Sugar Beet Disease Management

Ashok K. Chanda
Associate Professor & Extension Sugarbeet Pathologist
College of Food, Agricultural and Natural Resources Sciences
Dept. of Plant Pathology, University of Minnesota, St. Paul, MN
Northwest Research & Outreach Center, Crookston, MN

achanda@umn.edu
218-281-8625
@BeetPath

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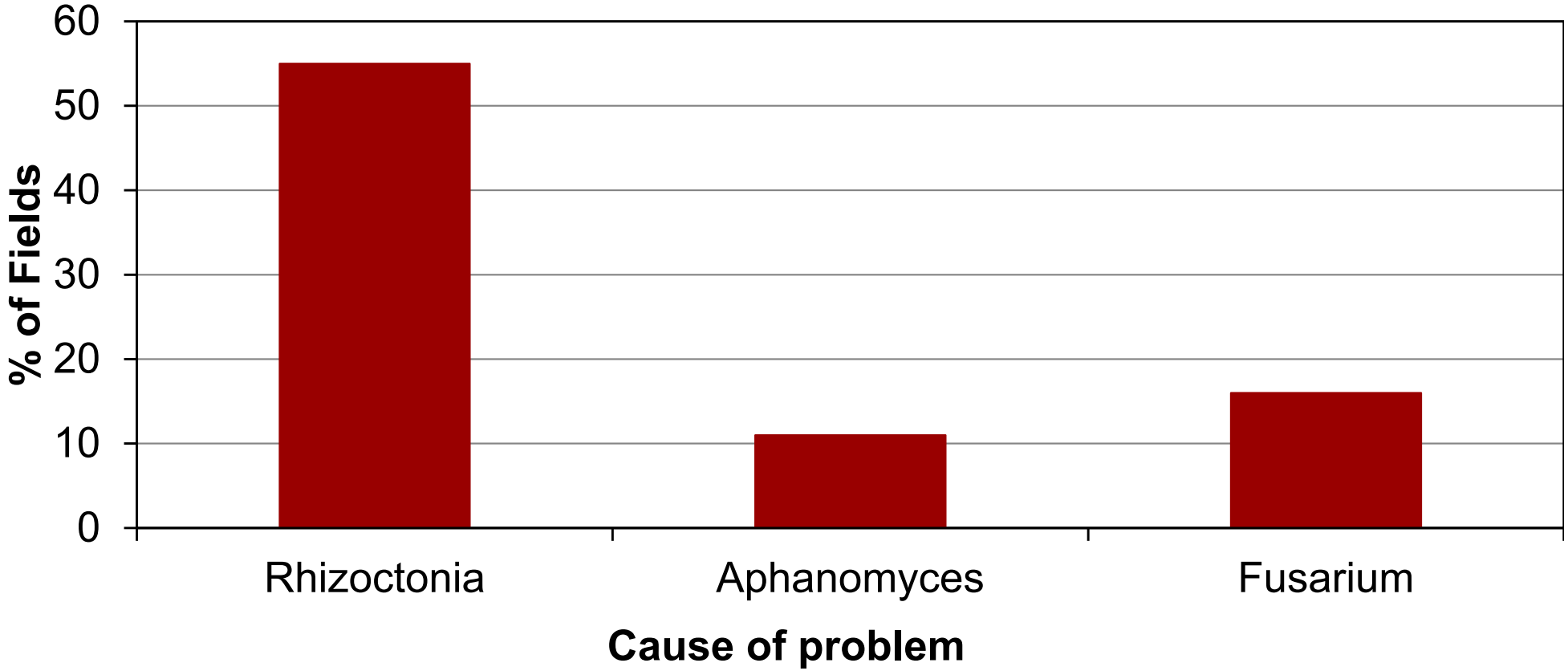
Summary of 2025 Root Sample Diagnosis



Sometimes diagnosis is very clear!

Rhizoctonia

Aphanomyces

Fusarium

Sometimes diagnosis is tricky!

Rhizoctonia + Aphanomyces

Please submit root and leaf samples for Diagnosis in 2026

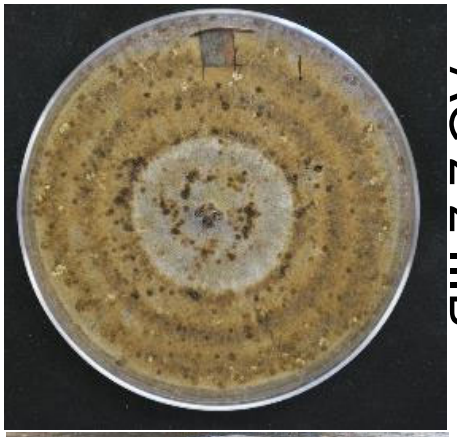
Key points about Sugarbeet Rhizoctonia

- *Rhizoctonia solani* – AG 2-2 (IIIB & IV), AG 4
  - AG 2-2 IIIB can grow at 35 C (more common in So. MN)
  - AG 2-2 IV (more common in the Red River Valley)
  - IIIB and IV are equally virulent in causing root rot
- Distribution in a field– random vs patchy
- Inoculum depth varies from field to field (low = 0-2 in., moderate 0-4 in. and severe 0-6 in.)
- Row cultivation can increase the risk for crown rot
- Can survive in soil as dormant sclerotia for 2-3 years

