Keeping Spuds Safe in the Soil

Fusarium Dry Rot and Rhizoctonia Control

Jeff Miller and Trent Taysom

Impact of anastomosis groups on Rhizoctonia canker management

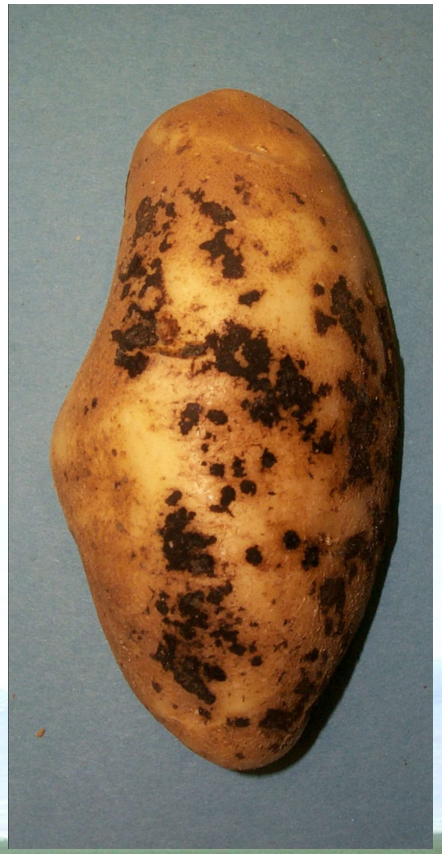
Trent Taysom, Jeff Miller, and James Woodhall

Miller Research

Welcome To The Northwest Potato Research Consortium

University of Idaho

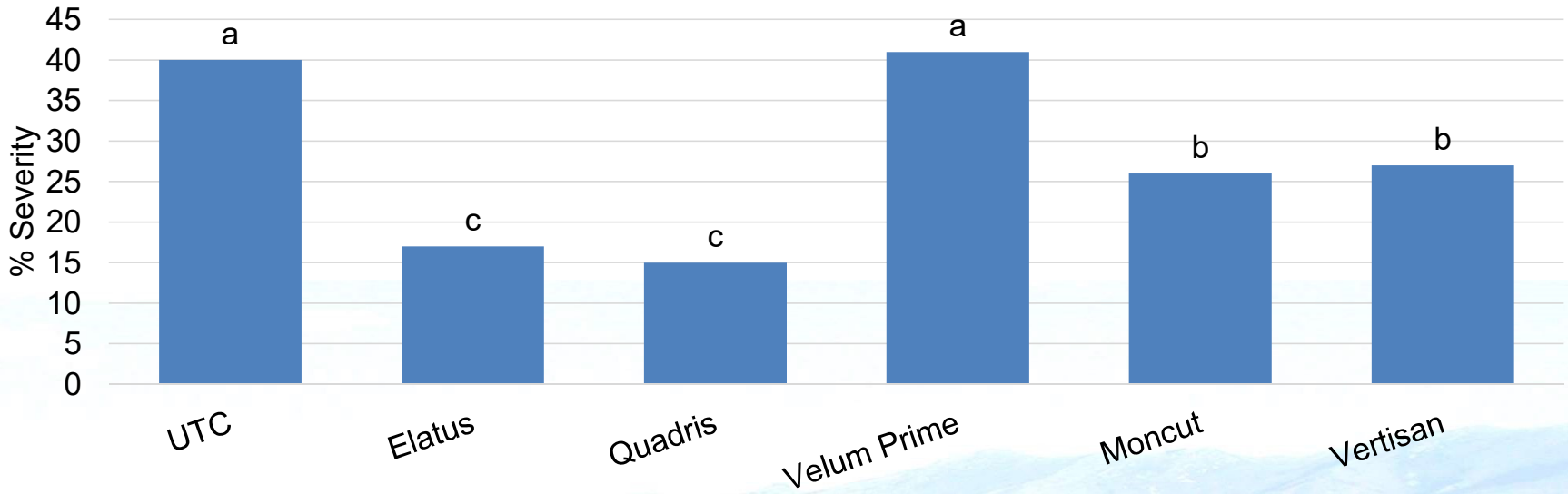
Rhizoctonia Canker and Black Scurf



Selected Fungicide Options - Rhizoctonia

Product	Form	M3	Group 12	Group 3	Group 7	Group 11
Maxim MZ	Dust ST	Mancozeb	Fludioxonil			
Maxim, Spirato, STartUP FLUDI	Liquid ST		Fludioxonil			
CruiserMaxx Potato	Liquid ST		Fludioxonil			
Moncoat MZ	Dust ST	Mancozeb			Flutolanil	
CruiserMaxx Potato Extreme	Liquid ST		Fludioxonil	Difenoconazole		
CruiserMaxx Potato Vibrance	Liquid ST		Fludioxonil	Difenoconazole	Sedaxane	
Emesto Silver	Liquid ST			Prothioconazole	Penflufen	
Salient	Liquid ST			Difenoconazole		
Quadris, AZteroid, others	IF					Azoxystrobin
Moncut	IF				Flutolanil	
Elatus	IF				Benzovindiflupyr	Azoxystrobin
Priaxor	IF				Fluxapyroxad	Pyraclostrobin
Vertisan	IF				Penthiopyrad	

In-Furrow Fungicides for Rhizoctonia Control



Not all Rhizoctonia is the same

	Anastomosis Group							
	3-PT	**2-2IIIB**	**4HG-I**	**4HG-III**	**5**	**A**	**R**	**Total**
Black scurf	40	1	0	0	1	3	2	47
Stem canker	1	5	2	2	0	0	0	10
Stolon canker	0	0	1	0	0	0	0	1
Elephant hide	25	1	0	0	0	9	1	36
Growth crack and elephant hide	10	0	0	0	0	1	0	11
Potato rhizosphere soil	2	1	0	0	0	0	0	3
Corky spots	0	0	0	1	0	3	0	4
Total	97	8	3	3	1	16	3	131

Muzhinji et al., 2015, Plant Dis. 99:1790-1802

Goal, Hypothesis, and Objective

- Our goal is to determine the most effect IF fungicides to manage Rhizoctonia in potato.
- Test if different AG require different fungicides
- Hypothesis: AGs of *R. solani* differ in the type and severity of disease symptoms and control

Experimental Design

- Split-plot design, 4 reps, cv. Russet Burbank
- Main plot = Rhizoctonia AG
  - AG2-1
  - AG3-PT
  - AG4 HGII
- Sub-plot = In-furrow fungicide
  1. Non-treated check
  2. Elatus, 7.7 oz/acre
  3. Quadris, 9 fl oz/acre
  4. Moncut, 25 fl oz/acre

1	3	Non	4
2	4	2	3
3	1	1	2
4	2	4	1
1	Non	3	4
2	3	2	3
3	4	1	2
4	1	4	1
Non	2	3	4
1	3	2	3
2	4	1	2
3	1	4	1
4	2	3	Non

