



# Regional disease updates for the Sacramento Valley- 2024

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Pathology

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**South Sacramento Valley**

**Processing Tomato Production Meeting**

Jan 15, 2025



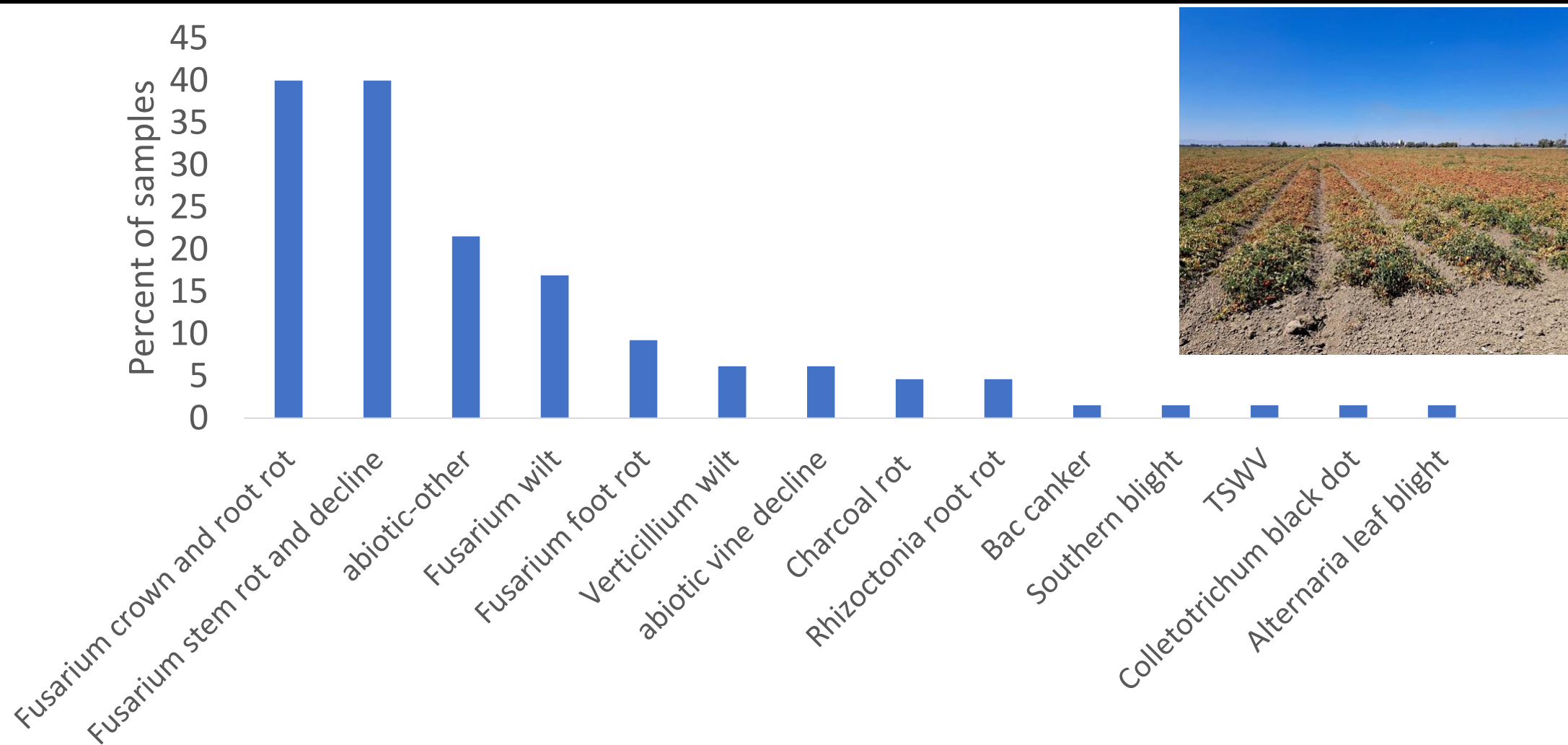


Ask questions  
as we go along!

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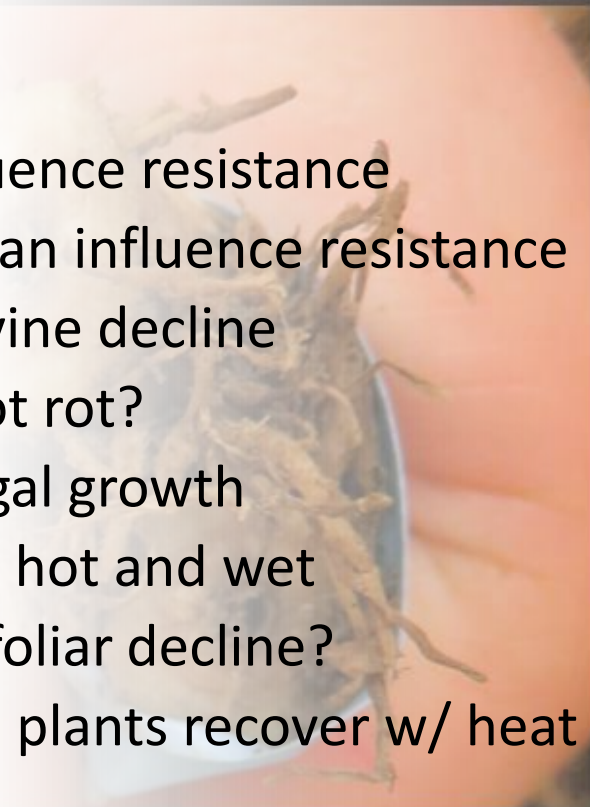
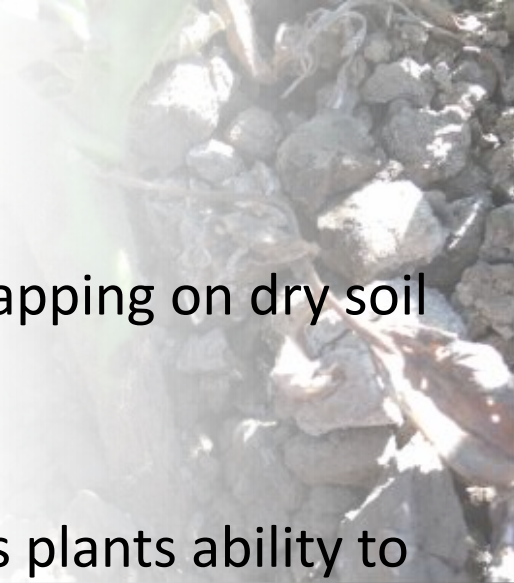


