



MDFC Research Overview

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Research Agronomist

Research Trials...

- Starter Fertilizer
- Foliar Quality Enhancement
- Differing Fungicide Programs with CR+ Varieties
 - Rates/Timings/Products
- Adjuvant Study for CLS
- POST Product Screening for Rhizoctonia
- Ultra Blazer Safeners
- Defoliation Timing
- Experimental Product Screening
- Collaboration with universities, extension, USDA, and other sugar coops



Research and Resource

Cercospora

Cercospora is a type of fungi that presents itself as leaf spots and causes plant disease.



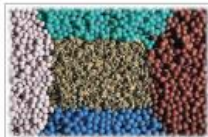
Beet Topics

Beet Topics is publication produced by Minn-Dak Farmer Cooperative's research and development department.



Beet Seed

Information about sugarbeet seed packets, individual Minn-Dak test trial locations and the highlights from those test trials.



Resources

These resources provide our growers with articles, production tips, and downloadable resources to help improve their bottom line.



Research Trial Results

View the results of trials conducted by the research team at Minn-Dak Farmers Cooperative.



Research and Resource

Crop Update

Harvest Update

Lime Information

Grower Practice Records

Receiving Stations

Ag Contact

News

Sugar Fun Fact

Sugar is an ingredient in sugar scrubs for your body and some cleaning products for your home. It is also used to make certain types of detergents.

<https://sugar.org/>



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Research Trial Results

Here growers will find the results of the trials that the research team conducts. Results are downloadable and will be updated annually.

Cercospora Leaf Spot

- [Adjuvant Comparison \(2018\)](#)
- [Comparison of Coppers Tank Mixed with a Triazole \(2018\)](#)
- [Fungicide Program Comparison \(2018\)](#)
- [Management Tips \(2017\)](#)

Rhizoctonia

- [AZteroid \(2018\)](#)
- [Elatus \(2018-2018\)](#)
- [In-Furrow Fungicide Comparison \(2018\)](#)
- [Serenade \(2015-2017\)](#)
- [Management Tips \(2014-2016\)](#)
- [Priaxor \(2015\)](#)
- [Treatment Comparison \(2013\)](#)

Sugarbeet Quality

- [K-Express \(2018\)](#)
- [REV \(2018\)](#)
- [Utilization of Plant Growth Regulators \(2016-2018\)](#)
- [Improving Sugarbeet Quality \(2017\)](#)
- [Planting Date \(2017\)](#)
- [Rotational Crops \(2017\)](#)
- [Row Spacing \(2017\)](#)
- [Seed Spacing \(2017\)](#)
- [Supplemental Lime \(2015\)](#)
- [Lime & Tile \(2014\)](#)
- [Regalia \(2013\)](#)

Starter Fertilizer & Fertility

- [Nitrogen Rate Study \(2018\)](#)
- [MicroEssentials \(2016\)](#)
- [Starter Fertilizer \(2014-2018\)](#)
- [In-Furrow Fungicides + 10-34-0 \(2015\)](#)
- [MicroEssentials \(2014\)](#)
- [MicroNutrients \(2013-2014\)](#)
- [Generate \(2013\)](#)
- [Germain's Seed Treatments \(2013\)](#)
- [Top Dressing 28% \(2013\)](#)

Weed Control

- [Waterhemp Control \(2018\)](#)
- [Sugarbeet Sensitivity to Dicamba \(2017-2018\)](#)
- [Waterhemp Control \(2017\)](#)
- [Nurse Crop Removal Timing \(2016\)](#)
- [Sugarbeet Crop Safety, Soil-Applied Herbicides \(2015-2016\)](#)
- [Impact of Soil-Applied Herbicides on Nurse Crops \(NDSU, 2015\)](#)

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Treatment List



- MDFC EBDC
 - 2023 MDFC Fungicide Program using EBDC as the tank mix partner
- MDFC Copper
 - 2023 MDFC Fungicide Program using copper as the tank mix partner
- MFDC Sulfur
 - 2023 MDFC Fungicide Program using sulfur as the tank mix partner
- MDFC Swap
 - 2023 MDFC Fungicide Program swapping triazole order
- No Early
 - No early application of EBDC prior to row closure
- Late Start
 - 2023 MDFC Fungicide Program but was started a month late
- Tins
 - Tin + EBDC sprayed each time
- Triazoles
 - Triazole + EBDC sprayed each time
 - *Triazole 'groups' were rotated*

