

Fusarium wilt of strawberry

Tom Gordon

Department of Plant Pathology



Collaborators:

Oleg Daugovish

Mark Bolda



Fusarium wilt



Fusarium oxysporum



DETECTION & CONFIRMATION

of Fusarium Wilt Pathogens:

Challenges, Errors, and Limitations

By: Steven T. Koike | Director, TriCal Diagnostics
Tom Gordon | Professor, University of California at Davis

***Fusarium oxysporum* is common in soil**

Most strains are not pathogenic

Non-pathogenic strains colonize roots

Pathogen ID requires further testing

Specific test for *Fusarium oxysporum* f. sp. *fragariae*



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Factors influencing severity of Fusarium wilt

Cultivar susceptibility

Inoculum level in soil

Temperature during the growing season

Resistance to Fusarium wilt

Major gene resistance

Fw1

Quantitative resistance

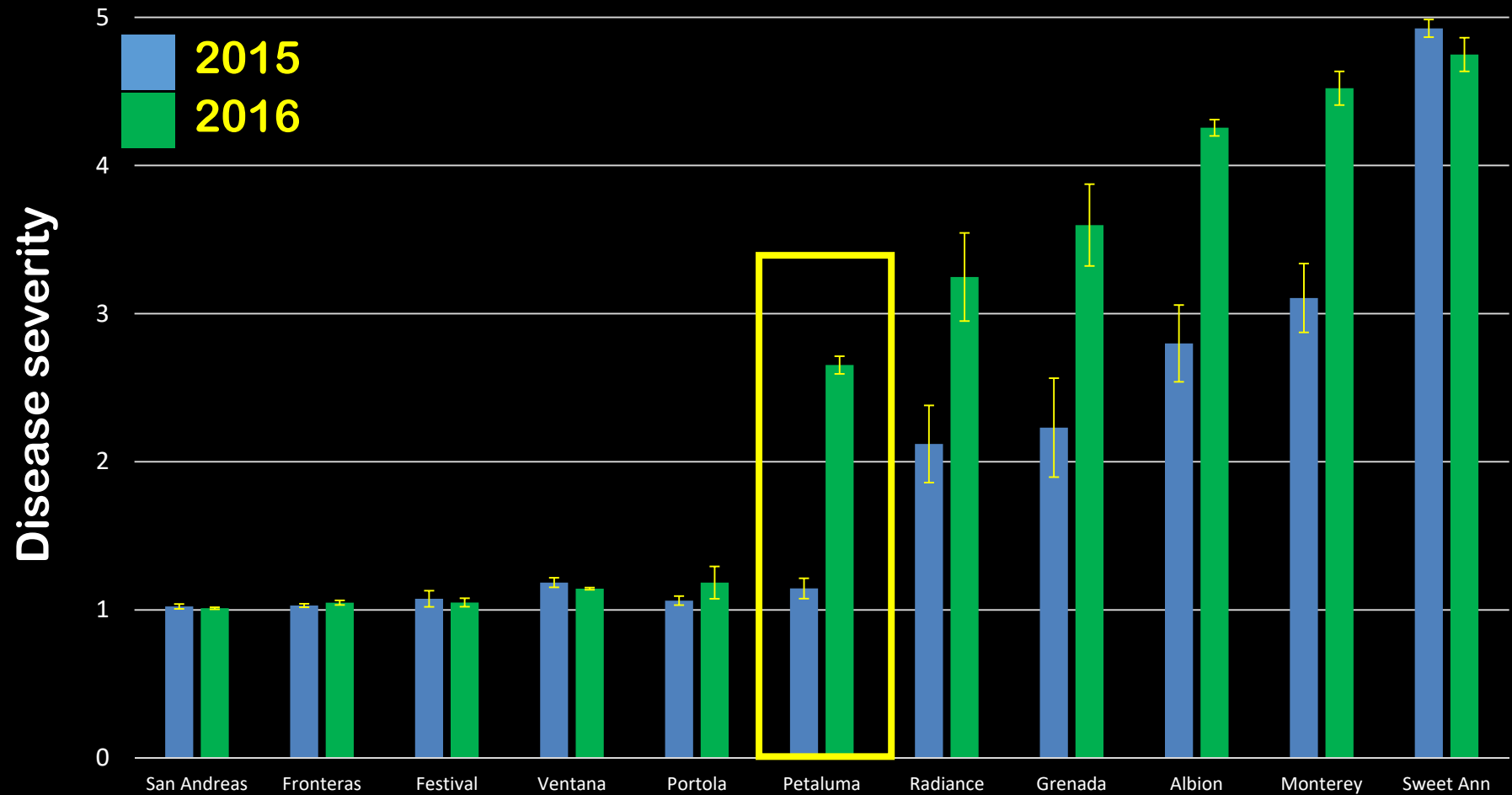
= intermediate resistance

Intermediate resistance

Disease is less severe

Higher inoculum level required to cause disease

Tests of susceptibility to Fusarium wilt



Petaluma shows intermediate resistance

Disease severity on a 1 – 5 Scale

2015	1.1 ± 0.1
2016	2.7 ± 0.1

Difference in inoculum level between years

Factors influencing severity of Fusarium wilt

Cultivar susceptibility

Inoculum level in soil

Temperature during the growing season

Fusarium wilt of lettuce

Effect of Planting Date and Inoculum Density on Severity of Fusarium Wilt of Lettuce in California

