Summer bunch rot, sour rot, and Aspergillus Vine Canker of Grapevine

Current Management Options

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UCCE Viticulture Farm Advisor

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Overview

- 2023 weather and disease pressure
- Summer bunch rot
- Sour rot
- Aspergillus vine canker
- Resources

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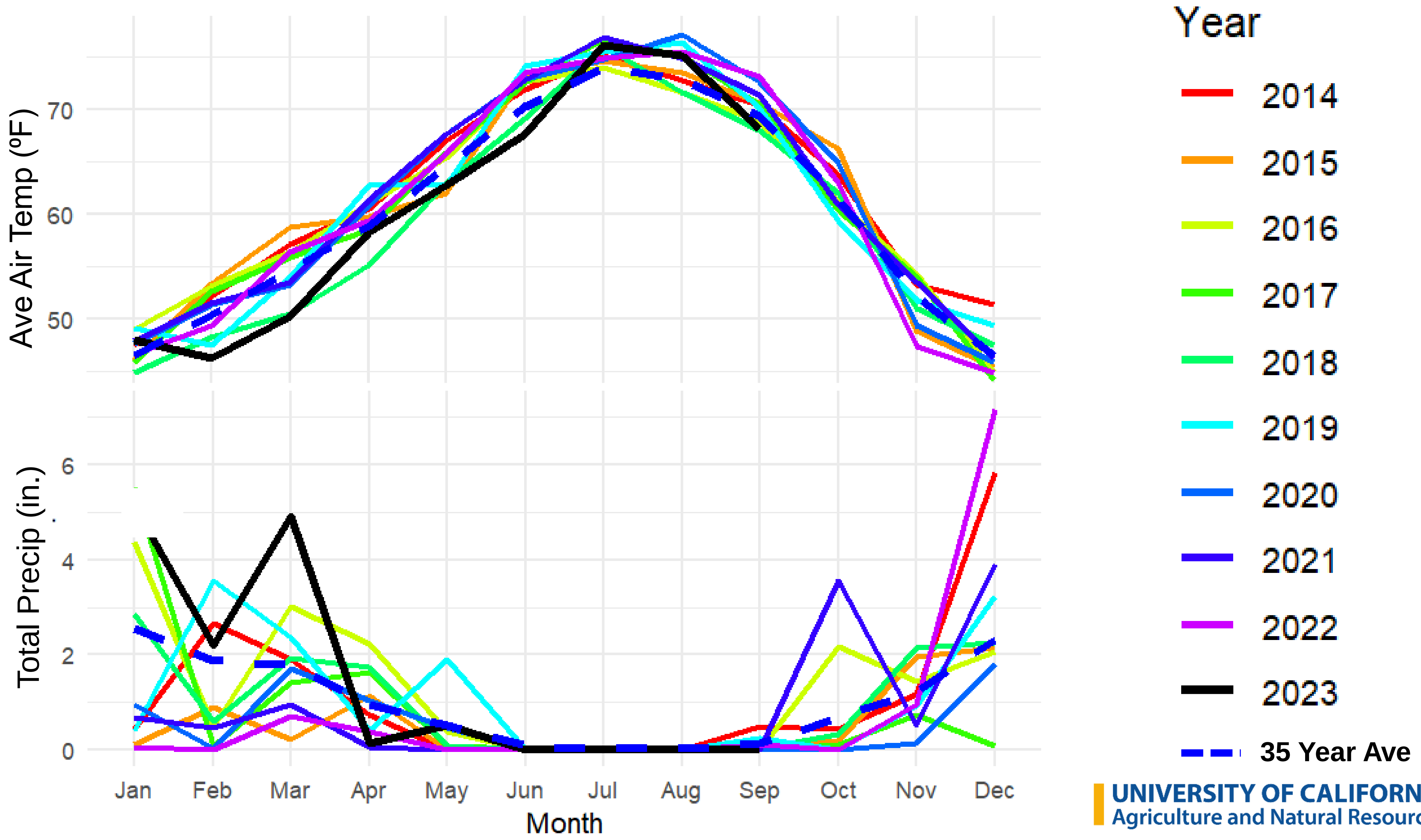
2023 Season

