



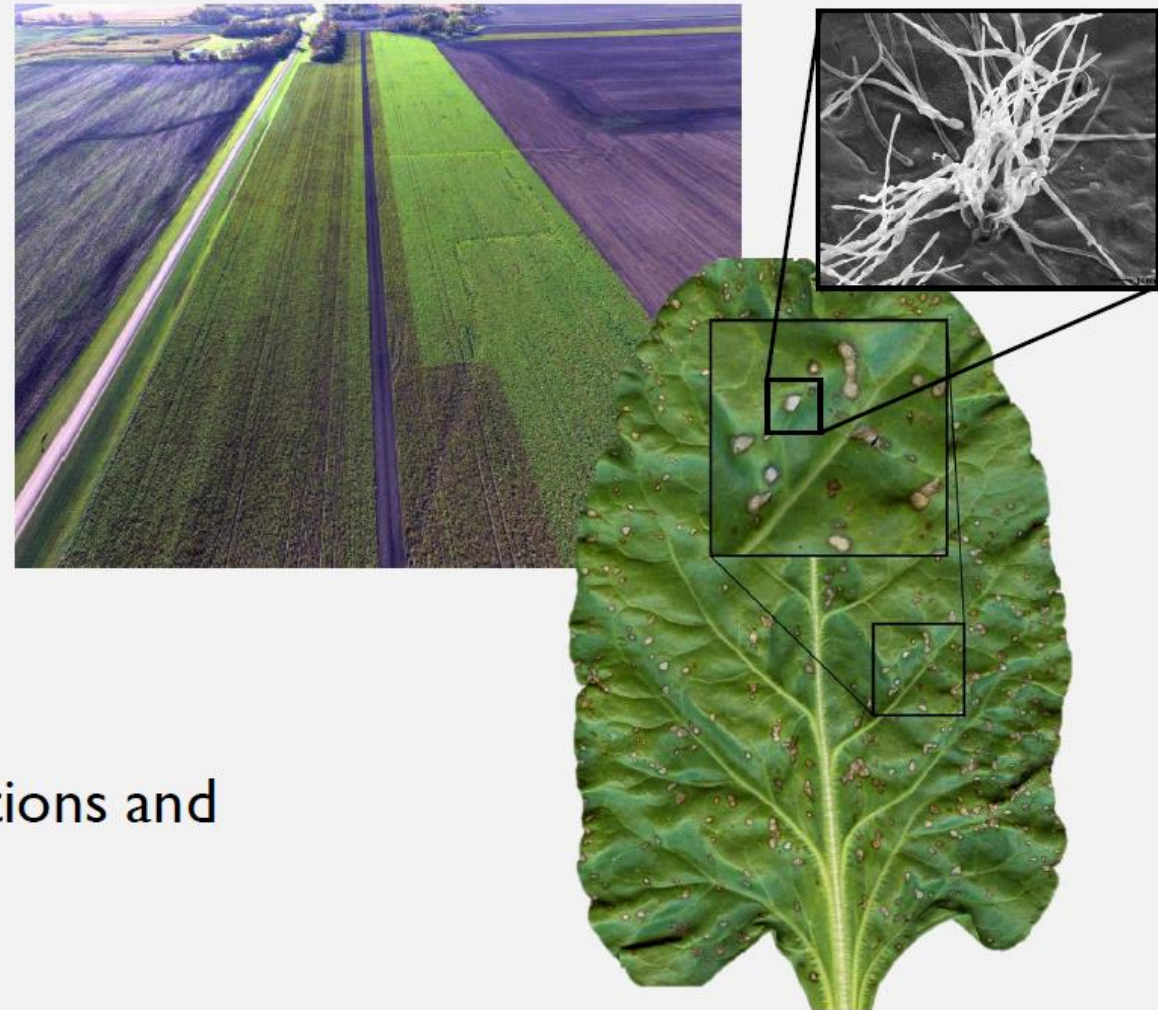
# 2025 CLS Recommendations

Emma Burt

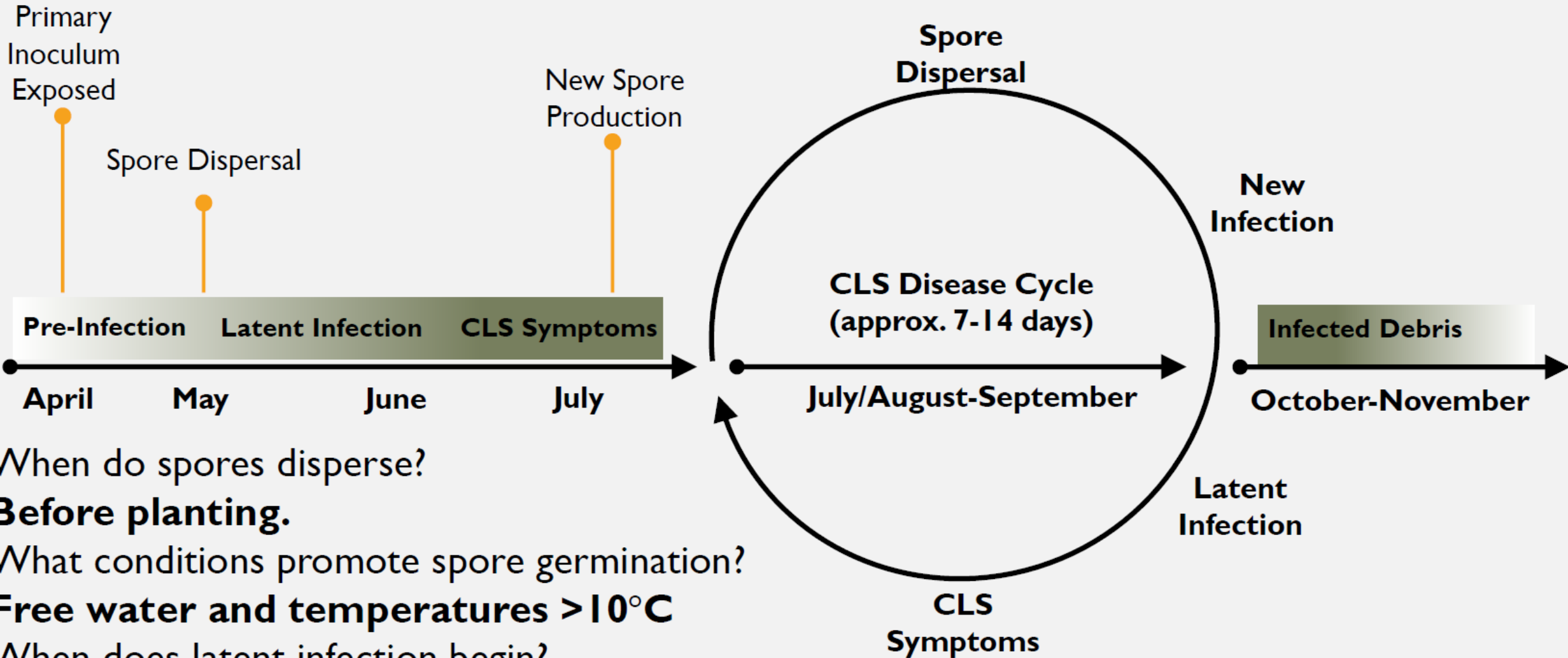
Research Agronomist

# *Cercospora beticola*

- Cercospora leaf spot (CLS) on sugarbeet
- Hemibiotrophic fungus
  - Asymptomatic biotrophic phase
  - Symptomatic necrotrophic phase
- Polycyclic and genetically diverse
  - Cryptic sexual cycle
- Primarily controlled through fungicide applications and resistant sugarbeet varieties.



# CLS disease cycle



When do spores disperse?

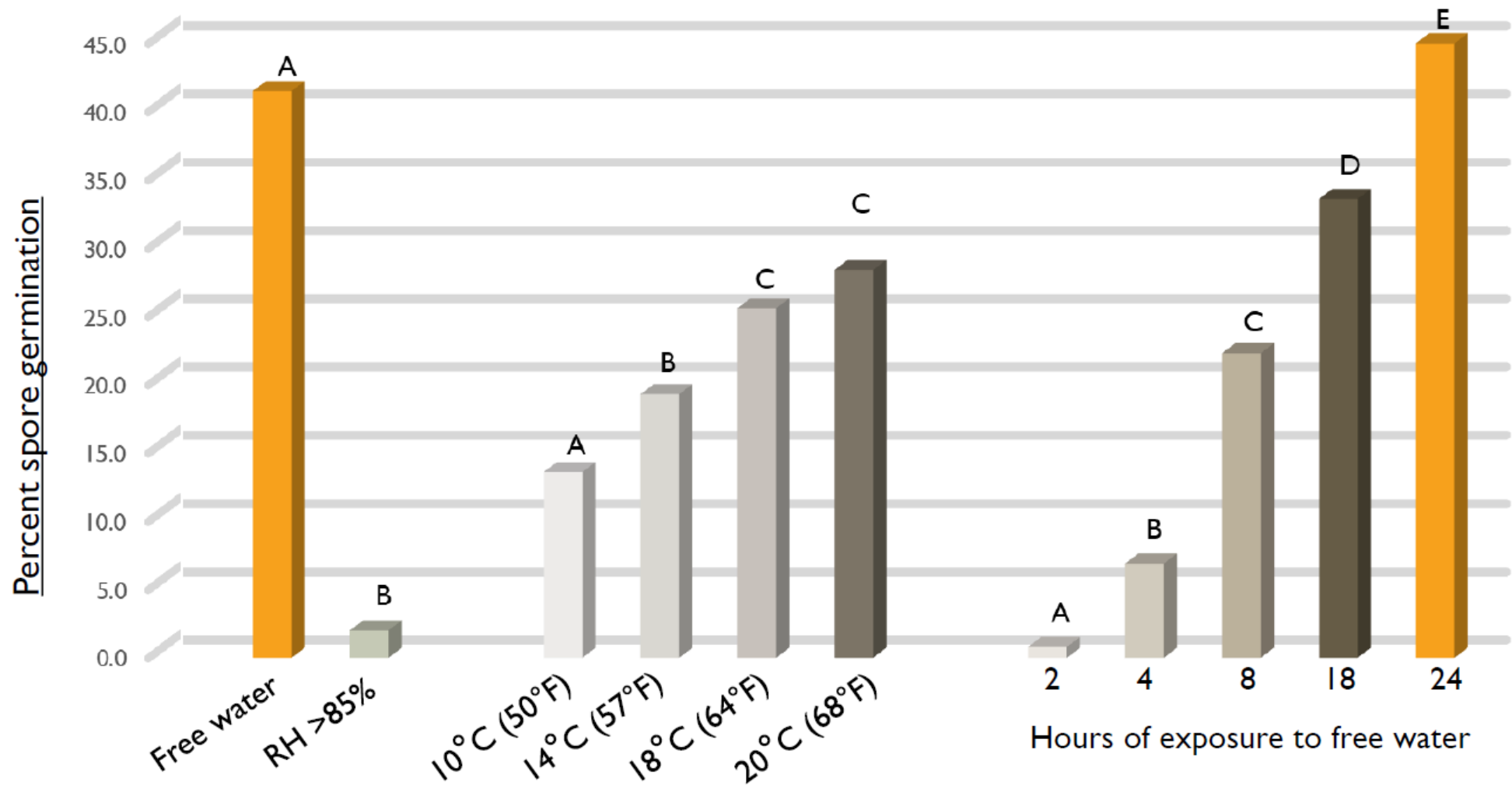
**Before planting.**

What conditions promote spore germination?