# Diseases in the Sacramento Valley region 2024

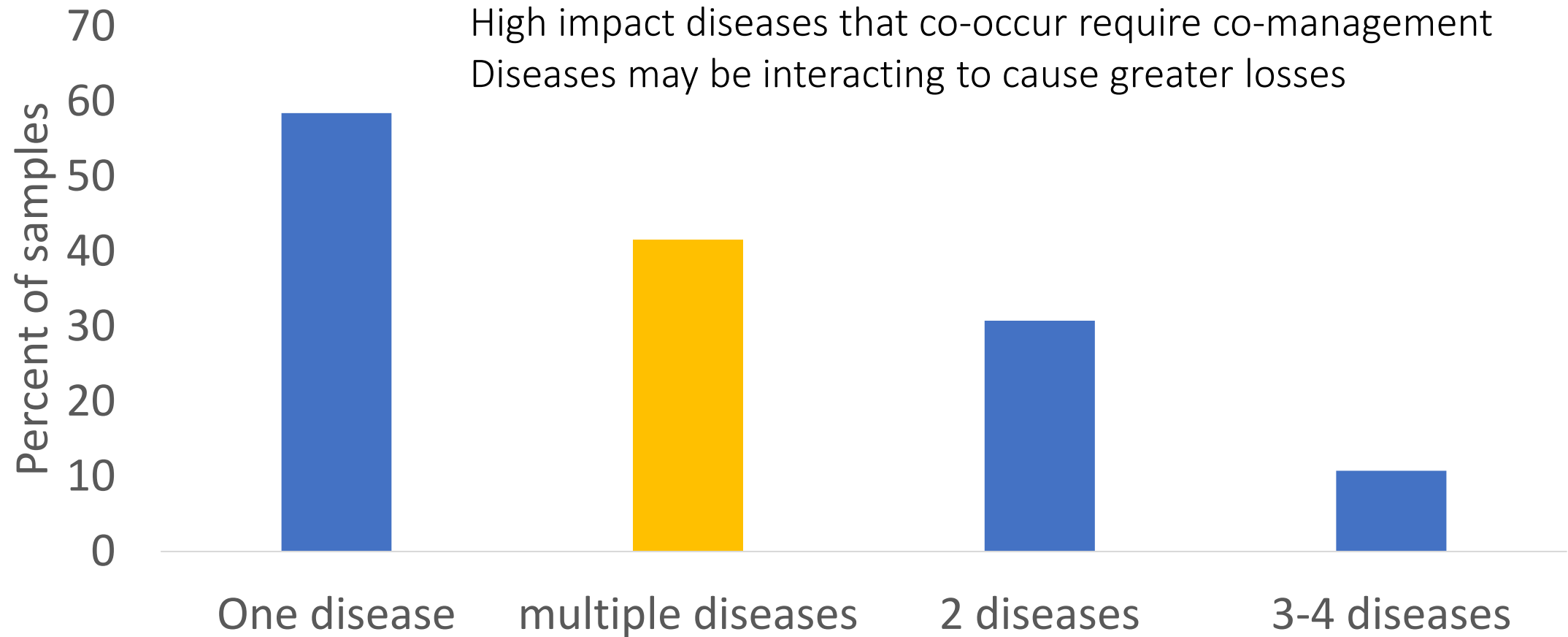


# Field notes 2024

- Spring: high winds
  - Transplant rub damage / snapping on dry soil
  - Manage with irrigation
- Summer: high temperatures
  - Heat / drought stress affects plants ability to defend itself
  - Stress-triggered diseases
    - Fusarium wilt—can influence resistance
    - Root knot nematode—can influence resistance
    - Fusarium stem rot and vine decline
    - Fusarium crown and root rot?
  - Heat can also stimulate fungal growth
    - Southern blight—likes it hot and wet
  - Abiotic heat-related issues-foliar decline?
  - Verticillium—in some fields, plants recover w/ heat



# Many fields have multiple management targets in this region



## Case study of co-management

- Many Fusarium wilt-resistant F3 cultivars with FRD resistance
- Chemical treatments for co-management:
  - K-Pam, in-season chemigation with Miravis
- Crop rotations that work well for both: underway

Fusarium wilt



Fusarium stem rot and decline (FRD)



## Case study of conflicting management

- Both occur under hot conditions for different reasons
- FRD: hot dry conditions trigger disease—compromises host resistance
  - Water well
- SB: hot, wet conditions trigger disease—stimulates fungal growth
  - Water less--Avoid hot mud
- When together? A challenge!
  - Option: use more FRD / stress resistant cultivars

