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FTP Early Stage Researchers Forum

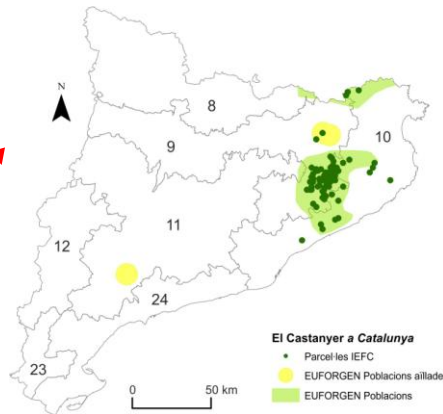
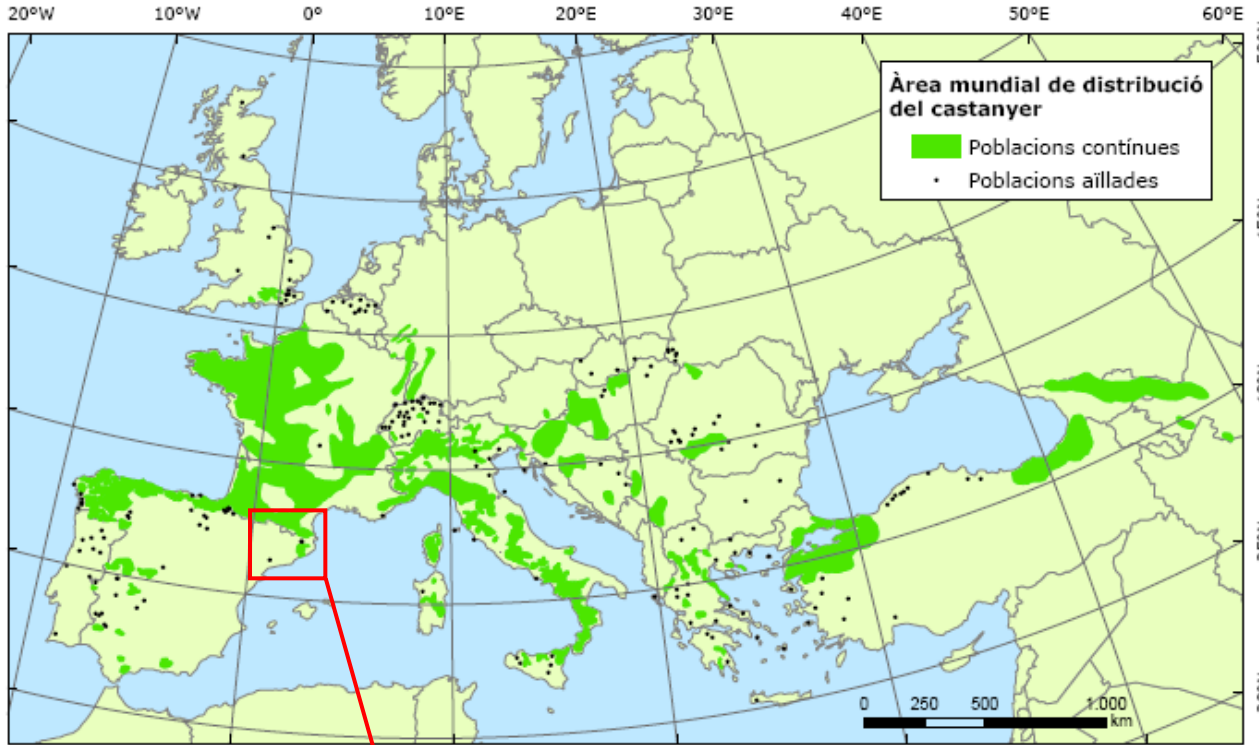
**Physical and mechanical  
wood properties of *Castanea  
sativa* applied to glulam**

