Poster

Mycotoxin degradation by earthworms – belowground support for healthy arable soils

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Sustainable arable management promotes soil biodiversity and offers the potential to optimize benefits from functions and ecosystem services, fulfilled and provided by soil biota. To adapt agricultural activity to current demands, knowledge of management impacts on the ecosystem service/disservice balance and the self-regulation of soils is, hence, essential. In this context, it is known, that the reduction of soil tillage intensity and remaining mulch layers on the soil surface, on the one hand, promote the survival of soil borne, mycotoxin-producing plant pathogenic fungi, but, on the other hand, enhance the diversity of antagonistic, fungivorous and mycotoxin-degrading soil biota. However, so far the resulting ecosystem service/disservice balance and involved self-regulation mechanisms are still unclear.

To analyse and assess the role of the fungivorous decomposer key species *Lumbricus terrestris* (earthworms) during bioregulation of economically relevant fungi of the genus *Fusarium* and degradation of its mycotoxins (deoxynivalenol (DON), zearalenone (ZEA), 3-Acetyl-DON, Fumonisin B1), mesocosm studies were conducted in reduced tillage long-term field experiments in Germany and Romania. Maize stubbles of different size classes from artificially infected plants were used as substrate. In the context of the detoxification of *Fusarium* mycotoxins, it is hypothesised that (1) earthworms accelerate the mycotoxin degradation in crop residues; (2) degradation rates depend on substrate size and mycotoxin composition; (3) the detoxification potential differs depending on site conditions and soil texture.

The results reflect that earthworms can significantly enhance degradation rates of mycotoxins by up to 300%. Their detoxification potential, thereby, differs depending on respective mycotoxin and soil conditions but independent of substrate size.

The present study contributes to a deeper understanding of the interrelationship between soil management and the ecosystem service/disservice balance.