

## ABSTRACT

The Kuywa River watershed has undergone riparian vegetation planting since 2006 in order to improve the river health. Studies undertaken elsewhere have investigated how environmental factors affect ecosystem processes and functionalities but fail to show how planted riparian vegetation and water quality parameters influence the structure of the benthic macroinvertebrates. These studies also focus on disturbances on natural riparian vegetation but fail to consider the influence of planted riparian vegetation on benthic macroinvertebrate assemblages. Furthermore, limited studies in Kenya have documented the influence of planted riparian cover and water quality parameters on benthic macroinvertebrate assemblages. Therefore, the purpose of this study was to assess the influence of planted riparian vegetation cover and water quality parameters on benthic macroinvertebrate assemblages in Kuywa River. The specific objectives were to: establish the influence of water quality parameters on benthic macroinvertebrate assemblages in the Kuywa River; to determine the influence of planted riparian vegetation cover on benthic macroinvertebrate species abundance in the Kuywa River; and analyse the relationship between temporal variation for water quality parameters and benthic macroinvertebrate assemblages in Kuywa River. The study adopted a mix of empirical cross-section descriptive and longitudinal research designs. Nine sites, were identified to represent the whole length of the Kuywa River. Primary data were collected four times between January and October, 2016 to cover dry and wet seasons. Benthic macroinvertebrate sampling was carried out using a 250  $\mu$ m mesh dip net. In-situ water quality parameters were measured using a standardized electronic meters. The water quality parameters requiring laboratory analyses (nitrites, nitrates, and sulphates) were collected and transported to the laboratory for analysis. Data analyses employed descriptive statistics which included comparison of Richness Index (S), Abundance Index (N), Margalef Richness (d) and Shannon Index (H). It also used inferential statistics Spearman rank correlation, PCA, BIO-ENV BEST, MDS, ANOSIM, SIMPER and SIMPROOF. The study established that *Elassoneuria* sp., *Ephemerella* sp., *Macrobdeella* sp. abundance were positively correlated to altitude ( $p < 0.01$ ), *Elassoneuria* sp., *Ephemerella* sp., *Synclita* sp., *Macrobdeella* sp., *Hydropsyche* sp. and *Baetis* sp. were positive correlated to oxygen concentration ( $p < 0.05$ ) but were negatively correlate to total nitrogen ( $r = -0.72$ ,  $p = 0.015$ ). *Megalagrion* sp., *Baetis* sp., and *Elmnae* sp. abundance were significantly negative correlated to nitrites and nitrates. *Hexatoma* sp., *Belostoria* sp., and *Simulium* sp. were significantly positive correlated to percentage vegetation cover ( $p = 0.01$ ) while sites KG and T2 which had good riparian vegetation cover had the highest species richness (35). Temporal variation in water quality parameters influenced benthic macroinvertebrate assemblages, dry season recording 2,330 and wet 5,112 individuals. Dry season had higher species evenness (ranging 0.5 to 0.8) than wet (0.2 to 0.8). EPT species richness was found to be higher during the wet season (range 0.3 to 5.4). This result demonstrated that riparian vegetation cover favoured sensitive benthic macroinvertebrate species in Kuywa River while sites with poor vegetation cover favoured tolerant species. Equally, wet season favoured more benthic macroinvertebrates than dry season due to dilution influence of higher water discharge in wet season. The planting of riparian vegetation should be increased along the Kuywa River and should begin from the headwaters down through the catchment and a continuous buffer length be achieved.