Hidden Consequences: The Effects of Daikon Radish on the Microbial Communities of Purple Vetch in Cover Crop Mixtures

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Background
Many microbes live in and on plants. Some of these microbes are mutualists, and help the plant, while others are pathogenic and cause harm. It is not always clear which will occur, because the outcomes are influenced by the host, the microbe, and their shared environmental context.

Cash crops are crops that are planted with the main purpose of harvesting and selling them to generate revenue. Cover crops, on the other hand, are crops that are planted near cash crops, not with the main intent of generating revenue, but rather, with the main purpose of providing supporting benefits to the cash crops or the soil around the cash crops. A previous study from our lab of the microbes associated with cover crops in samples with or without radish: the Microbial Communities of Purple Vetch in Cover Crop Mixtures found that leaves of cover crops were frequently inhabited by fungi in the classes Dothideomycetes, Leotiomycetes, Sordariomycetes, and Agaricomycetes. Using the recently-published FungalTraits database, I determined the commonly observed families Protomycetaceae and Sclerotiniaceae both primarily contain species that act as plant pathogens (Tables 1 and 2, Figures 5 and 6), which indicates that the decision to use daikon radish as a cover of crop mixtures has more complex implications than previously thought. The findings provide new insight on the effects of planting of daikon radish as a part of cover crop mixtures on organic farms.

Results and Discussion
I found that there were two primary fungal families that could explain these differences in vetch when planted with or without radish: the Protomycetaceae and the Sclerotiniaceae (Figures 3 and 4). The sequences from Protomycetaceae appeared in more purple vetch leaf samples (and at higher sequence abundances) when purple vetch was planted without daikon radish, compared to when purple vetch was planted without daikon radish. Sequences from Sclerotiniaceae appeared in higher frequencies when purple vetch was planted without daikon radish.

The FungalTraits database suggests that families Protomycetaceae and Sclerotiniaceae both primarily contain species that act as plant pathogens (Tables 1 and 2, Figures 5 and 6), which may indicate that the decision to use daikon radish as part of a cover crop mixture has more complex implications than previously thought. The findings provide new insight on the effects of planting of daikon radish as a part of cover crop mixtures on organic farms.

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