Conditioning soil microbiome by cover crops to suppress root knot nematodes in potato production

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Root knot nematodes (RKN) remain a major problem in potato production. Cover crops have the potential to modulate soil microbiota to promote soil suppressiveness against RKNs. However, limited knowledge of the cover crop species which stimulate and enrich beneficial soil microbiota to promote soil suppressiveness hinders effective management of RKN in organic potato production using cover cropping. We conducted greenhouse pot trials to evaluate the potential of different cover crop species to modulate RKN-suppressive soil microbiomes using five soils collected from different agricultural fields. Some of the soil microbiomes modulated by cover crops significantly reduced *Meloidogyne chitwoodi* root invasion and reproduction on potato. In particular, microbiomes from crotalaria (*Crotalaria juncea*), phacelia (*Phacelia tanacetifolia*) and nasturtium (*Tropaeolum majus*) consistently suppressed nematode root invasion and reproduction on potato across all field soils. Crotalaria induced the most suppressive soil microbiome, reducing nematode root invasion and reproduction on potato by up to 60% and 81%, respectively, compared to non-conditioned fallow soil. When grown adjacent to potato, crotalaria modulated the potato rhizosphere microbiome in a way that it significantly reduced *M. chitwoodi* root invasion by up to 56% when compared to potato monocrop. We will use 16S rRNA and ITS amplicon sequencing to analyze microbial communities assembled by the suppressive cover crops. These results provide new insights into the potential of using cover cropping to condition nematode-suppressive soils for the sustainable management of RKN in potato production.