

## COST ACTION ES1406 – Minutes of the meeting in Tartu, Estonia (January 17-19, 2017)

*Minutes were taken by the persons mentioned with the respective date and partly modified and supplemented by Juliane Filser (who kept a lot of details, due to JJ not having been able to attend). Please note that WG notes are all listed for January 19, but the minutes of January 18 are not complete – amendments welcome! Some remarks were added based on subsequent e-mails.*

17/01/17

(Kevin Butt)

### 09.00 Introduction

Introduction and reminders from JF e.g. re update of webpage “animal of the month”. Note from MB that everyone should be responsible for update of the webpages – on all aspects of the ACTION.

### 09:20-09:30 – WG1 – Juliane Filser (JF) – state-of-the-art and gap analysis of SOM – soil fauna interactions data – Common experimentation protocol (phase 1)

Literature review and gap analysis – provide open information on experiments – to do

Sharing of data – partly underway

Conceptual framework and field analysis.

Paper in “Soil” – Filser et al 2016: Conceptual Framework

Jack Faber – Q re gap analysis and research funding – KEYSOM cannot accommodate research – but need to identify research needs and communicate to WG4. Dissemination is vital. Discussed with JF.

Feed into modellers work and collect parameter information. Two activities run in parallel – gap analysis and model development. Synthesis: available data into existing models or into KEYSOM model – compare outputs of different models. Scaling issue – local vs global – upscaling needed, but different parameters may apply to different scales (No. 9 in figure).

Q. Protocols of linking practical work to models? – to hopefully come from this meeting.

More material from field experiment needs to be sent in (e.g. earthworms as agreed).

It's a “CAST” action (PHK, Osijek 2015).

2 PhDs underway, plus teabag experiment (student course) – easy and standardized, however: microbes only and highly artificial. Participants agreed that teabag experiments are not helpful for the purpose here.

EU proposal BIOSALT – failed at 2<sup>nd</sup> step.

Lots of activities by other WG 1 members: papers, experiments, proposals, PhD, oral and poster presentations, dissemination activities (interview, video clips etc). It would be very useful adding them to the KEYSOM website (note: mail with instructions for adding such information sent to all MC members by [keysomproject@gmail.com](mailto:keysomproject@gmail.com) on Feb 23, 2016!!!). Add this info – NEED to bring all of this together!

SOM hotspots – a focus for modelling

Focus of STSM – what about, e.g., termites or beetle larvae?

#### THE FIELD EXPERIMENT

Some in autumn 2016 – most to come spring 2017. Participants agreed that all sites should be (re-)sampled in spring 2017 (except pedological information).

A need to ensure that all make it clear who is participating. N=23, 15 countries. Enough already.

#### MANIPULATION EXPERIMENT

Details required; protocols; use quartz sand as standard; litterbags to be made by Jan Frouz and sent out; litter; glass beds; cost of mailing? (see January 19).

In addition – chance for all to summarise what they have done. And finally a “who does what by when?” task list to be put together.

Q from Visa Nuutinen– Knowledge gap analysis – how to cover whole?

JF – concentrate on major groups – compile what we receive.

Q from Lidia Sas Paszt – on field data – answer – written up in protocol – please read up.

10.05-10.50 Invited Talk: “Data management and reusability with the Edaphobase data warehouse and the BonaRes Knowledge Portal” – David Russell – Senckenberg Museum of Natural History Görlitz, Germany

Objectives of **Edaphobase** – link soil zoology with sampling methods and habitat data; increase availability of data; combine data from institutes; analyse data; develop tools for prognosis of soil communities. All work in progress...

In Germany - Use collections, the literature and project data as sources.

Observation/Objective – site and taxon naturally important – site description/sampling description/taxon description (latter weak). = Basic model.

Taxon – major groups but carabids and spiders intentionally not included (other good databases already online). New groups can be added as required – takes weeks/months as demonstrated by inclusion of isopods in 2014.

MINIMUM DATASET – source, location, date, method, taxon name, how many.

Taxonomy – important of course.; Place description...;

<http://portal.edaphobase.org/> online data query and analysis. Can register easily and interrogate.

