



Phenotypic plasticity of fruits of *Acrocomia aculeata* in western Minas Gerais, Brazil.

Claudio E.M. Campos^{1*}, Catherine Meyer^{2*}, Thomas Hilger², Georg Cadisch², Sergio Y. Motoike³

- 1 - Department of Forestry Engineering, Universidade Federal de Viçosa, Minas Gerais, Brazil;
2 - Agronomy in the Tropics and Subtropics, Institute of Agricultural Tropics (Hans-Ruthenberg-Institute), University of Hohenheim, Stuttgart, Germany;
3 - Department of Agronomy, Universidade Federal de Viçosa, Minas Gerais, Brazil.

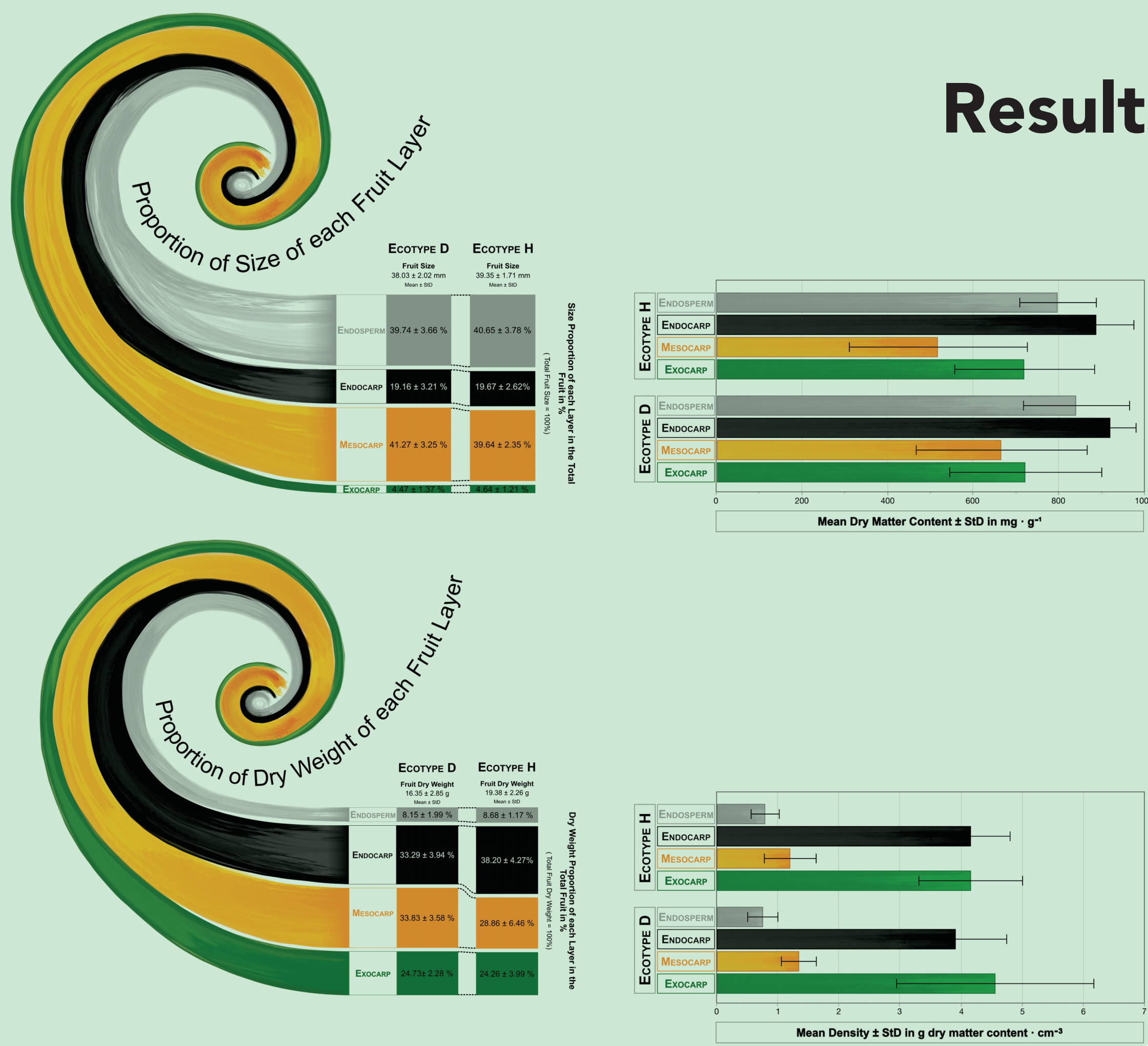
Background

Endemic to the Americas, mostly at the region of Minas Gerais, Brazil, *Acrocomia* can produce 6,000 kg crude oil per hectare. In regard to *Acrocomia*, studying fruit phenotypes can improve the development of better crops and breeding of new varieties showing decent yields under sub-optimal growing conditions (drought events, poor soils, etc.) in view of *Acrocomia* tree can grow in very different environments (dry or humidity, poor soil or not). With a high production of oil, this plant can be a sustainable industrial and agricultural alternative to the oil palm (*Elaeis guineensis*). Fruits are compound by four layers: a slim, tough protective exocarp that can be easily opened; a fleshy mesocarp from which the majority of the oil can be extracted; a very hard endocarp and an endosperm from which it is also possible to extract oil.

This study aimed:

- 1 - To elaborate the variability in fruit phenotypic characteristics of ecotypes from two different regions;
- 2 - To access the difference between ecotypes originating from dry and humid region.

