CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
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Project Number
J2425

Project Title
The Effect of Various Surfaces on the Behavior of Managed Bees

Abstract

Objectives/Goals
I predict that more honey bees will land on the yellow disc compared to any other test surface, per ten minute exposure time. Pollination of food crops by "portable" bee colonies managed by beekeepers is what farmers rely on for best crop production. Man-made additions to their habitat such as water tanks, irrigation pipes, and vehicles, now also include solar panel frameworks! Do different surfaces contribute stress to bees?

Methods/Materials
Pencils, notebook, tape, string, stopwatch, thermometer: Digital Springfield Precise Temp., digital camera - Kodak EasyShare V530, four cardboard discs - diameter 0.914 m, aluminum foil, yellow paper, red paper, solar panel - 0.787 x 0.66 m anti-glare triple layered tempered glass, www.ElectriCare.com, managed bee colony, 84 hives, Fallbrook, CA, protective clothing.

Results
34.80 landings occurred on the polished aluminum disc, or, 295% more landings than on the brown control. Bees exhibited agitated buzzing noises and fell out of the sky possibly due to being blinded. Fewest bee landings occurred on the solar panel surface, 2.40 landings, probably because of the triple layered anti-glare surface. Compared to the brown control, the solar panel had 80% fewer landings, a surface the bees ignored. The yellow and brown control averaged the same number of landings, 11.80, so the yellow surface had a 0% percent change compared to the brown control. Bees were attracted to both these surfaces without agitated buzzing or confusion. The red paper disc averaged 7.60 landings also without agitation or confusion. Red had 36% fewer landings than the brown control. Bees are red-blind and few landings were recorded. Bees landed, or really "collapsed" the most on the polished aluminum.

Conclusions/Discussion
The greatest average of bee landings, 34.80, occurred on the polished aluminum surface. My hypothesis was incorrect. I hypothesized that the bees would land most on the yellow paper disc since UV, violet, blue are known bee attractants, and yellow is next in the spectrum. Rapid light movements disturb bees and the polished aluminum made the bees buzz loudly and have a seizure like attack. Polished aluminum also had bee deaths as opposed to the other four surfaces without deaths or agitated behavior. All other surfaces had significantly fewer landings compared to polished aluminum.

Summary Statement
Managed honey bees were exposed to surfaces, yellow, red, brown (ground) control, polished aluminum, and a solar panel, in an attempt to identify stresses in their habitat affecting behavior; polished aluminum was a significant stressor.

Help Received
Mother counted bee landings; Aunt let me use her managed bee colonies; Eddie Haro loaned his solar panel; Dr. Eric Mussen contributed advice; Dad cared for my bee sting.