

Soilborne problems affecting strawberries

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Macrophomina phaseolina

Fusarium oxysporum

Verticillium dahliae

Where do they come from?

Resident in soil

Colonizer of a previous crop

Pathogen = cause of disease

Growth on another crop but not a cause of disease

Where do they come from?

Resident in soil

Moved with soil from another location

Introduced with infected plants

Management

Avoid introduction

Soil on equipment

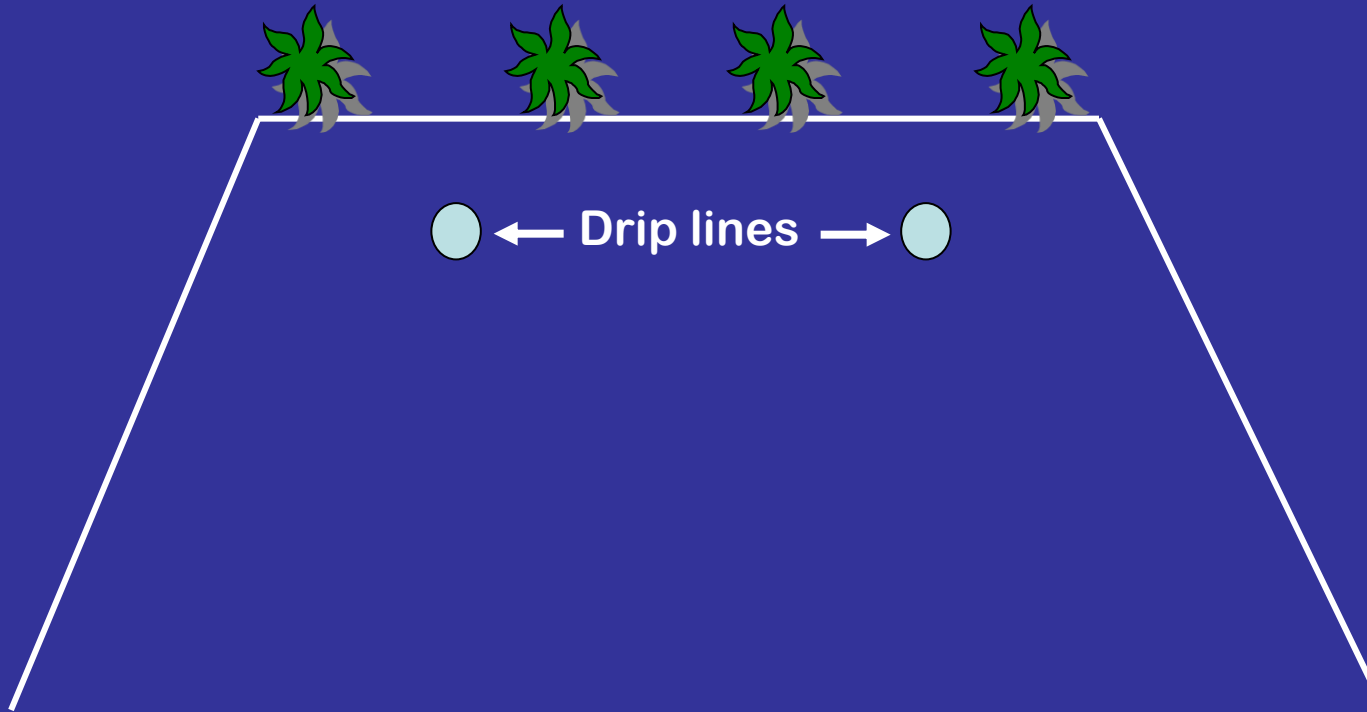
