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Studies on The Ecology and Fish Fauna of Gopalpura Tank of Guna District (Madhya Pradesh)

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Abstract

Gopalpura Tank is located near village Gopalpura in Distt. Guna of M. P. It is one of the artificial water bodies of Guna (M. P.) used for irrigation as well as for pisciculture. No known source of pollution enters the water body. Physico-chemical studies were undertaken to enhance the limnological knowledge about the tank and to explore possibilities for better management of pisciculture.

This paper deals with the some fishes of the Gopalpura Tank at Guna Distt. (M. P.) in relation to the abiotic factors i. e. physical (Temperature, Conductivity, Transparency, Turbidity, Colour) and chemical (pH, DO , Free CO_2. COD, Chloride, Total alkalinity, Hardness). Altogether the total numbers of fishes described are eleven in number from this Tank.

Key Words: ***Gopalpura Tank, Physico-Chemical factors, Fish fauna.***

Introduction

Gopalpura Tank is located near village Gopalpura in district Guna of M. P. Guna is situated between latitude 23° 90' -25° 15' north and 76 ° 85'-78° 20' longitude east towards north western corner of Malwa in southern Gwalior division of M. P. The Gopalpura Tank is situated at a distance of just 2 Km from Guna town, it is one of the artificial water bodies of Guna .The tank has a catchment area of about 6 sq Kms. The tank is not very large in its area, but it serves very important function of irrigation for the villagers. It is also used for pisciculture of major carps and locally available fishes by fisherman and villagers. The present work is to investigate the physico-chemical parameters of the tank and their effects upon fish life.

Materials and Methods

Collection of water and fish samples was done on monthly basis from August 2000 to January 2001. The monthly water samples for limnological studies were collected between 8 A. M. and 10 A. M.

Standard methods of APHA 1985, Trivedi and Goel 1986 were employed for physical and chemical analysis of the Tank water.

Fish samples were collected from fishermen catches monthly and were identified using Day 1989, Jhingran 1975, Shrivastava 1986 and Qureshi 1983.

Results

Total 13 physico-chemical parameters were studied every month from August 2000 to January 2001 and presented in Table 1, Fishes are enlisted in Table 2.

The temperature varied from 16.5 to 25.3 °C . The minimum temperature was recorded 16.50° during Jan 2001 and during August 2000 the temperature was maximum being 25.30 °C.

Table 1. Physico-Chemical Analysis of Gopalpura Tank

Parameters	Aug 2000	Sep 2000	Oct 2000	Nov 2000	Dec 2000	Jan 2001
Temperature °C	25.3	24.1	22.1	20.5	18.2	16.5
pH	7.9	7.6	7.8	8.0	8.1	8.2
Conductivity mohs	261.0	254.0	180.0	130.8	117	121.8
Color	Turbid	Turbid	Turbid	Light Green	Light Green	Light Green
Turbidity (NTU)	76.0	75.8	58.2	46.5	36.0	33.8
Transparency (cm)	14.8	16.0	25.0	40.9	46.2	50.7
Dissolved Oxygen mg/L	7.5	7.2	8.2	8.3	8.5	8.7
Free CO_2 mg/L	0.3	0.3	0.2	0.2	0.1	0.1
Chloride mg/L.	12.6	6.5	6.4	5.9	5.8	5.0
Hardness mg/L	56.8	36.3	35.1	33.8	33.1	31.5
Total Alkalinity	160	151	135	238.6	238	215
BID ppm	2.0	2.1	1.86	1.69	1.48	1.32
COD ppm	4.42	4.5	4.26	4.24	4.20	4.18

