

Fumigant and non-fumigant research update

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Trends in Southern European strawberry

- Evaluating cultivars for tolerance to pathogens
- Fumigant regulations: Fewer available, Lowering rates and frequency of application

FOCUS:

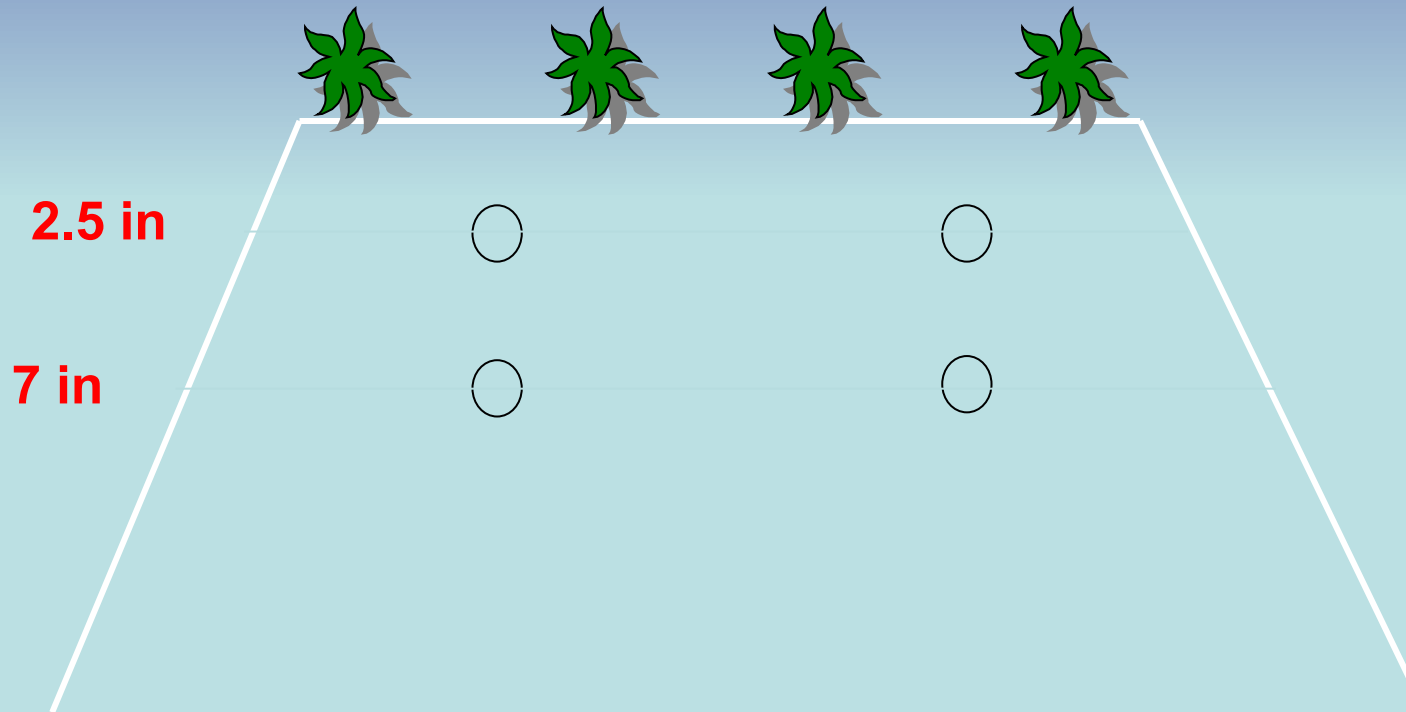
- 1) maximize efficacy (tarps, methods of application/equipment, rotation of fumigants)
- 2) non-fumigant technologies

For better fumigation results

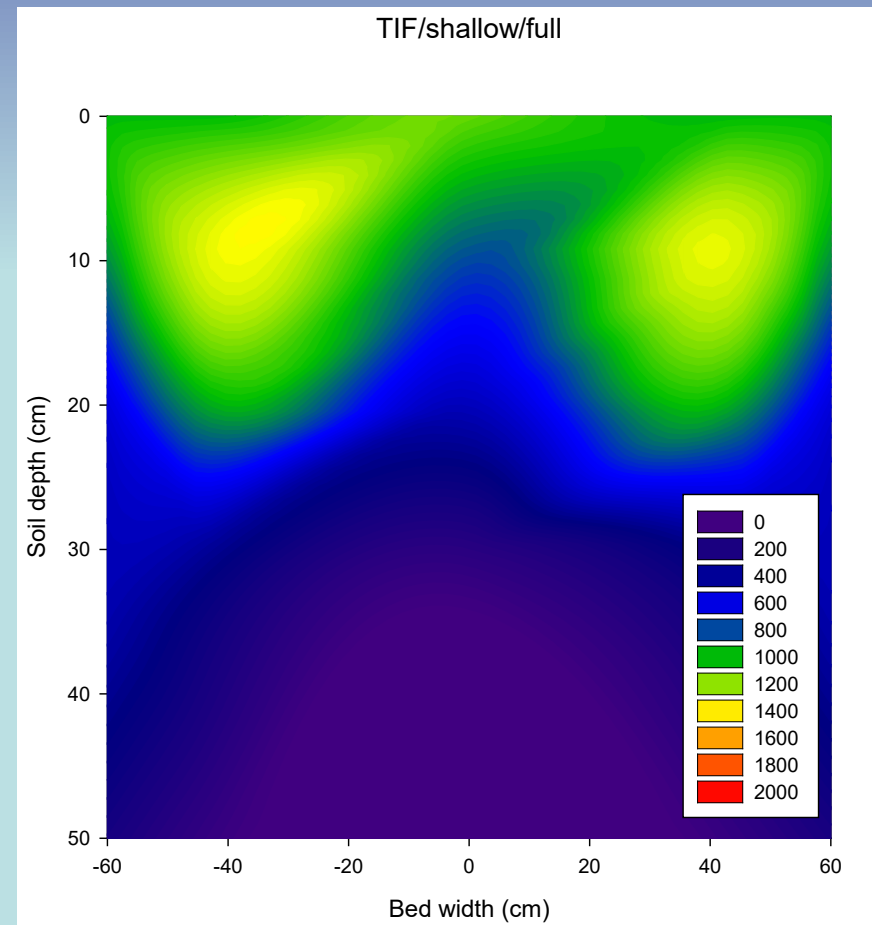
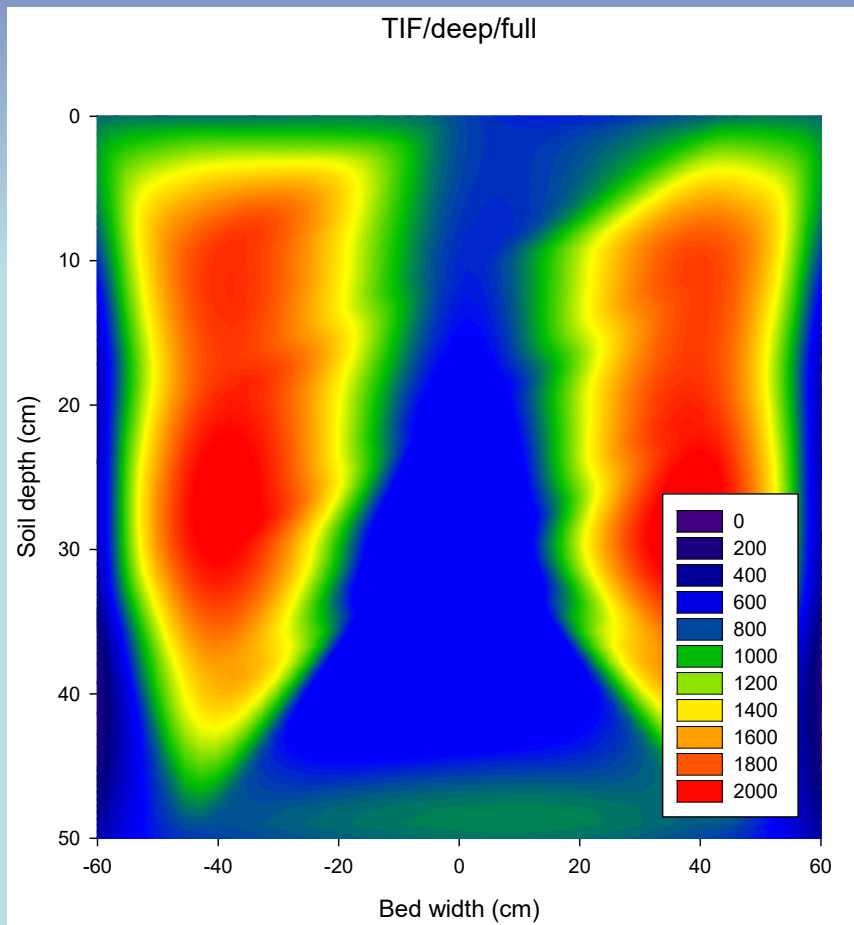
- Flat fumigation at high rates (85-90% control for *M. phaseolina* and *F. oxysporum*)
- Break or remove infested crowns
- Using TIF

