Journal of Arid Environments

Volume 73, Issue 10, October 2009, Pages 877-884

Plantâ€“water relationships and growth strategies of *Jatropha curcas* L. seedlings under different levels of drought stress

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https://doi.org/10.1016/j.jaridenv.2009.04.013

Abstract

Although *Jatropha curcas*, an important tropical biofuel crop, is reputed for its drought resistance, its ability to perform under dry conditions has hardly been investigated. In a greenhouse experiment we investigated the plantâ€“water relationships of *Jatropha* seedlings from different accessions under different levels of drought stress. There was little difference in plantâ€“water relations between accessions. Drought significantly reduced leaf area, biomass and relative growth rate, but had no effect on specific leaf area, daily range in leaf water potential, leaf water content, transpiration efficiency or aboveground biomass water productivity, corrected for atmospheric conditions. Stem wood density was equally low (0.26Â gÂ cmâ^'3) forÂ all treatments. Stem water content was lowest for dry treatment seedlings. Based on these results, *Jatropha* could be characterized as a stem-succulent tree. In contrast to other stem-succulent deciduous

trees, leaves were not shed immediately after the seedlings were confronted with drought. Instead, at the onset of drought, leaves with a higher adaxial stomatal density were formed, after which leaves were only gradually shed. The role of the succulent stem in the water economy of *Jatropha* was confined to balancing the small water losses of the leaves during drought.

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Keywords

Biodiesel; Leaf water potential; Physic nut; Stem succulent; Stomatal density; Stomatal conductance

[1] These authors contributed equally to this work.

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