- Cool, wet spring
- Delayed phenology
  - Budbreak, bloom
- High growth potential
  - Large canopy and great fruit set
- Dense canopies
  - Higher disease pressure, less effective spray penetration
- NOAA
  - "El Niño is anticipated to continue through the Northern Hemisphere winter (with greater than 95% chance through January - March 2024)"

Seasonal Weather

Monthly CIMIS weather data from Manteca, CA 1988 - 2023



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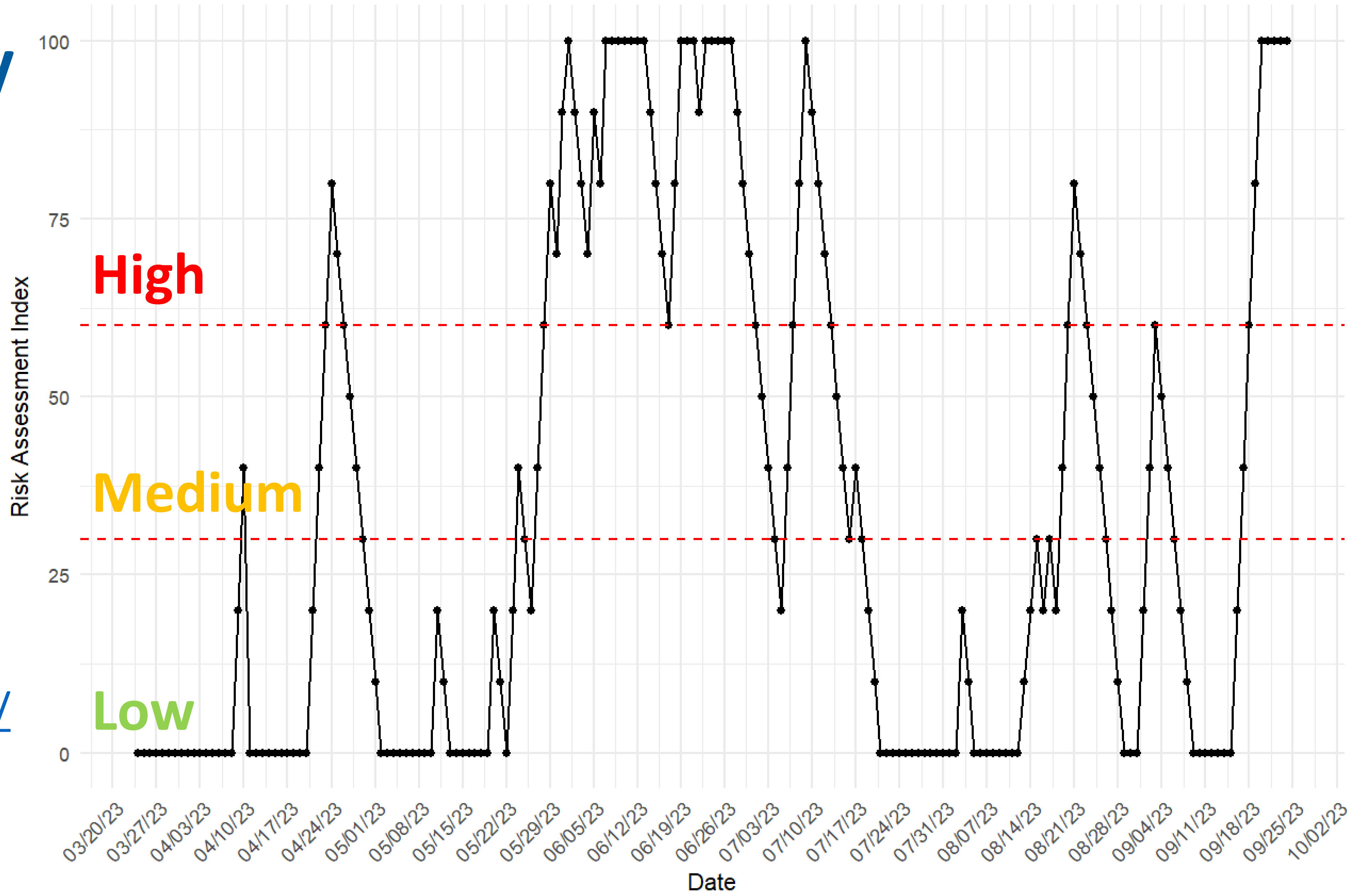
High Powdery Mildew Pressure Year



