

# Plant collapse caused by *Fusarium oxysporum*



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# *Fusarium oxysporum*

Common soilborne fungus

Most strains are not  
pathogenic



# ***Fusarium oxysporum***

**Common soilborne fungus**

**Most strains are not  
pathogenic**

**Many host-specific  
pathogens**

**Tomato**

**Melon**

**Cotton**

**Lettuce**

**Celery**

# *Fusarium oxysporum*

Host-specific pathogen on strawberries

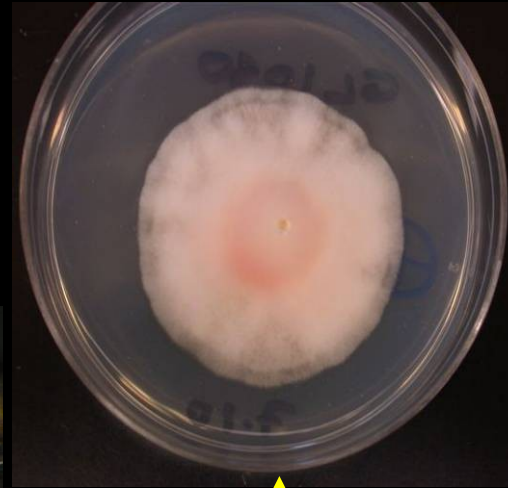
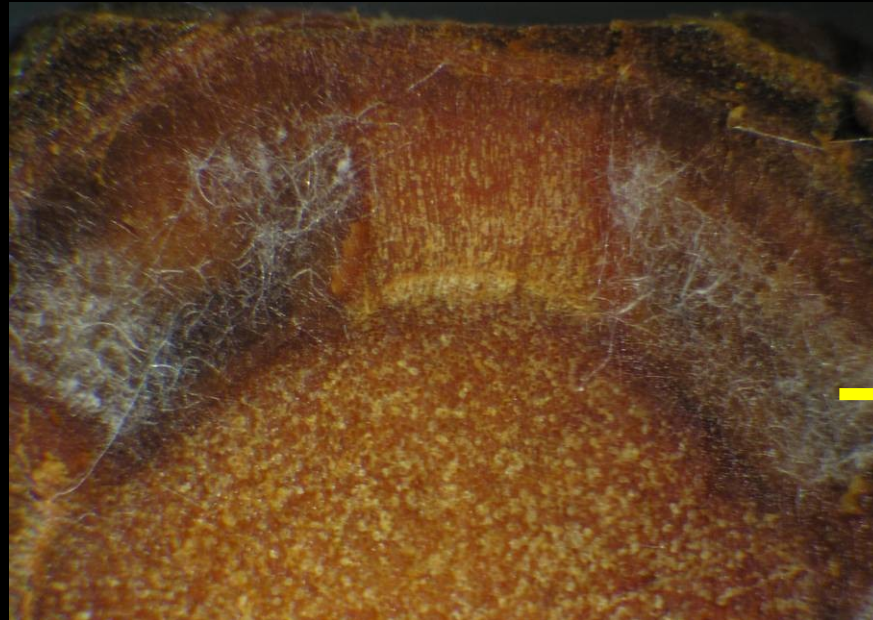
Monterey County

