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Management updates for Fusarium diseases of tomato, and beyond

Cassandra Swett
CE Specialist—Vegetable and Field Crop Pathology, Plant Pathology Dept., UC Davis

Brenna Aegerter, UC Cooperative Extension Advisor, San Joaquin Co.
Tom Turini, UC Cooperative Extension Advisor, Fresno Co.
Zach Bagley, CTRI director

Will pause for questions as we go along

Fusarium wilt

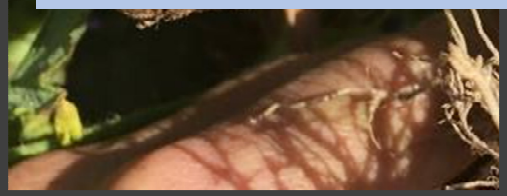
Fusarium crown and root rot

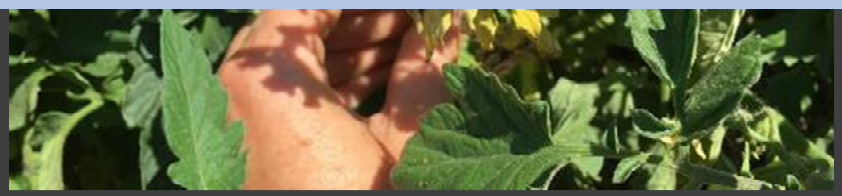
Fusarium falciforme stem rot and vine decline

Management strategies lacking

Fusarium wilt and *F. falciforme* symptoms are very similar: easily confused in the field

Laboratory analysis needed for diagnosis
Accurate diagnosis is need for selection of appropriate management tools

