SILVICULTURE OF NATIVE SPECIES
PP&D-SEN

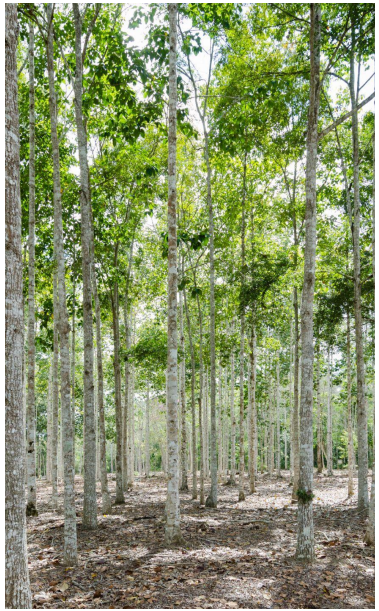
DecisionES 2025
Porto Seguro
Jun 30th to Jul 4th BR

Reference Hubs: Revisiting Old Native Species Silvicultural Trials in Brazil

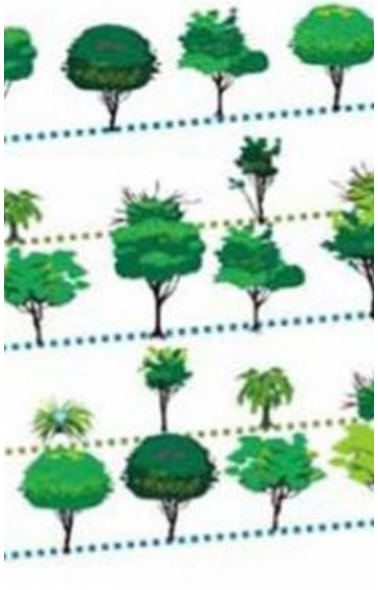
Daniel Piotto; Lucas J. M. Freitas; Jéssica A. M. dos Reis; Miguel Calmon; Samir G. Rolim; Silvio B. Junior; Fátima C. M. Piña-Rodrigues; Ricardo A. G. Viani; Carlos E. S. da Silva; Tatiana M. do Amaral

PP&D-SEN structure and differences

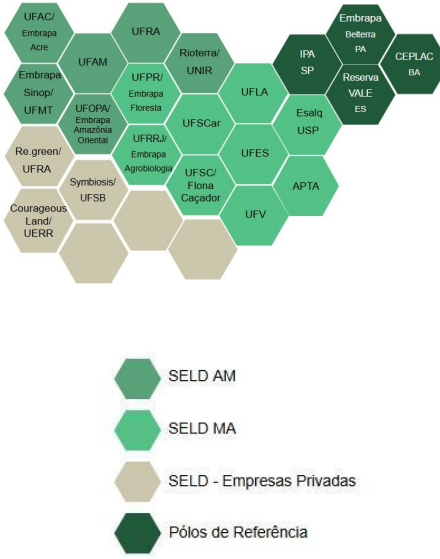
Long-Term Study Research Sites (SELD Network)



Reference Hub



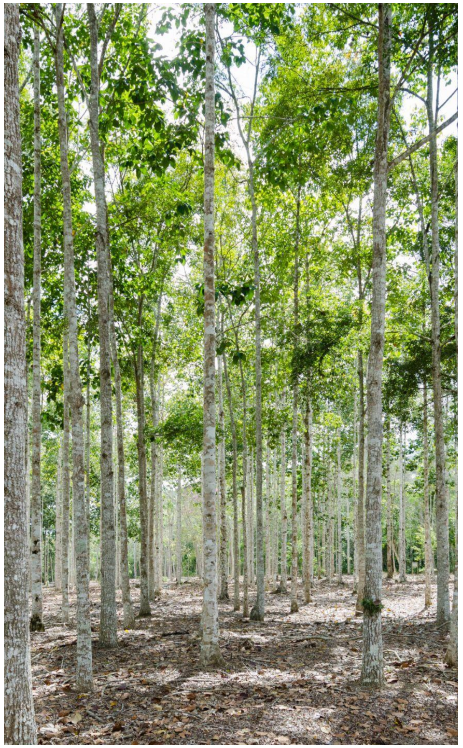
Standardized experimental design



Partnerships

Reference Hub

- Areas with mature native species plantations
- Enable evaluation of wood quality and productivity
- Focused on PP&D-SEN priority species
- Selected through technical inspection and evaluation
- Key Activities:
  - Revitalization of experiments and historical data collection (old measurements)
  - Inspection & mapping of research plots (inventory, georeferencing, cartography)
  - Inventory (census) of planted native trees
  - Thinning for wood technology studies
  - Selection of superior trees for seed production and genetic breeding research



