

Effective Fungicide Use for Managing Potato Disease



Trent Taysom



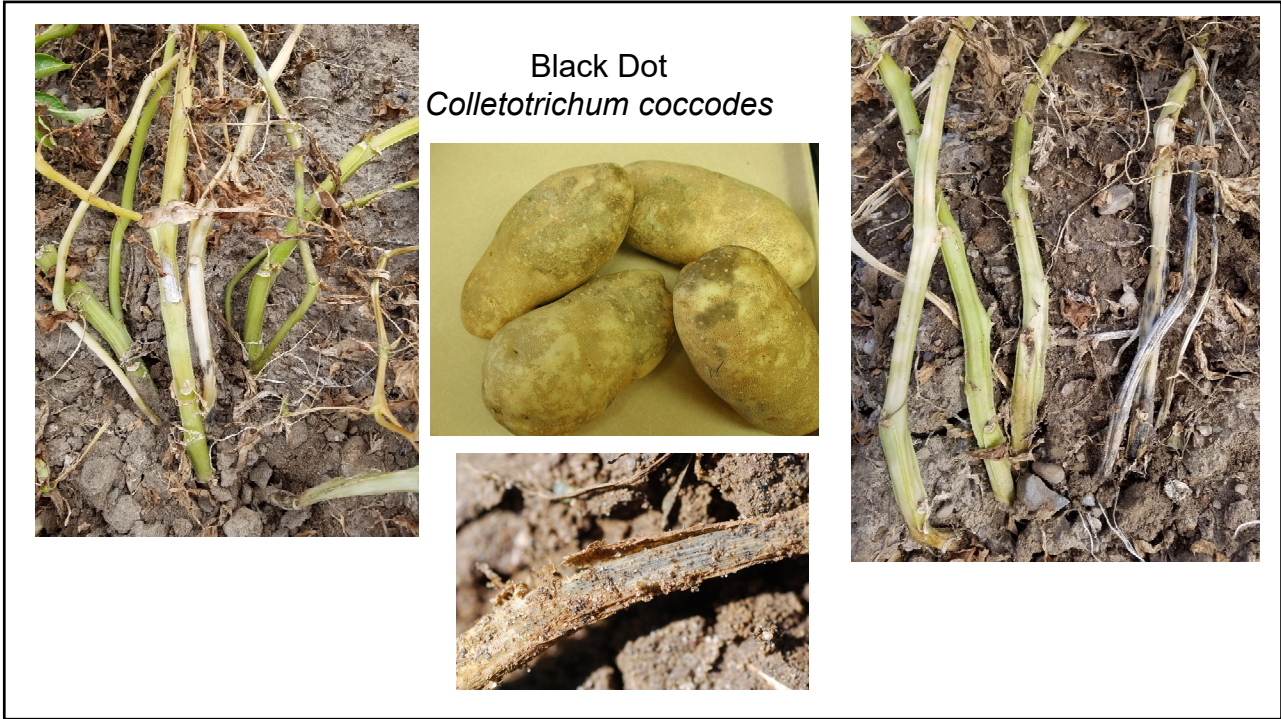
Early blight
Alternaria solani



Photo courtesy P. Wharton

Brown Spot
Alternaria alternata





How do I measure dollar return?

- ROI – Dollars back for each dollar spent?
- Insurance?



From Daily Stuff, October 29, 2022, Daniel Deisinger



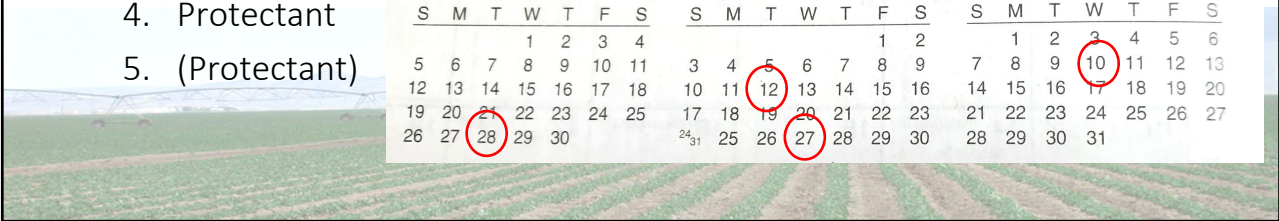
Products Tested in Public Foliar Disease Trials

Amistar Top	Endura	Omega	Revus Top
Aproach	Endura Pro	Omega Top	Rovral
AZterknot	Gavel	Penncozeb	Scala
AZteroid	Gem	Polyram	Serenade
Badge SC	Headline	Priaxor	Super Tin
Bravo WS	Innliven Elite	Propulse (Luna Pro)	Tanos
Cabrio Plus	Inspire	Provysol	Veltyma
Cupridyne	Luna Privilege	Quadris	Velum Prime
Delaro	Luna Tranquility	Quadris Top	Vertisan/Fontelis
Dithane F45 and DF	Manzate	Quash	Wetcit
Double Nickel	Miravis Prime	Reason	Zing!
Echo DF and ZN	Omavo Elite	Regev	Zoxium

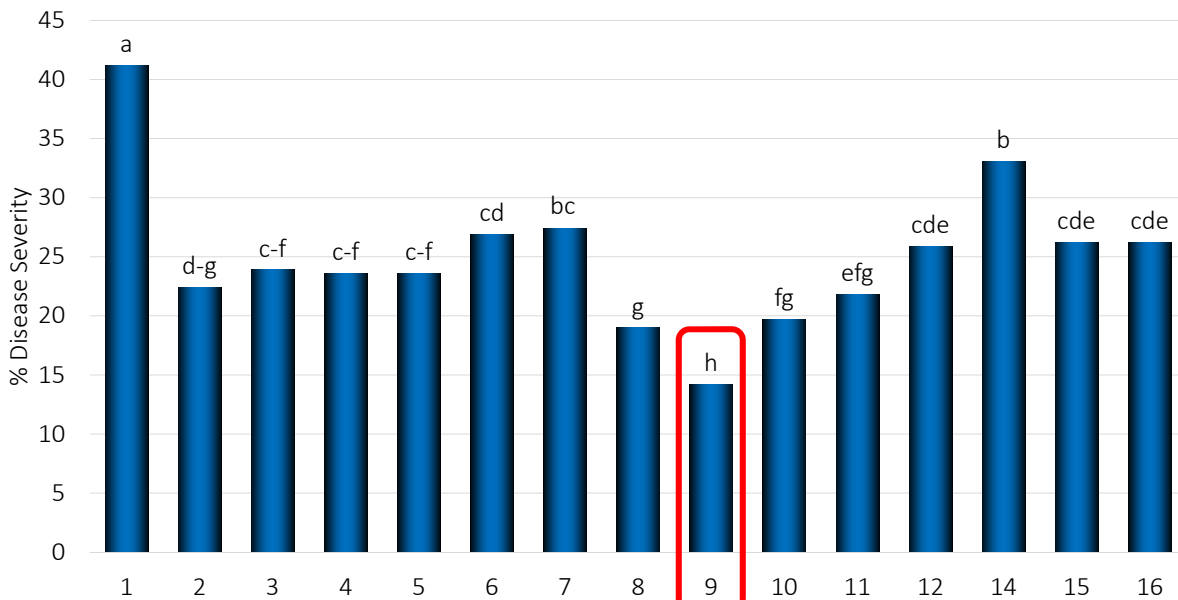
How should I use my fungicides in a semi-arid environment?

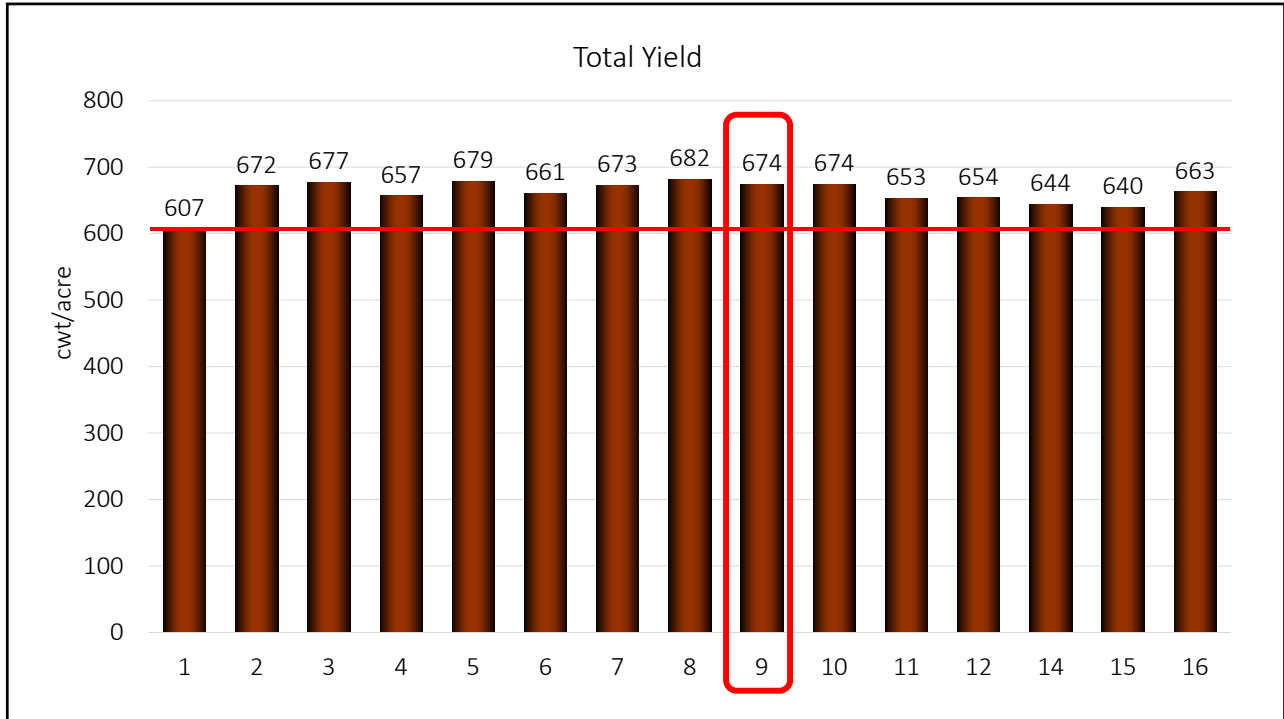
- Start at or just before row closure
 - Applications before that are not cost effective
- Apply every 10-14 days
 1. Premium product (EB/BS, WM) + protectant (EB/BS, LB)
 2. Premium product (EB/BS, WM) + protectant (EB/BS, LB)
 3. Protectant
 4. Protectant
 5. (Protectant)

JUNE							JULY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
			1	2	3	4						1	2		1	2	3	4	5	6
5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13
12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20
19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27
26	27	28	29	30			²⁴ ₃₁	25	26	27	28	29	30	28	29	30	31			



% Early Blight/Brown Spot Severity – August 22, 2023





How much did the program cost?

