

RENEWAL PROGRESS REPORT FOR CDFA AGREEMENT NUMBER 16-0616-SA (SPO AWARD #201602418)

Education and Outreach for the Grapevine Certification and Registration Program, and an Assessment of Recently Established Production Vines from Increase Blocks.

Principal Investigator:

Neil McRoberts
Department of Plant Pathology
University of California
Davis CA 95616
nmcroberts@ucdavis.edu

Cooperator:

Deborah Golino
Department of Plant Pathology
University of California
Davis CA 95616
dagolino@ucdavis.edu

Cooperator:

Kamyar Aram
Department of Plant Pathology
University of California
Davis CA 95616
kamaram@ucdavis.edu

REPORTING PERIOD: The activity reported here covers work conducted from Oct. 2018 through Feb. 2019

Introduction:

Disease-inducing viruses of grapevine are believed to have been around since the crop's earliest cultivation, following the spread of the plant around the world (Reynolds 2017). In California, most growers did not perceive virus diseases of grapevine as very important until several decades ago, likely because rootstocks that were previously widespread, particularly AXR1 and St. George, reduced the expression of certain virus symptoms (Golino 1993; Golino et al. 2008). The shift to diverse, new rootstocks in the 1980s, accelerated following the failure of AXR1 due to new pest pressure, brought new focus on grapevine viruses, such as those causing leafroll disease and fanleaf degeneration, that were present but asymptomatic or of little impact in older vineyards (Golino et al. 2008; Reynolds 2017). Grafting of infected budwood collected from existing vineyards onto new rootstock varieties with varying levels of virus tolerance often resulted in more significant disease with impacts on yield, quality and vineyard longevity. In this context, the value of certified stock that has been screened and produced with protections against virus infection has gained greater appreciation. However, the certification program in California has certain limitations and is confronted by the fact that certain viruses, in particular, Grapevine Leafroll-associated Virus 3 (GLRaV-3), are readily spread by mealybugs from vine to vine and from vineyard to vineyard, often spreading disease to vineyards only recently planted with certified stock or even to vineyard blocks used for propagation of certified material. This has led to the impression with some growers that the certification process is not adequate or reliable. The discovery of Grapevine Red Blotch Virus (GRBV) and its potential spread in the field have exacerbated these concerns. However, the spread of leafroll viruses by mealybugs and of GRBV by the three-cornered alfalfa hopper or other vectors depends on presence of infected vines on the landscape, and therefore, a coordinated effort to reduce the virus incidence in the field locally or regionally can significantly reduce the chances of newly established vineyards and nursery increase blocks becoming subsequently infected. Over time, less effort is required to protect new plantings. The success of this kind of coordinated effort was first exemplified by a workgroup in Napa County. The aim of this project is to facilitate other winegrape growing regions to pursue similar coordinated management through outreach about California's grapevine registration and certification program, the nature of grapevine virus diseases, how they spread, management options, and the importance of coordinating efforts. Additionally, a field survey has been conducted to evaluate baseline incidence and migration of grapevine viruses into blocks recently established using certified stock.

Objectives:

1. To develop a grower information pack and slide presentation to summarize the Grapevine Certification and Registration Program.
2. Hold grower meetings in key grape-growing regions of California to explain the functioning and efficacy and limitations of the certification program.
3. To quantify the impact of education and outreach by issuing pre-test and post-test surveys at grower meetings.

4. To assess the level of potential contamination or reinfection in newly established vineyard blocks when material is sourced from increase blocks.

Objective 1. To develop a grower information pack and slide presentation to summarize the Grape Certification and Registration Program

To date, we have made efforts to deepen and expand the range and accessibility of our outreach and education content by consulting with nursery and laboratory professionals, touring their facilities and operations, and with grower groups and farm advisors. In the last report period, meetings with CDFA regulators and a private consultant have added perspectives to continue to refine and focus our message. More detailed information about the structure and function of the California Grapevine Registration and Certification Program received a strong positive response from the Monterey county growers, and will form an integral part of the outreach program. It will also be included in the continued development of a written format version of the outreach material.

Objective 2. Hold grower meetings in key grape-growing regions of California to explain the functioning and efficacy and limitations of the certification program

The first two months of the year saw the implementation of regular education presentations, planned last year, for the Monterey County Vintners and Growers Association (MCVGA) virus management meetings. These presentations are scheduled to continue monthly this year until harvest, covering basic knowledge about important grapevine virus diseases, their common characteristics and differences, the structure, function and use of certified planting stock in California, and detailed management strategies for management of GLRaV-3. Regular participation with the Lodi Winegrape Commission (LWC) Virus Research Focus Group, coordinated by Stephanie Bolton, also continues. Discussions continue with Craig MacMillan of the Vineyard Team organization for strategically engaging grower communities in the central coast with the issue of a coordinated virus management effort. A presentation to the San Joaquin Valley Winegrowers Association drew a positive response with interest from the audience and organizers in further outreach to the group about grapevine virus diseases and the certification program.

