Exploring the role of non-native Asian shore crabs as prey for native predators

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Abstract

Populations of the invasive Asian shore crab, Hemigrapsus sanguineus, now dominate the rocky intertidal of southern New England. While larvae and juveniles may serve as a food source for ecologically important species, little is known about predation of mature *H. sanguineus*, or the influence of habitat on predation pressure. To assess natural predation rates of adult *H. sanguineus*, crabs were tethered in the intertidal at Clarks Cove in New Bedford, MA. Crabs were left in situ for half of a daytime or nighttime tidal cycle then observed for signs of predation. Results of separate high and low tide trials show adult crabs are preyed upon at high and low tide, though at a significantly higher rate during high tide during both daytime and nighttime, suggesting predation by fish is greater than that by birds. To investigate the role of habitat as refuge from predation, a laboratory experiment manipulated the complexity of habitat provided to crabs in the presence of native fish predators. Results indicate better refuge is provided by more complex shelter. Together, findings suggest fish, crabs, and/or diving birds are important predators for *H. sanguineus* in the invaded range and that habitat complexity acts to reduce predation pressure.

Predation was:

- Higher at high tide than low tide
- Similar during day and night
- Lower when complex shelter was present

Next Steps

- Perform tethering experiments with habitat of varying complexity

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References

Brousseau, D. J., A. E. Murphy, N. P. Enriquez, and K. Gibbons. 2008. Foraging by two estuarine fishes, *Fundulus heteroclitus* and *Fundulus majalis*, on juvenile Asian shore crabs (*Hemigrapsus sanguineus*) in western Long Island Sound. Estuaries Coasts 31:144–151.

Epifanio, C. E. 2013. Invasion biology of the Asian shore crab *Hemigrapsus sanguineus*: A review. J. Exp. Mar. Biol. Ecol. 441:33–49.
Kim, A., and N. J. O'Connor. 2007. Early stages of the Asian shore crab *Hemigrapsus sanguineus* as potential prey for the striped killifish *Fundulus majalis*. J. Exp. Mar. Biol. Ecol. 346:28–35.

Savaria, M. C., and N. J. O'Connor. 2013. Predation of the non-native Asian shore crab *Hemigrapsus sanguineus* by a native fish species, the cunner (*Tautogolabrus adspersus*). J. Exp. Mar. Biol. Ecol. 449:335–339.

Zachary William Towne. 2022. Intertidal habitat complexity influences the density of the non-native Asian shore crab, *Hemigrapsus sanguineus*. University of Massachusetts Dartmouth, Department of Biology.

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