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Does mechanical state of bark change with ontogeny?
A study on several tropical rainforest species

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**BACKGROUND**

- **Inner bark** is implicated in many tree functions: transport, storage, protection ...

  ... but it is also able to **generate forces** to offset the effect of gravity:

  B. Clair, R 32 "The bark side of the force", August 11, at 15:30

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**QUESTIONS**

- **How mechanical state of bark varies with tree size?**
- **Does the allometry between bark and wood differ between species with active and passive bark?**

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**METHODS**

- Selection of 6 species differing by the anatomical structure of their bark

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**RESULTS**

- **Bark Residual strain varies with tree size:**
  - Compressive strain increases in Jacaranda and Goupia
  - Tensile strain increases in Pachira, Cecropia, Virola, and Simarouba but decreases when stem diameter > 10 cm

  
  
  ![Graph showing bark longitudinal residual strain vs stem diameter](image)

- **The relationship between bark thickness and wood radius is allometric:**
  - Scaling exponent does not differentiate active and passive bark species
  - Species with higher tensile strain have higher intercept value

  
  
  ![Graph showing inner bark thickness vs wood radius](image)

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**CONCLUSION**

- Species with active bark produce more bark per unit of wood than species with passive bark
- For species with active bark: the magnitude of tensile strain increases during young stages and decreases in older stages
- Study of secondary changes in bark and numerical simulations are in progress to understand how the shift of bark mechanical state occurs during ontogeny