

# **Current Status and Options for Forest Biotechnologies in Developing Countries**

## **Comments**

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# **General Comments:**

- The document is very well structured and covers a very large amount of topics.**
- Is written in a way to facilitate the understanding of the subject.**
- Important to recognize the difference in approach of using biotechnology compared with crop or livestock sectors.**
- Considers situations related to natural forest management and planted forests. In tropical humid forests, the use of biotechnolgy is getting more and more important in different lines of research combined with genetics, ecology and/or taxonomy.**

# General Comments:

- Cont.
- Most of the molecular markers are DNA-based systems. These molecular markers and genomics are getting more available for tropical tree species, in plantated and naturally regenerated forests.
- However, in the context of **reduced impact logging**, we still face a basic problem related to a **correct identification for tropical species** for several valuable economic groups.

# **High Inter-specific Diversity: Leading to an incorrect species identification**

- Identification based on common names**
- The correspondence of the scientific names is not done based on botanical material, or checked carefully with existing species lists.**
- There are species groups of valuable economic wood very difficult to separate at specific level.**

# Exemplos of Complex Groups

## ANGELINS

### Angelins verdadeiros

angelim-da-mata	<i>Hymenolobium excelsum</i>
angelim-pedra (verdadeiro)	<i>H. petraeum</i>
angelim-fedorento	<i>H. pulcherrimum</i>
angelim-do-Pará	<i>H. flavum</i>
angelim-pedra-falso	<i>H. modestum</i>

angelim-falso	<i>Abarema jupunba</i>
angelim-vermelho	<i>Dinizia excelsa</i>
angelim-rajado	<i>Zygia racemosa</i>
angelim-doce	<i>Andira</i> spp.
angelim-amargoso	<i>Vatairea</i> e <i>Vataireopsis</i> spp.

