Banana production is threatened by numerous pests such as nematodes. The side effects of nematicides on human health and the environment requires the development of alternative control measures. Among these are the use of beneficial microorganisms such as arbuscular mycorrhizal fungi (AMF) and push-pull plants such as Crotalaria spp. Here we investigated the combination of AMF with *C. spectabilis* as control measure against the burrowing nematode *R. similis*. Three objectives were pursued: investigate the impact of (1) AMF on nematodes population and root infestation of banana plantlets grown under autotrophic in vitro culture conditions; (2) the concomitant use of AMF and *C. spectabilis* on the control of *R. similis* population, (3) roots exudates of AMF-colonized *C. spectabilis* plantlets on the chemotaxis and vitality of *R. similis*. Whatever the experiment, all the developmental stages of the nematodes were affected in presence of the AMF with a drastic decrease of nematodes multiplication rates. *C. spectabilis* also decreased the nematode population in banana roots. Indeed, the concomitant use of AMF and *C. spectabilis* impacted all the developmental stages of the nematodes and significantly decreased the surface of necrotic roots as compared to both organisms alone. Concerning chemotaxis, nematodes were more attracted by exudates of *C. spectabilis* when opposed to banana exudates suggesting the presence of attractant compounds. The vitality of nematodes was affected by the root exudates of *C. spectabilis*, while they remained mobile in exudates of banana roots. This effect was highly concentration-dependent and nematodes recovered mobility after cleaning from the *C. spectabilis* exudates suggesting a nematostatic rather than nematicidal effect of the exudates. The impact of AMF on exudates composition could not be ascertained nor excluded.

**Membres du jury:**

Prof. Stephan Declerck (UCL), supervisor
Prof. Jacques Mahillon (UCL), chairperson
Prof. Xavier Draye (UCL), secretary
Dr. Kodjo Tomekpe (CIRAD, Guadeloupe)
Prof. Annemie Elsen (Soil service of Belgium, UGent)
Prof. Nicole Viaene (ILVO, UGent)