Management

Reduce inoculum levels in soil

Pre-plant fumigation

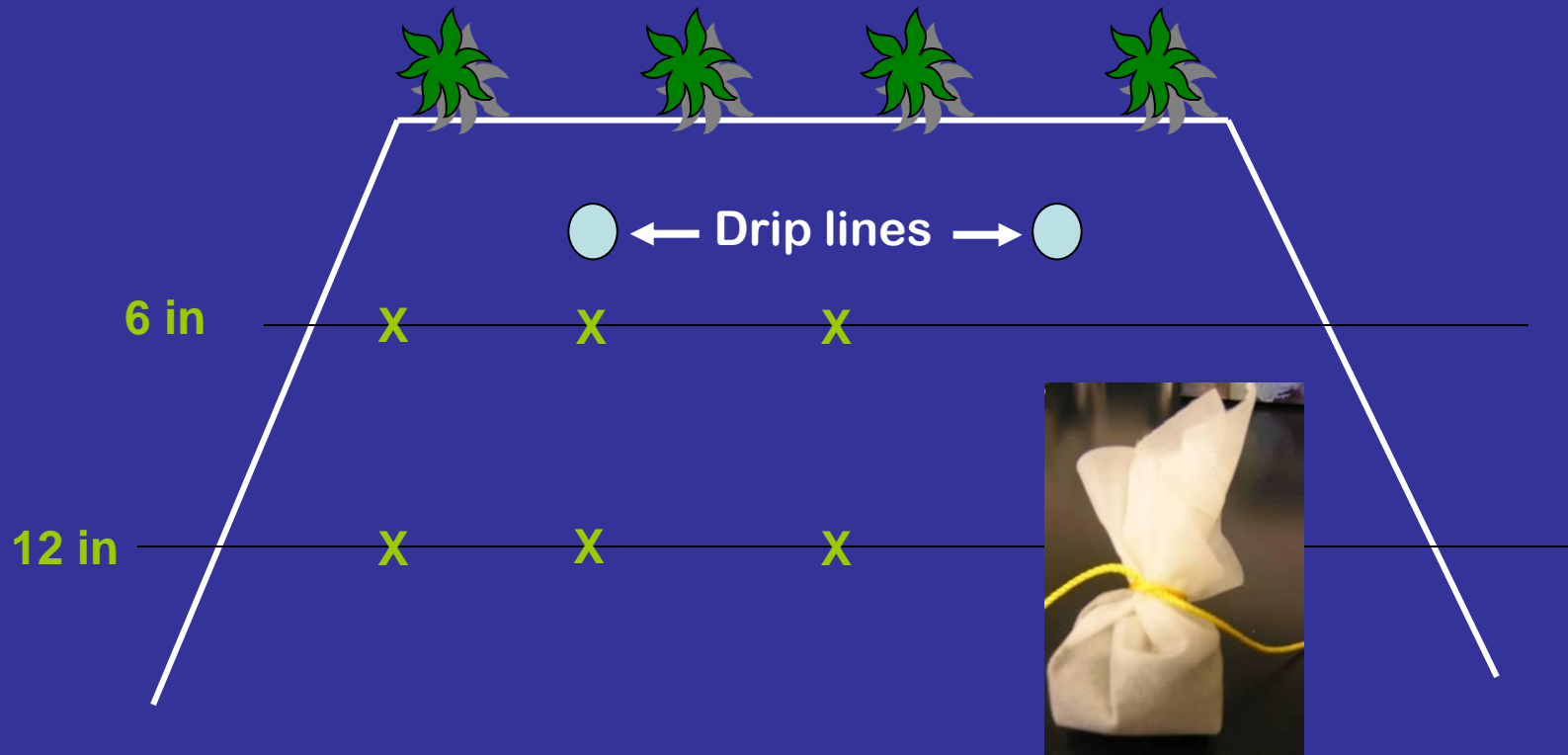
Flat fumigation to treat the entire field

Bed fumigation



The soil is not uniformly exposed to the fumigant

Inoculum buried in beds prior to fumigation



The soil is not uniformly exposed to the fumigant

Consider more than two drip lines

Beds fumigated with Pic-60



Efficacy of fumigants

Methyl Bromide:Chloropicrin 2:1 @ 350 pounds/acre

Chloropicrin @ 400 pounds/acre

Telone (1,3-Dichloropropene)