Timing	Bayer	Syngenta 1	Syngenta 2	BASF
8" Plants	--	--	Amistar Top(10)	--
Row Close	Luna Pro (10.3)+Bravo (1) \$37.33 + \$3.13	Miravis Prime (11.4) \$36.58	Miravis Prime (11.4) \$36.58	Endura (5.5)+Provysol (3) \$20.02 + \$15.91
Early July	Luna Pro (10.3)+Bravo (1) \$37.33 + \$3.13	Miravis Prime (11.4) \$36.58	Miravis Prime (11.4) \$36.58	Endura (5.5)+Provysol (3) \$20.02 + \$15.91
Late July	Bravo WS (1.5) \$4.69	Bravo WS (1.5) \$4.69	Revus Top (5.5) \$15.92	Bravo WS (1.5) \$4.69
Early August	Bravo WS (1.5) \$4.69	Bravo WS (1.5) \$4.69	Bravo WS (1.5) \$4.69	Bravo WS (1.5) \$4.69
Appl. Cost*	\$60.00	\$60.00	\$75.00	\$60.00
Total Cost:	\$150.28	\$142.54	\$185.67	\$141.24

*Cost estimates from 2024 based on what it would have cost Miller Research personnel to purchase these products from our local distributor. Assuming \$15/acre for aerial application, 4-5 applications. Application rates given as fl oz for all but Bravo WS which is given in pints.

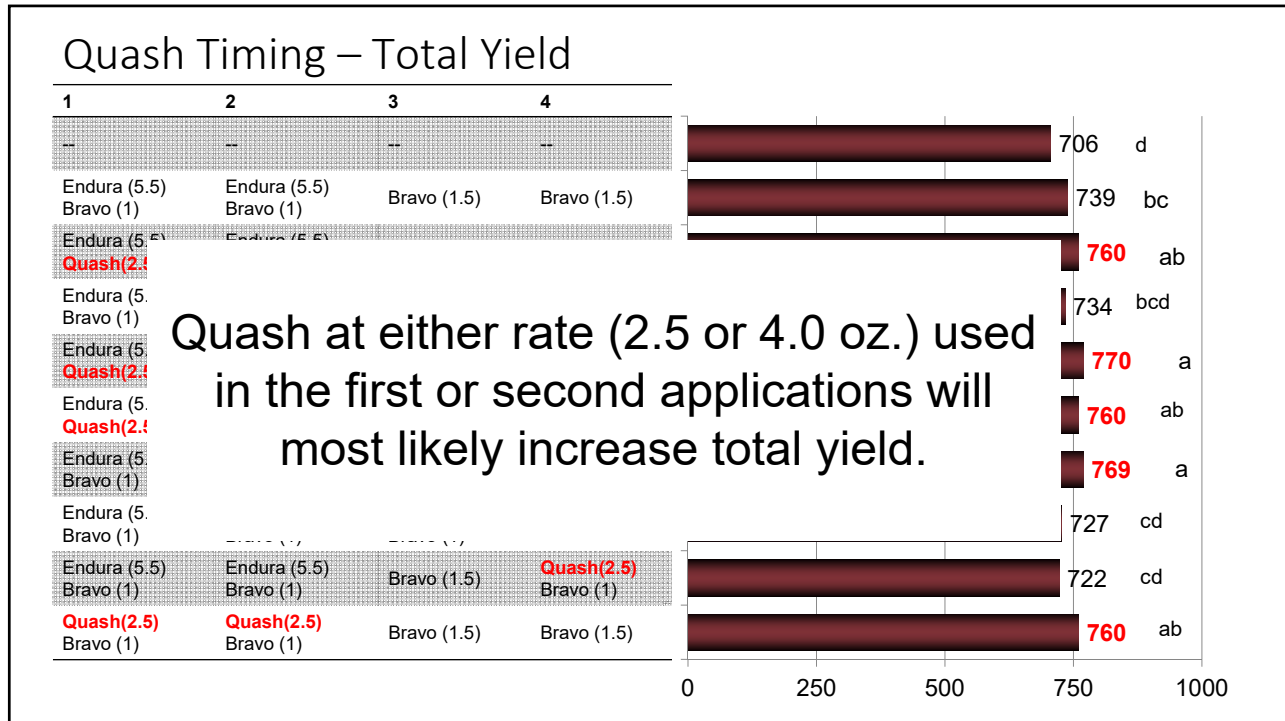
What does the fungicide program do for me?

Year	Untreated Check	Fungicide Program	% Control	+ cwt/acre (%)	
2016	40	10	75	9 (1.3)	
2017	27	8	70	31 (4.5)	
2018-1	Burbank	18	2	88	35 (5.0)
2018-2		24	3	88	3 (0.4)
2019-1		31	3	89	5 (0.8)
2019-2		21	4	82	15 (2.4)
2020		22	3	86	28 (4.2)
2021		Ranger	33	14	58
2022	18		5	73	35 (5.1)
2023	41		22	47	65 (10.7)
No correlation between % control and increase in yield.			Average increase:	26 (4.0)	
				~\$275 gross, \$128 net	

Does a fungicide program help with resistant varieties?

	"Light" EB/BS		"Moderate" EB/BS	
	2019	2020	2019	2020
	Total	Marketable	Total	Marketable
Treated (4 apps)	682	632	672	596
Untreated	652	607	649	582
Difference	+30	+25	+23	+14

Trial conducted on Clearwater Russet

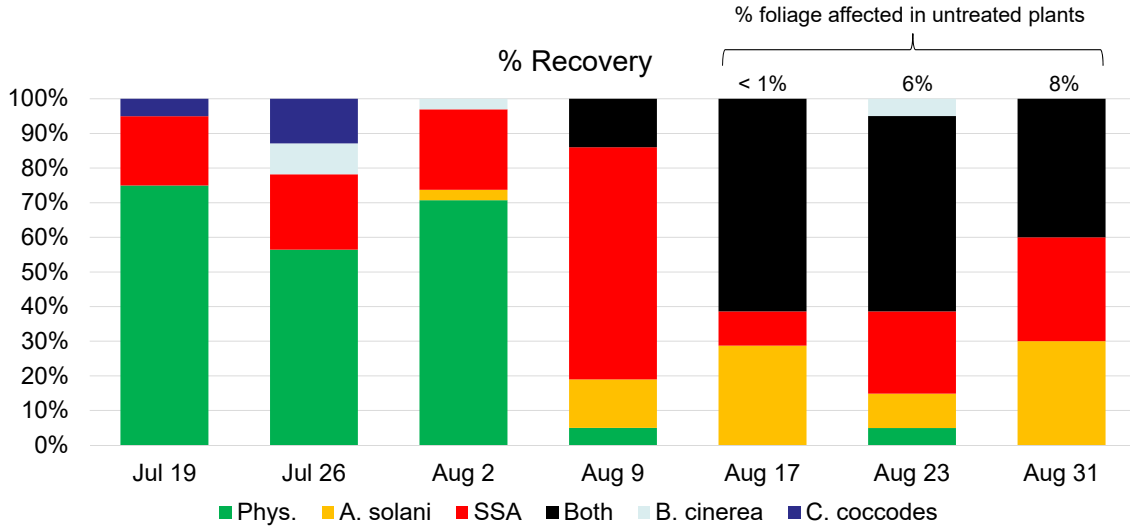


Take-Home Message

- Foliar fungicide programs are cost effective
 - >\$100/acre net return on investment
- Quash can improve yield further
 - Not related to disease control

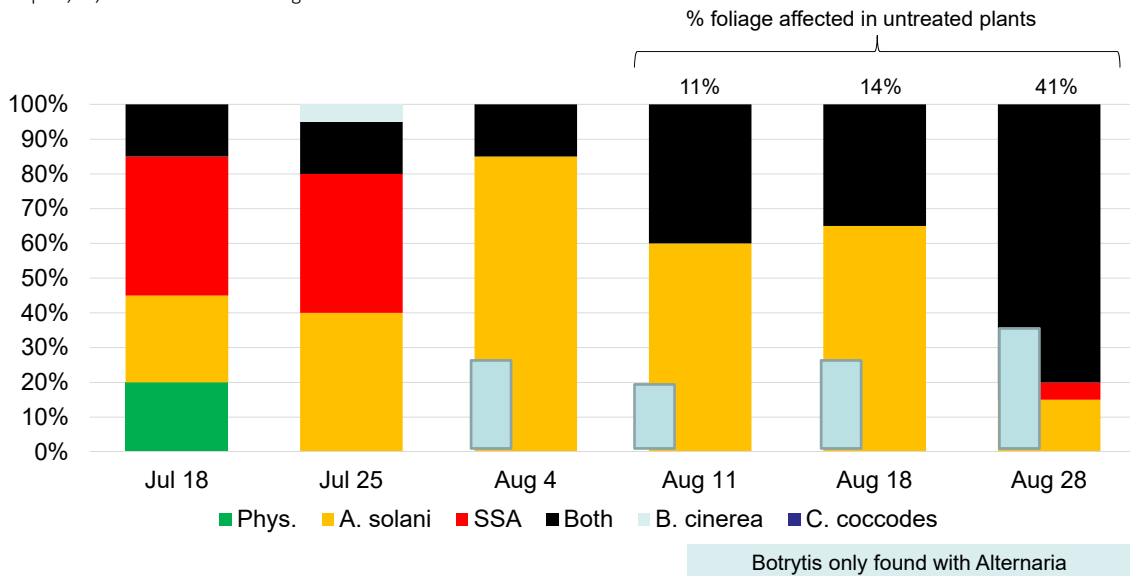
What was causing lesions in 2022?

