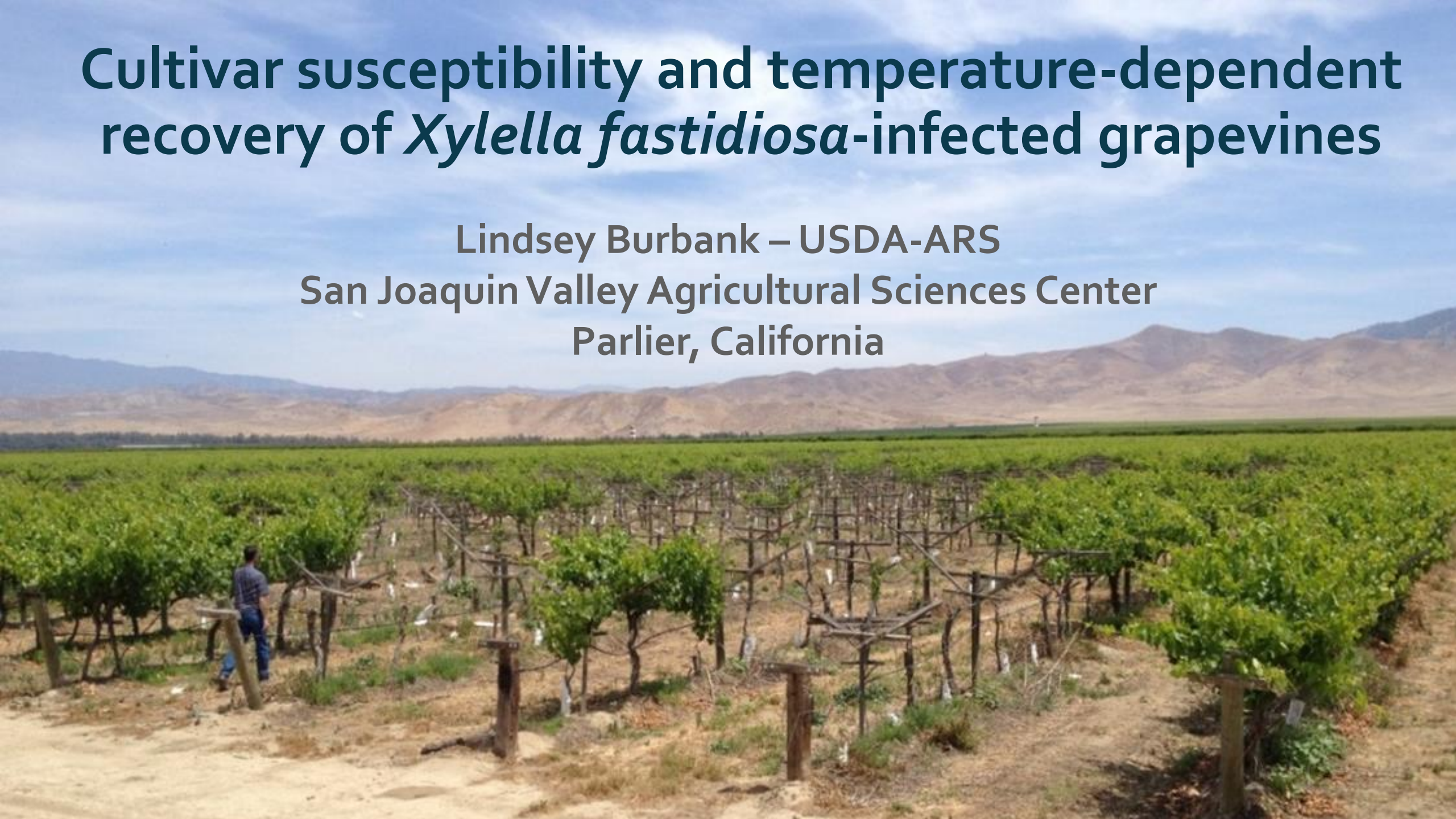
Cultivar susceptibility and temperature-dependent recovery of *Xylella fastidiosa*-infected grapevines

Lindsey Burbank – USDA-ARS
San Joaquin Valley Agricultural Sciences Center
Parlier, California



Parlier


SAN JOAQUIN VALLEY AGRICULTURAL SCIENCES CENTER
USDA
United States Department of Agriculture
Agricultural Research Service

