

Temporal and Spatial Variations in Hydrography, Plankton, Benthic Organisms and Trophic Status of Dutch Canal and Mundel Lake during Intensive Shrimp Farming Practices

By

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Abstract

Dutch Canal and Mundel Lake located in the north western coastal region of Sri Lanka were examined for seasonal and temporal patterns in hydrography, nutrients, photosynthetic primary production and, planktonic and benthic organisms over a period of three years from 1995 to 1998. The primary objective of this study was to determine the impact of shrimp farming practices along the Dutch Canal from Deduru Oya estuary to the southern tip of the Mundel Lake and in the periphery of Mundel Lake.

Physicochemical parameters measured during this study included water depth, water temperature, Secchi depth, turbidity, total suspended solids, pH, salinity, alkalinity, dissolved oxygen, nitrate-N, nitrite-N, ammonia-N, dissolved phosphorous, biological oxygen demand (BOD_5) and chemical oxygen demand (COD). Chlorophyll-a (chl-a) content was determined as an index of biomass of phytoplankton. Biological status of the two water bodies were determined by the occurrence and abundance of phytoplankton, zooplankton and benthic macro-invertebrates.

Most of the physicochemical parameters demonstrated distinct spatial and temporal variation both in the Dutch Canal and the Mundel Lake. Variation in Dutch Canal was markedly influenced by rainfall-bound freshwater influx and limited seawater influxes and effluxes that occur through the long narrow corridor as well as by shrimp farming activities. Increased nutrient loading and high dissolved oxygen levels during day time in the canal water indicate growth of macro-algae or hyper eutrophic status in the Dutch Canal. In the Mundel Lake, hypersaline conditions

prevailed during the dry period. Water quality of the Mundel Lake was mainly influenced by monsoon-bound seasonal rainfall. High levels of dissolved oxygen recorded from Mundel Lake was directly linked with photosynthetic activity of sea grass beds rather than phytoplankton indicating importance of sea grass to overall productivity of the lagoon ecosystem.

A new species, *Ctenapseudes extravaganza* was recorded from Dutch Canal during the study. Another species belonging to the family Tanidae, earlier identified as *Apseues srilankansis* was renamed as *Halmyrapseudes srilankaensis* after finding of the male specimen from the Mundel Lake during this study. The occurrence of macro-invertebrates and their seasonal patterns in the Dutch Canal and Mundel Lake is determined by substrate type.