Data source: UC IPM Powdery Mildew Risk Index

https://ipm.ucanr.edu/weather/grape-powdery-mildew-risk-assessment-index/

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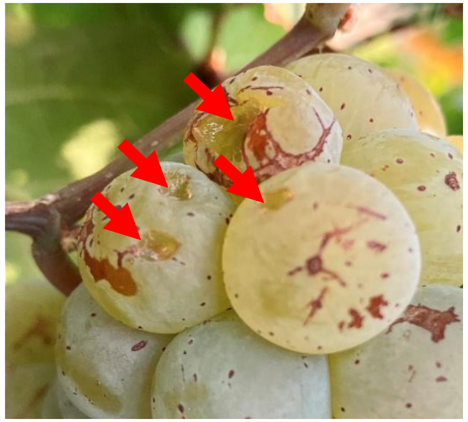
Increased bunch rot disease pressure

- In fruit damaged by powdery mildew, insects or birds, and mechanical injury (ex. mechanical leaf removal)
- Varieties with tight clusters, more susceptible to cracking/splitting
- Areas that previously experienced bunch rot – higher inoculum
- Areas close to water which have higher relative humidity
- Low lying areas that are wind sheltered – dry more slowly

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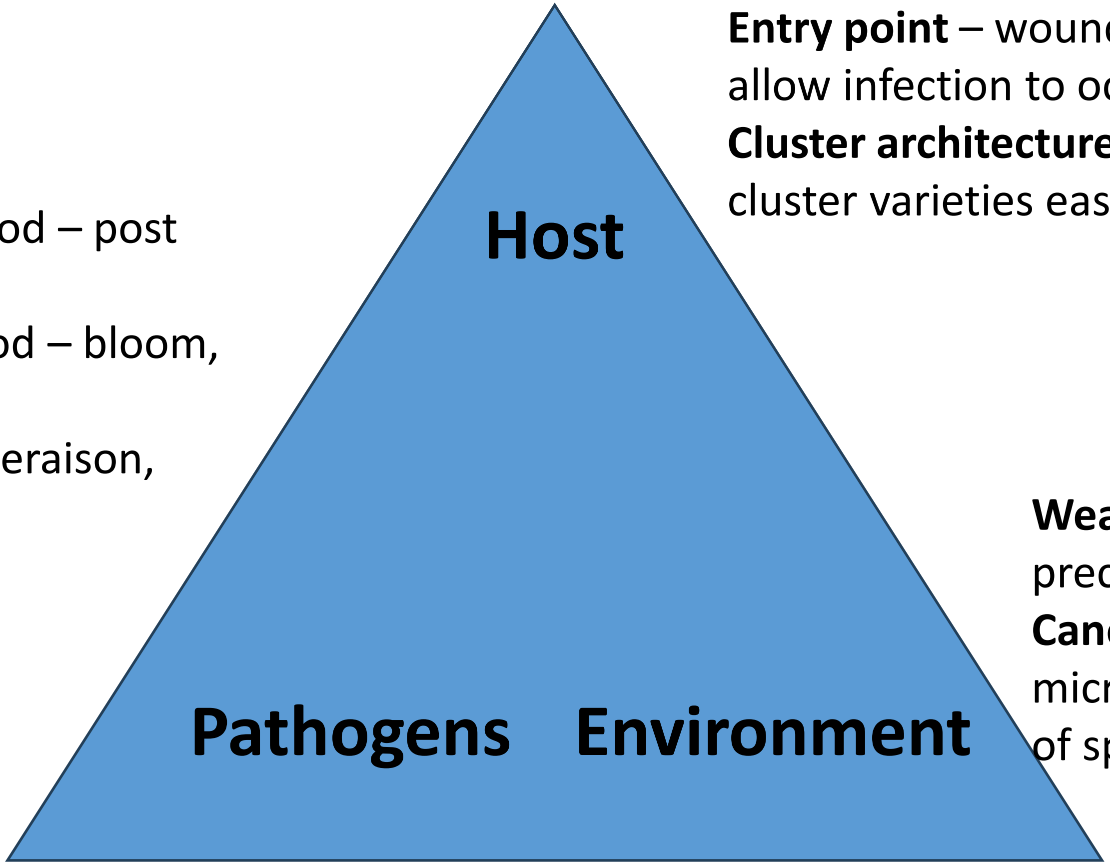
Bunch rot disease triangle

