

Ventura County update on soil disinfestation trials



What's in our soils

Documented fields during last 8 years with:

Fusarium oxysporum: 16

Macrophomina phaseolina: 11

Verticillium dahliae: 5

Phytophthora fragariae 3

Undocumented: 30%? 60%? 100%?

- 'Minor' pathogens:

cause 10-50% reduction in yield when soil is untreated

- Yellow nutsedge: 25-30% of fields

In both: winter and summer strawberries



Summer-planted
Portola,
200lbs/A Pic



'Fronteras' is resistant to *F.oxysporum* ?!



CONVENTIONAL PRODUCTION

FUMIGATION COSTS:

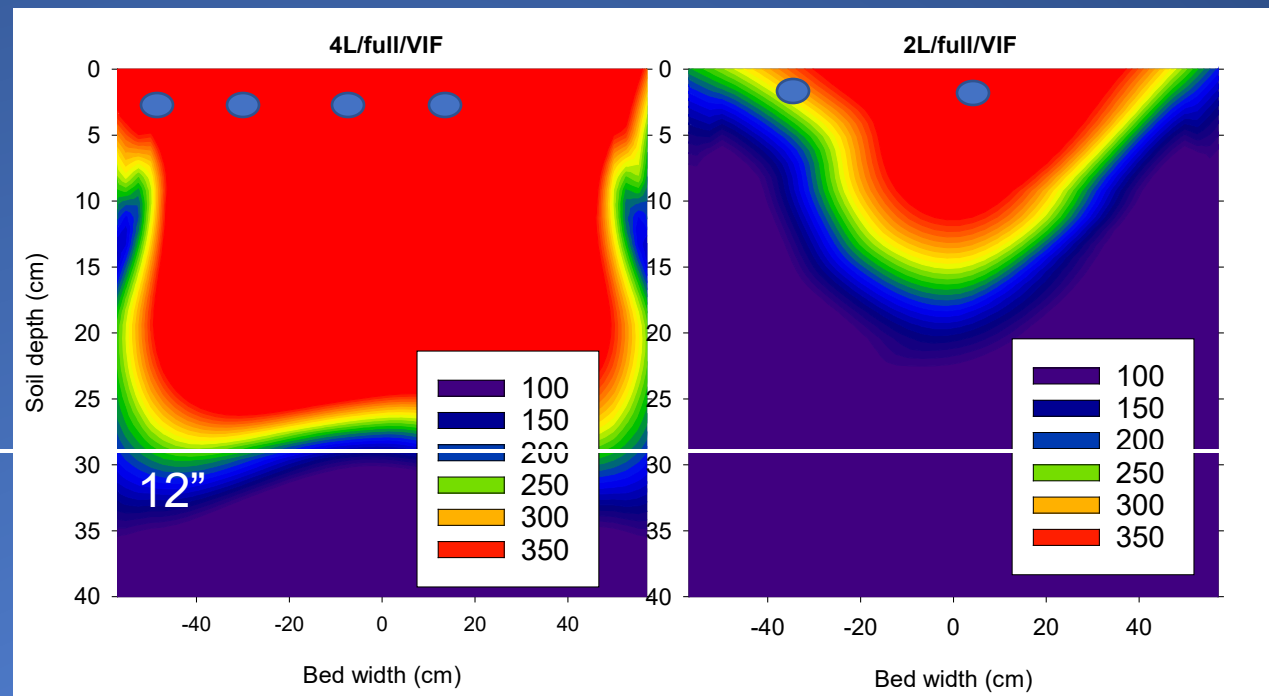
Flat fumigation = \$3,000-3,700/Acre

Drip (bed) fumigation = \$ 1,200-1,800/Acre (>70% of all fumigated acres)