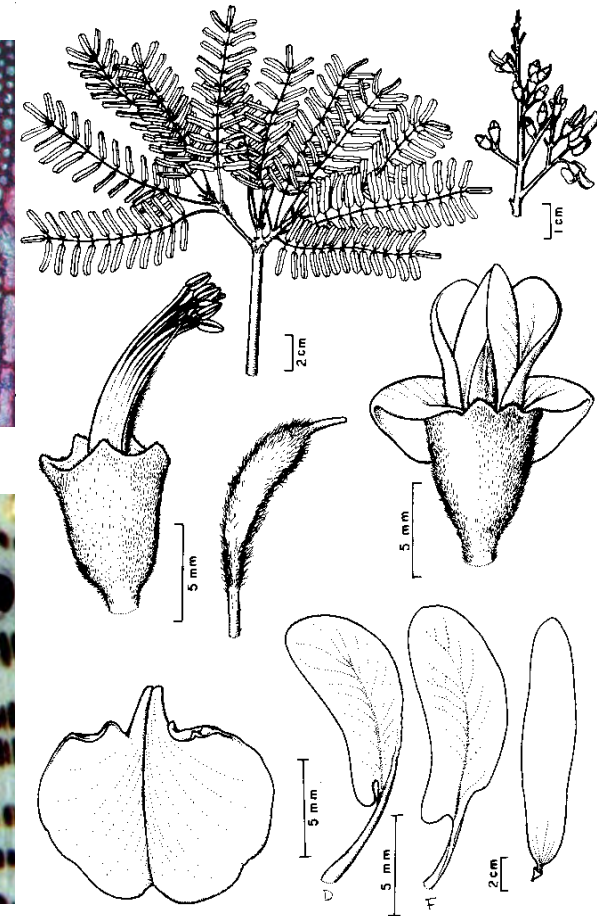
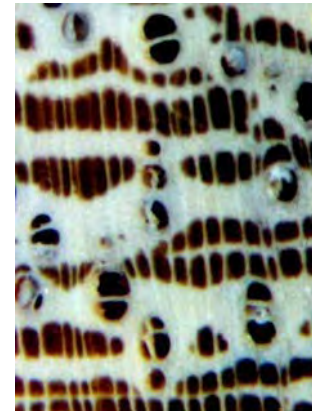
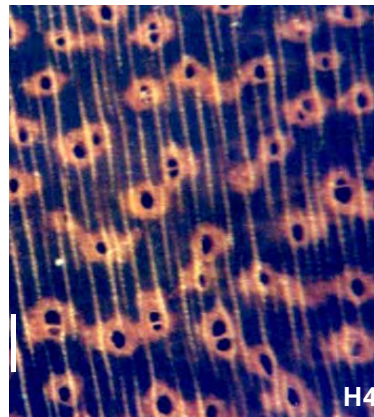
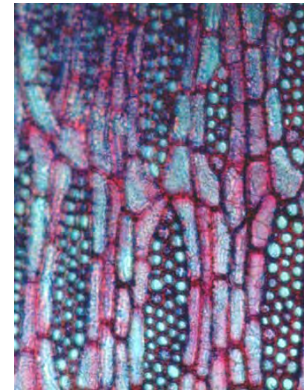
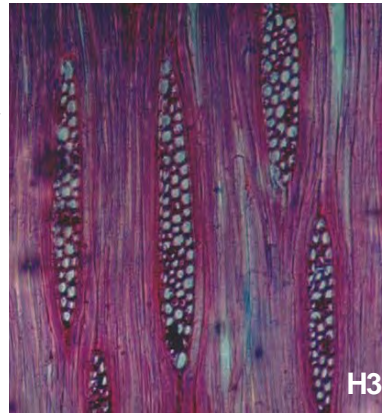
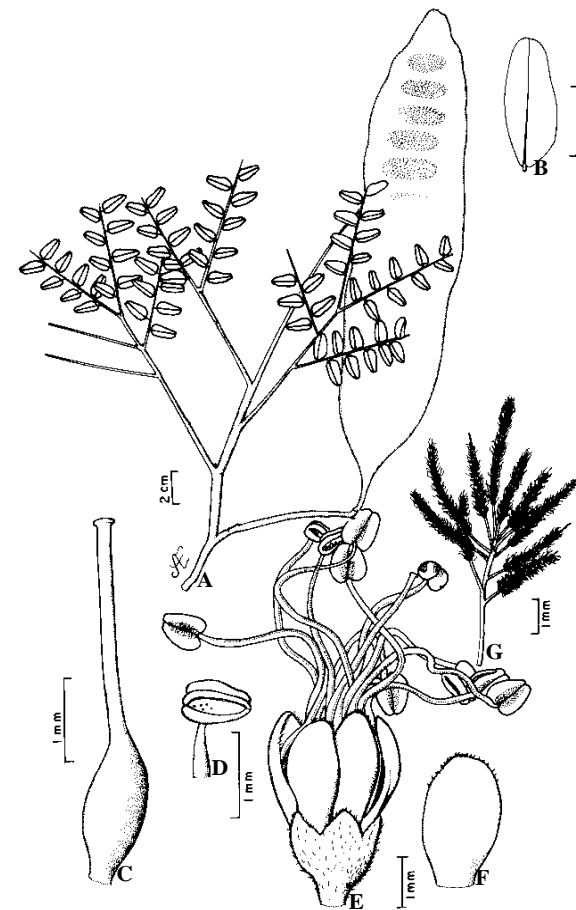


### Angelins falsos

<i>Abarema</i>	saboeiro
<i>Bowdichia</i>	sucupira
<i>Dimorphandra</i>	faveira-amarela
<i>Enterolobium</i>	orelha-de-macaco
<i>Parkia pendula</i>	visgueiro ou fava-bolota
<i>Vouacapoua americana</i>	acapu

