



MICHIGAN SUGARBEET
REACH
Research & Education Advisory Council

2020 Research Results

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MISSION STATEMENT:

The mission of the **Michigan Sugarbeet Research Education Advisory Council** is to be the central trusted source of agronomic information for the sugarbeet industry.

The council will provide direction for the Michigan-Ontario sugarbeet researchers and assemble and distribute research/agronomy information.

Cooperative educational efforts will be conducted with the goal of improving productivity and profitability for all stakeholders.

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2020 Research Results

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RESEARCH SPECIALISTS:

MICHIGAN SUGAR COMPANY

Corey Guza, PhD, Director of Agronomy

Cell.....989.415.3419

Emailcorey.guza@michigansugar.com

Jim Stewart, Director of Research

Cell.....989.225.6720

Emailjames.stewart@michigansugar.com

Dennis Bischer, Agronomist

Cell.....989.551.4416

Emaildennis.bischer@michigansugar.com

Brian Groulx, Research Assistant

Cell.....989.225.6709

Emailbrian.groulx@michigansugar.com

MICHIGAN STATE UNIVERSITY

Tom Wenzel, Research Technician

Cell.....989.737.9447

Emailwenzelth@msu.edu

Daniel Bublit, SBA Director

Cell.....989.392.7805

Emailbublitd@msu.edu

CORPORATE AGRICULTURAL OFFICE

122 UpTown Dr. Suite 300

Bay City, MI 48708

Telephone (989) 686-0161 - Fax (989) 671-3714



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Rhizoctonia Crown Rot Product Efficacy Trial

Answer Plot, Bach - 2020

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Trial Quality: Fair

Variety: HIL-2240

Planted: April 20

Harvested: Oct 6

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 tractor mounted plot sprayer, compressed air, 30 psi, 15.3 gpa- Foliar 7" band

Monosem 6-row Agronomy Planter, compressed air, 30 psi, 9 gpa - IF, 3.5" band

Soil Info: Clay Loam

% OM: 2.9 **pH:** 7.3 **CEC:** 16.6

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side dress

Prev Crop: Soy Beans

Rhizoc Level: Moderate

Cerc Control: Fair

Problems: None

Seeding Rate: 4.5 in.

Rainfall: 20.7 in.

Beets/100 ft: ~197

No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets / 100 ft	Vigor*	Net \$/A	RWSA	RWST	T/A	% SUC
						20-Aug					
15	Quadris	10 fl oz	At Plant	In-Fur	2.4	8.1	\$2,451	12603	310	40.6	19.8
	Topsin	20 fl oz	At Plant	In-Fur							
4	Quadris	10 fl oz	At Plant	In-Fur	4.1	8.4	\$2,309	11950	299	40.1	19.0
	Quadris	14.25 fl oz	6 lf	Banded							
3	Quadris	14.25 fl oz	6 lf	Banded	4.3	8.3	\$2,392	12316	301	40.9	19.2
8	Xanthion A	1.8 fl oz	At Plant	In-Fur	4.7	8.5	\$2,457	12646	297	42.7	18.9
	Xanthion B	9 fl oz	At Plant	In-Fur							
	Quadris	14.25 fl oz	6 lf	Banded							
6	Quadris	15.5 fl oz	18 lf	Banded	5.0	8.0	\$2,314	11927	302	39.5	19.3
14	Propulse	13.6 fl oz	At Plant	In-Fur	5.2	8.1	\$2,328	12121	310	39.0	19.7
10	Proline 480 SC	5.7 fl oz	At Plant	In-Fur	5.4	8.4	\$2,446	12589	309	40.8	19.8
16	Quadris	10 fl oz	At Plant	In-Fur	5.4	8.5	\$2,456	12793	310	41.2	19.8
	Topsin	20 fl oz	At Plant	In-Fur							
	Quadris	14.25 fl oz	6 lf	Banded							
	Topsin	20 fl oz	6 lf	Banded							
5	Quadris	15.5 fl oz	6 lf	Banded	7.1	8.6	\$2,565	13206	307	43.0	19.6
17	Quadris	9.2 fl oz	At Plant	In-Fur	7.5	8.3	\$2,310	11989	302	39.6	19.4
	Proline 480 SC	5.7 fl oz	6 lf	Banded							
12	Quadris	10 fl oz	At Plant	In-Fur	10.6	8.4	\$2,312	11952	295	40.4	18.9
	Serifel	4 oz	At Plant	In-Fur							
13	Propulse	13.6 fl oz	At Plant	In-Fur	11.4	7.9	\$2,262	11898	302	39.4	19.2
	Quadris	14.25 fl oz	6 lf	Banded							
18	Minuet	12.8 fl oz	At Plant	In-Fur	11.6	8.1	\$2,266	11812	294	40.1	18.9
	Quadris	9.2 fl oz	At Plant	In-Fur							
	Proline 480 SC	5.7 fl oz	6 lf	Banded							

*Vigor: 0 to 10 ratings, 10 is the best.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Rhizoctonia Crown Rot Product Efficacy Trial

Answer Plot, Bach - 2020

(Page 2 of 2)

No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets / 100 ft	Vigor* 20-Aug	Net \$/A	RWSA	RWST	T/A	% SUC
2	Quadris	10 fl oz	At Plant	In-Fur	11.9	8.31	\$2,261	11624	302	38.4	19.2
11	Proline 480 SC	5.7 fl oz	At Plant	In-Fur	12.9	7.69	\$2,332	12124	303	40.0	19.5
	Quadris	14.25 fl oz	6 lf	Banded							
9	Headline	9 fl oz	At Plant	In-Fur	13.4	8.00	\$2,318	11926	305	39.1	19.4
7	Xanthion A	1.8 fl oz	At Plant	In-Fur	15.9	8.00	\$2,151	11076	282	39.2	18.2
	Xanthion B		At Plant	In-Fur							
1	Untreated Check				16.4	8.00	\$2,333	11902	294	40.4	18.8
Average					8.6	8.20	\$2,348.0	12136.3	301.4	40.25	19.25
LSD 5%					13.3	0.61	289.6	1477.3	16.9	4.37	0.95
CV%					108.4	5.2	8.7	8.6	4.0	7.6	3.5

*Vigor: 0 to 10 ratings, 10 is the best.

Comments: This trial was designed to test fungicides for Rhizoctonia Crown and Root Rot.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

Mid-Season Root Disease Mngt Ackerman Brothers Farm, Reese - 2020

Trial Quality: Good
Variety: C-G752NT
Plot Size: 5 reps
Row Spacing: 22 inch

Soil Type: Loam
Prev Crop: Corn
Weather: Moderate rain after planting, periods of dry weather in summer

Rhizoc Control: Fair control: Quadris I.F. (6 oz), 6-8 leaf (12 oz), additional materials below

Other Pests: Aphanomyces, Fusarium

Treatment	Dead Beets / 1200 Ft
Check	124
Topsin	133
Quadris	140

Average	132
LSD 5%	N.S.
CV %	57.4

Comments: On July 10, the SBA team was asked to investigate a root disease issue at this location near Reese. Rhizoctonia root rot was the primary disease, but Aphanomyces and Fusarium root rots were also found. After confirming the diagnosis and discussing the field with colleagues at MSU, the USDA, and MSC, the decision was made to set up a trial to determine if a mid-season application of either Quadris or Topsin would help to reduce the impact of these diseases. On July 24, beets were treated with 15.5 oz/acre of broadcast Quadris, 20 oz/acre of broadcast Topsin, or remained untreated. A count of the number of beets that were dead or dying in 1200 foot of row was taken on September 4. No significant difference in the dead beet count was found between any of the treatments. Leaf spot management in this field was very good, with the program as follows: 6/24 EBDC only, 7/1 Delaro + Proline, 7/20 Tin, 8/7 Provysol, 8/31 Tin. All applications included EBDC and a spreader/sticker.

Quadris with Adjuvants Wishowski Farms, Auburn - 2020

Trial Quality: Fair
Variety: SX-2283
Plot Size: 3 reps
Row Spacing: 30 inch

Soil Type: Loamy sand
Prev Crop: Corn
Weather: Excess rain in May. Periods of drought in summer

Rhizoc Control: Good control: AZteroid I.F. (4.2 oz), 8-10 leaf materials below

Other Pests: N/A

Treatment	Dead Beets / 1200 Ft
Rainier EA + Quadris	22
Quadris	34
MasterLock + Quadris	55
EBDC + Quadris + Masterlock	60
Check	104

Average	55
LSD 5%	N.S.
CV %	68.5

Comments: The efficacy of Quadris in part depends on its ability to move into the soil and impact the disease. The goal of this study was to determine the impact different adjuvants have on the mobility and efficacy Quadris. Two types of adjuvants were tested, both of which were applied with Quadris at 10.5 oz/acre in a 7 inch T-band in 10 gpa of water on June 26. The first was Rainier EA (7.5 oz/acre), a spreader from Wilbur-Ellis. It was hypothesized this adjuvant could help Quadris by improving its mobility. The second was MasterLock (1.5 oz/acre), a common spreader-sticker from Winfield. Before the experiment it was hypothesized this adjuvant could decrease the efficacy of Quadris by limiting its mobility. One treatment included both MasterLock and an EBDC (0.8 oz/acre) in a 15 inch T-band to see if this would aid in CLS management. The check received no second Quadris application. All treatments previously received AZteroid in-furrow at 4.2 oz/acre. The impact of the treatments was measured by a dead beet count on Oct 21. No significant differences in dead beet count were found between the different treatments, but this idea may be worth investigating more in the future. CLS management was good, with the following fungicide materials were as follows: 1. Inspire XT, 2. Tin, 3. Lucento (Topguard + SDHI), 4. Tin, 5. Badge. No difference in CLS levels between the treatments was observed.

N.S. – not significant

Rhizoctonia Management

VanDenBoom Farms, Munger - 2020

Trial Quality: Very Good

Soil Type: Loam

Rhizoc Control: See treatments.

Variety: See below

Fertilizer: Fall: 250# potash; 2x2: 41#-

Planted: April 19

22#-1.2#-11.4S-.2Zn + B & Mn;

Cerc Control: Good control: See treatments

Harv/Samp: Oct 26 / Oct 7

S.D.: 50 gal of 28%

Plot Size: 4 reps

Prev Crop: Corn

Row Spacing: 28 inch

Weather: Excessive rains early in the season. Periods of drought during the summer.

Other Pests: N/A

Seeding Rate: 55,000

Variety	Quadris Apps	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets / 1200 Ft
								15 Day	39 Day	
B-1606N	IF	\$1,883	12151	287	42.4	18.9	95.6	174	236	29
B-1606N	Both	\$1,882	12140	280	43.3	18.5	95.5	—	—	4
B-1606N	Foliar	\$1,866	12038	283	42.5	18.8	95.8	—	—	11
B-1606N	None	\$1,771	11423	278	41.1	18.5	95.7	184	226	89
SX-1278N	Both	\$1,649	10636	297	35.8	19.6	95.6	—	—	222
SX-1278N	IF	\$1,528	9855	296	33.3	19.5	95.7	63	220	498
SX-1278N	Foliar	\$1,473	9503	289	32.8	19.1	95.7	—	—	361
SX-1278N	None	\$1,293	8342	293	28.5	19.3	95.7	68	206	699

Average	\$1,668	10761	288	37.5	19.0	95.7	122	222	239
LSD 5%	85.8	553.3	N.S.	1.6	N.S.	N.S.	N.S.	N.S.	114.8
CV %	3.5	3.5	2.6	2.9	2.3	0.2	15.7	6.6	32.7

Comments: This trial was done to test four combinations of Quadris applications on varieties with different levels of Rhizoctonia resistance. The goal was to see if two applications of Quadris are still needed to control Rhizoctonia in some of the better resistant varieties available. The variety B-1606N has good resistance to root diseases and variety SX-1278N is one of the most susceptible to root diseases. Both varieties have high yield potential and have performed well in SBA variety trials when Rhizoctonia is not excessive. This field had a very high level of Rhizoctonia as can be seen in the dead beet counts. These counts are the number of beets that were dead or dying in a fall count of 1200 foot of row. This field had excess rain in May and irrigation (1.75" each time) applied 3 times in the summer during dry periods. This extra water likely contributed to the high rate of Rhizoctonia. The T-band in-furrow applications of Quadris were 6.4 oz/acre with 4 oz/acre of Mustang. The check treatments did not receive either Quadris or Mustang. The foliar applications were 11.25 oz/acre applied in a 7" band on June 15 at the 8-10 leaf stage. Variety SX-1278N seemed to be delayed at emergence and was about 1 leaf stage behind B-1606N during the early part of the season. The reason for the delay is unknown and was not seen in SBA variety trials this year, but it likely was a part of the difference in yield between the 2 varieties. The leafspot program was as follows: 6/22 EBDC, 7/3 Delaro + Proline + EBDC, 7/17 Tin + EBDC, 7/25 Provysol + EBDC, 8/7 EBDC, 8/15 Tin + EBDC, 8/30 Inspire XT + EBDC, 9/14 Tin . All applications included MasterLock.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Propulse vs Quadris In-Furrow

M & K Farms, Quanicassee - 2020

Trial Quality:	Excellent	Soil Type:	Loam	Rhizoc Control:	Very good control: See treatments and comments
Variety:	B-1606N	Fertilizer:	Fall: V.R. potash; 2x2: 21 gal of 23-9-0-1.1S + B & Mn; S.D.: 45 gal of 28%		
Planted:	April 20			Cerc Control:	Good control: See comments for materials
Harv/Samp:	Oct 31 / Oct 7				
Plot Size:	5 reps*	Prev Crop:	Corn		
Row Spacing:	28 inch	Weather:	Heavier than desired rains in May, periods of dry weather through the summer	Other Pests:	N/A
Seeding Rate:	55,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets/ 1200Ft	Sugarbeet Cyst Nematode		
							15 Day	46 Day		Cysts	Eggs	J2's
Propulse	\$1,772	11434	278	41.2	18.4	95.6	138	224	10	1	100	4
Quadris	\$1,763	11375	271	41.9	18.0	95.4	136	230	14	3	109	11
Check	\$1,760	11352	274	41.4	18.2	95.4	159	230	19	2	240	17
Average	\$1,765	11387	274	41.5	18.2	95.4	145	228	14	2	150	11
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	1.7	1.7	2.1	1.3	1.8	0.3	23.5	4.4	98.3	103.3	111.2	128.5

Comments: This trial was done to evaluate an in-furrow application of Propulse fungicide (Bayer Crop Science) for effectiveness on Rhizoctonia and sugarbeet cyst nematode. Propulse fungicide is the combination of prothioconazole (active ingredient in Proline) and fluopyram. Bayer representatives believe that fluopyram may help in control of sugarbeet cyst nematode. Propulse at 10 oz/acre was compared to Quadris at 7 oz/acre. Neither treatment included an insecticide. The Check treatment did not have any in-furrow fungicide or insecticide. The Propulse and Quadris treatments were applied in a T-band with water at 5 GPA. None of the trial received any foliar Quadris. Even with no foliar Quadris, disease pressure in this trial was very low with the untreated check only having an average Rhizoctonia dead beet count of 19. Sugarbeet cyst nematode (SBCN) samples were taken in the fall in 100 feet of row in each of the replications. Any potential nematode help from Propulse did not result in a yield or sugar improvement. The leafspot program was as follows: 6/30 Inspire XT, 7/14 Priaxor, 7/28 Tin, 8/7 Delaro + Proline, 8/26 Tin, 9/10 Topguard. All applications included an EBDC and MasterLock.

**7 reps were used for population beet data.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Azoxystrobin sensitivity of *Rhizoctonia solani* AG2-2 populations affecting Michigan sugar beet

Jaime F. Willbur¹, Chris Bloomingdale¹, Cameron Pincumbe¹, Carly Hendershot¹, Alexandra Hernandez¹, Emma Schlachter¹, Douglas H. Minier¹, Linda E. Hanson²; ¹Michigan State University, ²USDA-ARS

Summary: From 2018-2019, *Rhizoctonia solani* primarily AG 2-2 isolates were tested for sensitivity to azoxystrobin. In Michigan, azoxystrobin (Quadris) is widely applied one to two times per season to manage *Rhizoctonia* root and crown rot. Azoxystrobin, a quinone outside inhibitor, targets a single site to inhibit fungal respiration and so possesses a high risk of fungicide resistance development. Continued reliance on this product has justified recent investigations of azoxystrobin sensitivity in Michigan *R. solani* populations. Isolates were collected from research and commercial fields in Michigan (10 counties). Two additional baseline isolates (R1 and R9), collected prior to azoxystrobin use in sugar beet, were included for comparison. Isolates were screened in half-strength clarified V8 broth amended with salicylhydroxamic acid at 10 µg ml⁻¹ and azoxystrobin at concentrations: 0, 0.01, 0.1, 1, 10, and 100 µg ml⁻¹. The effective concentrations for 50% inhibition of colony mass (EC₅₀) were determined using three-parameter logistic regression. The majority of tested isolates were comparable to baseline isolates. Thus far, azoxystrobin insensitivity was not observed in Michigan *R. solani* populations. No trends in year of collection, host of origin, or county of origin were observed.

Table 1. Mean, standard deviation, minimum, and maximum azoxystrobin EC₅₀ values (µg ml⁻¹) for baseline and nonbaseline *Rhizoctonia solani* AG 2-2 isolates tested in 2018 and 2019.

Tested	Collected	Isolate Group	N	Mean	St. Dev.	Min.	Max.
2018	Pre-1999	Baseline	2	0.025	0.001	0.025	0.026
	2015-2018	Nonbaseline	37	0.050	0.095	0.012	0.606
2019	Pre-1999	Baseline	2	0.014	0.003	0.012	0.016
	2019	Nonbaseline	49	0.228	0.983	0.005	4.956

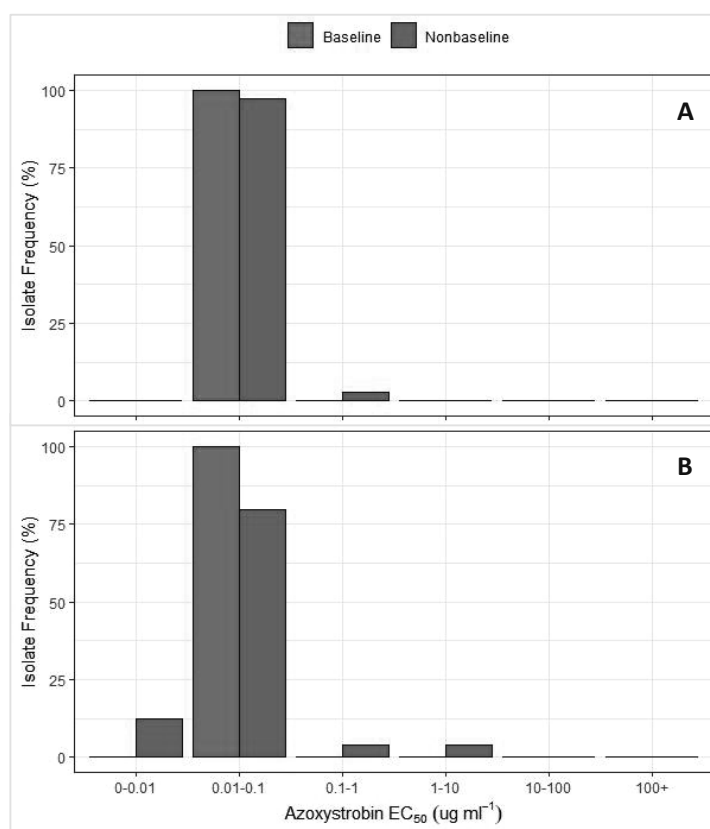


Figure 1 (left). Frequencies of *Rhizoctonia solani* primarily AG 2-2 EC₅₀ values (µg ml⁻¹) for baseline isolates collected pre-1999 and nonbaseline isolates collected A, between 2015 and 2018 (N = 37), and B, in 2019 (N = 49).

