Department of Horticulture | Oregon Wine Research Institute

Can Impacts of Red Blotch Disease be Managed in the Willamette Valley?

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Oregon State University

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2020 Industry Survey

- Improved identification
  - ↑ virus testing
  - Commercial labs: leaf blades or dormant canes
- Economic impacts
  - None – 51%
  - Negative – 29%, ↑ costs ↓ revenue
- Managing in vineyard (81%), winery (3%), or both (14%)

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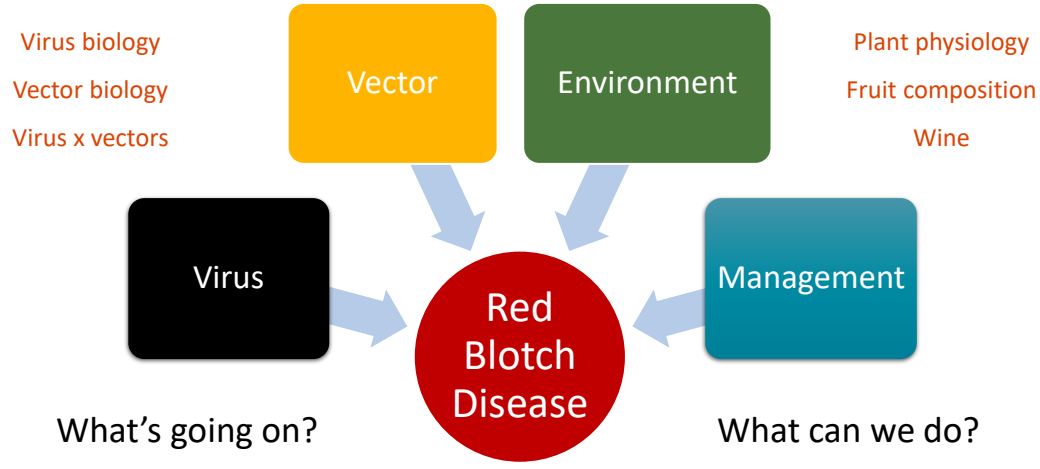
Approach to Red Blotch Research



Project 1: What are the Impacts?

Comparing GRBV+ and GRBV- vines

- Individual vines evaluated (n=20)
- Virus tested
  - Red Blotch: GRBV (neg. n=7, pos. n=13)
  - Leafroll: GLRaV 1, 2, 3, and 4 (all neg.)
  - Rupestris Stem Pitting Virus: GRSPaV (all pos.)
- GRBV:
  - Classed by virus and symptom
- Vineyard Details
  - High vigor
  - Irrigated late season only

Results – *Physiological Responses*

- Growth — no differences in canopy leaf area or pruning weight
- Photoassimilation — no impacts on vine photosynthesis
- Leaf chlorophyll — no impacts on vine photosynthesis
- Vine nutrient status
  - No differences in N
  - Consistent differences in K and Mg

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Why no differences in Photosynthesis?

GRBV+ vs. GRBV-

- Virus did not affect leaf chlorophyll pre-véraison
- No visible chlorosis of leaves in-season
- Late season loss of chlorophyll delayed (postharvest)

Reb blotchy leaves are also very green!

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GRBV Impacts on Mineral Nutrient Status

- Symptomatic GRBV+
  - Lower leaf blade P – *2 yrs*
  - Lower leaf blade K – *3 yrs*
  - Lower leaf blade Mg – *3 yrs*
  - Higher petiole Mg – *3 yrs*
- Asymptomatic GRBV+ and GRBV-
  - More similar nutrient status
    P, K, Mg

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Impacts on Fruit Yield?

