

Research Paper—Zoology



SEPT—2009

**PHYSICO-CHEMICAL CHARACTERISTICS
OF BHANDARWADI DAM WATER AT
PANGAON, DIST LATUR,
(MAHARASHTRA)**



DANDE, K.G. *LOKHANDE, M.V. **SHAIKH,A.M.

*Department of Zoology and Dairy Science, Mahatama Basweshwar College, Latur

**Department of Zoology, ACS College, Khed, Dist- Ratnagiri

INTRODUCTION

Water quality in reservoir is an important aspect of water resources management. It is a for development and conservation because it determines the dynamics of aquatic organisms and drives various water used in aquatic ecosystems including reservoirs. The water quality can be visualized in terms of the physical, chemical and biological properties within which several elements of water quality can be identified. Now in recent days water pollution is due to the alteration in physical, chemical and biological characteristics which may lead to harmful effect on human and aquatic biota. The present study assesses the water quality of Bhandarwadi dam water during the year June 2006- July 2007. This reservoir is one of the minor irrigation project and the water of the project being used for different purposes like agriculture, industrial, drinking and fishery activities etc. The Bhandarwadi dam is basically constructed to provide the water for agriculture purposes but present days the water of reservoir is also used for drinking purpose to nearer villages. So it is need to check the water quality of Bhandarwadi dam water.

MATERIALS AND METHODS—

The water samples were collected from Bhandarwadi dam from three selected spots named as Spot A,B and C for a period of one year during June 2006-July 2007. The physical parameters such as Atmospheric and water temperature, pH were recorded at the field. The water and Atmospheric temperature recorded with the help of thermometer. The pH of water was determined by using (Hanna) pH meter. The chemical parameters such as dissolved oxygen, carbon dioxide, total alkalinity, total hardness and total dissolved solids were determined by standard methods suggested by APHA(1998) and Koderkar *et.al.*(1998).

RESULTS AND DISCUSSION—

Monthly variation of physico-chemical parameters of Bhandarwadi dam water is represented in table No. 1& 2 and co-relation between the parameters are shown in table No.3,4&5. In the present investigation the atmospheric temperature of water ranges from 24.2 to 38.4 °c, 23.2 to 38.8 °c and 24.8 to 38.0 °c at spot A, B and C respectively. The minimum values recorded in the months of winter season and maximum values in the

summer season in the month of March. Similar observation were made by Jawale *et.al* (2009) on Terna reservoir at Makani, Ingole *et.al* (2001) on Majalgaon dam and Sathe *et.al* (2001) working on Ped reservoir at Sangli. The variation in water temperature is play important role in the distribution and survival of animals. In the study period water temperature ranges between 23.1 to 38.0°C at spot A, 23.2 to 34.2 °C at spot B and 23.2 to 34.8 °C at spot C. The maximum value of water temperature recorded in the month of May during summer season it is may be due to the bright sunshine during this period but minimum in the month of winter season. These results are correlated with the Kumbhar *et.al* (2009) recorded the water temperature ranges between 28.62 to 29.77 °C in Ujani reservoir, Jawale *et.al* (2009) reported that the water temperature values ranged from 23.0 to 32.0 °C in Terna reservoir at Makani and Ingole *et.al* (2009) on Magalgaon reservoir.

The presence of carbonate and bicarbonate ions in water it depends upon the pH of water. The Bhandarwadi dam water the value of pH ranges from 7.0 to 8.4, 7.0 to 8.4 and 7.2 to 8.9 at spot A, B and C respectively. The maximum range of pH was recorded in the summer season and minimum in the winter season. Present observation were correlated with the Prapurna and Shashikant (2002), Jawale *et.al* (2009), Jayabhye *et.al* (2005) reported that the range of pH in between 7.4 to 8.5. Dissolved oxygen is one of the most important parameters in water it regulates the metabolic activity of aquatic organisms. The dissolved oxygen values ranged from 6.1 to 8.8 mg/L, 6.2 to 8.7 mg/L and 6.1 to 8.4 mg/L at spot A, B and C respectively. The Tarzwell (1957) has stated that for supporting aquatic life minimum 3 mg/L dissolved oxygen is essential. The similar results were observed by

Jawale *et.al* (2009) on Terna reservoir, Ingole *et.al* (2009) on Magalgaon reservoir, Gaur and Khan (1995).

Free carbon dioxide values in the present study was observed between the range of 1.0 to 2.9 mg/L, 0.8 to 3.0 mg/L and 0.9 to 2.8 mg/L at spot A, B and C respectively. The minimum values of free carbon dioxide recorded in the month of May during summer season. Similar observation were made by Bade *et.al* (2009) and Kumbhar *et.al* (2009) working on the Sai reservoir at Latur and Ujani reservoir at Solapur. In the present investigation the total alkalinity of water ranges between 132 to 164 mg/L at spot A, 132 to 166 mg/L and 137 to 167 mg/L at spot C. The values of total alkalinity were fluctuated to season to season. But the maximum during rainy season and minimum in the winter season. Such type of results observed by Bade, *et.al.* (2009), Kumbhar *et.al* (2009) and Ingole *et.al.* (2009).