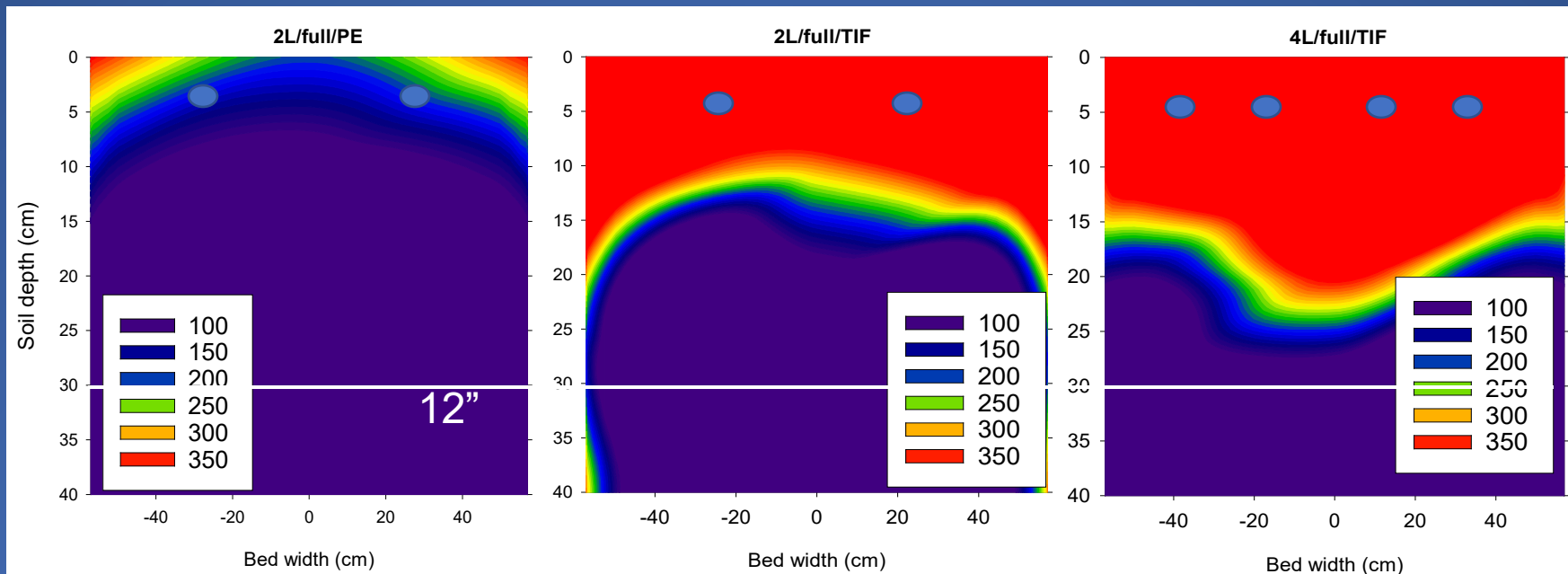
Adding lines for drip fumigation



**2014 Oxnard trial
with Tri-Chlor EC**
Full rate:
224 lbs/ac

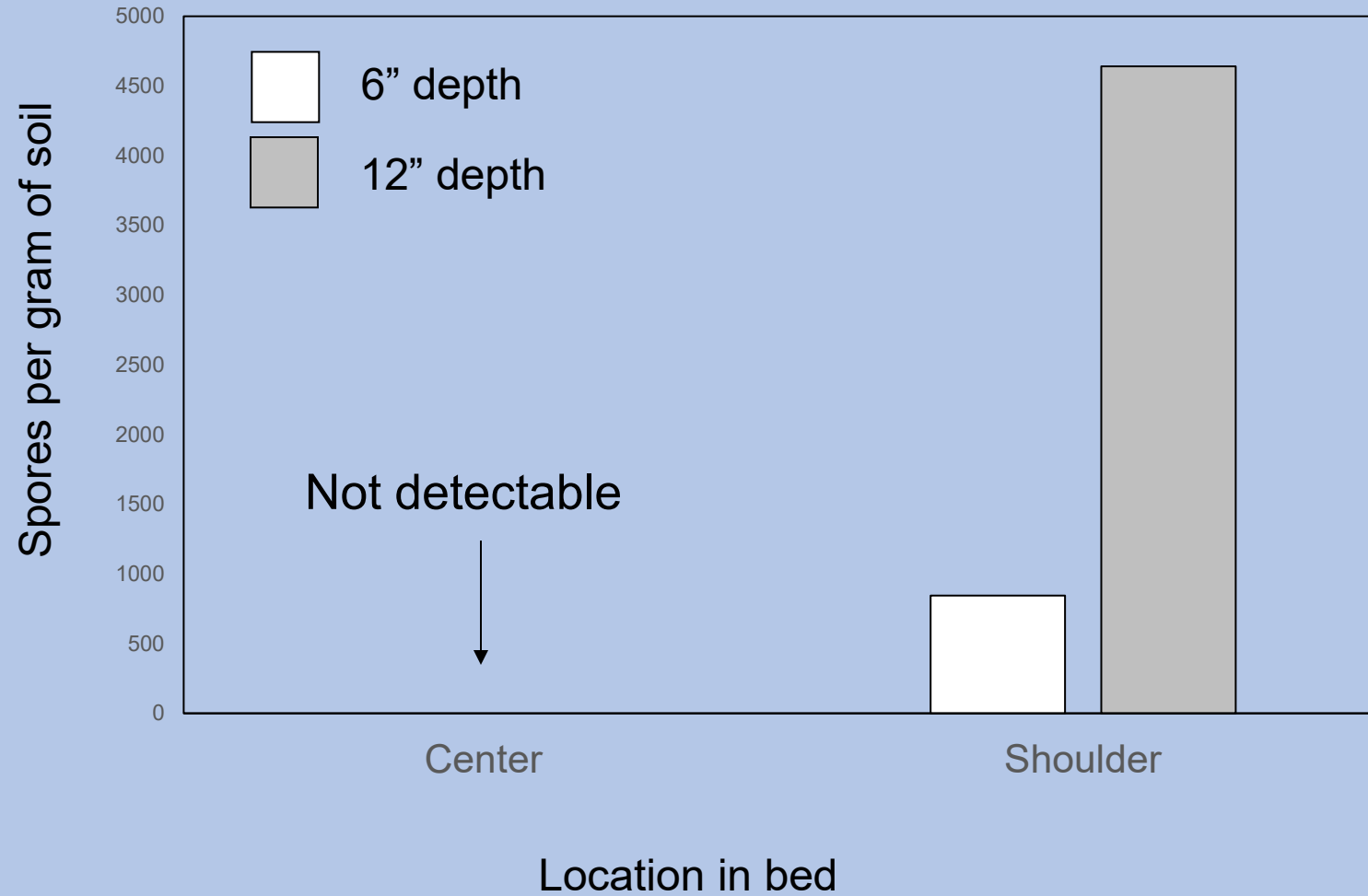


— CT value is accumulated (fumigant concentration * fumigation time)



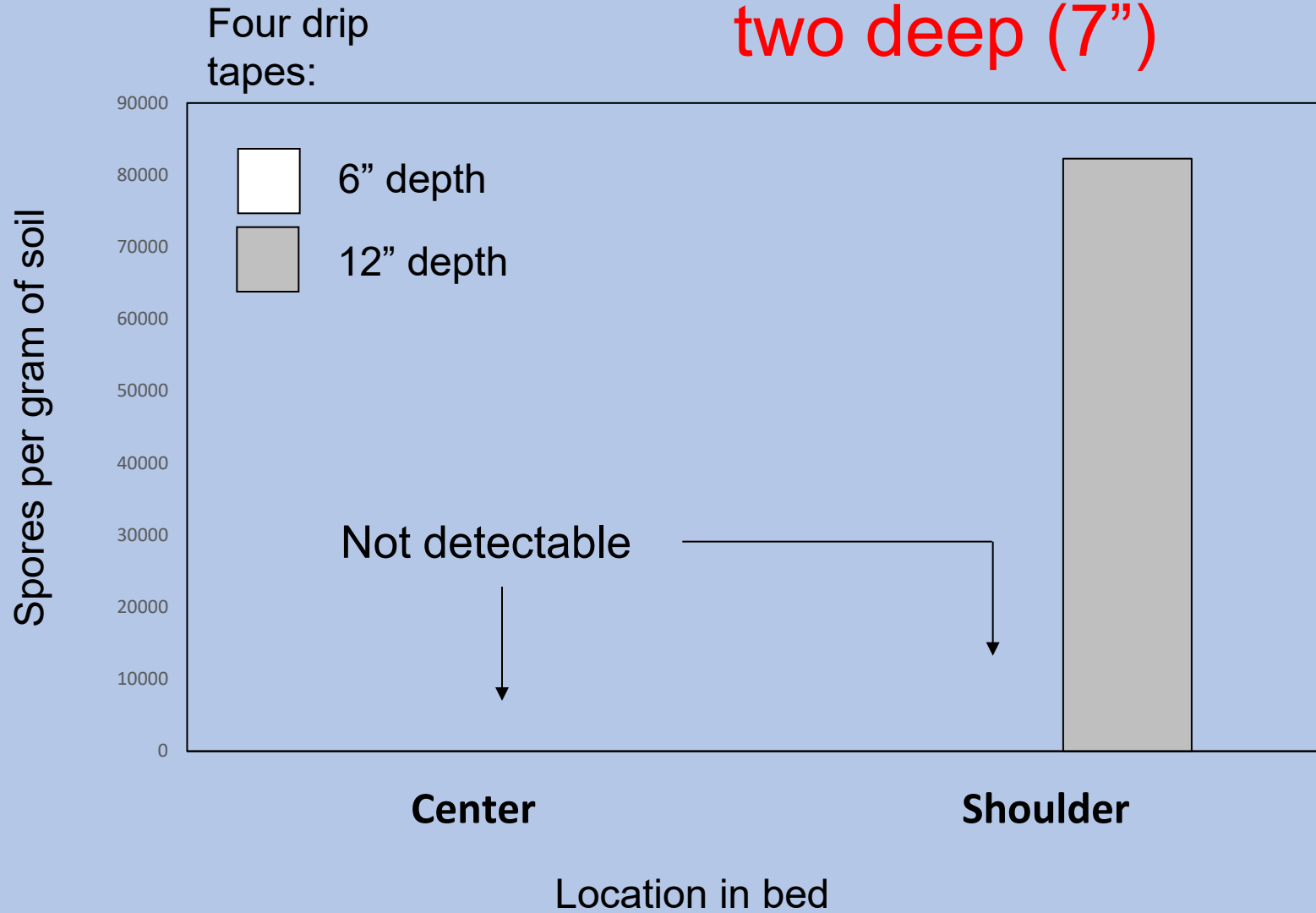
**2015 Oxnard trial
with Tri-Chlor EC:
full rate: 200 lbs/ac
half rate: 100 lbs/ac**

