Evaluating a soft pesticide program for wine grapes in the Great Lakes region

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SARE
Sustainable Agriculture
Research & Education

Bunch rots

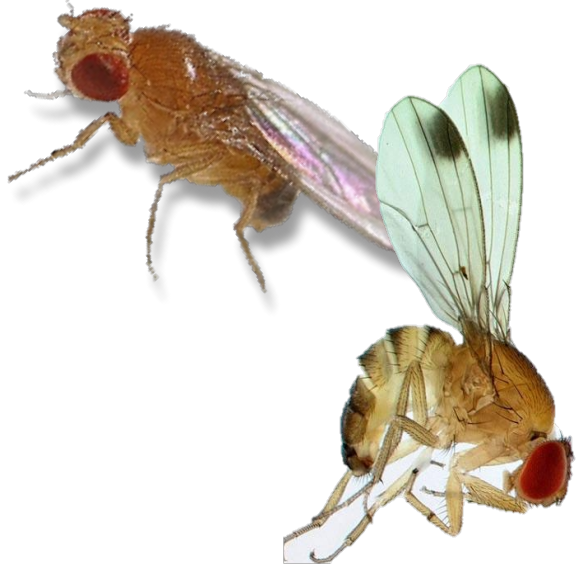
- Economically important disease of grapes
- Impact grape production and wine quality
- Increases management costs
- Degrades quality of wine

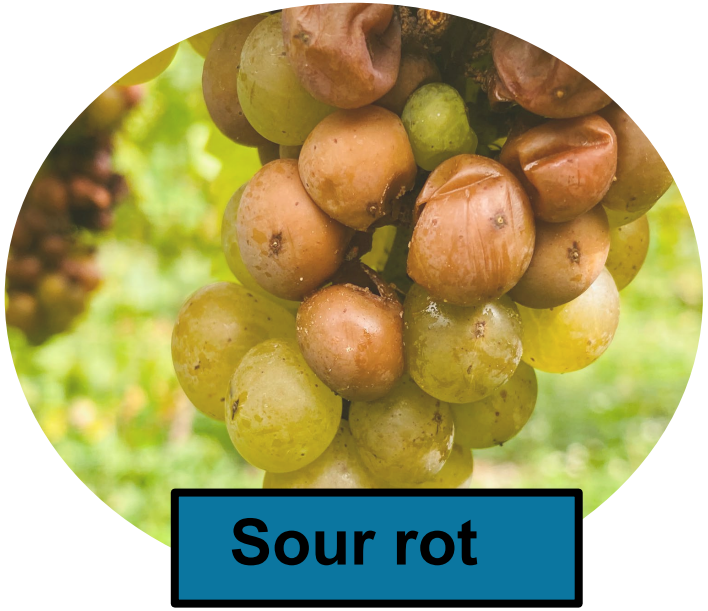
Botrytis bunch rot

Sour rot

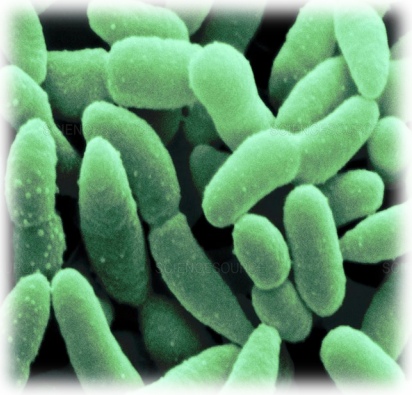
Causes of sour rot

Caused by
- ✓ Acetic acid bacteria
- ✓ Fungi- yeasts
- ✓ Drosophila vinegar flies

