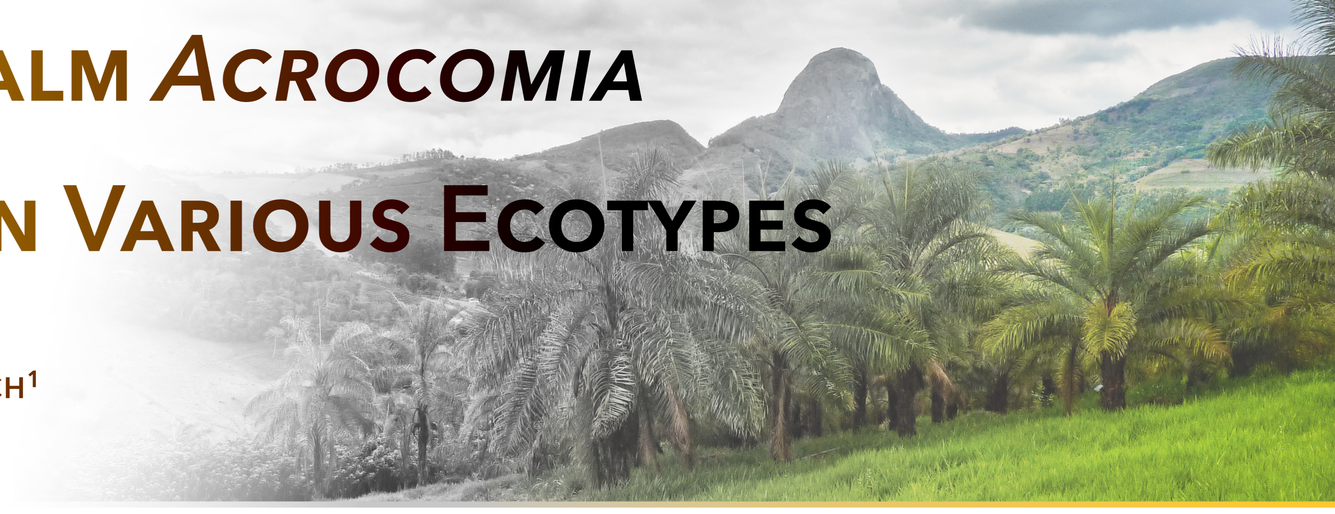
Flowering in the Oilseed Palm *Acrocomia*

Rachillae Morphology in Various Ecotypes



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Background

The oilseed palm *Acrocomia*, endemic to the South-Americas, is a promising sustainable alternative to the African oil palm (*Elaeis guineensis*) due to its drought tolerance and adaptability to a wide range of soils and climatic conditions.

Acrocomia flowers in the first half of the rainy season. In general, palms produce several large inflorescences which open one at a time. The inflorescences are panicles with first order branching consisting of a main rachis and several hundred short rachillae. Those rachillae bear the female and male flowers at their basal and apical end, respectively. The female and male flowers can be found in certain structures, so-called triads(♀), polyads(♀) and dyads (♂) (Mazzottini-dos-Santos et al., 2015).

Research Aim

Most studies on *Acrocomia* are performed using wild populations. Consequently, the separation of the location and the genotype effect cannot be made.

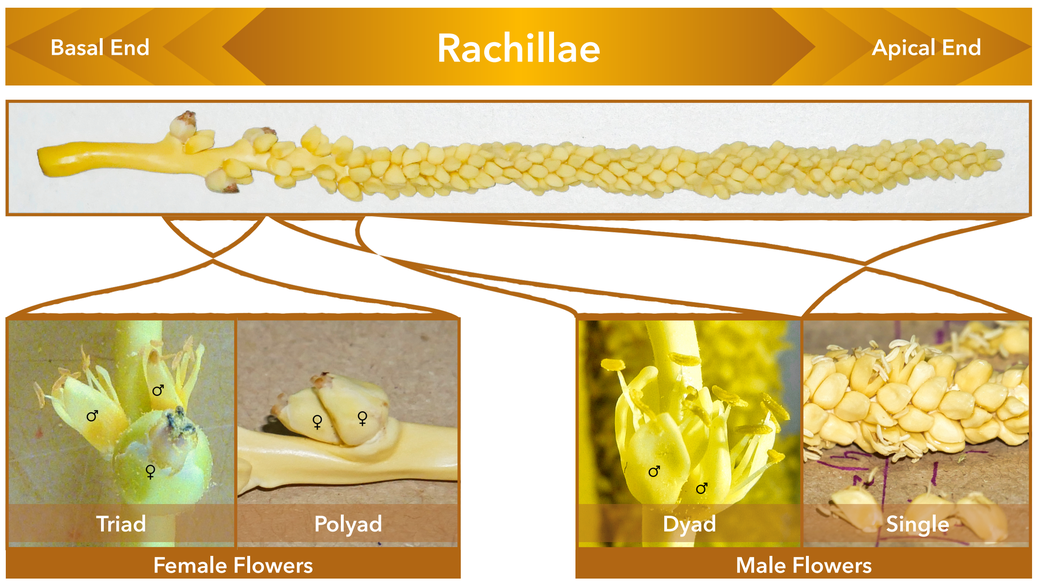
This study aimed to assess the variability in the rachillae morphology of various ecotypes of the species *Acrocomia aculeata* and *Acrocomia totaí* grown at the same location in the Acrocomia Active Germplasm Bank in Araponga, MG, Brazil.

