Roots, mycorrhizas and their external mycelia in carbon dynamics in forest soil

9-13 September 2006
Rovaniemi, Finland

Second Announcement

Finnish Forest Research Institute
University of Joensuu

COST E38 Woody Root Processes
Background, aims and sessions

There is wide consensus in the scientific community that roots of trees and understorey vegetation play an important role in the carbon dynamics of forest soils, but quantitatively, not enough is known about their contribution to the carbon budgets. Fine roots - due to their fast turnover in comparison with many other plant components - may produce a large part of the soil litter input. Thus, a high proportion of soil organic matter originates from dead and decomposing fine roots. Data on fine root mortality are however scarce, and turnover rates vary in different experiments and between different methods.

In the decomposition process, carbon is either emitted as CO$_2$, immobilised in the structure of decomposing organisms, or accumulates into physically and chemically stable structures. The chemical characteristics of the litter (e.g. organic compounds such as lignins and polyfenols) affect its decomposition rate. Only a few studies have focused on fine root litter decomposition. Mycorrhizal symbioses increase the sink strength of roots for carbon, primarily by increasing metabolic activity of the root system but also by increasing the size of the root-hyphal sink. It has also been demonstrated that a large part of soil respiration is derived from roots. The structure of both fine roots and associated mycorrhizas varies greatly in different species and sites and the relationships of structural variation to functioning is a new challenging research area.

Comparison and development of methods for measuring and modelling coarse root systems is also important for evaluating the role of roots in carbon storage and cycling. A further key aspect will be to develop knowledge and methods on how to relate the structure of coarse root systems to fine root distribution and function.

Knowledge about carbon allocation to roots would be important for estimating the role of soils in the global carbon budget under scenarios of increasing atmospheric carbon, for understanding plant productivity under changing climate, or in different silvicultural regimes.

The aim of the international workshop Roots, mycorrhizas and their external mycelia in carbon dynamics in forest soil is to present and discuss research results on the role of roots in carbon dynamics in forest and peatland soils. The second aim is to compare and evaluate methods and models for estimating fine root dynamics and coarse root biomass and structure.

The workshop will be divided into three sessions
1) Roots as indicators of environmental change
2) Fine root dynamics
3) Coarse root biomass and structure

The sessions of the workshop relate to the Working Groups of the Cost Action E 38 "Woody Root Processes". This workshop also belongs to the series of Cost E38 workshops, organized in 2004 in Sweden and Greece, 2005 in Estonia and winter 2006 in Israel.

The national sponsors of the workshop include the Maj and Tor Nessling Foundation, the Academy of Finland and the Metsämiesten Säätiö Foundation.

The main organisers of the workshop are the Finnish Forest Research Institute and the University of Joensuu.

On the behalf of the organisers we are looking forward to see you in Lapland autumn 2006!

Heljä-Sisko Helmisaari and Tarja Lehto
Program

Saturday 9th September 2006

16.00  Registration and mounting of posters
18.30  COST E38 Management Committee meeting
20.00  Welcome reception (with dinner)

Sunday 10th September 2006

8.30  Welcome addresses

Session 1: Roots and mycorrhizas as indicators of environmental change
Chairperson Douglas Godbold

8.50  Keynote Woody roots and their mycorrhiza - Does climate change have impacts?
      Toini Holopainen

9.20  Too much of a good thing? The extraradical mycelium of seven ectomycorrhizal fungi
      associated with Pinus sylvestris grown under ambient and elevated CO₂
      Odair Alberton & Thomas W. Kuyper

9.40  Does decreasing soil base saturation affect the vitality of fine roots of European
      beech? Anika K. Richter, E. Frossard & I. Brunner

10.00  Coffee break

Session 1 continued
Chairperson Ivano Brunner

10.30  Fine root morphological adaptations and their relation to site fertility in Scots pine,
       Norway spruce and silver birch along a latitudinal gradient in boreal forests
       Ivika Ostonen, K. Lõhmus, H.-S. Helmisaari, J. Truu & S. Alama

10.50  The importance of distinguishing live/dead ratios of fine roots as vitality criteria in
       forest ecosystems
       Hans Persson & I. Stadenberg

11.10  Root and shoot responses to clear-cutting and soil scarification
       Leena Finér, M. Palviainen, S. Piirainen, H. Mannerkoski & M. R. Starr