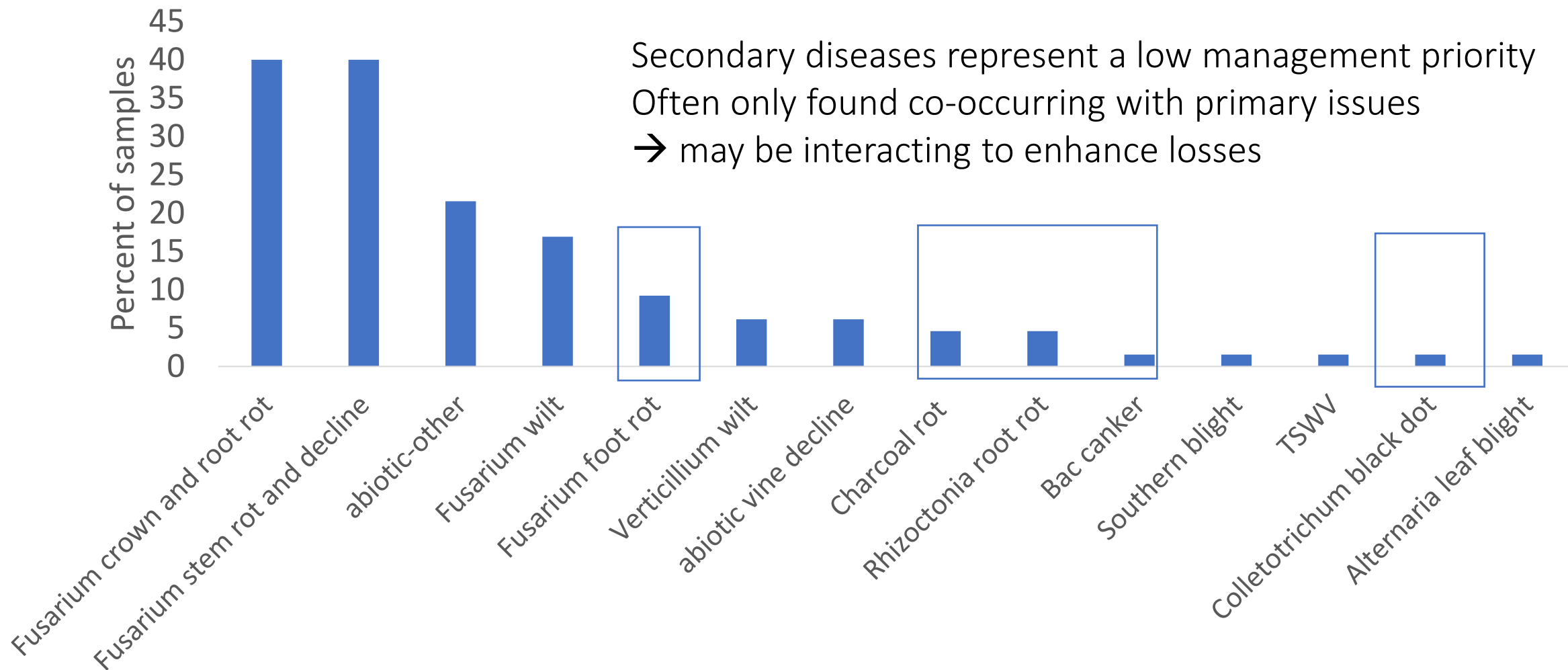
Southern blight



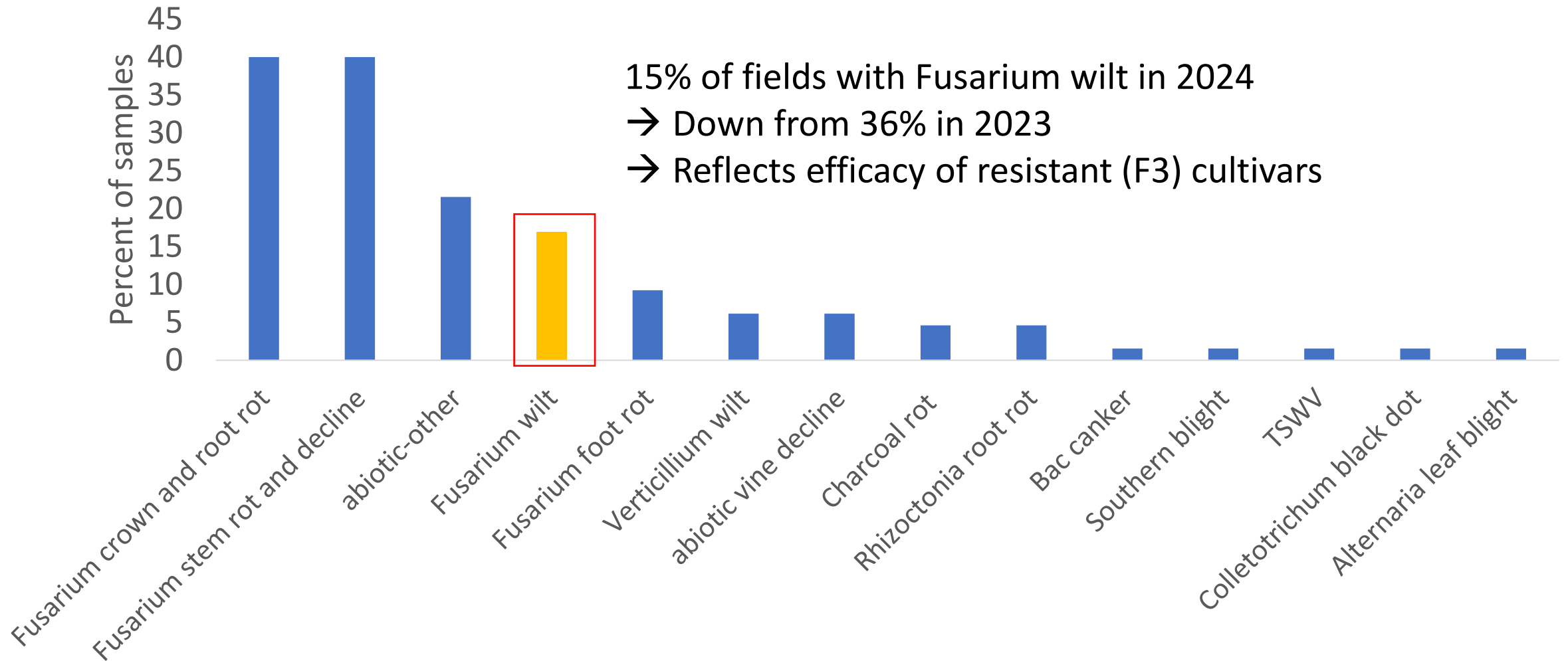
Fusarium stem rot and decline (FRD)



