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# Eucalyptus 2018

## Managing *Eucalyptus* plantations under global changes

# Abstracts Book

# Functional trait plasticity in trees of Eucalyptus grandis

Loïc Brancheriau *† [1], Charlene Arnaud [2], Gilles Chaix [3], Christine Heinz [2], Sylvie Sabatier [2], Mario Tomazello Filho [4]

[1] BioWooEB (UR) – CIRAD – 34398 Montpellier, France
[2] Botanique et modélisation de l'architecture des plantes et des végétations (UMR Amap) – Université de Montpellier : UMR5120 – 34398 Montpellier, France
[3] Amélioration génétique et adaptation des plantes méditerranéennes et tropicales (UMR Agap) – Université de Montpellier – Montpellier, France
[4] Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ) – Piracicaba, SP, CEP 13418-900, Brazil

Potassium and water availability are limiting factors for tree growth. Their influence on anatomical and morphological traits is well known but their combined effects on tree growth remain uncertain. Eucalyptus grandis trees (Itatinga, SP states -Brazil) were analysed in a split-plot experimental design of one clone (ADD clone name) growing under different water regimes (37% rainfall exclusion and no rainfall exclusion) and fertilization treatments (increased potassium supply and control potassium supply). Eight trees per plot were sampled representing a total of 32 trees. Wood anatomy traits (vessel frequency, diameter and lumen area, theoretical hydraulic conductivity, ray frequency and fibre lumen/wall dimensions), morphological traits (tree height, DBH and slenderness) and wood mechanical properties (longitudinal elastic modulus and specific modulus) were studied in order to investigate how water availability and potassium fertilization influenced these traits. Fertilized trees were both taller and had wider diameters than non-fertilized trees. Vessel diameter and theoretical hydraulic conductivity were also notably higher in fertilized trees. By contrast rainfall exclusion had no significant effect on tree growth and measured traits. Mechanical properties were similar across treatments and showed relatively high values compared to values known previously for Eucalyptus. In addition to the effects of potassium, anatomical traits showed strong relationships with morphological traits of trees. But all expected wood anatomical traits modifications in response to rainfall exclusion, as vessel diameter decreased, were not observed. The results suggest that potassium has a markedly positive effect on tree growth promoting taller and larger trees and that trees, at least of this clone, have developed mechanisms that mitigate against limited water availability. Potassium supply seems to indirectly impacts anatomical traits. Indeed, results show that modification of anatomical traits is primary linked to tree height and DBH witch are driven here by K fertilization.

**Keywords:** Wood anatomy, tree morphology, mechanical properties, Eucalyptus, rainfall exclusion, potassium supply

*Speaker
†Corresponding author: loic.brancheriau@cirad.fr