Metam sodium

Decomposition of residue

More is better



Effect of fragmentation on pathogen survival

More than one cycle of fumigation may be required



Crop rotation to reduce inoculum levels

Fusarium wilt

Specific to strawberry

Macrophomina

Wide host range

Inoculum levels decline when other crops are grown

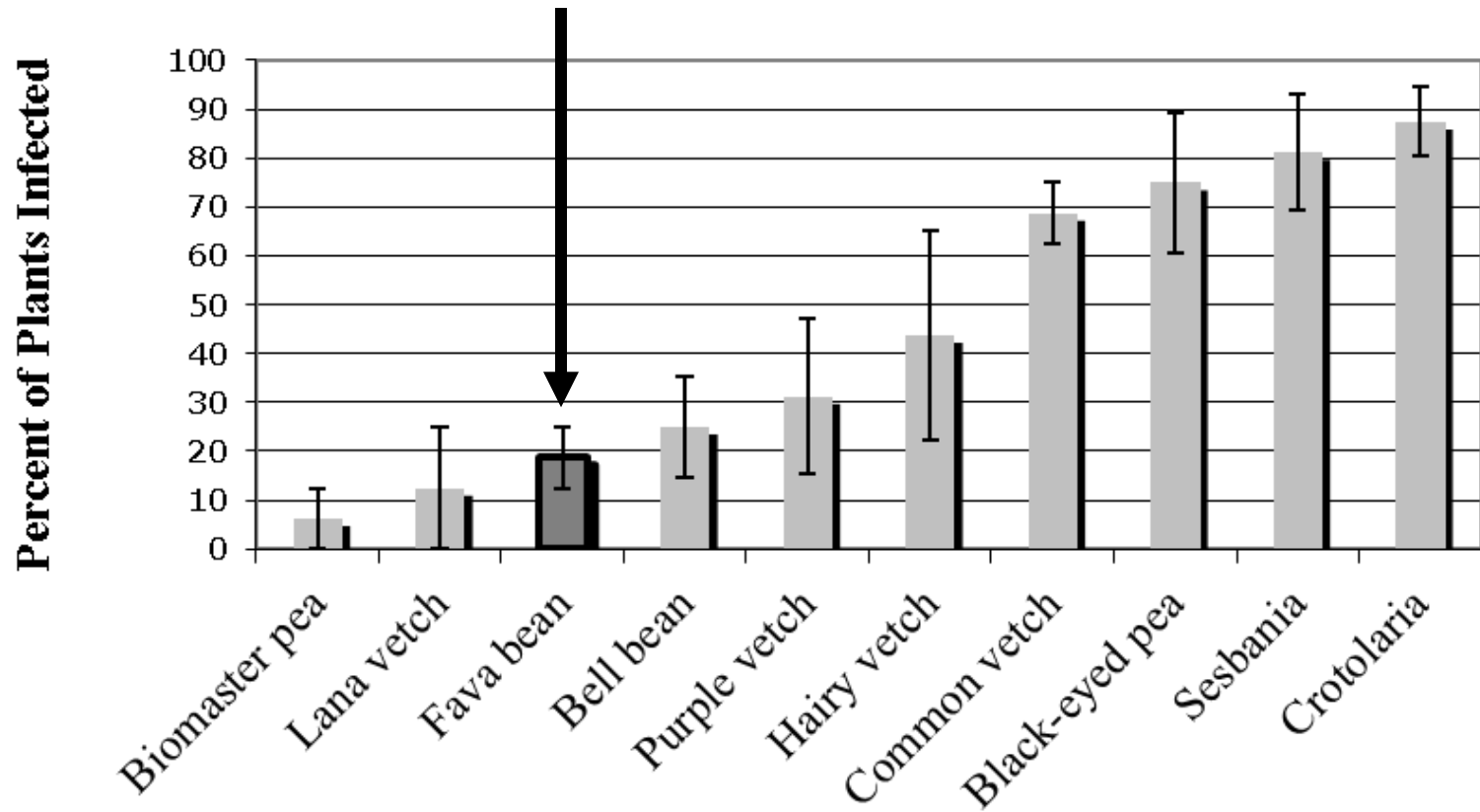
Verticillium wilt



