

Trophic Status and Spatial Variation of Cyanobacterial Diversity in Lunugamwehera Reservoir, Sri Lanka

M.H.M.A.S.V. Gunawardane¹, S.M.K. Widana Gamage^{1*}, M.M. Wijesooriya¹,
G.W.A.P. Randima¹, K. Masakorala¹, K.S.S. Atapattu² and K. Sanjaya²

^{1*}*Department of Botany, University of Ruhuna, Matara, Sri Lanka*

²*Department of Limnology and Water Technology, University of Ruhuna, Matara, Sri Lanka*

Lunugamwehera is a large man-made reservoir located in the South Eastern dry zone of Sri Lanka. It is the main source of drinking water, irrigation, and fisheries for more than 5000 families in the area. The occurrence of cyanobacterial blooms or high population densities in water bodies results in various environmental and health issues. Population density and composition of cyanobacteria in a waterbody may vary with the trophic status of water. There is a high potential of contaminating the Lunugamwehera reservoir with mineral nutrients that come from agricultural lands. However, considerable attention has not been paid to study trophic status and cyanobacterial diversity of the Lunugamwehera reservoir. Therefore, our objective was to determine the spatial variation of cyanobacterial diversity in the Lunugamwehera reservoir along with trophic status. Sub-surface water samples collected from 28 sampling sites representing the whole waterbody were microscopically examined to identify cyanobacterial species. Total phosphorous concentration, total chlorophyll-a concentration, and Secchi depth were determined to assess trophic status using Carlson Trophic State Index. Also, water quality parameters were measured using a multi-parameter water quality meter. Microscopic analysis revealed the presence of only two cyanobacterial species, *Microcystis* and *Oscillatoria* implying less cyanobacterial diversity in the reservoir. *Microcystis* spp. ($\sim 3.257 \times 10^7$ cells mL⁻¹) dominated all sampling sites with significant difference ($p < 0.05$) in cell densities among sites while *Oscillatoria* spp. (5 - 10 cells mL⁻¹) occurred rarely. Apart from cyanobacteria, *Pediastrum* spp., *Tribonema* spp. and *Nitzschia* spp. (1 - 2 cells mL⁻¹) were also identified scarcely. Water quality parameters were approximately similar in all sampling sites except increased turbidity near the inlet. According to the Carlson Trophic State Index (37.70), the water body was 'slightly oligotrophic'. Therefore, the overall results infer the presence of less cyanobacterial diversity and significant spatial variation in *Microcystis* spp. as the dominant species in the slightly oligotrophic water of the Lunugamwehera reservoir.

Keywords: Carlson trophic state index, Cyanobacteria, Oligotrophic, Spatial variation

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