Rupert, ID; Miller Research – Ranger Russet



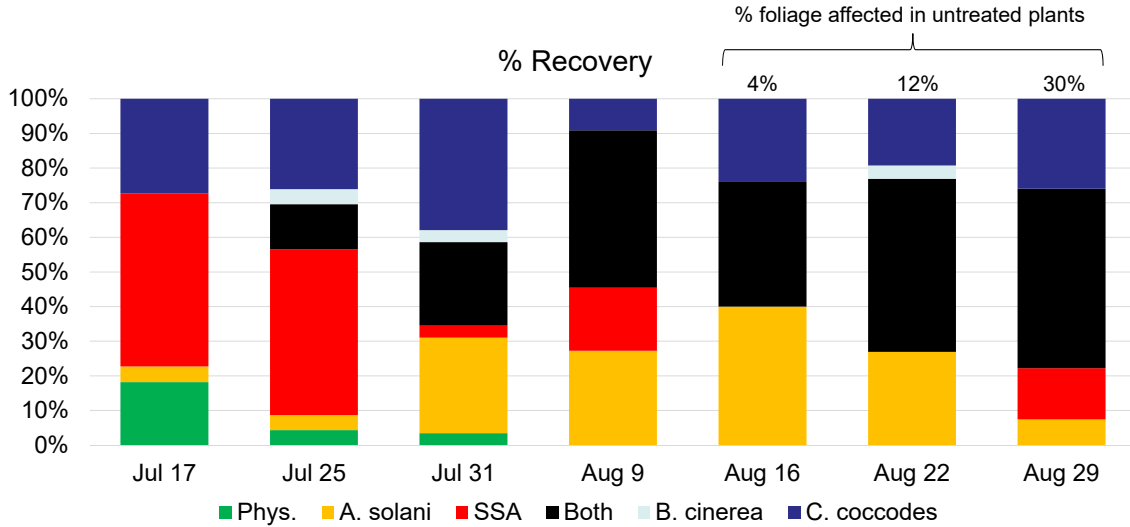
What is causing lesions in 2023?

Rupert, ID; Miller Research – Ranger Russet



What was causing lesions in 2024?

Rupert, ID; Miller Research – Ranger Russet



	In-furrow (A)	Dime Size Tubers (B)	Row Closure (C)	RC + 2 weeks (D)	RC + 4 weeks (E)	RC + 6 weeks (F)	RC+ 8 weeks (G)
1.	--	--	--	--	--	--	--
2.	--	--	Miravis Prime (11.4)* Bravo WS (1)	Miravis Prime (11.4)* Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)	Bravo WS (1.5)
3.	--	--	Regev (7)	Miravis Prime (11.4)*	Regev (7)	Bravo WS (1.5)	Bravo WS (1.5)
4.	--	--	Endura Pro (18.5)** Bravo WS (1)	Endura Pro (18.5)** Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)	Bravo WS (1.5)
5.	Velum Rise (13.0)	--	--	Endura Pro (18.5)** Bravo WS (1)	Provysol (4)** Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)
6.	--	--	AZterknot (18.4)	AZterknot (18.4)	Bravo WS (1.5)	Bravo WS (1.5)	Bravo WS (1.5)

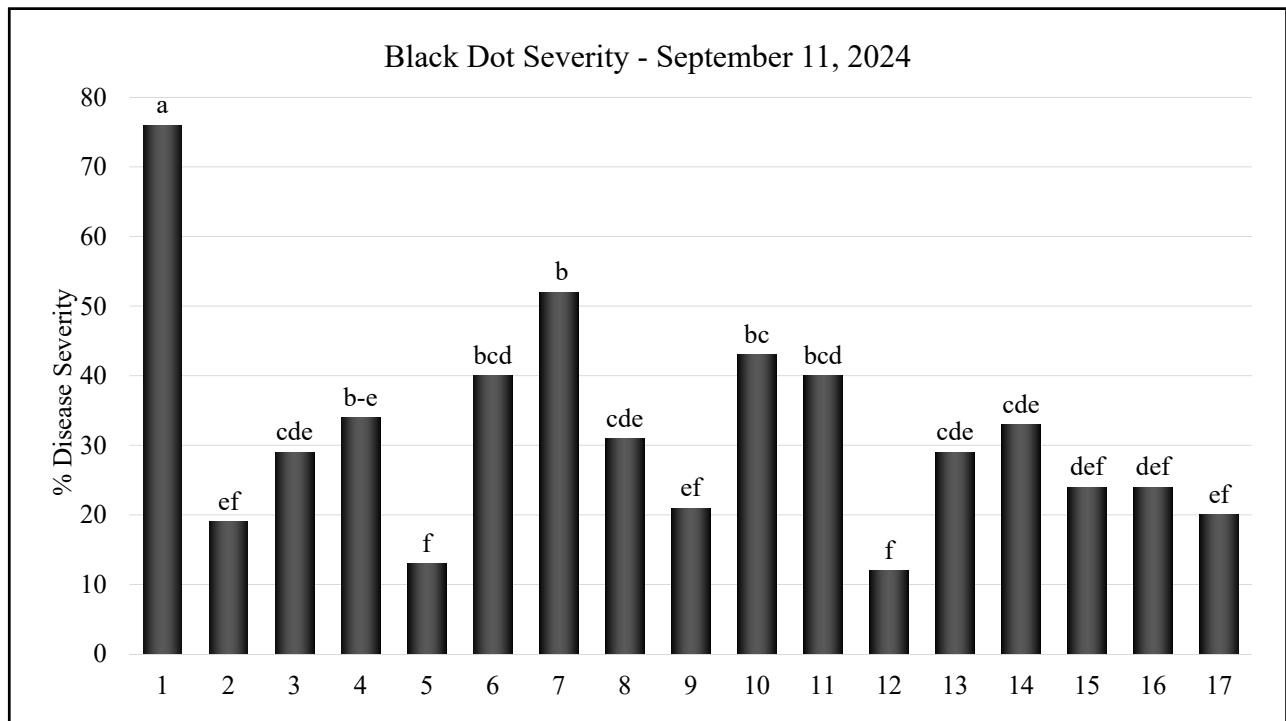
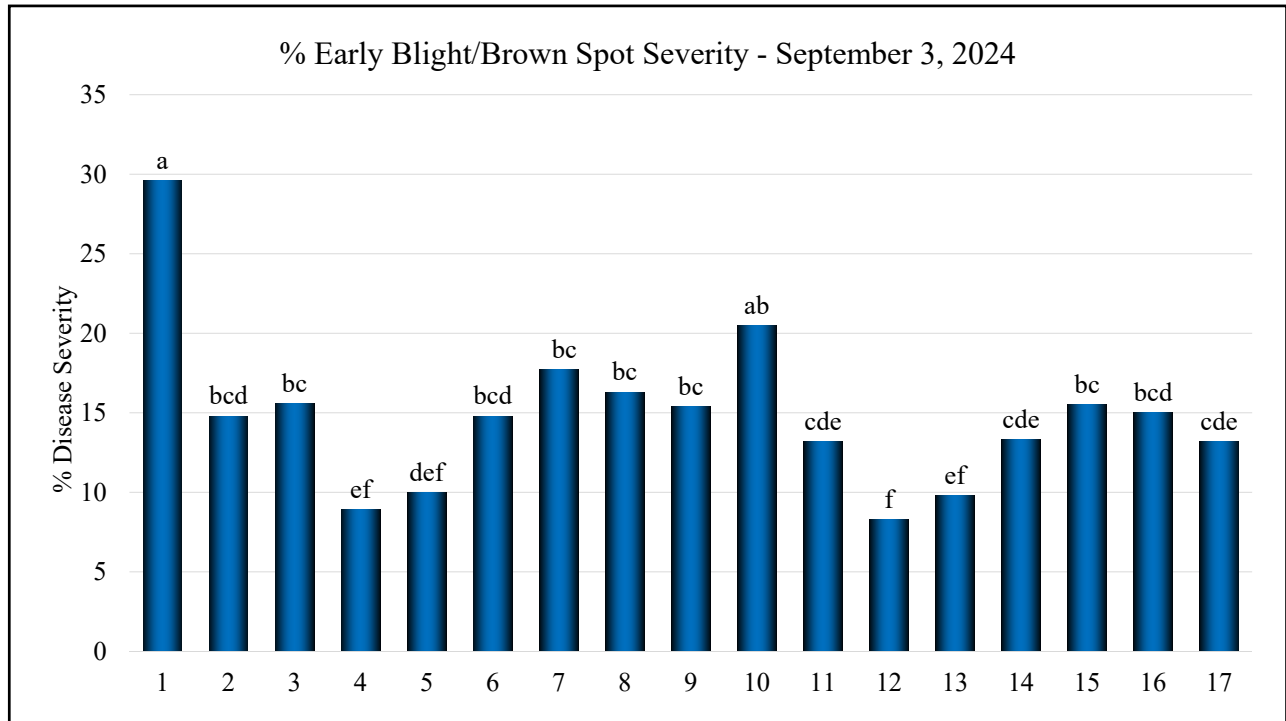
*NIS = Avor, 0.25% v/v; **Dyne-Amic, 0.25% v/v, *** Valkarie, 0.25% v/v.