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Evaluation of in-furrow fungicides to manage Rhizoctonia root and crown rot of sugar beet

Chris Bloomingdale and Jaime Willbur, Michigan State University

Location: Frankenmuth (SVREC)	Treatment Timings: In-Furrow & Banded (6-8 leaf stage)
Planting Dates: May 5, 2020	Pesticides: see table
Soil Type: Loam	O.M.: 5.0 pH: 7.5
Replicates: 4	Variety: HIL-9879NT

Summary: No differences were observed in the percent stand loss of treatments ($P > 0.05$), which had mean values ranging between 1.6-14.7%. Mean yield values ranged between 15.4-19.7 t/A but were not significantly different among treatment programs ($P > 0.05$). Significant differences were observed in Rhizoctonia root rot index ratings at harvest ($P = 0.05$). DX values ranged from 3.9 to 9.8%, and though differences were detected among fungicide programs, no program differed from the controls.

Table 1. End of season stand loss, Rhizoctonia root rot index, and yield from the tested fungicide programs.

No.	Treatment, Rate ^a	Application Type ^b	Stand Loss (%)	Yield (t/A)	Disease Index (%) ^{c, d}
3	Quadris, 9.2 fl oz Proline, 5.7 fl oz	In-Furrow Banded	1.6	18.6	3.9 c
9	Actinovate AG, 6 oz Excalia, 2 fl oz	In-Furrow Banded	4.4	19.2	3.9 c
11	Elatus, 7 oz Elatus, 7 oz	In-Furrow Banded	8.4	17.9	3.9 c
8	Excalia, 4 oz	Banded	6.5	19.7	4.3 bc
10	Quadris, 13.9 fl oz Quadris, 13.9 fl oz	In-Furrow Banded	4.6	15.4	4.3 bc
6	Quadris, 12 fl oz	Banded	5.4	17.4	4.4 bc
7	Excalia, 2 fl oz	Banded	11.6	18.7	4.9 bc
2	Non-Inoculated Control ^e	-	5.2	19.0	6.1 abc
4	Experimental, 12.8 fl oz Quadris, 9.2 fl oz Proline, 5.7 fl oz	In-Furrow In-Furrow Banded	11.9	18.2	7.5 abc
1	Inoculated Control ^e	-	13.1	17.1	7.6 abc
12	Quadris, 13.9 fl oz Elatus, 7 oz	In-Furrow Banded	14.7	17.6	8.4 ab
5	Quadris, 12 fl oz	In-Furrow	7.6	17.5	9.8 a

^a All rates are listed as measure of a product per acre.

^b In-furrow treatments were applied at planting, banded applications were applied at the 6-8 leaf stage.

^c Disease index was calculated by multiplying the Rhizoctonia root rot incidence (0-100%) by the mean symptomatic root severity (1-7) and dividing by 7.

^d Column values followed by the same letter were not significantly different based on Fisher's Protected LSD ($\alpha=0.05$).

^e Non-treated.



Evaluate Fungicide Application Timings (BEETcast) for control of

Cercospora Leafspot - Blumfield West - Richville, MI - 2020

(Page 1 of 8)

Trial Quality: Good

Varieties: B-1703, C-675,
C-943 & HIL-9865

Planted: April 18

Harvested: Nov 3

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Clay Loam

% OM: 2.5 **pH:** 7.5 **CEC:** 14.9

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, Manure

Previous Crop: Fallow

Rhizoc Level: Moderate

Problems: Spider mites

Seeding Rate: 4.1 in.

Rainfall: 22.81 in.

Beets/100 ft: ~172

No.	Treatment	Variety	# of Applic	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				24-Sep	30-Oct						
5	Less Aggressive	B-1703	4	0.00	0.14	\$1,682	11676	328	35.6	21.2	96.7
3	More Aggressive	B-1703	6	0.00	0.16	\$2,060	14401	333	43.3	21.3	97.1
2	Standard	B-1703	5	0.01	0.34	\$1,840	12743	327	39.0	20.8	97.6
4	1st and 15th	B-1703	7	0.00	0.36	\$1,617	11875	325	36.6	20.8	97.4
6	Farm Q&A	B-1703	9	0.01	0.36	\$1,822	13387	339	39.5	21.5	97.8
1	Untreated Check	B-1703	0	3.07	12.10	\$1,691	10907	311	35.0	20.5	95.8
8	Standard	C-675	6	0.00	0.12	\$1,930	13720	336	41.0	21.3	97.6
9	More Aggressive	C-675	6	0.00	0.13	\$1,970	13957	334	41.9	21.1	98.0
10	1st and 15th#	C-675	6	0.00	0.13	\$1,670	11882	344	34.5	21.7	97.9
12	Farm Q&A	C-675	9	0.01	0.18	\$1,944	14112	342	41.3	21.6	97.9
11	Less Aggressive	C-675	5	0.01	0.23	\$1,732	12109	342	35.4	21.7	97.8
7	Untreated Check	C-675	0	7.02	15.25	\$1,831	11815	310	38.4	19.8	97.6
29	3 Spray Late	C-943	3	0.01	0.09	\$1,607	11122	318	35.2	21.1	95.5
30	Farm Q&A	C-943	9	0.01	0.11	\$1,818	13462	310	43.5	20.5	95.7
21	More Aggressive	C-943	4	0.01	0.11	\$1,896	13134	312	42.3	20.5	96.0
23	Old Standard	C-943	3	0.01	0.13	\$1,665	11498	324	35.5	21.0	96.5
27	2 Spray	C-943	2	0.00	0.14	\$1,858	12464	306	40.6	20.1	96.2
28	1 Spray Late	C-943	1	0.01	0.16	\$1,566	10377	306	34.0	20.3	95.5
26	1 Spray Early	C-943	1	0.01	0.18	\$1,695	11213	290	38.8	20.0	93.9
25	1st and 15th	C-943	7	0.00	0.22	\$1,847	13368	317	42.2	20.8	96.0
24	Less Aggressive Early	C-943	2	0.01	0.34	\$1,675	11285	301	37.6	20.1	95.4
20	Standard	C-943	3	0.00	0.35	\$1,743	12001	315	38.1	20.6	96.2
22	Less Aggressive Late	C-943	2	0.01	0.36	\$1,658	11177	318	35.2	20.9	95.9
19	Untreated Check	C-943	0	0.01	1.40	\$1,684	10867	303	35.9	20.2	95.2
15	More Aggressive	HIL-9865	7	0.00	0.14	\$1,891	13638	331	41.3	21.3	96.9
18	Farm Q&A	HIL-9865	9	0.01	0.14	\$1,838	13491	324	41.6	20.8	97.1
17	Less Aggressive	HIL-9865	6	0.01	0.16	\$1,556	11307	331	34.2	21.0	97.8
16	1st and 15th	HIL-9865	7	0.01	0.18	\$1,410	10539	330	32.0	21.0	97.5
14	Standard	HIL-9865	6	0.01	0.62	\$1,650	11690	321	36.7	20.6	97.2
13	Untreated Check	HIL-9865	0	8.60	12.10	\$1,490	9615	318	30.3	20.5	97.0
Average				0.63	1.55	\$1,744.5	12161.0	321.4	37.87	20.82	96.67
LSD 5%				3.60	1.56	228.5	1474.4	15.1	4.91	0.76	1.30
CV %				408.4	71.6	9.3	8.6	3.3	9.2	2.6	1.0

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

#C-675 - 1st and 15th was sprayed on the same spray intervals as the More Aggressive treatment. Thus the reason for one less spray vs the 1st and 15th with other varieties. The products sprayed between the 1st and 15th were different than the More Aggressive treatment.



Evaluate Fungicide Application Timings (BEETcast) for control of

Cercospora Leafspot - Blumfield West - Richville, MI - 2020 (Page 2 of 8)

RWSA												
Program	Trt	# Spray	943	Trt	# Spray	1703	Trt	# Spray	675	Trt	# Spray	9865
Untreated	19	0	10867	1	0	10907	7	0	11815	13	0	9615
Standard	20	3	12001	2	5	12743	8	6	13720	14	6	11690
More Aggr	21	4	13134	3	6	14401	9	6	13957	15	7	13638
1st & 15th	25	7	13368	4	7	11875	10#	6	11882	16	7	10539
Less Aggr	X	X	X	5	4	11676	11	5	12109	17	6	11307
Less Aggr Late	22	2	11177	X	X	X	X	X	X	X	X	X
Old Standard	23	3	11498	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	11285	X	X	X	X	X	X	X	X	X
1 Spray Early	26	1	11213	X	X	X	X	X	X	X	X	X
2 Spray	27	2	12464	X	X	X	X	X	X	X	X	X
1 Spray Late	28	1	10377	X	X	X	X	X	X	X	X	X
3 Spray Late	29	3	11122	X	X	X	X	X	X	X	X	X
Farm Q&A	30	9	13462	6	9	13387	12	9	14112	18	9	13491

RWST												
Program	Trt	# Spray	943	Trt	# Spray	1703	Trt	# Spray	675	Trt	# Spray	9865
Untreated	19	0	303	1	0	311	7	0	310	13	0	318
Standard	20	3	315	2	5	327	8	6	336	14	6	321
More Aggr	21	4	312	3	6	333	9	6	334	15	7	331
1st & 15th	25	7	317	4	7	325	10#	6	344	16	7	330
Less Aggr	X	X	X	5	4	328	11	5	342	17	6	331
Less Aggr Late	22	2	318	X	X	X	X	X	X	X	X	X
Old Standard	23	3	324	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	301	X	X	X	X	X	X	X	X	X
1 Spray Early	26	1	290	X	X	X	X	X	X	X	X	X
2 Spray	27	2	306	X	X	X	X	X	X	X	X	X
1 Spray Late	28	1	306	X	X	X	X	X	X	X	X	X
3 Spray Late	29	3	318	X	X	X	X	X	X	X	X	X
Farm Q&A	30	9	310	6	9	339	12	9	342	18	9	324

% Leaf Damage October 30th												
Program	Trt	# Spray	943	Trt	# Spray	1703	Trt	# Spray	675	Trt	# Spray	9865
Untreated	19	0	1.40	1	0	12.10	7	0	15.25	13	0	12.10
Standard	20	3	0.35	2	5	0.34	8	6	0.12	14	6	0.62
More Aggr	21	4	0.11	3	6	0.16	9	6	0.13	15	7	0.14
1st & 15th	25	7	0.22	4	7	0.36	10#	6	0.13	16	7	0.18
Less Aggr	X	X	X	5	4	0.14	11	5	0.23	17	6	0.16
Less Aggr Late	22	2	0.36	X	X	X	X	X	X	X	X	X
Old Standard	23	3	0.13	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	0.34	X	X	X	X	X	X	X	X	X
1 Spray Early	26	1	0.18	X	X	X	X	X	X	X	X	X
2 Spray	27	2	0.14	X	X	X	X	X	X	X	X	X
1 Spray Late	28	1	0.16	X	X	X	X	X	X	X	X	X
3 Spray Late	29	3	0.09	X	X	X	X	X	X	X	X	X
Farm Q&A	30	9	0.11	6	9	0.36	12	9	0.18	18	9	0.14

#C-675 - 1st and 15th was sprayed on the same spray intervals as the More Aggressive treatment. Thus the reason for one less spray vs the 1st and 15th with other varieties. The products sprayed between the 1st and 15th were different than the More Aggressive treatment.



Evaluate Fungicide Application Timings (BEETcast) for Control of

Cercospora Leafspot - Gruehn - Owendale, MI - 2020

(Page 3 of 8)

Trial Quality: Good

Varieties: B-1703, C-675,
C-943 & HIL-9865

Planted: April 22

Harvested: Oct 20

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Sandy Clay Loam

% OM: 2.4 **pH:** 6.9 **CEC:** 9.5

P: Above Opt. **K:** Opt.

Mn: High **B:** Medium

Added N: 35 lbs. 2x2,
85 lbs. PPI, 50 lbs. side- dress

Previous Crop: Wheat

Rhizoc Level: Moderate

Problems: None

Seeding Rate: 4.1 in.

Rainfall: 14.36 in.

Beets/100 ft: ~170

No.	Treatment	Variety	# of Applic	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	20-Oct						
3	More Aggressive	B-1703	6	0.01	0.03	\$1,816	12826	322	39.8	21.0	96.4
4	1st and 15th	B-1703	7	0.01	0.04	\$1,728	12590	318	39.6	20.9	95.8
5	Less Aggressive	B-1703	4	0.01	0.04	\$1,935	13314	321	41.5	21.2	95.8
2	Standard	B-1703	5	0.01	0.04	\$1,915	13227	314	42.2	20.8	95.5
6	Farm Q&A	B-1703	9	0.01	0.06	\$1,750	12923	315	41.0	20.8	95.7
1	Untreated Check	B-1703	0	2.09	3.35	\$1,919	12381	317	39.1	20.8	96.0
10	1st and 15th#	C-675	6	0.01	0.01	\$1,856	13085	329	39.8	21.4	96.6
8	Standard	C-675	6	0.01	0.01	\$1,687	12148	316	38.4	20.7	96.3
11	Less Aggressive	C-675	5	0.01	0.02	\$1,748	12215	321	38.0	21.0	96.0
9	More Aggressive	C-675	6	0.01	0.02	\$1,799	12856	322	39.9	21.2	96.0
12	Farm Q&A	C-675	9	0.01	0.03	\$1,920	13958	330	42.3	21.7	95.7
7	Untreated Check	C-675	0	4.65	7.38	\$1,844	11900	311	38.3	20.4	96.2
30	Farm Q&A	C-943	9	0.01	0.01	\$1,790	13277	310	42.8	20.4	96.1
25	1st and 15th	C-943	7	0.01	0.01	\$1,774	12896	316	40.8	20.9	95.7
29	3 Spray Late	C-943	3	0.01	0.01	\$1,863	12776	307	41.7	20.3	95.7
26	1 Spray Early	C-943	1	0.02	0.02	\$1,907	12576	305	41.3	20.3	95.3
24	Less Aggressive Early	C-943	2	0.01	0.02	\$1,865	12509	311	40.2	20.8	95.3
28	1 Spray Late	C-943	1	0.03	0.03	\$1,860	12276	314	39.1	20.7	95.9
23	Old Standard	C-943	3	0.03	0.04	\$1,642	11350	299	37.9	20.0	95.3
27	2 Spray	C-943	2	0.04	0.04	\$1,740	11708	303	38.6	20.3	95.2
22	Less Aggressive Late	C-943	2	0.04	0.04	\$1,781	11971	307	39.0	20.2	96.1
20	Standard	C-943	3	0.02	0.04	\$2,007	13699	311	44.1	20.7	95.2
21	More Aggressive	C-943	4	0.01	0.05	\$1,850	12837	308	41.7	20.7	94.9
19	Untreated Check	C-943	0	0.06	0.09	\$1,742	11237	301	37.3	20.3	94.8
16	1st and 15th	HIL-9865	7	0.01	0.01	\$1,891	13642	334	40.8	21.5	97.0
14	Standard	HIL-9865	6	0.01	0.02	\$1,701	12018	324	37.1	20.8	97.1
15	More Aggressive	HIL-9865	7	0.01	0.03	\$1,866	13477	335	40.3	21.6	96.8
18	Farm Q&A	HIL-9865	9	0.02	0.03	\$1,873	13715	341	40.2	21.9	96.9
17	Less Aggressive	HIL-9865	6	0.02	0.05	\$1,809	12937	327	39.6	21.2	96.6
13	Untreated Check	HIL-9865	0	11.70	12.71	\$1,837	11851	334	35.5	21.4	97.1
Average				0.63	0.81	\$1,823.8	12672.5	317.4	39.93	20.85	95.96
LSD 5%				2.35	2.92	205.3	1324.4	13.0	3.75	0.80	0.78
CV %				265.4	257.5	8.0	7.4	2.9	6.7	2.7	0.6

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

#C-675 - 1st and 15th was sprayed on the same spray intervals as the More Aggressive treatment. Thus the reason for one less spray vs the 1st and 15th with other varieties. The products sprayed between the 1st and 15th were different than the More Aggressive treatment.



Evaluate Fungicide Application Timings (BEETcast) for control of

Cercospora Leafspot - Gruehn - Owendale, MI - 2020

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RWSA												
Program	Trt	# Spray	943	Trt	# Spray	1703	Trt	# Spray	675	Trt	# Spray	9865
untreated	19	0	11237	1	0	12381	7	0	11900	13	0	11851
Standard	20	3	13699	2	5	13227	8	6	12148	14	6	12018
More Aggr	21	4	12837	3	6	12826	9	6	12856	15	7	13477
1st & 15th	25	7	12896	4	7	12590	10#	6	13085	16	7	13642
Less Aggr	X	X	X	5	4	13314	11	5	12215	17	6	12937
Less Aggr Late	22	2	11971	X	X	X	X	X	X	X	X	X
Old Standard	23	3	11350	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	12509	X	X	X	X	X	X	X	X	X
1 Spray Early	26	1	12576	X	X	X	X	X	X	X	X	X
2 Spray	27	2	11708	X	X	X	X	X	X	X	X	X
1 Spray Late	28	1	12276	X	X	X	X	X	X	X	X	X
3 Spray Late	29	3	12776	X	X	X	X	X	X	X	X	X
Farm Q&A	30	9	13277	6	9	12923	12	9	13958	18	9	13715

RWST												
Program	Trt	# Spray	943	Trt	# Spray	1703	Trt	# Spray	675	Trt	# Spray	9865
untreated	19	0	301	1	0	317	7	0	311	13	0	334
Standard	20	3	311	2	5	314	8	6	316	14	6	324
More Aggr	21	4	308	3	6	322	9	6	322	15	7	335
1st & 15th	25	7	316	4	7	318	10#	6	329	16	7	334
Less Aggr	X	X	X	5	4	321	11	5	321	17	6	327
Less Aggr Late	22	2	307	X	X	X	X	X	X	X	X	X
Old Standard	23	3	299	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	311	X	X	X	X	X	X	X	X	X
1 Spray Early	26	1	305	X	X	X	X	X	X	X	X	X
2 Spray	27	2	303	X	X	X	X	X	X	X	X	X
1 Spray Late	28	1	314	X	X	X	X	X	X	X	X	X
3 Spray Late	29	3	307	X	X	X	X	X	X	X	X	X
Farm Q&A	30	9	310	6	9	315	12	9	330	18	9	341

% Leaf Damage October 20th												
Program	Trt	# Spray	943	Trt	# Spray	1703	Trt	# Spray	675	Trt	# Spray	9865
untreated	19	0	0.09	1	0	3.38	7	0	7.38	13	0	12.71
Standard	20	3	0.04	2	5	0.04	8	6	0.01	14	6	0.02
More Aggr	21	4	0.05	3	6	0.03	9	6	0.02	15	7	0.03
1st & 15th	25	7	0.01	4	7	0.04	10#	6	0.01	16	7	0.01
Less Aggr	X	X	X	5	4	0.04	11	5	0.02	17	6	0.05
Less Aggr Late	22	2	0.04	X	X	X	X	X	X	X	X	X
Old Standard	23	3	0.04	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	0.02	X	X	X	X	X	X	X	X	X
1 Spray Early	26	1	0.02	X	X	X	X	X	X	X	X	X
2 Spray	27	2	0.04	X	X	X	X	X	X	X	X	X
1 Spray Late	28	1	0.03	X	X	X	X	X	X	X	X	X
3 Spray Late	29	3	0.01	X	X	X	X	X	X	X	X	X
Farm Q&A	30	9	0.01	6	9	0.06	12	9	0.03	18	9	0.03

#C-675 - 1st and 15th was sprayed on the same spray intervals as the More Aggressive treatment. Thus the reason for one less spray vs the 1st and 15th with other varieties. The products sprayed between the 1st and 15th were different than the More Aggressive treatment.



