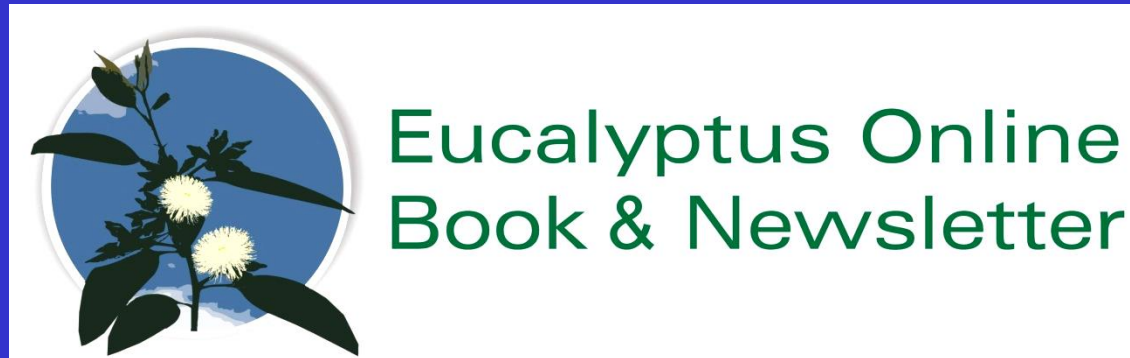


# Papermaking Properties of the *Eucalyptus* Wood & Fibers

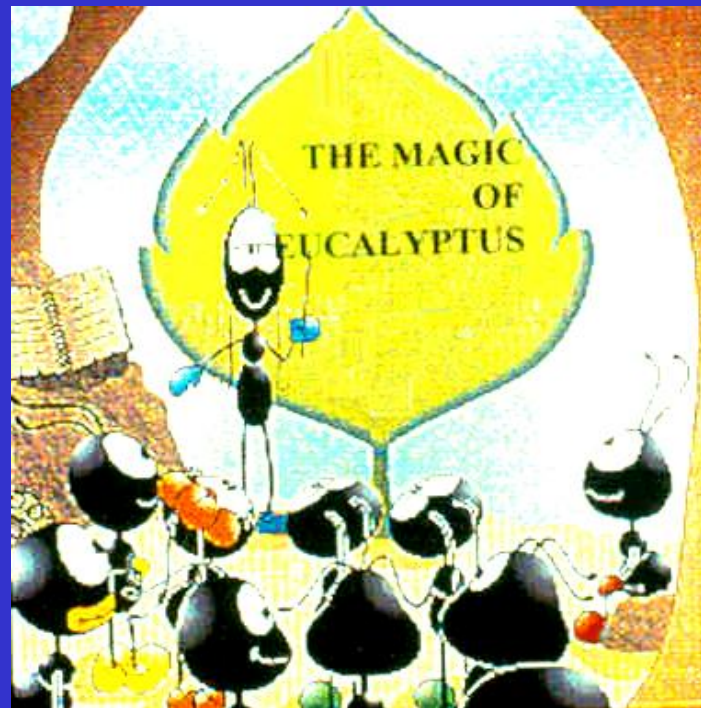
**Celso Foelkel**



<http://www.eucalyptus.com.br/eucaliptos/ENG14.pdf>

Not a scientific presentation...

But a lecture addressed to a distinguished audience...

