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Drought responses on elephant grass genotypes as bioenergy feedstocks

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In perennial grasses, water deficit reduces productivity, therefore, genotypes with higher drought tolerance and soil water use efficiency are desirable. In recent years, the establishment of perennial grasses as energy crops has emerged as a viable option mainly due to their comparative advantages over annual energy crops and attractive characteristics like their high-yield potential and the high contents of lignin and cellulose. Elephant grass is a warm season specie that have generally been among the most productive perennial grass crops, producing dry matter yields of 20-45 Mg ha⁻¹. The objective of this work was to evaluate two elephant grass genotypes (BRS Capiaçú and Madeira) with high biomass production potential regarding to the tolerance to water stress during the growth phase. The experiment was conducted in a greenhouse, with water suppression carried out at 68 days after planting. Were evaluated: photosynthesis (A), stomatal conductance (gS), transpiration (E) and chlorophyll fluorescence (PSII) along eight days of water suppression (DAWS). Results showed that both genotypes presents significantly decreased in all parameters. BRS Capiaçú presents initial physiological rates of 28,98 mmol m⁻² s⁻¹ (A), 0,20 mol m⁻² s⁻¹ (gS), 4,77 mmol m⁻² s⁻¹ (E) and 0,70 (PSII). After 8 DAWS, these rates were reduced to 8,22 mmol m⁻² s⁻¹ (A), 0,08 mol m⁻² s⁻¹ (gS), 2,12 mmol m⁻² s⁻¹ and 0,32 (FS II). Madeira genotype presents initial rates of 29,47 mmol m⁻² s⁻¹ (A), 0,18 mol m⁻² s⁻¹ (gS), 3,91 mmol m⁻² s⁻¹ (E) and 0,70 (PSII). After 8 DAWS these rates were of 0,96 mmol m⁻² s⁻¹ (A), 0,07 mol m⁻² s⁻¹ (gS), 1,70 mmol m⁻² s⁻¹ (E) and 0,26 (PSII). The dry matter production were reduced 24,7 and 18,1% in BRS Capiaçú and Madeira, respectively.

Keywords: *Pennisetum purpureum*, bioenergy, water deficit, gas exchange,