Improving fumigant distribution with 2 additional 'deep' lines

2013-2014

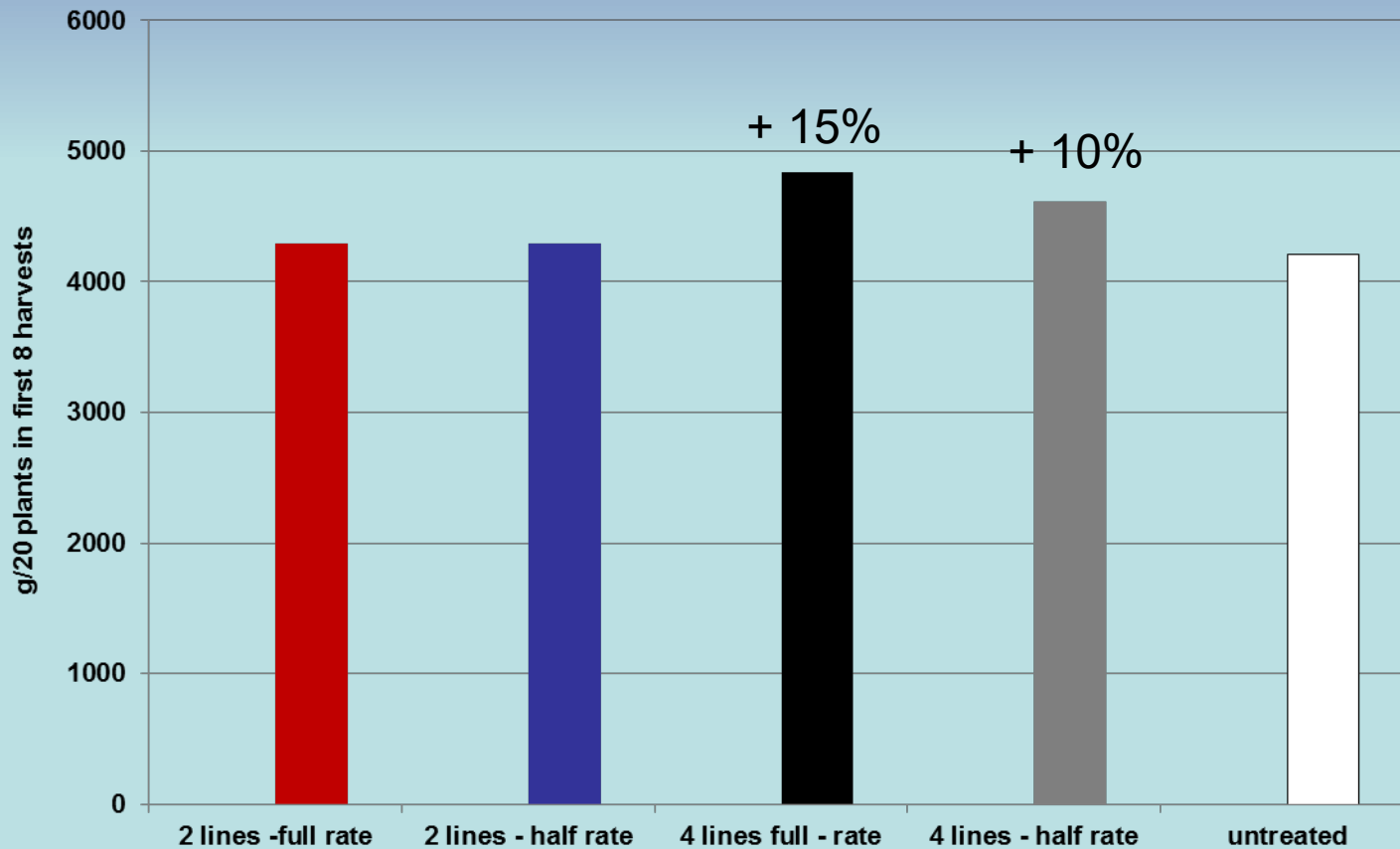


Fumigant concentration time exposure index

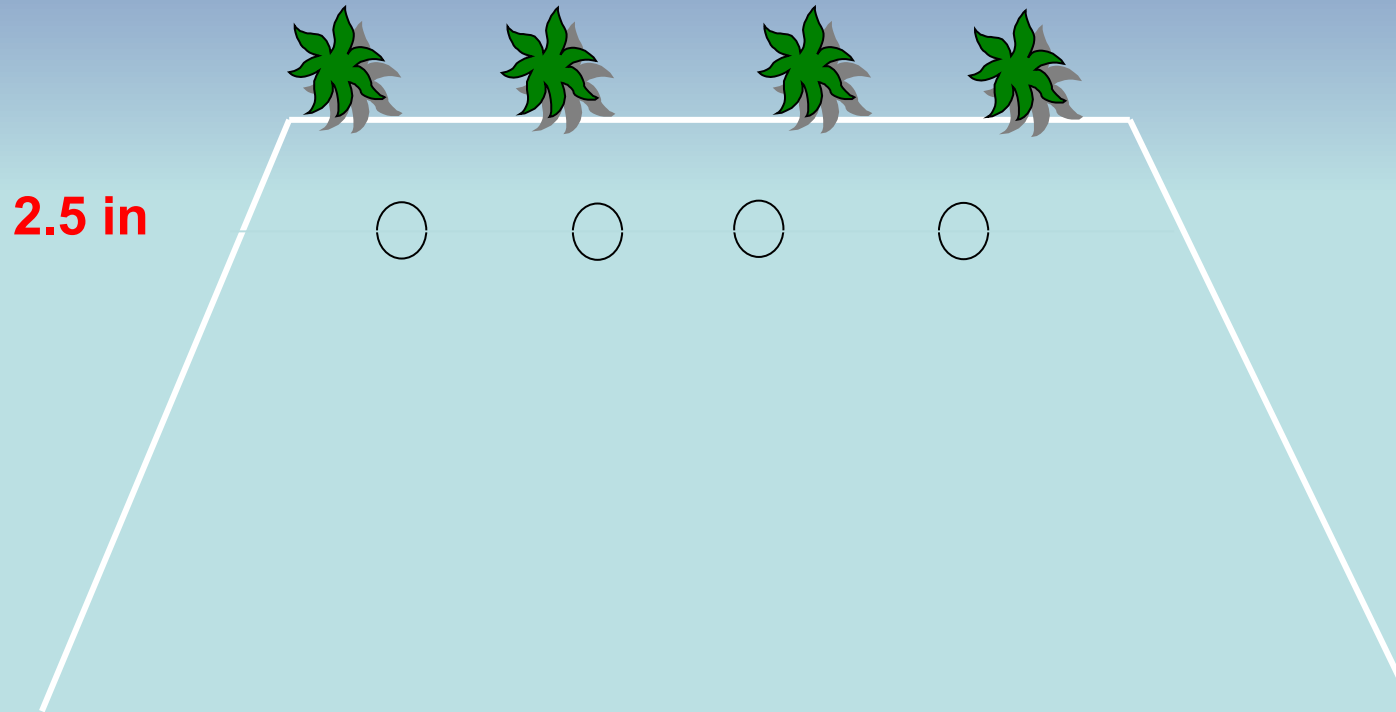


Marketable fruit yield

January 30 to March 18.