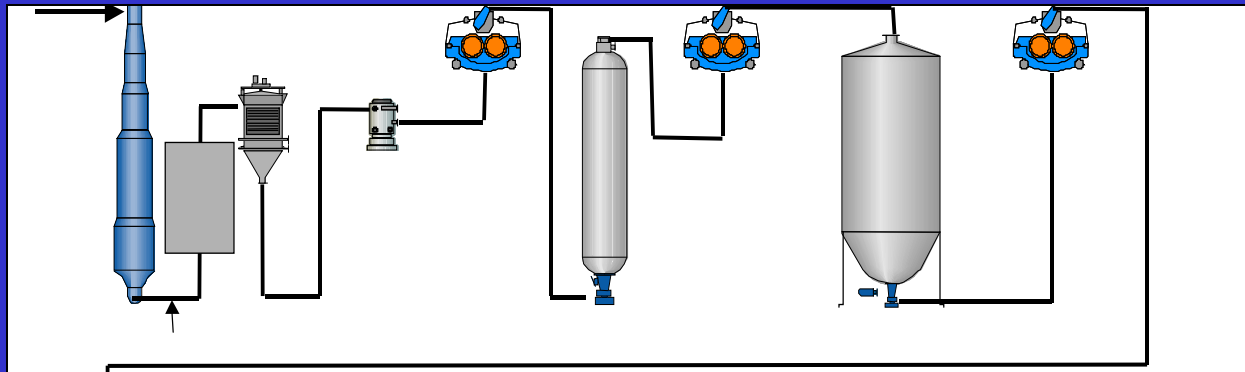




Woods, pulps and papers are not equal

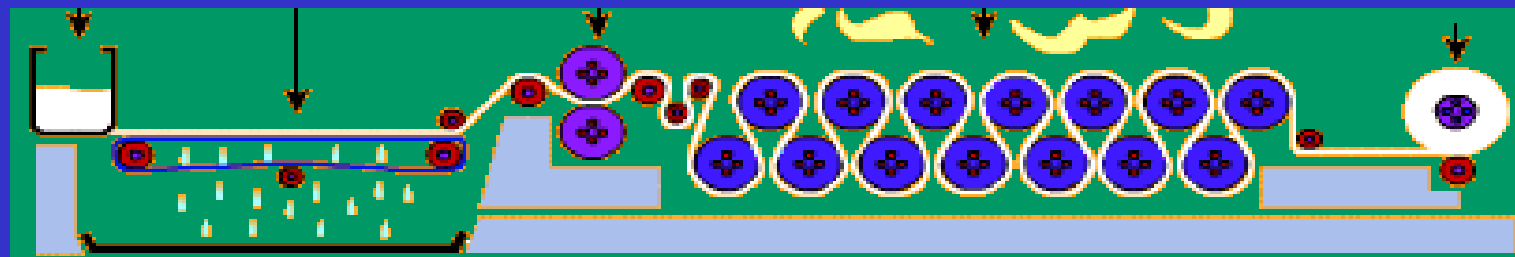


and so different are the pulp and paper manufacturing processes...