- No difference in yield or yield components
  - Cluster weight
  - Berry size
- Consistent finding for WV and S. OR GRBV studies

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Harvest Fruit Composition

	GRBV+ vs. GRBV-	
Parameter	**Willamette Valley**	**Southern Oregon**
Total Soluble Solids (Brix)	No impact	Lower
pH	Higher	No impact
TA	Lower	No impact
Total anthocyanin	No impact	Lower
Total phenolics	No impact	Lower
Total tannins	No impact	Lower
	Litwin, Skinkis, Martin	Levin, KC, Copp

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Summary

- No virus impacts on
  - Vine growth and yield
  - Photoassimilation – S. OR, not WV
  - Water relations – S. OR, not WV
- Few fruit composition impacts
  - Greater differences appear stress-mediated
    - Season
    - Vineyard site (soils, elevation)
    - Management history
    - Intensity of symptoms

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Project 2: Abscisic Acid (ABA)

- Vineyard details →
  - Symptoms first noted – 2016
  - 100% GRBV+
- Foliar application of ABA
  - ProTone SG® - 300 mg/L
  - 2 applications to cluster zone
    - véraison onset + 2 weeks later

Cultivar	Pinot noir 777
Rootstock	3309C
Year planted	2000
Spacing	8’ x 5’
Irrigated	no

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Abscisic Acid (ABA) Trial - *Results*

- No impact on
  - basic ripeness
  - anthocyanin, phenolics, or tannins
- Protone SG is costly application
  - $680/acre

Year	Treatment	TSS (Brix)	pH	TA (g/L)
2018	ABA	23.5	3.26	6.7
	Control	23.2	3.32	6.0
	p	ns	ns	ns
2019	ABA	20.3	3.27	7.1
	Control	21.3	3.27	7.1
	p	ns	ns	ns

ns - not significant

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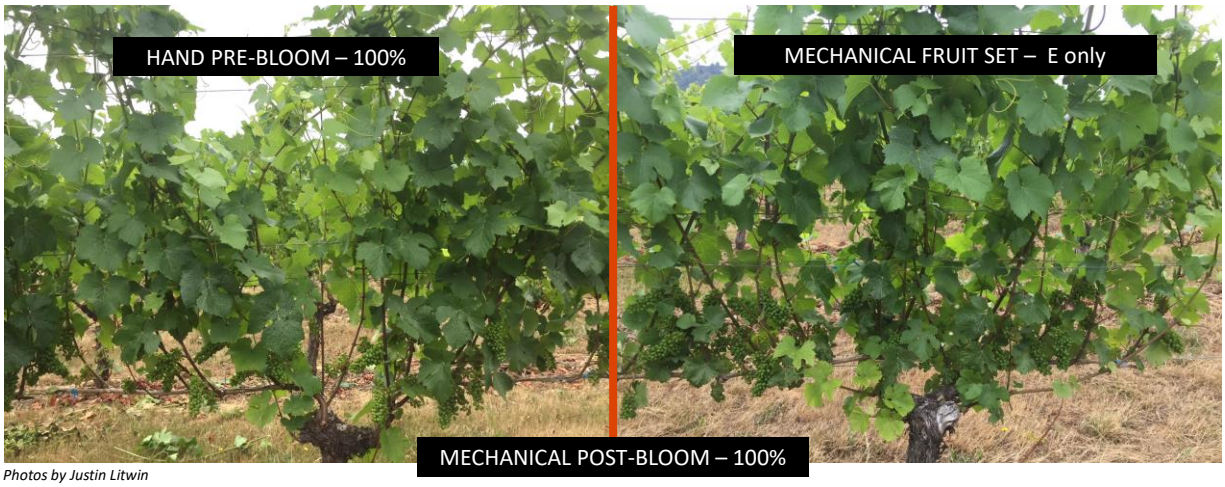
Project 3: Cluster Zone Leaf Removal

- **Hypothesis**: leaf removal conducted **early** and on **both sides** should increase total anthocyanin concentration of berries
- Vineyard details →
  - 100% GRBV+
  - Symptoms first noted – 2016

Cultivar	Pinot noir 777
Rootstock	101-14
Year planted	2002
Spacing	8’ x 5’
Irrigated	no