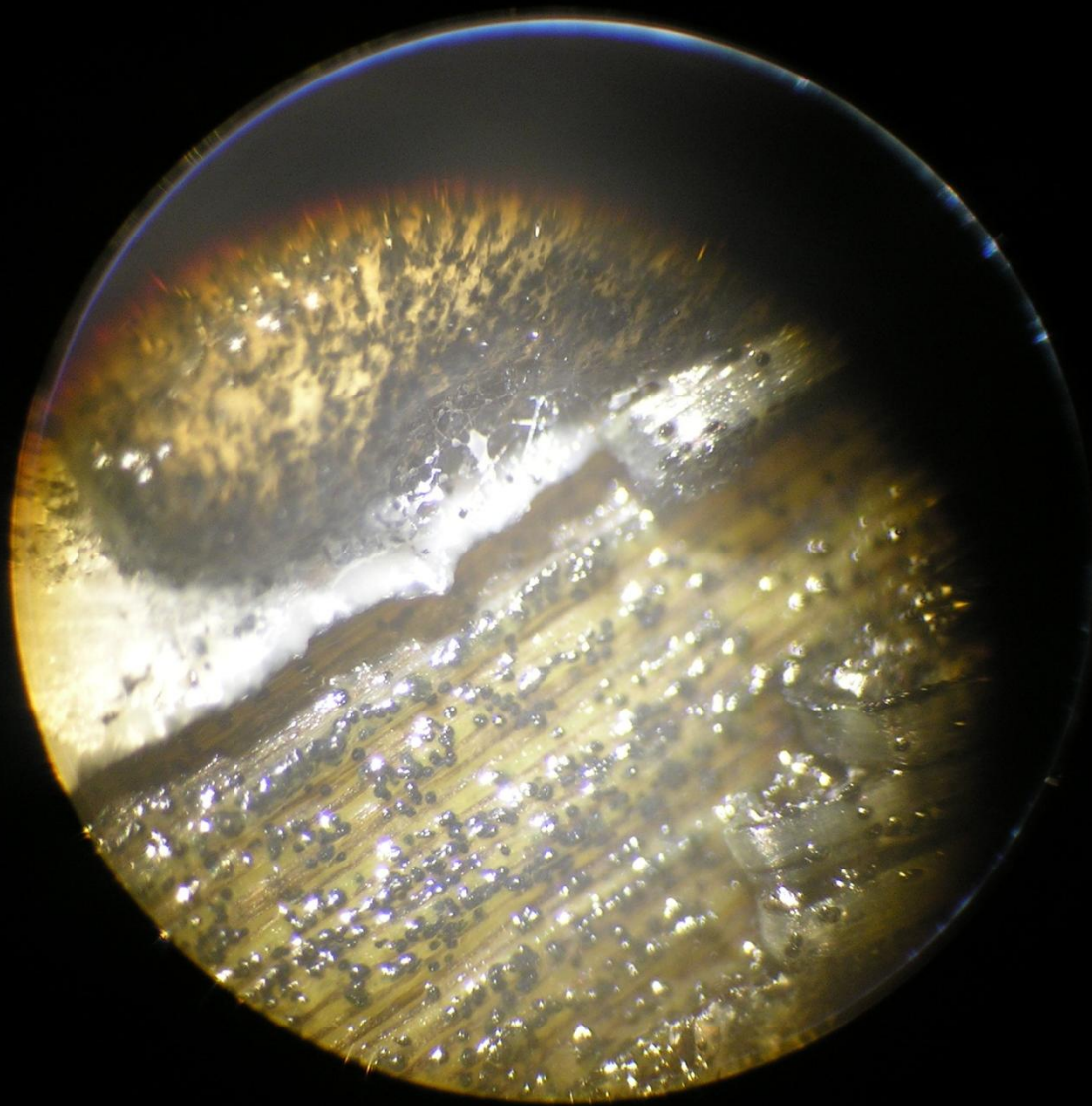
Legumes



Susceptible to disease



Microsclerotia



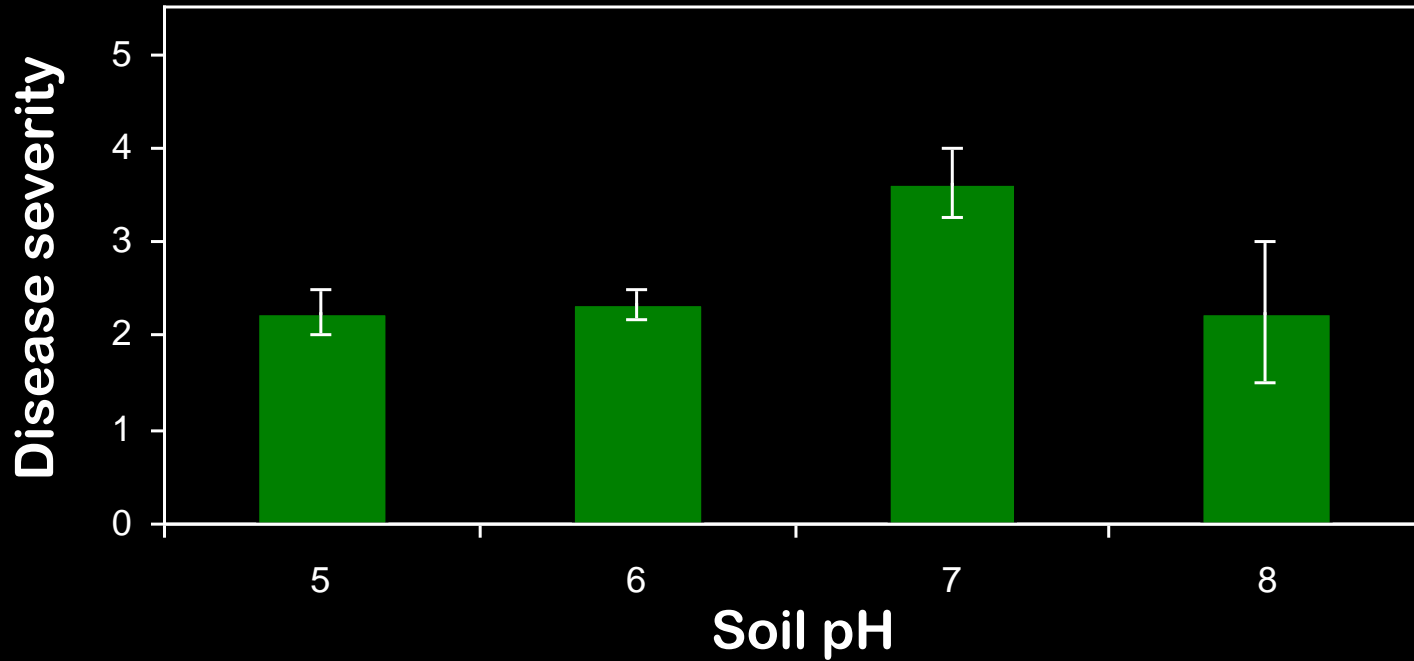
Reduce the rate of infection

Effect of soil pH on Fusarium wilt

**Elevating pH to 7.0 reduced
severity of Fusarium wilt of tomato**

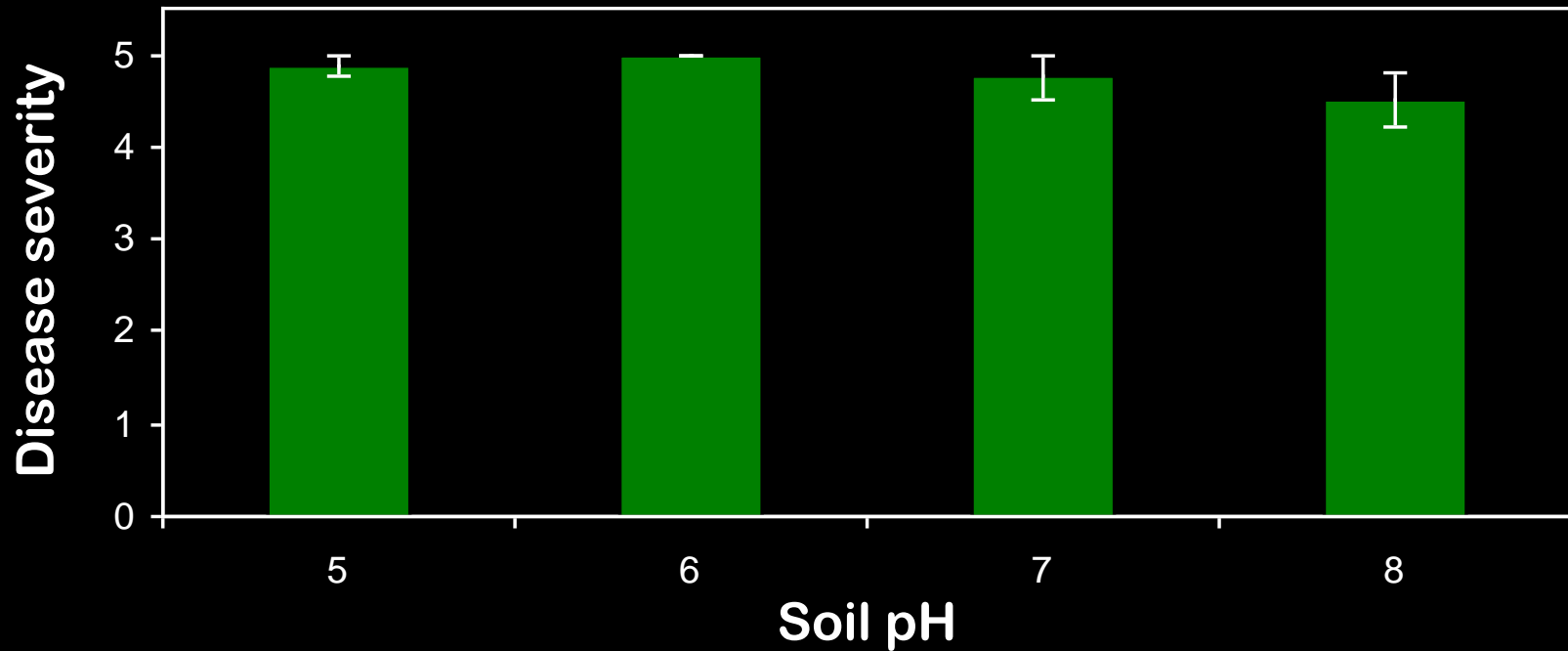
Effect of soil pH on disease severity

Inoculum density = 5000 Colony-forming units per gram