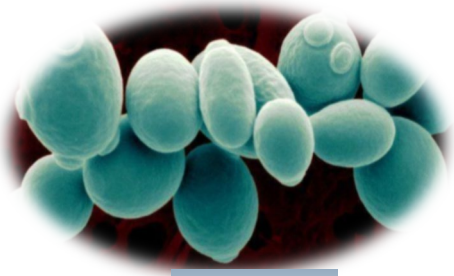




Pungent vinegar smell



Acetic acid bacteria

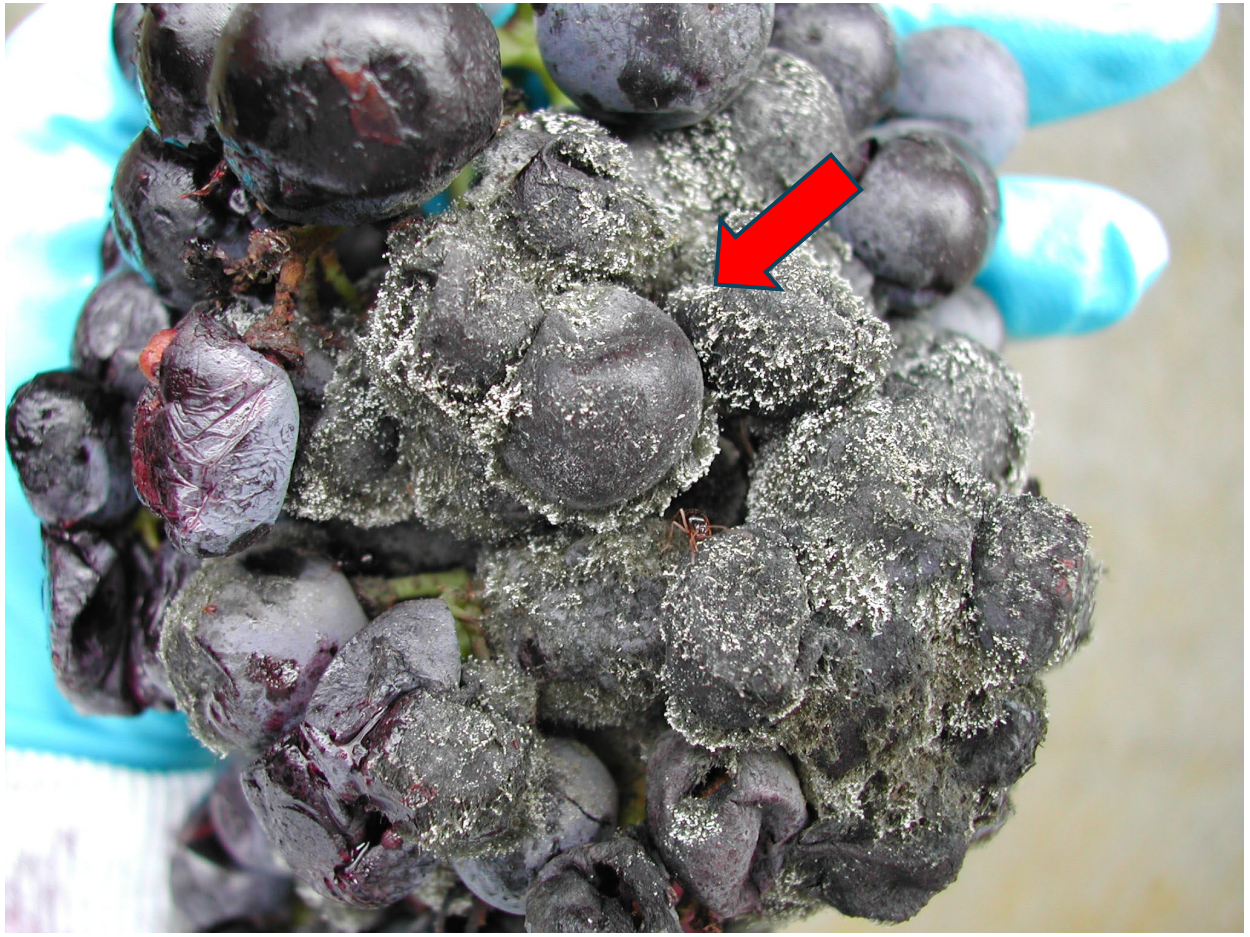


Yeast

- ➢ Spread yeast and bacteria in healthy berries
- ➢ Directly contributes to disease symptoms
- ➢ Creates injury and pathways for microbes

(Barata et al. 2012; Hall et al. 2018; Ioriatti et al. 2018)