4 Lines shallow layout





Installing 4 drip tapes

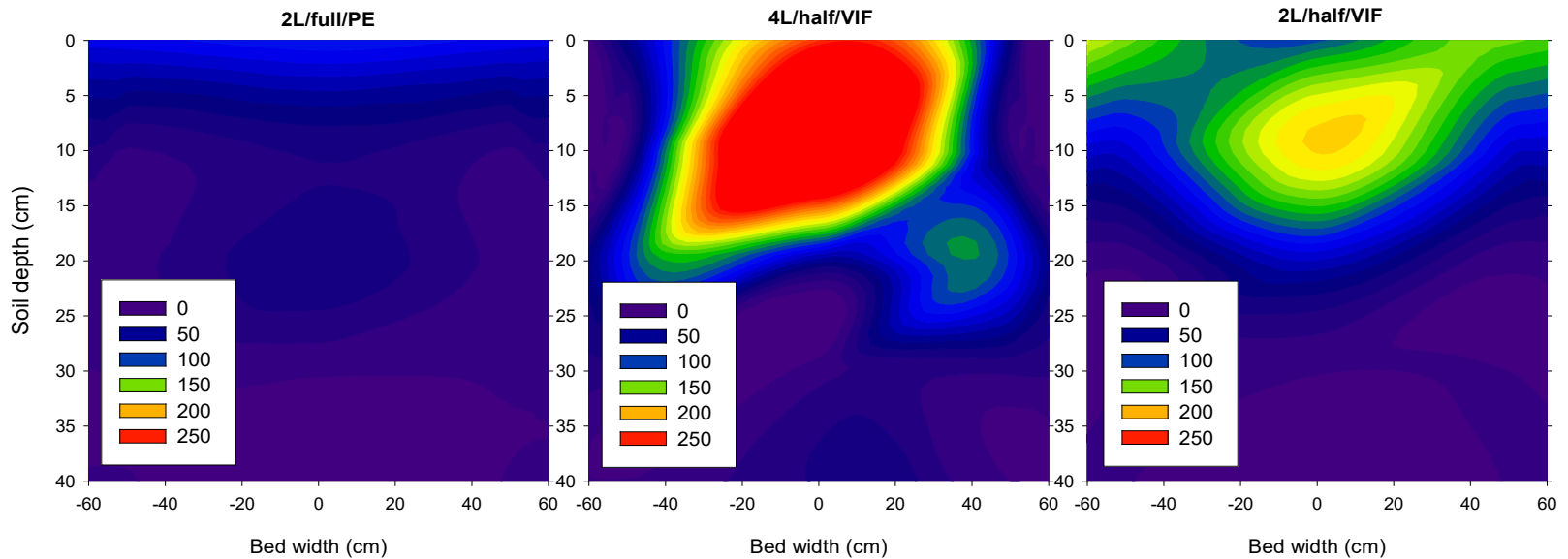
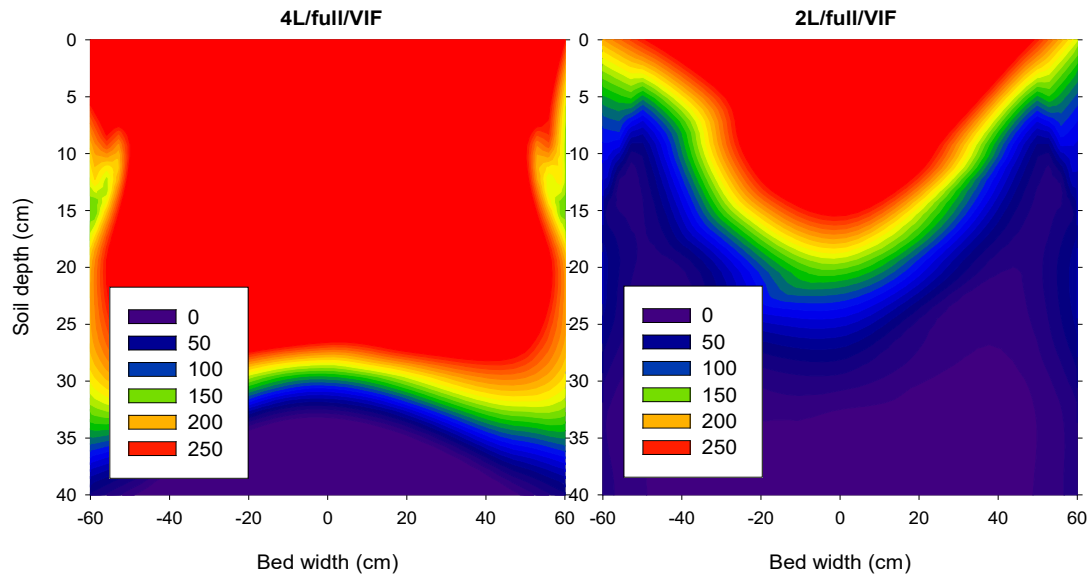
Materials and Methods

- Field trial (Sept. 2014-June 2015) at Oxnard, CA:
 - Raised-beds production system with sandy loam soil.
- Bed configuration:
 - 45" (bed width), 16" (bed height), 68" (bed center-center).
- Installation tube depths:
 - 2" deep.
- Fumigant:
 - Tri-Clor EC [a mixture of 94% chloropicrin (CP) and 6% inert ingredients]
- Film type:
 - PE vs. Virtually impermeable film (VIF; Filmtech Grozone, black).
- Application rate:
 - 224 lbs/ac (full rate) vs. 112 lbs/ac (half rate).

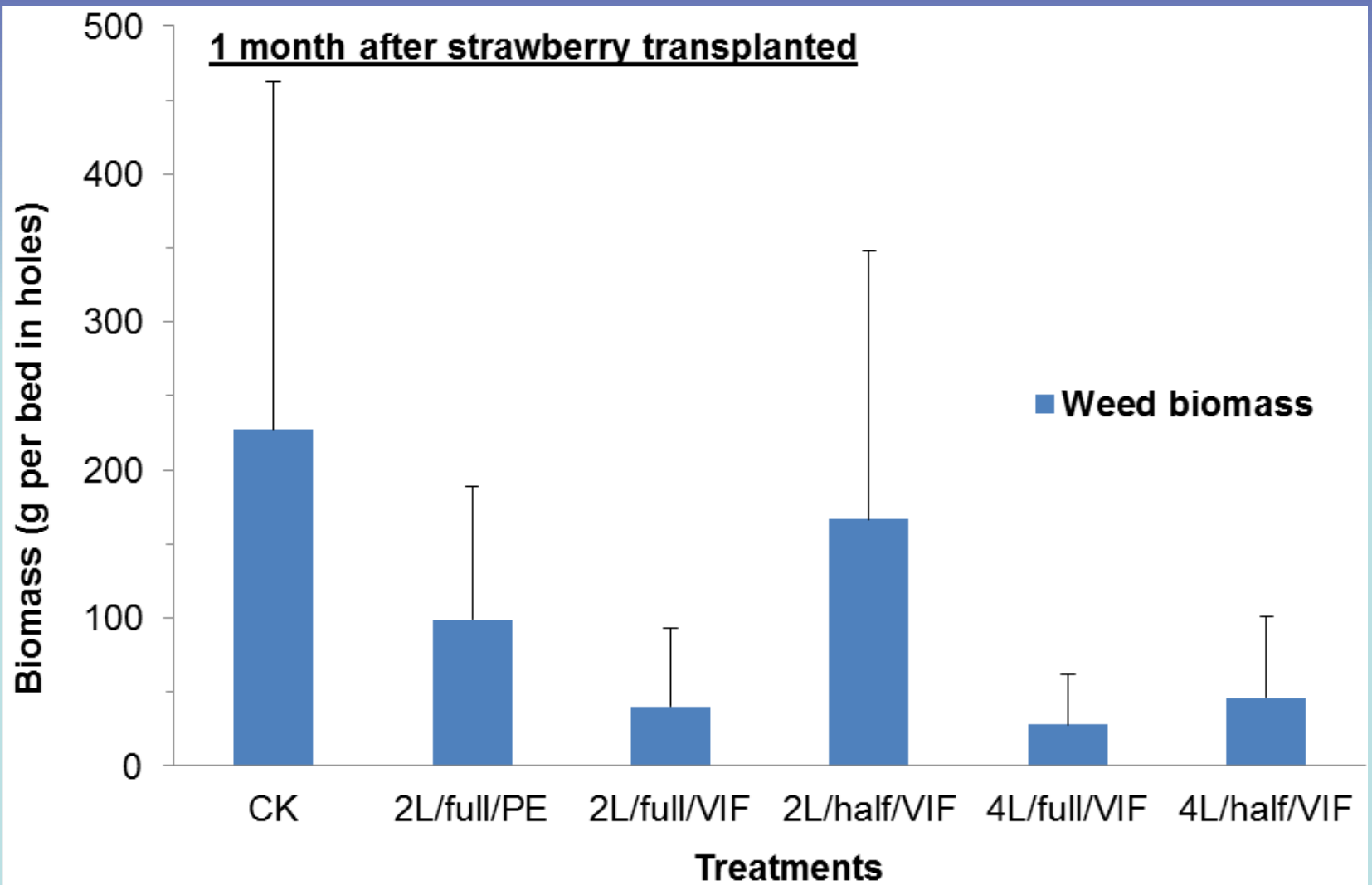
Fumigant behavior

- **VIF-tarped beds had dramatically lower emission flux and much higher concentration than PE-tarped beds.**
- **Full rates > half rates, 4 lines > 2 lines**

