CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34500

Project Title

Investigating Ant Trail Pheromones

Abstract

Objectives/Goals

I was interested in this project because my family has often had ant problems. Ants secrete pheromones to mark trails to food. I wanted to investigate how pheromones work and how to clean up unwanted trails. For my project, I tested several cleaning materials to see which cleaned the pheromone the best. I think boiling water will clean ant pheromones the best because it will cause it to evaporate. The clean wash cloth will not clean up the pheromone well because it will spread it around.

Methods/Materials

Set up a path to a food source that the ants can find. Place a container upside down in a pie pan filled with water. Attach a Plexiglas path that is 8 in. x 0.5 in. to the top of the container. Fill the indent in the container with sugar water. Capture 6 ants and put at the sugar water. Wait for a trail to form and count the ants. Brush the ants off the trail and container using a soft paintbrush. Clean the pathway with a cleaning material: nothing (control), soapy water, baking soda water, boiling water, a clean washcloth, and ammonia. Replace the path. Time until the trail has reformed to its original number. For the no food test, take away sugar water from the trail and time how long it takes for no ants to come to the container. For the danger test, disturb an ant on the trail and time how long it takes for ants to ignore the warning.

Results

The boiling water took an average time of 98.3 minutes to reform a trail. The clean washcloth took 62 minutes. The ants found the path quickly, but ran in circles. The baking soda took 7 minutes. The ammonia took 17.3 minutes. The soapy water took 22.7 minutes. Control took 17.7 minutes. It took 25 minutes for the for ants to stop noticing the danger pheromone. When close to the warning, the ants became frenzied. It took 66 minutes for ants to stop coming to the sugar in the no food test. A lot of ants bumped antennae to communicate about where the food was. There were more ants at night and late afternoon than in the morning.

Conclusions/Discussion

The boiling water worked the best to clean the pheromone. However, the clean washcloth was the second best. It would not be the best material to use in a house because the ants still found the trail. The cloth spread pheromones around confusing the ants. The boiling water worked the best because pheromones are lipids and evaporate at low temperatures. Ants smell the pheromone in the air and follow it.

Summary Statement

I wanted to investigate how ant pheromones work and how to clean up unwanted trails.

Help Received

Mother helped with handling of ammonia and boiling water.

Preliminary