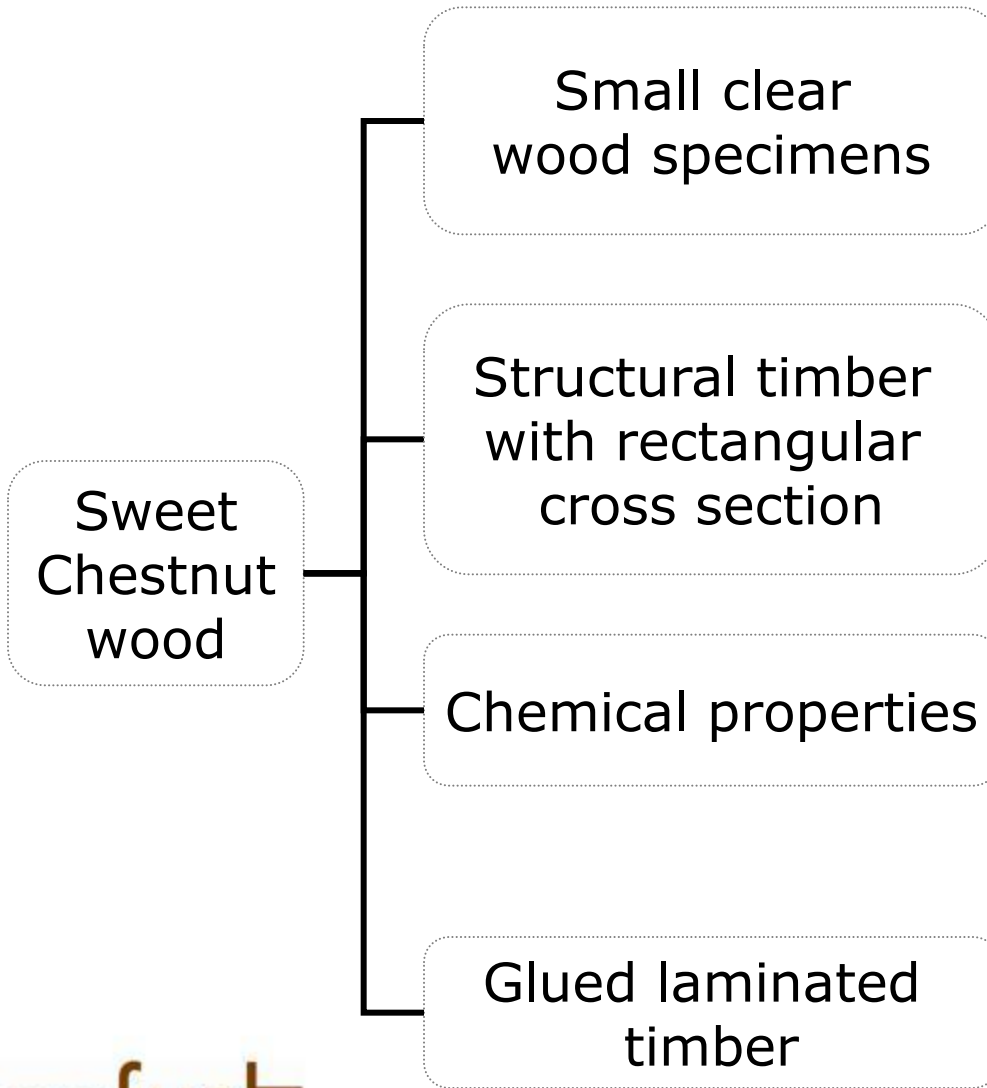
25 September 2011 | Warsaw

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Eduard Correal Mòdol | Wood Catalan Institute

## The main character: *Castanea sativa*

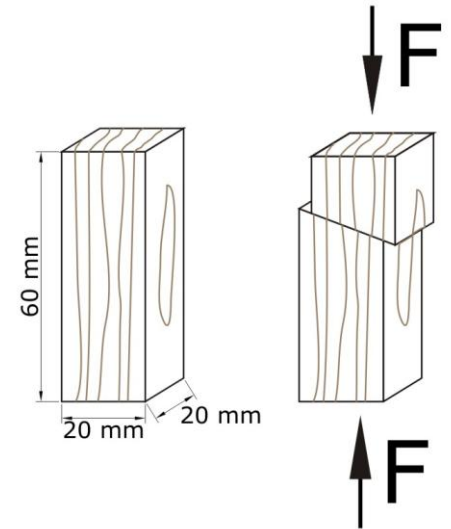




## Small clear wood specimens

### CLASSICAL CHARACTERIZATION

- Density ( $\text{kg/m}^3$ )
- Shrinkage (%)
- Hygroscopicity ( $\text{kg/m}^3$ )
- Hardness ( $\text{mm}^{-1}$ )
- Compression strength ( $\text{kg/m}^3$ )
- Bending strength ( $\text{kg/m}^3$ )
- Perpendicular tension strength ( $\text{kg/m}^3$ )