Ventura County



# *Fusarium oxysporum*

**Vascular pathogen**



Causes wilting and plant collapse

# Factors influencing severity of Fusarium wilt

Inoculum level in soil

Environmental conditions

Cultivar susceptibility

# Preplant soil fumigation



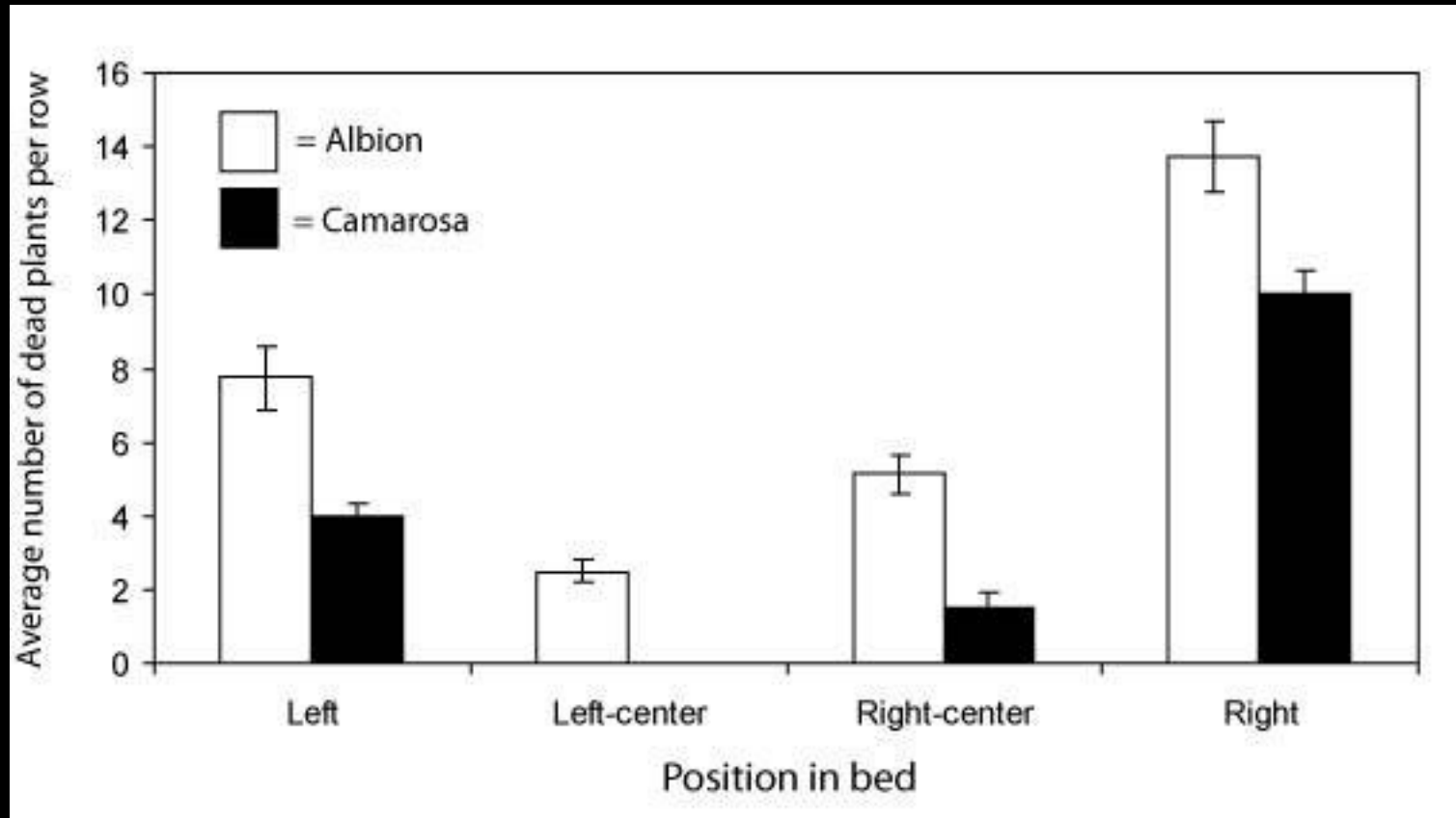


Inadequate exposure  
to fumigant

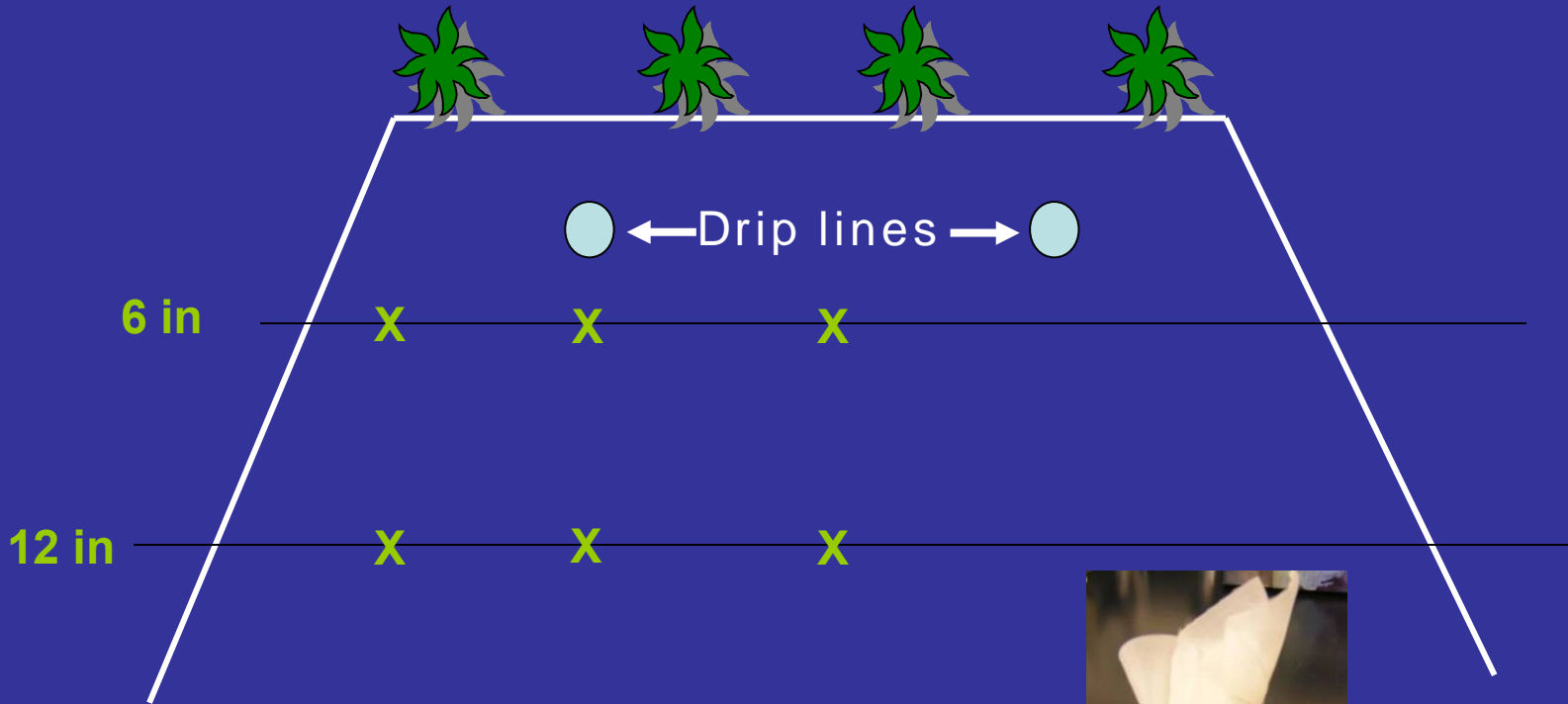
Mortality is not evenly  
distributed across beds



