

## ABSTRACT

Despite their socio-economic and ecological contributions, rivers are among the most threatened ecosystems. Reliable and affordable monitoring system is fundamental for their effective management and conservation. In such freshwater ecosystems, biodiversity conservation has been focused on large vertebrates and plants with pronounced economic values, compared to smaller organisms, such as benthic macroinvertebrates with particular roles. Also, despite their key ecological functions and application in biomonitoring, little is known about the algal flora of Uganda, such as the diatoms within the lotic systems. The study aimed to compare the utility of two Biological Monitoring Working Party (BMWP) indices, from England (temperate region) and Costa Rica (tropical region) for assessing water quality, and explore the assemblages of benthic macroinvertebrates and diatoms in relation to selected environmental variables on spatial and seasonal scales along River Aturukuku, Eastern Uganda, beginning in 2018. The organisms and environmental variables at a reference site upstream, urban mid-stream sites and one in the downstream were sampled, analysed and compared. The two BMWPs failed to separate sites based on pollution gradient, attributable to biogeographical differences in environmental conditions and pollution tolerances among macroinvertebrates. Benthic macroinvertebrate diversity in the river was lower than that reported from less disturbed small rivers within the same region; with moderate to high pollution tolerant taxa, dominating. Chironomidae, Oligochaeta and *Simulium* sp. predominated at the urban sites receiving sewage and abattoir effluent. The Shannon-Wiener diversity index, species richness and species evenness for benthic macroinvertebrates and diatoms were generally low, indicating a moderately to highly polluted river. Diatom species *Navicula gastrum*, *Gyrosigma attenuatum*, *Nitzschia acularis* and *Surirella linearis*, with likely tolerance of moderate or elevated pollution dominated in the entire river and seasons. Nutrients, dissolved oxygen, temperature and streambed substrate were significant in structuring macroinvertebrate and diatom assemblages. There is need to adapt a foreign biotic index or develop an indigenous one for Uganda, through an intensive study. Specific mitigation measures are recommended to boost conservation of macroinvertebrates, diatoms and the entire riverine ecosystem.