**Healthy wood**



**Decayed "red" wood**

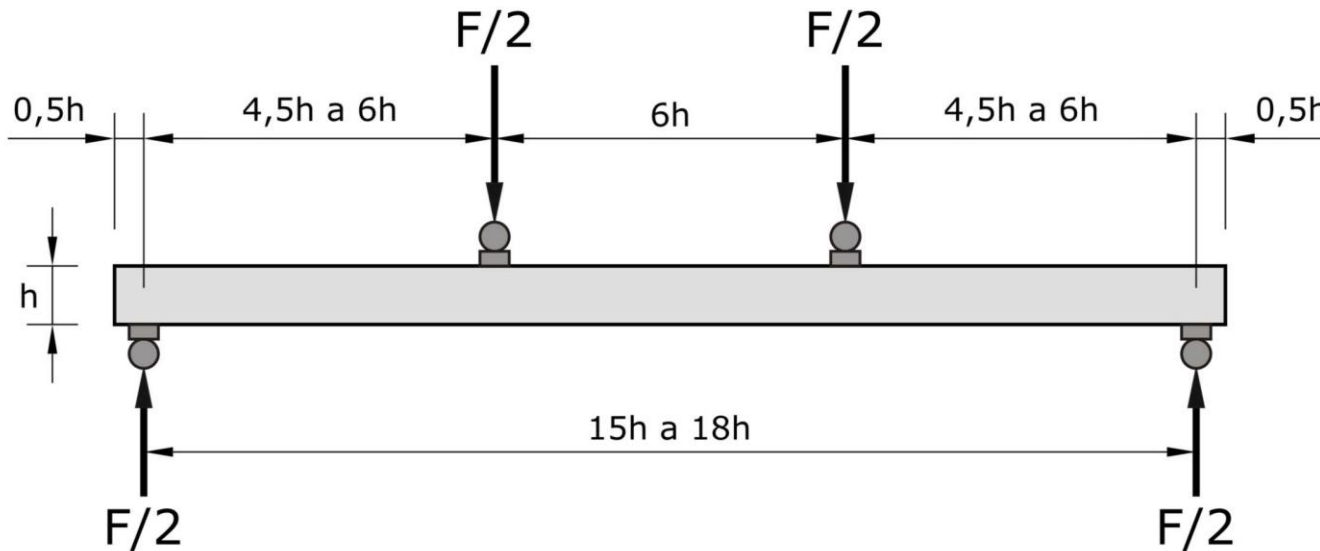
# 3

## Structural timber

### STRUCTURAL CHARACTERIZATION

- Density ( $\text{kg/m}^3$ )
- Modulus of Elasticity ( $\text{N/mm}^2$ )
- Bending Strength ( $\text{N/mm}^2$ )

