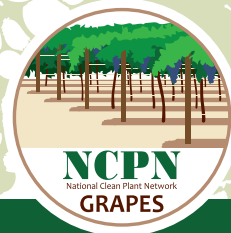


FACT SHEET

National Clean Plant Network



Start clean, stay clean.

Grapevine Vein Clearing and Vine Decline Disease

What is Grapevine Vein Clearing and Vine Decline Disease?

Grapevine vein clearing and vine decline disease is becoming a serious problem in vineyards in the Midwest and Upper South. This disease was first observed in regional vineyards over 30 years ago, but was misidentified as a disease caused by *Grapevine fanleaf virus* (GFLV) based on observations and the analytical methods of the period. A comprehensive investigation of the disease and associated pathogens was started in 2004. In these studies, symptomatic vines were extensively tested for GFLV and *Tomato ringspot virus* (ToRSV). A close association between these viruses and disease was not observed. In 2009, next generation sequencing technology was applied in the screening of potential viruses in symptomatic vines and a new virus was found to be associated with the disease.

What are the symptoms?

As new shoots emerge from the dormant buds, margins of some leaves split and become crinkled. Veins appear translucent on the deformed leaves and also on normal leaves. In early June, young leaves show translucent major and minor veins. Affected leaves are smaller than healthy leaves and frequently misshaped. A mosaic pattern of green tissues and chlorotic or yellowing tissues first appears on mature and fully expanded leaves. Affected shoots have short zig-zag internodes. In July and August, short internodes become more pronounced. Mosaic and deformed leaves continue to develop on affected vines. Severely affected vines display reduced vine size over time which results in a less dense canopy than in healthy vines. Cluster size is reduced and some berries have an irregular shape and abnormal texture. In extreme cases, cordons or entire vines die from the infection.

How is it detected?

GVCV can be detected by a polymerase chain reaction assay that is commonly used in many diagnostic labs.

Known Susceptible cultivars:

Chardonnay, Chardone, Vidal Blanc, Traminette, Cayuga White, Cabernet Sauvignon, Cabernet Franc, Valvin Muscat, Zinfandel, and Merlot. More may be added as testing continues.

What kind of virus is it?

Grapevine vein clearing virus (GVCV) is a new DNA virus, the first DNA virus discovered in grapevine (most grapevine viruses are RNA viruses). It is a new species in the *Badnavirus* genus, *Caulimoviridae* family. GVCV is closely associated with the vein-clearing symptom. It has not been verified that GVCV is the sole causal pathogen of the disease.



Translucent vein clearing on young leaves.
Photo: Wenping Qiu, Missouri State University.



Short, zig-zag internodes on shoots.
Photo: Wenping Qiu, Missouri State University.

How does it spread?

GVCV spreads primarily through propagation of infected cuttings and buds. Grafting transmits GVCV quickly. Severe symptoms showed up on the grafted Chardonnay within three months after grafting. It is possible that the virus may also be spread by an insect vector. Disease incidence has been observed to increase over time. No insect vectors have been identified.



Decline of vine size and less dense canopy on a severely affected Vidal Blanc vine.
Photo: Wenping Qiu, Missouri State University.



Reduced cluster size and deformed berry shape on a severely affected Vidal Blanc vine.
Photo: Wenping Qiu, Missouri State University.

Where can I find GVCV-tested materials?

Mother grapevines of Norton, Chambourcin, Chardonnay, Vignoles, Vidal Blanc, Cayuga White and Traminette at the Missouri State University Foundation Vineyard have tested negative for the presence of GVCV. Tested dormant and green cuttings are available from the Missouri State Fruit Experiment Station at Mountain Grove, Missouri. Testing is in progress for vines in the new Russell Ranch Foundation Vineyard at Foundation Plant Services, UC Davis and also in other Grapevine Clean Plant Centers.

References:

Zhang, Y., Singh, K., Kaur, R., and Qiu, W. 2011. Association of a novel DNA virus with the grapevine vein-clearing and vine decline syndrome. *Phytopathology* 101:1081-1090.

Qiu, W. P., Avery, J. D., and Lunden, S. 2007. Characterization of a severe virus-like disease in Chardonnay grapevines in Missouri. *Plant Health Progress* doi:10.1094/PHP-2007-1119-01-BR.

NCPN GRAPES

The National Clean Plant Network for Grapes is an association of clean plant centers, scientists, educators, state and federal regulators, and nurseries and growers from the wine, table, raisin and juice grape industry concerned with the health of grapevine budwood and rootstock.

It was established in 2008 and is part of the NCPN specialty crops network. The network operates under the umbrella of the United States Department of Agriculture (USDA).

There are five grapes clean plant centers located in California, Florida, Missouri, New York and Washington.



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