

## HYDROBIOLOGICAL STUDY OF DEVTALE LAKE IN SANGAMNER TALUKA OF AHMEDNAGER DISTRICT OF MAHARASHTRA STATE, INDIA

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### ABSTRACT

The water samples from the Devtale near village Devgaon in Sangamner taluka of Ahmednager district of Maharashtra State, India were collected and analyzed. The physicochemical parameters such as Alkalinity, Acidity, Carbon di oxide, Dissolved oxygen, Hardness, pH and Temperature were studied. Alkalinity was lowest in the month of March 93 mg/lit. and highest in December 225mg/lit. Acidity was lowest in March 21.5mg/lit and highest in December 75 mg/lit. D.O was lowest in March 1.85 and highest in August 6.3mg/lit, Carbon dioxide was lowest in August 13.2mg/lit and highest in March 33mg/lit, Hardness was lowest in August 26.3 mg/lit and highest in March 210mg/lit. pH was 7.67 in August and 8.1 in March. Temperature was lowest in December 30<sup>0</sup>C and highest in March 36<sup>0</sup>C. The fauna observed there includes fish *Gambusia affinis*, amphibian *Microhyla oranata*, Zooplankton Copepods.

**KEYWORDS:** Alkalinity, Acidity, Carbon di oxide, Devgaon in Sangamner taluka, Dissolved oxygen, Hydrobiology.

### INTRODUCTION

As we all know that without water life cannot exist. It is necessary for all life processes as well as for various needs of the living beings. For Agriculture, for washing, bathing, drinking and several other needs. It is necessary not only to conserve it but its management and proper use is also necessary. To do these things knowledge about its physicochemical parameters, its hydrobiology and awareness about use is very necessary. Sangamner is a town in Sangamner taluka of Ahmednager district, (M.S.), India. The rural economy is mainly depending on agriculture and dairy industry. These two sectors provide employment to majority of the people. Both these sectors required a lot of water. Groundwater level is decreasing day by day therefore one cannot depend on it. The main source is surface water. Rivers are the sources to the areas on its banks or near the irrigation canals only. But lakes are providing water to the live stocks which are scattered in nearby villages. Therefore it is necessary to do the study of lakes. Much work has been done on the aquatic ecosystems in the world. Kozhova *et al* (1994), reviewed the hydrobiology of lake Khubsugul (Mangolia). Jagtap *et al.* (2012) and Zohair *et al.* (2012), has studied the zooplanktons from the lake of Mosul dame and their seasonal variations. Several researchers in India also studied the various lakes. Gorai *et al* 2005 while studying the macrozoobenthos of two freshwater ponds in Dhanbad found that the physicochemical factors showed variation in different months of the year. A significant correlation was also recorded between the population number of Chironomus larva and alkalinity. Joshi and Patel (2012), studied the Physico-chemical status of two Lakes Deliya and Malap Lake, under biotic stress of Visnagar taluka in Mehsana district, Gujrath Much work has been carried out in Maharashtra also. Ugale *et al.* (2005) while studying zooplankton diversity in Jagatunga samudra reservoir Kandhar in Nanded district of Maharashtra. found that the zooplankton population in reservoir show higher magnitude during winter season and the lower magnitude during summer season Copepod, Cladocera, Rotifera, and Ostracoda were among the dominating groups. Shaikh *et al* 2013 studied the physicochemical characteristics of water quality in Katraj lake, Pune. Review of literature showed that much work has not been done on the lakes in this region. In the present study Devtale near Devgaon village is selected for the study Fig.1. Devgaon is famous for the temple of Lord Khandoba, the deity worshiped by several people. In the honour of Lord Khandoba, the villagers organize a fair every year. Devtale Lake is very useful for the study of lentic ecosystem and a place of recreation also. In the present study physicochemical parameters in different seasons and fauna are also observed.

