



Investigating the molecular basis of drought tolerance in Populus: The WATBIO Populus core experiment

H. Wildhagen, H. Smith, M. Valdes-Fragoso, C. Douthe, David Cohen, Oliver Brendel, Didier Le Thiec, D. Janz, S. Pollastrini, G. Della Roca, et al.

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1Wildhagen H, 2Smith H, 2Valdes-Fragoso M, 3Douthe C, 4Cohen D, 4Brendel O, 4Le Thiec D, 1Janz D, 5Pollastri S, 5Della Roca G, 6Rüger S, 5Centritto M, 5Loreto F, 3Flexas J, 4Bogeat-Triboulot M-B, 2Taylor G, 1Polle A

1 Büsgen-Institute, Dep. of Forest Botany and Tree Physiology, Georg-August-University Göttingen, Germany (UGOE)
 2 Centre for Biological Sciences, University of Southampton, UK (SOTON)
 3 Universitat de les Illes Balears, Spian (UIB)
 4 UMR Ecologie et Ecophysiologie Forestières, INRA Nancy, France (INRA)
 5 Consiglio Nazionale delle Ricerche, Italy (CNR)
 6 ZIM Plant Technology GmbH, Germany

Introduction

- **Populus core experiment:** Investigation of drought stress responses of selected *Populus* genotypes
- **Unifying research aim of participating groups:** Analysis of development of tissues and organs under drought in order to identify mechanisms important to maintain growth under limited water availability
- **Main hypothesis:** *Populus* genotypes originating from different environments harbour adaptation mechanisms that can be exploited to produce new germplasm for sustained biomass production under stress