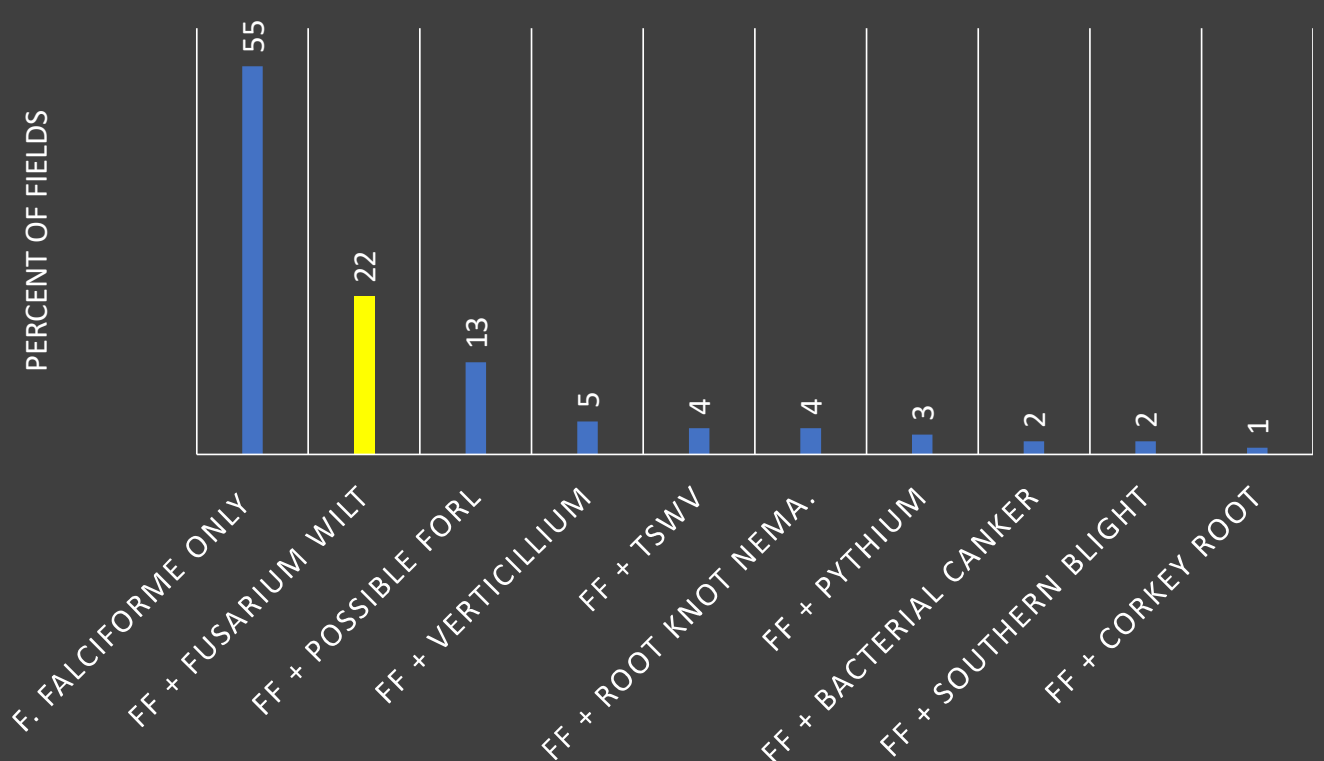




Vascular discoloration caused by both diseases

Yellow flagging of branches is caused by both diseases

These pathogens commonly co-occur, making diagnosis and management challenging

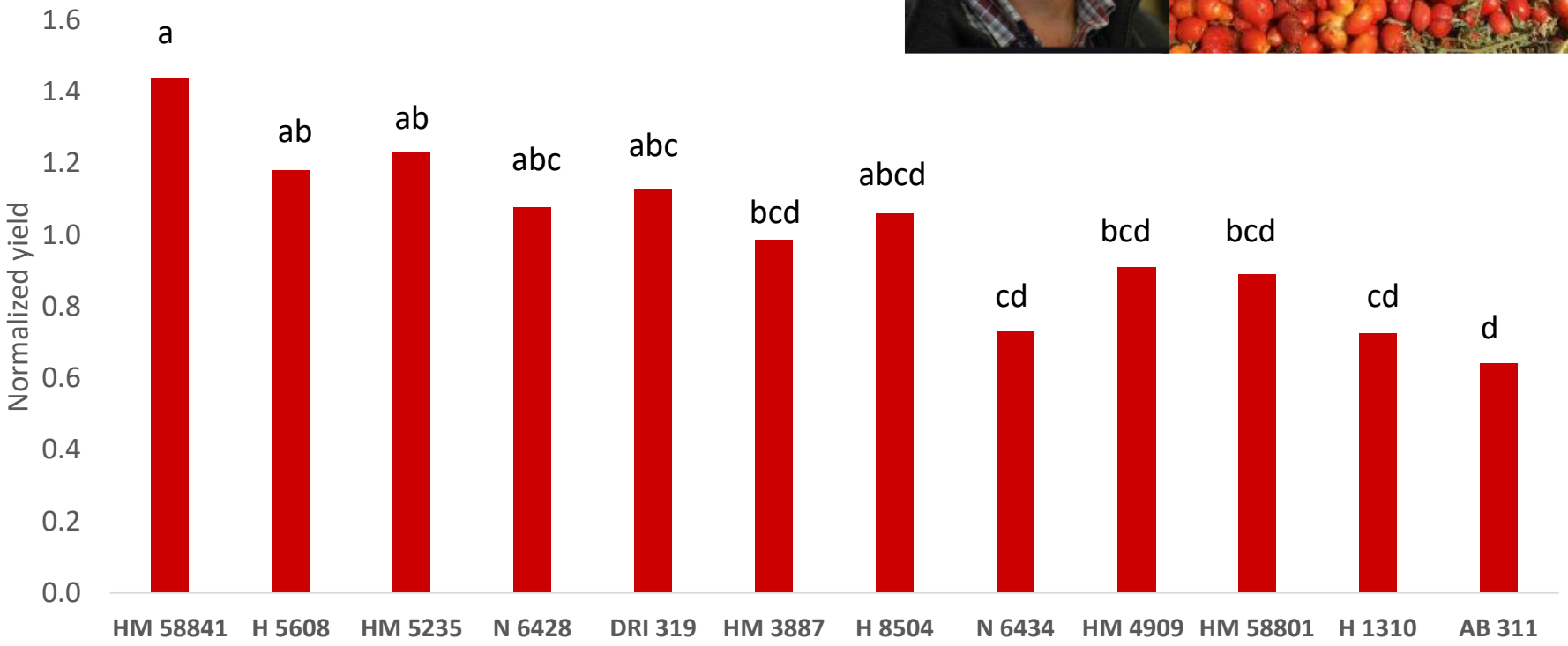


Improving management strategies for F. falciforme including co-management options with Fusarium wilt

Cultivar-based management tools

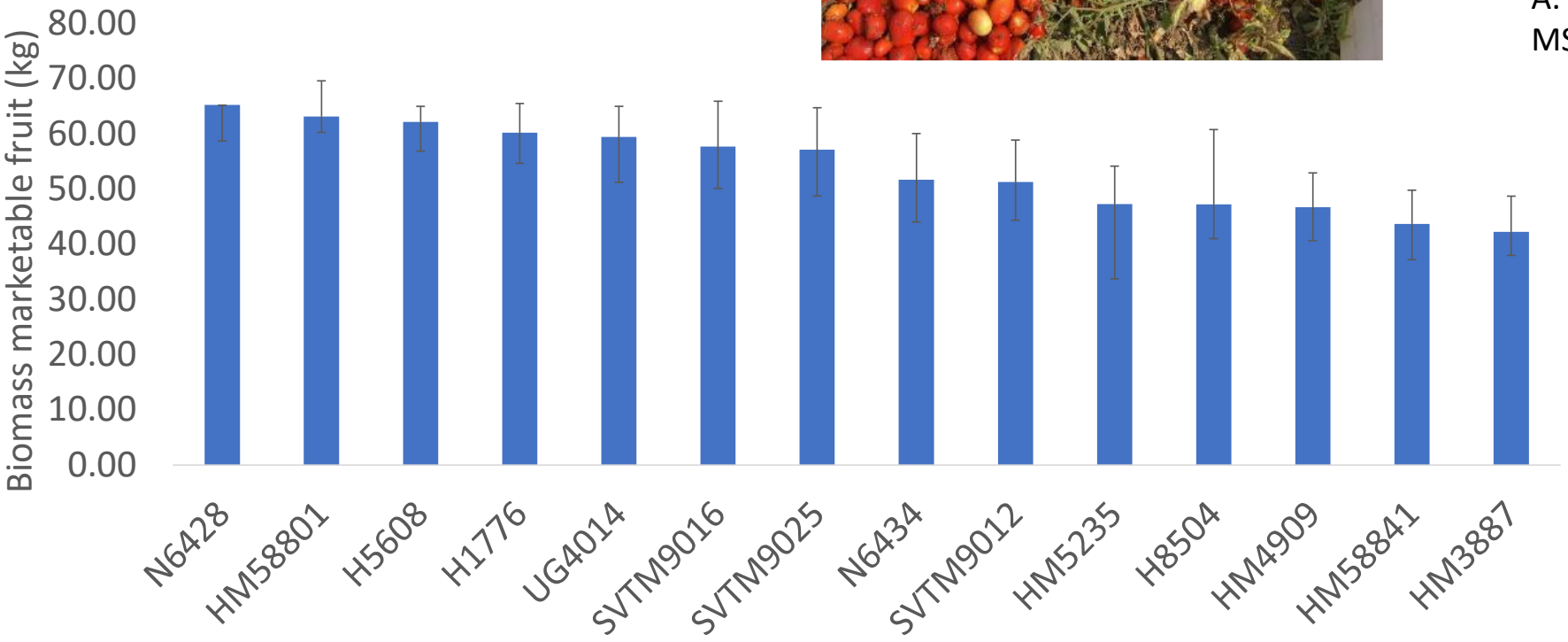
Commercial cultivars vary in performance under F. falciforme pressure

