Composition and distribution of zooplankton community in the Negombo estuary in relation to environmental conditions

M. Gammanpila

National Aquatic Resources Research and Development Agency (NARA), Regional Research Center, Kadolkele, Negombo, Sri Lanka.

Negombo estuary, 3164 ha in extent, is one of the most productive estuaries in the West coast of Sri Lanka. During the past several decades there has been a visible degradation of the lagoon environment due to many anthropogenic activities including industrial and municipal pollution, unplanned settlement, deforestation and intensification of fishing. The composition, abundance and the distribution of zooplankton were investigated in relation to some physico-chemical parameters of the six sampling sites in the estuary, from January to December 2011. Mean surface water salinity varied strongly and spatially from 3.45±3.91 to 19.55±7.47 ppt in Dandugam oya and Pitipana respectively. Mean dissolved oxygen ranged from 2.45±0.75 mg/l to 5.07±1.45 mg/l in Munnakkaraya and Dungalpitiya. The Biological Oxygen Demand varied from 1.74±0.61mg/l in Munnakkaraya and 2.65±1.20 mg/l in Pitipana, while mean water turbidity ranged from 9.47±3.06 NTU in Pitipana to 14.47±8.44 NTU in Dandugam oya where the main fresh water inlet to the lagoon is present. Mean highest chlorophyll *a* (21.67 mg/m^3) was recorded from Pitipana and mean nitrate-N varied from 0.02±0.03 to 0.20±0.34 mg/l, while phosphate ranged from 0.75±0.54 mg/l (Munnakkaraya) to 1.85±3.15 mg/l (Pitipana) during the study period. Crustaceans represented the major component of zooplanktons, ranging from 66.34 to 92.66% of the zooplankton community during the investigation period. The highest percentage (12.14±18.25%) and density (1219 number/l) of rotifer was recorded from Dungalpitiya followed by 11.86±24.71% in Munnakkaraya, 10.53±13.96% from the Hamilton canal and 10.08±8.36% from the Pitipana respectively. A significant and positive correlation ($P<0.05$) between the rotifer density and the amount of phosphate was observed in Munnakkaraya (r^2 = 0.569).The highest density of molluscans (16.49%) and annelids (5.84%) were recorded from Munnakkaraya and Madabokka respectively. A significant and a positive correlation ($P<0.05$) was observed between the water turbidity and the nauplius density (r^2=0.569) in Dungalpitiya, whereas the nauplius density positively but insignificantly correlated with the Nitrate-N in the Pitipana area, and negatively but insignificantly correlated with the biological oxygen demand in the same area.

A relatively higher amount of nutrients especially the phosphate concentration and pollution indicator organisms such as rotifers, indicated the presence of organic pollution in several locations of the estuary. This is further evident by the distribution patterns of zooplankton which are often influenced by the environmental factors, and their spatial and temporal distributions which are obviously influenced by the anthropogenic activities and hydrodynamic processes in the estuary.

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*Corresponding author e –mail: gMeneke@yahoo.com