FUSARIUM survivorship **4 drip tapes at 2.5" depth:**

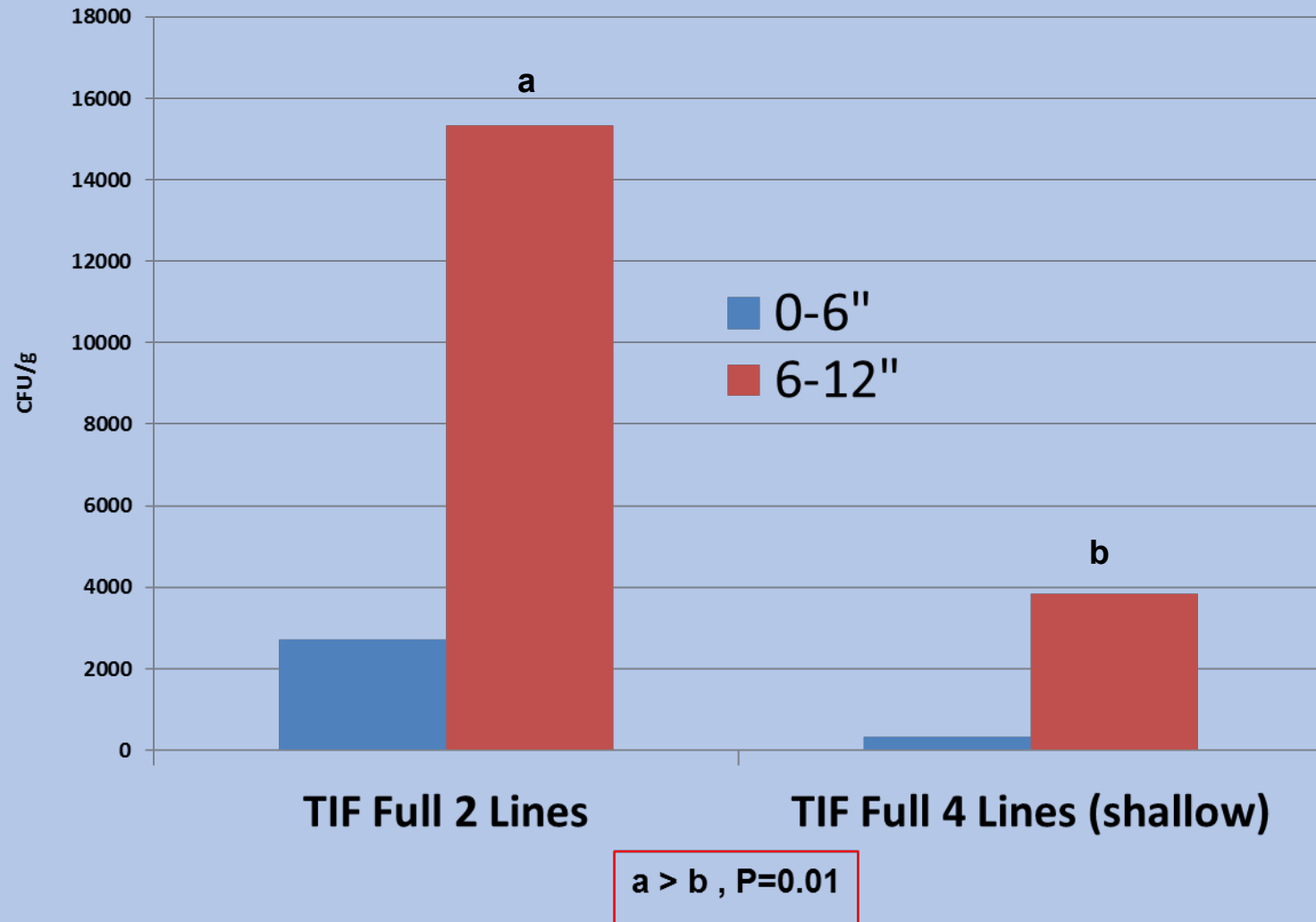


FUSARIUM survivorship

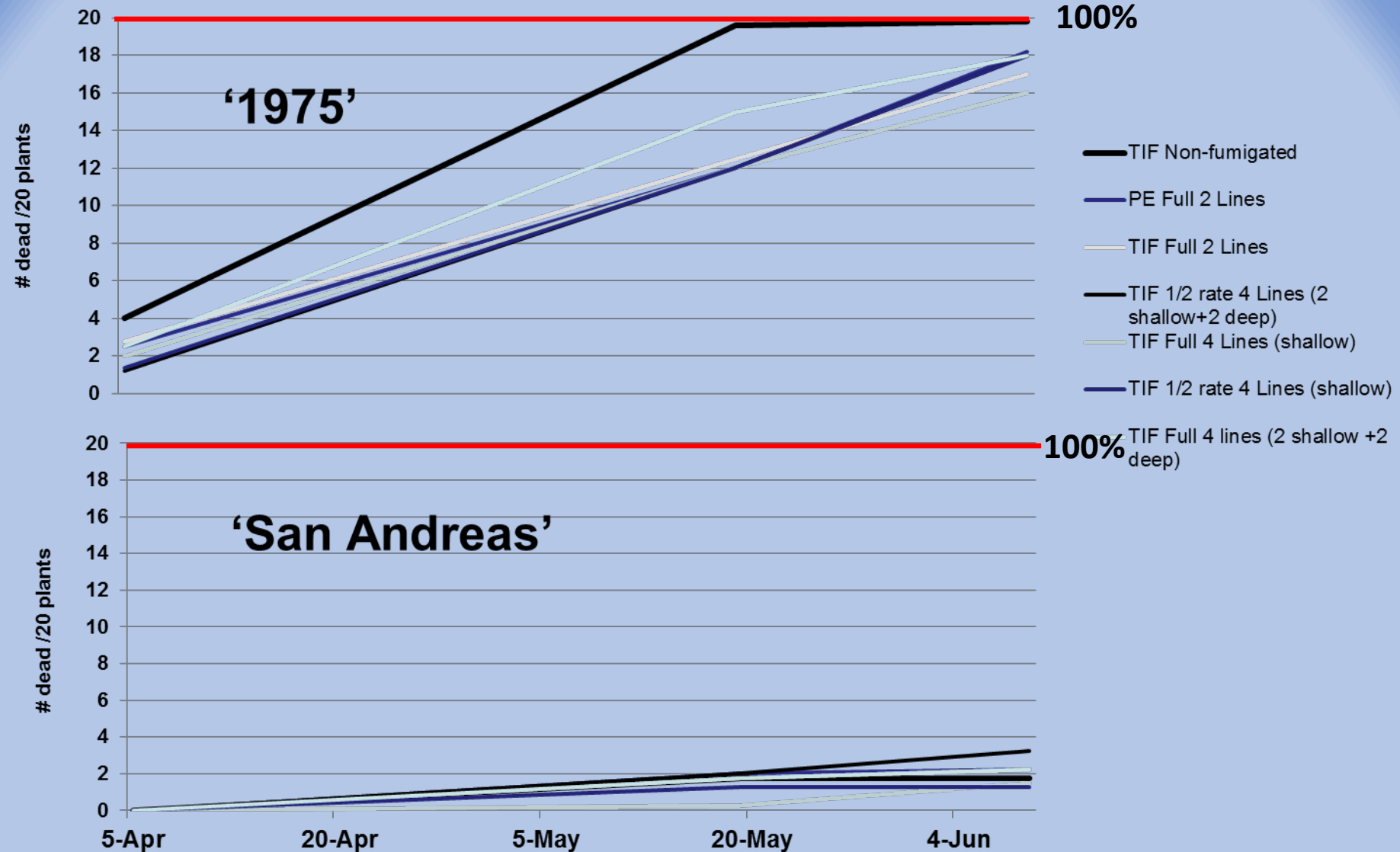
two shallow (2.5") +
two deep (7")



Fusarium in sand inoculum



Plant mortality (due to Fusarium)



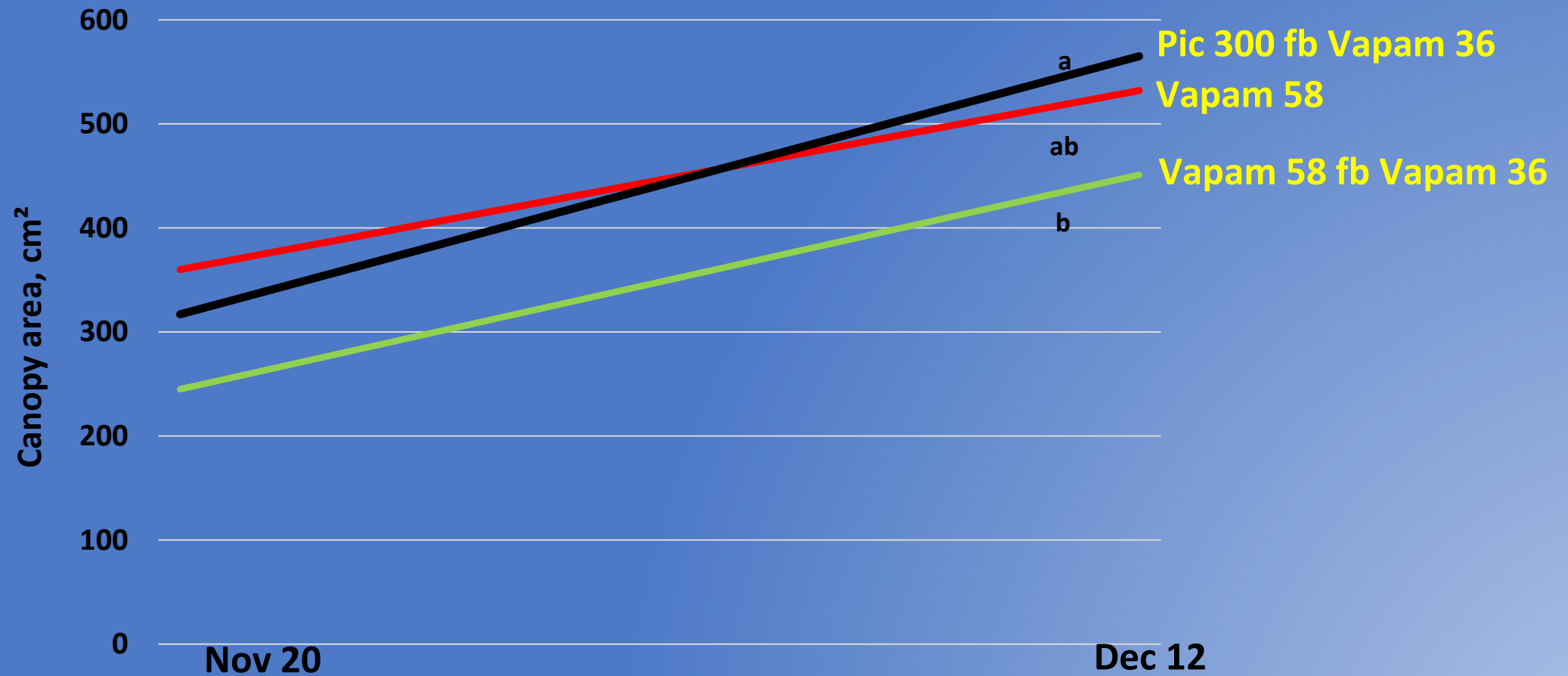
What else can we do?

