



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Suh Young Woo	Project Number S1725
Project Title Photosynthetic CO(2) Uptake of a Southern California Coastal Sage Scrub Community	
Abstract Objectives/Goals Because of the rising CO(2) concentrations in our environment, plants become important mechanisms in reducing the CO(2) in our atmosphere. This study compared the photosynthetic CO(2) uptake, water-use efficiency, transpiration, and leaf conductance to water vapor of evergreen and deciduous plants of the costal sage community. Through the results it examined the different strategies that plants use to cope with the Mediterranean-type environment. In addition, the relationship between the leaf lifespan and the photosynthetic carbon dioxide uptake was found. Methods/Materials A portable gas exchange system (LI-6400, LI-COR Inc., Lincoln, Nebraska, USA) was used to measure the maximum rates of net photosynthesis, stomatal conductance to water vapor, and water-use efficiency in three different shrub species. The shrub species included an evergreen, <i>Rhus integrifolia</i> (Lemonadeberry) , and two deciduous, <i>Salvia mellifera</i> (Black Sage) and <i>Salvia leucophylla</i> (Purple Sage). This study was performed at the greenhouse where optimum sunlight, water, and carbon dioxide were available and at the coastal sage scrub community in the Palos Verdes Peninsula. Results It was found that evergreen leaves have a low photosynthetic rate while the deciduous leaves had a high photosynthetic rate. The evergreen species save their water and carbon dioxide to use when not enough water is available during drought, but the deciduous plants use all the energy up for growth so that during drought, they remain dormant. When the CO(2) uptake in relation to leaf age was measured, it was found that the rate of photosynthetic carbon dioxide uptake decreases as the leaf#s age increases. The older leaves lost their ability to fix CO2 because they do not have enough enzymes and proteins available. Conclusions/Discussion This study clearly showed the difference between the photosynthetic carbon dioxide uptake of evergreen and deciduous species that live in the sage scrub community and the amount of CO(2) uptake in relation to leaf lifespan. But most important, this project addressed a possible solution for reducing the amount of carbon dioxide in the atmosphere.	
Summary Statement This project is about determining the photosynthetic CO(2) uptake of a deciduous and evergreen coastal sage species to determine which plants are more favorable to the increasing carbon dioxide of our environment.	
Help Received Used lab equipment at university of California Los Angeles under the supervision of Dr. Rasoul Sharifi	