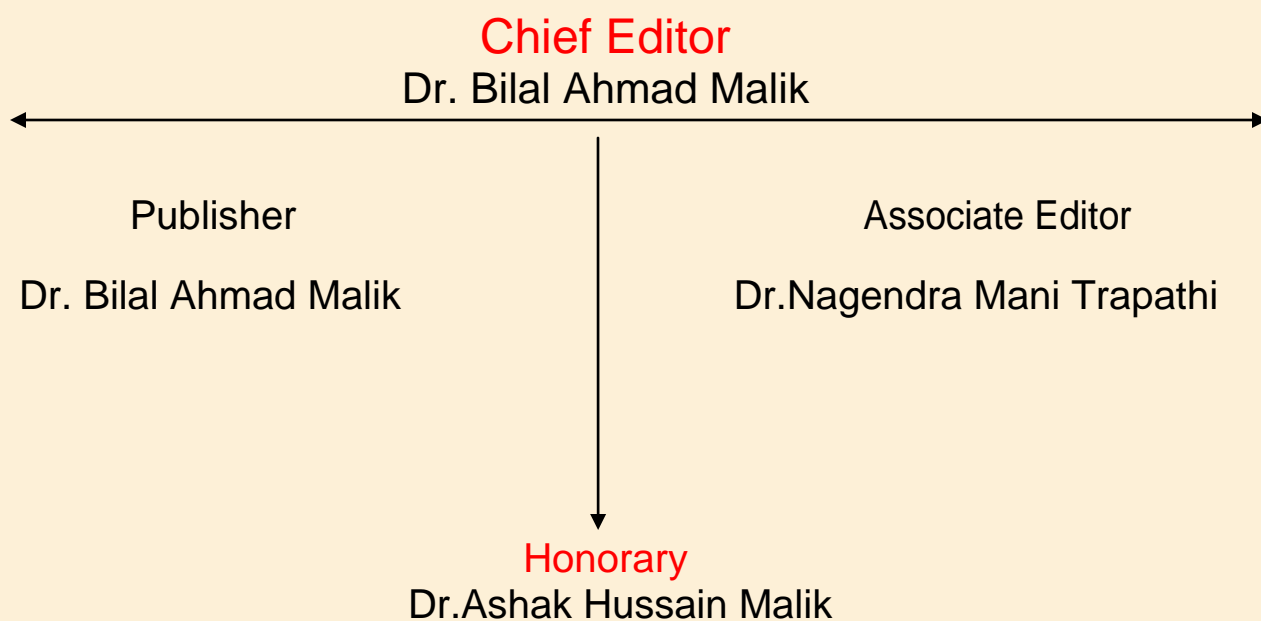


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PHYSICO-CHEMICAL PARAMETERS ON BIODIVERSITY OF OEDOGONIUM IN TAPE RIVER IN SARANKHEDA BARAGE OF SHAHADA TAL. NANDURBAR DISTRICT MAHARASHTRA.

C. V. PATIL AND T.S. PATIL

Department of Botany P. S.G.V. Prasark mandal Art,Sci,Comm, college
Shahada Dist. Nandurbar (M.S.) 425409

ABSTRACT.

The study of the physico-chemical parameters of Tapi river in Nandurbar District. Maharashtra Monthly changes in Physical and chemical parameters. Total 21 species of phytoplankton were identified belonging oedogonium. Such as pH, water temperature, BOD, COD, D.O. , T.D.S. ,Ca, Mg, Al, Na,K,NO₃ , PO₄, SO₄, Cl. In the present study, the results clearly showed that the Sarangkhedha barrage in Tapi river nandurbar district. The dominated by Oedogonium of some species. *Oedogonium*, *Oedogonium khannae*, *Bulbochaete debaryana*, *Bulbochaete triangulae*, *Bulbochaete kosmoceps*. Were analyzed for a periods of one year from Oct 2011 to Sept 2012. All parameter were within the permissible limits, the results indicate that the Barrage is Non polluted and can be used for Domestic, Irrigation.

