# Anatomic features underlying wood density, in 110 rainforest tree species from central Congo basin

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WOOD SCIENCE UNDERPINNING TROPICAL FOREST ECOLOGY AND MANAGEMENT

## Introduction

**Carbon stocks** in Earth's forests play a **central role in the global carbon cycle**, and accordingly influence climate at a global scale. In order **to quantify these stocks** and their variations, **wood density is often used**, as it has been shown to be the **second most important predictor** of above ground biomass (Chave et al. 2005). However, **wood density**, as an integrative wood property, is **but the result of multiple anatomic features**, linked to several other wood property.

This research project **investigates the impact of wood anatomic features on wood density** on one hand, and the relationships between wood density and other wood traits. To this end, **1102 trees among 110 taxa** were sampled for wood in Yangambi Man and Biosphere Reserve in the center of Congo basin's rainforest. **Among these 110 taxa, 46 were absent of Dryad wood density database** (http://datadryad.org/).

Photo : Thalès de Haulleville

## Aim ▶

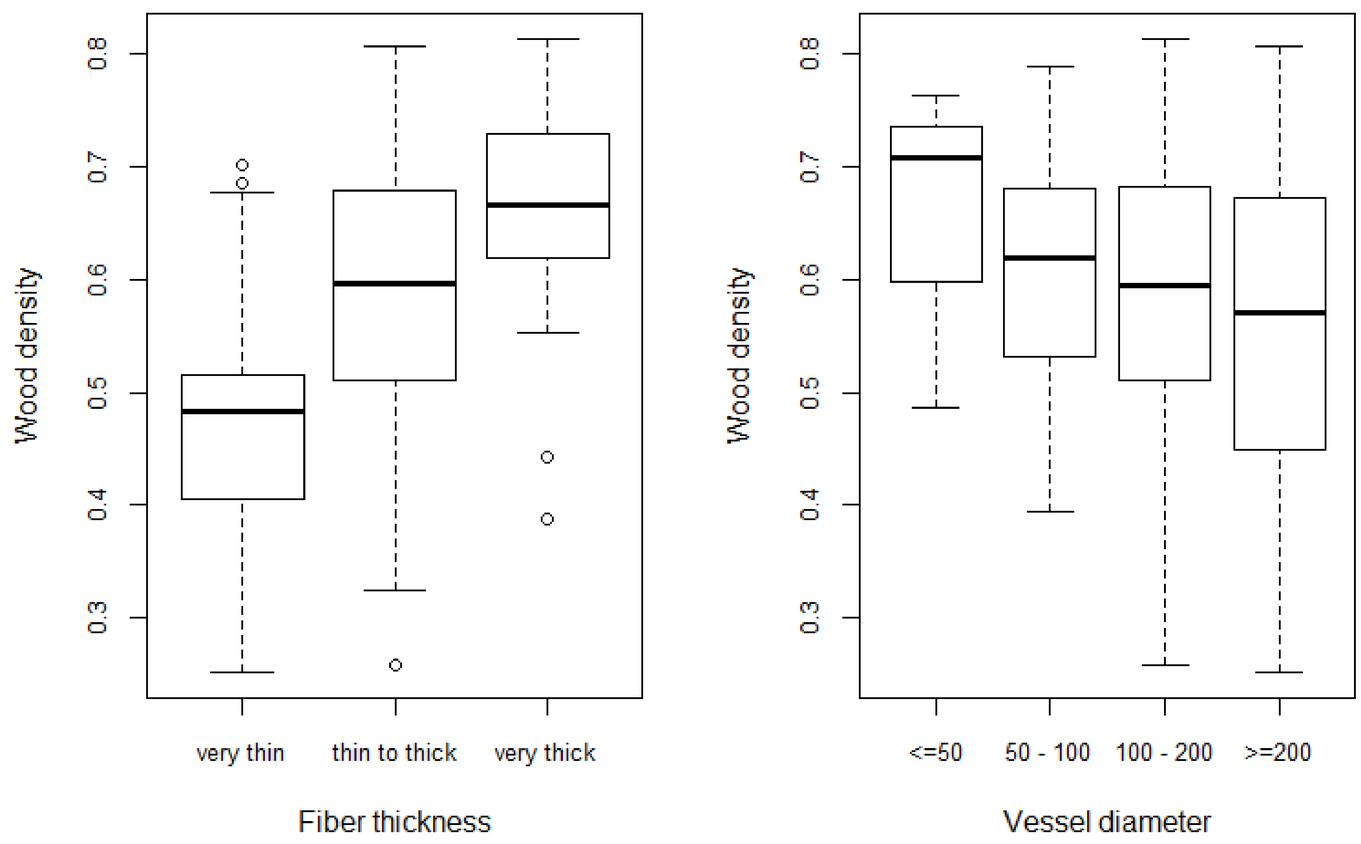
The aim of this research project is to investigate **the influence of fiber thickness and vessel diameter on the wood density** in 110 rainforest tree species, and the relationships between **wood density**, wood **water content** and **shrinking ratio**.