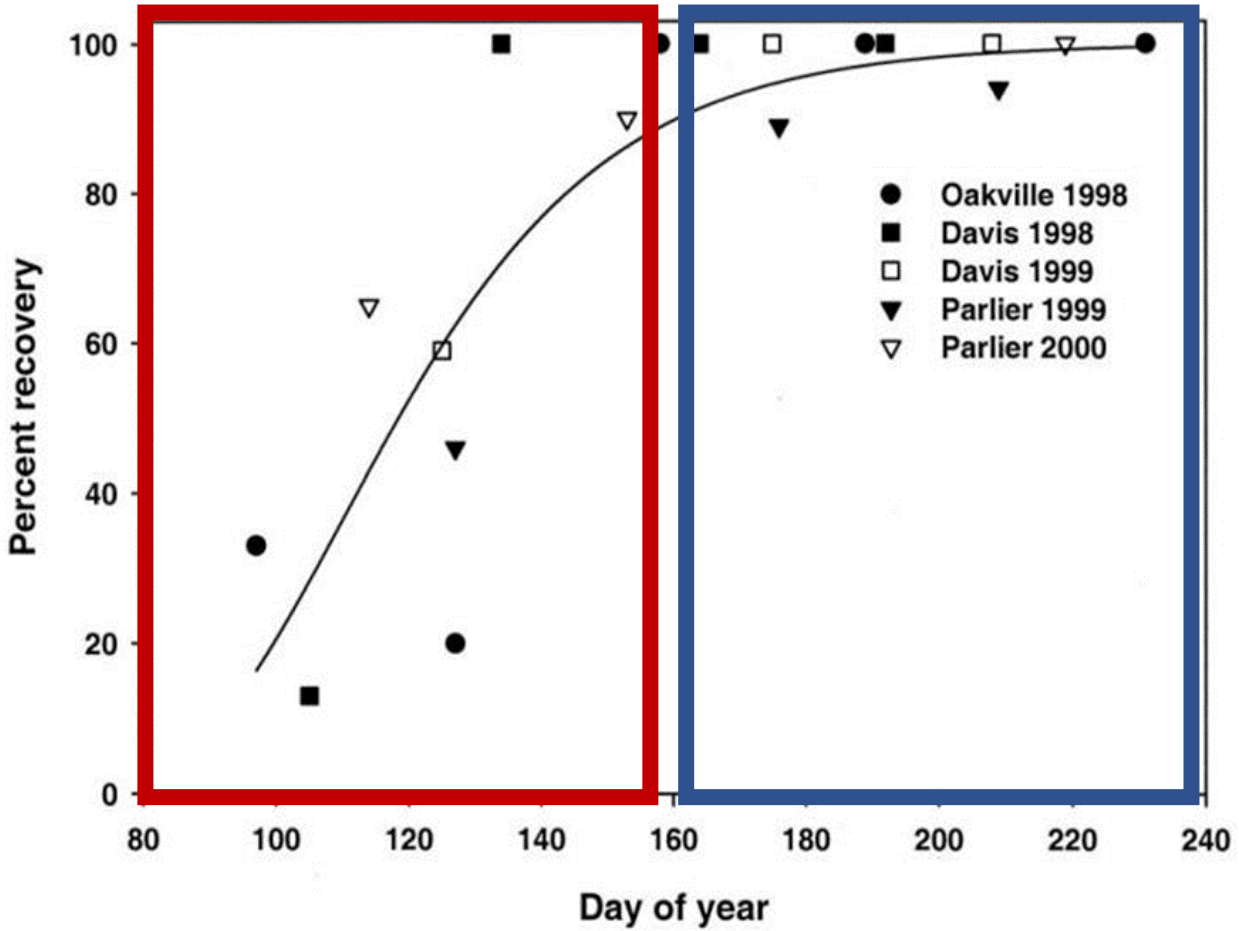
Temperature-dependent vine recovery

Winter temperatures

Cultivar susceptibility

Summer temperatures

Xylella fastidiosa can be eliminated from infected vines over the winter



Time of inoculation

Late season – vines recover

Early season – chronic infections

Feil et al (2003) Phytopathology 93 (2) pg 244-251

Many studies of vine recovery focused on northern California

North Coast

Napa

UC Davis

Fresno County

Milder winters in southern regions can impact vine recovery rates

Southern San Joaquin Valley (Table grapes)

Temecula Valley

Northern and southern California have different winter chill hours

1600
1400
1200
800
600
200

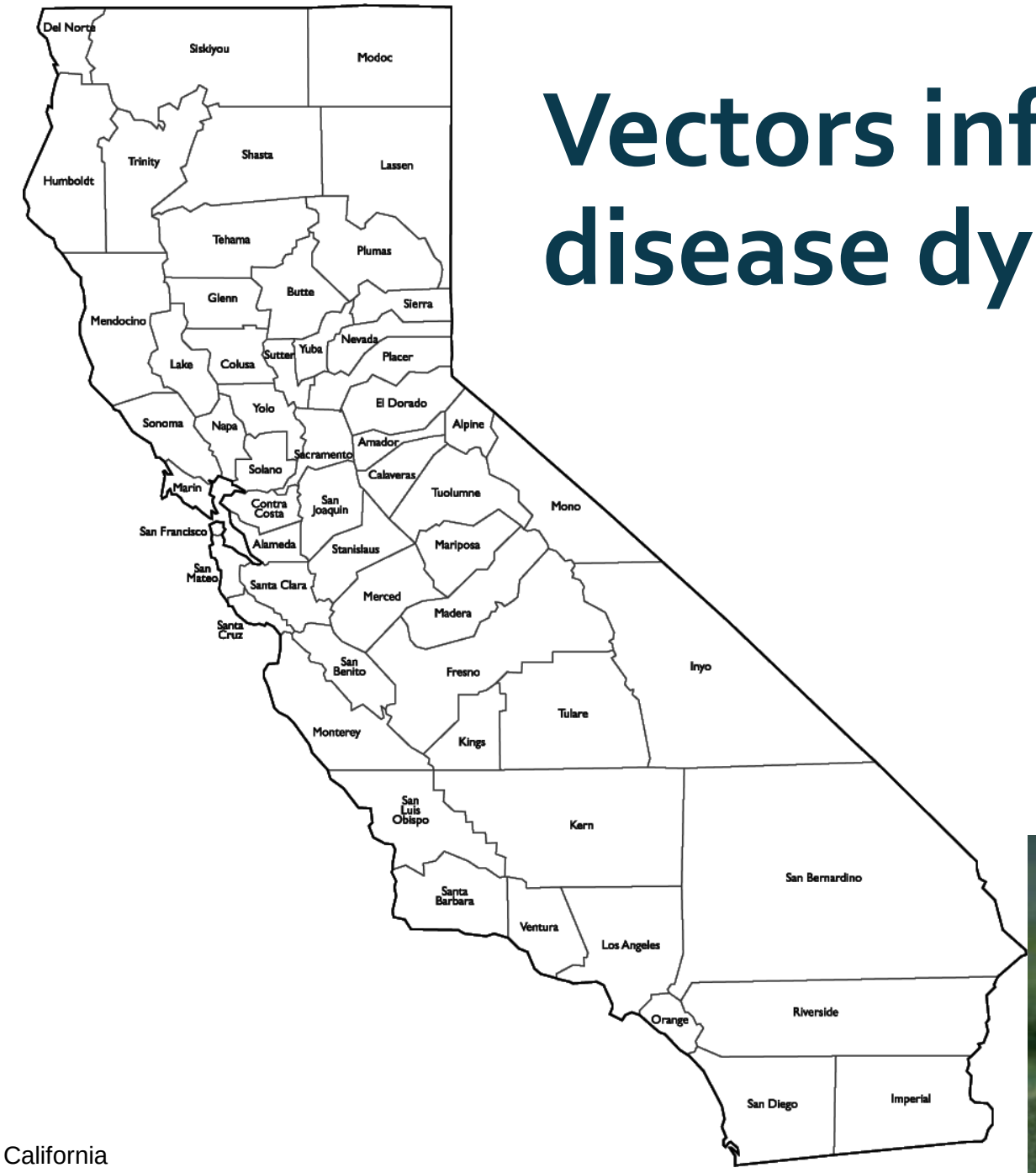
Hours ≤ 45° F (7.2 °C)

Cumulative effect

Image created by Mississippi State Extension with data from University of Maryland (https://webapps.msucares.com/chill_hours/)