### MATERIAL AND METHODS

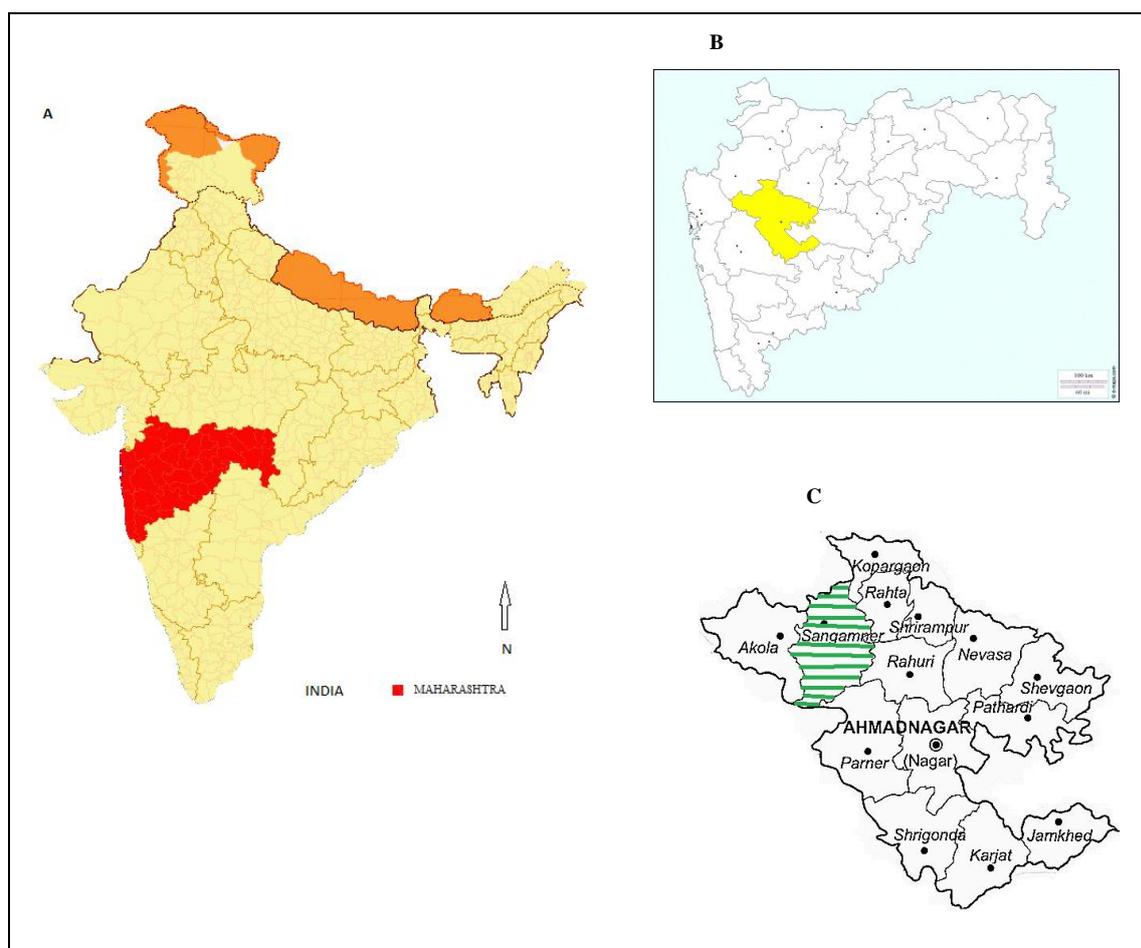
Samples were collected from the Devtale lake in the month of August, December and March. Temperature was recorded by using thermometer, pH was measured by using Hanna pen pH meter. Water samples were collected in D.O bottles and oxygen was fixed on the spot by using Winker A and B solutions. Water samples were also collected for other parameters and brought to the laboratory and analysed by using methods given by Maiti (2011).