Conclusion

- Differences in structures present in the individual ecotypes and species ➡ high morphological variability useful for genetic improvement
- Occurrence of branched rachillae ➡ Inflorescence can be a panicle with second order branching
- Position of rachillae within inflorescence has an impact on number and occurrence of structures
- Advantage/Disadvantage of branched rachillae and polyads unknown ➡ further investigation needed

Results and Discussion

Rachillae Morphological Structures: Observations



Apical End

▶ Several hundred **single male flowers** arranged in a spiral around the rachillae stalk

Medial Region

▶ **Dyads:** Pairs of male flowers

Basal End

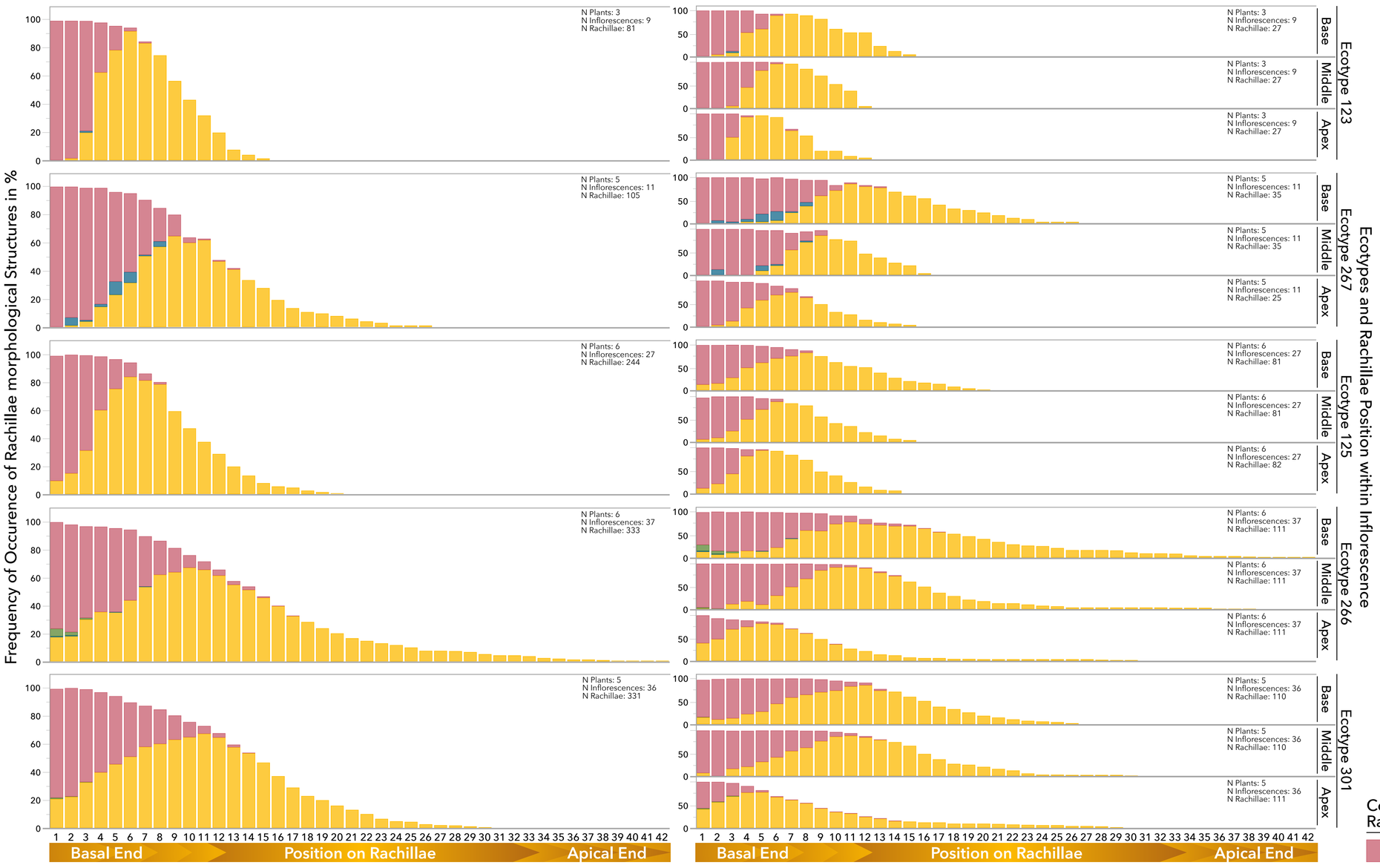
▶ **Female Flowers**

- **Triads**: one female flower flanked by up to two male flowers
- **Polyads**: two female flowers flanked by up to two male flowers

Novelty

In rare cases, **branched rachillae** were found. Up to three additional branches were observed. In general, only male flowers (in dyads or single) were found on those branches.

Sequence and Occurrence of Rachillae Morphological Structures



▶ **Effect: Ecotypes**

- *Acrocomia totaí* ecotypes (266 and 301) show higher number of structures in particular in the number of dyads found

▶ **Effect: Rachillae Position within Inflorescence**

- Decrease in number of structures from rachillae of the base to rachillae from the apex
  ➡ coherent with rachillae length (data not shown)
- Decrease in number of female flowers from rachillae of the base to rachillae from the apex

▶ **Variability in Sequence within Rachillae**

- Dyads: ➡ not exclusively in medial region
  ➡ also found in basal region before or between female flowers