Vectors influence disease dynamics

Blue-green Sharpshooter



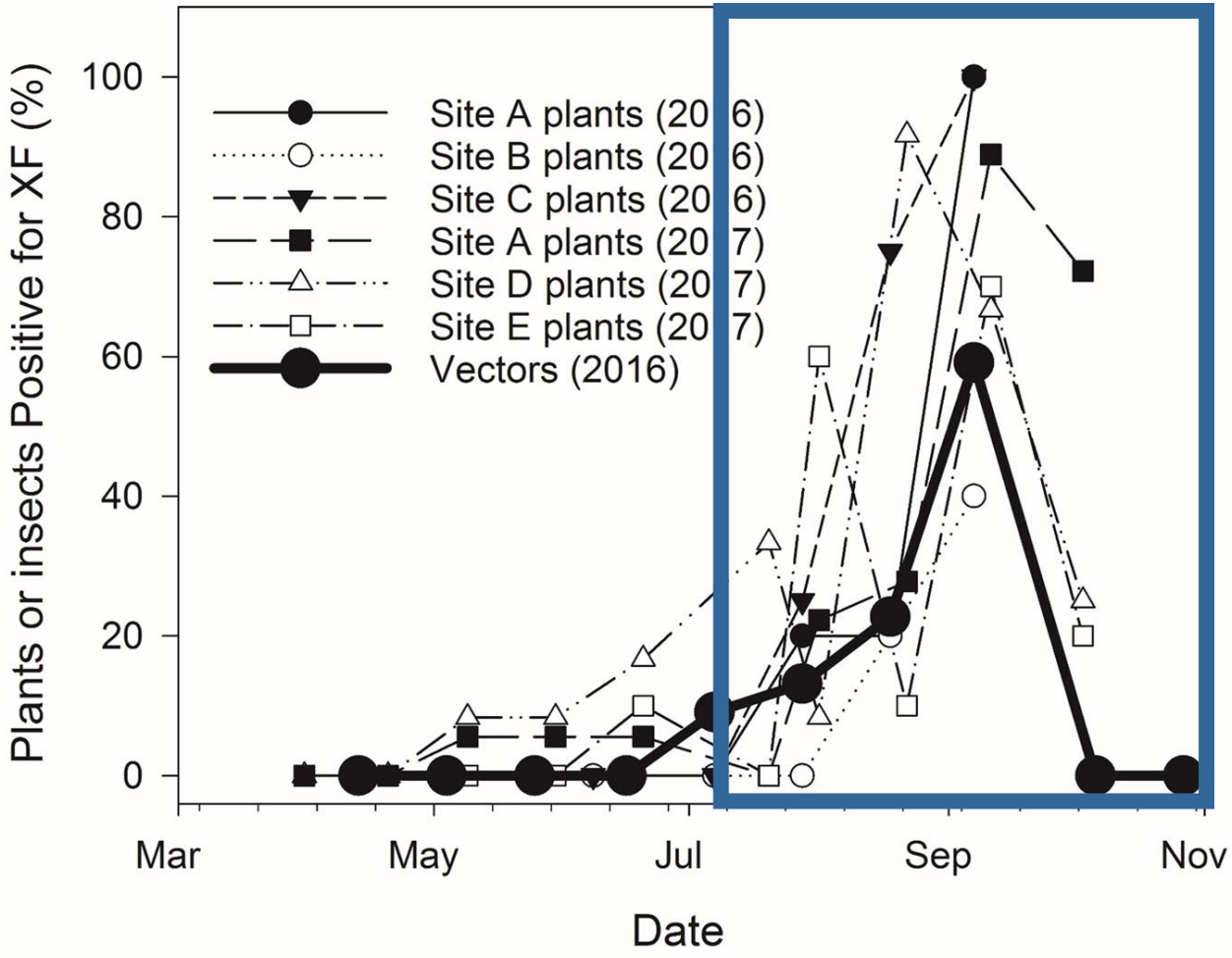
Glassy-winged Sharpshooter

Photos: UC Statewide IPM project, University of California

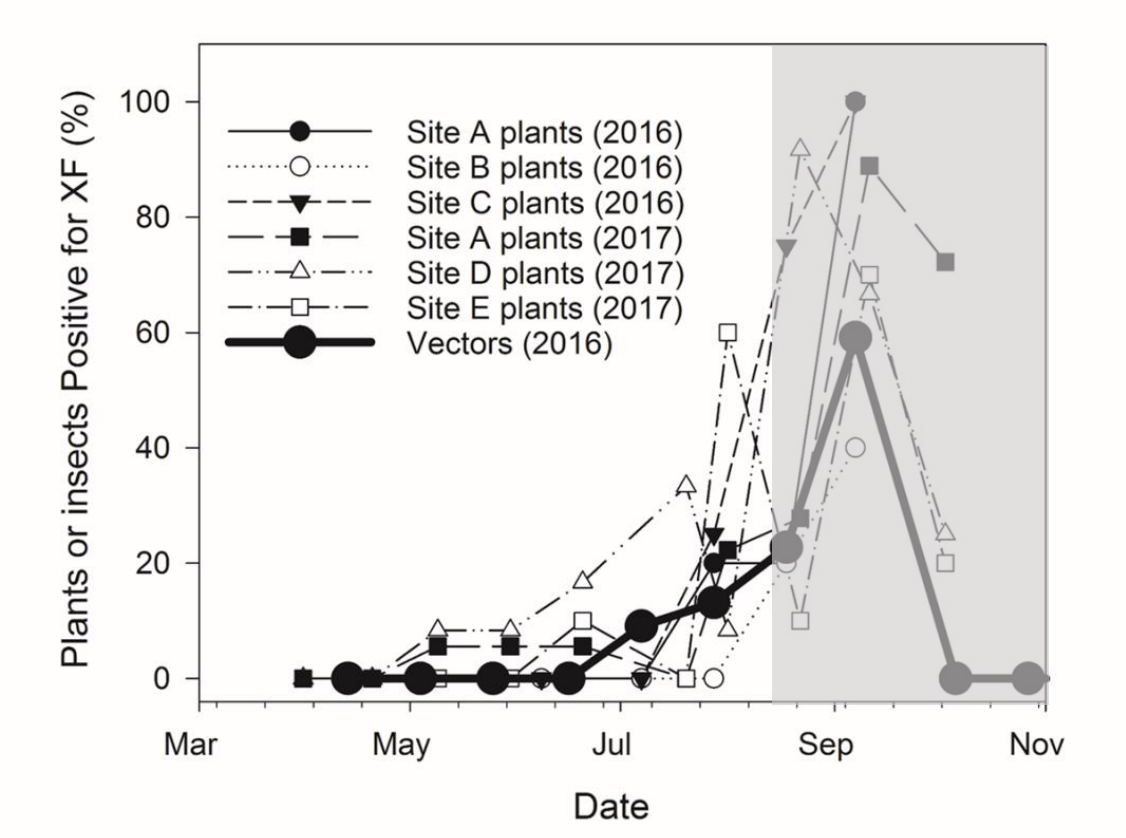
San Joaquin Valley experiences high Pierce's disease incidence

