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 ongoing 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).

- Preliminary results
  - Direct larval emissions

Cockchafer larvae produce significant amounts of CO₂ and CH₄ 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 CH₄, they have the potential to increase soil CH₄ sinks.

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Soil fauna should be considered in soil carbon monitoring to further our understanding of soil carbon cycling.

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