Fonte: G. Ferreira, 2002

# Wood Anatomy



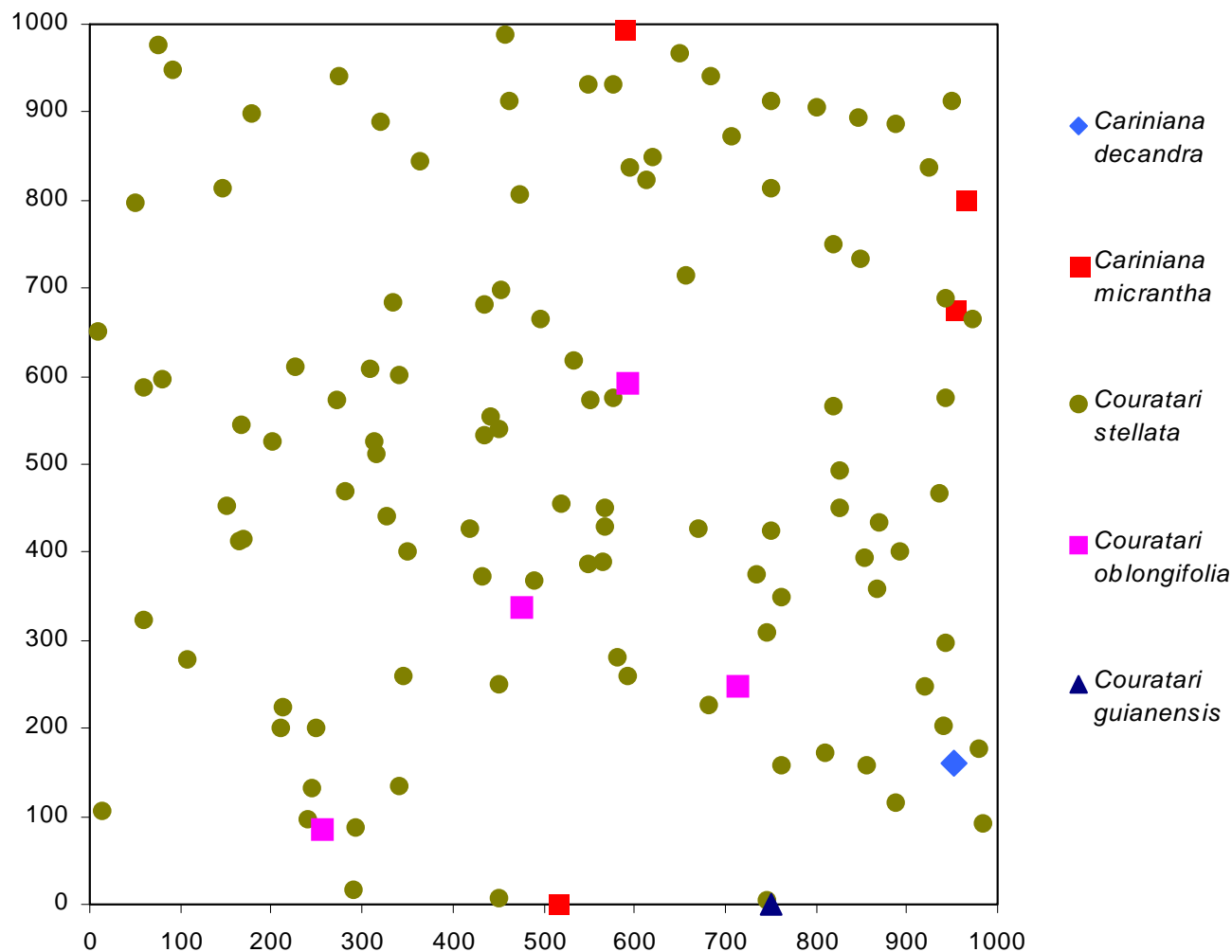
*Dinizia excelsa*

*Hymenolobium excelsum*

Fonte: G. Ferreira, 2002