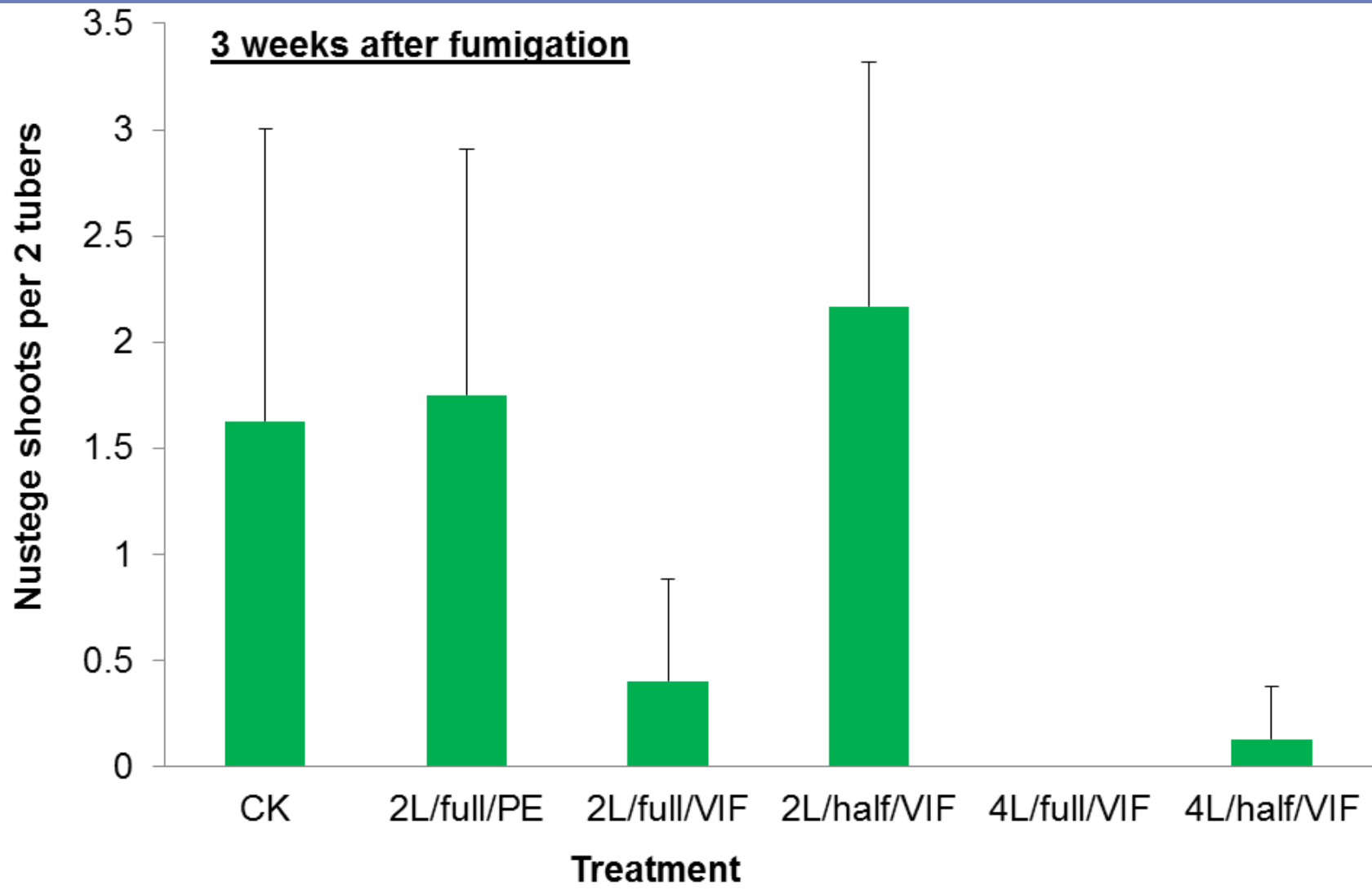
Concentration-time exposure index ($\mu\text{g cm}^{-3} \text{ h}$)