Rhizoctonia Damping-off

Rhizoctonia Crown and Root Rot

Rhizoctonia Crown and Root Rot



AG 2-2 IIIB

AG 2-2 IV

Management of Rhizoctonia

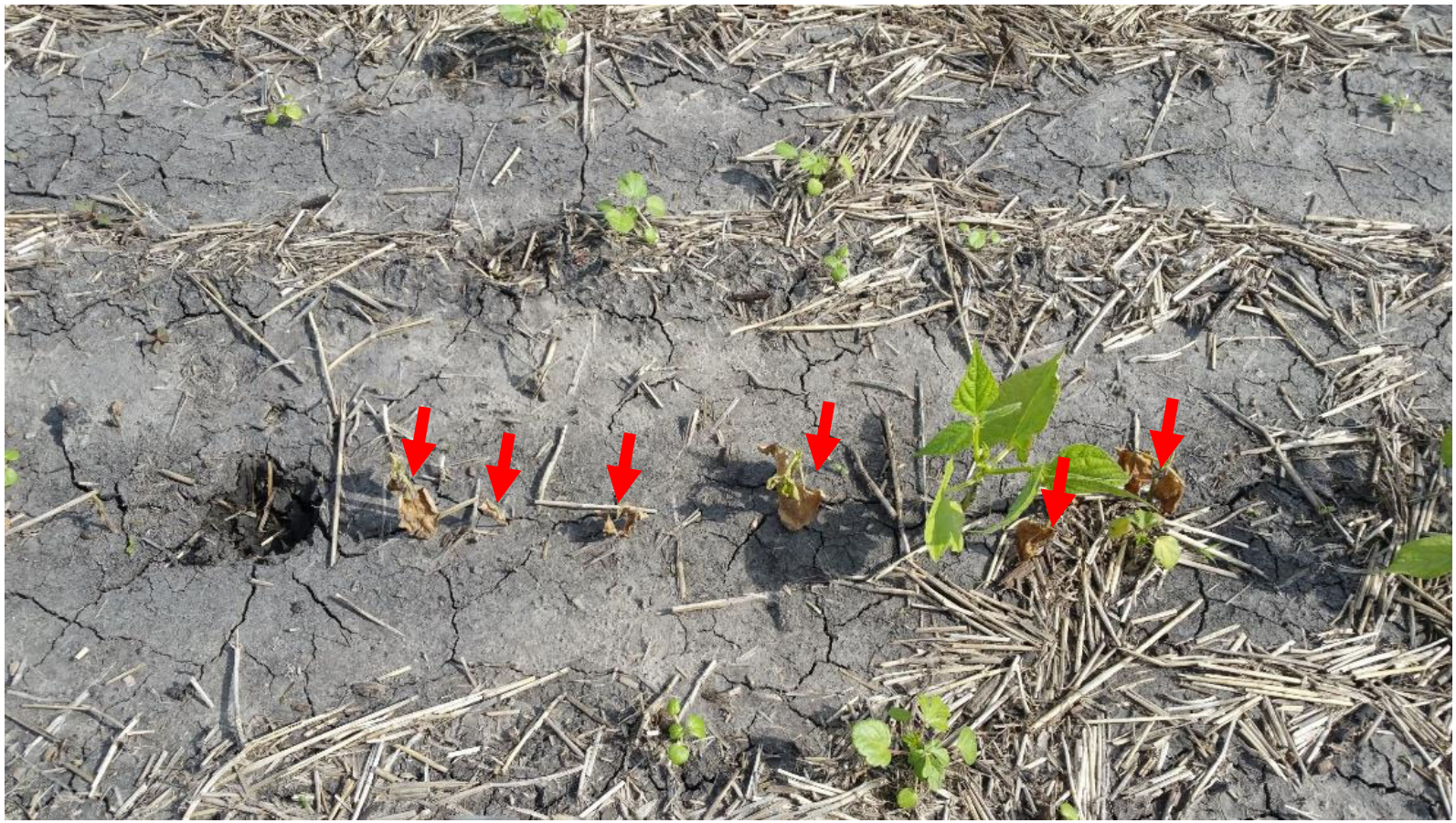
- Early planting
- Crop Rotation
  - Length (short = high risk, long = low risk)
  - Crop choice & weed control
    - Wheat or other small grains is preferred
    - Soybeans/edible beans/ corn increases risk

Soybeans

Pre-emergence

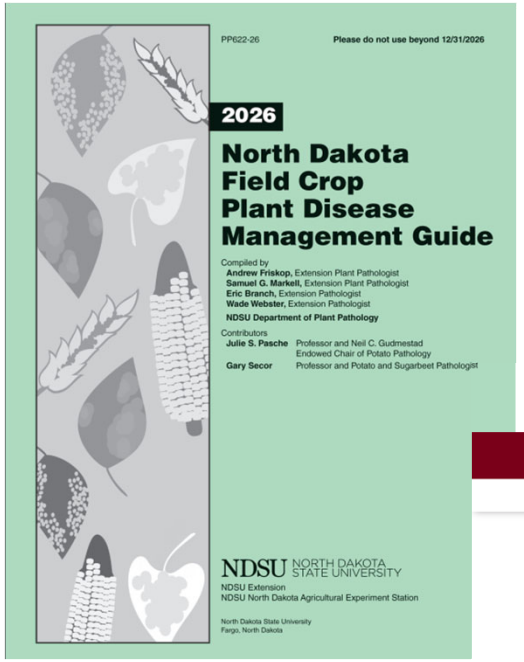
Post-emergence

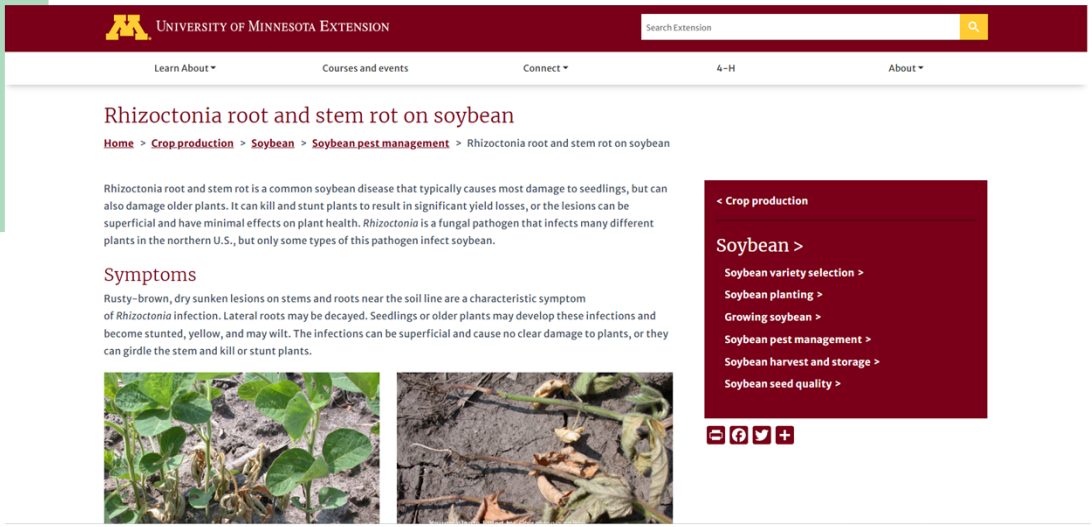
Navy beans



Manage in Rotation Crops

- Resistant varieties
- Seed treatments
  - Fluxapyroxad, Sedaxane, Rizolex
- In-furrow or postemergence fungicides
  - Azoxystrobin, Pyraclostrobin





Dean Malvick

dmalvick@umn.edu
+1 612 625 5282

Management of Rhizoctonia

- Crop Rotation
  - Length
  - Crop choice & weed control
- Early planting
- Resistant varieties
  - Genetic resistance does not express until 6 to 8 leaf stage

Rhizoctonia Specialty Variety Matters!

