

ASSESSMENT OF BIOLOGICAL CHARACTERISTICS OF KHUSHALSAR LAKE SRINAGAR, INDIA

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Abstract: *The analysis and Assessment of biological characteristics of the Khushalsar Lake is one of the important study. The study was carried out to ascertain the biological status of the lake. The study revealed the presence of various biological; species in the lake. The result concludes the overall health status of the lake and study has an implication on long term management of the Khushalsar Lake.*

Key Words: *Khushalsar lake, biological characteristics.*

1. INTRODUCTION:

The Kashmir valley (32° 17' - 37° 5'N and 72° 40' - 80° 30'E) occupies central position at an average elevation of 1600 m.a.s.l within the state of Jammu and Kashmir. It is an oval "dun" of tectonic origin surrounded by the great Himalayas and the Pir Panjal ranges. These lofty mountains include large glaciers between their spurs and are covered by snow for about eight months in the year. According to Hugal (1845) these mountains form a regular oval of snowy summits. The J&K measures area of about 2,25,000 Sq.Km. In the middle of the valley is an extensive level alluvial tract intersected by river Jehlum and its numerous tributaries. All the streams find their way by the sole channel of Jehlum through the Baramullah pass to the plains of Punjab.

2. MATERIALS AND METHODS:

Qualitative and Quantitative analysis of plankton population:- Qualitative analysis of plankton population (Phyto-zooplankton) was done by hauling No. 25 plankton net through horizontal and vertical direction of the lake. A sub-sample of the plankton population was examined while the other portion was preserved by the addition of 5% formalin zooplankton and with a few drops of Lugo's solution (10g pure iodine, 20g KI, 200ml distilled water 20g of glacial acetic acid) for phytoplankton identification. Following works were consulted for plankton identification, Kifer (1939), Smj, 1950, Hirano, Minoru, 1952-53-55-63-65, 66, Gronblad (1960), Subba Raju (1963), Wanamalu Naidu (1952-53-55-63-65,66), Gronblad (1960), Philipose (1967), Weber (1971), Chengalath et al (1974), Fernando (1974), Daems and Dumont (1974) and Suxena and Venkateshwarla (1966-68).

The quantitative analysis of plankton population was done by filtering a known volume of water (1 litre) through a plankton net No.25 (64 µm grade). Filtered sample was reduced to 100ml. The samples were preserved with 5% formalin and Lugo's solution and then reduced to 1/10th of the initial volume by concentrating in a centrifuge for about 20 minutes at 1500 rpm. Enumeration of the phyto and Zooplankton was done by taking 1ml of subsample in a Sedgwick Rafter chamber and counting entire contents of the chamber for different plankton species. The results have been expressed as unit/l. Any possible error due to sub sampling was compensated for by increasing the number of subsamples counted.

The general principles of quantitative expression of unit/l have been adapted from Tucker (1957).

3. RESULTS:

Phytoplankton:

During the present investigation a total of 118 species were recorded from nine different sites of Khushalsar during the month of Feb. 2006. Out of these species, 66 species belonged to the class Cyanophyceae, while only 6 and 3 species were recorded from Euglenophyceae and Dinophyceae class respectively.

Bacillariophyceae: Bacillariophyceae population range was found to lie between 3700 – 16500 units / l. at site I (Near Dalgate Channel) and site 8 (Between Nishat and Camel Bridge) respectively and its average percentage contribution towards various phytoplankton classes at various sites ranged from about 50 to 90%. The minimum of 21 species were recorded at site 3 (Near Mir Mohalla) and maximum of 37 species at site 5.