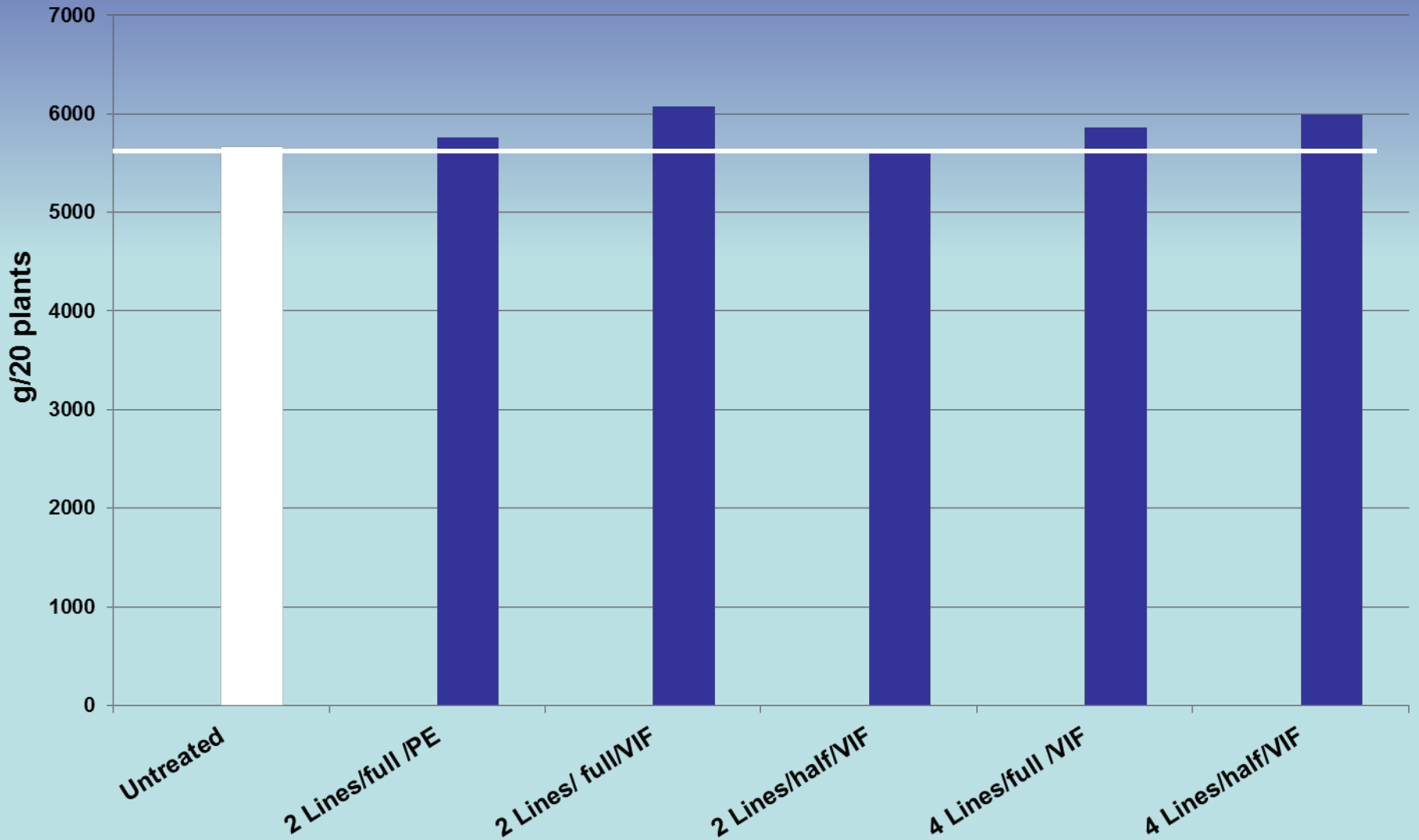
Weeds in planting holes



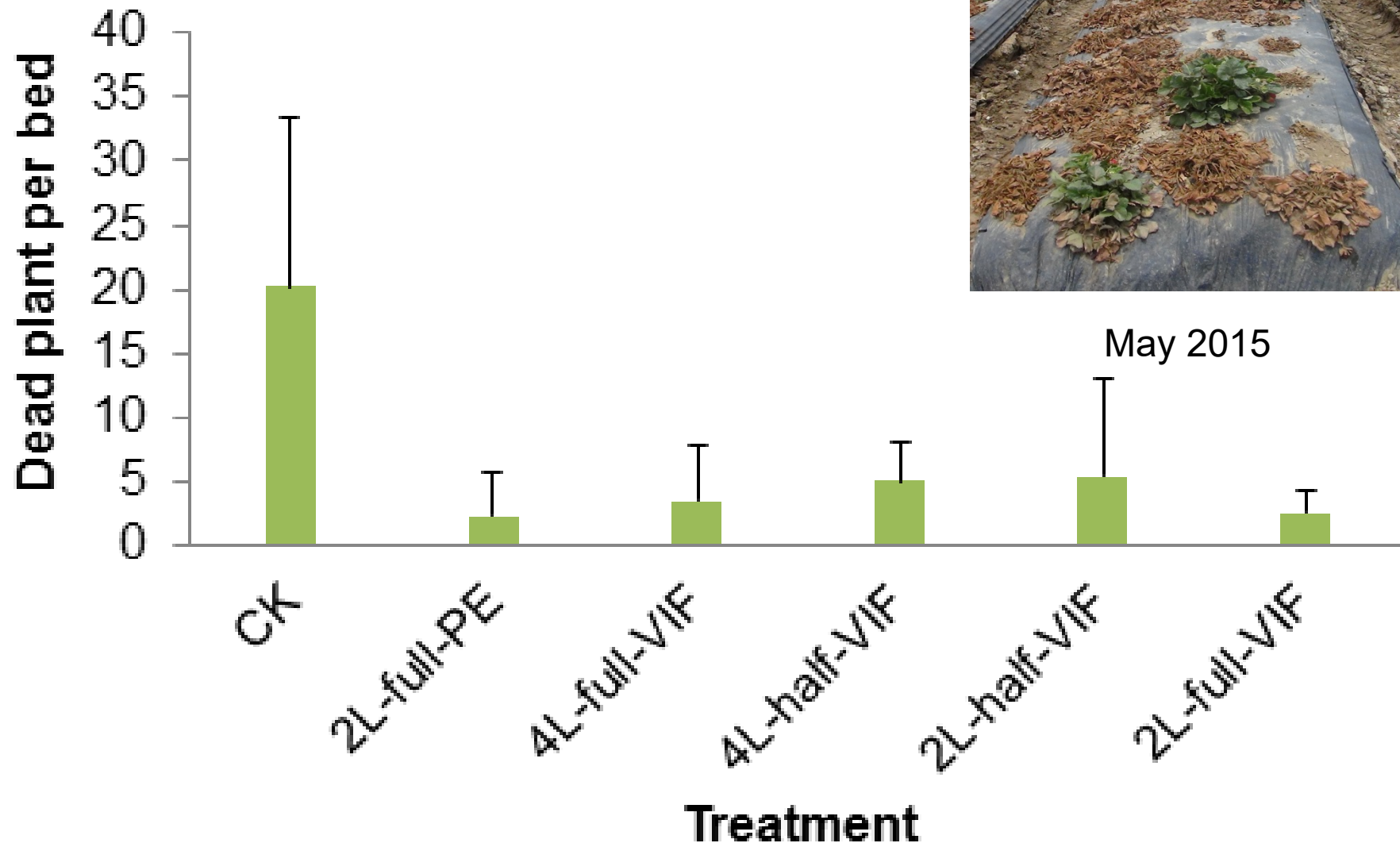
Yellow nutsedge shoots



Early (Dec-March) fruit yields

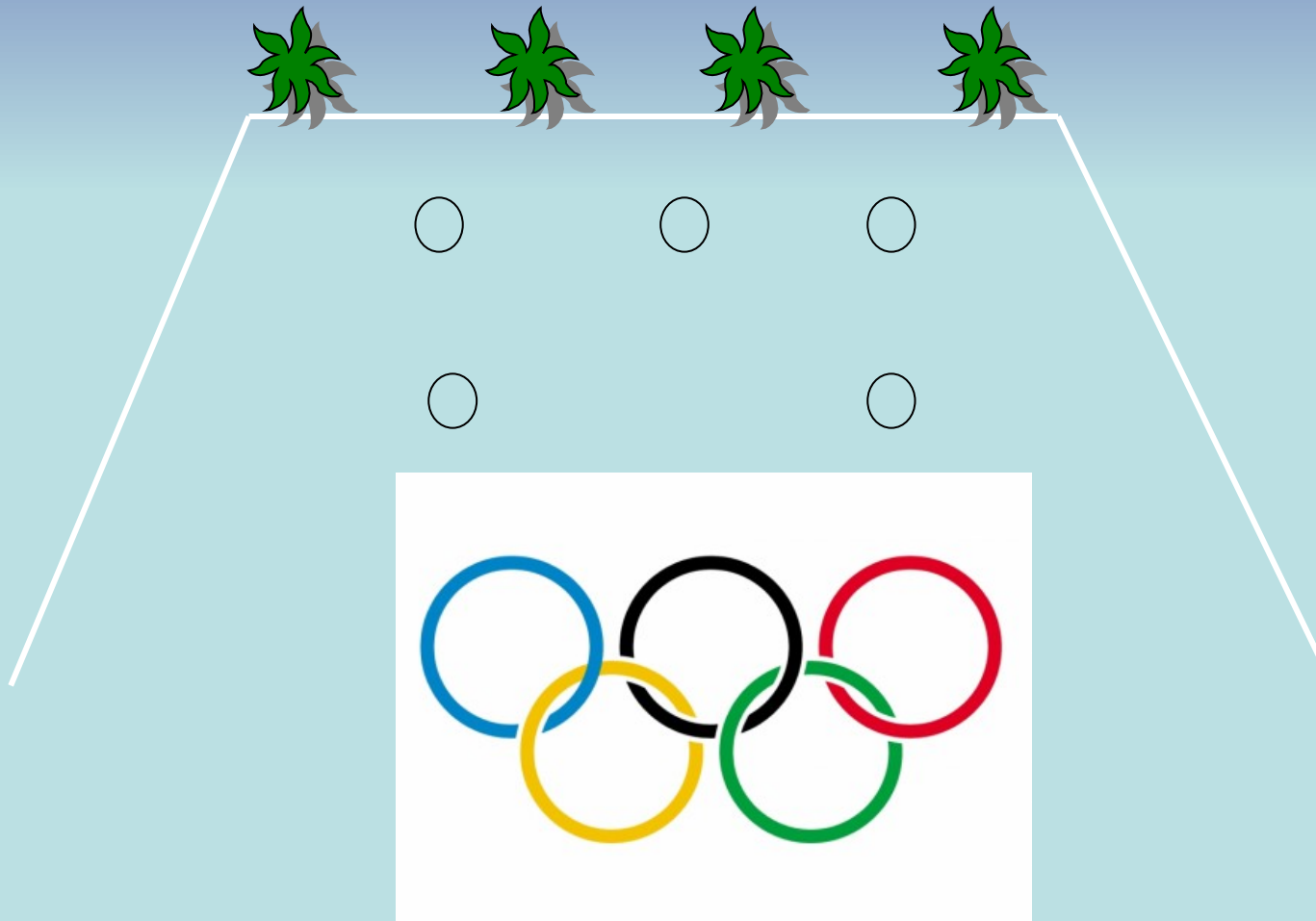


Mortality per 300 ft bed (*F.oxysporum* isolated)



What's next?

