



**2<sup>nd</sup> Workshop Carbon Allocation in plants**  
Advances in carbon allocation and acquisition  
20th-21th November 2023, INRAE, Versailles

***Scientific Program***

***Monday 20<sup>th</sup> November***

**08:00 - 09:40** Workshop registration – Installation of posters

**08:00 - 09:40** *Welcome Coffee*

**09:40 - 09:55** **Welcome and opening remarks**

**Helen North** (Head of Institute Jean Pierre Bourgin, Versailles, France).

**Sylvie Dinant, John Lunn, Ekkehard Neuhaus, Ruth Stadler, Nathalie Pourtau**

**SESSION 1 - Transport of sugars**

**Moderator: Rozenn Le Hir**

**10:00 - 10:30** **Alexander Schulz** "Diversity in seed plants of osmotic water uptake along the (pre-) phloem pathway" (Department of Plant and Environmental Sciences, Frederiksberg, Denmark)

**10:30 - 10:50** **Christina Kühn** "Protein-protein interactions of plant glucose and sucrose transporters affect their subcellular mobility" (Humboldt-Universität zu Berlin, Institute of Biology, Berlin, Germany)

**10:50 - 11:10** **Sylvie Dinant** "Unravelling the role of SUC/SUT transporters in the regulation of apoplasmic sucrose levels" (Institute Jean-Pierre Bourgin, INRAE, Versailles, France)

**11:10 - 11:30** **Isabel Keller** "Unlocking the Secrets of Sugar Beet: Exploring the Relationship Between Taproot Sugar and Floral Induction Using MRI" (Department of Plant Physiology, University of Kaiserslautern, Kaiserslautern, Germany)

**11:30 - 11:50** **Wolfgang Zierer** "Assimilate Allocation in Manihot esculenta – An Overview" (Friedrich-Alexander University Erlangen-Nuremberg, Erlangen, Germany)

11:50 - 12:10 **Benoit Monnereau** "Investigating the role of the grapevine hexose transporter VvHT5 in basal resistance against *Botrytis cinerea*" (UMR EBI, Poitiers University, CNRS, POITIERS, France)

12:10 - 12:30 **Ekkehard Neuhaus** "Intracellular sugar transport impacts plant development and stress tolerance" (Department of Plant Physiology, University of Kaiserslautern, Kaiserslautern, Germany)

*12:30 – 14:00 Lunch break*

## SESSION 2 - Carbon uptake and storage in plants

**Moderator: Xenie Johnson**

14:00 - 14:30 **Andreas Weber** "Natural variation and synthetic improvement of photosynthetic carbon assimilation in land plants" (Institute of Plant Biochemistry, Heinrich Heine University, Düsseldorf, Germany)

14:30 – 14:50 **Alexis De Angeli** "Impact of vacuolar transient store of C4-Organic Acids on plant growth, role of vacuolar transport" (IPSiM, CNRS INRAE , Montpellier, France)

14:50 - 15:10 **Younès Dello** "Using <sup>13</sup>C metabolic probes to assess carbon allocation processes within the central metabolism of Brassica napus source leaves" (IGEPP, Rennes University, INRAE, Le Rheu, France)

15:10 - 15:30 **Joan Doidy** "Transcriptional regulation of sugar transport and starch metabolism during pea seed development following a water deficit" (UMR EBI, Poitiers University, Poitiers, France)

15:30 - 15:50 **Anja Krieger-Liszkay** "Increased drought resistance in state transition mutants is linked to modified plastoquinone pool redox state" (Institute for Integrative Biology of the Cell, Paris-Saclay University, Gif-sur-Yvette, France)

15:50 - 16:10 **Annette Morvan-Bertrand** "Exploring the localization of fructans in plants using original monoclonal antibodies: towards a paradigm shift from vacuolar to multiple subcellular localization?" (Normandie University, INRAE, Caen, France)

16:10 - 16:30 **Totte Niittylä** "New insights into carbon uptake and storage in trees" (Umeå Plant Science Centre, Umeå, Sweden)

*16:30 - 17:00 Coffee break*

## SESSION 3 - Sugar homeostasis under contrasting environments

**Moderator: Nathalie Pourtau**

17:00 - 17:30 **Franziska Fichtner** "The sugar signalling metabolite trehalose 6-phosphate is a key signal in regulating plant development" (Institute of Plant Biochemistry, Heinrich Heine University, Düsseldorf, Germany)