- Removal or destruction of infested crowns
- Precision fumigation/or other management based on need
- Using low-cost MITC generators as only pre-plant fumigants
- Getting new varieties with genetic resistance/tolerance

**Can we sustain production
with less expensive, bed-applied MITC generators?**

- 1. Vapam single application of 58 gal/A,**
- 2. Vapam (58) fb Vapam (36) split application and**
- 3. Vapam (36) after flat Pic (300) application**

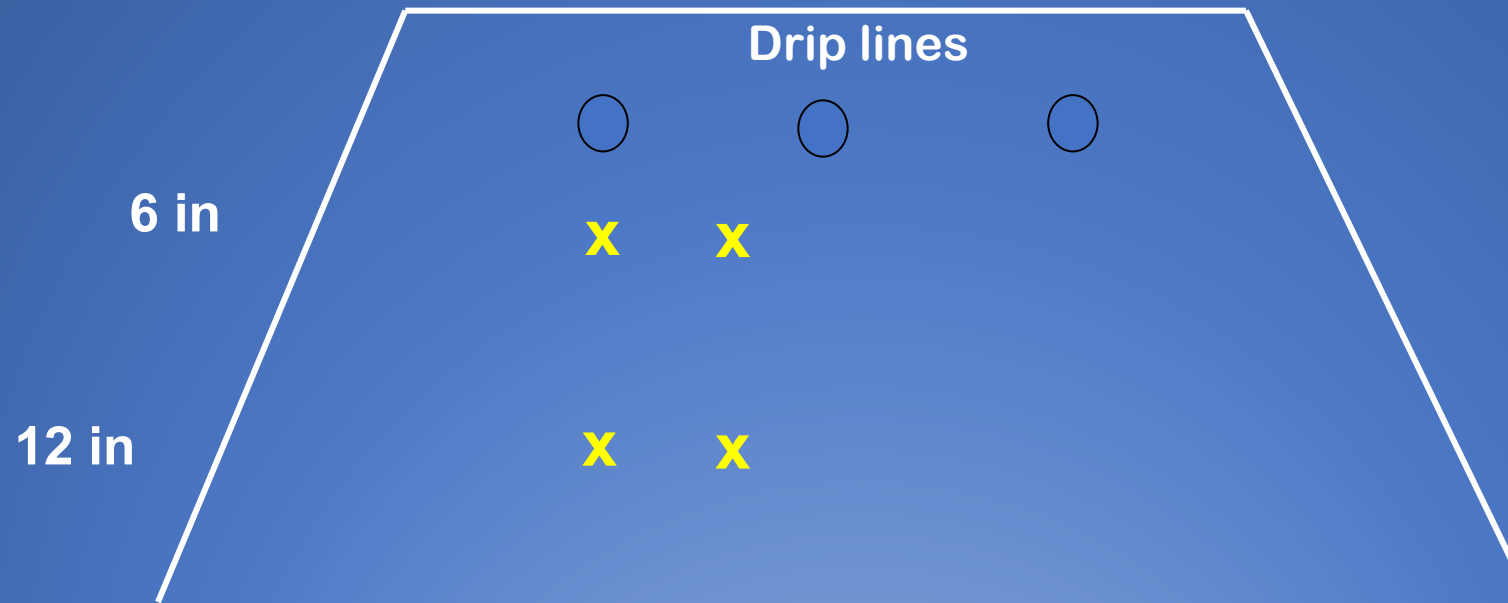
Plant early vigor



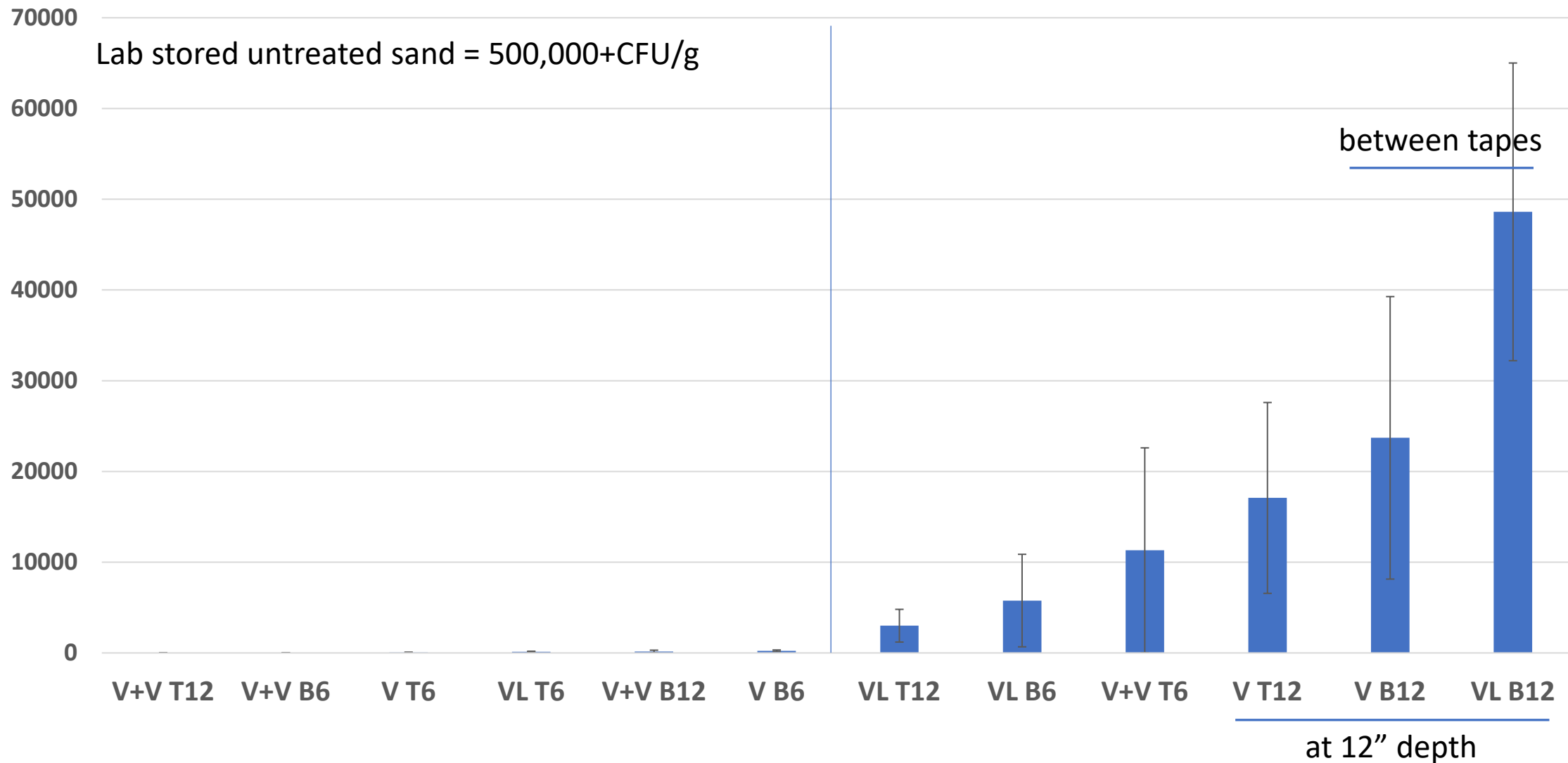
What about Fusarium and Macrophomina?



