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STUDIES ON SPECIES COMPOSITION, ABUNDANCE AND DISTRIBUTION OF MACROBENTHOS IN NEGOMBO ESTUARY

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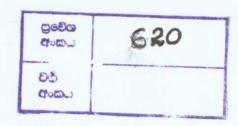DEVELOPMENT AGENCY (NARA)
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ABSTRACT

The present study was carried out to determine the species composition, abundance and distribution of macrobenthic community in the Negombo estuary, Sri Lanka and to investigate how the distribution of macrobenthos of the Negombo estuary is affected by the environmental factors and the resource use patterns of the area. Benthic samples were collected from 37 sampling sites scattered throughout the estuary and eight sampling transects representing various pollution input sources at monthly intervals from January 2005 to December 2006. The environmental parameters such as salinity, depth, pH, water temperature, dissolved oxygen content, organic matter content of bottom sediments, dissolve nitrite, nitrate and phosphate contents and soil texture (percentages of sand, silt and clay) were determined at these sites. The sea grass cover at each site and the abundance of mangroves on the banks in the closest proximity to each site were recorded using an arbitrary scale. Anthropogenic activities such as disposal of sewage and use of the fishing gear were also recorded. The diversity of macrobenthos in each site was estimated using Shannon-Wiener index (H'). The similarities of benthic communities among sampling sites were determined using Bray-Curtis similarity coefficient. Ordinations of Non-metric Multidimensional Scaling (MDS) of sampling sites were determined based on the Bray-Curtis similarity matrix. Ninety-eight species of benthic invertebrates belonging to 58 families were recorded during the study. A total of 40 species of polychaetes, 18 species of crustaceans, 24 species of gastropods and 16 species of bivalves were recorded in the samples. The most abundant group of macrobenthos was mollusks, which contributed for 76.32 % of total macrobenthic

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community in the estuary, followed by crustaceans which contributed for 14.5 %. Of the gastropods, those belonging to families Assimineidae, Atyidae, Cerithiidae and Hydrobiidae were the most abundant. The most abundant bivalves were those of the families Mytilidae and Veneridae. Among amphipods, Aorids and Gammarids were recorded in most of the sampling sites. The most abundant polychaetes were those of the families Nereididae, Pilargidiidae, and Spionidae. The values for correlation coefficients between combination of environmental parameters and abundance of macrobenthos calculated using BIO-ENV function indicated that the combination of salinity, depth, nitrite content, percentage of sand and organic matter content mostly affected the abundance of macrobenthos. Identification of pollution indicators was not possible because most of the macrobenthos recorded along the transects at pollution sites were present in other areas of the estuary too. In all sampling transects abundance of macrobenthos was low or zero at the points of discharge outlets. This indicates that macrobenthos in Negombo estuary can not tolerate high pollution inputs. Diversity and abundance of benthic invertebrates gradually increased along the sampling transects in most instances until 50 and 100m from the point of drainage outlet and then gradually decrease towards the end of the transect (150 and 200 m). Significant relationship between abundance of macrobenthos with Nitrate and Phosphate contents of the water along the transects were noted especially during the dry months. The results of the present study clearly show that the Negombo estuary is rich in macrobenthic biodiversty. Some macrobenthic species that were not recorded in earlier studies were also recorded during the present study. These include some amphipod and polychaete species. Therefore, future work on preparation of a taxonomic guide for the identification of benthic fauna in Sri Lankan brackish waters appears to be extremely important.

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