CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
S1916

Project Title
The Physical Effects of Low Temperature on Two Diverse Species of Insects

Abstract

Objectives/Goals
My goal was to observe and determine the physical effects on two diverse species of the insect class as a result of different times of exposure to low temperature.

Methods/Materials
Two hundred sixteen plastic wrap covered containers were created for 108 ants and 108 crickets to six different times of low temperature exposure; 30 seconds, 1 minute, 1 ½ minutes, 2 minutes, 2 ½ minutes, and 3 minutes. There were containers holding one, two, or three ants or crickets and three sets of ants or crickets exposed for each time of exposure (i.e., the experiments were performed in triplicate). Since survival is difficult to measure, due to not having access to the proper equipment, I have used cessation of motion as a surrogate for determining survival.

Results
The results of the study, based on the established criteria, were a survival rate for all periods of exposure was 100% for the crickets and 44% for the ants. The survival rate of ants in freezing temperatures is significantly less than that of crickets, with none of the ants surviving exposure to freezing temperatures for three minutes. The crickets, experienced in this study, had a higher rate of survival which is directly attributed to their greater body mass.

Conclusions/Discussion
The results clearly validate my first hypothesis that with identical exposures to low temperatures, crickets will survive longer than ants due to their larger body mass; which enables them to store heat longer. The test results were inadequate to validate or disprove my second hypothesis which was that the rate of survival will improve for both ants and crickets when the number of specimen in each test is increased. While the survival rate did not increase when multiple ants were added to the population, the test results were inconclusive because 100% of the crickets survived at all exposure levels. Expanding the testing model and extending the exposure time for crickets would have been necessary to provide additional data for this study.

Summary Statement
Determining and observing the physical effects of two diverse living organisms if the temperature drastically dropped.

Help Received
My mom and dad helped me get from place to place and buy all the materials I needed and the insects I would experiment with. My older sister helped me chose a topic for my experiment. My younger sister helped me when I was containing the crickets.