Results



Conclusion and Outlook

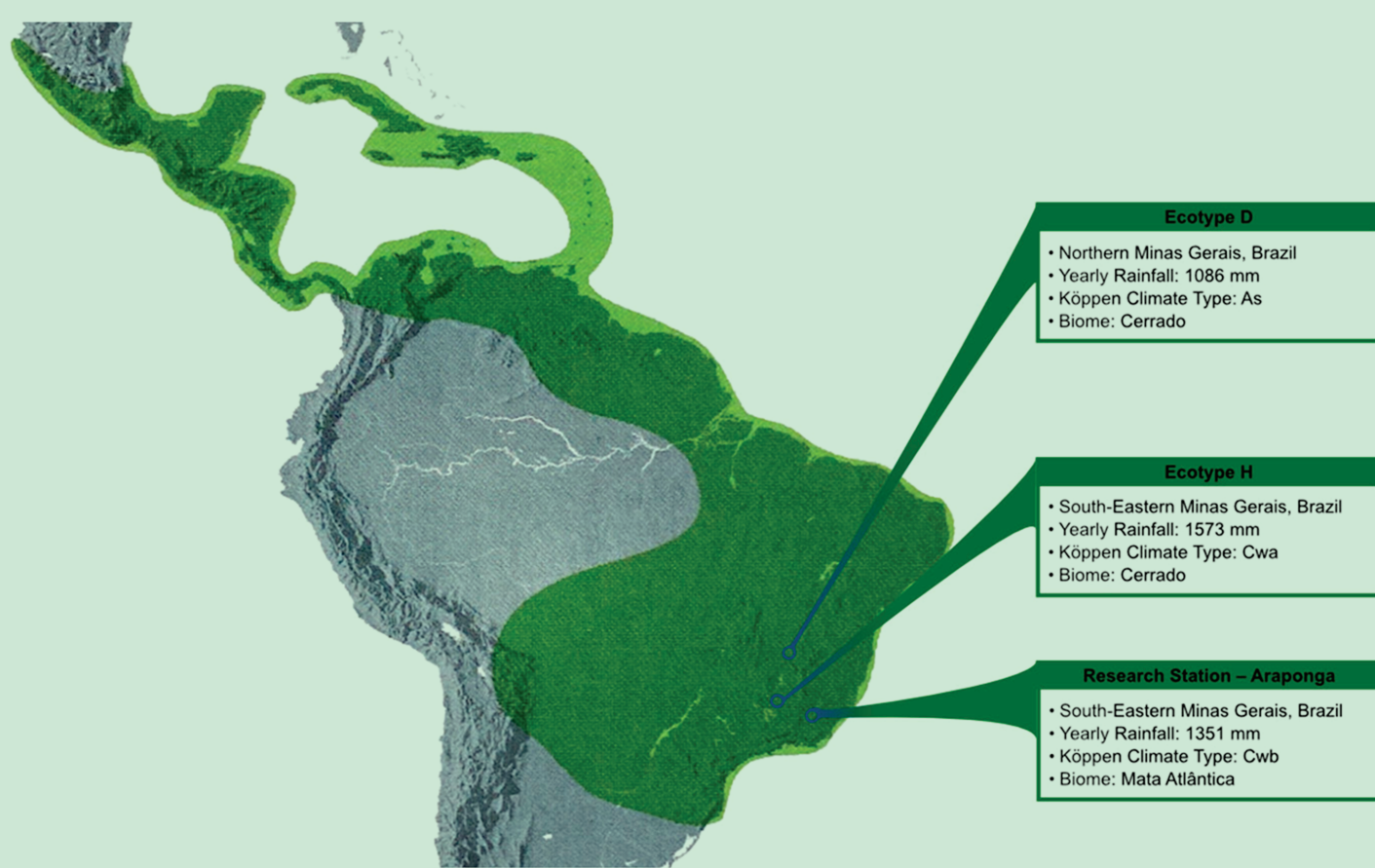
- The fruits show a natural ecotype difference:
 - Fruits from Ecotype H tend to be bigger with a harder endocarp;
 - Fruits from Ecotype D tend to have a tougher exocarp with a higher density.
- Both ecotypes show similar proportion in size of each layer, and mesocarp and endosperm densities.
- In both ecotypes the endosperm size, dry weight, dry matter content and density are comparable in contrast to the mesocarp:
 - o Similar in size and density, however Ecotype H shows a lower dry weight and dry matter content;
 - o More mesocarp can be gained from Ecotype D, suggesting also a higher amount of oil which could be extracted.
- Fruits have a high plasticity increasing the phenotypic characteristics variability, which is of importance for developing *Acrocomia* into a crop through breeding.

In the upcoming month:

- Extraction of oil from the mesocarp and endosperm;
- Assessment of more ecotypes from other regions of Brazil.

Materials and Methods

