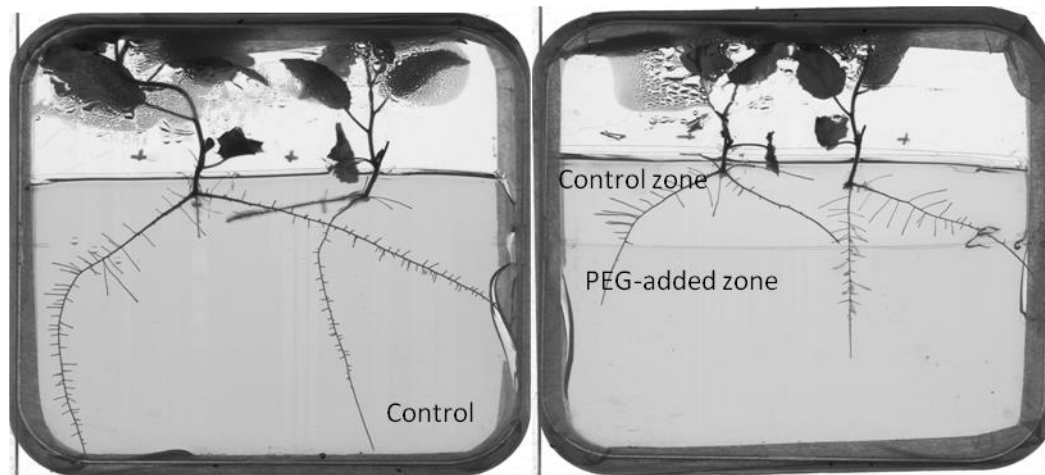


RootEx



Structure-function analysis of proteins involved in stress resistance mechanisms in the model tree *Populus trichocarpa*

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Context — The great adaptability to the environmental constraints of root development is a crucial property in tree functioning. Root system development, i.e. root growth and lateral root formation, is responsive to factors of the rhizosphere, including interactions with fungi, nutrient availability, and water availability. While stem cells were shown to play an important role in root development, the effects of environmental cues on their functioning has not been assessed yet.

Objectives — RootEx project aims at testing the hypothesis that root stem cells play a key role in the response of root growth to signals coming from the rhizosphere, being biotic or abiotic. Our analysis will focus on the implication of key transcription factors (TF) identified in Arabidopsis stem cells functioning.

Approach — We carried a dual analysis of growth and gene expression, focusing on TF involved in stem cells activity in response to both mycorrhization and osmotic stress (applied by PEG) on poplar cutting grown *in vitro*.

Key results —

- Root growth inhibition occurred as soon as after one week of contact with the ectomycorrhizal fungus. Root growth was reduced according to osmotic stress intensity.
- Poplar homologs of the candidate genes were identified from the poplar genome and specific primers were designed.
- We found that all studied TF were expressed in the poplar root apex, in control and in both treatments.
- TF expression was monitored during the mycorrhization formation (1 point/week) showing a significant up-regulation of PTL2 and ACR4 expression at the first week.
- The osmotic stress induced the expression of PTL2, ACR4 and SCR1 and repressed that of WOX5.

Main conclusions including key points of discussion — Growth variations induced by the biotic and abiotic cues were related to those of TF expression in the root apex. The responses differ partially between biotic and abiotic stress. Considering the cellular pattern of TF expression in Arabidopsis, it appears important to localise the FT expression within the more complex root meristem of poplar.

Future perspectives — We initially planned to analyse the regulation of TF expression in Arabidopsis reporter lines (GUS, GFP, CFP) in response to water deficit. The move of V. Legué for another university precociously stopped the project.

Valorisation —

The project was presented as part of the Tree Biotechnoloy Congress (June 2012).
The data was not repeated enough to be publishable.