CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34151

Project Title

Frankenfood, Fertility, and the Food Chain: The Effects of Secondary Consumption of GMO

Abstract

Objectives/Goals

The goal of my project is to expand my experiment from last year when I observed the effects of GMO versus organic papaya diet on the longevity and fertility of fruit flies. This year, I wanted to take the observation up the food chain. I hypothesised that ladybugs fed pea aphids on a GMO diet of pea sprouts would have reduced fertility and longevity compared to ladybugs fed pea aphids on an organic diet of pea sprouts.

Methods/Materials

I sorted 100 newly hatched ladybugs, 50 males and 50 females, in a terrarium with pea aphids on organic pea sprouts grown in a styrofoam cup. In another terrarium, I put 100 newly hatched ladybugs, 50 males and 50 females, with pea aphids on a genetically modified pea sprouts grown in a styrofoam cup. I stored them in a garden shed away from direct light on mite paper. Every 5 days I would remove, count, and record any larvae and dead ladybugs. I would spray the terrarium with water. I would also replenish pea aphids equally in each terrarium.

Results

The ladybugs which were fed pea aphids on organic pea sprouts lived on average 37% longer than the ladybugs fed pea aphids on GMO pea sprouts. The population for the ladybugs fed pea aphids on GMO sprouts ended between day 35 and day 40. The population for the ladybugs fed pea aphids on organic pea sprouts is still going at 60+ days. Regarding dietary effects on reproductive rates, the ladybugs fed pea aphids on organic pea sprouts produced more larvae than ladybugs fed pea aphids on GMO pea sprouts by 71%.

Conclusions/Discussion

Based on the experimental data I observed, the results support my hypothesis that ladybugs fed pea aphids on a genetically modified diet will have a reduced lifespan and fertility compared to ladybugs fed pea aphids on an organic diet. I think the dramatic difference in the results is attributed to the fact that GM peas contain a protein functioning as a pesticide. This could have decreased the population and reproduction of pea aphids which would mean less food for ladybugs in the GMO terrarium. When ladybugs run out of food, they will perform cannibalism on eggs, larvae, and adults.

Summary Statement

My project studies the effects of secondary consumption of GMO by observing the lifespan and fertility of ladybugs that consume pea aphids fed on GMO pea sprouts.

Help Received

My mother helped me with ordering the materials from a lab and stores. She also helped me count the ladybugs and larvae. My father helped me with the graphs and the formula for Excel Spreadsheets. They both taught me how to use Keynote and Pages to create my own display board.

Preliminary