Recruitment and Mortality of *Spisula solidissima*: field and flume experiments

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**Introduction**

Recruitment of the commercially important surfclam (*Spisula solidissima*) is both spatially and temporally variable in continental shelf sediments. At the Long-term Ecosystem Observatory (LEO-15) located on Beach Haven Ridge (Fig. 1A) this variability has been linked to differences in larval supply, upwelling and downwelling circulation, and predation (Ma 2005, Weissberger and Grassle 2003). Surfclams have two recruitment events each year, with a larger event in June/July, and a smaller one in October/November. Large numbers of juvenile surfclams were present at LEO-15 in January 2009 which indicates that a high-density settlement and recruitment event occurred last year (Fuller, pers. comm. et al. 2009). Despite high-density settlement, most surfclams disappear by early winter because newly settled surfclams are susceptible to predation by crabs, snails, sea stars, and shrimp. Thus their survival following settlement may also depend on the habitat where larvae settle.

**Field Work**

At LEO-15 large numbers of surfclams have been observed in sediments underlying shell-hash beds (Fig. 1B) Ephemeral shell hash patches (aggregations of surfclam valves covering the seafloor) vary within and among the LEO-15 stations (Grassle and Potereca, unpubl. observ.). Such habitat may provide refuge for juvenile surfclams by acting as a physical and chemical barrier to predators. For example, shell-hash patches may provide a refuge from predators and reduce erosion of surfclams from the sediments. Also, since many predators rely on chemosensory cues to locate their prey, increased herbivory caused by shell-hash may provide a more diffuse odor cue thus reducing the ability of the predator to locate its prey (see Fig. 6D-E).

**Methods & Results**

**Flume Experiments**

In the racetrack flume at the Institute of Marine and Coastal Sciences (IMCS), Rutgers University predation by crabs on surfclams was examined in two habitats: 1. a sandy bed covered in shell-hash (60% cover) (Fig. 6B), and 2. flat sand bed (Fig. 6C). A patch of 60 burrowed surfclams (12.8 mm ± 1.34) was placed downstream of the surfclam patch and feeding behavior in the patch was recorded for 120 min. Free stream velocity was 5 cm s⁻¹, comparable to mean flow at LEO-15 and experiments were conducted in dim light to simulate the crab’s natural environment for foraging. Unaten surfclams were counted and videos to examine crab behavior were analyzed for, time spent in patch, time to initial patch entry, and the number of entries into the patch.

**Discussion & Conclusions**

Since the mid-to late 1990’s the commercially valuable NJ surfclam population has declined severely. Predation on post-larval surfclams may be one factor contributing to the decline. By examining the role habitat plays in the survival of juvenile surfclams we may be able to identify ways to help facilitate successful surfclam recruitment in natural populations.

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**References**
