CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Julie A. Guerin

Project Number
S1904

Project Title
Effects of Salinity Concentration on Rates of Polyp Cloning, Growth, and Strobilation in the Aurelia labiata

Abstract

Objectives/Goals
The purpose of this study was to determine how decreased and increased salinity concentrations affect the developmental asexual stage in the life cycle of the Aurelia labiata. This species of moon jelly is known to be adaptable in the changing marine environments of coastal ecosystems, but environmental factors could influence their reproduction rates. Global warming also is causing large scale salinity changes in the oceans as is evidenced by shifts in the distribution of fresh and saline waters. I hypothesized that at decreased 2.5% salinity, polyps would successfully clone, colonize and strobilate at a slower rate, but that at increased 4.5% salinity polyps would not reproduce.

Methods/Materials
After culturing from fertilized eggs, 10 similarly developed polyps on settlement plates were suspended in closed system tanks having salinity concentrations of 2.5%, 3.5% (control), and 4.5%. Four overlapping trials of 9-12 weeks were conducted, two using a freshwater and artificial sea salt and two using seawater, artificial sea salt and RO water. Observations on health, cloning, colonizing, strobilation and ephyrae release were made weekly and recorded onto template data sheets.

Results
Results in the trials with a freshwater base were inconclusive due to unexpected distress and substantial detachment losses of control polyps, resulting in the decision to conduct the two trials with a seawater base and RO water. In these, all polyps in 2.5% and 3.5% salinities survived and formed colonies. The rate of cloning, colonizing, strobilation and release of ephyrae was faster in the 2.5% salinity than in the control group. No polyps in the 4.5% survived the length of the trials.

Conclusions/Discussion
My hypothesis was not supported in the 2.5% salinity group as these developed at a faster rate, but that polyps would not survive a high salinity concentration of 4.5% was confirmed. Results indicate that a lower salinity induces polyp cloning and strobilation. Examining adaptability can contribute to knowledge about the ecology of the life phases of this species, and contribute to future solutions in managing bloom problems in coastal habitats. I hope to further investigate salinity effects in combination with other relevant environmental variations, such as effects of increased ocean absorption of CO(2) which leads to higher water acidity levels.

Summary Statement
This project was conducted to determine effects of decreased and increased salinity concentrations on the asexual reproductive phase in the life cycle of Aurelia labiata

Help Received
Mike Schaadt, Dr. Kiersten Darrow, and Andres Carrilo at Cabrillo Marine Aquarium for guidance and teaching me procedures, my mother for driving me and encouragement; participant in Junior Southern California Academy of Sciences (JSCAS)