Inter-linkage among some physico-chemical and biological factors in the tropical mangrove estuary

ABSTRACT

The interaction between abiotic and biotic parameters in an ecosystem usually shows health and functioning of the system. Thus, some physico-chemical parameters, phytoplankton abundance, chlorophyll a and primary production of the mangrove estuary in Sarawak, Malaysia were extensively investigated from January 2013 to December 2013 in order to establish the inter-linkage among them. The Pearson correlation coefficient revealed a significant relation between atmospheric and water temperatures (r = 0.692). Similarly, surface water temperature showed a significant positive correlation with salinity (r = 0.744), TDS (r = 0.708) and conductivity (r = 0.776). The light extinction coefficient (LEC, K) changed negatively in relation to TDS (r =-0.623), conductivity (r =-0.644) and surface water temperature (r =-0.766). Ammonium showed a negative correlation with rainfall (r =-0.620) but a positive correlation with salinity (r = 0.600). The biological variable such as phytoplankton abundance was found to be positively correlated with chlorophyll a (r = 0.692), ammonium (r = 0.645) and silica (r = 0.644) and negatively with rainfall (r =-0.644). The canonical correspondence analysis revealed a strong positive correlation between environmental parameters and phytoplankton species. The analysis of variance disclosed significant seasonal differences in salinity, water temperature, TDS, conductivity, LEC, ammonium and chlorophyll a.

Keyword: Chlorophyll a; Mangrove estuary; Physico-chemical parameters; Phytoplankton; Primary production