The Effect of Temperature on Caterpillar Growth Rate
By the Mangrove Blues

Introduction

Our group did an experiment on Painted Lady Butterflies. The species is called *Vanessa cardui*. These butterfly’s wingspan usually grow up to 5.1-7.3 cm long. The topside of the butterflies’ wings is orange and brown with dark wing bases. The forewings of the butterflies are black. The wings together have four eyespots.

. The affect the butterflies have on life is to pollinate flowers and keep the generation of flowers from becoming extinct. Most males patrol & perch in the afternoons for female butterflies. Most of these butterflies fly four or five times a day, nothing more. Most Painted Ladies prefer nectar from joe-pyeweed and ironweed. These butterflies live almost everywhere, especially on disturbed and open areas. The General Life Cycle is from egg to larva to chrysalis to butterfly. The butterflies do not live very long.

(http://www.public.iastate.edu/~mariposa/homepage.html)

The temperature can influence how much the caterpillars eat and grow. Also one important thing that would largely affect the caterpillars are the environment inside the plastic testing box’s. According to the way we put the caterpillars in the box it might not be very comfortable metamorphosing next to other caterpillars which would affect the way they eat, sleep, and grow. We wished to see if humidity affected the caterpillar’s weight.

The variable in this project is the humidity in each box. Our null-hypothesis is that there will not be any difference in the weight of the caterpillars. Our alternate hypothesis is that there will be a difference in the caterpillar’s weight caused by the variable. Our prediction of this experiment is that the higher the humidity level the heavier the caterpillar will be.

Methods

Thirty-five Painted Lady butterflies were used at the early larval stage. The clear plastic cup that has an average weight of 3.5g and the average 0.3g lid were weighed separately. Each cup was taken and numbered one through thirty. A line was drawn 2 cm from the bottom of the cup, around the circumference of the cup and the provided commercial food was packed to the line. Each cup was weighed with the food and lid. A larva was added to each cup and then weighed. After setting up the larvae in their cups, we set up the environment in which the larvae would be.

The lights were set on the top of the cardboard box. A timer was connected to both lights (treatment and control box) and set from 7am-7pm. Then the same size and amount of paper towels were placed in two plastic containers. The paper towels in the treatment container were wet with 20ml of water. The paper towels in the control container stayed dry. The 30 cups were then split into 2 groups of 15 and placed in the two different containers. The two
containers were covered with clear cellophane. The same amounts of random holes were punched into the cellophane. The two containers were placed in two identical cardboard boxes and left for further observations.

Results

The results of our statistical one-tailed t-test \( t = 1.8; \ P = 0.3 \) show that increased humidity does not affect the weight of the caterpillar. We do not reject our null hypothesis, which was “There is no difference in the weight of caterpillars in increased humidity.” The treatment group had a final average weight measurement of 0.7 with a standard deviation of 0.1. The control group had a final average weight measurement of 0.7 standard deviation of 0.1 (Table 1).

Discussion

The problem statement was “Does the increased humidity affect a caterpillar’s weight?” We predicted that the treatment caterpillars would be heavier than the ones in the control group. At the end only 6 results from the dry and 7 from the wet box’s were measurable because some of them died and most of the results were skewed. The t-test showed that there was no significant difference between the weight of the dry (control) and wet (treatment) caterpillars.

Also another reason why the results were not what we expected is because the humidity did not affect the caterpillars weight at all. One possible reason caterpillars were not heavier in the treatment group is because their weight are genetically controlled and not affected by its environment. Additionally the caterpillars' weight was not affected by the humidity because the cups where sealed close by the lid and the humidity was not able to go inside. In the future we could make the experiment better by not putting the caterpillars in sealed cups so that the caterpillars would feel the humidity. In conclusion, the humidity level has no effect on the treatment group. Therefore we failed to reject our null hypothesis.