CLS Rating Scale



Category 1
1-5 spots/leaf
0.1% severity



Category 2
6-12 spots/leaf
0.35% severity



Category 3
13-25 spots/leaf
0.75% severity



Category 4
26-50 spots/leaf
1.5% severity



Category 5
51-75 spots/leaf
2.5% severity



Category 6
3% severity
PROVEN ECONOMIC DAMAGE



Category 7
6% severity



Category 8
12% severity



Category 9
25% severity



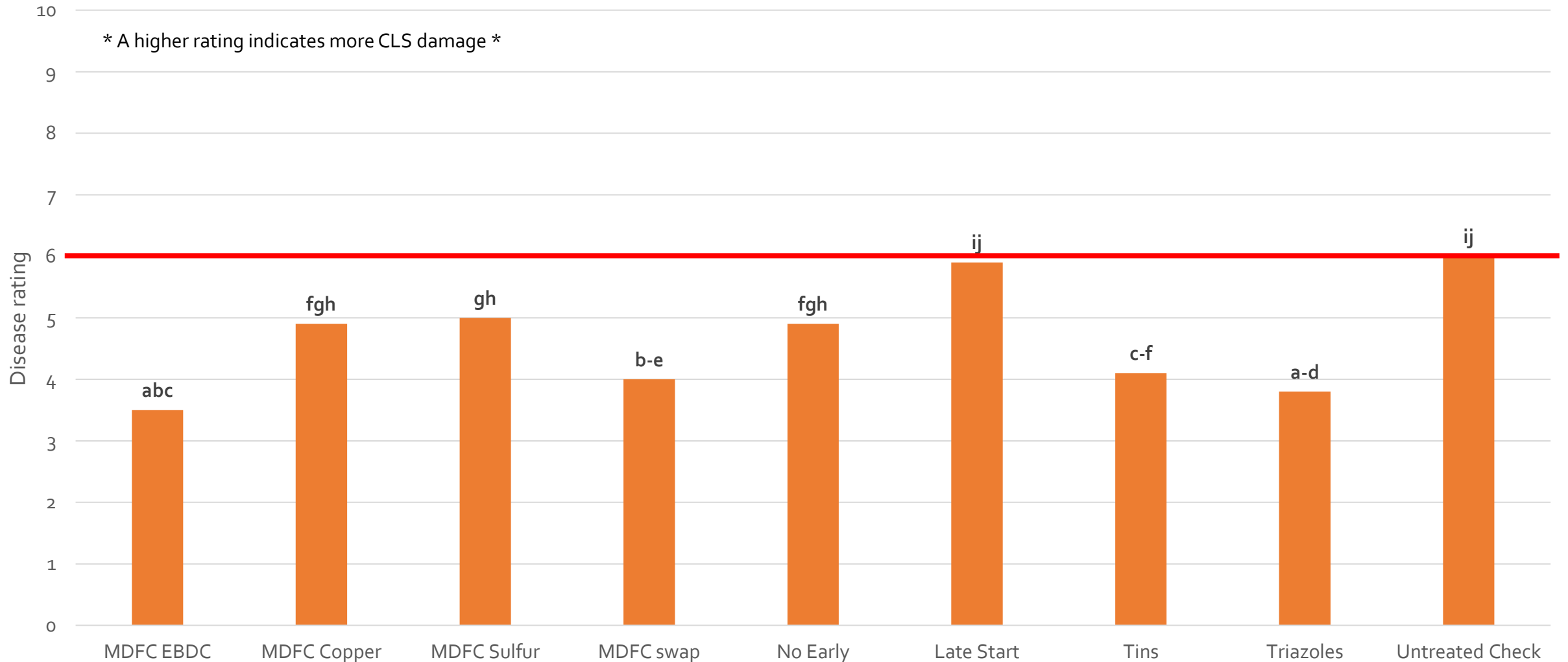
Category 10
50% severity

CR+ Program Comparison

LSD (p=0.10): 0.81
CV: 14.87



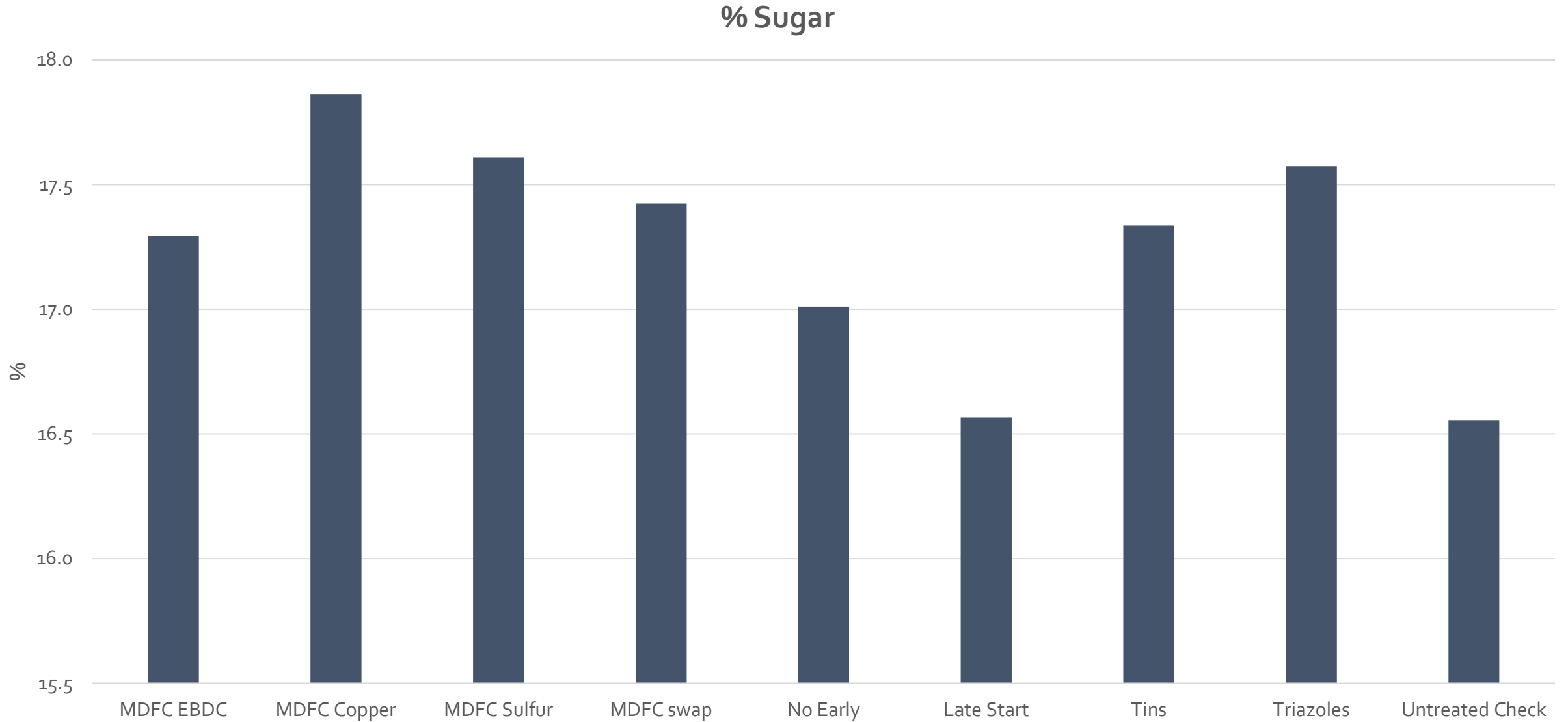
CLS Rating – September 6, 2023



Treatments with the same letter are not statistically different