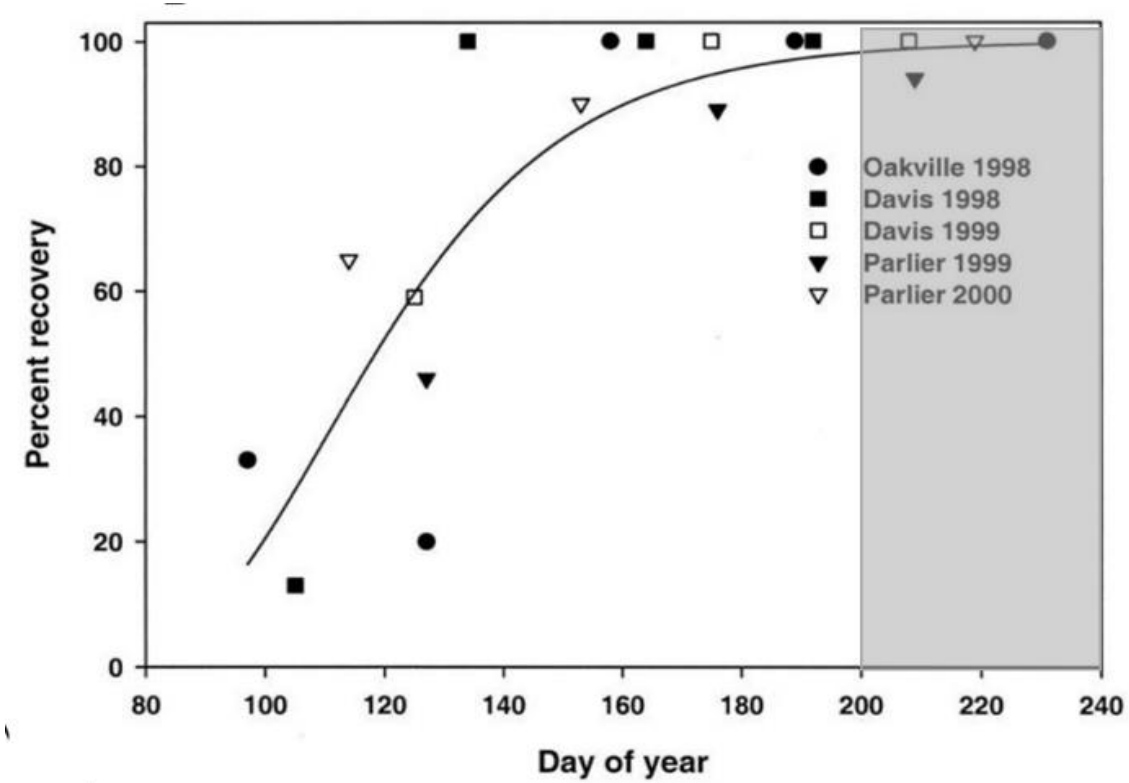
Photos: MS Sisterson

Pathogen is most easily detectable in late summer



Late summer inoculations likely cause reoccurring infections in southern California





Temperature-dependent vine recovery

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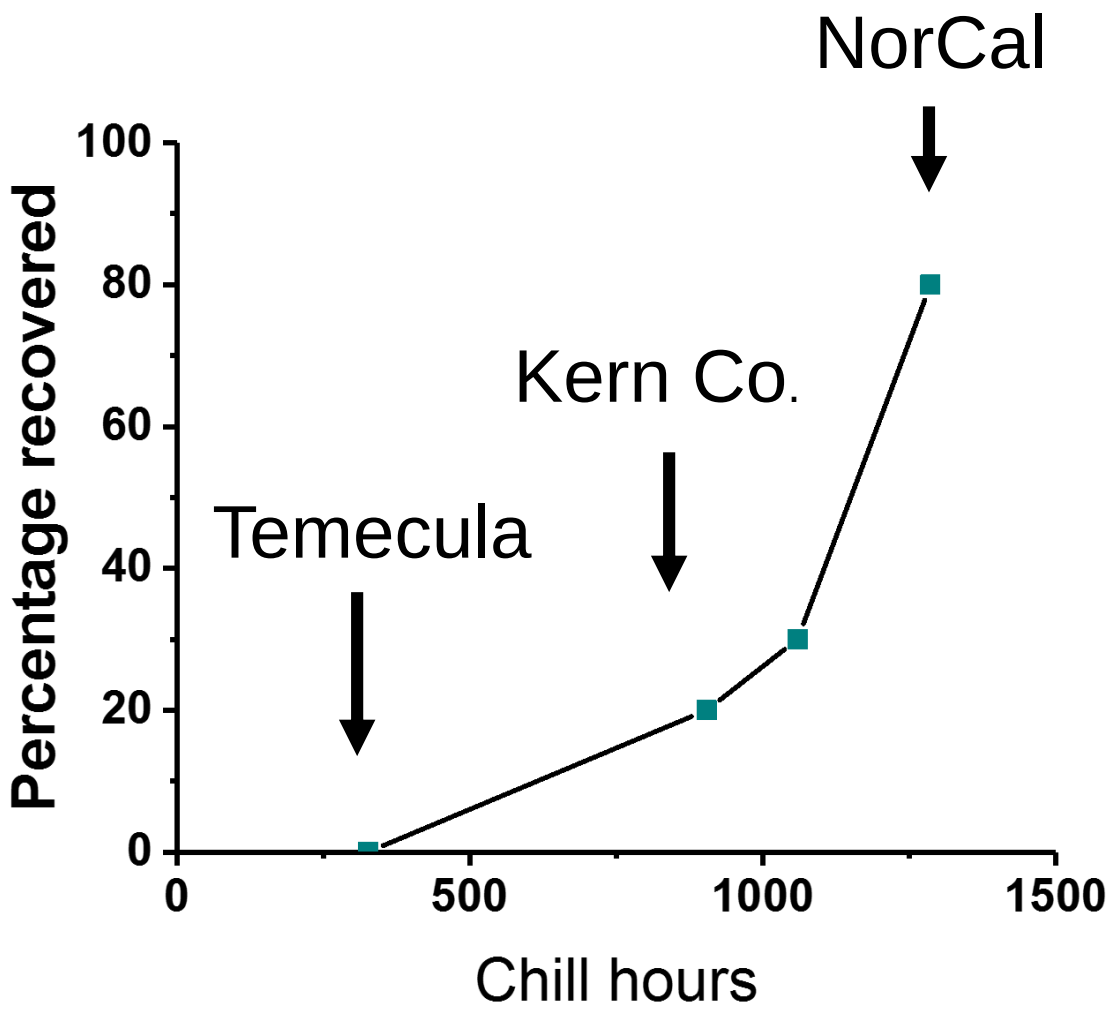
Cultivar susceptibility