- Evaluate efficacy in Fusarium infested field



What else can we do with Anaerobic Soil Disinfestation?



Oleg Daugovish, Anna Howell, Bill Rutan, Steve Koike (UC-ANR), Joji Muramoto and Carol Shennan (UCSC)

Effective ASD = C-source + water + plastic mulch

- Need C-source uniformly mixed
- Standard LDPE mulch – sufficient
- Black mulch as good as clear
- 3 inches of water - sufficient
- 3 weeks duration in summer

For C-source:

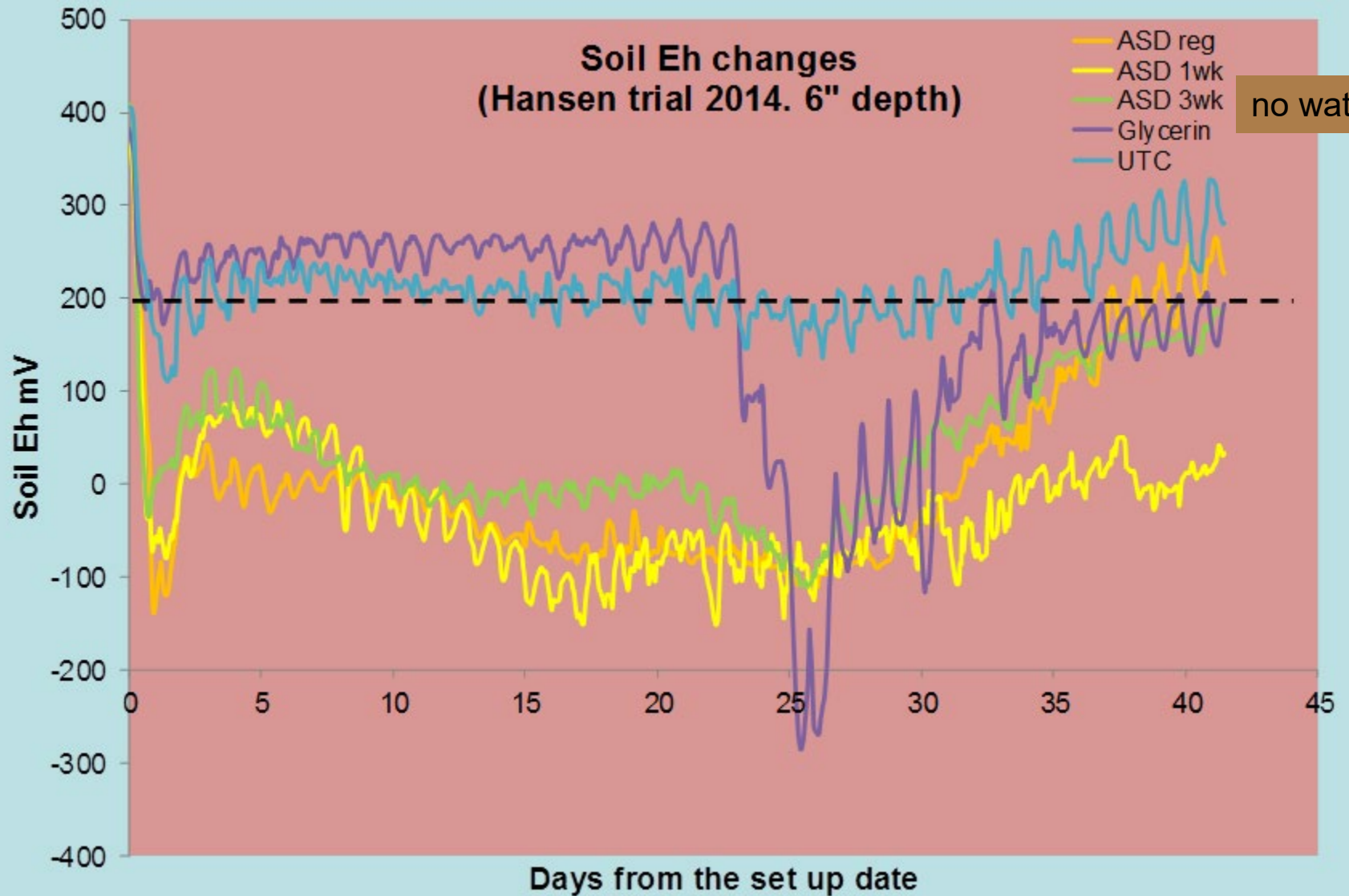
- Rice bran applied to beds: at least 25% less needed
- Apply Glycerin at 4% by volume via drip

For water:

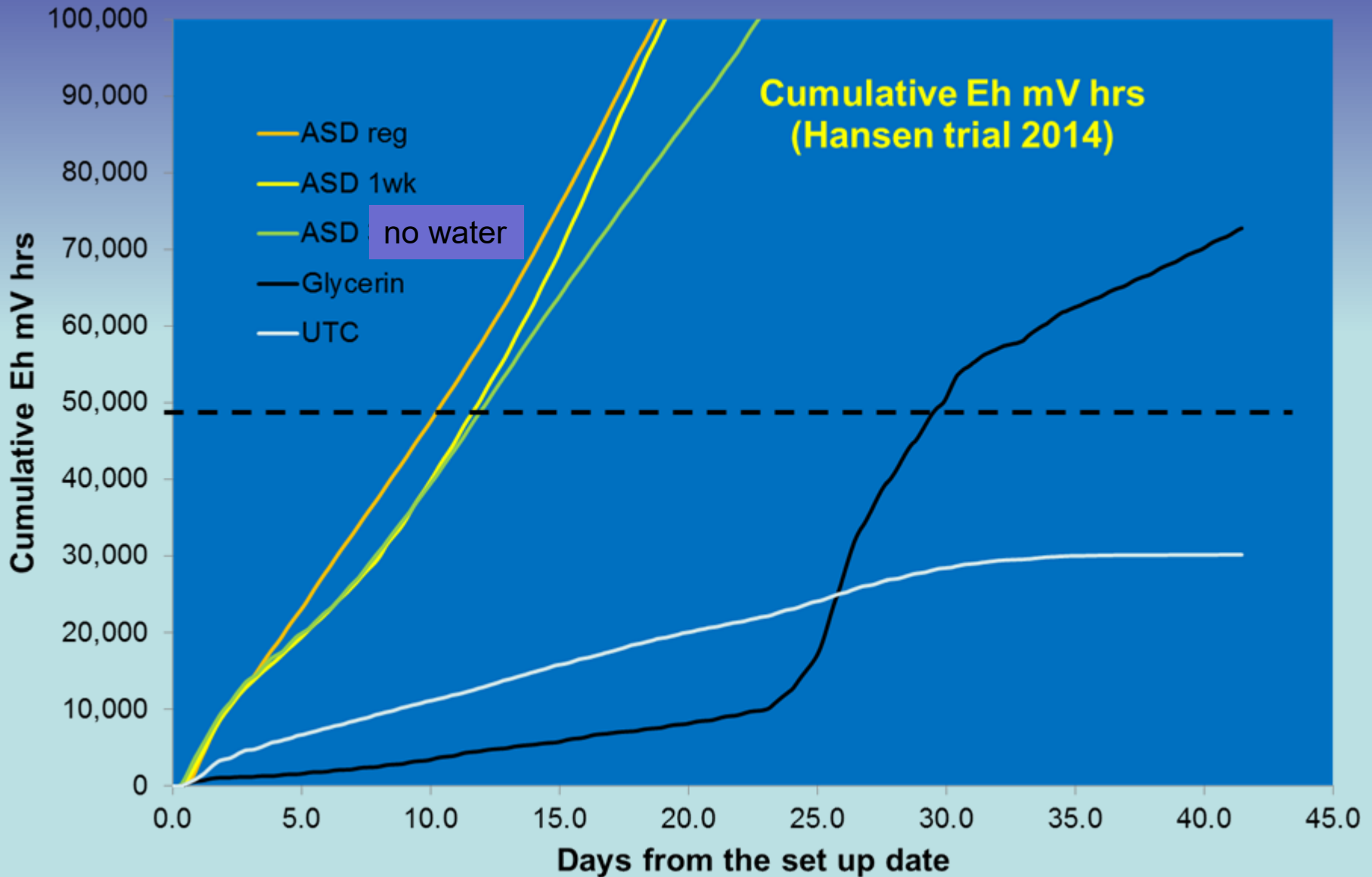
- Delay drip irrigation 1 wk after bedding
- Apply no water after bedding
- Drip-irrigate immediately