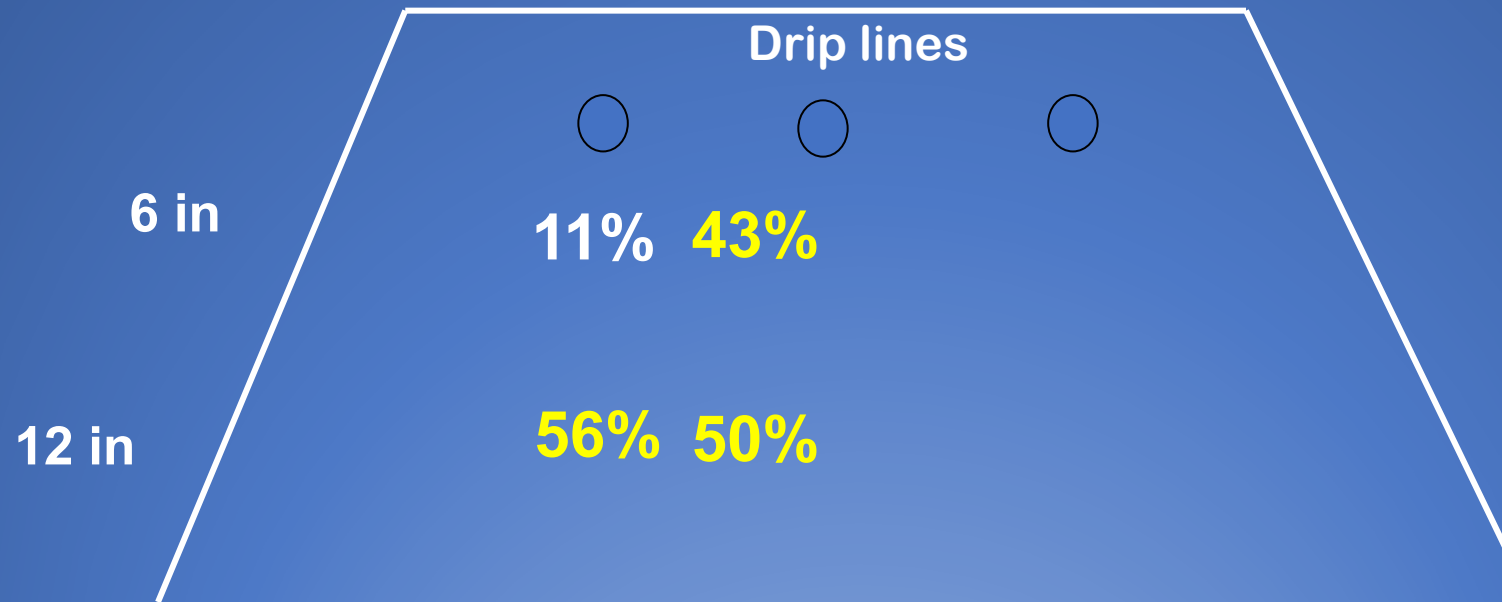
Inoculum buried before Vapam treatments



CFU, g/sand *Fusarium oxysporum* survivorship in sand inoculum

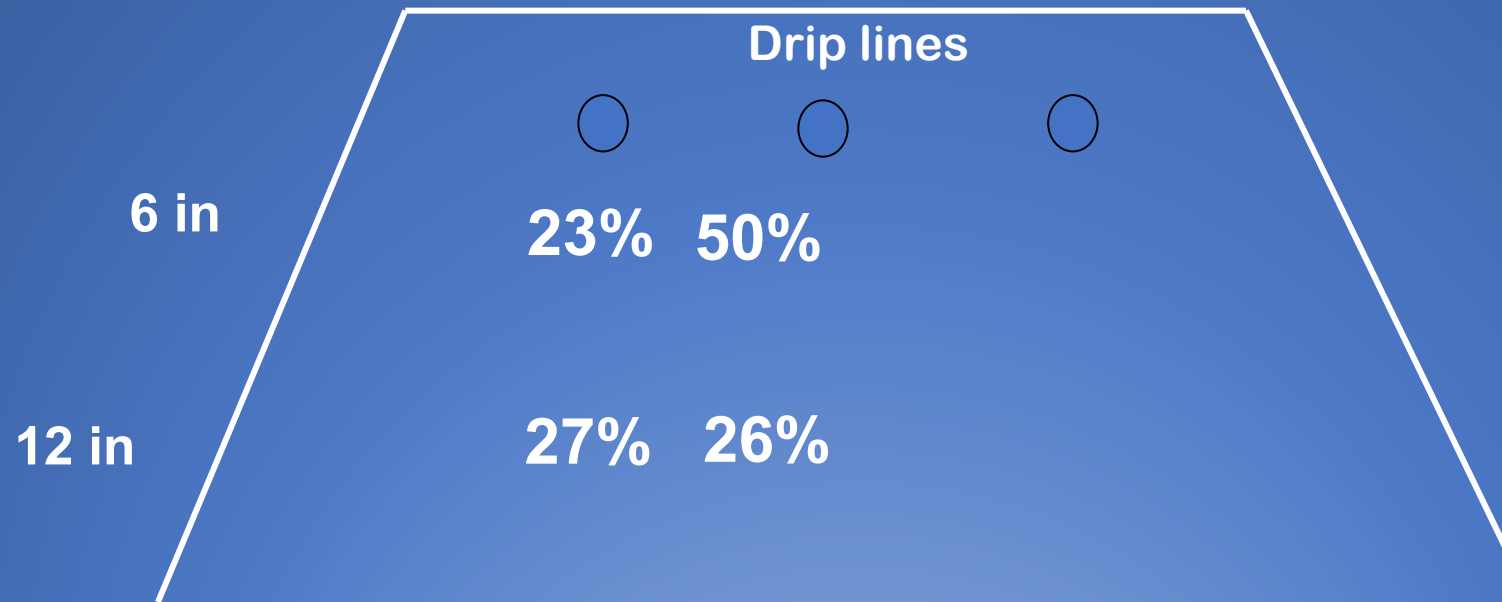


Fusarium survivorship in crowns after Vapam: no treatment effect



Fusarium in untreated lab soil: 2/6 (33%)

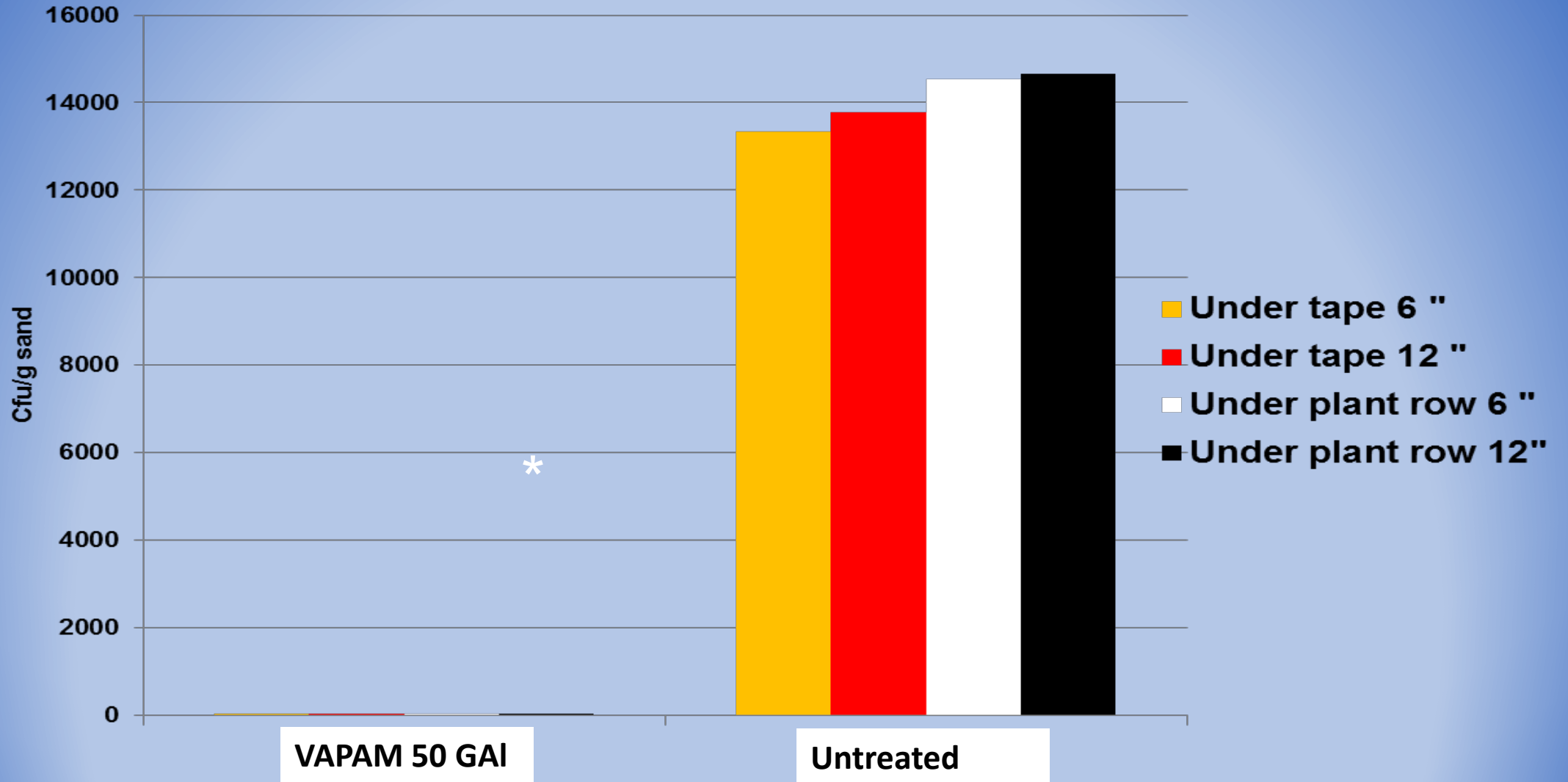
Macrophomina survivorship in crowns after Vapam: no treatment or location effect