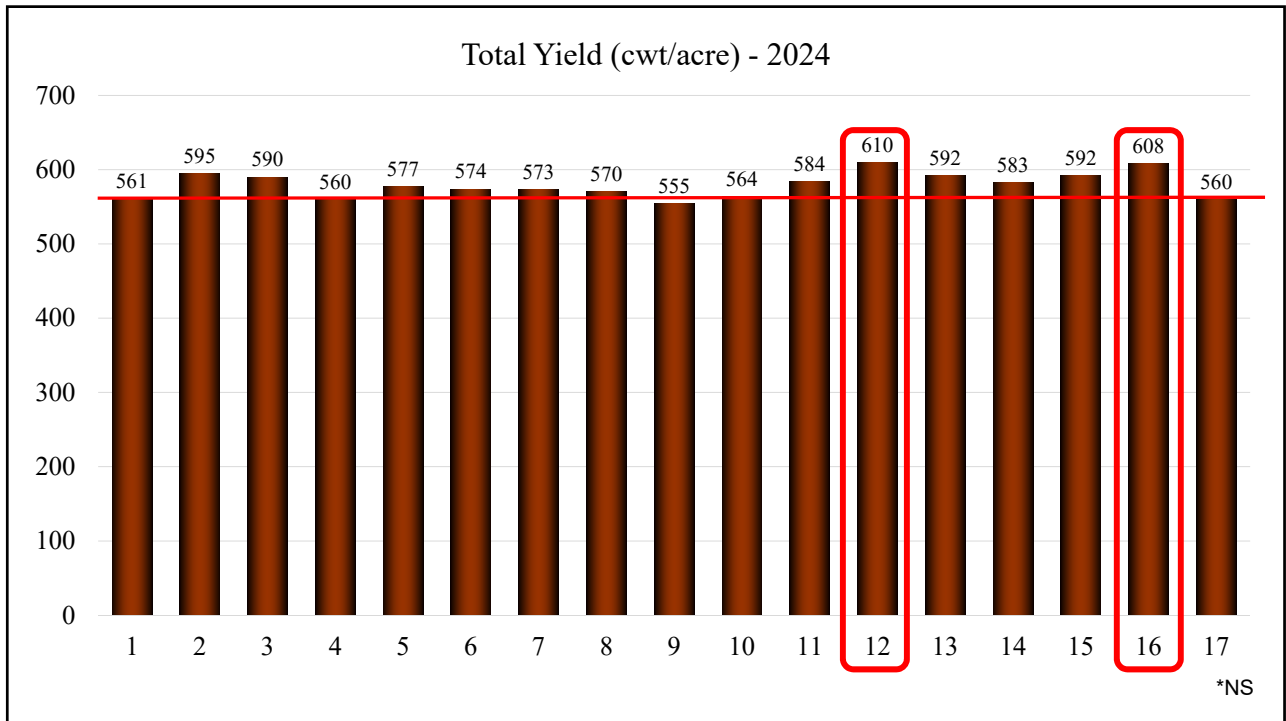
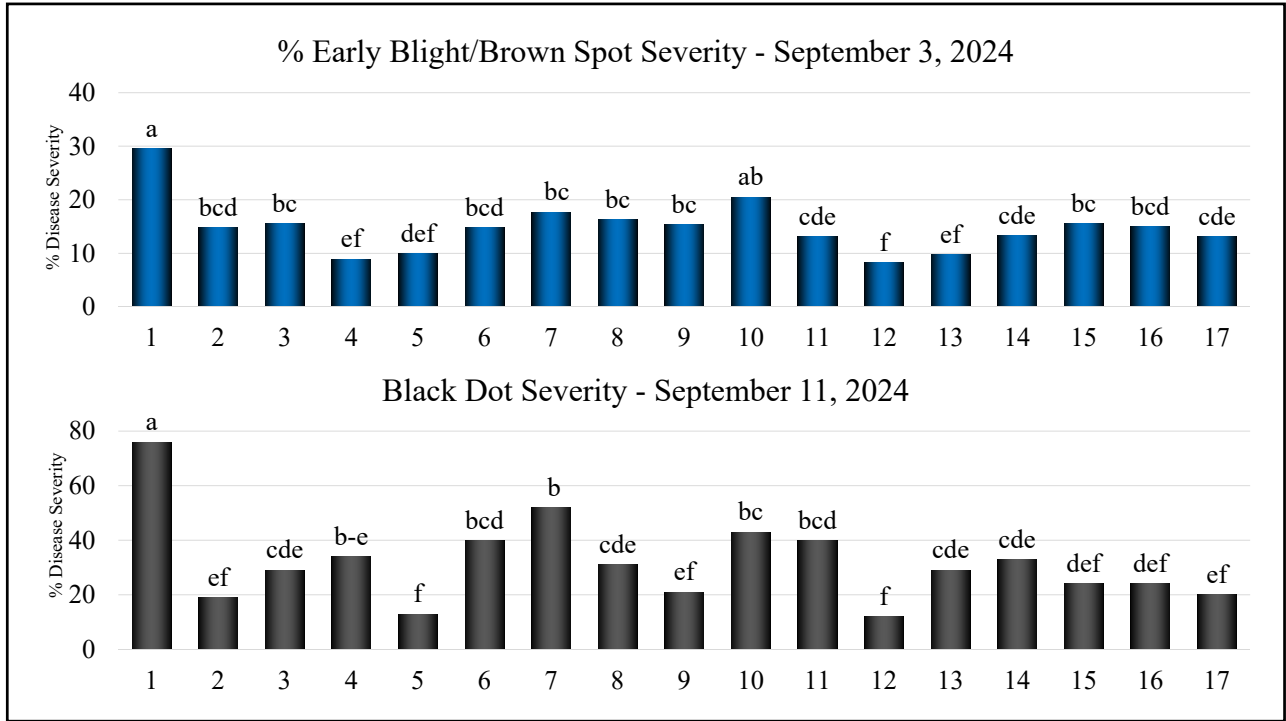
In-furrow (A)	Dime Size Tubers (B)	Row Closure (C)	RC + 2 weeks (D)	RC + 4 weeks (E)	RC + 6 weeks (F)	RC+ 8 weeks (G)
7. --	Badge (2)	Reason 500 SC (5.5)* Bravo WS (1)	Luna T. (11.2)* Bravo WS (1)	Zing! (32)*	Zing! (32)*	Zing! (32)*
8. --	--	Luna Pro (10)*** Eluvium (1)	Omavo Elite (14.5) *** Eluvium (1)	Eluvium (1.5)	Mancovo (2)	Bravo WS (1.5)
9. --	--	Innliven Elite (7)*** Eluvium (1)	Luna Pro (10)*** Eluvium (1)	Omavo Elite (14.5) *** Eluvium (1)	Mancovo (2)	Bravo WS (1.5)
10. Bexfond (14)	--	Fontelis (24) Bravo WS (1)	Fontelis (24) Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)	Bravo WS (1.5)
11. --	--	Corteva EXP (22.8) Bravo WS (1)	Corteva EXP (22.8) Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)	Bravo WS (1.5)
12. Velum Rise (13)	--	Amistar Top (10)*	Miravis Prime (11.4)* Bravo WS (1)	Miravis Prime (11.4)* Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)
13. Velum Rise (13)	--	Omega (7)	Miravis Prime (11.4)* Bravo WS (1)	Miravis Prime (11.4)* Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)

*NIS = Avor, 0.25% v/v; **Dyne-Amic, 0.25% v/v, *** Valkarie, 0.25% v/v.

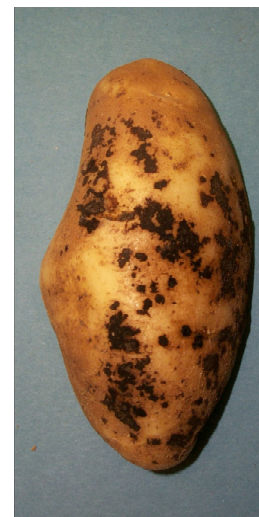
In-furrow (A)	Dime Size Tubers (B)	Row Closure (C)	RC + 2 weeks (D)	RC + 4 weeks (E)	RC + 6 weeks (F)	RC+ 8 weeks (G)
14. --	--	Luna Pro (10)* Bravo WS (1)	Luna Pro (10)* Bravo WS (1)	Bravo WS (1.5)	Bravo WS (1.5)	Bravo WS (1.5)
15. Velum Rise (13)	Delaro (11.4)*	Luna Pro (10)* Bravo WS (1)	Scala (7)* Bravo WS (1)	Bravo WS (1.5)	Scala (7)* Bravo WS (1)	Scala (7)* Bravo WS (1)
16. --	--	Vantana (8) Quash (2.5) MasterCop (1.5)	Vantana (8) Quash (2.5) MasterCop (1.5)	MasterCop (1.5) Bravo WS (1.5)	MasterCop (1.5) Bravo WS (1.5)	MasterCop (1.5) Bravo WS (1.5)
17. --	--	Vantana (8) Provysol (4) MasterCop (1.5)	Vantana (8) Provysol (4) MasterCop (1.5)	MasterCop (1.5) Bravo WS (1.5)	MasterCop (1.5) Bravo WS (1.5)	MasterCop (1.5) Bravo WS (1.5)

*NIS = Avor, 0.25% v/v; **Dyne-Amic, 0.25% v/v, *** Valkarie, 0.25% v/v.