Maps can be generated and multi-aspects of data extracted and downloaded.

Can also upload data to this database – quality control-checked first.

Does not include DNA analysis – no fungi/microbes.

Another project (not observational data) **BonaRes** – using publications

Looking at drivers of soil processes (**soil fauna and functions**)

Interaction types and quantitative effects

Collected data for meta-analyses and models for soil function

Visualise relations between literature information

Make collected knowledge publically available.

Bibtex used - 350 publications to date.

Q. – To be used for **data storage and exchange for KEYSOM?** – Yes, especially for **WG 1** – reason for attendance.

11.15-11.50 Invited Talk: "The role of food webs and primary vegetation for the carbon cycling in the initial phase of ecosystem development" – **Bernd Uwe Schneider** – Head of Staff – Scientific Executive Board; German Research Centre for Geosciences GFZ.

Ecosystem development – Lusation post-mining landscapes. A return to equilibrium or a new equilibrium. Open cast coaling area near Polish border.

1 Geo-system (substrate only); 2 hydro-geo-system (water added naturally); 3 Bio-hydro-geo-system.

Chicken creek watershed (Europe's largest artificial watershed) created – dump, sands, clay layer (basin) sand layer: 6 ha instrumented – all developments recorded.

Plant succession 2005-2010 – natural dynamics – trees taking over after 10 years. Reißmann studies on soil fauna – colonisation, succession and effects e.g. on compaction. (Reißmann 2016). 4 groups nematodes, tardigrades, collembolans, mites. (*Lotus corniculatus* (leguminous), trees (*Robinia*) plus *Calamagrostis epigeios* as experimental plots, plus controls). See the paper for results on abundances of groups.

Development of biological crusts important for early mesofauna development. – cyanobacteria, green algae and later with mosses...

Also chronosequence approach (lignite-rich Scots pine stands: Carabidae). Time an important factor.

Influence of landuse systems on mesofauna – agroforestry – goes beyond forest and agricultural systems. Significant differences between tree hedge and agricultural sites (low).

Chicken creek – use of minirhizotron – to look at dynamics of root development. Tree root growth down to 2 m after 2 years (trees mentioned above).

Nutrient depletion occurs in soil/subsoil when trees growing compared with tree-free controls. Leguminous trees of interest here. (Boldt Bursh (? Spelling ?) et al 2012 – Plant Soil)

In Germany a move to increase mixed stands of trees (pine to beech e.g.) – change in  $C_{org}$  stocks (Bens et al 2007) increased C sequestration due to change on tree spp., but what of soil fauna? Looking at roots of beech and Scots pine – different use of soil depths. C added over time through root turnover. Mycorrhiza differences too – that of beech more diverse than pine.

Conclusions: –

Observations and experiments in early phases of ecosystem development may help to decrease complexity in view of linking causes and effects?

Landuse systems and landuse change are major drivers for C sequestration, requiring a differentiated view on role of mesofauna?

Heterogeneity over time and space (particularly depth) needs consideration over time and space of soil fauna

Roots (deep roots and mycorrhizae) may be more important than above ground litter.

Q. – on importance of soil depth and value of minirhizotrons

#### 11:50 – 12:30 WG 2: Soil Modelling – Gaby Deckmyn – Lessons Learned and overview

##### **Why model:**

A representation in formula of “something”

A tool used to predict “something”

Empirical (statistical) – process based

Negatives:

- Must need a good reason for a model
- Don't predict what is already known
- If not simpler or more useful than measure then why model

Positives:

Increase understanding and synthesizing knowledge  
Steering research towards knowledge gaps  
Doing virtual experiments “impossible” in the field/lab

##### **Dos and don'ts**

Model only if understand basic concept

Distinguish empirical from process based

Model always empirical at some level

Distinguish short and long term effects

Realise that data are also uncertain (if the model doesn't fit the data, how sure are you of the data)

Be conscious of trade-offs between generality – complexity – precision

AS DETAILED AS NECESSARY – AS SIMPLE AS POSSIBLE

##### **Uncertainty**

Context uncertainty; ID of boundary of a system

Model structure uncertainty  
Parameter uncertainty – reflected by distribution of parameter  
Model calibration – optimising/uncertainty  
Model validation – efficiency and success/suitability/validation/accuracy/butterfly effect

### **Existing soil models the good bad and other**

Not so many actually  
Simple “black box” representation  
Model at different times (centuries or s) and space scales (layers – regions)  
Focus on SOM – plant growth (including N) – communities – food chains  
SOM models: explicit representation of microbial function/biomass or not?  
First order kinetics (flux depends on pool size) or maximal soil SOM?  
Temperature (and water) effects: Q10 (strong non-linear-responses)?

