CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
William L. Perdue, IV

Project Number
J1623

Project Title
Saving the Olive Crop

Abstract

Objectives/Goals

The olive fruit fly, (Bactrocera oleae,) could wipe out the entire olive oil industry in California. Because its maggot feeds on the inner pulp of the olive, it allows bacteria to enter the fruit and rot the olives. This is serious because if 1% table olives, or 5% oil olives are stung, the entire batch can be rejected from processing. Conventional pesticides are not an option because consumers demand organic methods, but organic methods are not always effective.

I hypothesized that I could separate fly-damaged olives from good olives by density differences, since fly-damaged olives have a hole eaten in them, and may be less dense. My method needed to be safe and inexpensive, so it could be used by anyone farming olives.

Methods/Materials

I used two scales, one a balance beam scale, the other a standard weight scale, a graduated cylinder, an Erlenmeyer flask, water, olives, and two thermometers.

I used the thermometers to measure the temperature of the olives and the water, and the other tools to find the density of the olives and the water.

Density is mass divided by volume. I found the density of the olives by measuring them on the balance beam scale, finding the mass. I used the graduated cylinder, added water, took note of the measurement, added the olives, took note of the new level, and subtracted the old measurement from the new. Then to find the density, divided mass by volume.

Results

I sampled olives from a small orchard and determined that 6.7% were fly-damaged. I put the sample in to 62.8˚F water; I noted that some olives floated, but most sank. Most of the floating olives were fly-damaged, most of the ones that sank were good. By removing the floating olives, I reduced the percent of fly-damaged olives from 6.7% to 1.7%; well below the 5% rejection level for oil.

Conclusions/Discussion

I conclude that fly-damage effects olive density, and because of that, density differences can be used to separate fly-damaged olives from good olives.

Summary Statement

Differentiating fly-damaged olives from good ones on the basis of their density.

Help Received

Father and Mother helped pick olives. Father asked questions that helped formulate some answers.