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Hydrobiological Studies on Gomai River of Shahada Tehasil of Nandurbar District (M.S.)

Dr. SANTOSH KADU TAYADE | Head, Department of Botany,P. S. G. V. P. Mandal's Arts, Science and Commerce College, Shahada, Dist-Nandurbar, 425 409 (M.S.)

ABSTRACT

Hydrobiological studies were carried out in river Gomai of Shahada tehasil during 15th July 2011 to 30th December 2011. Samples were collected fortnightly from different places. In all total twelve samples were collected and duly analyzed in the laboratory for physicochemical properties, physical parameters like temperature was between 30-340 C, odour earthy to musty, taste, flat, palatable bitter to unacceptable, pH varied from 8 to 9. The phytoplankton consisted of green algae; blue green algae and diatoms wide fluctuation in the river was due to common pollutant arising from upward villages and domestic waste.

KEYWORDS Physico-chemical parameters, blue greens, greens and diatoms

INTRODUCTION:

River Gomai has a little path originated in Madhya Pradesh is a one of the big tributary of river Tapi. Along its bank large number of village were established. Hydrobiological studies on river Gomai was carried out from July 2011 to December 2011. The rainy season and ended at the end of winter.

MATERIALS AND METHODS:

The hydrobiology study of river was done for a period of one year from 15th July to 30th December 2011 including monsoon. The samples from the sites were collected fortnightly. The water temperature was recorded at the site it self. Fixation of oxygen was done in the field it self for the estimation of dissolved oxygen. The samples were brought to the laboratory and chemical analysis was done on the same day. The chemical analysis and water analysis methods were followed from American Public Health Association (1976).

RESULT AND DISCUSSION:

Physical parameter like temp ranges in between 30-34° C, odour earthy to musty, taste, flat, palatable bitter to unacceptable, pH varied from 8 to 9 chemical parameters like total dissolved salt was between 0.14 to 6.6, hardness in between 21.29 to 49.51 mg/l, dissolved Oxygen was from 5.1 to 7.1 ppm, electric conductivity was in between 2.2 to 9 ms/c, total alkalinity 114 to 287mg/, Calcium (Ca) showed variation from 3.383 to 17.88 mg/l, Magnesium (Mg) varied in between 17.9 to 3723 mg/l, Chlorine (Cl) from 5.69 to 56.98 mg/l, Sodium (Na) was 31.6 to 49.8 mg/l, Potassium (K) from 5.7 to 8.89 mg/l. The phytoplankton consisted of green algae, blue green algae and diatoms. Wide fluctuation in the physicochemical parameters of the river was due to common pollutants arising from upward villages and domestic waste of the region. The phytoplanktons were identified with the help of standard flora like Randhava (1959), Subramanyam (1946), and Venkatraman (1939). The planktons were represented by blue greens, greens and diatoms. The river Gomai during its path of flowing travels through the villages and small towns in around the region, which are dominated with agriculture and agro based industries. Therefore, most of the pollution comes in to the river were agricultural run off and mountain silicates coming from the Satpura ranges nearby the region. (Hutchinson,1957). Therefore during the monsoon when river flows voluminously the water became palatable when compared with the WHO parameters. Physical parameter like temperature, the seasonal changes observed in water temperature was always correlated with similar behaviors of atmospheric temperature (More and Nandan 2000, Qasim and Sengupta, 1981). Temperature ranges in between 30-33° C observed that the density of algal organism were more around 30° C., pH was found 8-8.5 during monsoon but increases to 9 in post monsoon as river stop flowing and became stagnant due to eutrophication of some greens and blue greens. Earthy odour during monsoon period is due to run off of silicate from hills and land in post monsoon it become musty with rotten smell. Water becomes palatable when flowing but soon bitter and unacceptable as water become stagnant.

During monsoon total dissolved salt and total hardness increase 2.8 ppm to 6.6 ppm and 21.29 mg/l to 49.51mg/l. During post monsoon dissolve oxygen increases toward post monsoon season from 6.3 ppm to 7.1 ppm as the algal density increases. Electric conductivity increases monsoon to post monsoon from 2.2 m to 9 m due to dissolution of salts. Similarly total alkalinity increases from 159.0 mg/l to 287 mg/l as concentration of algal organisms increases during monsoon when river flows to its full capacity. (Chaugule,2004) Concentration of Calcium decreases with increase in salinity (Sengupta ***et al*** 1980). The sparingly dissolution of Calcium, Magnesium, Chorine, sodium, potassium of the soluble salts were observed during study period. Density and biodiversity of algal forms increases from July 2011 to December 2011 till the end of post monsoon were dominated mainly by greens, blue green and diatoms. ***Microcystis***, ***Oscillatoria***, ***Nostoc*** and ***Anebeana*** were dominated from blue greens. ***Spirogyra***, ***Zygnema Eudogonium*** was from greens and ***Synedra, Ulva***, ***Navicula*** species and ***0pinnularia*** species were dominant during the study period. Algal flora is largely composed of ***Chlorophyceae*** and ***Cyanophyceae***. Species of ***chlorophyceae*** were abundant during early period of monsoon, but as soon as water flow stops and become stagnant species of ***Cyanophyceae*** become abundant due to eutrophic effect of some blue green algae.

