



JUSTUS-LIEBIG-

Including Soil Fauna in **Soil Carbon Monitoring**



Quantifying the effect of soil fauna on soil carbon cycling

Soil fauna affects the variability of soil carbon fluxes and the distribution of soil carbon via their metabolic activities and by changing the physical, chemical and biological properties of soils. However, the magnitude of these effects remains poorly quantified. We present preliminary data from an on-going study (CH4ScarabDetect) aiming to quantify the contribution of scarab beetle larvae to soil carbon fluxes.

Materials and Methods

Combining flux chambers, stable carbon isotopes and acoustic to quantify scarab beetle larvae emissions in situ

In Germany, field measurements take place in a controlled mesocosm experiment and at sites naturally infested with Melolontha melolontha (Common cockchafer) and M. hippocastani (Forest cockchafer).





Measurement sites and equipment © C.-M. Görres

• Preliminary results

Direct larval emissions

Cockchafer larvae produce significant amounts of CO₂ and CH_4 which seem to vary with larval size, larval fitness and food supply. At infested sites, cockchafer abundances can easily increase to >40 larvae m^{-2} .

Effect of larvae on soil net carbon fluxes

It still has to be determined at which abundances scarab beetle larvae exert a significant effect on soil carbon cycling. With regard to CH_4 , they have the potential to increase soil CH_4 sinks.

0 larvae/m² 16 larvae/m² 8 larvae/m²

Meadow Carrots



Example net C fluxes mesocosm experiment © C.-M. Görres





Contact

C.-M. Görres* (HGU), C. Kammann (HGU), D. Chesmore (UY), C. Müller (UG/UCD) *Contact author: carolyn.goerres@hs-gm.de Hochschule Geisenheim University (HGU) Department of Soil Science and Plant Nutrition Germany www.hs-geisenheim.de

considered in soil carbon monitoring to

further our

understanding of soil carbon cycling.

Initiative #4per1000 Bonn (Germany) November 2017

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No 703107 (CH4ScarabDetect).