# Effect of bed location on plant mortality

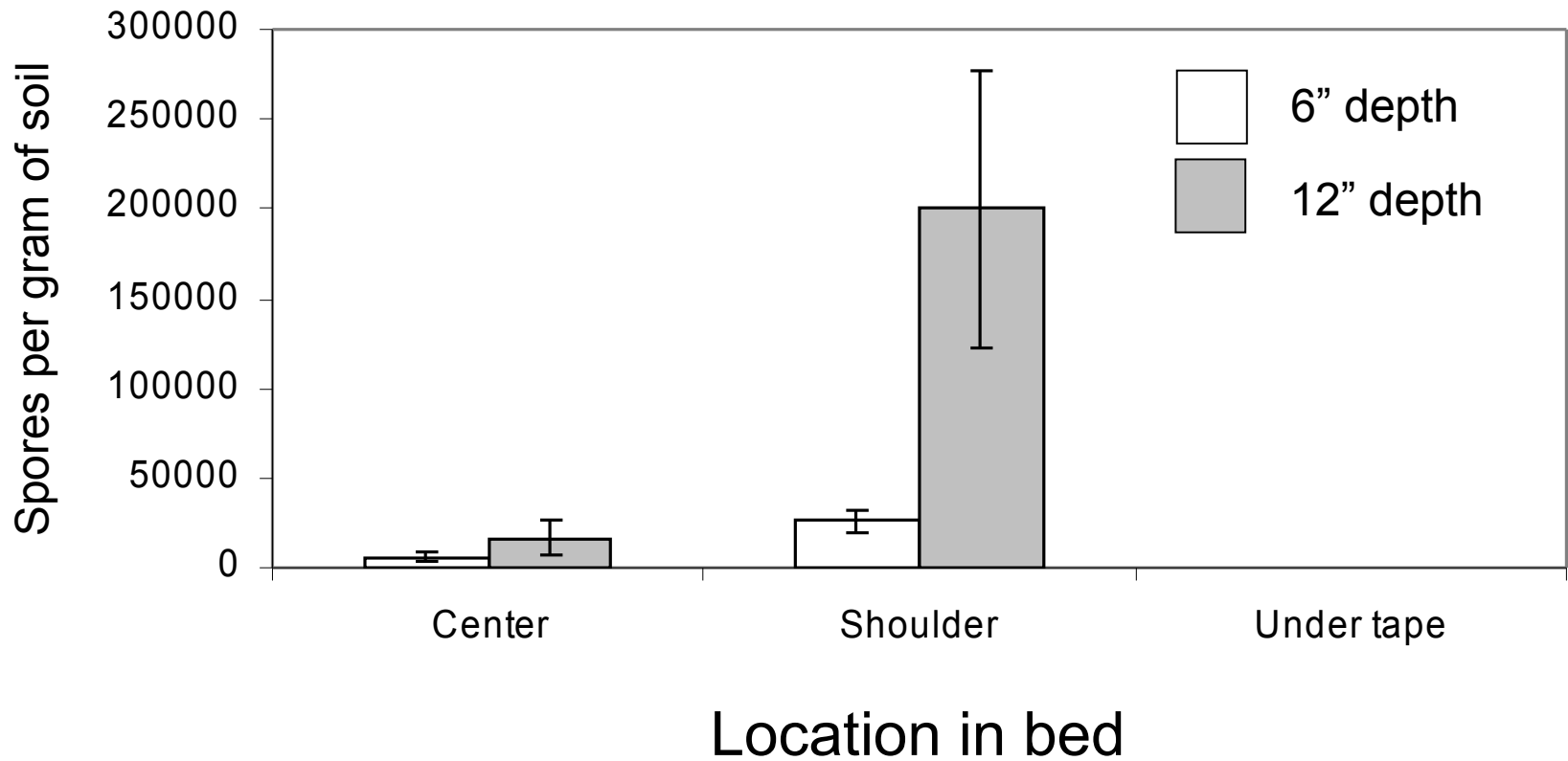


# Inoculum buried in beds prior to fumigation

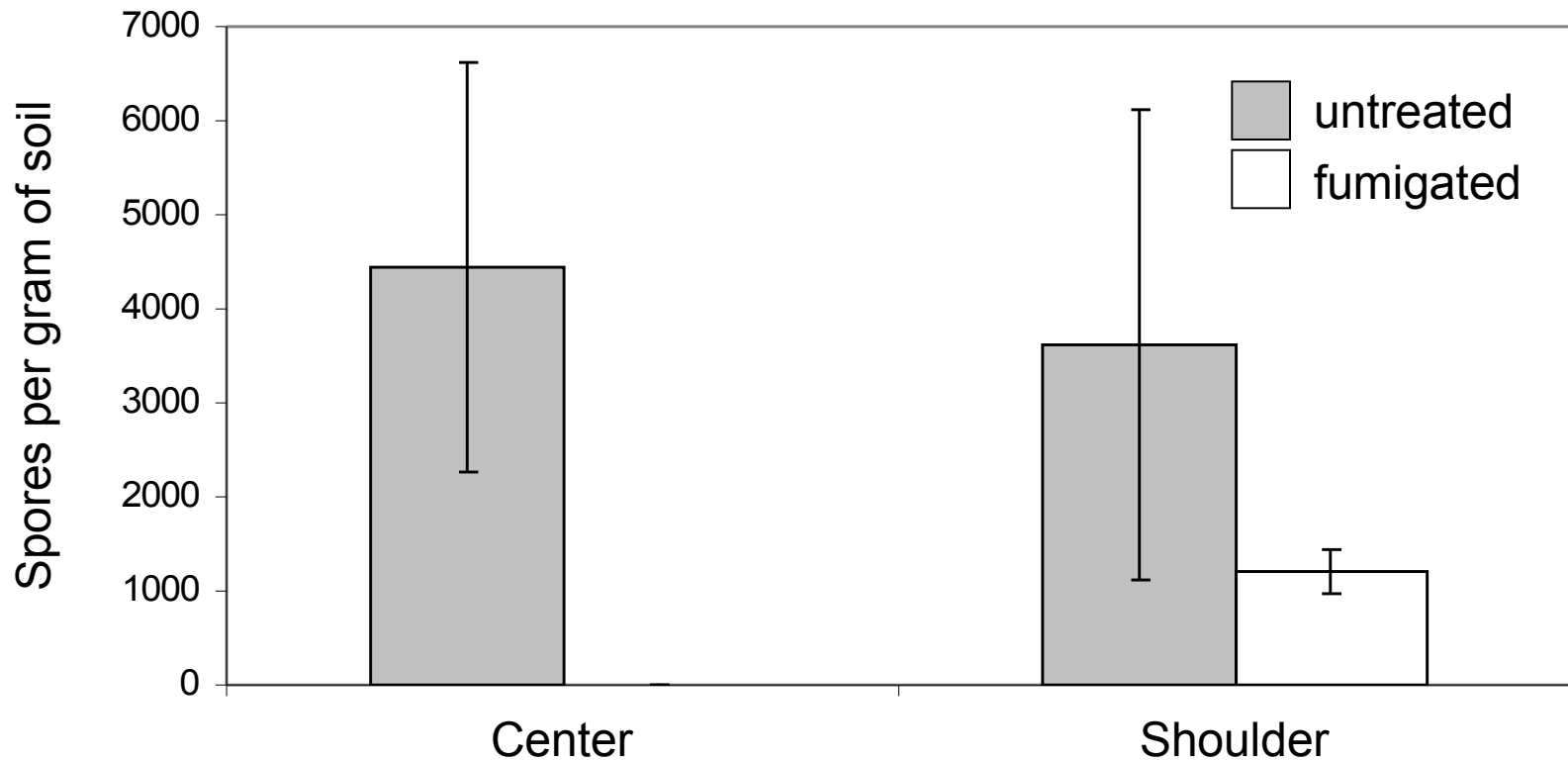