Methods

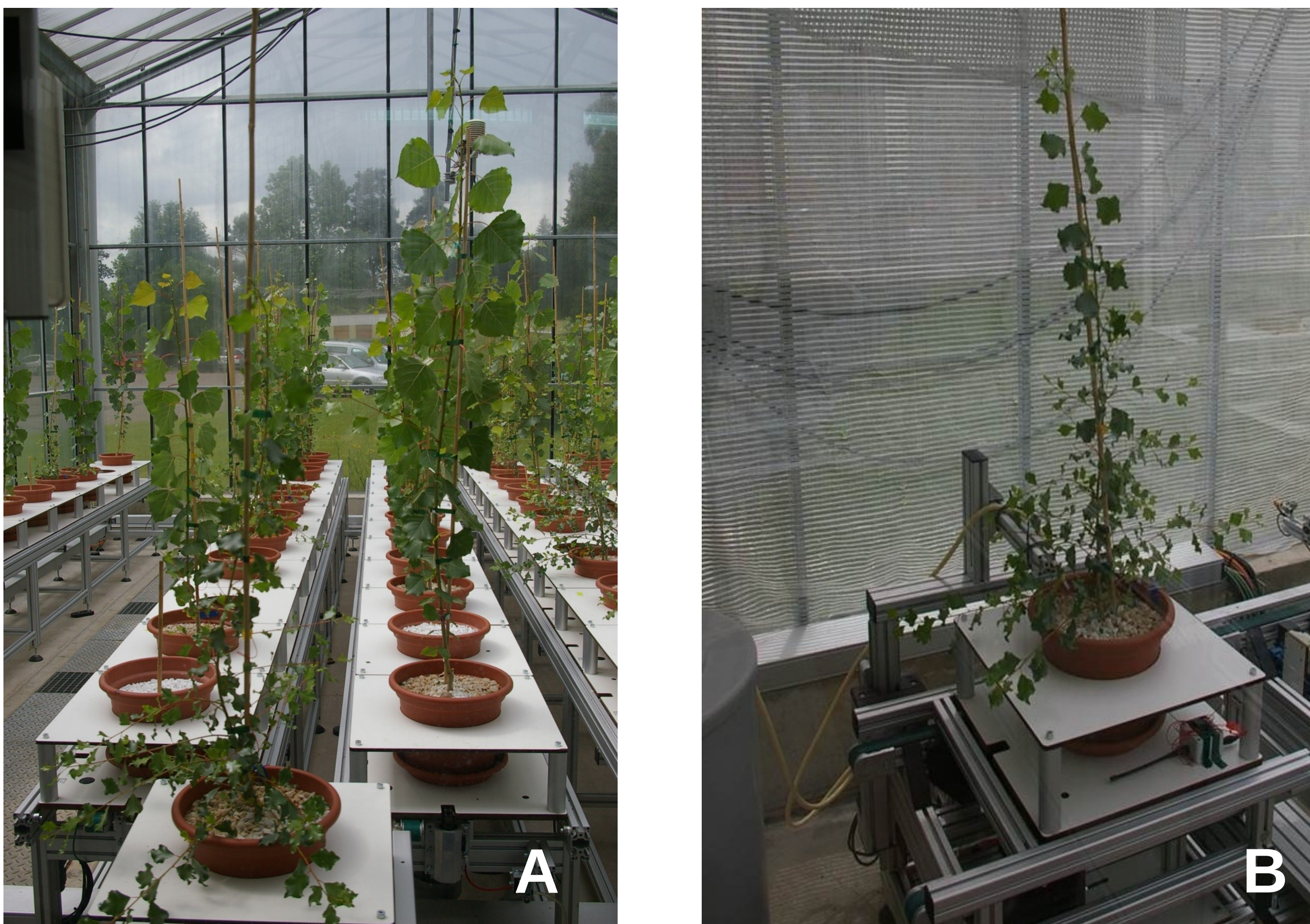


Fig. 1 | Poplar plants in the glasshouse at INRA Nancy (A, B). Trees of three *Populus nigra* genotypes originating from habitats characterised by increasing water limitation were exposed to a control or drought treatment (cf. Fig. 2). B) A plant of genotype „Spain“ on the watering station, a balance adjusting the pot weight to a target weight corresponding to the defined soil water content three times per day.