Kelley R. Paugh and Thomas R. Gordon[†]

Department of Plant Pathology, University of California, Davis, CA 95616

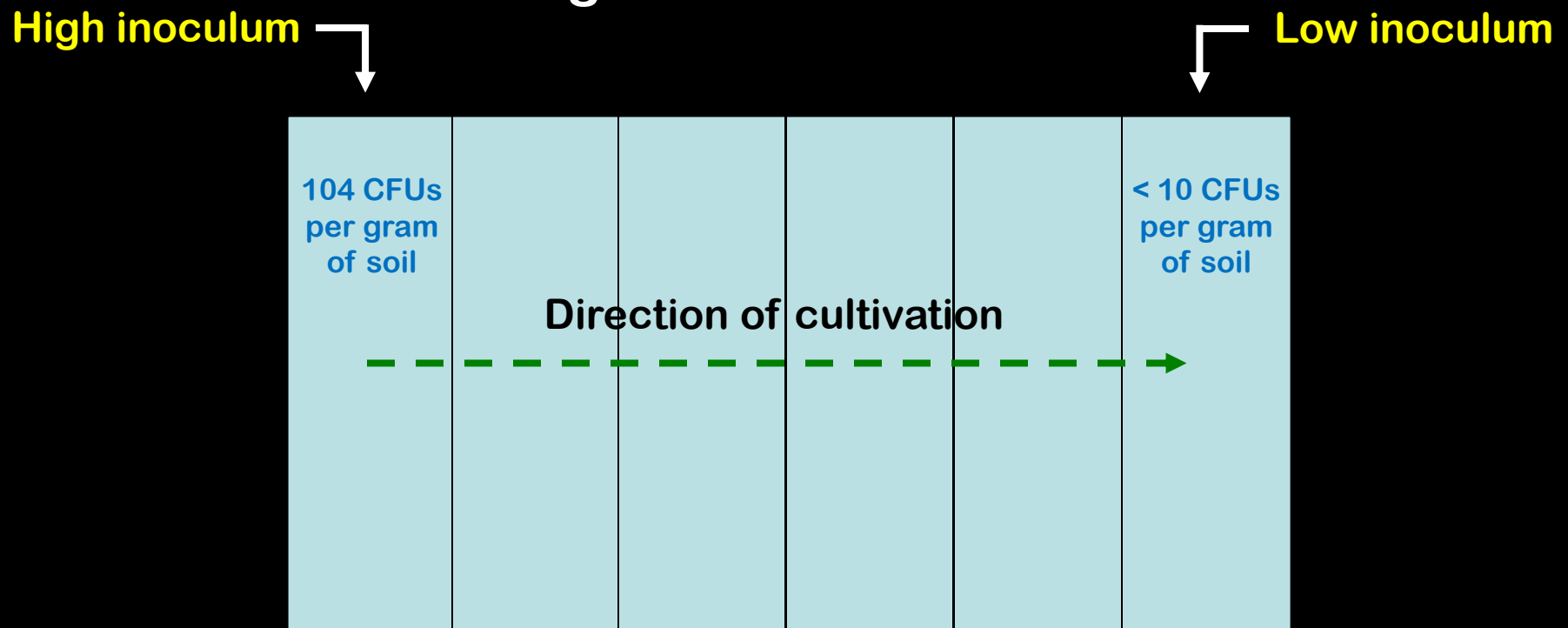
Fusarium wilt of lettuce



Field experiments at UC Davis

Two cultivars of intermediate susceptibility

Range of inoculum levels



Four planting dates (= range of temperatures)

Four planting dates

October

April

August (2×)