- Two different ecotypes from the Macaúba Active Germplasm Bank of the Universidade Federal de Viçosa in Araponga Minas Gerais, Brazil were selected:
 - 1 - Ecotype D from northern of Minas Gerais → dry region of origin with 1086 mm yearly rainfall.
 - 2 - Ecotype H from south-eastern of Minas Gerais → humid region of origin with 1573 mm yearly rainfall.
- 15 fruits per fruit stand were collected in the harvest season in February-March 2020:
 - 1 - Ecotype D: 5 fruit stands → 66 fruits.
 - 2 - Ecotype H: 4 fruit stands → 81 fruits.
- The different layers (exocarpo, mesocarpo, endocarpo and endosperm) were separated. Fresh weight, thickness and dry weight were determined.



MESOCARP

Thickness measured by pachymeter
Dry and fresh weight.

EXOCARP

Thickness measured by pachymeter
Dry and fresh weight.

ENDOSPERM

Dry and fresh weight.



ENDOCARP

Thickness measured by pachymeter
Height and diameter.
Dry and fresh weight.

FRUIT:
Height and diameter measured by pachymeter
Fresh fruits total weight.

*Corresponding Author:
Claudio E.M. Campos
claudio.campos@ufv.br
Catherine Meyer, M.Sc., M.Sc. ETH
catherine.meyer@uni-hohenheim.de