2026 Minn-Dak Seed Approval List

Fully Approved Varieties:

- ACH 166
- ACH 370 (CLS)
- Beta 7231 (CLS)
- HIL 2325

Test Market Varieties:

- ACH 417 (CLS, RHC, APH)
- ACH 472 (CLS, RHC, APH)
- ACH 489 (APH)
- Beta 7416 (RHC)
- Beta 7456 (CLS, RHC)

Specialty Varieties:

- ACH 290 (RHC)
- HIL 2547 (RHC)

Conditionally Approved Varieties:

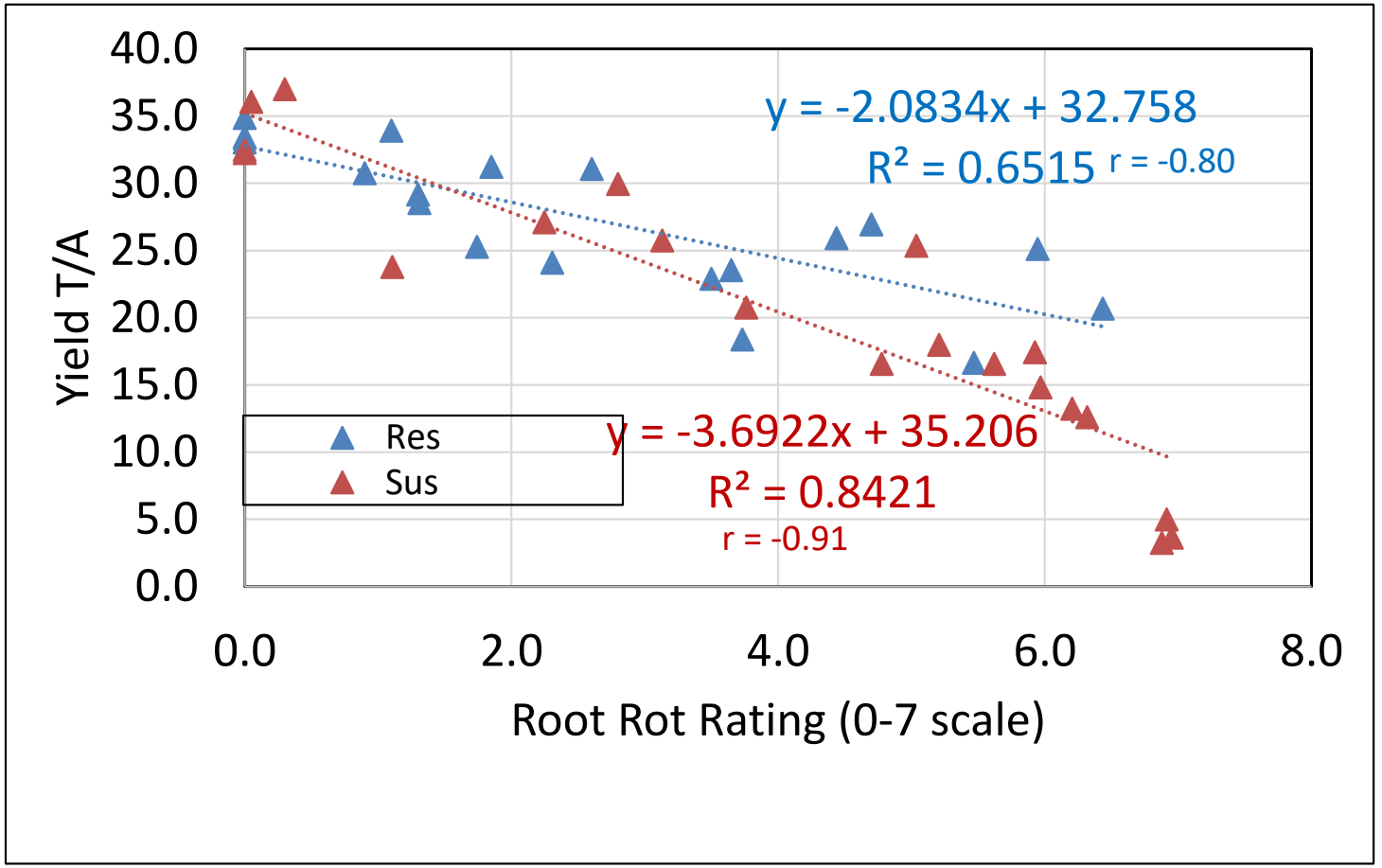
- None

Varieties That Did Not Make Approval But Are Still Available For Sale:

- Beta 7068
- Beta 7170

Rhizoctonia Specialty Variety Matters!

For each point increase in root rot severity by harvest:
Specialty Variety: lost ~ 2 tons/A
Susceptible Variety: lost ~ 3.7 tons/A

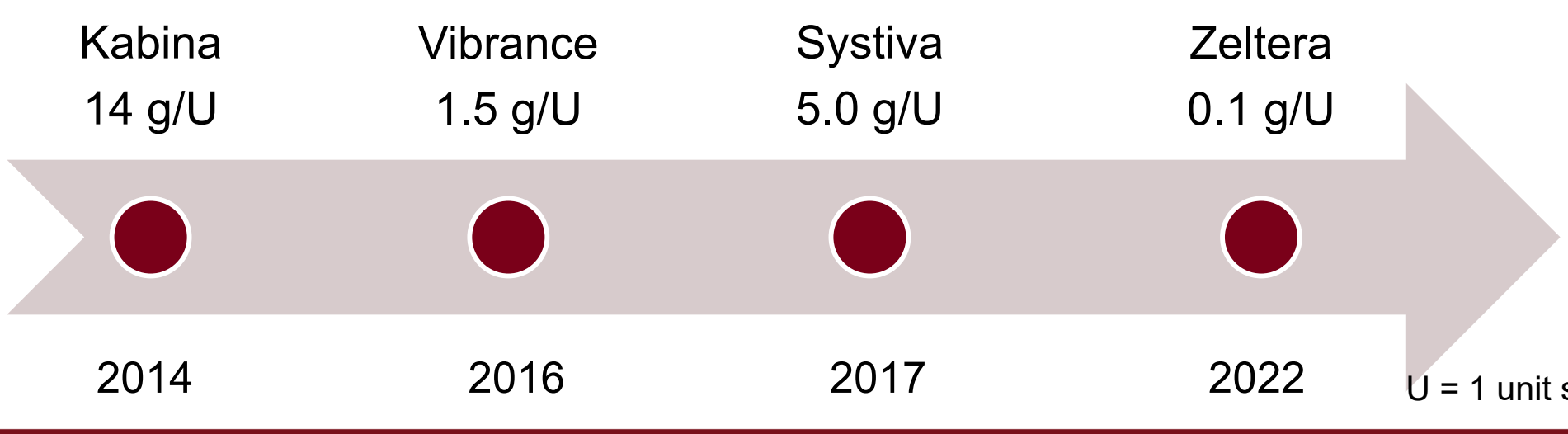


Management of Rhizoctonia

- Crop Rotation
  - Length
  - Crop choice & weed control
- Early planting
- Resistant varieties
- At-planting fungicides
  - Seed treatments
  - In-furrow fungicides

