

TEMPORAL DYNAMICS OF BIOINDICATOR PHYTOPLANKTON SPECIES IN CONNECTED FRESHWATER ECOSYSTEMS

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ABSTRACT

Bioindicator phytoplankton species form an important component in aquatic systems. Fresh water phytoplankton such as blue-green algae *Microcystis* spp is indicative of pre-existing high nutrient and eutrophic status. In the context of change, bioindicators serve as early-warning signals to reflect the health status of an aquatic system. The fresh water ponds at the University of Embu, initially built for irrigation purposes, have in the recent past been a source of water for various activities. These ponds receive water from areas surrounding the University and could be prone to various sources of pollution. We undertook to study phytoplankton bioindicators in the University of Embu dams during a one-month period between 9th February to 21st March. Five points from three dams were sampled and were designated as “Dam1”, “Dam3Pt1”, “Dam3Pt2”, “Dam5Pt1” and “Dam5Pt2”. During each sampling event, physicochemical parameters including temperature, pH, water transparency, and conductivity were measured and water samples were collected for *chlorophyll-a* analysis as well as phytoplankton species identification and counting. The data was subjected to both quantitative and qualitative methods of statistical analysis using graph pad prism version 7 for windows and R, a language used for environmental statistical computing. A combined total of 56 species of phytoplankton were identified to species level; Chlorophyta (24), Cyanophyta (12), Euglenophyta (9), Bacillariophyta (5), Xanthophyta (4) and Pyrrophyta (2). Significant differences among dams for *Microcystis aeruginosa* were observed. Temporal differences were observed in four of the five focal bioindicator species. The presence of *M. aeruginosa* and *Anabaena cylindrica* could be an indicator of deteriorating conditions of water quality due to organic pollutants. The information generated by this study not only form baseline for future studies but also be used to advise the University management of the status of the waters for enhanced use and conservation.

Keywords: Bioindicators, Physico-chemical parameters, Phytoplankton, *Microcystis aeruginosa*, *Anabaena cylindrical*, pollution