



STUDIES ON THE SEASONAL VARIATIONS IN PHYSICO-CHEMICAL PARAMETERS OF DHARMASAGAR RESERVOIR TELANGANA STATE

*ARUNA DEVI. M^{1,2} and BENARJEE.G¹

¹Fisheries Research Laboratory, Department of Zoology
Kakatiya University, Warangal-506 009.

²Kakatiya Mahila Degree College Nakkala Gutta Hanamkonda. -506001(T.G.)

ABSTRACT:

The seasonal variations in the physico-chemical parameters of Dharmasagar Reservoir Warangal District, Telangana. An investigation was carried out to monitor the water quality over a period of one year on monthly basis at four study sites in the Reservoir. Among the various parameters recorded, the overall water temperature ranged from 22.5° C to 32.5° C, Electrical Conductivity from ranged from 260 to 355 µmhos, Total Dissolved Solids ranged from 135.25 to 393.25 mg/l, P^H ranged from 7.0 to 8.0, Dissolved Oxygen ranged from 6.70 to 10.32 mg/l, Free CO₂ ranged from 3.25 to 10.10 mg/l, Total Alkalinity ranged from 100.50 to 215.30 mg/l, Total Hardness ranged from 85.62 to 125.86 mg/l, Chlorides ranged from 31.46 to 60.62 mg/l and Biological Oxygen Demand ranged from 3.20 to 9.65 mg/l were estimated. It is revealed that all these values are within the permissible limits and suitable for drinking and fish culture.

KEY WORDS: Physico-chemical parameters, Dharmasagar Reservoir.

INTRODUCTION:

Water is one of the maximum precious assets of nature given to guy and has been exploited on the higher degree than any other useful resource for survival. Over 97% of the water on the planet is saved in oceans and icecaps. Nearly 97.3% is available in Oceans and is salty in nature. Huge amount of water is saved as polar icecaps and glaciers. Only 0.02% fresh water to fulfill your diverse desires comes from lakes, rivers, and ponds. The floor clean water in the shape of lakes and rivers is hardly 0.01% of total water to be had on the planet. Demand for sparkling water has increased markedly in latest years. It is estimated that nearly one third of the world's inhabitant's stay in nations with extreme water troubles (Kumar et al., 2005). Physico-chemical elements play an

vital position in analysis of pollutant or contaminant. The chemical and biological factors are interrelated and interdependent. The essential goal of the experimental paintings undertaken is to research distinct chemical ingredients present in the herbal and disturbed aquatic environment, wherein ponds and lakes have been profoundly altered and have lost plenty of their fee; the medical expertise of these water our bodies is being used in prescribing recovery methods (Lewis, 2000).

MATERIALS&METHODS:

Study Area: The reservoir was constructed during the grand period of Kakatiya rulers. It is located at Dharmasagar village, Warangal District, Telangana. Which falls under 18⁰-00'-15" N latitudes and 79-43'-26" E longitudes. Water spread area of this reservoir is 81.2 sq. kms and total catchment area is 159.0 sq. kms. The main scope of this reservoir is drinking and fish culture.



Fig-1: Satellite Image of Dharmasagar Reservoir

The present study was carried out for a period from Feb 2017 to Jan, 2018. The water samples were collected from four selected stations of the Dharmasagar Reservoir Warangal District. All the samples collection was during the morning hours between 7:00 am to 9.00 am throughout the study period. Physico-chemical parameters like water temperature, Electrical Conductivity, Total Dissolved Solids, PH, Dissolved Oxygen, Free CO₂, Total Alkalinity, Total Hardness, Chloride and Biological Oxygen Demand, were done according to standard methods APHA (2005).The recorded data was yearly segregated in three seasons, Summer(Feb to May),Monsoon(Jun to Sep) and Winter(Oct to Jan)(Table-1).

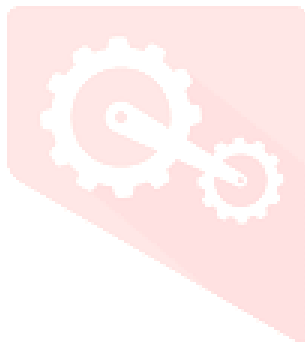
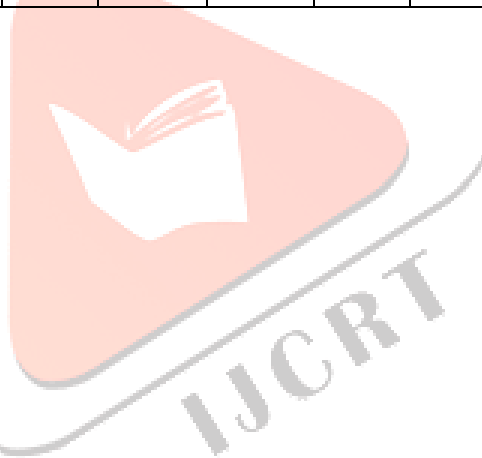
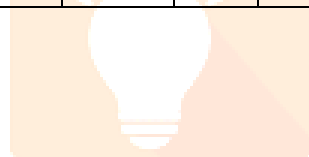
RESULTS & DISCUSSION:

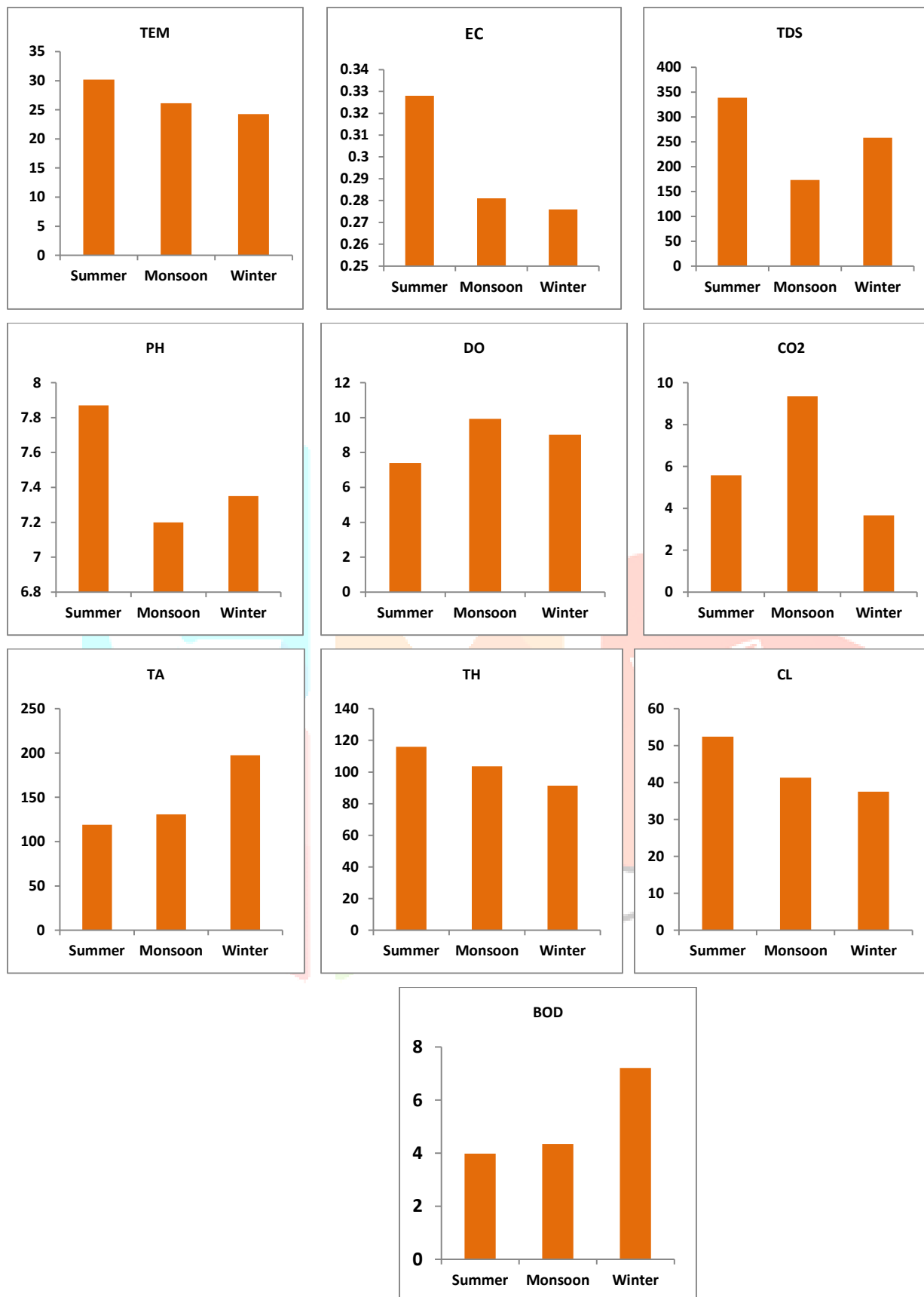
Water temperature is an important parameter which influences the onset of fish spawn, the growth of aquatic vegetation and the BOD of the pond water. The water temperature observed in this lake was normal and suitable for the survival of aquatic life and it is in agreement with the earlier reports (Boyd, 1982). In the present investigation highest temperature was summer season while the lowest temperature was recorded in winter season. The present study agreement with (Kaur and Joshi 2003). In the present investigation EC values from 260 to 355 μ mhos. The highest EC value was summer season, while the lowest value was recorded in winter season. The present study agreement with (NidhiBajpai *et al.*, 2012). Water is universal solvent and has many salts dissolved in it which largely govern in physic-chemical properties. In the present investigation TDS values from