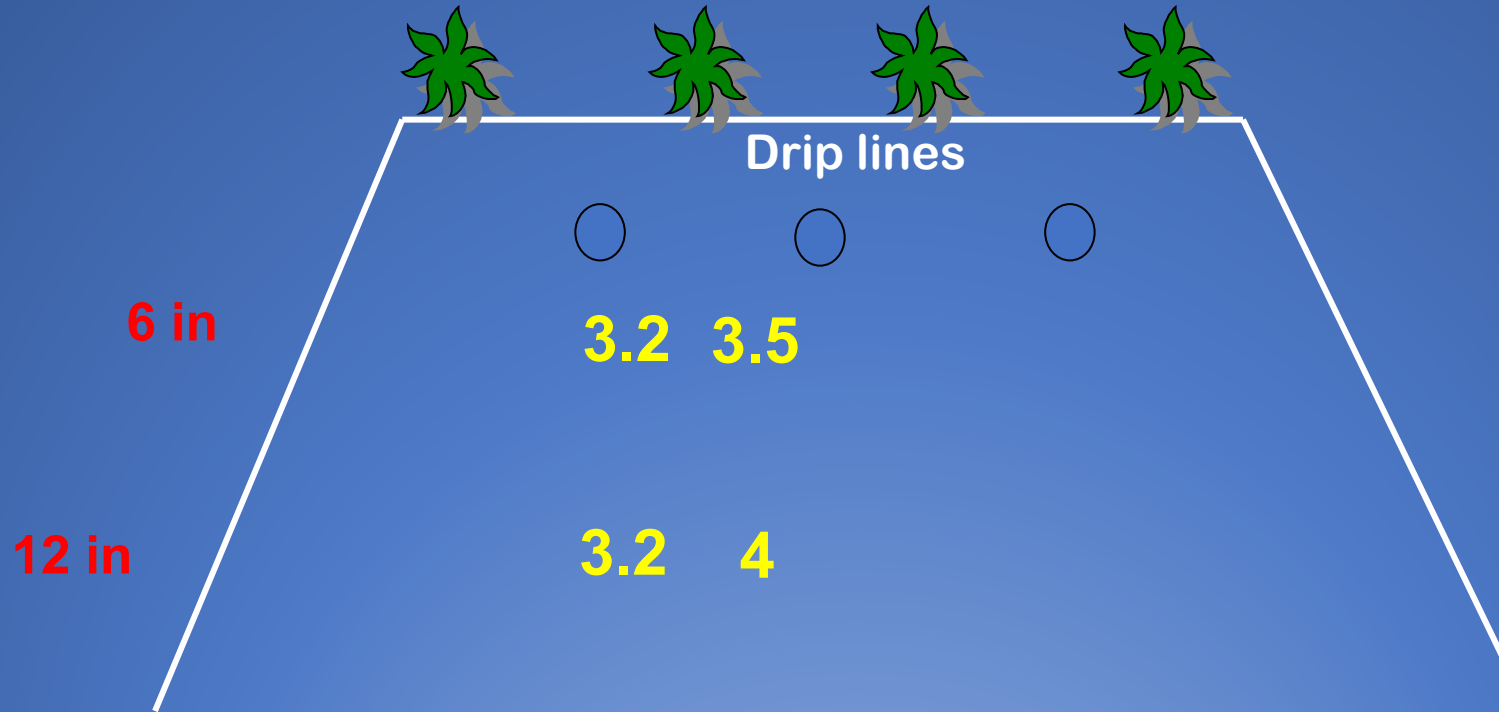
Macrophomina in untreated lab soil: 6/6 (100%)

