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RESEARCH ARTICLE

An Assessment of Abiotic and Biotic Factors of a Fresh Water Body, Dadri, District G.B. Nagar, U.P.

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ABSTRACT

Present study has been conducted to study the abiotic and biotic factors of a fresh water body located at Dadri, District G. B. Nagar (U. P.). Water samples collected were analyzed for some abiotic factors i.e. Temperature, pH, Dissolved oxygen, CO2 and Alkalinity. Biotic factors were assessed by studying the zooplankton population which is represented by 3 major groups i.e. Rotifera, Cladocera and Copepoda. Monthly variations in both abiotic and biotic factors are described.

Key words*: Abiotic and Biotic factors, water, Zooplanktons*

INTRODUCTION

Fresh water bodies are one of the important water resources used for various purposes of human usage. To fulfill human needs water quality of a fresh water body should not be abused and polluted. Water quality gets degraded when pollutants get accumulated in these water reservoirs.

Present study has been carried out to assess the water quality of a fresh water body by studying its abiotic and biotic factors. The pond receives water from domestic discharges and rain water which accumulates during rainy season. The pond is regularly used for agriculture, bathing, washing of clothes, and fishing by local people.

MATERIAL AND METHODS

The fresh water pond is situated at village Chithera, near Dadri, District G.B. Nagar, U.P. (India). The water samples were collected monthly during November, 2004 to October, 2005. Water samples were brought to the laboratory and some physico-chemical parameters (abiotic factors) were taken into consideration. The parameters such as water temperature, pH, Dissolved oxygen, free carbon dioxide and alkalinity were analyzed. Temperature and pH were recorded on site. Dissolved oxygen was analyzed by using Winkler's modification method.

For the analysis of biotic factors represented by Zooplanktons population, samples were collected from the water body and filtered by passing through a plankton net made up of silk cloth. Samples were then washed into bottles and preserved by adding 5% formaldehyde solution. Further analysis was done by using Sedgewick-Rafter cell.

RESULTS AND DISCUSSION

Results for abiotic factors (physico-chemical parameters) are given in Table-1. Water temperature was ranged from 16 ◦ C to 33 ◦ C. Minimum water temperature (16 ◦ C) was recorded during February 2005 and maximum (33 ◦ C) during July 2005. Free CO2 was found to be absent during the study period. Similar data about CO2 absence has been reported by Ganapati (1960) and Jana and Sarkar (1971). The pH was ranged from 7.6 to 8.5. The minimum pH (7.6) was recorded on January, 2005 and maximum pH (8.5) was on March 2005. This variation in pH might be due to household detergents coming into pond water from nearby houses and also due to cattle bathing. The dissolved oxygen ranged from 4.2 to 9.0. Maximum D.O. (9.0) was recorded in March, 2005 and minimum (4.2) in October, 2005.

High D.O. content might be due to increased photosynthetic activity of autotrophs while low content might be due to increase respiration of organisms, low photosynthetic rate and increased organic matter decomposition. Alkalinity ranged from 225 to 610. Maximum alkalinity (610) was observed in January, 2005 and minimum (225) in July, 2005.

Table1: Monthly variation in abiotic factors (Physico-chemical parameters) in Pond

Months	pH	Temp.(°C)	D.O.	CO2	Alkalinity
November,04	8.4	23	8.6	NIL	400
December	8.0	18	6.3	NIL	510
January,05	7.6	17	8.4	NIL	610
February	8.1	16	8.6	NIL	520
March	8.5	22	9.0	NIL	410
April	7.8	24	8.0	NIL	430
May	7.8	29	5.8	NIL	310
June	7.9	32	5.4	NIL	260
July	8.1	33	5.0	NIL	225
August	7.9	28	4.8	NIL	228
September	8.1	27	5.2	NIL	252
October	8.2	25	4.2	NIL	400

Table 2: Monthly variation in the biotic factors (zooplankton's unit number/L) in pond

Months	Rotifera	Cladocera	Copepoda
November,04	13	21	6
December	9	34	6
January,05	17	33	4
February	28	38	5
March	23	32	7
April	22	24	8
May	13	21	6
June	10	17	10
July	7	13	7
August	10	11	4
September	16	16	7
October	8	19	6

Zooplanktons were represented by three major groups namely Rotifera, Cladocera and Copepoda. In the present study Cladocerans were recorded highest in number followed by Rotifers and Copepods. The highest number (38/lt.) of Cladocerans were recorded in February, 2005 and lowest number (11/lt.) in August, 2005. In Rotifers highest number (28/lt.) was recorded in February, 2005 and minimum number (7/lt.) was in July, 2005. Copepods were recorded few in numbers. The highest number (10/lt.) was recorded in June, 2005 and lowest number (4/lt.) was in August, 2005.

Zooplanktons act as primary and secondary consumers. Fishes and aquatic insects feed on them. Any adverse effect on them causes drastic changes in the food chain of pond ecosystem. Their good diversity and numbers reflects the overall health of pond. The present study showed considerable variations in zooplankton populations.

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