# Many diseases are likely secondary



# Fusarium wilt - *F. oxysporum* f. sp. *lycopersici* (Fol) race 3



# Fusarium wilt detected in resistant (F3) cultivars

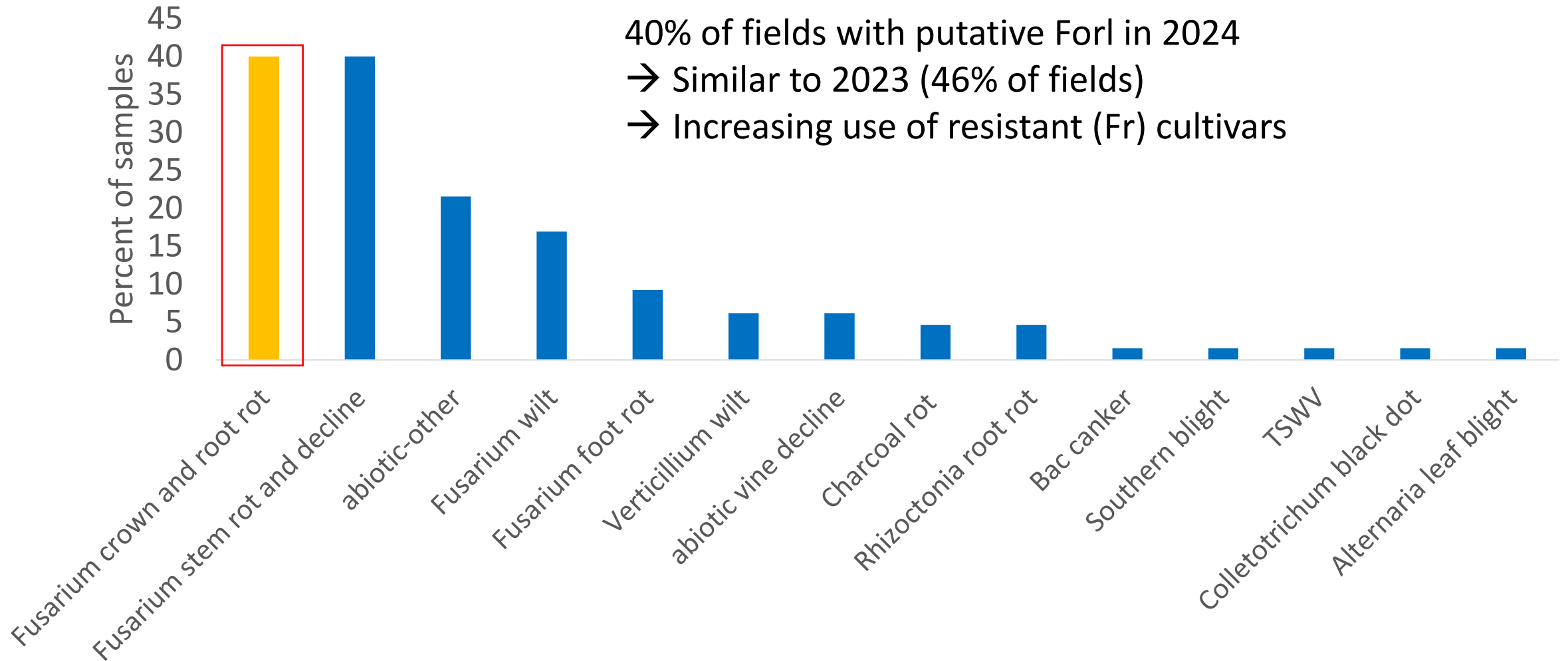
- 4 fields in 2024 statewide
- 3 of these in this region



- Resistance breaking-anticipated by 2028
  - 2017-2023: 29 F3 fields with Fusarium wilt
  - None were resistance breaking—mostly Fol race 3
- Some plants do not get the resistance gene (off-types)—see wilt in ~2% of the field
- Stress induced—wilt in 5-15% of the field

Year	Total	Pot Fol	No fields (percent)					
			Fol R1	Fol R2	Fol R3	Fol R4	Forl	Non-Path
2017	2	2	0	0	2 (100%)	0	0	0
2018	11	11	0	0	11 (100%)	0	0	0
2019	0	0	0	0	0	0	0	0
2020	2	2	0	0	2 (100%)	0	0	0
2021	2	2	0	0	2 (100%)	0	0	0
2022	3	3	0	0	3 (100%)	0	0	0
2023	9	9	0	0	3	0	2	4
<b>Total</b>	<b>29</b>	<b>29</b>	<b>0</b>	<b>0</b>	<b>23 (79%)</b>	<b>0</b>	<b>2 (7%)</b>	<b>4 (13%)</b>
<b>2024</b>	<b>4</b>	<b>4</b>				<b>TBD</b>		

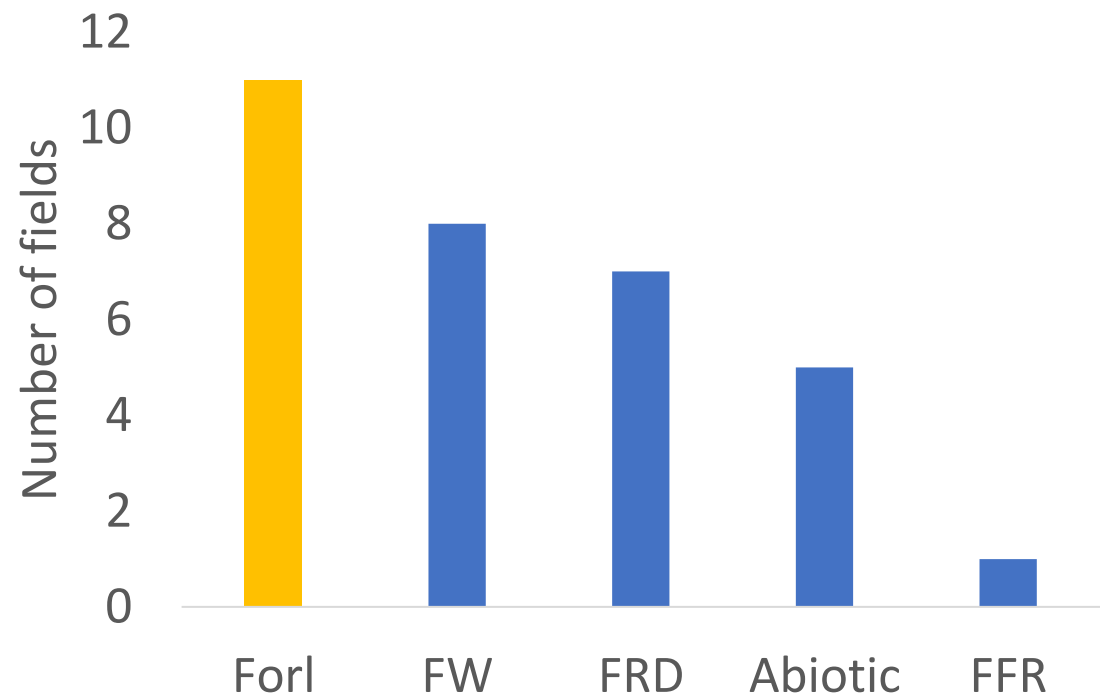
# Fusarium crown and root rot - *F. oxysporum* f. sp. *radicis lycopersici* (Forl)