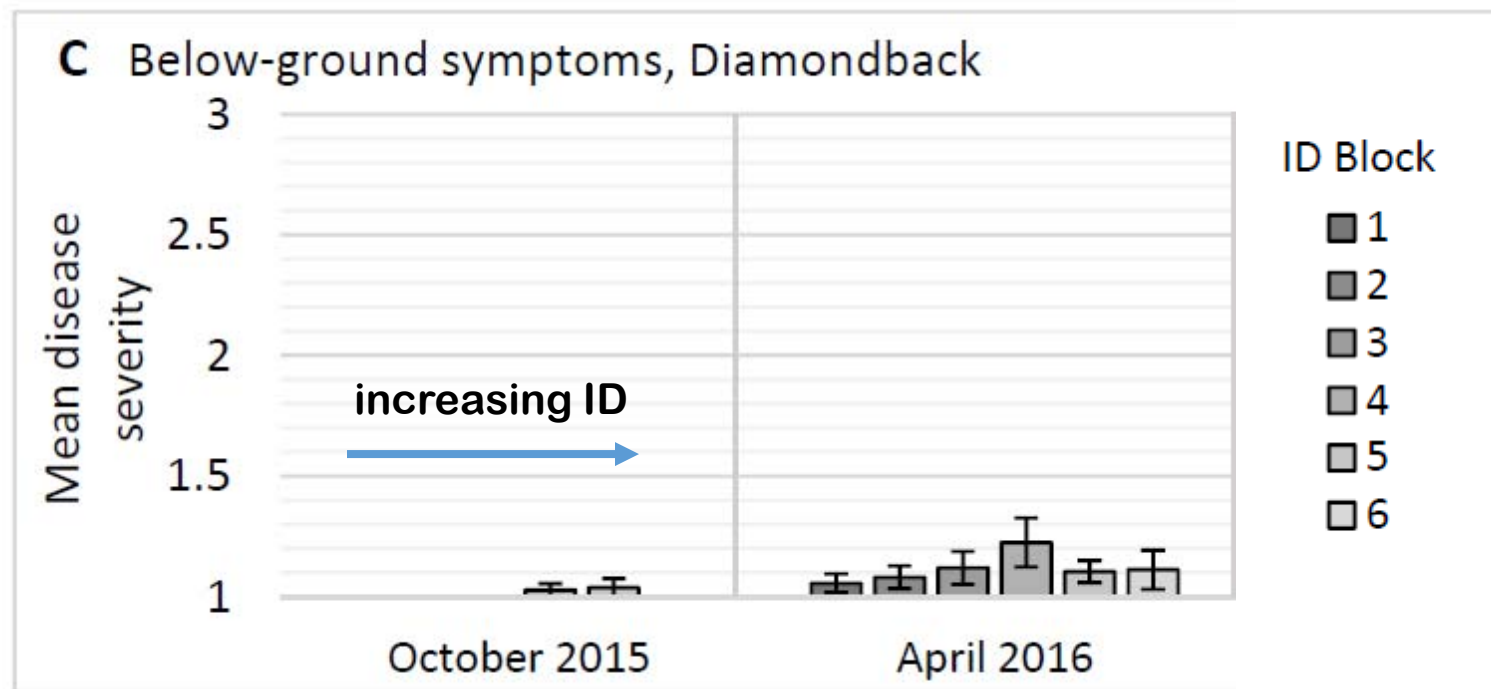
Provide a range of temperatures

October planting

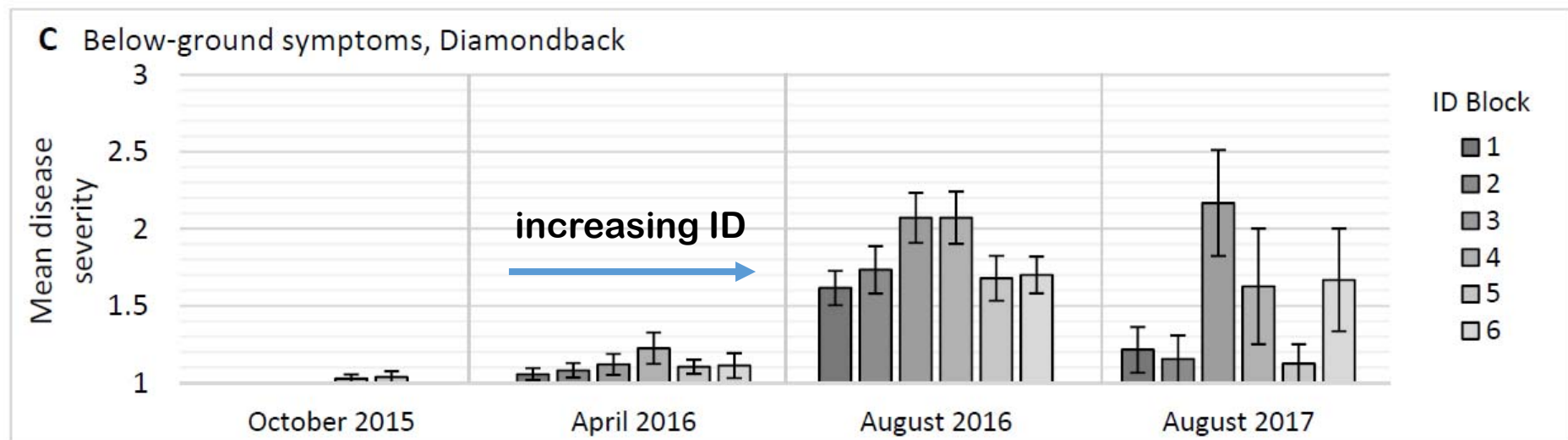
No disease

In susceptible cultivars

If soil inoculum level is $\leq 10^4$ CFUs/gram

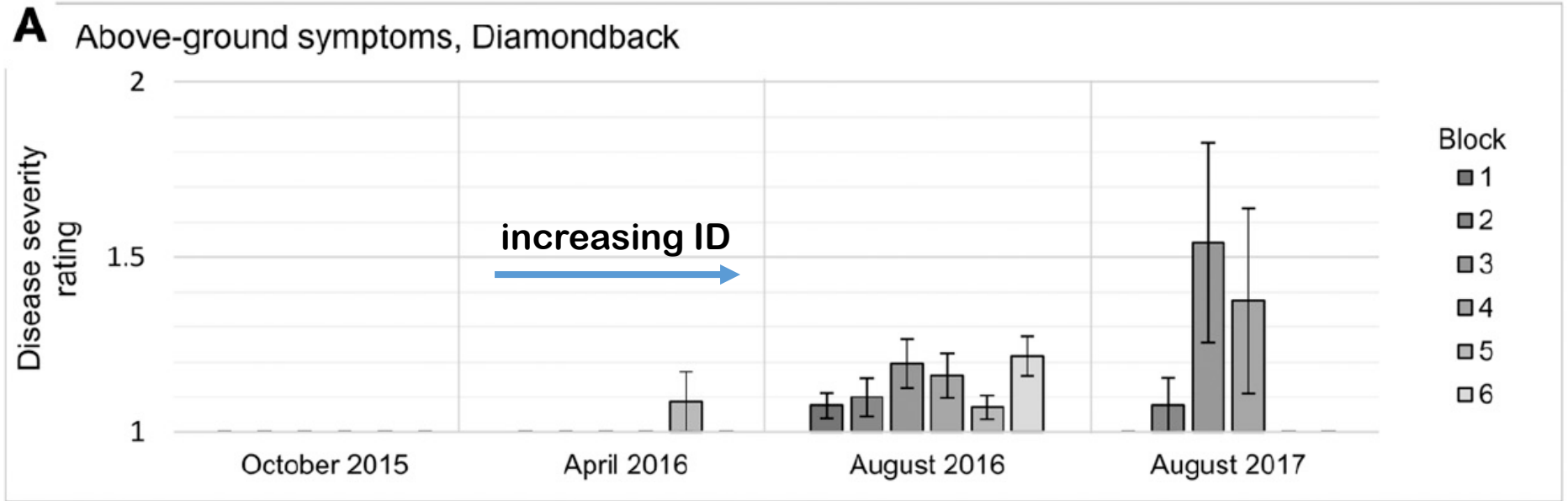


Planting dates



Planting dates

Inoculum level $\leq 10^4$ CFUs per gram of soil



Planting dates

Inoculum level $\leq 10^4$ CFUs per gram of soil

Fusarium wilt

Soil inoculum level $\leq 10^4$ CFUs/gram

No disease under cool conditions

Low risk of disease under warm conditions

For cultivars of intermediate resistance



Fusarium wilt



Fusarium oxysporum

What we need to better manage Fusarium wilt in strawberries

Resistance rating for new cultivars

(1 – 5 scale)

Characterize:

1. The effect of temperature on disease
2. The relationship between soil inoculum level and disease

Effect of Soil Inoculum Density Development of Fusarium wilt

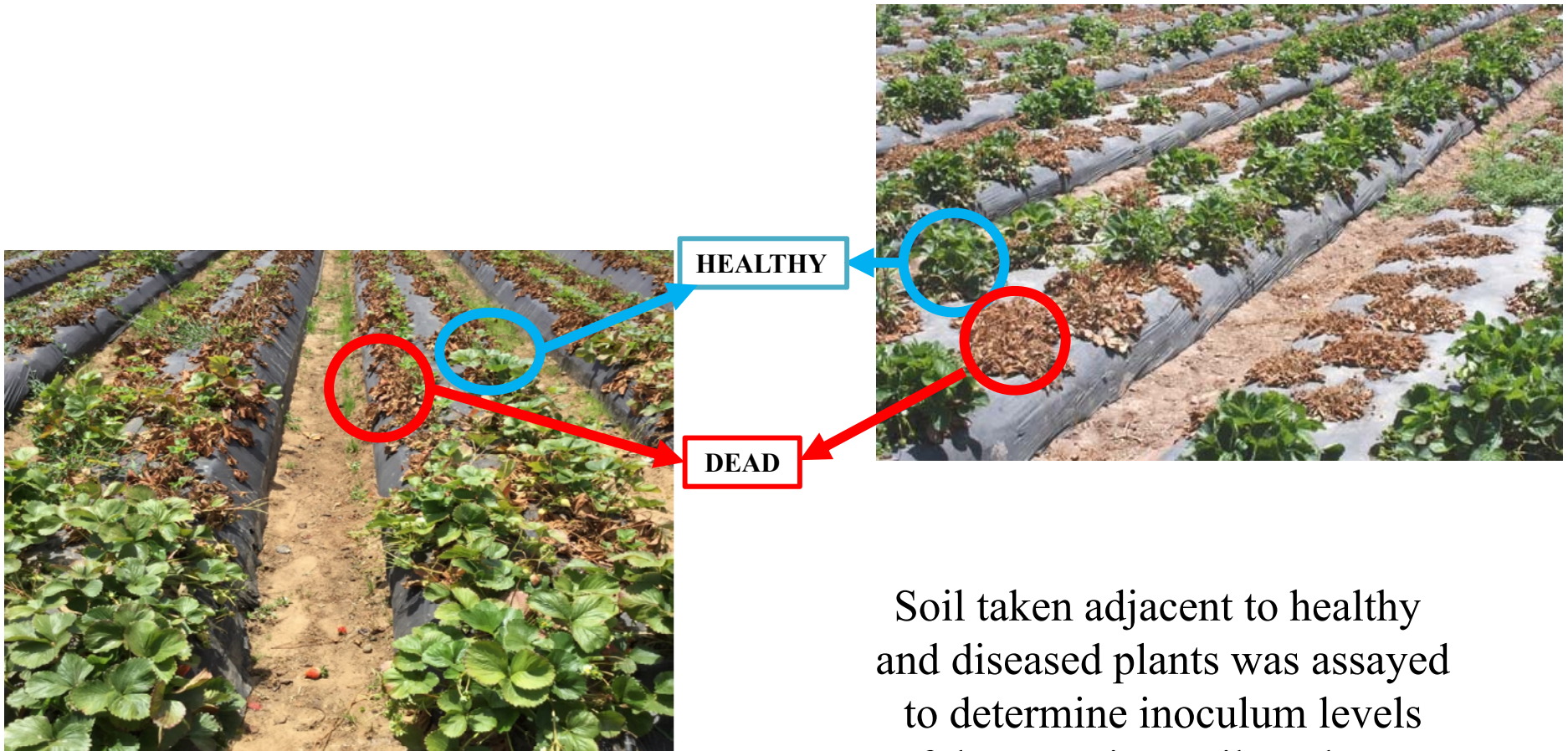
Ana M. Pastrana, Thomas R. Gordon, Karina D. Elfar, Akif Eskalen, Mark Bolda
Department of Plant Pathology, University of California, Davis

