

# **Influence of microhabitat and intertidal elevation on the predator-prey relationship of green crabs (*Carcinus maenas*) and soft-shell clams (*Mya arenaria*)**

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This summer I worked with soft-shell clams and green crabs in the intertidal zone of Kent Island. Examining predation in the intertidal zone offered me an opportunity to create a valid and meaningful experiment, develop field research skills, and come to understand the intricacies and beauty of this ecological zone.

The predator-prey relationship between the soft-shell clam *Mya arenaria* and the green crab *Carcinus maenas* provides insight into the impact of rising ocean temperatures in the intertidal zone. As the clam fishery in northeastern North America has declined, many studies and anecdotal evidence has implicated the invasive green crab as a key antagonist in the decrease of clam populations. Crab populations have increased as ocean temperatures rise. Recent studies have focused on different aspects of this relationship in order to characterize the biological and environmental factors that influence clam populations. This study investigates the impact of intertidal elevation, microhabitat, substrate, and proximity to rocky cobbles on clam survival. Green crabs spend low tide sheltered in rockweed covered cobble outcroppings to avoid predation, and hunt during high tide. I propose that clams exposed longer to crabs in the lower intertidal, in closer proximity to cobbles and in substrates which facilitate crab digging will have the lowest rates of survival. Plots were set up and harvested in the four treatment areas (high open, high close, low open, low close) to examine the effect of cobble proximity and placement in the intertidal zone on mortality. Data about each plot was collected including green crab density, substrate type and depth, and algal cover. Feeding rate was explored through the placement of exclosures with a set number of clams and monitored over a 24-hour interval. Initial results indicate the importance of substrate in clam mortality. Softer sediment corresponded with higher mortality in the trial plots. Analysis of the relationship of mortality and tidal height is expected to indicate the lower intertidal elevations to have higher predation by green crabs. In the exclosure experiment green crab predation on clams was significantly lower than previously reported. Further study will explore the critical importance of substrate type on clam survival as well as the role of current velocity on crab predation. This research can be applied to focusing clam fishery recovery efforts on habitats where the likelihood of survival is greatest and encourage researchers to examine other factors contributing to the decline of soft-shell clams.

Spending the summer as a researcher on Kent Island has been a transformative experience. It was a delight and a challenge to be involved in an active and vibrant field station community. I have been able to explore not only the intertidal zone through my own work but the island as a whole and the impressive variety of scientific and artistic endeavors that it supports. The entirety of my time on Kent Island has been exceptional.

**Faculty Mentor: Damon P. Gannon**

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