

# **STSM Final report**

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## **Introduction**

The Short Term Scientific Mission (STSM) within COST Action ES1406 (“Soil fauna - Key to Soil Organic Matter Dynamics and Modelling – KEYSOM”) began on 3rd of October, 2016 and it ended in 12th of December, 2016. It was performed at the University of Bremen under the supervision of Prof. Dr. Juliane Filser.

The STSM purpose was to evaluate knowledge gaps with respect to the interactions of soil invertebrates (others than annelids) and soil organic matter dynamics, with the intent to publish a review paper about it.

During the STSM time bibliographic research on the above topic was made. Articles were selected, read, structured, and summarized in figures and tables. Two oral presentations were given during the weekly group meetings. Some field work was performed as well.

## **Theoretical part**

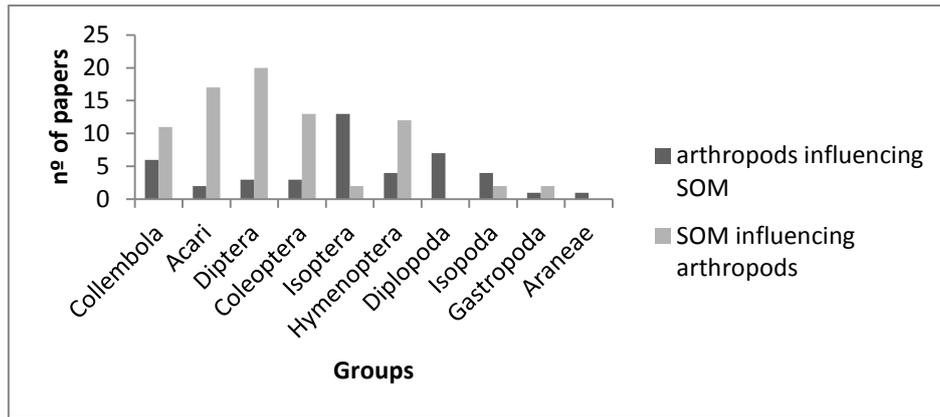
### **Methods:**

The first thing was to decide for the most important ten groups of invertebrates involved in soil organic matter decomposition by a first look in books and papers. Collembola, Acari, Diptera, Isopoda, Hymenoptera, Isoptera, Gastropoda, Diplopoda, Coleoptera and Araneae were chosen. After that it was decided which keywords to use, and searched for these in Web of Science (on 31<sup>st</sup> of October and 1<sup>st</sup> of November). After downloading the available papers they were read and a resume was made (2<sup>nd</sup> to 16<sup>th</sup> of November).

To have an idea of the number of papers that were reviews or performed in the laboratory or in the field, they were counted for each group of invertebrates, and, in for those that were performed in the field the respective environmental conditions were registered as well (17<sup>th</sup> to 21<sup>st</sup> of November). At last, a table with the principal conclusions in each group of invertebrates was made.

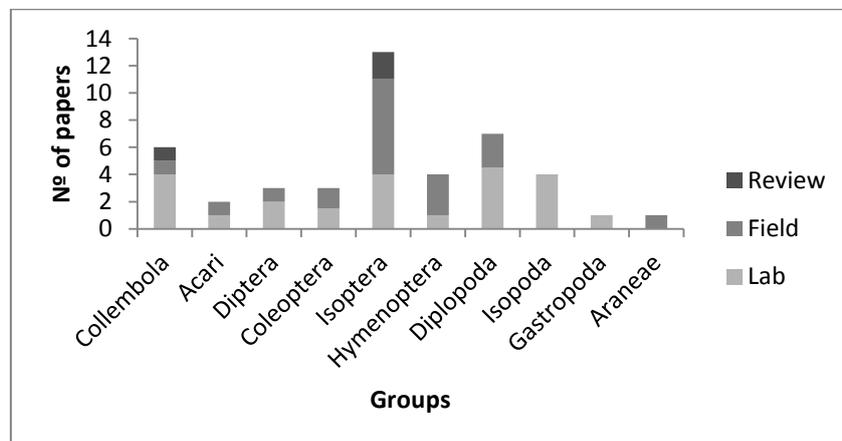
### **Results:**

The preliminary results show that there is a visible gap of information concerning interactions of invertebrates (others than annelids) with the turnover of soil organic matter. There are only few papers that studied the influence of the selected soil invertebrates on decomposition rate (only 44 papers on total of all groups). The best studied group is Isoptera with 13 papers; on the other hand, Gastropoda and Aranea are the worst studied groups, with only one paper each. (Figure 1).



**Figure 1:** Number of papers found with the keywords used, separated by invertebrate influence soil organic matter (in black) and (in grey) soil organic matter influences on soil invertebrate communities.

In total 23 papers were laboratory experiments, 18 papers were performed in field, and 3 papers are reviews (Figure 2).



**Figure 1:** Number of papers found for each group of invertebrates, subdivided into type of study (laboratory, field or review).

The next step of this work is to write a review paper presenting the information of the relation of soil invertebrates with soil organic matter and what kind of studies should be done in the future to increase the knowledge of interactions between soil organic matter dynamics and soil invertebrates.

### Field work at the Bremen study site

(Divided into three parts)

**Part I** – Hand sorting of earthworms was performed, followed by an allyl isothiocyanate (AITC) extraction and sorting. Then the samples were taken to the laboratory to measure the total biomass of earthworms and to preserve them for a posterior identification.

**Part II** – Soil samples from different depths (0, 5, 10, 20, 30, 60 and 90 cm) were collected to do a soil characterization and prepare samples for a stable isotope composition (bulk  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ) analysis. The soil was collected with a soil auger. Both Part I and II were part of the common field experiment within KEYSOM.

**Part III** – Measurement of soil water content and soil temperature (to help a PhD student who is doing manipulation experiments with biochar, compost and soil mesofauna in the same site).