

# Texas Agricultural Experiment Station

NCR 101 - Committee on Controlled Environment Technology and Use  
2006 Station Report

Genhua Niu, Texas A&M University, Agricultural Research & Extension Center at El Paso

## GENERAL OVERVIEW

El Paso Agricultural Research and Extension Center, Texas A&M University (TAMU), is one of the 13 Research and Extension Centers of the TAMU systems. Urban Landscape Water Conservation is one of the seven research projects/laboratories at the Center. Personnel for this project include Genhua Niu, project leader; Denise S. Rodriguez, Technician II; and 2 to 5 undergraduate student assistants from University of Texas at El Paso and El Paso Community College.

## FACILITIES AND INSTRUMENTS

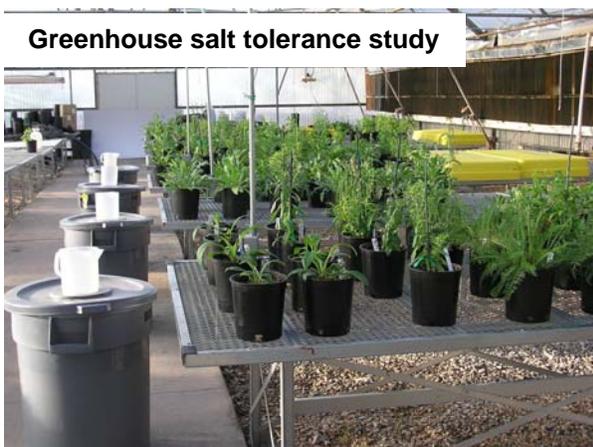
The Agricultural Research & Extension Center at El Paso has 10,000 sq ft greenhouse space and analytical instruments for analyzing plant, soil and water samples. A portable gas exchange measurement system (CIRAS-2), pressure chamber, a chlorophyll fluorescence meter (plant efficiency analyzer), soil moisture sensors and dataloggers were purchased in 2005. Drainage lysimeters and raised flower beds were constructed and a weather station was installed in the same field plot for water use, drought tolerance, irrigation and nutrient management studies. In addition, a CR7 datalogger with 70-channels for connecting thermocouple psychrometers was recently set up for measurement of leaf water potential and osmotic potential.

## RESEARCH PROJECTS

The followings are the main research directions. Landscape plants under studies include flowering annuals, herbaceous perennials, groundcovers, and woody ornamentals.

- **Determining salt tolerance of landscape plants**

Greenhouse and field experiments are being conducted to evaluate landscape plant tolerance to various levels of salinity applied through soil surface. In addition to overall measures of plant growth and health, plant tissue is being analyzed for ion accumulation.



*Agricultural Research and Extension Center at El Paso  
Texas Agricultural Experiment Station, Texas A&M University  
1380 A&M Circle, El Paso, Texas 79927  
Phone: (915) 859-9111, Fax: (915) 859-1078  
<http://elpaso.tamu.edu/Research> 04/04/06*

- **Determining drought tolerance of landscape plants**

Herbaceous plants are grown in raised flower beds, each with independent irrigation control. Drought tolerance is evaluated according to overall growth, visual quality, and physiological responses (gas exchange rate, chlorophyll fluorescence, and osmotic potential).



- **Determining water use and crop coefficient of landscape plants**

The water use of container-grown plants can be accurately obtained gravimetrically. The objectives of this study are to determine and compare the water use and crop coefficients of landscape plants growing in drainage lysimeters (simulation of landscape conditions) and in above-ground containers (nursery practices) simultaneously in the same growing season. We found that overall growth, plant water use and crop coefficients are different in the two culture systems. However, water use per leaf area of the same species was statistically similar. This indicates that by quantifying leaf area plant water use in the two culture systems is exchangeable for the same species.



## Publications for 2005

- Niu, G. and D.S. Rodriguez. 2005. Responses of several herbaceous perennials and groundcovers to salinity. ASHS Annual Conference, HortScience. 40:1034.
- Niu, G. and D.S. Rodriguez. 2005. Growth responses of *Salvia greggii* and *Dalea frutescens* to drought stress. ASHS Annual Conference, HortScience. 40:1036.
- Wang, Y. and G. Niu. 2005. Long-term Growth of Live Oak from Seed or Cutting. ASHS Annual Conference, HortScience. 40: 1000-1001.
- Niu, G., L. McConnell, and V.R. Reddy. 2005. Propylene glycol vapor contamination in controlled environment growth chambers - Toxicity to corn and soybean plants. J. Environ. Sci. Health, Part B. Vol.B40, No.3: 443-448.
- Faust, J. J. Adelberg, K. Lewis, and G. Niu. 2005. Evaluating the storage of elephant ears acclimatized from tissue culture. HortTechnology 15(2):295-298.
- Niu, G. 2005. Modeling and simulation in photoautotrophic micropropagation. p.225-236. In T. Kozai, F. Afreen and S.M.A.Zobayed (eds.). Photoautotrophic (sugar-free medium) micropropagation as a new propagation and transplant production system. Springer.