STUDY ON PHYTOPLANKTON ABUNDANCE AND DIVERSITY IN RELATION TO RESERVOIR WATER LEVEL AND WATER QUALITY: A STUDY IN MAGALLA RESERVOIR IN SRI LANKA

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The study was carried out in the Magalla freshwater reservoir located in Nikaweratiya, Sri Lanka. The objective was to determine how the water level (m) and water quality affect the abundance (individuals/L) and diversity of phytoplankton. Data were collected from May to December 2023 across four sampling sites. Site 1 had domestic waste, site 2 was a bathing area associated with soap and detergents, site 3 had urban runoff, and site 4 was an area with minimum disturbances as the reference site. Standard methods were employed for in situ analyses of various water quality parameters including, water temperature (^{0}C), dissolved oxygen concentration (mg L^{-1}), pH values, total dissolved solids (mg L^{-1}), electrical conductivity (µS cm^{-1}), salinity (%), and transparency (cm) as well as for phytoplankton assessment. Daily water level data for the reservoir was obtained from the irrigation office, Nikaweratiya. Phytoplankton diversity was evaluated using the Shannon-Wiener Diversity Index (SWDI) and Pielou's Evenness Index (PEI). The significance level established for the study was $P < 0.05$. A total of 29 phytoplankton species belonging to 7 classes were identified. 1 in *Trebouxiophyceae*, *Euglenophyceae* 2 in *Chrysophyceae*, *Zygnematophyceae*, 4 in *Cyanophyceae*, 7 in *Bacillariophyceae*, and 12 in *Chlorophyceae*. Notably, the SWDI for phytoplankton at site 3 showed a significant difference ($P < 0.05$), while the SWDI of sites 1,2 as well as the abundance, and PEI values of phytoplankton at sites 1,2, and 3 did not significantly differ ($P > 0.05$) from the reference site (ANOVA, Tukey's method). The highest abundance, SWDI, and PEI of phytoplankton were observed in August when the reservoir water level was at its lowest (2.08 m). Conversely, the lowest values of these metrics were recorded in November coinciding with the highest water level (5.56 m). The phytoplankton abundance (site 1: - 0.71, site 2: - 0.74, site 3: - 0.68, site 4: - 0.56) and SWDI (site 1: - 0.33, site 2: - 0.51, site 3: - 0.47, site 4: - 0.52) across all sites did not show a significant correlation with the reservoir water level. However, temperature (site 1: 0.93, site 2: 0.88, site 3: 0.86), Salinity (site 2: 0.94, site 3: 0.89, reference site: 0.82), and conductivity (site 1: 0.83, site 3: 0.96) exhibited a strong positive correlation while transparency (site 1: - 0.81, site 2: - 0.78, reference site: - 0.72), showed a negative correlation with phytoplankton abundance as indicated by Pearson correlation analysis. Thus, the findings suggest that the reservoir water level does not directly influence the phytoplankton community. Water quality does impact their abundance and distribution.

***Keywords**: Abundance, Diversity, Phytoplankton, Water level, Water quality.*