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Macro benthic invertebrate abundance and diversity in relation to water quality parameters: A case study on Beira lake and Ihalagama lake in the Western Province in Sri Lanka

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Benthic macroinvertebrates are important components of the aquatic ecosystem. Diversity and abundance of benthic macroinvertebrate community of two urban lakes namely Ihalagama Lake and Beira Lake were assessed in this study. Beira Lake is considered as one of the polluted water bodies due to anthropogenic activities. Hence water quality parameters and composition of the biotic components, are changed from time to time. Ihalagama Lake is also located in Western province; however, it is considered as less polluted than the Beira Lake. Therefore, the present study investigated how the distribution of the benthic macroinvertebrates varied with the physical and chemical water quality parameters in Beira Lake and relatively less polluted Ihalagama Lake. Sediment samples (n=72) were collected from September 2023, to February 2024. Spatial variation of water quality parameters (temperature, pH, salinity, dissolved oxygen, conductivity, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), nitrate and phosphate) and diversity of macrobenthos were assessed by one-way ANOVA followed by Tukey's pairwise comparison using MINITAB 17 software. Principal Component Analysis was conducted for assessing water quality and macrobenthic abundance. Altogether 27 benthic macroinvertebrate species that belonging to Phylum Annelida and Phylum Mollusca were identified from both lakes. Among them *Thiara scabra* is the dominated species in the Beira Lake while *Gyraulus* spp. is the most abundant species in Ihalagama Lake. Macrobenthic diversity was higher in Beira Lake than the Ihalagama Lake. The highest recorded value for the Shannon-Wiener diversity index was obtained from Beira Lake (H=1.388), while the lowest value (H=0.565) was obtained from Ihalagama Lake. Some water quality parameters including NO_3^- concentration, PO_4^{3-} concentration, COD, and BOD varied significantly between four sampling sites ($P<0.05$). The total abundance and diversity of the benthic community were found to increase with rising levels of BOD, COD, nitrate, and phosphate. Collectively, between the two lakes, Beira Lake was characterized by high levels of BOD, COD, nitrate, and phosphate, while Ihalagama Lake had less-polluted water quality conditions, indicated by lower levels of BOD, COD, nitrate, and phosphate compared to Beira Lake. Therefore, it is recommended to conduct continuous monitoring of water quality parameters, especially in Beira Lake, and identify the source of pollutants.

Keywords: Abundance; benthic macroinvertebrates; polluted; water quality

Underlined is the presenting author.