### **Main Components**

Litter (fractions...)  
SOM pools  
Decomposers – fauna...  
T-model  
Water model  
N, P, S...  
Structure (sand clay/pores/burrows/compaction)  
Mineral composition (clay, type of clay,...)

### **Recent Reviews**

Campbell & Paustian (2015) Environ Res Let 10 2015  
Vereecken...  
....

#### *Yasso Model*

Cascade Excel model – all linear kinetic, t and water effects, litter input = constant (or modelled)  
Extremely well validated  
Goal = soil C or litter  
Validation relevant  
Influence of Climate change  
Missing drivers  
Expected evolution I time of pools

#### *Century Model*

Grandmother model  
POM active slow and passive SOM  
Originally for agricultural soils  
C, N, P and S  
Top 20 cm

#### RothC

1 layer  
No plants  
SOM model  
Litter = 2 fractions  
Humified...

#### ANAFOR

Extremely mechanistic

Mycorrhizae, active microbes, worms  
All elements  
Detailed soil water  
Soil t needs improvement  
Significant butterfly effects

#### *Hierarchical Model Concept*

Lavelle 1993  
Concepts SOM turnover hierarchical drivers  
Climate-clay content-nutrients-litter quality-macroorganisms  
Hierarchy not fixed  
Tropics wet, acid  
Humic acids  
Rhizosphere-drilosphere-termitosphere  
Choose right drivers

#### **Current issues – lacking knowledge**

Even simple water flow (Richard equation) hard to simulate  
Many non-linear effects - changes all  
Many unknown processes/interactions  
What is recalcitrant? Which organisms decay what? Tannins, lignin  
Animals 30-50% of leaves eaten; deer move litter  
Earthworms burrows: measured or not? How to simulate  
Rising water from water table (biologists don't like geology)  
Weathering often not included.

Future perspectives  
Use >1 model for any study  
Include uncertainty to model output  
Complex model evolving into simpler derivatives  
Include soil macrofauna  
Include fauna (deer – above)  
Include diversity but not all species

Diversity  
Necessary to model this...

NOTE – Computer froze at a point hereafter and only the above autosaved from morning session – apologies.

Afternoon

14:00-14:45 Invited Talk: “New chances to explore biogeochemical processes in situ: Linking C modelling and soil biological monitoring” – **Monika Joschko**, Leibniz Centre for Agricultural Landscape Research, Germany.

C-dynamics and soil biology insufficient

CASE STUDY 1 (V140/00) 50 years Müncheberg  
Control/NPK addition/NPK + Manure/NPK + straw. Expt 2010-2013  
Sig diffs between treatments.  
C-Models CANDY CCB (simplified model = Candy Carbon Balance) CIPS  
Inputs - soil properties; plant; organic fertiliser

Outputs – C-reproduction, mineralisation, SOM, Biological Active Time (BAT) – an important factor.

BAT – normalised C turnover (d) compared to lab.

High BAT – high turnover – low biomass – e.g. sandy soils

LOW BAT – low turnover – high biomass – lots earthworms (EW)

C – Total added higher in manure than straw

SOM – reproduction- efficient C – higher in manure treatments

Easily decomposable C (edc) similar in manure & straw treatments.

+ive correlation between collembolan & edc

Hypothesis C deficiency in soil comp by plants – no root exudation

CASE STUDY 2 Reduced Vs Conventional Tillage

Relief across site determines clay content (3-13%)

Crop rotation – cereal-dominated. Straw left on site.

EWs *L. terrestris*/*A. caliginosa*/*A. rosea*

C content increased.