# Effect of location on fumigant efficacy

Beds fumigated with Pic-60



# Pic 60 followed by metam sodium

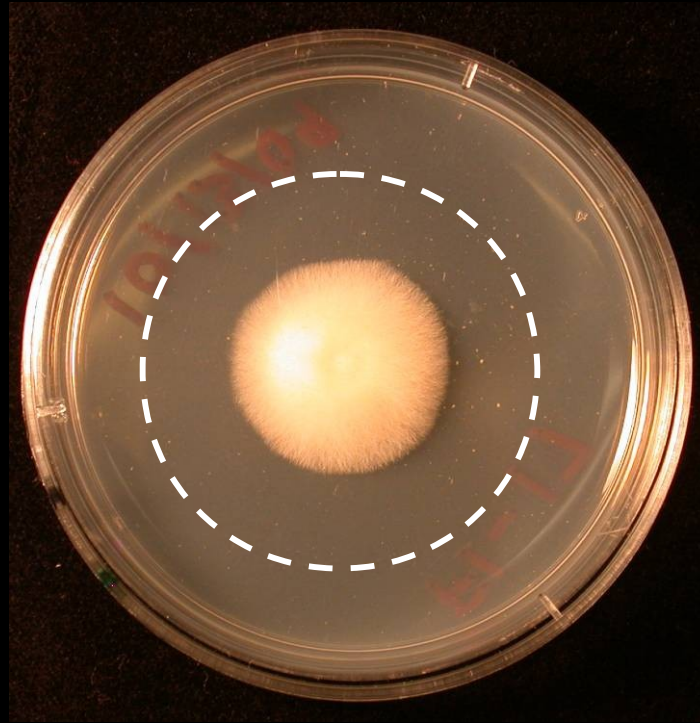


Consider more than two drip lines

Does soil pH affect severity of disease?

