CALIFORNIA STATE SCIENCE FAIR

CaliforniaScienCenter

Your Name (List all student names if multiple authors.)

Ana L. Carrillo

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)

Do Predators Always Win? Daphnia vs. Guppies

Preferred Category (See page 5 for descriptions.)

18 - Zoology

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)
Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.
Objective: My objective was to determine if r-selected species may be better adapted to changes even when predators are present.
To see if temperature changes would stimulate the Daphnia to reproduce sexually and model the populations with mathematical
equations.
Materials and Methods: 6 test tubes; a culture of at least 100 Daphnia magna; 3 male guppies, Poecilia reticulata; 3 thermometers;
6 1000 mL beakers; algae culture for Daphnia food; a TI-89 calculator; an aquarium heater; and running tap water. I placed 60
Daphnia magna with three guppies in three different 1000 mL beakers. And 2 adult Daphnia in each test tube and two test tubes in
a beaker that was in a bucket full of water being warmed by the aquarium heater. Two others were placed in a beaker with running
tap water. The other two were left in a beaker with room temperature water.
Results: I was unable to stimulate the Daphnia to reproduce sexually. In two of the beakers, the guppy ended up eating all the
Daphnia, but in the other, the Daphnia ate the guppy. The mathematical equation for test tube A over all was a sufficient modeling
equation. The mathematical equation for test tube B was perfect since if modeled the rapid increase in number and the constant
number of organisms alive. The mathematical equation for the test tube C was not any good since it was just a flat line. The
mathematical equation for test tube D was not accurate since the graph of it was a straight line and stopped at a certain coordinate.
The mathematical model for test tube E started out like a sufficient model but kept increasing to infinity. The model equation for
test tube F was also just a line emphasizing the average of Daphnia that were in that test tube. The mathematical model for Beaker
A was not sufficient since it showed that the population of Daphnia kept increasing but did not. The model graph of Beaker B
modeled the data well for the first part but then, went on to infinity. The model for Beaker C was just a straight line but the data
shows it did not just stay constant.
Conclusion: I was not able to stimulate the Daphnia to reproduce sexually in spite of my efforts. The experiment with the guppies
did not give me enough information to determine if actually a predator would stabilize the Daphnia populations. I conclude that I
needed to record more data over a longer period of time.

Summary Statement (In one sentence, state what your project is about.)

Trying to stimulate Daphnia to reproduce sexually under different temperature, and to see if predators
would stabilize their populations.

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at
university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.

Mentor helped set-up and record data; Teacher provided computer and room; Calculus instructor helped
with mathematical models.