Tropentag, September 17-19, 2013, Stuttgart-Hohenheim

"Agricultural development within the rural-urban continuum"

Growth and Photosynthesis Responses of Chihuahuan Desert Succulent Seedlings

Reyes M. Pérez-Sánchez[1], Joel Flores[2], Claudia González-Salvatierra[2], Enrique Jurado[1], Oscar Alberto Aguirre Calderon[1], Marisela Pando Moreno[1], Humberto Gonzalez Rodriguez[1]

[1] *Universidad Autónoma de Nuevo León, School of Forest Sciences, Mexico*
[2] *Instituto Potosino de Investigación Científica y Tecnológica, Environmental Sciences, Mexico*

Abstract

In arid and semiarid environments characterised by low and erratic rainfall as well as high solar radiation, plants are at high risk of mortality during the early stages of seedling growth. In general, seedling establishment is more successful under nurse plants due to microenvironmental conditions that allow for a more efficient use of resources. The mechanisms that allow succulent desert plants to establish their seedlings in arid environments are not known. We tested the hypothesis that shaded seedlings have higher growth and higher photosynthesis than seedlings exposed to direct sunlight. The study site was located in the town of San Juanico Chico, San Luis Potosí, San Luis Potosí, México. In here we studied the photosynthetic responses and seedling growth for seven species from two families (Cactaceae: *Echinocactus platyacanthus, Ferocactus histrix, Myrtillocactus geometrizans* and *Stenocactus coptonogonus*; and Agavaceae: *Agave lechuguilla, A. salmiana* and *Yucca filifera*) from the Chihuahuan Desert under direct sunlight conditions and under the shade of nurse trees for 105 days. All seedlings had the same age at the beginning of the experiment. The nurse plant was always a mesquite tree (*Prosopis laevigata*). Response variables evaluated were relative growth rate, photochemical efficiency of photosystem II and electron transport rate. Seedling relative growth rate was not influenced by light condition, while photosynthetic variables differed between species and light conditions. These results give us a better understanding of the mechanisms with which succulent seedlings survive under stressful environmental conditions. With these results we can determine safe sites for establishment and suggest suitable sites for reforestation for each species in rural and urban environments.

Keywords: Agavaceae, Cactaceae, photosynthetic efficiency, seedling growth

Contact Address: Oscar Alberto Aguirre Calderon, Universidad Autónoma de Nuevo León, School of Forest Sciences, Carretera Nacional km. 145, 67700 Linares, Mexico, e-mail: oscar.aguirrecl@uanl.edu.mx