Edc – not related to EWs

BAT – negative related mean EW abundance (10 yrs)

C-SOM – positive related mean EW abundance

LOW BAT – poss retardation of turnover. EW slow C cycling

See Franko & Spiegel (2016)

(50% reduction C turnover from 23 related mean EW abundance to 13 d)

BAT – useful concept for soil fauna inclusion.

Q Possibly need to include thought of fine root turnover?

Q What of mycorrhizae? Particularly in control plots?

Q Consider effects of different EW ecological groups?

14:55-15:30 Invited Talk: “Agroecological approach to sustainable soil management”  
– Boris Boincean, (“Alec Russo” State University of Balti, Republic of Moldova)

Long term – used to focus on yield – not soils. What cost to increase yields?

Yield gap in wheat across Europe (1996)...

Profit to farmers has decreased greatly over the last century...

“lack of knowledge cannot be compensated by excess use of fertiliser”

Effects of crop rotations/fertilisers on yields – many examples given...

Need resource conservation – system changes...

“Use nature as a model”

Need to feed the soil (EWs)

Long term studies needed.

16.00-17.30

SHORT TERM SCIENTIFIC MISSIONS (STSM)

Update of the above by all present plus background information provided by new members.

All to provide a half page of information on self – name; position; expertise; input to ACTION.

18/01/17

(Agisilaos Economou)

Soil fauna management in East and Southeast Europe

Structure of the paper

1. Policies of the EU that have a significant influence on soil fauna protection (Agisilaos)
2. Case studies (Soil fauna management in each country and an example or a good practice)
  - 2.1. Soil fauna management in Estonia (Mari)
    - 2.1.1. Soil fauna characteristics of Estonia.
    - 2.1.2. Impact of climate change on soil fauna
    - 2.1.3. Protection of soil fauna: land use, organic farming regulations. Soil fauna is weakly protected
  - 2.2. Soil fauna management in Romania, Agricultural strategy and approaches in order to mitigate the impact of soil erosion (Maria I).
  - 2.3. Soil fauna management in Bulgaria, Forest management and soil fauna protection (Emiliya)
  - 2.4. Soil fauna management in Greece, Effects of fires and soil erosion as well as measures for the protection of soil fauna (Agisilaos)
  - 2.5. Developing economic models to assess the impact on soil fauna (Information from Atlas, paper).
  - 2.6. Irrigation impact on SOM and soil fauna in Mediterranean Environment (Jose Manuel)
    - 2.6.1. Good practices, measures, effects and results

(MC meeting see 19/01/17)

19/01/17

(11:00 – 12:30, Beat Frey; points discussed later added by J. Filser)

WG Meetings were held simultaneously on January 18 and 19.

WG 1 (J. Filser, supported by O. Schmidt and P. Querner)

WG 1 discussed and fixed details of the field experiment.

**a) Field study**

Field study participants: please fill the list in the dropbox (full or minimum participation, site type, expected start, remarks). Instructions were given how to participate, facing problems, details of the experiments, time, type of soil, etc. Pros and cons of practical experiences and protocols were listed and partly modified. Measurement of temperature and moisture was controversially discussed. Most members considered available data from nearby weather stations sufficient. "Forest" seems too general for site description → see required information in the dropbox.

Monika Joschko (MJ) suggested measuring soil structure of one or more site(s) by computer tomography, which was considered highly attractive but also somewhat complicated

concerning logistics. A workshop in Müncheberg in March 2018 was discussed where participants could also bring their own cores. MJ will provide a suggestion on the ifs and hows of this idea.

