

BLUE CRAB RESIDENCY AND MIGRATION IN THE MOBILE BAY ESTUARY: A STABLE ISOTOPE STUDY

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Abstract

The blue crab (*Callinectes sapidus*) is an important commercial species throughout Gulf of Mexico. We used carbon and nitrogen stable isotopes from fast and slow turnover tissues to investigate residency and migration of blue crabs in Mobile Bay. A laboratory diet switch experiment was conducted to estimate tissue turnover. By day 83 of the experiment, hepatopancreas tissue turnover averaged 94%, while muscle turnover averaged 43%. Results confirmed that hepatopancreas and muscle tissues are indicators of recent and past diets, respectively. Therefore, these two tissue types were sampled from individual crabs from the delta, mid-bay (Fowl River), and coastal sites to investigate residency. Average divergence in $\delta^{13}\text{C}$ values between the two tissues from crabs in the delta (-0.41‰) and Fowl River (-0.31‰) was small, while for crabs in the coastal sites such as Fort Morgan featured a large average divergence (2.39‰). The convergence of hepatopancreas and muscle tissues to similar $\delta^{13}\text{C}$ values are indicative of residency, while a large divergence between the tissues is characteristic of migratory crabs. Additionally, we found that the Fowl River site is a hot spot for female crabs that delay their spawning migration to coastal waters. Blue crabs and other migratory species link the food webs in the delta and Gulf of Mexico. A greater understanding the role of migratory species as agents of connectivity is critical for fisheries management in response to climate and human induced changes.