CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
J1408

Project Title
Analyzing the Effects of Gasoline Vapors on Senecio cineraria: Acute vs. Chronic Exposure

Abstract

Objectives/Goals
What happens to our environment when someone forgets to take the gas nozzle out of the car and they drive off and it leaks? What happens to our environment because of that long steady drip? The objective of this project is to compare these two predicaments. These are both life situations that could be harming the plant life around us.

Methods/Materials
This experimentation consisted of taking nine plants and separating them into three groups, control, chronic, and acute. The control plants received no gasoline fumes. The chronic plants received 10 minutes of gasoline fumes every day for six days. This was similar to the long, steady drip of the nozzle. The acute plants received 60 minutes of gasoline fumes every six days. This was similar to a large gasoline spill. The experimentation went on for eighteen days before leaf area, chlorophyll, and dry weight testing. After the eighteen days were over, the plants had to be gotten ready for the testing. The plants were cut apart into three sections, the roots, stems, and leaves. One average sized leaf was taken from the leaf pile and put on ice for chlorophyll. Then, the plants were taken to a college lab. The leaves were tested for leaf area in a leaf area machine. Afterwards, the plants (except for the chlorophyll leaves) were put into a drying oven. For chlorophyll, the leaves had to be ground up in acetone and then spun in a centrifuge. The liquid then had to be diluted 1:5 and the absorbents were measured in a Thermo-Spectronic Analyzer. The absorbents were measured at two different wavelengths, 645 and 663 MHz and then put into an equation in order to find out the amount of chlorophyll. After a week of drying, the plants were weighed. All of this information was used in order to find ratios and compare results. The experiment was run three times to ensure consistent results.

Results
The results of this project were that the acute exposure plants were the heaviest, largest, and had the most chlorophyll. The chronic exposure plants were the lightest, smallest, and had the least chlorophyll. The control plants were in between the two exposures.

Conclusions/Discussion
This experiment concludes with the fact that the long, steady drip is worse for the plants than a large gas spill. There may have been ethylene in the gasoline, which is a plant stimulant so that may be why the acute exposure plants were the biggest.

Summary Statement
Although human error cannot be avoided, and we cannot prevent accidental spills, we can prevent the drip by making sure that all of the gasoline pumps and tanks are in good working condition, which will prevent harmful vapors.

Help Received
Used lab equipment and Fresno State University under the supervision of Dr. John Constable; Used gasoline from All American Service Station Maintenance under the supervision of Jeff Doran