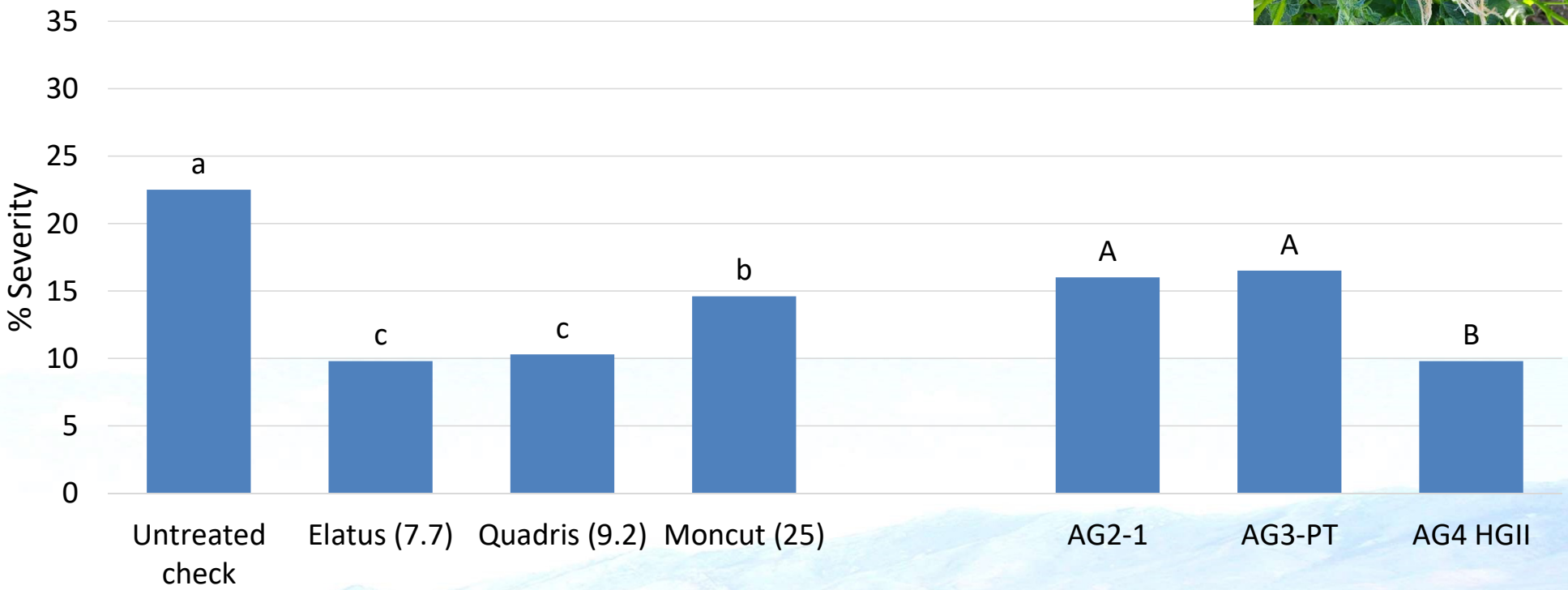
Inoculation and Treatment

Evaluations

- Stem and stolon canker
  - Late June
  - Mid-July
  - 10 plants/plot
- Tuber black scurf
  - 25 tubers/plot
- Confirmation of AG at Parma

Rhizoctonia Stem and Stolon Canker

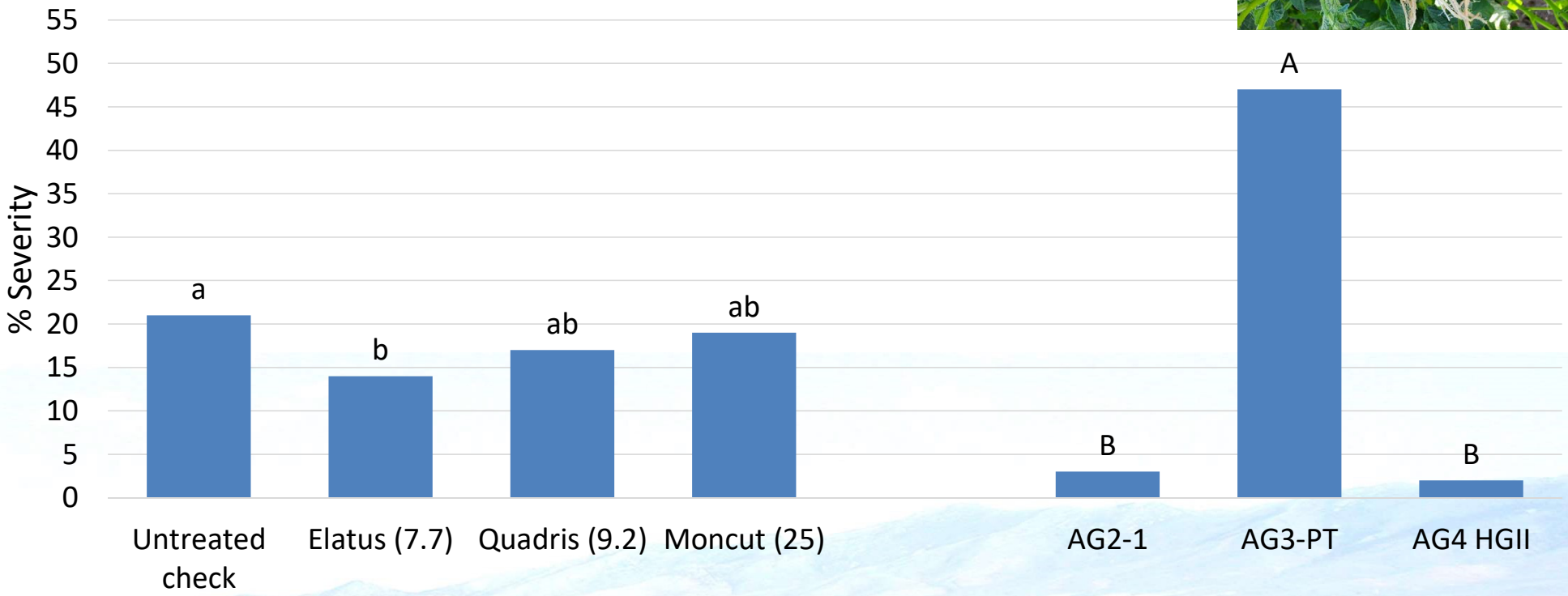
June 17, 2021



The interaction between AG and fungicide was not significant.

Rhizoctonia Stem and Stolon Canker

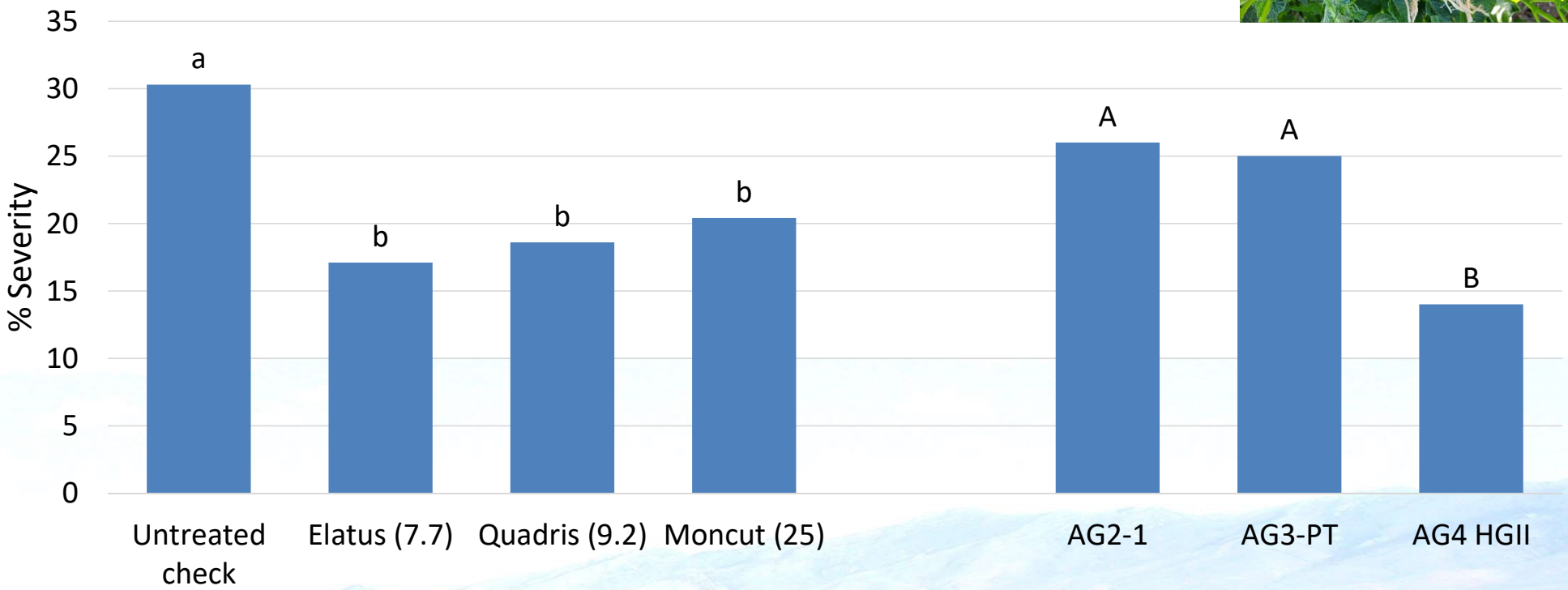
June 29, 2022



The interaction between AG and fungicide was not significant in 2021 but was in 2023.