Seed Treatments

- SDHI class of fungicides (**S**uccinate **D**e**H**ydrogenase **I**nhibitor, FRAC group 7)
- Single site of action - Inhibit fungal respiration



In-furrow Fungicides

- Do a jar test for compatibility for mixing
- Agitation in the tank is important to avoid nozzle clogging

My Trials:

- Fungicide in 6 gal. water applied via drip tube (2025)
- Fungicide in 3 gal. water + 10-34-0 @ 3 gal. applied via drip tube (past years)

In-furrow Fungicides (rates per acre)

Conventional

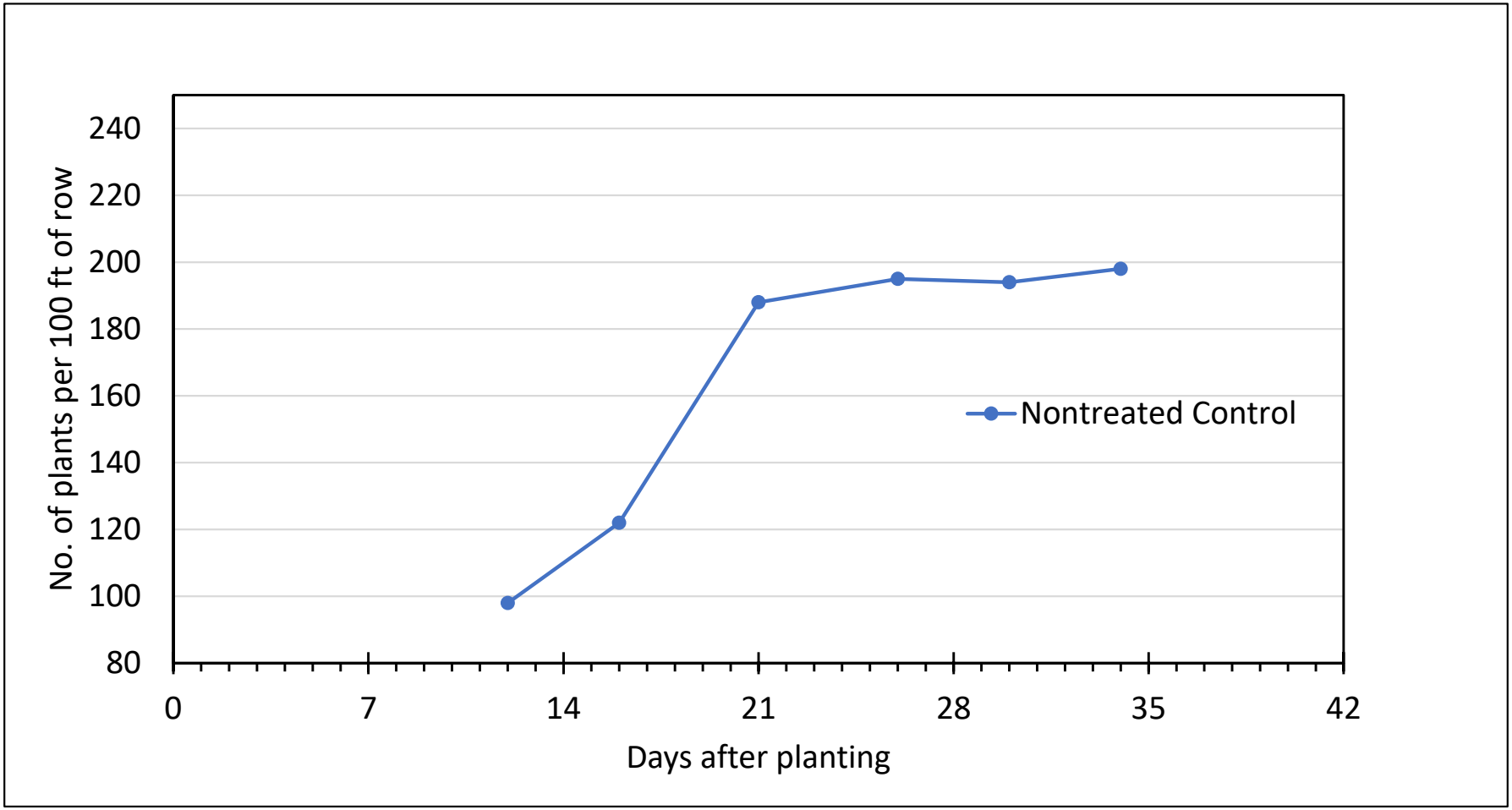
- Quadris 9.5 fl oz (QoI)
- AZteroid 5.7 fl oz (QoI)
- Elatus 7.1 fl oz (QoI + SDHI)
- Headline 9 fl oz (QoI)
- Proline 5.7 fl oz (DMI)
- Propulse 13.6 fl oz (DMI + SDHI)
- Priaxor 6.7 fl oz (QoI + SDHI)