Fresno trial 2020 (Turini): yields



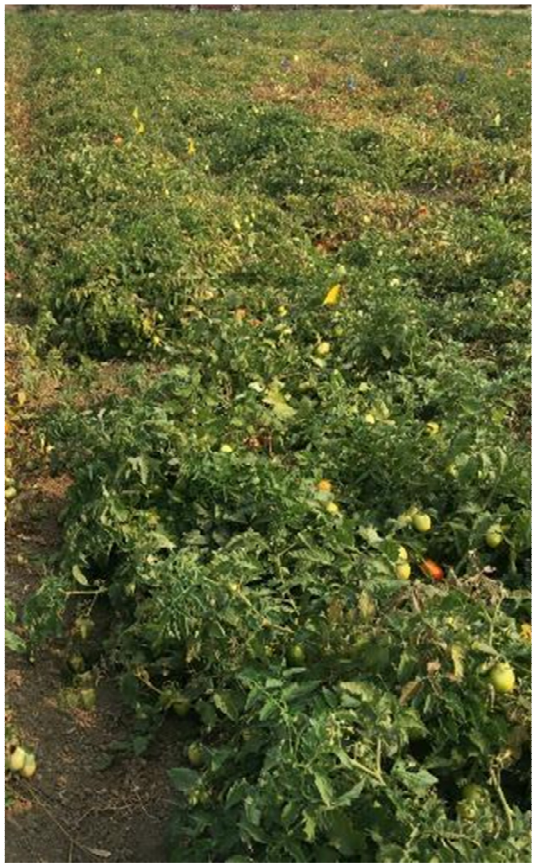
UC Davis trial: yields

A. Brackrog
MS student



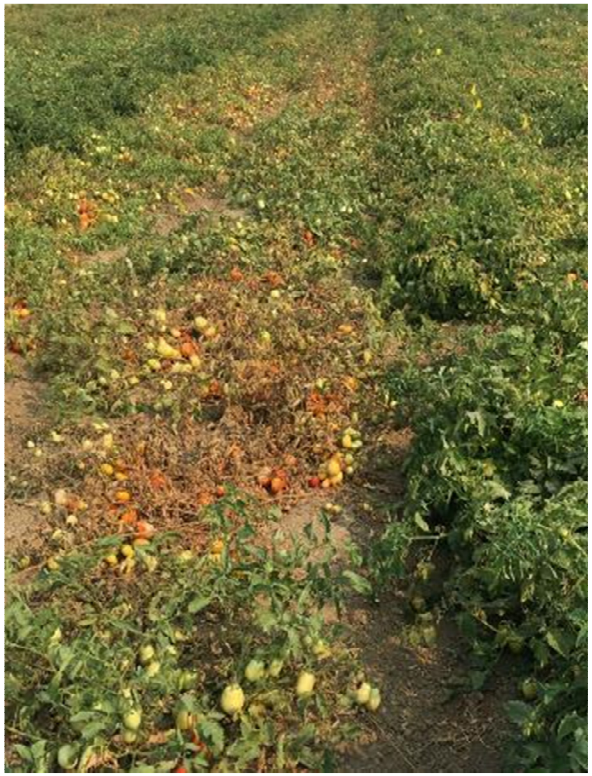
Top yielders under *F. falciforme* pressure

- Consistently top performers:
  - N 6428; H 5608; SVTM 9016
- Cultivars which performed well in one site but not the other:
  - HM58841, HM5235, HM58801
- Cultivars which performed well in the first trial year
  - H1779, UG4014, DRI 319; SVTM 9023
- Intermediate performers
  - H8504, SVTM 9036, SVTM 9037, BQ 391



Do not plant these in F. falciforme-infested fields

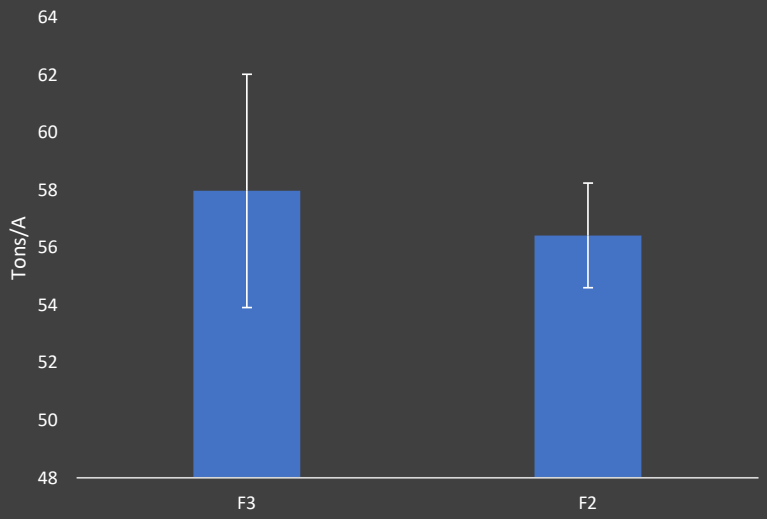
- High risk, tested at many sites
  - HM 3887, H 9663
- High risk, only tested at a single site:
  - 2020: AB 311, HM4909, N6434
  - 2019: H1310, H9663, N6416
  - 2021: SVTM 9027, 9032, 9034
- Cultivars which performed poorly in one site but not the other:
  - HM58841, HM5235



Co-managing F. falciforme and Fusarium wilt- performance of F3 cultivars in co-infested fields

B. Aegerter

F3 cultivars have slightly greater performance overall



Co-managing F. falciforme and Fusarium wilt-performance of F3 cultivars in co-infested fields

