COST Action "KEYSOM" – 3rd Training School

Soil fauna - Key to Soil Organic Matter Dynamics and Modelling
Interactions with other components of soils – Mycorrhizal fungi

Tartu, Estonia, 22-24 January 2019
http://www.keysom.eu/

Linking Soil Biodiversity with Soil Organic Matter Dynamics

Framed within the objectives of the COST ACTION KEYSOM (Soil fauna - Key to Soil Organic Matter Dynamics and Modelling – see http://keysom.eu/) this third Training School aims at linking the role of the soil biodiversity with the soil organic matter dynamics. This school will provide a comprehensive overview of the tools available to assess the soil biodiversity (including macrofauna, mesofauna, microfauna and microorganisms), such as classical taxonomic approaches and novel soil DNA metabarcoding. The originality of this training school lies in the interdisciplinarity of its subjects, from molecular biology to soil science, and its trainers, getting together soil ecologists, biogeochemists and modellers.

Dr. Maarja Öpik and Prof. Alar Astover will be hosting this third KEYSOM Training School. A selection of relevant speakers (see below) are invited to provide their knowledge and experience in themes ranging from soil biodiversity, soil function, and SOM interaction. Targeted mainly at PhD students and young post-doctoral fellows (ECIs), this training school also aims at stimulating collaborative research among participants and with the guest lecturers.

PARTICIPATION & REGISTRATION (30 participants max.):

The participation in this Training School has no registration fees. Participants will be selected based on their CV and motivation letter. Applications (one single pdf), including a CV and a motivation letter, should be sent by e-mail to Maarja Öpik (maarja.opik@ut.ee) until December 15, 2018.

Selected participants will receive a "trainee grant" as a contribution to their expenses regarding travelling, accommodation and meals, according to COST regulations. Trainees eligible for reimbursement are those from all COST countries, approved Near Neighbour Countries' institutions and approved European RTD Organisations (see COST rules in the vademecum at: https://www.cost.eu/wp-content/uploads/2018/08/COSTVademecum.pdf).

	Morning (9h00 – 12h30)	Afternoon (14h00 – 17h30)
Tuesday 22nd January 2019	**Welcome, opening of the course & getting acquainted** Maarja Öpik **Lecture 1:** Why a COST Action on soil fauna and SOM dynamics? *Juan J. Jiménez (ARAID-IPE-CSIC, Spain)* **Lecture 2:** *On the Ifs and Hows of Mesofauna – SOM interactions* *Juliane Filser, University of Bremen, Germany)* **Lecture 3:** "Fungal diversity in soil" *Maarja Öpik, Kadri Koorem, Inga Hiiesalu, University of Tartu (Estonia)*	**Lecture 4:** "The interactions between soil biota, soil structure, and SOM dynamics" *Georg Guggenberger (Institute of Soil Science, Leibniz Universität Hannover, Germany)* **Lecture 5:** "Soil organisms, organic matter and climate change" *Davorka Hackenberger (J.J. Strossmayer University, Osijek, Croatia)* **Lecture 6:** "New insights from the KEYLINK soil model: are predators crucial?" *Gaby Deckmyn (University of Antwerpen, Belgium)*
Wednesday 23rd January 2019	**Lecture 7:** "Soil profiles (lecture and practical class)" *Alar Astover, Estonian University of Life Sciences (Estonia)* **Lecture 8:** "Soil nematodes and other soil fauna" *Yosef Steinberger (Faculty of Life Sciences, Bar Ilan University, Ramat Gan, Israel)*	**Lab practical:** Sampling techniques in soil ecology studies – practical course (Y. Steinberger; Arne Fjellberg)
Thursday 24th January 2019	**Lecture 9:** "Can climate-induced shifts in soil fauna community composition and subsequent effects on litter decomposition be predicted?" *Matty Berg (VU University, Amsterdam, The Netherlands)* **Lecture 10:** "Collembola. Population characteristics and response to a changing environment" *Arne Fjellberg*, Mågerøveien 168, N-3145, Tjøme, Norway*)* **Lecture 11:** Spectroscopy-based analysis for SOM-soil fauna relationships *Juan J. Jiménez (ARAID-IPE-CSIC, Spain)*	**Lecture 12:** "Statistics for unveiling plant-soil organic matter-soil organisms' interactions" *Guillermo Bueno & Lena Neuenkamp (University of Tartu, Estonia)* **Lecture 13:** "LUCAS Soil, a tool for research and policy making development" *Alberto Orgiazzi (EU JRC, Italy)* **Closing**

Invited Selected Trainers:

***Prof. Alar Astover**, Estonian University of Life Sciences, Tartu (EE)*

***Prof. Matty Berg**, VU University, Amsterdam (NL)*

***Dr. Gaby Deckmyn**, University of Antwerpen (BE)*

***Prof. Juliane Filser**, Soil Ecology (mesofauna), Bremen University (DE)*

***Prof. Arne Fjellberg**, Soil mesofauna in Arctic ecosystems (NO)*

***Prof. Georg Guggenberger,** Soil sciences, Leibniz University, Hannover (DE)*

***Dr. Davorka Hackenberger**, Earthworm taxonomy, Osijek (HR)*

***Dr. Juan J. Jiménez**, Soil Ecology (macrofauna), ARAID, IPE-CSIC (ES)*

***Dr. Maarja Öpik**, Department of Botany, University of Tartu, Tartu (EE)*

***Dr. Alberto Orgiazzi**, Joint Research Center, Ispra (IT)*

***Prof. Yosef Steinberger**, Bar Ilan University, Ramat Gan (IL)*

Local Trainers from the *Department of Botany, University of Tartu*:

Dr. Guillermo Bueno, Dr. Inga Hiiesalu**, **Dr. Kadri Koorem**, **Dr. Lena Neuenkamp

Organization: Maarja Öpik

Senior Research Fellow in Plant Ecology
Department of Botany
Institute of Ecology and Earth Sciences
University of Tartu

KEYSOM Action Chairs:

Juan J. Jiménez (Chair) &

Juliane Filser (Vice chair)

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Grant Holder

About the Trainers:

Alar Astover (Estonian University of Life Sciences, Tartu, Estonia)

Professor of soil science and head of the chair of soil science at the Estonian University of Life Sciences, Tartu. His research focuses on soil quality and its sustainable management in agricultural ecosystems. He has broad teaching experience in various fields of soil science from bachelor to PhD level. Full academic profile is available here *(https://www.etis.ee/CV/Alar_Astover/est?tabId=CV_ENG)*

Matty P. Berg (Dept. Of Ecological Science, Vrije Universiteit Amsterdam / Groningen Institute for Evolutionary Life Sciences, Groningen University, The Netherlands)

He is an honorary professor in Soil Fauna and Natural Ecosystem Dynamics. He studied biology in Amsterdam, where he also did his PhD on the topic of atmospheric-N deposition, soil food webs and nutrient dynamics. After a post-doc at the SLU in Uppsala he returned to the VU were he holds a fixed position on Community Ecology. His research activities cover the interplay between species-specific traits, community assembly, and ecosystem processes. His research aims to integrate ecological and evolutionary concepts into soil community ecology to understand the impact of environmental change on ecosystems. He has a particular interest in ecosystem engineers.

C. Guillermo Bueno (Dept. of Botany, Institute of Ecology and Earth Sciences, Tartu, Estonia)

Plant ecologist who has been working on plant-biotic interactions, either plant-animal (in his phD he analyzed the effect of wild boar disturbances in alpine ecosystems) plant-plant (as a postdoc in the University of Alberta, Canada, he studied the interactions among plants facing warming and herbivory) and plant-fungal interaction (working with the ecology and distribution of plant mycorrhizal traits in the University of Tartu, since 2014). In his work, soil ecology has increasingly becoming the crucial element to explain what happens above-ground. He has received a strong statistical formation attending more than 20 international courses and has taught several statistic courses in Spain and Canada.

Gaby Deckmyn (University of Antwerpen, Belgium)

She studied biology at the University of Antwerpen. After her PhD she specialised on developing mechanistic models of plant growth. She also teaches ecological modeling (master course). More recently she has focused on soil models and how to include aspects of the soil fauna related to SOM turnover and soil structure. Within the BIOLINK and KEYSOM COST Actions she coordinated the development of the KEYLINK soil model.

Juliane Filser (UFT, University of Bremen, Germany)

She studied biology in Munich, where she also worked most of her graduate student and postdoc time – specializing in agroecosystems, soil zoology and ecotoxicology, particularly of heavy metals. Repeatedly she was visiting scientist in Silkeborg (DK) and in Wageningen (NL). Since 2000 she holds the chair of general and theoretical ecology at the University of Bremen. Research activities cover environmental hazards, with an emphasis on soil ecology. Major recent projects deal with engineered nanomaterials and soil carbon turnover.

Arne Fjellberg (Univ. of Tromsø, Norway)

He has been working with collembolan biogeography and systematics since a young student, mainly in Arctic and northern areas. The author of the two volume monograph "The Collembola of Fennoscandia and Denmark" (1998, 2007). Curator of Entomology at Tromsø Museum, Univ. of Tromsø, 1982-1992.