Botrytis bunch rot is caused by fungus *Botrytis cinerea*



Current need for sustainable approaches in vineyards

Social aspects

Reduced pesticide residue risk

Improved worker access

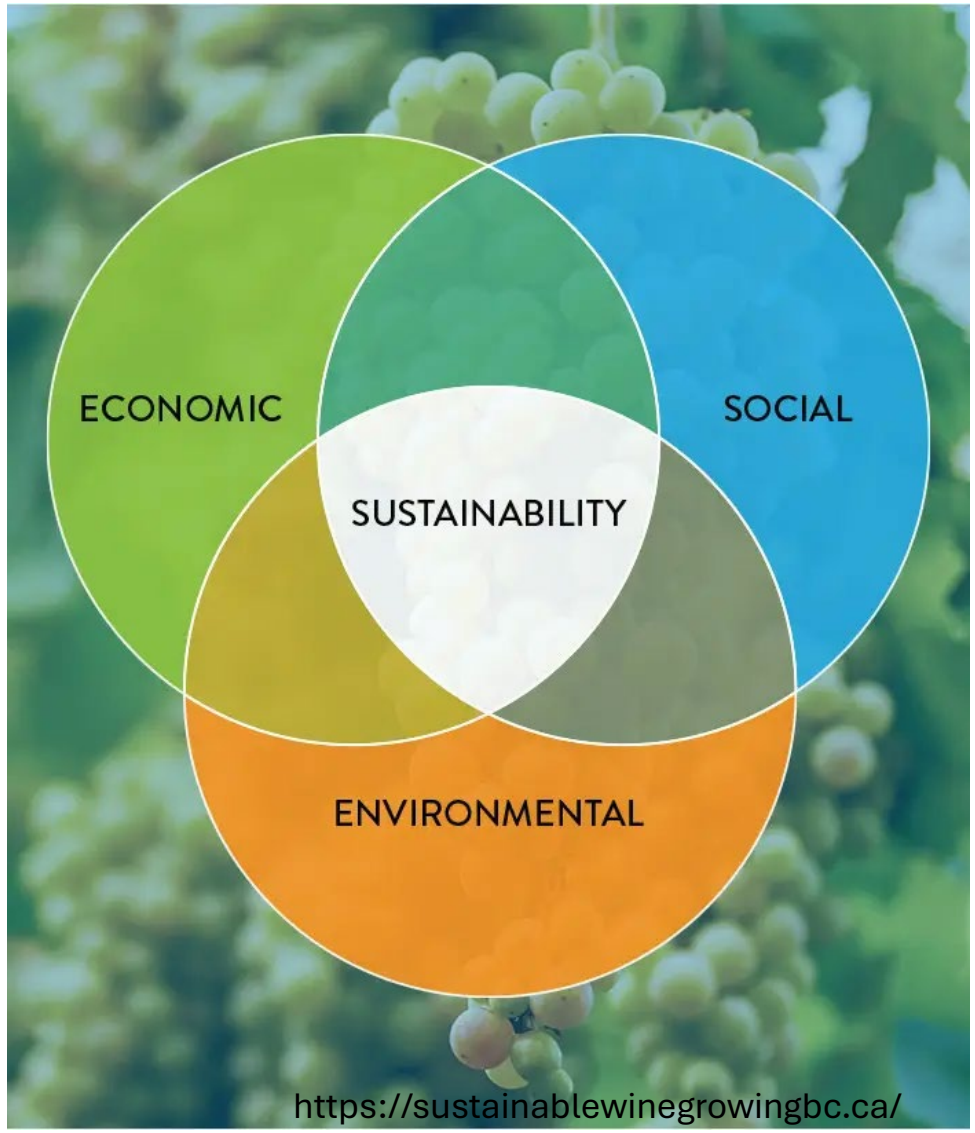
Environmental aspects

Pesticide resistance management

Conservation of beneficial insects

Economic aspects

Improve productivity and profits



Project goal

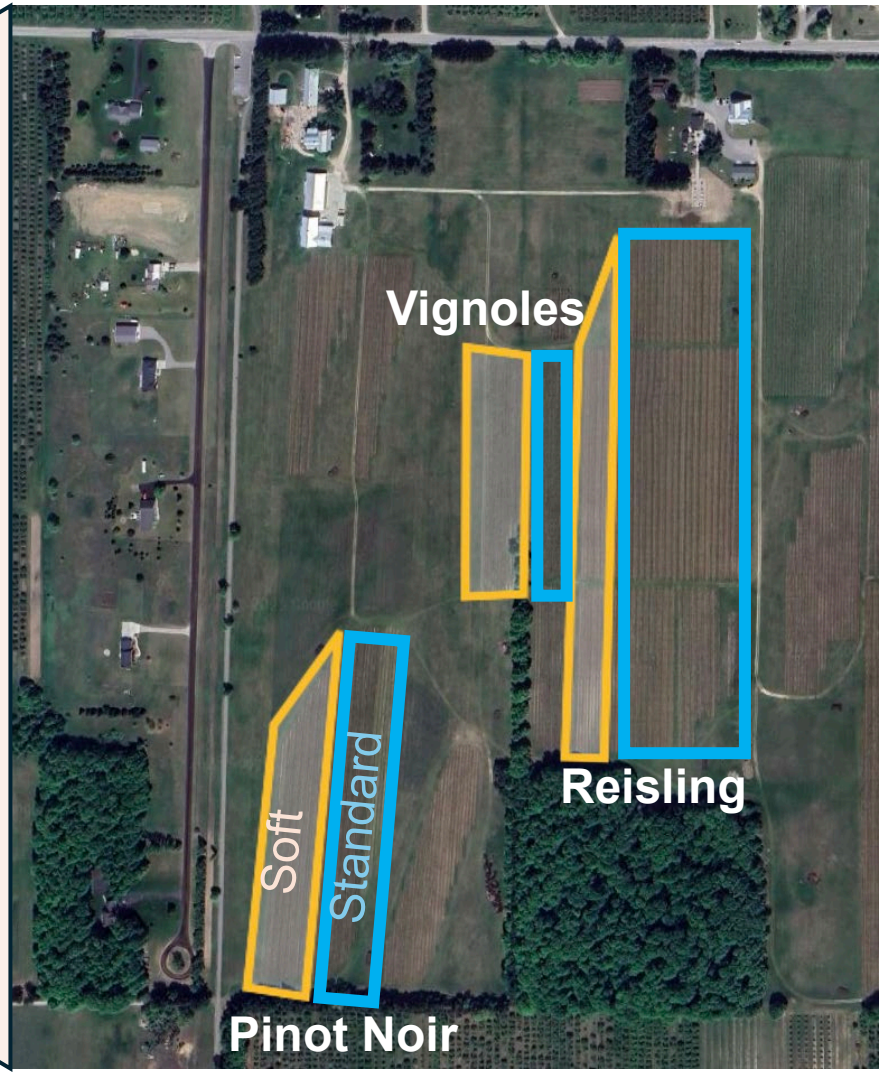
Compare the efficacy of a soft chemistry spray program to that of a conventional synthetic program in rot susceptible vineyards

SARE Sustainable Agriculture Research & Education

Farmer-Rancher Grant Program support, 2024

Research location

Research site



Research plots

Research treatments compared in three cultivars

EARLY SEASON APPLICATIONS