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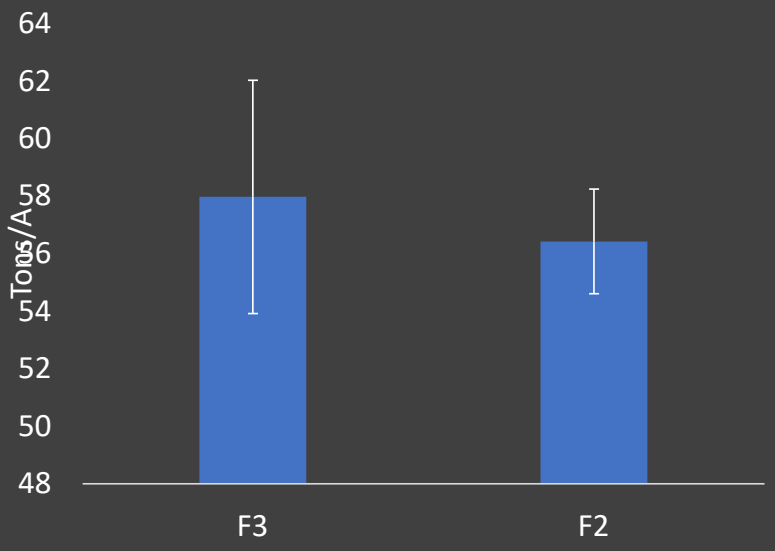
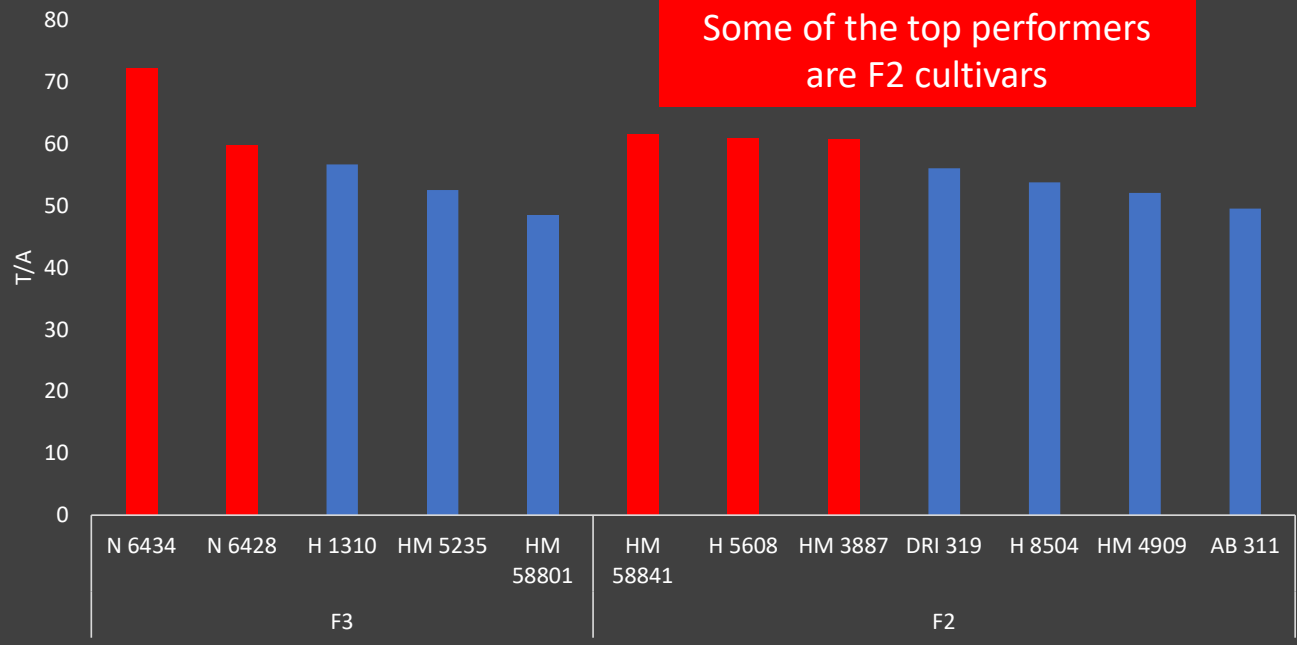


…However

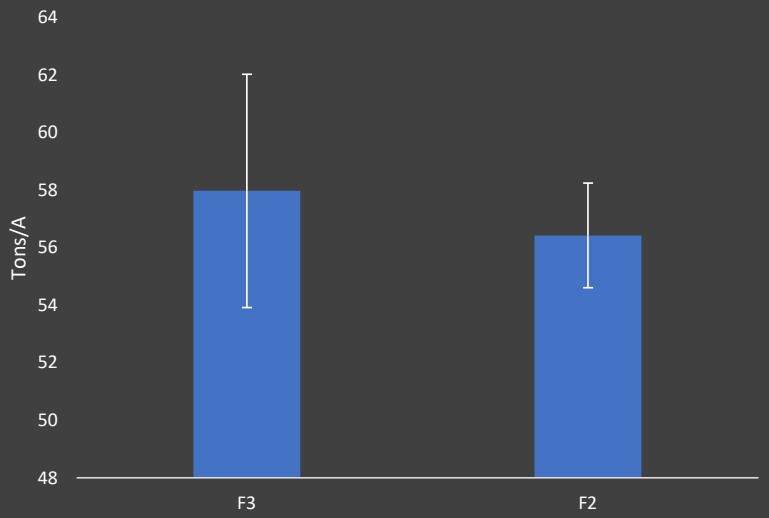
B. Aegerter

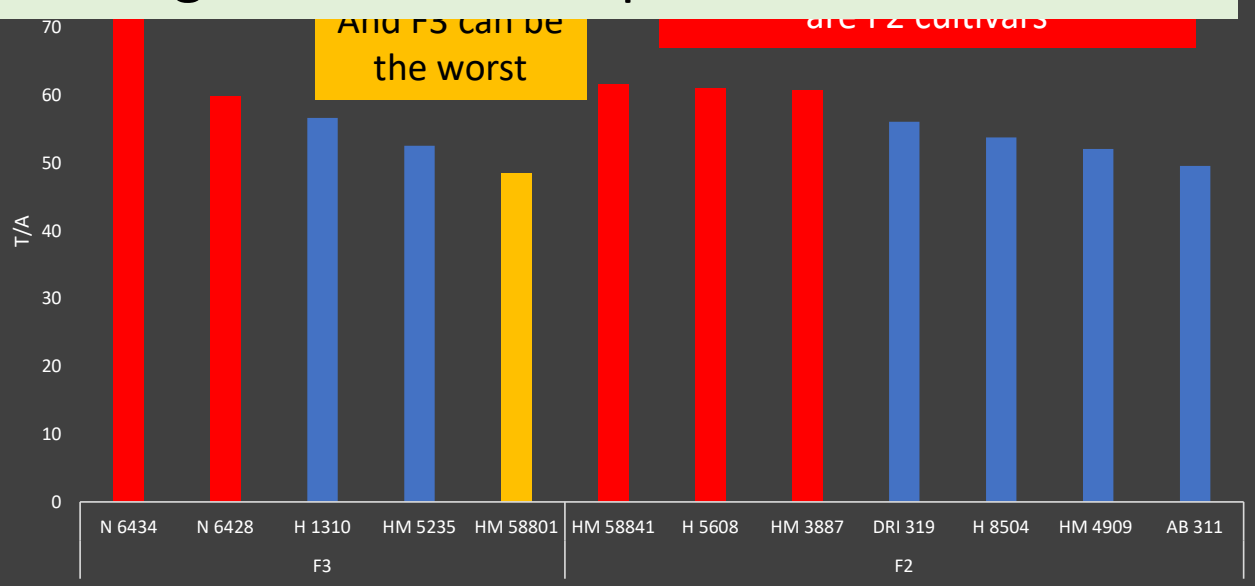
Some of the top performers are F2 cultivars



Co-managing F. falciforme and Fusarium wilt-performance of F3 cultivars in co-infested fields