Summer bunch rot infection period – post veraison
Botrytis bunch rot infection period – bloom, post veraison
Sour rot infection period – post veraison, rapidly spreads by fruit flies



Entry point – wounds/damage on berries allow infection to occur
Cluster architecture – splitting in tight cluster varieties easily infected

Weather – temperature, humidity, precipitation
Canopy - influences cluster microclimate, humidity and efficiently of spray application

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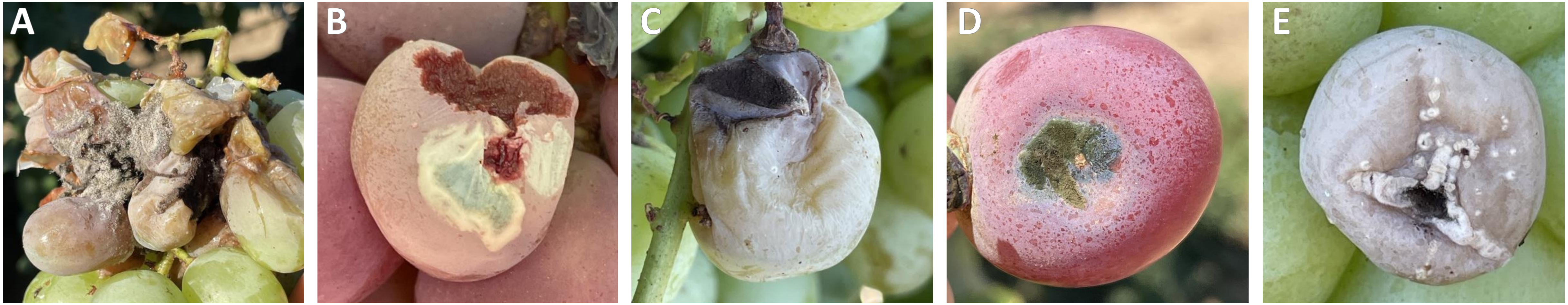
Summer bunch rot

Disease complex caused by one or more of several fungal organisms after veraison

Botrytis cinerea, Aspergillus tubingensis, *A. carbonarius*, *A. niger*, *Alternaria* sp. *Cladosporium* sp., *Rhizopus* sp., and *Penicillium* sp.

Summer bunch rot symptoms on berries



(A) Botrytis, (B) Penicillium, (C) Aspergillus, (D) Cladosporium, (E) yeast

Botrytis bunch rot-*Botrytis cinerea*

- Also known as grey mold and a widespread pathogen affecting many crops
- Can cause significant crop loss
- Produces laccase, a powerful oxidizing enzyme
- Canopy management practices that increase air circulation in the fruit zone greatly reduce disease incidence
- Fungicide applications prior to bunch closure can reduce infections

Botrytis early season infection

- Botrytis overwinters as sclerotia in berry mummies
- After rain or irrigation, sclerotia germinate and produce spores
- Infections require free water on tissues and temperatures between 65 – 80ºF
- Flowers and young shoots are susceptible
- Infection in flowers/berries lies dormant until sugar concentration increases

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Sour rot

- Distinguished by the development of high levels of acetic acid in berries
- Caused by **yeasts** + **acetic acid bacteria** and **fruit flies** (*Drosophila*)
- Damaged fruit are susceptible to infection after veraison
- Fruit flies are attracted to the rotting clusters and quickly spread yeast and bacteria