Biologicals

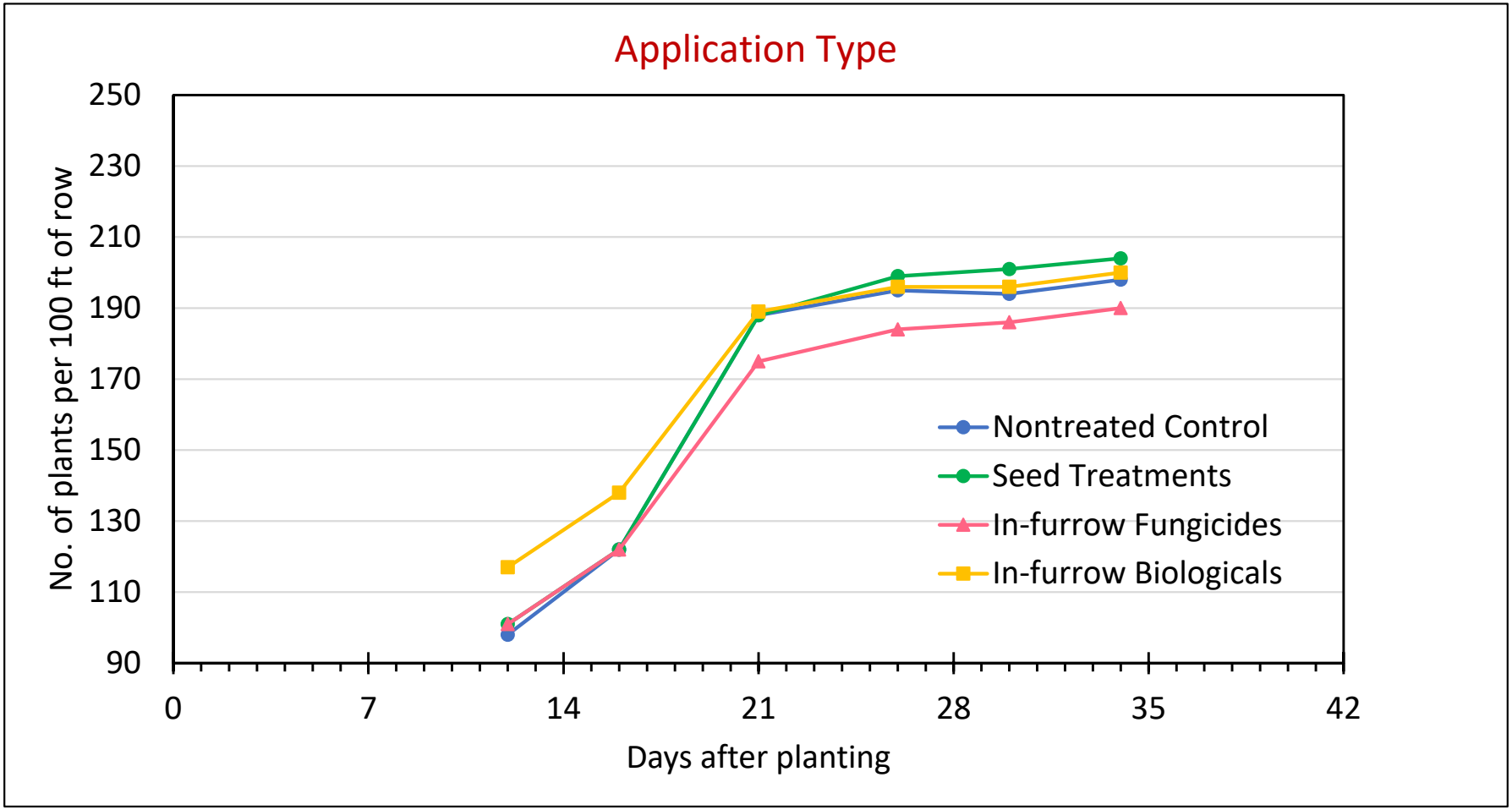
- Zironar (12 fl oz): *Bacillus licheniformis* FMCH001 + *B. subtilis* FMCH002
- Bexfond (14 fl oz): *B. amyloliquefaciens* subsp. *plantarum* FZB42
- Serenade ASO (128 fl oz): *B. subtilis* QST713
- Howler EVO (40 fl oz): *Pesudomonas chloroaphis* AFS009

Rhizoctonia inoculum

(Moderately Susceptible Variety 4.1)



(MS variety 4.1)



Root rot rating scale 0-10

0 1 2 3 4 5 6 7 8 9 10

1 = 1 – 10% rot, 10 = 91 – 100 % rot

At-planting treatments (2025)

Application Type	Root Rot Severity (%)	Sucrose (%)	Root yield (tons/A)	Extractable sucrose yield (lbs/A)
Nontreated	9.1 ab	17.28 ab	27.0	8554
Seed treatments	5.7 a	17.59 b	27.7	8971
In-Furrow Fungicides	6.5 a	17.19 a	27.5	8713
In-Furrow Biologicals	9.4 b	17.26 ab	27.9	8888
p-value	**0.0239**	**0.0193**	0.7629	0.4059

Management of Rhizoctonia

- Crop Rotation
  - Length
  - Crop choice & weed control
- Early planting
- Resistant varieties
- At-planting fungicides
  - Seed treatments
  - In-furrow fungicides
- Postemergence fungicides

Postemergence Fungicides (rates per acre)

Recommended
Timing: 4-8 leaf stage

- Quadris 10 & 14.5 fl oz (QoI)
- AZteroid 9.2 fl oz (QoI)
- AZterknot 16.6 fl oz (QoI + Knotweed extract)
- Elatus 7.1 fl oz (QoI + SDHI)
- Proline 5.7 fl oz. (DMI)
- Excalia 0.64 fl oz (band), 2.0 fl oz (broadcast) (SDHI)

Postemergence Fungicides

Treatment	Root Rot Severity (%)	Root Rot Incidence (%)	Root Yield (tons/A)	Extractable sucrose yield (lbs/A)
Nontreated Control	**22.1**	**51.3**	**25.9**	**7583**
Band vs Broadcast Contrast				
7- Band	2.0	11.3	28.0	8472
Broadcast	2.2	8.6	27.1	8110
	0.8650	0.3911	0.2522	0.1090

Gain of 527- 889 lbs RSA over nontreated control

Both methods were equally effective

Fungicide Options for Rhizoctonia

Seed Treatment			In-Furrow			POST		
Kabina			Headline			Quadris		
Systiva			Quadris			Elatus		
Vibrance			Elatus			AZteroid		
Zeltera			AZteroid			Excalia		
			Proline			Topguard EQ		
			Propulse			Proline		
						Propulse		
						Priaxor		

Mode of Action

SDHI	QoI	DMI

Rhizoctonia Management

- Specialty varieties
  - can underperform under severe Rhizoctonia pressure
- Seed treatments - excellent early-season protection
- In-furrow conventional fungicides - excellent early- to mid-season protection
- In-furrow biologicals- Need more field trials in the future
- Postemergence fungicides - mid- to late-season protection
  - No differences between 7-in. band or broadcast
  - 4-leaf (high risk fields) to 8-leaf stage (moderate risk)
- Best Practices
  - Seed treatment + POST (4- to 8-leaf stage) – most fields
  - Seed treatment + in-furrow (make sure they mix well with the starter fertilizers) + POST – may be needed for fields with severe history