Georg Guggenberger (Institute of Soil Science, Leibniz Universität, Hannover, Germany)

He is full Professor of Soil Science at Leibniz Universität Hannover, before working at the Universities of Bayreuth and Halle (Germany). His focus is on processes of organic matter decomposition and stabilization in temperate, tropical, and permafrost soils, considering climate and land-use change. Of his particular interest is the complex interrelation between soil mineralogy, soil microbiota, and soil organic carbon and nitrogen storage and turnover, which is approached along chronosequences and climosequences. Recently, he is also studying processes at the plant-mycorrhizal fungi-soil interface with respect to soil organic matter formation, mineral weathering, and plant nutrition.

Davorka Hackenberger (Dept. of Biology, J. J. Strossmayer University, Osijek, Croatia)

Professor of Biology, she obtained her PhD in 2012 from the University of Zagreb (Croatia). She is working as an assistant professor at Department of Biology, J.J. Strossmayer University in Osijek, Croatia, where she is involved in teaching activities at undergraduate and graduate level. Her research interest is related to soil ecology with particular emphasis on earthworm ecology and taxonomy, and terrestrial ecotoxicology. She has authored several papers at international peer-reviewed journals, many conference proceedings and developed software-based earthworm identification key.

Juan J. Jiménez (ARAID, Instituto Pirenaico de Ecología-CSIC, Jaca, Spain)

Senior researcher at the Pyrenean Institute of Ecology-CSIC, Spain, he has extensively work on the field of soil ecology and surveys for environmental and biodiversity studies. His activities are focused on community ecology and nutrient dynamics (phosphorus, carbon and nitrogen) in the soil and the biogenic structures produced by soil ecosystem engineers (earthworms, termites and ants) and their impact in soil function. He has worked several years for CGIAR system and FAO. Main study methods include experimental field design strategies for long-term surveys and the statistical planning of both field and lab experimentation, including spatial ecology statistics.

Kadri Koorem (Department of Botany, Institute of Ecology and Earth Sciences, Tartu, Estonia)

PhD in Plant Ecology and Ecophysiology (University of Tartu, Estonia), her research focuses on the interactions between plants and soil organisms. During her PhD, she studied the role of abiotic environment (e.g. soil nutrient content, light) in determining the interactions between plants and arbuscular mycorrhizal fungi. During her current post-doctoral studies in NIOO-KNAW (The Netherlands) her research focuses on range-expanding plant species and specifically on their interactions with multiple groups of soil organisms (such as arbuscular mycorrhizal fungi, bacteria, nematodes).

Lena Neuenkamp (Department of Botany, Institute of Ecology and Earth Sciences, Tartu, Estonia)

Plant ecology specialist working at the department of Botany at Tartu University. At the same department, Lena finished her PhD studies in June 2018, investigating the effects of arbuscular mycorrhizal (AM) fungal community structure on plant diversity and composition in semi-natural dry grasslands and how these effects change in response to altered land-use practices (http://dspace.ut.ee/handle/10062/59635). As a specialist, she continues her work on the disentangling the factors shaping the interaction between plant and AM fungal communities, focusing mostly on the effect of AM fungal diversity as a driver of plant-plant competition and the role of changes in carbon limitation due to altered light conditions. She is looking forward for her debut teaching statistics at the COST training course.

Maarja Öpik (Department of Botany, Institute of Ecology and Earth Sciences, Tartu, Estonia)

Expert in ecology of arbuscular mycorrhizal (AM) fungi. She obtained her PhD in University of Tartu in 2004, hold a Marie Curie Post-doctoral Fellowship at the Scottish Crop Research Institute (now The James Hutton Institute), UK, in 2006-2008, and has since then worked at the University of Tartu. She established a database for AM fungal sequences and ecological data (MaarjAM database), which is by now a widely used tool in AM fungal ecology. Her current research focuses on AM fungal diversity patterns at different spatial scales, AM fungal species concept, and AM fungal applications.

Yosef Steinberger (Faculty of Life Sciences, Bar Ilan University, Ramat Gan, Israel)

Since the early 1980, Prof. Yosef Steinberger is conducting studies on different aspects related to desert terrestrial ecosystem. The studies are primary focus on belowground processes in with emphasis on relationship of soil invertebrates and detrital food web structure to primary production, monitoring decomposition processes, and climate change effect on biotic component of soil biota. One of the studied soil biota are the soil free-living nematodes which are one of the most abundant metazoans (expressed in millions per square) and have high species diversity. In various studies, ecologists have used the free-living nematodes, which reflect ecological processes and indicate changes occurring in the soil, as indicators by evaluating the density and diversity of their functional assemblages or community structure.