End-season fumigation

F. oxysporum in sand inoculum after end-season fumigation



Yellow nutsedge shoots / 4 tubers

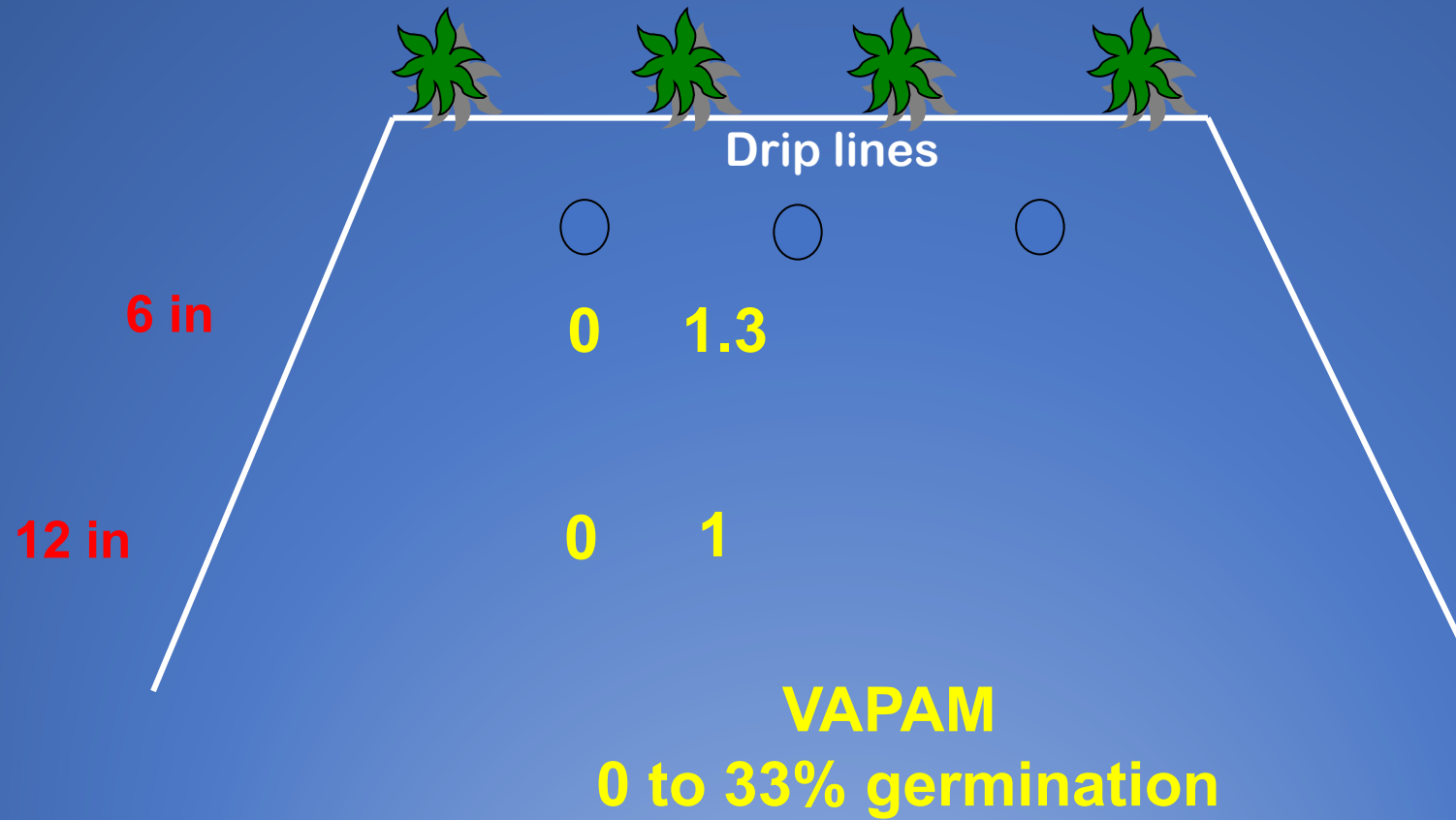


UNTREATED CHECK:
80-100% germination

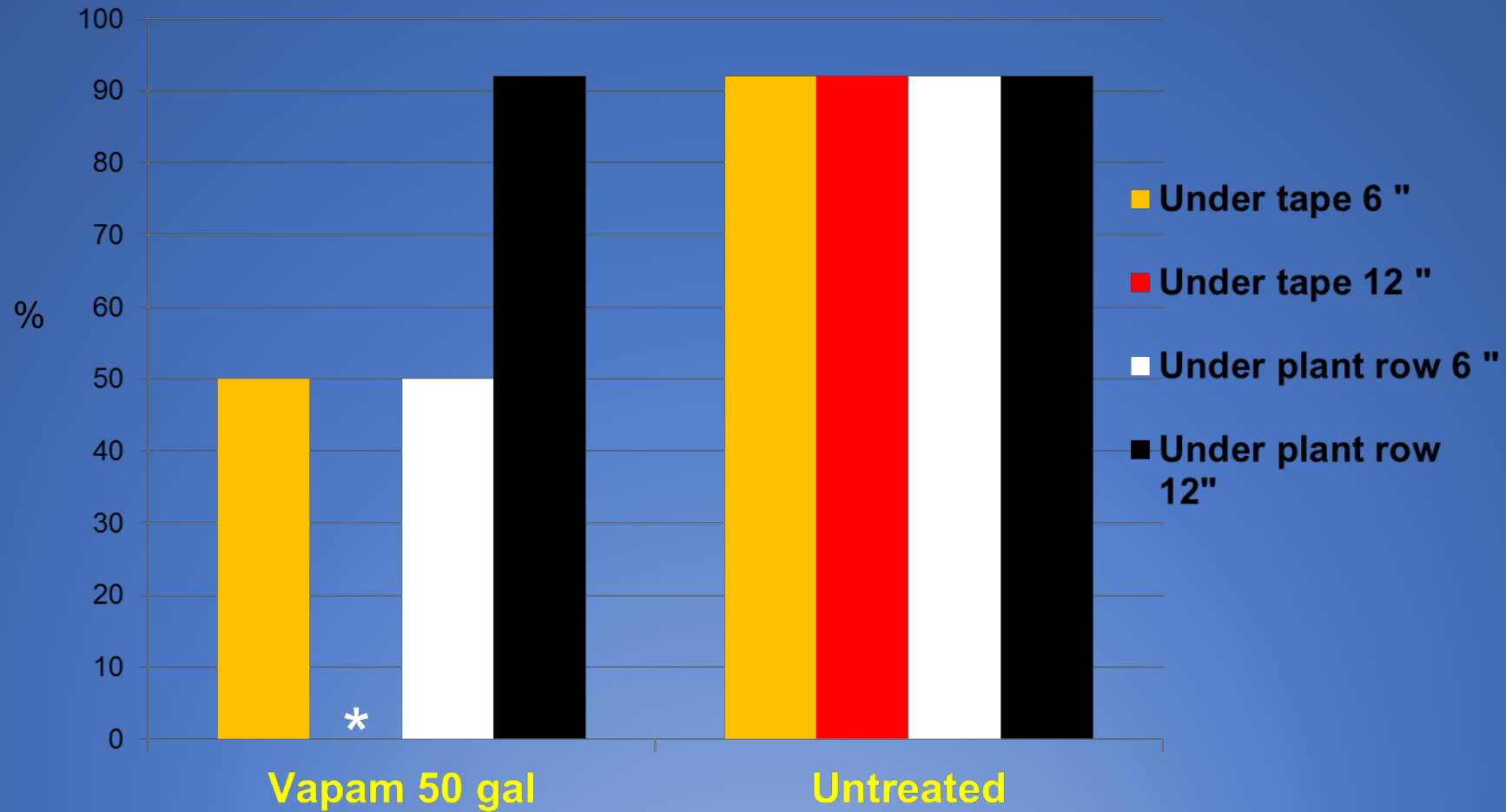
UNTREATED CHECK



Yellow nutsedge shoots / 4 tubers

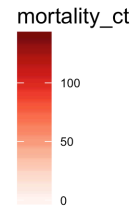
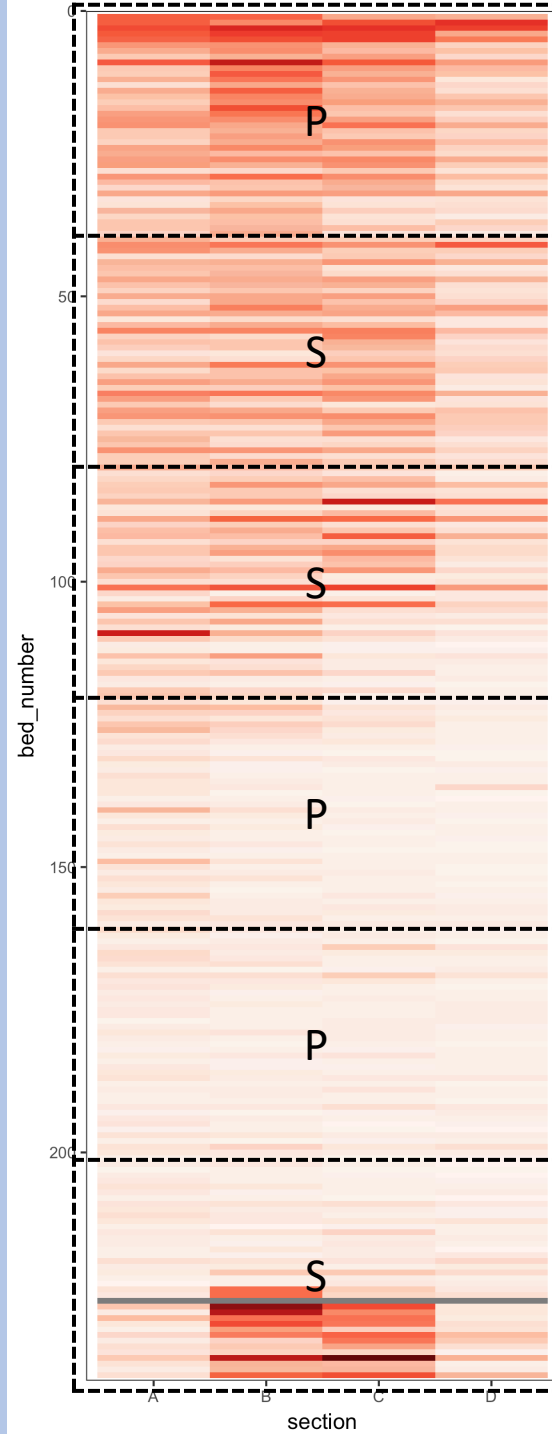


Recovery of *F. oxysporum* from infested crowns



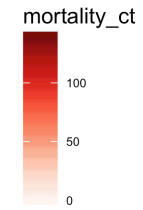
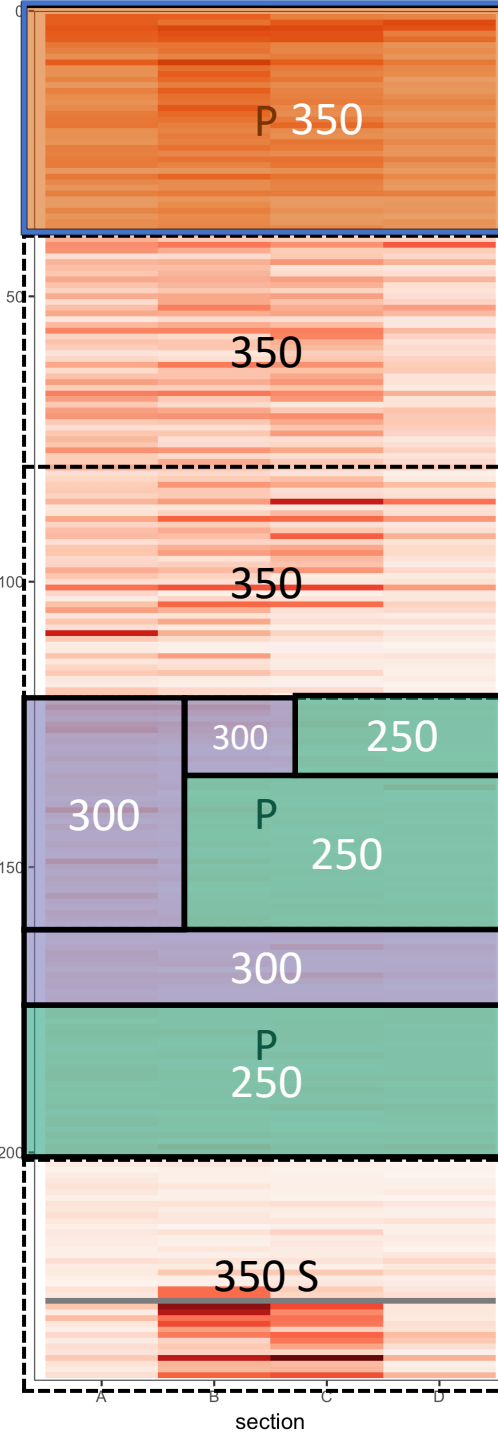
Mortality and rates

