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Drought Adaptation of four Native Shrub Species in Northeastern Mexico

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Abstract

Water deficit is one of the most limiting factors in the northeastern region of Mexico. The aim of this study was to determine the water potential (WP) of native shrub species such as *Amyris texana* (Rutaceae), *Bumelia celastrina* (Sapotaceae), *Cordia boissieri* (Boraginaceae) and *Leucophyllum frutescens* (Scrophulariaceae) and its relationship with soil water content, evaporative demand components and rainfall. The study was conducted at the Experimental Research Station of the Faculty of Forest Sciences, UANL, located in Linares county, state of Nuevo León. Water potentials were determined at intervals of 15 days from January 17 to October 31, 2011, at 06:00 h (WPpd; predawn) and 14:00 h (WPmd; midday). Cumulative rainfall recorded at the site was 502 mm. During the wettest period, WP ranged from -0.40 MPa (*B. celastrina*) to -0.92 MPa (*L. frutescens*). With respect to WPpd during the driest period, it varied from -1.86 MPa (*L. frutescens*) to -4.0 MPa (*A. texana*). In contrast, WPmd during the wettest period ranged from -1.08 MPa (*C. boissieri*) to -1.56 MPa (*A. texana*), while during the driest period ranged from -2.0 MPa (*L. frutescens*) to -4.0 MPa (*A. texana*). Diurnal WP showed maximum values at dawn, then decreased gradually to minimum values at midday and in the afternoon it recovered. On a seasonal basis, WPpd and WPmd was positively correlated with soil water content and negatively correlated with air temperature, however, no correlation was detected with relative humidity and precipitation. Diurnal WP was negatively correlated with air temperature and vapour pressure deficit, whereas, relative humidity showed a positive correlation. WPpd explained 74 % of the total variability WPmd. Since *B. celastrina*, *C. boissieri* and *L. frutescens* showed high WPpd and WPmd during water stress conditions with respect to *A. texana*, these species are considered tolerant to water shortage induced by drought.

Keywords: Drought, Tamaulipan Thornscrub, water potential, water stress

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