



Macroinvertebrates as ecological indicators in Rekawa lagoon, Sri Lanka

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Abstract

Macroinvertebrates are essential biological elements for maintaining the function and integrity of ecosystems and also for assessing and monitoring the ecological state of a particular ecosystem. In this study, the ecological status in Rekawa lagoon was determined using macroinvertebrates. Sampling was performed in September 2023. Physico-chemical parameters of water, including temperature, salinity, pH, Dissolved oxygen concentration (DO), total dissolved solids, water depth, and Secchi depth were measured. Macroinvertebrates were identified up to the species level. Family Biotic Index (FBI), Biological Monitoring Working Party (BMWP) index, and Average Scores Per Taxon (ASPT) were calculated. Spatial differences were determined by using ANOVA and Redundancy analysis (RDA) was carried out to examine the variation of macroinvertebrates and their relationship to environmental variables. The taxonomic families Aoridae, Gammaridae, Aegidae, Belostomatidae, Chironomidae, Thiaridae, Nassariidae, Lymnaeidae, and Nereididae of the macroinvertebrates were identified in the Rekawa lagoon. There was no significant difference in FBI in seven sampling sites ($p > 0.05$). According to FBI, water quality was “Fairly poor” and the degree of organic pollution was “Substantial pollution likely” in all seven sites. Site 1 which was near the outlet of a fish farm had a significantly higher difference in BMWP scores compared to other sites ($p < 0.05$). Both BMWP scores and the ASPT index indicated that all seven sites are “polluted and impacted”. According to RDA, samples from site 6 had an overgrowth of *Najas* sp. and showed a positive correlation with DO (adj. $R^2 = 46.14\%$; model significance $p < 0.05$). Further, *Chironomus* sp. larva (red blood worm) showed a significant positive association with salinity indicating their high tolerance for salinity. The *Gammarus* sp. was significantly and positively associated with DO concentration (adj $R^2 = 46.14\%$, $p < 0.05$). Our study highlighted that pollution control and management practices are needed to preserve and conserve the biodiversity of the Rekawa lagoon.

Keywords

Biotic indices, macroinvertebrates, redundancy analysis, Rekawa lagoon