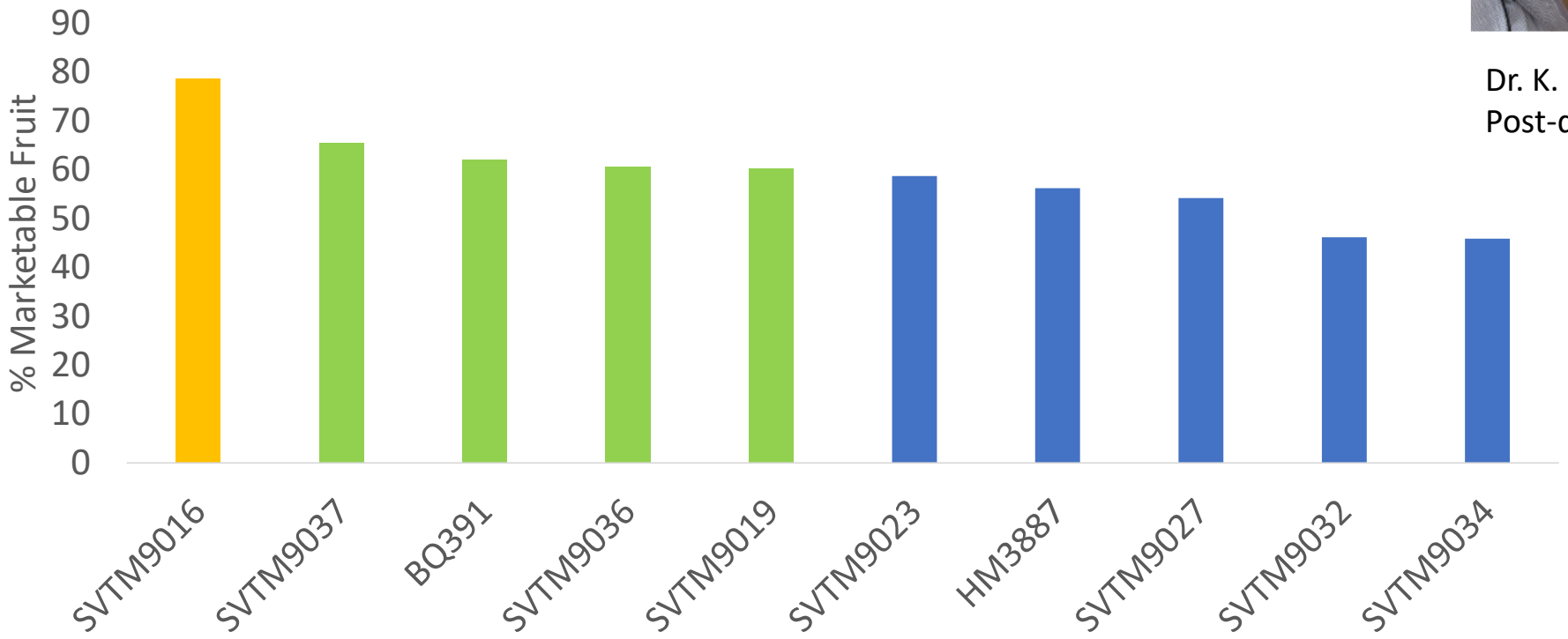
F3 cultivars-with resistance to Fusarium wilt race 3-are not necessarily more resistant to F. falciforme and some F3 cultivars are among the most susceptible





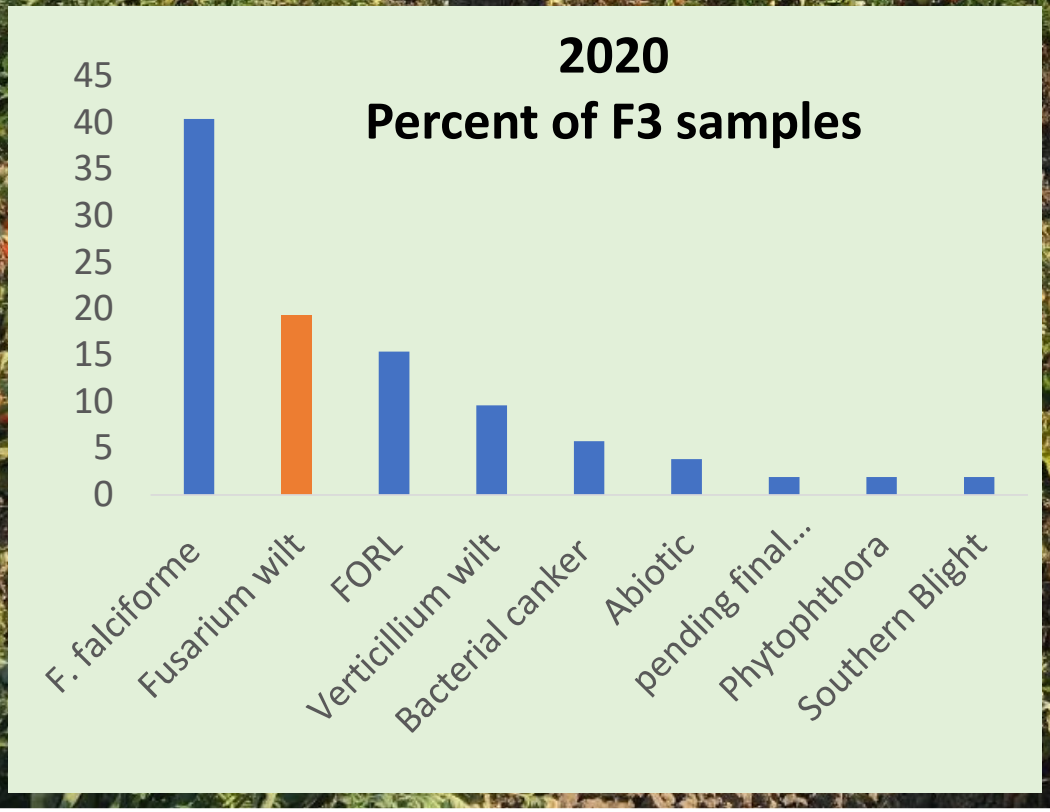
Increasing efforts to evaluate a wider range of F3 cultivars for performance under F. falciforme and dual pathogen pressure