Key Words: Physico-Chemical Parameter, Monthly variation, phytoplankton, Tapi river.

INTRODUCTION

Tapi river water flowing down on the state Madhya Pradesh through Gujarat and Maharashtra . One of the most important Tapi river of Maharashtra study area lies in Maharashtra state in the district of Nandurbar, Shahada Tahsil, The water reservoir at Sarangkhedha [21° 36 N , 74° 24 E] Water resources is utilized for various purposes such as irrigation, domestic use, fish culture.

The species composition, distribution and abundance of phytoplankton, particularly the phytoplankton, in any water body depend upon the chemical and physical properties of water. In tropical and subtropical regions, vertical sunlight provides maximum penetration of light into the water. High temperature and strong radiations are thus the main factors in these areas which are responsible for the abundance of phytoplankton (Bisht 1993). In different water bodies various physico-chemical factors have been studied and have often been correlated with phytoplankton growth. The objective of present study was to assess the effect of various physico-chemical parameters on phytoplankton.

The studied some numbers of Oedogoniales have also been recorded earlier by Khan and Kukreti (1974), This is the sixth communication in the series on the algal flora of M, Khan (1977). Diversity, distribution, abundance and variation in the biotic factors provide information of energy turnover in the aquatic systems (Forsberg. 1982).

The present investigation attempts to find out the seasonal variation in the physic-chemical parameters and also focus on water quality.

MATERIAL AND METHODS

The samples were collected in polythene bottle cleaned by nitric acid and distilled water. The samples were collected every month at early in the morning 8.00 to 11.00 am. from Oct 2011 to Sept 2012. pH value and temperature were recorded on the spot in the field. The further physic-chemical analysis of water as well as phytoplankton diversity was carried out by standard method APHA, 1985.

Water, plankton, aquatic plants were collected monthly between Oct 2011–Sept 2012. With a view to having a general picture of the phytoplankton productivity of the Tapi river of Sarangkhedda barrage collections of water samples from the surface and bottom and phytoplankton net samples. Phytoplankton were collected for identification with a plankton net (mesh size 10 μm) which was pulled up vertically to the surface. The water sample from the plankton net was place into an approximately 100 ml bottle; this process required 2-3 samples to fill the bottle. The water samples at the deepest point of both sections were collected for the first- 4Ft for every one Ft from then on to the bottom of the Saragkheda barrage. The water samples were poured into dark glass bottles and preserved with 4ml of Lugol's solution per 100ml of sample. Study of plankton was made with a light microscope, and species identification was made by reference to Oedogonium, Indian Council of Agricultural Research. New Delhi. Ell A. Gonzalves (1981).

A Physico-chemical property of the barrage water, 1 liter of the surface water was collected from the spot in a colored, sterilized bottle. Sampling was usually done in the morning. Standard method of for analysis were used (APHA 1985) temperature was measured with a mercury thermometer and pH digital meter, Bio Chemical Oxygen Demand, Chemical Oxygen Demand, Dissolved Oxygen, Total Dissolved Solids, Calcium, Magnesium, Alkalinity, Sodium, Potassium, Nitrate, Phosphate, Sulphate, Chloride and Phytoplankton were investigated during the period. The further physic-chemical analysis of water as well as phytoplankton diversity was carried out by standard method APHA (1985), Trivedy and Goel (1986).

OBSERVATION TABLE:-**Table.1- Diversity of phytoplankton various different depth at Sarangkhedha barrage on Tapi river**