Summer temperatures

Higher chill hours increase vine recovery



Chardonnay

Temperature-dependent vine recovery

Winter temperatures

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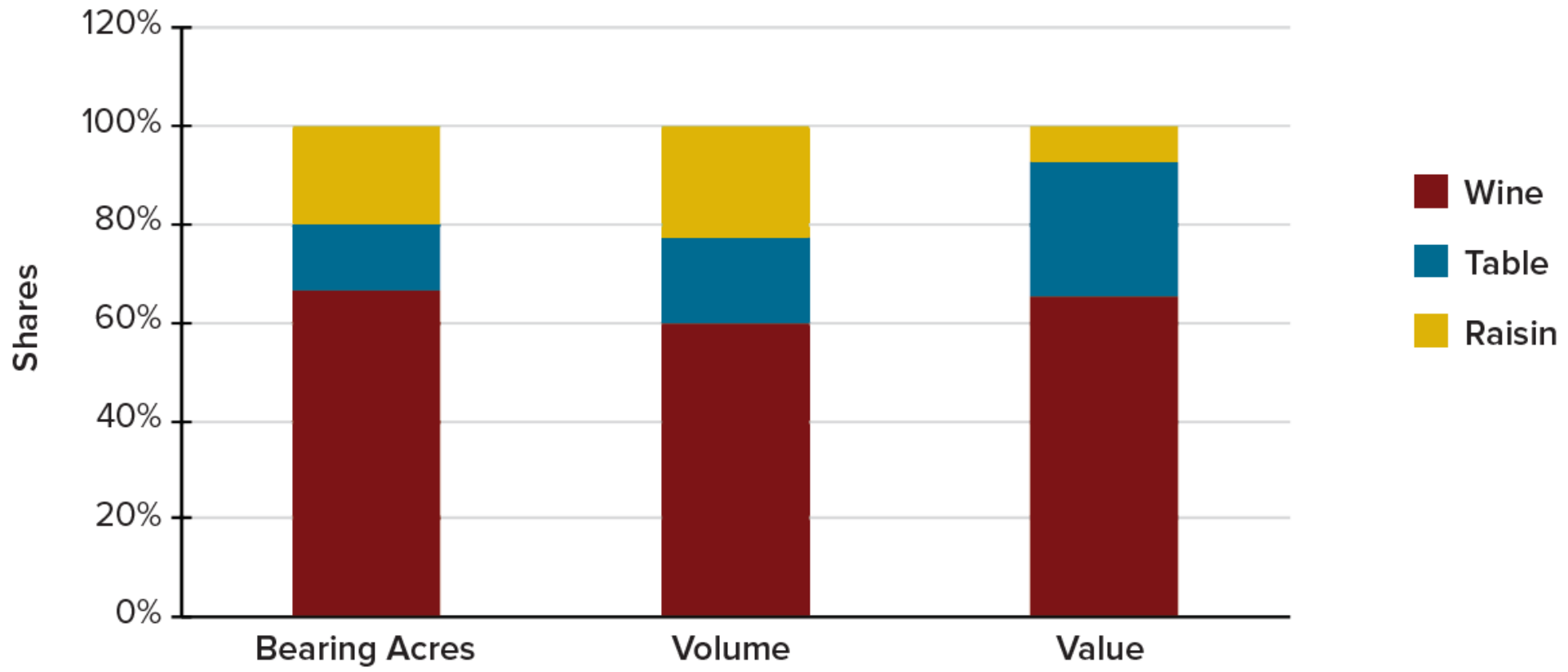
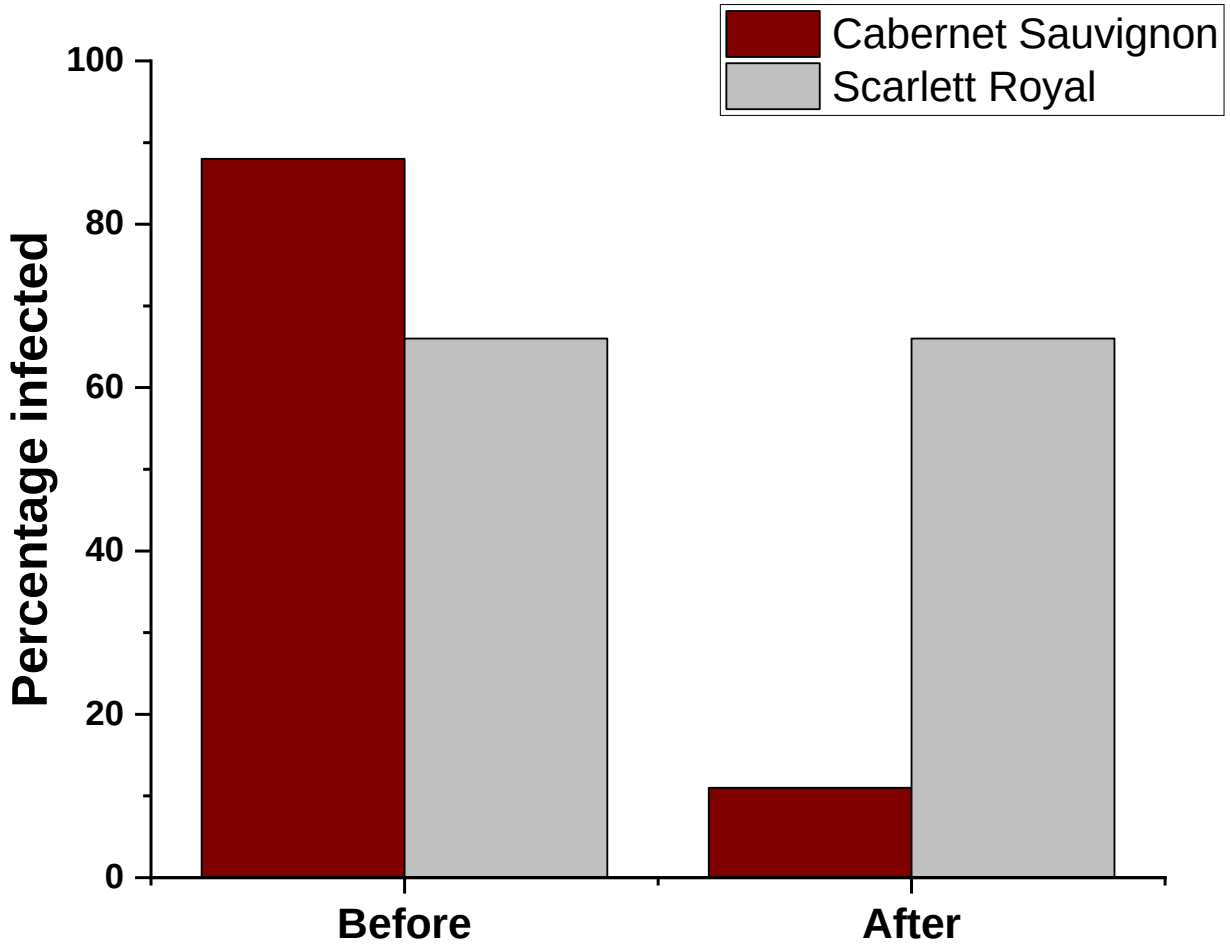
Less information is available relating to table grape varieties



Grape and Wine Production in California. Julian M. Alston, James T. Lapsley, and Olena Sambucci