Rhizoctonia Stem and Stolon Canker

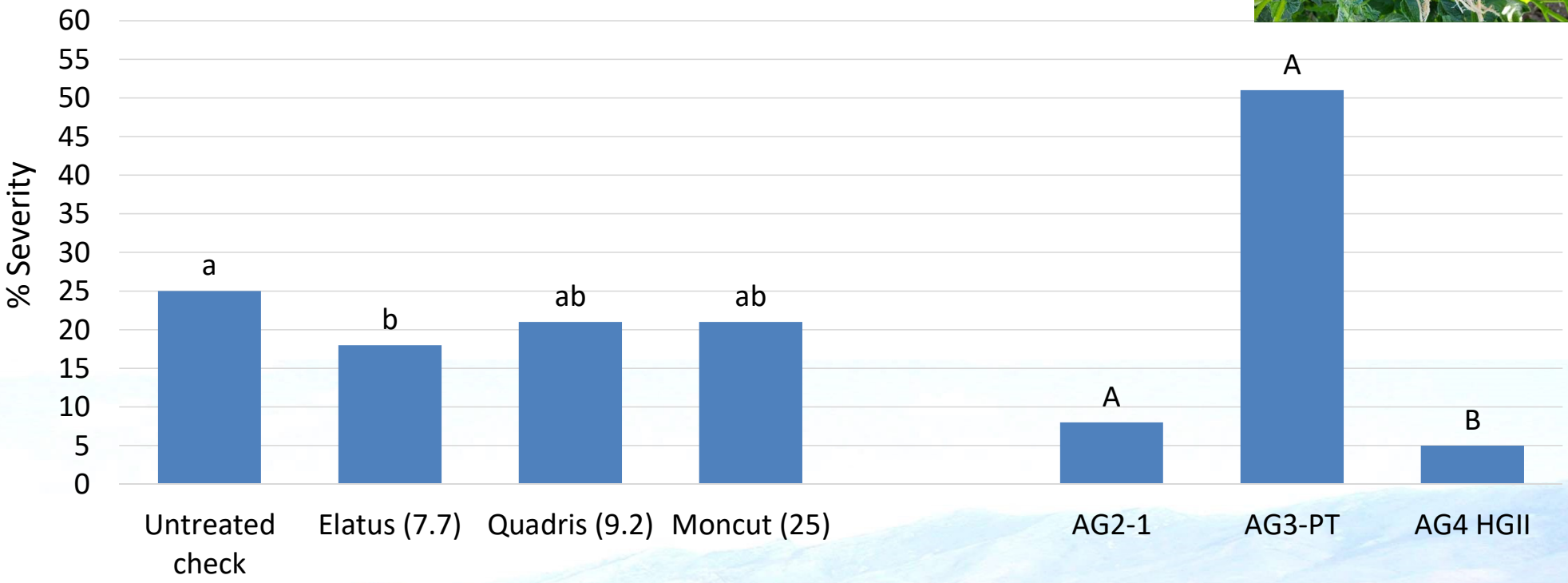
July 14, 2021



The interaction between AG and fungicide was not significant.

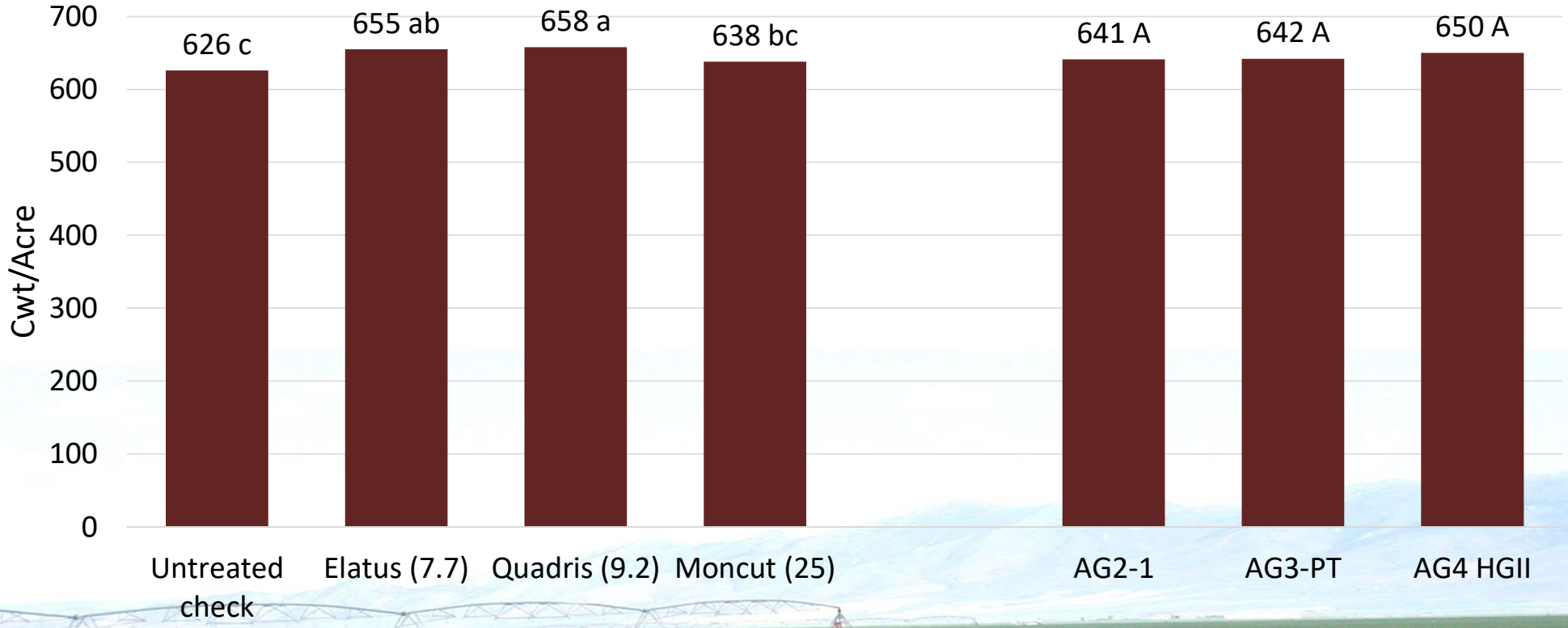
Rhizoctonia Stem and Stolon Canker

July 28, 2022



The interaction between AG and fungicide was not significant.