# Fusarium crown and root rot - *F. oxysporum* f. sp. *radicis lycopersici* (Forl)

- Dogma—Forl is a minor problem
- Contradicting this: Forl had the highest sole-occurrence frequency
  - Indicates that Forl is an important primary disease driver
  - And we are not effectively managing it

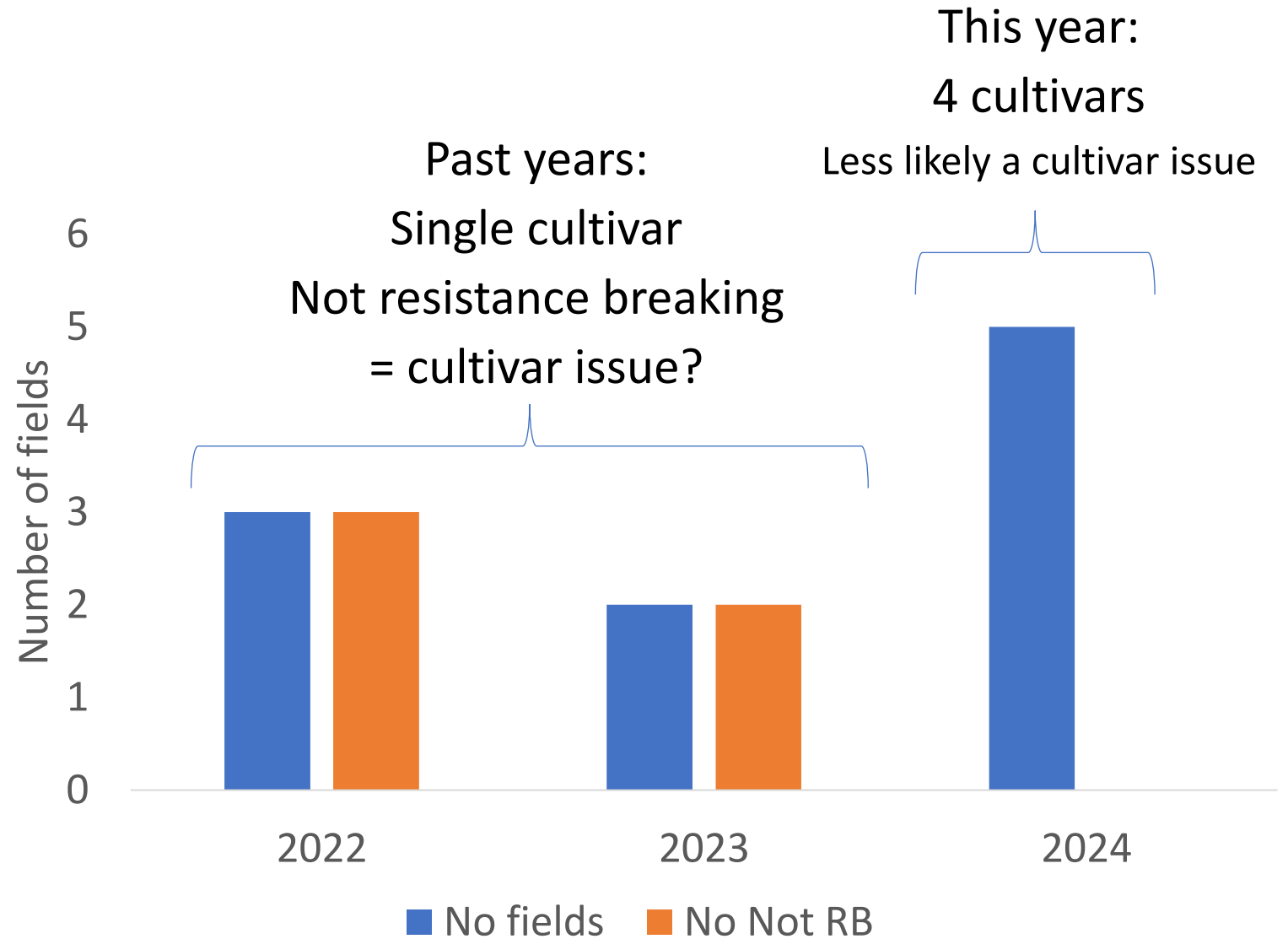
**Number of fields where each disease occurred alone in Sacramento region**