Evaluate Fungicide Application Timings (BEETcast) for control of

Cercospora Leafspot - Blumfield West & Gruehn

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No.	Program	Treatment**	App	Rate/A	Blum West		Gruehn	
					Date	DSV	Date	DSV
1	UTC - B-1703							
2	Standard B-1703	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	13-Jul	67	13-Jul	66
		Super Tin + Topsin + EBCD*	C	8 fl oz + 20 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	19-Aug	135	19-Aug	130
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	7-Sep	168	7-Sep	163
3	More Aggr B-1703	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Super Tin + Topsin + EBCD*	C	8 fl oz + 20 fl oz + 1.6 qt	24-Jul	91	24-Jul	85
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	10-Aug	121	10-Aug	113
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	27-Aug	149	29-Aug	151
		EBDC* + Copper*	F	1.6 qt + 2 pt	11-Sep	172	12-Sep	167
4	1st and 15th B-1703	EBDC*	A	1.6 qt	26-Jun	39	26-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	29-Jun	44	29-Jun	43
		Super Tin + Topsin + EBCD*	C	8 fl oz + 20 fl oz + 1.6 qt	15-Jul	70	15-Jul	68
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	14-Aug	128	14-Aug	120
		EBDC* + Copper*	F	1.6 qt + 2 pt	1-Sep	160	1-Sep	155
		Priaxor + Copper*	G	8 fl oz + 2 pt	11-Sep	172	12-Sep	167
5	Less Aggr B-1703	Proline + EBDC*	A	5.7 fl oz + 1.6 qt	25-Jun	39	25-Jun	39
		Super Tin + Topsin + EBCD*	B	8 fl oz + 20 fl oz + 1.6 qt	17-Jul	76	17-Jul	72
		Inspire XT + EBDC*	C	7 fl oz + 1.6 qt	7-Aug	116	7-Aug	108
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	27-Aug	149	29-Aug	151
6	Farm Q & A B-1703	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Inspire XT + EBDC*	C	7 fl oz + 1.6 qt	17-Jul	76	17-Jul	72
		Super Tin + Topsin + EBCD*	D	8 fl oz + 20 fl oz + 1.6 qt	22-Jul	87	22-Jul	81
		Priaxor + Copper*	E	8 fl oz + 2 pt	31-Jul	104	31-Jul	97
		Super Tin + EBDC*	F	8 fl oz + 1.6 qt	5-Aug	114	6-Aug	107
		EBDC*	G	1.6 qt	19-Aug	135	18-Aug	129
		Copper*	H	2 pt	29-Aug	156	29-Aug	151
		Copper*	I	2 pt	4-Sep	165	4-Sep	160
7	UTC - C-675							
8	Standard C-675	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Super Tin + Topsin + EBCD*	C	8 fl oz + 20 fl oz + 1.6 qt	24-Jul	91	24-Jul	85
		Inspire XT + EBDC*	D	8 fl oz + 1.6 qt	10-Aug	121	10-Aug	113
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	27-Aug	149	29-Aug	151
		Priaxor + Copper*	F	8 fl oz + 2 pt	11-Sep	172	12-Sep	167

* EBDC = Manzate / Copper = Badge

**All Treatments included MasterLock @ 6.4 fl oz



Evaluate Fungicide Application Timings (BEETcast) for control of

Cercospora Leafspot - Blumfield West & Gruehn

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No.	Program	Treatment**	App	Rate/A	Blum West		Gruehn	
					Date	DSV	Date	DSV
9	More Aggr C-675	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 1.6 qt	24-Jul	91	24-Jul	85
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	7-Aug	116	7-Aug	108
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	21-Aug	137	21-Aug	133
		Priaxor + EBDC*	F	8 fl oz + 1.6 qt	11-Sep	172	4-Sep	160
10	1st and 15th C-675	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 1.6 qt	24-Jul	91	24-Jul	85
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	7-Aug	116	7-Aug	108
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	21-Aug	137	21-Aug	133
		EBDC* + Copper*	F	1.6 qt + 2 pt	11-Sep	172	4-Sep	160
11	Less Aggr C-675	Proline + EBDC*	A	5.7 fl oz + 1.6 qt	25-Jun	39	25-Jun	39
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Inspire XT + EBDC*	C	7 fl oz + 1.6 qt	24-Jul	91	24-Jul	85
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	10-Aug	121	10-Aug	113
		EBDC*	E	1.6 qt	27-Aug	149	29-Aug	151
12	Farm Q & A C-675	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Inspire XT + EBDC*	C	7 fl oz + 1.6 qt	17-Jul	76	17-Jul	72
		Super Tin + Topsin + EBDC*	D	8 fl oz + 20 fl oz + 1.6 qt	22-Jul	87	22-Jul	81
		Priaxor + Copper*	E	8 fl oz + 2 pt	31-Jul	104	31-Jul	97
		Super Tin + EBDC*	F	8 fl oz + 1.6 qt	5-Aug	114	6-Aug	107
		EBDC*	G	1.6 qt	19-Aug	135	18-Aug	129
		Copper*	H	2 pt	29-Aug	156	29-Aug	151
		Copper*	I	2 pt	4-Sep	165	4-Sep	160
13	UTC - HIL-9865							
14	Standard HIL-9865	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 1.6 qt	24-Jul	91	24-Jul	85
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	7-Aug	116	7-Aug	108
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	21-Aug	137	21-Aug	133
		EBDC*	F	1.6 qt	11-Sep	172	4-Sep	160
15	More Aggr HIL-9865	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	7-Jul	53	7-Jul	54
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 1.6 qt	20-Jul	83	20-Jul	78
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	13-Aug	126	13-Aug	118
		EBDC* + Copper*	F	1.6 qt + 2 pt	27-Aug	149	29-Aug	151
		Priaxor + Copper*	G	8 fl oz + 2 pt	7-Sep	168	7-Sep	163

* EBDC = Manzate / Copper = Badge

**All Treatments included MasterLock @ 6.4 fl oz



Evaluate Fungicide Application Timings (BEETcast) for control of

Cercospora Leafspot - Blumfield West & Gruehn

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No.	Program	Treatment**	App	Rate/A	Blum West		Gruehn	
					Date	DSV	Date	DSV
16	1st and 15th HIL-9865	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	29-Jun	44	29-Jun	43
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 1.6 qt	15-Jul	70	15-Jul	68
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Super Tin + EBDC*	E	8 fl oz + 1.6 qt	14-Aug	128	14-Aug	120
		EBDC* + Copper*	F	1.6 qt + 2 pt	1-Sep	160	1-Sep	155
		Priaxor + Copper*	G	8 fl oz + 2 pt	11-Sep	172	12-Sep	167
17	Less Aggr HIL-9865	Proline + EBDC*	A	5.7 fl oz + 1.6 qt	25-Jun	39	25-Jun	39
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Inspire XT + EBDC*	C	7 fl oz + 1.6 qt	24-Jul	91	24-Jul	85
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	10-Aug	121	10-Aug	113
		Priaxor + Copper*	E	8 fl oz + 2 pt	27-Aug	149	29-Aug	151
		EBDC*	F	1.6 qt	11-Sep	172	12-Sep	167
18	Farm Q & A HIL-9865	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Inspire XT + EBDC*	C	7 fl oz + 1.6 qt	17-Jul	76	17-Jul	72
		Super Tin + Topsin + EBDC*	D	8 fl oz + 20 fl oz + 1.6 qt	22-Jul	87	22-Jul	81
		Priaxor + Copper*	E	8 fl oz + 2 pt	31-Jul	104	31-Jul	97
		Super Tin + EBDC*	F	8 fl oz + 1.6 qt	5-Aug	114	6-Aug	107
		EBDC*	G	1.6 qt	19-Aug	135	18-Aug	129
		Copper*	H	2 pt	29-Aug	156	29-Aug	151
		Copper*	I	2 pt	4-Sep	165	4-Sep	160
19	UTC - C-943							
20	Standard C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	29-Jun	44	29-Jun	43
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Delaro + Proline + EBDC*	C	11 fl oz + 1.6 fl oz + 1.6 qt	1-Sep	160	1-Sep	155
21	More Aggr C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	29-Jun	44	29-Jun	43
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	22-Jul	87	22-Jul	81
		Delaro + Proline + EBDC*	C	11 fl oz + 1.6 fl oz + 1.6 qt	13-Aug	126	13-Aug	118
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	2-Sep	163	2-Sep	158
22	Less Aggr Late C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	15-Jul	70	15-Jul	68
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	14-Aug	128	14-Aug	120
23	Old Standard C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Delaro + Proline + EBDC*	C	11 fl oz + 1.6 fl oz + 1.6 qt	21-Aug	137	21-Aug	133
24	Less Aggr Early C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	29-Jun	44	29-Jun	43
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	31-Jul	104	31-Jul	97

* EBDC = Manzate / Copper = Badge

**All Treatments included MasterLock @ 6.4 fl oz



Evaluate Fungicide Application Timings (BEETcast) for control of

Cercospora Leafspot - Blumfield West & Gruehn

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No.	Program	Treatment**	App	Rate/A	Blum West		Gruehn	
					Date	DSV	Date	DSV
25	1st and 15th C-943	EBDC*	A	1.6 qt	25-Jun	39	25-Jun	39
		Provysol + EBDC*	B	5 fl oz + 1.6 qt	29-Jun	44	29-Jun	43
		Super Tin + EBDC*	C	8 fl oz + 1.6 qt	15-Jul	70	15-Jul	68
		Priaxor + Topsin + EBDC*	D	8 fl oz + 20 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Proline + EBDC*	E	5.7 fl oz + 1.6 qt	14-Aug	128	14-Aug	120
		Super Tin + EBDC*	F	8 fl oz + 1.6 qt	1-Sep	160	1-Sep	155
		Copper* + EBDC*	G	2 pt + 1.6 qt	11-Sep	172	12-Sep	167
26	1 Spray Early C-943	Delaro + Proline + EBDC*	A	11 fl oz + 1.6 fl oz + 1.6 qt	15-Jul	70	15-Jul	68
27	2 Spray C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	1-Sep	160	1-Sep	155
28	1 Spray Late C-943	Delaro + Proline + EBDC*	A	11 fl oz + 1.6 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
29	3 Spray Late C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	15-Jul	70	15-Jul	68
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	14-Aug	128	14-Aug	120
		Delaro + Proline + EBDC*	C	11 fl oz + 1.6 fl oz + 1.6 qt	11-Sep	172	12-Sep	167
30	Farm Q & A C-943	Provysol + EBDC*	A	5 fl oz + 1.6 qt	25-Jun	39	25-Jun	39
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	9-Jul	58	9-Jul	58
		Delaro + Proline + EBDC*	C	11 fl oz + 1.6 fl oz + 1.6 qt	17-Jul	76	17-Jul	72
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	22-Jul	87	22-Jul	81
		Proline + EBDC*	E	5.7 fl oz + 1.6 qt	31-Jul	104	31-Jul	97
		Super Tin + EBDC*	F	8 fl oz + 1.6 qt	5-Aug	114	6-Aug	107
		Copper* + EBDC*	G	2 pt + 1.6 qt	19-Aug	135	18-Aug	129
		Copper*	H	2 pt	29-Aug	156	29-Aug	151
		Copper*	I	2 pt	4-Sep	165	4-Sep	160

* EBDC = Manzate / Copper = Badge

**All Treatments included MasterLock @ 6.4 fl oz

Comments: Varieties were picked based on a range of tolerance to Cercospora leafspot. Ratings were taken from the 2019 Michigan Sugar Company Cercospora nursery data. C-943 is a CR+ variety with a rating of 2.8. B-1703 was rated 5.1. C-675 was rated 5.5. HIL-9865 was rated 6.0. In the 2021 Approved Varieties table C-943 was considered Excellent for tolerance to CLS., B-1703 Good+, C-675 Good, HIL-9865 Fair.

Fungicide treatments were picked to reflect current successful spray programs and to attempt to demonstrate differences between "more aggressive", "less aggressive" and "standard" programs. The programs were defined by more or less sprays and tighter or wider spray intervals. The Farm Q&A program was based on a new disease forecasting model that Michigan Sugar Company is studying.



CR+ Cercospora Leafspot Trial

Blumfield West , Richville - 2020

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Trial Quality: Fair

Varieties: BTS-1703, C-G943, C-G675

Planted: Apr 18

Harvested: Nov 3

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Clay Loam

% OM: 2.5 **pH:** 7.5 **CEC:** 14.9

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Previous Crop: Fallow

Rhizoc Level: Moderate

Problems: Spider Mites

Seeding Rate: 4.1 in.

Rainfall: 22.81 in.

Beets/100 ft: ~199

No.	Treatment	Variety	# of Appl	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Aug	30-Oct						
8	Strongest	B - 1703	6	0.00	0.26	\$2,000	13275	337	39.3	21.1	98.5
10	1st of each month w/ EBDC	B - 1703	3	0.01	0.40	\$2,126	13590	326	41.7	20.7	97.7
9	1st & 15th	B - 1703	5	0.01	0.45	\$2,085	13478	337	40.0	21.1	98.5
12	Start Late/End Early	B - 1703	3	0.03	0.88	\$1,821	11615	321	36.0	20.2	98.4
11	1st of each month w/o EBDC	B - 1703	3	0.01	1.41	\$1,940	12338	328	37.7	20.7	98.2
7	Untreated Check	B - 1703	0	0.93	10.74	\$1,927	11680	320	36.6	20.2	98.2
14	Strongest	C-G675	6	0.01	0.16	\$1,945	12941	344	37.6	21.5	98.5
15	1st & 15th	C-G675	5	0.03	1.05	\$2,173	14010	340	41.3	21.4	98.2
16	1st of each month w/ EBDC	C-G675	3	0.01	1.88	\$2,233	14243	344	41.4	21.5	98.5
17	1st of Each month w/o EBDC	C-G675	3	0.06	2.49	\$2,071	13130	336	39.1	21.0	98.5
18	Start Late/End Early	C-G675	3	0.05	4.97	\$2,014	12787	334	38.3	20.9	98.4
13	Untreated Check	C-G675	0	4.97	15.72	\$1,922	11650	325	35.8	20.5	98.2
5	1st of each month w/o EBDC	C-G943	3	0.01	0.13	\$1,883	11993	317	38.1	20.5	96.8
2	Strongest	C-G943	6	0.01	0.18	\$1,996	13253	330	40.2	20.9	97.9
3	1st & 15th	C-G943	5	0.01	0.35	\$2,075	13417	315	42.5	20.2	97.5
4	1st of each month w/ EBDC	C-G943	3	0.00	0.38	\$2,174	13831	317	43.5	20.2	97.6
6	Start Late/End Early	C-G943	3	0.01	1.41	\$1,762	11262	319	35.3	20.5	97.2
1	Untreated Check	C-G943	0	0.02	3.95	\$2,078	12591	317	39.8	20.0	98.1
Average				0.34	2.60	\$2,012.4	12838.0	328.2	39.12	20.72	98.04
LSD 5%				1.15	3.88	324.4	1966.0	17.5	5.71	0.96	0.68
CV %				236.3	105.2	11.4	10.8	3.8	10.3	3.3	0.5

Comments: This trial was part of a multi-state trial comparing CLS management strategies with a CR+ variety (C-G943) to some currently approved varieties. Varieties were picked based on a range of tolerance to Cercospora leafspot. Ratings were taken from the 2019 Michigan Sugar Company Cercospora nursery data. C-G943 is a CR+ variety with a rating of 2.8. B-1703 was rated 5.1. C-675 was rated 5.5. In the 2021 Approved Varieties table, C-G943 was considered Excellent for tolerance to CLS, B-1703 Good+, C-675 Good. Fungicide treatments were picked to reflect current successful spray programs and then treatments with and without EBDC fungicide, starting late vs starting early, and spraying less often. Including an EBDC fungicide and spraying 3 times during the growing season appeared to be the best strategy with CR+ varieties.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



CR+ Cercospora Leafspot Trial

Blumfield West Variety Comparison

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RWSA							
Program	Trt	943	Trt	1703	Trt	675	# of Sprays
Untreated	1	12591	7	11680	13	11650	0
Strongest	2	13253	8	13275	14	12941	6
1st & 15th	3	13417	9	13478	15	14010	5
1st of each month w/EBDC	4	13831	10	13590	16	14243	3
1st of each month w/o EBDC	5	11993	11	12338	17	13130	3
Start Late/End Early	6	11262	12	11615	18	12787	3

RWST							
Program	Trt	943	Trt	1703	Trt	675	# of Sprays
Untreated	1	317	7	320	13	325	0
Strongest	2	330	8	337	14	344	6
1st & 15th	3	315	9	337	15	340	5
1st of each month w/EBDC	4	317	10	326	16	344	3
1st of each month w/o EBDC	5	317	11	328	17	336	3
Start Late/End Early	6	319	12	321	18	334	3

% Leaf Damage October 30th							
Program	Trt	943	Trt	1703	Trt	675	# of Sprays
Untreated	1	3.95	7	10.74	13	15.72	0
Strongest	2	0.18	8	0.26	14	0.16	6
1st & 15th	3	0.35	9	0.45	15	1.05	5
1st of each month w/EBDC	4	0.38	10	0.40	16	1.88	3
1st of each month w/o EBDC	5	0.13	11	1.41	17	2.49	3
Start Late/End Early	6	1.41	12	0.88	18	4.97	3



CR+ Cercospora Leafspot Trial

Gruehn - Owendale - 2020

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Trial Quality: Good

Varieties: BTS-1703, C-G943, C-G675

Planted: Apr 22

Harvested: Oct 21

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Clay Loam

% OM: 2.8 **pH:** 8.0 **CEC:** 11.2

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Previous Crop: Corn

Rhizoc Level: Low

Problems: None

Seeding Rate: 4.1 in.

Rainfall: 15.4 in.

