



# QuaPla

## Variabilité des propriétés et des structures de bois issus des plantations innovantes en Lorraine : qualité bois et son implication biomécanique

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### *Collaborations :*

*Identification des placettes d'intérêts : Forest stands identification: Myriam LEGAY (AgroParisTech), Jean LADIER (ONF Avignon), Christine DELEUZE (ONF Dijon);*

*Estimation de l'ancrage racinaire : Pauline DEFOSSEZ (ISPA, Bordeaux) ;*

*Analyse chimique localisée : Brigitte CHABBERT (FARE, Reims) ;*

*Modélisation: Tancrede ALMERAS (LMGC, Montpellier), Jan TIPPNER (Mendel University in Brno, Czech Republic);*

*Evaluation de la qualité du bois et de la vulnérabilité des espèces au vent: Thomas SEIFERT (Albert-Ludwig-Universität Freiburg, Germany).*

### **Summary**

*Context* — To adapt the wood production to climate change, shorter production cycles and lower tree density in plantation are frequently recommended to better resist drought. Forest managers are also testing the growth potential of some exotic species originating from drier climates such as for example Atlas cedar or Corsican pine. Although there is some knowledge existing on average wood properties of these species, only a few references exist about how these properties would vary with silviculture in the forecasted environment of continental Europe. For example, wide tree spacing exposes trees more to wind, which might induce reaction wood. A major effect is also a faster growth in earlier growth stage, which leads to a production of larger extent of lower quality juvenile wood, well known as a great problem for industrial uses.

*Objectives* — Assess the biomechanical hypothesis assuming that the radial variation of wood properties is a functional adaptation of the tree to resist wind loads. Mechanobiological response of cambial cells would be an essential element of the tree survival tailoring the transition from the stress avoidant strategy (reed) to the stress resistant strategy (oak) during the tree growth.

*Approaches* — Traits measured at different scales will be used for integrative modelling in order to assess the contribution of each individual traits to the tree resistance to wind. For each species, two forest stands with contrasted tree density will be tested.

*Expected results and impacts* — Produce a framework to evaluate and anticipate the wood quality (wood properties and stem shape) from exotic softwood plantations recommended to replace Fir, Spruce and Beech in Lorraine (Atlas cedar, Corsican pine and Douglas-fir).