**Free water and temperatures  $> 10^{\circ}\text{C}$**

When does latent infection begin?

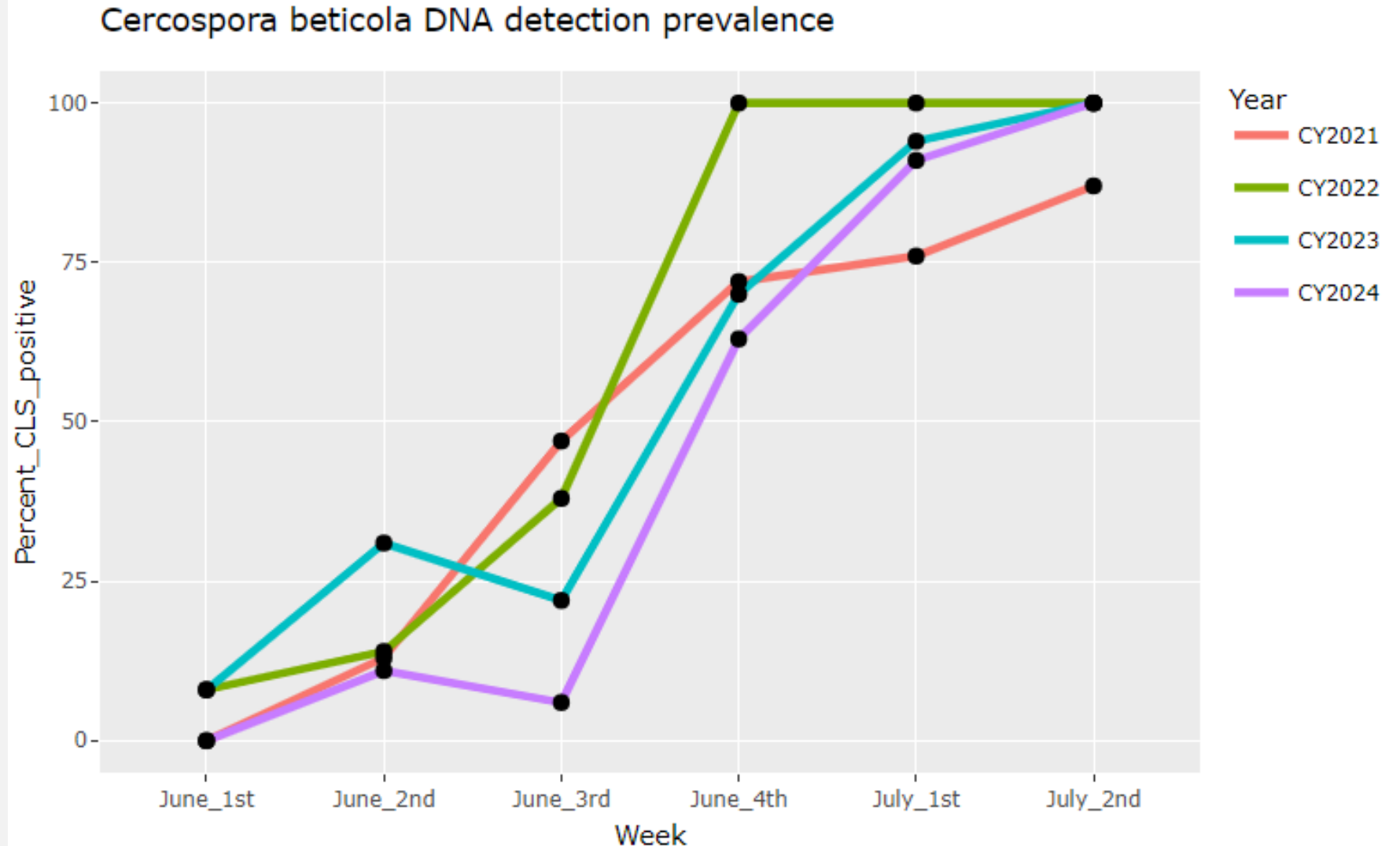
# Spore germination



# 2021-2024 Latent CLS prevalence

## Primary results

- Near **100%** of submitted samples are **positive** for latent CLS infection by the **first week of July** (~row closure)



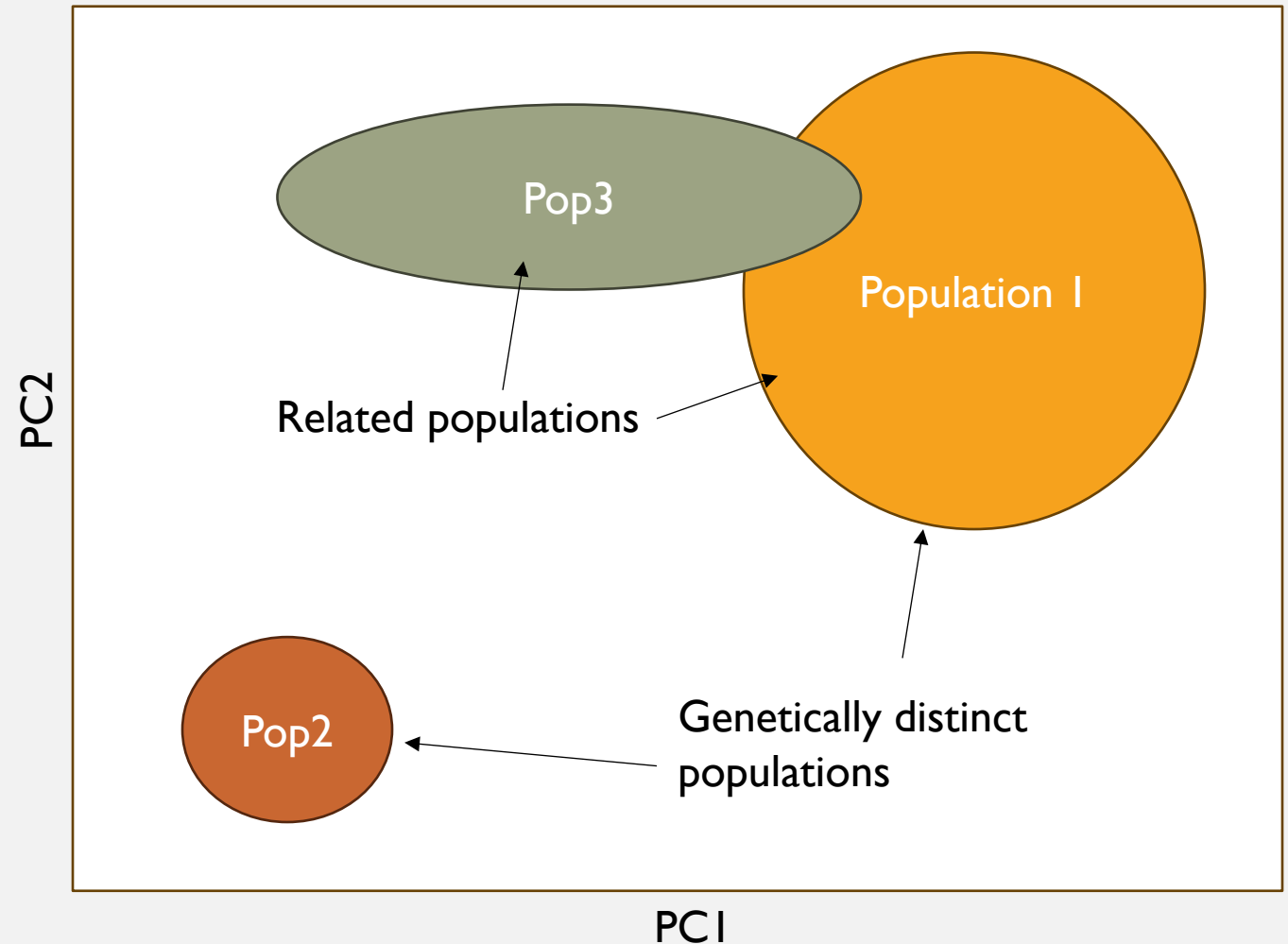
# WGS and PCA Primer

Whole genome sequencing of RRV populations to identify mutations.

Principle component analysis can be used to identify patterns of genetic variation among individuals/populations.