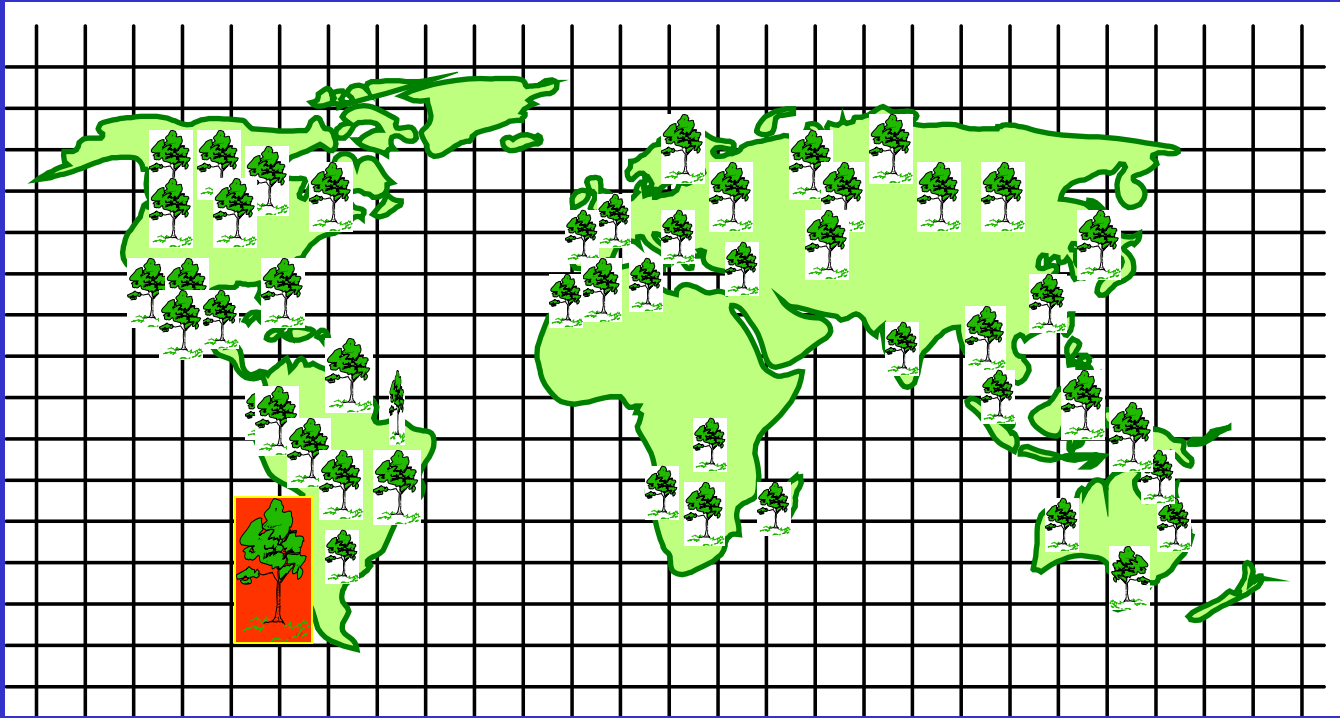


## Eucalyptus Pulping and Papermaking

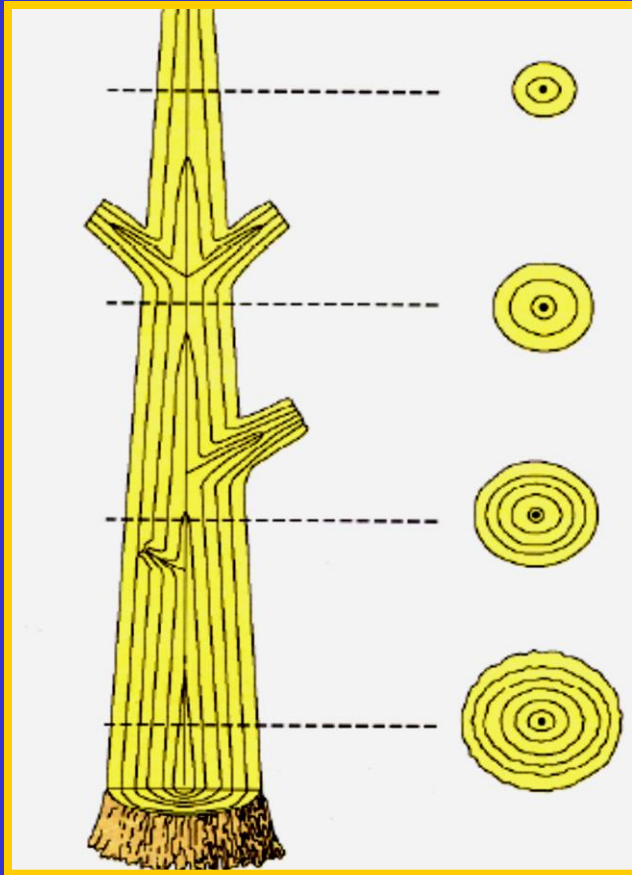
Simple things of the  
real life...



Wood variability is part of our lives since the early papermaking days







Variability is part of our lives



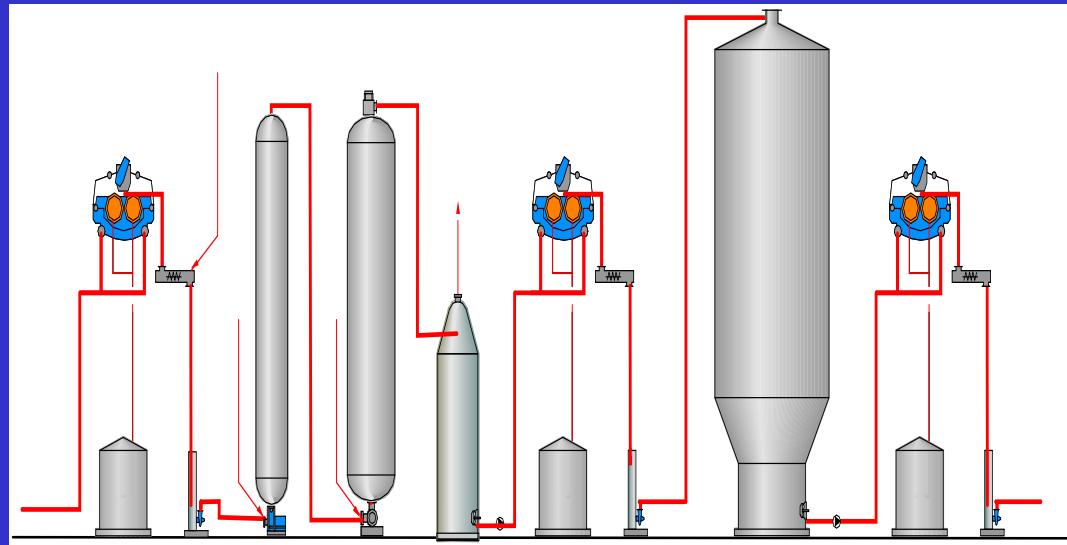
Efforts to evaluate and to tame variability are not equally distributed





