

Determination of food web in intertidal mudflat of tropical mangrove ecosystem using stable isotope markers: a preliminary study

Abstract

Present study utilized stable isotope markers of carbon-13 (^{13}C) and nitrogen-15 (^{15}N) to indicate existing food web in an intertidal mudflat of Sungai Janggut, Selangor, Malaysia and also the relative contribution of primary producers to the diets of consumers. The $\delta^{13}\text{C}$ values of algae was $-18.69 \pm 0.7\text{‰}$, detritus $-24.38 \pm 0.9\text{‰}$, invertebrates -15.25 ± 0.1 to $-21.39 \pm 0.1\text{‰}$ and fishes -16.17 to $-21.45 \pm 0.2\text{‰}$. The $\delta^{15}\text{N}$ values of algae was $2.52 \pm 0.1\text{‰}$, detritus $1.53 \pm 0.1\text{‰}$, invertebrates 4.33 ± 0.4 to $8.97 \pm 0.5\text{‰}$ and fishes 9.54 ± 0.3 to $12.81 \pm 0.4\text{‰}$. This showed the assimilation of carbon and nitrogen from variety of sources in mangrove ecosystem. In general, organisms had more positive value of carbon than algae and detritus, indicating a metabolic shift in isotope ratios. This was particular; the average carbon in animal isotope ratio was 0.4‰ and 5.9‰ more positive than mean ratio of algae and detritus. Although there have no obvious systematic trophic enrichment in $\delta^{13}\text{C}$, the value of $\delta^{15}\text{N}$ is good enough to demonstrate the existence of a food web in mangrove ecosystem of Sungai Janggut. Further investigations are needed to gather enough information in order to design an accurate and comprehensive model of the food web in a mangrove ecosystem.

Keyword: Stable isotope marker; $\delta^{13}\text{C}$; $\delta^{15}\text{N}$; Intertidal zone; Food web