Standard treatment	**Soft** treatment
5/9- Sulforix 1 gal/A Bond 16 oz/100 gal 5/20- Badge 1 qt/A Bond 1 pt/100 gal (half-cover) 5/30- Badge 1 qt/A Bond 1 pt/100 gal (half-cover) 6/11- Badge 1qt/A Assail 3 oz/A Satori 12.8 oz/A Li700 1.3 pt/100 6/17- Endura 8 oz/A Microblaster 1 qt/A Borosol 10% 1 qt/A Li700 1.3 pt/100 (half-cover) 6/26- Endura 8 oz/A Microblaster 1 qt/A Borosol 10% 1 qt/A Li700 1.3 pt/100 (half-cover)	5/9- Sulforix 1 gal/A Bond 16 oz/100 gal 5/21- Badge 1 qt/A Bond 1 pt/100 (half-cover) 5/31- Badge 1 qt/A Bond 1 pt/100 gal (half-cover) 6/14- Serenade Opti 1.3 lbs/A Biocover, crop oil- 2 qt/ 100 gal Neemiz 16 oz/100 Nu Film P 1 qt/100 6/18- ProBlad1 qt/A Microblaster 1 qt/A Borosol 10% 1 qt/A NuFilm P 1.3 pt/100 6/27- ProBlad1 qt/A Microblaster 1 qt/A Borosol 10% 1 qt/A NuFilm P 1.3 pt/100

