CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
S1704

Project Title
The Effects of Elevated Carbon Dioxide Levels on the Transpiratoin Rates of Zonal Geranium Plants

Abstract

Objectives/Goals
The objective of this experiment was to find a correlation between increasing the carbon dioxide levels that the Zonal Geranium Plant is exposed to and how that affects the plant's transpiration rate by using an apparatus I developed for this experiment.

Methods/Materials
The leaves of the Zonal Geranium plants were cut off and placed into a potometer. An apparatus (which was a closed system) was then developed and used along with the potometer in order to demonstrate the effects of carbon dioxide on the plant#s transpiration rate. A pilot project was done prior to the experiment to determine the optimal time for the plant#s transpiration (between 12 AM and 6 AM). Three Zonal Geranium leaves were placed into separate setups, each having all factors the same except for a different level of Carbon Dioxide: the control chamber (1000 PPM), and two experimental chambers one doubling (2000 PPM) and other tripling (3000 PPM) the carbon dioxide level of the control chamber were used. The leaves were set in the apparatus, as they transpired, they pulled up water from the calibrated pipette. Water loss from the pipette was measured after the six-hour transpiration period. A carbon dioxide probe continuously monitored the carbon dioxide levels within each tube. The latter experiment was carried out twenty times for each of the two experimental and the control variable, totaling sixty of the apparatuses set up through out this experiment.

Results
At the end of the 6-hour period, the average amount of water displaced from the calibrated glass pipettes was .56 mL for the control, .265 mL for the chamber with double the carbon dioxide, and 0.07 mL for the chamber with the carbon dioxide level tripled compared to the control.

Conclusions/Discussion
At the end of the 6-hour period, result averages for water displaced were control = .57 mL, double carbon dioxide = .25 mL, and triple carbon dioxide = 0.08 mL. My results indicate that there is an inverse relationship between elevated carbon dioxide levels and the amount of transpiration that the plant demonstrates. This experiment can be applied to foresee how increasing green house gas levels, of which carbon dioxide is said to double within the next century, can employ plants as a tool for global warming.

Summary Statement
Zonal Gernaium plants were exposed to elevated levels of carbon dioxide and their rate of transpiration was observed.

Help Received
Advisor Dr. Pal helped me obtain materials; Mother helped me obtain plants.