Beets/100 ft: ~183

No.	Treatment	Variety	# of Appl	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	20-Oct						
8	Strongest	B-1703	6	0.01	0.02	\$1,826	13010	317	41.1	20.2	97.6
10	1st of each month w/ EBDC	B-1703	3	0.02	0.03	\$1,740	11979	320	37.4	20.3	97.9
12	Start Late/End Early	B-1703	3	0.08	0.10	\$1,723	11732	309	37.9	19.7	97.8
11	1st of each month w/o EBDC	B-1703	3	0.20	0.11	\$1,809	12289	333	37.0	21.1	97.7
9	1st & 15th	B-1703	5	0.01	0.17	\$1,720	11990	308	38.9	19.9	97.1
7	Untreated Check	B-1703	0	1.54	2.25	\$1,767	11398	323	35.2	20.8	97.0
14	Strongest	C-G675	6	0.01	0.03	\$2,015	14234	326	43.7	20.8	97.6
16	1st of each month w/ EBDC	C-G675	3	0.04	0.03	\$1,945	13303	324	41.1	20.6	97.5
15	1st & 15th	C-G675	5	0.03	0.10	\$1,948	13464	319	42.2	20.2	97.8
17	1st of each month w/o EBDC	C-G675	3	1.65	0.62	\$1,798	12221	315	38.9	20.2	97.3
18	Start Late/End Early	C-G675	3	0.28	0.68	\$1,830	12428	315	39.5	20.2	97.4
13	Untreated Check	C-G675	0	1.89	5.11	\$2,066	13328	319	41.7	20.6	97.1
3	1st & 15th	C-G943	5	0.02	0.03	\$1,765	12280	303	40.5	19.5	97.3
5	1st of each month w/o EBDC	C-G943	3	0.06	0.03	\$1,685	11487	302	38.1	19.4	97.2
6	Start Late/End Early	C-G943	3	0.01	0.04	\$1,831	12429	299	41.6	19.3	97.1
4	1st of each month w/ EBDC	C-G943	3	0.02	0.04	\$1,752	12054	307	39.4	19.8	97.0
2	Strongest	C-G943	6	0.05	0.05	\$1,814	12933	309	42.0	19.8	97.4
1	Untreated Check	C-G943	0	0.04	1.14	\$1,925	12420	310	40.1	20.0	97.1
Average				0.33	0.58	\$1,831.0	\$12,498.8	\$314.4	39.80	20.13	97.39
LSD 5%				0.98	2.24	193.7	1249.7	17.0	4.10	1.01	0.95
CV %				208.5	270.3	7.5	7.0	3.8	7.3	3.5	0.7

Comments: This trial was part of a multi-state trial comparing CLS management strategies with a CR+ variety (C-G943) to some currently approved varieties. Varieties were picked based on a range of tolerance to Cercospora leafspot. Ratings were taken from the 2019 Michigan Sugar Company Cercospora nursery data. C-G943 is a CR+ variety with a rating of 2.8. B-1703 was rated 5.1. C-675 was rated 5.5. In the 2021 Approved Varieties table, C-G943 was considered Excellent for tolerance to CLS, B-1703 Good+, C-675 Good. Fungicide treatments were picked to reflect current successful spray programs and then treatments with and without EBDC fungicide, starting late vs starting early, and spraying less often. Including an EBDC fungicide and spraying 3 times during the growing season appeared to be the best strategy with CR+ varieties.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



CR+ Cercospora Leafspot Trial

Gruehn Variety Comparison

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RWSA							
Program	Trt	943	Trt	1703	Trt	675	# of Sprays
Untreated	1	12420	7	11398	13	13328	0
Strongest	2	12933	8	13010	14	14234	6
1st & 15th	3	12280	9	11990	15	13464	5
1st of each month w/EBDC	4	12054	10	11979	16	13303	3
1st of each month w/o EBDC	5	11487	11	12289	17	12221	3
Start Late/End Early	6	12429	12	11732	18	12428	3

RWST							
Program	Trt	943	Trt	1703	Trt	675	# of Sprays
Untreated	1	310	7	323	13	319	0
Strongest	2	309	8	317	14	326	6
1st & 15th	3	303	9	308	15	319	5
1st of each month w/EBDC	4	307	10	320	16	324	3
1st of each month w/o EBDC	5	302	11	333	17	315	3
Start Late/End Early	6	299	12	309	18	315	3

% Leaf Damage October 20th							
Program	Trt	943	Trt	1703	Trt	675	# of Sprays
Untreated	1	1.14	7	2.25	13	5.11	0
Strongest	2	0.05	8	0.02	14	0.03	6
1st and 15th	3	0.03	9	0.17	15	0.10	5
1st of each month w/EBDC	4	0.04	10	0.03	16	0.03	3
1st of each month w/o EBDC	5	0.03	11	0.11	17	0.62	3
Start Late/End Early	6	0.04	12	0.10	18	0.68	3



CR+ Cercospora Leafspot Trial

Blumfield West, Richville & Gruehn, Owendale

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No.	Program	Treatment**	Rate/A	App	Blumfield West		Gruehn	
					Date	DSV	Date	DSV
1	Untreated Check - C-G943							
2	Strongest-C-G943	EBDC*	1.6 qt	A	25-Jun	39	25-Jun	39
		EBDC* + Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		EBDC* + Super Tin + Topsin	8 fl oz + 20 fl oz	C	15-Jul	70	15-Jul	68
		EBDC* + Inspire XT	7 fl oz	D	31-Jul	104	31-Jul	97
		EBDC* + Super Tin	8 fl oz	E	14-Aug	128	14-Aug	120
		EBDC* + Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155
3	1st & 15th C-G943	Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		Super Tin + Topsin	8 fl oz + 20 fl oz	C	15-Jul	70	15-Jul	68
		Inspire XT	7 fl oz	D	31-Jul	104	31-Jul	97
		Super Tin	8 fl oz	E	14-Aug	128	14-Aug	120
		Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155
4	1st of each month with EBDC C-G943	EBDC* + Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		EBDC* + Super Tin + Topsin	8 fl oz + 20 fl oz	D	31-Jul	104	31-Jul	97
		EBDC* + Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155
5	1st of each month without EBDC C-G943	Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		Super Tin + Topsin	8 fl oz + 20 fl oz	D	31-Jul	104	31-Jul	97
		Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155
6	Start Late/End Early C-G943	Provysol	5 fl oz	C	15-Jul	70	15-Jul	68
		Super Tin + Topsin	8 fl oz + 20 fl oz	D	31-Jul	104	31-Jul	97
		Delaro + Proline	11 fl oz + 1.6 fl oz	E	14-Aug	128	14-Aug	120
7	Untreated Check - B-1703							
8	Strongest BTS-1703	EBDC*	1.6 qt	A	25-Jun	39	25-Jun	39
		EBDC* + Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		EBDC* + Super Tin + Topsin	8 fl oz+ 20 fl oz	C	15-Jul	70	15-Jul	68
		EBDC* + Inspire XT	7 fl oz	D	31-Jul	104	31-Jul	97
		EBDC* + Super Tin	8 fl oz	E	14-Aug	128	14-Aug	120
		EBDC* + Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155
9	1st & 15th BTS-1703	Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		Super Tin + Topsin	8 fl oz + 20 fl oz	C	15-Jul	70	15-Jul	68
		Inspire XT	7 fl oz	D	31-Jul	104	31-Jul	97
		Super Tin	8 fl oz	E	14-Aug	128	14-Aug	120
		Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155
10	1st of each month with EBDC BTS-1703	EBDC* + Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		EBDC* + Super Tin + Topsin	8 fl oz + 20 fl oz	D	31-Jul	104	31-Jul	97
		EBDC* + Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155
11	1st of each month without EBDC BTS-1703	Provysol	5 fl oz	B	29-Jun	44	29-Jun	43
		Super Tin + Topsin	8 fl oz + 20 fl oz	D	31-Jul	104	31-Jul	97
		Delaro + Proline	11 fl oz + 1.6 fl oz	F	1-Sep	160	1-Sep	155

* EBDC = Manzate @ 1.6 qt

** MasterLock Applied to all treatments @ 6.4 fl oz



CR+ Cercospora Leafspot Trial

Blumfield West, Richville & Gruehn, Owendale

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No.	Program	Treatment**	Rate/A	App	Blumfield West		Gruehn	
					Date	DSV	Date	DSV
12	Start Late/End Early BTS - 1703	Provysol Super Tin + Topsin Delaro + Proline	5 fl oz 8 fl oz + 20 fl oz 11 fl oz + 1.6 fl oz	C D E	15-Jul 31-Jul 14-Aug	70 104 128	15-Jul 31-Jul 14-Aug	68 97 120
13	Untreated Check - C-G675							
14	Strongest C-G675	EBDC* EBDC* + Provysol EBDC* + Super Tin + Topsin EBDC* + Inspire XT EBDC* + Super Tin EBDC* + Delaro + Proline	1.6 qt 5 fl oz 8 fl oz + 20 fl oz 7 fl oz 8 fl oz 11 fl oz + 1.6 fl oz	A B C D E F	25-Jun 29-Jun 15-Jul 31-Jul 14-Aug 1-Sep	39 44 70 104 128 160	25-Jun 29-Jun 15-Jul 31-Jul 14-Aug 1-Sep	39 43 68 97 120 155
15	1st & 15th C-G675	Provysol Super Tin + Topsin Inspire XT Super Tin Delaro + Proline	5 fl oz 8 fl oz + 20 fl oz 7 fl oz 8 fl oz 11 fl oz + 1.6 fl oz	B C D E F	29-Jun 15-Jul 31-Jul 14-Aug 1-Sep	44 70 104 128 160	29-Jun 15-Jul 31-Jul 14-Aug 1-Sep	43 68 97 120 155
16	1st of month with EBDC C-G675	EBDC* + Provysol EBDC* + Super Tin + Topsin EBDC* Delaro + Proline	5 fl oz 8 fl oz + 20 fl oz 11 fl oz + 1.6 fl oz	B D F	29-Jun 31-Jul 1-Sep	44 104 160	29-Jun 31-Jul 1-Sep	43 97 155
17	1st of each month without EBDC C-G675	Provysol Super Tin + Topsin Delaro + Proline	5 fl oz 8 fl oz + 20 fl oz 11 fl oz + 1.6 fl oz	B D F	29-Jun 31-Jul 1-Sep	44 104 160	29-Jun 31-Jul 1-Sep	43 97 155
18	Start Late/End Early C-G675	Provysol Super Tin + Topsin Delaro + Proline	5 fl oz 8 fl oz + 20 fl oz 11 fl oz + 1.6 fl oz	C D E	15-Jul 31-Jul 14-Aug	70 104 128	15-Jul 31-Jul 14-Aug	68 97 120

* EBDC = Manzate @ 1.6 qt

** MasterLock Applied to all treatments @ 6.4 fl oz



Cercospora Fungicide Efficacy

Blumfield West, Richville, MI - 2020

(Page 1 of 5)

Trial Quality: Good

Variety: C-333NT

Planted: April 18

Harvested: Nov 3

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 Tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Sandy Clay Loam

% OM: 2.4 **pH:** 7.7 **CEC:** 14.0

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Prev Crop: Fallow

Rhizoc Level: Moderate

Problems: Spider mites

Seeding Rate: 4.1 in.

Rainfall: 22.81 in.

Beets/100 ft: ~191

No.	Treatment**	Rate/A	Applic Timing	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
				29-Sep	30-Oct						
15	EBDC*	1.6 qt	A, C, E, F	0.02	0.48	\$1,628	11364	310	36.6	20.0	97.2
	EBDC*	1.6 qt	B, D								
	Lucento	5.5 fl oz	B, D								
6	EBDC*	1.6 qt	A, C, E, F	0.03	0.55	\$1,961	13524	322	41.9	20.5	97.7
	EBDC*	1.6 qt	B, D								
	Minerva	13 fl oz	B, D								
5	EBDC*	1.6 qt	A, C, E, F	0.01	0.80	\$1,535	10761	307	35.1	19.9	96.8
	EBDC*	1.6 qt	B, D								
	Enable	8 fl oz	B, D								
4	EBDC*	1.6 qt	A, C, E, F	0.03	0.80	\$1,468	10335	309	33.2	20.0	96.9
	EBDC*	1.6 qt	B, D								
	Topguard	14 fl oz	B, D								
10	EBDC*	1.6 qt	A, C, E, F	0.01	0.92	\$1,800	12345	314	39.5	20.3	96.9
	EBDC*	1.6 qt	B, D								
	Super Tin	8 fl oz	B, D								
19	EBDC*	1.6 qt	A, C, E, F	0.02	1.04	\$1,704	12174	314	38.5	20.4	96.7
	EBDC*	1.6 qt	B, D								
	Priaxor	8 fl oz	B, D								
14	EBDC*	1.6 qt	A, C, E, F	0.01	1.18	\$1,475	10506	311	33.7	20.2	96.6
	EBDC*	1.6 qt	B, D								
	Delaro	11 fl oz	B, D								
13	EBDC*	1.6 qt	A, C, E, F	0.04	1.28	\$1,649	11921	311	38.2	20.2	96.8
	EBDC*	1.6 qt	B, D								
	Propulse	13.6 fl oz	B, D								
11	EBDC*	1.6 qt	A, C, E, F	0.01	1.28	\$1,848	12164	305	39.9	19.8	96.8
	EBDC*	1.6 qt	B, D								
	Super Tin	8 fl oz	B, D								
9	EBDC*	1.6 qt	A, C, E, F	0.03	1.34	\$1,824	12830	308	41.7	19.8	97.2
	EBDC*	1.6 qt	B, D								
	Priaxor	8 fl oz	B, D								
20	EBDC*	1.6 qt	A, C, E, F	0.03	1.72	\$1,817	12555	307	40.9	19.9	96.7
	EBDC*	1.6 qt	B, D								
	Veltyma	10 fl oz	B, D								

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

No.	Treatment**	Rate/A	Applic Timing	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
				29-Sep	30-Oct						
16	EBDC*	1.6 qt	A, C, E, F	0.03	1.73	\$1,539	10714	308	34.9	19.9	97.0
	EBDC*	1.6 qt	B, D								
	Dexter Max	2.1 lb	B, D								
3	EBDC*	1.6 qt	A, C, E, F	0.02	1.86	\$1,739	12164	306	39.9	19.8	96.8
	EBDC*	1.6 qt	B, D								
	Proline	5.7 fl oz	B, D								
21	EBDC*	1.6 qt	A - F	0.09	1.98	\$1,500	10335	301	34.2	19.6	96.5
17	EBDC*	1.6 qt	A, C, E, F	0.01	2.12	\$1,738	11996	314	38.1	20.1	97.4
	EBDC*	1.6 qt	B, D								
	Copper*	2 pt	B, D								
18	EBDC*	1.6 qt	A, C, E, F	0.07	2.22	\$1,682	11726	309	37.9	19.9	97.0
	EBDC*	1.6 qt	B, D								
	Flint Extra	3.6 fl oz	B, D								
12	EBDC*	1.6 qt	A, C, E, F	0.04	2.24	\$1,622	11352	303	37.6	19.5	97.1
	EBDC*	1.6 qt	B, D								
	Minerva Duo	16 fl oz	B, D								
8	EBDC*	1.6 qt	A, C, E, F	0.04	2.54	\$1,630	11537	315	36.7	20.3	97.1
	EBDC*	1.6 qt	B, D								
	Headline	12 fl oz	B, D								
2	EBDC*	1.6 qt	A, C, E, F	0.02	2.67	\$1,576	11047	322	34.3	20.7	97.2
	EBDC*	1.6 qt	B, D								
	Inspire XT	7 fl oz	B, D								
7	EBDC*	1.6 qt	A - F	0.05	3.43	\$1,720	12075	303	39.8	19.8	96.5
	EBDC*	1.6 qt	B, D								
	Provysol	5 fl oz	B, D								
1	Untreated Check			4.93	14.38	\$1,379	8895	296	30.1	19.5	96.1
Average				0.26	2.22	\$1,658.7	11568.4	310.1	37.26	20.04	96.92
LSD 5%				1.81	2.06	307.4	1983.2	18.9	5.79	0.82	1.57
CV %				488.4	65.6	13.1	12.1	4.3	11.0	2.9	1.1

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

Comments: Leafspot levels were low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Fungicide Efficacy

Gruehn, Owendale, MI - 2020

(Page 3 of 5)

Trial Quality: Good
Variety: C-333NT
Planted: April 22
Harvested: Oct 10
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Clay Loam
% OM: 2.8 **pH:** 8.0 **CEC:** 11.2
P: Above Opt **K:** Above Opt
Mn: High **B:** Medium
Added N: 35 lbs. 2x2,
 120 lbs. side-dress
Prev Crop: Corn

Rhizoc Level: Moderate
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 15.4 in.
Beets/100 ft: ~173

Application: JD 3520 Tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment**	Rate/A	Applic Timing	% Leafspot Damage		Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
				29-Sep	30-Oct						
19	EBDC*	1.6 qt	A, C, E, F	0.02	0.01	\$2,339	14325	301	47.7	19.8	96.1
	EBDC*	1.6 qt	B, D								
	Priaxor Topsin	8 fl oz 20 fl oz	B, D B, D								
6	EBDC*	1.6 qt	A, C, E, F	0.01	0.01	\$2,409	14448	320	45.1	20.8	96.4
	EBDC*	1.6 qt	B, D								
	Minerva	13 fl oz	B, D								
14	EBDC*	1.6 qt	A, C, E, F	0.04	0.01	\$2,443	14744	303	48.6	19.9	96.0
	EBDC*	1.6 qt	B, D								
	Delaro Proline	11 fl oz 1.6 fl oz	B, D B, D								
15	EBDC*	1.6 qt	A, C, E, F	0.03	0.02	\$2,433	14574	321	45.4	20.9	96.5
	EBDC*	1.6 qt	B, D								
	Lucento	5.5 fl oz	B, D								
7	EBDC*	1.6 qt	A, C, E, F	0.03	0.03	\$2,384	14404	309	46.7	20.0	96.8
	EBDC*	1.6 qt	B, D								
	Provysol	5 fl oz	B, D								
5	EBDC*	1.6 qt	A, C, E, F	0.01	0.03	\$2,315	13902	294	47.3	19.6	95.4
	EBDC*	1.6 qt	B, D								
	Enable	8 fl oz	B, D								
2	EBDC*	1.6 qt	A, C, E, F	0.05	0.03	\$2,427	14553	317	46.1	20.5	96.8
	EBDC*	1.6 qt	B, D								
	Inspire XT	7 fl oz	B, D								
17	EBDC*	1.6 qt	A, C, E, F	0.02	0.03	\$2,293	13716	316	43.5	20.7	96.1
	EBDC*	1.6 qt	B, D								
	Copper*	2 pt	B, D								
10	EBDC*	1.6 qt	A, C, E, F	0.04	0.04	\$2,282	13607	302	45.2	19.9	95.8
	EBDC*	1.6 qt	B, D								
	Super Tin	8 fl oz	B, D								
13	EBDC*	1.6 qt	A, C, E, F	0.04	0.04	\$2,239	13842	305	45.4	20.0	96.2
	EBDC*	1.6 qt	B, D								
	Propulse	13.6 fl oz	B, D								
18	EBDC*	1.6 qt	A, C, E, F	0.01	0.05	\$2,413	14473	308	47.2	20.2	96.0
	EBDC*	1.6 qt	B, D								
	Flint Extra	3.6 fl oz	B, D								
11	EBDC*	1.6 qt	A, C, E, F	0.01	0.05	\$2,353	14117	314	45.0	20.5	96.4
	EBDC*	1.6 qt	B, D								
	Super Tin Topsin	8 fl oz 20 fl oz	B, D B, D								

