NAPA VALLEY GRAPEGROWERS
- ESTABLISHED 1975 -

Red Blotch Research

Background on research investments in red blotch

BRIEF HISTORY OF RED BLOTCH

1940

Leaves from a vine near Geyserville, Sonoma County are collected and preserved, reportedly by UC Davis ampelographer Harold Olmo.

2008

Napa Valley growers first notice unusual red leaf coloring and poor fruit ripening in the field.

2012-13

First presented in October 2012 at the ICVG virus conference at UC Davis. Al Rwahnih et al. then publish the first paper linking a DNA virus to red blotch disease in California (Phytopathology, 2013). A closely related virus had been reported in New York a year earlier under a different name.

2014-15

AVF begins funding red blotch work in 2014 (Kent Daane's vector search, continuing 2013 Napa County funds); the CDFA PD/GWSS Board takes over that project in July 2015, its first documented red blotch grant. Separately, in **May 2015 NVGG directs its own $19,100 through AVF to UC Davis/UCCE red blotch trial**, under a bilateral agreement outside AVF's standard RFP process.

2015

Retrospective testing of the preserved 1940 sample confirms the virus had been present for at least 75 years before it was recognized.

2016-23: Confirming a Vector

UC Davis's Zalom lab and USDA-ARS's Sudarshana first prove in 2016, under greenhouse conditions, that the three-cornered alfalfa hopper (Spissistilus festinus) transmits GRBV (Phytopathology, July 2016). Cornell's Fuchs lab confirms the same transmission in an actual vineyard for the first time in 2023 (Flasco et al., Viruses).

2017-21: Russell Ranch

Planted in 2009 as UC Davis's own foundation vineyard, source of certified clean mother vines for California's nursery system, RRV tests clean every year since 2013. On Dec 20, 2017, FPS finds 5 of 4,132 vines infected (0.1%) via field transmission, not a bad batch. Despite a 2018 test-to-order policy, added inspections, and vector spraying, incidence still climbs to 0.5% (2018), 7.1% (2019), and 18% (2020, when FPS halts RRV distribution entirely), reaching an estimated 51.6% by 2021. Conventional tools couldn't stop it.

2022-23: A $5.25M Fix

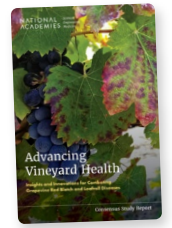
Four grower-funded California boards and commissions fund a $5.25M, 14,400-sq-ft insect-proof greenhouse to physically wall off FPS's clean grapevine collection from vector-borne spread, completed end of 2023 with capacity for half the vines the open vineyard held. The National Clean Plant Network also supports.

2024: NVG ROOTSTOCK

NVG devotes its Nov. 19 annual ROOTSTOCK conference, titled "Red Blotch and Red Leaf Viruses," to both diseases. Seven sessions span vector biology, grower communication, and wine-quality impacts; Cornell's Marc Fuchs and UCCE's Monica Cooper both recommend zonal roguing, clearing vines within 20-30 ft of a hotspot. Seminal offering from NVG, still referenced in current reporting.

2025: The NASEM Report

At CDFA's request, the National Academies of Sciences, Engineering, and Medicine publish "Advancing Vineyard Health," reviewing the PD/GWSS Board's own RFP process and the state of red blotch and leafroll research. It's funded through that same Board's assessment fund, which has collected $83.1M total since 2001 for grapevine disease research.