No matter what wood we are talking about  
- they are variable at the fiberlines -

Even clonal wood material or single species supplies



This variability is partly natural and partly caused by man...

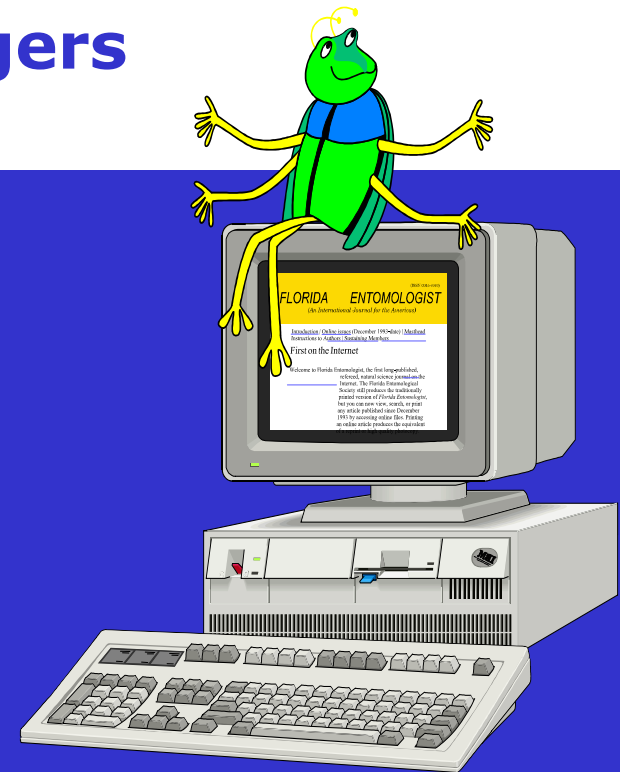


Even so, we are reckless to measure and to control it...

- **sampling sizes are inappropriate**
  - based on composite sampling
  - number of replications is small
  - few statistical tools are used
- **focus on mean/averages (or averages of averages) and not range and extremes**
- **statistic errors are not evaluated, even forgotten that they exist**
  - **a lot of risks involved to take safe decisions**  
***(but managers do not talk or care about this !!!!)***

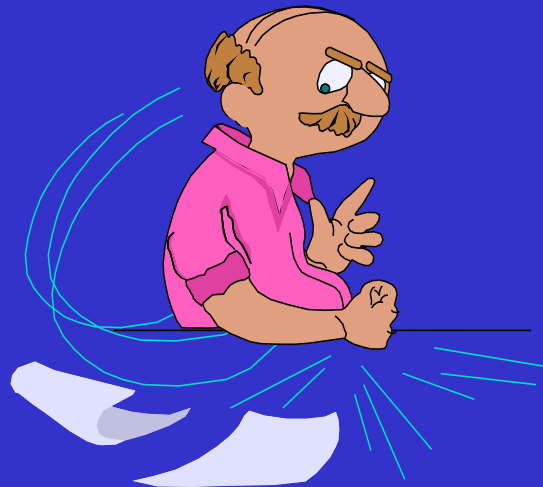
What means that...

**A lot of analyses are made to provide numbers and to please managers**



As a result...

- **Pulpmakers complain about the wood...**
- **Papermakers complain about the pulp...**
- **Customers of paper complain about the paper performance and quality they purchase...**





## Dialogue is vital..

**when visiting your pulp customer you should ask him...**

- main paper attribute being aimed?
- why *Eucalyptus* fibers are being used? Or why not?
  - what does he need in the pulp we supply?
- What does he love in the pulp we provide? In case he does, sure...
  - which are the main paper-mill bottlenecks?

