CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35207

Project Title

A Crab for All Seasons: Examining What Affects Distribution and Abundance of Emerita Analoga in the Monterey Swash Zone

Abstract

Objectives/Goals

The objective of this project was to determine what factors affect Pacific mole crab (Emerita Analoga) location and distribution within the swash zone throughout the year.

Methods/Materials

The Pacific mole crab populations at Asilomar Beach in Pacific Grove, CA were surveyed along five transects of a 12 meter stretch of beach. The swash zone length was determined through observation and measurement with a tape measure upon arrival at the beach. Based upon swash zone length, the midpoints for the upper, middle, and lower swash zones were calculated. Cores (6-inch diameter) were taken to a 10 cm depth at each of these midpoints along each of the five transects. The sand sample was then filtered through a sieve that separated adults (>9mm), recruits (3-9mm), and juveniles (<3mm). Crab size was determined by measuring the carapace with calipers. Gender was determined for all adults by careful examination under the telson. Data was collected at both high and low tides over several days of each of the seasons (June 2014 to April 2015).

Results

Of the 994 mole crabs sampled and measured, 73% were recruits, 12% were males, 11% were females, and 4% were females with eggs (FE). The majority of the males, females, and FE were found during high tides while most recruits were found during low tides. Except for FE crabs, all other crabs were present in all seasons. Recruits were most abundant during the summer and spring. Males and females were most abundant in fall and winter. Females with eggs were predominantly found in spring. Location within the swash zone for each group of crabs varied with the season. The majority of females were found in the lower and middle swash zones in spring and summer, but shifted to the upper swash zone in fall and winter. More males were found in the lower swash zone in summer and fall, but then spread evenly to all areas in winter and spring. More recruits were found in the lower swash zone in the spring, while the rest of the year most were found in the upper and middle swash zone.

Conclusions/Discussion

The results supported my hypothesis. Season and tidal height play large roles in the location of Emerita Analoga in the Monterey swash zone. Additionally, while size and gender do not appear to be factors in the location within the swash zone, they are related to the abundance of Emerita Analoga throughout the year due to the normal life cycle of these invertebrates.

Summary Statement

This project is about the annual movements of Emerita Analoga and factors that affect their migration within the swash zone throughout the year.

Help Received

Emily Gottlieb, LiMPETS coordinator for Monterey Bay and Santa Cruz areas, answered questions and provided historical data. My family helped with data recording at the beach. Staci Bynum (environmental science teacher) loaned me equipment for data collection.