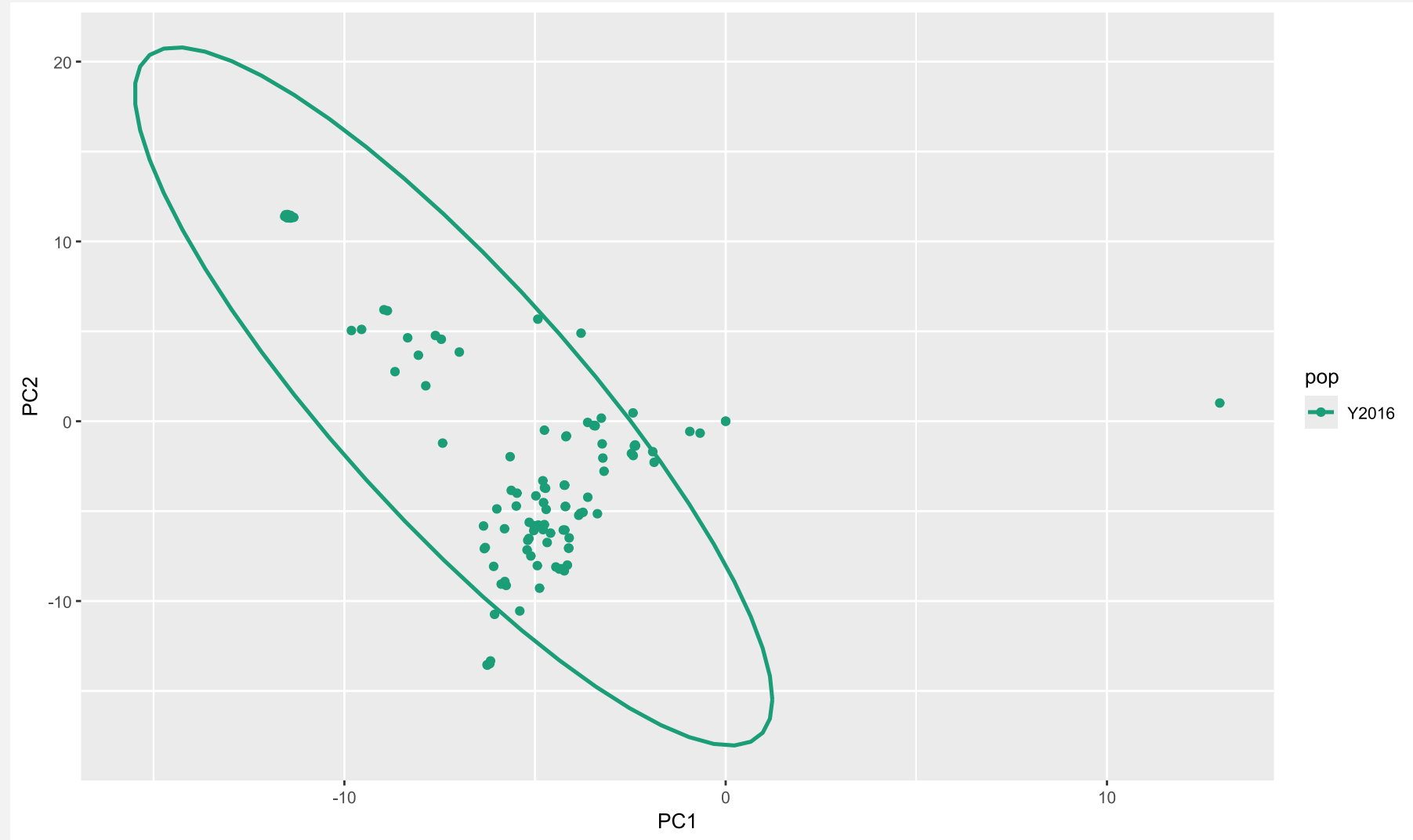
Factors commonly influencing population structure:

- Geography
- Sampling timeline
- Environmental conditions
- Specific selective pressures  
i.e. Management practices



