

Fruit flies

New Mexico

Supercomputing challenge

Final Report

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Team #59

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Executive Summary

Our project is over the breeding of fruit flies. Fruit flies are commonly used in Biology class labs to show the principles of Genetics. In our project we will model the traits of fruit flies and how they are passed from generation to generation. We decided to do this report on fruit flies because a computer model will be a faster, easier, and cheaper way to determine how fly traits will be inherited and how fly populations will change.

Fruit flies are common in homes, supermarkets and wherever else food is allowed to rot and ferment. Adults are about 1/8 inch long and usually have red eyes. The front portion of the body is tan and the rear portion is black. Fruit flies lay their eggs on moist, organic materials. Upon hatching, the tiny larvae continue to feed near the surface of the fermenting mass. This surface-feeding characteristic of the larvae is significant in that portions of fruits and vegetables can be cut away to allow the collection of specimens for study. The reproductive potential of fruit flies is enormous; given the opportunity, they will lay about 500 eggs. The entire lifecycle from egg to adult can be completed in about two weeks. After the female lays her eggs she dies.

In our model we will have different populations of flies with unique combinations of eye color, wing shape, and body type. We are going to interbreed them and find the traits of the resulting offspring. We will use Star Logo to make a model of our system. We will have different areas that contain the individual types of flies. We can then breed each of the flies to the others and statistically determine the offspring's characteristics. We will have the program set up to make and calculate Punnet Squares, then track and record the results. Next we will turn equal amount of the individual type of

the flies loose and let them enter breed randomly to determine what traits survive to show up in the long run.

Problem Statement

In our project we will be using the different genetic traits for eye color, wing type, and body style..

Fruit Flies Eyes The compound eye of *Drosophila* is a marvel of precisely organized structural elements. There are a lot of different types of fruit fly eyes! In our project we used red, black and eyeless.

Fruit Flies Wings The wings are mostly clear with a small dark spot near the tip. The three different types of wings are: shriveled wings, wings with dots on them, and normal wings.

Fruit Flies Body The adult flies is a very small insect, about 3/16 inches long (4-5mm). The normal body color is usually a light yellow to tan color or a reddish-brown in color. The two other types of bodies are tan with black strips, or yellow body with a red triangle on its abdomen.

Description of Method

We used Star Logo to graphically represent fruit flies in our model. We designed different colonies of flies with all the possible combinations of traits and then used Star Logo to complete punnett squares to show the results of the interbreeding.

Our punnett squares were developed using standard genetic principles and we used those squares to graphically show trends of trait changes in fly populations over time.

Original Achievement

We designed and made a computer model that simulated fruit flies. Not bad for a couple of beginners!!! Our achievement is that we learned introductory computer programming that helped us to solve a problem. We worked with Star Logo and learned how fruit flies reproduce and the fundamentals of genetics. That should help us in biology class next year!!!

Acknowledgment

We would like to thank every body that's helped us this year, and to all the teachers that let us out of class to work on our project.