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Macrobenthic diversity and their potential as bio-indicators in some urban reservoirs in the Western province, Sri Lanka

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Studies addressing the macrobenthic diversity and their potential as bio-indicators in water quality assessment programmes are scarce in Sri Lanka. In this study, we investigated the macrobenthic diversity in relation to water quality parameters in some urban reservoirs in the Western province in Sri Lanka, and assessed their potential as bio-indicators in water quality assessment programmes. The reservoirs selected for the study were the Ihalagama tank, Peralanda tank, Kesbewa tank, Boralesgamuwa tank, Bolgoda Lake, and the Beira Lake. The abundance of macrobenthic faunas at randomly selected locations (n=9) in each reservoir, and the water quality parameters viz temperature, pH, conductivity, total dissolved solids, BOD₅, dissolved nitrates, total dissolved phosphates and alkalinity of the overlying water at each location were measured using standard data collection methods between July, 2020 to January, 2021. The species richness (SR), species heterogeneity (H') and species evenness (J) for the macrobenthic fauna in each reservoir were calculated, and the abundance and water quality data were analyzed using ANOVA and PCA as appropriate. Altogether, thirteen macrobenthic taxa namely, *Glyphidrilus* sp., *Limnodrilus socialis*, *Dero* sp., *Stratiomyd* larva, Chironomid larva, *Bellamyia* sp., *Melanoides tuberculata*, *Gyraulus* sp., *Lymnaea* sp., *Paludomus* sp., *Thiara* sp., *Ancylus* sp., and *Mesostoma* sp. were recorded from the six reservoirs. The tubificid worm *L. socialis* dominated in all the sediment samples and accounted for more than 94.7% of the total macrobenthic abundance where the highest relative abundance of this species was recorded at the Beira Lake (99.3%). The species richness of the macrobenthic community was the highest at the Ihalagama and Kesbewa tanks (SR=5), while it was the lowest at the Peralanda tank (SR=2). Since the benthic community was mainly dominated by *L. socialis*, the lowest species heterogeneity as well as the species evenness values were recorded at the Beira Lake (H' = 0.05; J = 0.03). Further, the water quality parameters varied among the selected reservoirs, where the Beira Lake registered significantly high BOD₅, dissolved nitrates, and total dissolved phosphates (p<0.05) than the other reservoirs, indicating a higher degree of eutrophication. In addition, the SR, J, and the H' in the studied reservoirs decreased with the increasing levels of BOD₅, dissolved nitrates, and total dissolved phosphates. Therefore, it was concluded that the abundance and diversity of macrobenthic faunas are primarily governed by water quality parameters, and the tubificid worm *L. socialis* can be used as a potential bio-indicator organism in water quality assessment programmes in urban reservoirs.

Keywords: Bio-indicators, Eutrophication, *Limnodrilus socialis*, Macrobenthos, Water quality parameters