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**STUDIES ON SOME PHYSICO-CHEMICAL PARAMETERS  
WITH REFERENCE TO ZOOPLANKTON OF WALEKHINDI  
TANK FROM JATH TALUKA DIST-SANGALI.**

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**ABSTRACT:**

*This is an attempt to study of physico-chemical parameters and zooplankton of Walekhindi water tank from Jath taluka Sangali district of Maharashtra. Monthly variations in physical and chemical parameters such as atmospheric temperature, water temperature, pH, dissolved oxygen, free CO<sub>2</sub> turbidity, transparency, total alkalinity, total hardness, total dissolved solids, phosphate, and nitrate were analyzed also studied zooplankton diversity. In the present study 16 total zooplankton species were identified. Among these 16 zooplankton species a 09 species belongs to rotifer, 03 species belongs to cladocera, 03 species belongs to copepod and 01 species belongs to ostracoda. from July 2012 to June 2013. Water tank is non polluted and can be used for domestic use, agriculture and animals for drinking. The benefited villages are Walekhindi and Gulvanchi.*

**Key wards:** Sangali, Walekhindi. Zooplankton

**INTRODUCTION:**

In nature water is the abundantly available substances, which man has exploited more than any other resources for the substance. Water of the quality is required for living organisms. Most water bodies become contaminated due to incorporation of untreated solids and liquid waste. (Jayabhaye U.M, *et al*, 2008). Water covers about 70% of the earth's surface out of which only 2% of the total water is fresh water, of which 1% is ice free water in the rivers, lakes and atmosphere as biological water. It has been estimated that only 0.00192% of the total water on earth is available for human consumption. (Trivedy R.K 1988. Ecology and pollution of India Rivers, Ashish publication house, New Delhi).

Plankton is the natural food of many species of fishes, especially zooplankton constitute important food item of many omnivorous and carnivorous fishes. The larvae of carps feed mostly on zooplankton (Dewan *et al.*, 1977), because zooplankton provides the necessary amount of protein for the rapid growth and specially that of the gonad. Zooplankton also plays very important role in the food chain as they occupy second trophic level as primary consumer and also as contributors to the next trophic level. S. A Manjare et al (2010) studied on water quality assessment of Vadgaon tank of Kolhapur (Maharashtra), with special reference to zooplankton. Khan M A G and Choudhary S H. (1994.) worked on Physico-chemical limnology of lake Kaptai, Bangladesh. Hujare M S. (2008) studied on Seasonal variations in physical parameters in the perennial tank of Talsande, Maharashtra. Jain C, (2000) studied on Ground water quality in Sugar dist, M P. India

#### **MATERIAL AND METHOD:**

The water tank in the present study is located with in the geographical coordinates of 17°10'40"N longitudinal and 75°5'35"E latitude. The water tank is constructed for the purpose of agricultural and drinking purpose to animals. The benefited villages are Walekhindi and Gulvanchi.

Water sample from Walekhindi tank were collected from three different stations in the polythene bottles regularly for every month. Sample collection was done during morning hours 9 to 11 am. The samples were brought in the laboratory for the estimation of various physico-chemical parameters like water temperature, transparency, pH were estimated on the spot by using thermometer, secchi disc, and digital pH meter. While other parameters like dissolved oxygen, free CO<sub>2</sub>, total dissolved solids total alkalinity, total hardness, phosphate and nitrate were analyzed in the laboratory as per standard methods prescribed by Trivedy and goel (1986), APHA (1992). Kodarkar *et al* (1998). . For zooplankton analysis, the zooplankton samples were collected using plankton net made by bolting nylon cloth (Mesh size 25µm) by sieving a 40 liter volume of water sample. The collected zooplanktons were preserved in 4% formalin in 100 ml bottles. The samples were studied for the diversity of zooplankton. Zooplankton were observed and identified under research binocular microscope by using standard key and literature (Tonpi 1980, Murugan 1998, Kodarkar et al 1998).

