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## Water Relations in Native Trees, Northeastern Mexico

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### Abstract

Native trees and shrubs that grow in the semiarid regions of northeastern Mexico are very important feed resources for range ruminants and white-tailed deer. They also provide high quality fuel wood and timber for fencing of range land and construction of domestic goods. Since water stress is the most limiting factor in this region, the present work was focused to investigate the relation and the effect of diurnal and seasonal leaf water potentials ( $\Psi$ ) of native tree species on soil water availability and evaporative demand components. Water potential is the index of water stress. This study was carried out at the Faculty of Forest Sciences of the University of Nuevo Leon (24° 47'N; 99° 32'W; 350 masl) Mexico. The tree species included in this study were: *Cordia boissieri* (Boraginaceae), *Condalia hookeri* (Rhamnaceae), *Diospyros texana* (Ebenaceae) and *Bumelia celastrina* (Sapotaceae). Determinations of  $\Psi$  in the four tree species were made at 10 days intervals between July 10 and November 30, 2007 by using a Scholander pressure bomb.  $\Psi$  was monitored in five different plants per species at 2-h intervals between 06:00 (predawn) and 18:00 h. Air temperature, relative humidity vapour pressure deficit, precipitation and soil water content were registered throughout. Data were subjected to one-way ANOVA and correlation analysis. During the wettest period (Sep-10),  $\Psi$  ranged from -0.72 in *C. boissieri* to -1.30 MPa in *B. celastrina*. Conversely, during the driest period (Nov-30),  $\Psi$  varied from -2.90 (*B. celastrina*) to -6.10 MPa (*D. texana*) revealing high water stress during driest season and *B. celastrina* was more tolerant to water stress. Diurnal  $\Psi$  values were negatively correlated with air temperature and vapour pressure deficit, on the contrary, a positive relationship was found with relative humidity. Gravimetric soil water content and precipitation data were linearly correlated with predawn. The ability of tree species to cope with drought stress depends on the pattern of water uptake, seasonal precipitation and the extent to control water loss through the transpirational flux. Further studies on these and other tree species in the region will help in the efficient management and selection of drought tolerant species

**Keywords:** Drought, native trees, northeastern Mexico, soil water content, water potential, water stress