



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Suh Young Woo	Project Number S2020
Project Title The Effects of Drought Conditions on the Photosynthetic CO(2) Uptake and Water Potential of an Invasive and Native Speci	
Abstract Objectives/Goals Plant invasions are widely recognized as significant threats to biodiversity conservation worldwide. In addition, the drought in California is an environmental concern. Therefore, water is the first limiting factor in plant growth for the California Coastal Sage Community. The objectives of this research were to compare the photosynthetic CO(2) uptake, water potential, and water-use efficiency of an invasive and a native species during well-watered and drought conditions and to determine which species, invasive or the native, would be more favorable during drought conditions. Methods/Materials Five pots of Ageratina adenophora and Encelia californica were obtained. The plants were maintained under well-watered conditions and fertilized twice weekly. Then at the start of the experiment, top of the pots were sealed with plastic to avoid evapotranspiration from the soil surface. Water use and transpiration was measured by weighing the pots every two hours and using a LI-1600 Steady State Porometer. Then Net photosynthetic rate (A), instantaneous water-use efficiency (A/E), intrinsic water-use efficiency (A/g), and internal CO2 measured using a gas exchange system. Water potential was measured using a pressure chamber and the specific leaf area was found. Results It was found that a California native plant, that is known to thrive in dry conditions, has lower water-use efficiency than an invasive plant. Therefore, the reason for invasive plants to drive out the native plant is because of the wise use of water. Even though the native plant has a greater rate of assimilation and transpiration, they grow faster and they show late senescence. Their higher water potential also indicates that they have more water available in their leaves. Conclusions/Discussion Water-use efficiency in invasive plants may be identified as an important factor contributing to the success of the invasive species. Furthermore, Invasive plants tend save water and use water more wisely than native plant which can be a reason for invasive plants to drive out native plants. When invasive plants and native plants live side by side each other, water would not be a limiting factor for the invasive species. In conclusion, Invasive species can possibly decrease our need for water because they do not take up as much water as a native plant, but the risks beyond keeping an exotic plant may be far too great.	
Summary Statement My project is about the water-use efficiency of an invasive and native plant during drought conditions.	
Help Received Used lab equipment at University of California, Los Angeles under the supervision of Dr. Rasoul Sharifi.	