



Tropentag, September 9-11, 2020, virtual conference

“Food and nutrition security and its resilience
to global crises”

Phenotypic Plasticity of Fruits of *Acrocomia aculeata* in Western Minas Gerais, Brazil

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Abstract

Vegetable oils are an important international commodity in today's food and non-food industry. Nowadays, the oil palm (*Elaeis guineensis*) has the biggest share of this commodity. By the next few years, the demand of the cost-competitive palm oil is expected to rise up. An alternative to supply this demand is *Acrocomia aculeata*, an oilseed palm endemic to the Americas which has a productivity and oil composition comparable to *E. guineensis*. *Acrocomia* also shows a variety of agricultural advantages: being fire and drought tolerant, its possible cultivation on degraded soils and its environmental plasticity. Mature fruits of *Acrocomia* have a smooth hard exocarp, a fleshy mesocarp and a very hard, thick endocarp encompassing the endosperm. The mesocarp as the endosperm can be used for oil extraction whereas the endocarp and exocarp are promising for the production of bio-charcoal. This study aims to elaborate the variability in fruit phenotypic characteristics of ecotypes from different regions of Minas Gerais, Brazil, and to assess the difference between plants, originating from dry and humid regions. Mature fruits from different ecotypes were collected at the Macaúba Active Germplasm Bank, of the Universidade Federal de Viçosa in Araponga, MG, Brazil, in February 2020. The layers were separated. Their thickness, proportions, fresh and dry weight were determined. The mesocarp was dried for 48 hours so oil extraction could be done. The fruits are showing natural ecotypic differences. Fruit weight ranged from 20.4 to 41.3 g per fruit, where the predominant fruit mass was situated between 27.4–32.9 g and 32.2–36.5 g for the ecotypes from the dry northern and humid midwestern Minas Gerais, respectively. Fruits from dry regions tend to be smaller than fruits from humid regions. Exocarp thickness is between 0.5–1.5 mm independent of the ecotype. However, a difference between ecotypes can be found in the proportion of the exocarp to the total fruit. The majority of fruits show a proportion from 23.7–25.6% and 18.5–23.3% for the northern and midwestern ecotypes, respectively. *Acrocomia* ecotypes show a high fruit phenotypic plasticity, important for further development of the species as a crop.

Keywords: *Acrocomia aculeata*, Brazil, fruit characteristics, oilseed palm, phenotypic plasticity