Total Tuber Yield, Cwt/Acre 2021



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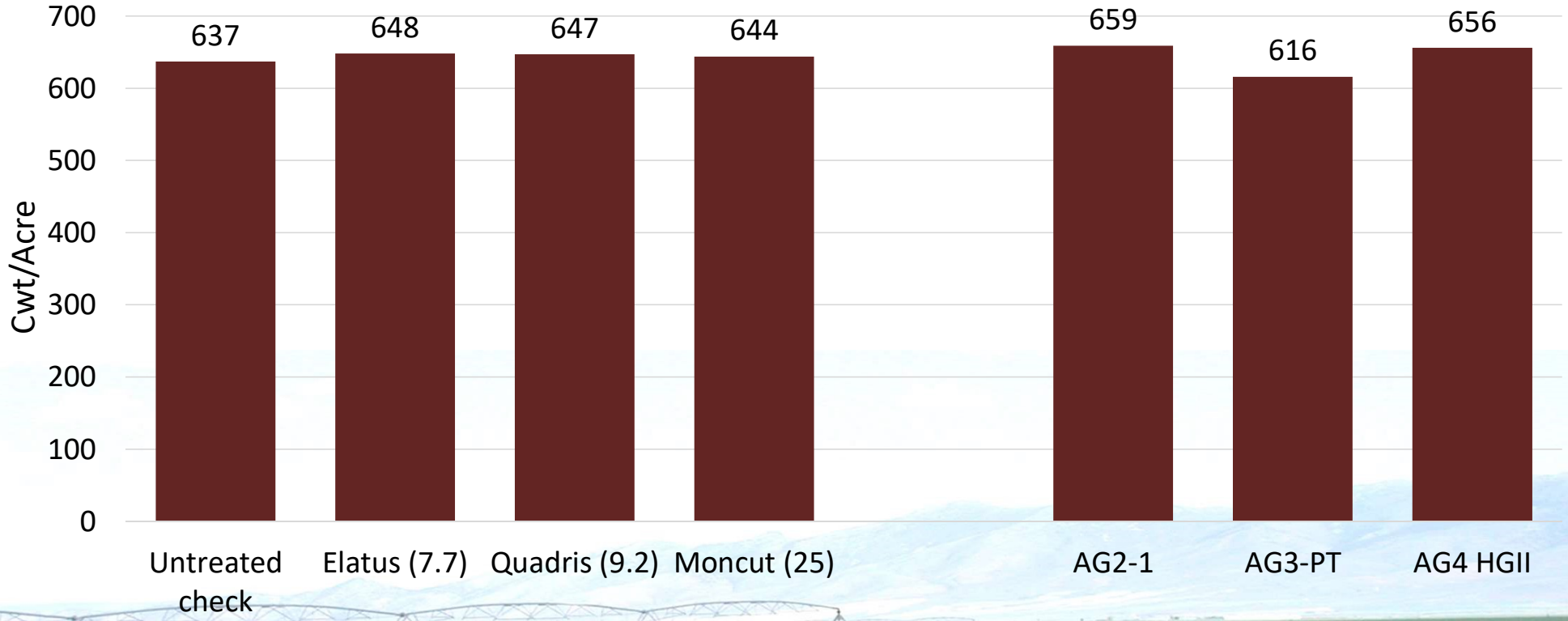
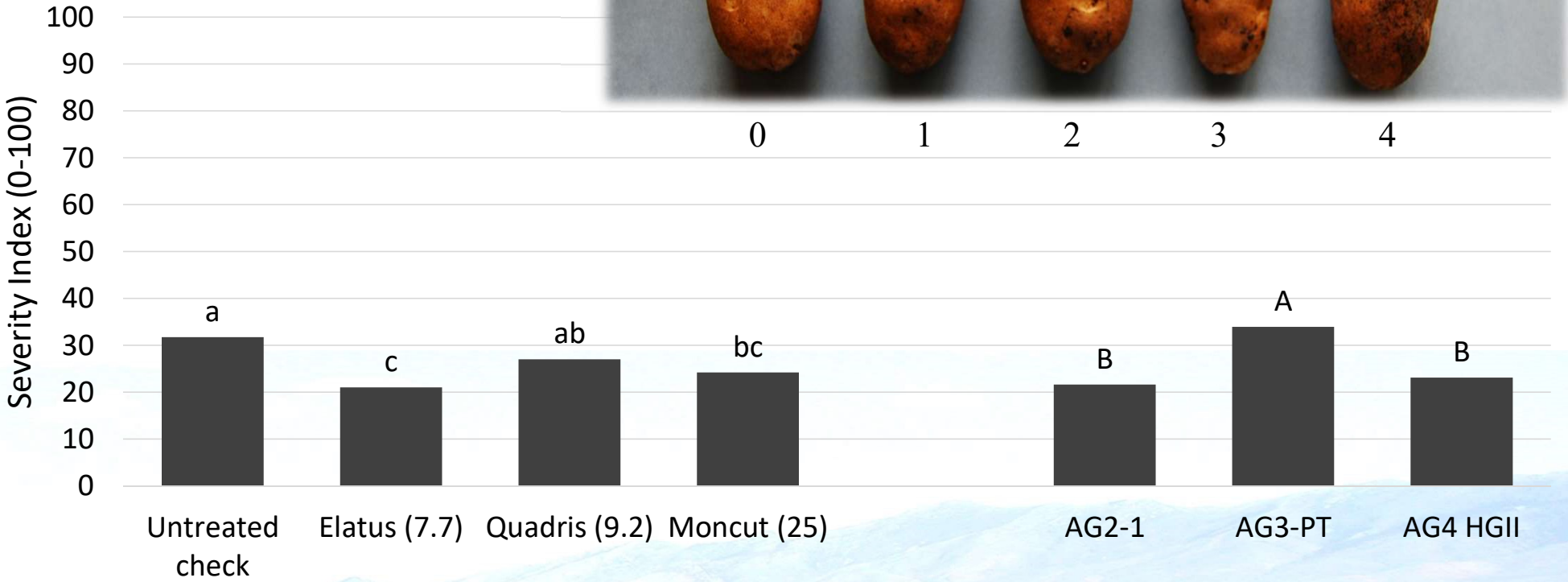
Total Tuber Yield, Cwt/Acre 2022



The interaction between AG and fungicide was not significant.

Tuber Black Scurf

Post Harvest 2021



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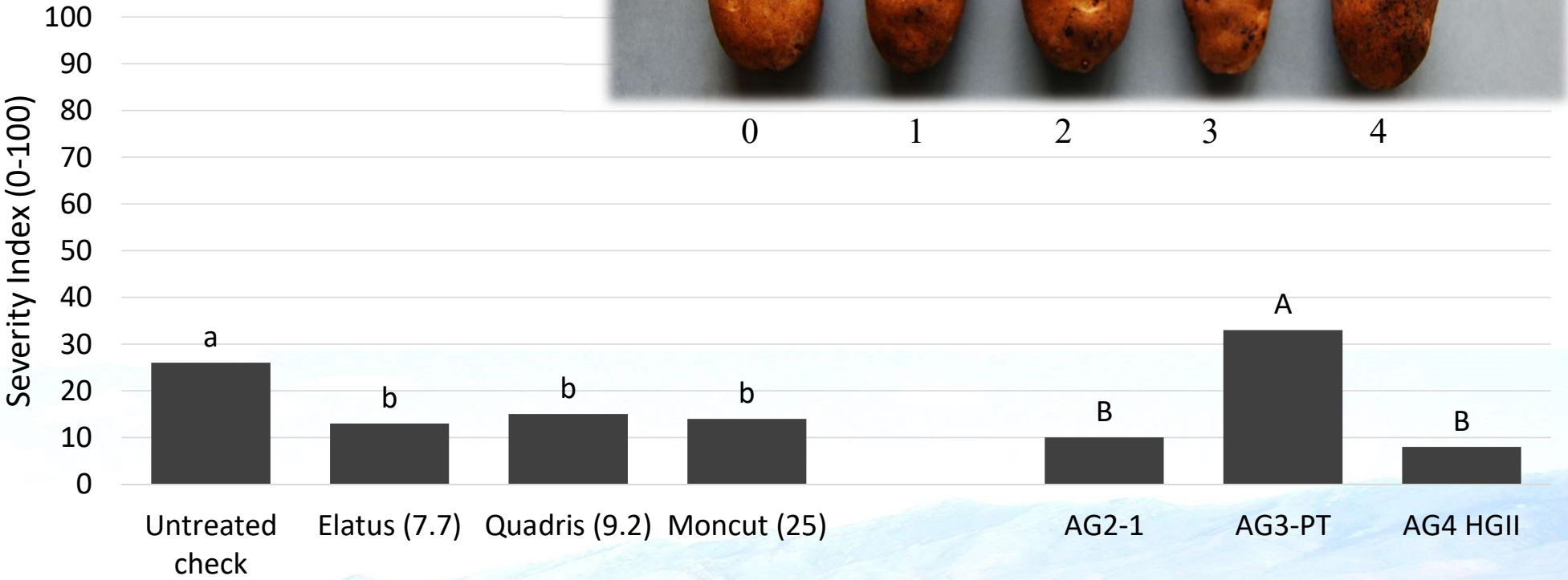
Tuber Black Scurf

Post Harvest 2022



The interaction between AG and fungicide was not significant.

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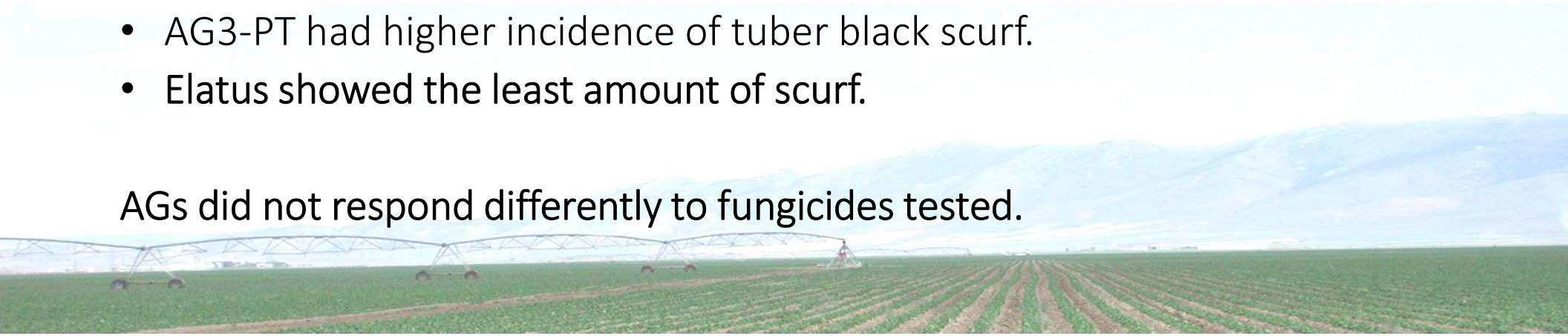
Muzhinji et al., 2015, Plant Dis. 99:1790-1802

