

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/360611589>

The Evolution of Bambusa vulgaris Plantations in Brazil

Presentation · December 2021

CITATIONS

0

2 authors, including:



Laércio Couto

University of Toronto

336 PUBLICATIONS 2,072 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Eucalypts, Pines, African Mahoganies, Australian Cedar, agroforestry based projects in Brazil [View project](#)



Low Carbon Silviculture and Agroforestry in Brazil [View project](#)

The Evolution of *Bambusa vulgaris* Plantations in Brazil

Laercio Couto, Ph.D.

Juliana M F C Brunetta, D.Sc.



What is *Bambusa vulgaris* ?

- *Bambusa vulgaris* is a C4 plant such as sugar cane
- A very fast growing species
- A multiple purpose species
- Originated from China and Madagascar
- Belongs to the *Poaceae* family, *Bambusoideae* subfamily, *Bambuseae* tribe
- *Bambusa* genus and *vulgaris* species
- Some varieties can also be found such as *Bambusa vulgaris var vitata*
- *It is found in almost all Brazilian territory in face of its plasticity*
- *And facility to survive in different climatic and soil conditions*



How did *Bambusa vulgaris* arrived in Brazil ?

- *Bambusa vulgaris* was introduced in Brazil by the Portuguese colonizers
- Martin Afonso de Souza was the first Portuguese colonizer of Brazil
- The Portuguese colonizers brought several exotic plants to Brazil
- *Bambusa vulgaris* was one of them, from China and Madagascar
- Very useful for living fences for energy and other uses by rural landowners
- *It was first planted in the coastal region and later in Brazilian inland*
- *In some regions of Minas Gerais very used in the boundaries of rural properties*
- *It is possible to say that *Bambusa vulgaris* was planted in almost all Brazilian states*



The First Large Scale *Bambusa vulgaris* Plantation in Brazil

- The first large scale commercial plantation of *Bambusa vulgaris* in Brazil was done by the Joao Santos Group in Maranhao and Pernambuco states
- The objective was to supply biomass for pulp and paper production
- Special papers to produce bags for the Nassau cement from the industries of the Group in Northeastern Brazil
- Some ethanol was also produced by using the bamboo biomass in a facility in Coelho Neto, Maranhao
- Tetrapack was also produced for milk and juices individual containers by using the bamboo pulp
- *Joao Santos Group is estimated to have planted about 30,000 ha of Bambusa vulgaris in the NorthEastern region of Brazil*



Other Commercial *Bambusa vulgaris* Plantations in Brazil

- Following the steps of Group Joao Santos there were the PENHA Group in Santo Amaro in Bahia and Cia Mineira de Papeis in Cataguazes, Minsa Gerais
- The PENHA Group today uses bambo biomass only for energy in its paper plant in Bahia and has about 3,000 ha of *Bambusa vulgaris* in the region
- Cia Mineira de Papeis has been sold and no longer exists and therefore there is no use of *Bambusa vulgaris* biomass in that region of Minas Gerais
- Today FS Bioenergia is the most important player in Brazil in the use of *Bambusa vulgaris* biomass for energy
- Some other companies are also starting testing this option to supply their need form biomass for energy to dry grains and for electricity cogeneration
- *FS Bioenergy is at the moment the leading company in the use of Bambusa vulgaris for energy in Brazil*



People Who Made History in the *Bambusa vulgaris* Saga in Brazil

- Joao Santos Group
- PENHA Group
- Cia Mineira de Papeis
- People from the Agronomic Institute of Campinas such as Agronomist Salgado
- Professors and Researchers from several Universities and Research Institutions in Brazil
- Osmarino Borges (*in memoriam*) who founded the biggest nursery of *Bambusa vulgaris* in Brazil in Timon, Maranhao, allowing companies to have seedlings to start their research work and their commercial plantations
- *FS Bioenergy the company that is boosting the *Bambusa vulgaris* for energy plantation activity in Brazil*



Antonio Luiz de Barros Salgado
Instituto Agronomico de Campinas

FS Bioenergia



Florestas de bambu



FS Bioenergia



FS Bioenergia



Irrimar Agroflorestal



IRRIMAR AMBIENTAL SERVIÇOS LTDA ME



The Contribution of UFV



O que já temos...