Table.2 List of Fishes of Gopalpura Tank

S.No.	Present Scientific Name	Local Name	Family	Fin Formula
1.	*Labeo rohita*	Rohu	Cyprinidae	D16(3/13),P17 V9 A7(2/5) C19 L1 40 Ltr 6 ½-7 1/2 /9 Barbels 1 Pair
2.	*Cirrhinus*	Nain	Cyprinidae	D16 (3/13), P18 V9 A8 (2/6)C15L1 42 Ltr 6 ½/6 ½ Barbels 1 Pair
3.	*Catla catla*	Katla	Cyprinidae	D18(3/15)P19 V9 A8(3/5)C19 L143 Ltr 7 ½ /6 ½
4.	*Puntius ticto*	Sidhari	Cyprinidae	D11(3/8)P13 V9 A8(3/5)C19L1 25Ltr 5 ½ /6 ½
5.	*Notopterus notopterus*	Patola	Notopteridae	D8(1/7)P17 V6 A100 C19L1 225
6.	*Wallago attu*	Parhin	Siluridae	D5P1/14V10 A86(4/82)C17 Barbels 2 Pairs
7.	*Ompok bimaculatus*	Puffta	Siluridae	D4P1/13V8A65(2/63)C18 Barbels 2 Pairs
8.	*Mystus seenghals*	Tengar	Bagridae	D8P1/9V6A11(3/8) C19 Barbels 4Pairs
9.	*Heteropneustis fossilis*	Singhi	Sacobranchidae	D6P1/7V6A62C19 Barbels 4Pairs
10.	*Channa marulius*	Saur	Ophiocephalidae	D46P18 V6 A32 L165 Ltr 6/11
11.	*Mastacembelus armatus*	Baam	Mastacembelidae	D37/78 P23 A3/75

The value of pH fluctuated between 7.6 and 8.2.

The conductivity was recorded minimum 117 mohs during December 2000 and maximum 261 mohs during August 2000.

The color of water showed variation during the period of observation. The water was turbid during August-September and October and it becomes light green during November December and January.

Turbidity ranged from 33.8 mg/L to 76.00 mg/L. Transparency was report to be increasing continuously (August to January). It ranged between 14.8 and 50.7 cm.

Dissolved Oxygen and free CO_2 in the Tank ranged between 7.2 and 8.7 ppm and 0.1 mg/L and to .03 mg/L respectively.

Values of Chloride ranged from 5.0 to 12.6 ppm. Hardness values ranged from 31.5 to 56.8 mg/L.

Alkalinity in the Gopalpura Tank fluctuated from 135 to 238.6 ppm. BOD and COD were recorded from 1.32 to 2.1 ppm and 4.18 to 4.5 ppm respectively.

Discussion

Variations in the physico-chemical parameters of Gopalpura tank are quite favourable for the nature piscine life. Decreasing fish production of the Tank is certainly affected by the changing physico-chemical characteristics resulted from the addition of different chemicals. Other major causes are illegal fishing and dynamiting practices etc.

The fluctuation in water temperature has relationship with the air temperature. It was well with in limit for survival of fishes. Similar fluctuation are reported by Khanna *et al.* 1999.

During the study period we found that pH variation lies mostly with in the alkaline range. According to Jhingran 1975 pH range between 7 and 9 is considerable good for fish culture. Thus, our results indicate that the Gopalpura Tank having pH from 7.6 to 8.2 is suitable for fish culture.

During the course of study low specific conductivity values support the fact that Tank is very productive (Rao 1993).

Turbidity and Transparency are also quite favourable for fish fauna. Transparency of water ranged between 14.8 and 50.7 cm during the course of study and had a negative correlation with turbidly. Similar results are reported by Dagaonkar and Saxena 1992.

The dissolved Oxygen ranged from 7.2 to 8.7 ppm having moderate fluctuation. The presence of free CO_2 is due to incomplete utilization in photosynthesis and Respiratory activity. Free CO_2 and dissolved Oxygen showed Inverse relationship to one another as similar to Welch 1952, Hutchinson 1957, and Hynes 1970. The value is in the range of fish life.

Cholorides were low indicating no organic pollution in Tank. Chloride concentration was recorded from 5.0 to 12.6 mg/L showed a decreasing trend during the study but in the month of August it increased up to a comparatively higher level, certainly the reason was the adding of chemicals viz bleaching powder etc.

Chloride and Hardness showed a positive relationship. Similar type of relationship was observed by Khann *et al.* 1999. Hardness also showed low values, similar results were reported by Rao 1993.

Hardness and Alkalinity showed negative relationship to one another and their range are quite favourable for fish life as indicated by Mathur 1982.

BOD and COD showed a positive relationship to one another while both showed a negative relationship to DO as reported by Chopra and Patrick 1994. The value of both BOD and COD are in the range of favourable piscine life.

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