Cross sections		Spec.
Depth	With	
120	65	40
80	80	64
95	95	62
135	135	75

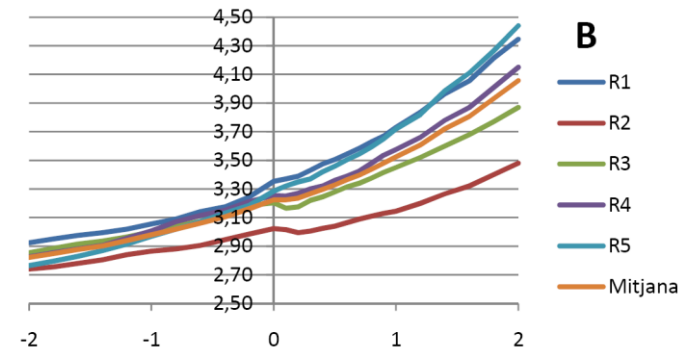
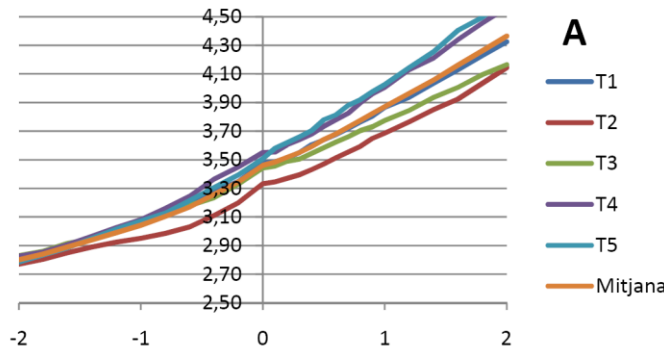


## Chemical properties

### Wood decay

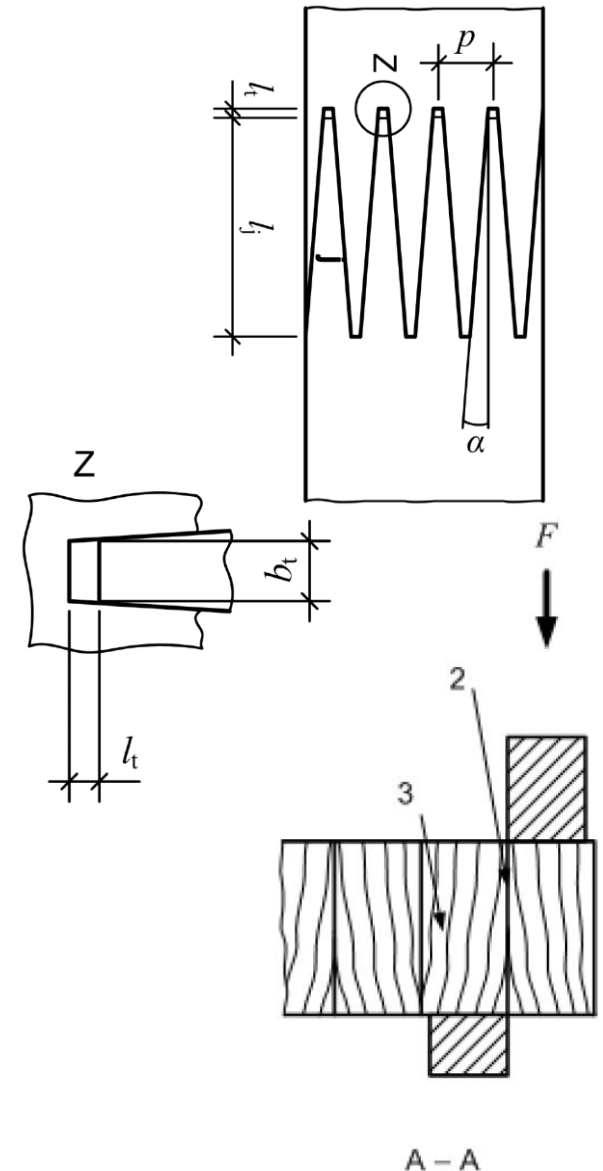
- pH
- Buffer capacity
- Extractives content:
  - Dichloromethane solubility
  - Ethanol-toluene solubility
- Ashes: amount and composition
- Solubility on NaOH
- Lignin content

### Bonding related properties



- **30** prototype beams:
  - 6 laminations: 22x90 mm
  - Cross section: 132x90x2508 mm
  - Polyurethane
- **200** prototype finger joints
  - Finger length ( $l$ ): 15 mm
  - Pitch ( $p$ ): 3,8 mm
  - Tip width: 1 mm
  - Polyurethane
- **30** shear strength
- **30** delaminations (weatherproof)

**Strength class  $\approx$  GLh 32**



# Glued Laminated Timber



**THANK YOU FOR  
YOUR ATTENTION**



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