UFV

Universidade Federal de Viçosa



The Contribution of UFV



O QUE JÁ FIZEMOS NO DEF/UFV

Trabalhos realizados no LCP com Bambú

GOMIDE, J. L. ; COLODETTE, J. L. ; **OLIVEIRA, R. C.** . Estudos das Potencialidades do Bambusa Vulgaris para a Produção de Papéis Tipo Kraft. *O Papel*, São Paulo-SP, v. 43, n.7, p. 38-42, 1982.

GOMIDE, J. L. ; COLODETTE, J. L. ; **OLIVEIRA, R. C.** . Estudos das Potencialidades do Bambusa Vulgaris para Produção de Papéis Tipo Kraft. In: IV CONGRESSO FLORESTAL BRASILEIRO, 1983. ANAIS DO IV CONGRESSO FLORESTAL BRASILEIRO. BELO HORIZONTE-MG. v. 28. p. 808-812.

GOMIDE, J. L. ; COLODETTE, J. L. ; **OLIVEIRA, R. C.** . Influência do Alcali Ativo e da Temperatura na Polpação Kraft de Bambusa vulgaris. In: ANAIS DO XV CONGRESSO ANUAL DA ABCP-ASSOC. BRAS. DE CELULOSE E PAPEL, 1982, São Paulo. XV CONGRESSO ANUAL DA ABCP-ASSOC. BRAS. DE CELULOSE E PAPEL. São Paulo-SP: ABTCP, 1982. v. 1. p. 183-203.

OLIVEIRA, R. C. Utilização do Fator-H na Polpação Alcalina de Bambusa Vulgaris Var. Vulgaris. In: ANAIS DO III CONGRESSO LATINO-AMERICANO DE CELULOSE E PAPEL, 1983, São Paulo. III CONGRESSO LATINO-AMERICANO DE CELULOSE E PAPEL. SÃO PAULO, SP: ABTCP, 1983. v. 1. p. 241-257.

GOMIDE, J. L. Influência do Alcali Ativo e da Temperatura na Polpação Kraft de Bambusa Vulgaris. *Revista Árvore* (Impresso) **Viçosa - MG**, v. 5, n.2, p. 181-193, 1981

GOMIDE, J. L. Estudos sobre a Constituição Química do Bambusa Vulgaris, Visando a Produção de Polpa Celulósica. *O Papel* (São Paulo), São Paulo, v. 47, n.10, p. 64-68, 1986.

MONTALVÃO FILHO, A. ; **GOMIDE, J. L.** ; CONDÉ, A. R. . Variabilidade da Constituição Química e das Características Dimensionais das Fibras do Bambusa Vulgaris. *Revista Árvore* (Impresso) **Viçosa - MG**, v. 8, n.1, p. 12-27, 1984.

The Contribution of UFV



O QUE JÁ FIZEMOS NO DEF/UFV

2011

LARISSA APARECIDA RIBAS BATALHA

ESTUDO COMPARATIVO DE PRODUÇÃO DE POLPA SOLÚVEL A PARTIR DE BAMBU
E EUCALIPTO

Dissertação apresentada à Universidade
Federal de Viçosa, como parte das exigências do
Programa de Pós-Graduação em Agronomia,
para obtenção do título de Mestre em Ciências.

química dos cavacos de bambu não era inteiramente lavorável (22,4% de lignina; 19,5% de xilana; 49,3% de celulose; 16,8% de extrativos totais e 1,5% de cinzas). A polpa produzida apresentou alvura de 92,4% e teores de α -celulose, de xilanas, de extrativos e de cinzas de 94,9%, 5,1%, 0,041% e 0,13%, respectivamente. A polpa solúvel com estas características é adequada para a fabricação de viscose com vistas à produção de fios de raiona e outros derivados de menor exigência quanto ao teor de alfa-celulose.