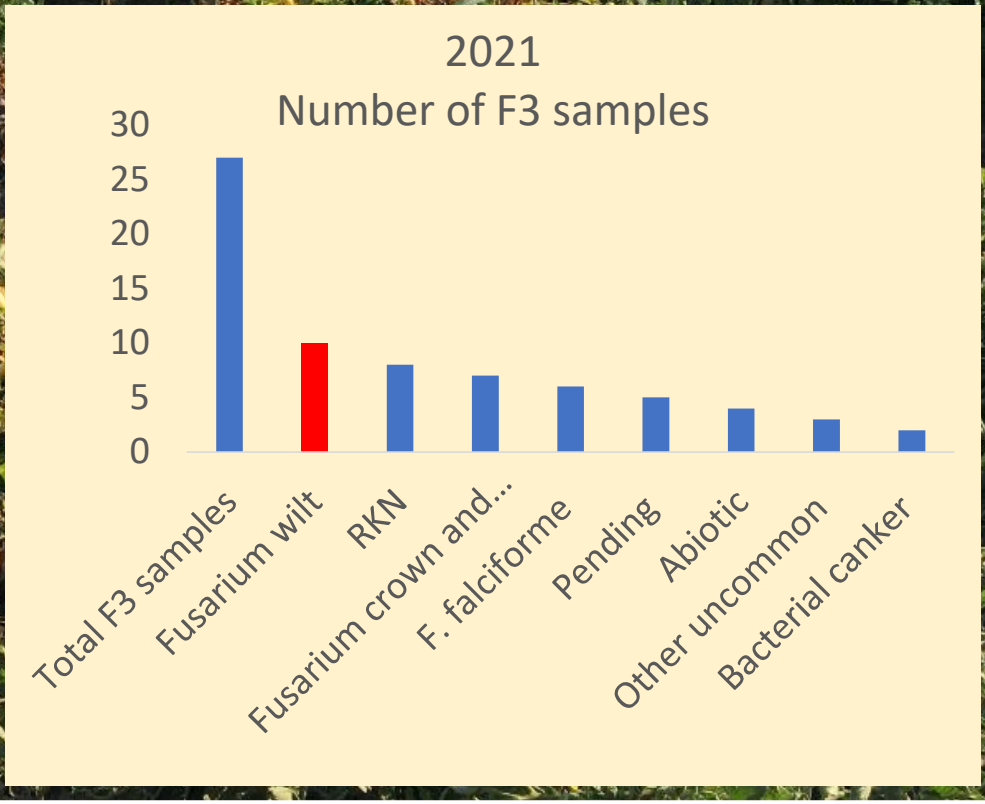
Dr. K. Paugh
Post-doc



Are F3 cultivars still working to control Fusarium wilt?

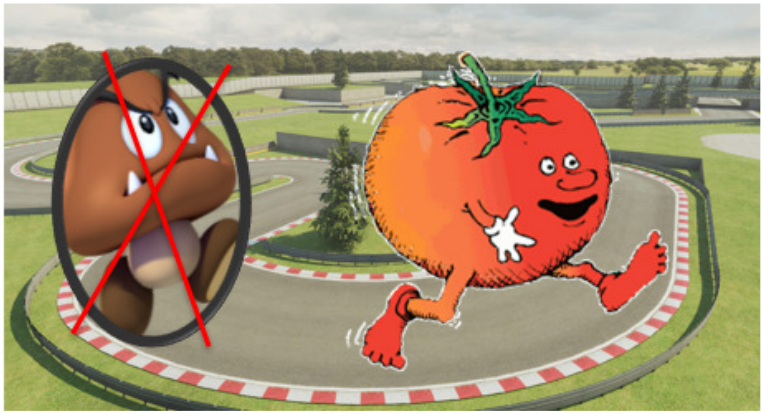
Fusarium wilt occasionally recovered from F3 cultivars





Fusarium wilt race 4 monitoring: not yet detected

Year	# putative R4	% race 3	% race 4
2018	9	100%	0
2019	2	100%	0
2020	12	100%	0
2021	10	TBD	TBD



Why Fol R3 is causing Fusarium wilt in F3 cultivars? Variable efficacy of the I3 resistance gene

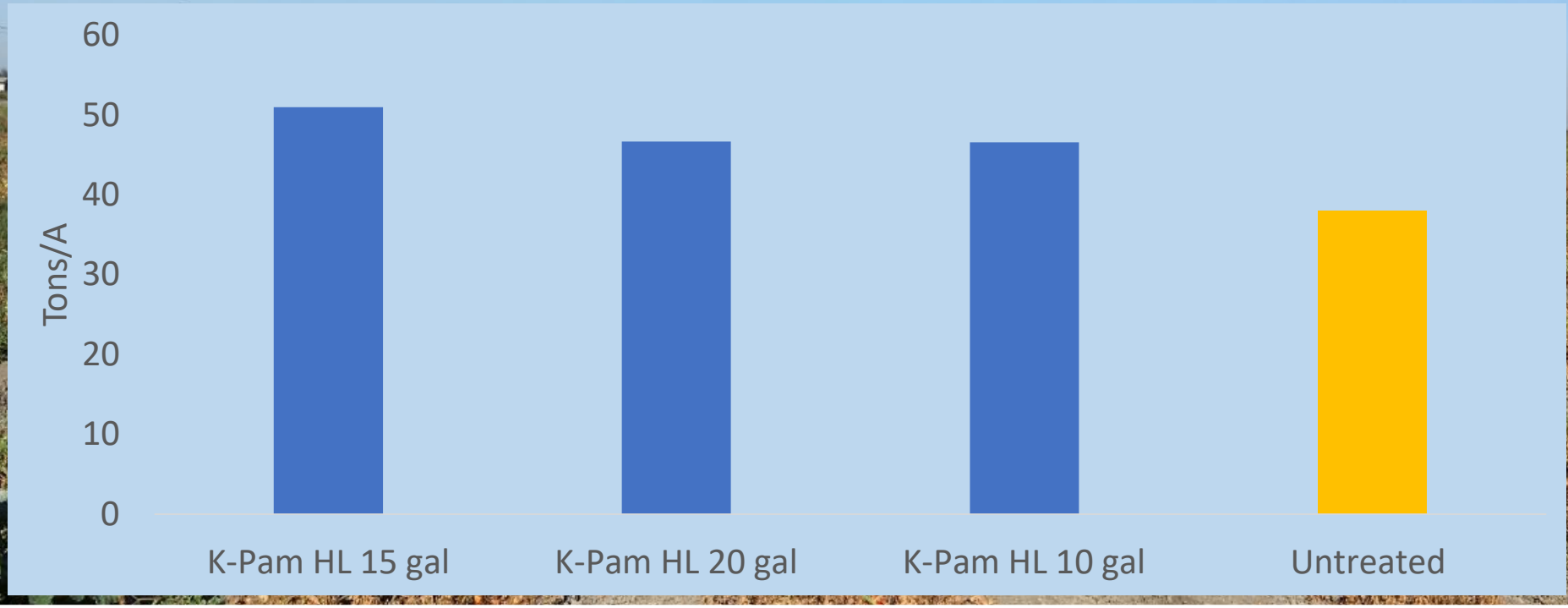
Salinity

Resistance-breaking root knot nematode

63% of F3-Fusarium wilt diagnoses had RKN infections (More to come-next talk)

