Macrozoobenthic community structure in the channel segment, Negombo estuary, Western coast of Sri Lanka

D.D.G.L. Dahanayaka and S.C. Jayamanne

National Aquatic Resources Research and Development Agency, Crow Island, Colombo 15, Sri Lanka.
gihan@nara.ac.lk

Key words: macrobenthos, channel segment, Negombo, anthropogenic, sea grasses.

Abstract

Channel segment of the Negombo estuary (7°6' – 7°12'N, 79°49' – 79°53'E) is very important for the continuation of estuarine functions through exchange of water between sea and the estuary, but are subjected to changes due to various anthropogenic activities such as planting mangroves, boat and fishing gear operations and discharge of industrial effluents. A survey was carried out in August 2005 to study the community structure of the macrozoobenthic community in the channel segment in relation to the environmental factors and anthropogenic activities. Eleven stations, accurately recorded using a hand held GPS were sampled using a Peterson grab and macrobenthos were separated by wet sieving and identified up to the lowest possible level. At each sampling site, the depth and salinity were measured and the presence of sea grasses and mangroves was recorded. The anthropogenic activities that are carried out at each sampling site such as disposal of sewage and fishing were also noted. The diversity of macrobenthos was determined using Shannon-Wiener and Pielou's indices respectively. The similarities among the macrobenthic communities at different sites were determined using Bray-Curtis similarity coefficient, ordinations of Non-parametric Multidimensional Scaling (MDS) and the BIO-ENV function was used to relate the multivariate community structure to environmental variables and to determine the most responsible variables for the inter-site variability of the benthic community using PRIMER-5 software package (Version 5.2.2). Thirty-two species of invertebrates consisting of 3 species of polychaetes, 14 species of gastropods, 7 species of bivalves and 8 species of crustaceans were recorded during the present study. *Neritids* and *Hydrobiids* were the most abundant gastropods while *Venerids* were the most abundant bivalves. Salinity of water changed from 17 to 30g/kg and the water depth changed from 0.3 to 2.5 m. Highest diversity (2.031) was recorded in association of sea grasses and lowest (0) in highly polluted site near Dutch canal. As indicated by Bray-Curtis similarity index and MDS ordination, two sample sites located at the mouth of the estuary and upper left region of Munnakkare clearly separated from the other sites which may be explained by the presence of two species of bivalves in these sites. Results of the Spearman rank correlation coefficients for permutations of environmental variables of the BIO-ENV function indicate that the combination of abundance of sea grasses and mangroves mostly affect the abundance and diversity of macrobenthos in the channel segment of the Negombo estuary.