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The Effect of Drought on Leaf Emergence and Development in the Oilseed Palm *Acrocomia aculeata*

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Abstract

Acrocomia aculeata is an oilseed palm native to semi-arid and arid regions of Central and South America. They are solitary palms with pinnate leaf blades of around two to three metres in length. Young leaves are emerging tightly furled, reminding of a spear, thus named spear leaves. The leaves unfurl and expand when completely emerged. *Acrocomia* shows a resilience to drought, however knowledge is lacking on how water deficit affects the leaf formation and development. This study aimed to determine the monthly leaf emergence and unfurling in different *Acrocomia* ecotypes and to evaluate the effect of water deficit on leaf development using specific leaf area (SLA), leaf dry matter (LDM) and leaf thickness (LT) as indicators. It was hypothesised that leaf emergence, SLA and LDM decrease during the dry season whereas LT increases.

Data collection was done in the Macaúba Germplasm Bank of the Universidade Federal de Viçosa in Araponga, MG, Brazil. Selection of the *Acrocomia* ecotypes was based on their climatic origin. From April 2019 to March 2020, the number of newly formed leaves was counted monthly. Leaflets from the petiole middle of one-month old leaves were sampled. The fresh and dry weight, and the leaf length and width were determined. Additionally, data on climate and soil moisture content were collected.

In the dry season, the leaf unfurling was slowed down, leading to an accumulation of spear leaves. Furthermore, only zero to one leaf emerged versus two to three leaves in the rainy season. Consequently, water deficit caused a decelerated vegetative growth. A difference between the ecotypes could be observed, where ecotypes coming from drier regions used the strategy of reduced leaf unfurling and ecotypes from humid regions showed a decreased leaf emergence. Contrary to expectations, the SLA, LT and LDM showed no clear response to water availability. SLA ranged between 4.2–7.9 m² kg⁻¹ and 4.0–6.7 m² kg⁻¹, LDM between 26.2–45.8 % and 34.5–45.8 %, and LT between 380–596 μm and 379–653 μm for the dry and rainy seasons, respectively. This could be explained by the faster leaf development in the rainy season, which has a decreasing impact on SLA and LDM.

Keywords: *Acrocomia aculeata*, Brazil, leaf development, leaf emergence, oilseed palm, specific leaf area, water availability