No.	SPECIES NAME	0-1Ft	1-2Ft	2-3Ft	3-4Ft
45	<i>Oedogonium carrissoi</i>	+	+	+	+
46	<i>Oedogonium brevicingulatum</i>	+	+	+	+
47	<i>Oedogonium globosum</i>	+	-	+	-
48	<i>Oedogonium nanyohense</i>	+	+	+	+
49	<i>Oedogonium parvum</i>	+	+	+	+
50	<i>Oedogonium khannae</i>	+	+	+	-
51	<i>Oedogonium mesocostatum</i>	+	-	+	+
52	<i>Oedogonium orientale</i>	+	+	++	-
53	<i>Oedogonium luisierianum</i>	+	-	-	-
54	<i>Oedogonium magnusii</i>	+	+	+	-
55	<i>Oedogonium angulosum</i>	+	+	+	+
56	<i>Oedogonium indicum</i>	+	+	+	-
57	<i>Oedogonium pseudospirale</i>	+	+	+	-
58	<i>Oedogonium cyclostomum</i>	+	+	-	+
59	<i>Oedogonium reductum</i>	+	+	+	-
60	<i>Bulbochaete debaryana</i>	+	+	+	-
61	<i>Bulbochaete mirabilis</i>	+	+	-	+
62	<i>Bulbochaete nan var chungkingensi</i>	+	+	-	-
63	<i>Bulbochaete triangulais</i>	+	+	+	-
64	<i>Bulbochaete horrid</i>	+	-	+	-
65	<i>Bulbochaete kosmoceps</i>	+	+	+	+

(+ present, - absent species)+

Table 2 : Monthly variation in Physico-chemical parameter in Tape river in Sarangkhedra dam nadurbar dist M.S.(2011-12)

2011-12	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
pH	7.62	7.82	7.78	8.46	7.88	7.86	7.92	7.66	7.98	7.92	8.00	7.86
Temp	26.42	26.02	23.36	24.16	24.92	28.34	29.22	29.88	29.80	29.00	29.72	28.46
BOD	30.78	59.27	43.57	30.73	12.43	49.37	43.61	41.26	28.6	18.96	25.97	56.12
COD	54.45	90.2	50.07	62.4	21.61	71.72	54.81	56.53	32.76	38.21	39.48	57.01
D.O.	5.98	5.04	5.98	5.96	6.24	6.98	5.74	6.44	6.24	6.52	6.06	6.14
TDS	498.20	468.80	522.60	558.40	542.20	388.20	386.40	402.40	386.60	376.40	435.00	401.60
Ca	43.64	33.93	21.87	32.08	27.74	25.46	42.28	53.03	33.76	43.77	38.71	37.61
Mg	32.85	44.15	31.46	41.89	44.53	59.57	77.90	63.77	33.57	19.82	17.42	40.47
Al	195.63	188.65	112.16	123.05	140.65	115.16	142.35	174.62	134.13	152.02	169.82	156.17
Na	19.42	19.08	17.29	19.35	24.74	25.72	24.82	28.45	10.45	13.26	12.48	14.63
K	1.82	2.38	1.88	1.86	2.08	2.26	2.06	1.94	1.68	1.58	1.96	1.70
NO3	0.73	0.89	0.76	0.89	0.88	1.04	0.80	0.95	0.97	0.42	0.44	0.46
PO4	0.57	0.68	1.11	1.01	0.49	0.92	0.85	0.87	1.63	1.44	1.37	1.42
SO4	17.76	14.86	15.02	22.05	24.56	28.66	31.42	26.74	12.08	13.98	10.88	14.48
Cl	77.81	87.47	44.84	85.43	50.31	69.06	49.78	71.81	32.92	27.67	23.64	51.20

Figure 1. Monthly variation in physic-chemical parameter at sarangkhedra Barrage of tapi river oct 2011to sep2012.