Cultivar affects rate of vine recovery



Cold treatment = 4 weeks at 4° C

Temperature-dependent vine recovery

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Cultivar susceptibility

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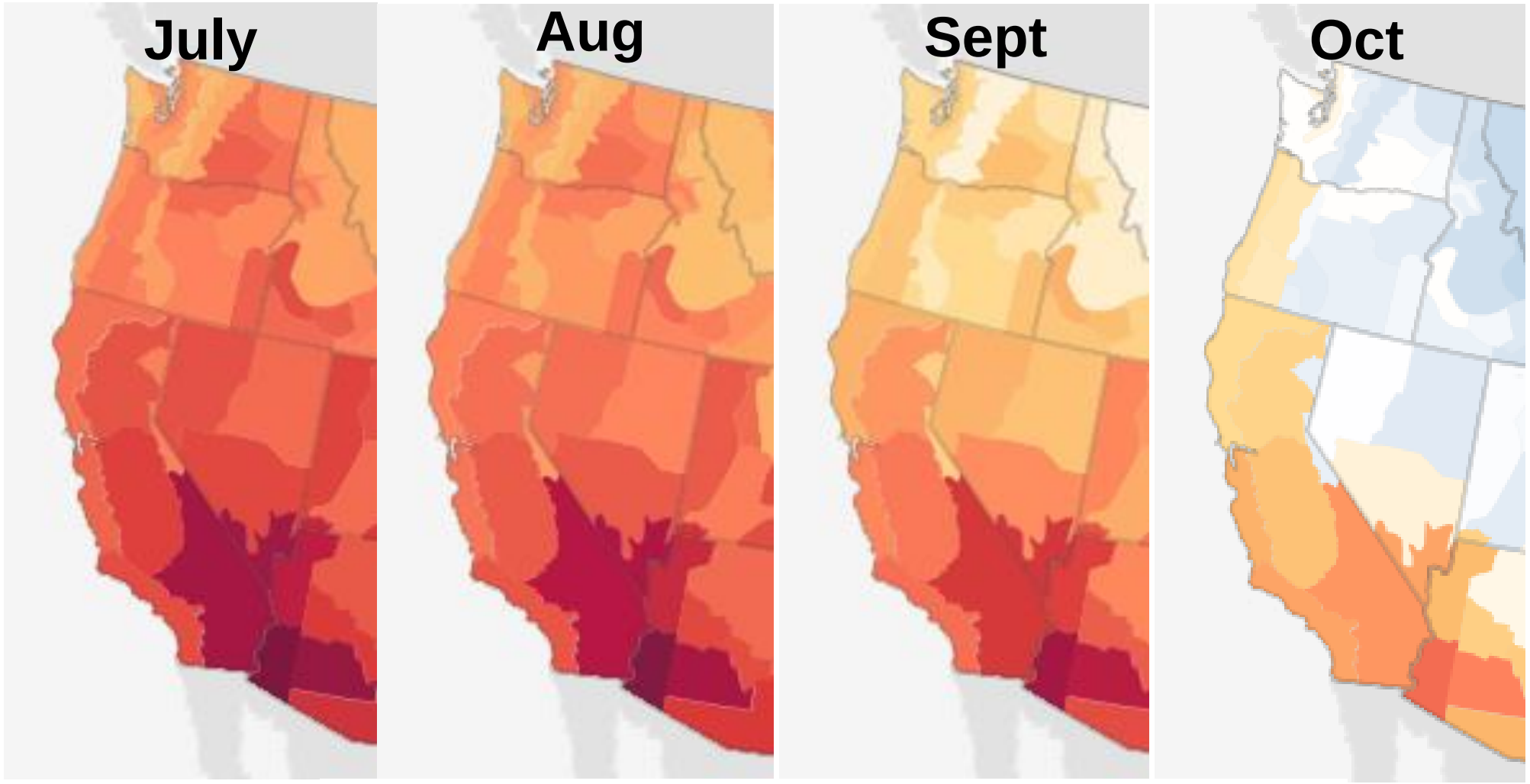
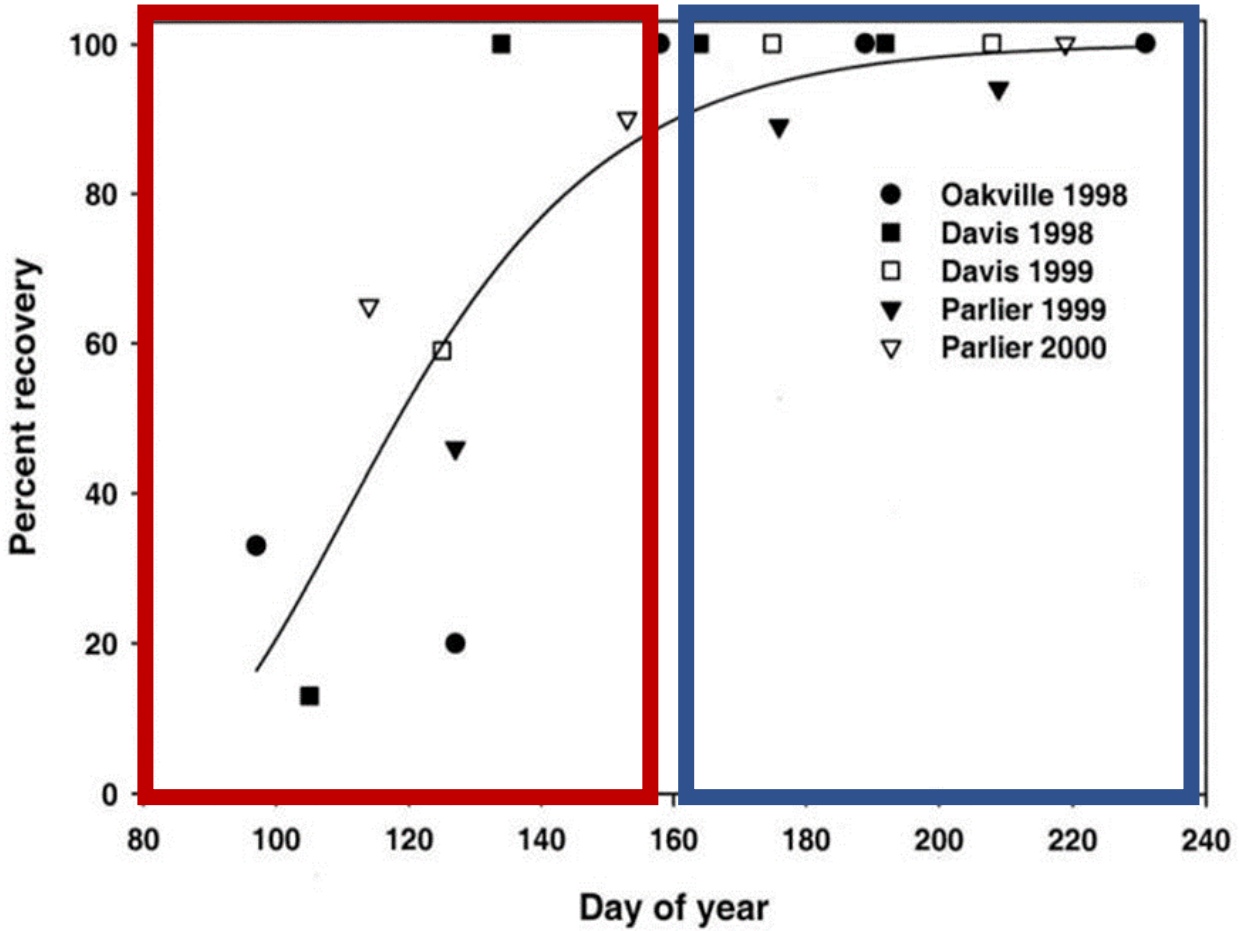
Summer temperatures are also higher in southern California



Temperature data from the National Oceanic and Atmospheric Administration (US)

The time of inoculation effect – duration or seasonal temperature?



