the subsurface water in the semi-arid region of Quetta and Sorange Intermontane valleys in Pakistan. They emphasize the necessity of doing scientific research in the hard rock formations that are exposed in the region, such as Chiltan, Parh, Dungan, Dhok Pathan, and Soan, in order to meet the anticipated demand for water in the future. In addition, a contemporary sewage system is essential

in order to mitigate the effects of human activity, in particular in the urban core of Quetta, which contains an exceptionally high population density. Mohammad et al. (2015) evaluated the quality of the water in the Wyra reservoir in the Khammam district by using physico-chemical parameters. They found that the water in this reservoir could be used for drinking in both the winter and summer months, despite the fact that it is also used for irrigation and pisciculture. This research was published in 2015. According to the research that was done by Dede and Deshmukh (2015) on the zooplankton composition and seasonal variation in the Bhima river, it was found that the average abundance of species was highest during the winter season, while it was lower during the monsoon season, and it was at its highest during the summer season. This was found to be a result of the varying environmental conditions of the water bodies. The limnological investigations of Jaisamand lake were investigated by Balai et al. (2016). The researchers were interested in the lake's potential use not just for aquaculture and fisheries, but also for irrigation and drinking. Panwar (2017) evaluated the effects of the changing climate pattern on the lakes and water quality of the Kumaun region and found that the trophic status of the lakes was shifting toward eutrophication even while the conditions were subtropical. Following an analysis of the water quality in the Lingala Munner Krishna district, Lamma and Sallam (2018) came to the conclusion that the water could be utilized for drinking purposes during both the winter and summer seasons, and that it could also be used for agriculture. In their 2019 study, Prajapati and Patel compared the physico-chemical characteristics and phytoplankton diversity of two perennial ponds located in Mahesana Gujarat. The ponds in question were Panchot and Chhatiyarda.

Water is the elixir of life, and there is a plentiful supply of it on earth. Yet, this abundant natural resource has been exhausted and has become a scars commodity as a result of increased consumption. The provision of safe drinking water and the protection of existing supplies is currently the most pressing and important issue facing the globe today. A wide diversity of zooplankton and phytoplankton can be found in bodies of water. Both zooplankton and phytoplankton are examples of microscopic creatures and plants that are free swimming and make up a significant portion of the aquatic fauna. It holds an important position in the ecological energy pyramid, and their part in the process of trophodynamics is notable. The majority of invertebrate phyla can be found among the members of the zooplankton. The diversity of zooplankton is one of the ecological parameters that is considered most essential when evaluating water quality. They are essential for breaking down the organic contaminants and, as a result, lowering the amount of harm done. Physico-chemical parameters such as temperature, pH, Alkalinity, Turbidity, Dissolved

Oxygen, Biological Oxygen Demand, Hardness, Sulphates and Phosphate contains freshwater Zooplankton have an important function in transitional ecosystem by filtering Phytoplankton and then acting as food source for larger organisms such as fish, thereby linking primary production to secondary production. The abundance and distribution of freshwater Zooplankton and Phy Their diversity and density are mostly determined by the adaptation of the food as well as the favorable condition of the water. Zooplankton and phytoplankton found in fresh water serve as bioindicators and contribute to the process of determining the level of water pollution. In the current examination, an attempt was made to explore the variety of freshwater zooplankton and phytoplankton in Junewani Dam, which is located in Pandhurna District of Chhindwara.

Methdology

Collecting and testing samples (materials and methodology): In order to complete this research project, water samples were taken at random from four distinct locations within the dam. The water from the dam's surface was taken directly from the various collection points. The water samples that contained freshwater zooplankton and phytoplankton were transferred to the bottles with extreme caution, and then they were transported to the laboratory in a manner that caused as little disruption as possible. During a period of four months, beginning in September 2020 and continuing through December 2020, samples were gathered from each of the four stations on a weekly basis. The samples were taken at several points throughout the morning. Protection and delineation of the characteristics of fresh water Zooplankton were obtained by passing 400 milliliters of sample water through a filter of a quality that was established beforehand. After that, these were stored in a solution containing 5% formaldehyde after being filtered through a Zooplankton net with a fine mesh. Animals were viewed via a light microscope, and a standard key in addition to other published sources were used to identify them. In order to prepare permanent slides, the conserved material of freshwater zooplankton was first rinsed in distilled water and then dehydrated through a series of increasingly stronger concentrations of alcohol. After being hydrated, they were separated from one another by being stained with acetocarmine. After that, it was mounted in the DPX so that permanent slides could be prepared. Protection and delineation of the characteristics of fresh water Phytoplankton samples were gathered on a monthly basis for analysis. A Sedgwick Rafter Counting Cell was utilized in order to carry out the task of algal counting. Standard procedures were followed in order to isolate and identify the samples. The drop method was utilized in order to calculate the phytoplankton population density.

Results and Discussion

It was attempted to conduct an analysis of the percentage variation among all Zooplankton that were counted on a month-by-month basis from November 2021 to December 2022. Rotifers, Copepods, Cladocerans, and protozoan make up the zooplankton of the freshwater body Junewani Dam in the Pandhurna District of Chhindwara. The presence of 12 different species belonging to the cyanophyceae, chlorophyceae, and bacillariophyceae families was detected by the phytoplankton. However, only two of these plants might be considered perennial.

Water is the precious gift provided by God to the human beings. Mostly fresh water is present in rivers, lakes and ponds. These are the lifeline for the expansion and growth of human civilization. The development of a civilization is dependent on the availability and distribution of fresh water in river systems. As the civilization developed, use of water got increased up to the indefinite level and after use polluted water having different types of contaminant is excreted out. These polluting substances are introduced into water resources. They are transported from one place to other and may be transformed by physical, chemical, biological, and biochemical processes. To determine the impact of the substance on the water system, analytical strategies are performed for river water assessments related to the present and future water pollution.

Conclusion

The Junewani Dam is an essential resource for the Pandhurna district, as well as for the available zooplankton and phytoplankton.

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