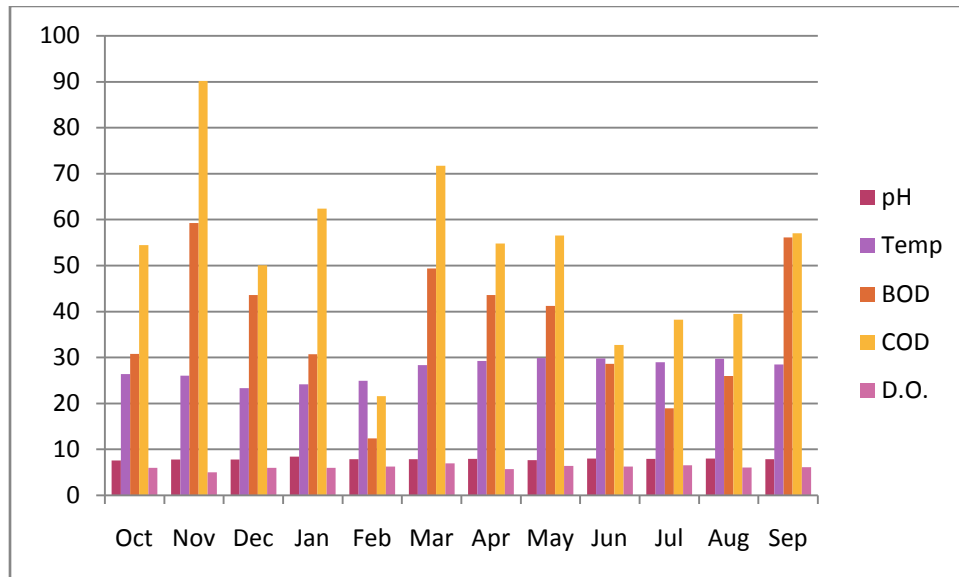


Figure 2. Monthly variation in physic-chemical parameter at sarangkhedha Barrage of tapi river oct 2011to sep2012.

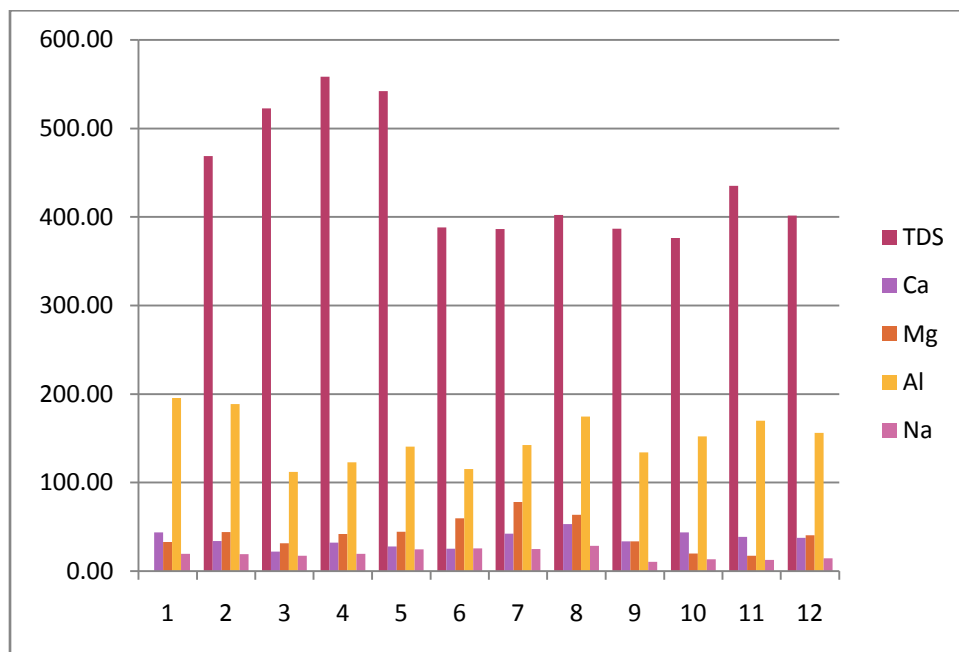
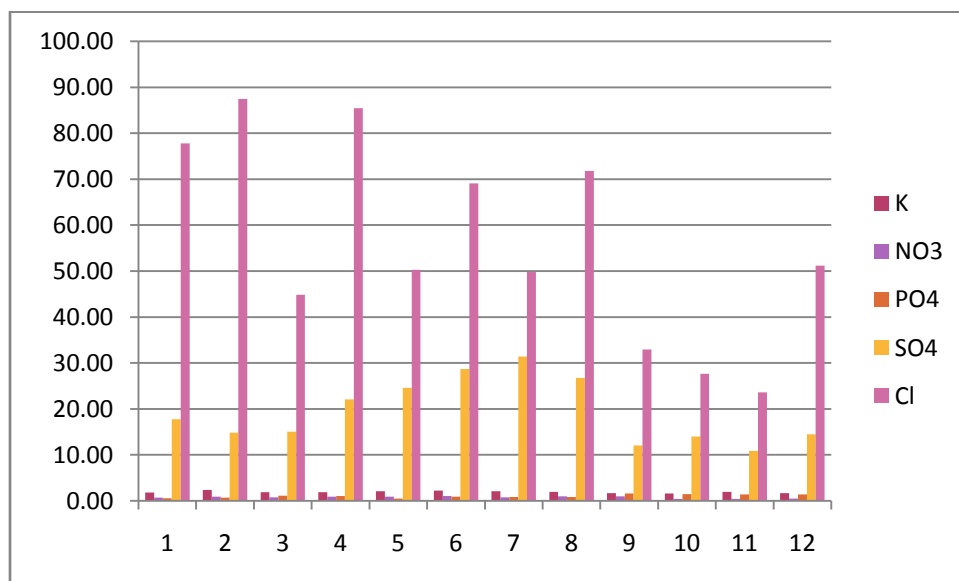


