



# 7<sup>th</sup> International Symposium on Physiological Processes in Roots of Woody Plants

University of Tartu, Omicum building (Riia 23B, Tartu), Estonia, June 26 - 29, 2017

Sunday 25 <sup>th</sup> June	Time	Monday 26 <sup>th</sup> June	Time	Tuesday 27 <sup>th</sup> June	Time	Wednesday 28 <sup>th</sup> June	Thursday 29 <sup>th</sup> June	Friday 30 <sup>th</sup> June
		08.00	Arrival/registration					
	09.00-9.15	<b>Welcome: Iivika Ostonen</b> Chair of Woody Root 7 symposium	8.30-16.15	<b>Session: Linking root functioning and belowground biodiversity</b> Chair: Martin Lukac	9.30-12.15	<b>Session: Roots, global change and ecosystem services</b> Chair: Mark R Bakker		
	9.15-12.00	<b>Session: Water acquisition and nutrient uptake</b> Chair: Ivano Brunner	8.30-9.15	<b>Keynote and COST invited speaker:</b> <b>Björn Lindahl</b> Influence of ectomycorrhiza on decomposition across biomes	9.30-9.15	<b>Keynote and COST invited speaker:</b> <b>Phil Ineson</b> Assessing the Functional Activity of Roots in the Field: Novel Techniques and Old Questions		
	9.15-10.00	<b>Keynote and COST invited speaker:</b> <b>Arthur Gessler</b> The role of nutrients in drought-induced tree mortality and recovery	9.15-9.30	<b>Petr Baldrian</b> Feed in summer, rest in winter: Microbial carbon utilization in coniferous forest soil reflects root activity	9.15-9.30	<b>Lars Vesterdal</b> Are tree species diversity and tree species identity effects on soil carbon stocks across Europe linked with fine root biomass?		
	10.00-10.15	<b>Annie DesRochers</b> Physiological integration of connected <i>Populus balsamifera</i> ramets	9.30-9.45	<b>Ivano Brunner</b> The root of the matter - decomposition of Scots pine roots and its microbial communities	9.30-9.45	<b>Leena Finér</b> Relationships between fine root biomass and tree species diversity and functional group in European forest types		
	10.15-10.30	<b>Tapani Repo</b> Biophysical changes in roots of Scots pine seedlings by cold acclimation and freezing damage	9.45-10.00	<b>Sannakajsa Velmala</b> Root architecture of Norway spruce families with contrasting growth phenotypes in response to nutrient-rich patches within a nutrient-poor environment	9.45-10.00	<b>Joanna Mucha</b> Response of ectomycorrhizal fungal community of boreal and temperate host species near their range limits to experimental warming		
	10.30-11.00	Coffee Chair: Jhonian Ephrath	10.00-10.30	Coffee Chair: Mari Moora	10.00-10.30	Coffee Chair: Tarja Lehto		
	11.00-11.15	<b>Taina Pennanen</b> Unearthing mechanisms behind variable growth rate in Norway spruce	10.30-10.45	<b>Oskar Franklin</b> The role of mycorrhiza for carbon storage in forests – an ecosystem perspective	10.30-10.45	<b>Tuula Larmola</b> Impact of simulated atmospheric nitrogen deposition on nutrient cycling and carbon sink via mycorrhizal fungi in two nutrient-poor peatlands		
	11.15-11.30	<b>Leena Hamberg</b> Early root growth and architecture of fast- and slow-growing Norway spruce ( <i>Picea abies</i> ) families differ – potential for functional adaptation	10.45-11.00	<b>Rodica Pena</b> Partitioning of soil fungal biomass between saprotrophic and ectomycorrhizal guilds in deciduous and coniferous temperate forests	10.45-11.00	<b>Inga Dirks</b> P uptake and use efficiencies of Palestine oak respond to N availability and drought		
	11.30-11.45	<b>Sonia Meller</b> The potential of beech seedlings to adapt to low P availability in soil – linking plant P and biomass allocation with rhizosphere processes	11.00-11.15	<b>Nadia Soudzilovskaia</b> Environmental predictors of plant species richness within distinct mycorrhizal types	11.00-11.15	<b>Timo Domisch</b> Forest tree seedlings may suffer from predicted future winters with less snow		
	11.45-12.00	<b>Mana Mukai</b> Effects of tree-root exudates on the solubilization of phosphorus adsorbed to allophane in the rhizosphere on Andisols, Yakushima Island, Japan	11.15-11.30	<b>Tanja Mrak</b> Belowground response to combined effects of ozone and drought in seedlings of three oak species ( <i>Quercus ilex</i> , <i>Q. pubescens</i> and <i>Q. robur</i> )	11.15-11.30	<b>Krista Löhmus</b> Elevated atmospheric humidity shapes fine root foraging strategies and the carbon cycle of a silver birch forest ecosystem: a FAHM study		
