



Photosynthetic restriction induced by combination of drought and heat stresses in cashew plants

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Although the effects of the drought and heat have been extensively studied, little is known how their combination affects the photosynthesis. In this study were assessed the combined effects of drought and heat stresses on the photosynthetic efficiency in cashew plants. Thirty days-old plants were submitted to drought by withdrawing water until they have reached a stomatal restriction of 80%. Then, control and drought-stressed plants were exposed to 25°C or 45°C for 12 h in a growth chamber under controlled conditions performing the following treatments: control (25°C), drought, heat (45°C) and drought + heat. The stomatal conductance of plants exposed to drought, heat and drought + heat stresses was reduced by 70%, 20%, and 80%, respectively, while the CO₂ assimilation in plants subjected to those three stresses was decreased by 60%, 60%, and 95%, respectively, in relation to control. The effective quantum yield of photosystem II was not affected by drought stress, but it was dropped by 50% and 25% in response to heat and in the drought + heat combination, respectively. The electron transport rate was not affected by drought but it was reduced by 50% and 20% in the heat stress and in the combination of the two stresses, respectively. The non-photochemical quenching was not affected by drought, but it was increased by 300% in response to both heat and drought + heat stresses. The photochemical quenching was equally decreased by 20% in heat and drought + heat treatments whereas drought alone did not change that photochemical parameter. The results show that the photosynthesis of cashew plants is more affected by heat than by drought and that when plants



previously exposed to drought are subjected to heat stress, an antagonistic effect is clearly perceived.

Keyword: Drought; heat; multiple stresses; photosynthesis; *Anacardium occidentale*.

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