# TAUARIS

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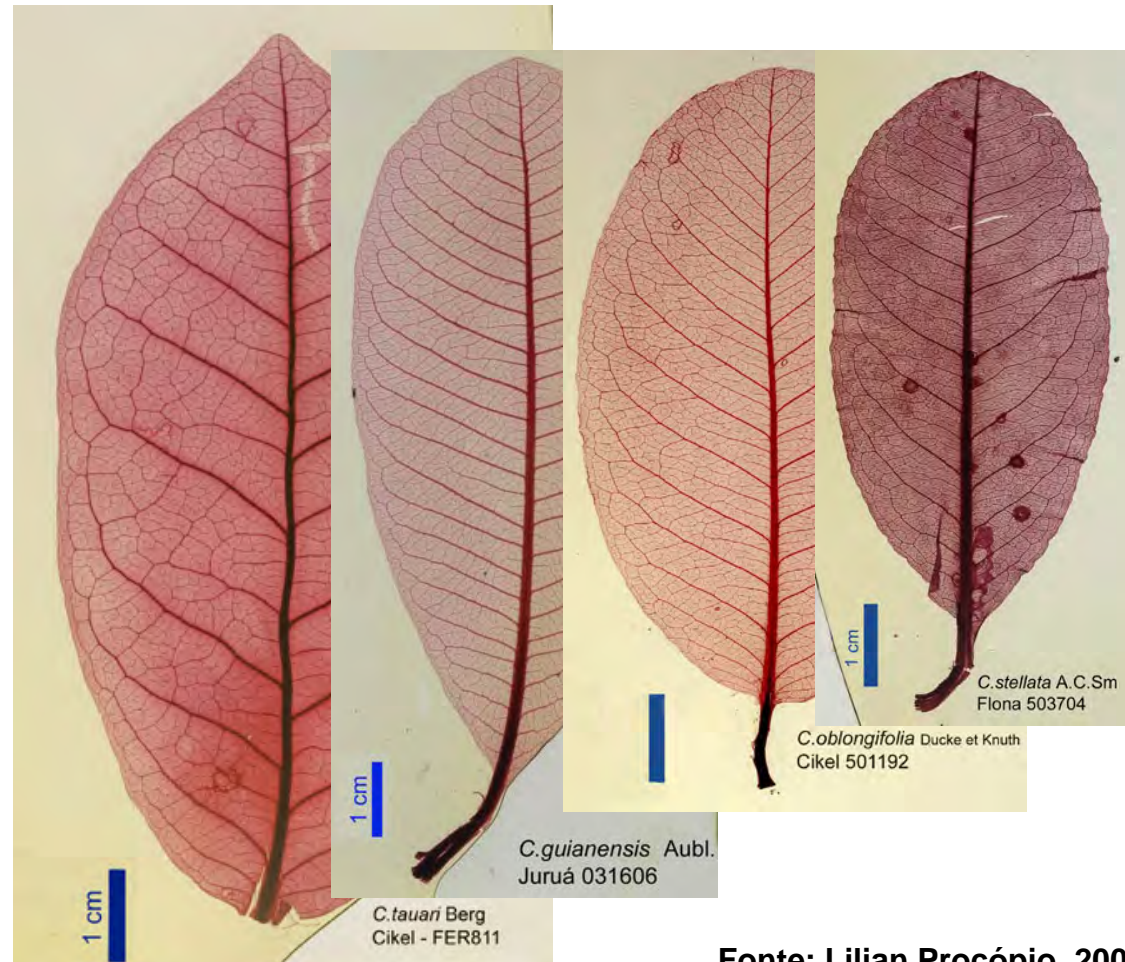
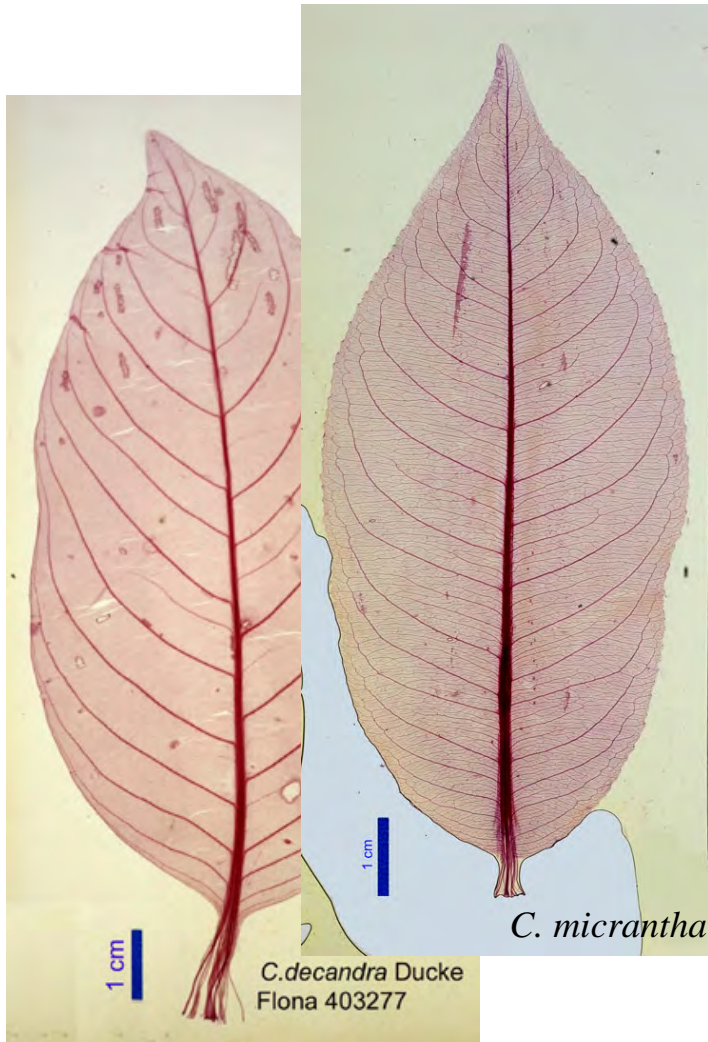