Sources: Al Rwahnih et al., "Association of a DNA Virus with Grapevines Affected by Red Blotch Disease in California," Phytopathology 103(10), 2013; "First Report of Grapevine Red Blotch-Associated Virus in Archival Grapevine Material From Sonoma County, California," Plant Disease journal; CDFA PD/GWSS Board interim report, "Searching for Potential Vectors of Grapevine Red Blotch-Associated Virus" (agreement 15-0428-SA), Kent Daane, April 2018; UC ANR Bug Squad, "Meet the Researchers and the Three-Cornered Alfalfa Hopper," on the 2016 Zalom/Sudarshana greenhouse transmission study (Phytopathology, July 2016); Flasco et al., Cornell Fuchs Lab blog, "The Three-Cornered Alfalfa Hopper Is a Vector of Grapevine Red Blotch Virus in Vineyards," May 8, 2023, and Flasco et al., Viruses, 2023; Flasco et al., "Distinct Red Blotch Disease Epidemiological Dynamics in Two Nearby Vineyards," Viruses 15(5):1184, 2023; Klaassen and Al Rwahnih, "Spring qPCR Provides Early Detection of Grapevine Red Blotch Virus Infection in Cabernet Franc Sentinel Vines," Phytopathology, 2026; "Red Blotch Detected on Russell Ranch Grapevines," American Vineyard Magazine; Golino and Al Rwahnih, FPS customer letter on GRBV, Oct. 14, 2020; Monis, "Update on Grapevine Plant Quarantine and Certification Programs," The Grapevine Magazine, May 26, 2026; UC Davis CA&ES, "UC Davis to Build New $5.25M Greenhouse to Protect U.S. Grapevine Collection"; National Academies of Sciences, Engineering, and Medicine, "Advancing Vineyard Health," 2025; Napa Valley Grapegrowers, napagrowers.org/red-blotch.html; NVG's internal 2024 ROOTSTOCK agenda and presentation summaries (Nov. 19, 2024); and the NVGG-AVF Grant Agreement, "Economics of Red Blotch Trial," countersigned June 8, 2015. Olmo's role is from a secondary account and should be confirmed against the original text.

Multiple channels currently fund Red Blotch research

PD/GWSS Board (CDFA)

$14.2M

Directed to grapevine diseases beyond Pierce's Disease, including red blotch and leafroll, since 2010: the year this funding category began.

28 of 60 grants funded between July 2015 and July 2023 targeted red blotch specifically.

Separately, the Board has directed $43.5M to Pierce's Disease and GWSS research alone since 2001, funded by an $83.1M industry assessment collected since 2001. Current assessment rate is $1.25/$1,000 in crop value.

PD/GWSS Board: Funding Priorities

- Pierce's disease and its vectors, GWSS, etc.
- Brown marmorated stink bug
- Grapevine fanleaf disease
- Grapevine leafroll disease
- Grapevine red blotch disease
- Mealybug pests of winegrapes
- Spotted lanternfly

2024 Red Blotch Awards

Transmission of Grapevine Red Blotch Virus and Behavior of its Insect Vector
M. Fuchs, Cornell University — $132,282

Development and Validation of Hiplex Assays for Improved Detection of GLRaVs and GRBV in Grapes
M. Al Rwahnih, UC Davis — $195,802

Ecology of Grapevine Red Blotch Virus Disease
R. Almeida, UC Berkeley — $107,257

Plant-Level Early and Autonomous Field-Detection of Virus Infections in White and Black Grape Vines
L. Brillante, CSU Fresno — $397,017

2024 Total Newly Awarded: $832,358

2025 Red Blotch Awards

Virus-Based Delivery of Interfering RNAs Targeting Grapevine Leafroll-Associated Virus(es) and Grapevine Red Blotch Virus
Y-W. Kuo, UC Davis — $437,326

Transmission Ecology of Grapevine Red Blotch Virus Genetic Clades
R. Almeida, UC Berkeley — $165,914

Evaluating the Impact of dsRNA-Induced Silencing of Four C1-Protein Interactors on GRBV Activity in Infected Grapevine
L. Deluc, Oregon State University — $89,924

2025 Total Newly Awarded: $693,164

2024/2025 award amounts are total funding for 1-3 year grants, not annual figures.

AVF is the other major channel funding Red Blotch research

American Vineyard Foundation (AVF)

Grower-directed, since 1978

In 2013, AVF provided lead funding — with other industry donors and the CA Grapevine Rootstock Research Foundation, over $250,000 combined in year one — for the first research identifying and characterizing red blotch, led by Marc Fuchs (Cornell) and Mysore Sudarshana (USDA–ARS/UC Davis).