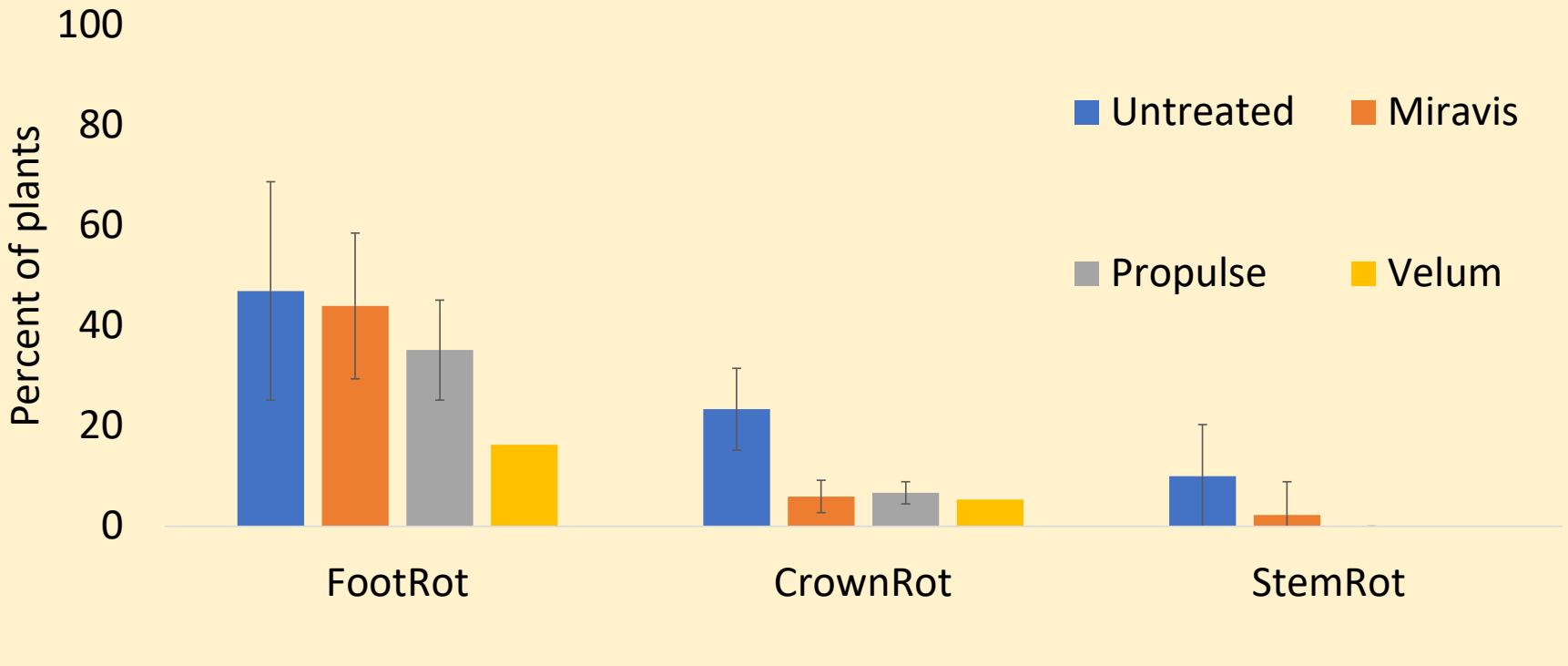
Chemical management of F. falciforme-pre planting

F. falciforme (F3 field)
Yields under KPam enhanced 1.3x's



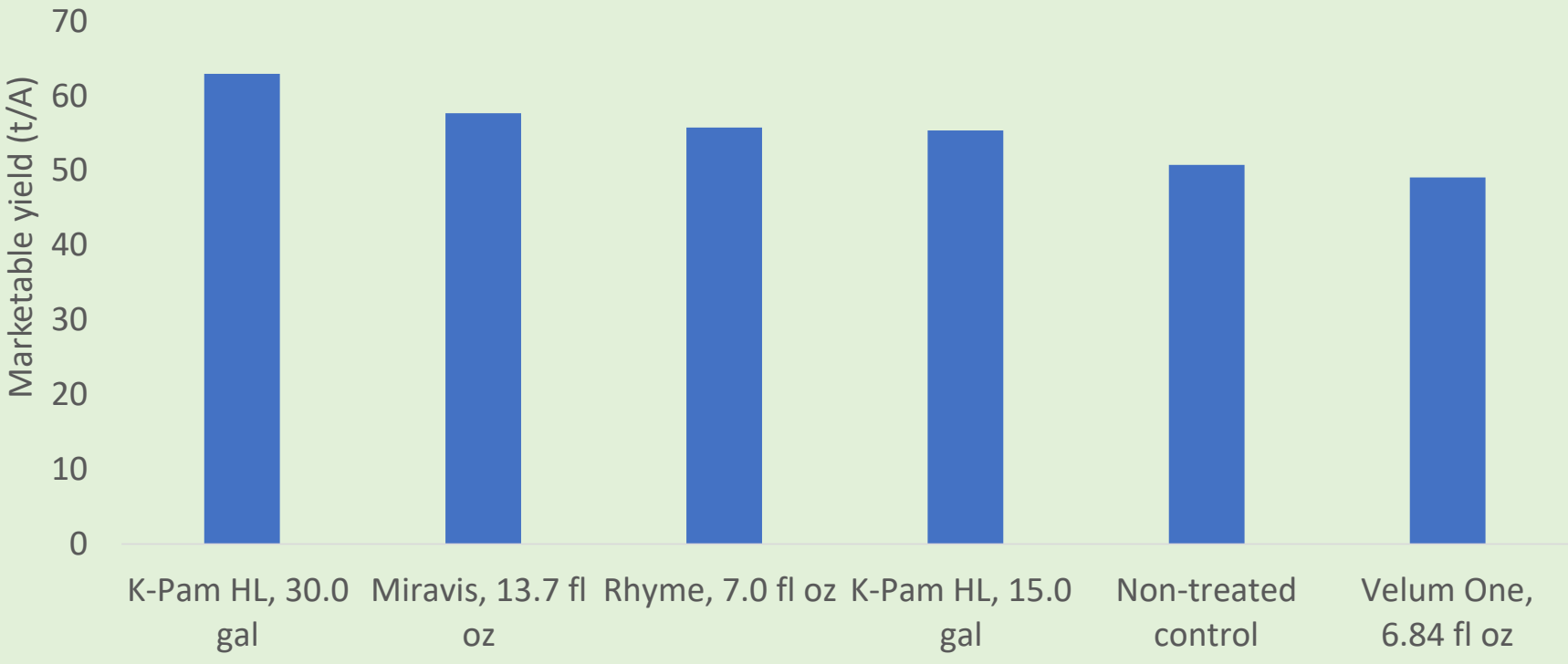
Chemical management of F. falciforme -in season

