RSA Plasticity

Effets de contraintes édaphiques localisées (déficit hydrique, résistance mécanique) sur la plasticité développementale du système racinaire du peuplier

Principle investigator: **Marie-Béatrice BOGEAT-TRIBOULOT, UMR Silva**

LabEx partners: UMR Interactions Arbres/Micro-organismes (IAM)

Collaborations*: Irène Hummel (UMR Silva), Claire Veneault-Fourrey (UMR IAM)*

Summary

Context — Roots stand as the master interface between the soil resources and the microbiome, and the aboveground. Bad rooting reduces aerial growth, hampers resistance to stresses and can lead to significant economic impacts. The root system architecture (RSA) is responsive to the biotic and abiotic cues within the soil such as mutualistic fungi derived signals, water and nutrient availability, pH or mechanical resistance. RSA may respond to local cues but also to systemic signals. How environmental cues are transmitted into phenotypic changes of the RSA are overlooked, especially in trees.

Objectives — We will study the developmental plasticity of the poplar root system and the local and systemic signalling in response to these two major edaphic constraints, water deficit and mechanical impedance.

Approaches — Poplar cuttings will be grown in 2D growing boxes in order to monitor root growth and RSA plasticity at high temporal resolution, using our automatic imaging facility. The systemic nature of RSA responses to stress will be assessed using split-root growing systems. Considering transgenic lines affected in distinct hormonal pathways will reveal the contribution of hormone signalling in the local and systemic responses.

Expected results and impacts — This project will provide new knowledge on the molecular processes underpinning how environmental cues are transmitted into phenotypic changes of the root system architecture. As root development influence deeply the acclimation to environmental challenges and the tree fitness, it will benefit our understanding of forest ecosystem resilience.