Figure 3. Monthly variation in physic-chemical parameter at sarangkhedha Barrage of tapi river oct 2011to sep2012.



RESULT AND DISCUSSION.

Temperature

The temperature of water was found to be in the range between 23.36⁰c to 29.88⁰c. The temperature of water was maximum 29.88⁰c in the summer and minimum 23.36⁰c in winter. Normally diurnal fluctuation occurs in temperature.

pH Value

During the study pH value ranged from 7.6 to 8.4. It was maximum 8.4 in the summers and minimum 7.6 in the winter. Factors like temperature influences in pH. (B.B. Mishra 2010) has reported a direct relationship between water temperature and pH. The lower value of pH during winter season is due to dilution of alkaline substances or atmospheric CO₂.

Bio Chemical Oxygen Demand (BOD)

The bio chemical oxygen demand was varied from 12.43 to 59.57 mg/L during the study. The BOD found to be maximum 59.57 mg/L in the winter and minimum 12.43mg/L in summer.

Chemical Oxygen Demand (COD)

Chemical oxygen demand was measure of oxygen consumed during the oxidation of oxidizing agent. Varied from 21.16 mg/L to 90.2 mg/L during the study of water bodies. The COD found to maximum 90.2mg/L winter and minimum in 21.16mg/L in the summer.

Dissolved Oxygen (DO)

The dissolved oxygen was varied from 5.04mg/L to 6.98 mg/L during the study. The DO found to be maximum 6.98mg/L in summer and minimum 5.04mg/L in the winter.

Total Dissolved Solids (TDS)

Total dissolved Solids values ranged from 376.410mg/L to 558.40mg/L the total solid value was high 558.40mg/L winter and 376.410mg/L in summer. The high values of suspended solid during monsoon are due to increased day by day in surface runoff water. This was also reflecting on the turbidity level.

Calcium (Ca)

The calcium is an important element influencing flora of ecosystem which plays an important role in metabolism and growth. The average of it varied from 21.87mg/L to 53.03mg/L. The maximum concentration of 53.03mg/L. was noticed in summer, while minimum concentration is 21.87mg/L in the winter season. Normally these ions are not problematic but at higher concentration, increases total hardness of water.

Magnesium (Mg)

The magnesium level varied from 17.42mg/L to 77.90mg/L. the minimum values 17.42mg/L were during rainy season and maximum value to 77.90mg/L in summer season.

Alkalinity (Al)

The Alkalinity level varied from 110.75mg/L – 182.63mg/L. The maximum value was recorded during rainy season in 182.63mg/L, and minimum value was recorded in winter season 110.75mg/L.

Sodium (Na)

The average value of Sodium ranged from 12.08mg/L – 27.29mg/L. The maximum value was recorded during winter season in 27.29mg/L and minimum value was recorded in rainy season 12.08mg/L.

Potassium (K)

The average value was recorded Potassium from 1.44mg/L -2.52mg/L. The maximum value was recorded during summer season in 2.52mg/L and minimum value was recorded during winter season in 1.44mg/L.