S = Standard
P = Precision



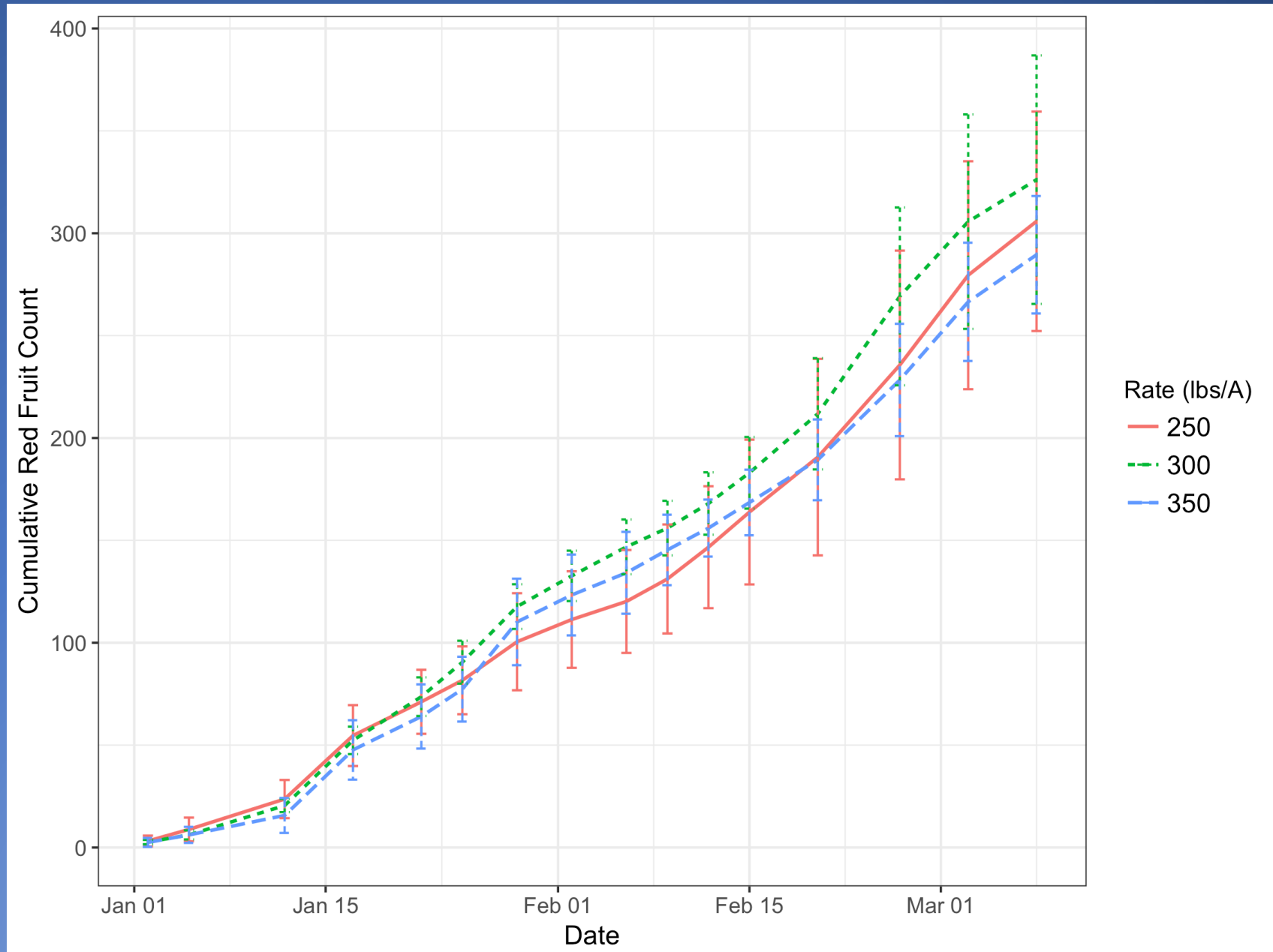
Rate Zones

- High
- Medium
- Low



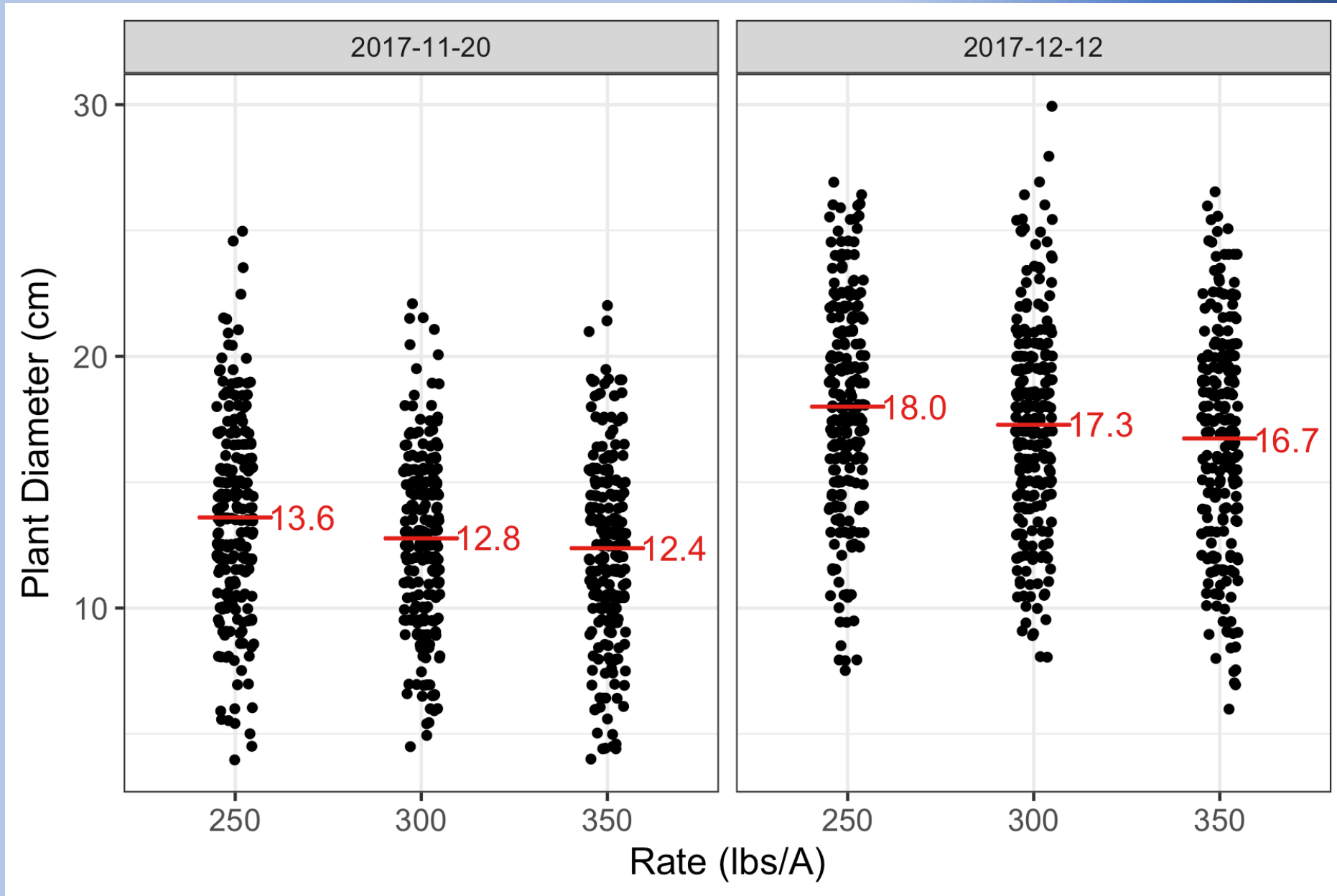
Marketable fruit -from specific points

**NO
SIGNIFICANT
DIFFERENCES
AMONG RATES**



Plant
early vigor
-from
specific
points

NO
SIGNIFICANT
DIFFERENCES
AMONG RATES
($P=0.21$)



Acknowledgements

- Matt Conroy and Dave Murray (Andrew and Williamson fresh produce)
- Hector Gutierrez (Otillo Farms)
- Henry Ito (Ito Bros.)
- Will Doyle with DW Berry Farms
- Tom Gordon's lab (UCD)
- Cal strawberry commission