	12.00-13.00	Lunch	11.30-11.45	<b>Marc Goebel</b> Decomposition dynamics of undisturbed, dead fine roots in temperate tree species	11.30-11.45	<b>Arvo Tullus</b> Regeneration of hybrid aspen from root suckers and stump sprouts under elevated air humidity in the FAHM experiment		
	13.00-16.00	<b>Session: Belowground assimilate allocation</b> Chair: Krista Löhmus	11.45-12.00	<b>Saori Fujii</b> Soil microarthropod communities involved in decomposition of leaf and root litter	11.45-12.00	<b>Seung Hyun Han</b> Effect of soil moisture on fine root production under experimental warming and precipitation manipulation		
	13.00-13.45	<b>Keynote speaker: David Eissenstat</b> Plant Functional Traits Associated with Mycorrhizal Root Foraging in Arbuscular Mycorrhizal and Ectomycorrhizal Trees	12.00-13.00	Lunch	12.00-12.15	<b>Kaining Zhou</b> The Effects of Photosensitive Nets on Shoot and Root Development of Young Grafted Orange Trees in the Field		
	13.45-14.00	<b>Jaana Leppälampi-Kujansuu</b> Fine root dynamics in the boreal soil fertility gradient		Chair: Leho Tedersoo	12.15-13.20	Lunch		
	14.00-14.15	<b>Rabbil Bhuiyan</b> Estimating fine-root production by tree species and understory functional groups in peatland forests	13.00-13.45	<b>Keynote speaker: Wim van der Putten</b> Feedback interactions between plant roots and soil biodiversity during range shifts and ecosystem development	13.20-13.30	Intro: ISRR 10 in Israel. <b>Jhonian Ephrath</b>		
	14.15-14.30	<b>Yasuhiro Hirano</b> Contrasting root systems of <i>Pinus thunbergii</i> in soils with different groundwater levels in a coastal forest	13.45-14.00	<b>Diogo Pinho</b> The rhizosphere microbiome in the oak decline	13.30-16.45	<b>Session: Root traits, models, concepts</b> Chair: David Eissenstat		
	14.30-15.00	Coffee Chair: Yasuhiro Hirano	14.00-14.15	<b>Rasmus Kjeller</b> Use of in-growth mesh bags to assess the physiological status of ectomycorrhizal fungi	13.30-14.15	<b>Keynote speaker: Daniel C Laughlin</b> Integrating fine root traits into predictive models of community assembly		
	15.00-15.15	<b>Ina Christin Meier</b> Root exudation depends on soil depth, root morphology, and environment	14.15-14.30	<b>Siim-Kaarel Sepp</b> Effects of moderate land use on arbuscular fungal communities	14.15-14.30	<b>Martin Lukac</b> How do plant roots drive soil biodiversity?		
	15.15-15.30	<b>Bartosz Adamczyk</b> How root chemistry affect sequestration of carbon from fungal biomass	14.30-15.00	Chair: Maarja Öpik	14.30-14.45	<b>Frida Andreasson</b> Fine root growth, production and morphology of <i>Pinus pinaster</i> and its understory species		
	15.30-15.45	<b>Heljä-Sisko Helmisaari</b> Fine root carbon compounds of Norway spruce and Scots pine on a latitude gradient	15.00-15.45	<b>Keynote speaker: Martin Zobel</b> Macroecology of arbuscular mycorrhiza (AM)	14.45-15.00	<b>Hidetoshi Ikeno</b> Reconstruction of root systems of <i>Cryptomeria japonica</i> using coordinate points and root diameters		
	15.45-16.00	<b>Pille Mänd</b> Acclimation of Silver birch ( <i>Betula pendula</i> ) roots in artificial gradient of soil moisture	15.45-16.00	<b>Irena Maček</b> Locally Extreme Environments as Natural Long-Term Experiments in Community Ecology of Arbuscular Mycorrhizal Fungi	15.00-15.30	Coffee Chair: Heljä-Sisko Helmisaari		
	16.00-16.15		16.00-16.15	<b>Dominika Thiem</b> Tripartite mutualism of black alder ( <i>Alnus glutinosa</i> L.) at saline area	15.30-16.00	<b>COST invited speaker: Ari Laurén</b> Using laboratory manipulation experiment to improve ROMUL-decomposition model		
	16.15-18.15/	WG activities, MC meeting (rooms will be specified)	16.15-19.00	<b>Poster session</b> with drinks and snacks	16.00-16.15	<b>Gaby Deckmyn</b> Keylink: An integrative soil representation for inclusion in ecosystem scale models		
	17.00-18.00/	Hands-on PlutoF course "Create and manage soil biodiversity database" (Vanemuise 46, room will be specified)			16.15-16.30	<b>Mirco Rodeghiero</b> Investigation of spatial and temporal oxygen evolution during root-pathogen interaction using planar optodes		
	17.00-19.00	Visiting University of Tartu Natural History Museum (Vanemuise 46, Tartu)			16.30-17.00	<b>Final discussions and symposium wrap up</b>		
					19.30-01.00	<b>Symposium dinner</b> at Ahhaa Science Centre, Sadama 1, Tartu		