Rhizoctonia Canker and Black Scurf



Selected Fungicide Options - Rhizoctonia

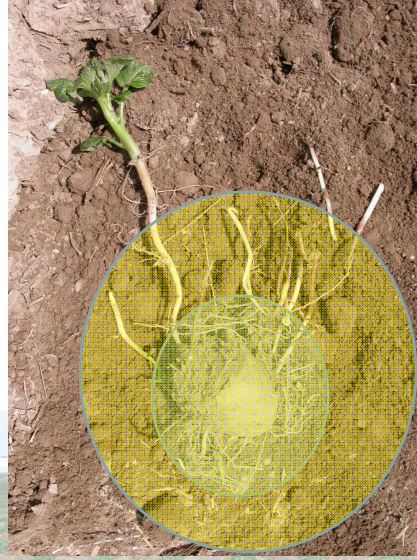
Product	Form	M3	Group 12	Group 3	Group 7	Group 11
Maxim MZ	Dust ST	Mancozeb	Fludioxonil			
Moncoat MZ	Dust ST	Mancozeb			Flutolanil	
Maxim, Spirato, STartUP FLUDI	Liquid ST		Fludioxonil			
CruiserMaxx Potato	Liquid ST		Fludioxonil			
CruiserMaxx Potato Extreme	Liquid ST		Fludioxonil	Difenoconazole		
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	
Velum Rise	IF				Penflufen + Fluopyram	

What is the best fungicide application method?

Seed treatment – Best for seed-borne inoculum

In-furrow – Best for treating soil-borne inoculum

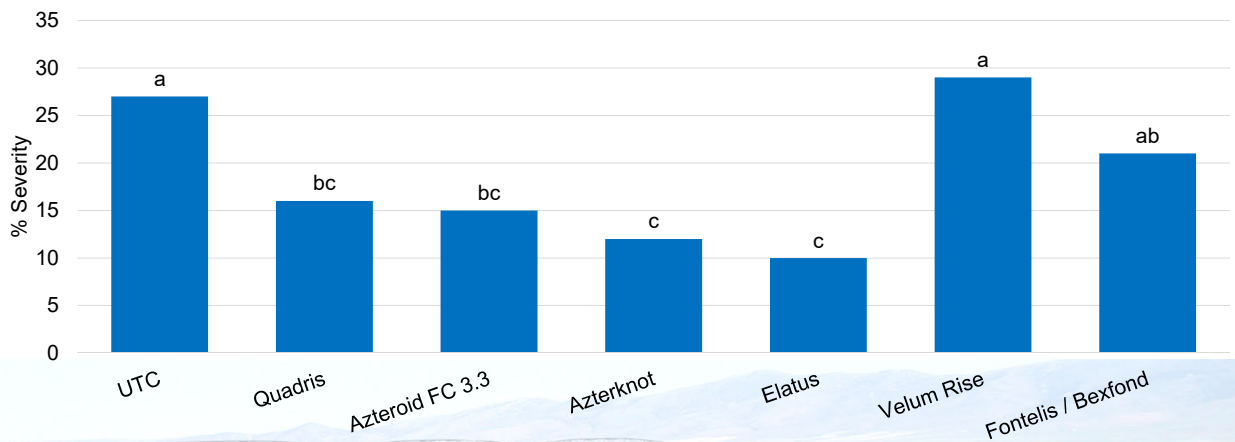
Combination will be the most effective.

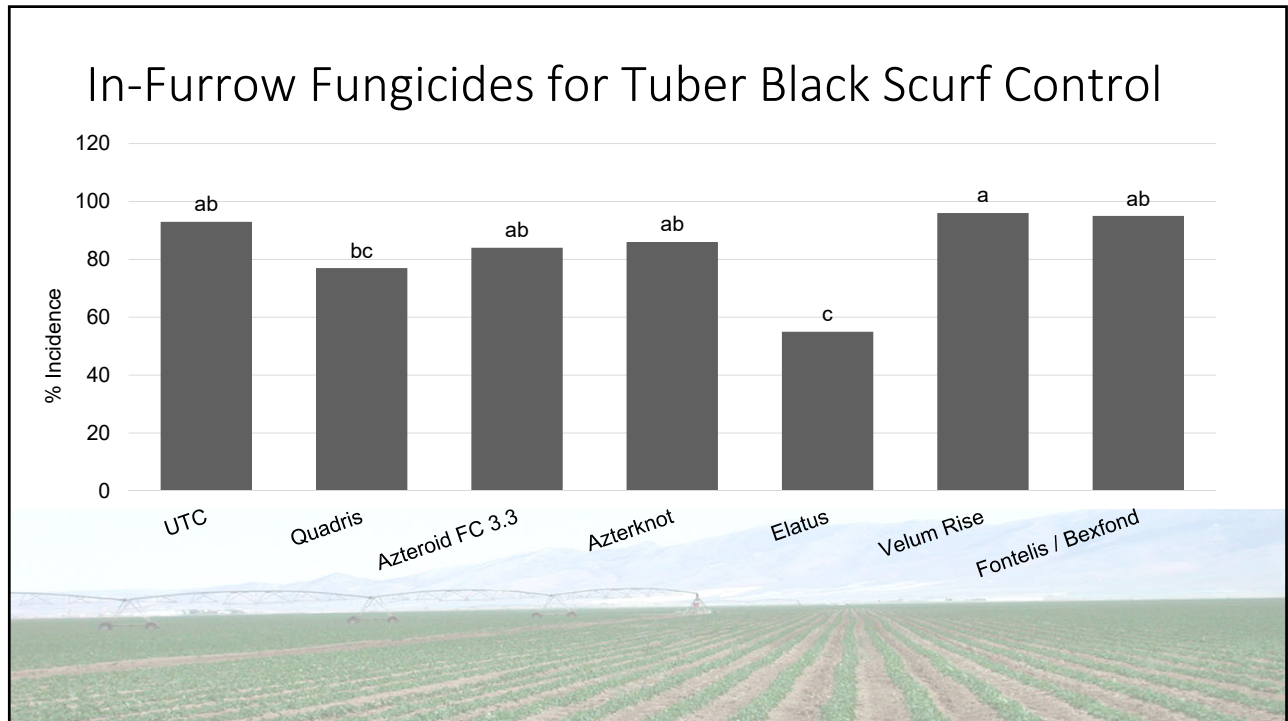
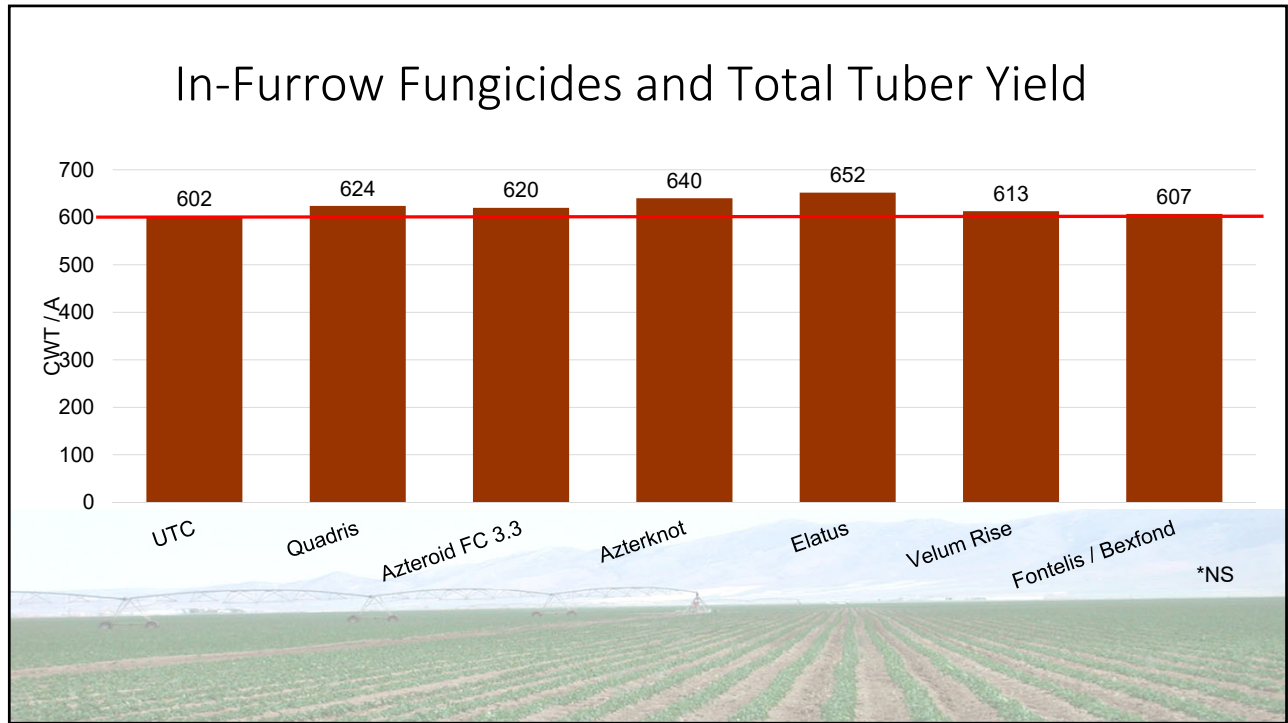