Summary

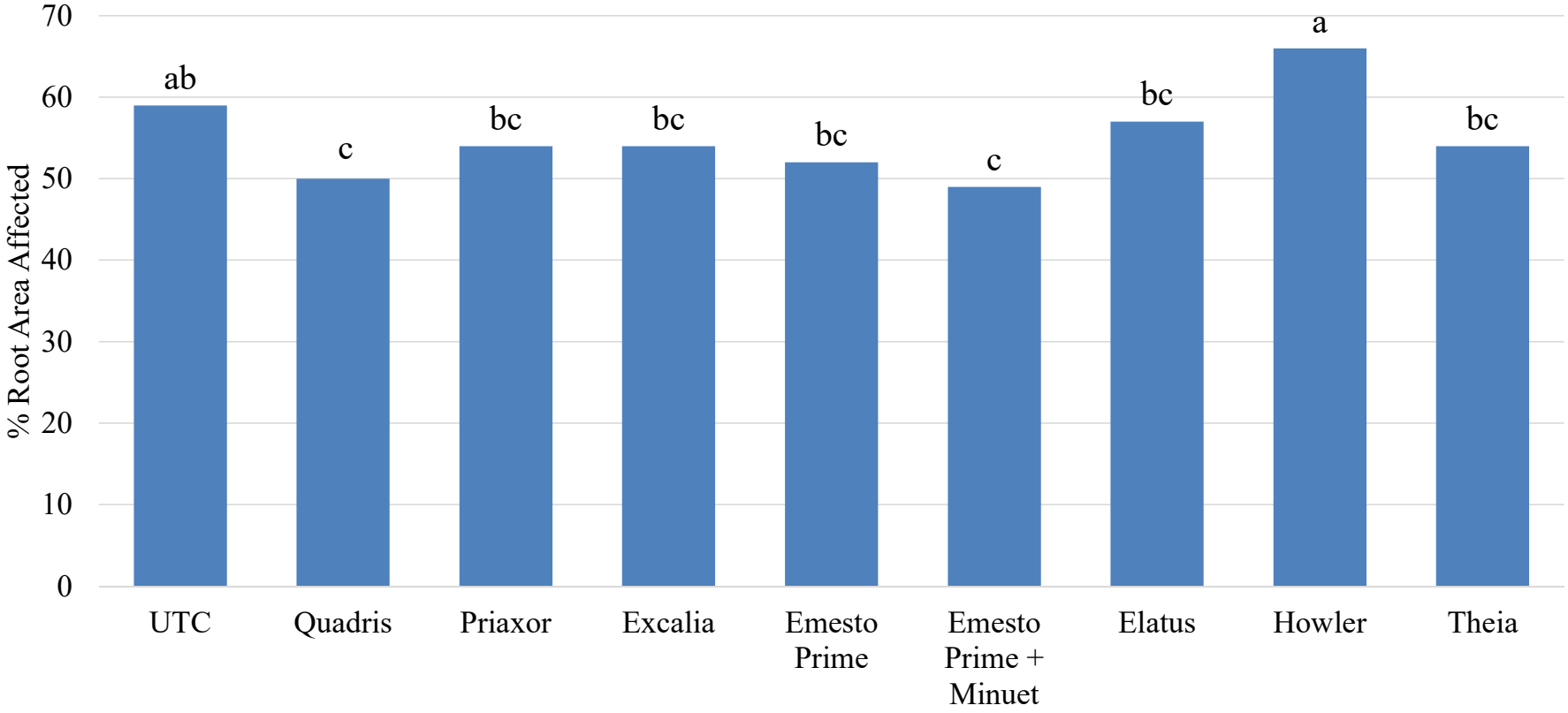
- All fungicides reduced stem and stolon canker in 2021.
- Only Elatus reduced stem canker in 2022.
- Rhizoctonia control resulted in generally higher yields.
- AG-group did not affect fungicide performance.
- AG4 HGII had lower stem canker severity than AG2-1 and AG3-PT.
- All AGs had similar yield.
- AG3-PT had higher incidence of tuber black scurf.
- Elatus showed the least amount of scurf.

AGs did not respond differently to fungicides tested.



