EGU2020-6624
https://doi.org/10.5194/egusphere-egu2020-6624
EGU General Assembly 2020

How energy crops (Maize, Field grass, Cup Plant) affect soil microarthropods and their decomposition services

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Energy crops are grown at low cost and low maintenance used in making biofuels, such as bioethanol, or combusted to generate electricity or heat. Production of energy crops as an alternative to fossil fuels will help to reduce CO_2 emission, thus leading to large scale changes in agricultural landscapes. Increase in the cultivation of annual energy crops such as maize (*Zea mays*) is assumed to decrease biodiversity in the agrarian landscape. This may lead to changes in soil properties, thereby affecting the soil biodiversity and its ecosystem functions and services like for instance soil microarthropod communities and their contribution to decomposition of plant litter. Perennial crops such as field grass (a mixture of Festulolium, *Dactylis glomerate, Loliuim perenne, Festuca pratensis and Festuca arundinacea*) and cup plant (*Silphium perfoliatum*) are assumed to protect and promote soil biodiversity through less intensive management. The relationship between decomposer diversity and ecosystem functioning is little understood. So far, the role of soil microarthropods in decomposition is the most disputed aspect due to scarce empirical data.

The main aim of this field study was to assess the effect of soil microarthropods on litter of maize, field grass and cup plant, via decomposition using litter bags with 2 different mesh sizes (0.02 mm and 0.5 mm) for a period of 3 months during the vegetation period. At the end of the experiment, the decomposition rate was higher in cup plant followed by maize and field grass in the coarse mesh size, and higher in the cup plant followed by field grass and maize in the fine mesh size. A total of 55,464 soil microarthropods (73% mites, 25% collembola and 2% others) were extracted from the litter bags. The diversity and abundance of soil microarthropods was higher under cup plant cultivation followed by field grass and maize.