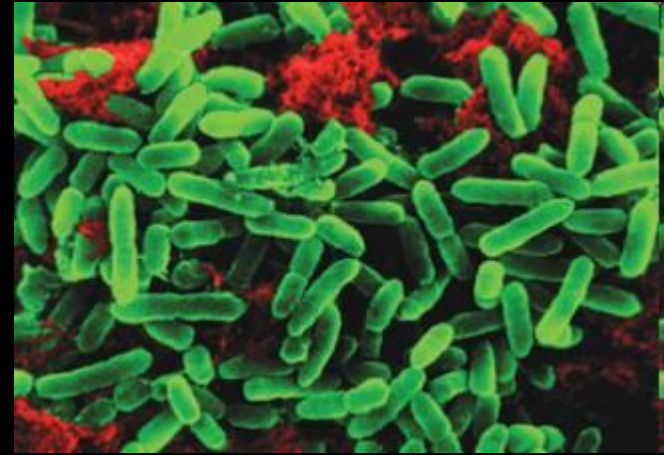
Effect of soil pH on disease severity

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



Fusarium oxysporum

Biological amendments
to reduce the rate of infection



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Picture: 0108-20100610_166242.bmp



In soil fungi compete with bacteria

Acidic soil tends to
favor fungi over bacteria



Trichoderma spp.