**Table No 1: Monthly analysis of physico-chemical parameters in Walekhindi water tank from July 2012- June 13**

Month	Air Temp	Water Temp	PH	DO	Free Co2	Transparency	Turbidity	TA	TH	TDS	Phosphate	Nitrate
July	31.26	25.26	7.23	5.63	1.53	21.76	7	151	157.66	360	0.17	0.088
Aug	29.53	26.23	7.16	5.96	1.73	27.26	8.33	147.33	154.33	343.66	0.15	0.059
Sept	27.36	24.46	7.43	6.83	1.53	29.23	10.66	145.66	146	305.33	0.22	0.092
Oct	33.13	26.26	7.23	6.5	2.5	36.46	9.33	157.33	132.33	267.66	0.20	0.080
Nov	31.33	25.23	7.33	6.13	2.23	35.13	8.66	161	130	307.66	0.17	0.078
Dec	28.33	28.23	7.26	6.46	1.76	36.36	7.66	162	133	315.66	0.18	0.064
Jan	27.16	24.26	7.23	5.66	2	35.76	5.33	175	129.33	341.33	0.11	0.061
Feb	35.33	30.13	7.86	6.5	1.56	37.96	3.66	173.66	134.66	319	0.12	0.063
Mar	37.43	27.36	7.73	6.36	1.43	41.23	2.66	182.33	138.66	328.66	0.16	0.065
April	38.36	29.76	7.93	4.26	1.33	44.83	3.33	187.33	141	310.33	0.14	0.054
May	39.13	32.76	8.06	5.66	1.23	47.56	4.33	190	143.33	318.66	0.14	0.060
June	32.26	28.16	7.73	4.86	1.76	25.66	5	157.33	151.66	358	0.25	0.072

**Table No.2 : Diversity of Zooplanktons in Walekhindi Water Tank during July 2012 to June 2013**

Rotifera	Cladocera	Copepoda	Ostracoda
<i>Branchionus angulari</i>	<i>Diaphnosoma</i>	<i>Cyclopoid copepods</i>	<i>Steno cypris</i>
<i>B havanaensis</i>	<i>Ceriodaphnia</i>	<i>Meso Cyclops</i>	
<i>B forticula</i>	<i>cornuta</i>	<i>Streptocephalus</i>	
<i>Ascomorpha Spp</i>	<i>Daphnia cornuta</i>	<i>diaptomus</i>	
<i>Lecane bulla</i>			
<i>Rotaria</i>			
<i>Ploesoma Spp</i>			
<i>F termanilis</i>			
<i>Lecane Luna</i>			

## RESULT AND DISCUSSION:

The variation in the physico-chemical parameters of Walekhindi tank during the period July 2012 to Jun 2013 are represented in the table 1

### Atmospheric Temperature

The atmospheric temperature recorded during year July 2012 to Jun 2013 ranged in between 27.16°C to 39.13°C. It was minimum during January and maximum in month of May. S.A Manjare et al 2009 observed that high temperature in summer. .

*Randive S. R., Dehsmukh A. L. and Kamble V. S.*

**Water Temperature**

The water temperature recorded during year July 2012 to Jun 2013 ranged in between 24.26° C to 32.76° C. It was minimum during January and maximum in month of May. M J Lubal et al 2008 observed that high temperature in summer.

**pH**

The PH recorded during year July 2012 to Jun 2013 ranged in between 7.16 to 8.06. It was minimum during August and maximum in month of May. Air temperature factor influence the changes the pH of water. Observed values of pH are with in permissible limit.

**DO**

The dissolved oxygen recorded during year July 2012 to Jun 2013 ranged in between 4.26 Mg/L to 6.83Mg/L. It was minimum during April and maximum in month of September. This parameter is important for the aquatic organisms to regulate metabolic processes and it is also important for animal respiration M J lubal et al 2012 observed highest value of DO in monsoon.