The total hardness of water ranges between 93 to 109 mg/L at spot A, 91 to 106 at spot B and 92 to 105 mg/L at spot C. The total dissolved solids ranges between 233 to 369 mg/L, 251 to 379 mg/L and 258 to 380 mg/L at spot A, B and C respectively. Similar observation were made by Narain and Chauhan (2002), Paka and Rao (1997), Ingole *et.al.* (2009). The maximum hardness was found during the winter season but the total dissolved solids was found in winter season.

CONCLUSION—The seasonal and monthly fluctuation of physico-chemical parameters of Bhandarwadi dam water was observed little changes in parameters from all the three sampling spots. All parameters are found within the range of standards values suggested by (WHO). The correlation in the AT, WT, pH was found negative relationship with the carbon dioxide, Dissolved oxygen and

total dissolved solids at spot A, B and C respectively. The results was reported in the present study indicates that the water of Bhandarwadi dam may be soft water and it is quite suitable for the agricultural industrial purpose but the water use for drinking purpose before proper treatment.

Table No. 1 Monthly variation in physico-chemical poarameters of Bhandarwadi dam water during June 2006- May 2007.

Parameters & Months	Atmospheric Temperature(°c)			Water temperature(°c)			pH			Dissolved Oxygen(mg/L)		
	A	B	C	A	B	C	A	B	C	A	B	C
June	34.2	34.2	34.6	35.1	34.2	34.2	7.1	7.0	7.1	6.6	6.4	6.1
July	30.2	30.3	30.4	28.4	28.2	29.4	7.1	7.2	7.0	6.9	6.8	6.0
August	29.4	29.2	29.4	29.2	29.2	29.1	7.2	7.2	7.1	7.9	7.8	7.9
September	30.2	30.3	30.6	28.2	29.2	29.2	7.4	7.2	7.1	8.1	8.2	8.4
October	24.2	30.2	29.2	27.1	27.1	27.6	7.3	7.0	7.2	8.2	8.2	8.2
November	24.5	23.2	23.6	23.1	23.2	23.2	7.6	7.3	7.2	8.3	8.4	8.0
December	25.2	24.2	24.8	24.1	24.9	24.4	7.0	7.0	7.6	8.8	8.7	8.2
January	32.4	25.8	25.2	25.1	25.4	25.3	6.9	6.8	9.6	8.1	8.2	8.1
February	28.7	29.9	30.3	25.4	25.8	24.9	7.1	7.2	7.2	8.0	7.9	7.9
March	32.8	34.0	33.3	27.2	28.1	29.2	8.2	8.2	8.0	7.0	6.8	6.7
April	36.2	35.4	35.8	31.9	33.1	34.1	8.4	8.6	8.6	6.2	6.6	6.2
May	38.4	38.8	38.0	36.1	34.2	34.8	8.0	8.2	8.9	6.1	6.2	6.2

Table No. 2 Monthly variation in physico-chemical poarameters of Bhandarwadi dam water during June 2006- May 2007.

Parameters & Months	Atmospheric Temperature(°c)			Water temperature(°c)			Total Hardness (mg/L)			Dissolved Oxygen(mg/L)		
	A	B	C	A	B	C	A	B	C	A	B	C
June	2.9	3.0	2.6	164	166	167	108	103	104	302	311	304
July	2.0	2.1	2.4	147	141	138	109	104	105	291	303	258
August	2.6	2.2	2.8	132	134	131	108	106	104	281	273	264
September	2.2	2.4	2.4	138	137	134	99	100	101	258	261	254
October	2.8	2.8	2.8	138	132	131	93	95	94	251	251	232
November	2.6	2.7	2.1	137	134	135	96	94	95	233	226	222
December	2.1	1.4	1.6	132	136	138	95	91	92	249	257	233
January	1.4	1.6	1.5	144	142	149	97	96	96	277	281	288
February	1.2	1.2	1.3	149	148	142	99	100	98	294	302	321
March	1.2	1.2	1.2	158	152	154	101	102	100	313	306	329
April	1.8	1.2	1.0	160	161	159	103	104	102	346	326	362
May	1.0	0.8	0.9	159	164	163	104	103	103	363	379	380

Table No. 3 correlation coefficient of parameters of Spot A.

