

Effect of Climate Changing Pattern on Aquatic Biodiversity of Bhimtal Lake at Kumaun Himalaya (India)

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Abstract : Bhimtal lake is located between 29° 21' N latitude and 79° 24' E longitude, at an elevation of 1332m above mean sea level in the Kumaun region of Uttarakhand of Indian subcontinent. The lake surface area is decreasing in water area, depth level in relation to ecological and biological characteristics due to climatic variations, invasive land use pattern, degraded forest zones and changed agriculture pattern in lake catchment basin. The present study is focused on long and short term effects of climate change on aquatic biodiversity and productivity of Bhimtal lake. The meteorological data of last fifteen years of Bhimtal lake catchment basin revealed that air temperature has been increased 1.5 to 2.1°C in summer, 0.2 to 0.8 °C in winter, relative humidity increased 4 to 6% in summer and rainfall pattern changed erratically in rainy seasons. The surface water temperature of Bhimtal lake showed an increasing pattern as 0.8 to 2.6 °C, pH value decreased 0.5 to 0.2 in winter and increased 0.4 to 0.6 in summer. Dissolved oxygen level in lake showed a decreasing trend as 0.7 to 0.4mg/l in winter months. The mesotrophic nature of Bhimtal lake is changing towards eutrophic conditions and contributed for decreasing biodiversity. The aquatic biodiversity of Bhimtal lake consisted mainly phytoplankton, zooplankton, benthos and fish species. In the present study, a total of 5 groups of phytoplankton, 3 groups of zooplankton, 11 groups of benthos and 15 fish species were recorded from Bhimtal lake. The comparative data of biodiversity of Bhimtal lake since January, 2000 indicated the changing pattern of phytoplankton biomass were decreasing as 1.99 and 1.08% of Chlorophyceae and Bacillariophyceae families respectively. The biomass of Cynophyceae was increasing as 0.45% and contributing the algal blooms during summer season in lake. The biomass of zooplankton and benthos were found decreasing in winter season and increasing during summer season. The endemic fish species (18 no.) were found in year 2000-05, as while the fish species (15 no.) were recorded in present study. The relative fecundity of major fish species were observed decreasing trends during their breeding periods in lake. The natural and anthropogenic factors were identified as ecological threats for existing aquatic biodiversity of Bhimtal lake. The present research paper emphasized on the effect of changing pattern of different climatic variables on species composition, biomass of phytoplankton, zooplankton, benthos, and fishes in Bhimtal lake of Kumaun region. The present research data will be contributed significantly to assess the changing pattern of aquatic biodiversity and productivity of Bhimtal lake with different time scale.

Keywords : aquatic biodiversity, Bhimtal lake, climate change, lake ecology

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