Objective of the Initiative

- Revitalize old silvicultural experimental trials with native species

- Establish **Reference Hubs** for:
  - Innovation in native species silviculture
  - Genetic improvement, wood quality, and processing studies
  - Advance silviculture of native species in Brazil

Importance of Reference Hubs

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- Strategic centers for Research & Development (R&D)
- Bridge between science and commercial application
- Support for public policy and the forestry sector
- Supply timber for emerging markerts

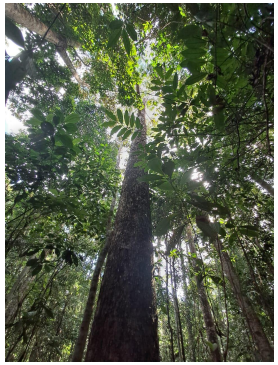
Belterra Hub (Pará State)

Over 45 years of experiments with Amazonian native species

Around 80 species included in the experiments

- *Carapa guianensis*
- *Bertholletia excelsa*
- *Dipteryx odorata*
- *Schefflera morototoni*

National reference for Amazon reforestation trials.



Porto Seguro Hub (Bahia State)

SILVICULTURE OF NATIVE SPECIES
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Over 50 years of trials with Atlantic Forest native species

Around 100 species included in the experiments

Pure and mixed plots

- *Dalbergia nigra*
- *Paubrasilia echinata*
- *Cariniana legalis*
- *Platymenia reticulata*

Key site for silvicultural studies of coastal Atlantic rainforest

Expected Outcomes

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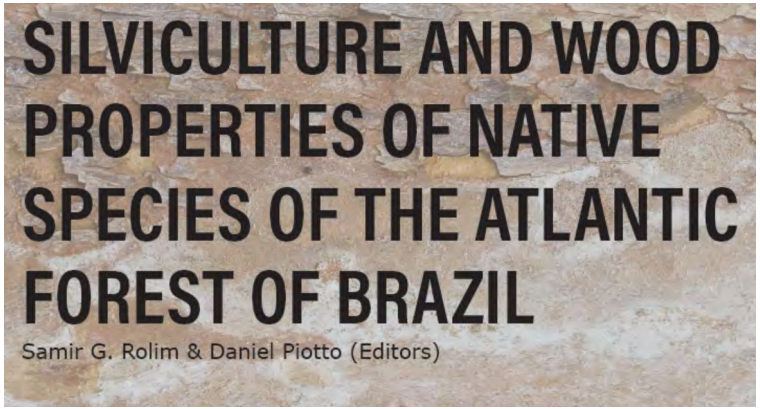
- Development of growth and biometric models
- Improved silvicultural management and species selection
- Scientific basis for large-scale silviculture and sustainable timber production