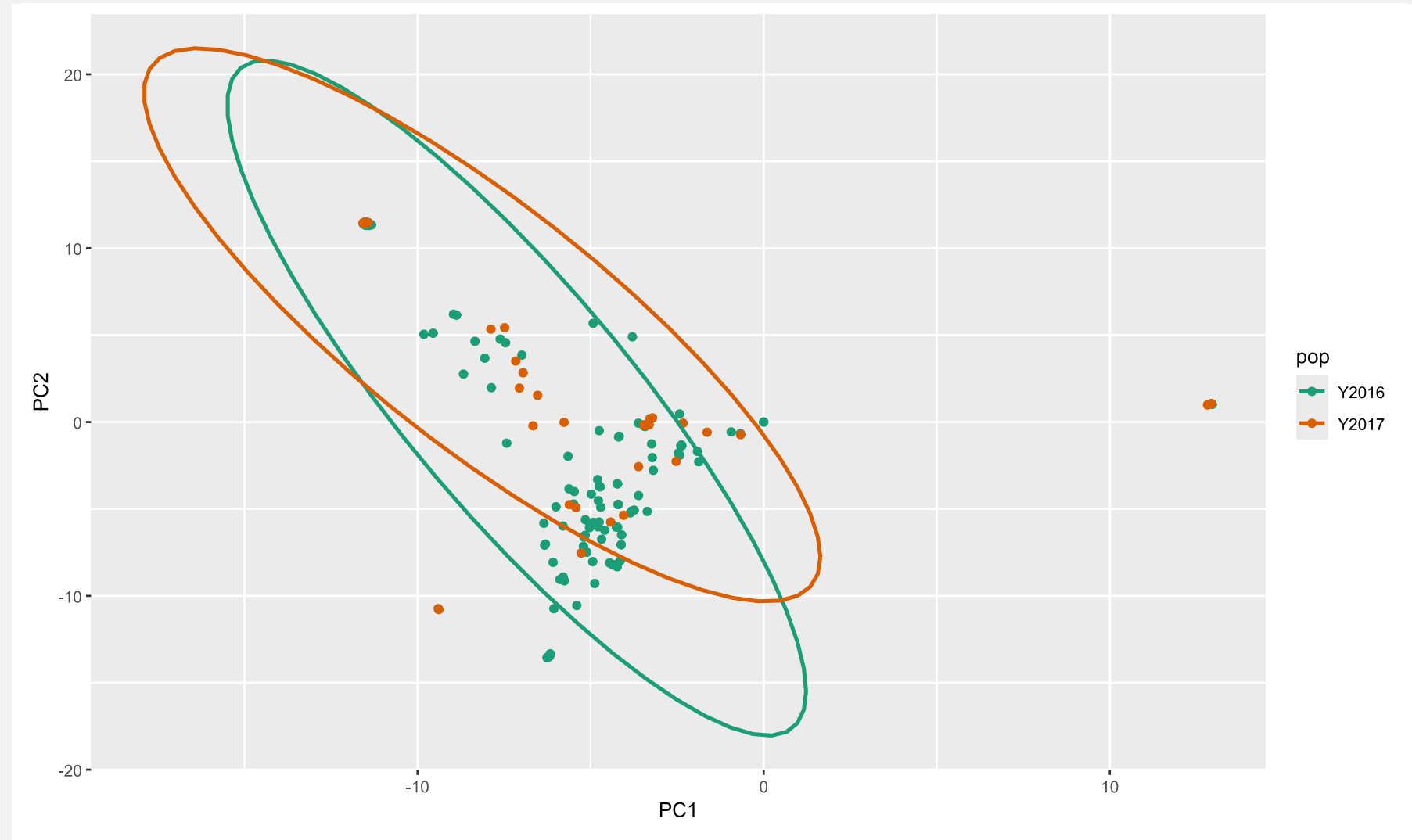
# *C. beticola* population dynamics

2016



# *C. beticola* population dynamics

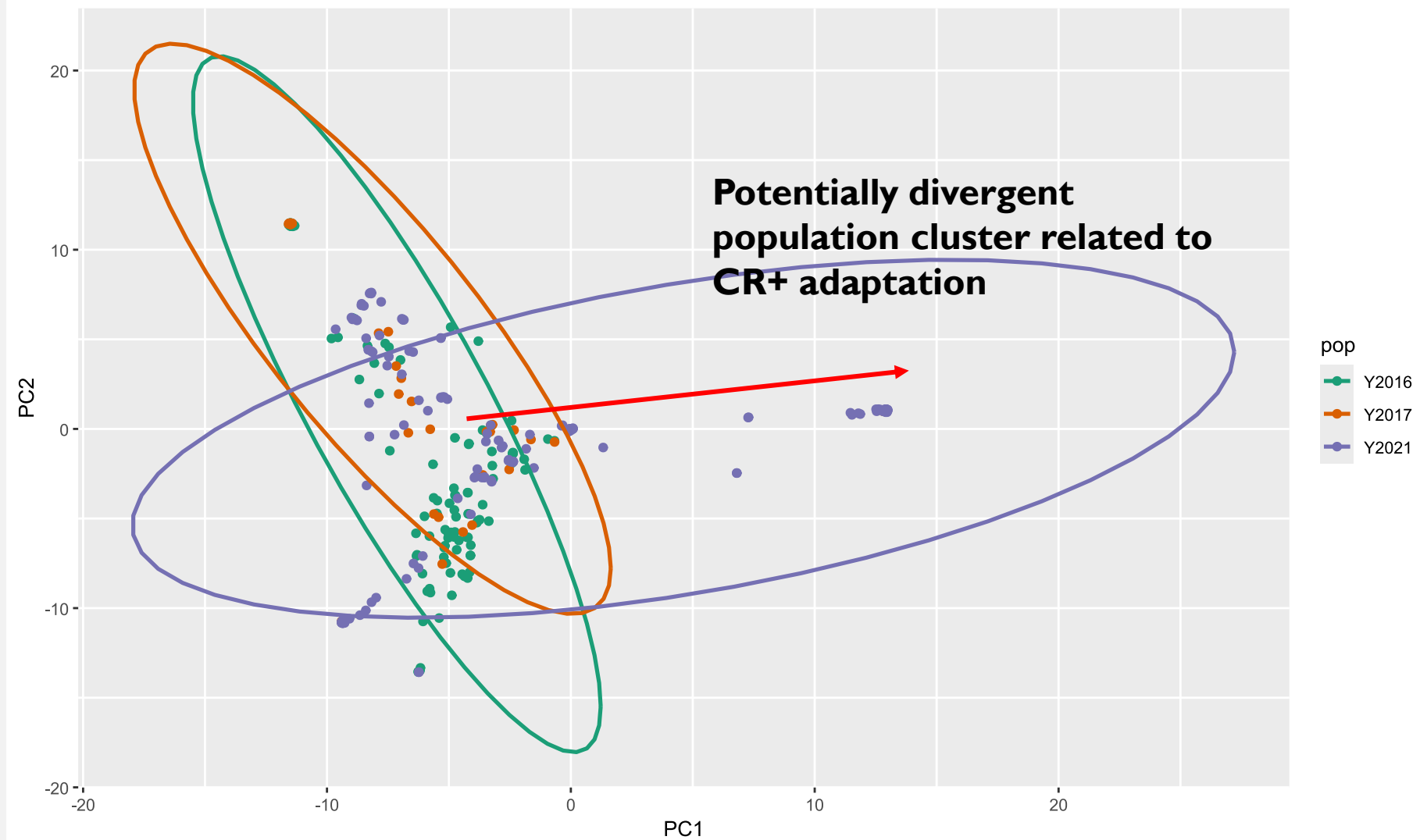
2016 - 2017





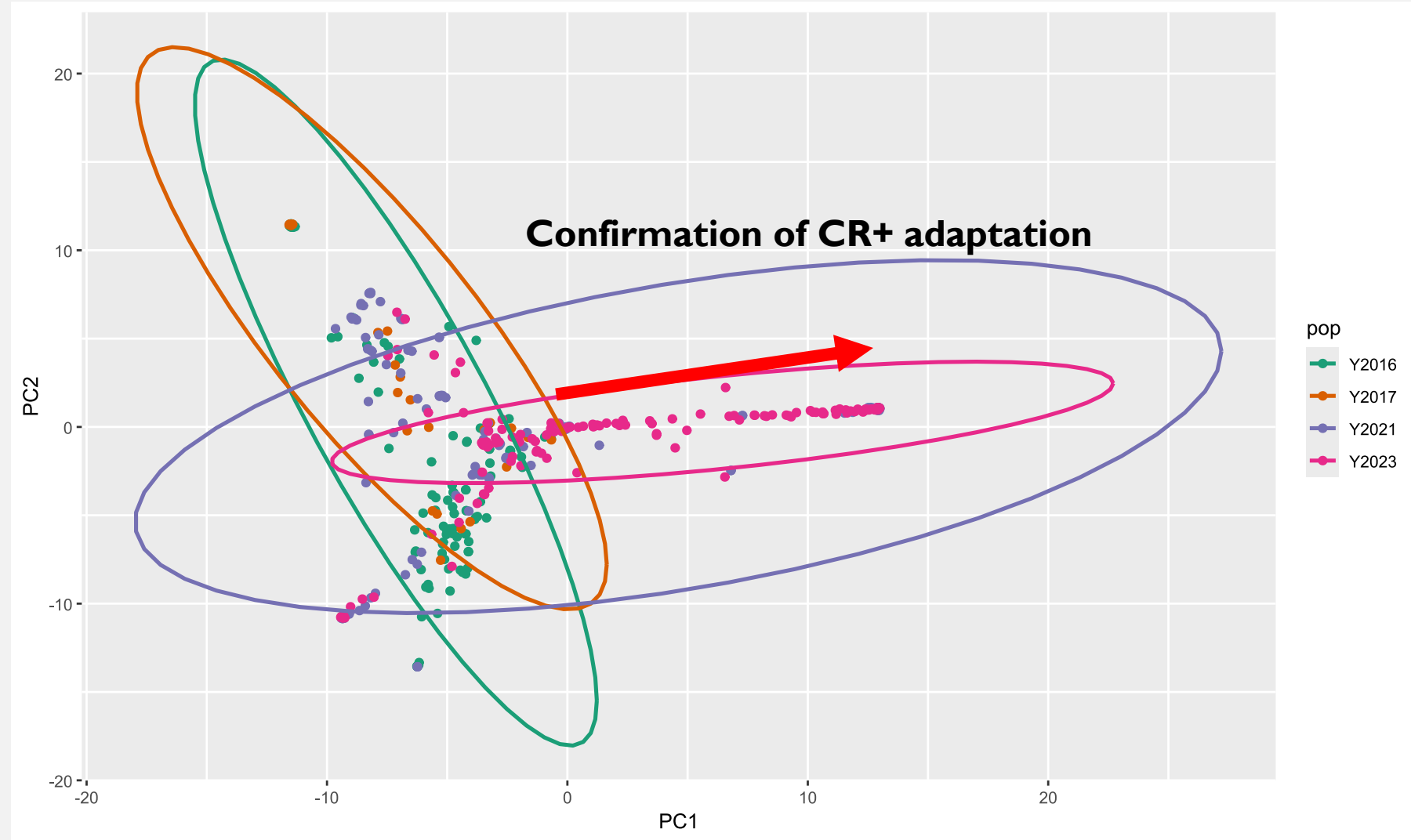
# *C. beticola* population dynamics: CR+

2016 - 2021



# *C. beticola* population dynamics: CR+

2016 - 2023



# 2024 MDFC CLS Timings Trial



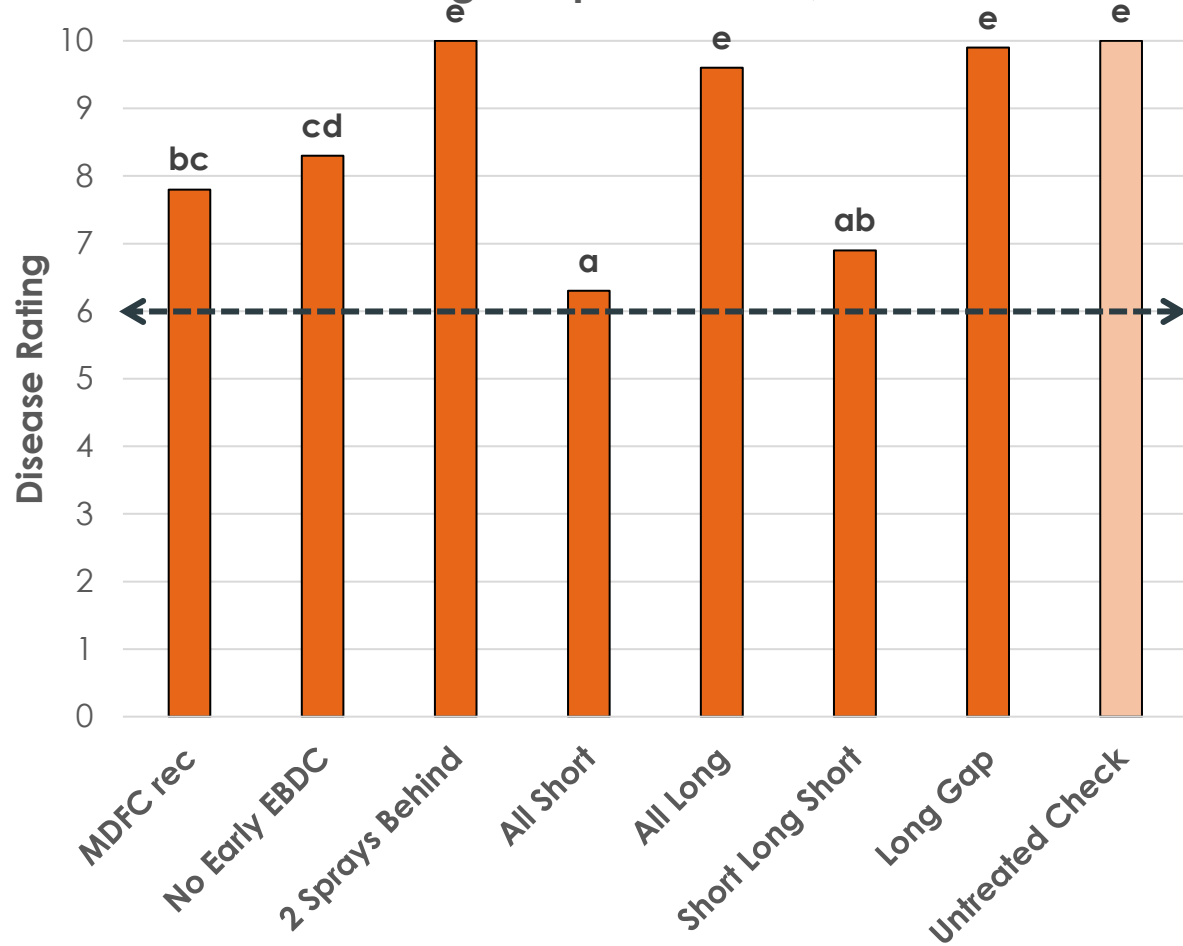
- **MDFC Rec:**
  - Standard 4-spray program, “One, Two, Skip a Few”
- **No Early EBDC:**
  - No EBDC application at row closure
- **2 Sprays Behind:**
  - Started the program late, didn’t apply first two applications
- **All Short:**
  - All applications on 10-14-day intervals
- **All Long:**
  - All applications on 21-day intervals
- **Short Long Short:**
  - Alternated between 10-14-day and 21-day intervals
- **Long Gap:**
  - EBDC application at row closure, spray again ~1 month later