Anaerobic conditions



Anaerobic conditions



Dec 28, 2014



ASD/9t rice bran

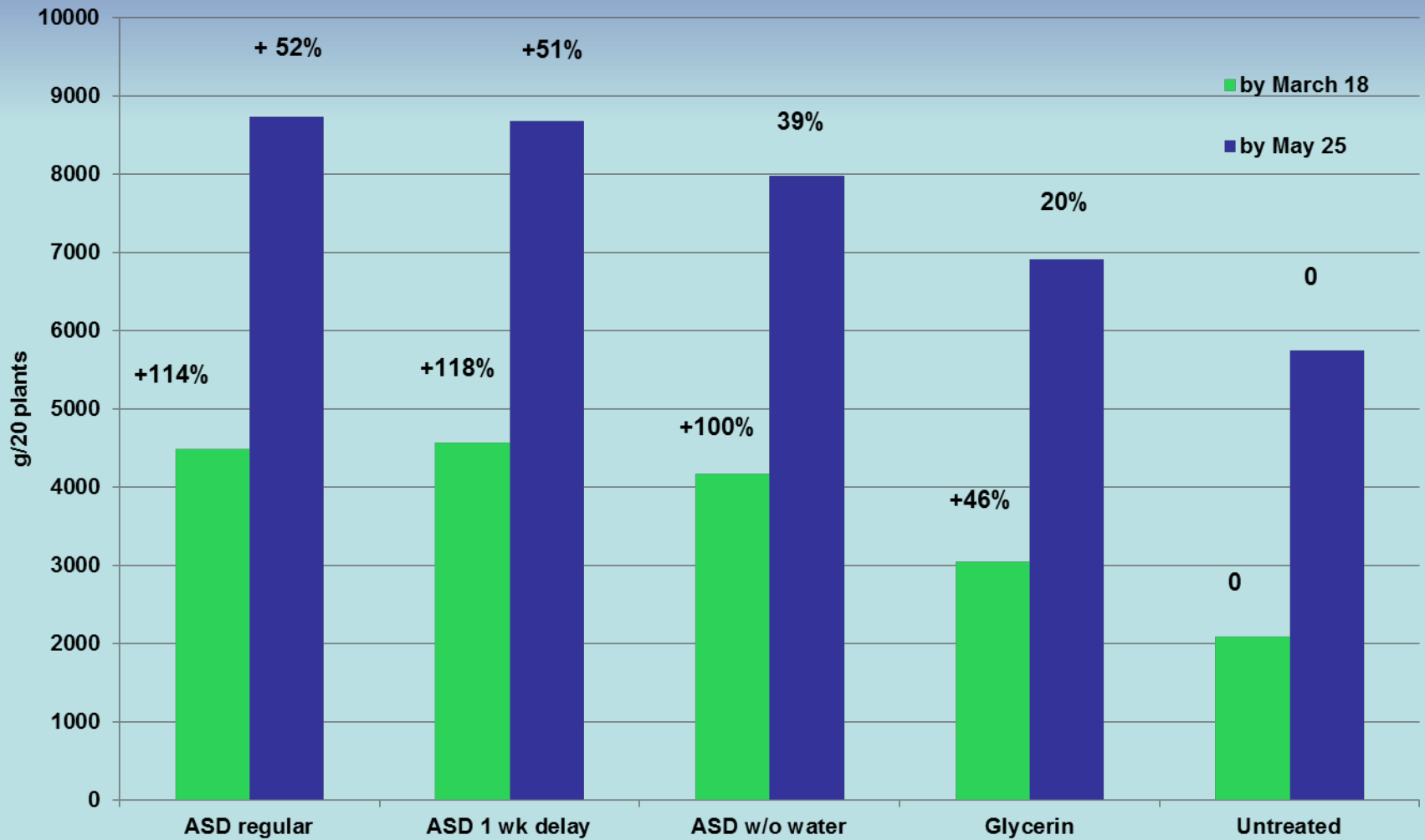


ASD/glycerin

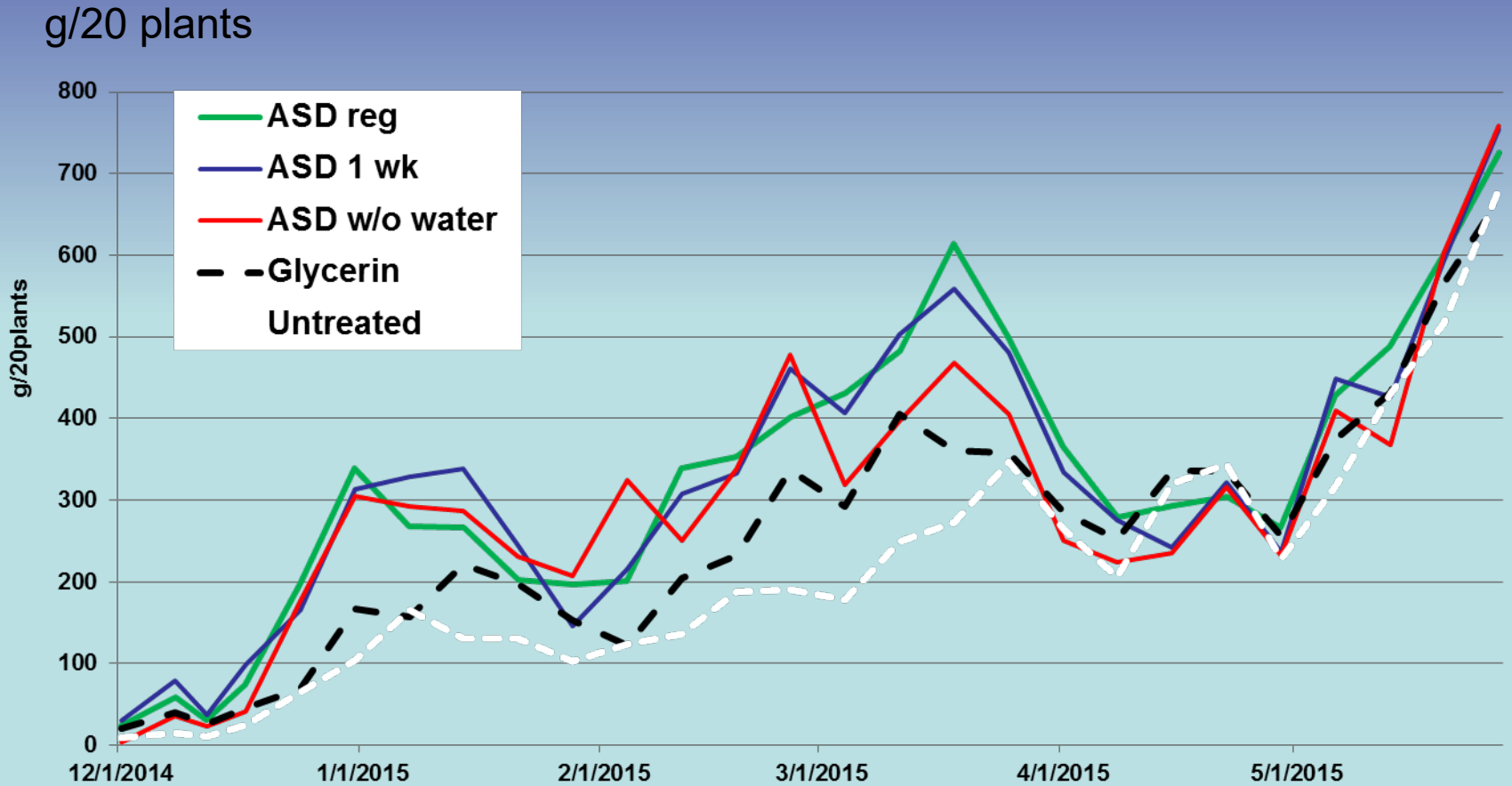


Untreated

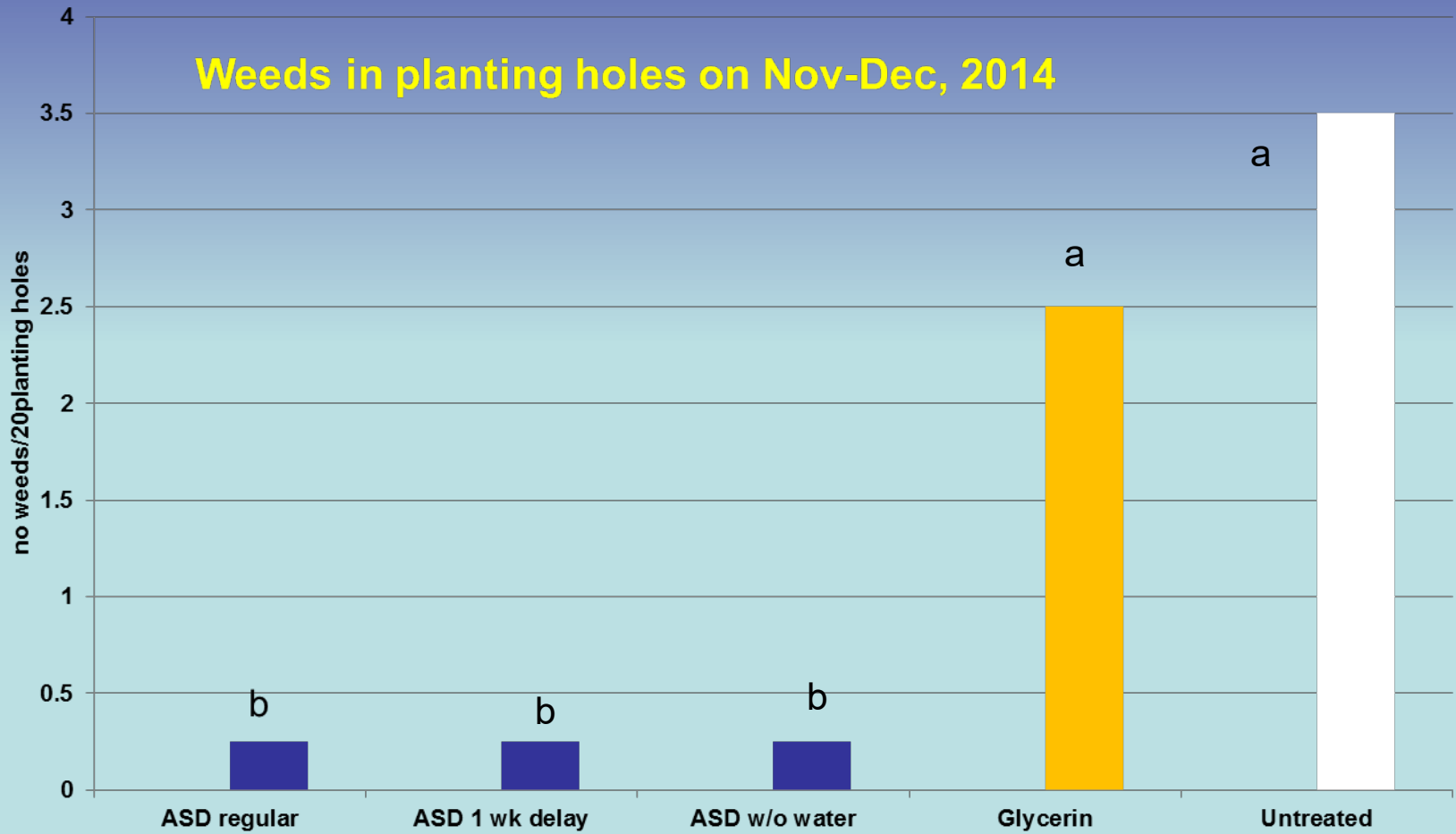
Marketable yield



Marketable yield: Dec-May



Weeds



Glycerin (applied in August) in beds in June



Soil in ASD with 9T rice bran vs untreated

- **Lower bulk density, ECe (salinity), likely due to differences in infiltration and leaching**
- **30-35% greater volumetric water content at 8-16 cm soil depth (water holding capacity)**