CR+ Program Comparison

LSD (p=0.10): NS
CV: 4.60

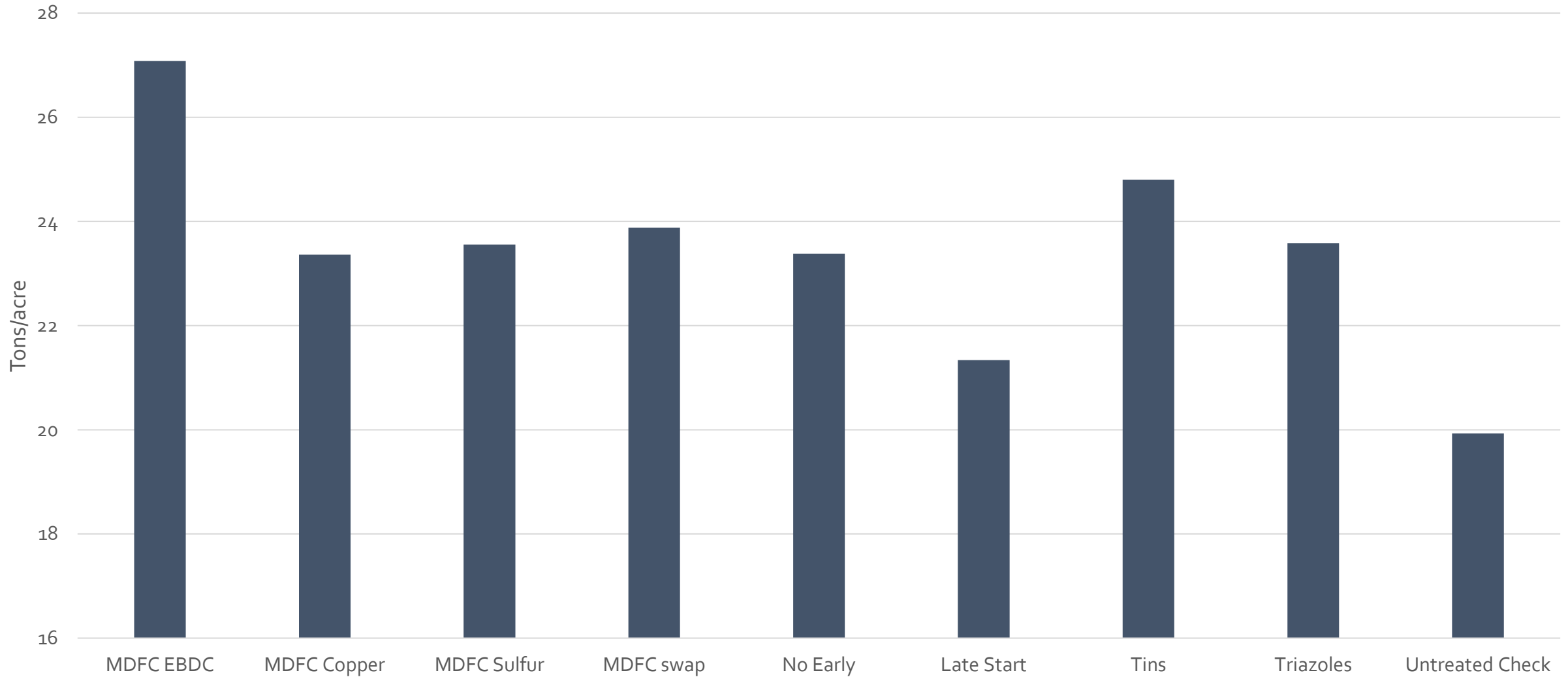


CR+ Program Comparison

LSD (p=0.10): NS
CV: 17.37



Root Yield

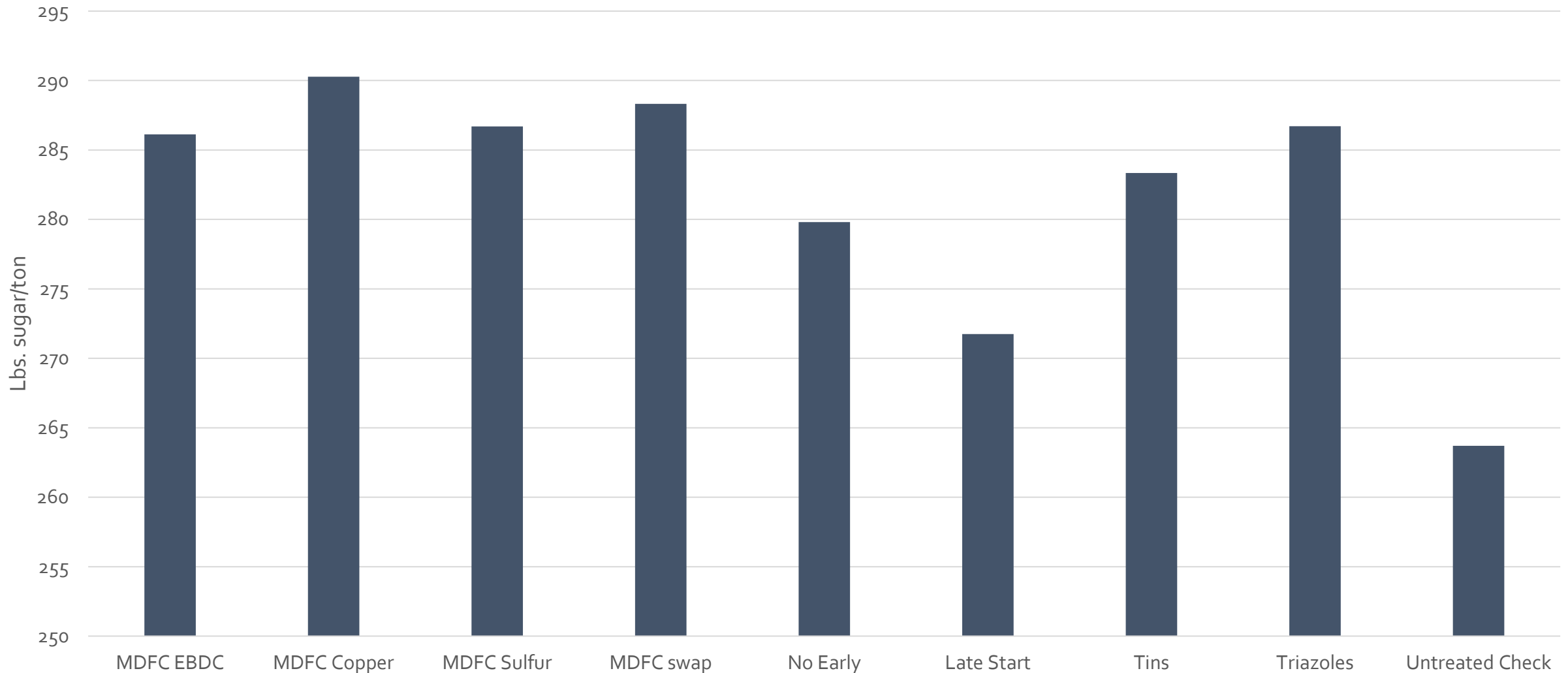


CR+ Program Comparison

LSD (p=0.10): NS
CV: 6.01



Recoverable Sugar per Ton

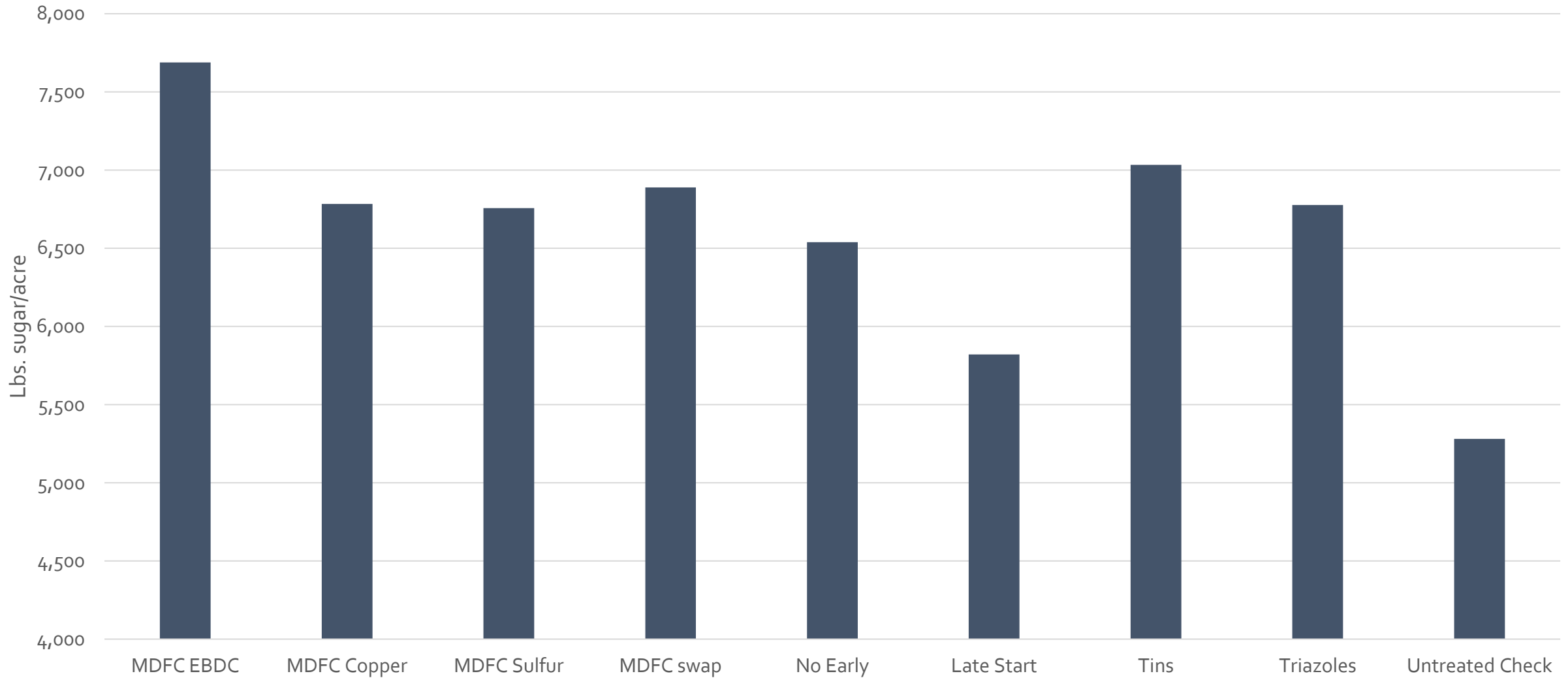