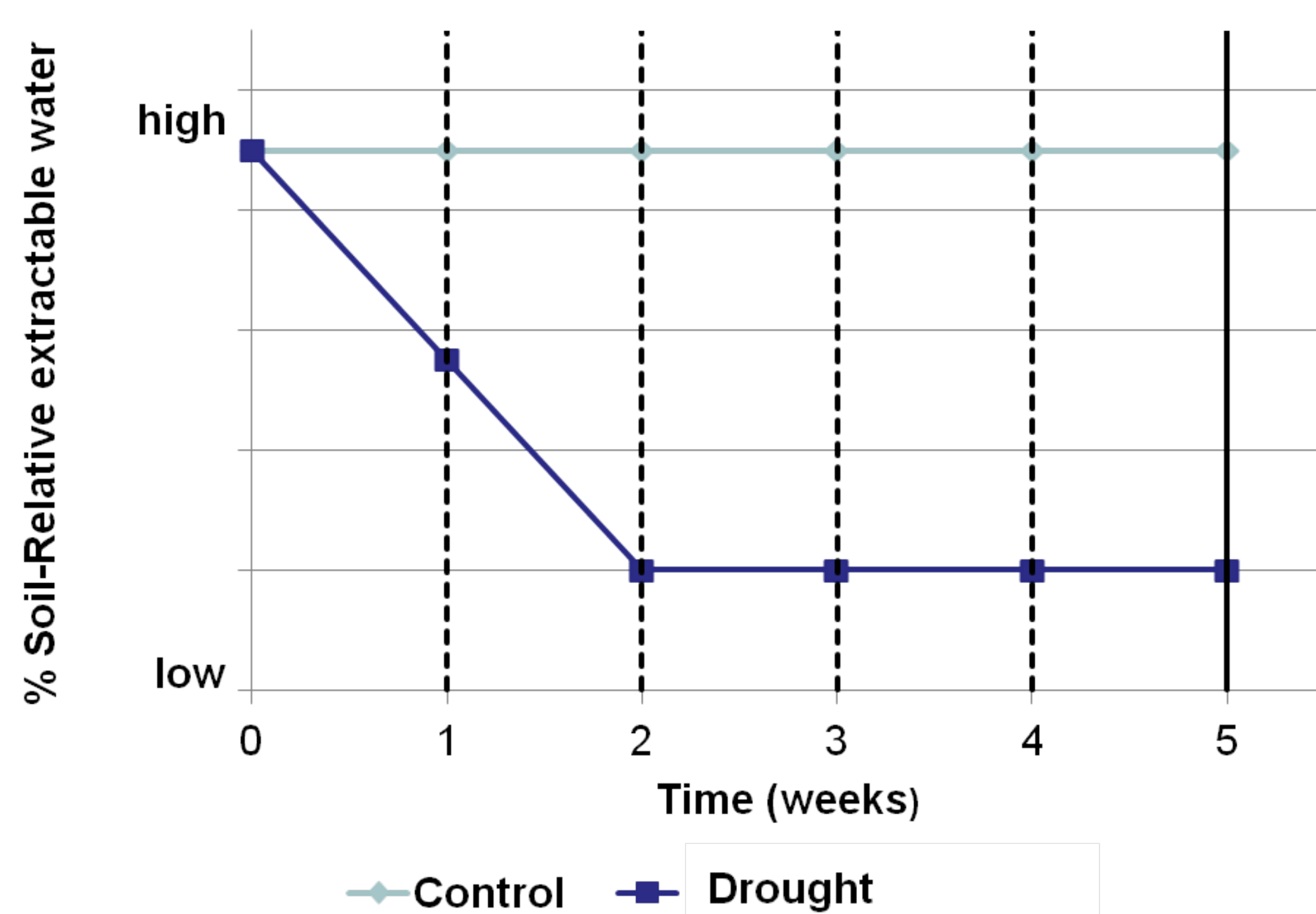
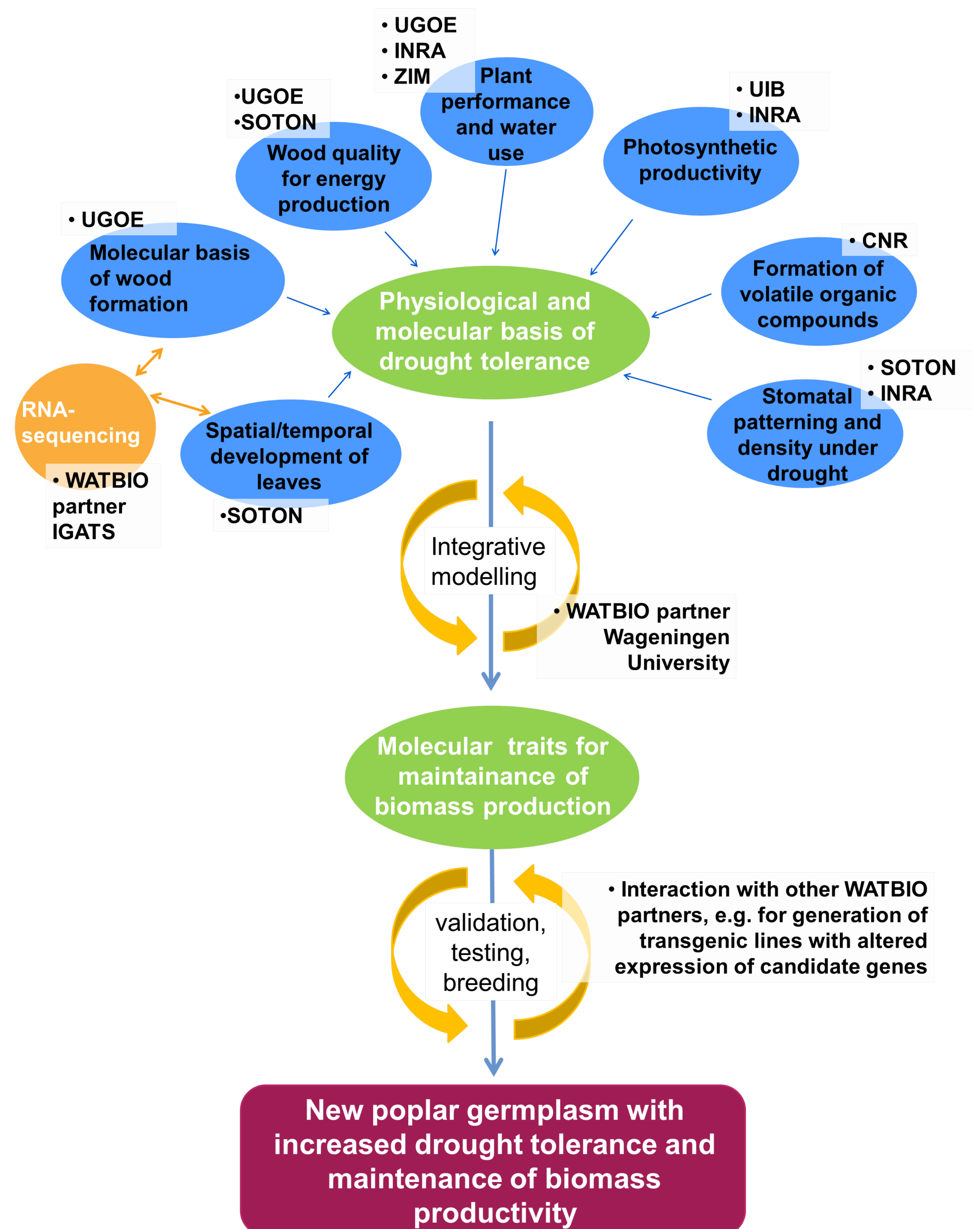


Fig. 2 | Soil water conditions in a drought stress experiment with *Populus nigra*. Trees of three genotypes were exposed to a control treatment with high soil-relative extractable water (soil-REW) or a drought treatment with a low level soil-REW.

Concept

- The involved partners contribute their expertise to achieve the main goal of the WATBIO project



- A core set of measurements is carried out
 - Biomass yield
 - Soil water status
 - Plant water status
 - Leaf size, total leaf area
 - Branching patterns
 - Stomatal conductance
 - Wood/lignocellulosic quality, saccharification potential

Outlook

- Data analysis of growth and physiological parameters
- Study wood anatomy and –composition
- Perform transcriptomics (mRNA-Seq) and metabolomics to understand the molecular basis of the observed changes in growth in physiology

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