Our progress

- Growth and biometric models



2. BIOMETRIC MODELS FOR MIXED-SPECIES PLANTATION IN THE NORTH OF ESPIRITO SANTO, BRAZIL

SAMIR G. ROLIM, ENRIQUE ORELLANA, DANIEL PIOTTO, EDGAR DE SOUZA VISMARA

Contents lists available at ScienceDirect

Forest Ecology and Management

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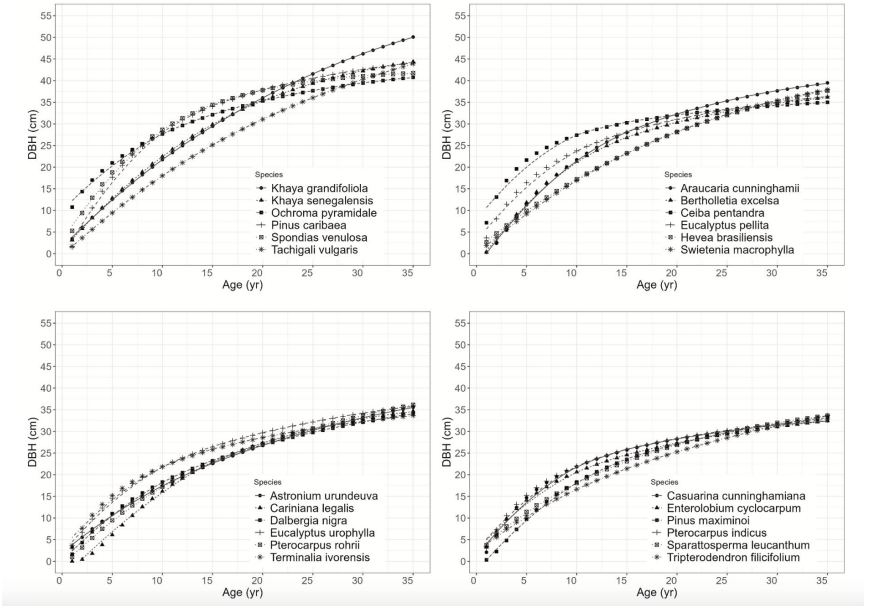
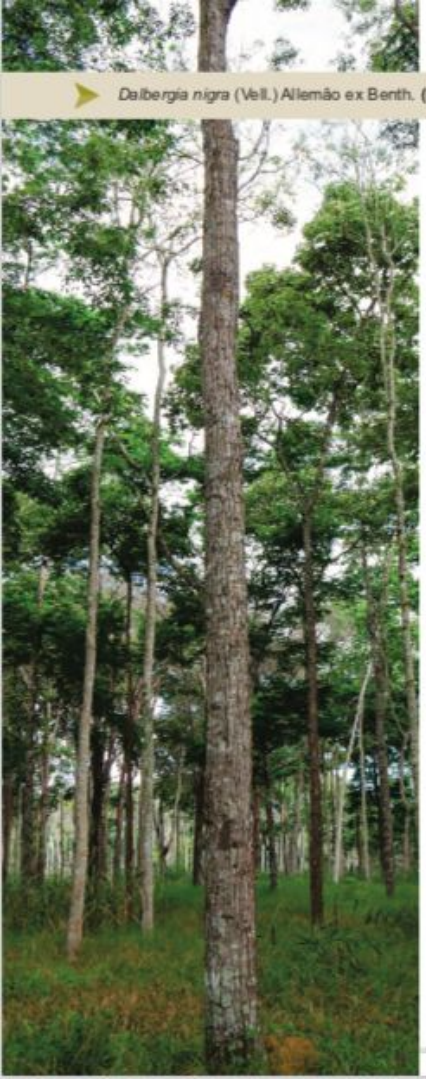
Diameter growth models and performance of 100 tropical tree species in silvicultural trials in Brazil

Samir G. Rolim, Daniel Piotto *

Centro de Formação em Ciências Agroflorestais, Universidade Federal do Sul da Bahia, BR 415, km 29, Ilhéus, BA 45613-204, Brazil





Dalbergia nigra (Vell.) Allemão ex Benth. **(Fabaceae)**

Distribution: Commonly known as jacarandá-da-bahia or jacarandá caviúna, it mainly occurs in ombrophilous and seasonal forests in the state of Bahia, Espírito Santo, Minas Gerais, and Rio de Janeiro (Lima, 2015a). It is the species with the most valuable wood in the Atlantic Forest; and thus has been highly exploited, which almost led to the extinction of its natural populations.

Mean Growth and Yield: Growth data was obtained from a mixed plantation of *D. Paratecoma peroba* (peroba) and *Zeyheria tuberculosa* (ipê-felpudo), with 1.5 × 1.5 and two *P. peroba* to two *Z. tuberculosa* and one *D. nigra*. Several thinnings were on an irregular basis, and the remaining trees of *D. nigra* at 20 years of age pres shaped stems that were slightly tortuous, but with good health. Mortality was 7% un age. The fitted equation to estimate the DBH relative to Age (t in years) was as