From Mike Thornton, University of Idaho

In-Furrow Fungicides for Rhizoctonia Control

July 17, 2024





Other Benefits

- Seed treatment/in-furrow combinations – silver scurf
 - Strobilurins, triazoles, fludioxonil
 - Group 7 (SDHI) fungicides not as effective
- Velum (fluopyram) – early blight, white mold, nematodes



Pink Rot



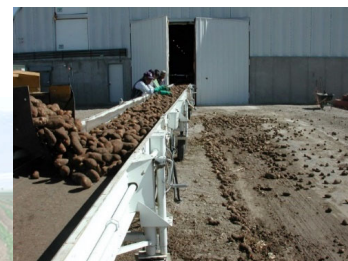
Fungicides for Pink Rot Control

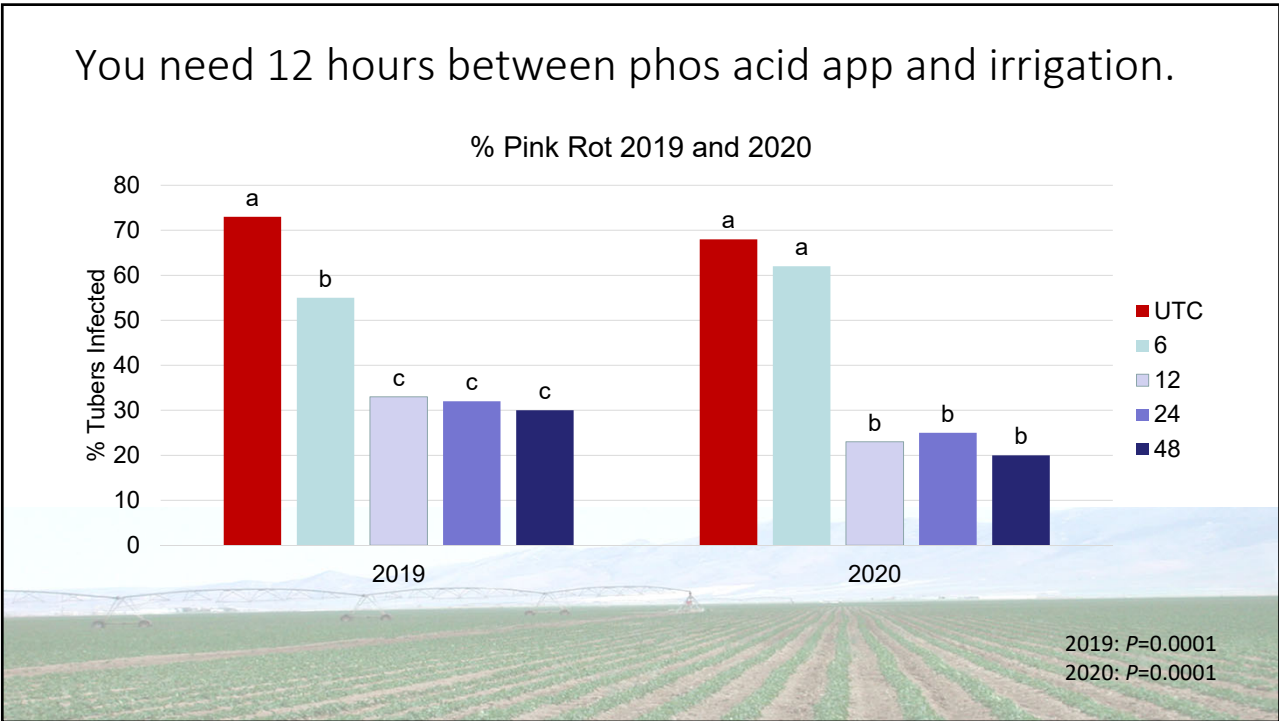
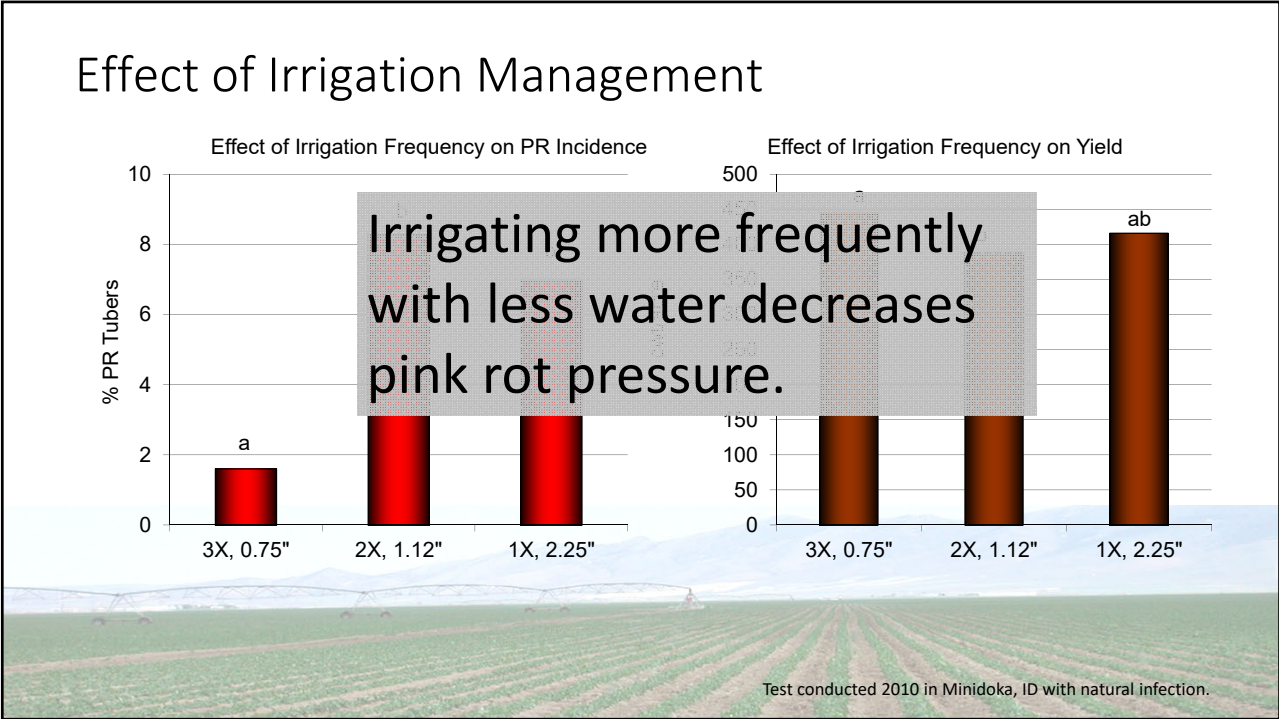
- Mefenoxam/metalaxyl (Group 4)
 - Ridomil Gold products
 - Ultra Flourish
 - MetaStar
 - Xylar FC
- Oxathiapiprolin + Mefenoxam (in-furrow only; Group 49 + 4)
 - Orondis Gold
- Phosphorous acid (Group 33)
 - Phostrol
 - Resist 57
 - Phiticide
 - (Others)
- Cyazofamid (Group 21)
 - Ranman
- Ethaboxam (Group 22)
 - Elumin

Inconsistent performance

Pink Rot Management

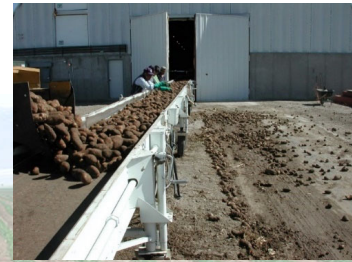
1. Field selection/crop rotation
2. Adjust soil pH by lime application in low pH soils
3. Plant less susceptible varieties
4. Proper irrigation management
 - Ensure 12 hours between phosphite application and irrigation
5. Use appropriate fungicides
6. Avoid “disease-favorable” conditions at harvest
7. Apply post-harvest fungicides
8. Grade out infected tubers going into storage
9. Reduce tuber pulp temperatures to 55°F or lower



