

## VIRUS SPREAD

Spread of GRBV in vineyards has been documented in Oregon and California.

The pattern of spread suggests that the vector is a flying insect.



Photo from bugguide.net

Three cornered alfalfa hopper (*Spissistilus festinus*)



Photo from bit.ly/2ad7F9p

- Vector transmission trials at UC Davis demonstrated transmission of GRBV by the three cornered alfalfa hopper in 20% (3/15) test plants.
- Research continues in several U.S. labs to determine if other vectors exist.
- The detection of the virus in an insect does not show that it is a vector.

## IMPACT OF GRBV ON FRUIT QUALITY

Red blotch disease can result in a significant reduction in sugar accumulation – up to 5 °Brix has been reported. In Oregon, °Brix reductions ranging from 0-5 have been observed and varies depending on variety, rootstock and location.

Uneven ripening, or failure to ripen, have been observed in Cabernet franc, Pinot noir and Syrah in Oregon, which has resulted in off flavors or unripe fruit. Several vineyard blocks in the Willamette Valley and Southern Oregon have been removed due to poor fruit quality caused by GRBV infection.

## MANAGING THE DISEASE

Nothing is more important than starting with vines that are not infected or termed “clean” in a virus management program. Once virus infected, a vine cannot be cured in the field.

- **Start clean!** When starting a new vineyard, purchase certified grapevines from reputable nurseries. Establishing a vineyard is a long-term investment, and certified plant material can cost more. Ask the nursery for its testing records. Does the nursery have traceability back to tested vines? Don't be afraid to ask questions of the nursery!

People are the most efficient vector of grapevine viruses as they can move the viruses over great distances in a very short period of time.

- If you suspect you have GRBV in your vineyards, get it tested; **test – don't guess.**

### MORE INFORMATION

**National Clean Plant Network for Grapes**  
Fact sheets on Red Blotch, Leafroll, and Vein Clearing Viruses and Crown Gall.  
Online: [bit.ly/2azNVAI](http://bit.ly/2azNVAI)

**The American Phytopathological Society**  
*Grapevine red blotch-associated virus, an emerging threat to the grapevine industry.* Sudarshana, M.R., Perry, K.L. and Fuchs, M.F. (2015). Photos showing GRBV look alikes.  
Online: [bit.ly/2akl69k](http://bit.ly/2akl69k)

**IPM eAcademy video series**  
Grapevine Red Blotch – What you need to know  
Online: [bit.ly/1OTKsU1](http://bit.ly/1OTKsU1)

### TESTING FACILITIES

- Agri-Analysis – CA
- Eurofins STA Laboratories – CA
- ELISA Lab WSU – Prosser, WA
- OSU Plant Clinic – Oregon State University, OR
- Plant Health Program – Oregon Department of Agriculture
- **Research Related Testing**  
USDA-ARS, Corvallis, OR  
WSU, Prosser, WA

USDA-ARS Horticultural Crops Research Unit  
Robert R. Martin & Grapevine Improvement Committee  
3420 NW Orchard Ave, Corvallis, OR 97330

Oregon Department of Agriculture  
Market Access & Certification Program  
635 Capitol St NE, Salem, OR 97301  
[www.oregon.gov/ODA](http://www.oregon.gov/ODA) — (503) 986-4620

## GRAPEVINE RED BLOTCH DISEASE



Photo from [apps.caes.uga.edu/gafaces](http://apps.caes.uga.edu/gafaces)

Symptoms of grapevine red blotch virus in pinot noir (note reddened veins). Photo courtesy of R.R. Martin, USDA-ARS.

### WHAT YOU SHOULD KNOW ABOUT

*Grapevine red blotch virus (GBRV)*

Grapevine red blotch disease (GRBD) was first recognized as a new disease of grapevines in Napa Valley, California approximately ten years ago.

The disease is caused by Grapevine red blotch virus (GBRV). GRBD has been confirmed in all grape growing regions of Oregon and in the major grape producing states in the United States.

- Red-fruit cultivars often have red veins on symptomatic leaves, but they can remain green.
- GRBV symptoms are easily confused with symptoms of Grapevine leafroll viruses.
- GRBV does not cause leaves to roll downward as observed with Grapevine leafroll infection.
- Not all leaves on symptomatic vines show similar levels of symptoms.



**Oregon**  
Department of Agriculture



## SYMPTOMS IN RED-FRUITED VARIETIES



Symptoms of GRBV in Cabernet franc late in season showing severe reddening of the leaf blade with green veins (*Photo courtesy of R.R. Martin*).



Grapevine leafroll virus symptoms in Merlot showing reddening of the blade, green veins, and downward rolling of the leaves (*Photo courtesy of R.R. Martin*).



Uneven ripening of fruit in Cabernet franc infected with GRBV (*Photo courtesy of R.R. Martin*).

## SYMPTOMS IN WHITE-FRUITED VARIETIES



Chardonnay leaf with progressive symptoms: chlorosis in September (above) and necrosis in October (below). (*Photo courtesy of R. Smith, UCCE*).



Chardonnay leaf showing downward rolling of the leaves in a vine with Grapevine leafroll (*Photo courtesy of R.R. Martin*).

## HOW TO CONFIRM VIRUS

- Nursery owners and vineyard managers should test for the virus rather than depend on symptom development.
- Symptoms can be delayed and in white-fruited varieties symptoms are very difficult to discern.
- Abiotic stress such as magnesium deficiency or drought can produce similar symptoms.

## TEST, DON'T GUESS

- Two sets of PCR primers used together detect all known isolates of GRBV. PCR is the only method to confirm the presence of GRBV.
- PCR detection is relatively expensive but efficient method of virus detection.



Symptoms of Magnesium deficiency (above) and drought stress (below) (*Photo courtesy of R.P. Schreiner, USDA-ARS*).