- 17:30 – 17:50        **Christoph Weiste** “S1 basic leucine zipper transcription factors shape plant architecture by controlling C/N partitioning between apical and lateral organs” (Julius-von-Sachs-Institute, Würzburg, Germany)
- 17:50 – 18:10        **Johanna Krahrmer** “Internal sugar allocation in response to a shade signal is regulated by concerted action of auxin and sucrose” (Department of Plant and Environmental Sciences, University of Copenhagen, Denmark)
- 18:10 – 18:30        **John Lunn** “Trehalose 6-phosphate - the insulin of plants” (Max Planck Institute of Molecular Plant Physiology, Golm, Germany)

*18:30 - 19:45 Poster Session*

*19:45 - 22:00 Cocktail at the Versailles Center*

## **Tuesday 21<sup>th</sup> November**

*08:00 - 08:30 Welcome Coffee*

### **SESSION 4 - Source-to-sink relationships and modelling**

**Moderator: Fabien Chardon**

- 8:30 - 9:00        **Uwe Sonnewald** “The difficult task to create heat tolerant potato genotypes” (Department of Biology, Friedrich-Alexander Universität, Erlangen, Germany)
- 9:00 - 9:20        **Bas van den Herik** “Modeling sucrose efflux-mitigation in potato uncovers increased transport efficiency and preferentially enhanced tuber resource partitioning” (Computational Developmental Biology, Utrecht University, Utrecht, The Netherlands)
- 9:20 - 9:40        **Ralf Metzner** “<sup>11</sup>C-labelling in combination with Positron Emission Tomography (PET) can be used for investigating carbon transport dynamics even in complex 3D plant organs above and belowground” (Institute of Bio- and Geosciences, Jülich, Germany)
- 09:40 - 10:00        **Carel W. Windt** “A mobile NMR sensor to nondestructively monitor the dynamics of carbon deposition and remobilization in plants and developing fruit” (Forschungszentrum Jülich GmbH, Jülich, Germany)
- 10:00 - 10:30        **Ruth Stadler** “Nutrition strategies of the parasitic plant dodder”, (Friedrich-Alexander University of Erlangen - Nuremberg, Molecular Plant Physiology, Erlangen, Germany)

#### **Junior Prize**

- 10:30 – 10:50        **Emma Raven** “Plasmodesmal response to stress depends on sink-source status” (John Innes Centre, Norwich, United Kingdom)

*10:50 - 11:20 Coffee break + Poster Session*

## **SESSION 5 – Ecophysiology of the carbon cycle & Plant-soil interactions**

**Moderator: Frédéric Rees**

11:20 - 11:50 **Kathy Steppe** “CO<sub>2</sub>: blessing or curse for tree health during drought, origin matters” (Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium)

11:50 - 12:10 **Thiéry Constant** “Wind as a powerful regulator of the photosynthetates distribution inside the tree” (UMR Silva, Lorraine University, INRAE, Nancy, France)

12:10 – 12:30 **Tristan Gérard** “How can local sugar concentrations in roots regulate the exchanges of C & N between shoots, roots and soil?” (UMR ECOSYS, INRAE, Paris-Saclay University, France)

*12:30 - 13:50 Lunch break*

13:50 - 14:20 **Christiana Staudinger** “Root exudation in response to nutrient limitation in monocot crop species” (Department of Forest and Soil Science, Tulln, Austria)

14:20 - 14:40 **Lee Cackett** “Maximising symbiotic nutrient uptake by increasing carbon allocation to arbuscular mycorrhizal fungi” (Department of Plant Sciences, University of Cambridge, United Kingdom)

14:40 - 15:00 **Chloé Folacher** “Carbon allocation in the plant/soil system according to plant resource acquisition strategies” (ECODIV, INRAE, Rouen University, France)

## **ROUND TABLE**

### **CO<sub>2</sub> capture: the need to integrate scales - From genes to population**

**Moderators: Jean-Louis Durand, Nathalie Ollat, Xenie Johnson, Norbert Rolland, Sylvie Dinant and Anja Krieger-Liszkay**

15:10 - 17:00 Round-table & Discussion

**17:00 Conclusions and Final Remarks**

## **Poster Session Program**

### **SESSION 1 - Transport of sugars**

- P1-1 Rozenn Le Hir** “Linking sugar transport and nitrogen remobilization and use efficiency in *Arabidopsis*” (Institute Jean-Pierre Bourgin, Versailles, France)
- P1-2 Melike Aksu** “Unraveling Fructose Signaling in Plant Cells: AtCIPK6 and Beyond” (Department of Plant Physiology, University of Kaiserslautern, Germany)
- P1-3 Meerim Arystanbek Kyzyb** “Senescence Associated Sugar Transporter1 Regulates TOR Activity for Controlled Senescence in *Arabidopsis*” (Department of Plant Physiology, University of Kaiserslautern, Germany)
- P1-4 Gertrud Lohaus** “Sugar concentration and phloem loading in European beech (*Fagus sylvatica*) and Common oak (*Quercus robur*)” (Molecular Plant Science/Plant Biochemistry, University of Wuppertal; Germany)