February 5th, 2020

2020 UCCE Annual Strawberry Production Research Meeting

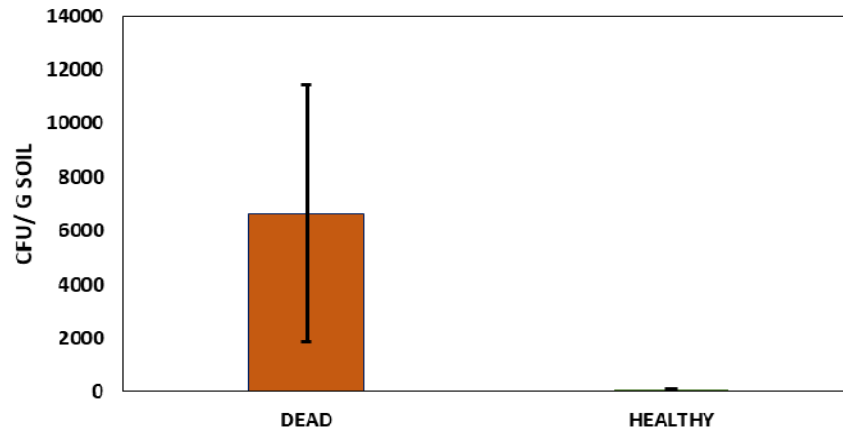


Naturally Infested Soils – Commercial Fields – June 2019

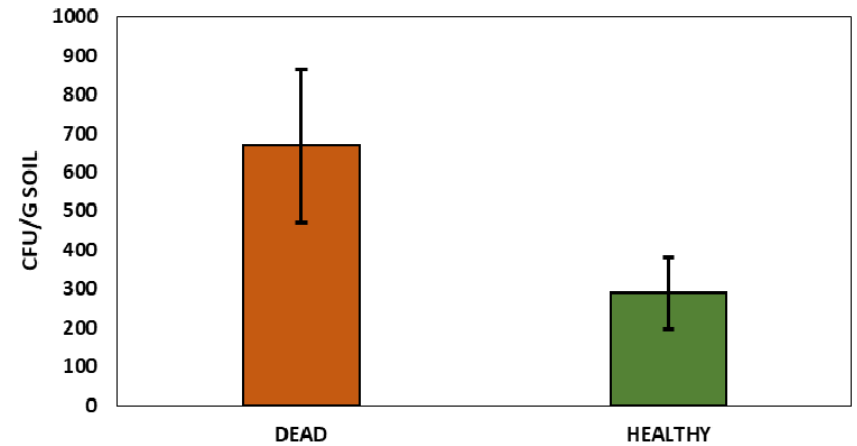


RESULTS

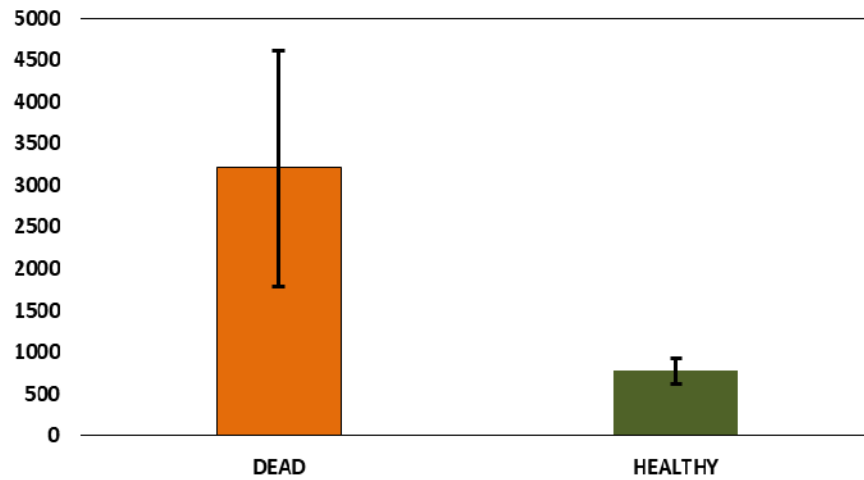
Ranch One – #324WellPick



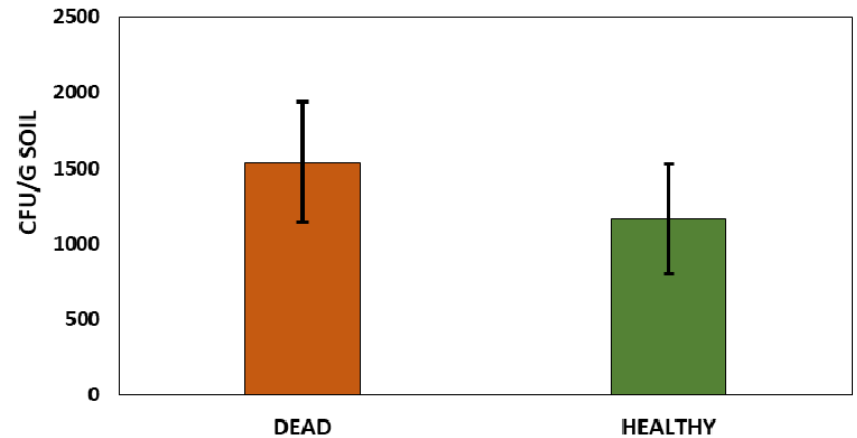