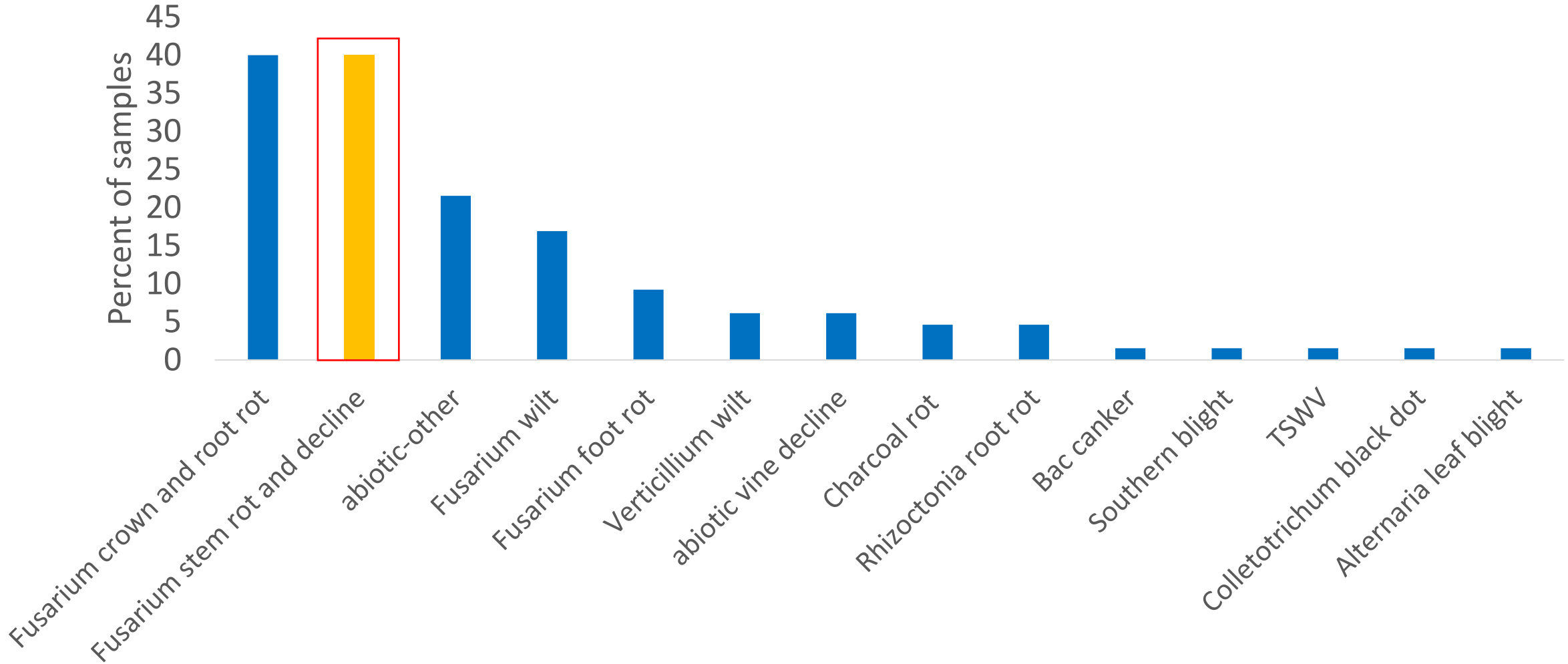
# Fusarium crown and root rot (Forl) in resistant (Fr) cultivars

→ 5 fields in 2024

→ 4 of these in this region



# Fusarium “falciforme” stem rot and vine decline (FRD) – *F. noneumartii* and *F. martii*



# *Fusarium* “*falciforme*” refresher

Fusarium stem rot and vine decline (FRD)

*F. noneumartii* and *F. martii*

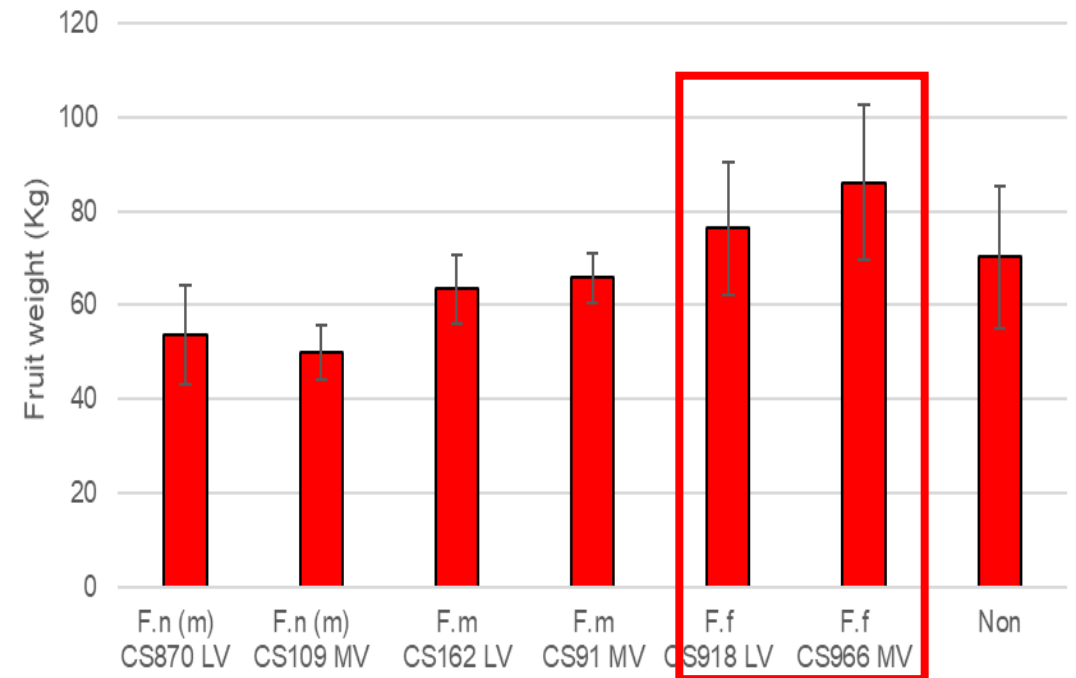
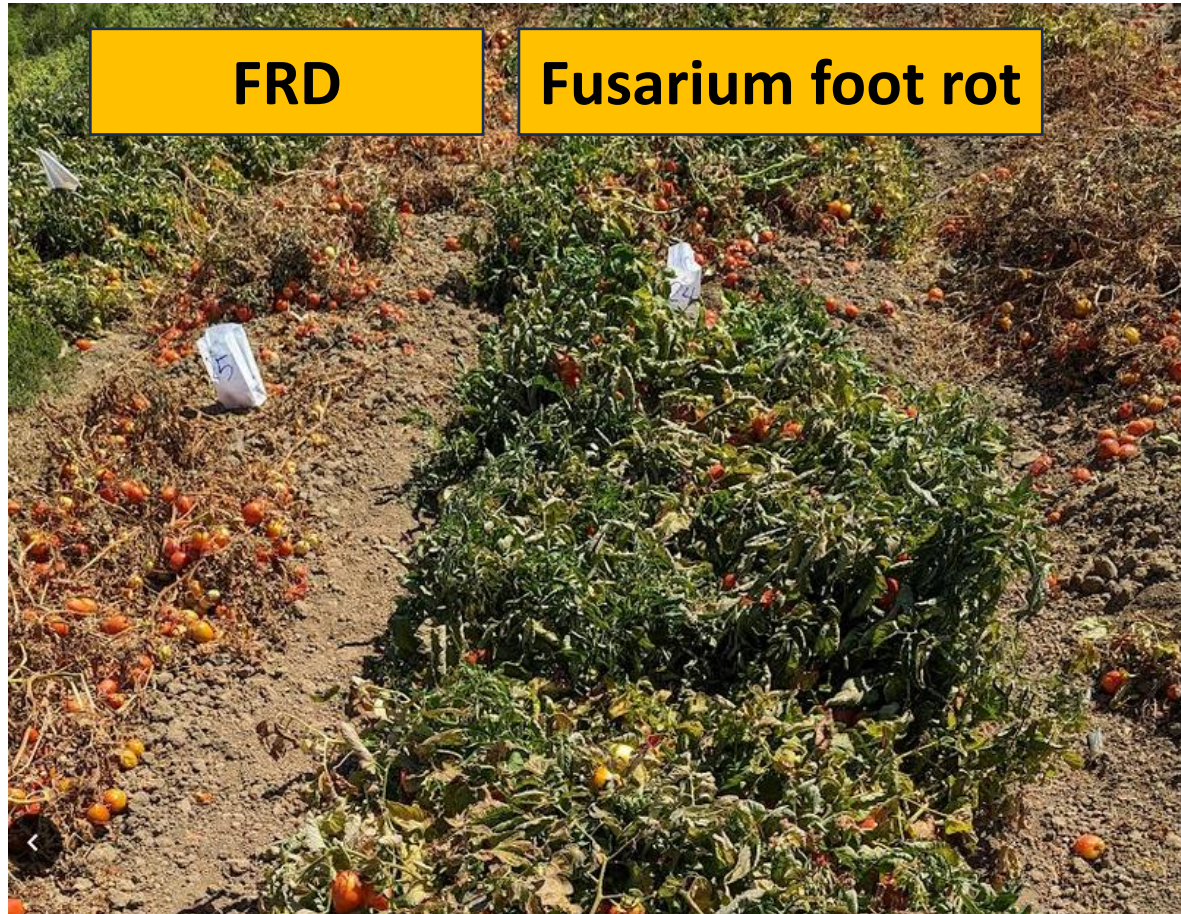


