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Zooplankton composition and distribution in relation to physico-chemical parameters in the Negombo estuary

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The Negombo estuaries serve as a fishing ground and sink for many anthropogenic effluents from the surrounding urban area. The seasonal abundance and distribution of plankton were investigated in relation to some physico-chemical parameters of the estuary from March to December 2010. Zooplankton and surface water samples were collected from six sampling sites where effluent discharges to the lagoon and analyzed using standard methods. Salinity varied from 4.30±6.15 to 17.30±8.31 ppt, surface water temperature varied from 29.4 to 30.25°C, and mean pH ranged between 7.32 ± 0.22 to 7.88 ± 0.65 during sampling period. Dissolved oxygen ranged from 3.48±1.29 mg/l to 6.47±1.08 mg/l in Munnakkaraya and Dungalpitiya, water depth varied from 54.30±16.28 cm in Madabokka to 230.50±22.54 cm in Dandugam oya. Chlorophyll-a levels were ranged from 0.98±1.08 to 6.69±6.26 mg/m^3 in Dandugam oya and Pitipana Veediya respectively. The nitrite-N varied from 0.0061±0.0031 mg/l (Dungalpitiya) to 0.0214±0.0324 mg/l (Munnakkaraya), while phosphate ranged from 0.27±0.42 mg/l (Madabokka) to 0.70±0.53 mg/l (Pitipana veediya) during the study period.

Among zooplanktons, crustaceans represented the major component (55.93 to 80.84% of the zooplankton community) during the investigation period. More freshwater cladocerans were recorded during the low salinity period (May and Nov 2010) in Hamilton canal, which is the freshwater inlet in the lagoon. However, salinity was not significantly correlated with density of cladocerans in Hamilton canal (r^2 = 0.3029). A significant and positive correlation ($P<0.05$) was observed between water salinity and nauplius density (r^2 = 0.5598) in Dandugam oya. Nauplius density was also positively correlated with Nitrate-N (r^2 = 0.4246) in Pitipana area but this was not statistically significant. Rotifer density in Pitipana also showed a positive and significant relationship with nitrate-N content (r^2 =0.5574) and insignificantly correlated with Nitrite-N content in the same area (r^2 =0.3826). Rotifer density in other sampling sites was positively correlated with BOD and nutrient content of the area. However correlations were not significant. Highest density of molluscans (18.16±27.73%) and rotifers (34.55±3±1.59%) were recorded in Munnakkaraya and Pitipana respectively. High level of phosphate concentration (0.70±0.53 mg/l) and some pollution indicator species (rotifers) showed organic pollution in several locations of the Negombo estuary. Zooplankton assemblages and its correlation with environmental variables showed that salinity and nutrients were the main factors influencing the distribution of zooplankton.

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