Aphanomyces can be a full-season pathogen

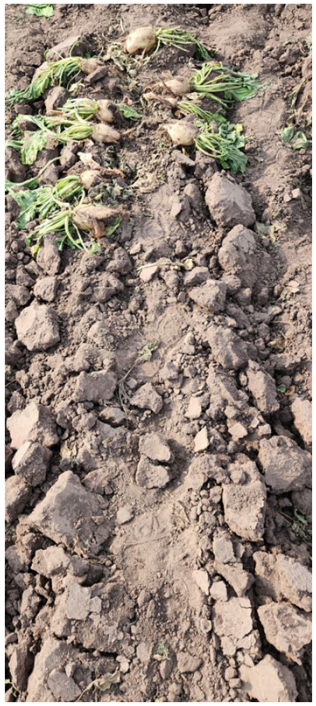
Aphanomyces damping-off

Aphanomyces root rot

Management of Aphanomyces

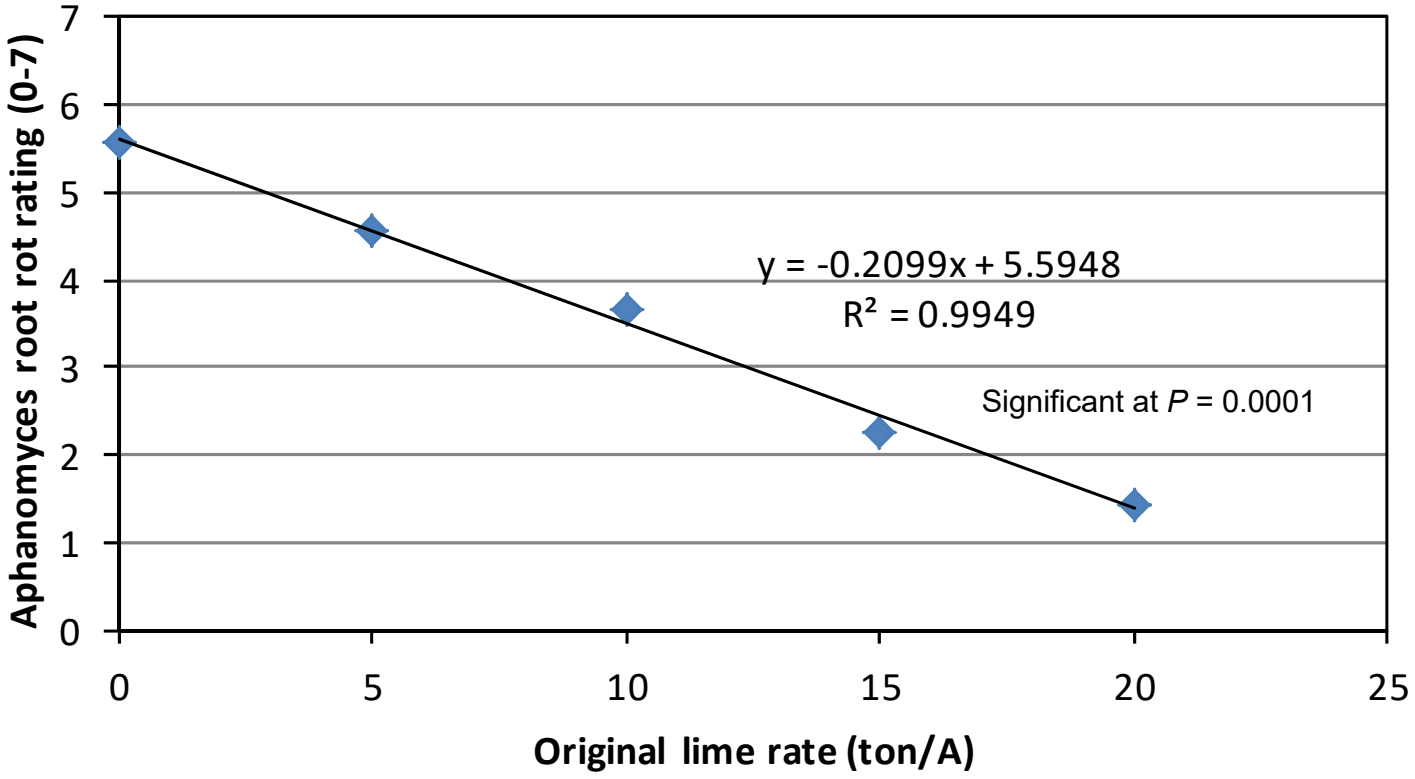
- Early planting
- Seed treatments
  - Tachigaren
  - Intego Solo
- Resistant varieties

Resistant

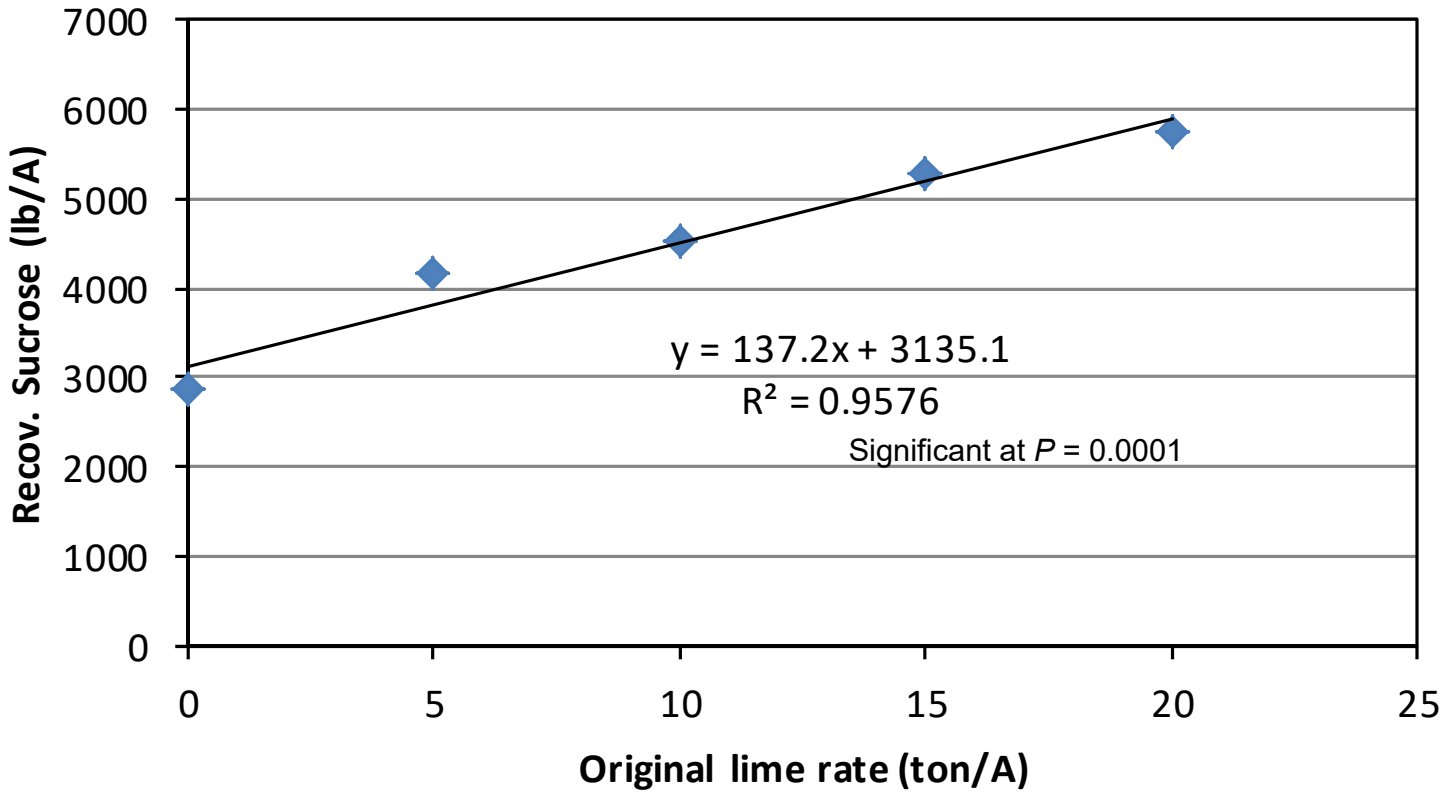


Susceptible

Waste lime reduced Aphanomyces (12 years after application)