Time of inoculation

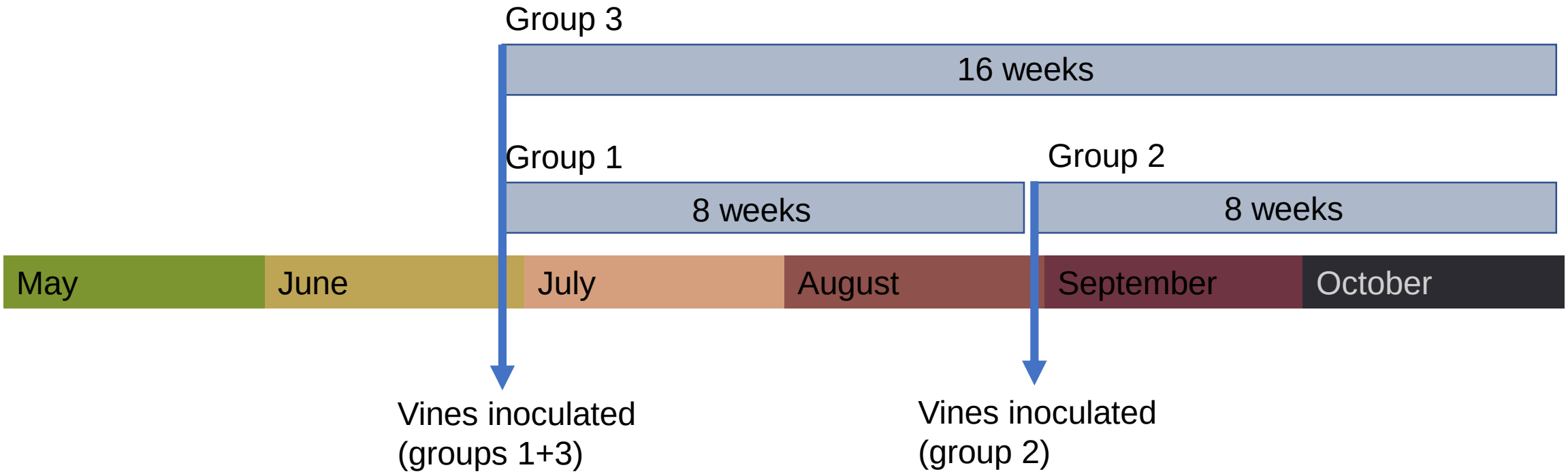
Late season – vines recover

Early season – chronic infections

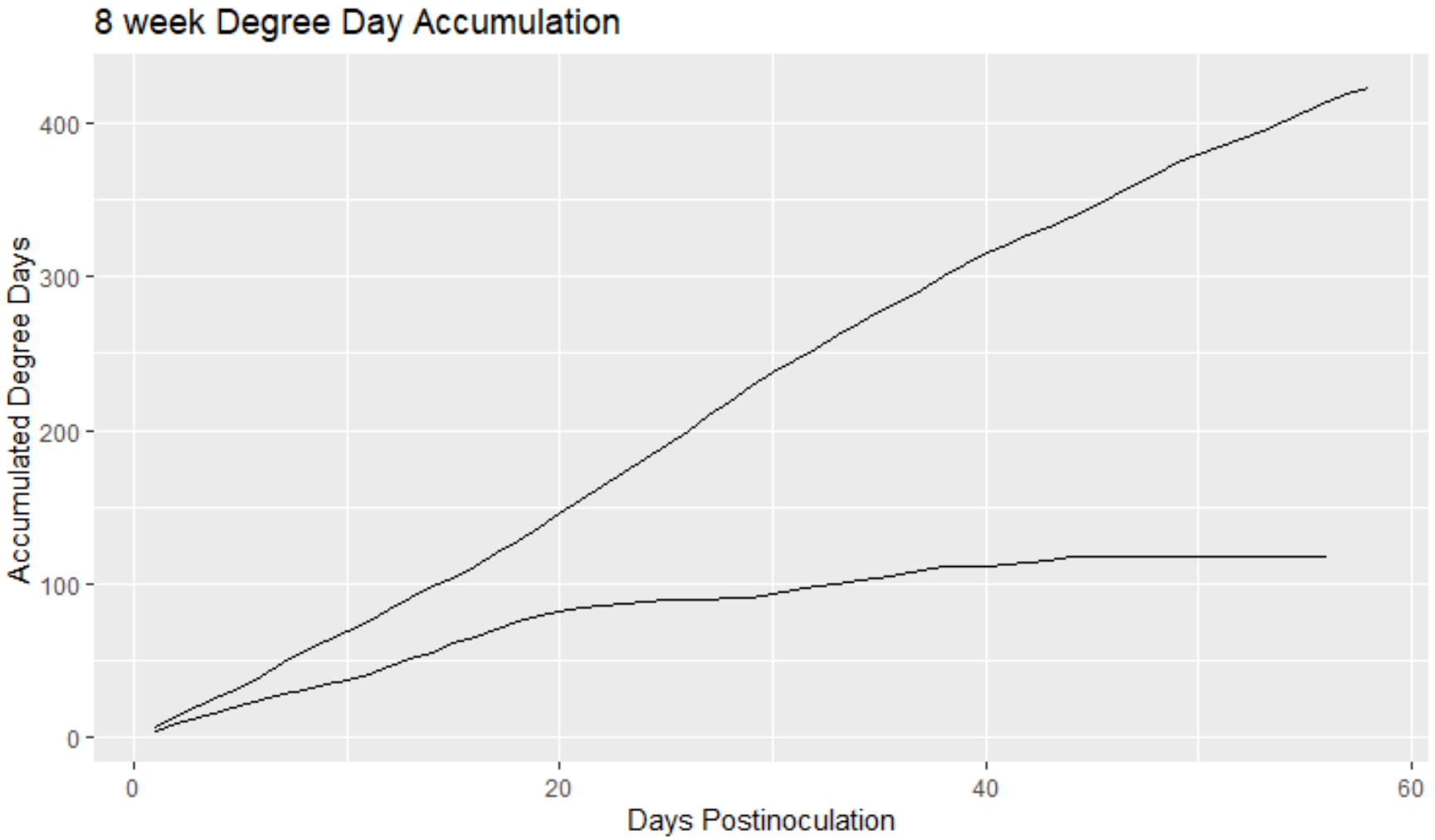
Feil et al (2003) Phytopathology 93 (2) pg 244-251