Leaf Removal Trial

Completely GRBV-infected block
Effect of early and greater leaf removal

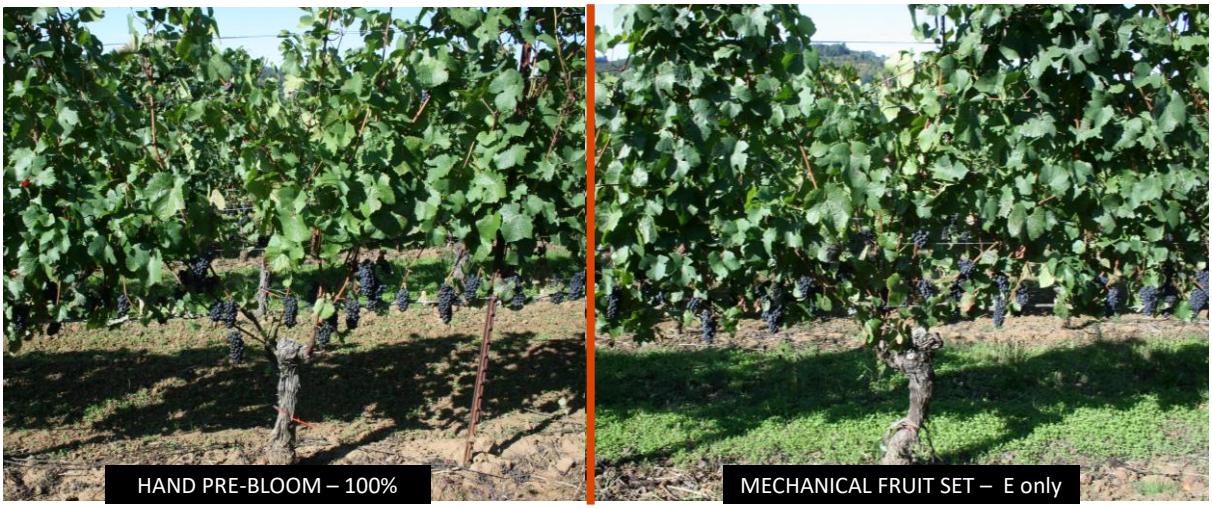


Photos by Justin Litwin

Leaf Removal Trial – *Harvest 2018*

Photos by Patty Skinkis

Leaf Removal Trial – *Harvest 2019*



Leaf Removal Trial – *Harvest 2019*

MECHANICAL POST-BLOOM – 100%

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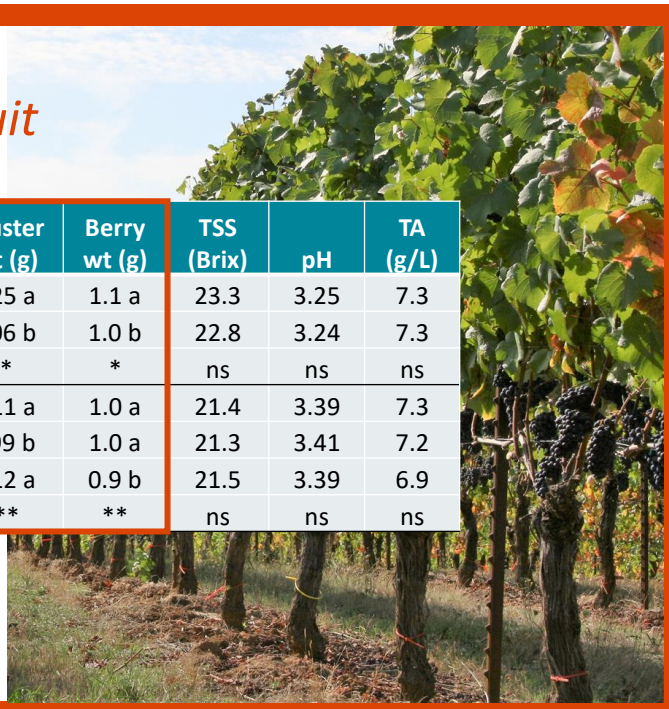
Leaf Removal Trial - *Fruit*

