Experimental Methods to Study Predation on Juvenile Green Sea Urchins
*Strongylocentrotus droebachiensis* in Massachusetts

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Factors determining the early life history success of the commercially harvested green sea urchin, *Strongylocentrotus droebachiensis*, are not well understood for post-settlement stages. Predation is likely to be an important source of mortality for newly settled and young juvenile urchins, but its real impact is not known. In this study, predation by crab (*Cancer* sp.), lobster (*Homarus americanus*), and cunner (*Tautogolabrus adspersus*), three potential subtidal predators, on juvenile green sea urchins was studied. Laboratory experiments were conducted with predators of various size classes placed in aquaria with 3 different size classes of juvenile urchins (small: 2-5 mm, medium: 7-10 mm, and large: 13-16 mm). Trials were run for 8 days and feeding size preference was recorded. Preliminary results indicate crabs of all sizes prefer larger urchins in contrast to lobsters, which regardless of their size, select smaller urchins. In 9 trials with cunner, a total of two small urchins were eaten, thus suggesting cunner in this size range may have little impact on natural populations of juvenile urchins.

Natural densities of the above predators and urchins were assessed at a subtidal site using SCUBA, band transecting, and quadratting methods. The locations occupied by urchins on exposed areas or in crevices were recorded to investigate whether juveniles were found in greater abundance in exposed or protected areas. Past studies have investigated different cryptic habitats and numerous studies cite the potential importance of rock crevices as habitat refuges, but quantitative data are lacking. For this study, the importance of habitat complexity in providing refuges to urchins from predation was studied in the field by constructing artificial substrates using concrete patio blocks that were cut with crevices to create three different levels of rugosity. Urchins from the same size classes studied in the laboratory were then attached with Kop-Coat Inc., A-788 Splash Zone Compound® (*Z-Spar™* marine epoxy) and plates were deployed at twenty feet. Attack rates on juvenile urchins were recorded over three days. Preliminary analysis indicates a preference for the largest size class of urchins (13-16 mm) and no significant effect of the surface rugosity on mortality rates.