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Fungicide Efficacy

Gruehn, Owendale, MI - 2020

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No.	Treatment**	Rate/A	Applic Timing	% Leafspot Damage		Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
				29-Sep	30-Oct						
9	EBDC*	1.6 qt	A, C, E, F	0.04	0.05	\$2,305	14026	305	46.0	19.9	96.4
	EBDC*	1.6 qt	B, D								
	Priaxor	8 fl oz	B, D								
20	EBDC*	1.6 qt	A, C, E, F	0.07	0.05	\$2,278	13673	303	45.4	20.0	95.8
	EBDC*	1.6 qt	B, D								
	Veltyrna	10 fl oz	B, D								
4	EBDC*	1.6 qt	A, C, E, F	0.03	0.06	\$2,334	14014	314	44.6	20.6	96.1
	EBDC*	1.6 qt	B, D								
	Topguard	14 fl oz	B, D								
3	EBDC*	1.6 qt	A, C, E, F	0.03	0.06	\$2,382	14359	308	46.6	20.1	96.4
	EBDC*	1.6 qt	B, D								
	Proline	5.7 fl oz	B, D								
21	EBDC*	1.6 qt	A - F	0.02	0.08	\$2,386	14132	313	45.3	20.5	96.1
16	EBDC*	1.6 qt	A, C, E, F	0.03	0.08	\$2,417	14420	316	45.6	20.7	96.3
	EBDC*	1.6 qt	B, D								
	Dexter Max	2.1 lb	B, D								
8	EBDC*	1.6 qt	A, C, E, F	0.01	0.08	\$2,348	14234	307	46.4	20.2	96.1
	EBDC*	1.6 qt	B, D								
	Headline	12 fl oz	B, D								
12	EBDC*	1.6 qt	A, C, E, F	0.04	0.08	\$2,389	14354	305	47.0	20.1	96.0
	EBDC*	1.6 qt	B, D								
	Minerva Duo	16 fl oz	B, D								
1	Untreated Check			9.29	13.76	\$2,390	13574	312	43.5	20.5	96.0
Average				0.47	0.70	\$2,360.0	14166.3	309.2	45.88	20.26	96.17
LSD 5%				1.75	2.91	N.S.	N.S.	18.5	N.S.	N.S.	0.84
CV %				263.9	295.9	7.2	6.8	4.2	7.2	3.8	0.6

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

Comments: Leafspot levels were low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Fungicide Efficacy

Blum West, Richville & Gruehn, Owendale

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No.	Treatment**	Application Timing	Blum West	Gruehn
			Date	Date
1	Untreated Check			
2	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Inspire XT	B, D	7/9, 8/6	7/13, 8/10
3	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Proline	B, D	7/9, 8/6	7/13, 8/10
4	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Topguard	B, D	7/9, 8/6	7/13, 8/10
5	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Enable	B, D	7/9, 8/6	7/13, 8/10
6	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Minerva	B, D	7/9, 8/6	7/13, 8/10
7	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Provysol	B, D	7/9, 8/6	7/13, 8/10
8	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Headline	B, D	7/9, 8/6	7/13, 8/10
9	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Priaxor	B, D	7/9, 8/6	7/13, 8/10
10	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Super Tin	B, D	7/9, 8/6	7/13, 8/10
11	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Super Tin + Topsin	B, D	7/9, 8/6	7/13, 8/10
12	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Minerva Duo	B, D	7/9, 8/6	7/13, 8/10
13	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Propulse	B, D	7/9, 8/6	7/13, 8/10
14	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Delaro + Proline	B, D	7/9, 8/6	7/13, 8/10
15	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Lucento	B, D	7/9, 8/6	7/13, 8/10
16	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Dexter Max	B, D	7/9, 8/6	7/13, 8/10
17	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Copper	B, D	7/9, 8/6	7/13, 8/10
18	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Flin Extra	B, D	7/9, 8/6	7/13, 8/10
19	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Priaxor + Topsin	B, D	7/9, 8/6	7/13, 8/10
20	EBDC*	A, C, E, F	6/25, 7/23, 8/20, 9/2	6/29, 7/27, 8/24, 9/7
	EBDC* + Veltyma	B, D	7/9, 8/6	7/13, 8/10
21	EBDC*	A - F	6/25, 7/9, 7/23, 8/6, 8/20, 9/2	6/29, 7/13, 7/27, 8/10, 8/24, 9/7

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz



Cercospora Leafspot Programs

Blumfield West, Richville - 2020

(Page 1 of 6)

Trial Quality: Fair
Variety: C-G333NT

Planted: Apr 18

Harvested: Nov 3

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Sandy Clay Loam

% OM: 2.4 **pH:** 7.7 **CEC:** 14.0

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Prev Crop: Fallow

Rhizoc Level: Moderate

Problems: Spider Mites

Seeding Rate: 4.1 in.

Rainfall: 22.81 in.

Beets/100 ft: ~202

No.	Treatment*	Rate / A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	30-Oct						
2	Provysol	5 fl oz	7/6	0.01	0.20	\$1,293	9769	311	31.5	20.0	97.1
	Super Tin	8 fl oz	7/21								
	Priaxor + Topsin	8 fl oz + 20 fl oz	8/5								
	Proline	5.7 fl oz	8/19								
	Super Tin	8 fl oz	9/2								
5	Provysol	5 fl oz	7/6	0.02	0.28	\$1,158	8804	296	29.8	19.5	96.1
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/21								
	Proline	5.7 fl oz	8/5								
	Super Tin	8 fl oz	8/19								
	Inspire XT	7 fl oz	9/2								
12	Quadris*	15.5 fl oz	6/25	0.01	0.40	\$1,265	9832	308	31.8	19.9	97.0
	Propulse	13.6 fl oz	7/6								
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/21								
	Provysol	5 fl oz	8/5								
	Super Tin	8 fl oz	8/19								
	Delaro + Proline	11 fl oz + 1.6 fl oz	9/2								
11	Delaro + Proline	11 fl oz + 1.6 fl oz	7/6	0.01	0.48	\$1,301	9731	302	31.9	19.7	96.4
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/21								
	Inspire XT	7 fl oz	8/5								
	Super Tin	8 fl oz	8/19								
	Proline	5.7 fl oz	9/2								
6	Provysol	5 fl oz	7/6	0.03	0.48	\$1,393	10533	310	34.1	19.9	97.5
	Priaxor + Topsin	8 fl oz + 20 fl oz	7/21								
	Inspire XT	7 fl oz	8/5								
	Copper***	1 qt	8/19								
	Delaro + Proline	11 fl oz + 1.6 fl oz	9/2								

*First Application for all treatments except for treatment 12 was EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz. on June 25th.

The first application for Treatment 12 was Quadris @ 15.5 fl oz, EBDC @ 1.6 qt & MasterLock @ 6.4 fl oz on June 25th.

**All treatments included EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz.

***Copper = Badge

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Leafspot Programs

Blumfield West, Richville - 2020

(Page 2 of 6)

No.	Treatment*	Rate / A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	30-Oct						
7	Provysol	5 fl oz	7/6	0.03	0.48	\$1,309	10185	305	33.5	19.8	96.8
	Priaxor + Topsin	8 fl oz + 20 fl oz	7/21								
	Inspire XT	7 fl oz	8/5								
	Flint Extra	3.6 fl oz	8/19								
	Propulse	13.6 fl oz	9/2								
3	Provysol + N-Demand + Boron	5 fl oz + 1 gal + 1 qt	7/6	0.01	0.68	\$1,319	10132	296	34.3	19.3	96.7
	Super Tin	8 fl oz	7/21								
	Priaxor + Topsin + N-Demand + Boron	8 fl oz + 20 fl oz + 1 gal + 1 qt	8/5								
	Proline + N-Demand + Boron	5.7 fl oz + 1 gal + 1 qt	8/19								
	Super Tin	8 fl oz	9/2								
13	Veltyma	10 fl oz	7/6	0.03	0.75	\$1,278	9597	302	31.6	19.8	96.4
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/21								
	Inspire XT	7 fl oz	8/5								
	Super Tin	8 fl oz	8/19								
	Proline	5.7 fl oz	9/2								
10	Provysol + Enable	5 fl oz + 8 fl oz	7/6	0.01	1.00	\$1,423	10820	310	35.0	19.9	97.3
	Super Tin	8 fl oz	7/21								
	Priaxor + Topsin	8 fl oz + 20 fl oz	8/5								
	Proline + Inspire XT	5.7 fl oz + 7 fl oz	8/19								
	Super Tin	8 fl oz	9/2								
8	Provysol	5 fl oz	7/6	0.02	1.09	\$1,470	10912	302	35.8	19.5	97.1
	Super Tin	8 fl oz	7/21								
	Proline	5.7 fl oz	8/5								
	Priaxor + Topsin	8 fl oz + 20 fl oz	8/19								
	Super Tin	8 fl oz	9/2								

*First Application for all treatments except for treatment 12 was EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz. on June 25th.

The first application for Treatment 12 was Quadris @ 15.5 fl oz, EBDC @ 1.6 qt & MasterLock @ 6.4 fl oz on June 25th.

**All treatments included EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz.

***Copper = Badge

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Leafspot Programs

Blumfield West, Richville - 2020

(Page 3 of 6)

No.	Treatment*	Rate / A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	30-Oct						
9	Topguard	14 fl oz	7/6	0.01	1.53	\$1,459	10585	307	34.5	19.6	97.6
	Super Tin	8 fl oz	7/21								
	Eminent	13 fl oz	8/5								
	Super Tin	8 fl oz	8/19								
	Enable	8 fl oz	9/2								
4	Provysol	5 fl oz	7/6	0.01	1.96	\$1,280	9684	310	31.2	20.0	97.0
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/21								
	Priaxor	8 fl oz	8/5								
	Proline	5.7 fl oz	8/19								
	Super Tin	8 fl oz	9/2								
14	Copper***	1 qt	7/6	0.09	2.35	\$1,295	9457	292	32.4	19.1	96.3
	Copper***	1 qt	7/21								
	Copper***	1 qt	8/5								
	Copper***	1 qt	8/19								
	Copper***	1 qt	9/2								
1	Untreated			3.41	17.25	\$1,317	8496	283	30.0	18.8	95.6
Average				0.26	2.06	\$1,325.6	9895.5	302.4	32.67	19.62	96.78
LSD 5%				0.86	2.19	N.S.	2104.8	19.3	N.S.	0.82	1.47
CV %				227.7	74.0	17.2	14.9	4.5	14.6	2.9	1.1

*First Application for all treatments except for treatment 12 was EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz. on June 25th.

First application for Treatment 12 was Quadris @ 15.5 fl oz, EBDC @ 1.6 qt & MasterLock @ 6.4 fl oz on June 25th.

**All treatments included EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz.

***Copper = Badge

Comments: Cercospora Leafspot was low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Leafspot Programs

Gruehn, Owendale - 2020

(Page 4 of 6)

Trial Quality: Good

Variety: C-G333NT

Planted: Apr 22

Harvested: Oct 20

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Sandy Clay Loam

% OM: 2.9 **pH:** 7.6 **CEC:** 14.1

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Prev Crop: Corn

Rhizoc Level: Moderate

Problems: None

Seeding Rate: 4.1 in.

Rainfall: 15.4 in.

Beets/100 ft: ~175

No.	Treatment*	Rate / A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	20-Oct						
3	Provysol + N-Demand + Boron	5 fl oz + 1 gal + 1 qt	7/9	0.01	0.01	\$1,778	13088	311	42.1	20.4	96.2
	Super Tin	8 fl oz	7/24								
	Priaxor + Topsin + N-Demand + Boron	8 fl oz + 20 fl oz + 1 gal + 1 qt	8/7								
	Proline + N-Demand + Boron	5.7 fl oz + 1 gal + 1 qt	8/21								
	Super Tin	8 fl oz	9/4								
10	Provysol + Enable	5 fl oz + 8 fl oz	7/9	0.02	0.01	\$1,776	13096	314	41.7	20.6	96.1
	Super Tin	8 fl oz	7/24								
	Priaxor + Topsin	8 fl oz + 20 fl oz	8/7								
	Proline + Inspire XT	5.7 fl oz + 7 fl oz	8/21								
	Super Tin	8 fl oz	9/4								
11	Delaro + Proline	5 fl oz + 1.6 fl oz	7/9	0.02	0.04	\$1,918	13712	319	42.9	21.0	95.9
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/24								
	Inspire XT	7 fl oz	8/7								
	Super Tin	8 fl oz	8/21								
	Proline	5.7 fl oz	9/4								
2	Provysol	5 fl oz	7/9	0.01	0.04	\$1,876	13532	318	42.6	20.8	96.2
	Super Tin	8 fl oz	7/24								
	Priaxor + Topsin	8 fl oz + 20 fl oz	8/7								
	Proline	5.7 fl oz	8/21								
	Super Tin	8 fl oz	9/4								
5	Provysol	5 fl oz	7/9	0.01	0.04	\$1,850	13270	315	42.2	20.6	96.1
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/24								
	Proline	5.7 fl oz	8/7								
	Super Tin	8 fl oz	8/21								
	Inspire XT	7 fl oz	9/4								

*First Application for all treatments except for treatment 12 was EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz. on June 29th.

First application for Treatment 12 was Quadris @ 15.5 fl oz, EBDC @ 1.6 qt & MasterLock @ 6.4 fl oz on June 29th.

**All treatments included EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz.

***Copper = Badge

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Leafspot Programs

Gruehn, Owendale - 2020

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No.	Treatment*	Rate / A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	20-Oct						
12	Quadris*	15.5 fl oz	6/29	0.01	0.04	\$1,846	13582	313	43.4	20.5	96.0
	Propulse	13.6 fl oz	7/9								
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/24								
	Provysol	5 fl oz	8/7								
	Super Tin	8 fl oz	8/21								
	Delaro + Proline	11 fl oz + 1.6 fl oz	9/4								
6	Provysol	5 fl oz	7/9	0.01	0.05	\$1,899	13798	315	43.9	20.5	96.4
	Priaxor + Topsin	8 fl oz + 20 fl oz	7/24								
	Inspire XT	7 fl oz	8/7								
	Copper***	1 qt	8/21								
	Delaro + Proline	11 fl oz + 1.6 fl oz	9/4								
8	Provysol	5 fl oz	7/9	0.02	0.07	\$1,967	14120	320	44.1	20.7	96.7
	Super Tin	8 fl oz	7/24								
	Proline	5.7 fl oz	8/7								
	Priaxor + Topsin	8 fl oz + 20 fl oz	8/21								
	Super Tin	8 fl oz	9/4								
4	Provysol	5 fl oz	7/9	0.03	0.07	\$1,923	13838	325	42.6	21.1	96.4
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/24								
	Priaxor	8 fl oz	8/7								
	Proline	5.7 fl oz	8/21								
	Super Tin	8 fl oz	9/4								
14	Copper***	1 qt	7/9	0.17	0.07	\$1,837	12954	306	42.4	20.3	95.6
	Copper***	1 qt	7/24								
	Copper***	1 qt	8/7								
	Copper***	1 qt	8/21								
	Copper***	1 qt	9/4								
7	Provysol	5 fl oz	7/9	0.02	0.08	\$1,746	13006	306	42.5	20.0	96.4
	Priaxor + Topsin	8 fl oz + 20 fl oz	7/24								
	Inspire XT	7 fl oz	8/7								
	Flint Extra	3.5 fl oz	8/21								
	Propulse	13.6 fl oz	9/4								

*First Application for all treatments except for treatment 12 was EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz. on June 29th.

First application for Treatment 12 was Quadris @ 15.5 fl oz, EBDC @ 1.6 qt & MasterLock @ 6.4 fl oz on June 29th.

**All treatments included EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz.

***Copper = Badge

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Cercospora Leafspot Programs

Gruehn, Owendale - 2020

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No.	Treatment*	Rate / A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	20-Oct						
9	Topguard	14 fl oz	7/9	0.02	0.08	\$1,830	12976	315	41.2	20.5	96.3
	Super Tin	8 fl oz	7/24								
	Eminent	13 fl oz	8/7								
	Super Tin	8 fl oz	8/21								
	Enable	8 fl oz	9/4								
13	Veltyrna	10 fl oz	7/9	0.03	0.08	\$1,873	13433	317	42.3	20.8	96.2
	Super Tin + Topsin	8 fl oz + 20 fl oz	7/24								
	Inspire XT	7 fl oz	8/7								
	Super Tin	8 fl oz	8/21								
	Proline	5.7 fl oz	9/4								
1	Untreated			7.88	10.65	\$1,879	12176	306	39.8	20.3	95.5
Average				0.59	0.81	\$1,856.9	13327.1	314.2	42.42	20.58	96.14
LSD 5%				1.83	2.55	159.0	1032.1	N.S	2.76	0.76	0.78
CV %				243.9	248.0	6.7	6.1	3.6	5.1	2.9	0.64

*First Application for all treatments except for treatment 12 was EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz. on June 29th.

First application for Treatment 12 was Quadris @ 15.5 fl oz, EBDC @ 1.6 qt & MasterLock @ 6.4 fl oz on June 29th.

**All treatments included EBDC @ 1.6 qt., & MasterLock @ 6.4 fl oz.

***Copper = Badge

Comments: Cercospora leafspot was low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Ontario Leafspot Programs Trial

Blumfield West, Richville - 2020

(Page 1 of 5)

Trial Quality: Good

Variety: C-G333NT

Planted: Apr 18

Harvested: Nov 3

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 in.

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

Soil Info: Sandy Clay Loam

% OM: 2.4 **pH:** 7.7 **CEC:** 14.0

P: Above Opt **K:** Above Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Prev Crop: Fallow

Rhizoc Level: Moderate

Problems: Spider Mites

Seeding Rate: 4.1 in.

Rainfall: 22.81 in.

