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Companion plants to enhance AMF diversity and protect peppers against root-knot nematodes

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1 Context

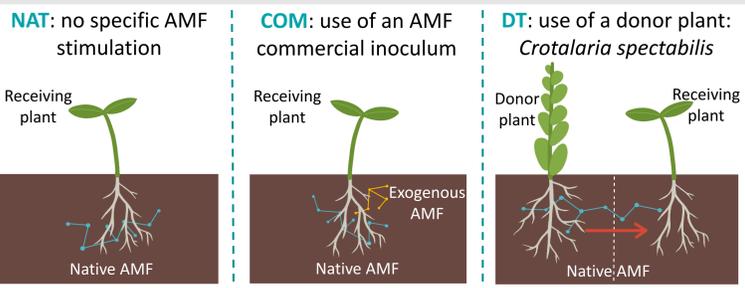
- Root-knot nematodes have a severe impact on vegetable crops
- To control these soil-borne pests, we need to combine several agroecological practices such as Arbuscular Mycorrhizal Fungi (AMF), which have good potential as biocontrol agents. [1]

2 Aims of the study

- Combining the biocontrol effects of AMF and companion plants as an alternative to pesticides.
- Reducing the impact of root-knot nematodes on susceptible pepper plants (*Capsicum annuum* cv Doux Long des Landes).

3 Materials and Methods

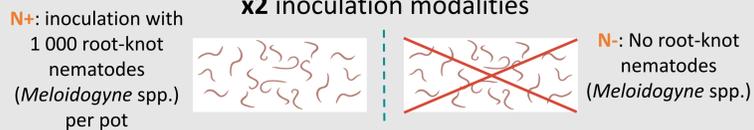
3 AMF stimulation modalities



x2 receiving plants modalities



x2 inoculation modalities



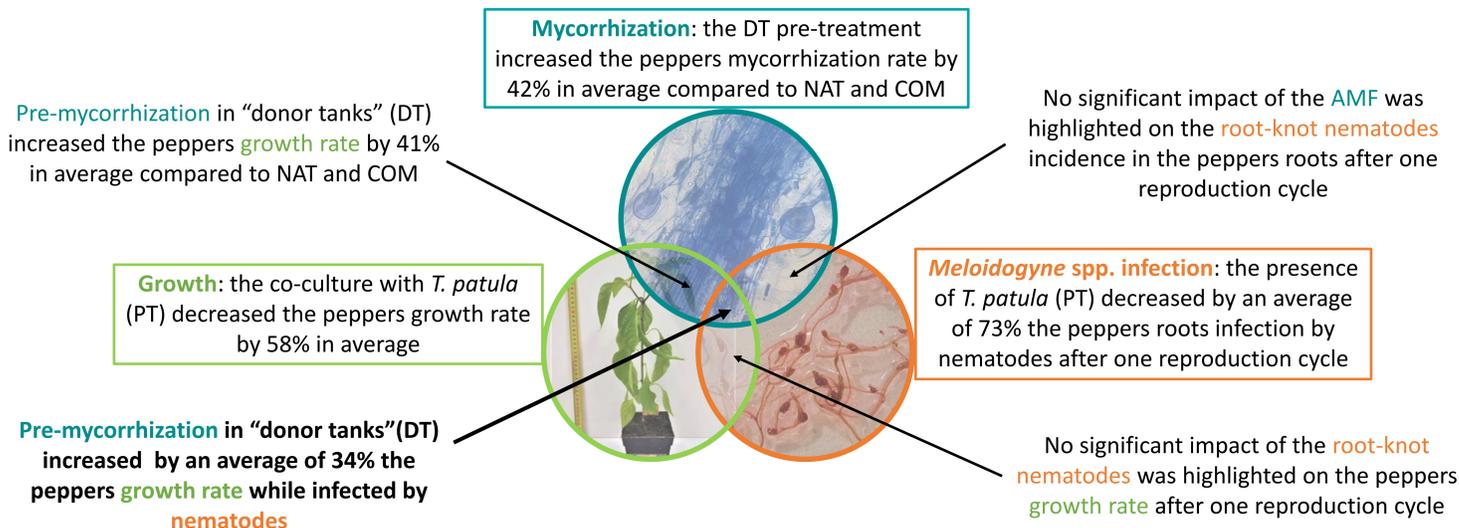
Total: 12 treatments with 8 replicates each → 96 pots

- Greenhouse experimentation: pre-treatment in “donor tanks” (DT) or in pots (NAT & COM) (a)
- Repotting (b) and inoculation with nematodes of the N+ modalities
- The post-inoculation experiment lasted 6 weeks, i.e. the duration of one nematode reproduction cycle
- Follow-up measures on peppers: height and diameter of the stem, leaves number, phenological stages
- One-off measures: mycorrhization rate (c) ; number of nematodes galls and egg masses (d)
- Metabarcoding identification of the AMF species in root samples of each treatment to conduct diversity analysis



4 Results

Effects of the *T. patula* – AMF stimulation strategy combination on the peppers growth, mycorrhization and *Meloidogyne* spp. infection



Metabarcoding analysis

- There is a wide variation in the AMF communities identified by metabarcoding depending on the modality
- No significant effect of the AMF stimulation method on the α diversity (Shannon index)

5 Conclusion and prospects

- Among the three AMF stimulation strategies, the most effective is the use of donor plants. This method needs to be tested in nurseries systems.
- *T. patula* not only greatly reduces the incidence of root-knot nematodes, but is also a highly mycorrhizotrophic plant. A better management of the interspecific competition is essential to be able to use this multiservice plant.
- Longer trials under controlled conditions are still needed; the link between AMF diversity and their biocontrol ability calls for further studies.