FOLIAR ABSCISIC ACID (ABA) CONCENTRATION AND LEAF GAS EXCHANGE PROPERTIES OF *JATROPHA CURCAS* SUBJECTED TO WATER STRESS

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ABSTRACT

International interest in Jatropha curcas as a drought tolerant, fast-growing crop, suitable for bio-energy production, has grown significantly in recent years. The effective management of commercially planted species in terms of possible water resource impacts requires accurate information on water use and bio-physical production characteristics relevant to areas having planting potential. Currently there is no knowledge on the type of water regimes suitable for the survival, growth and yield performances of J. curcas particularly in Sarawak which seems to be receiving rainfall all year round. Foliar abscisic acid (ABA) concentration and leaf gas exchange properties of Jatropha curcas subjected to water stress were examined. Foliar ABA concentration of J. curcas increased to 5 fold while its leaf stomatal conductance (g_s) was reduced by 31 % as the soil water potential decreased from field capacity to more than 1.5 MPa. Photosynthetic rates (A) of plants grown under control conditions were higher with mean values ranging from 13.69 to 20.27 $\mu mol\ m^{-2}\ s^{-1}$ compared to those under water-stress with mean values ranging from 8.39 to 15.47 $\mu mol\ m^{-2}\ s^{-1}$. Photosynthetic rates were however reduced by 41 to 39 % from April to July after as the soil water potential decreased from field capacity to > 1.5 MPa indicating that water stress depressed photosynthetic capacity of J. curcas. A strong relationship between A and g_s regardless of treatments ($r^2 = 0.86$) was observed indicating that photosynthesis was closely related to the changes in the leaf stomatal conductance and overall plant growth performance was closely correlated to photosynthetic rates. Under water stress, the fivefold increment of foliar ABA assisted plant in adaptation to drought stress through stomata closure thus reducing excessive transpiration. The combinations of physiological mechanisms that effectively postpone dehydration and minimize damage enable this species to survive in hostile environment with unpredictable precipitation.

Keywords: *J. curcas*, water availability, photosynthesis, stomatal conductance, growth performances