Study on diversity and abundance of phytoplankton in Mawella Lagoon with reference to water quality parameters

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The present survey was focused on studying the phytoplankton diversity and abundance with reference to physico-chemical parameters of water quality of the Mawella Lagoon, Hambanthota District, Sri Lanka. Field sampling was conducted with ten randomly selected sampling locations from November 2019 to January 2020. In-situ analysis was carried out for water temperature, pH, dissolved oxygen, electrical conductivity, salinity and turbidity of the lagoon. The collected water samples were analyzed in accordance with Standard Methods for the Examination of Water and Wastewater (APHA 22nd edition, 2012). Plankton samples were collected using a 15 µm plankton net. All phytoplankton taxa were identified up to possible taxonomic levels using standard identification keys and their diversity and abundance were calculated. The statistical analysis was performed by the SPSS 20 and Minitab 17 software. Results of the study revealed that, mean water temperature, dissolved oxygen, pH, electrical conductivity and turbidity were 29.28±0.27 °C, 7.11±0.28 mg/L, 8.38±0.06, 2.69±0.03 mS/cm, and 34±0.27 NTU, respectively. Salinity varied from 0 to 6 ppt possibly due to seasonal opening of the sea mouth and loss of regular salt water exchange of the lagoon. The mean NH_4-N, NO_3-N, NO_2-N, phosphate, biological oxygen demand, chlorophyll-a (Chl-a), total suspended solids, total hardness, alkalinity, and chloride were recorded as 0.052±0.003 mg/L, 0.01±0.0004 mg/L, 0.02±0.0002 mg/L, 0.006±0.001 mg/L, 3.10±0.33 mg/L, 10.74±2.44 µg/L, 5.99±0.42 mg/L, 332.14±3.25 mg/L, 215.02±7.92 mg/L and 472.52±7.9 mg/L, respectively. Class composition of the phytoplankton was represented by, Chlorophyceae (78%), Bacscillariophyceae (11%), Zygnematophyceae (2%), Euglenophyceae (7%) and Cyanophyceae (2%). The Shannon Wiener Diversity Index ranged from 0.84 to 1.24 in the sampling locations. In accordance with Pearson Correlation, species abundance was negatively correlated with the total suspended solids and positively correlated with Chl-a. Overall results indicated that, the lagoon has favourable conditions with reference to the water quality parameters, except the total suspended solids and the salinity level.

Keywords: Mawella Lagoon, water quality, phytoplankton diversity, phytoplankton abundance

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