Beets/100 ft: ~205

No.	Treatment**	Rate/A	Applic Timing*	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	23-Oct						
8	Penncozeb	2 lb	A	0.04	0.18	\$1,247	9504	284	33.3	18.7	96.1
	ChamplON	2 lb	B, F								
	Penncozeb	2 lb	B, F								
	Proline	5.7 fl oz	C, G								
	Penncozeb	2 lb	C, G								
	Priaxor	6 fl oz	D								
	Topsin	10 fl oz	D								
	Penncozeb	2 lb	D								
	Cevya (Provysol)	5 fl oz	E								
	Penncozeb	2 lb	E								
16	Penncozeb	2 lb	A	0.02	0.20	\$1,283	9834	283	34.7	18.6	96.4
	ChamplON	2 lb	B, F								
	Penncozeb	2 lb	B, F								
	Proline	5.7 fl oz	C, G								
	Tilt	4 fl oz	C, G								
	Penncozeb	2 lb	C, G								
	Priaxor	6 fl oz	D								
	Topsin	10 fl oz	D								
	Penncozeb	2 lb	D								
	Cevya (Provysol)	5 fl oz	E								
	Tilt	4 fl oz	E								
	Penncozeb	2 lb	E								
10	Penncozeb	2 lb	A	0.05	0.20	\$1,274	9639	294	32.9	19.2	96.6
	Priaxor	6 fl oz	B								
	Topsin	10 fl oz	B								
	Penncozeb	2 lb	B								
	Proline	5.7 fl oz	C								
	Tilt	4 fl oz	C								
	Penncozeb	2 lb	C								
	ChamplON	2 lb	D, F, G								
	Penncozeb	2 lb	D, F, G								
	Cevya (Provysol)	5 fl oz	E								
	Tilt	4 fl oz	E								
	Penncozeb	2 lb	E								

**All treatments included MasterLock @ 6.4 fl oz.

*Application dates for all treatments: A - 6/25, B - 7/6, C - 7/21, D - 8/5, E - 8/19, F - 9/1, G - 9/11

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Ontario Leafspot Programs Trial

Blumfield West, Richville - 2020

(Page 2 of 5)

No.	Treatment**	Rate/A	Applic Timing*	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	23-Oct						
4	Penncozeb	2 lb	A, E	0.02	0.23	\$1,119	8651	289	30.0	18.7	97.2
	Proline	5.7 fl oz	B								
	Penncozeb	2 lb	B								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	Penncozeb	2 lb	C								
	Cevya (Provysol)	5 fl oz	D								
	Penncozeb	2 lb	D								
	Priaxor	6 fl oz	F								
	Penncozeb	2 lb	F								
	Penncozeb	2 lb	G								
	ChamplON	2 lb	G								
5	ChamplON	2 lb	A	0.05	0.25	\$1,153	8767	278	31.2	18.4	96.0
	Priaxor	6 fl oz	B								
	Topsin	10 fl oz	B								
	ChamplON	2 lb	B								
	Proline	5.7 fl oz	C								
	ChamplON	2 lb	C								
	ChamplON	2 lb	D, F, G								
	Penncozeb	2 lb	D, F, G								
	Cevya (Provysol)	5 fl oz	E								
	ChamplON	2 lb	E								
3	ChamplON	2 lb	A, E	0.04	0.26	\$1,084	8387	284	29.6	18.8	95.9
	Proline	5.7 fl oz	B								
	ChamplON	2 lb	B								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	ChamplON	2 lb	C								
	Cevya (Provysol)	5 fl oz	D								
	ChamplON	2 lb	D								
	Priaxor	6 fl oz	F								
	ChamplON	2 lb	F								
	Penncozeb	2 lb	G								
	ChamplON	2 lb	G								
7	Headline	12.3 fl oz	A	0.05	0.35	\$1,084	8522	283	29.9	18.6	96.1
	Proline	5.7 fl oz	B, F								
	ChamplON	2 lb	B, F								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	ChamplON	2 lb	C								
	Cevya (Provysol)	5 fl oz	D								
	ChamplON	2 lb	D								
	Penncozeb	2 lb	E								
	ChamplON	2 lb	E								
	ChamplON	2 lb	G								

**All treatments included MasterLock @ 6.4 fl oz.

*Application dates for all treatments: A - 6/25, B - 7/6, C - 7/21, D - 8/5, E - 8/19, F - 9/1, G - 9/11

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

No.	Treatment**	Rate/A	Applic Timing*	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	23-Oct						
14	Headline	12.3 fl oz	A	0.08	0.40	\$1,143	9036	281	32.0	18.7	95.7
	Proline	5.7 fl oz	B, F								
	Tilt	4 fl oz	B, F								
	Penncozeb	2 lb	B, F								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	Penncozeb	2 lb	C								
	Cevya (Provysol)	5 fl oz	D								
	Tilt	4 fl oz	D								
	Penncozeb	2 lb	D								
15	Headline	12.3 fl oz	A	0.04	0.48	\$1,001	8084	284	28.5	18.8	96.0
	Proline	5.7 fl oz	B, F								
	Tilt	4 fl oz	B, F								
	ChamplON	2 lb	B, F								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	ChamplON	2 lb	C								
	Cevya (Provysol)	5 fl oz	D								
	Tilt	4 fl oz	D								
	ChamplON	2 lb	D								
13	Penncozeb	2 lb	E	0.04	0.59	\$1,225	9423	286	32.9	18.9	95.9
	ChamplON	2 lb	E								
	ChamplON	2 lb	E								
	Headline	12.3 fl oz	G								
	Tilt	4 fl oz	G								
	ChamplON	2 lb	G								
	Penncozeb	2 lb	D, F								
	ChamplON	2 lb	D, F								
	Cevya (Provysol)	5 fl oz	E								
	Tilt	4 fl oz	E								

**All treatments included MasterLock @ 6.4 fl oz.

*Application dates for all treatments: A - 6/25, B - 7/6, C - 7/21, D - 8/5, E - 8/19, F - 9/1, G - 9/11

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

No.	Treatment**	Rate/A	Applic Timing*	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	23-Oct						
9	ChamplON	2 lb	A	0.04	0.60	\$1,113	8607	286	30.1	18.8	96.2
	ChamplON	2 lb	B, F								
	Penncozeb	2 lb	B, F								
	Proline	5.7 fl oz	C, G								
	ChamplON	2 lb	C, G								
	Priaxor	6 fl oz	D								
	Topsin	10 fl oz	D								
	ChamplON	2 lb	D								
6	Cevya (Provysol)	5 fl oz	E	0.05	0.60	\$1,079	8517	287	29.6	18.7	96.7
	ChamplON	2 lb	E								
	Headline	12.3 fl oz	A								
	Proline	5.7 fl oz	B, F								
	Penncozeb	2 lb	B, F								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	Penncozeb	2 lb	C								
2	Cevya (Provysol)	5 fl oz	D	0.07	0.60	\$1,278	9595	295	32.3	19.2	96.7
	Penncozeb	2 lb	D								
	ChamplON	2 lb	E								
	Penncozeb	2 lb	E								
	Penncozeb	2 lb	G								
	Priaxor	6 fl oz	B								
	Topsin	10 fl oz	B								
	Penncozeb	2 lb	B								
11	Proline	5.7 fl oz	C	0.06	0.68	\$1,054	8299	287	28.7	18.7	96.8
	Penncozeb	2 lb	C								
	ChamplON	2 lb	D, F, G								
	Penncozeb	2 lb	D, F, G								
	Cevya (Provysol)	5 fl oz	E								
	Penncozeb	2 lb	E								
	ChamplON	2 lb	A								
	Proline	5.7 fl oz	B								
11	Tilt	4 fl oz	B	0.06	0.68	\$1,054	8299	287	28.7	18.7	96.8
	ChamplON	2 lb	B								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	ChamplON	2 lb	C								
	Cevya (Provysol)	5 fl oz	D								
	Tilt	4 fl oz	D								
	ChamplON	2 lb	D								
11	Penncozeb	2 lb	E, G	0.06	0.68	\$1,054	8299	287	28.7	18.7	96.8
	ChamplON	2 lb	E, G								
	Proline	5.7 fl oz	F								
	Penncozeb	2 lb	F								

**All treatments included MasterLock @ 6.4 fl oz.

*Application dates for all treatments: A - 6/25, B - 7/6, C - 7/21, D - 8/5, E - 8/19, F - 9/1, G - 9/11

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Ontario Leafspot Programs Trial

Blumfield West, Richville - 2020

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No.	Treatment**	Rate/A	Applic Timing*	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				29-Sep	23-Oct						
17	Penncozeb	2 lb	A	0.10	1.04	\$1,239	9527	279	34.1	18.6	95.5
	ChamplON	2 lb	B, F								
	Penncozeb	2 lb	B, F								
	Proline	5.7 fl oz	C, G								
	Tilt	4 fl oz	C, G								
	ChamplON	2 lb	C, G								
	Priaxor	6 fl oz	D								
	Topsin	10 fl oz	D								
	ChamplON	2 lb	D								
	Cevya (Provysol)	5 fl oz	E								
12	Tilt	4 fl oz	E								
	ChamplON	2 lb	E								
	Penncozeb	2 lb	A	0.11	1.30	\$1,133	8837	286	30.9	18.8	96.4
	Proline	5.7 fl oz	B								
	Tilt	4 fl oz	B								
	Penncozeb	2 lb	B								
	Priaxor	6 fl oz	C								
	Topsin	10 fl oz	C								
	Penncozeb	2 lb	C								
	Cevya (Provysol)	5 fl oz	D								
	Tilt	4 fl oz	D								
	Penncozeb	2 lb	D								
	Proline	5.7 fl oz	F								
	Penncozeb	2 lb	F								
	ChamplON	2 lb	E, G								
	Penncozeb	2 lb	E, G								
1	Untreated Check			2.25	7.35	\$1,196	7716	272	28.3	18.0	96.0
Average				0.18	0.90	\$1,159.2	8879	284.5	31.12	18.71	96.25
LSD 5%				0.93	0.94	233.1	1503.8	20.0	4.94	0.97	1.25
CV %				360.3	73.8	14.1	11.9	4.9	11.2	3.6	0.9

**All treatments included MasterLock @ 6.4 fl oz.

*Application dates for all treatments: A - 6/25, B - 7/6, C - 7/21, D - 8/5, E - 8/19, F - 9/1, G - 9/11

Comments: This trial is focused on leafspot products available in Ontario.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Evaluate Sticker / Spreaders added to Fungicides for Cercospora

Leafspot Control - Blumfield East, Richville - 2020

(Page 1 of 2)

Trial Quality: Good
Variety: C-G333NT
Planted: Apr 18
Harvested: Nov 4
Plots: 6 rows X 38 ft, 3 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
%OM: 2.3 **pH:** 8.0 **CEC:** 12.5
P: Above Opt **K:** Above Opt
Mn: High **B:** Medium
Added N: 35 lbs. 2x2,
 120 lbs side-dress
Prev Crop: Raddish

Rhizoc Control: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 22.81 in.
Beets/100 ft: ~180

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Sticker	Rate	Applic Timing	% Leaf Damage	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				30-Oct						
7	Cohere + Justified	4 fl oz/A + 4 fl oz/A	A-E	0.3	\$1,697	11008	301	36.9	19.5	96.8
5	MasterLock + Reguard	6.4 fl oz/A + 12 fl oz/A	A-E	0.4	\$1,658	11027	310	35.6	19.6	98.2
14	Cerium Elite	8 fl oz/A	A-E	0.4	\$1,769	11417	315	36.1	20.0	97.8
6	Accudrop	3 fl oz/A	A-E	0.7	\$1,724	11149	318	35.3	20.2	97.8
9	Cidewinder	8 fl oz/A	A-E	0.7	\$1,654	10743	321	33.6	20.4	97.8
18	Potassium 19	3 fl oz/A	A-E	0.8	\$1,872	12001	311	38.7	19.9	97.5
19	Potassium 19	6 fl oz/A	A-E	0.8	\$1,807	11693	307	38.5	19.7	97.4
16	WC458	6.4 fl oz/A	A-E	0.8	\$1,910	12214	321	38.1	20.4	97.6
8	Justified	8 fl oz/A	A-E	1.0	\$1,931	12332	321	38.8	20.3	98.0
3	Reguard	12 fl oz/A	A-E	1.0	\$1,876	12219	316	38.7	20.1	97.6
10	Justified + HMRTFE	8 fl oz/A + 1 gram ai/A	A-E	1.0	\$1,745	11327	313	36.4	19.7	98.3
13	FS Talent + FS Cropstik	4 fl oz/A + 4 fl oz/A	A-E	1.0	\$1,770	11443	309	37.4	19.7	97.6
15	WC507	3 fl oz/A	A-E	1.1	\$1,896	12133	321	37.8	20.3	98.2

Spray Program for treatments 2-21**

- A. EBDC* + Sticker
- B. Provysol (5 fl oz) + EBDC* + Sticker
- C. Super Tin (8 fl oz) + EBDC* (1.6 qt) + Sticker
- D. Priaxor (8 fl oz) + Topsin (20 fl oz) + EBDC* (1.6 qt) + Sticker
- E. Proline (5.7 fl oz) + EBDC* + Sticker

****Application dates for all treatments: A - 6/24, B - 7/8, C - 7/21, D - 8/7, E - 8/21**

*EBDC = Manzate

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Evaluate Sticker / Spreaders added to Fungicides for Cercospora

Leafspot Control - Blumfield East, Richville - 2020

(Page 2 of 2)

No.	Sticker	Rate	Applic Timing	% Leaf Damage	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				30-Oct						
21	LI700	1 qt/100 gal	A-E	1.2	\$1,695	10954	321	34.4	20.3	97.9
12	FS Cropstik	4 fl oz/A	A-E	1.3	\$1,796	11528	322	35.8	20.4	98.1
11	FS Talent	4 fl oz/A	A-E	1.3	\$1,942	12410	324	38.5	20.5	98.0
20	Liberate	1 qt/100 gal	A-E	1.5	\$1,922	12285	318	38.9	20.2	98.0
17	Parachute 11	3 fl oz/A	A-E	1.5	\$1,890	12080	310	39.2	19.7	97.8
4	Reguard + Diligence	12 fl oz/A + 1.5 fl oz/A	A-E	2.3	\$1,846	12119	318	38.1	20.3	97.5
2	MasterLock	6.4 fl oz/A	A-E	2.6	\$1,771	11429	324	35.7	20.3	98.3
1	Untreated			6.8	\$1,846	10822	302	36.0	19.3	97.7
Average				1.37	\$1,810.5	11,634.9	315.4	37.07	20.04	97.81
LSD 5%				2.33	N.S.	N.S.	21.7	N.S.	1.03	1.11
CV%				120.1	11.5	10.5	4.9	12.8	3.6	0.8

Spray Program for treatments 2-21**

- A. EBDC* + Sticker
- B. Provysol (5 fl oz) + EBDC* + Sticker
- C. Super Tin (8 fl oz) + EBDC* (1.6 qt) + Sticker
- D. Priaxor (8 fl oz) + Topsin (20 fl oz) + EBDC* (1.6 qt) + Sticker
- E. Proline (5.7 fl oz) + EBDC* + Sticker

****Application dates for all treatments: A - 6/24, B - 7/8, C - 7/21, D - 8/7, E - 8/21**

*EBDC = Manzate

Comments: Cercospora Leafspot pressure was low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Nozzle, Pressure and Volume for managing Cercospora Leafspot

Ziel, Pigeon 2020

Trial Quality: Good

Variety: C-G333NT

Planted: Apr 15

Harvested: Oct 13

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Clay Loam

% OM: 2.4 **pH:** 6.9 **CEC:** 9.5

P: Above Opt **K:** Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 85 lbs. PPI,
50 lbs. side-dress

Previous Crop: Wheat

Rhizoc Level: Low

Problems: None

Seeding Rate: 4.1 in.

Rainfall: 14.36 in.

Application: JD 3520 tractor mounted plot sprayer, compressed air

No.	Treatment***	GPA	PSI	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	6-Oct						
11	Turbo Tee Jet + ML	21	75	0.07	0.19	\$1,752	11405	287	39.7	18.8	96.3
1	JD Hypro 3D	17	50	0.01	0.23	\$1,926	12317	287	42.9	18.7	96.5
5	Turbo Tee Jet	21	75	0.03	0.24	\$1,810	11635	291	40.0	19.0	96.6
8	JD Hypro 3D + ML	21	75	0.06	0.25	\$1,845	11945	287	41.5	18.7	96.7
6	Turbo Tee Jet	25	100	0.01	0.29	\$1,805	11607	281	41.8	18.5	96.1
2	JD Hypro 3D	21	75	0.06	0.29	\$1,832	11764	282	41.6	18.6	96.0
3	JD Hypro 3D	25	100	0.05	0.31	\$1,812	11648	276	42.3	18.2	96.4
10	Turbo Tee Jet + ML	17	50	0.01	0.32	\$1,792	11637	287	40.6	18.7	96.6
7	JD Hypro 3D + ML	17	50	0.03	0.33	\$1,711	11163	271	41.0	18.1	95.8
4	Turbo Tee Jet	17	50	0.07	0.34	\$1,906	12203	289	42.2	19.0	96.4
9	JD Hypro 3D + ML	25	100	0.03	0.45	\$1,844	11943	285	41.8	18.7	96.3
12	Turbo Tee Jet + ML	25	100	0.07	0.71	\$1,827	11840	292	40.6	19.1	96.6
Average				0.04	0.33	\$1,821.7	11758.9	284.6	41.35	18.68	96.35
LSD 5%				0.06	0.36	N.S.	N.S.	19.2	N.S.	0.84	N.S.
CV %				107.2	85.5	11.5	10.5	5.3	10.5	3.5	1.2

Spray Program for treatments 1-6**

- A. Proline (5.7 fl oz) + EBDC* (1.6 qt)
- B. Super Tin (8 fl oz) + EBDC* (1.6 qt)
- C. Priaxor (8 fl oz) + EBDC* (1.6 qt)
- D. Super Tin (8 fl oz) + EBDC* (1.6 qt)
- E. Inspire XT (7 fl oz) + EBDC* (1.6 qt)
- F. Copper* (2 pt) + EBDC* (1.6 qt)

Spray Program for treatments 7-12**

- A. Proline (5.7 fl oz) + EBDC* (1.6 qt) + MasterLock (6.4 fl oz)
- B. Super Tin (8 fl oz) + EBDC* (1.6 qt) + MasterLock (6.4 fl oz)
- C. Priaxor (8 fl oz) + EBDC* (1.6 qt) + MasterLock (6.4 fl oz)
- D. Super Tin (8 fl oz) + EBDC* (1.6 qt) + MasterLock (6.4 fl oz)
- E. Inspire XT (7 fl oz) + EBDC* (1.6 qt) + MasterLock (6.4 fl oz)
- F. Copper* (2 pt) + EBDC* (1.6 qt) + MasterLock (6.4 fl oz)

*EBDC = Manzate / Copper = Badge

**Application dates for all treatments: A - 7/1, B - 7/14, C - 7/29, D - 8/12, E - 8/31, F - 9/12

***JD Hypro 3D - Droplet Size - Fine

***Turbo Tee Jet - Droplet Size - Very Fine

Comments: Leafspot pressure was low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Evaluate BASF Fungicides for Control of Cercospora Leafspot

Ziel, Pigeon, MI - 2020

Trial Quality: Fair
Variety: C-G333NT
Planted: Apr 15
Harvested: Oct 14
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
% OM: 2.4 **pH:** 6.9 **CEC:** 9.5
P: Above Opt **K:** Opt
Mn: High **B:** Medium
Added N: 35 lbs. 2x2, 85 lbs. PPI,
 50 lbs. side-dress
Previous Crop: Wheat

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 14.36 in.
Beets/100 ft: ~182

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment*	Rate/A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	6-Oct						
4	EBDC** + Proline	1.6 qt + 5.7 fl oz	14-Jul	0.14	0.15	\$1,704	11226	306	36.7	19.7	97.3
	EBDC** + Super Tin	1.6 qt + 8 fl oz	28-Jul								
	EBDC** + Flint Extra + Topsin	1.6 qt + 3.6 fl oz + 20 fl oz	11-Aug								
	EBDC** + Proline	1.6 qt + 5.7 fl oz	25-Aug								
	EBDC** + Super Tin	1.6 qt + 8 fl oz	12-Sep								
3	EBDC** + Provysol	1.6 qt + 5 fl oz	14-Jul	0.26	0.18	\$1,633	11032	300	36.9	19.5	96.9
	Serifel + Super Tin	4 oz + 8 fl oz	28-Jul								
	EBDC** + Priaxor + Topsin	1.6 qt + 8 fl oz + 20 fl oz	11-Aug								
	Serifel + Provysol	4 oz + 5 fl oz	25-Aug								
	EBDC** + Super Tin	1.6 qt + 8 fl oz	12-Sep								
2	EBDC** + Provysol	1.6 qt + 5 fl oz	14-Jul	0.18	0.24	\$1,809	11923	313	38.3	20.0	97.4
	EBDC** + Super Tin	1.6 qt + 8 fl oz	28-Jul								
	EBDC** + Priaxor + Topsin	1.6 qt + 8 fl oz + 20 fl oz	11-Aug								
	EBDC** + Provysol	1.6 qt + 5 fl oz	25-Aug								
	EBDC** + Super Tin	1.6 qt + 8 fl oz	12-Sep								
1	Untreated			1.98	9.85	\$1,845	10927	302	36.3	19.8	96.3
Average				0.64	2.61	\$1,747.7	11276.8	305.2	37.03	19.73	96.97
LSD 5%				0.52	1.55	185.2	N.S.	N.S.	N.S.	N.S.	0.99
CV %				58.9	43.2	7.7	7.1	3.6	7.3	2.5	0.7

*First Application for all treatments was EBDC @ 1.6 qt. All Treatments included MasterLock @ 6.4 fl oz

** EBDC = Manzate

Comments: Leafspot pressure was low in 2020. Net \$/A difference is due to removal of fungicide cost in each treatment.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