Industry-identified research priorities:

- **Viruses:** Red Blotch, Leafroll, and their vectors
- Changing environment: heat and water-stress impacts on yield/quality
- Vineyard sustainability: water, input efficiency, labor, chemicals
- Wine sensory-to-chemistry relationships
- Improved winemaking practices
- Winery sustainability

Note: AVF is not accepting Pierce's Disease/GWSS proposals for the 2025–26 cycle

Proposals reviewed by five standing panels:

- Breeding & Genetics
- Cultural Practices
- Disease & Pest Management
- Enology
- Outreach & Education

Coordinates research funding with:

- CA Table Grape Commission
- CA Grape Rootstock Improvement Commission
- CA Grape Rootstock Research Foundation
- CDFA PD/GWSS Board
- Oregon Wine Board
- Washington Winegrape Commission

AVF-Funded Red Blotch Research, 2013–2025

Year(s)	Project & Investigator
2013	Biology & Spread of the Virus M. Fuchs (Cornell), K. Perry, D. Golino
2013	Insect Vector Transmission Trials K. Daane
2013	Symptom Development & Fruit Maturity R. Smith, M. Cooper, M. Sudarshana
2013	Impact on Grape & Wine Composition A. Oberholster, UC Davis — includes NVG's 2015 $19,100 grant (see earlier slide)
2015	Nutrient Transport & Photosynthesis D. Smart
2016	Vine Nutrition in Infected Vines R. Smith, M. Cooper, M. Sudarshana
2017	Virus Spread & Vector Ecology M. Fuchs, Cornell — flags three-cornered alfalfa treehopper as a likely vector
2018	Red Blotch & Deficit Irrigation A. KC
2021	GMO-Free RNA Interference Approach L. Deluc
2024	Building Community Resilience & Collaboration M. Cooper & M. Hobbs, UCCE Napa (AVF #2024-2746)
2025	Spatial-Temporal Impact of Red Blotch L. Brillante, CSU Fresno (AVF #2025-2964)

Other channels: federal, state, and university sources, outside PD/GWSS and AVF

CDFA Biologically Integrated Farming Systems (BIFS) Program

$1,000,000

Announced Oct. 9, 2026 by CDFA's Office of Pesticide Consultation and Analysis: a 4-year award for an area-wide monitoring system for grapevine red blotch and leafroll disease using hyperspectral imaging to detect both remotely at scale — internally called "HYPERVID" by the project team.

Luca Brillante, Ph.D. (Bronco Wine Co. Chair in Viticulture, CSU Fresno) — the same PI behind the 2025 AVF-funded $78,000 red blotch grant on the previous slide, now running two separately funded red blotch projects through two different channels.

Cornell Red Blotch Epidemiology Study (2023)

"Distinct Red Blotch Disease Epidemiological Dynamics in Two Nearby Vineyards" — M. Flasco, E. Cieniewicz, S. Pethybridge, M. Fuchs (Cornell University & Clemson University; *Viruses*, 2023). Tracked virus spread in two Napa County vineyards, including St. Supery Estate, pointing to infected planting material as the main initial source.

Funding acknowledged in the paper:

- American Vineyard Foundation, grant 2015–1515 (the same Fuchs "Biology & Spread" project listed on the AVF slide)
- CDFA Pierce's Disease Control Program
- USDA–NIFA Federal Capacity Funds
- Cornell AgriTech Venture Funds

Seminars, outreach, and advocacy

- **2015:** NVG directs $19,100 through AVF to a UC Davis/UCCE red blotch trial, under a bilateral grant agreement outside AVF's standard RFP process — likely Dr. Anita Oberholster's (UC Davis) multi-year study on GRBaV's impact on grape and wine composition and quality, with UCCE's Monica Cooper.
- **Nov 2024:** NVG devotes its entire ROOTSTOCK conference, "Red Blotch and Red Leaf Viruses," opened in memory of former FPS director Dr. Deborah Golino
- **Apr 2026:** NVG's Red Blotch Grower Field Day at Beckstoffer Vineyards draws 70+ attendees, including five UC Davis staff and a PhD researcher.
- **Standing resources:** NVG maintains a dedicated Red Blotch page on its website (napagrowers.org/red-blotch.html), hosting recorded ROOTSTOCK sessions and ongoing program updates for growers. Multiple podcast episodes featuring Red Blotch. Red Blotch white paper in progress.
- **Advocacy:** NVG's Board signs a letter urging $2M in Congressionally Directed Spending toward red blotch through USDA APHIS (Feb 2026); Dr. Montpetit briefs the CA Senate Select Committee on the Wine Industry and NVG meets CAWG leadership on red blotch funding interest (Mar 2026); NVG joins NVV's Linda Reiff to meet CDFA Secretary Karen Ross, advocating for state and federal resources toward red blotch research (Aug 2026).