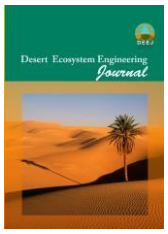
DEEJ (2015) 4 (7) 43-52

University of Kashan

Desert Ecosystem Engineering Journal

Journal homepage: http://deej.kashanu.ac.ir



Morphological and Physiological Changes in Calotropis procera Seedlings under Water Stress Conditions

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Received: Jun/01/2015 Accepted: Aug/24/2015

Abstract

Drought and low water stress is the most important environmental stress which plant are exposed to in low precipitation regions such as southern and central parts of Iran. Milkweed is one of valuable plant species with numerous industrial (producing high quality fibers) and medicinal benefits which has relatively resistance to drought conditions of southern Iran. The present study aimed to investigate the effect of water stress on morpho-physiological characteristics of Calotropis procera seedlings on the greenhouse conditions. This experiment was carried out at six levels of water stress (irrigation periods of 3, 6, 9, 12, 15 and 18 days) in a completely randomized design during 6 months. The survival rate of seedling was 100% for the irrigation periods of 3, 6, 9 days and 75% for 12 days; But at 15 and 18 days irrigation periods any seedling did not survive. The greatest amount of root length, root/shoot ratio, root surface, root volume and root length density were observed at 9-day water stress. Water potential increased with increasing water stress. The maximum amount of photosynthesis, stomatal conductance, transpiration and leaf temperature, dry weight of shoots and roots, seedlings height, collar diameter and the number of leaves belonged to 3-day irrigation. Overall, the findings of this study revealed that Calotropis procera seedling had suitable condition of morpho-physiological characteristics in respond to tree- to nine-day irrigation periods. However, due to the good conditions of the seedlings and 100% of seedling survival in 9-day irrigation period, it can be proposed as afforestation and rural green spaces, instead of the 3-day irrigation period because of the economic and management reasons.

Keywords: Calotropis procera, Irrigation period, Seedling survival, Photosynthesis, Stomatal flux.

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