- **Twice more residual Olsen P_2O_5 at 0-30cm (12 inch) soil profile in planting holes**
- **Similarity of microbial communities among all treatments with rice bran, distinctly different from those observed in untreated and glycerin treatments.**

What's next?

C-sources:

favorable C/N ratio, local, available, cheap

Coffee grounds
(Roasting plant at Camarillo)



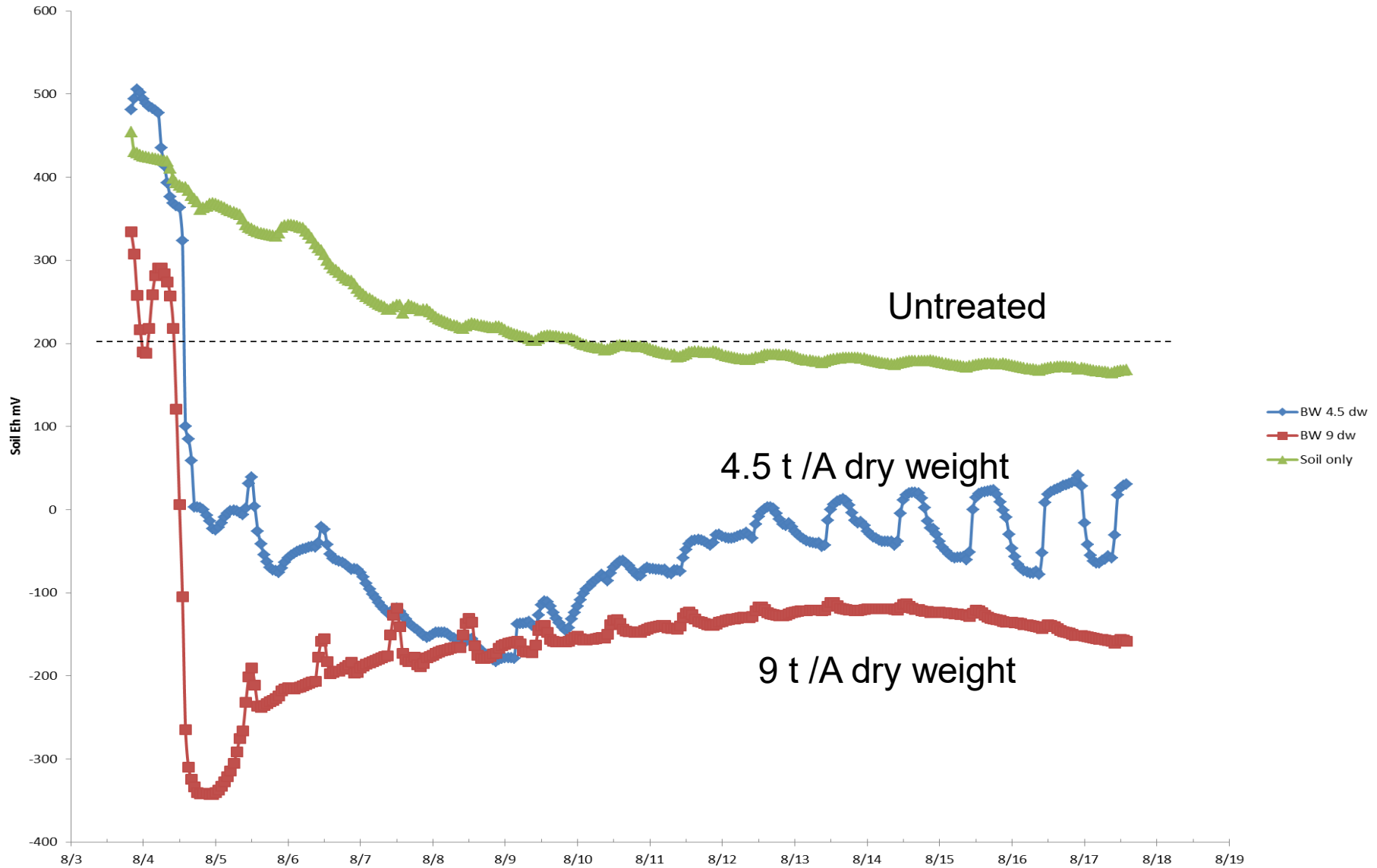
Spent grain
(Surf Brewery, Ventura)



Grass clippings
(Southland Sod at Camarillo)



Anaerobic conditions: spent grain



C-sources research support



PHOTO: THINKSTOCK



Acknowledgements:

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- CSC