$$DBH = 61.47\ exp^{-3.92\,t^{-0.4828}}$$

The models showed a trend in growth until 35 years of age, when the estimate 248 m³/ha for 438 trees/ha, with a mean DBH of 30.5 cm and stem height of 1 age, the estimated MAI in volume was 7.1 m³/ha/year, MAI in diameter was 0.87 cm/year, and stocked biomass was 241 Mg/ha. The highest growth for *D. nigra* reported by Carvalho (2003) was 17.6 cm at 12 years of age in the Atlantic Forest, which corresponds with the value of 18.7 cm observed in Linhares. Growth in the Ceplac arboretum, located in Bahia, was low, with a DBH of 9.9 cm at 12 years of age (Vinha & Lobão, 1989). A DBH of 17 cm at 9 years of age was reported for an agroforestry system in the state of Bahia (Matos, 2016). Outside its area of origin, in the Amazon, Silva & Canto (1994) reported good growth (17.7 cm at 19 years of age), but with short (3.8 m) and tortuous stems due to very wide spacing and lack of management. Care should be taken with tree borers, which may lead to high plant mortality rates (Jesus et al., 1992). Its heartwood, which is the attractive and valuable part of the wood, takes a long time to form, which warrants the estimation of the best felling age for trees to be 50 years of age, a perfectly acceptable age due to the very high value of the wood. At this age, the tree density will be reduced to approximately 350 trees/ha, but all trees will have a higher percentage of heartwood. It should not be planted in full sun, and produces straighter stems when established as enrichment planting, which stimulates vertical growth and minimizes borer attacks. It should be highlighted that it is sensitive to excessive shading, which may decrease its growth rate.

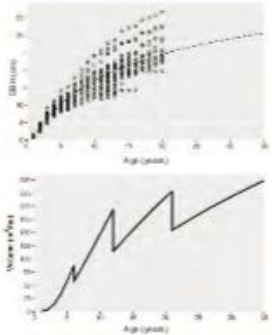


Figure 3. Diameter growth of *Dalbergia nigra* grown in a mixed plantation with *Paratecoma peroba* and *Zeyheria tuberculosa* in Linhares (ES), and a simulation of volume production for a plantation with 3 × 2 spacing, with thinning at 6, 12, and 21 years.

Our progress

- Silvics and wood quality

(Wood properties)

(Cross section, zoom 10x)

Overall Wood Properties: Distinct heartwood and sapwood, dark gray heartwood with darker veins, whitish-yellow sapwood, uncharacteristic odor, sweet taste, coarse texture, straight grain, and little variance in luster.

Macroscopic Anatomical Description:
Axial Parenchyma: visible without magnification, paratracheal aliform, vasicentric, and in discontinuous narrow bands. Rays: only visible under magnification in the cross-sectional and longitudinal-tangential plane, little contrast in the longitudinal-radial plane, very thin, few to very numerous, stratified. Vessels: visible without magnification, small, numerous, diffuse-porous, oblique, solitary and radial multiples (2–3 vessels). Growth Rings: delimited by fibrous tissue and discontinuous narrow bands of parenchyma.

Physical and mechanical properties	
Apparent density (g/cm³ - air dried sample)	0.782
Basic density (g/cm³)	0.634
Volume variation (shrinkage %)	12.89
Anisotropy coefficient	1.26
Modulus of rupture for static bending strength (kgf/cm²)	863.79
Shear strength (kgf/cm²)	152.49
Compression strength parallel to the grain (kgf/cm²)	482.92
Janka hardness (kgf) – parallel and perpendicular to the grain	647.67 – 855.00

Assays conducted according to the normative document ABNT 7190:1997

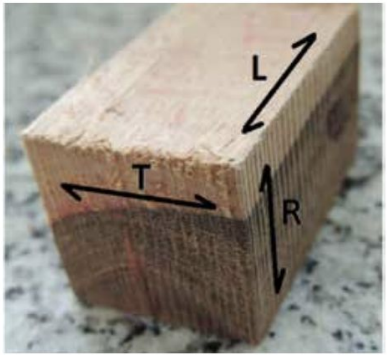
Workability and use indications									
Planing		Boring with helical bit (through-hole)			Boring with spade bit (10mm)		Sanding	Lateral mortising	Nail acceptance (%)
With	Against	6 mm	8 mm	10 mm	Throughhole	Nonthroughhole			
Excellent	Fair	Good	Fair	Good	Excellent	Good	Good	Excellent	22% accepts; 78% does not accept

Assays conducted according to the normative document ASTM D1666/1994

Medium to high hardness and density wood, very low tendency to twist and warp. Indicated for use in structures, decoration (due to the aesthetic beauty of the interaction between the heartwood and sapwood colors), furniture, and utensils. Good planing properties with the grain, with more flaws against the grain. Overall, it is easy to bore, and presents good sanding properties and excellent lateral mortising properties. Low nail acceptance in the heartwood due to high hardness.