Year	Treatment	Yield (kg)	Cluster wt (g)	Berry wt (g)	TSS (Brix)	pH	TA (g/L)
2018	Standard	2.7	125 a	1.1 a	23.3	3.25	7.3
	Pre-bloom 100%	2.3	106 b	1.0 b	22.8	3.24	7.3
	p	ns	*	*	ns	ns	ns
2019	Standard	2.6	111 a	1.0 a	21.4	3.39	7.3
	Pre-bloom 100%	2.4	99 b	1.0 a	21.3	3.41	7.2
	Post-bloom 100%	2.4	112 a	0.9 b	21.5	3.39	6.9
	p	ns	**	**	ns	ns	ns

*p<0.05, ** p<0.01, ns - not significant

Smaller clusters and berries with earlier, more intense leaf removal



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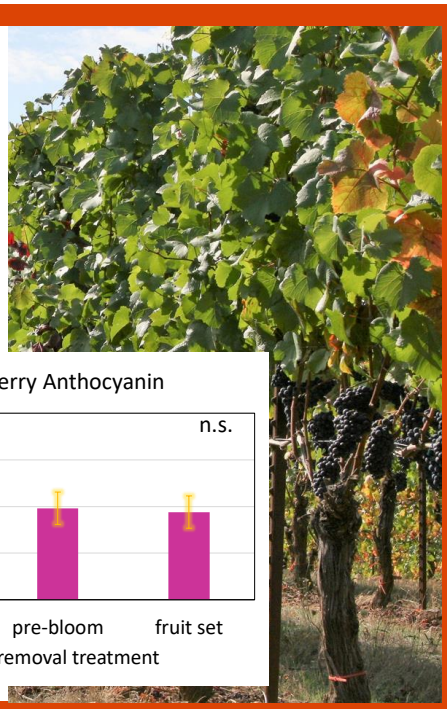
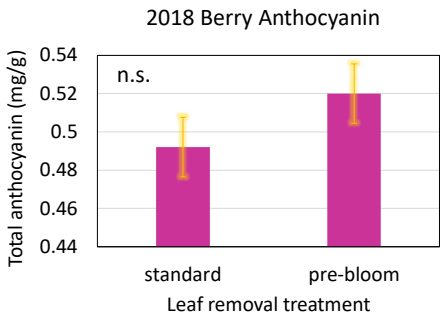
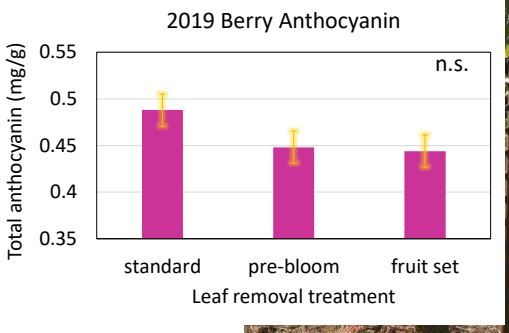
Leaf Removal Trial - *Phenolics*

- No statistical differences in anthocyanins, phenolics, or tannins







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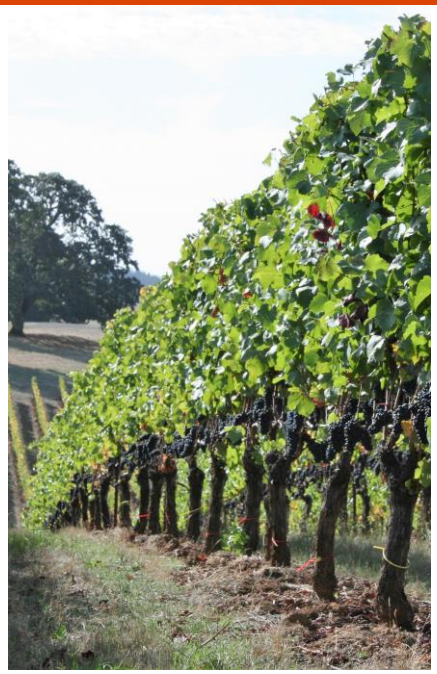
Take home message…

- Determine GRBV vineyard impacts
  - Yield?
  - Fruit composition?
  - Wine quality?
- Management tactics
  - Reduce vine stress
  - Most targeted management practices won't make much difference



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Skinkis Lab Staff

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