The following decisions were taken and suggestions made:

- Re-sample DNA + earthworms in spring 2017
- Send dropbox link to all (done 18.01.2017)
- Juanjo to finish NIRS protocol
- The DNA protocol was modified (10 instead of 20 cores!)
- Separate biogenic and non-biogenic aggregates by rounded vs. sharp edges upon breaking (Monika sends paper by Cathy Fox)
- **Not more than two sites per country – otherwise pay for extraction kit to Maarja (120 € / site)**
- Optional: further analyses, e.g. bait lamina, microarthropods, enzymes of DNA samples (but mind costs – samples need to be fresh!) – send fresh samples via courier to Aline
- Aline to do enzyme analyses for DNA samples (her)
- Subset of forest sites: acid hydrolysis (separation of hydrolysable and non-hydrolysable carbon) – wide-range selection after 1st C analysis, to be defined by modelling group and Emilia, to be analysed by Javier who also provides protocol)
- Simonida Djuric suggested she could do the C/N analyses for the field study

#### b) Manipulation experiment

The following **to-do's and urgent points** were addressed:

- Make prototypes + movies, test it with students: Juliane + Olaf (grassland), Simonida, Maria (forest) – start by April at the latest, collection see above
- **Jan Frouz's commitment to produce and send them by end of February**
- Olaf to check sand and clay details
- Everybody try to get local money for consumables
- Commitment by every party = **explicit confirmation of participation in file Dropbox\KeySom models\Field study "Field study Participants.xlsx"!!!**
- Juliane to tidy up dropbox (done 22.01.2017)

Optional analyses: isotopes, CT of the excavated soil (then ship / bring it to Müncheberg) – even the glass beads would be seen.

The procedure of the manipulation experiment was modified as follows:

#### Draft protocol subject to modification following pilot tests

- Cylinders 5 cm wide, 20 cm deep – made of fine mesh (1 mm) or fine mesh with holes for macrofauna access –
- Jan to produce and send the containers off by end of February
- Protocol specifies sand and kaolin supplier; some countries may share (Olaf)
- Fill inserted mesh cylinder with mixture of quartz sand and clay (according to **OECD artificial soil**)
- Cut/scrape off top vegetation and litter of the excavated core, sort out any macrofauna and put it onto sand core (no previous drying)
- Add coloured glass beads for assessing bioturbation
- Mesh longer than cylinders – staple them – bend them to the site, fix it at the surface with a peg and cover it with surrounding litter (invisibility!)
- Water the cores after preparation (~ 100 mL tap water)

#### Comentado [JF1]: OECD artificial soil:

- 5% sphagnum peat, air-dried and finely ground (a particle size of  $2 \pm 1$  mm is acceptable);  
- 20% kaolin clay (kaolinite content preferably above 30%);  
- approximately 74% air-dried industrial sand (depending on the amount of CaCO<sub>3</sub> needed), predominantly fine sand with more than 50% of the particles between 50 and 200 microns.  
The exact amount of sand depends on the amount of CaCO<sub>3</sub> (see below), together they should add up to 75 %.  
- < 1.0% calcium carbonate (CaCO<sub>3</sub>, pulverised, analytical grade) to obtain a pH of  $6.0 \pm 0.5$ ;  
the amount of calcium carbonate to be added may depend principally on the quality/nature of the peat (see Note 1).

- Install some extra cores for beforehand method checking (only few sites; sampling late autumn or early spring 2018)

In the end:

- Subdivide sand core into 0-5, 5-10, 10-20 cm layers
- Check root ingrowth into cores: pre-dry to about 120% of initial dry mass
- Separate roots and soil manually
- Dry and separate aggregates either manually (visual appearance) or according to KEYSOM-01
- Take 20 g subsamples of soil for each layer; separate aggregates and soil
- Send 10 g Olaf (glass beads); see separate protocols
- Sieve 11 g to 0.2 mm, send 10 to Juanjo (NIRS), powderise (mortar) 0.5 g and mail it to Simonida for C/N analysis

Comentado [JF2]: To be specified

## WG 2 (G. Deckmyn)

Main contributors: Gaby Deckmyn, Jorge Curiel-Yuste, Xavier Domene, Maria Briones, Tine Grebenc, Ivika Ostonen, Maarja Öpik

Goals reached concerning paper II

- Finalisation of the SOM pools concept
- Finalisation of the engineering concept
- Interaction with specialists from the different other WG's
- Restructuring manuscript
- Fitting together and shortening submitted parts (long version remains online!)

