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Water Stress on the Photosynthetic and Enzymatic Metabolism in Seedlings Native Specie's of Brazilian Cerrado

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Editorial

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Abbreviations

A_{max} – Photosynthesis; A/C_i – carboxylation efficiency; C_i – intracellular CO_2 concentration; g_s – stomatal conductance; PS II – photosystem II; PAR – photosynthetically active radiation; *WUE*= water use efficiency.

Editorial

The fruit and native specie's found in the Brazilian Cerrado present agromedicinal potential owing to the presence of bioactive compounds and pharmacological properties in its leaves and fruits. In seedlings phase may be inserted in programs for recovery of degraded areas and formation integrated production systems (e.g. agroforestry). It is also noteworthy that rural communities in several states in Brazil practice sustainable extractivism through the collection of fruits for preparation of sweets, jellies, liqueurs, among other artisanal products, as an alternative family income. In these premises, knowledge about the production of seedlings of species found on the Cerrado it is essential to establish its conservation *in situ* and *ex situ* in order to ensure the maintenance of plant genetic resources, environmental and socioeconomic services.

However, generally in phytophysiognomies on the Cerrado there are fluctuation in soil water status, because of rainfall irregularity or increase in the volume of water in the water table at certain periods of the year, characterizing deficit and flooding conditions, respectively. These environmental fluctuations can reduce germination potential and physiological responses through collapses in reaction centers and the photosynthetic apparatus caused oxidative stress, becoming an aggravating factor in the establishment of these native species. Based on this information, we ask: i) does the seedlings have lower metabolic characteristics owing to water deficit or flooding? ii) after the stress period, does the seedlings recovery photosynthetic metabolism and growth?

In works of Plant Ecophysiology Research Group – «GEEP/UFGD», we have shown that seedlings native species [*Campomanesia adamantium* (Cambess.) O. Berg, *Campomanesia xanthocarpa* (Mart.) O. Berg, *Schinus terebinthiolia* Raddi, *Dipteryx alata* Vogel, among others] under stress conditions (deficit or flooding), there is an increase in intracellular CO_2 concentration (C_i) in the sub-stomatal chambers, reduced gas exchange, such photosynthesis (A_{max}), stomatal conductance (g_s), carboxylation efficiency (A/C_i) and water use efficiency (WUE), suggesting sensitivity to adverse conditions. Moreover, the plants present changes in the photochemical apparatus, such as partial inactivation of electrons transfers in the reaction centers on photosystem II (PS II), owing to the instability of leaves metabolism, promoting negative impacts on photochemical processes and A_{max} even under appropriate PAR for each species considering their classifications at ecological succession groups. Under these conditions, the general occurred increase in activity of antioxidant metabolism enzymes, including peroxidase, proline, and catalase and superoxide dismutase in order to minimize the deleterious effects, signaling a stress

condition.

After the period temporary water stress, the native species in the initial growth phase are able to resume normal conditions of A_{max} through adjustments in leaves characteristics, indicating physiological plasticity, favored their environmental resilience, i.e., demonstrating that even under environmental restriction by water, very native species development in as stabilized manner in areas of forest restoration. In other perspectives, studies associated with agents that may mitigate/attenuate (salicylic acid, silicon, water-retaining polymer, ascorbic acid, among others) the deleterious effects in seedlings under water stress and/or accelerate metabolic recovery process post-stress of native species found in the vegetation Brazilian Cerrado needs to be developed.

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