### **SESSION 2 - Carbon uptake and storage in plants**

- P2-1 Nathalie Noiraud-Romy** “Sucrose-synthesizing enzymes activities and gene expressions in ryegrass following defoliation” (Normandie University, Caen, France)
- P2-2 Jeanne Marie Al Frenn** “Role of chloroplast nucleoids in C4 photosynthetic differentiation in *Zea mays*” (IP2S, Paris-Saclay University, France)
- P2-3 Nicolas Chéron** “What molecular dynamics simulations can bring to the study of PEP Carboxylase” (Ecole Normale Supérieure, Département de Chimie, Paris, France)
- P2-4 Richard Dorrell** “Environmentally-informed functional characterisation of a plastidial diatom glycolytic bridge of mitochondrial origin” (Institut de Biologie, École Normale Supérieure, Paris, France)

### SESSION 3 - Sugar homeostasis under contrasting environments

- P3-1 Mathias Coulon** “Tolerance to water stress, root functioning and carbon flux optimized for improved yield in pea” (UMR EBI, Poitiers University, Poitiers, France)
- P3-2 Moritz Göbel** “Trehalose-6-phosphate in root development” (Heinrich-Heine University, Düsseldorf, Germany)
- P3-3 Lucas Müller** “The tissue-specific functions of trehalose 6-phosphate in coordinating plant metabolism with development” (Heinrich Heine University Düsseldorf, Germany)
- P3-4 Simona Nardoza** “Towards sustainable and climate resilient yield in kiwifruit” (Mt Albert Research Centre, Auckland New Zealand)
- P3-5 Jesús Praena** “From *Arabidopsis* to *Arabis alpina*: Investigating the Role of Trehalose 6-Phosphate in Perennial Plant Physiology” (Max Planck Institute for Plant Breeding Research, Germany)
- P3-6 Carlo Pasini** “Linking abscisic acid to starch and sugar metabolism in the leaves of *Arabidopsis thaliana*” (ETH Zürich, Switzerland)
- P3-7 Erik Solhaug** “Targeted manipulation of nectary starch in *Arabidopsis thaliana* impacts nectar sugar” (Institute of Molecular Plant Biology, ETH, Zürich)
- P3-8 Ana Cristina Zepeda** “Carbon storage in plants: a dynamic model predicting structural growth, soluble sugar and starch concentrations under fluctuating light and temperature” (Department of Plant Sciences, Wageningen, The Netherlands)

### SESSION 4 - Source-to-sink relationships and modelling

- P4-1 Andrew Friend** “A model exploration of source-sink interactions in plants and their consequences for growth responses to environmental change” (Department of Geography, University of Cambridge, UK)
- P4-2 Maria Mastoraki** “Unveiling the Impact of Far-Red Light on Carbohydrate Allocation and Yield in Dwarf Tomato Cultivars” (Wageningen University & Research, The Netherlands)
- P4-3 Hannah Lanzrath** “Analyzing time activity curves from radioactive tracer experiments to determine tracer transport velocity in plants” (Institute of Bio- and Geosciences (IBG), Jülich, Germany)
- P4-4 Che Liu** “Carbon source and sink limitations on boreal trees’ cambial growth: implications of a coupled stomatal and growth model” (Department of Forest Sciences, Faculty of Agriculture and Forestry, University of Helsinki, Institute for Atmospheric and Earth System Research (INAR), Helsinki, Finland)

**P4-5 Antonia Chlubek** “A routine Carbon-11-PET workflow for in vivo measurements of plants: from a custom plant facility to data analysis” (Forschungszentrum Jülich GmbH, Institute of Bio- and Geosciences (IBG), Jülich, Germany)

## SESSION 5 – Ecophysiology of the carbon cycle & Plant-soil interactions

**P5-1 Michael Anokye** “Shoot level phenotyping reveals adaptive variation in the grass genus, *Hordeum*” (Heinrich-Heine Universität Düsseldorf, Germany)

**P5-2 Elisa Zofia Stefaniak** “Framework for Optimality Theory informed Carbon Storage Allocation under drought in a Plant Population Model” (International Institute for Applied Systems Analysis, Laxenburg, Austria)