CR+ Program Comparison

LSD (p=0.10): NS
CV: 18.34

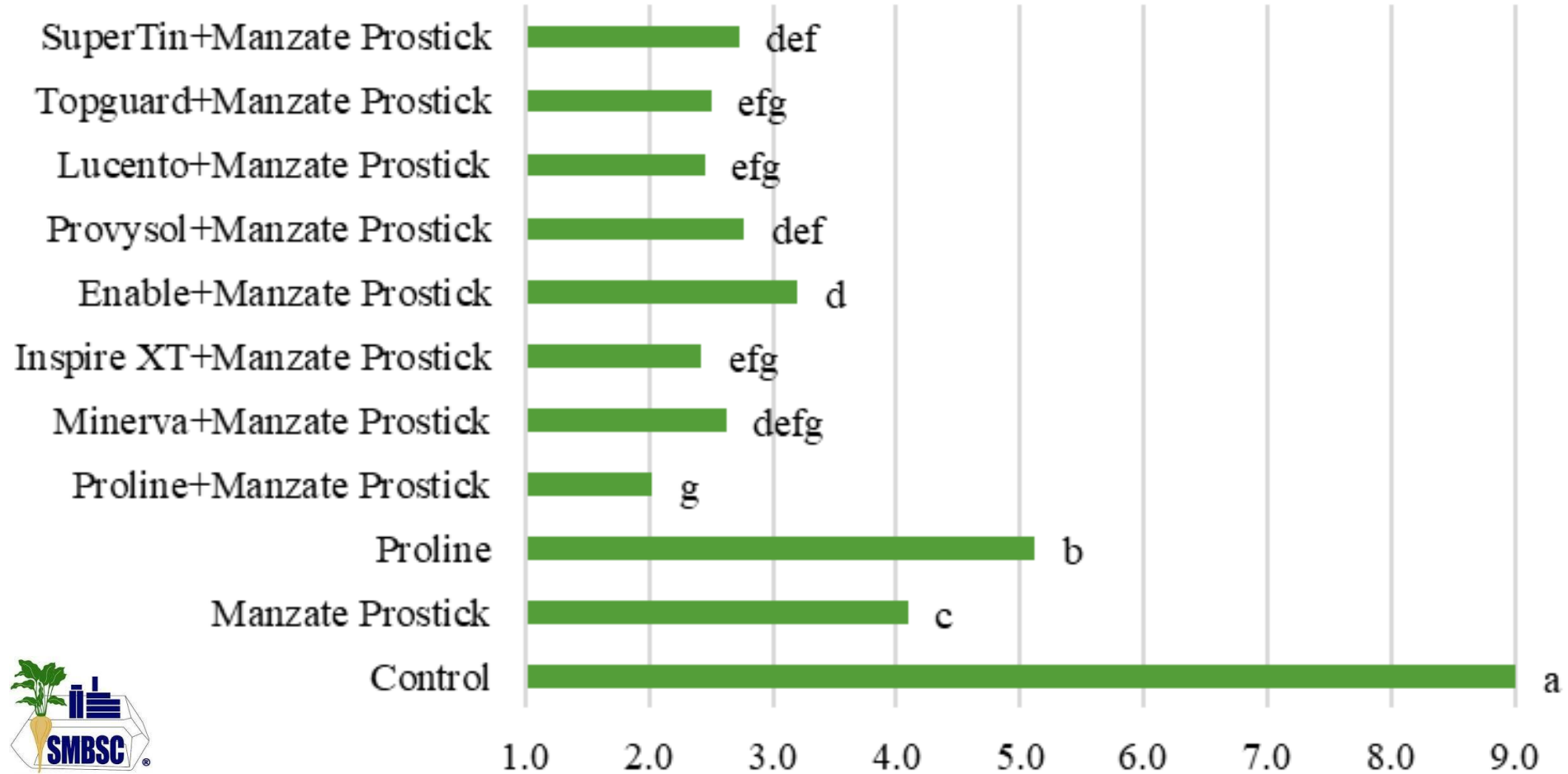


Recoverable Sugar per Acre



Trial data from Southern Minnesota
Beet Sugar Cooperative

Fungicide Screening Trial



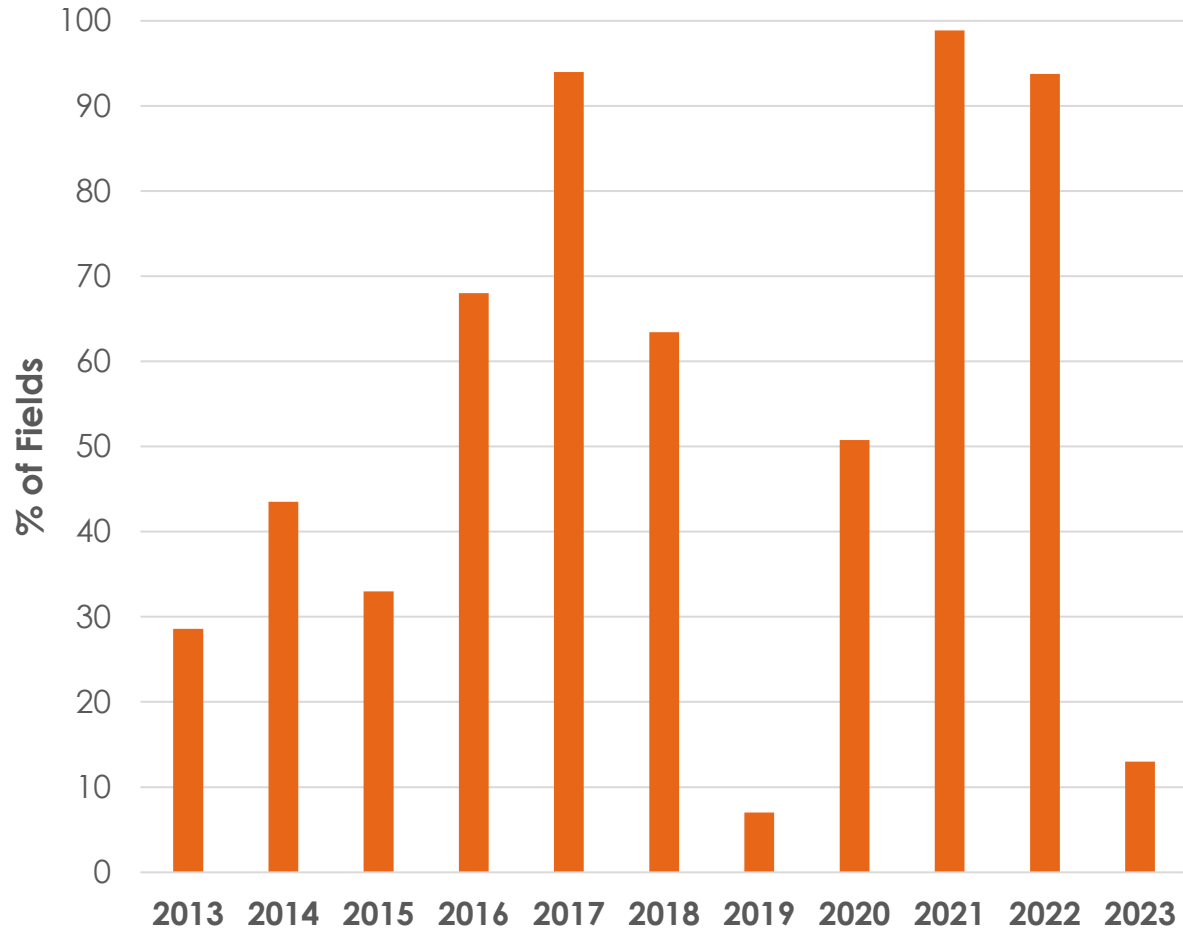
The CR+ trait is not immune to CLS.