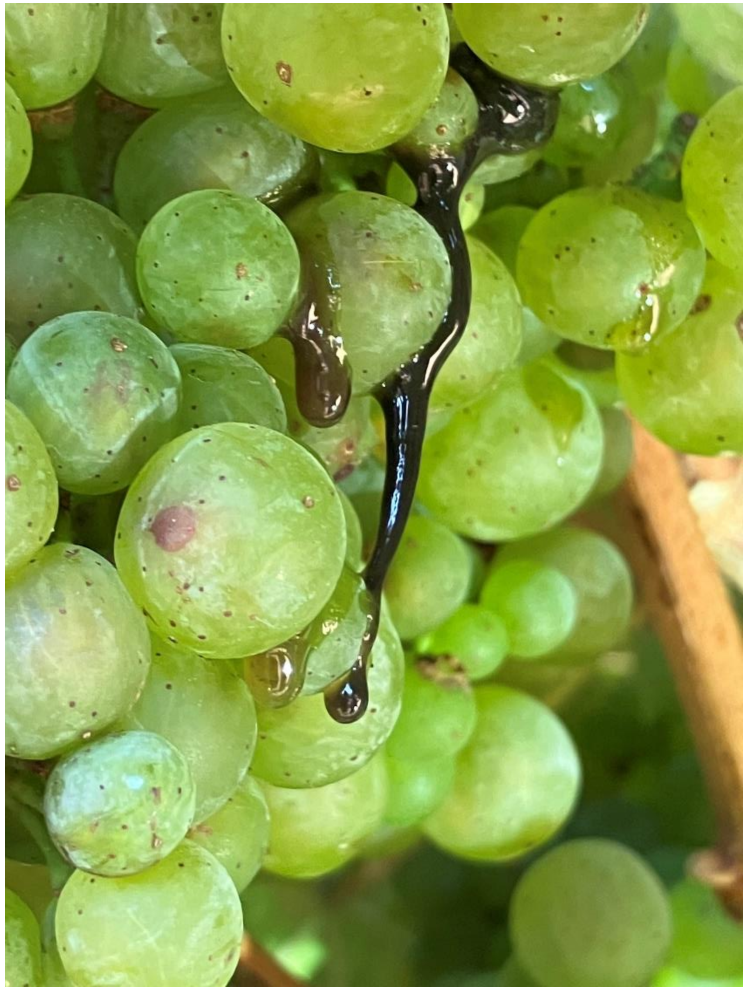
Sour rot management

Before disease incidence

- In blocks with history of sour rot:
  - Manage canopy to decrease humidity and improve spray penetration in the fruit zone
  - Avoid over irrigating and over fertilizing
  - Broad spectrum insecticide + surface disinfectant
  - Start insecticide before infection (≤15 brix)

After disease development

- Monitor vineyard to identify hotspots
- Insecticide treatment needs to be reapplied
- Remove infected clusters from vineyard when possible



Pesticide use

- Always read and comply with product label
- Rotate products to different chemistry (FRAC groups) to prevent resistance development

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Short Communication

OXFORD

Short Communication

Insecticide Resistance in *Drosophila melanogaster* (Diptera: Drosophilidae) is Associated with Field Control Failure of Sour Rot Disease in a New York Vineyard

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Abstract

Sour rot is a complex disease of grapes caused by an interaction of yeast, acetic acid bacteria, and *Drosophila* spp. Application of insecticides (most commonly zeta-cypermethrin) targeting *Drosophila* has previously provided substantial control of sour rot in wine grapes of New York vineyards. In harvest season of 2018, a control failure of sour rot and high populations of *Drosophila*, mostly *Drosophila melanogaster*, were observed in a vineyard in the Finger Lakes region, NY, despite repeated applications of zeta-cypermethrin (Mustang Maxx). To determine if resistance was responsible for the control failure, we quantified the toxicity of zeta-cypermethrin and the four other insecticides registered for *Drosophila* control in NY vineyards. Diagnostic concentrations (susceptible strain LC_{95}, 4 × LC_{95}, and 16 × LC_{95}) were used to evaluate percentage survival of the field flies relative to the susceptible Canton-S strain. Resistance to zeta-cypermethrin, acetamiprid, and malathion, but not to spinosad and spinetoram, was observed in the field-collected flies. This study provides evidence that insecticide resistance of *Drosophila* is associated with control failure of sour rot in some vineyards, and directly influencing grape production. The implications of these results to insecticide resistance monitoring and management are discussed.