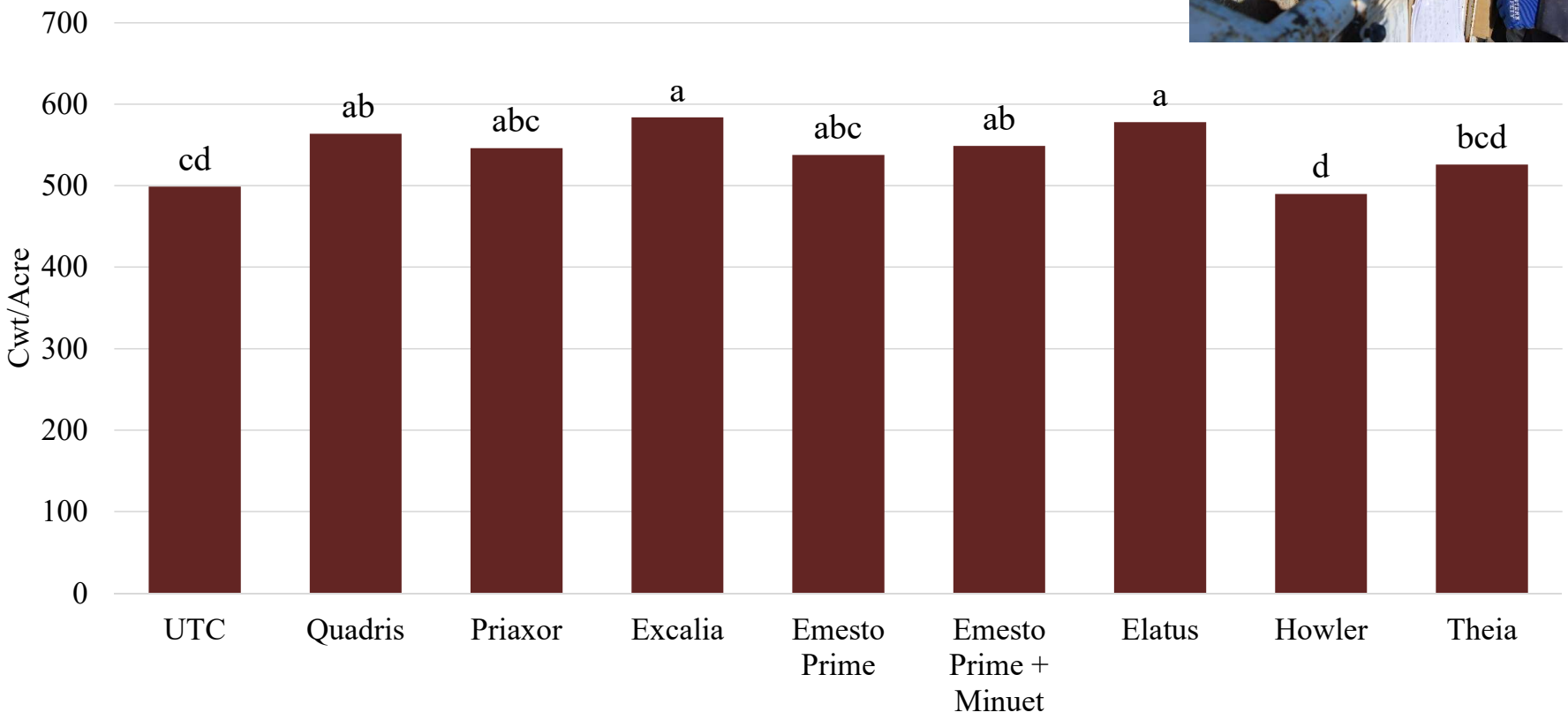
2021 Fungicide Performance Trial

Rhizoctonia Stem Canker Severity July 27, 2021



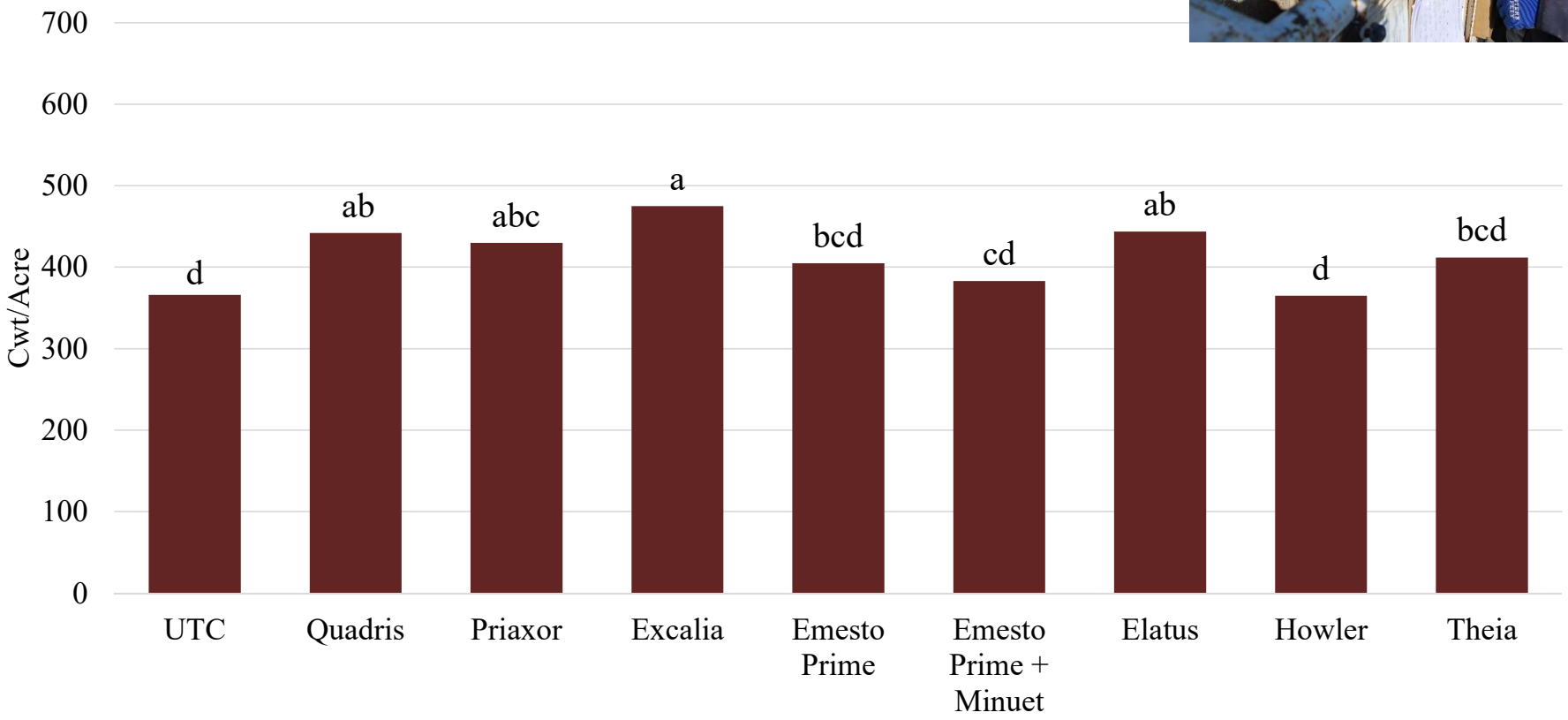
2021 Fungicide Performance Trial

Total Tuber Yield



2021 Fungicide Performance Trial

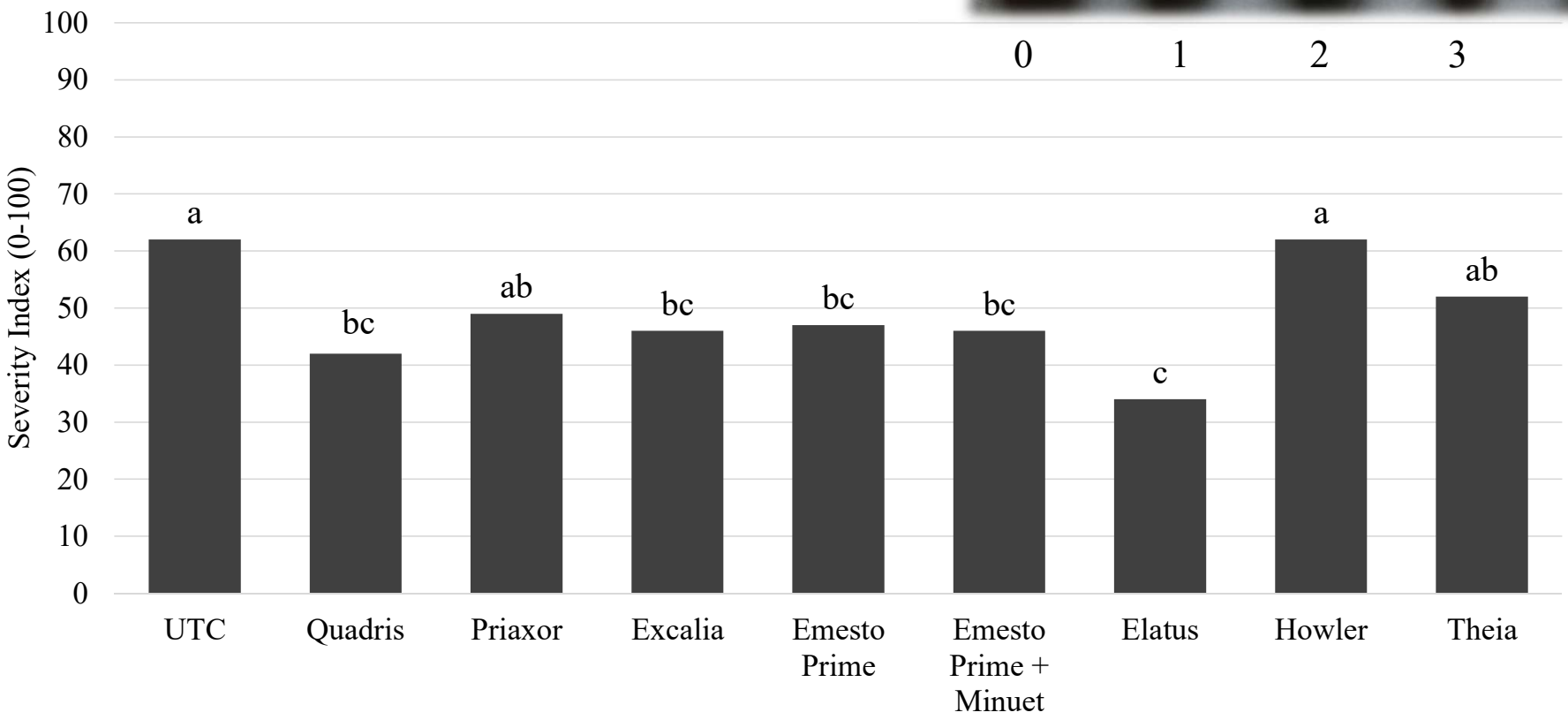
Marketable Yield



2021 Fungicide Performance Trial

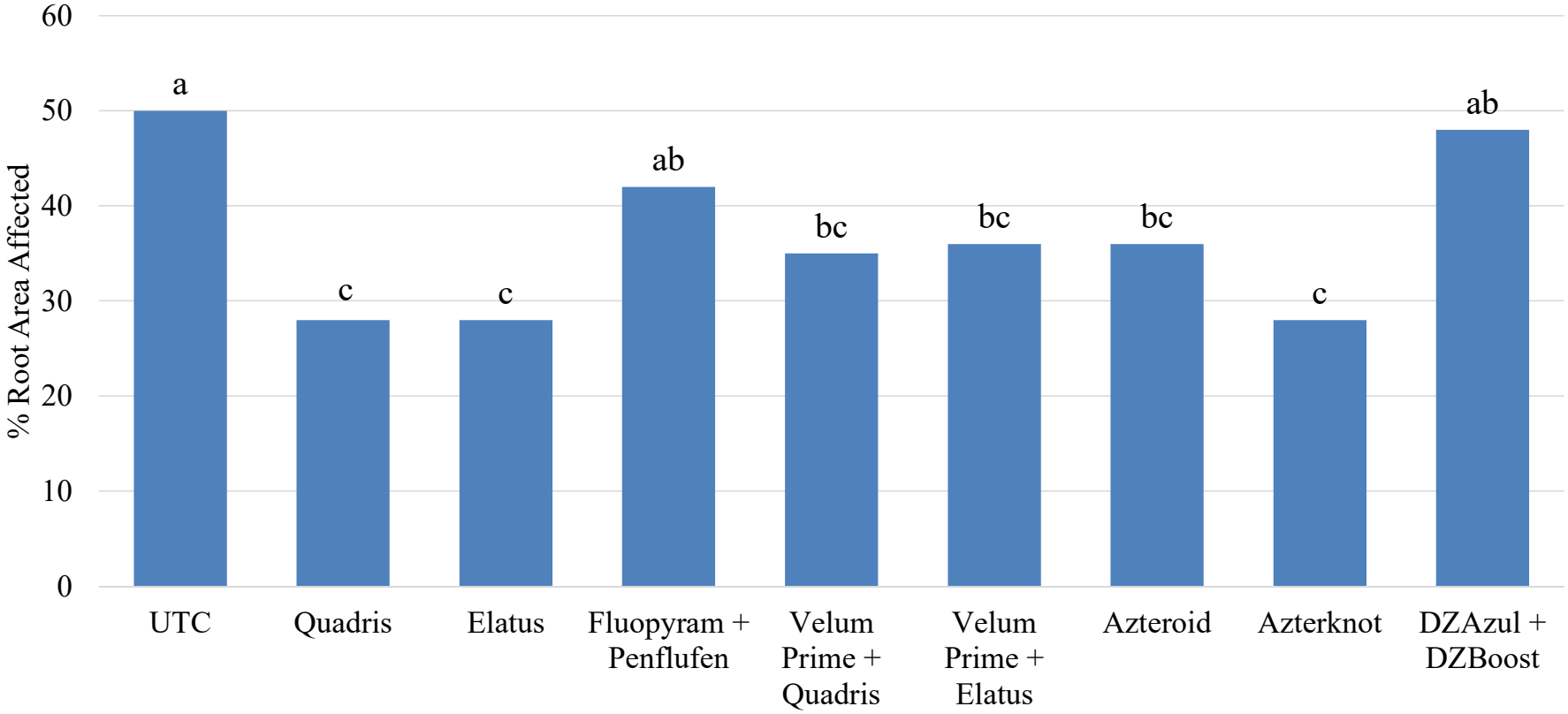
Tuber Black Scurf

Post Harvest



2022 Fungicide Performance Trial

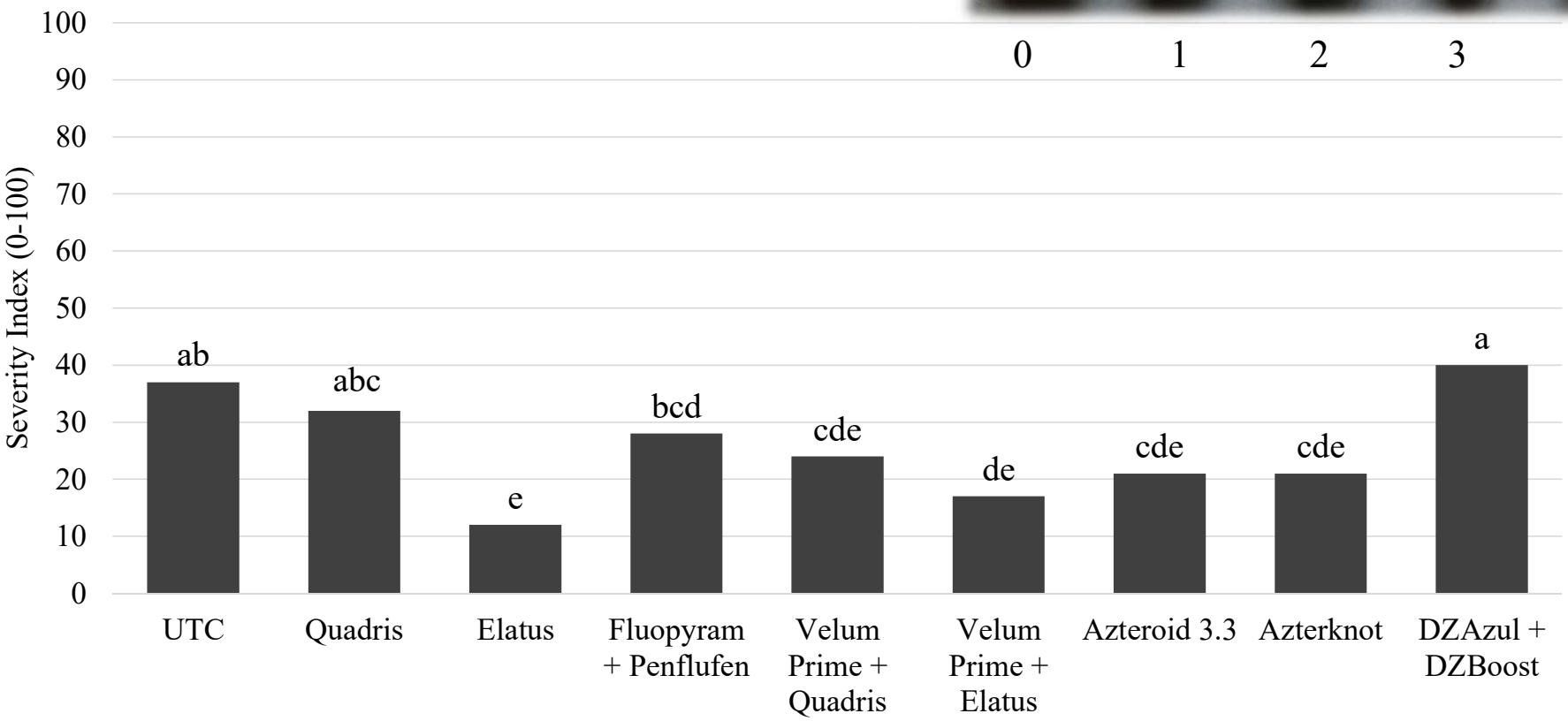
Rhizoctonia Stem Canker Severity June 22, 2022



2022 Fungicide Performance Trial

Tuber Black Scurf

Post Harvest



Fusarium Dry Rot Control

So what do I do to prevent seed piece decay?

1. Purchase seed with as little dry rot as possible.
2. Plant uncut seed, if possible.
3. Sterilize seed cutting equipment.