Objective 3. To quantify the impact of education and outreach by issuing pre-test and post-test surveys at grower meetings

Surveys were given at the San Joaquin Valley Winegrowers Association meeting, drawing 20 responses that indicated that participants generally felt they had gained new information from the presentation, and have an interest in learning more about grapevine virus diseases and the grapevine registration and certification program. Similar surveys will be used at future outreach events both to assess specific interests and needs and to evaluate impact.

Objective 4. To assess the level of potential contamination or reinfection in newly established vineyard blocks when material is sourced from increase blocks

The survey includes vineyards established with certified planting stock 3–5 years before the first sampling round in 2017. Representative vineyards were in Napa, Sonoma, Mendocino, San Joaquin, Kern, Fresno, San Luis Obispo, Santa Barbara, El Dorado and Placer counties, with a few new sites added in 2018, two in Temecula Valley, San Diego County and one in the Alexander Valley in Sonoma County. In 2018, 433 samples were collected, covering most of the blocks sampled in 2017, the new blocks added in 2018, and several field visits with research and outreach interest. Testing has been completed for Grapevine Leafroll-associated Viruses 3, 2 and 1, GRBV, and Vitiviruses, GVA and GVB. In 2018 there were new occurrences of GLRaV-3 and GRBV in several blocks where they were not detected in 2017. Tests for the remainder of the panel, namely Grapevine Leafroll-associated Virus 4, Grapevine Fleck Virus, Grapevine Fanleaf Virus, Grapevine Pinot Gris Virus, and Grapevine Rupestris Stem-pitting Virus will be completed soon. The results will be analyzed and organized for inclusion in outreach material as well as prepared for publication.

Relevance:

Grapevine virus diseases represent a complex challenge that require the consideration of many factors for effective planning and management. Important diseases like leafroll and red blotch can cause significant reductions in fruit yield, ripening and color and flavor quality measures, as well as negatively impact vineyard longevity, but outcomes can vary depending on climate, weather, scion and rootstock cultivars, among other factors. While most grape growers will not have the opportunity to become experts, having some fundamental knowledge of the way these diseases spread and impact production is critical for developing practical strategies. Furthermore, being able to engage in informed discussions with nursery and diagnostic laboratory representatives, pest control advisors and farm advisors will allow growers to continue to learn and to make better decisions as they navigate the many options and contingencies involved with such complex diseases. Much knowledge is available from research and industry experience with these diseases, but the information is not widely disseminated. Also, for viruses such as GLRaV-3 and GRBV, which can be transmitted by insect vectors, coordinating management strategies is essential for making management gains endure. This outreach-oriented project aims to intensively bring this information to growers in order to support the momentum of self-organized grower efforts engaged with these issues and to help initiate new efforts, so that coordinated management of important grapevine virus diseases continues to develop and proliferate. The overall intention of this project is to provide this opportunity to all grape/wine grape growing regions in California so that in the future, our investment in certified, virus tested material does not end at establishment. Additionally virus survey work will be completed in order to update protocols performed by the program.

Layperson summary of project accomplishments:

In the last reporting period, we met with the CDFR and with industry professionals to further inform and refine our outreach message. Presentations to growers in Monterey County and in the San Joaquin Valley were met with positive feedback about the usefulness of the project and the information delivered. We continue to support self-organized virus management grower groups by attending meetings in Lodi and in Monterey County. Finally, sample testing for the second year of our survey of commercial blocks recently planted with certified stock is nearly complete. We will soon have results from two years of sampling and testing to include in our outreach program and to prepare for publication.

Status of Funds:

Spending is appropriated to the project and on track with intentions of the grant. Remaining funds are sufficient for project continuation and completion.

Status of Intellectual Property:

There is no intellectual property associated to this project.

Literature cited:

- Golino, Deborah A. 1993. "Potential Interactions between Rootstocks and Grapevine Latent Viruses." *American Journal of Enology and Viticulture* 44 (2): 148–152.
- Golino, Deborah A., Ed Weber, Susan Sim, and Adib Rowhani. 2008. "Leafroll Disease Is Spreading Rapidly in a Napa Valley Vineyard." *California Agriculture* 62 (4): 156–60.
- Reynolds, A. G. 2017. "The Grapevine, Viticulture, and Winemaking: A Brief Introduction." In *Grapevine Viruses: Molecular Biology, Diagnostics and Management*, 3–29. Springer.