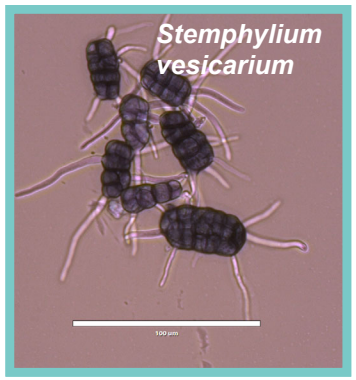


Waste lime improved sugar yield (12 years after application)



Alternaria and *Stemphylium*

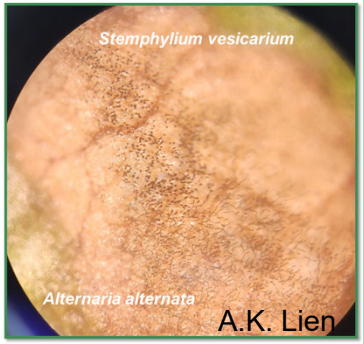
- Primarily saprophytes and opportunistic pathogens
- *Alternaria spp.* became a more serious issue in Michigan during 2015-2019
- *Stemphylium* spp. reported in Netherlands, Michigan, and Minnesota in recent years



Alternaria Leaf Spot (ALS)

A. alternata

Stemphylium Leaf Spot (SLS)

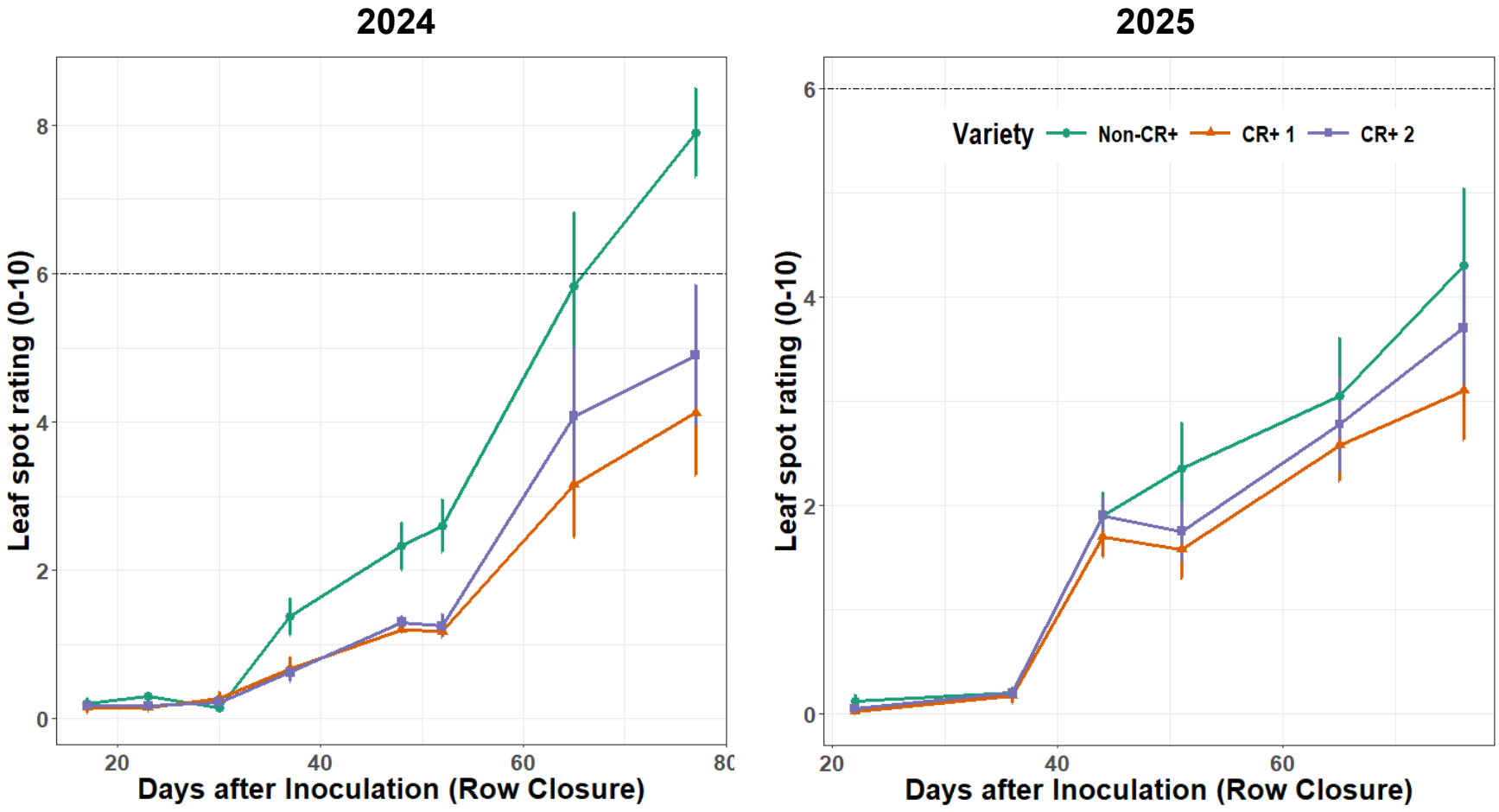


Field Trials (2024 & 2025)

