(78)

Aquatic Plant and Benthic Macroinvertebrate Diversity in Headwaters of Sapugahadola Stream, Walasmulla

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Abstract

Headwater regions of the streams consist an array of unique biological communities, and these ecosystems are considered the most sensitive element of river ecosystems. The significant role played by these ecosystems are well documented but the information relevant to Sri Lankan water bodies is very limited. Thus, the present study was designed to study the vegetation and benthic macro- invertebrates in relation to their habitats at upstream *Sapugahadola* in *Walasmulla*. Four sites were selected in the headwater region from upstream to downstream (S1, S2, S3 and S4) and each site was visited two consecutive months in 2018. Distribution of aquatic plants was observed along a transect (7-13 m) which placed perpendicular to the stream bank. Benthos were collected at each four sites using Surber sampler. Water quality parameters (Temperature, pH, Conductivity, Dissolved Oxygen (DO)) were measured using water quality meters while Total Suspended Solids (TSS), Biological Oxygen Demand (BOD), nitrate and phosphate contents of water were measured using the standard analytical procedures. Soil pH, soil conductivity, soil nitrate, soil phosphate and soil organic carbon were measured as soil properties. Eleven macro- invertebrate families were found in the sampling sites representing eight orders, including nine insect families. Leptoceridae, baetidae and potamonidae were the most dominant families. Benthos diversity increased towards downstream and it was noticed in the Shannon-Wiener Index (SWI). The SWI of S1, S2, S3 and S4 were 1.49, 1.72, 1.70 and 1.88 respectively. Eighteen aquatic plant species were found in the stream sites, and out of those species, *Taxiphyllum* sp*, Bryum* sp and *Homaliodendron flabellatum* were dominant. The most dominated phylum was bryophyte and nine species were recorded. The highest SWI for plant was found in site 3 while it was statistically similar for other sites. Benthos diversity was strongly correlated with dissolved oxygen content ($r=0.85$, $p<0.05$), soil nitrate content ($r=0.95$, $p<0.05$) while the vegetation diversity was strongly correlated with total suspended solids ($r=-0.74$, $p<0.05$) and biological oxygen demand ($r=0.89$, $p<0.05$). Although the relationship between macro-invertebrate diversity and soil quality parameters were significant, vegetation diversity was independent from soil properties. Most of the vegetation were found on rocky surfaces that were above the water level of the stream.

Keywords: Vegetation, Macro- invertebrates, Diversity, Soil properties, Water quality