Elevating pH to 7.0 reduced  
severity of Fusarium wilt of tomato

Test effect of pH on growth of *Fusarium  
oxysporum*



Test effect of pH on growth of *Fusarium oxysporum*

Growth medium adjusted to

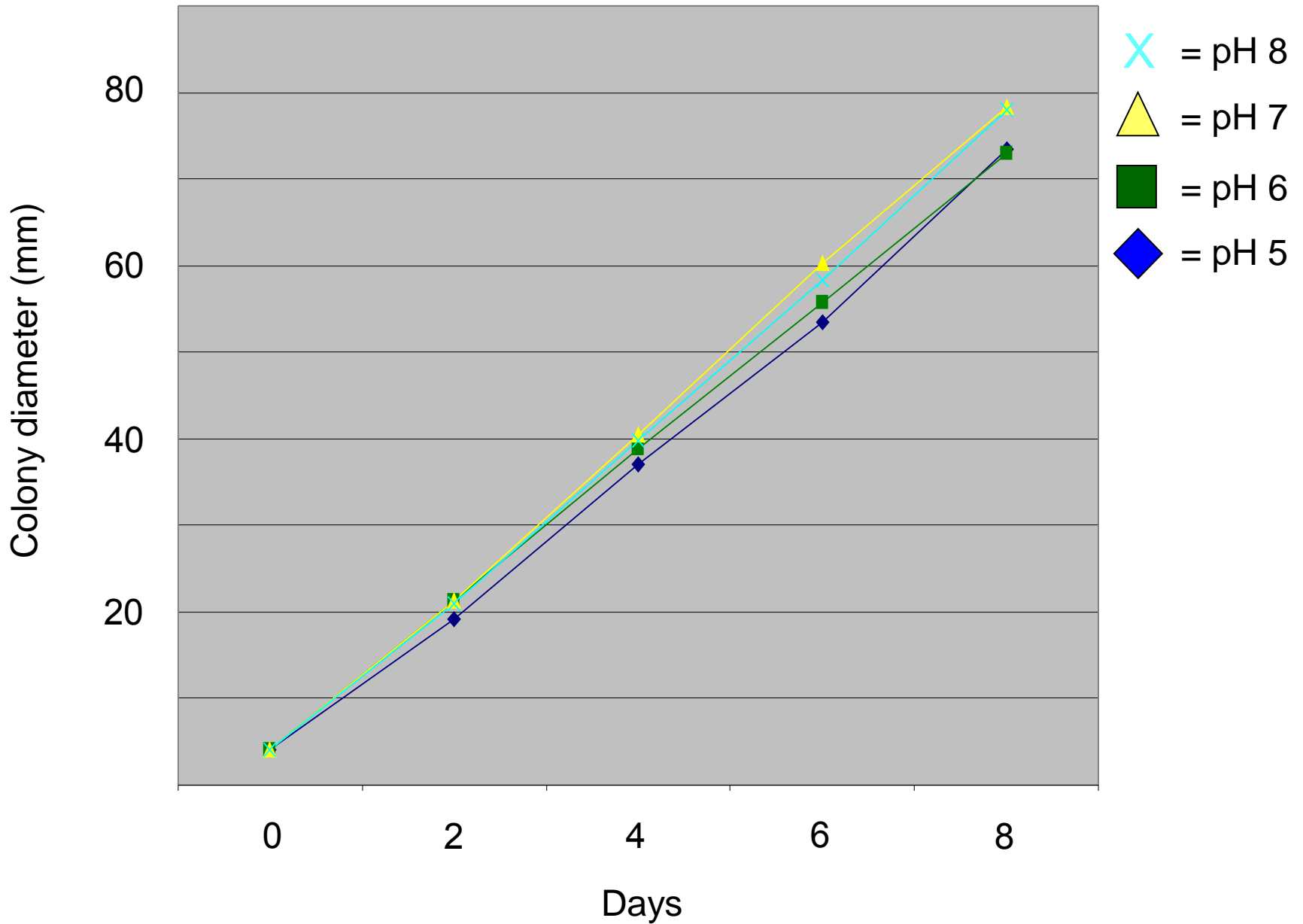
pH 5

pH 6

pH 7

pH 8

Effect of pH on growth of *Fusarium oxysporum*

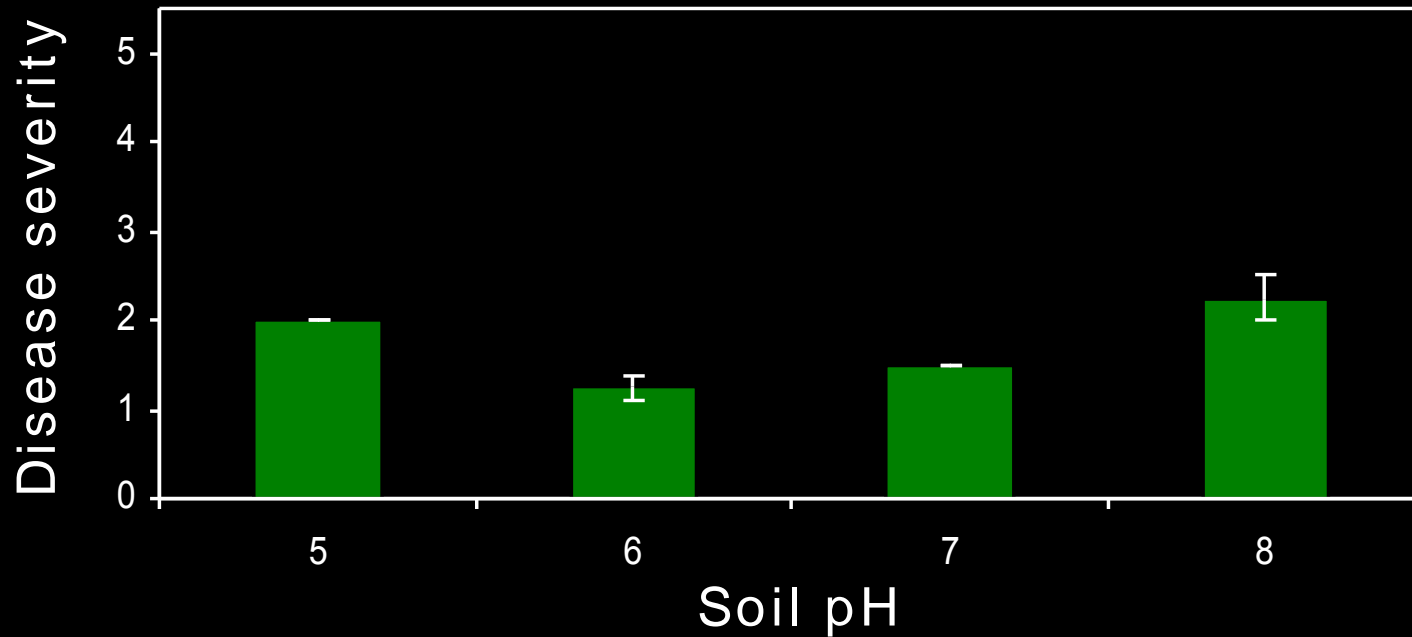






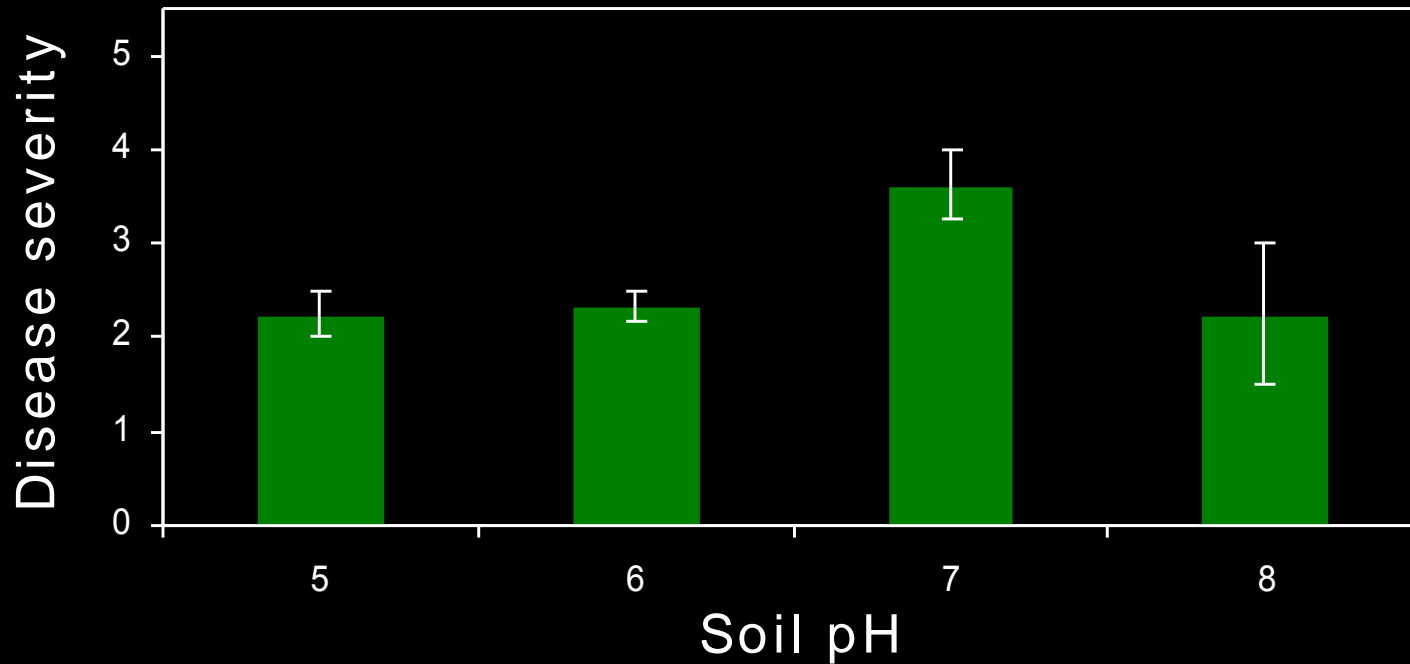
# Effect of soil pH on disease severity

Inoculum density = 500 Colony-forming units per gram



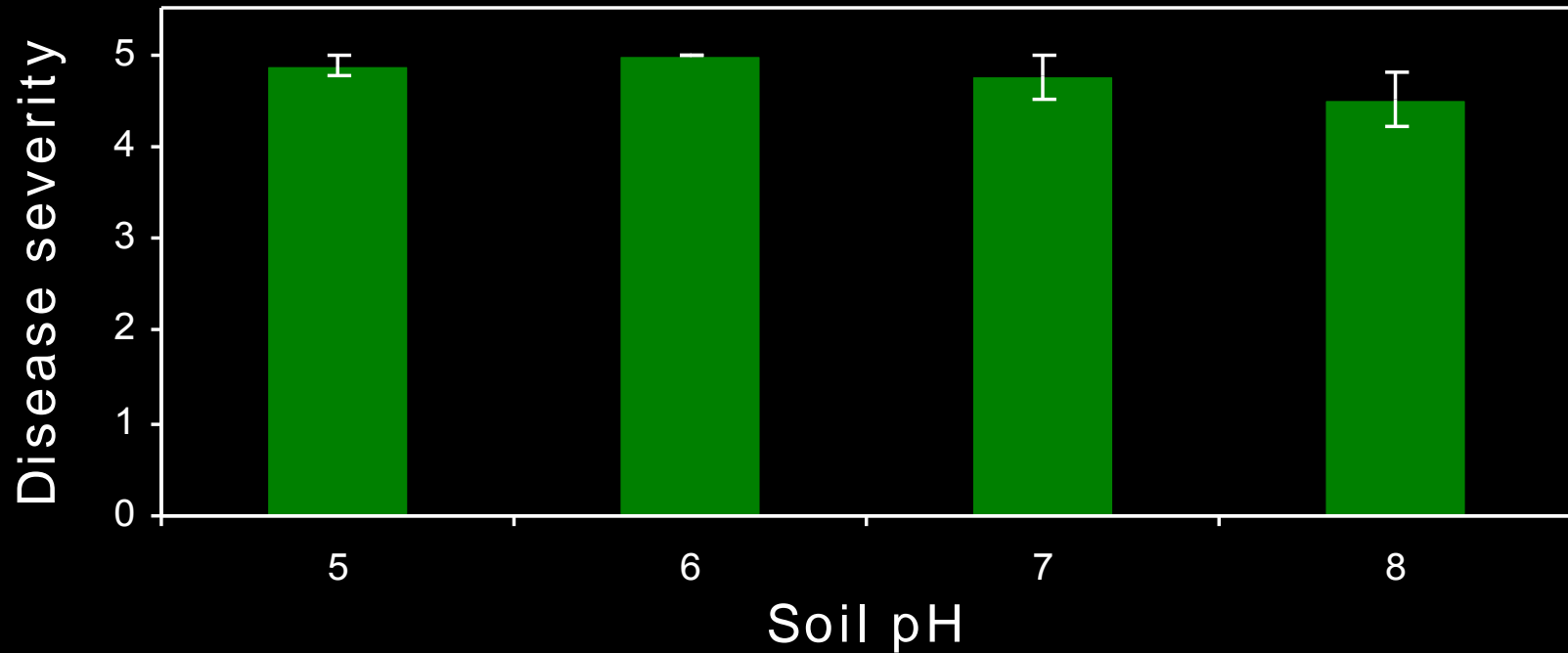
# Effect of soil pH on disease severity

Inoculum density = 5000 Colony-forming units per gram



