



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Caroline A. Frost	Project Number 31837
Project Title Scrubbing the Air: Reducing CO(2) Levels with Fragaria, Galvezia, Heteromeles, and Salvia	
Objectives/Goals The objective is to test how the photosynthetic rate of four plants, fragaria, galvezia, heteromeles and salvia respond to increases in atmospheric CO2 levels. My hypothesis is that there will be an initial increase in photosynthetic rate, but that the rate will then decrease due to the influence of CO2 on the stomata. Abstract Methods/Materials To test my hypothesis I used the LI-COR 6400XT generously donated by Dr. Brennan in her biology lab at LMU. The LI-COR uses gas exchange principles to measure photosynthetic and transpiration rate and reports other statistics like the indicator as to how the biochemical process in the leaf is utilizing the available CO2. Before each test, I calibrated the machine to eliminate the influence of atmospheric pressure from test to test. Before each reading, I waited for a steady state to be achieved in the leaf chamber. I conducted many tests at the CO2 concentrations 250, 400, 550, and 700ppm, and averaged the results. Results Salvia's photosynthetic rate increased over the tested concentration interval. The biochemical indicator showed that the leaf was using the available CO2 and conductance indicated that stomata remained open. Galvezia and Fragaria's photosynthetic rate decreased and the indication was that the biochemical machinery could not use the available CO2. Heteromeles showed results that were anomalous, indicating that it could have been in a semi-dormant state at the time. Conclusions/Discussion Salvia results indicated that CO2 was the limiting factor in the photosynthetic rate (not rubisco or the diffusion of the CO2 in the leaf structures). Galvezia and Fragaria results indicated that the stomata were acting as a regulator and closing since the leaf could not utilize the available CO2. The results also showed that these two plants biochemical machinery could not utilize the available CO2 and this condition worsened as the atmospheric CO2 increased.	
Summary Statement Reducing Atmospheric CO2 levels through increases in the photosynthetic rate of four native S. California plants	
Help Received Dr. P. Drennan of LMU graciously allowed me to use the LI-COR machine in her lab.	