# 2024 MDFC CLS Timings Trial



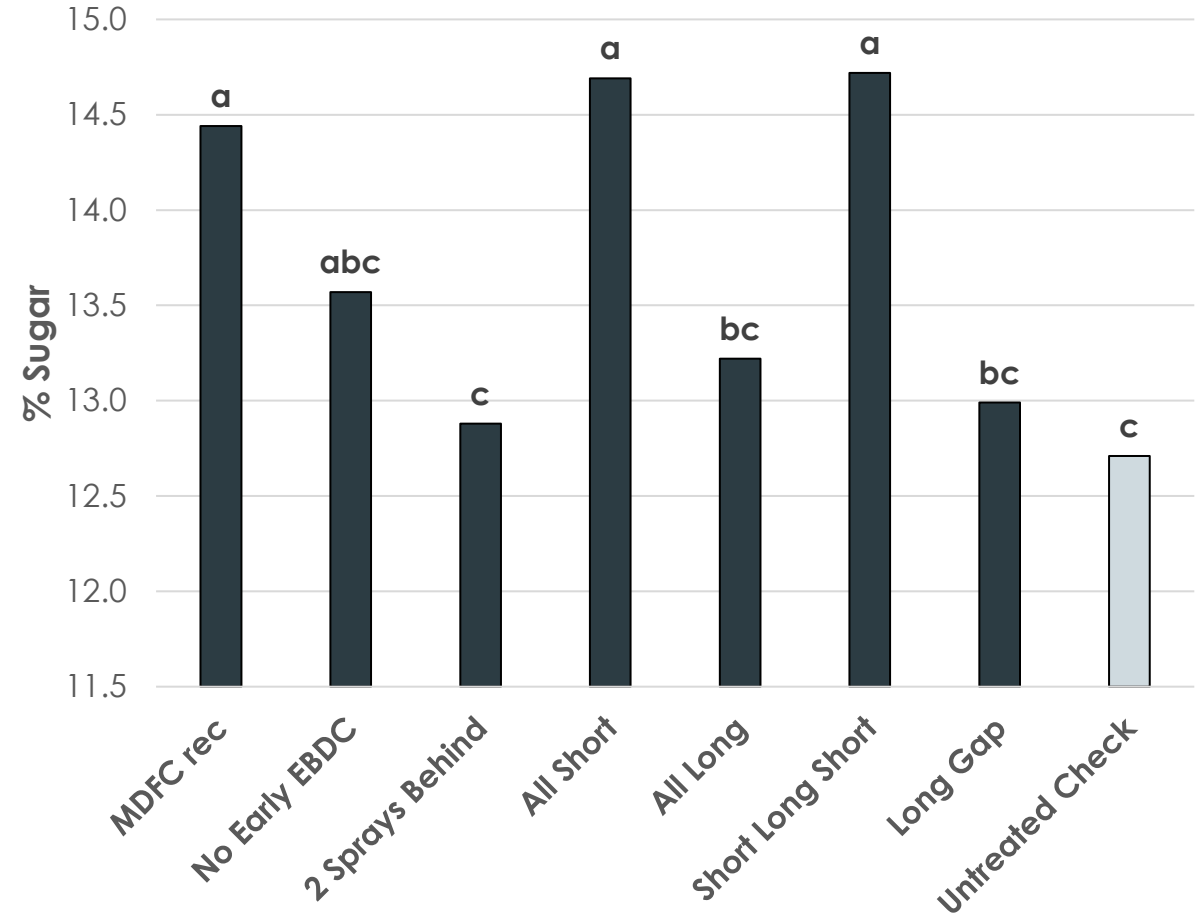
LSD (p=0.10): 1.00  
CV: 9.73

### CLS Rating – September 17, 2024



LSD (p=0.10): 1.19  
CV: 7.24

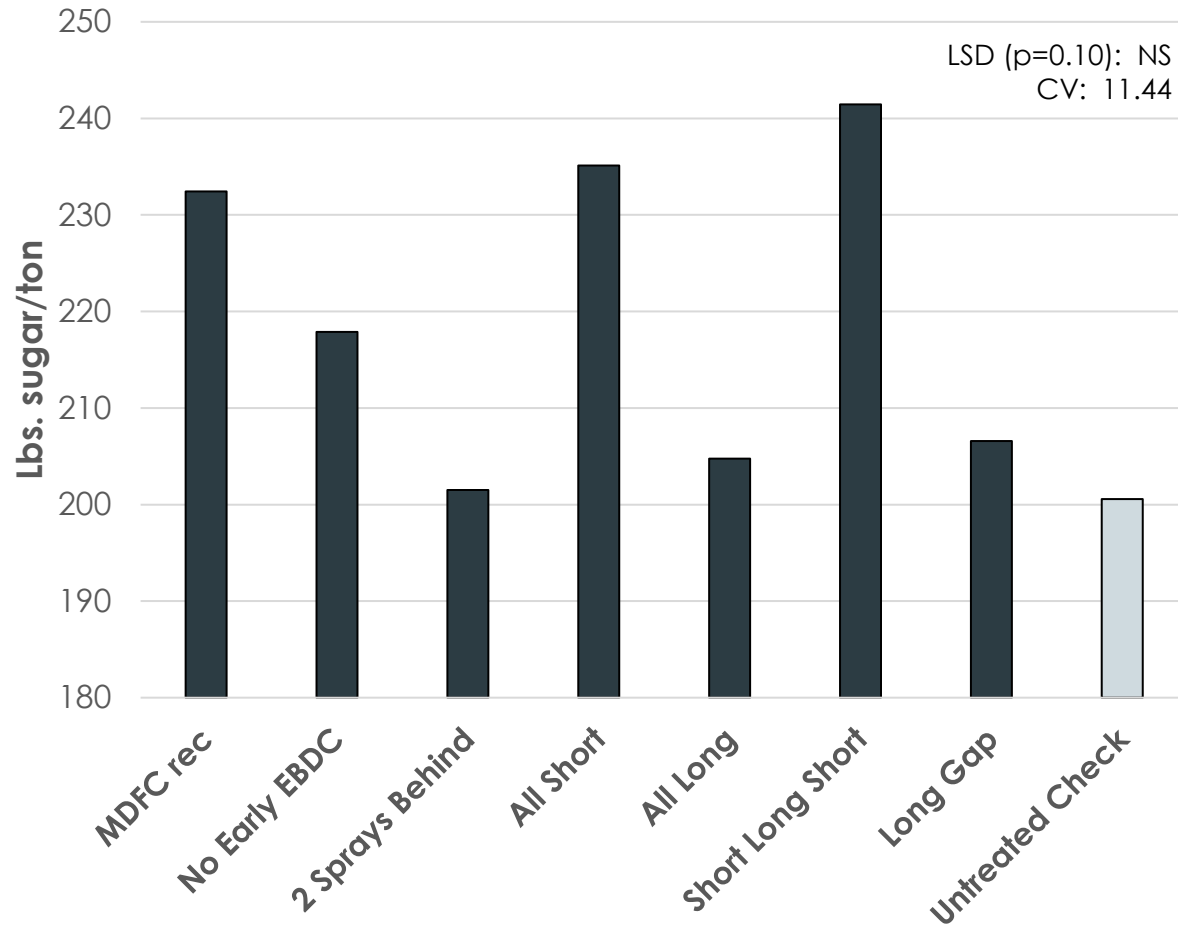
### % Sugar



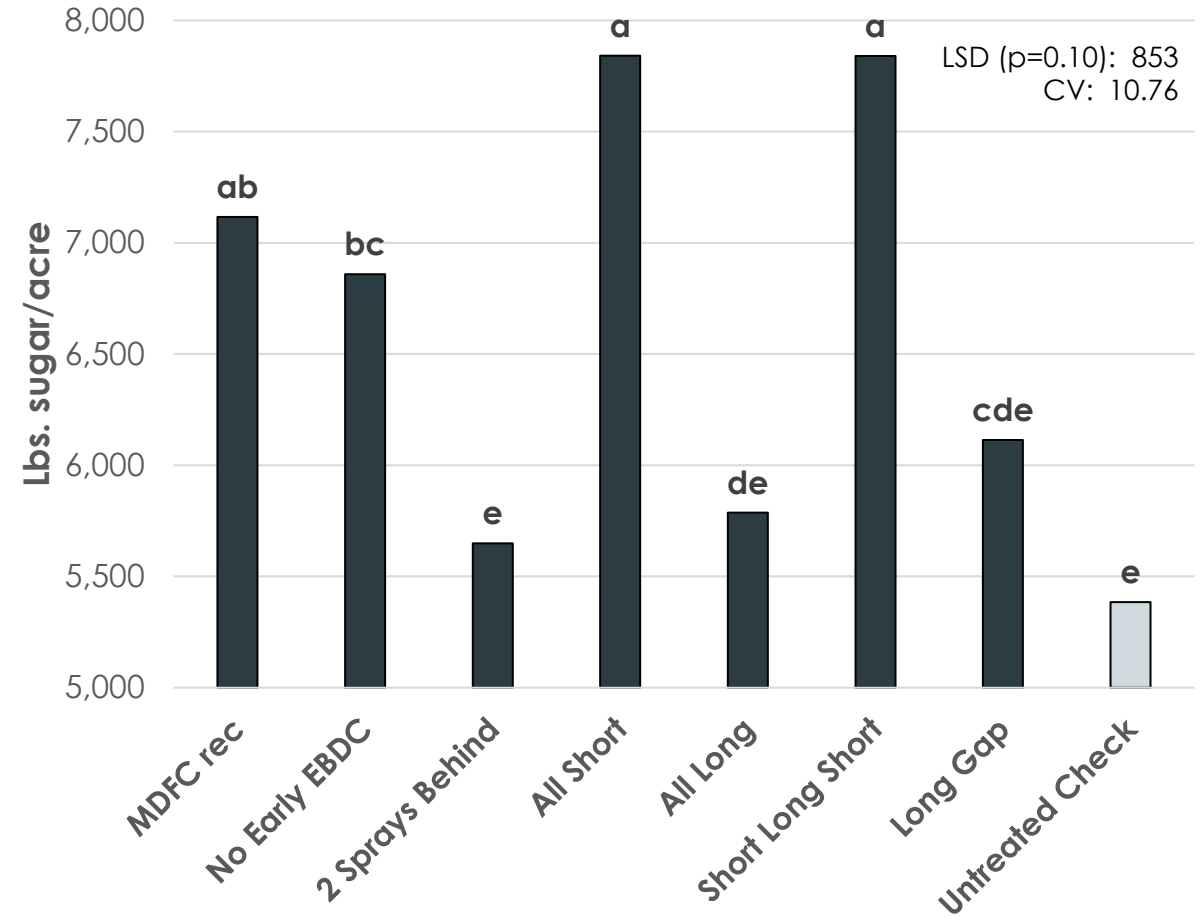
# 2024 MDFC CLS Timings Trial



### Recoverable Sugar per Ton



### Recoverable Sugar per Acre





**MDFC Rec**



**2 Sprays Behind**



**All Short Intervals**



**All Long Intervals**



**MDFC Rec**



**Untreated**



# CLS & MDFC

- High inoculum from 2024
  - 2024 was an ideal environment for CLS
- Selected for CR+ adaptation
  - 99% CR+ ~ Top 5 Varieties
    - 2021 Ave Rating: 1.89
    - 2022 Ave Rating: 1.84
    - 2023 Ave Rating: 2.40
    - 2024 Ave Rating: 2.20
- Start time is key
- Intervals adjusted