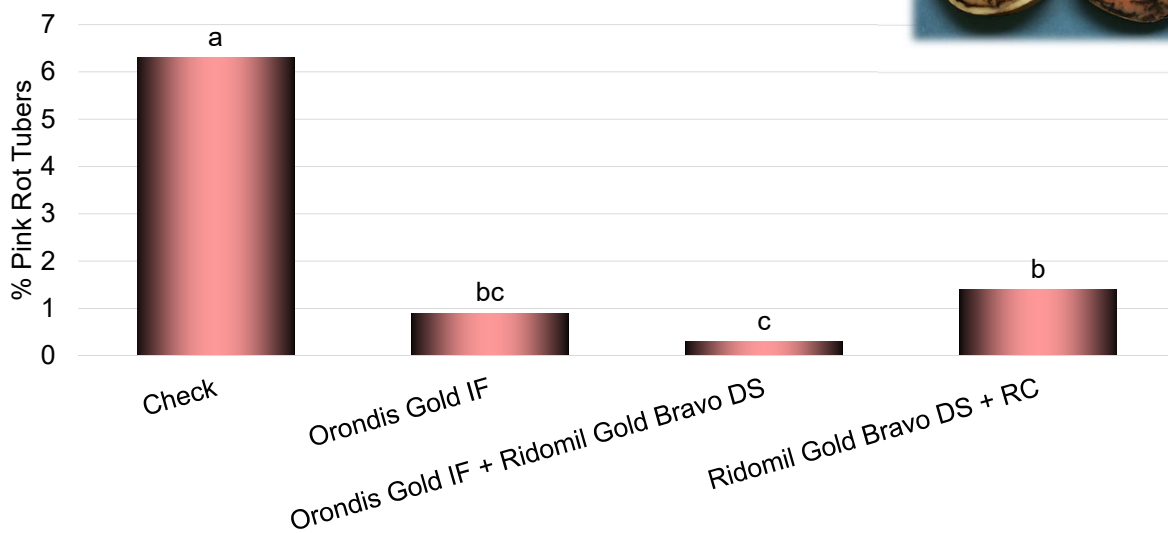


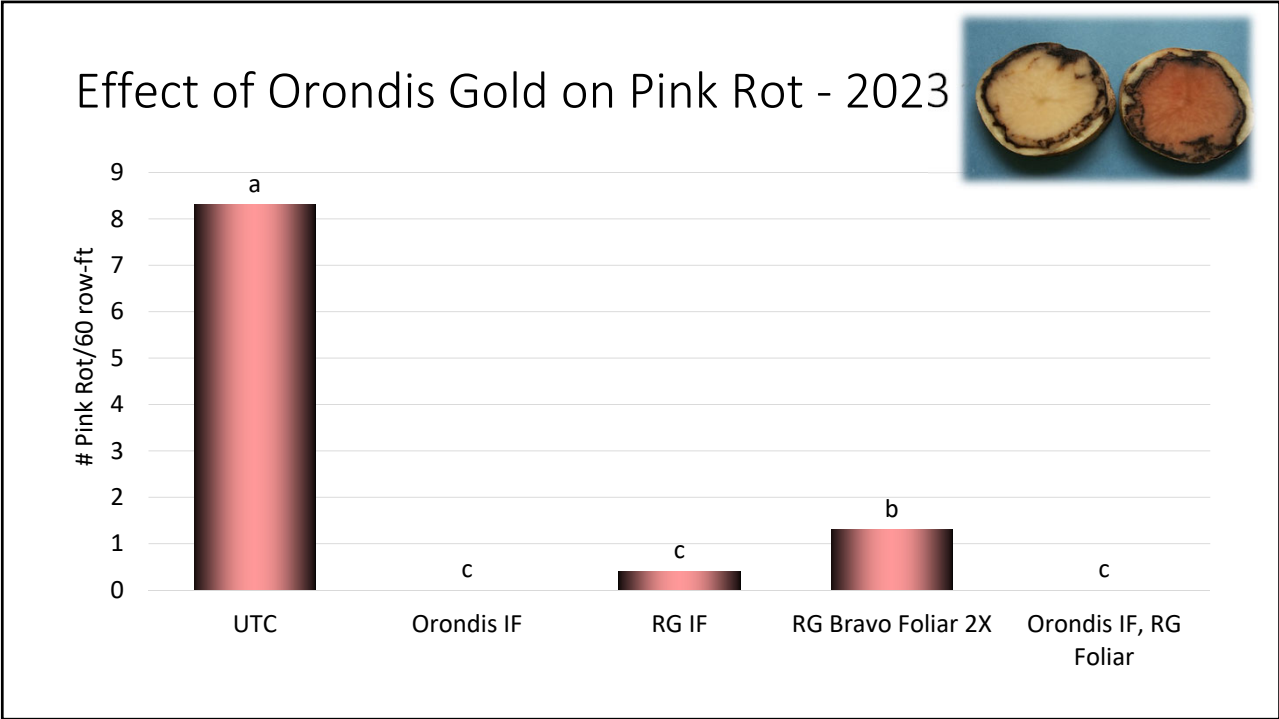
Pink Rot Management

1. Field selection/crop rotation
2. Adjust soil pH by lime application in low pH soils
3. Plant less susceptible varieties
4. Proper irrigation management
5. Use appropriate fungicides
 - Orondis Gold in-furrow is a newer effective option
6. Avoid “disease-favorable” conditions at harvest
7. Apply post-harvest fungicides
8. Grade out infected tubers going into storage
9. Reduce tuber pulp temperatures to 55°F or lower



Effect of Orondis Gold on Pink Rot - 2018





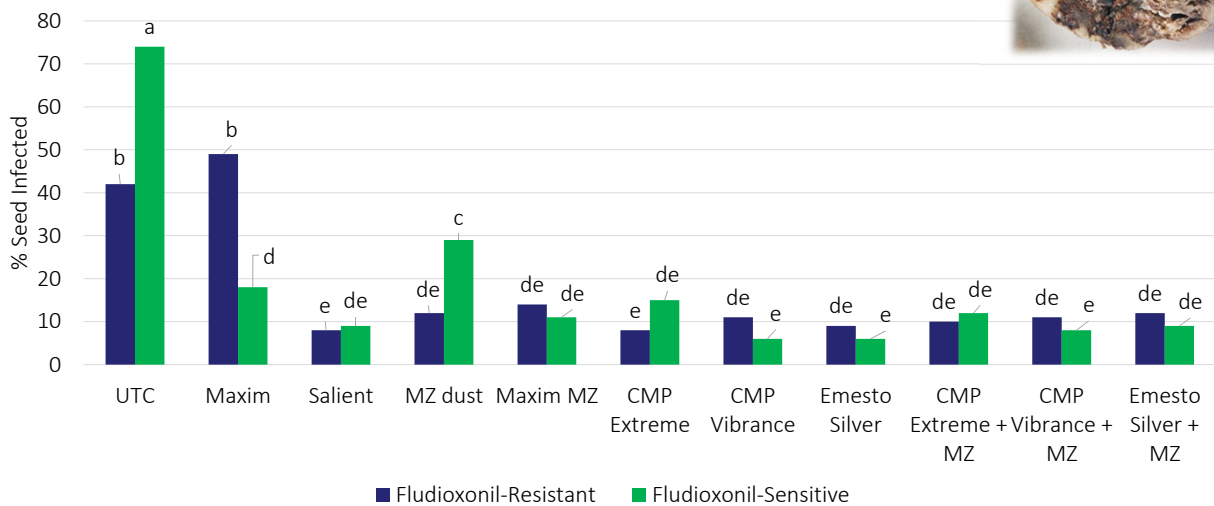
Seed Treatment Options – Fusarium Dry Rot

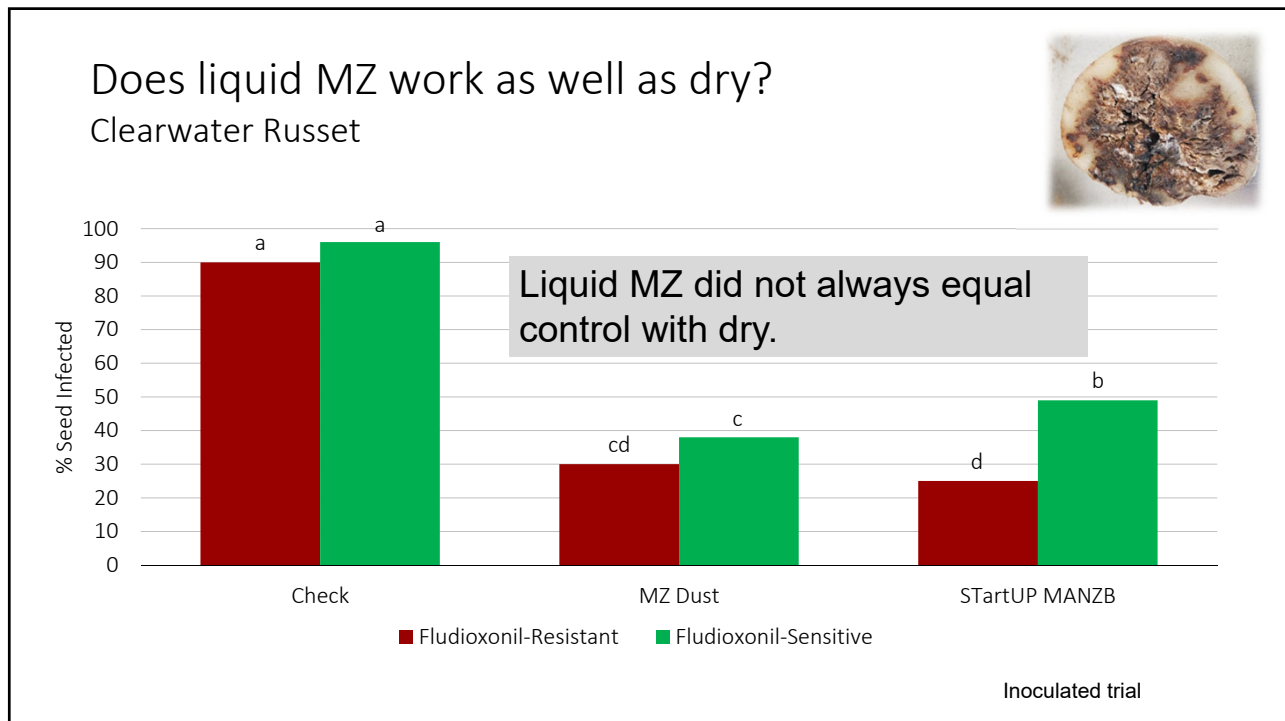
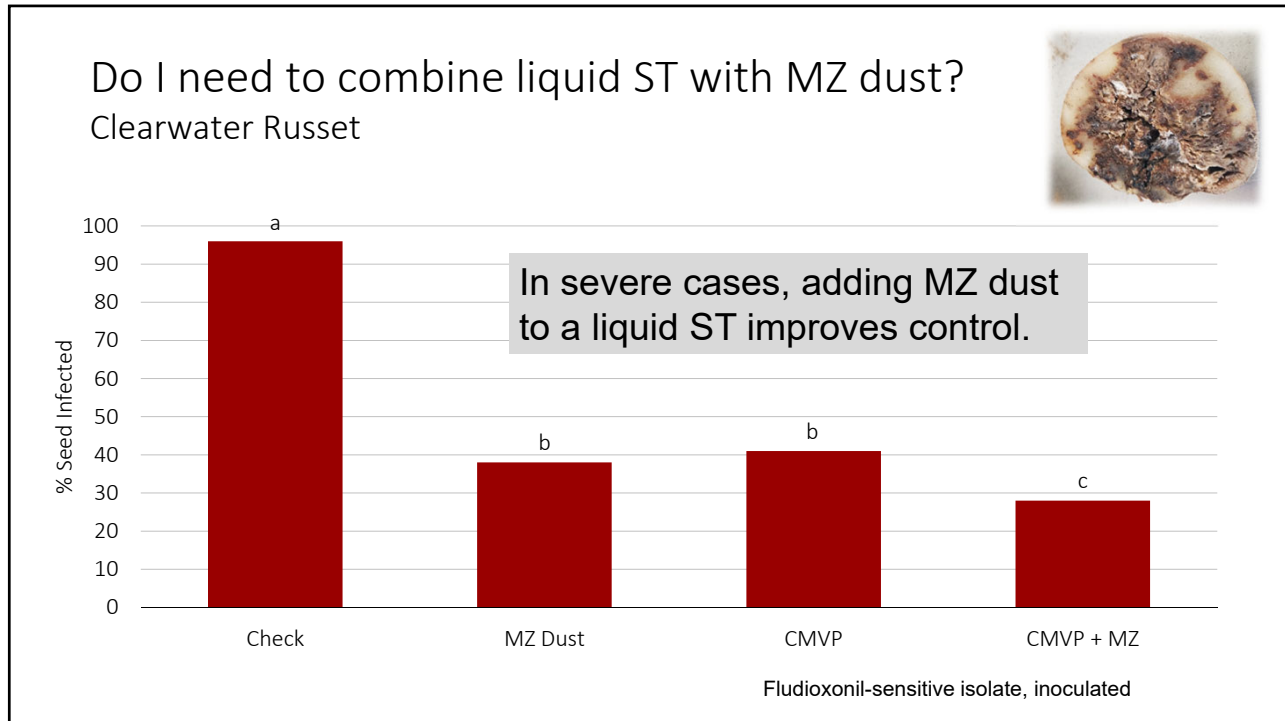
Product	Form	M3	Group 12	Group 3	Group 7	Cost/A*
MZ Dust	Dust	Mancozeb				19
Maxim MZ	Dust	Mancozeb	Fludioxonil			73
Moncoat MZ	Dust	Mancozeb			Flutolanil	
STartUP MANZB	Liquid	Mancozeb				
Maxim 4 FS	Liquid		Fludioxonil			21
Spirato	Liquid		Fludioxonil			
STartUP FLUDI	Liquid		Fludioxonil			
CruiserMaxx Potato Extreme	Liquid		Fludioxonil	Difenoconazole		29
CruiserMaxx Potato Vibrance	Liquid		Fludioxonil	Difenoconazole	Sedaxane	29
Emesto Silver	Liquid			Prothioconazole	Penflufen	20
Salient	Liquid			Difenoconazole		

