CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
J1612

Project Title
Not on My Turf: A Study of Allelopathic Trees

Abstract

Objectives/Goals
The objective was to determine which trees in the neighborhood are allelopathic.

Methods/Materials
Picked 3 different kinds of trees, chose at least one or two with little undergrowth. Collected 3 or more leaves from each tree and then ground them in a mortar along with a small amount of water to make a liquid. Cut out 3 small circles of paper towels and placed them in a petri dish. Using a medicine dropper, saturated the petri dish paper towels with the leaf/water mixture. Placed cabbage seeds on the moist paper towels and put the covers on the petri dishes. Thoroughly washed the mortar and pestle and medicine dropper with water and repeated the procedure for the other trees and the control. Placed the petri dishes in a warm place with sunlight and examined them for seven days. Looked for signs of cabbage seed germination with the hand lens, and counted and recorded the total number of seeds germinated every day in each petri dish.

Results
The California Redwood had the least growth of the three trees and the control in all 3 experiments. The redwood needle/water solution clearly slowed or stopped the growing process. The needles from the Redwood must have released allelopathic chemicals into the water that was used to soak the paper towels. The Magnolia and Japanese Elm leaf/water solutions had little to no effect on the growing process. The control showed the most growth. The Japanese Elm, the Magnolia, and the control solution cabbage seeds would likely germinate into cabbage plants if they continued to grow. The seeds in the Magnolia solution in Test #1 did not germinate, therefore the data was left out of the calculation of the average. The most likely cause was that there wasn't enough of the solution on the paper towel (and so the seeds didn#t have enough water to germinate). Another possible cause might be that the eyedropper was not completely clean after using it for the California Redwood solution, and some of the allelopathic chemicals from the Redwood were mixed with the Magnolia solution used for the first Magnolia petri dish.

Conclusions/Discussion
The hypothesis was correct. The California Redwood solution caused little cabbage seed growth, while the solution from the other trees and control had little effect on cabbage seed growth. Therefore, the research shows that the California Redwood is allelopathic and the Magnolia and Japanese Elm are not.

Summary Statement
My project demonstrates how certain chemicals released by allelopathic trees inhibit the growth of other plants.

Help Received
Father helped type report.