

Final Plain Language Research Summary - AgriScience Grape & Wine Cluster 2018-2023

Activity: *Using groundcover to control soil-borne pathogens in grapevine*

Principal Investigator(s): Miranda Hart (University of British Columbia – Okanagan)

The role of groundcover in pathogen control is largely unknown, yet it is well known plants can alter the composition of soil fungal communities. Increasing the biodiversity of Canadian vineyards above ground may have advantages beyond pathogen suppression, including improved nutrient retention, improved soil structure, reduced herbivory. These ecosystem services will become increasingly important as growers experience the effects of future climate regimes. Although grape growers are eager to exploit cover crops as biofumigants there is insufficient evidence to recommend particular crops or combinations. We will test the role of plant identity in cover crops in viticulture on the incidence and abundance of common trunk fungal diseases.

Objectives:

1. Assess existing ground cover management/disease incidence in the Okanagan wine growing region
2. Develop ground cover mixes (and management) that reduce root disease
3. Test and monitor common vine diseases in commercial vineyards

This research will identify groundcover mixes and management to reduce pathogens in grapevine and promote low input, sustainable viticultural practices. Building on current work which shows that the identity of groundcover mix has significant effects on the abundance of vine pathogens and beneficials, this project represents the next step: translating experimental findings into robust industry practices.

Our study found brassica cover crops to increase species evenness which is inconsistent with current literature. We found no significant difference in effect on diversity metrics among different brassica species. There was no effect on the soil fungal community composition, soil nematode abundance, or AMF spore abundance between brassicas and the control or among brassica species. From the results of this study, we can suggest there would be no detriments to using these brassica species as cover crops in a vineyard. Although the brassica species used are non-mycorrhizal, they do not appear to suppress the AMF population. Additionally, they are not able to host ring nematodes. Shepherd's purse and white mustard in particular show potential for controlling the PPN population. Regarding other benefits expected from using plants with biofumigant properties, more research should be done on the functional changes in the soil rather than only species diversity and composition. The only possible negative result is that all brassica species used appear capable of being colonized by *Ilyonectria*. However, more research needs to be done to understand this interaction and if it would be detrimental in a vineyard. The results from this study provides evidence that brassica cover crops are a safe cover crop choice for vineyards. Although the beneficial effects may be smaller than desired, there is potential



for suppression of soil-borne pathogens using brassica cover crops without the need for incorporation. Future studies should focus on maximizing these beneficial effects as well as studying the interactions between the cover crop and the cash crop under field conditions.