11.30  Root mineral composition. The effect of age, mycorrhiza colonization and nutrient
       availability
       Cristina Cruz, A. Tavares, A. Jullioti, A. Bio & M.A. Martins-Loução

11.50  Adapted responses of tree roots to match nitrogen demand
Krista Lõhmus & H.-S. Helmisaari

12.10  Lunch break

13.30  Root research in the Kivalo experimental forest – Background information for the field excursion Heljä-Sisko Helmisaari & Raija Laiho

Working group session

14.00  Roots as indicators of environmental change – Working group progress Ivano Brunner, Pavel Cudlin, Elena Vanguelova & Poppy Radoglou

14.30  Working group (WG) meetings

15.30  Coffee break

16.00-18.00 Poster session, all authors present

18.00-20.00 Sauna

20.00  Dinner

Monday 11th September 2006

8.00  Departure for the excursion

9.30  Kivalo experimental forest
    Tree species and soil carbon and nutrient dynamics

11.30  Field lunch

15.00  Pyhätunturi National Park and Kultakero mountain

19.30  Arrival to the hotel

20.00  Dinner

Tuesday 12th September 2006

Session 2: Fine root dynamics
Chairperson Krista Lõhmus

8.30  Keynote Carbon flux to soil via ectomycorrhizal fungi in different ecosystems Håkan Wallander

9.00  The Minimum Constructional Requirements for a “Fine Root”
Minirhizotron estimates of fine root longevity and mycorrhization in a Norway spruce chronosequence

Isabella Børja, H. Lange, H. Majdi & A. Steffenre

9.20

Fine root dynamics in thinned and limed pitch pine and Japanese larch plantations

Jaehong Hwang & Yowhan Son

9.40

The function of fine roots in tree nutrient uptake at different soil depths


10.00

Coffee break

Session 2 continued

Chairperson Toril D. Eldhuset

10.50 Keynote Soil carbon flux and storage: What is the role of ericoid mycorrhiza?

Jonathan R. Leake

11.20 Carbon fluxes in mineral soil horizons of three boreal forests along a climatic gradient in Sweden

Hooshang Majdi, D. Berggren Kleja, G. Ågren & L. Truus

11.40 Biomass of external mycelium in mycorrhizosphere of mature Norway spruce in mountain and lowland forests in Poland

L. Karliński, Kieliszewska-Rokicka Barbara, T. Staszewski & P. Kubiesa

12.00 The contribution of fine roots to soil carbon dynamics in naturally regenerated birch and plantation Sitka spruce in industrial cutaway peatlands

Raquel Cabral, K. A. Byrne & E. P. Farrell

12.20 Nano-scale root elongation measurements of Japanese red pine plants using Statistical Interferometry

Anura Pushpakumara, H. Kadono, S. Toyooka & M. Miwa

12.40 Lunch break

Session 3: Coarse roots and carbon dynamics

Chairperson Yoav Waisel

13.50 Size and absorbing activity of superficial and sinker roots as detected using earth impedance and sap flow patterns in stems

Jan Čermák, Nadja Nadezhdina & Pavel Cudlin

14.10 Carbon storage in Pinus pinaster coarse roots: assessing infra-density distribution in mature root system

Frédéric Danjon, D. Bert & D. Galionis

14.30 Evaluating coarse-root debris – very difficult!

Brian Tobin & M. Nieuwenhuis

Working group session

Chairperson Douglas Godbold
14.50  Working group reports and final discussion

15.50  Coffee break

16.15  COST E38 Management Committee meeting

17.00  Meeting of the international organizing committee of the IUFRO conference "Dynamics of Physiological Processes in Roots of Woody Plants" (2007)

19.30  Conference dinner

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**Wednesday 13th September 2006**

Departure of participants
International Scientific Committee

Douglas L. GODBOLD, U.K.
Heljä-Sisko HELMISAARI, Finland
Tarja LEHTO, Finland
Ivano BRUNNER, Switzerland
Ad OLSTHOORN, Netherlands
Hooshang MAJDI, Sweden
Donato CHIATANTE, Italy

