

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

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

Principal Investigator(s): Dr. Wendy McFadden-Smith (Brock University); Dr. Oualid Ellouz (AAFC Vineland)

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?

Sampling of 58 vineyard blocks in Niagara, Prince Edward County and Essex-Pelee Island was completed between June and August, with a total of 217 samples submitted for isolations. French hybrid blocks were included in addition to vinifera. Multiple esca pathogens were isolated from many trunks. No foliar symptoms were observed in any of the blocks that were sampled. Vines were selected based on the presence of multiple large pruning wounds at the head and fruiting bodies of the fungi. Vineyard age ranged from over 3 to 40 years.

A new spore trap location was added to the existing 2 locations. Spores of the esca pathogens were identified at both initial sites (April – October) with highest numbers of spores caught between the end of April and the end of June. However, the trap contents have not been quantified overwinter (2025-2026) yet so the timing of spore release relative to pruning timing has not yet determined. To date, only inoculum of the *Botryosphaeriaceae* has been tested in the spore trap samples. There are other grapevine trunk diseases (GTDs) pathogens that have to be quantified. The relationships between spore release and weather have not yet been determined as this requires multi-year study.

Significant progress was made in identifying promising tools to help manage GTDs in Ontario vineyards. Researchers first confirmed that fungal isolates collected from diseased grapevines were capable of causing disease under greenhouse conditions, ensuring that they were appropriate targets for testing disease management strategies. These validated pathogens were then used to evaluate a range of chemical and biological control products.

Several commonly used fungicides were tested against GTD fungi in laboratory studies. Among the products evaluated, Cabrio and Pristine consistently provided the strongest suppression of fungal growth across multiple disease-causing species. These results helped identify the most promising chemical options for further testing.

A large screening effort was also conducted to assess the potential of beneficial fungi as biological control agents. Twelve beneficial fungal species were tested against ten different GTD pathogens. Several *Trichoderma* species demonstrated strong and consistent ability to inhibit pathogen growth and emerged as leading candidates for future development. Additional biological control candidates isolated from Ontario vineyards were incorporated into the screening program to expand the pool of potential management tools.

Based on these results, the most effective chemical and biological treatments were shortlisted for further evaluation. This work supports the project's goal of developing practical and sustainable management strategies for grapevine trunk diseases. Selected products will now be tested under greenhouse and field conditions at the AAFC Jordan Farm to determine their effectiveness under commercial production settings. Future work will also investigate whether

combinations of biological control agents can provide enhanced disease suppression compared with individual treatments.

In addition to research activities, several knowledge-transfer and outreach efforts were carried out to share findings on grapevine trunk diseases with the grape industry. These included presentations at the 13th International Workshop on Grapevine Trunk Diseases (June 2025) and the Ontario Fruit and Vegetable Convention (February 2026), where posters highlighted ongoing work on vineyard surveys, as well as potential biological and chemical control strategies. Additional outreach included a stop on the Grapevine Research Tailgate Tour (August 2025) and a field workshop with Mark Sosnowski (February 2026) focused on disease identification, pruning practices, and trunk disease management. Results were also shared through a published abstract in *Phytopathologia Mediterranea*, a webinar on the national status of GTDs hosted by the Canadian Grapevine Certification Network (May 2026), and a student poster award-winning presentation on biocontrol approaches. Overall, these activities helped communicate research findings and provide practical guidance to support improved management of grapevine trunk diseases in Canadian vineyards.

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?

Understanding when the majority of inoculum is present will help growers with knowing the best time to prune their vines to avoid infection by GTDs and maximize the longevity and productivity of their grapevines. The research is also identifying effective chemical and biological products that can help prevent or reduce GTD infections. Together, these findings will support more sustainable and cost-effective disease management strategies, helping growers reduce vine losses, extend vineyard lifespan, and maintain stable production.

In addition to the research itself, strong knowledge-transfer and outreach activities are helping ensure that results are accessible and useful to the industry. Findings have been shared through grower workshops, field demonstrations, industry conferences, webinars, and posters, helping bridge the gap between research and on-farm practice. These efforts support growers in adopting improved disease monitoring and management strategies more quickly and effectively.

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

- Poster: **On the hunt for grapevine trunk diseases: A preliminary survey of vineyards in Ontario, Canada** at the 13th International Workshop on Grapevine Trunk Diseases, June 21-24, 2025 and at Ontario Fruit and Vegetable Convention, Feb 18-19, 2026
- Stop on the Grapevine Research Tailgate tour, August 22, 2025
- Field workshop with Mark Sosnowski to demonstrate what to look for re trunk disease and pruning strategies. Feb 20, 2026
- Two posters titled “**Potential biocontrol for grapevine trunk diseases in Ontario**” and “**Potential chemical control of grapevine trunk diseases in Ontario**” were presented at the 2026 Ontario Fruit and Vegetable Convention. The poster on biocontrol approaches was awarded 3rd place in the student poster competition.
- An abstract published in Phytopathologia Mediterranea (64(3): 480). <https://doi.org/10.36253/phyto-16743>
- A webinar on the national status of grapevine trunk diseases (GTDs) in Canada was hosted by the Canadian Grapevine Certification Network (CGCN) on May 5, 2026. The webinar highlighted recent research findings, disease monitoring activities, and management strategies for the Canadian grape and wine industry: <https://youtu.be/4avrTJ5Iz0w?si=PGz-ktQtPwPLxYxO>