17.00-19.00 Welcome Reception  
Drinks & snacks, Omicum building (Riia 23B, Tartu)

Excursions: Buses leave in front of Vanemuise 46, Tartu at 9:00 a.m.  
Trip 1: Free Air Humidity (FAHM) experimental site – SMEAR station – Järvelja Nature Reserve – Unikula;  
Trip 2: Soontaga forest station – Mäenikunno hiking trail – Giants of Ootspalu Valley.

9.00 - 16.00 Post-Symposium CAR-ES Workshop  
Vanemuise 46, room 327

# Looking for Root Image Analysis Tools?

We Offer these Reliable and Accurate Software and Systems:

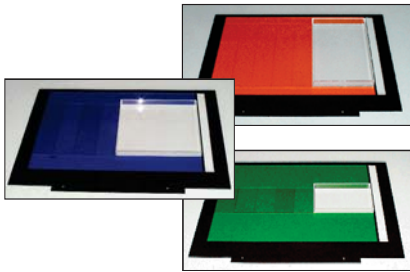


## WinRHIZO™

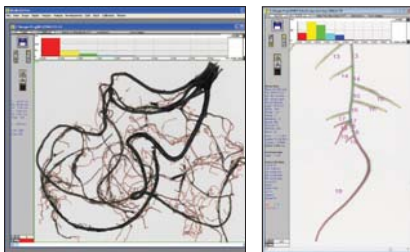
### Basic, Regular & Pro

Systems Designed for Automatic Washed Root Analysis

Scan washed roots easily and rapidly with Regent's scanners and root positioning systems.



See analysis results summarized on screen automatically after scanning.



- ✓ Root morphology in function of root diameter and color: length, area, volume and number of tips
- ✓ Number of forks and crossings
- ✓ Root overlap detection for accurate measurement
- ✓ Topology, link and architecture with fractals
- ✓ Developmental classification

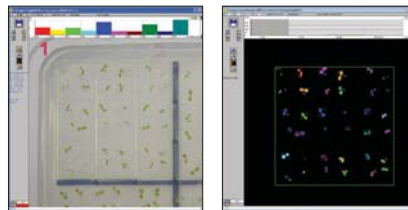
### Arabidopsis

Automatic Analysis System for Washed Roots and Seedlings in Petri Dish

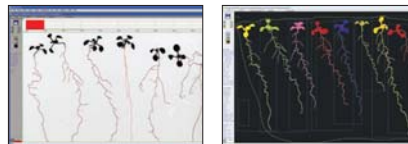
Analyse seedlings and leaves:

Globally  
one analysis per image

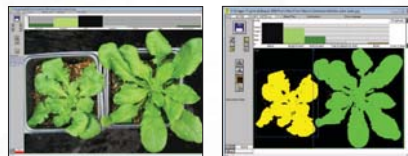
Individually  
multiple analyses per image



- ✓ Leaf area of seedlings grown in Petri dish
- ✓ Germination Count



- ✓ Leaf area - leaf/hypocotyl distinction
- ✓ Root morphology
- ✓ Topology and developmental analysis



- ✓ Leaf area, length and width of plants in soil



## WinRHIZO™ Tron

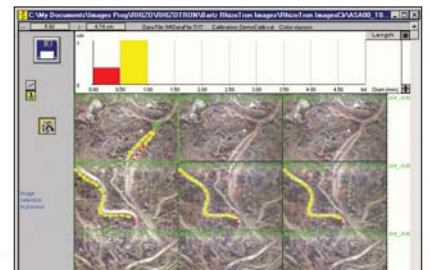
### Tron & Tron MF

Software Programs for Interactive Analysis of Images of Roots in Soil and Rhizotron

Trace roots manually with a mouse or by touching the screen of all-in-one or tablet computers.



Monitor root growth by analysing Multiple Frames (images) of a root system taken at different times.



- ✓ Root morphology in function of root diameter and color: length, area, volume and number of tips
- ✓ Topology and developmental analysis
- ✓ Data retrievable from file names using the ICAP naming scheme
- ✓ Previous analysis can be retrieved to resume analysis of the same location at a later time simply by adding new or dead roots since the last analysis



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