Original Research Article

Comparison of temperate and tropical versions of Biological Monitoring Working Party (BMWP) index for assessing water quality of River Aturukuku in Eastern Uganda

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A B S T R A C T

Despite their socio-economic and ecological importance, rivers are among the most threatened ecosystems. As a result, reliable and affordable monitoring system is fundamental for their effective management and conservation. The utility of Biological Monitoring Working Party, BMWP (England, E) index developed for the temperate region and BMWP-CR modified for Costa Rica, the tropics, were compared for assessing water quality of River Aturukuku in Eastern Uganda. Benthic macroinvertebrates were used in the biomonitoring study because of their wide spectrum of sensitivity to changes in water physico-chemical characteristics. The riverine water quality at upstream site (rural area), four sites in mid-stream (urban area) and one site downstream (rural area), were evaluated using the BMWP indices from February to October, 2018. The Shannon-Wiener diversity index (H′) and selected physico-chemical variables were used to validate performance of the BMWP indices. Although BMWP-CR included more local macroinvertebrate taxa for pollution sensitivity scores than BMWP (E), the performance of both indices was similar. The BMWP (E) and BMWP-CR classified river water quality as bad to moderate, whereas the associated Average Score Per Taxon (ASPT), from England, ASPT (E) and ASPT-CR from Costa Rica indicated moderate to very good category, across seasons. The H′ and physico-chemical variables classified river water quality as bad to moderate. The BMWPs and associated ASPTs allotted sites at urban effluent sources as moderate to very good, while those in rural settings as bad to good, contrary to allocations by H′ and physico-chemical variables. The two BMPs failed to reliably separate sites based on pollution gradient, attributable to biogeographical differences in environmental conditions and pollution tolerances among macroinvertebrates. There is need to adapt a biotic index such as BMWP-CR or develop an indigenous one for Uganda, through an intensive study on local macroinvertebrate assemblages.

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