# 2025 CLS Recommendation

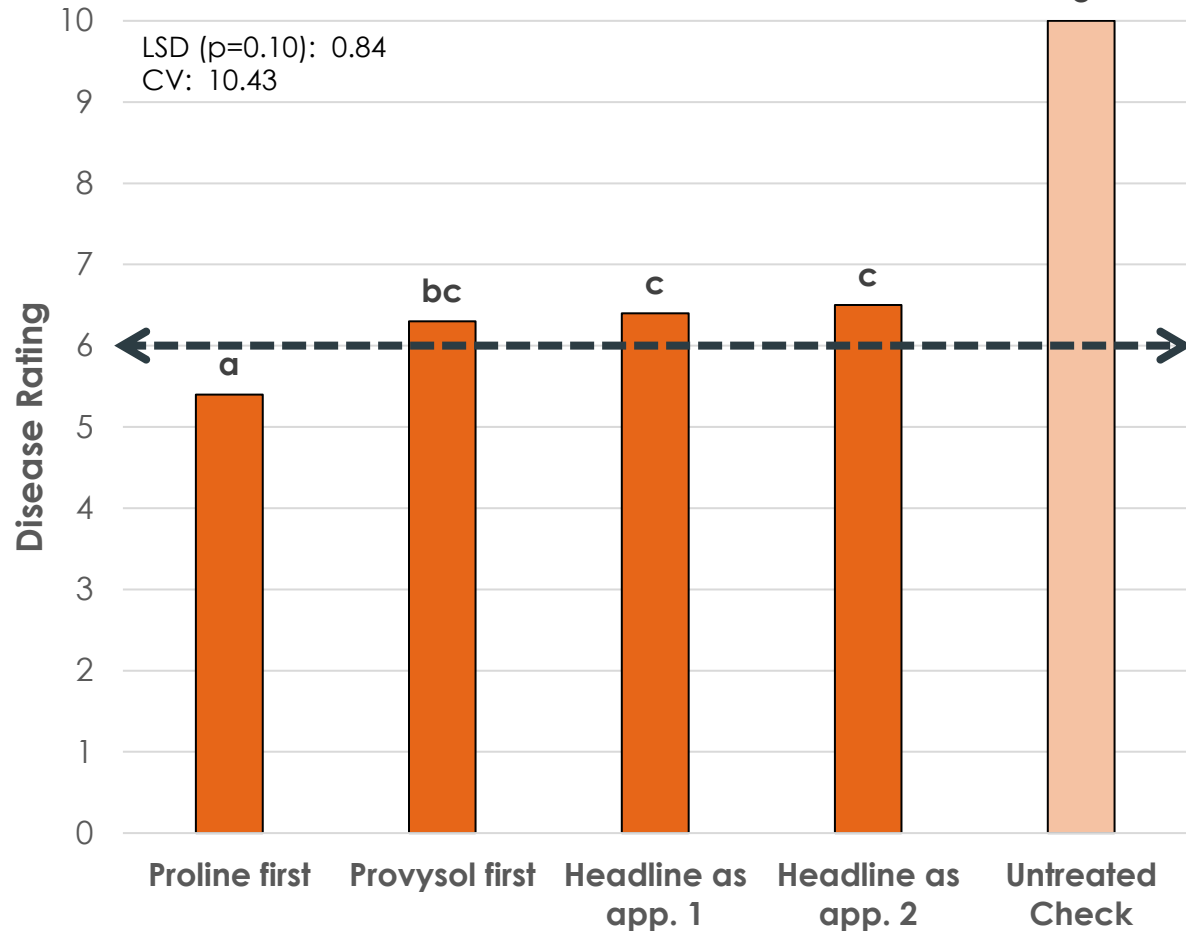


## 1. Proline\* + EBDC

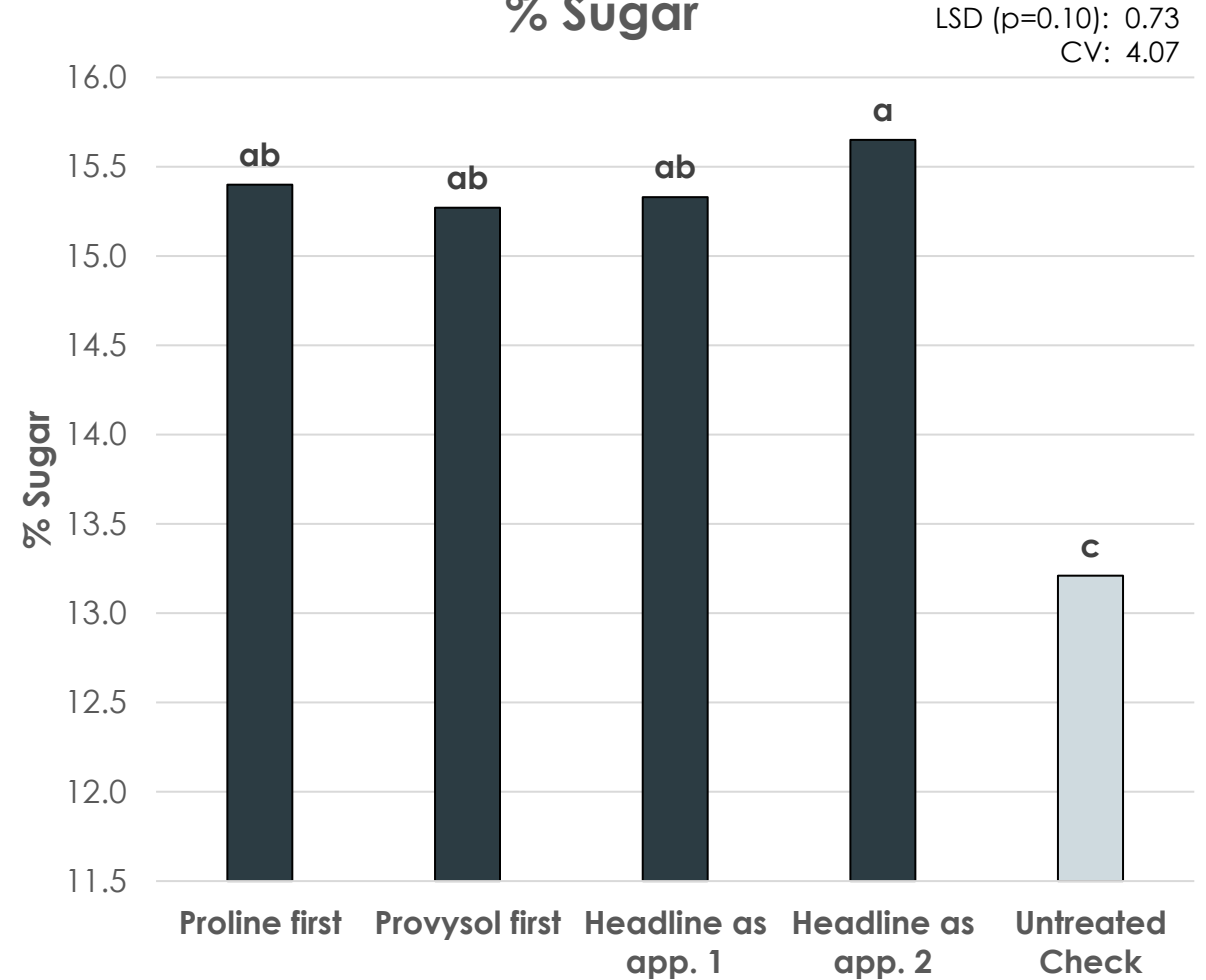
# 2024 MDFC CLS Program Trial



### CLS Rating – September 17, 2024



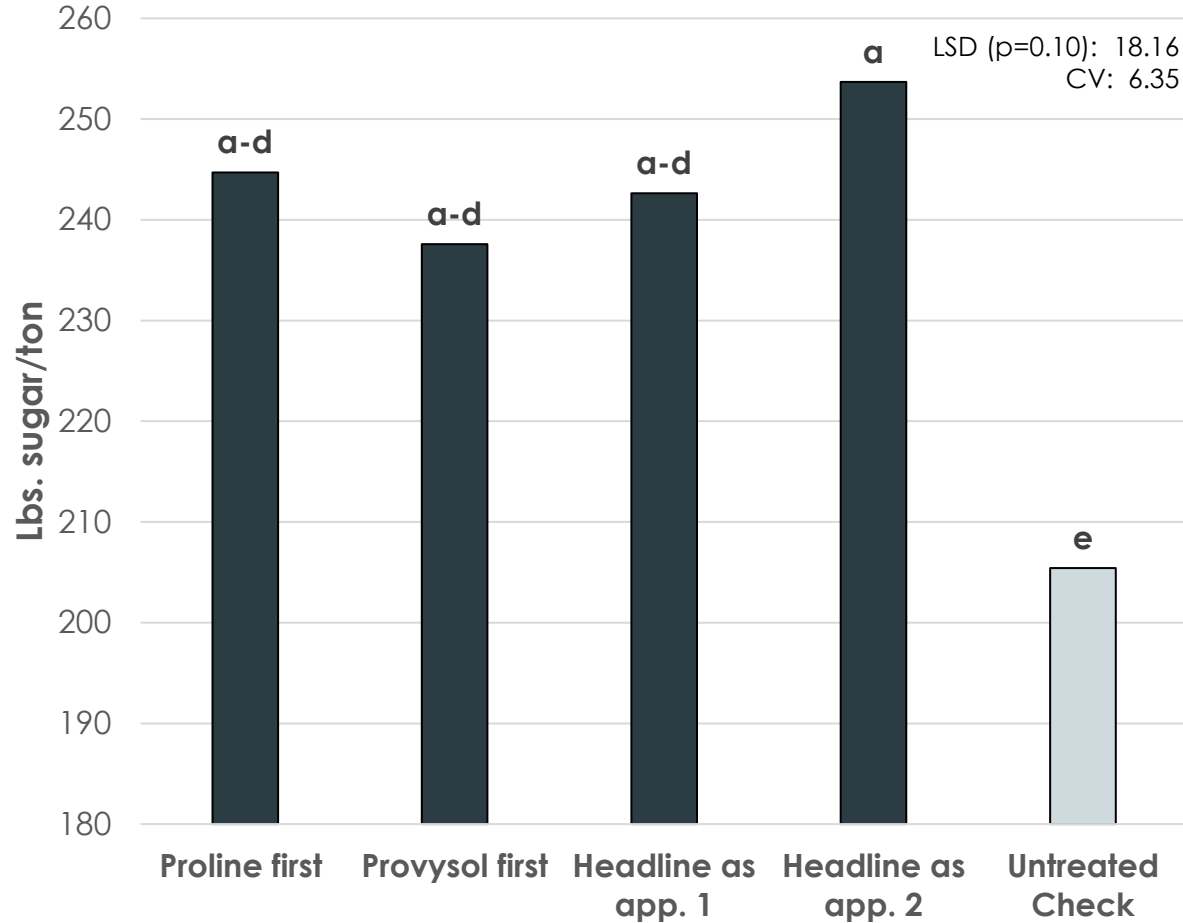
### % Sugar



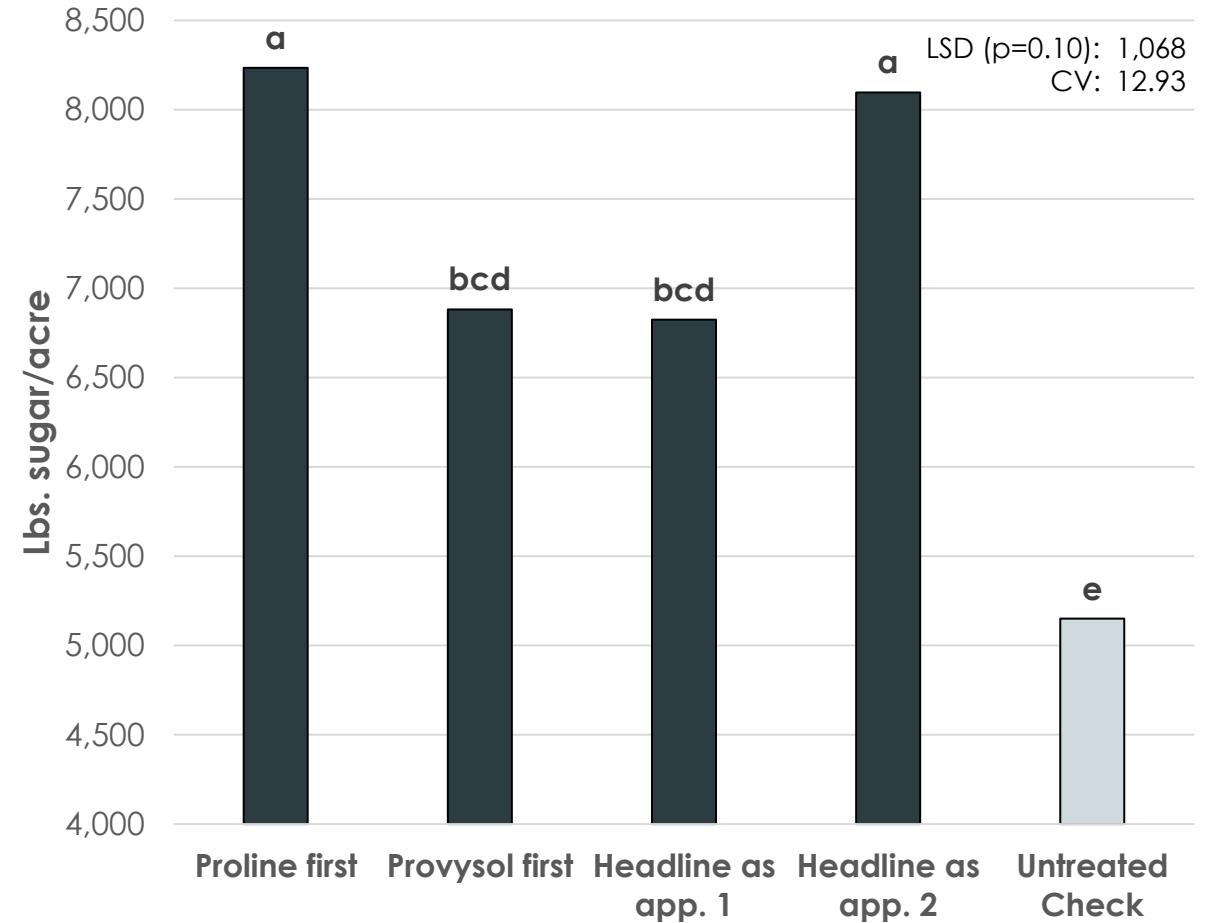
# 2024 MDFC CLS Program Trial



## Recoverable Sugar per Ton



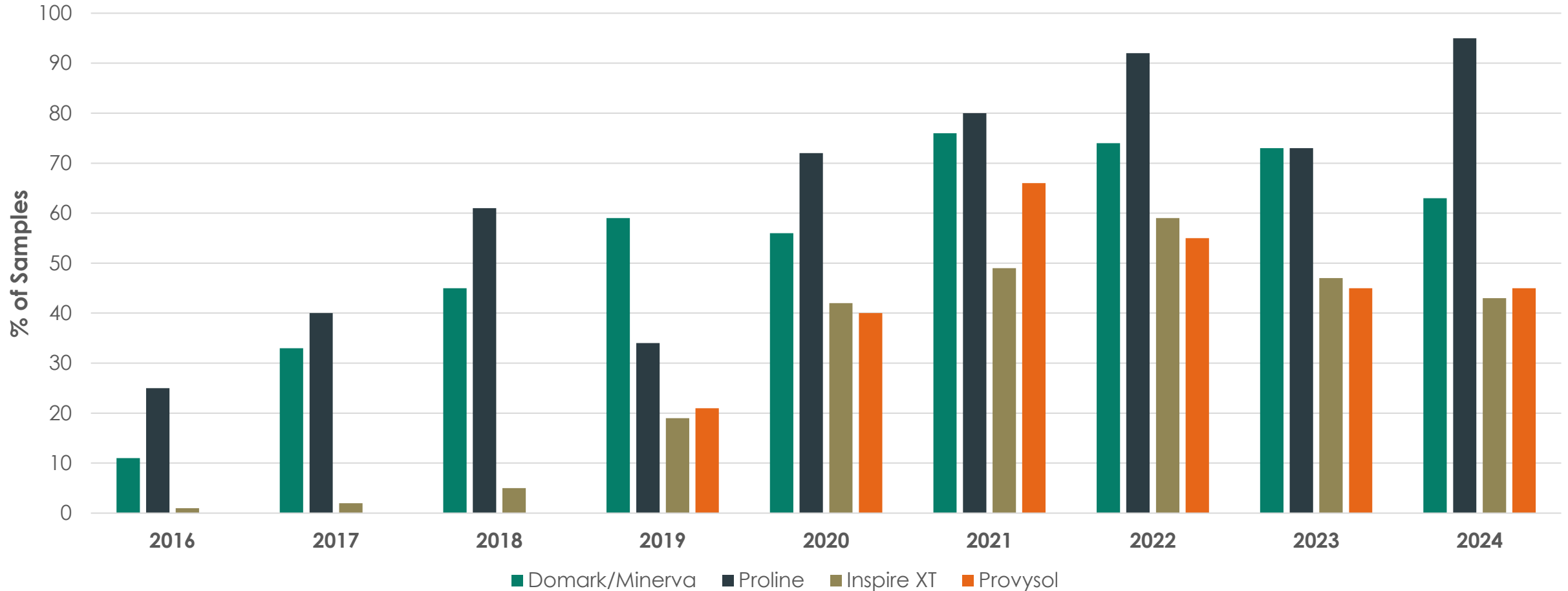
## Recoverable Sugar per Acre



# Triazole Fungicide Resistance



EC<sub>50</sub> > 10



# 2025 CLS Recommendation

1. Proline\* + EBDC
- 2. Tin + Topsin**