# Effect of soil pH on disease severity

Inoculum density = 50,000 Colony-forming units per gram



No experimental support for  
a beneficial effect of pH

pH

6.0

7.0

8.0

50,000

5000

500

0



# Varietal differences in susceptibility



Inoculated



Control



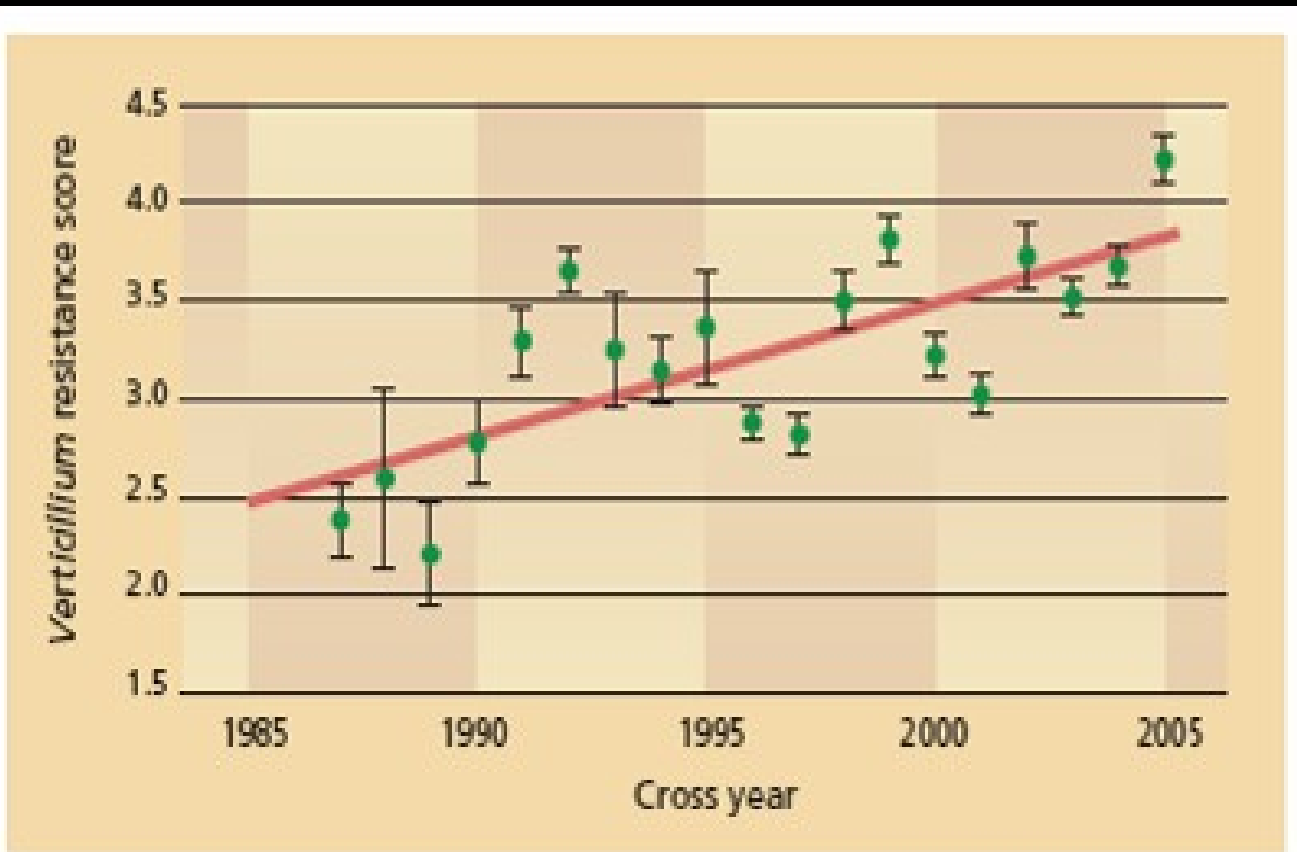
# Strawberry breeding improves genetic resistance to *Verticillium* wilt

by Douglas V. Shaw, Thomas R. Gordon, Kirk D. Larson, W. Douglas Gubler, John Hansen and Sharon C. Kirkpatrick

*Since 1994, more than 480 genotypes from the UC strawberry breeding program have been screened for resistance to *Verticillium dahliae* Kleb., an important soil pathogen of strawberry. Genotypes for parents of subsequent generations have been chosen using a multiple-trait strategy that incorporates their *Verticillium* resistance rating. This selection strategy has increased resistance scores for the parents by 60%, and increased the percentage of moderately resistant genotypes from 35.0% in the*



# Increase in resistance scores over time



1 – 5 scale

1 = Susceptible

5 = Resistant

Fig. 1. Changes in the mean *Verticillium* resistance score (1 = severely diseased, and 5 = no symptoms of disease) in genotypes from cross years 1987 (original germplasm) to 2005,  $\pm$  standard error.

