Canadian Grapevine Certification Network
CGCN · RCCV
Réseau Canadien de Certification de la Vigne

Plain Language Research Summary - AgriScience Grape & Wine Cluster - *2025-2026*

Activity #4.1: Vegetation management for long-term productivity and enhanced ecosystem services in Canadian semi-arid vineyards

Principal Investigator(s): Dr. Mehdi Sharifi, Dr. David Ensing (AAFC Summerland)

1. What is the overall focus of this research activity?

This research focuses on how plants growing between and under vineyard rows, often called cover crops or non-crop vegetation, can be used to improve vineyard health and sustainability. The project is testing which plant species grow well in dry vineyard conditions and how they affect weeds, soil health, water use, insects, pests, vine growth, grape yield, and fruit quality. The overall goal is to help grape growers choose cover crops that fit their vineyard conditions and management goals. This work will support practical recommendations and the development of a future online decision-support tool for selecting suitable cover crops for semi-arid Canadian vineyards.

2. What are the main progress updates/milestones in terms of work that was done on this research activity this year?

During the 2025–2026 reporting period, the project made strong progress across several areas, including vineyard vegetation surveys, cover crop field trials, insect monitoring, soil pest and pathogen assessments, and soil biology research. The vineyard survey network was expanded by adding 18 new vineyard sites, bringing the total to 40 satellite sites. Vegetation surveys were completed across these sites and at five core research vineyards. More than 100 plant specimens were processed and verified, contributing to the identification of 170 plant species across the study network. A vineyard management survey was also developed and analyzed to better understand how vineyard practices are linked to plant diversity and groundcover patterns.

Cover crop trials were also analyzed at four vineyard sites: Waldhof Vineyards, Sebastian Farms-33, Le Vieux Pin, and Diamondback Vineyards. The research team reviewed, cleaned, and analyzed data on cover crop growth, weed pressure, grape yield, berry quality, vine growth, vine water status, and other vineyard performance indicators. At Waldhof, Italian ryegrass, microclover, and red/white clovers generally produced more cover crop biomass than the control or cultivated treatments, especially under standard irrigation, showing stronger

establishment potential. These cover crops did not clearly reduce or increase total yield, suggesting no major yield penalty during this reporting period. At Sebastian Farms-33, standard irrigation generally supported higher yield, cluster number, and vine growth, while reduced irrigation showed more stress-related responses, although soluble solids remained relatively high. At Le Vieux Pin, standard irrigation generally supported higher yield, berry weight, soluble solids, and juice pH than reduced irrigation. At Diamondback, legume-based cover crops, particularly sainfoin + lentils and field peas, showed better establishment under reduced irrigation, while Italian ryegrass had higher weed biomass, suggesting weaker weed suppression at that site. Overall, the results show that cover crop performance varied by site, species, and irrigation condition, but several species showed good potential for improving vineyard floor management.

The insect monitoring component also advanced this year. Beneficial and pest insects were sampled across 43 vineyards in the Okanagan Valley using sticky cards and pitfall traps. More than 10,700 insect specimens from core sites and more than 21,200 specimens from satellite sites have been identified and recorded. These insects are being grouped into categories such as predators, parasitoids, pests, and pollinators to better understand how vineyard vegetation may support beneficial insects or influence pest pressure.

Soil pest, pathogen, and soil biology work also progressed during the reporting period. Nematode populations were sampled at Sebastian Farms and Waldhof in May and October 2025. Several plant-parasitic nematode groups were found at both sites, including ring nematodes, northern root-knot nematodes, dagger nematodes, root-lesion nematodes, pin nematodes, spiral nematodes, and stunt nematodes. Some of these groups are known to parasitize grapevines and may affect vine health if populations become high. In 2025, no clear cover crop treatment effect was detected on nematode populations, likely because the cover crops are still relatively new and more time is needed for vegetation treatments to influence soil pest communities. Soil samples were also tested for fungal root pathogens linked to young-vine decline, including *Ilyonectria macrodidyma* and *Ilyonectria torresensis*. *I. torresensis* was generally more abundant than *I. macrodidyma*, and pathogen levels were higher at Sebastian Farms than at Waldhof.

In addition, soil biology work advanced through DNA-based testing of beneficial microbes and nutrient-cycling organisms. Soil samples from 2024 and 2025 were processed, DNA was extracted, and about 5,600 qPCR reactions were completed for microbial groups involved in carbon, nitrogen, and phosphorus cycling, as well as beneficial fungi such as arbuscular mycorrhizal fungi and Metarhizium. Early results suggest that soil microbial communities differed by site, irrigation level, and cover crop treatment. For example, *Metarhizium robertsii*, a beneficial fungus associated with insect pest suppression, was more abundant at Waldhof than at Diamondback and Le Vieux Pin. Arbuscular mycorrhizal fungi, which can support plant nutrient uptake and soil health, were more abundant at Diamondback than Waldhof, and sainfoin at Diamondback appeared to nearly double their abundance compared with the control.

3. **What is this research activity's intended impact on the Canadian grape and wine industry? What benefits could/will the growers, wineries, consumers, etc. see as a result of this research?**

This research is intended to help Canadian grape growers make more informed decisions about vineyard floor management. By identifying which cover crops perform well under dry conditions and how they affect weeds, soil health, insects, vine growth, yield, and fruit quality, the project will help growers choose practices that are both practical and sustainable. This is especially important in semi-arid regions such as the Okanagan Valley, where water availability, heat, soil degradation, and production costs are ongoing concerns.

The expected benefits include improved weed management, healthier soils, better use of water, greater biodiversity, and more resilient vineyards. Growers may also benefit from reduced reliance on some agricultural inputs if cover crops can help provide services such as weed suppression, soil protection, and support for beneficial insects and microbes. For wineries and consumers, the long-term benefit is a more sustainable and resilient Canadian wine industry that can maintain grape quality while adapting to climate and environmental challenges.

4. **Do you have any communications materials, publications, or other content related to this research activity that you would like CGCN-RCCV to share?**

Several communication and knowledge-transfer products are being developed from this research activity, including field tour materials, grower-facing summaries, cover crop performance results, and future extension materials to support cover crop decision-making in vineyards. The project is also generating scientific outputs and datasets that will support future publications and the development of a web-based cover crop selection tool for Canadian semi-arid vineyards.