

Utilization of terrestrial organic matter by marine benthic polychaetes in estuarine ecosystem

SATO, Takahisa¹ ; SUGIMOTO, Ryo² ; YOKOYAMA, Yoshihiro² ; TOMINAGA, Osamu^{2*}

¹Yamagata prefectural fisheries high school, ²Fukui prefectural university

In semi-enclosed bays, terrestrial plants transported by river have become a major constituent of estuary sediment. Since it is difficult for marine organisms to digest the terrestrial plants which mainly contains the non-living refractory cellulosic matrices, few studies have been taken into account the role played by the terrestrial particulate organic matter (tPOM) in enhancing the productivity of the coastal biotic community. However, the important role of tPOM as the food source for marine benthic organisms has been recognized in estuarine environments. In the present study, we examined the $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ values and cellulase activity of the several species of polychaetes to elucidate the contribution of terrestrial plants to benthic biological production in small semi-enclosed Bay. Polychaete annelids were collected at estuary of the Kita and Minami River in semi-enclosed Obama Bay, the Sea of Japan from August 2007 to June 2010. The carbon and nitrogen stable isotope ratios of polychaetes were analyzed. Cellulase activity analyses were assayed by using carboxymethyl cellulose (CMC) plate assay. The $\delta^{13}\text{C}$ values of deposit or suspension feeding polychaetes were lower than the $\delta^{13}\text{C}$ value of POM but higher than the terrestrial plants. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of carnivores-feeding polychaetes were higher than those polychaetes. Cellulase activities was found in many deposit or suspension feeding polychaetes but also carnivorous feeding polychaetes. On the other hand, the polychaete species with lower isotope signature did not show cellulase activities. The polychaetes which showed cellulase activity were abundant through the four seasons in estuary. These results suggest that many polychaetes can decomposition and assimilation the terrestrial plants.

Keywords: terrestrial plants, cellulase, semi-enclosed bay, polychaetes