**Free CO<sub>2</sub>**

The free co<sub>2</sub> recorded during year July 2012 to Jun 2013 ranged in between 1.23 Mg/L to 2.23 Mg/L. It was minimum during May and maximum in month of November. The highest value recorded in winter due to the low photosynthetic process. That's why CO<sub>2</sub> utilization is not done properly. Similar observation of the highest value of the CO<sub>2</sub> in winter reported by S.A Manjare et al 2010 fro Vadgaon tank of Kolhapur, (MH).

**Transparency**

The transparency recorded during year July 2012 to Jun 2013 ranged in between 21.76 Cm to 47. 56 Cm .It was minimum during July and maximum in month of May. Light is the major factor for the process of photosynthesis and the growth of all aquatic floras. (Mitchell, 1974). In rainy season water was turbid more.

**Turbidity**

The turbidity recorded during year July 2012 to Jun 2013 ranged in between 2.66 NTU to 10.66 NTU. It was minimum during March and maximum in month of September high turbidity due to the washing, bathing activities of man and degradation of the algae.

**Total Alkalinity**

The total alkalinity recorded during year July 2012 to Jun 2013 ranged in between 145.66 Mg/L to 190 Mg/L. It was minimum during September and maximum in month of May. The highest value of alkalinity shows the presence of the carbonate, bicarbonate and hydroxide of the water source (Jain et al 2002). Similar observation is reported by More R R and Ramaiah 2015 from Shivam dam Nandurbar.

**Total Hardness**

The total hardness recorded during year July 2012 to Jun 2013 ranged in between 129.33 Mg/L to 157.66 Mg/L. It was minimum during January and maximum in month of July. The highest value of hardness is reported in monsoon by M.J Iubal et al 2012 in Maswad water tank Satara.

**TDS**

The total dissolved solids recorded during year July 2012 to Jun 2013 ranged in between 267.66 Mg/L to 360 Mg/L. It was minimum during October and maximum in month of July. Large TDS in water is due to the high turbulence influenced by the rain fall and flow of the sediments along rain water. High value of TDS in monsoon observed by More R R and P V Ramaiah 2015 from Shivan dam Nandurbar.

**Phosphate**

The phosphate recorded during year July 2012 to Jun 2013 ranged in between 0.11 Mg/L to 0.25 Mg/L. It was minimum during January and maximum in month of June. PO<sub>4</sub> in fresh water need in small amounts for living things. High value of phosphate in monsoon observed by More R R and P V Ramaiah 2015 from Shivan dam Nandurbar.. Highest value of phosphate may due to the rain, agriculture runoff and human activities.

**Nitrate**

The nitrate recorded during year July 2012 to Jun 2013 ranged in between 0.054 Mg/L to 0.092 Mg/L. It was minimum during April and maximum in month of September. This nutrient increases the process of eutrophication. Highest value of the nitrate is recorded by by More R R and P V Ramaiah 2015 from Shivan dam Nandurbar.

**Zooplanktons**

Diversity of zooplankton from July 2012 to June 2013 is represented in table no-2. In the present study 16 total zooplankton species were identified. Among these 16 zooplankton species 09 species belongs to rotifer, 03 species belongs to cladocera and 03 species belongs to copepod and 01 species belongs to ostracoda. Rotifers were maximum during summer season. Tripathi and Tiwari 2006 reported highest zooplankton in summer season and lowest in winter season from Seetawar Lake, in Uttarpradesh. Temperature parameter has considered as one of the most primary factor to cause the abundance of zooplankton in fresh waters particularly in shallow lakes or ponds, where bottom shows considerable variations in temperature, especially increasing the warm season. (Mecombie, 1953, Das, 1956, Bamforth, 1958, moitra and Battacharya, 1965).

**CONCLUSION:**

Water quality of walekhindi water tank is better. All values are within the prescribed limit. The low values of Phosphate and Nitrate in Walekhindi water tank shows that tank is not polluted. Water tank shows good diversity of zooplankton.

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