RESPONSES OF *JATROPHA CURCAS* SEEDLINGS TO DROUGHT STRESS. AND SALINITY

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ABSTRACT *Jatropha curcas* L. has recently drawn the attention of the international research community due to its potential as a biodiesel crop. In addition, it is very well adapted to arid and semiarid climate conditions. In this research, the effects of drought and salinity on growth, leaf water relation and organic solutes, leaf and root mineral concentration, chlorophyll fluorescence parameters, leaf gas exchange and carbohydrate concentration were studied in seedlings of *J. curcas* to elucidate the physiological and morphological mechanisms related to their drought and salinity tolerance. Four-week-old seedlings were grown in growth chambers with five different water regimes corresponding to 100, 75, 50, 25, and 0% field capacity (FC) for four weeks. Seedlings, maintained a good water status regardless of the drought stress treatment because all water regimes did not affect the leaf relative water content, whereas the leaf water potential was only reduced in the water-stressed plants from the 0% and 25% FC treatments. Drought treatments (75, 50, 25 and 0 % FC) reduced leaf, stem and root growth. However, the decrease in growth was higher in the aerial part of the plant than in the root, so that the root-to-shoot ratio in drought-stressed plants increased compared to that in the wellwatered plants. Net assimilation of CO_2 (ACO_2) and stomatal conductance (gs) decreased in all treatments, although ACO_2 gradually declined as the water supply was decreased, while the reduction in stomatal conductance was similar in all drought stress treatments. Hence, we conclude that the strong control of transpirational water loss by reducing both stomatal conductance and biomass from aerial parts could be involved in the ability of this plant to resist drought conditions. Additionally, were evaluated six treatments using different NaCl concentrations (mM) in the irrigation water: 0 (control), 30, 60, 90, 120 and 150. These results suggest that *J. curcas* seedlings are moderately salt tolerant as were able to tolerate up to 4 dS m^{-1} (EC water irrigation; 30 mM NaCl). Negative effect of the salinity are due to Na^+ and Cl^- toxicity and nutritional imbalances caused by an increase in the Na^+/K^+ ratio. Osmotic effect of the salinity on this specie is negligible perhaps due to a strong control of the leaf transpiration avoiding water loss. The study of stomatal morphology under drought stress reveals that the reduction in transpirational water loss is due to reduction of adaxial stomatal density and the strong regulation of stomatal closure during the day corresponding to light condition

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