Local Organizing Committee

Heljä-Sisko HELMISAARI Finnish Forest Research Institute, Vantaa
Tarja LEHTO University of Joensuu
Leena FINÉR Finnish Forest Research Institute, Joensuu
Toini HOLOPAINEN University of Kuopio
Raija LAIHO University of Helsinki
Tapani REPO Finnish Forest Research Institute, Joensuu
Rauni STRÖMMER University of Helsinki

Important dates

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<tr>
<td>Closing date for presentation and poster abstracts</td>
<td>1 June 2006</td>
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<tr>
<td>Closing date for registration and room reservation</td>
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**Venue**

The meeting will be held in the Arctic Hotel Pohtimo (www.arctichotelpohtimo.fi), about 20 km north-west of Rovaniemi, on the arctic circle.

September is a colourful autumn month in Lapland, and daily temperatures may vary from +18 °C to just above zero (during the night).

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**Transportation to venue**

There are daily flights between Helsinki and most European capitals with a number of airlines, including Finnair and Blue 1. Ryan Air flies to Tampere.

Helsinki is also reached from Estonia by ferries and fast ferries (dense connection) and from Stockholm by ferry once a day. See www.siljaline.fi, www.vikingline.fi (Sweden - Finland, Estonia-Finland) www.eckeroline.fi, www.tallink.fi (Estonia - Finland)

There are daily flights to Rovaniemi from Helsinki by Finnair or Blue 1 (SAS-group). www.finnair.fi, www.blueone.fi

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Blue:

| Helsinki | 14.30 |
| Rovaniemi | 15.50 |

There are daily trains to Rovaniemi from Helsinki, Tampere and Turku (train change in Tampere). www.vr.fi

| Helsinki | 7.04 10.04 19.20 22.30 |
| Rovaniemi | 16.53 19.55 7.51 10.54 |

For the night trains you can book a place in a 2- or 3-bed sleeping wagon.

The main railway station of Helsinki is located in the city center. If you will arrive by flight and will travel by train to Rovaniemi, it is easiest to take the local bus 61 or taxi from the airport to Tikkurila railway station where all trains Helsinki-Rovaniemi stop.

For cash payments only euro is accepted, all taxis take also credit cards.

In Rovaniemi, we will organize a shuttle bus from all trains and flights on 9.9.2006. To organize the transport, also if you will arrive earlier or later than 9.9, please tell us your arrival time. It is also possible to take a taxi to Pohtimo - the fare from the airport is about 20 euros.
Accommodation

Accommodation has been reserved at special conference prices at Pohtimo Arctic Hotel. Single room 62 euros/night/person; Double room 37 euros/night/person. Breakfast is included.

Please reserve accommodation by sending the registration form not later than 1.6.2006. The list of participants will be forwarded to the hotel. Participants should pay their rooms directly to the hotel by credit card or euros. No earlier payment for accommodation is needed.

Arctic Hotel Pohtimo main building and one of the saunas by the lake.
Excursion

The first field site on the excursion is the Kivalo experimental forest where results from research projects on tree species and soil carbon and nutrient dynamics will be presented. The forests on the Kivalo fells represent highland forests typical of southern Lapland, the tree species, sites and altitude conditions vary forming an exceptionally diverse natural environment.
Kivalo Experimental Forest: www.metla.fi/metsat/kivalo/index-en.htm

The second site will be Pyhätunturi fell, remnant of one of the Earth’s oldest mountain ranges, formed over 2000 million years ago. Special features of the National Park are steep slopes, deep ravines, separating fell tops from one another, rugged quartzite quarries and scree patches.
Pyhätunturi National Park and other national parks:www.luontoon.fi/page.asp?Section=5248

(Photos from Kivalo: © Erkki Oksanen/Metla;
minirhizotron images on silver birch and Scots pine fine roots in Kivalo forest soil: project 3324/ H-S.Helmisaari).
Authors are requested to study the instructions below before preparing and submitting their abstract. The author submitting the abstract will receive acknowledgement of the submission. The acceptance of papers/posters will be informed to the authors via E-mail by 20.6.2006.

**Format**

In general, the abstract should include objectives, methods, results and conclusions. Only standard abbreviations may be used. Do not include endnotes, footnotes or frames. Abstracts must be submitted in English. Abstracts will be published exactly as submitted, so copy should be checked carefully for accuracy and spelling.