High temperature promotes disease progression

Inoculation experiments to separate effects of temperature from effects of time



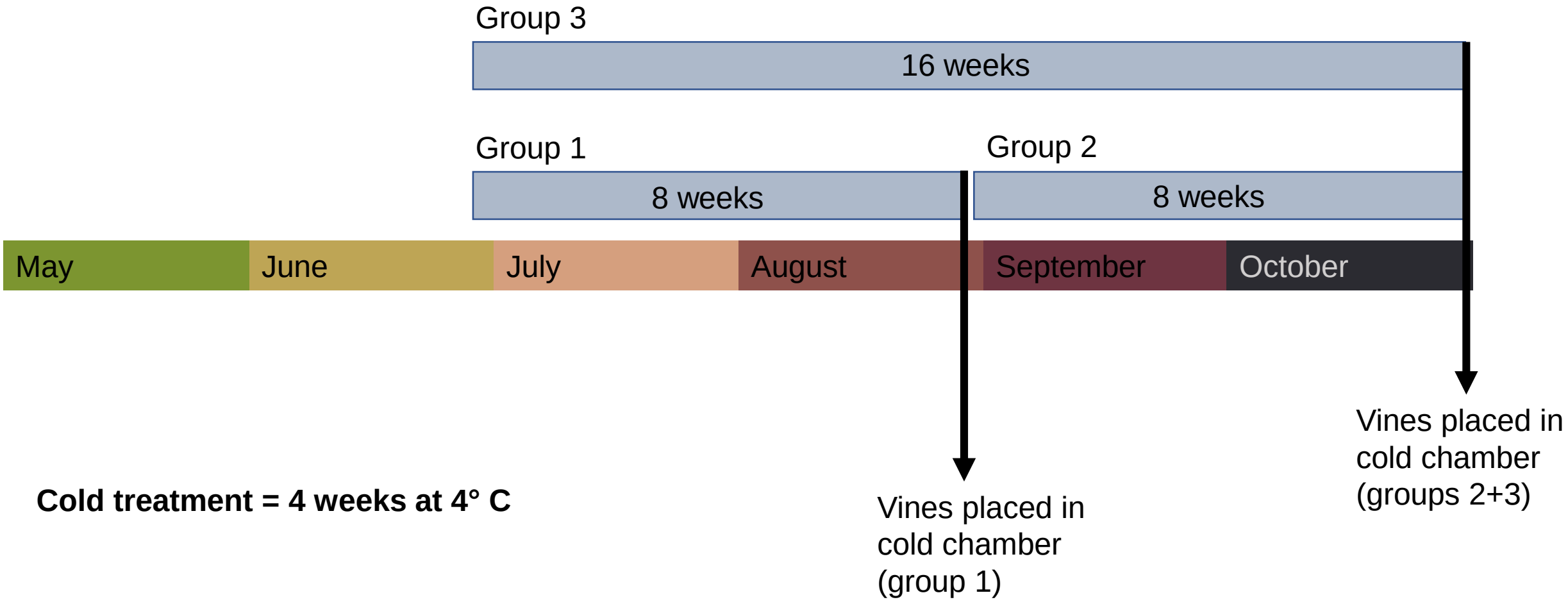
Degree day accumulation is faster earlier in the summer



Group 1

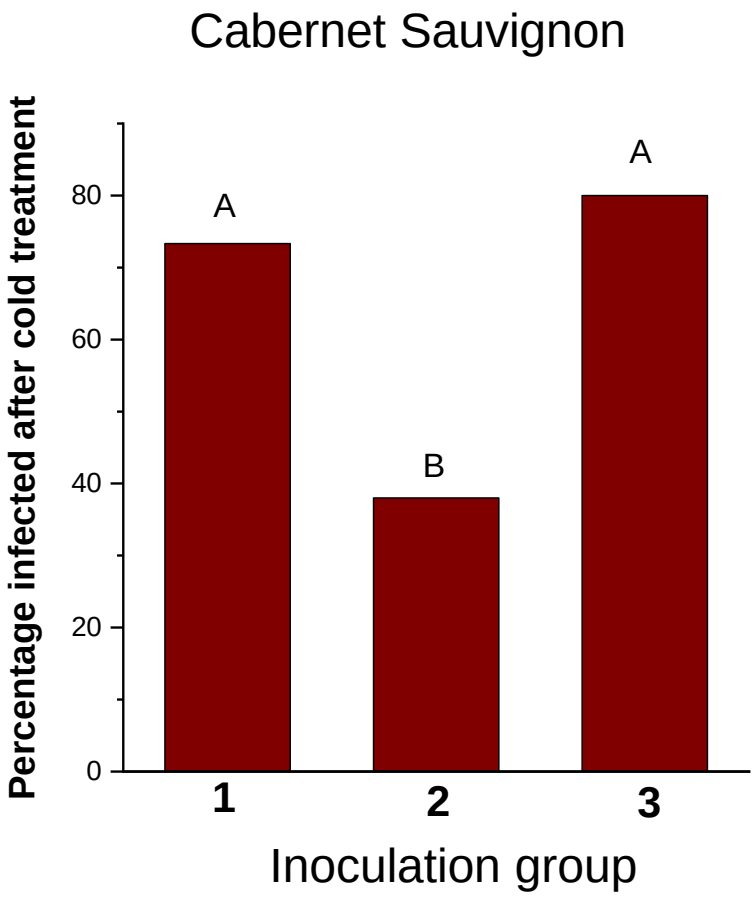
Group 2

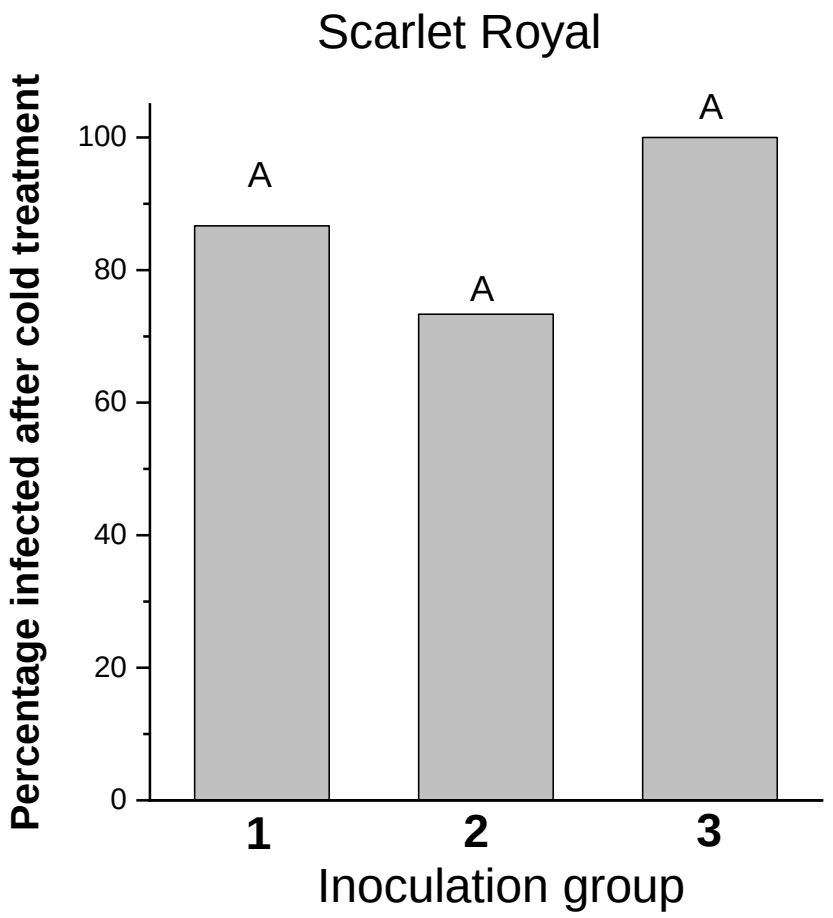
Inoculation experiments to separate effects of temperature from effects of time



Cold treatment = 4 weeks at 4° C

Degree day accumulation affects vine recovery





Groups 1+2 = 8 weeks
Group 3 = 16 weeks

Temperature-dependent vine recovery

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Cultivar susceptibility

USDA Agricultural Research Service

Lab Members
Brandon Ortega
Wei Wei
Nathan Luna
Robert Leija
Joanna Ochoa

Collaborators
Mark Sisterson
Rachel Naegele
Rodrigo Krugner
Drake Stenger