Suppression of infective stages of phytonematodes by associated microbiomes

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The role of soil-borne microbiomes in suppression of plant diseases caused by plant-parasitic nematodes (PPN) has become a focus of many studies and search for putative microbial suppressors is essential in this regard. Our project is based on the assumption that specific microbes attach to migrating infective stages of PPN in soil and trigger induced systemic resistance in plants, rather than directly antagonizing nematodes.

To better understand this paradigm of nematode-plant-microbe interactions we have designed a greenhouse experiment where we tested three different soils for their suppression against root-knot nematode *Meloidogyne hapla*. Infective second-stage juveniles (J2) of *M. hapla* were baited in soil suspension of respective soils and inoculated in the pots with tomato plants. After one week we stained the roots and found a significant reduction in number of invading J2 in two soils compared to the control, and a reproduction rate is yet to be determined. In order to detect and isolate microbes that are responsible for this suppression, we aim to apply culture-dependent and culture-independent methods, including the next generation sequencing.

As hypothesized that soil microbes specifically attached to J2 induce systemic resistance in plants, we established protocols for RNA extraction from roots and RT-PCR to analyse the expression of defence genes. In this case surface-sterilized nematodes are baited in soil suspensions and applied to aseptic tomato plants. In addition, we have succeeded to produce aseptic tomato plants via callus in order to avoid the interference of nematode-attached microbes with plant endophytes when assessing the induced systemic resistance in plants.

Relying on our work to date, we are aiming to expand our study and include some other nematode species and different populations of *M. hapla* so we could see if the same story applies to all of them and/or which differences are involved.

Biological control of PPN has gained an important place in successful agriculture systems and our aim to widen knowledge in nematode suppression by specifically attached soil microbes will be the basis for including a soil microbiome management in integrated control strategies.