



## **Effects of Water Stress on Root Growth, Water Use Efficiency, Leaf Area and Chlorophyll Content in the Desert Shrub *Calotropis procera***

Tahar Boutraa\*

*Department of Biology, Faculty of Sciences, University of Taibah, Al-Madinah Al-Munawarah, Kingdom of Saudi Arabia.*

*Received November 17, 2009; Accepted January 8, 2010*

**Abstract:** *Calotropis procera* is a spreading shrub exuding milky sap when cut or broken. It is a desert plant, grows in semi arid and arid regions. The native existence of *Calotropis procera* covers South West Asia and Africa. *Calotropis procera* is considered to be one of the most drought tolerant desert plants. A pot experiment was designed to investigate the effects of water stress on plant growth performance. The growth is expressed by root dry mass, leaf area, specific leaf area, chlorophyll content and Water use efficiency (WUE). The association between WUE and root dry weights was examined. Plants were grown under three water regimes; 80% (control), 50% and 30% of soil field capacity (FC). Plants were harvested on four occasions; 7, 14, 21 and 28 days after water stress treatments application. Water stress significantly reduced root dry weights at 80% FC more than that of 50% and 30% FC treatments. Leaf areas were also reduced under the severe water stress conditions (30%) and highest water regime (80%). The highest leaf area was recorded under the moderate water stress level (50%). A positive correlation between root dry weights and accumulated water ( $R^2 = 0.55$ ) was observed. A significant reduction in total chlorophyll content was found in plants grown under 80% water stress treatment, while the maximum amount of chlorophyll content were recorded under the severe water stress conditions.

**Keywords:** *Calotropis procera*, water stress, specific leaf area, water use efficiency.

---

\*Corresponding: E-mail: [tboutraa@yahoo.co.uk](mailto:tboutraa@yahoo.co.uk); Tel: 00966 48460008 (1430); Fax: 00966 48454770