

Abstract

Prudent management of lotic systems requires information on their ecological status that can be estimated by monitoring water quality and biodiversity attributes. To understand environmental conditions in Gatharaini drainage basin in Central Kenya, a study was carried out to establish the relationship between water quality and macroinvertebrate assemblages between the months of March and September 1996. Six sampling sites, each 25 m long were selected along a 24-km stretch of the stream, which drained land under agricultural, residential and industrial use. Water physico-chemical data was explored using multivariate analysis of Principal Component Analysis to detect environmental trends downstream. Both macroinvertebrates and water physico-chemical data of suggested trends were analysed for variations and correlations. Temperatures and invertebrate densities changed significantly between the dry and wet season ($P < 0.01$) but the fluctuations were not evident downstream. Water physico-chemical characteristics (total dissolved solids (TDS), pH, turbidity, dissolved oxygen) and biodiversity indices (species richness, diversity, dominance, evenness) changed markedly downstream ($P < 0.01$). Biodiversity indices correlated inversely with TDS, pH and turbidity but positively with dissolved O_2 . It was evident macroinvertebrate assemblages changed significantly downstream as opposed to functional feeding groups. Diptera was important in most sites whilst Oligochaeta dominance increased downstream corresponding to the deterioration in water quality. Collectors/browsers were the dominant functional feeding groups at most sites. This study showed that significant changes in aquatic macroinvertebrate assemblages were primarily due to water quality rather than prevailing climatic conditions.