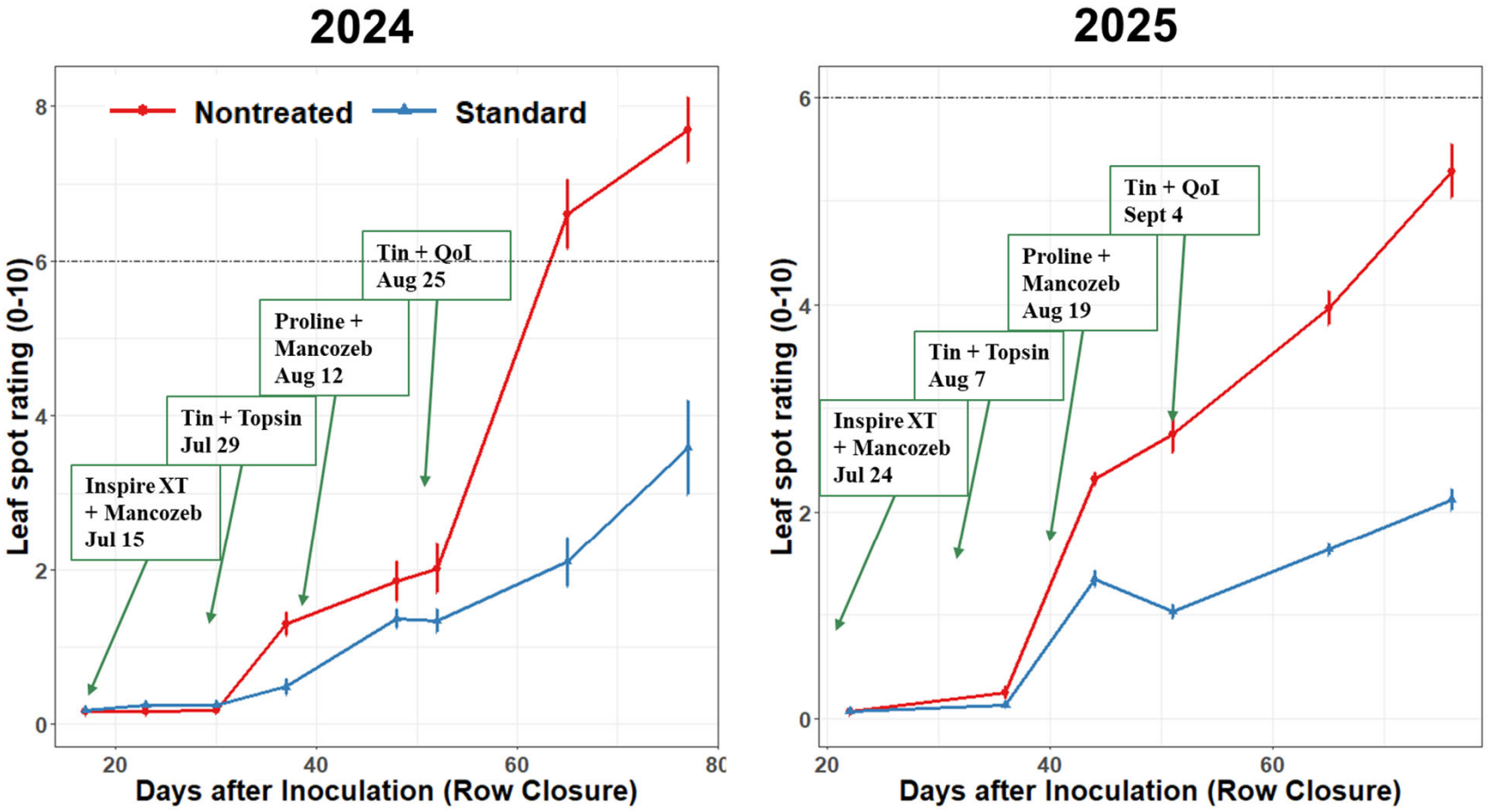
Objectives:

- Are CR+ varieties more susceptible to ALS and SLS than non-CR+ varieties?
- Does a standard CLS fungicide program control ALS and SLS?

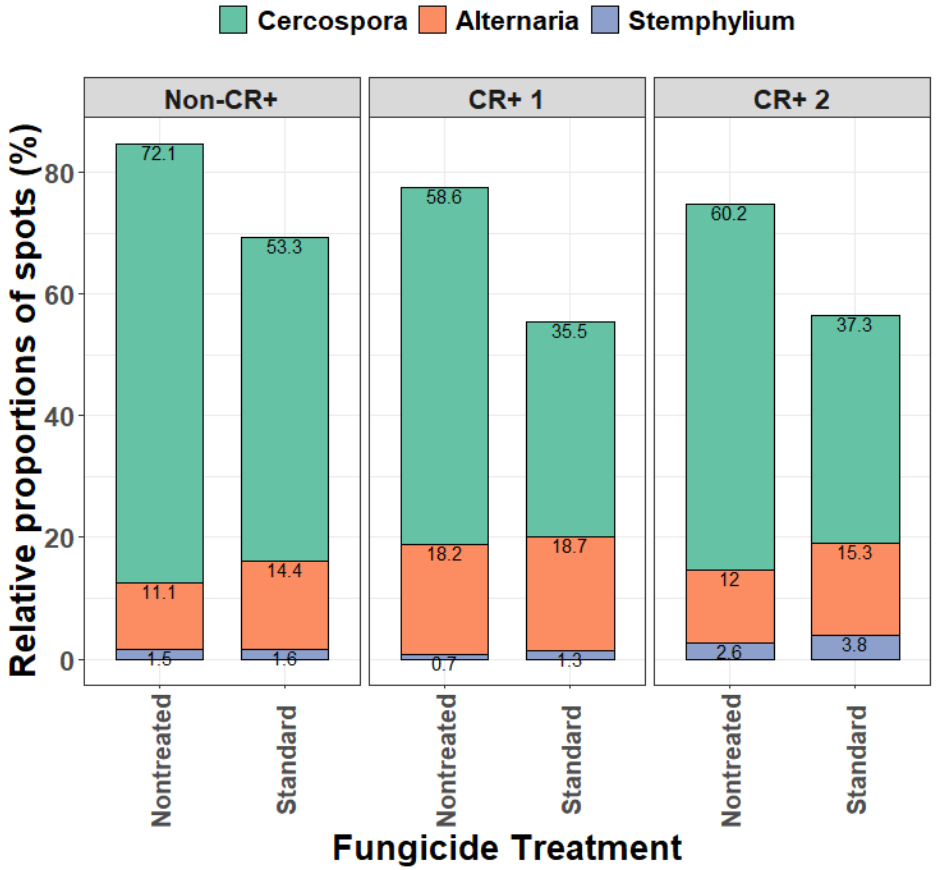
Disease Progress by Variety



Disease Progress by Treatment



Proportion of Spots: Full Season



Summary – Emerging Leaf Diseases

- CLS was predominantly present in both years
- CR+ varieties had lower CLS development
- Alternaria LS was higher in one CR+ variety and Stemphylium LS was higher in another CR+ variety
- Fungicide program effectively controlled CLS
  - Alternaria and Stemphylium are known to be strong saprophytes – can co-colonize CLS lesions

Acknowledgements

- **Sugarbeet Research and Education Board of Minnesota and North Dakota**
- NWROC core research support team
- American Crystal Sugar Company
- Al Farahmand, Germains Seed Technology
- Seed, chemical, and allied industries
- American Crystal Sugar Company quality labs – East Grand Forks and Moorhead
- U of M, NWROC facilities

Thank You!

Sugarbeet Pathology Team

Questions?

achanda@umn.edu

@BeetPath