VS

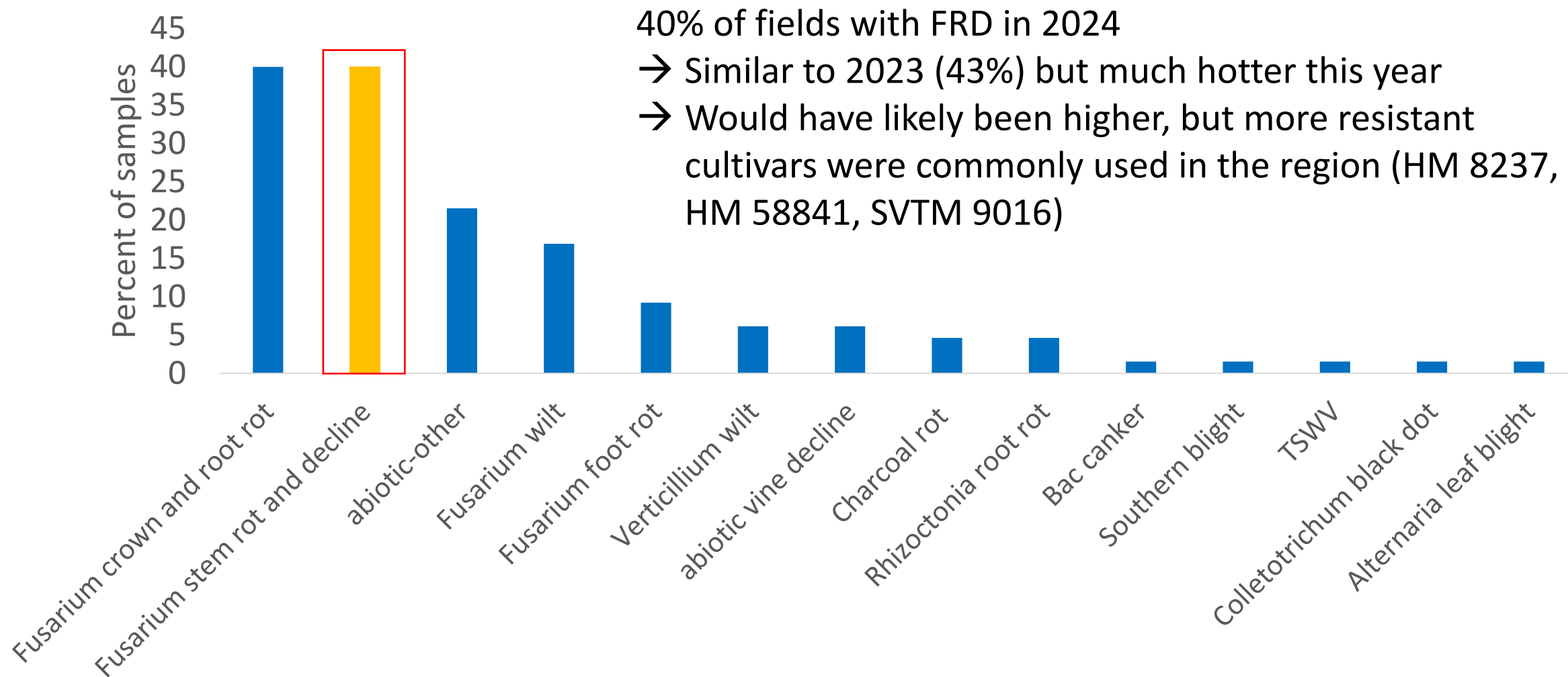
Fusarium foot rot  
*F. falciforme*



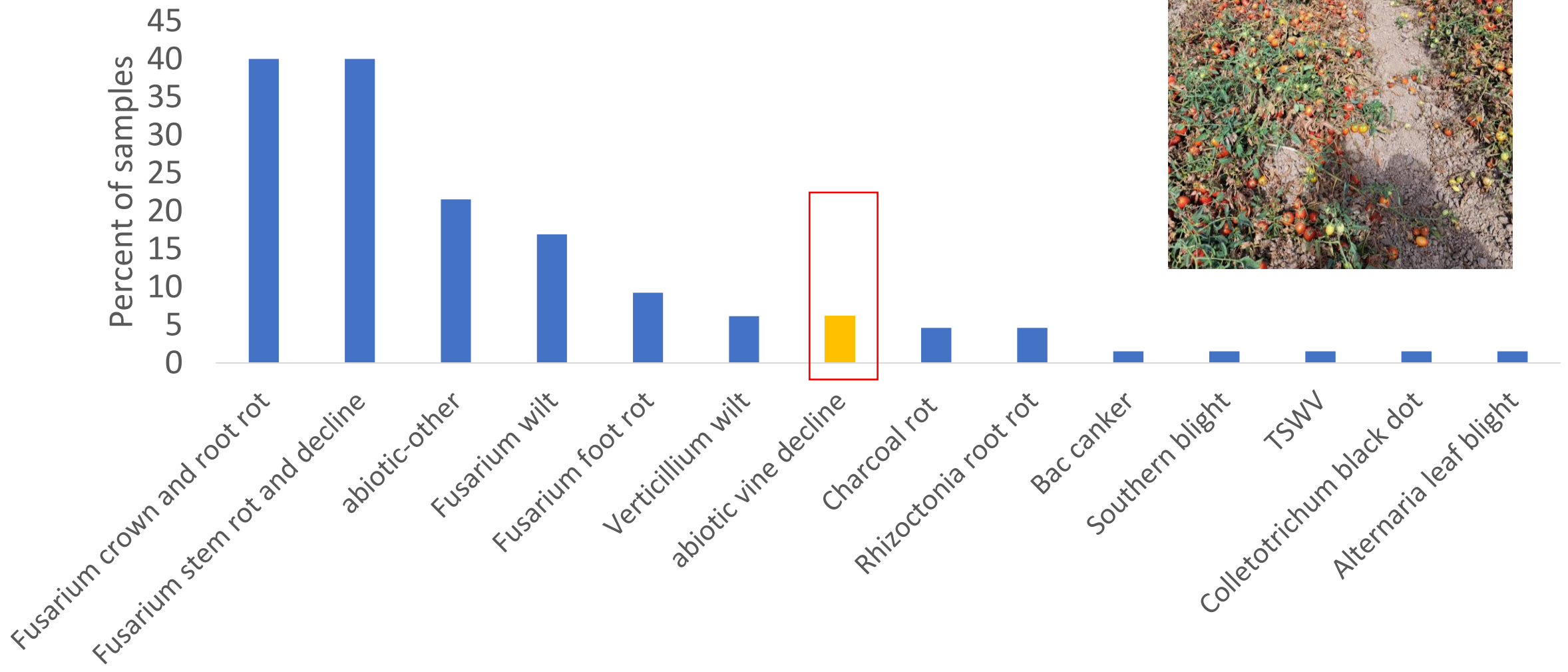
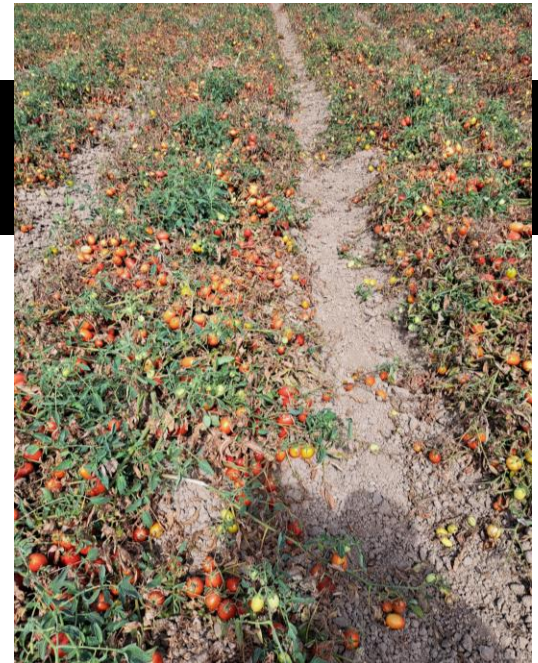
# Foot rot does not appear to cause yield loss and thus may not require management



# Fusarium stem rot and vine decline (FRD) – *F. noneumartii* and *F. martii*



# Abiotic vine decline







No root or stem rot



# Abiotic Vine Decline

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- Sacramento and Yolo counties—severe field level decline
- Unknown cause
  - Premature vine collapse
  - No clear biotic cause detected
    - Can co-occur with pathogens like Forl—pathogens may be facilitated by stress
- Possible drivers include
  - Heat stress
  - Boron toxicity
  - Low potassium
  - High salinity
  - Herbicide damage

# Current and forthcoming resources

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- Swett lab extension resources:  
<https://swettlab.faculty.ucdavis.edu/extension/>