	AT	WT	PH	DO	CO2	TA	TH	TDS
AT	1	0.79807	0.50575	-0.86985	-0.51516494	0.811104	0.590319477	0.915853788
WT		1	0.36749	-0.8477	-0.04095477	0.696068	0.670448356	0.772788783
PH			1	-0.61427	-0.34932067	0.522782	0.090467112	0.609848164
DO				1	0.30450481	-0.87958	-0.68640177	-0.904198912
CO2					1	-0.39825	0.017574188	-0.69362235
TA						1	0.458905454	0.822237495
TH							1	0.561259159
TDS								1

Table No. 4 correlation coefficient of parameters of Spot B.

	AT	WT	PH	DO	CO2	TA	TH	TDS
AT	1	0.893251181	0.690665786	-0.88414	-0.33341	0.804284	0.72251	0.867679
WT		1	0.5199864	-0.83915	-0.11084	0.794041	0.725251	0.769911
PH			1	-0.6427	-0.59723	0.594568	0.467798	0.629094
DO				1	0.262859	-0.85923	-0.77029	-0.86508
CO2					1	-0.38597	-0.13512	-0.6147
TA						1	0.526884	0.858952
TH							1	0.645045
TDS								1

Table No. 5 correlation coefficient of parameters of Spot C.

	AT	WT	PH	DO	CO2	TA	TH	TDS
AT	1	0.923830175	0.176507265	-0.75776	-0.3135	0.704783	0.710346	0.824766
WT		1	0.188694834	-0.77929	-0.11729	0.699126	0.763856	0.681469
PH			1	-0.16615	-0.70878	0.532592	-0.08812	0.572221
DO				1	0.275809	-0.74145	-0.70876	-0.64712
CO2					1	-0.55059	0.095922	-0.72551
TA						1	0.399017	0.818943
TH							1	0.491036
TDS								1

REFERENCE

- * APHA (1986) Standard methods for the examination of water and waste water (19th) edition. Washington D. C.
- * Bade, B.B., Kulkarni, D.A. and Kumbhar, A.C. (2009) Studies on physico-chemical parameters in Sai reservoir, Latur Dist., Maharashtra. *Shodh. Samiksha aur Mulkayan. II (7) : 31-34.*
- * Gaur, R.K., Khan, A.A. and Alam, A. (1995) Oxygen system dynamics of the pond harboring a permanent bloom of a cyanobacterium *Microcystis aeruginosa*. *J. Ecotoxicol. Monitoring. 5 (1) : 71-76.*
- * Ingole, S.B., R.G. Pawale and P.N. Wavde (2009) Water quality studies on Majalgaon dam, Beed district, Maharashtra. *J. Aqua. Biol. 24 (1) : 71-76.*
- * Jawale, C.A., R. V. Rohikar, D.V. Menkudale and M.G. Babre (2009) Seasonal variation in different physico-chemical parameters of second Terna Makni reservoir in relation to pisciculture, osmanabad District, Maharashtra. *J. Aqua. Biol. 24 (1) : 87-90.*
- * Jayabhaye, U.M., B.S. Salve and M.S. Pentewar (2008) Some physico-chemical aspects of Kayadhu river district Hingoli, Maharashtra. *J. of Aqua. Biol. 23 (1) : 64-68.*
- * Kodarkar, M. S. (1998) Methodology of water analysis, Hyderabad.
- * Kumbhar, A.C., Kulkarni, D.A. and Bade, B.B. (2009) Seasonal variation in physico-chemical parameters of Ujani reservoir of Madha Tashil, Dist- Solapur. *Shodh. Samiksha aur Mulkayan. II (7) : 150-152.*
- * Narain and Chauhan (2000) Water quality status of river complex Yamua at Panchlnada (Dist. Etawahd, V.P. India) I : An integrated management Approach. *Poll. Res. 19 (3) : 357-364.*
- * Paka Swarnalatha and Rao Narsing (1997) Interrelationship of physico-chemical factors of a pond. *J Environ. Biol. 18 (1) : 67-72.*
- * Prapurna, N and Shashikant, K (2002) Pollution level in Hussain Sagar lake of Hyderabad, A case study. *Poll. Res. 21 (2) : 187-190.*
- * Sathe, S.S., Suresh Khabade and Milind Hujare (2001) Hydrobiological studies on two man made reservoir from Tasgaon tashil (Maharashtra). *Ecol. Env.and Cons. 7 (2) : 211-217.*
- * Tarzwell, C.M. (1957) Water quality criteria for aquatic life. In biological problems in water pollution (Ed) Department of Health education and welfare, P.H.S. 246-272.

ACKNOWLEDGEMENT—The authors are thankful to the principal Dr. N. L. Kumbhar and Dr. S. V. Karadkhele, Head, Department of Zoology and Dairy Science, Mahatma Basweshwar College, Latur for providing laboratory facilities during completion of work.