## RESULTS AND DISCUSSION

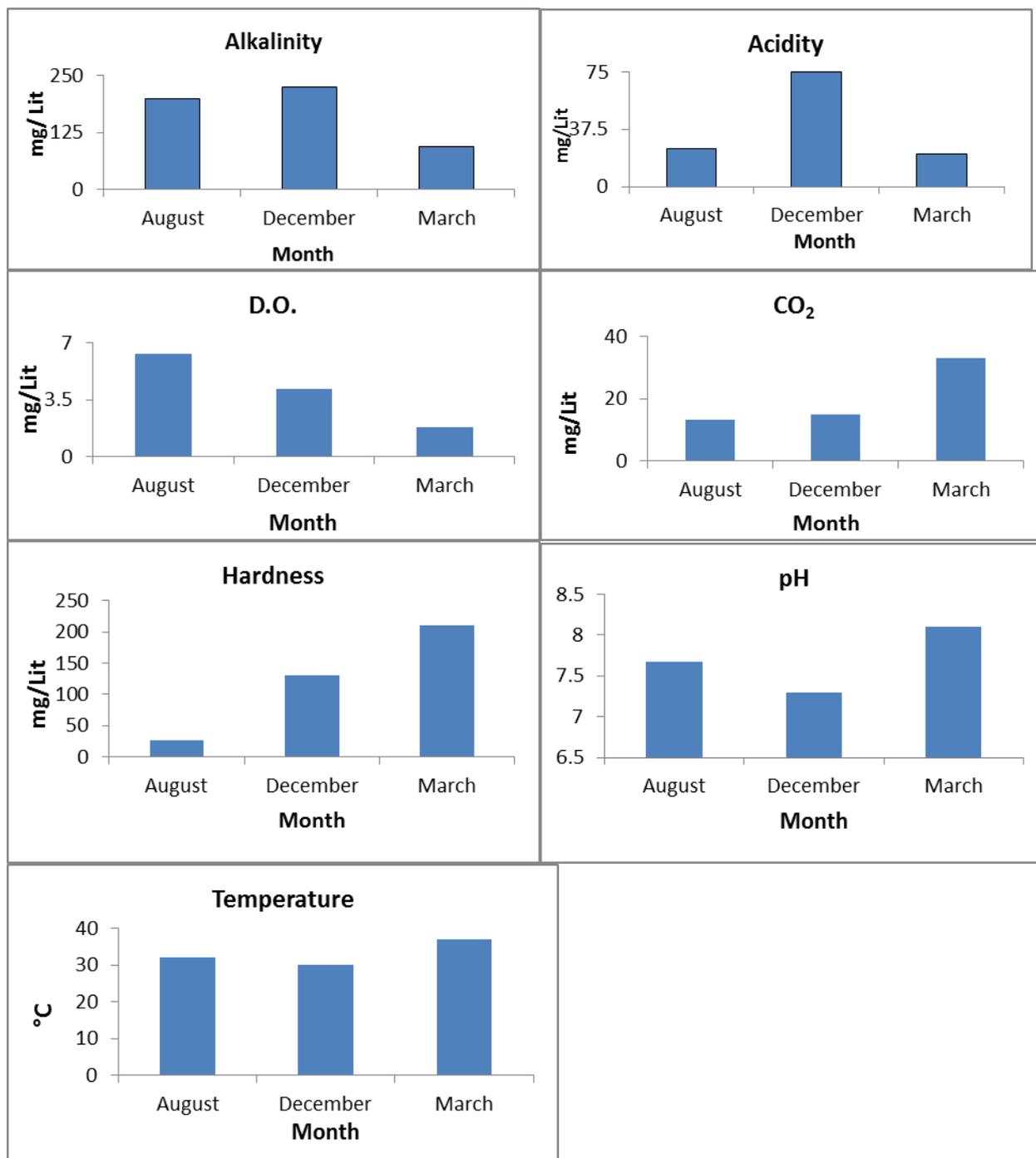
The results shown in Table 1, Graph 1 and Figure 1 and 2. From the table 1, it is observed that Alkalinity was found to be 200mg/lit in the month of August, 225mg/lit in December which is highest and 93mg/lit in the month of March which is lowest. Acidity was found in the range of 21.5 to 75 mg/lit.

**Table 1.** The physicochemical parameters of Devtale Lake.

	Alkalinity mg/lit	Acidity mg/lit	D.O. mg/lit	CO <sub>2</sub> mg/lit	Hardness mg/lit	pH	Temperature °C
August	200	25	6.3	13.2	26.3	7.67	32
December	225	75	4.2	14.8	130	7.3	30
March	93	21.5	1.85	33	210	8.1	37



**Figure 1.** A- Map of India  
B-Map of Maharashtra  
C- Map of Ahmदनगर District (Green Colour indicates: Sangamner Taluka)



