

## Plain Language Research Summary - AgriScience Grape & Wine Cluster 2023-2024

**Activity 10:** Grapevine trunk disease: an under-rated threat to the Ontario grape industry?

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

Grapevine trunk diseases caused by fungi have been largely ignored in Ontario vineyards with assumptions that vine decline and death are due to cold injury rather than pathogenesis. The goal of this project is to determine a baseline of incidence of grapevine trunk diseases, the pathogens responsible for them, the timing of inoculum presence (when infection could occur) relative to weather and vine development, and to identify possible cultural, chemical and biological management options.

Baseline incidence will be determined by observing symptoms and collecting trunk samples in the early and late summer from Ontario vineyards of different ages. Pathogens will be isolated and identified using molecular techniques. The presence of inoculum (fungal spores) will be monitored using volumetric spore traps. Spores will be sucked into tubes that will be collected weekly and analyzed using molecular techniques to identify which pathogens are present and the weather conditions that are associated with spore release. Diagnostic tools will be developed to facilitate identification of infected vines by growers and consultants.

This project aims to shed light on a hidden problem in Ontario vineyards: the role of fungal trunk infections in the decline and death of grapevines, a problem previously attributed mainly to cold weather. Fungal trunk diseases can weaken grapevines, leading to reduced vigor, lower fruit yield, and poorer fruit quality, while also shortening the lifespan of the vines. Researchers are setting out to understand how widespread these fungal diseases are, identify the specific fungi responsible, and pinpoint the times these fungi are most likely to infect the vines. This includes exploring various ways to protect the vines, ranging from traditional farming practices to chemical treatments and biological controls.

To gather the necessary information, the team will examine grapevines at key growth stages during the growing season, collecting samples to identify the fungi using advanced lab techniques. They will also deploy spore traps to capture and identify fungal spores in the air, linking their presence to specific weather conditions that might trigger outbreaks. The ultimate goal is to develop easy-to-use tools for vineyard owners and consultants, enabling them to quickly detect infected plants. This research not only aims to protect Ontario's grapevines from these hidden threats but also to ensure the sustainability and productivity of the vineyards.

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

Despite a slow start due to delayed funding, our team has made significant steps in setting the stage for groundbreaking research into combating fungal diseases in grapevines. With a focus on Ontario's commercial vineyards, we've laid the groundwork for a series of comprehensive studies that will span the next four years. Here's what we've achieved so far:

- 1- **Identification of Vineyards:** We've successfully identified the commercial vineyards that will serve as the cornerstone of our research. This is a crucial step, as these locations will serve as the primary sites for monitoring and collecting data on the health of grapevines over the next few years.
- 2- **Selection of Grapevine Varieties for the Experimental Vineyards at the AAFC Jordan Farm:** Understanding that different grape varieties respond differently to fungal diseases and weather conditions, we've carefully chosen a range of vines to study. This includes both red and white varieties known for their varying degrees of cold sensitivity, such as Pinot Noir, Chardonnay Muscaté, Sauvignon Blanc, Cabernet Franc, and Cabernet Sauvignon.
- 3- **Preparation of the Experimental Vineyards at the AAFC Jordan Farm:** We are currently in the process of preparing the plots at the AAFC Jordan Farm for the establishment of our experimental vineyards. Scheduled for planting in the summer of 2024, this site will serve as our living laboratory. Here, we will implement and assess various strategies aimed at safeguarding the vines. These strategies encompass a spectrum of approaches, ranging from traditional agricultural practices to the application of cutting-edge chemical treatments and the exploration of innovative biological controls.
- 4- **Planning for the Future:** With the vineyard plots being prepared, we're gearing up to plant our selected grapevine varieties. This step marks the beginning of a detailed, four-year investigation into the most effective ways for protecting Ontario's grapevines from fungal threats. We aim to conduct fully replicated trials in the field, ensuring our findings are robust and applicable on a wide scale.

Our team is excited about the potential of this research to make a lasting impact on the health and productivity of Ontario vineyards. By understanding more about the fungal diseases that affect grapevines and how best to combat them, we're working towards a future where vineyard owners have the tools and knowledge they need to protect their crops and their livelihoods.

**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? Please use plain language intended for a non-academic/non-scientific audience and aim for 1-2 paragraphs.**

This research aims to address a significant threat to Canadian grape growers: fungal trunk diseases. These diseases can weaken grapevines, leading to reduced vigor, lower fruit yield, and poorer fruit quality, while also shortening the lifespan of the vines. By identifying the specific

fungi responsible and pinpointing when they're most likely to strike, we can figure out the best times to prune grapevines to minimize the risk of infection through wounds left by pruning.

The potential impact of this research is substantial for grape growers and even consumers. By preventing fungal infections, growers can expect to see increased fruit yield and improved fruit quality, ultimately resulting in greater profitability. Additionally, by prolonging the lifespan of their vines, growers can reduce the need for costly vine replacements. This research has the potential to significantly benefit the Canadian grape industry by safeguarding vineyards, improving grape quality, and ensuring a more sustainable future for grape cultivation.

- 4. Do you have any communications materials, publications, or other content related to this research activity that you would like CGCN-RCCV to share? If so, please provide a brief description here and either link it here or send the file as an attachment along with this summary.**

Due to delayed funding and subsequent delays in our planned activities, we haven't been able to develop any communication materials thus far. As our activities progress and timelines become clearer, we will prioritize the creation of appropriate communication materials to ensure effective dissemination of information.