Root-dip

Soil drench



Bacillus subtilis

Root-dip

Soil drench

TOPSIN[®] M 70WP

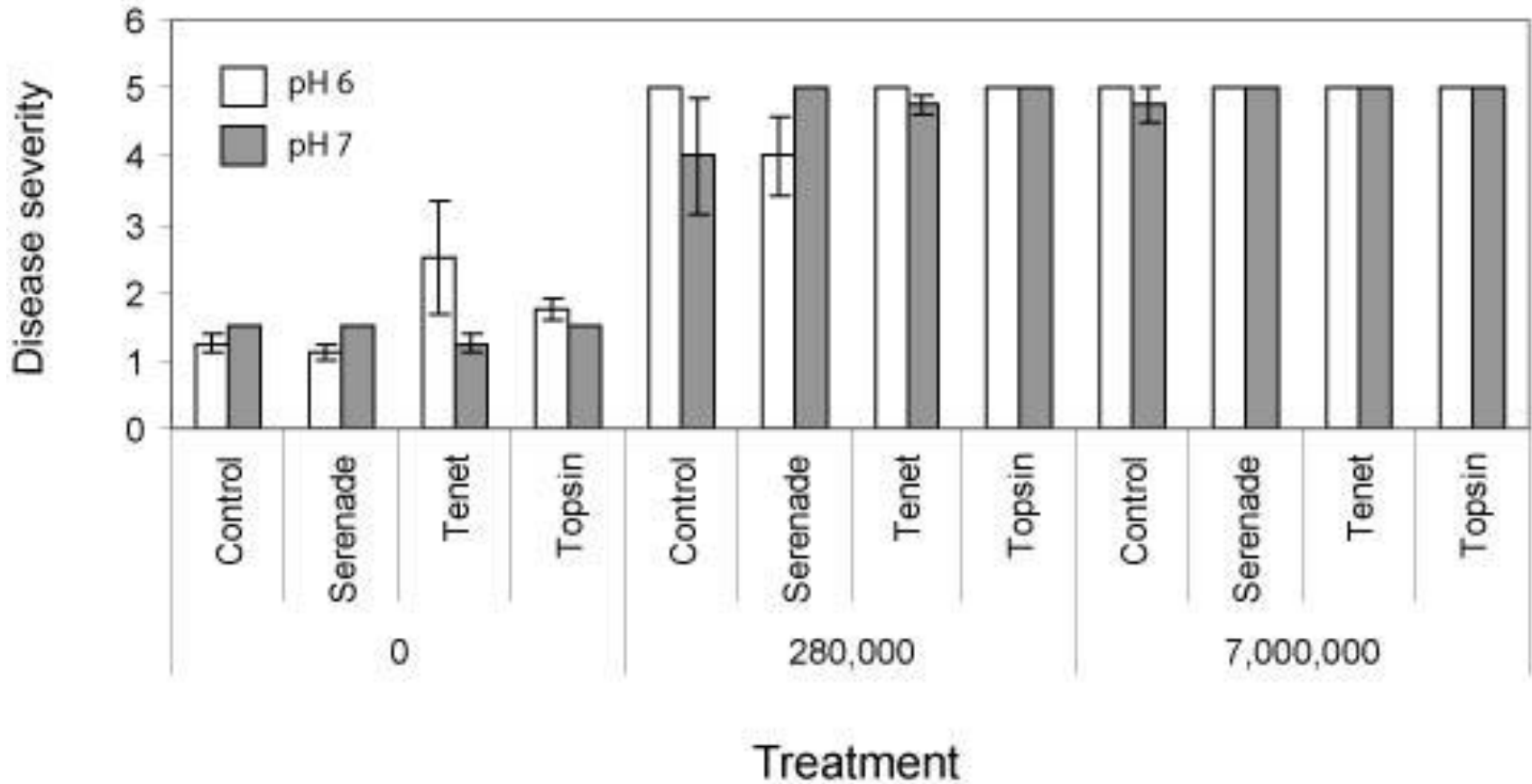
THIOPHANATE-METHYL FUNGICIDE
70% Wettable Powder



