

## STUDIES ON SOME ABIOTIC AND BIOTIC FACTORS OF BHATANA WATER RESEVIORS, MAHARASHTRA (INDIA)

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**ABSTRACT** – Pollution creates many problems in world. pollution adversely affects the life of organisms & human .there are various types of pollution among them water pollution is the major pollution. Water is essential for life but contaminated water causes various serious problems in human being there are various views had been taken place about the origin of pollution there are human population explosion, sewage problems, combination of fuel use of fertilizers and pesticides, Industrialization, unplanned urbanization, deforestation etc .The present work related to some abiotic factors of water reservoir at bhatana near Aurangabad. these water reservoir is largest rain fed water reservoir with rocky-cum sandy wall is built on one side and fields are present on other sides, water of reservoirs mainly servers as drinking, bathing washing and also for irrigation.

**Keywords :** Water pollution, Abiotic and biotic factor, Protozoan, Rotifers , Bhatana Reservoir.

### INTRODUCTION

The few decades environment was undisturbed and non polluted which is suitable for human and other animals now fast deterioration of water quality is a major problem not only India but also all over the world in rural areas water reservoirs is normally useful for all kinds of human requirements like bathing ,washing irrigation, aquaculture and even for drinking purpose also an attempt has been made in the present study to check the quality of water with respect to suitability of drinking of human and aquatic life.

The present study, deals with various biotic and abiotic factors. Author given the focus on biotic factors like protozoans and rotifers. The protozoans are identified during study are Cyst of *Balantidium coli*, *Entamoeba histolytica*, *Gardia lamblia*, *Arcella vulgairs* and *Amoeba* and the rotifers identified during the study are like *Brachionus*, *Cephalodella*, *Filinia* , *Keratella*, *Epiphanes* and *Lepadelea*. The abiotic factors are recorded by author are ambient temperature and water temperature, pH, dissolved oxygen

### MATERIALS AND METHODS

Water reservoirs of Bhatana is particularly used for drinking, irrigation and aquaculture keeping this in view the abiotic and biotic properties were studied over six months (Jan.2012 to June 2012 ).water samples were collected from water reservoirs in glass bottles these samples were studied for abiotic and biotic factors. The abiotic factors like temperature, pH by pH meter, dissolved oxygen by using Wrinklers Modified Methods for analysis

(APHA, 1998). The biotic factors like Protozoans and Rotifers were studied and identified and were carried out with help of Endomason (1959); Mahajan (1965) and (Kaushik and sharma ,1994).

### RESULT AND DISCUSSION

All the sample of water were contaminated by microbes like Protozoans and Rotifers species the Protozoan species commonly found are Cyst of *Balantidium coli*, *Entamoeba histolytica*, *Gardia lamblia*, *Arcella vulgairs* and *Amoeba*. The protozoan population was recorded is highly during the months of April and May-2012. i.e, 20/L and their count remains low during months of June 2012 , 10/L, due to dilution of water caused by rain, Among the protozoan group Cyst of *Balantidium coli* and *Entoameaba histolytica* was highest during months of March 16/L, April 18/L and May 20/L and Cyst of *Gardia lamblia* and *Arcella vulgaris*, *Amoeba* are reported during month of January 12/L February 14/L and during June 10/L range. The *Arcella vulgairs* were collected from water reservoir are microscopic, yellow with brown colour consists appature at the center which is circular, it has two to six finger like simple or branched structures around the body, this protozoans are free living (Ehrenberg, 1930 and Kotpal, 1988-1989).

In the present study rotifer was also found abundantly during investigation in Bhatana reservoir the species represents like *Brachionus*, *Cephalodella*, *Filinia* , *Keratella*, *Epiphanes* and *Lepadelea*. Rotifers are mainly freshwater forms and presence of these

organisms abundantly is due to suitable condition of their survival Dhanapati (2000). In this water reservoir *Brachionus*, was recorded high during the month of Jan, Feb, March, April and May (Kauthik and Saxena 1995) have also reported plenty of *Brachionus* in various water bodies of central India, Keratella was also found abundantly in these water bodies, the occurrence of this genus along with *Brachionus* indicate nutrient rich status of water bodies (Berzins and Pejler, 1987).