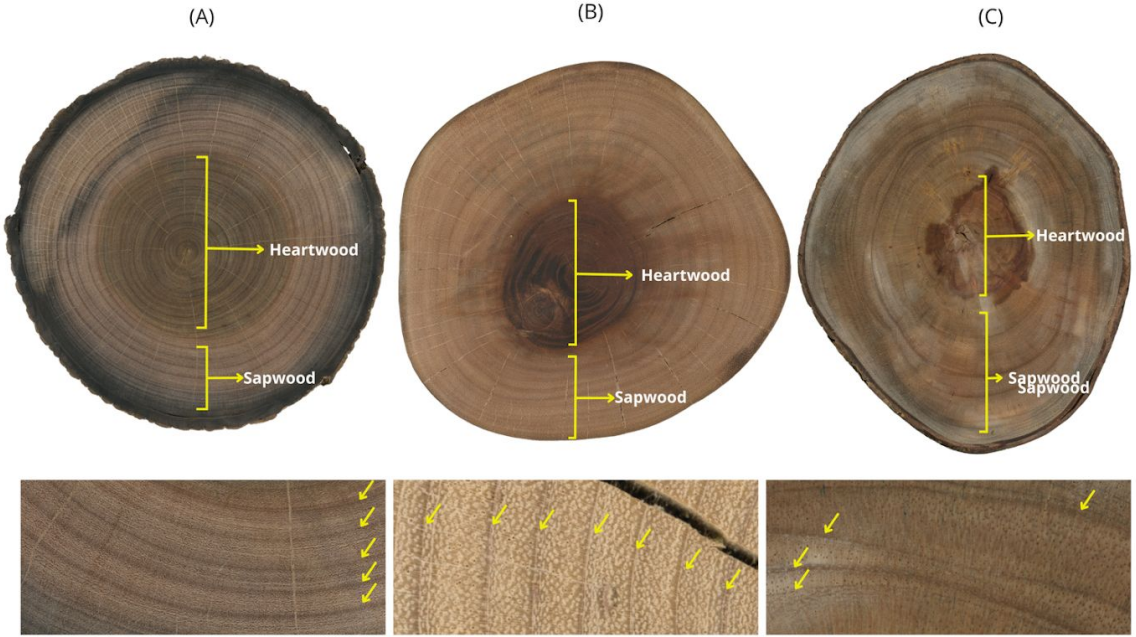
Our progress

Silvics and wood quality



Our progress

- Growth models and climate change effects



Our progress

- Genetic breeding

ELSEVIER

Industrial Crops and Products
Volume 221, 1 December 2024, 119393

Early selection efficiency in a progeny test of timber species *Cordia trichotoma* (Vell.) Arráb. ex Steud

Andrei Caíque Pires Nunes [a], Taís Conceição dos Santos [a],
Kethlin de Carvalho Santos Romão [a], Aline Pinto dos Santos [b], Ricardo Gallo [c]

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https://doi.org/10.15287/afr.2022.2106

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Genetic variability and predicted gain in progeny tests of native Atlantic Forest timber species: *Cariniana legalis*, *Cordia trichotoma*, and *Zeyheria tuberculosa*

Aline Pinto dos Santos[1], Andrei Caíque Pires Nunes[2], Marlon dos Santos Pereira Birindiba Garuzzo[3], Ronan Xavier Corrêa[1], Felipe Garbelini Marques[4]

Forest Ecology and Management

Age trends in Bertholletia excelsa Bonpl. progeny test reveals high early selection efficiency and support genetically-oriented thinning management

--Manuscript Draft--

Research Article

Grafting of Jequitibá-rosa (*Cariniana legalis* Mart. O. Ktze) and Ipê-felpudo (*Zeyheria tuberculosa* (Vell.) Bur.) Genotypes for Hybridization Orchard Assembling

Aline Pinto dos Santos, Andrei Caíque Pires Nunes, Ronan Xavier Corrêa,
Kethlin de Carvalho Santos Romão, Felipe Garbelini Marques, Lílian Alves Carvalho Reis & ...show all

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BRAZILIAN COALITION ON CLIMATE, FORESTS AND AGRICULTURE

SILVICULTURE OF NATIVE SPECIES

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Thank you!

Get in touch to learn more and discuss partnership opportunities.

silvicultura.nativas@coalizaobrasil.org

https://coalizaobr.com.br/en/nativespecies/

DecisionES 2025 Symposium on Ecosystem Services, Forest Management and Decision Making

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