The Future of *Bambusa vulgaris* in Brazil

- *Bambusa vulgaris* is the most reliable source of biomass for energy in the short run in Brazil
- From the three pioneer companies which started bamboo plantations in Brazil, only PENHA Group in Santa Amaro, Bahia, continues to use its 3,000 ha plantations for energy
- However the big change occurred recently when FS Bioenergy started using *Bambusa vulgaris* in Mato Grosso, to supply its corn based ethanol production facilities, with biomass for energy
- Several Brazilian companies are also looking at bamboo to supply their needs for biomass for energy.
- Along with eucalypts and Corymbias, bamboos are to become the new source of short rotation biomass for energy in Brazil

Short Rotation *Bambusa vulgaris* Plantations in Brazil

- Today, bamboo plantations in Brazil involve an initial spacing of 6.00 m x 3.00 m with the first cut at the age of 3 years and subsequent rotation cycles of 2 years based on a coppicing system which can be practiced for 30 years
- This system can produce at least 25 tons of green biomass per hectare per year
- However, it is expected that the initial spacing will change to 6.00 m x 1.5 m or 1.111 seedlings per hectare with a corresponding increase in biomass production per hectare per year
- Development of new clones, new seedling production systems and adequate fertilization, it will be possible to reach at least 50 tons of green biomass per hectare per year

Low Carbon *Bambusa vulgaris* Silviculture in Brazil

- *This system devised in a eucalypt plantation in Luis Eduardo Magalhaes, Bahia, can also be applied to the bamboo plantation*
- *It uses a 6.00 m x 1.50 m or 1.111 seedlings per hectare planted in a 2 m strips with a 4 m strip treated only with a mulcher*
- This system allows a cost reduction of 30 to 40% on the plantations
- It is expected that this system be adopted by most of the forest companies in Brazil

Bambusa vulgaris Based Agroforestry Systems in Brazil

- *The low carbon silviculture system of bamboo plantation with a 6.00 m x 1.50 m initial spacing allows also the use of Agroforestry Systems*
- *The planted strips should be on the East – West direction*
- *The agricultural crop such as rice, corn, beans, sunflower, or pastures, should be planted on the 4.00 m strip between the 2.00 m plantation strip*

Bambusa vulgaris Seedlings Production in Brazil

- Up to now it is known that in Brazil there is only one nursery in Brazil with capacity to supply seedlings for large bamboo plantations
- It is the Irrimar Agroflorestal located in Timon, Maranhao
- This nursery has supplied FS Bioenergia in its large *bambusa vulgaris* plantations in the State of Mato Grosso
- The founder of this nursery was Osmarino Borges (in memory) who used to work with Salgado in the Group Joao Santos in Coelho Neto, Maranhao
- The technology used copies the one used to produce seedlings of eucalypts through vegetative propagation
- Irrimar uses small primary and secondary axilar branches of the bamboo culms existing in the region
- Actually the price of the seedlings and their transportation costs are very high

Harvesting Bambusa vulgaris Plantations in Brazil

- In the earlier days of the three pioneer companies in Maranhao, Pernambuco, Bahia and Minas Gerais, harvesting was manual and a very unsafe operation
- Later on a mechanized system was used based on equipment used by sugar cane companies in NorthEastern Brazil
- Today only the PENHA Group in Santo Amaro, Bahia, is harvesting extensive bamboo plantations by using harvesters, mini skidders and portable chipping machines developed by them
- However it is possible to use a specific harvester that will replace all three equipments, such as the one used to harvest short rotation closely spaced eucalypt plantations in Austral



Bambu Cortado (aguardando colheita)



Bell Colhendo Bambu



AGRIMEX
Agro Industrial Peru, Ecuador S.A.