LATE-SEASON APPLICATIONS

Standard treatment	**Soft** treatment
7/4- ProBlad 1 qt/A Badge 1 qt/A Microblaster 1 qt/A Li700 1.3 pt/100 7/15- Assail 3 oz/A Inspire Super 20 oz/A Ranman 2.75 oz/A Micromix DL 1.25 pt/A Li700 1.3 pt/100 7/31- Quintec 3.75 oz/A Zampro 14 oz/A Activator 90 1.3 pt/100 8/21- Serenade Opti 1.25 lbs/A Revus Top 7 oz/A Nachurs Fe 1 qt/A Microblaster 1 qt/A Max N-pact 1.25 qt/A Li700 1.3 pt/100 9/11- ProBlad 1 qt/A Zampro 14 oz/A Nachurs Fe 1 pt/A Delegate 4 oz/A Microblaster 1 pt/A Li700 1.3 pt/100	7/6- ThymeGuard 2 qt/100 Neemix 16 oz/100 NuFilm P 1.3 pt/100 7/16- JMS Stylet oil 1 qt/A Orange oil (100%) 1 qt/A Neemix 16 oz/100 NuFilm P 1.3 pt/100 8/5 - Serenade Opti 1.25 lbs/A Phostrol 2.5 pt/A NuFilm P 1.3 pt/100 8/20 - Serenade Opti 1.25 lbs/A Phostrol 2.5 pt/A Nachurs Fe 1 qt/A Microblaster 1 qt/A Max Npact 1.3 qt/A NuFilm P 1.3 pt/100 9/9- ProBlad 1 qt/A JMS Stylet oil 1 qt/A Orange oil (100%) 1 qt/A Entrust 2 oz/A Nachurs Fe 1 pt/A NuFilm P 1.3 pt/100

Application methods

- Application using a Rears Pul-Blast airblast sprayer.
- Driving speed - 3.4 mph
- Gallons of water per acre – 50 gal/A

Cluster rot field survey

MICHIGAN STATE UNIVERSITY
Department of Entomology

Assessed sour rot and botrytis bunch rot

Visual and odor symptoms used on 25 randomly-selected grape clusters in each plot.

Standard and Soft plots sampled across the three cultivars.