  - Fusarium stem rot and decline cultivar performance table here
- Fusarium stem rot and decline UC IPM Pest Note
- Fusarium wilt management UC IPM 8000 series article
- Diagnostic guide as hard copy pocket book
- Training in new diagnostic methods for Fusarium diseases—late 2025 to early 2026



## OUTREACH RESOURCES

### Diagnostic field guides

[Diagnosing vine decline and rot diseases of tomatoes in the field](#)

### Equipment Sanitation working BMPs

[Field Equipment Sanitation Best Management Guidelines \(V1.3 May 2024\)](#)

[UCD\\_Harvester Sanitation Best Management GuidelinesV1](#)

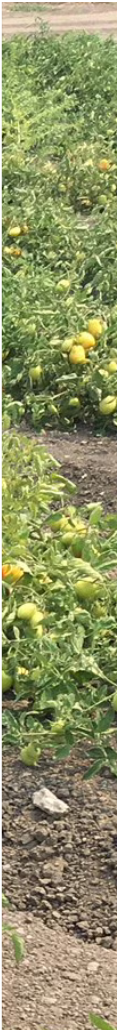
### Tomato cultivar trial results

[Tomato cultivar performance against Fusarium stem rot and vine decline \(FRD / “falciforme”\)](#)

### Newsletter Articles

[Fusarium wilt of tomato: diagnosis, distribution and management](#)

[Southern Blight Cliff Notes 2017](#)



# Questions?

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