Fungicide

Root-dip

Treatment effects on severity of Fusarium wilt



Management of soilborne pathogens

Avoid introductions

Reduce inoculum levels

Reduce infection rates

Disease resistance

Differences in susceptibility to Fusarium wilt

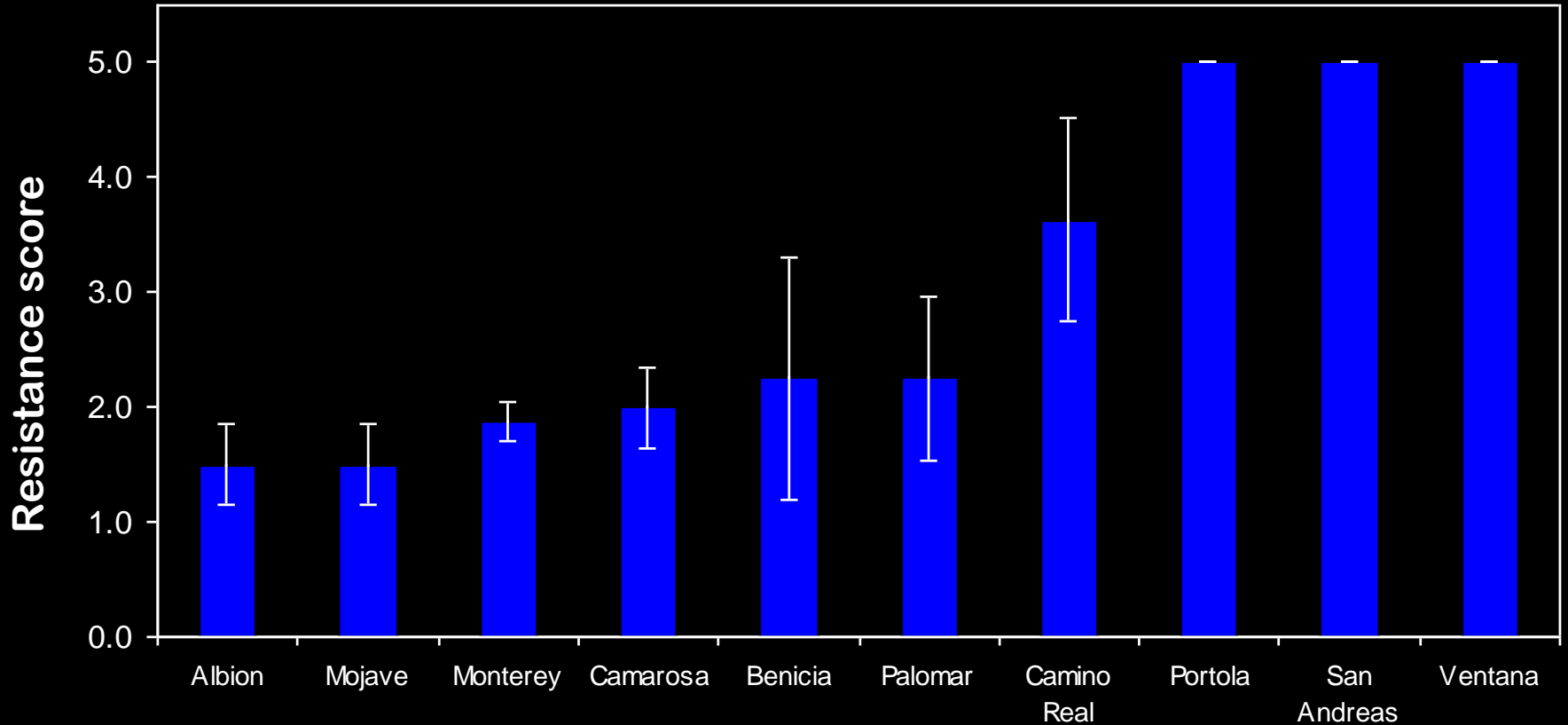


Camarosa



Ventana

Currently grown UC cultivars



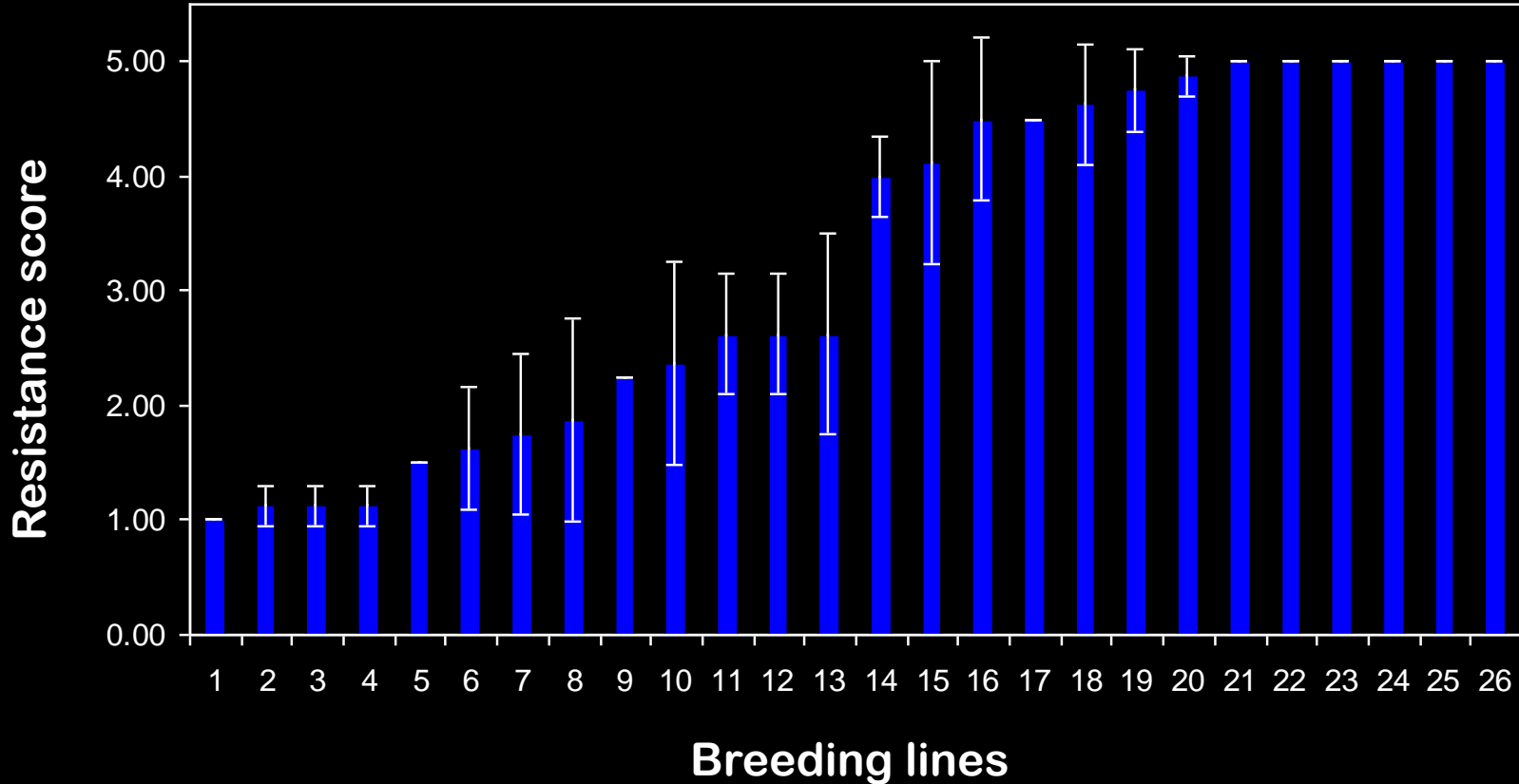
1 – 5 Scale; 1 = Susceptible, 5 = Resistant