**Title:** The title should be in Times New Roman 12 pt bold font.

**Author(s) and institution(s):** Type author(s) name with initials only in Times New Roman 10 pt normal font. If the abstract has more than one author, use numerical superscripts to indicate those from different institutions. Underline the name of the person presenting the paper. All addresses should follow the last author's name. Include full address and E-mail.

**Keywords:** Include a maximum of 5 keywords in Times New Roman 10 pt bold font; separate keywords with a comma.

**Content:** Prepare an abstract that does not exceed 300 words (text). Use Times New Roman 12 pt normal font. Use superscripts and subscripts for chemical formulae and Greek symbols from "Insert symbol ... (normal text)".

**Submission**

Please submit the abstract as an E-mail attachment saved in rtf format or as an MS Word doc.file to helja-sisko.helmisaari@metla.fi. Filenames must be first author name, plus initial e.g. SMITHP.RTF or SMITHP.DOC.

All submitted abstracts will be reviewed and selected for papers and posters or eventually rejected according to their scientific quality and interest.

**Posters**

Each poster will be exhibited during the whole conference. The presenting author should be in attendance at poster sessions. Maximum poster size: width< 1m, height< 1.5 m.

**Registration**

**The conference fee is € 160** for full participants and accompanying persons, and includes local transportation, participation, conference book of abstracts, excursion, all meals - coffee breaks, lunches and dinners, including the welcome reception and the conference dinner.

The completed registration form will be accepted only if accompanied by full payment of fees before 1 June 2006. There are no refunds if not cancelled before 15.8.2006.
Registration form
Roots, mycorrhizas and their external mycelia
in carbon dynamics in forest soil
9-13 September 2006, Rovaniemi, Finland

Deadline for final registration 1 June 2006.

Registration fee:
€ 160 (incl. local transportation, conference book of abstracts, excursion, all meals and coffees from Sept 9 evening to Sept 13 morning).

Accommodation is not included in the registration fee.
The participants will pay their accommodation at the hotel with credit card or euros.

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Date of arrival to Arctic Hotel Pohtimo:
Time of arrival to Rovaniemi (required for transport to Pohtimo)
airport railway station
Date of departure from Arctic Hotel Pohtimo

Accompanying person
I have submitted an abstract for oral presentation
I have submitted an abstract for poster presentation
I will make a reservation for a single room (62 euros/night/person)
I will make a reservation for a double room (37 euros/night/person)
I will share the room with                                               (name)
Dietary needs (vegetarian diet, allergies etc.)
Other special wishes:

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PAYMENT INFORMATION

The completed registration form will be accepted only if accompanied by full payment of fees before 1 June 2006. There are no refunds if not cancelled before 15.8.2006.

Fees should be paid by VISA, INVOICE or bank draft in euros drawn to the ACCOUNT OF THE FINNISH FOREST RESEARCH INSTITUTE:

Bank name: Nordea Bank Finland Plc
Branch address: Aleksis Kiven katu 3-5, 00020 NORDEA
SWIFT code: NDEAFIHH
IBAN on paper: FI89 1660 3000 1029 16
IBAN electronic: FI8916603000102916
Ref. COST E38 Roots

Credit card
Visa, Mastercard and Eurocard are accepted. To be able to charge your credit card, Finnish Forest Research Institute needs a hard copy (by fax or ordinary mail) of the signed payment information form sent to

Heljä-Sisko Helmisaari
Telefax: +358 10 211 2206
Address: Finnish Forest Research Institute, P.O.Box 18, FI-01301 Vantaa, Finland

Invoice
Payment by invoice is also possible- please fill in the invoice address to the payment information form and we will send you an invoice after receiving the registration. Please note that all bank charges must be paid by the participant.

Contact address:

Dr. Heljä-Sisko Helmisaari, Finnish Forest Research Institute, P.O. Box 18, FIN-01301 Vantaa, Finland, Tel. +358 50 391 2533, Fax +358 10 211 2206, helja-sisko.helmisaari@metla.fi

Dr. Tarja Lehto, University of Joensuu, Faculty of Forestry, P.O.Box 111, FIN-80101 Joensuu, Finland, Tel. +358 13 251 3642, Fax +358 13 251 4422, tarja.lehto@joensuu.fi