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Table-1. Physical parameters of river Gomai as observed during July to December 2011.

Sr. No.	Date of sampling	Temperature (°C)	Odour	Taste	pH
1.	15 July	33°C	Earthy	Flat	8
2.	30 July	34°C	Earthy	Flat	8.5
3.	15 Aug	33°C	Earthy	Flat	8.6
4.	30 Aug	33.5°C	Earthy	Flat	8.6
5.	15 Sep.	32°C	Earthy	Palatable	8.6
6.	30 Sep.	32°C	Earthy	Palatable	8.4
7.	15 Oct.	31.5°C	Earthy	Bitter	8.7
8.	30 Oct.	31.5°C	Earthy	Bitter	8.7
9.	15 Nov.	31.5°C	Musty	Unacceptable	8.8

10.	30 Nov.	30.5°C	Musty	Unacceptable	8.9
11.	15 Dec.	30°C	Musty	Unacceptable	8.9
12.	30 Dec.	30°C	Musty	Unacceptable	9

Table – 2. Chemical parameters of river Gomai during July to December 2011.

Sr. No.	Date of Sampling	TDS (ppm)	Total Hardness (mg/l)	Dissolved Oxygen (ppm)	EC	Total Alkalinity **(mg/l)**
1.	15 July	2.8	21.29	6.3	2.2	159.0
2.	30 July	3.0	33.17	6.3	4.4	185.5
3.	15 Aug.	2.6	37.63	6.5	3.8	174.9
4.	30 Aug.	3.4	39.61	6.2	5.0	178.0
5.	15 Sep.	0.14	38.62	5.1	2.6	180.0
6.	30 Sep.	5.8	39.61	7.0	8.8	114.0
7.	15 Oct.	3.8	45.07	6.6	5.8	197.0
8.	30 Oct.	4.0	45.0	6.6	5.8	243.0
9.	15 Nov.	3.4	47.09	6.2	5.4	245.0
10.	30 Nov.	5.8	48.10	7.0	8.8	255.0
11.	15 Dec.	6.0	49.20	7.0	9.0	280.0
12.	30 Dec.	6.6	49.51	7.1	5.4	287.0

Table 3. Amount of Ca, Mg, Cl, Na and K elements in Gomai River Water from June to December 2011.

Sr. No.	Date of Sampling	Ca (mg/l)	Mg (mg/l)	Cl (mg/l)	Na (mg/l)	K (mg/l)
1.	15 July	3.383	17.907	5.69	31.6	5.7
2.	30 July	9.535	23.635	26.80	31.8	5.9
3.	15 Aug.	11.68	25.95	26.98	34.9	5.9
4.	30 Aug.	14.76	24.85	26.78	35.00	6.2
5.	15 Sep.	14.12	24.50	25.66	42.1	6.9
6.	30 Sep.	14.76	24.55	32.66	43.1	6.18
7.	15 Oct.	17.84	37.23	33.98	44.00	6.9
8.	30 Oct.	14.30	35.21	34.12	47.7	7.1
9.	15 Nov.	15.21	31.88	35.50	47.7	7.1
10.	30 Nov.	14.30	35.00	36.27	48.2	7.9
11.	15 Dec.	17.84	31.00	56.80	48.7	7.8
12.	30 Dec.	17.88	32.08	56.98	49.8	8.29

REFERENCES:

1. American Public Health Association (1976) : Standard methods for the examination of water and waste water. Eds. 14th New York.
2. Chaugule B.B, (2004) Diversity of fresh water red algae in the Western Ghats and associated areas between latitudes 15 N – 21N ; Abst .Book , Nat , Symp. Boil and Biodiversity. Fresh water algae, Uni. Madras; 68-69.
3. Hutchinson, G.F.(1957). ***A Treatise on Limnology*** Vol.1. Geography, Physics and Chemistry. John Wiley and Sons, New York.
4. More, Y.S., and S. N. Nandan (2000) Hydrobiological study of Algae of ***Panzara*** river (M.S.) Ecology, Environment and Conservation, 6 (1): 99-103.
5. Qasim S.Z. and Sen Gupta .R (1980) Environmental characteristic of the Mandovi and Zuari system in Goa. Seminar on Estuaryies Dec. 7-11, NIO Goa, India.
6. Randhawa .M.S. (1959). Zygnemetaceae. L.G.A.R. New Delhi.
7. Sengupta e***t al*** (1980) Chemical oceanographic of the Arabian Sea Part V Hydro chemical characteristic of the central west coast of India . ***Ind. J. Mar Sci***. 9. 240-245.
8. Subrahmanyan, R. (1946) .A Systematic account of the marine plankton diatoms of the Madras Coast ***Proc. Ind. Acad ,Sci***. 24: 85-197.
9. Venkatraman, (1939), Systematic account of some South Indian Diatoms ***Proc.Ind .Acad Sci*** 10: 293-368.