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**FLUCTUATIONS IN MICRO-NUTRIENT CONTENT AND
PHYTOPLANKTON IN LENTIC AND LOTIC HABITATS
OF KALA OYA BASIN, SRI LANKA**



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Abstract

Kala Oya, the third longest (148 km) river in Sri Lanka rises from Matale Valley, close proximity to Nalanda, drains a vast area of dry zone through major perennial tributaries as well as through minor seasonal tributaries and empties into the Indian Ocean via the Dutch Bay of the Puttalam Lagoon at Gangevadiya and Vellamundal. The river flow has been augmented by transfer water from Mahaweli, regulated by two major trunk stream reservoirs (Kalawewa and Rajangana reservoir) and at Kalawewa it has been partially diverted to Malwathu Oya basin. Forest and scrub jungle comprises of 45% of the basin area whereas the paddy cultivation occupies 21%. Home gardens and functional reservoirs occupy 17% and 7% respectively. Due to multiple uses of the river basin, natural processes and functions of the river system have been greatly disturbed by human activities.

Micro nutrients, physicochemical parameters, chlorophyll-a content, and composition and diversity of phytoplankton and macroinvertebrates were studied in Kala Oya Basin for a period of two years from June 2003 to May 2005. Micro nutrients and physicochemical parameters were sampled continuously and analyzed using standard methods whereas phytoplankton and chlorophyll-a were studied in first year and macroinvertebrates in second year. Statistical analysis was carried out using MINITAB 14, PRIMER 5 and Ecological Methodology (second edition). The study was conducted to achieve three major objectives explicitly to study the temporal and spatial variation of micro nutrients and other physicochemical characteristics of lentic and lotic habitats of Kala Oya Basin, to study the impact of irrigation on water quality and suitability of water for irrigation in the Kala Oya Basin, and to study the impact of

damming and transbasin diversions on lotic and lentic biota with special reference to phytoplankton and macroinvertebrates

Significant spatial and temporal variations of micro nutrients and physicochemical parameters were obtained for riverine and lacustrine habitats of the river. Total phosphorous and total dissolved solids concentrations were high in downstream areas mainly due to lateral inputs from agricultural lands and diffused pollution from human settlements. Dissolved silica concentration was heavily regulated by man-made lacustrine habitats and these habitats were rich in diatom assemblage and sometimes there was an oscillation of dominant species between Cyanophytes (*Cylindrospermopsis raciborskii*) and Diatomophytes (*Synedra* sp) in some lacustrine habitats. Also trophic status of main reservoirs oscillated between eutrophic conditions to hypereutrophic condition in different water levels. Physicochemical parameters and phytoplankton densities in all five reservoirs were in the same level. Mean density of some aquatic insects was positively correlated with light intensity, temperature, TDS, Total Hardness, Na^+ , Ca^{++} , SO_4^- , Cu^{++} and Cl^- concentrations. However, none of these correlations exceed the coefficient of determination (r^2) of 0.70. Mean densities of macroinvertebrates in Kala Oya were low, compared to other tropical streams and this could be due to heavy disturbances caused by many dams/ reservoirs constructed along the trunk stream and various other human activities.