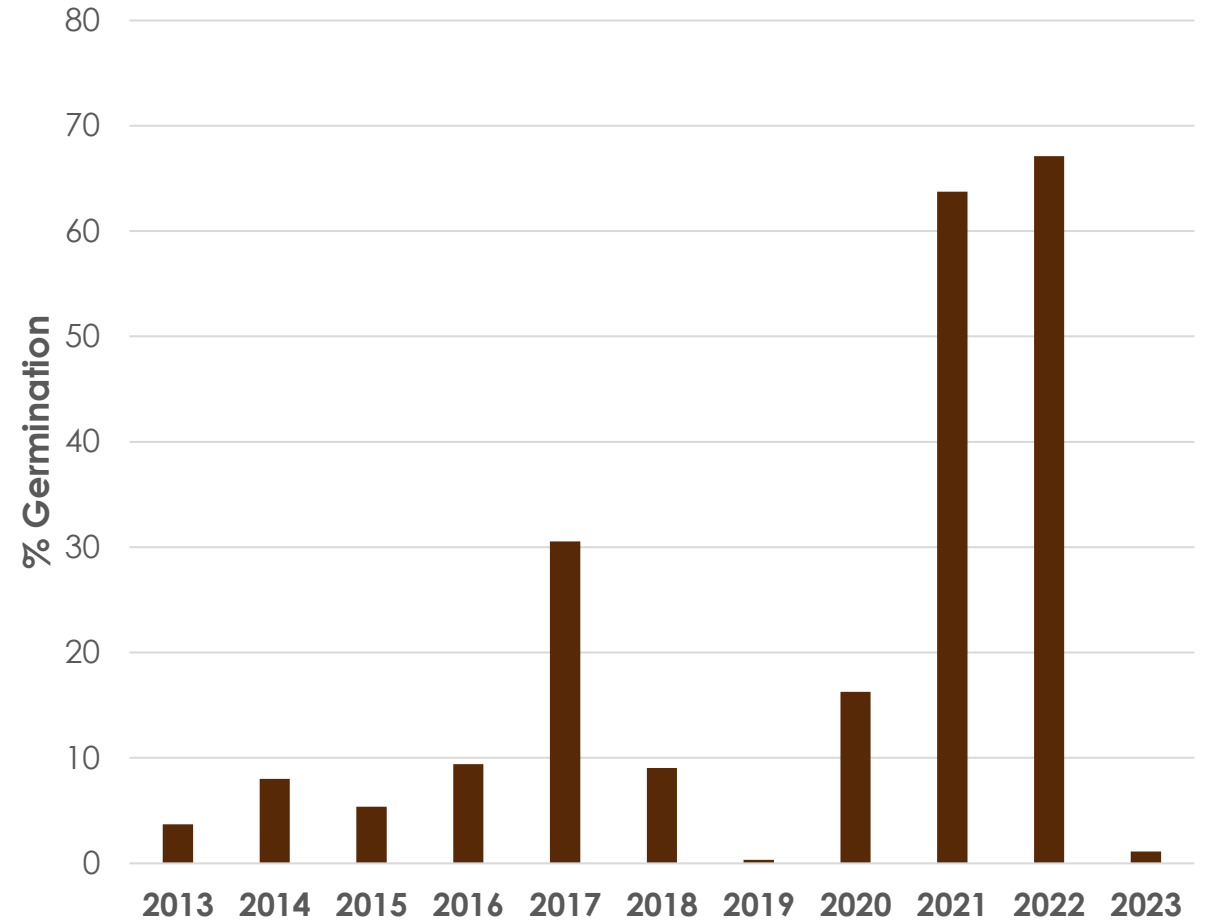
Tin Fungicide Resistance



Fields with CLS Spore Germination at 1 ppm Tin



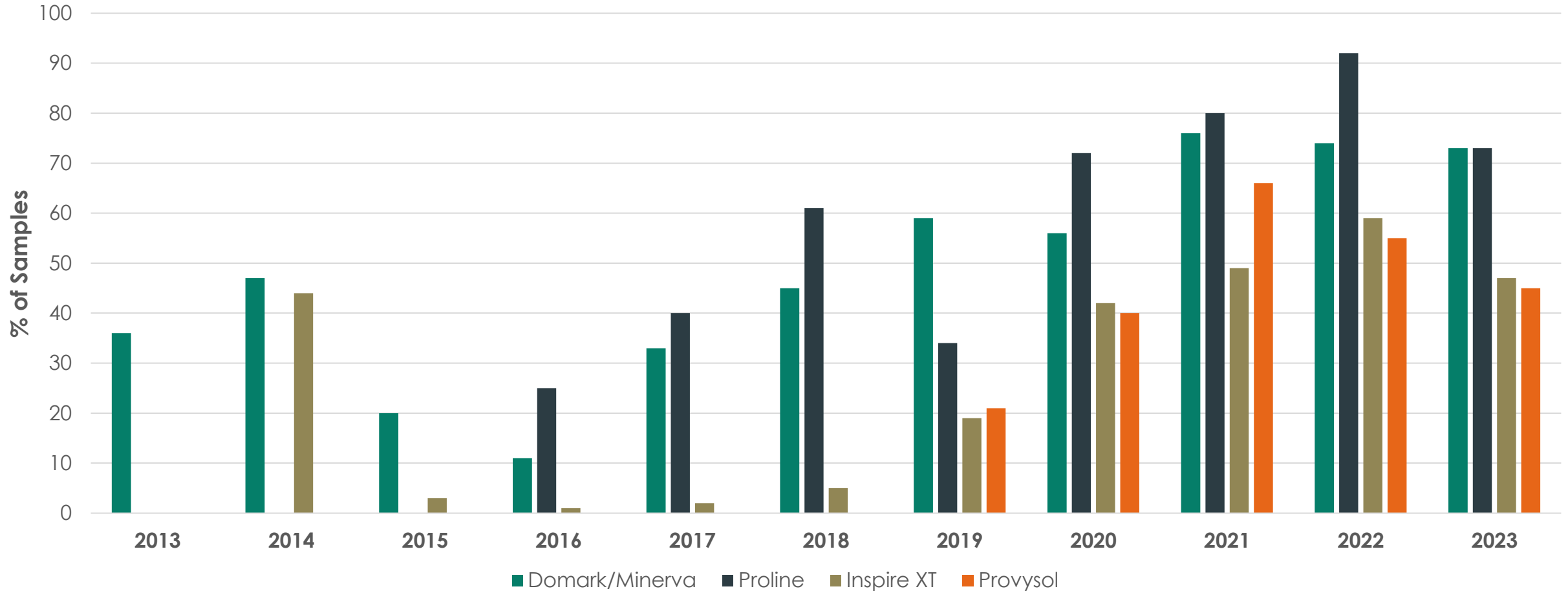
CLS Spore Germination at 1ppm Tin