4. Sharpen seed cutting knives.
5. Ensure pre-cut seed is suberized properly OR reduce time between cutting and planting.
6. Treat with an effective seed treatment.
7. Avoid planting into cold, wet soil.

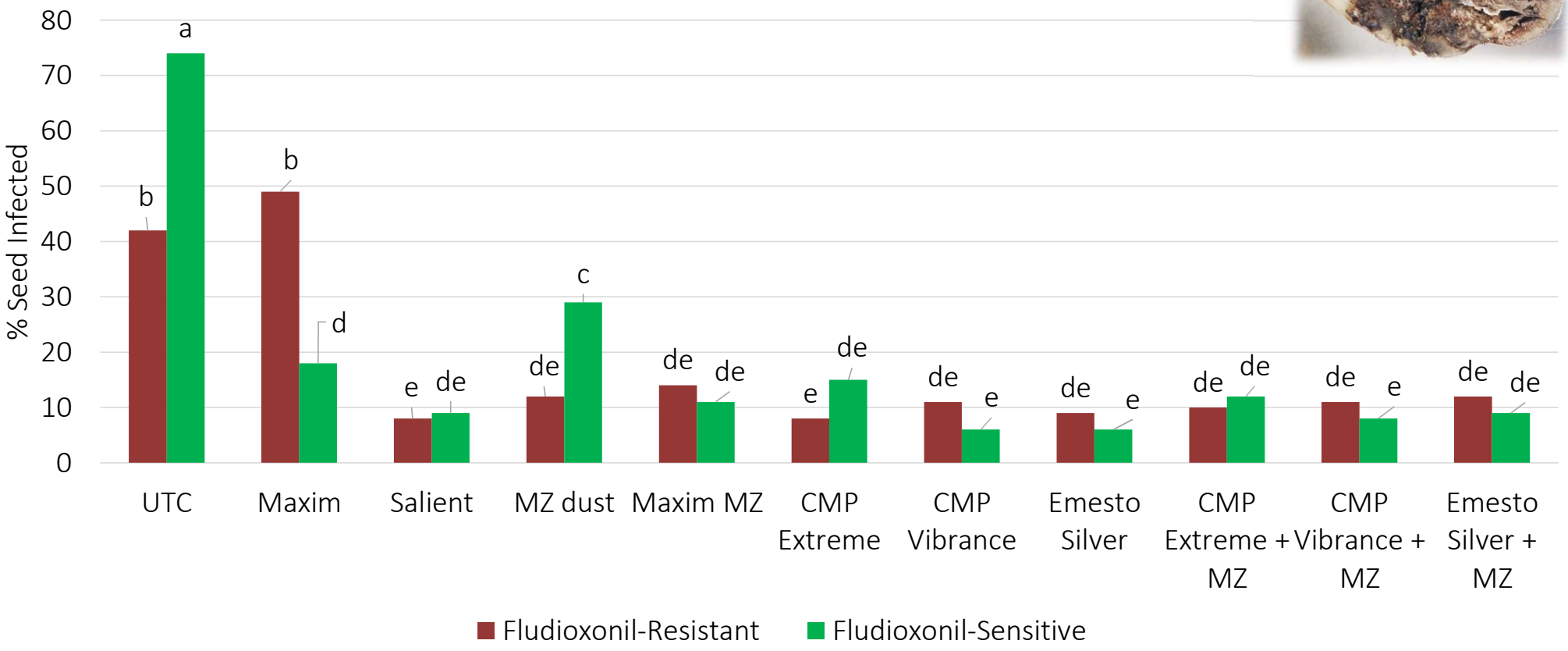
Selected Seed Treatment Options

Product	Form	M3	Group 12	Group 3	Group 7
MZ Dust	Dust	Mancozeb			
STartUP MANZB	Liquid	Mancozeb			
Maxim 4 FS	Liquid		Fludioxonil		
Maxim MZ	Dust	Mancozeb	Fludioxonil		
Moncoat MZ	Dust	Mancozeb			Flutolanil
CruiserMaxx Potato	Liquid		Fludioxonil		
Spirato	Liquid		Fludioxonil		
STartUP FLUDI	Liquid		Fludioxonil		
CruiserMaxx Potato Extreme	Liquid		Fludioxonil	Difenoconazole	
CruiserMaxx Potato Vibrance	Liquid		Fludioxonil	Difenoconazole	Sedaxane
Emesto Silver	Liquid			Prothioconazole	Penflufen
Salient	Liquid			Difenoconazole	

