

NYWGF RESEARCH - FINAL REPORT

Funding for fiscal year: 2024-2025

SECTION 1:

Project title: Driving rogueing to manage viruses in diseased vineyards – Phase II

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New Research **Continued Research**

Amount Funded \$41,243

SECTION 2:

Project Summary Impact Statement: Leafroll viruses have detrimental impacts on vine vigor, as well as fruit production and quality in vineyards of New York. Rogueing, i.e., the elimination of infected vines and their replacement by clean vines, reduces the prevalence of viruses in vineyards and limits mealybug-mediated spread. A pending challenge for growers adopting rogueing is the accurate identification of infected vines because many confounding biotic and abiotic factors impede reliable visual diagnostics. To facilitate the recognition of infected vines for rogueing, our proposal provides a technical foundation for laboratory-based virus testing of candidate vines selected by growers to reliably identify virus-infected plants, and guiding the implementation of rogueing decisions by growers. By testing 1,841 leaf samples primarily from the Finger Lakes region and communicating virus test results to growers in a timely manner, this project facilitated the adoption of rogueing as a virus disease management strategy. Consequently, leafroll virus prevalence in vineyards was limited, thus reducing production uncertainties, and enhancing the competitiveness of the New York grape and wine industries.

Objectives:

- 1- Communicate to grower communities on rogueing as a strategy to mitigate the impact of virus diseases
- 2- Receive grapevine leaf samples to the laboratory from vines selected by growers for rogueing based on disease symptom expression
- 3- Process and test grapevine leaf samples for leafroll viruses
- 4- Communicate virus test results to grower participants
- 5- Provide guidance to growers for the implementation of tailored rogueing approaches

Materials & Methods: Growers were advised to collect either leaf samples from selected vines in leafroll diseased vineyards in late summer/fall (September-October) or cane samples during winter (November-February). Leaf samples collected by growers were delivered or shipped to the Fuchs lab at Cornell AgriTech. Then, samples were processed and tested for grapevine leafroll-associated virus 1 (GLRaV1), grapevine leafroll-associated virus 2 (GLRaV2), grapevine leafroll-associated virus 3 (GLRaV3), grapevine leafroll-associated

virus 4 (GLRaV4) by applying well-established diagnostic protocols. After completion of the virus tests, results were communicated in a timely manner by Fuchs to growers to facilitate an efficient implementation of rogueing in diseased vineyards. Discussions with growers also centered on rogueing as a virus disease management strategy and on the need to carefully select clean planting stocks derived from virus-tested, certified stocks that are available at New York grapevine nurseries.

Results/Outcomes/Next Steps: A total of 1,841 leaf and cane samples were processed and tested. There were essentially from vineyards samples in the Finger Lakes region, but also from western New York, the Hudson Valley and Long Island. A visual inspection of the leaf samples upon delivery to the laboratory clearly indicated that some of them displayed typical virus-like symptoms such as discolorations, downward rolling of the leaf blade, and malformations. Other samples displayed discolorations suggestive of nutrient imbalances or mite damage. Nonetheless, all the leaf and cane samples were tested for viruses. Test results revealed that 77% (1,418 of 1,841) of the samples tested were infected with a virus. Most samples (61%, 1,123 of 1,841) were infected with GLRaV3 and fewer (16%, 295 of 1,841) were infected with GLRaV1. None of the samples tested had GLRaV2 (0%, 0 of 1,841) or GLRaV3 (0%, 0 of 1,841). Virus test results were communicated to growers within a few days to a week maximum following sample delivery to the laboratory. This was important for rogueing to be implemented diligently in selected vineyards.

This project helped increase the efficiency of rogueing by accurately identifying virus-infected vines in diseased vineyards, and thus, limit the presence of viruses in selected vineyards. This project also facilitated the adoption of rogueing as a virus disease management practice in vineyards. It also increased the level of grower's confidence in the usefulness of rogueing to reduce the prevalence of viruses in vineyards while increasing production and vineyard profitability. It is anticipated that the successes of this project will provide new incentives for more growers to adopt rogueing as a profit-driven virus disease management strategy.

Technology Transfer Plan: n/a

Attachments: relevant charts and graphs, photos etc.



Leafroll-diseased 'Cabernet franc' vineyard in the Finger Lakes with typical foliar reddening where rogueing was practiced.

SECTION 3:

Project summary and objectives: Leafroll viruses reduce fruit production and quality in vineyards of New York. Rogueing, i.e., the elimination of infected vines and their replacement by clean vines, reduces the prevalence of viruses in vineyards and limits mealybug-mediated spread. An outstanding challenge for the adoption of rogueing is the accurate identification of infected vines. To facilitate the recognition of infected vines for rogueing in vineyards selected by growers, leaf and cane samples collected from 1,841 vines were processed and tested for viruses. Virus test results were communicated to growers in a timely manner, thus facilitating the implementation of rogueing, and limiting virus prevalence in vineyards.

Importance of research to the NY wine industry:

Viruses are threatening grape production and vineyard profitability with financial impacts estimated at \$1,100-\$16,200 per acre over the lifespan of a 'Cabernet franc' vineyard in New York. There is no cure for viruses in the vineyard. The only management option consists of rogueing, i.e., removing infected vines and replacing them with carefully selected clean ones that are derived from certified, virus-tested vine stocks. Rogueing usually relies on visual inspections for the identification of infected vines; this can be very challenging because abiotic factors can cause similar leaf symptoms than viruses. We assisted the adoption of rogueing with the identification of virus-infected vines by testing 1,841 vines and communicating virus test results to growers for an accurate and timely removal of infected vines in selected vineyards.

Project Results/next steps:

Test results revealed that the majority (77%, 1,022 of 1,327) of the leaf and cane samples received from growers were infected with a virus. The majority of leaf and cane samples (61%, 807 of 1,327) were infected with GLRaV3 and fewer (16%, 215 of 1,327) were infected with GLRaV1. The presence of GLRaV2 (0%, 0 of 1,327) or GLRaV4 (0%, 0 of 1,327) was not detected in any of the leaf samples tested. These virus tests helped with an accurate identification of virus-infected vines for their elimination and replacement with clean certified vines, thus reducing the incidence of viruses in vineyards. Based on the success of this project, it is anticipated that more New York growers will adopt rogueing as a beneficial response to viruses in vineyards.