Sour rot

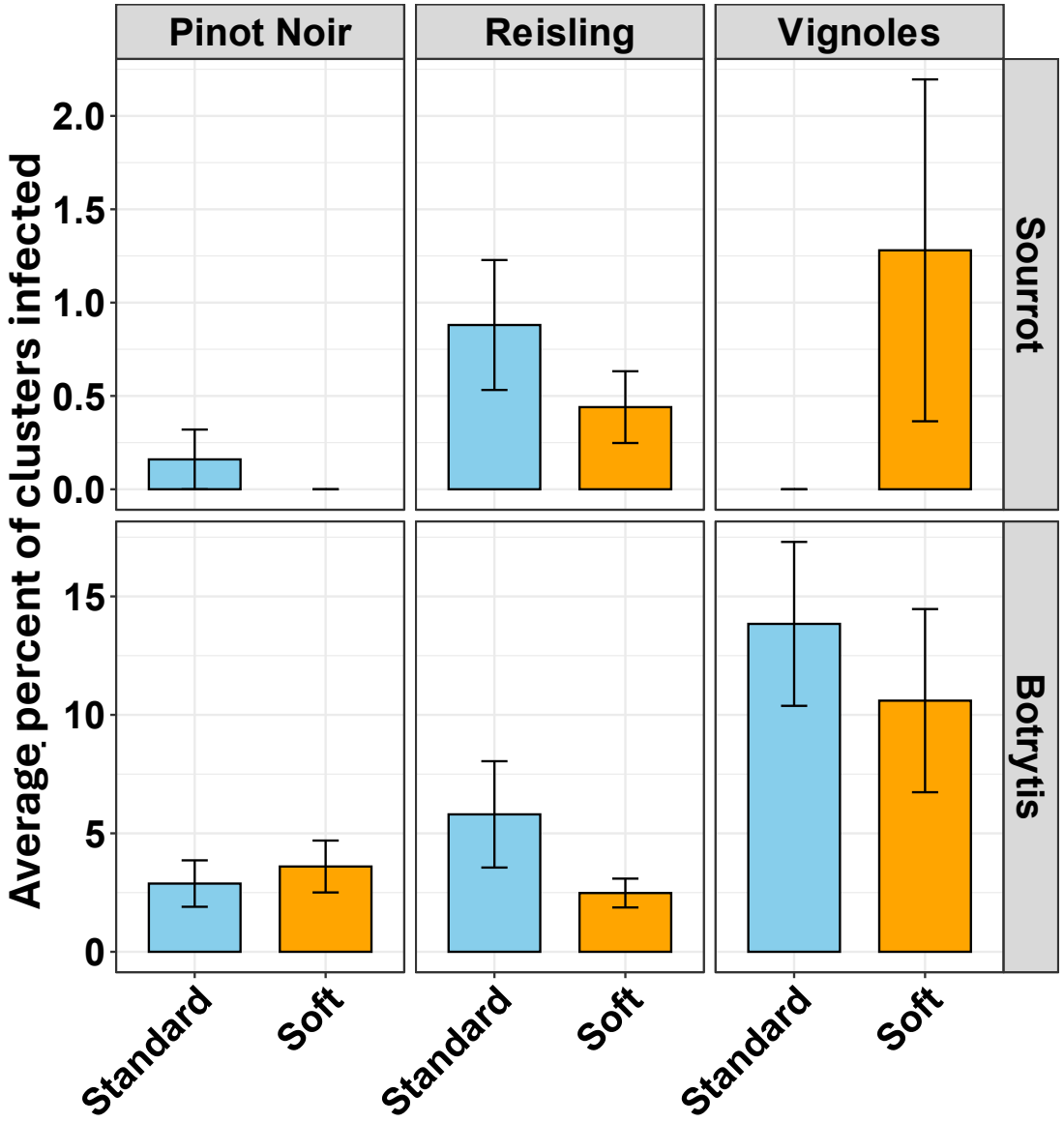
Botrytis bunch rot

Results

Cluster rot field survey

Low levels of sour rot in both treatments in 2024.

No consistent difference in rots between the two programs in Pinot Noir, Reisling or Vignoles.



Rearing of vinegar flies

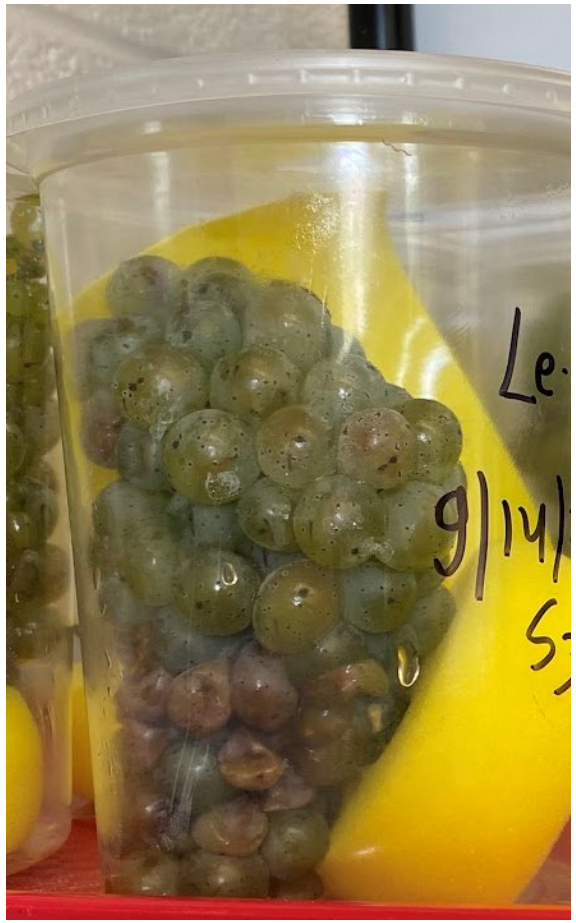
Eight clusters from each plot

Transported to the lab in a cooler

Assessed percent Botrytis bunch rot and sour rot for each cluster

Each cluster placed in deli cup with a mesh lid for 10 days to rear vinegar flies.

48 clusters from all three cultivars were used for rearing.