# Fungicide cross resistance

Fungicide	Commercial product	Headline	Topsin	Domark	Proline	Inspire	TPTH
Strobilurin	Headline	1.00					
Benzimidazole	Topsin	0.18	1.00				
Triazole	Domark	0.69	0.33	1.00			
Triazole	Proline	0.53	0.41	0.92	1.00		
Triazole	Inspire	0.51	0.37	0.59	0.60	1.00	
Tin	TPTH	0.40	0.21	0.48	0.54	0.43	1.00

## Primary results

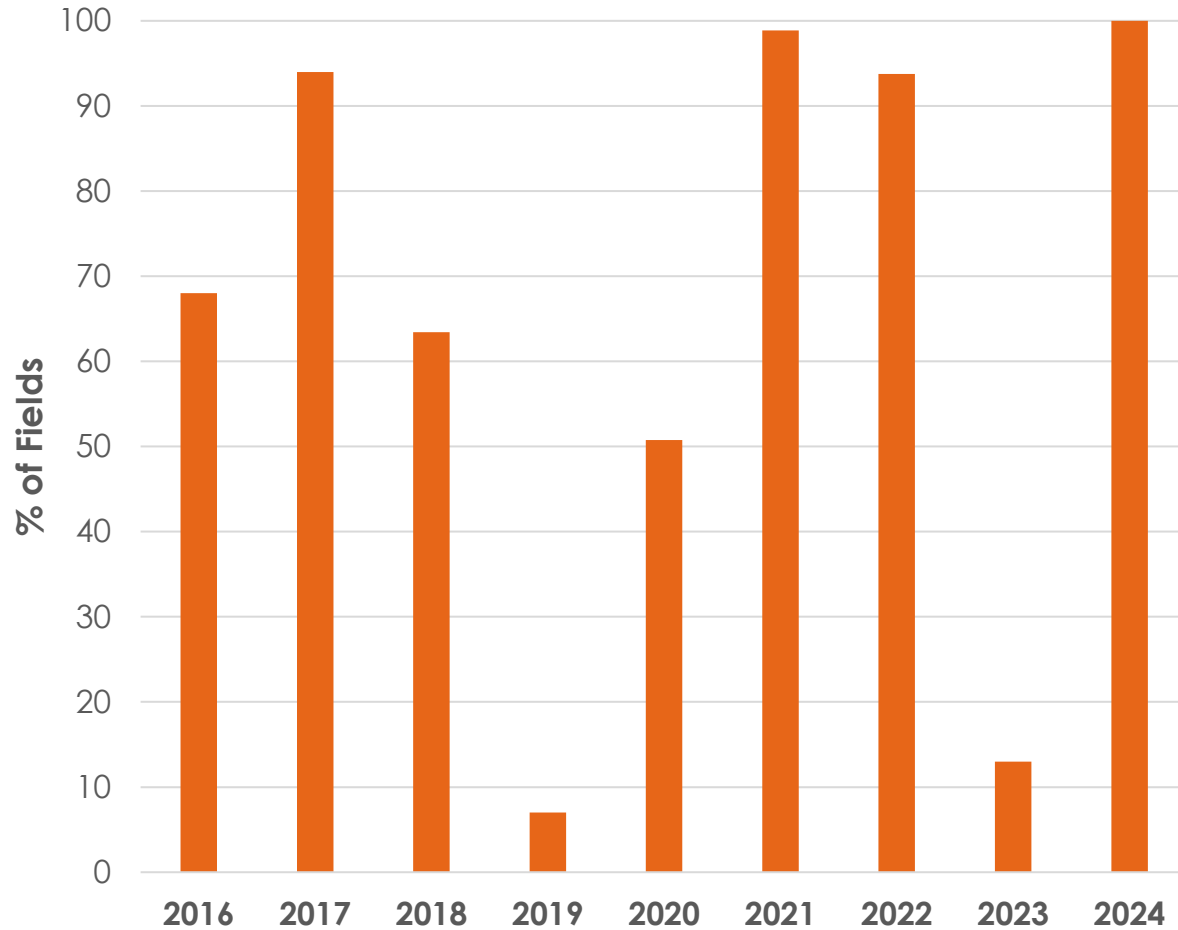
- Cross resistance is relatively low between different chemistries
- Tank Mixing multiple chemistries as an effective strategy
- No EBDC resistance has been detected.

- Cross resistance scored from 0.00 to 1.00 with higher values indicating higher degrees of cross resistance.