Triazole Fungicide Resistance



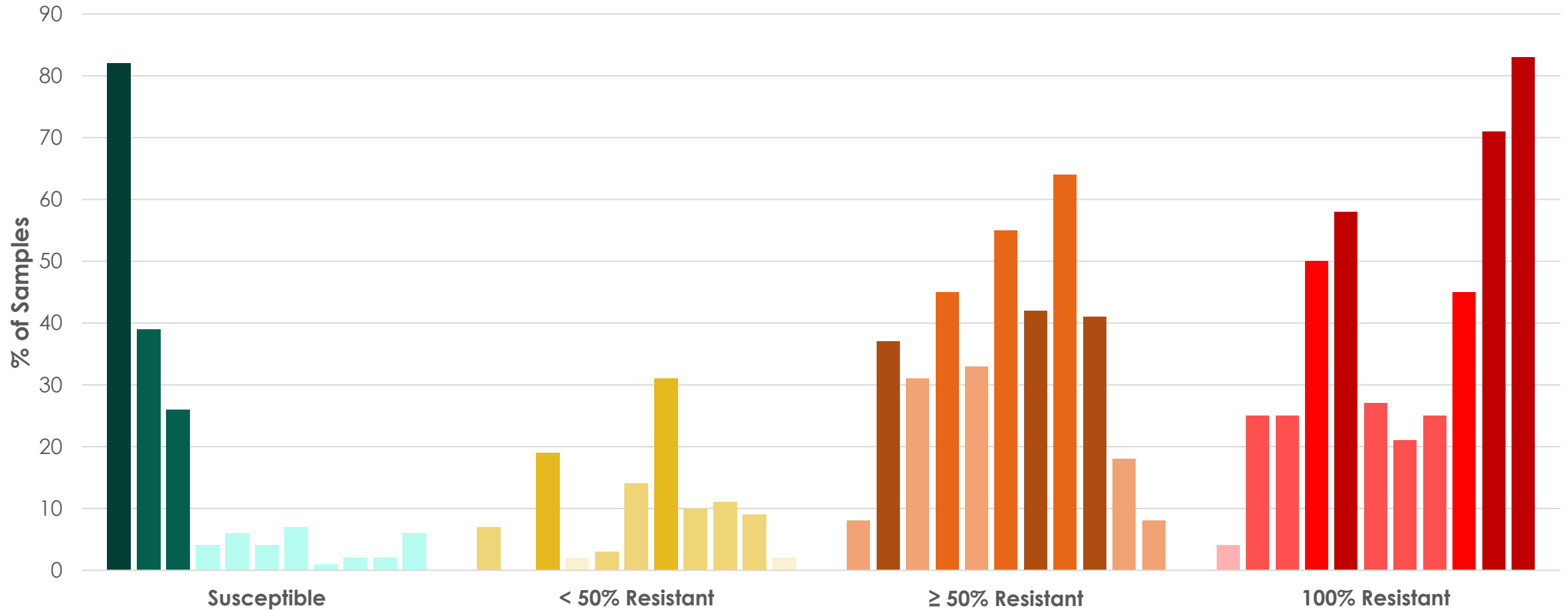
EC₅₀ > 10



QoI Fungicide Resistance



2013-2023



Alternaria (yellow) vs Cercospora (red)



