USDA Forest Products Laboratory
Center for Wood Anatomy Research

- Research
  - Systematic anatomy
  - Wood structure & properties
  - Wood identification
  - Wood quality

- More than 100,000 wood samples
- Identification service
- Technology transfer
- Analysis of seized material
  - CITES violations
  - Lacey Act violations
  - Criminal investigations
Surface Fluorescence
Sodium Nitrite Test

Dark purple on white oaks
Orange on red oaks
Dalbergia nigra
and
D. spruceana

D. nigra
D. spruceana
Water Extract Fluorescence in *Dalbergias*

*D. nigra*  
CITES App. I  
negative

*D. spruceana*  
CITES App. II  
blue
Ethanol Extract Fluorescence in Dalbergias

*D. nigra*

green/blue

*D. spruceana*

blue
Species Verification using Spectroscopy
Ring-Porosity vs Latitude

Note lack of RP in Southern Hemisphere
Parenchyma Arrangement vs Latitude & Temperature
Wood Specific Gravity as a Function of Distance from Pith
Coring a large *Ceiba*
Temperate

Basic Specific Gravity

Distance from Pith (cm)

Magnolia

Prunus
Ceiba from two sites

![Graph showing the variation of basic specific gravity with distance from pith in Ceiba trees from two sites: Tropical Wet and Tropical Dry. The graph highlights differences in specific gravity across different distances.]
7 cm from pith  
SG=0.10

39 cm from pith  
SG=0.44

2 cm from pith  
SG=0.09

20 cm from pith  
SG=0.21

**Ochroma**  

**Heliocarpus**
Chilga Ethiopia today – Oligocene Fossil trees
Big Fossil Tree
Cross-section (low mag.)

Vessels solitary & in groups

Vessel diameters
90-220 μm
Cross-section (high mag.)

Vasicentric parenchyma

Fiber walls medium-thick

100 μm
Tangential section

Rays 2-4 seriate

Septate fibers?
Radial section

Rays with several rows of uprights

100 μm
Transcontinental genus

*Antiaris*; 6 fossil stumps collected at Chilga

Ethiopia (fossil)  
Liberia (living)

Note buttresses on both trees

Voorhoeve 1965
**Pouteria; 4 at Chilga**

Vessels: radial groups; <100 \( \mu m \) diameter

Rays: 1-2 seriate; many rows of uprights; multiseriate width = uniseriate width

Parenchyma: diffuse-in-aggregates
**Brachystegia;** 6 small trees at Chilga

Large *kino* (condensed tannin) **veins** due to injury (e.g. fire)
Vessels: solitary & groups, 100-200 μm diameter
Parenchyma: aliform, marginal
Rays: uniseriate
**Magnistipula;** 3 at Chilga

Vessels: solitary, 180-250 μm diameter

Parenchyma: diffuse and diffuse-in-aggregates

Rays: uniseriate, homogeneous
Underwater Logging In Panama Canal
Launch and raft
Pontoon attached to tree
Cuna diver using hydraulic chainsaw
Guayacan leaving water
Cedro espino on ramp