

A baseline study of tropical phytoplankton abundance and its relationships to the environmental variables in the Terengganu river estuary, Malaysia

ABSTRACT

Phytoplankton is a vital and important organism as a producer of the primary food supply of the marine and freshwater food webs. This study is conducted to investigate the variability of phytoplankton abundance related to environmental variables in the Terengganu River Estuary, by using statistical analysis. Total of ten water samples were collected, of which three stations were in the estuary and seven stations were in the coastal water. A total of 124 taxa of 55 genera, belonging to six taxonomic classes were observed at the study area. The order of phytoplankton abundance was diatoms > blue-green algae > golden-brown algae > dinoflagellates > green algae > euglenoids. The phytoplankton abundance was higher in the coastal area compared to the estuary, with the maximum density 764.10 cells mL⁻¹ and 157.40 cells mL⁻¹ respectively. It was recorded that 10.96% of the total abundance from the data collection was registered in the estuary, while the remaining 89.04% were logged in the coastal region. The freshwater phytoplankton was dominated by golden-brown algae (Chrysophyceae), while marine phytoplankton was governed by diatoms and blue-green algae. It was observed that the water temperature and salinity were positively correlated with marine phytoplankton but negatively related to freshwater phytoplankton. High levels of water temperature and hypersalinity at the coastal region was observed to enhance the production rate in the coastal region. In contrast, the nutrients were positively related to freshwater phytoplankton, but negatively correlated to the marine phytoplankton, which results in low concentrations of nutrients in the coastal region that could be caused by intensive uptake by the abundance of marine phytoplankton. This study revealed that environmental variables are an important element in determining the phytoplankton community compositions in the tropical region.

Keyword: Estuary; Coastal water; Environmental variables; Nutrients; Phytoplankton