Chlorophyceae: - The population range of Chlorophyceae was recorded to lie between 500- 3300 units /l. The minimum population was observed at site 4 (Near Centaur Hotel) and the maximum population was observed at site 8 (between Nishat and camel bridge). The average percentage contribution towards various phytoplankton classes at various sites ranged from 5.26% to 21.91%. A minimum of 4 species were recorded from this class at site 4 (Near Centaur Hotel) and a maximum of 13 species were recorded at site

Cynophyceae: The population of cynophyceae ranged between 400-3400 units / lt. The minimum population of 400 units/lt. was recorded at site 4 (Near Centaur Hotel) and maximum population of 3400 units/lt. was recorded at site 8. The average percentage contribution towards various phytoplanktonic classes ranged from 4.21% - 14.40% Table 6 and 5.4 and 5.8. The minimum of 2 species were recorded from site 1 and 5

Euglenophyceae:- The population of this class ranged between 300-1500 units/lt. The minimum population was recorded at site 2 and maximum population was recorded from 3 (Near Heemal Hotel)

The percentage contribution of this class towards various phytoplanktonic classes varied between from site 7 and 8 a maximum of 6 species from site 2 (Near Heemal Hotel)

Dinophyceae:- This class of phytoplankton was recorded at only two sites 5 and 9 having population of 300 units/ lt. and 1400 units/lt. respectively. The percentage contribution dinophyceae towards various phytoplanktonic group at these two sites was 2.27% and 9.09% respectively. As far as species contribution is concerned, one species was recorded at site 5 and two species at site 9

Zooplankton

The biological carried out at nine different of Dal Khushalsar revealed the presence of 26 species of Zooplankton belonging to three different classes. Out of these species 14 belonged to the class Rotifer, 8 to cladocerans and 4 species copepods.

Rotifers:- the population range of rotifers was recorded to lie between 6-67 units/lt. the minimum population was recorded at site 8 and the maximum population was recorded at site 1.

The average percentage continuation towards various Zooplanktonic groups was found to lie between 14-63 to 79.54% . The minimum of two species was recorded from site 8 and maximum of 8 species was recorded from site1.

Cladocera:- the population of cladocerans ranged between 5-29 units/lt. the maximum population was recorded at site 5 and the minimum was recorded at site2. The average percentage continuation towards various Zooplanktonic groups was found to lie between 20.45-50.87. The minimum of 1 species was recorded at site2 and a maximum of 4 species was recorded at site 5,7,8 and9.

Copepoda:- No Copepoda population was recorded at site2 and site3 while its population range and at the rest of sites was recorded to lie between 8- 18 units/lt. the maximum population was recorded at site 5 and maximum of 18 units /lt was recorded at 3 sites viz. 1,8 and 9. The average % age contribution towards various zooplankton groups ranged between 14.3 – 43.90%. The minimum of two species was recorded from 3 sites viz. 4,,5 and8 while a maximum of 3 species was recorded from 4 sites viz. 1,6,7 and 8

DISCUSSION

Khushalsar lake: **Bcillariopyceae > Chloropycea> Cyanophyceae > Dinophyceae**

The phytoplankton communities shows broad overlap in species composition with temperature communities and have little endemics the abundance average percentage contribution of phytoplankton in Khushalsar lake was found to be quite high which probably indicates that population colonization in water bodies situated in between 15000-1600 m.s.i is fairly good.

On evaluating the dominance pattern of various algal classes, it was observed that the Hutchinson (1962) according to him the human activities in the catchment area of lake results in eutrophication by increasing the nutrient loading. Which in turn is responsible for the change in the lake flora from diatom assembling to those green and blue algae.

Among the zooplankton community Rotifers are dominant taxa in the lake. Asplanchnopus multicaps, squatinella mutica, trichocerca sp., Nothola acumenata and Trichocerta porcellus species. The other classes of zooplankton in the lake which were observed during the study in the month of February 2006 are cladocera and copepoda. Thus, from the mentioned discussion one can conclude that ecological status of Khushalsar is that the lake is calcium rich with hard water. High range of some other parameters from the investigation of the lake, it may be finalized that the lake is receiving the bulk quantities of nutrients, which has resulted in the pollution of the lake, which in turn leads to rapid eutrophication. By studying the parameter of other lakes like Dal lake it was observed that the Khushalsar lake is more polluted than the Dal lake due to more addition of agriculture runoff, sewage etc. It was estimated that the phosphorous and nitrogen load in two lakes reported 46kg/ yr in Dal lake 78 Kg's / yr. in Khushalsar and 840 Kg / yr in Dal lake 1150 kg / yr in Khushalsar respectively.

4. CONCLUSION:

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