F. falciforme alone:
Velum reduced total disease incidence

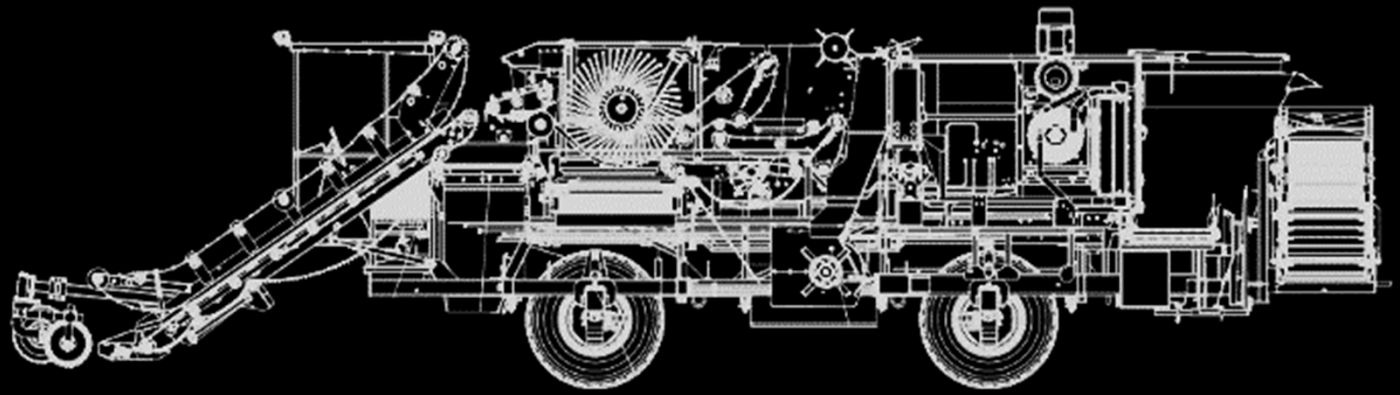


Chemical co-management of F. falciforme with Fusarium wilt-pre planting and in season

San Joaquin: FF + FW



Managing between field spread of pathogens and other pests on field equipment

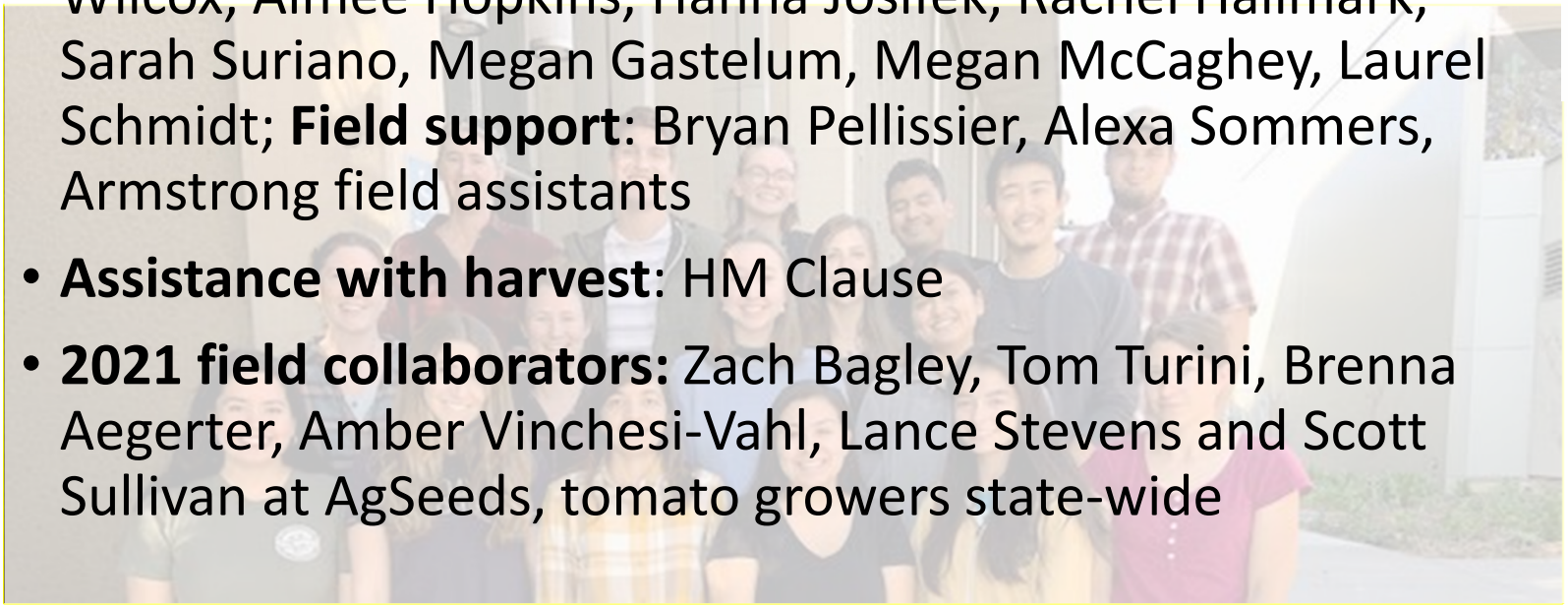


Equipment is moved between fields and often farms

Infested soil and plant debris clings to field equipment during normal farm operations

The amazing Swettonians!

- **People who conducted/assisted with these projects**: Kelley Paugh, Alyssa Brackrog, Beth Hellman, Myles Collinson, Emma Centeno, Brian Caine, Justine Beaulieu, Forrest Wilcox, Aimee Hopkins, Hanna Josifek, Rachel Hallmark, Sarah Suriano, Megan Gastelum, Megan McCaghey, Laurel Schmidt; **Field support**: Bryan Pellissier, Alexa Sommers, Armstrong field assistants
- **Assistance with harvest**: HM Clause
- **2021 field collaborators:** Zach Bagley, Tom Turini, Brenna Aegerter, Amber Vinchesi-Vahl, Lance Stevens and Scott Sullivan at AgSeeds, tomato growers state-wide



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Questions?
clswett@ucdavis.edu