Abundance and Distribution Patterns of Epibenthic Predators Relative to Juvenile Queen Conch Patch Densities

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Progress Report: Juvenile queen conch, *Strombus gigas*, are distributed patchily in shallow seagrass meadows in the Exuma Cays, Bahamas. We hypothesized that patch densities result in part from the activities of various predators. We examined this concept in 1990 (summer-fall) field experiments by quantifying the abundance, distribution and movement patterns of three epibenthic predators (hermit crabs, tulip snails and apple murex) relative to conch patch densities and mortality rates. Specifically, we tethered juvenile conch (total shell length = 100-120 mm) within three habitat types near Children's Bay Cay (CBC). The habitat types included a seagrass bed containing resident conch (site 1) and two seagrass beds at 50 m and 350 m outside the area containing resident conch (site 2 and 3, respectively). Similar sites were established to serve as replicate sites near Tug and Barge Cay (TBC), approximately 1.5 km away from CBC.

Our experiments demonstrated that juvenile queen conch tethered within seagrass beds containing resident conch had significantly lower mortality rates than those tethered in sites furthest (350 m) away. There were no significant differences in mortality rates between site 1 at CBC and site 1 at TBC, neither was site 3 at CBC significantly different from site 3 at TBC. However, there were significant differences in mortality rates between the two sites located 50 m outside the sites containing resident conch (site 2). At CBC, conch mortality increased with increasing distance from the area containing resident conch. However, mortality rates in the two sites outside the area containing resident conch (sites 2 and 3) were not significantly different. At TBC there was no significant difference between the site containing resident conch. These two sites however, had significantly lower mortality rates than the site farthest away from the area containing resident conch.

Our results further demonstrated that the pattern of conch mortality observed in our experimental sites can be explained partly by epibenthic predator occurrences. The mean numbers of predators were not significantly

different for CBC 1, 2 and 3. At TBC the mean numbers of predators were significantly higher in site 3 (the site farthest away from the area containing resident conch) than in sites 1 and 2. However, the mean numbers of predators within the latter of these two sites (TBC 2 and 3) were not significantly different.

Predator observations, in combination with observed mortality patterns suggest that epibenthic predators do not concentrate in areas containing resident conch; instead epibenthic predator occurrence appears to be random. We conclude that both habitat type and predator occurrence interact to produce the pattern of juvenile queen conch mortality patterns observed in our field experiments. Specifically, seagrass beds containing resident conch appear to exert a positive influence on conch survival. In addition, predation intensity and predator guilds, which sometimes differ across habitats, are largely responsible for the observed habitat-specific mortality patterns.