

Growing vines in sites infested with *Xiphinema index*

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Rhonda Smith
UCCE Viticulture Farm Advisor
Sonoma County

UC | University of California
CE | Agriculture and Natural Resources | Cooperative Extension

Plant parasitic nematodes Non-segmented, microscopic roundworms

***X. index*:**

Vector of grapevine fanleaf virus,
the causal agent of grapevine
fanleaf disease

- Virus is bound to esophagus lining in *X. index*
- Virus particles are lost at molt, do not pass through egg stage
- do not replicate inside nematode

*Xiphinema
index*



Image: courtesy of H. Ferris

Sauvignon blanc with fanleaf degeneration

Abnormal leaf shapes (“fanleaf deformation”)
Small internodes resulting in shorter shoots and bushy appearance



Three leaf symptoms

1. Vein banding



2. Fan shaped leaf blades

Photos: A. Walker

3. Yellow mosaic leaf symptoms in the spring



Yellow mosaic



Reduced fruit set



General guidelines: Sampling for nematodes in an established vineyard

- Collect soil samples that contain feeder roots
 - In the vine row; 12"-18" from the trunk
- Sample depth is at least 18". Remove the top 3".
- Divide the vineyard block into zones that have similar vine growth or soil texture.
- Within each zone, collect soil + roots from each of 5 randomly selected vines; a composite sample should be ~1 Qt (1 liter)
- Use a separate plastic bag for each composite sample
- Label each bag; call the lab for specifics

Sample timing and challenges

- Mid October to mid February (highest populations)
 - Moist soil; ideally after soil has drained
- Large variability in population density exists within a vineyard block at any time during the year.
- Nematodes can aggregate and vary between two adjacent vines.

UC ANR Publication 3343, Grape
Pest Management, 3rd edition

Once a vineyard has fanleaf degeneration, it will always be diseased and crop will be reduced each year

- When diseased vines are pulled, remaining roots provide a reservoir for the virus
- Complete decay of remnant roots is thought to take many years and *X. index* can survive on those roots
- When the site is replanted, the new vines will become infected and eventually show disease symptoms

Sonoma County vineyard fumigation permits

- Records search for Telone use permits in past six years (January 1, 2012 to February 2, 2018)
 - Average of 8 applications of Telone per year
 - Average treatment area is 11 acres per application.
- No Methyl Bromide applications have occurred for at least 10 years.

Source: Sonoma County Agricultural Commissioner

GRN Rootstocks

| | Root lesion Nematode | Citrus Nematode | Ring Nematode | Phylloxera Nodosities |
|-------|----------------------|-----------------|---------------|-----------------------|
| GRN-1 | MR | R | R | HR |
| GRN-2 | MR | MS | MS | HR |
| GRN-3 | MR | MR | MR | R |
| GRN-4 | MR | MR | MR | R |
| GRN-5 | MR | MR | R | MS |

All GRN rootstocks are resistant to *Xiphinema index* and 3 strains of root-knot nematodes

Ferris, Zheng and Walker. 2012. Journal of Nematology 4(4)

| | GRN Rootstock Parentage |
|-------------|---|
| GRN1 | <i>V. rupestris</i> x <i>V. rotundifolia</i> 'Cowart' |
| GRN2 | (<i>V. rufotomentosa</i> x (Dog Ridge x Riparia Gloire)) x Riparia Gloire |
| GRN3 | (<i>V. rufotomentosa</i> x (Dog Ridge x Riparia Gloire)) x <i>V. champinii</i> c9038 |
| GRN4 | (<i>V. rufotomentosa</i> x (Dog Ridge x Riparia Gloire)) x <i>V. champinii</i> c9038 |
| GRN5 | (Ramsey x Riparia Gloire) x <i>V. champinii</i> c9021 |

Rootstock Trial in Cabernet Sauvignon

Site: South end of Geyserville
Planted: 2012
Soil: Yolo loam
Spacing: 10 ft x 7 ft
Trellis: Modified vertical shoot positioned
Training: Bi-lateral cordon trained, spur pruned
Design: Randomized complete block, 8 replications of 11 rootstocks using 5-vine plots

Rootstock Trial, Alexander Valley, 2017



Rootstock Trial, Alexander Valley, 2017









