CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Alex Brown; Arjan Puniani

Project Number
22434

Project Title
The Effects of Ethyl Alcohol on Ant Colony Behavior

Abstract

Objectives/Goals
The objective is to determine whether varying amounts of ethyl alcohol will affect the behavior of worke| ants as they establish new colonies. We believe that the number of tunnels they dig and the time it tak| them to dig tunnels will decrease with higher percentages of ethyl alcohol given in their water supply.

Methods/Materials
Seven identical, giant, commercially purchased ant farms were stocked with seven (7) sets of commercially purchased red harvester ants of the genus species Pogonomyrmex californicus. A chemist at the local state university donated 100ml ethanol at 95%. This was proportionately divided int application bottles in seven varying ratios of 100% distilled water, 100% distilled water, 100% distille| water, 95% distilled and 5% ethyl alcohol, 90% distilled and 10% ethyl alcohol, 85% distilled and 15% ethyl alcohol, and 80% distilled and 20% ethyl alcohol. The three control groups and four variable grou| were administered their respective quantities every other day. They also received normal amounts of ant| food every seven days. We documented the number of tunnels dug and dead ants daily by visual count and digital photography.

Results
Colony number 4 (85% distilled water and 15% ethyl alcohol) had the highest number of tunnels dug at thirty-one (31). However, colony number 1C, a control group (100% distilled water) had the lowet amount of death at six (6), and the second highest amount of tunnels dug at twenty-six (26). Wht comparing the number of deaths to the number of tunnels dug, colony number 1C had the highest productivity-survival ratio.

Conclusions/Discussion
It is our conclusion that high levels of alcohol do have an adverse effect on ant colonies. The data indicated that colony number 4 (85% distilled water and 15% ethyl alcohol) dug the most tunnels. This i| due to either increased calories from the grain alcohol in addition to the ant food or having started ou| with a higher number of ant workers, which created a higher productivity number. However, colont number 1C had the higher survival rate and second highest number of tunnels dug. The data leads us to suspect that higher amounts of alcohol leads to higher death rates and at the same time the lack of calories€ from alcohol leads to less productivity.

Summary Statement
Varying amounts of ethyl alcohol affected the behavior of worker ants as they established new colonies by either increasing their death rate or increasing their productivity through the additional calories.

Help Received
Hazards & source of alcohol: Univ. Chem. Professor. Hazards of handling ants & amounts of alcohol to administer:Entomologist. Advice on figuring calculations-parent. Instruction on operation of digital camera, basic layout rules & board mock-ups - parent. Grammar editing and printing - parent.

Preliminary