Bambu

Biomassa e Celulose



Bamboo Harvesting in Coelho Neto, Maranhao

Harvesting *Bambusa vulgaris* Plantations in Brazil



Harvesting Bambusa vulgaris Plantations in Brazil



The Australian Bionic Beaver Bamboo
The Final Solution

Alternative Uses of Bambusa vulgaris in Brazil

- Pulp and paper
- Charcoal
- Ethanol
- Beer (from the leaves)
- Young culms for human food
- Construction material
- Erosion control and soil protection
- Nanomaterials
- Animal fodder
- Utensils and crafts



Broto De Bambu Banco de Imagens e Fotos ...
istockphoto.com



Broto De Bambu Banco de Imagem...
istockphoto.com



Brotos De Bambu Em Fundo Branco...
pt.dreamstime.com



Broto De Bambu Banco de Imagens e ...
istockphoto.com



Foto de Brotos De Bam...
istockphoto.com



Foto de Assado Broto De Bambu e mais 1...
istockphoto.com



Brotos De Bambu Em Fundo Branco ...
pt.dreamstime.com



Broto de bambu na comida de rua | Foto...
fr.freepik.com



Foto de Broto De Bam...
istockphoto.com



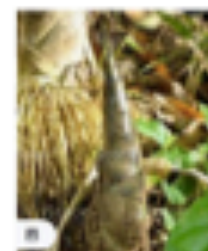
Broto de bambu na comida de rua |...
fr.freepik.com



conhecendo o broto de bambu - A Comida...
acomidamosa.ufrj.br



Hortifrutí de A a Z: Broto de Bambu | R...
revistaequimentacao.com.br



BAMBOO IPA

LA CERVEZA ARTESANAL
DE BAMBU

Es nuestra reinterpretación del estilo tradicional inglés con un ligero toque de nuestro extracto orgánico de bambú, cerveza tipo Ale, color dorado con perfil cítrico y herbal balanceada, con fino amargor, final refrescante moderadamente seco. Dry hopping con notas frutales y un aroma lupulado. Cuerpo medio ligero. Con espuma persistente.

1811's-50

5.8% Alcohol

VASO RECOMENDADO "SNIFTERS"

Temperatura de servicio: 7° - 10°

COMPRA EN:

UNO DEL BOSQUE 470 GUARDADO, VALLE DE GUAYMAS, NL



BAMBUSA

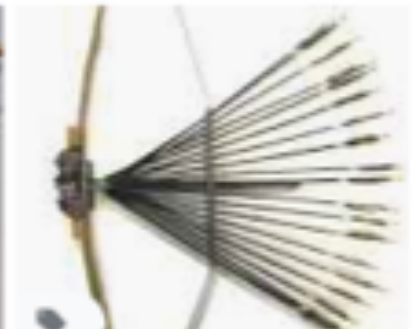
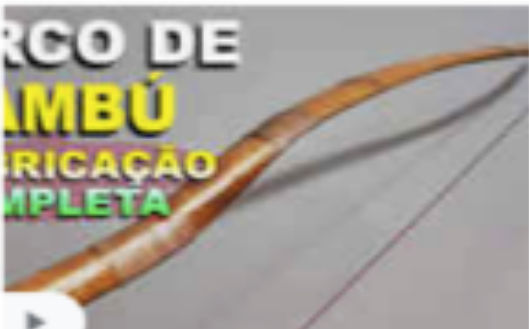
HECHO EN MEXICO



LA CERVEZA ARTESANAL DE BAMBU

BAMBUSA ES UN EMPRENIMIENTO PIONERO EN LA
ELABORACION DE BEBIDAS ARTESANALES CON
BAMBU EN MEXICO





Thanks !!!



*Daniels Forestry
University of Toronto
laercio.couto@utoronto.ca
lcouto@lcouto.com
+55 1 9 5483-9392*