135.25 to 393.25 mg/l. The highest TDS value was summer season, while the lowest value was recorded in monsoon season. The present study agreement with (Jena *et al.*, 2013). The hydrogen ion concentration or P^H of water is another essential factor that gives a precious indication of its quality and determines the metabolic activities of aquatic organisms (Wang *et al.*, 2002). In the present investigation P^H values from 7.0 to 8.0. The highest P^H value were summer season, while the lowest value were recorded in monsoon season. The present study agreement with (Siddartha *et al.* 2013). DO is one of the important parameters in water quality assessment. Its presence is essential to maintain the higher form of biological life in the water. In the present investigation DO values from 6.70 to 10.32 mg/l. The highest DO value was monsoon season, while the lowest value was recorded in summer season. The present study agreement with (Kataria *et al.*, 1996). Free carbon dioxide in water is essentially the only source of carbon that can be assimilated and incorporated into the skeleton of living matter of all the aquatic autotrophs. Most of the carbon in freshwater system occurred as equilibrium products of carbon dioxide. In the present investigation CO_2 values from 3.25 to 10.10 mg/l. The highest CO_2 value was monsoon season, while the lowest value was recorded in summer season. Alkalinity is a function of bicarbonate and carbonates. These salts get hydrolyze in solution and produced hydroxyl ion. It is also used as a measure of productivity of water (Jhingran, 1982; Hulyal and Kaliwal, 2011). In the present investigation Total Alkalinity values from 100.50 to 215.30 mg/l. The highest TA value was winter season, while the lowest value was recorded in summer season. The present study agreement with (Vijaykumar *et al.* 2009). The hardness in water is the sum of the concentrations of alkaline earth metals cat ions. The hardness of water reflects the nature of geological formations with which it has been in contact. In the present investigation Total Hardness values from 85.62 to 125.86 mg/l. The highest TH value was summer season, while the lowest value was recorded in winter season. The present study agreement with (Kataria *et al.*, 1996). Chloride is anion occurs in all natural waters in widely varying concentrations. In the present investigation chlorides values from 31.46 to 60.62 mg/l. The highest chlorides were summer season, while the lowest value was recorded in monsoon season. The present study agreement with (Sarma *et al.*, 2007, Kumar *et al.*, 2011 and Pauer *et al.*, 2014). Biological Oxygen den end indicates the purpose of organic lead in a water body. The high BOD values clearly indicate pollution which may be attributed to the percolation of wastewater loaded with biodegradable material. In the present investigation BOD values from 3.20 to 9.65 mg/l. The highest BOD was winter season, while the lowest value was recorded in summer season. The present study agreement with (Sengupta, 2006 and Singh *et al.*, 2013).

TABLE-1: Physico-Chemical Parameters of Dharmasagar Reservoir during the Year 2018-19

SEASON	MONTH	TEM	EC	TDS	PH	DO	CO ₂	TA	TH	CL	BOD
SUMMER	FEB	28.0	0.300	300.10	7.5	7.85	4.72	145.60	110.45	46.75	5.70
	MAR	29.5	0.315	320.20	7.7	7.73	4.92	125.35	115.30	48.85	3.60
	APR	31.1	0.342	340.00	8.0	7.30	5.50	105.20	125.86	53.55	3.45
	MAY	32.2	0.355	393.60	8.3	6.70	7.20	100.50	112.40	60.62	3.20
	MEAN	30.20	0.328	338.47	7.87	7.39	5.58	119.16	116.00	52.44	3.98
MONSON	JUN	27.5	0.295	220.10	7.6	9.00	9.05	145.30	110.00	50.61	3.85
	JUL	26.0	0.284	185.50	7.0	10.15	9.25	136.35	102.60	47.50	4.30
	AUG	24.0	0.276	152.30	7.2	10.32	10.10	140.20	101.50	35.70	4.52
	SEP	27.0	0.270	135.25	7.0	10.25	9.00	101.10	100.10	31.46	4.74
	MEAN	26.12	0.281	173.28	7.20	9.93	9.35	130.73	103.55	41.31	4.35
WINTER	OCT	25.0	0.265	245.65	7.3	9.68	4.15	215.30	85.62	34.26	5.55
	NOV	23.6	0.260	260.15	7.2	9.45	3.25	210.10	92.35	36.70	6.25
	DEC	22.5	0.275	275.10	7.3	8.55	3.55	200.10	90.55	38.94	7.42
	JAN	26.0	0.305	250.50	7.6	8.40	3.70	165.00	96.76	40.15	9.65
	MEAN	24.27	0.276	257.85	7.35	9.02	3.66	197.62	91.32	37.51	7.21