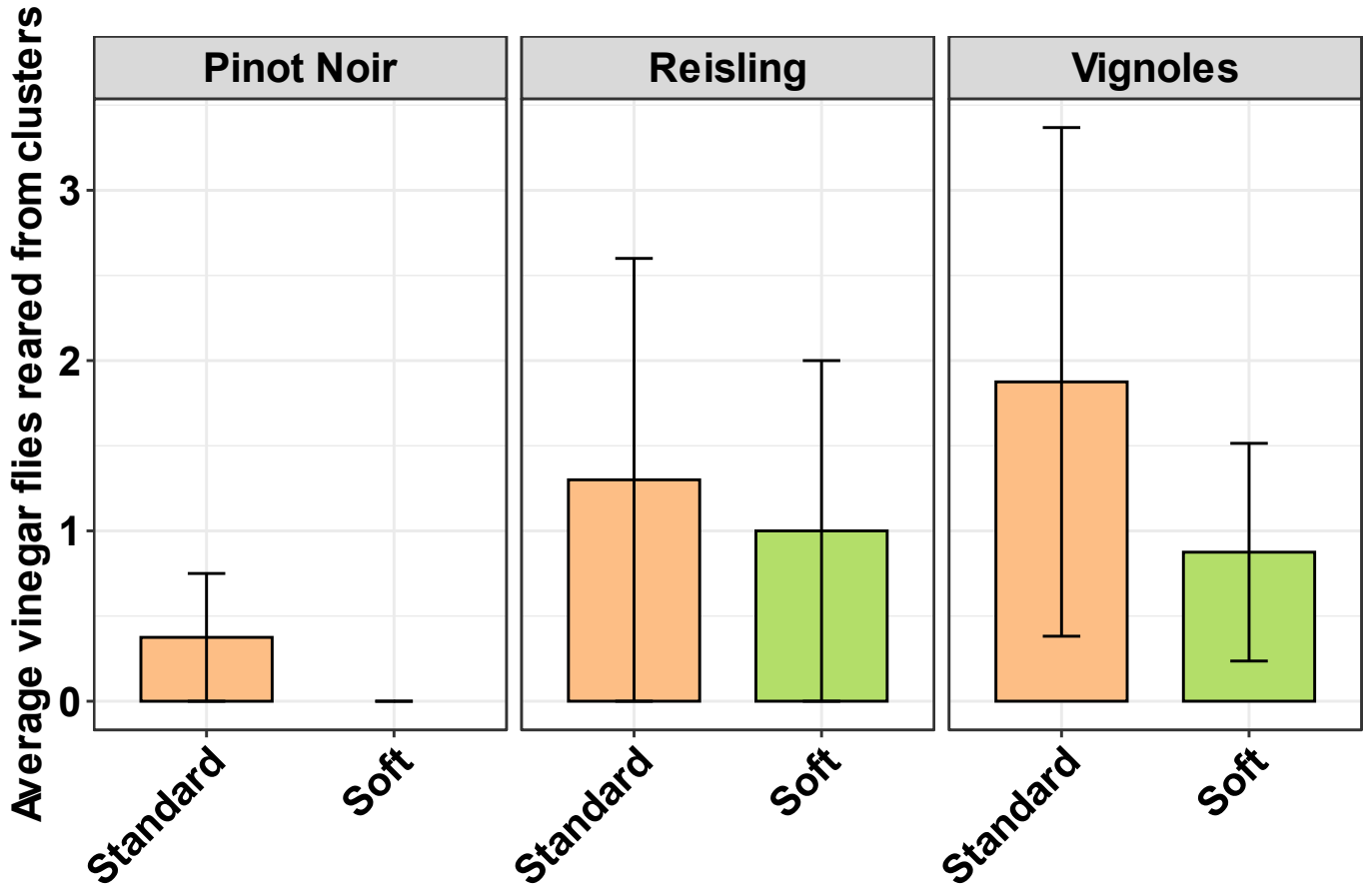


Rearing vinegar flies

Vinegar flies reared from clusters

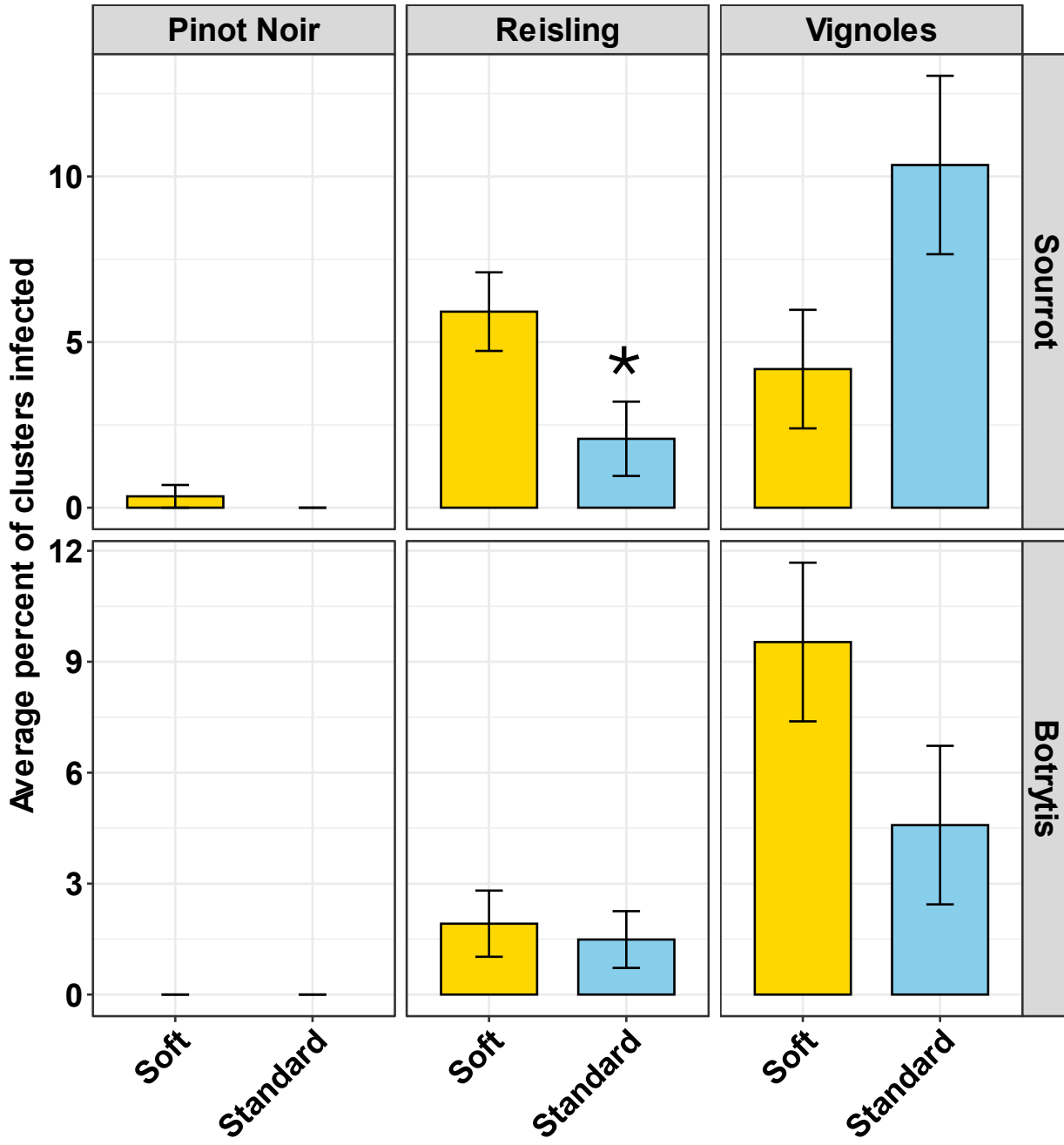
1-2 flies per cluster (low levels)

No significant difference in vinegar flies reared from clusters between the two programs for any cultivar.



Cluster disease on collected clusters

- No significant difference in sour rot infections between the two programs in Pinot Noir or Vignoles.
- Sour rot was significantly higher in the soft program in Reisling (6 vs. 2.5% clusters).
- No significant difference in Botrytis infections between the two programs.



Summary

- Generally low pressure from cluster rots in 2024.
- Limited differences between management programs, indicating soft program performed similar to the standard program.
- We are planning pesticide residue analysis on clusters from this trial.
- Hoping to continue with USDA-SARE support (proposal pending).

2025 study: Evaluate the interactive effects of leaf removal and bio-rational sprays on rot management in vineyards

Leaf removal

Bloom

Veraison

No leaf removal

➢ Tight cluster architecture

Leaf removal

➢ Loose cluster architecture
➢ Better air circulation
➢ Better penetration of pesticides

Biorational pesticides

Parka® (3.78 litre/acre)

PREV-AM

3-in-1 insecticide, miticide and fungicide

PREV-AM® (0.4% v/v)

Aza-Direct
BOTANICAL INSECTICIDE

Aza-Direct® (1.13 litre /acre)

OxiDate 5.0

Oxidate-5.0® (1% v/v)

Wrath ®
(2.41 litre /acre)