Nitrate (NO_3)

The average value of nitrate ranged from 0.30 - 1.06mg/L. The maximum value of nitrate was recorded during summer season 1.06mg/L. and minimum value recorded in rainy season 0.06mg/L.

Phosphate (PO_4)

The average value of phosphate ranged from 0.36 - 2.02mg/L. The maximum phosphate was recorded as 2.02mg/L and minimum as 0.36mg/L during minimum value in winter season and maximum value in rainy season.

Sulphate (SO_4)

The sulphate value showed marked seasonal fluctuation. During this study, sulphate ranged from 11.52 - 31.78mg/L. It was minimum value in rainy season and maximum value in summer season.

Chloride (Cl)

Chloride content varied from 23.29 - 107.57 mg/L indication on pollution status of the water body. The maximum value was recorded in winter season while minimum value was recorded in rainy season.

Phytoplankton – The study of the phytoplankton sampled in Sarngkheda dam showed 21 species of (Table 1.) The phytoplankton was represented by class of algae 21 by the chlorophytes. Some species occurred in all the depth at both the sites during the sampling period. *Oedogonium*, *Oedogonium khannae*, *Bulbochaete debaryana*, *Bulbochaete triangulais*, *Bulbochaete kosmoceps*. Phytoplankton growth as well as decomposition of organic materials in the ecosystem (Upadhyay, e.t.1988; Panigrahy, e.t. 1999)

Discussion- The water quality and eutrophication are due to casual attitude of people. Human activities include bethinks, washing of clothes, vehicles and household etc. The nature has got its own mechanisms to take care of the wastes when they are in limited quantities, all physic-chemical parameters showed higher values summer

Diversity of phytoplankton is dependent on quality of water and climatic factors. Phytoplankton diversity and physic-chemical parameter are strongly related to water quality as well as to biotic factors. The temperature, phosphate, nitrate, DO, supported the growth of phytoplankton in lentic waters. The plankton community on which the whole aquatic population depends, is largely influenced by interaction of a number of physic-chemical parameter is a factors like low DO, moderate sulphate, nitrate, phosphate and other characters, Nirmal Kumar,

(2011) show that a number of physico-chemical and biological factors acting simultaneously must be taken into consideration in understanding the diversity of plankton population. The present study ensures that variation in the abundance of plankton can be best when environmental factors jointly influence. Thus, it may be concluded that the composition of phytoplankton is dependent on different abiotic factors either directly or indirectly.

The physicochemical parameters including total dissolved solids, Total hardness, Calcium, Magnesium, Phosphate, Sulphate showed variation in respective water bodies were well within the normal range as reported Pawar et al (2006). The estimated values for total dissolved solids, calcium hardness, magnesium hardness, chlorides and sulphates showed lower trend during monsoon where as higher values were reported for these parameters during summer and lower values for these parameters indicated that they were diluted in the rainy season (Sharma et al,1990), Yeole and Patil (2005). The growth of aquatic flora a wide variety of fauna is also seen in this aquatic ecosystem. Phytoplankton is one of the such species that stagnant water, the growth and survival of which is supported by excess of nutrient and organic matter. The phytoplankton, zooplankton, suspended material and dead decaying organic matter present in the benthic zone of the water body (George and Irfan 2011).

CONCLUSION:-

Quantitatively fluctuation of total phytoplankton in oedogonium was recorded various depth of phytoplankton in maximum during level of 1-2 ft and 2-3ft and minimum phytoplankton present in water surface 0-1 ft.. The 21 species representing oedogonium were determined during present studies.

The physicochemical properties of Sarangkhedda dam of Tapi river were within tolerance limits; no excessive value was recorded during study period. Therefore, the water of Tapi river is suitable for growth of aquatic flora and fauna. The concluded the characteristics of water bodies are influenced by seasonal variations. It is recommended that the proper maintenance of the water bodies is influenced by seasonal variations. It is recommended that the proper maintenance of the water bodies is necessary proper sanitation measures and environmental education to public care essential to keep these water bodies clean and safe.

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