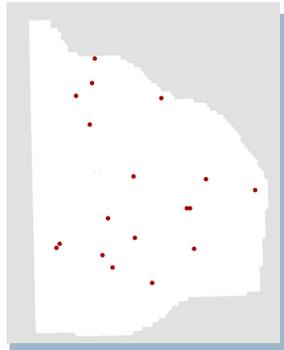


Grapevine Red Blotch Disease (GRBD) Ecology

A RANDOM INFECTIONS

Low disease pressure from distant source of inoculum

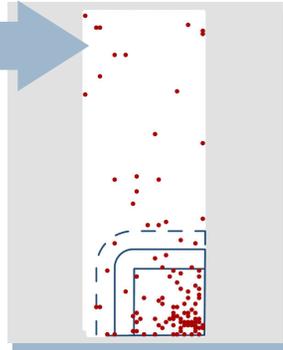


Random pattern - Slow disease spread

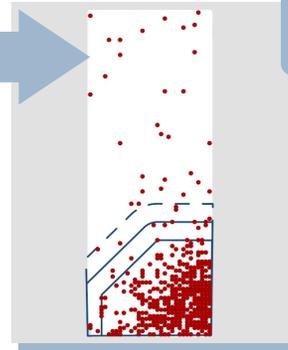
B AGGREGATED INFECTIONS

RED BLOTCH DISEASE PROGRESSION
High disease pressure from local (adjacent) source of inoculum

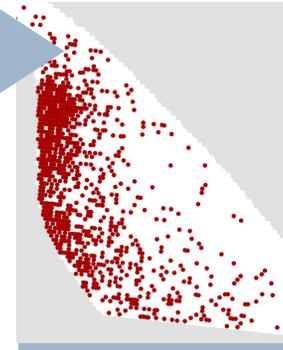
PHASE 1



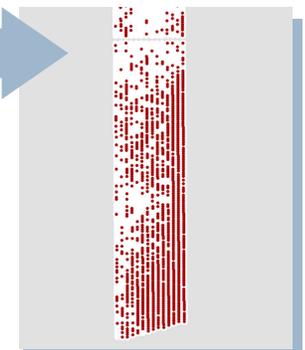
PHASE 2



PHASE 3



PHASE 4



Highly aggregated pattern - Rapid disease spread

→ Phase 1

→ Phase 2

→ Phase 3

→ Phase 4

VISUAL SYMPTOM INCIDENCE

≤ 1% Incidence

1-4% Incidence

4-16% Incidence

16-50% Incidence

>50% Incidence

* RANDOM VS. AGGREGATED

0% Aggregated
100% Random

10-60% Aggregated
40-90% Random

35-85% Aggregated
15-65% Random

70-90% Aggregated
10-30% Random

90-100% Aggregated
0-10% Random

MANAGEMENT STRATEGY

Vine-by-vine Roguing

Zonal Roguing in aggregated areas, vine-by-vine in random areas

Zonal Roguing in aggregated areas, vine-by-vine in random areas

Whole block removal

Whole block removal

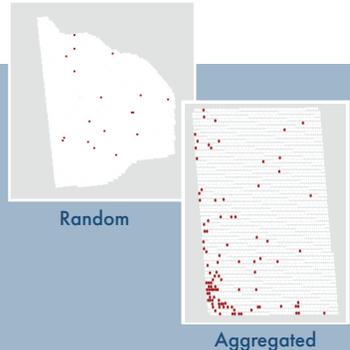
* Visually estimate the hotspot. Count the number of newly infected vines associated with the aggregated versus randomly distributed vines throughout the block.

This guide is intended to support decision-making for grapevine red blotch disease. We have synthesized information from GRBD ecology studies conducted at 12 field sites in Napa Valley from 2021-2024. Research is ongoing and individual experiences may differ from the scenarios presented here. UCCE is not responsible for outcomes of selected farming decisions.

Grapevine Red Blotch Disease (GRBD) Management

Aggregated vs. Random Spread

- A clumped distribution of symptomatic vines in a localized area is a GRBD aggregation (hotspot), while scattered distribution of diseased vines indicate random spread.
- Hotspots are high risk for spread, and therefore focal areas for aggressive disease management.



MANAGEMENT STRATEGIES

- **Vine-by-Vine Roguing** in areas with random spread: Catalog and remove symptomatic vines annually.
- **Zonal Roguing** in aggregated areas of infection: Delineate an area within which all vines will be removed, regardless of whether they have visual symptoms, to reduce risk of spread from symptomatic and asymptomatic infected vines.
- **Combine vine-by-vine and zonal roguing** when a block exhibits both random and aggregated spread patterns: Align the vine removal practice to the distribution pattern of diseased vines.
- **Block Removal** can be implemented when there is a high incidence of diseased vines, and symptomatic vines are distributed across a large area of the block.

ADDITIONAL CONSIDERATIONS

- **Source of Inoculum:** The GRBD progression chart does not account for inoculum sources in adjacent blocks. Active management should include nearby blocks that may serve as a source of inoculum.
- **Ongoing management:** Conduct annual assessments in blocks in phases A, B1, and B2 to manage spread. Monitor replanted blocks annually to detect incipient infections.
- **Aggregation and incidence:** A block may have low incidence but high aggregation. In blocks with aggregated spread, incidence should be the primary indicator for decision-making, with aggregation as an additional consideration. For example, if incidence is 14% (B2) but aggregation is 85% (B3), the block would be in phase B2.
- **Whole block removal:** Blocks with >50% incidence are candidates for removal and redevelopment to reduce further spread and optimize ROI on new plantings. Blocks with 20 to 50% incidence may also be considered for redevelopment, depending on the distribution of aggregated versus random spread.

ZONAL ROGUING AREAS

I. Primary Removal Zone

(0 - 30 Feet from Aggregated Area of Infection)

Vines within 30 feet of the aggregated area of infection should be considered high-risk and removed. This includes all vines in the 30-ft zone, regardless of whether they have visual symptoms.

II. Secondary Monitoring Zone

(30 - 60 Feet from Aggregated Area of Infection)

This is a medium-risk zone where vines should be closely monitored for grapevine red blotch disease. Monitoring techniques include:

- **Visual Inspection:** Look for characteristic red blotch symptoms at peak expression in late September to early October (location and season dependent).
- **Diagnostic tools:** LAMP (loop-mediated isothermal amplification) or qPCR (polymerase chain reaction) may be used to detect grapevine red blotch virus (GRBV) in symptomatic and asymptomatic vines. Trunk cambium is the optimum tissue for detecting asymptomatic infections.
- **Adaptive Cluster Sampling:** a statistically driven approach to identify at-risk vines. Within the secondary monitoring zone, select vines in a systematic pattern. Test the selected vines with a diagnostic assay for GRBV. For all resulting GRBV- positive vines, test their four nearest neighbors. Adjust roguing practices accordingly.

III. Vine-by-Vine Roguing Zone

Catalog and remove symptomatic vines annually. Continue to monitor for potential spread. If multiple infections are detected in a localized area, it may indicate a higher risk for spread and a zonal roguing approach may be needed.