Rotifers are abundantly found in the month of April and May indicate that the influence of temperature which was supported by direct relation between temperature and rotifer population (Kaushik and Sharma, 1994 and Singh, 2000). Made this observation during study of zooplankton population in Matsya Sarowar Gwalior and tropical lake respectively.

The abiotic factors studied during the work was

temperature, pH and dissolved oxygen the abiotic temperature were carried out at the sampling sides, temperature was recorded by simple thermometer, pH of water by pH meter and dissolved oxygen by winklers method.

The ambient temperature varied from 45.°C to 16.°C, it was highest during the months of May, 2012 and June 2012 and lowest during month of January 2012 the water temperature ranged from 14.02 °C during month of January and 30 °C during month of May.

In the present study, water temperature 14.02 °C to 30 °C due shallowness, water temperature nearly follow air temperature, its minimum value was recorded during month of January and maximum values during month of May. The present observation are similar (Sharma *et al*, 2007; and Shaikh and Yeargi, 2004) Tansa river Thane District, Maharashtra.

Table 1 : Monthly variation in Abiotic factors of Bhatana water reservoirs, Maharashtra.

Parameters	January	February	March	April	May	June
Ambient temp.°C	16 °C	25 °C	38 °C	41 °C	45 °C	43 °C
Water temperature	14.02 °C	23 °C	26 °C	27 °C	30 °C	29 °C
pH	8.05	8.01	7.9	7.30	7.36	7.20
Dissolved oxygen mg/l	8.7	8.4	7.8	6.5	3.3	3.4

Table 2 : Monthly variation in biotic factors of Bhatana water reservoirs, Maharashtra.

Months/Biotic factors	January	February	March	April	May	June
<b>(Protozoans)</b>						
BL	11/L	12/L	16/L	18/L	20/L	11/L
EH	12/L	13/L	16/L	18/L	20/L	11/L
GL	12/L	14/L	15/L	15/L	18/L	10/L
AV	12/L	14/L	15/L	16/L	18/L	11/L
AM	13/L	11/L	14/L	14/L	19/L	10/L
<b>(Rotifers)</b>						
BR	14/L	15/L	16/L	18/L	19/L	09/L
CE	13/L	12/L	15/L	19/L	18/L	10/L
FI	12/L	12/L	14/L	18/L	19/L	08/L
KE	11/L	12/L	14/L	19/L	18/L	09/L
EP	13/L	14/L	10/L	13/L	19/L	08/L
LE	14/L	14/L	15/L	18/L	18/L	10/L

**Protozoans:-**

BL= *Balantidium coli*, EH= *Entamoeba histolytica*, GL= *Giardia lamblia*, AV= *Arcella vulgaris* and AM= *Amoeba*

**Rotifers:-**

BR= *Brachionus*, CE= *Cephalodella*, FI= *Filinia*, KE= *Keratella* EP= *Epiphanes* and LE= *Lepidella*

The acidic and alkaline nature of water is indicated by pH, most of biological processes and biochemical reactions are pH dependent. The pH values of water reservoir fluctuate between 7.36-8.05 it is being minimum during summer and maximum during winter. Similar result were reported by Deshmukh and Ambore (2006) from Godavari river, increased range of pH is due to excessive use of fertilizers and pesticide around the water reservoirs by agricultural activity, which always mix with water and pollutes the water. The dissolved oxygen value ranged from 3.3- 8.7 mg/L the minimum value of dissolved oxygen were recorded during summer season and maximum during winter season. The minimum dissolved oxygen recorded due to high metabolic rate of organisms and maximum dissolved oxygen during winter season was due to low atmospheric temperature, similar observations were also made by ( Mishra and Yadav, 1978; Adebisi, 1981, Deshmukh and Ambore, 2006).

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