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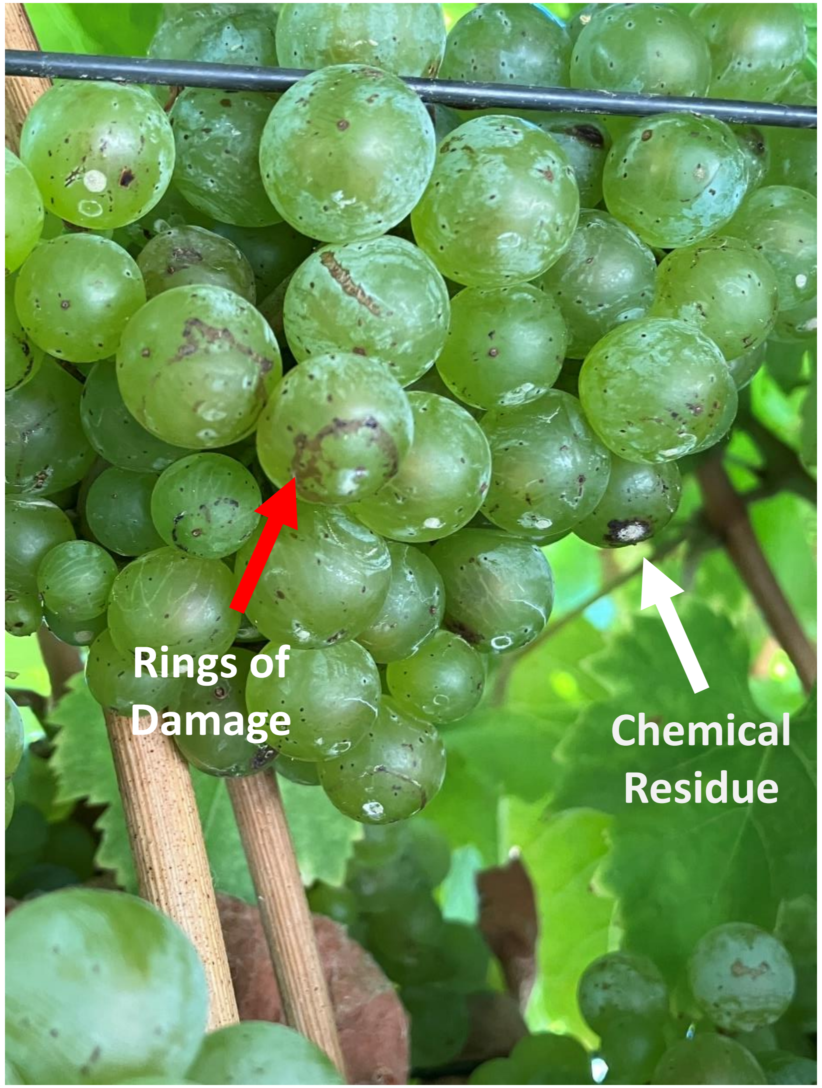
Symptoms of phytotoxic spray application