**Graph 1.** Show the month wise physicochemical parameters of Devtale Lake.



**Figure 2.** Devtale Lake (Study area)

It was 75mg/lit in December which was highest, 25mg/lit in August and 21.5 in March which was lowest. Dissolved oxygen was highest in the month of August i.e.6.3mg/lit, 4.2 in December and in the month of March it was lowest i.e.1.85. Carbon dioxide was found to be 13.2mg/lit in August which was lowest, 14.8mg/lit in December and 33mg/lit in the month of March which was highest (Graph 1). Hardness was 26.3 mg/lit in the month of August which was lowest, 130mg/lit in December and 210mg/lit in the month of March which was highest. pH was in the range of 7.67, 7.3 to 8.1 in the month of August, December and March respectively. Temperature was recorded 32°C in August, 30°C in December which was lowest and 37°C in the month of March which was highest. From the present study it is observed that seasonal variations are observed in the readings of physicochemical parameters. The fauna observed there includes fish *Gambusia affinis*, amphibian *Microhyla oranata*, and zooplankton Copepods. Perumalswamy and Thangmani (2004) studied species diversity and population indices in Malluruthu pond, Kalapperumalpatti and Thamaraikulum pond in Virudhunagar district of Tamilnadu. They observed that the mean value of air temperature ranged from 26 to 28.83° C while surface water temperature ranged from 28 to 29.33° C.

The highest value of salinity 102.8 ppm was recorded in Maruluthu pond during September 2003. The increased concentration of chloride is an indication of the accumulation of organic matter to be decomposed. Lendhe and Yeragi (2004) studied seasonal variations in primary productivity of Phirange Kharbav lake at Bhiwandi in Thane district of Maharashtra state. They observed seasonal variations in primary productivity from three sampling stations of the lake. Physicochemical parameters influencing the primary productivity like temperature, pH, Carbon dioxide, Nitrates and phosphates. The maximum productivity of the Phirange Kharbav lake was observed during rainy season. In freshwater environment pH is a determining factor that shows marked seasonal and annual fluctuations. The Carbon dioxide in the freshwater environment is produced as the end product of respiration. Seasonal fluctuation observed. The maximum CO<sub>2</sub> was recorded during premonsoon and low during post monsoon. The gross productivity was maximum during monsoon season. General rate of primary productivity is limited by availability of nutrients such as nitrogen, phosphorous, sulphur and others. Including both essential and trace elements. Pawar and Pulle (2005), while doing qualitative and quantitative study of zooplankton in Pethwadaj dam, Nanded district of Maharashtra, found that among zooplankton particularly Rotifera was among dominant groups. The highest count of Rotifera was recorded in the month of May.

Khadye and Patil (2014), studied the water quality of Katraj lake in Pune. Physicochemical parameters like pH, DO, BOD, COD, Chlorides, Total hardness, Total alkalinity, Phosphates, Nitrates, Total dissolved solids were analyzed. They observed high value of pH during rainy season. The high value of pH during rainy season may be due to the dilution of

alkaline substances or dissolution of atmospheric Carbon dioxide. . The dissolved oxygen was found to be maximum at post monsoon and minimum at pre monsoon. The dissolved oxygen in water is temperature dependent we can say it is inversely proportional to each other in most of the studies. As it is required to all the plants and animals for respiration, the high temperature and low dissolved oxygen during summer create favorable condition for the development of green algae. Shaikh *et al.*, (2010), observed the oxygen consumption of freshwater crab *Barytelphusa cunicularis*. The greater alkalinity values may be due to the larger scale use of its bank as open latrine and consequent washing of the excreta in and near by the water body. For restoration of lakes they suggested diversion of sewage, line from the lake, dredging of slit and removal of weeds. Planting native trees around the lake to control erosion of soil.

After studying the results of this study it is observed that physicochemical parameters have seasonal variations which is similar to the observations of earlier researchers.

## ACKNOWLEDGEMENT

Authors are thankful to Honorable Dr. K.K. Deshmukh , Principal, Dr Vandana Bhavare Head Department of Zoology, S.N. Arts, D.J.M. Commerce and B.N.S. Science College for giving encouragement and providing facilities to carry out this work. Authors also express their sincere thanks to Dr. Seema Borgave and Ms. Neha Wadekar for their timely assistance.

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