Fungicide resistance concerns

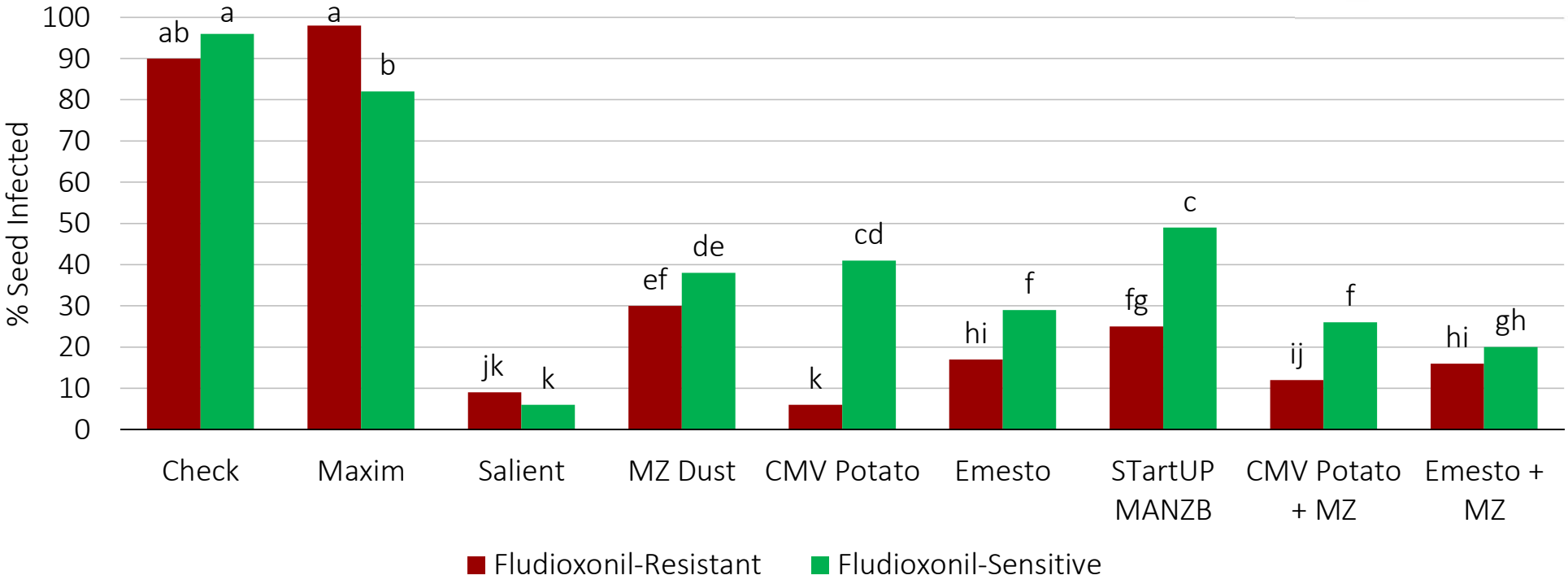
Fusarium Dry Rot Incidence - 2021

Clearwater Russet



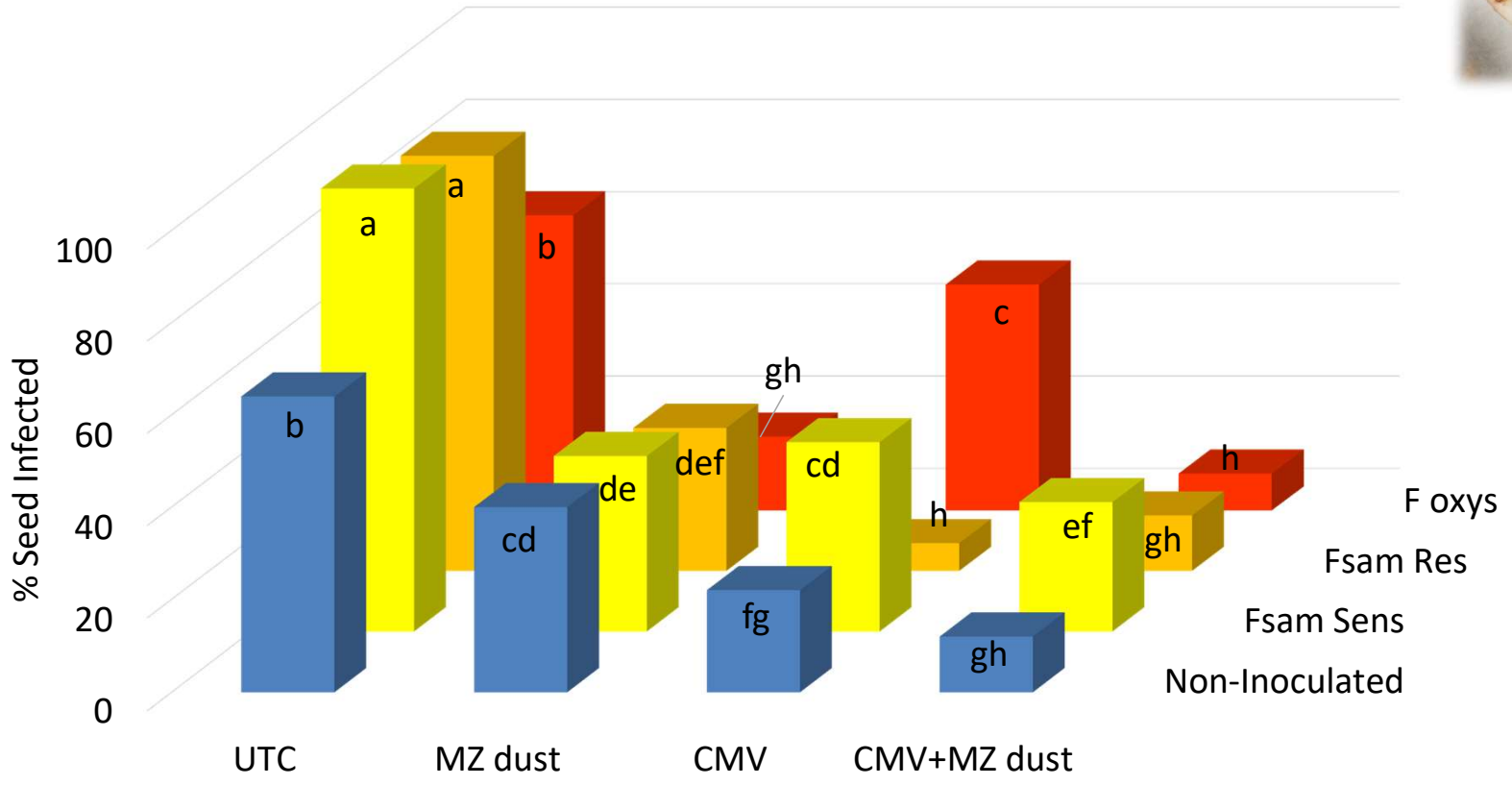
Fusarium Dry Rot Incidence - 2022

Clearwater Russet



Fusarium Dry Rot Incidence (%)

Clearwater Russet



CMV = CruiserMaxx Vibrance, 0.5 fl oz/cwt

Dry Rot Summary

- Box test did not translate to field differences.
- Seed lot did not influence dry rot severity in the field.
- Seed treatments were effective in reducing all 3 isolates.
  - Combining liquid with MZ dust was most effective
- Post-harvest Archive was similar to Stadium

Thank you!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