

## **THE EFFECT OF NUTRIENT LOADING ON ZOOPLANKTON COMMUNITY STRUCTURE IN THANDIKULAM RESERVOIR, VAVUNIYA, SRI LANKA**

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### **ABSTRACT**

Zooplankton are the heterotrophic aquatic organism that being drift by water currents and it act as a strong linkage between primary producers and secondary consumers. Zooplankton community structure (diversity and abundance) has been identified them as simple, accurate and important ecological indicator to assess eutrophication, acidification and pollution. Thandikulam reservoir is a seasonal reservoir with minimal disturbances of pollution and used for agriculture purpose in Vavuniya District. Therefore, this study was carried out to detect the effect of nutrient loading on zooplankton community structure. Plankton sampling was done by using zooplankton net (80  $\mu\text{m}$ ) in randomly selected four locations of this reservoir for couple of times per month from July, 2018 to February, 2019. Simultaneously, water samples were collected at each location to determine nutrient concentrations ( $\text{NO}_3^-$  and  $\text{PO}_4^{3-}$ ), dissolved oxygen and water temperature. Hydro-climatic data (monthly total rainfall, air temperature, water level) were obtained from meteorology department. Species identification was done based on standard zooplankton identification guides under high power of microscope. Abundance of zooplankton community was performed using the Sedgwick-Rafter cell under microscope. Zooplankton diversity was determined according to Shannon-Wiener's diversity index ( $H'$ ). Pearson correlation coefficient ( $r$ ) was obtained to identify the correlations between zooplankton community structure and nutrient concentrations. Total of 19 genera with 12 Rotifer species, 2 Cladocera species and 5 Copepod species were observed. During this study period, high nutrient concentrations were recorded in dry season (July-August, 2018). Increase in  $\text{PO}_4^{3-}$  concentration, significantly ( $p = 0.042$ ) decrease the zooplankton diversity and resulted strong negative correlation ( $r = - 0.805$ ). Although, increasing  $\text{NO}_3^-$  concentration seems to be reducing the zooplankton diversity ( $r = - 0.686$ ), no significant ( $p = 0.115$ ) relationship was observed. A negative correlation was recorded in overall zooplankton abundance with  $\text{PO}_4^{3-}$  ( $r = - 0.595$ ,  $p = 0.145$ ) and  $\text{NO}_3^-$  ( $r = - 0.608$ ,  $p = 0.138$ ) except Cladocera. Conclusively, this study revealed that nutrient concentration is greatly influenced diversity rather than overall abundance of zooplankton. These findings can be used in monitoring the health and water quality of reservoirs using zooplankton community structure as the principal constituent.

**Keywords:** zooplankton, community structure, nutrient, seasonal reservoir