Ranch Two – cv. BG975



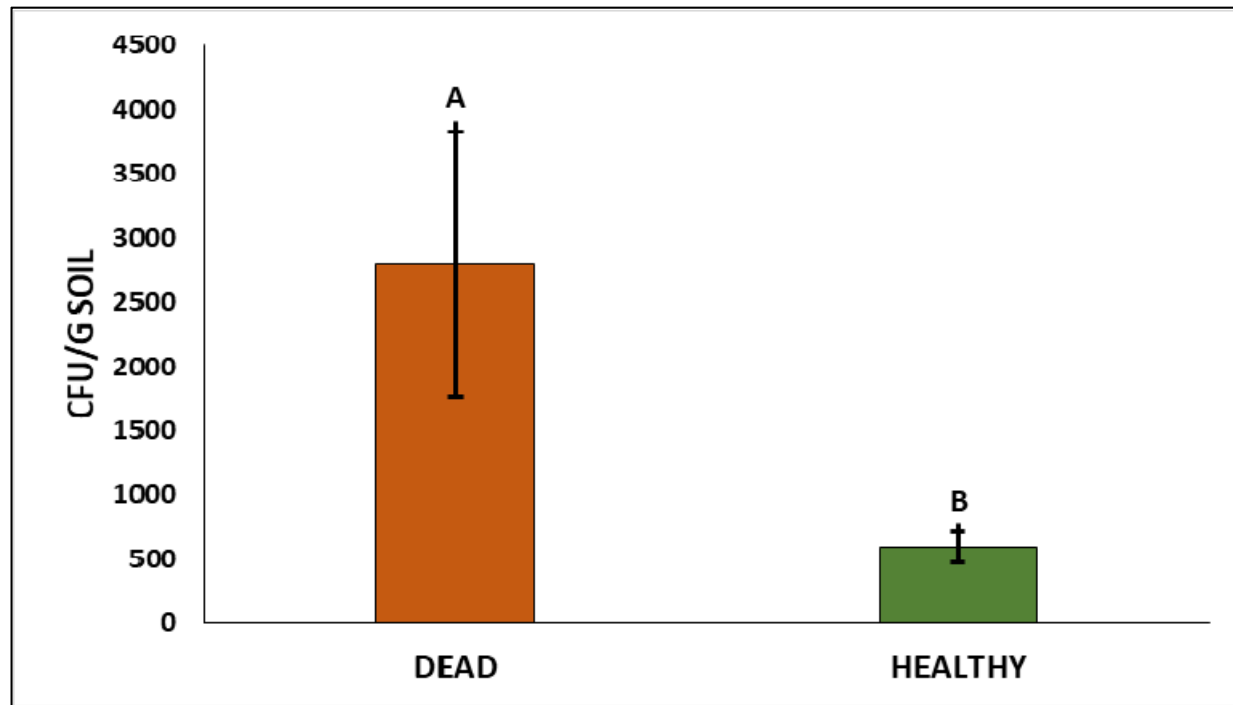
Ranch Three – cv. Monterey



Ranch Four – cv. Monterey



Average inoculum levels in soil adjacent to dead and healthy plants



CONCLUSION

Preliminary results show susceptible cultivars to remain healthy (through beginning of June) at inoculum level of 716 cfu/g of soil or lower.