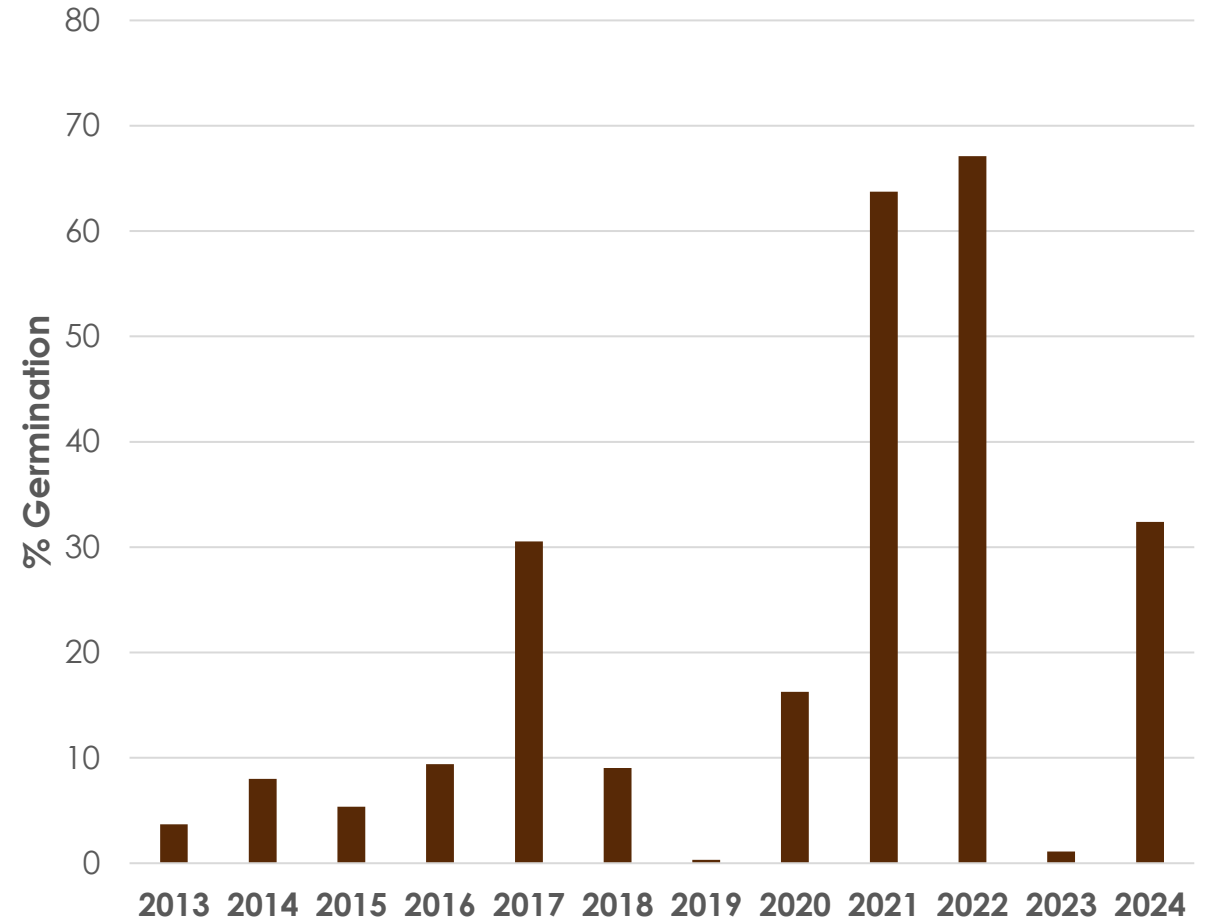
# Tin Fungicide Resistance



Fields with CLS Spore Germination at 1 ppm Tin



CLS Spore Germination at 1ppm Tin

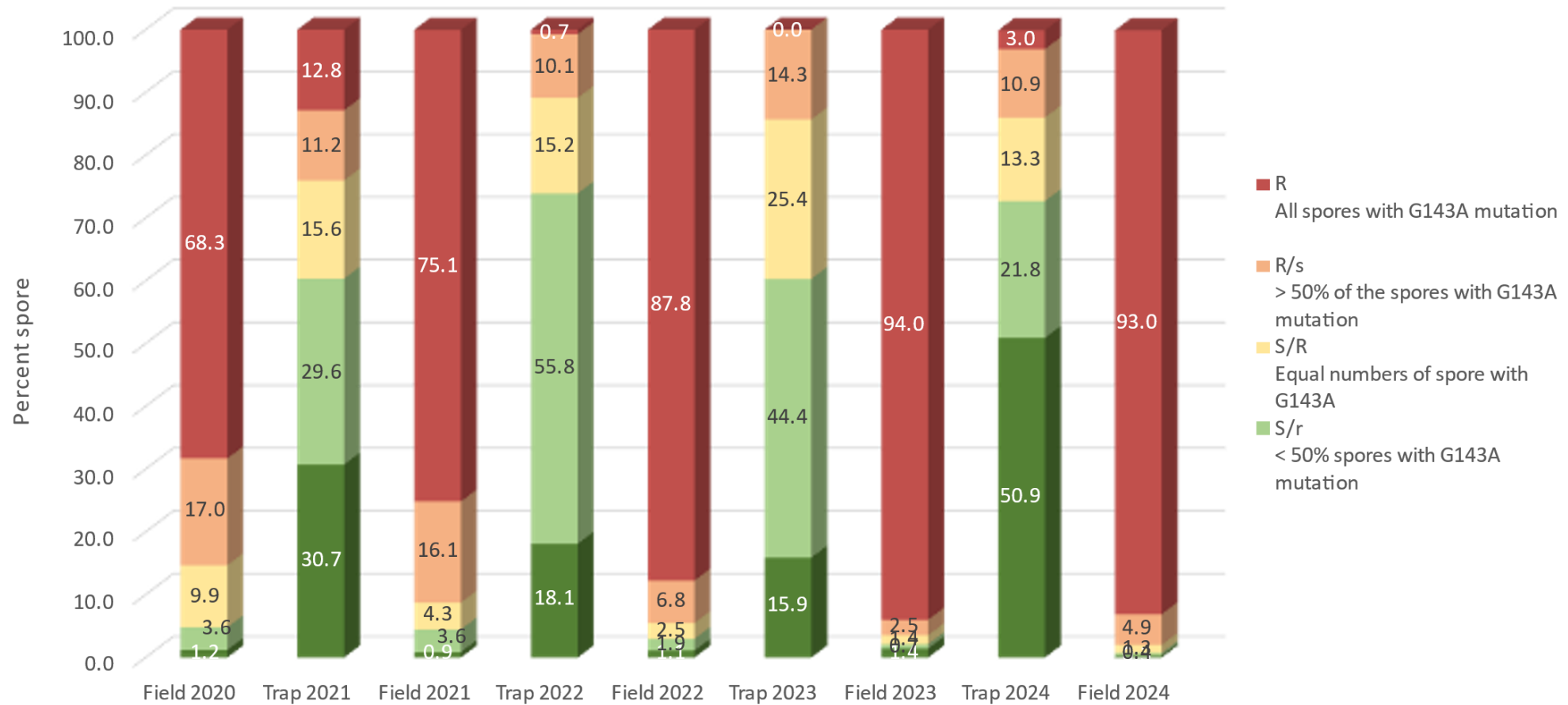




# 2025 CLS Recommendation

1. Proline\* + EBDC
2. Tin + Topsin
3. **QoI + EBDC**

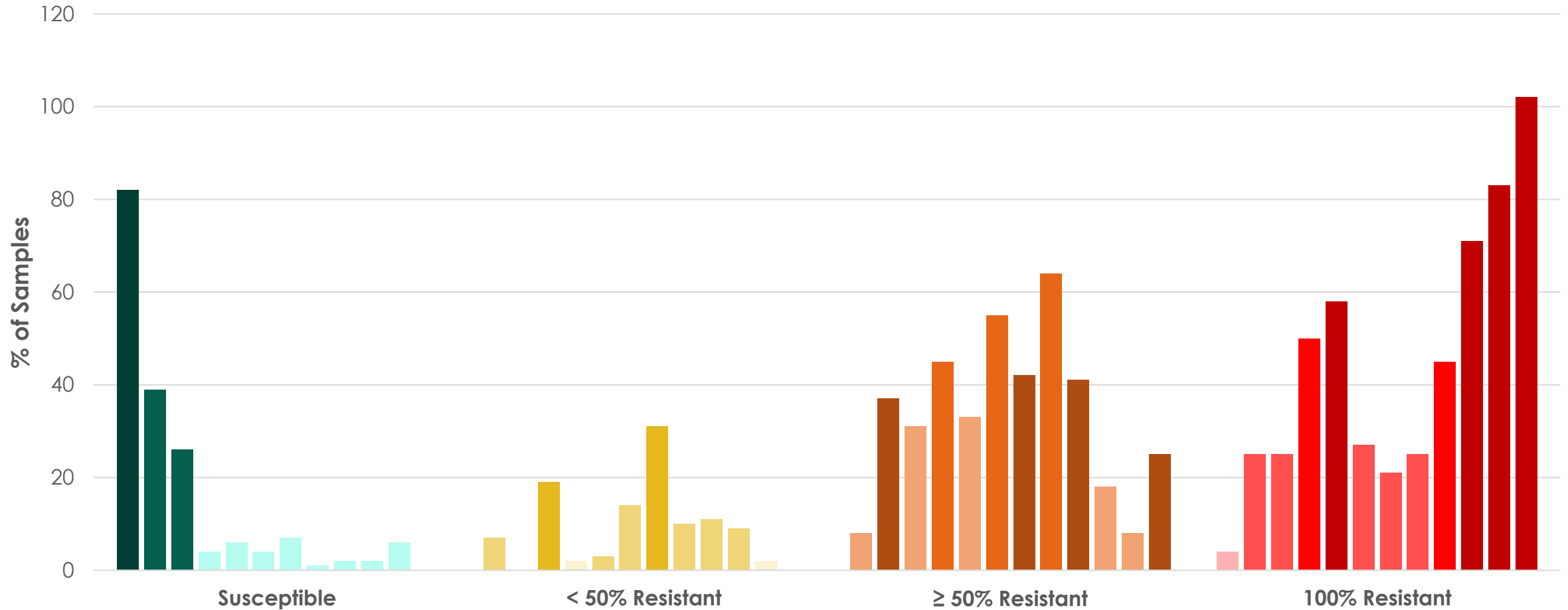
Comparison of sensitivity to Headline of *C. beticola* isolates to Headline from spore traps at the beginning of the season and isolates collected at end of the of the growing season



# QoI Fungicide Resistance



2013-2024



# 2025 CLS Recommendation

1. Proline\* + EBDC
2. Tin + Topsin
3. QoI + EBDC
- 4. Tin + EBDC**

# 2025 CLS Recommendation

1. Proline\* + EBDC
2. Tin + Topsin
3. QoI + EBDC
4. Tin + EBDC
- 5. Inspire XT/Provysol\*\* + EBDC**

# 2025 CLS Recommendation

1. Proline\* + EBDC
2. Tin + Topsin
3. QoI + EBDC
4. Tin + EBDC
5. Inspire XT/Provysol\*\* + EBDC
- 6. Tin + EBDC**

# Cercospora Leaf Spot – 2025

- First application ~**June 23**
  - Target 4<sup>th</sup> week of June
- **Stay on schedule** – 14-day intervals
  - Adjust for rain/weather
- **Tank-mix**
  - Widespread, patchy resistance to DMI/tin/Qol
  - No resistance ever reported to EBDC since registration in 1948
- **Full rates**
- **20 GPA** water volume
  - Coverage is key
- Adjuvants with protectants only

# 2025 MDFC Fungicide Program

1. Proline\* + EBDC
2. Tin + Topsin
3. QoI + EBDC
4. Tin + EBDC
5. Inspire XT\*\* or Provysol\*\* + EBDC
6. Tin + EBDC

Remember to rotate the triazoles:

- \*Proline or Domark or Minerva
- \*\*Inspire XT or Provysol or REGEV or Luna Flex

**Only use one product per group per season**

*Keep in contact with your Agriculturist – scout your fields to ensure excellent control*