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STUDIES ON ZOOBENTHOS IN RELATION TO WATER PARAMETERS OF SEETADWAR LAKE OF SHRAVASTI DISTRICT (U.P.) INDIA

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ABSTRACT

In the present study, several physico-chemical parameters such as DO (11.5 - 17.0 ppm), free CO_2 (5.0 - 20.0 ppm), total alkalinity (110-145) ppm), chloride (19.0 - 97.0 ppm), organic Carbon (1.28 - 22.80 mg g^{-1}) and transparancy (71-90 cm) were studied.

Variation in zoobenthos from the selected fields were examined by calculating taxa Annelids and Molluscs, three taxa were found in the study. Tubifex tubifex and Nepheles sp. were the most dominant sp. which indicated clean water of the lake. The correlation between zoobenthos diversity and physico-chemical parameters were also studied in lake.

Figure : 00 References : 27 Tables : 02

KEY WORDS : Physico-chemical parameters, Pisciculture, Zoobenthos.

Introduction

A lake is an area of land where soil is saturated with moisture either permanently or seasonally. Wetlands are considered the most biological diverse of all ecosystem[5]. Zoobenthos communities play a two fold role in this aspect. Firstly they act as connecting link in the food web and secondly they are used to purify the polluted water. The water, soil characteristics of the water bodies have a strong influence on the diversity of Zoobenthos[10,17].

The use of invertebrates as bio-indicators have been advocated by several researchers[1,8]. Macro-invertebrate organisms form an integral part of aquatic environment. They maintain various levels of interaction between community and environment. The structure of the Zoobenthos community provides precise and local information on recent events[14]. The Zoobenthos reside on or inside the deposit of bottom soil and feed on debris. They play a vital role in the circulation and recirculation of nutrients in aquatic ecosystem by accelerating the breakdown of decaying organic matter in to simpler inorganic forms[11]. They also serve as food for a wide range of fishes. Several studies deal with the relation of the Zoobenthos diversity and water, sediment with physico-chemicals status of the aquatic ecosystem[8,9,12,19,27].

Seetadwar lake is an important lake for natural remediation of Agricultural field waste, organic waste and their successful recycling in to habitat for Pisciculture. Zoobenthos are responsible for efficient utilization of sediments and their diversity indicates health of a lake in accordance to its sediments quality.

Literature reviewing on this aspect showed an inadequate information of Seetadwar Lake. Observations on the Zoobenthos diversity in relation to water parameters in Seetadwar Lake in Eastern Uttar Pradesh were conducted.

Materials and Methods

The district of Shrawasti lies between 27^0-04' and 28^0-24' north latitude, 82^0-18' and 81^0-06' east longitude and covers an area of 2380.30 sq.Km. It is the frontier district of eastern Uttar Pradesh with northern boundaries marching with Nepal for a long distance of the district. The line which runs in south-east direction parallel to the foot hills of Nepal forms one of the sides of the very perfect triangle which comprises the district. The western side of the triangles is provided by Kaurila

river, the lower part of it's course called the "Ghaghra" at the base of the Gonda district. Thus the area is bounded by Nepal in the north districts of Bahraich, Balrampur and Gonda in the west and south-east.

The area is of importance since the Zoobenthos occupy the sediments of the water bodies and play an important role as bio-indicators of ecosystem. Three sempling stations namely littoral, pelagic and polluted were set out, depending upon the degree of inflow and water turbidity. The Zoobenthos specimens were collected twice monthly (during December to May) using Ekman's dredge. The samples were collected from four corners (area : 1 Sqm) of each stations (spot was 2 m away form the edge of the lake.) The sediment samples of 3 stations were sieved through standard sieve (mesh size 0.5 mm) by washing with water. The organisms were preserved in 10% formalin.

Zoobenthos organisms were identified upto genus level[3,16]. Zoobenthos diversity was calculated respectively as per standard methods[18,20,22].

Water samples were collected 30 cm below the surface water twice monthly for six months that is from December to May and water parameters were analyzed following the standard methods of APHA (2005). Water temperature was determined with the help of thermometer (range 0^0-60^{0C} while pH of water was determined using pH meter (HANN, model no. H19 8107).

Result and Discussion

The average DO content was higher during. February and May (Table : 1). The CO_2 content was also low in different stations (Littoral and pelagic region) except in polluted region where CO_2 content was higher (20 ppm) than other regions. The water pH varied from February 7.3 - 8.2 always being higher in January. Organic carbon was also higher in December and it decreased during the rest of sampling period. Transparency was maximum in littoral region (90 cm) but in other region it was within the permissible limit for pisciculture. Alkalinity and chloride were within the range in all region of lake.

Organic carbon (1.75 - 2.25 mg^{g-1}) and organic matter (1.53 - 3.8 mg^{g-1}) of the soil were also within pisciculture permissible limit in lake. The amount of organic matter increased with the water temperature. Organic carbon was higher in December and then it decreased. In lake about six taxa of Zoobenthos were found. Zoobenthos diversity were higher in littoral and polluted region, Annelids and Molluscs were found frequently in all region, but Molluscs very few in number. *Lamellidens* sp., *Pila globosa* and *Planorbis* sp., were found only in littoral and polluted region. Among *Annelids nepheles* sp. was the most dominant species in lake. *Nais communis* and *Tubifex tubifex* second more abundant species. (Table- 2).

During the investigation presence of Zoobenthos was maximum in the summer months (May) and the minimum in the spring month (February). This is not in conformity to the earlier findings[6,7] who observed the maximum Zoobenthos in April and minimum in September in an American lake, while another worker[26] observed maximum in the month of June and minimum in the month of February from a lake of Lucknow (U.P.). A worker[15] concluded the peak period in the months of January and April but other workers[4,12,13] found maximum peak during summer months which is quite to conformity to the findings of this investigation. The differences in the occurrence of peaks in Zoobenthos might be due to the different nature of the water bodies, difference in the composition of abiotic factors of water, soil and the variation in the productivity of different water bodies. Some workers[19,21,23-25] correlated bottom community with the fish productivity and accordingly this water body is most suitable for the pisciculture.

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