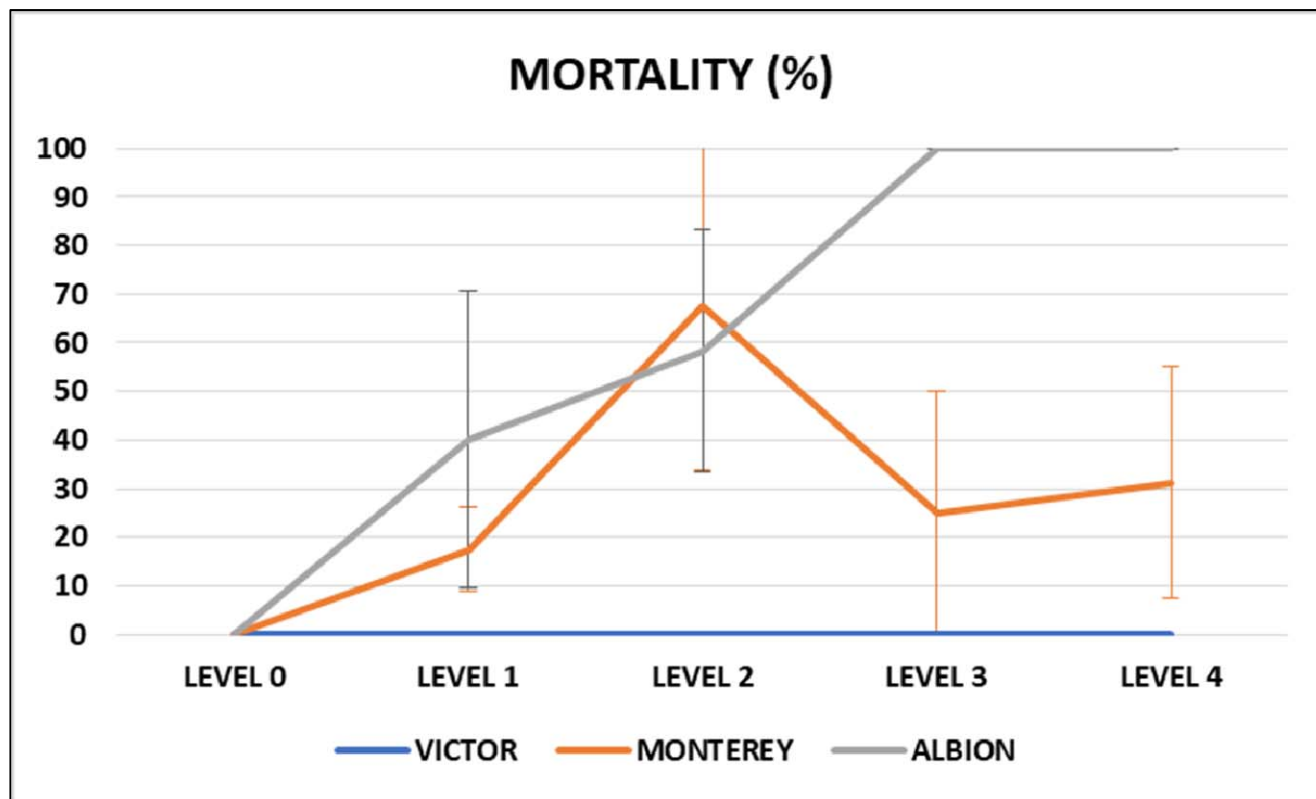
Artificially Infested Soils

REP 1	REP 2	REP 3	REP 4	
V P W W W P W P	V P W W W P W P	V P W W W P W P	V P W W W P W P	0 cfu/ g soil
V P W W W P W P	V P W W W P W P	V P W W W P W P	V P W W W P W P	100 cfu/ g soil
V P W W W P W P	V P W W W P W P	V P W W W P W P	V P W W W P W P	500 cfu/ g soil
V P W W W P W P	V P W W W P W P	V P W W W P W P	V P W W W P W P	1000 cfu/ g soil
V P W W W P W P	V P W W W P W P	V P W W W P W P	V P W W W P W P	2000 cfu/ g soil

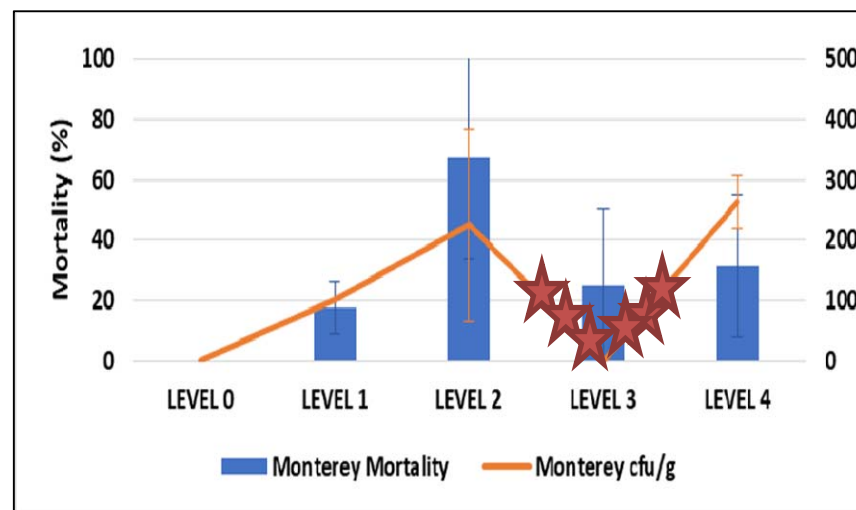
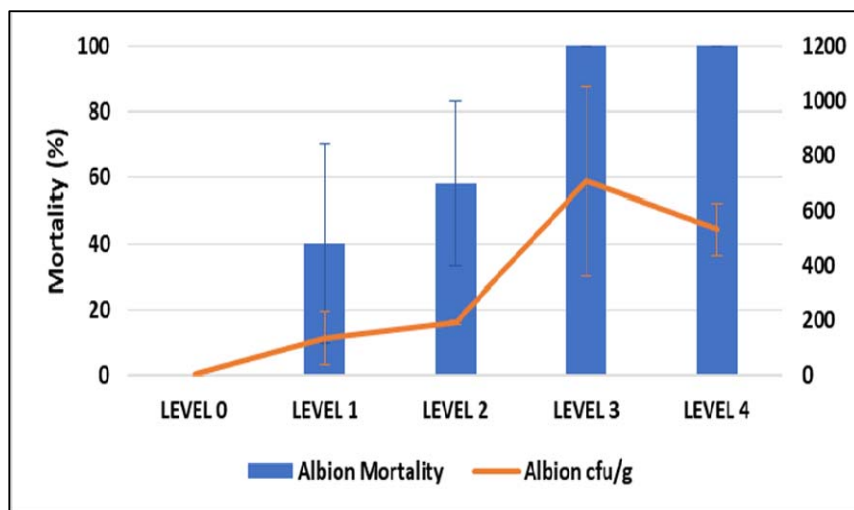
Hansen Agricultural Research and Extension Center



RESULTS



RESULTS



★ No data

CONCLUSION

- **Cv. Albion → 706.3 ± 344.2 CFU/g soil → 100% Mortality**
- **Cv. Monterey → 225.0 ± 159.1 CFU/g soil → 67.5 ± 33.75% Mortality**
- **Cv. Victor* → 2000 CFU/g soil → No mortality**

Resistant to *F. oxysporum* f. sp. *fragariae

Thanks

