

## **SUMMARY**

Limnology is the study of fresh or saline waters which are contained within continental boundaries. Sometimes limnology is described as 'hydrobiology' or 'aquatic biology'. According to Edgardo Baldi an ecologist, Limnology is the science dealing with internal actions of processes and methods whereby matter and energy are transformed within the lake or pond. Applied limnology has great scope in healthy bodies and to harvest the natural resources at sustainable level.

In India there are great - inland fresh water resources. In order to utilise these fresh water bodies successfully for fish production, it is very important to study the biotic and abiotic factors influencing the biological productivity of fresh water body. Around the Kolhapur city, about 10 tanks are present of varying sizes, which are used for minor irrigation, drinking, washing and bathing purpose. As a representative of these tanks "Shiroli reservoir" is selected for the hydrobiological investigation.

To study the hydrobiology of "Shiroli tank" the following parameters have been investigated such as, shape and size, observations of physical parameters like air and water temperature, humidity, rainfall, water

level (depth), water colour, turbidity and transparency. Chemical parameters like pH, dissolved oxygen free carbon dioxide, chlorinity, hardness of water and important nutrients like, phosphate and nitrate from water and effect of pollution if any. In biological investigations, study of microflora, macrophytes and microfauna showed ecological status of existing water body. All physico - Chemical studies have been carried out fortnightly from Aug. 1994. to July, 1995.

The shape of the reservoir is almost elongated and spread in 11.61 hect. in the survey No. 503. of Shirol village. The water samples were collected from five different stations ( A to E ) fixed around the tank for analysis. The physical parameters studied by using various materials and methods are as follows.

The aerial and surface water temperature was measured with the help of standard mercury thermometer. The maximum temperature was recorded in the month of May (31.8, 29°C) while minimum in the December (16.6, 21°C). Percent relative humidity and rainfall data was obtained from meteorological department of Agriculture college, Kolhapur. Relative humidity was maximum (95.2%) in October and minimum (46.1%) in the month of March, 1995. Rainfall in this area is mainly from South - West monsoon. The average rainfall of this region is above

1000 mm. During the period of investigation total rainfall was 814.8 mm. Water level is generally observed in man - made tanks and reservoirs Maximum water level of the study area (3.5 meters) was recorded in Aug. 94., while it was minimum in July, 95. Colour of the water is due to scattering of the light rays, because of suspended particles and water molecules. Turbidity plays an important role in changing water colour in rainy season. It ranged from 60 to 125 Hazens units. In natural waters turbidity may be due to suspended inorganic substances like silt, clay or planktonic organisms. The highest turbidity was recorded in Aug. 95 while lowest in Aug, 94 and was expressed in Jackson's units. Transparency was measured with the help of Secchi disc in cm. Average transparency of the water ranged from 35 to 125 cm. in the month of August, 94 and Aug. 95 respectively. The pattern of changes was uniform with minor differences.

During the present investigation seven major chemical parameters namely pH, dissolved oxygen, free carbon dioxide, chlorinity, hardness, phosphates and nitrates from the surface water were studied. The Hydrogen ion concentration (pH) was measured with pocket digital pH meter. Average pH ranges from 6.3 in March to 8.7 in July. The Dissolved oxygen was measured by standard Winkler's techniques and expressed in ml/lit at

N.T.P. Highest value was recorded in July (6.86 ml/lit) and lowest in Aug. (0.51 ml/lit). Free carbon dioxide was estimated by titration method in mg/lit. Free carbon dioxide range from 1.65 in May to 43.94 in June. Chlorinity was estimated in mg/lit with the help of titration method using silver nitrate as titrant. It ranges from 16.5 in August to 308.0 in July. Total hardness from surface water samples was estimated with standard EDTA method and expresses in mg-CaCO<sub>3</sub>/lit. Hardness ranges from 5.21 in October and 120.65 in July. The two important nutrients, phosphates and Nitrates were studied from water samples. The amount of phosphate phosphorous (PO<sub>4</sub>) was estimated with spectronic - 20 and expressed in mg/lit. It ranged from 0.48 in September to 2.94 in May, 95. The nitrates (NO<sub>3</sub>) were estimated by Brucine method adopted for spectronic-20 and expressed in mg/lit. of nitrate. It ranges from 0.4 in August to 3.6 May 95. Detection of heavy metals from water samples was done by Atomic Absorption spectrophotometer Entry of domestic sewage from shiroli village in to the reservoir was observed at some points. Above physico-chemical parameters of water samples from all the stations have been studied fortnightly by using standard methods of water analysis.

In Biological investigation, study of microflora and fauna in and around the water body have been investigated by collection, identification and preservation of various species in different seasons. The species of microflora and fauna have been listed separately. In plankton studies, volumes of plankton and percent composition of phyto and Zooplankton was estimated to record the productivity during the period of investigation. The information about the records of the rainfall, humidity, and air temperature were collected from meteorological office, College of Agriculture, Kolhapur. The information about fish stocking and fisheries of this tank was collected from District fisheries office, Kolhapur. The fishery observation were made in the field. The results of the above data are tabulated and presented in the final form.