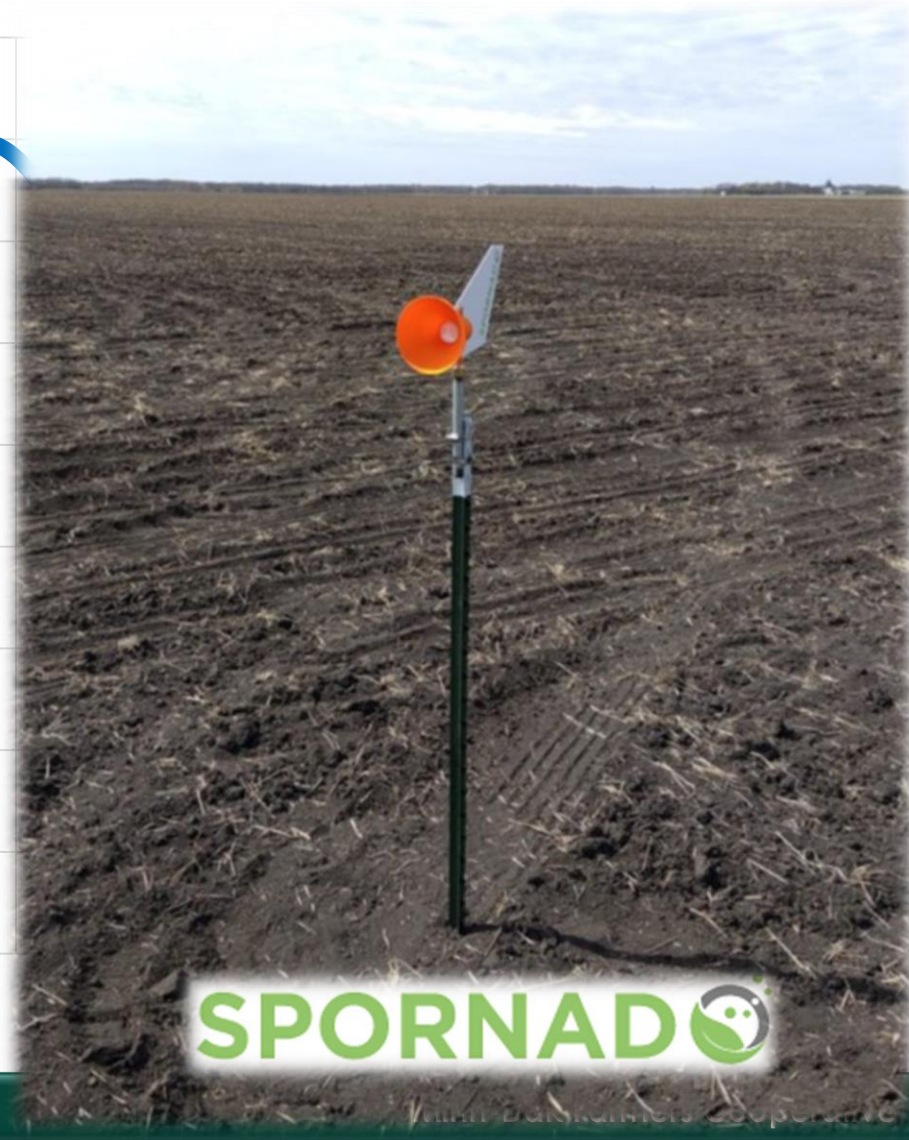
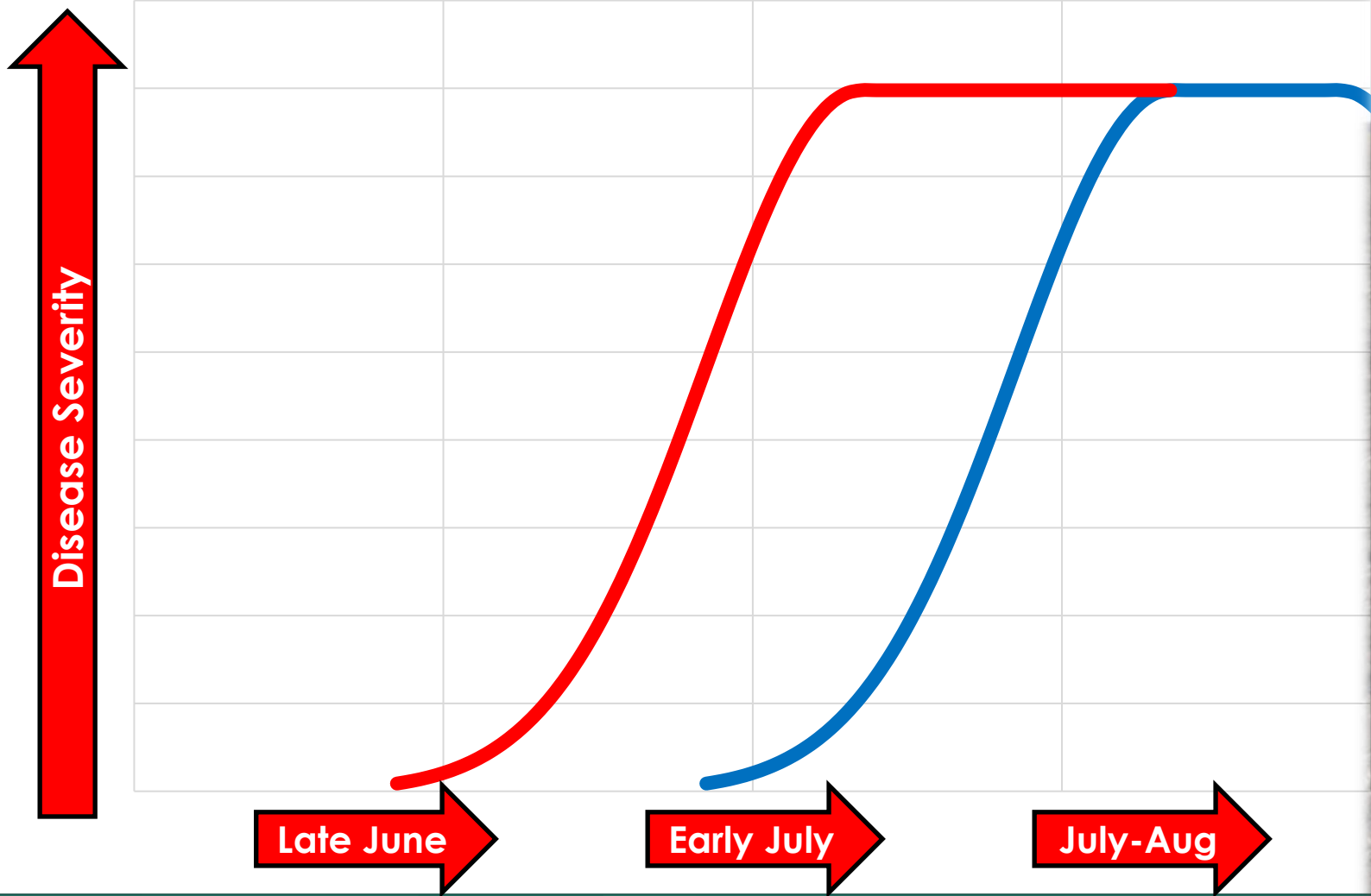
Photo Credit: Daniel Bublitz

What Can We Do To Protect This Technology?



CR+ Untreated ~ 9/6/2023

If you think it's too early to spray – you're right on time!!!



SPORNAD 

Cercospora Leaf Spot – 2024

- Inoculum level
 - Still present from 2021
 - Takes 2-3 years to really start seeing a depression
- ‘Herd Immunity’ is at full-force
 - CR+ is **NOT** immune to CLS – only an elevated tolerance
 - If we do not approach this genetic technology with stewardship, we won’t enjoy this technology for very long!
- Early Application **a MUST**
 - If you think that it is too early to be spraying, you’re going to be right on time!
- Coverage is key
 - Water is the cheapest thing that you put in the tank – don’t cut corners!

Cercospora Leaf Spot – 2024

- Topsin should not be utilized in your spray program
 - Topsin resistance was not monitored in 2023
 - 98% of the isolates with the resistance mutation in previous years
 - *Resistance does not go away*
- Tin and Triazole Resistance @ Manageable Levels
- **Full rates** – Always & No Exceptions
- **Stay on schedule** – Adjust for rainfall
- If using adjuvants, protectants only
- **Tank-mix, Tank-mix, Tank-mix**
 - No resistance ever reported to EBDC since registration in 1948

2024 MDFC Fungicide Program

For CR+ Varieties: *“One, two, skip a few...”*

1. Early EBDC
(10–12-day interval)
2. Triazole + EBDC
(20–24-day interval)
3. Tin + EBDC
(20–24-day interval)
4. Triazole+ EBDC

Remember to rotate the triazoles:

- *Proline or Domark or Minerva*
- *Inspire XT or Provysol*

Only use one product per group per season

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



2024 MDFC Fungicide Program

For Traditional Varieties:

1. Early EBDC
2. Triazole + EBDC
3. Tin + EBDC
4. Triazole + EBDC
5. Tin + EBDC
6. EBDC + Copper
7. Tin + EBDC

Remember to rotate the triazoles:

- *Proline or Domark or Minerva*
- *Inspire XT or Provysol*

Only use one product per group per season

*Keep fungicide applications to a **10–12-day spray interval**
(tighter if rain and/or DIVs require such)*