Graph: Shows Seasonal Mean variation of the parameters of Dharmasagar Reservoir (2017-2018)**CONCLUSION:**

The present data on physico-chemical parameters on water quality indicate that the reservoir is high productive nature. The results were showed significant seasonal variations. Present study the concentration of all parameters was found within the permissible limits and water is good for fish culture.

REFERENCES:

- APHA (2005). Standard methods for the examination of water and wastewater. 21st Edn., Washington, D. C.
- Jhingran V.G. (1982); Fish and fisheries of India. 2nd Edn. , Hindustan Publishing Corporation, India.
- Boyd CE(1982), Water quality management for pond fish culture. Elsevier Scientific Publ.Co., New York pp.318.
- Hulyal SB and Kaliwal BB (2011) Seasonal Variations in Physico-Chemical Characteristics of Almatti Reservoir of Bijapur district, Karnataka State. Int.J.E.Prot.1 (1):58-67.
- Jhingran V.G. (1982); Fish and fisheries of India. 2nd Edn. , Hindustan Publishing Corporation, India.
- Jena, V., S. Dixit, R. Shrivastava and S. Gupta: Study on pond water quality by the assessment of physico-chemical parameters and water quality index. Int. J. App. Bio. and Pharm. Techn. 4(1), 4752, (2013).
- KATARIA, H.C., IQBAL, S.A. & CHANDILYA, C.B. (1996) Limnological studies of Tawa reservoir. Indian J. Enviro. Pro. 16(11):841-846.
- Kaur, S and Joshi, B. D (2003) Seasonal variation in some physico-chemical parameters of river Ganga in and around Haridwar. Him. J. Zool. 17: 45-55.
- Kumar, R., Singh, R. D. and Sharma, K.D. 2005. Water resources of India, *Current Science*, 89(5): PP. 794-811.
- Kumar, V., Arya, S., Dhaka, A., Minakshi and Chanchal : A study on physico-chemical characteristics of Yamuna River around Hamirpur (U.P), Bundelkhand Region, Central India. Int. Multidis. Res. J., 1(5) 14-16 (2011).
- Lewis, W. M. 2000. Basis for the protection and management of trophic lakes. Lakes Reserv. Res. Manage. 5 35-48.
- Nidhi Bajpai, Jaishree Sikka and Sharma (2012) Effect of the Khan River Water on Chlorophyll content, Carotenoids and Enzyme Activities of *Pomoea fistulosa* and *Polygonum barbatum*. National In. And Poll. Tech. Journal vol 1-11 P319-323.
- Sengupta, B. : Water quality status of River Yamuna (1999-2005), Central Pollution Control Board, Delhi. Assessment and Development of River Basin series : ADSORBS/41/2006-07 (2006).
- Sarma, Dutta A and Choudary M (2007), "Limnology and Fisheries Under beel, Goalpara, Assam", J. Inland fish Soc. India, Vol.39, No.1, pp.51-54.
- Singh, Y., Ramteke, P.W., Mishra, S. and Shukla, P.K. : Physico-chemical analysis of Yamuna River water. Int. J. Res. Environ. Sci. Tech., 3(2), 58-60 (2013).
- Pawar, R.S. and Panoskar Dipak, B. : Characterization of ground water in relation to domestic and agricultural purposes, Solapur, Industrial belt, Maharashtra, India. J. Environ. Res. Develop., 9(1), 102-112 (2014).
- Siddhartha, R., Tanti, K.D., Mishra, A. and Pandey, B.N. 2013. Seasonal rhythms in the Physico-chemical characteristics of the swamps of Purnia, (Bihar); Int. J. of Life Sciences, 1(1):63-66.
- Vijaykumar, N., Saktivel, D. and Anandam, V. (2009). Studies on physico-chemical parameters in Thingathittu Estuary, Puducherry, South India, *J. Aqua. Biol.*, 24(1) : 104-106.