Activity 21

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2019-2020 Executive Summary (Plain Language)

The long term economic viability of the grapevine industry relies on healthy planting material and effective disease management strategies in vineyards. Nowadays, grapevine trunk diseases (GTD) are considered one of the most important biotic factors limiting both grapevine production and vineyards' lifespan not only in Canada but worldwide. Currently, no chemical/biological products are registered in Canada against GTD fungi. In addition, there is a lack if information of the best cultural practices that can be used to minimize the impact that these diseases have on vineyards under Canadian environmental conditions. Accordingly, the overall objective of this research project is to develop and implement effective management strategies against GTD in both young and mature vineyards in Canada. Within this main objective we also aim to investigate the health status of ready-to-plant grapevine nursery material in Canada regarding GTD pathogens and to better understand different stress conditions that may contribute to disease development in young vineyards. Significant progress has been made in all the objectives during 2019-2020 work year.

1. **Management of GTD in nurseries and young vineyards.**
   The Plant Pathology laboratory at the SuRDC have successfully implemented a specific and sensitive molecular tool that allows the absolute quantification of five of the most important GTD fungal pathogens present in grapevine nursery material. This tool is based on a recently developed technology known as droplet digital PCR (ddPCR). Results showed GTD fungal pathogens to be present in a high percentage of plants tested though pathogen amounts varied among plants and parts of the plant tested (roots, rootstock basal end, graft-union, scion). Results also showed GTD fungi to be detected from both asymptomatic and symptomatic grapevine tissues.
   Two greenhouse experiments are currently underway to determine the role that abiotic (water stress) and biotic (nematodes) stress factors may play on GTD symptoms' development in young vines. In addition, both experiments are also evaluating the use of arbuscular mycorrhizal fungi (AMF) to potentially mitigate stress factors conditions.
2. **Management of GTD in mature vineyards.**
   The Plant Pathology laboratory at the SuRDC has successfully identified and characterized eight different species in the genus *Trichoderma* and tested their potential use as biocontrol agents against GTD fungi. A field trial was completed during the 2019-2020 work year in which different chemical products and biological control agents (BCA) were tested for the control of GTD under British Columbia natural environmental conditions. Results from this first year trial are very promising. One commercial chemical product (tebuconazole-based), one commercial organic product (polymer-based) and one commercial BCA (*Trichoderma*-based) product showed very good control for up to 60 days after application. In addition, three *Trichoderma*-based products using native organisms from BC showed similar or better control than the commercial products tested. These results advance towards data generation needed for product registration in Canada.

The fourth year of a remedial surgery trial was completed during the 2019-2020 work year. This is an ongoing trial conducted in three vineyard blocks (Chardonnay, Pinot Gris, Pinot Noir) to evaluate the success rate of retraining vines infected with GTD. To date, successful results have been obtained with 100% survival of re-trained. This trial will continue during the 2020-2021 work year and can be a successful cultural practice to be implemented under BC conditions.