Plans

- Integrate missing parts (predators, herbivores) by end of February
- Integrate info on foodwebs and discuss implementation of foodweb models (with Peter De Ruiter) before March
- Send around complete draft to all co-authors
- Paper II coding in March workshop
- Working model to be tested/shown at Tartu Biolink workshop (June 2017)
- Paper I: model on earthworms is being developed by S. Barot who will ask input for parameters when this is finished from other action members
- Think about database requirements for model input
- Parametrisation: next workshop
- Published as two joint papers? Journal?

Pending Issues

- Can older scientists get an STSM?
- Gaby would like to be able to run the model for her own site as a test, including the 'field-experiment' data. 2 'visiting scientists' with experience are required (preferably strong males)
- Is it a solution to 'officially' have Gaby as joined WG leader so the WG is never 'leaderless'?
- Maybe (but no promise) a summer school in 2018 might be possible where each 'student' (or old student) parameterises and runs their data from the experiment with the new
- 'KEYLINK' model: does budget need to be foreseen already now?

Questions related to modelling issues were discussed in the plenary:

- How much of the C and N of the food sources (of soil fauna) goes into the different soil pools? There was a statement that a significant portion goes to the available pool (O. Schmidt).
- How much do earthworms need to eat (C, energy) that they have enough calories? What proxies can be used for calories? There was no consensus. Suggestions were carbon content of the food source (J. Filser) or metabolic quotient (MQ, J. Curiel-Yuste). Note however that MQ has frequently been criticized.
- Can soil pH be modelled? Is calcium enough to be included in the model? Perhaps also acid hydrolysis should be considered.
- Discussion was also initiated in respect to the parameters for the ANAFORE model (U. Schneider). Which parameters are needed for using the model? What are the important parameters? Which parameters have not been measured so far?

### WG 3 (D. Hackenberger)

There were issues discussed related to databases. The idea is to create our own database from the data of the field experiment. This database can also be used as a dissemination output!

- Agreement on attaching to Edaphobase
- Hows and whats to be defined
- Workshop Edaphobase-KEYSOM, Feb 23-24 in Frankfurt = milestone of WG 3
- To assess challenges of providing open-access data and information from different projects and sites in a database as a basis for extensive analysis, synthesis and modelling (cooperation with David Russell, Edaphobase, Senckenberg). Discuss and propose solutions to data sharing issues will be organized by WG 3 (23 – 24.2. 2017 in Frankfurt).
- To identify the needs and most useful means to promote data sharing and identify current obstacle strategies for promoting of data sharing facilities based on databases or web of cloud based solutions.
- How can our database be best linked to other databases, e.g to the Edaphobase? M. Öpik mentioned also the example from the MaarjaAM –Glomeromycota database. O. Schmidt advised to be realistic. We do not have the capacity and funding sources for something very big (such as ECOFINDERS).
- A nicely structured template for the data of our field experiment that can be directly linked to Edaphobase should be prepared by WG 3 → dissemination output!

### [WG 4 – No separate meeting; here: relevant points discussed in plenary]

Note: Skype meeting with Paulo Sousa (WG 4) had to be cancelled due to illness. His ideas and suggestions sent by e-mail are attached as pdf.

#### Relevant points discussed:

- Prepare proposal text / topic for a white paper for H2020 (DG Environment) and Soil Framework directive (J. Faber)
- Promote our topics for H2020, especially via national contact points (L. Sas)
- Videos (field experiment protocols)
- Methods handbook
- Flyer update (Juanjo)
- **Thematic conference** autumn 2018 or spring 2019: **rather one public day** in the end of our meeting, to save travelling time and costs

#### Papers related to policy / strategy

- First paper: Case studies (leading person: Agisilaos Economou; see 18/02/2017). Timeline is 15.2.2017 to have the contributions of authors. Abstract is finished, manuscript about 50%. Names of the authors should be defined (Mari Ivask, Maria lamendei, José Rato Nunes). Journal is not defined.
- Second paper: Soil fauna protection. Has not been started yet.