UPL Fungicide Trial

Ziel, Pigeon - 2020

Trial Quality: Good
Variety: C-G333NT
Planted: Apr 15
Harvested: Oct 13
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
% OM: 2.4 **pH:** 6.9 **CEC:** 9.5
P: Above Opt **K:** Opt
Mn: High **B:** Medium
Added N: 35 lbs. 2x2, 85 lbs. PPI,
 50 lbs. side-dress
Previous Crop: Wheat

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 14.36 in.
Beets/100 ft: ~196

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment**	Rate/A	Applic Timing ***	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	6-Oct						
2	Super Tin + Dexter Max + Topsin	8 fl oz + 2.1 lb + 20 fl oz	A	0.13	0.28	\$1,675	10809	287	37.8	18.4	97.7
	Dexter Max	2.1 lb	B								
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	C								
	Super Tin + Dexter Max	8 fl oz + 2.1 lb	D								
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	E								
	Dexter Max	2.1 lb	F								
3	Super Tin + EBDC* + Topsin	8 fl oz + 1.6 qt + 20 fl oz	A	0.16	0.35	\$1,889	12047	299	40.1	18.9	98.3
	Dexter Max	2.1 lb	B								
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	C								
	Super Tin + Dexter Max	8 fl oz + 2.1 lb	D								
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	E								
	Dexter Max	2.1 lb	F								
4	Proline + Copper*	5.7 fl oz + 2 pt	A	0.23	0.80	\$1,687	11268	296	38.0	18.9	97.8
	Super Tin + Topsin + Copper*	8 fl oz + 20 fl oz + 2 pt	B								
	Inspire XT + Copper*	7 fl oz + 2 pt	C								
	Super Tin + Copper*	8 fl oz + 2 pt	D								
	Priaxor + Copper*	8 fl oz + 2 pt	E								
	Provysol + Copper*	5 fl oz + 2 pt	F								
5	Copper*	2 pt	A-F	0.38	0.92	\$1,735	10868	287	37.9	18.4	97.7
1	Untreated			2.00	5.06	\$1,908	11181	287	39.0	18.3	98.1
Average				0.58	1.48	\$1,778.7	11234.7	291.0	38.57	18.56	97.89
LSD 5%				0.79	1.09	188.4	1104.1	N.S.	N.S.	N.S.	N.S.
CV %				88.5	47.8	6.9	6.4	4.2	6.1	3.2	0.7

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

***Application dates for all treatments: A - 6/30, B - 7/14, C - 7/28, D - 8/11, E - 8/25, F - 9/12

Comment: Cercospora Leafspot levels were low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Evaluate Certis Fungicides for Control of Cercospora Leafspot

Ziel, Pigeon, MI - 2020

Trial Quality: Good
Variety: C-G752NT
Planted: Apr 15
Harvested: Oct 14
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
% OM: 2.4 **pH:** 6.9 **CEC:** 9.5
P: Above Opt **K:** Opt
Mn: High **B:** Medium
Added N: 35 lbs. 2x2,
 85 lbs. PPI, 50 lbs. side-dress
Previous Crop: Wheat

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 14.36 in.
Beets/100 ft: ~164

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment*	Rate/A	Applic Timing* **	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	13-Oct						
2	EBDC**	1.6 qt	A	0.60	0.68	\$1,766	11475	286	40.1	19.4	94.7
	Proline + EBDC**	5.7 fl oz + 1.6 qt	B								
	Super Tin + Topsin + EBDC**	8 fl oz + 20 fl oz + 1.6 qt	C								
	Inspire XT + EBDC**	7 fl oz + 1.6 qt	D								
	Super Tin + EBDC**	8 fl oz + 1.6 qt	E								
	EBDC + Copper**	1.6 qt + 2 pt	F								
4	EBDC** + LifeGard	1.6 qt + 1.125 oz	A	0.55	0.99	\$1,907	12233	300	40.8	19.8	95.8
	Proline + EBDC**	5.7 fl oz + 1.6 qt	B								
	Super Tin + Topsin + LifeGard	8 fl oz + 20 fl oz + 1.125 oz	C								
	Inspire XT + EBDC**	7 fl oz + 1.6 qt	D								
	Super Tin + LifeGard	8 fl oz + 1.125 oz	E								
	EBDC + Copper**	1.6 qt + 2 pt	F								
5	ManKocide	4.3 lb	A-F	0.68	1.30	\$1,778	11608	287	40.4	19.4	94.8
3	LifeGard	1.125 oz	A-F	2.19	4.19	\$1,909	11674	295	39.6	19.8	94.9
1	Untreated			2.50	6.07	\$1,924	11391	295	38.6	19.7	95.3
Average				1.30	2.64	\$1,856.9	11676	292.5	39.91	19.62	95.11
LSD 5%				1.78	4.31	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %				88.9	105.7	7.1	6.7	4.9	4.5	2.9	1.0

*All treatments included MasterLock @ 6.4 fl oz.

** EBDC = Manzate / Copper = Badge

***Application dates for all treatments: A - 6/30, B - 7/14, C - 7/28, D - 8/11, E - 8/25, F - 9/12

Comments: Leafspot pressure was low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



FMC Cercospora Leafspot Trial

Ziel, Pigeon - 2020

(Page 1 of 2)

Trial Quality: Good
Variety: C-G333NT
Planted: Apr 15
Harvested: Oct 14
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
% OM: 2.4 **pH:** 6.9 **CEC:** 9.5
P: Above Opt **K:** Opt
Mn: High **B:** Medium
Added N: 35 lbs. 2x2,
 85 lbs., 50 lbs. side-dress

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 14.36 in.
Beets/100 ft: ~191

Previous Crop: Wheat

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment*	Rate/A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	6-Oct						
2	Lucento + Koverall	5.5 fl oz + 2 lb	14-Jul	0.25	0.20	\$1,559	10421	309	33.4	19.9	97.2
	Super Tin + Koverall + Topsin	8 fl oz + 2 lb + 20 fl oz	28-Jul								
	Topguard + Koverall	14 fl oz + 2 lb	11-Aug								
	Super Tin + Koverall	8 fl oz + 2 lb	25-Aug								
	Inspire XT + Koverall	7 fl oz + 2 lb	12-Sep								
5	Topguard + Koverall	14 fl oz + 2 lb	14-Jul	0.48	0.35	\$1,543	10659	303	35.2	19.4	97.5
	Super Tin + Koverall + Topsin	8 fl oz + 2 lb + 20 fl oz	28-Jul								
	Topguard + Koverall	14 fl oz + 2 lb	11-Aug								
	Topguard + Koverall	14 fl oz + 2 lb	25-Aug								
	Inspire XT + Koverall	7 fl oz + 2 lb	12-Sep								
3	Lucento + Koverall	5.5 fl oz + 2 lb	14-Jul	0.53	0.45	\$1,699	11151	304	36.7	19.5	97.5
	Super Tin + Koverall + Topsin	8 fl oz + 2 lb + 20 fl oz	28-Jul								
	Lucento + Koverall	5.5 fl oz + 2 lb	11-Aug								
	Lucento + Koverall	5.5 fl oz + 2 lb	25-Aug								
	Inspire XT + Koverall	7 fl oz + 2 lb	12-Sep								
4	Topguard + Koverall	14 fl oz + 2 lb	14-Jul	0.33	0.46	\$1,626	10847	301	35.9	19.6	96.7
	Super Tin + Koverall + Topsin	8 fl oz + 2 lb + 20 fl oz	28-Jul								
	Lucento + Koverall	5.5 fl oz + 2 lb	11-Aug								
	Lucento + Koverall	5.5 fl oz + 2 lb	25-Aug								
	Inspire XT + Koverall	7 fl oz + 2 lb	12-Sep								

*First Application for all treatments was Koverall @ 2 lb. All treatments included MasterLock @ 6.4 fl oz.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and

Bold: Results are not statistically different from top-ranking treatment in each column.



FMC Cercospora Leafspot Trial

Ziel, Pigeon - 2020

(Page 2 of 2)

No.	Treatment*	Rate/A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	6-Oct						
7	Proline + Koverall	5 fl oz + 2 lb	14-Jul	0.14	0.48	\$1,650	10990	305	36.0	19.6	97.1
	Super Tin + Koverall + Topsin	8 fl oz + 2 lb + 20 fl oz	28-Jul								
	Provysol + Koverall	5 fl oz + 2 lb	11-Aug								
	Provysol + Koverall	5 fl oz + 2 lb	25-Aug								
	Inspire XT + Koverall	7 fl oz + 2 lb	12-Sep								
6	Lucento + Koverall	5.5 fl oz + 2 lb	14-Jul	0.18	0.68	\$1,699	11151	304	36.7	19.5	97.5
	Super Tin + Koverall + Topsin	8 fl oz + 2 lb + 20 fl oz	28-Jul								
	Provysol + Koverall	5 fl oz + 2 lb	11-Aug								
	Provysol + Koverall	5 fl oz + 2 lb	25-Aug								
	Inspire XT + Koverall	7 fl oz + 2 lb	12-Sep								
1	Untreated			0.92	5.08	\$1,693	10022	291	34.4	19.1	96.3
Average				0.40	1.10	\$1,628.4	10703.4	301.7	35.40	19.51	96.98
LSD 5%				0.57	0.58	N.S.	N.S.	N.S.	N.S.	N.S.	1.08
CV %				96.0	35.8	12.8	11.6	5.4	8.8	4.2	0.8

*First Application for all treatments was Koverall @ 2 lb. All treatments included MasterLock @ 6.4 fl oz.

Comment: Cercospora leafspot levels were low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



AgriLife Cercospora Leafspot Trial

Ziel, Pigeon - 2020

Trial Quality: Good
Variety: C-333NT
Planted: Apr 15
Harvested: Oct 13
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
% OM: 2.4 **pH:** 6.9 **CEC:** 9.5
P: Above Opt **K:** Opt
Mn: High **B:** Medium
Added N: 35 lbs. 2x2, 85 lbs. PPI,
 50 lbs. side-dress

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 14.36 in.
Beets/100 ft: ~199

Previous Crop: Wheat

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment*	Rate/A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	6-Oct						
2	Proline + Copper**	5.7 fl oz + 2 pt	A	0.225	0.80	\$1,687	11268	296	38.0	18.9	97.8
	Super Tin + Topsin + Copper**	8 fl oz + 20 fl oz + 2 pt	B								
	Inspire XT + Copper**	7 fl oz + 2 pt	C								
	Super Tin + Copper**	8 fl oz + 2 pt	D								
	Priaxor + Copper**	8 fl oz + 2 pt	E								
	Provysol + Copper**	5 fl oz + 2 pt	F								
4	Copper**	2 pt	A-F	0.375	0.92	\$1,735	10868	287	37.9	18.4	97.7
3	Proline + Agri-Life	5.7 fl oz + 57 fl oz	A	0.263	0.92	\$1,479	10205	287	35.6	18.4	97.5
	Super Tin + Topsin + Agri-Life	8 fl oz + 20 fl oz + 57 fl oz	B								
	Inspire XT + Agri- Life	7 fl oz + 57 fl oz	C								
	Super Tin + Agri- Life	8 fl oz + 57 fl oz	D								
	Priaxor + Agri-Life	8 fl oz + 57 fl oz	E								
	Provysol + Agri-Life	5 fl oz + 57 fl oz	F								
1	Untreated			2.00	5.06	\$1,908	11181	287	39.0	18.3	98.1
Average				0.72	1.92	\$1,702.1	10880.6	289.1	37.63	18.49	97.76
LSD 5%				0.89	1.16	231.2	N.S.	N.S.	4.97	N.S.	N.S.
CV %				77.6	37.6	8.5	7.8	4.5	8.3	3.3	0.9

*All treatments included MasterLock @ 6.4 fl oz.

*Application dates for all treatments: A - 6/30, B - 7/14, C - 7/28, D - 8/11, E - 8/25, F - 9/12

**Copper = Badge

Comments: Cercospora Leafspot levels were low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Nufarm Cercopora Leafspot Trial

Ziel, Pigeon - 2020

Trial Quality: Good

Variety: C-G333NT

Planted: Apr 15

Harvested: Oct 13

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Clay Loam

% OM: 2.4 **pH:** 6.9 **CEC:** 9.5

P: Above Opt **K:** Opt

Mn: High **B:** Medium

Added N: 35 lbs. 2x2, 85 lbs. PPI,
50 lbs. side-dress

Previous Crop: Wheat

Rhizoc Level: Low

Problems: None

Seeding Rate: 4.1 in.

Rainfall: 14.36 in.

Beets/100 ft: ~199

Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment**	Rate/A	Applic Date	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				22-Sep	6-Oct						
5	Super Tin + EBDC*	8 fl oz + 1.6 qt	C (7/28)	0.18	0.45	\$1,610	10516	302	35.1	19.7	96.6
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	E (8/25)								
	Super Tin + EBDC*	8 fl oz + 1.6 qt	F (9/12)								
3	Agri-Tin + Champ 2F	8 fl oz + 32 fl oz	C (7/28)	0.25	0.63	\$1,650	10734	309	34.8	20.0	96.9
	Inspire XT + Champ 2F	7 fl oz + 32 fl oz	E (8/25)								
	Agri-Tin + EBDC*	8 fl oz + 1.6 qt	F (9/12)								
2	Agri-Tin + EBDC*	8 fl oz + 1.6 qt	C (7/28)	0.35	0.72	\$1,393	9239	296	31.2	19.3	96.7
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	E (8/25)								
	Agri-Tin + EBDC*	8 fl oz + 1.6 qt	F (9/12)								
4	Agri-Tin + ChampION	8 fl oz + 1.25 lb	C (7/28)	0.60	0.79	\$1,368	9078	300	30.2	19.5	96.5
	Inspire XT + ChampION	7 fl oz + 1.25 lb	E (8/25)								
	Agri-Tin + EBDC*	8 fl oz + 1.6 qt	F (9/12)								
1	Untreated			1.50	6.28	\$1,642	9627	301	31.9	19.6	96.7
Average				0.58	1.77	\$1,532.7	9838.8	301.5	32.63	19.60	96.68
LSD 5%				0.82	0.91	158.0	925.8	N.S.	3.26	N.S.	N.S.
CV %				92.4	33.3	6.7	6.1	4.5	6.5	3.4	0.7

**First Application for all treatments was EBDC @ 1.6 qt on June 30th. All treatments included MasterLock @ 64 fl oz.

-B timing for all treatments was Inspire XT @ 7 fl oz. & EBDC* @ 1.6 qt. on July 14th.

-D Timing for all treatments was Priaxor @ 8 fl oz., T-Methyl - SPC 50 @ 11.2 oz., & EBDC* @ 1.6 qt. on August 11th.

*EBDC = Manzate

Comments: Cercospora Leafspot pressure was low in 2020.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

Canopy coverage: deposition aid and nozzle type, Ridgetown, 2020

Ridgetown, Ontario, Canada

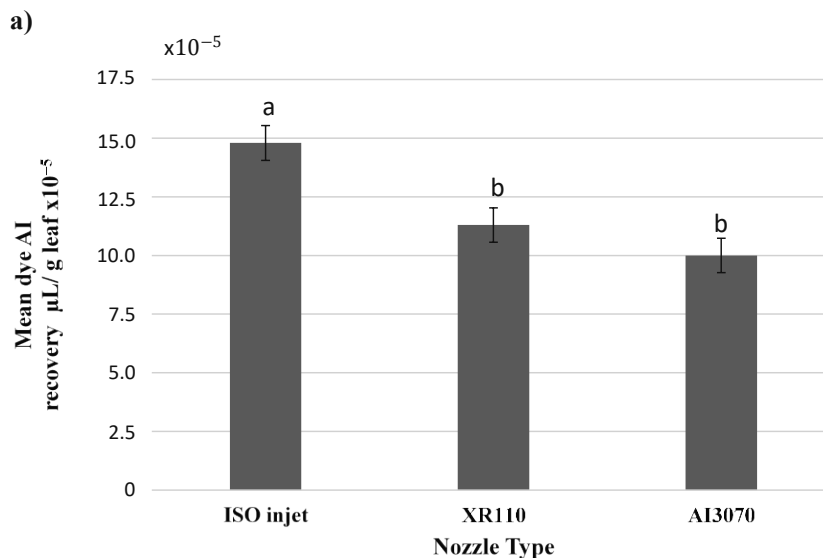
Kendra Thornton and Dr. Cheryl Trueman, University of Guelph, Ridgetown Campus, Ridgetown, ON

Dr. Jason Deveau, Ontario Ministry of Agriculture, Food, and Rural Affairs, Simcoe, ON

Trial Quality:	Very good	Variety:	C-RR059
Planted:	June 7 2019 (trial 1) April 22 2020 (trial 2) May 25 2020 (trial 3)	Location:	Ridgetown, Ontario, Canada
		Application Method:	hand-held boom, CO ₂ pressure
		Application Water	12 gpa
		Volume:	
Application:	August 12 2019 (trial 1) July 7-8 2020 (trial 2) August 5-6 (trial 3)	Reps:	4
		Seeding Rate:	3.5 seeds/foot
		Plot Size:	2 rows x 46 feet
Row Spacing:	2.5 feet		

Highlights:

- Rhodamine WT dye was added to spray mixtures to assess canopy coverage by measuring the μL of dye active ingredient (AI) recovered per gram of dry leaf using fluorimetry.
 - Adding InterLock to Manzate Pro-Stick did not alter dye recovery of any nozzle type tested (Hardi ISO injet air inclusion, Teejet XR110, and Teejet AI3070), in any canopy location sampled.
 - The ISO injet nozzle provided the greatest dye recovery compared to the XR110 and AI3070 nozzles.
 - Dye recovery at the mid canopy from the tip of the leaf was greater than all other canopy locations, and dye recovery at the outer and inner canopy from the base of the leaf was lower than all other locations.



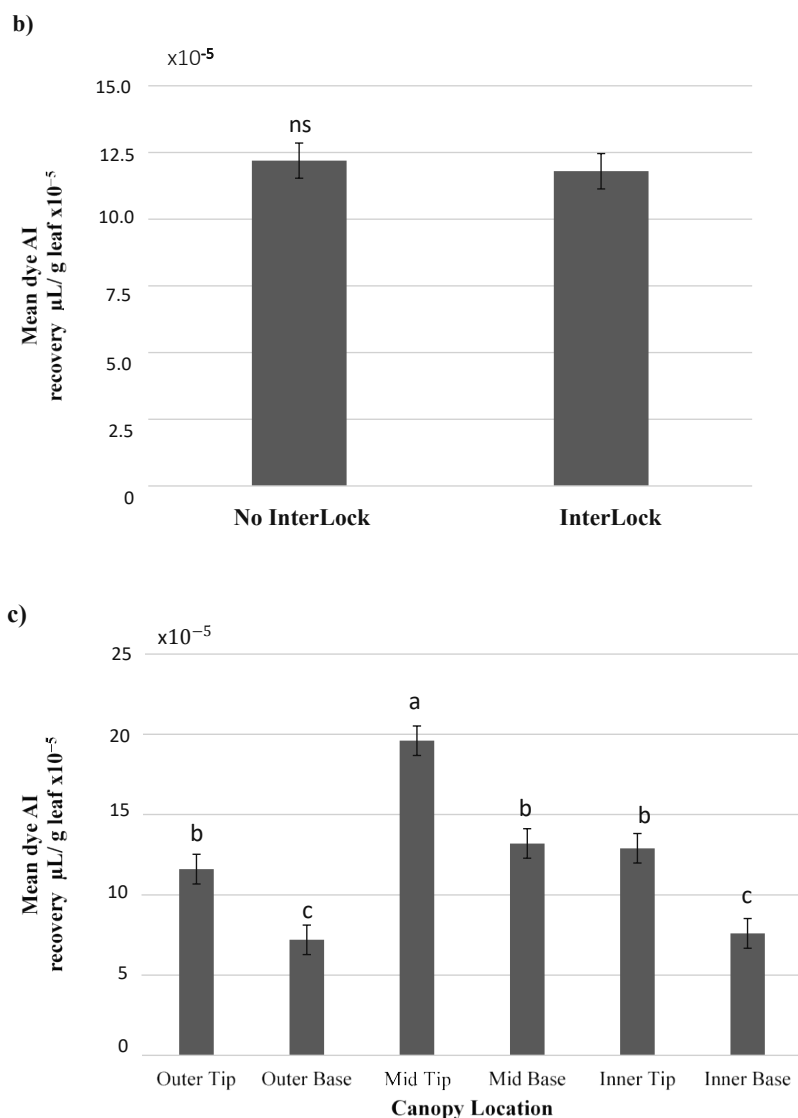


Figure. Effect of a) nozzle type, b) InterLock, and c) canopy location on mean Rhodamine WT active ingredient (μL per gram of dry leaf) recovered from six locations in a sugar beet canopy treated with InterLock and different nozzle types. All treatment applications included Manzate Pro-Stick. Bars followed by the same letter are not significantly different at $p \leq 0.05$, Tukey's HSD, ns= not significant. Treatment means include data from a) canopy location and InterLock, b) canopy location and nozzle type and c) nozzle type and InterLock treatment because of no significant nozzle*canopy, InterLock*canopy, or nozzle*InterLock interaction. Error bars represent standard error of the mean.