**124 individuals  
named tauari  
in 100 ha  
(Flona Tapajós  
- PA)**

Fonte: Lilian Procópio ,2004



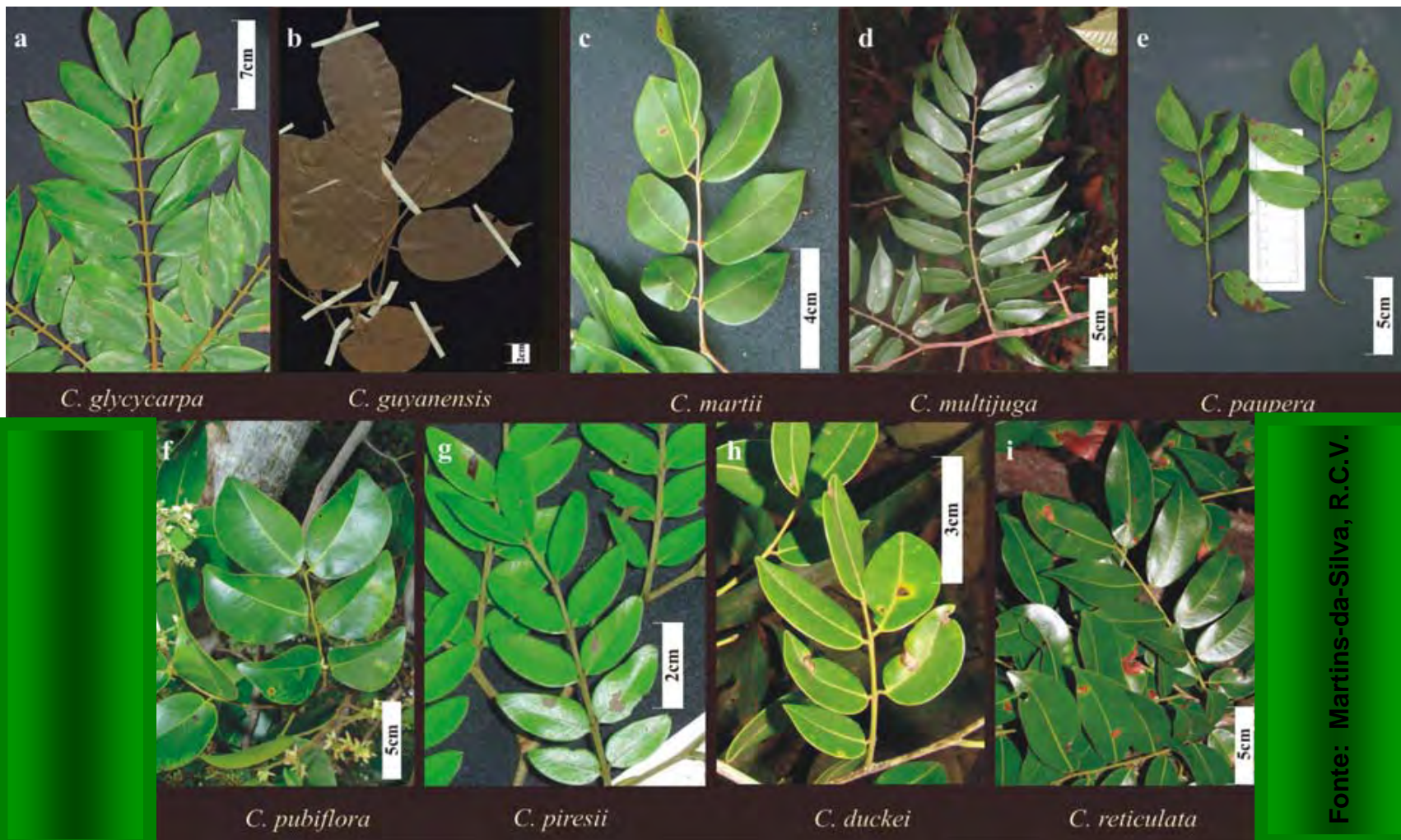
# Anatomy and leave morphology studies



Fonte: Lilian Procópio, 2004



# COPAIBAS – Copaifera spp



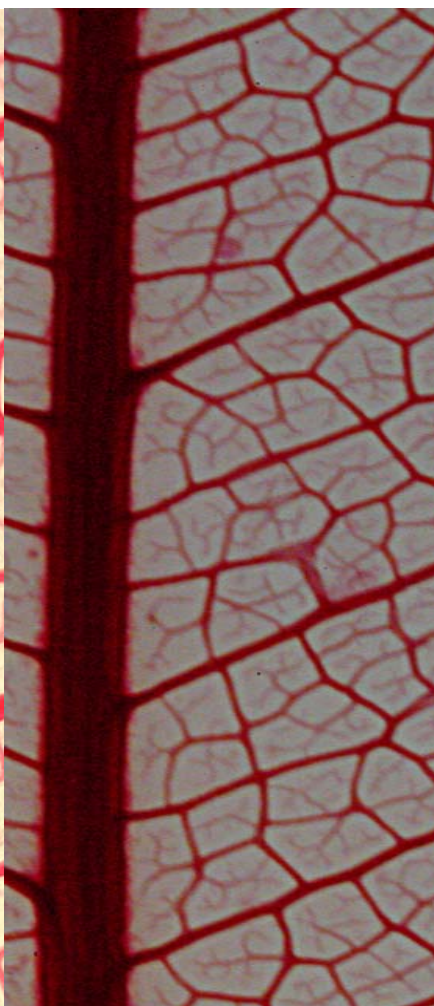
Fonte: Martins-da-Silva, R.C.V.



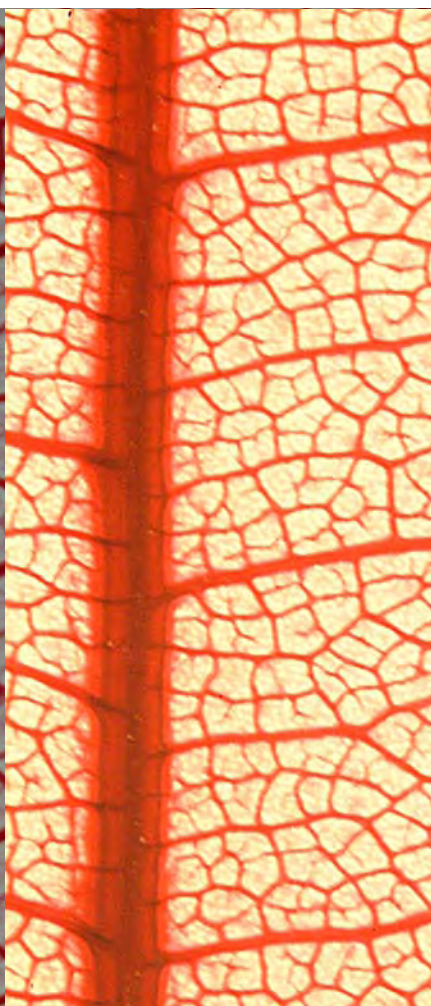
# Types of structures formed by secondary and tertiary venation



*C. guyanensis*



*C. duckei*



*C. glycyarpa*



*C. multijuga*

Fonte: Martins-da-Silva, R.C.V.

# Perspectives of Forest Management related to DNA markers

- Genetic fingerprinting using DNA marker (DNA extraction from dried wood) and Chemical fingerprint via stable isotope. This is a perspective to track illegal logging and species/provenance identification (Degen, pers. comun.)
- Population genomics and DNA barcoding, help separate different species (Azevedo, pers. comun.)
- **Much effort is needed to have Botanist/taxonomist and molecular biologist/ecologists working together.**

# **Great Challenges to Manage and Conserve Tropical Forests:**

- Maintenance of adaptive capacity of species: maximum genetic variation and genetic and ecological processes kept intact.**
- Species Biological Concept and Phylogenetic relationships. How to benefit on operation scale.**
- Access to Public Forests for Concessions (in Brasil since mar.2006). There are about 10 million hectares (20100) in condition to be managed under concession process.**
- Good Silviculture and Management Practices ( Biological Diversity and Climate Change**

# Looking Forward Preparing for the Future

- All points raised very important and much effort has to be done to implement actions in related issues.
- On a personal perspective: The increasing importance and attraction of biotechnology and new genetic methodologies, there is a lack of “conventional” crop and tree improvement professionals, which make a big challenge for food and fiber production increase.
- On more specific topic: Training and Capacitation of parataxonomists for tropical forests biodiversity inventory is very crucial for the Management and Conservation these ecosystems.



**Thank You !**

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# Materiais didáticos



Identificação Botânica na Amazônia: Situação Atual e Perspectiva



Agência de Informação Embrapa  
Espécies Arbóreas da Amazônia