*25 cwt/acre planting rate

Fusarium Dry Rot Incidence - 2021

Clearwater Russet

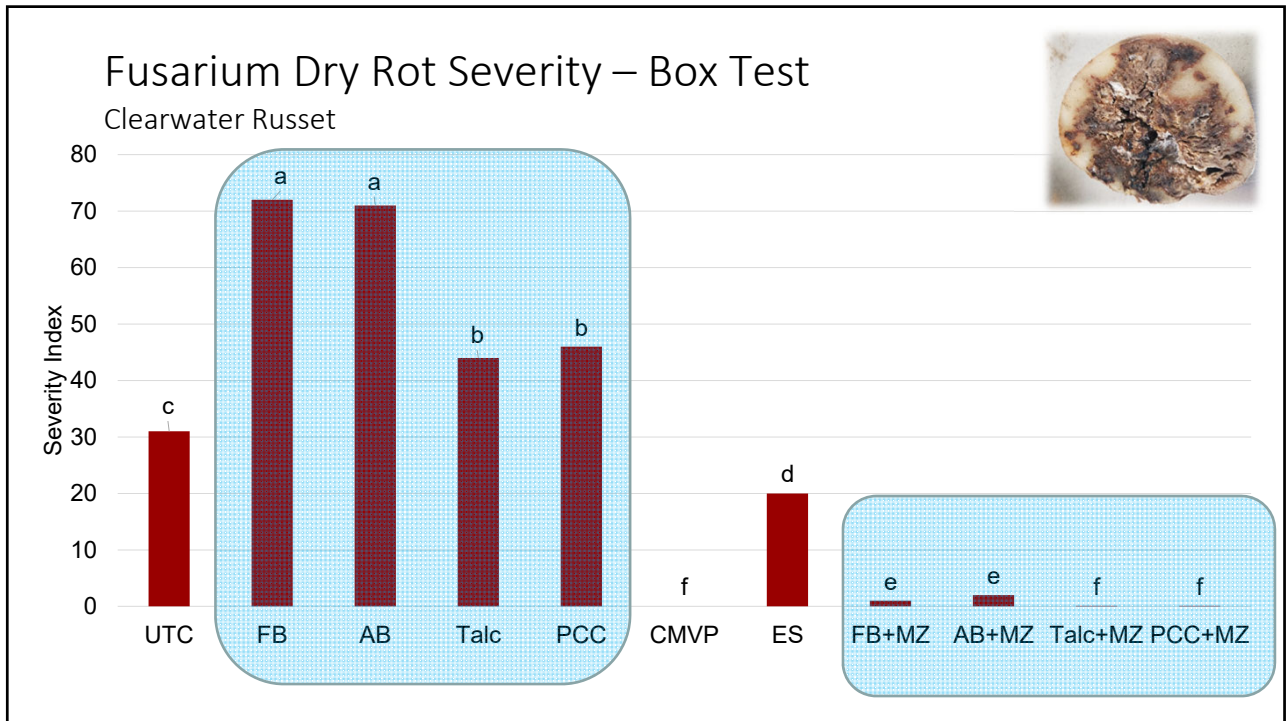


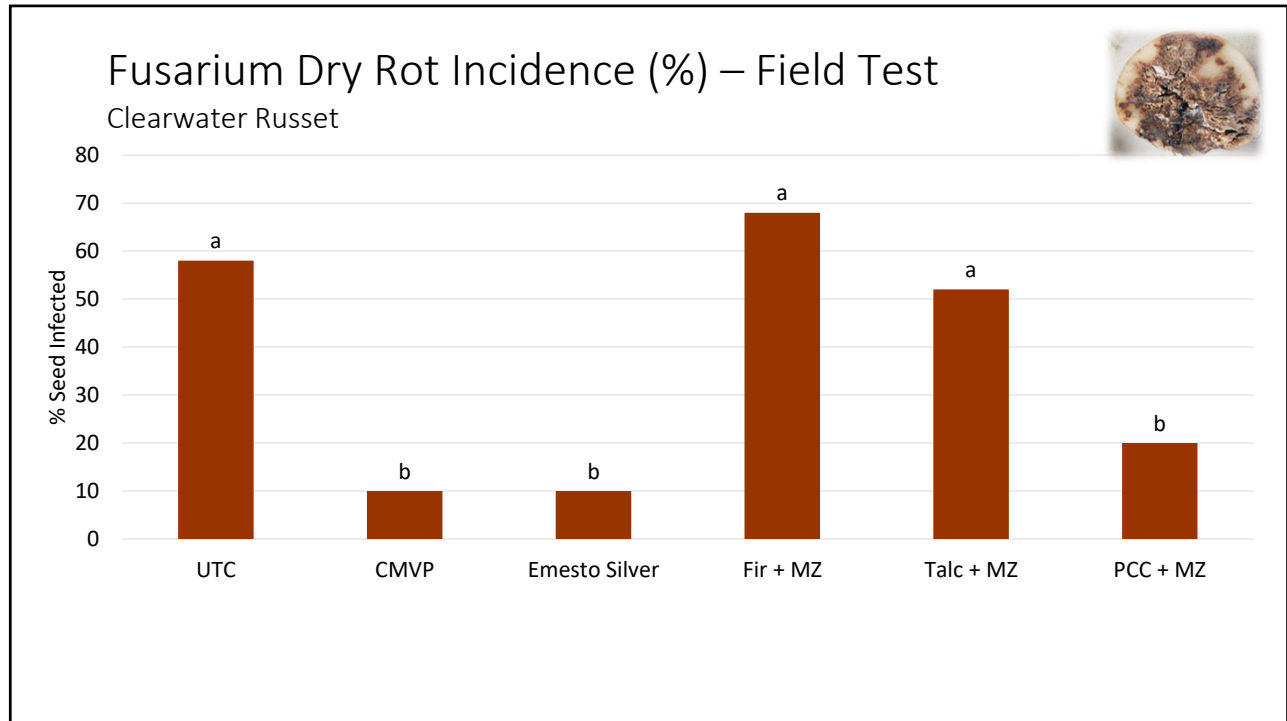


Preliminary Box Test – 2023-2024



Fir bark	Alder bark	Talc	PCC Lime	Compost
Fir bark + MZ	Alder bark + MZ	Talc + MZ	PCC Lime + MZ	Compost + MZ
CruiserMaxx Vibrance Potato	Emesto Silver	Untreated check		





Main Observations

- Liquid and dry options still effective.
- Fir and alder bark alone increase dry rot
- PCC lime has been an effective carrier for MZ



Thank You!