Ventana

Camarosa

Advanced breeding lines



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

Screening for resistance to *Macrophomina*

Detect differences among genotypes

Differences are heritable

Results correlate with field susceptibility

Differential susceptibility to *Macrophomina*



Modest gains accumulate over time

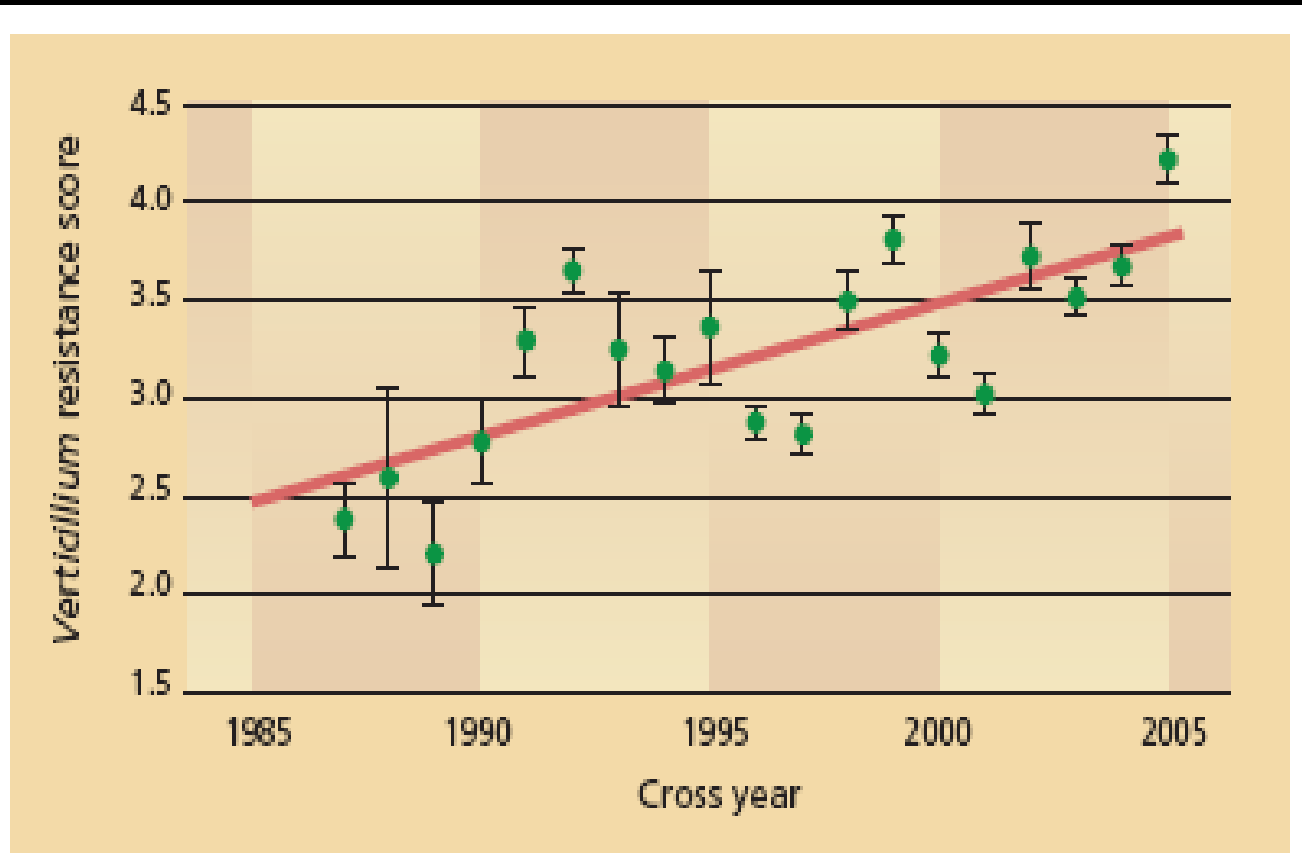


Fig. 1. Changes in the mean *Verticillium* resistance score (1 = severely diseased, and 5 = no symptoms of disease) in genotypes from cross years 1987 (original germplasm) to 2005, \pm standard error.

Management of soilborne pathogens

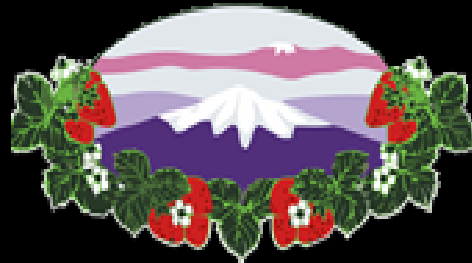
Avoid introductions

Reduce inoculum levels

Disease resistance

Thanks

california
STRAWBERRY COMMISSION



Lassen Canyon Nursery Inc.

Hansen Trust