- No development of female flowers is possible
  ➡ Rachillae with only dyads followed by the single male flowers of the apical end

▶ **Occurrence of Polyads**

- Rare however occurrence seems connected to certain ecotypes
- Found in the two ecotypes from drier regions
- Higher occurrence in rachillae of basal and medial regions of inflorescence

▶ **Occurrence of branched rachillae**

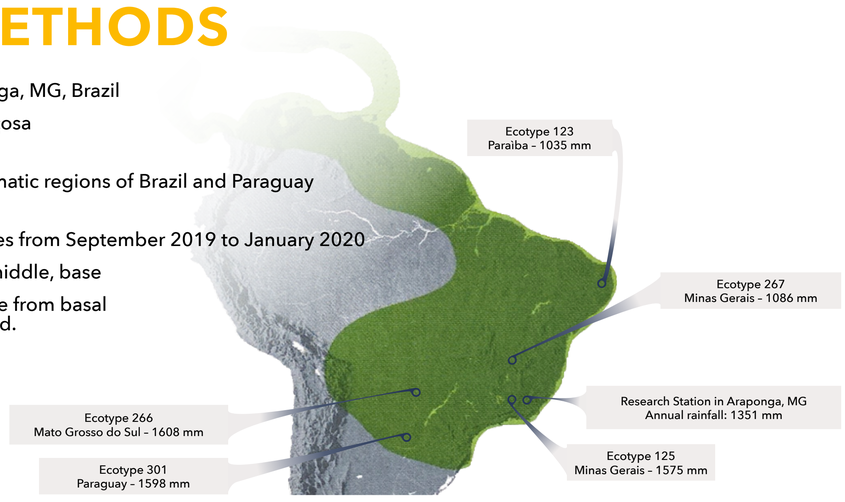
- Rare however occurrence seems connected to certain ecotypes
- Found in the two *A. totaí* ecotypes
- Presence highly dependent on examined individuals (detailed data not shown)

Colour Legend
Rachillae Morphological Structures

Triad · Polyad · Branch · Dyad

Materials and Methods

- Study Site: Acrocomia Active Germplasm Bank in Araponga, MG, Brazil
  Managed by the Universidade Federal de Viçosa
- Study Object: 5 ecotypes of Acrocomia from different climatic regions of Brazil and Paraguay
- Sampling of nine rachillae of each flowering inflorescences from September 2019 to January 2020
  ➡ 3 per position within the inflorescence: apex, middle, base
- Assessment and counting of each morphological structure from basal until the apical end of the rachillae. Exclusion of apical end.



References

Mazzottini-dos-Santos, H. C., Ribeiro, L. M., Mercadante-Simões, M. O., & Sant'Anna-Santos, B. F. (2015). Floral structure in Acrocomia aculeata (Arecaceae): Evolutionary and ecological aspects. Plant Systematics and Evolution, 301(5), 1425-1440.

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AcroWat – Influence of climate on ovariation of inflorescence traits in the neotropical oilseed palm *Acrocomia aculeata*

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