## Dialogue is vital..

**when visiting your customer you should try to understand his objectives and pressures**

- costs savings
- fewer breaks
- less broke generation
- better runnability
- end-product requirements
- environmental restrictions (carbon footprints, certified wood-fibers, AOX stringent legislation, etc.)



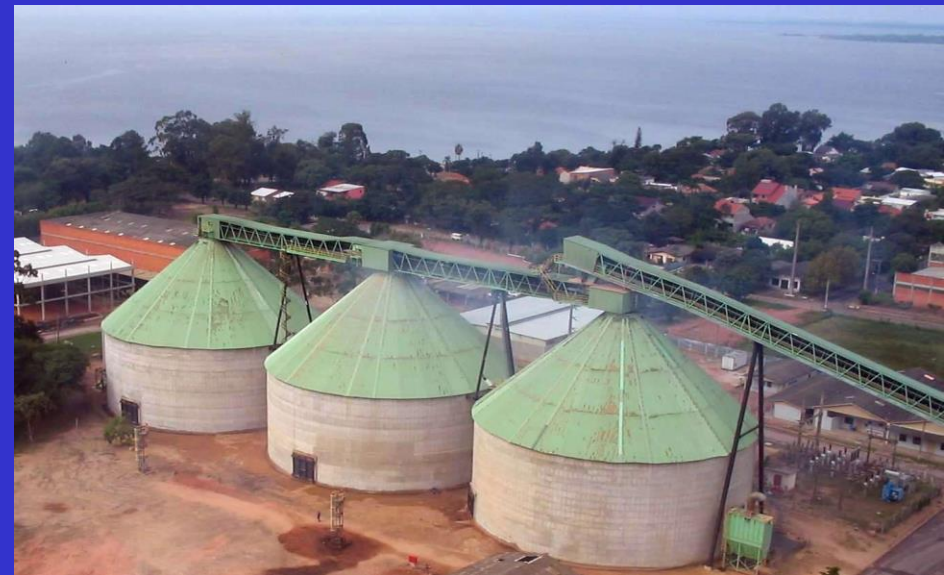
**Dialogue is vital...**

**The same with regard to the wood supply...**

**Performance and specification are built on  
these basic foundations**

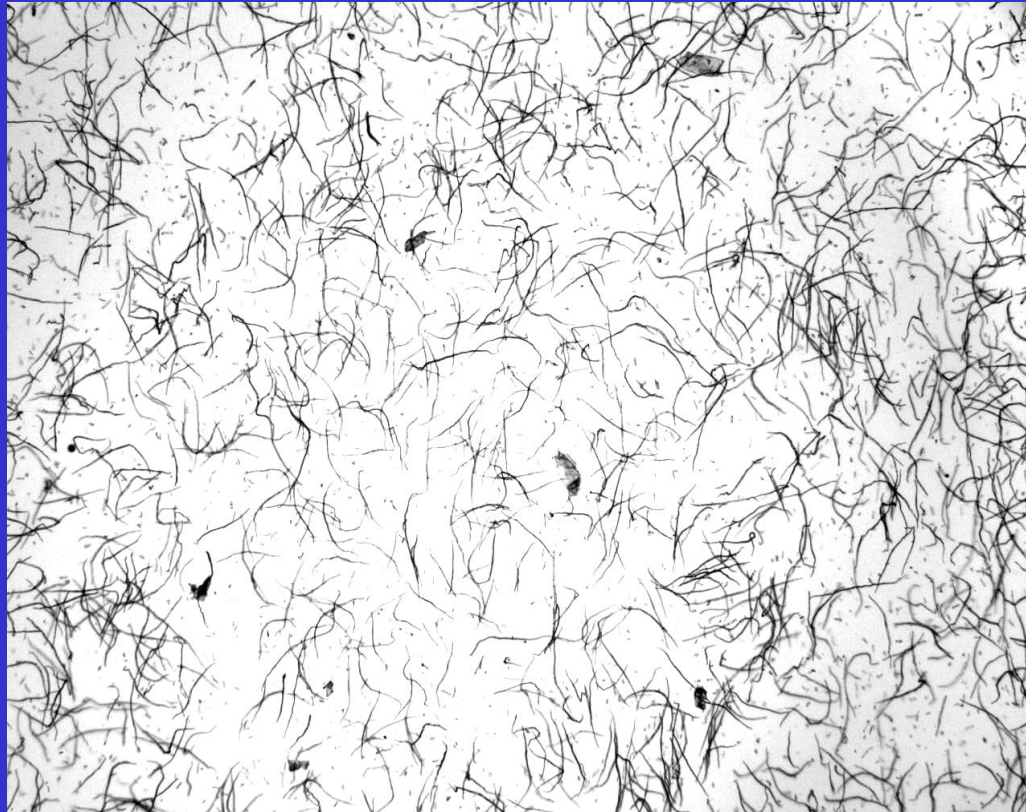
The mill bottlenecks will define what is important...