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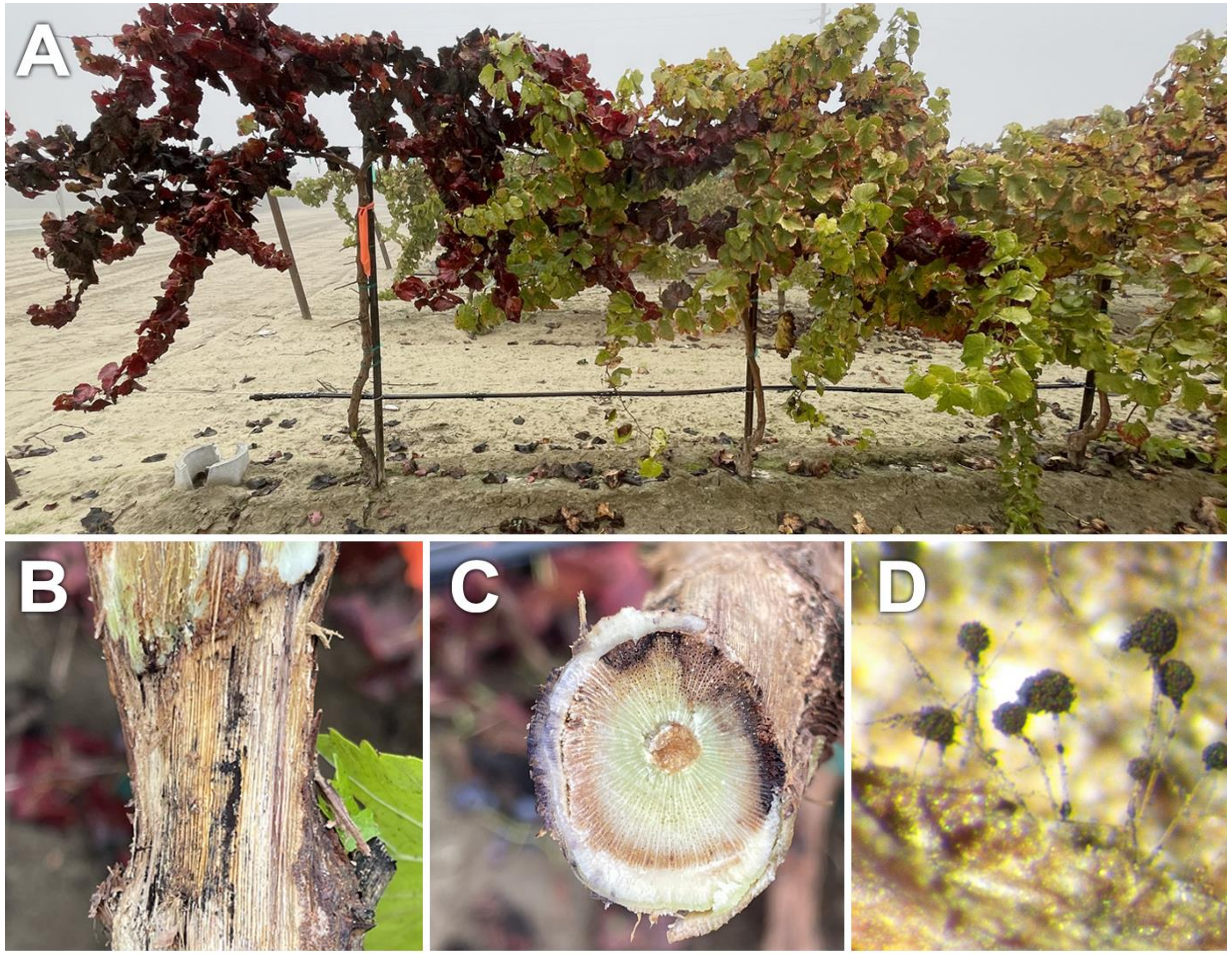
Aspergillus vine canker (AVC)

- Studies by the Eskalen Lab have shown that Aspergillus species associated with bunch rot can also infect wood
- A single vine can harbor multiple *Aspergillus* species located on different parts of the vine, including the trunk, cordon, and spurs.



Additional resources

UC ANR IPM website

- Summer bunch rot, sour rot information https://ipm.ucanr.edu/agriculture/grape/summer-bunch-rot-sour-rot/

Eskalen lab annual bunch rot trial

- Examines the efficacy of fungicide treatment programs to prevent and control these complex diseases using synthetic, biological, and organic fungicides
- Results from these trials can be found on the Eskalen lab website at https://ucanr.edu/sites/eskalenlab

Wrap-up

- Weather plays a critical role in disease pressure
- Risk for bunch rot infection begins after veraison
- Limiting damage to berries though proper IPM reduces infection
- Altering canopy microclimate through shoot thinning, hedging and leaf removal helps decrease suitability of environment for infection

Thank you!

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Link to needs assessment survey

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