#### MC Meeting - General Discussion (see also separate pdf)

(Note: had to be held on January 18, due to early departure of 11 out of 32 participants, partly continued on January 19: [E-voting required for this part \[in green colour\]](#))

If not mentioned otherwise, most points and formal decisions can be found in the attached pdf. The following points were raised:

#### 1. Pending STSM

There was disagreement that STSM are reserved for early stage researchers – e.g. both Maria B and Gaby have different experiences. This is all the more relevant as we apparently do not have any applicants (perhaps one?) for our announced STSM. Other STSM were suggested, such as

- Soil sampling and description (J. Curiel Yuste)
- Compilation of “animals of the month” (P. Querner)

#### 2. New training schools

Ideas for summer schools:

- a) Practical (WG 1) + “Selling Science” via videos etc. (for WG 4)
- b) Microbiological methods & how to handle data concerning bioinformatics (for WG 2):
- c) Modelling workshop (for WG 3) – suggestion: towards the end once we have our model

Location: CH nice but expensive, Estonia (possible in 2018), Vienna (Pascal asks for hosting). *Remark: Meanwhile an offer for spring 2018 has been made by Aline and Beat*

#### 3. Next meeting

The next meeting will be held in Bucuresti, Romania, and organised by Maria lamendei. The date will be selected based on a doodle poll initiated by the Action Chair.

#### 4. Dissemination

##### a) Interesting conferences

- Soil functions Berlin (Feb/March 2018 → David Russell)
- Joint Ecol Soc Meeting Gent (Dec 2017) – relevant for our purpose?
- GSBI China (no coverage by COST) October 2017
- Wageningen Soil Conference (end of August 2017): Maria Briones = invited; abstract deadline = March 23
- EGU 2018
- Earthworm conference with farmers / Braunschweig
- Next Biolink meetings (some budget available): before woody root symposium Tartu June 26-29; Granada spring 2018

#### b) “KEYSOM products”

- Methods handbook (based on field experiment protocols)
- Videos (as had been planned for the last training school)
- Our database from the field experiment can be used as a dissemination output

#### c) General aspects

- Dissemination issues (e.g. videos, website information) should be improved. Maarja tweeted the meeting including picture and wrote a little message for the newsblog. WG descriptions (website) and activities need to be more expanded (WG leaders); besides any KEYSOM members with a login account should regularly update their information (see minutes from January 17).
- FYR / STSM: further things (Pascal)
- Suggestions for animal of the month (within the next two weeks):  
Maria I: Curculionidae pest  
Xavi: Collembola  
Milos: tardigrades  
Kevin: earthworms  
David: mites  
Karin H.: museum animals etc.  
Gaby/Olaf: pig+boar (April)  
Matty: millipedes  
Gerlinde: nematodes
- [Note: meanwhile (Jan 29) a few animals have arrived, among them Gaby's pig and *L. terrestris* from Pascal. Gaby sent also a draft for WG 2 description]

#### 5. General Issues

What is not ideal in this Action? What could be improved? There were several statements.

- General part generally shorter; condensed: Mostly administrative and formal issues (e.g. budget confirmation, participation of new member states) should be sent in advance and agreed upon by e-voting so as to save time for more efficient work during forthcoming meetings (see below)
- For the same reason, in future meetings invited presentations should be reduced to one or two, unless they directly contribute to specific deliverables
- More active participation in small groups (working on WG deliverables) should be promoted. Some dissatisfaction related to some WG group leaders has been identified. To release these overly busy WG leaders from some of their manifold activities, replacement of WG leaders has been discussed; Gaby Deckmyn and Maria Briones would be willing to take over / share leadership in WG 3 and 4, respectively. [Remark based on subsequent e-mails: *The Action Chair was not pleased with this as he thinks that the leaders of WG 3 and 4 have made a very good job. In turn, Paulo Sousa would consider handing over WG leadership a “relief”, and Sebastian Barot would not mind sharing leadership with G. Deckmyn.*]
- It was also proposed to allocate some compensation money to WG group leaders.
- Summer school: problems because of short notice and hardly any practical. Had any videos been produced?
- What is the need of the core group meetings and what will be decided there? J. Filser explained that in these meetings basically the next grant period will be structured.
- Discuss authorship policy for field experiment

Finally, participants agreed that the meeting had been straining, but very constructive and successful. **Special thanks go to Maarja Opik and her team for their perfect organisation and hospitality!**