## Method

1. **21 one hectare plots** were set in **5 different forest types** throughout Yangambi reserve. (see Kearsley et al. 2013 for details)
2. Individuals were **identified** and diameter at breast height was measured to assess **basal area**.
3. Sapwood samples of species representing cumulatively **90% of total plot basal area** were collected.
4. **Wood density** (defined as oven-dry mass divided by fresh volume) was measured using **water displacement method**. **Water content** (defined as fresh mass minus oven-dry mass divided by oven-dry mass) and **shrinking ratio** (defined as fresh volume minus oven-dry volume divided by fresh volume) were also calculated.
5. Species' **fiber thickness** and **vessel diameter** were obtained via **InsideWood database.** (http://insidewood.lib.ncsu.edu/)

## Wood density, fiber thickness and vessel diameter

Preliminary results suggest the presence of a **direct correlation between wood density and fiber thickness**, while and a **milder inverse correlation between wood density and vessel diameter** can be observed.




Wood Density variation of 110 rainforest trees along fiber thickness and vessel diameter gradient.

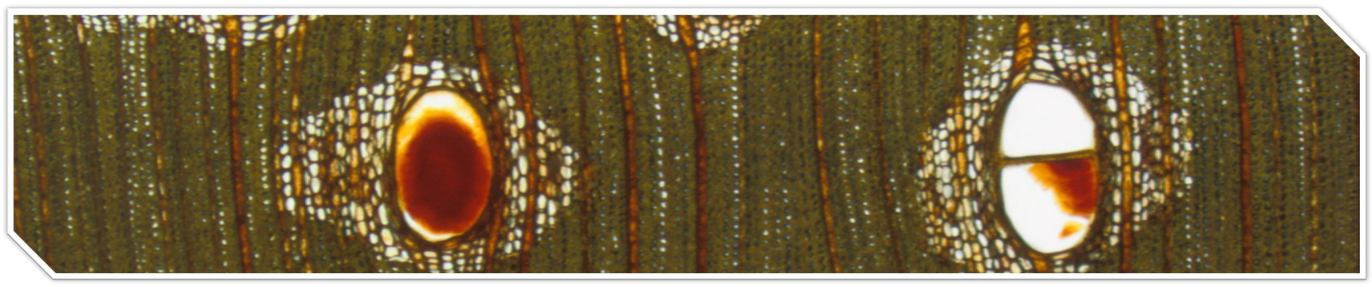


Photo : Royal Museum for Central Africa, Service of Wood Biology *(Gilbertiodendron dewevrei,* transversal section)

## Wood density, water content and shrinking ratio

**Wood density is inversely correlated to water content** (cor=-0.81), while **shrinking ratio** on the other hand has **no relationship** with wood density (cor=-0.043) nor water content (cor=-0.225)

## Take home messages

- **Wood density seems to be positively correlated to fiber thickness and negatively correlated to vessel diameter.**
- **Wood density is negatively correlated to water content.**
- **Shrinking ratio does not present any correlation with wood density nor water content.**