**“Removed the bottleneck, another specification should be raised, immediately”**



## What is really an *Eucalyptus* pulp ?

Fibers - Vessels - Fines



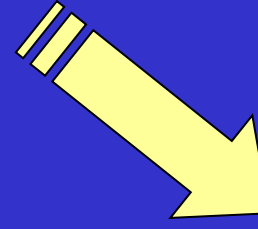
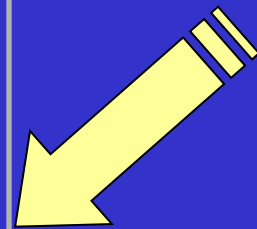


Most important quality properties to foresters and pulp-makers



At forests

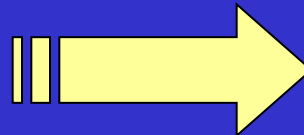
- *Eucalyptus* species
- Clone
- Forest age at harvesting
- Silvicultural practices and environmental causes effecting wood quality
- Wood defects



Forest quality

- Forest yield in volume
- Forest yield in weight
- Tree shape
- Health – resistance to pests and diseases
- Bark content
- Nutrient and water consumption
- Tolerance to deficit conditions

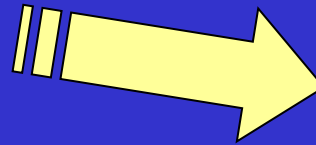
Most important quality properties to foresters and pulp-makers



Wood quality

- wood basic density
- fiber dimensions (wall thickness...)
- hemicellulose content
- lignin content
- lignin quality
- wood extractives
- ash content
- NPE's

## Most important technological factors to *Eucalyptus* pulp and paper manufacturing

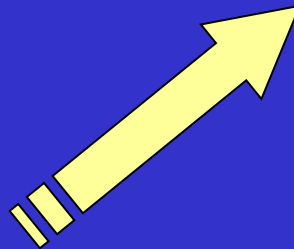


### At mills

- “wood mix”
- “pulp mix”
- mill technological age
- type of paper mill: integrated or not
- pulp and fiberline design
- papermaking process design
- bottlenecks
- broke handling



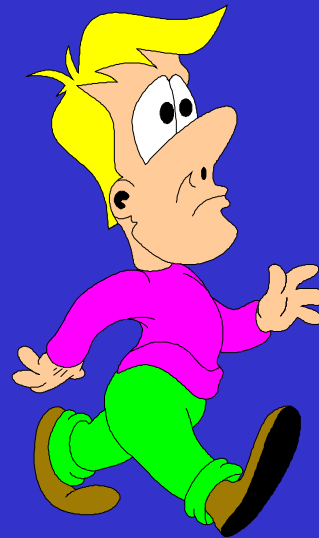
Most important quality properties to pulp-makers



Pulping process

- chip cleanliness
- chip dimensions
- wood health
- alkali consumption
- pulping yield
- wood specific consumption
- total dry solids/adt pulp
- pulp cleanliness
- bleachability (bleaching chemicals consumption)
- pulp dewatering, drainage

## Definitions for papermakers



### Machine productivity:

- fast speed
- fast drainage
- high consistency after the wet end
- excellent sheet consolidation
- minimum breaks

### Quality

- maximum achievements in paper specifications
- minimum generation of off-grades and broke
- minimum complaints from users

No matter what the papermaker is manufacturing,  
a commodity or a specialty product,  
his dreams are the same



## *Eucalyptus* Fibers

"why do we love them?"

Because they worth - no doubt about...  
In many case they are problem-solver pulps...

