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

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**Résumé**

Service plants have great potential in management of crop health and some, such as sorghum, are already used in biocontrol against root-knot nematodes (*Meloidogyne* spp.). These worldwide spread pests have a particularly severe impact on vegetable crops. Moreover, mycorrhizal service plants can enhance the establishment of the symbiosis between Arbuscular Mycorrhizal Fungi (AMF) and the companion crop. This symbiosis also contributes to the protection of crops against various soil-borne pests including root-knot nematodes. Both service plants and AMF result in partial protection. Thus, our aim is to combine mycorrhizal service plants and AMF to reduce more efficiently root-knot nematodes impact. Firstly, by using metabarcoding analysis, we studied different service plants (*Crotalaria spectabilis*, *Sorghum bicolor* and *Tagetes patula*) ability to promote native AMF diversity. Secondly, we assessed the biocontrol effect of the combination of the nematode-repulsive plant, *T. patula*, and AMF. The study was conducted under greenhouse conditions on a susceptible pepper cultivar (*Capsicum annuum cv Doux Long des Landes*) by comparing two AMF stimulation strategies. The first one involved the use of a standardized commercial inoculum composed of two strains of AMF (*Funneliformis mossae* and *Rhizophagus fasciculatus*), whereas the second aimed to enhance the diversity of native AMF before planting the peppers, by intercropping a mycorrhizal plant: *C. spectabilis*. We then assessed the biocontrol effect of the association of *T. patula* and the AMF communities on the nematodes-infected peppers. The association of *T. patula* with mycorrhized peppers resulted on an average reduction of root-knot nematodes infections on peppers by 72%. *T. patula* showed a good potential both for its biocontrol effect and its ability to promote native AMF diversity, making it a potent multi-service plant. These results call for further studies under controlled conditions over a longer time period before being conducted in the field.

**Mots-Clés:** Biocontrol, Service plants, AMF diversity, Vegetable crops

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