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Evaluation of the changes in zooplankton community and water quality parameters of the Polhena reef ecosystem (southern Sri Lanka) during inter monsoon to dry season

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This study provides baseline information on the physico-chemical parameters and the zooplankton community at the Polhena reef, from November 2010 to February 2011, the inter monsoons to dry season. Water samples were collected from seven stations at 15 days intervals to measure the physico-chemical parameters and for zooplankton identification and quantification. Average salinity, 28.8ppt-35.4ppt, TDS 29.56 g/L-39.23 g/L, DO 7.35 mg/L-10.36 mg/L, BOD 0.32 mg/L -1.95 mg/L, TH 5012 mg/L-5816 mg/L. Lowest values of all these parameters were occurred in the inter monsoon period and the highest average readings were recorded in the dry season. Average water temperature was 27.7 °C-29 °C, TSS 56.37 mg/L-70.19 mg/L, in which the highest average readings were recorded in the inter monsoon period and the lowest was recorded in the dry season. pH was approximately a constant.

Increased average Phosphate concentration was recorded in the dry season as 0.8 mg/L. Nitrite concentrations fluctuated without any distinct pattern, recording the highest average concentration as 0.063 mg/L in mid December. No significant changes in average DO levels, water temperature, BOD levels, salinities, TDS, TSS and TH levels, pH, and NO_2^- and PO_4^{3-} concentrations at different stations. Nevertheless the temporal changes of average DO levels, water temperatures, BOD levels, salinities, TDS, TSS and TH levels, PO_4^{3-} concentrations at the site were significant. In the dry season, higher average DO and BOD levels, increased salinity, TDS and TH levels, decreased water temperature and TSS level were detected. The average total zooplankton abundance increased in the dry season. The highest was recorded as 45,638.14 ind / m³ on Feb.01 and the lowest was recorded as 6,507.71 ind / m³ on Dec.01. The zooplankton community was identified into 17 groups, dominated by Copepods, Crustacean nauplii and Foraminiferans respectively. Their relative abundances were calculated as % by number of individuals. Copepods made up ~ 96% at station 3 in February, the highest relative abundance (%) of any group at any station. Nauplii stages appeared with peaked abundance of ~40% at station 7 in the end of December. Foraminiferans occupied ~50% of the total zooplankton community at station 1 in February. Relative abundance of Veliger larvae peaked to ~22%. Abundance of Trochophore was recorded as ~14% at station 5 in late November. There were Barnacle nauplii, Zoeal stages of Decapods, Isopods and Polychaetes which were limited to fewer stations. Hydrozoan larvae, Radiolarians, Ostracods, Appendicularians, Cirripedians Chaetognaths, Tintinnids were far less abundant.

Keywords: Zooplankton, physico-chemical parameters, temporal changes, changes at different stations