# Susceptibility to Fusarium wilt



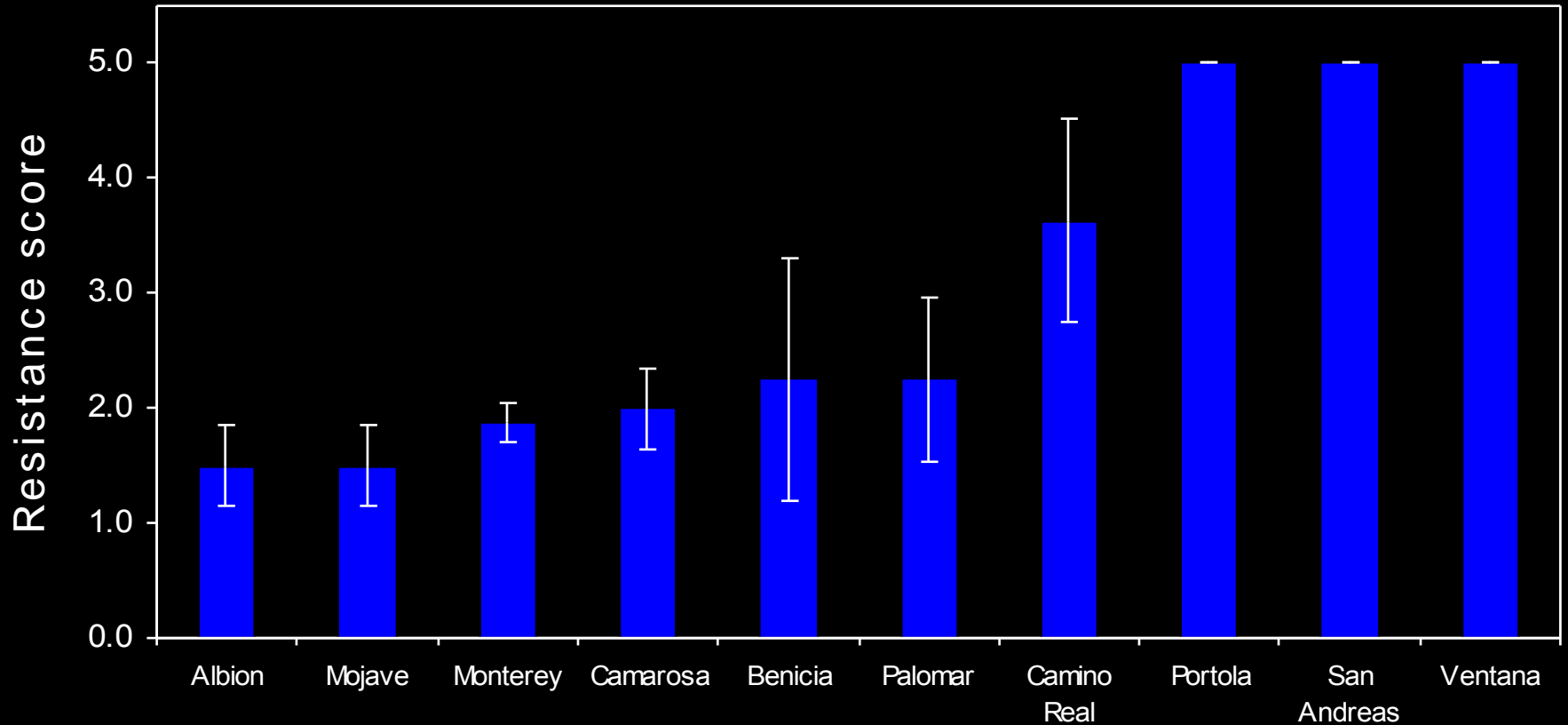
Camarosa



Ventana

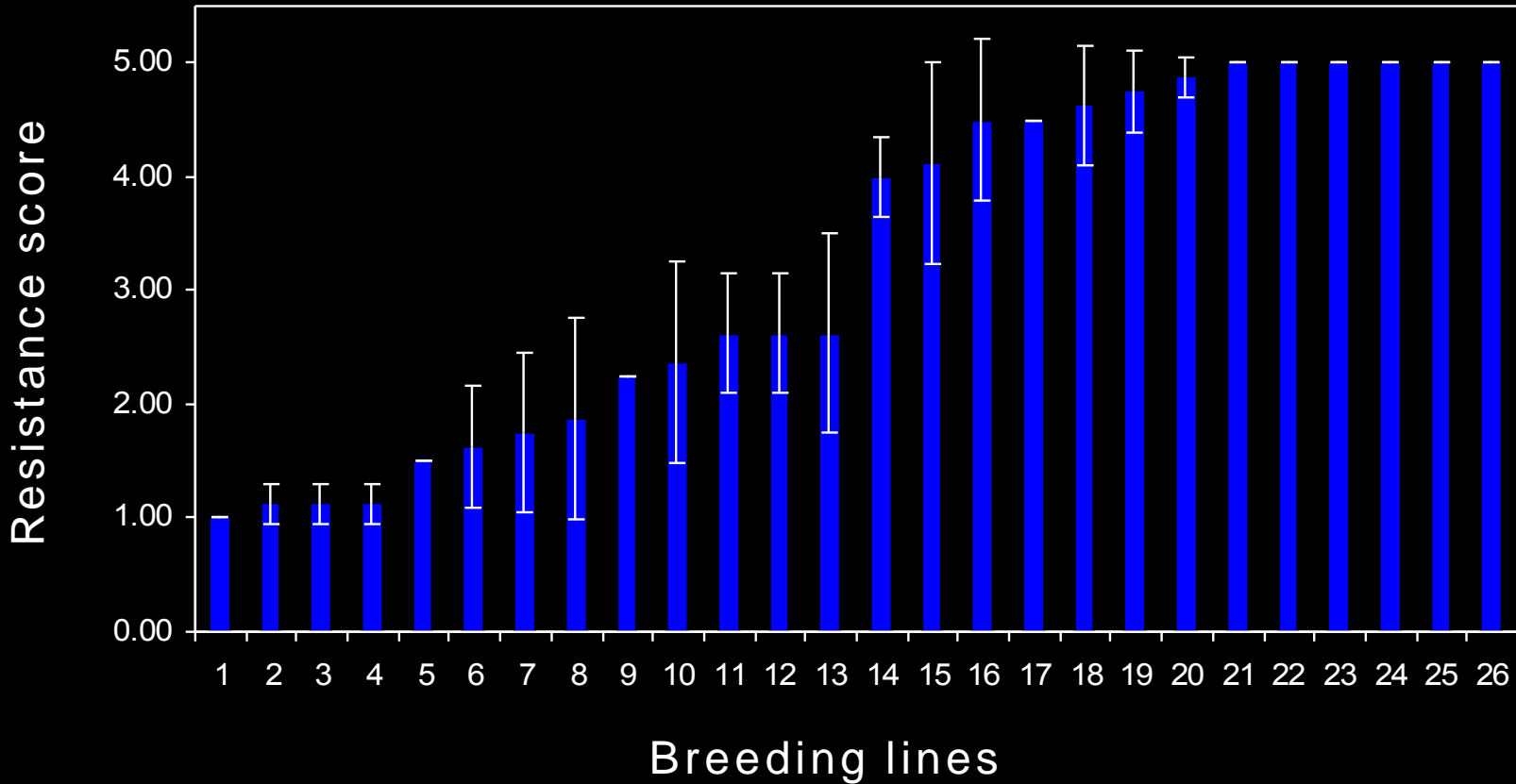


# Currently grown UC cultivars



**1 – 5 Scale; 1 = Susceptible, 5 = Resistant**

# Advanced breeding lines



1 – 5 Scale; 1 = Susceptible, 5 = Resistant

# Management of Fusarium wilt

Know the history of the field

Maximize distribution of the fumigant

Use resistant cultivars where pathogen is present

Avoid movement of soil from infested fields

# Thanks

california

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CALIFORNIA  
STRAWBERRIES

A HEALTHY INDULGENCE



*Lassen Canyon Nursery Inc.*

Terry Farms