Acknowledgements: This project was funded in part through the Canadian Agricultural Partnership (the Partnership), a federal-provincial-territorial initiative. The Agricultural Adaptation Council assists in the delivery of the Partnership in Ontario. Project funding was also provided by the Ontario Agri-Food Innovation Alliance Research Program. We also thank the Ontario Sugarbeet Growers' Association (OSGA) and the Michigan Sugar Company (MSC) for financial support.



Canopy coverage: deposition aid and carrier volume, Ridgetown, 2020

Ridgetown, Ontario, Canada

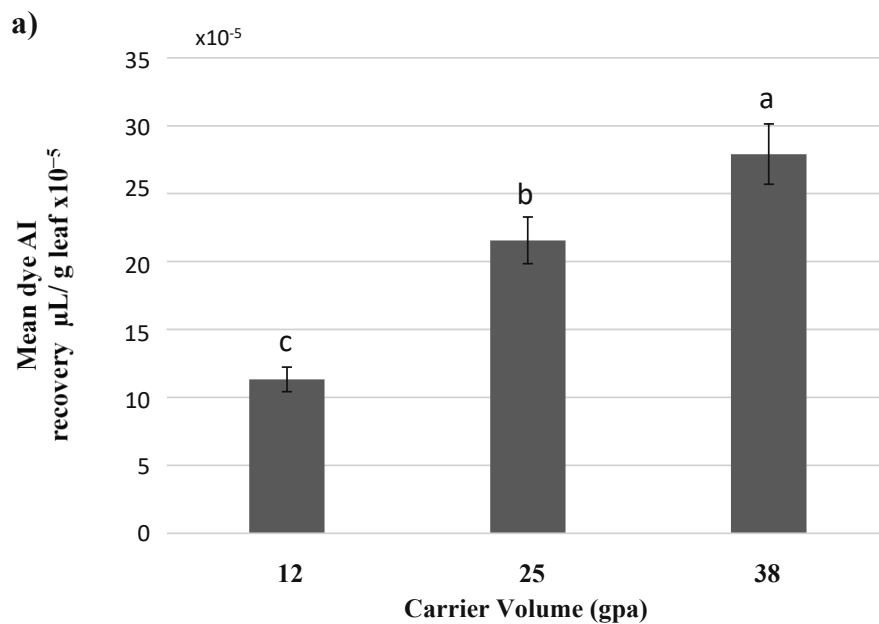
Kendra Thornton and Dr. Cheryl Trueman, University of Guelph, Ridgetown Campus, Ridgetown, ON

Dr. Jason Deveau, Ontario Ministry of Agriculture, Food, and Rural Affairs, Simcoe, ON

Trial Quality:	Very good	Variety:	C-RR059
Planted:	April 22	Location:	Ridgetown, Ontario, Canada
Application:	July 17 (trial 1) July 21 (trial 2)	Application Method:	hand-held boom, CO ₂ pressure
Plot Size:	2 rows x 46 feet	Application Water Volume:	See graph
Row Spacing:	2.5 feet	Reps:	4
		Seeding Rate:	3.5 seeds/foot

Highlights:

- Rhodamine WT dye was added to spray mixtures to assess canopy coverage by measuring the μL of dye active ingredient (AI) recovered per gram of dry leaf using fluorimetry.
 - Adding InterLock to Manzate Pro-Stick did not improve dye recovery for any carrier volume tested or canopy location sampled.
 - The 38 gpa volume provided the greatest dye recovery and the 12 gpa volume provided the lowest dye recovery.
 - The greatest dye recovery was found at the mid tip, with the lowest dye recovery found at the outer tip and base and inner base canopy location.



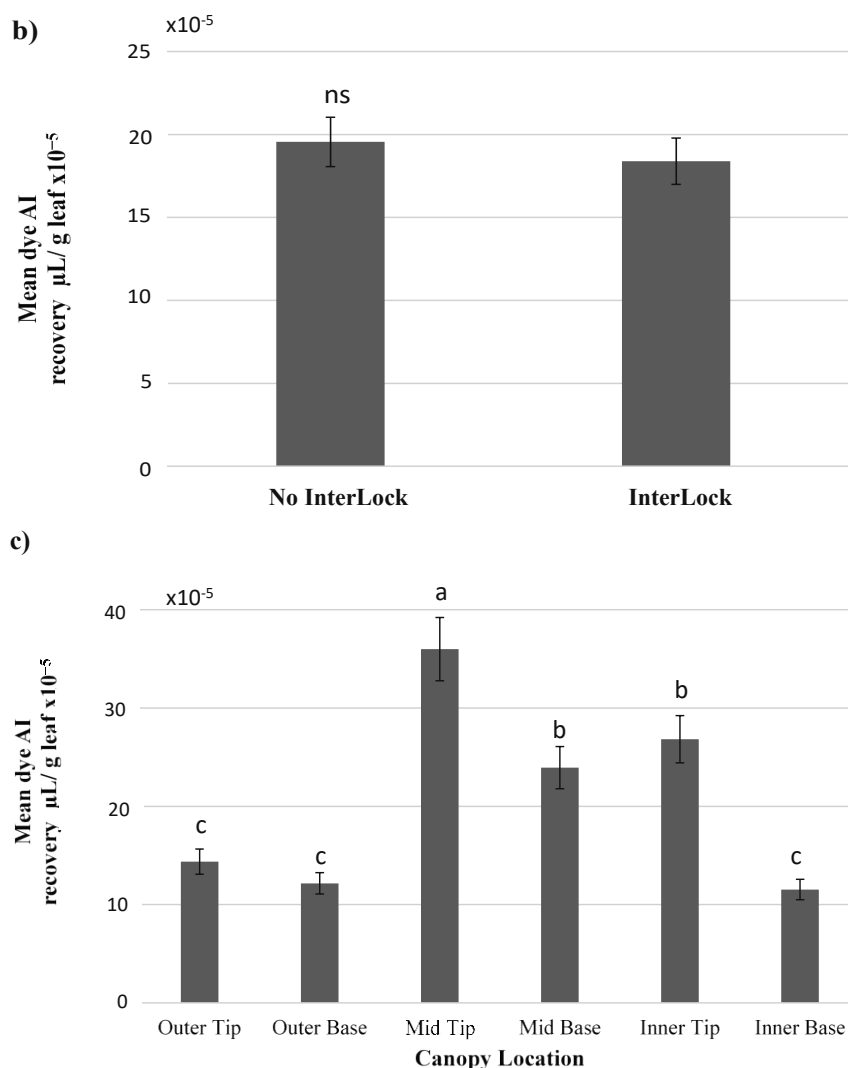


Figure 1. Effect of a) carrier volume, b) InterLock, and c) canopy location on mean Rhodamine WT active ingredient (μL per gram of dry leaf) recovered from six locations in a sugar beet canopy treated with InterLock and different carrier volumes. All treatment applications included Manzate Pro-Stick. Bars followed by the same letter are not significantly different at $p \leq 0.05$, Tukey's HSD, ns= not significant. Treatment means include data from canopy location and InterLock, canopy location and carrier volume, and carrier volume and InterLock treatment because of no significant volume*canopy, InterLock*canopy, or volume*InterLock interaction. Error bars represent standard error of the mean. Data analysis was performed on the lognormal scale, back-transformed means and se are presented.

Acknowledgements: This project was funded in part through the Canadian Agricultural Partnership (the Partnership), a federal-provincial-territorial initiative. Project funding was also provided by the Ontario Agri-Food Innovation Alliance Research Program, the Ontario Sugarbeet Growers' Association (OSGA) and the Michigan Sugar Company (MSC).



Cercospora leaf spot: fungicide efficacy using a deposition aid and carrier volume, Ridgetown early and late planted, 2020

Ridgetown, Ontario, Canada

Kendra Thornton and Dr. Cheryl Trueman, University of Guelph, Ridgetown Campus, Ridgetown, ON

Trial	Fair (early)	Location:	Ridgetown Ontario, Canada
Quality:	Good (late)	Application Method:	Hand-held boom, CO ₂ pressure
Planted:	April 22 (early) May 25 (late)	Application Water Vol.:	See table
Harvested:	October 20 (early) October 26 (late)	Reps:	4
Variety:	HIL-9908	Plot Size:	2 rows x 23 feet
		Row Spacing:	2.5 feet
		Seeding Rate:	3.5 seeds/foot

Highlights:

- Adding InterLock to Manzate Pro-Stick did not reduce disease severity or sAUDPS more than applications of Manzate Pro-Stick alone in the early planted trial, where average disease severity of water only plots was 43% at the time of harvest. For the late planted trial, where average disease severity of water only plots was 32% at the time of harvest, adding InterLock to Manzate Pro-Stick resulted in disease severity of 18% compared to using Manzate Pro-Stick alone, which had disease severity of 22% on the final assessment before harvest.
- Beet yield, RWSA, and RWST did not increase using Manzate Pro-Stick with InterLock compared to using Manzate Pro-Stick alone. Sugar content increased by 3% using Manzate Pro-Stick with InterLock compared to treatments of Manzate Pro-Stick alone, but not compared to the water treatment.
- Carrier volume had no effect on disease severity, and did not improve beet or sugar yield, or sugar quality. However, carrier volume did have an effect on sAUDPS; using 38 gpa reduced sAUDPS by 14% compared to using 12 gpa.

Table 1. Cercospora leaf spot severity (% leaf area affected), standardized area under the disease progress stairs (sAUDPS), yield, and sugar percent in sugarbeet ‘HIL-9908’ managed using Manzate Pro-Stick fungicide with or without the deposition aid InterLock at different application carrier volumes in Ridgetown, 2020.

Factor	Disease Severity (%)		sAUDPS ^b	Yield (tons/ac)	Sugar (%)	RWST ^c	RWSA ^d
	Early Trial Oct 7	Late Trial Oct 14 ^a					
<i>Program</i>							
Water	43 a ^e	32 a	13.2 a	32.0 b	19.0 ab	287 ab	9169 bc
InterLock	44 a	33 a	13.6 a	31.7 b	18.6 b	282 b	8937 c
Manzate Pro-Stick	27 b	22 b	7.9 b	33.6 ab	18.8 b	285 ab	9627 ab
Manzate Pro-Stick + InterLock	26 b	18 c	7.1 b	34.3 a	19.3 a	287 a	10053 a
<i>Carrier volume (gpa)</i>							
12	38 ns	27 ns	10.9 a	32.9 ns	18.8 ns	286 ns	9332 ns
25	37	25	10.4 ab	32.6	19.0	287	9422
38	30	24	9.4 b	33.1	19.0	289	9585
50	34	25	9.5 ab	33.0	18.8	285	9447

Data from both trials was pooled for analysis, except final severity ratings. Early planted trial treatment application dates: June 24, July 9, 23, August 7, 21, September 4, and 18. Late planted trial treatment application dates: June 29, July 13, 27, August 10, 24, September 8, 21, and October 5. ^a Late disease severity and sAUDPS was analyzed in lognormal. Back-transformed means are presented. ^b sAUDPS = standardized area under the disease progress stairs. A lower number is better. ^c RWST= recoverable white sugar per ton. ^d RWSA= recoverable white sugar per acre. ^e Numbers in a column followed by the same letter are not significantly different at $p \leq 0.05$, Tukey's HSD, ns= not significant. Treatment means include data from program and carrier volume treatments because of no significant program*volume interactions.

Acknowledgements: This project was funded in part through the Canadian Agricultural Partnership (the Partnership), a federal-provincial-territorial initiative. Project funding was also provided by the Ontario Agri-Food Innovation Alliance Research Program, the Ontario Sugarbeet Growers' Association (OSGA) and the Michigan Sugar Company (MSC).



Cercospora leaf spot: fungicide efficacy, Ridgetown, 2020

Ridgetown, Ontario, Canada

Christine Dervaric & Cheryl Trueman, University of Guelph, Ridgetown Campus, Ridgetown, ON

Trial Quality:	Very good	Variety:	HIL-9908
Planted:	April 22, May 25	Location:	Ridgetown, Ontario, Canada
Harvested:	September 28	Application Method:	hand-held boom, CO ₂ pressure
Plot Size:	2 rows x 23 feet	Application Water Volume:	32 gal/A
Row Spacing:	2.5 feet	Reps:	4
Seeding Rate:	3.5 seeds/foot		

- Registered and alternative fungicides were applied on a 7-10-day calendar schedule.
- Parasol with Vegol was the only treatment to have a lower area under the disease progress curve (AUDPC) than the nontreated control.
- AUDPC was statistically equivalent for Parasol with Vegol to Manzate-Pro-Stick, Phostrol, Cueva, and Parasol treated plots.
- No significant differences were found in sugar, RWST, RWSA or beet yield among treatments.

Effects of alternative and registered fungicides on sugarbeet yield and quality and severity of Cercospora leaf spot

Treatment ^a (product rate/Ha)	AUDPC ^b	Sugar (%)	RWST (lbs/ton) ^c	RWSA (lbs/acre) ^d	Beet Yield (ton/acre)
Nontreated control	528 ab ^e	19 ns	247 ns	5443 ns	14 ns
Manzate Pro-Stick @ 2.25 kg	73 c	19	256	6416	16
Milstop @ 5.6 kg	498 abc	19	247	5262	14
Phostrol @ 5.6 l	318 abc	19	256	5175	13
Cueva @ 1% v/v	461 abc	19	255	5190	13
Parasol @ 4.25 kg	93 bc	19	254	6072	16
Vegol @ 1% v/v	620 a	19	246	4921	13
Parasol @ 4.25 kg + Vegol @ 1% v/v	54 c	19	250	6322	16
Double nickel @ 2.34 l	647 a	19	249	5516	14

^a Treatments were applied on June 26, July 6, July 14, July 23, July 31, August 10, August 18, August 26, and September 3.

^b Disease severity values were used to calculate the area under the disease progress curve (AUDPC) using the formula $AUDPC = \sum_{i=1} [(Y_{i+1} + Y_i)/2][X_{i+1} - X_i]$ where Y_i is the mean rating at day X_i and Y_{i-1} is the mean rating at day X_{i-1} . A lower number is better.

^c RWST is the recoverable white sugar per ton.

^d RWSA is the recoverable white sugar per acre.

^e Values followed by the same letter are not significantly different at $p \leq 0.05$, Tukey's HSD. ns = no significant differences.

Funding: Ontario Agri-Food Innovation Alliance.

Cercospora leaf spot: fungicide programs, Ridgetown, 2020

Ridgetown, Ontario, Canada

Christine Dervaric & Cheryl Trueman, University of Guelph, Ridgetown Campus, Ridgetown, ON

Trial Quality:	Very good	Variety:	HIL-9908
Planted:	April 22	Location:	Ridgetown, Ontario, Canada
Harvested:	September 29	Application Method:	hand-held boom, CO ₂ pressure
Plot Size:	2 rows x 23 feet	Application Water Volume:	32 gal/A
Row Spacing:	2.5 feet	Reps:	4
Seeding Rate:	3.5 seeds/foot		

- A standard program of Manzate Pro-Stick/ Proline was compared to various alternative fungicide program options that used reduced or no applications of Proline and/or Manzate Pro-Stick using the BEETcast susceptible, BEETcast moderate, and calendar spray applications.
- All programs except for the no Proline, no Manzate Pro-Stick with added Phostrol calendar application had lower AUDPC (total disease) than the nontreated control, showing that several programs with reduced or no Proline or Manzate Pro-Stick can effectively manage CLS.
- No significant differences in beet yield or RWSA were found among treatments.

Effects of fungicide programs using reduced Proline and Manzate-Pro-Stick applications on sugarbeet yield and quality and severity of Cercospora leaf spot using three different application timings, Ridgetown, ON, 2020.

Treatment ^a (product rate/ Ha)	AUDPC ^c	Sugar (%)	RWST (lbs/ ton)^d	RWSA (lbs/acre)	Beet Yield (ton/acre)
1. Nontreated control	1569 a ^d	19.08 b	250 b	6792 a	27 a
<i>BEETcast™ moderate application interval</i>					
2. Manzate Pro-Stick 2.25 kg + Proline @ 365 ml (BH) Manzate Pro-Stick 2.25 kg (EKMPSU)	130 cd	20.32 ab	269 ab	7998 a	29 a
3. Manzate Pro-Stick 2.25 kg + Proline @ 365 ml (BH) Manzate Pro-Stick 2.25 kg (EK) Parasol @ 4.25 kg + Vegol @ 1% v/v (MPSU)	186 cd	19.79 ab	262 ab	8302 a	31 a
4. Manzate Pro-Stick 2.25 kg + Proline @ 365 ml (BH) Manzate Pro-Stick 2.25 kg (EK) PHOSTROL @ 5.6 L (MPSU)	232 cd	19.99 ab	262 ab	8215 a	31 a
5. Proline @ 365 ml (BH) Parasol @ 4.25 kg + Vegol @ 1% v/v (EKMPSU)	149 cd	19.65 ab	259 ab	7948 a	30.8
6. Phostrol @ 5.6 L + Proline @ 365 ml (BH) Phostrol @ 5.6 L (EKMPSU)	416 cd	19.91 ab	262 ab	5370 a	29 a
7. Phostrol @ 5.6 L + Proline @ 365 ml (BH) Phostrol @ 5.6 L (EKMPSU) Parasol @ 4.25 kg + Vegol @ 1% v/v (MPSU)	216 cd	20.12 ab	264 ab	7570 a	28 a
<i>BEETcast™ susceptible application interval</i>					
8. Manzate Pro-Stick 2.25 kg + Proline @ 365 ml (AF) Manzate Pro-Stick 2.25 kg (CHILOQTU)	71 d	20.87 a	377 a	9029 a	32 a

9. Manzate Pro-Stick 2.25 kg + Proline @ 365 ml (AF) Manzate Pro-Stick 2.25 kg (CH) Parasol @ 4.25 kg + Vegol @ 1% v/v (ILOQTU)	112 cd	19.96 ab	262 ab	7700 a	29 a
10. Manzate Pro-Stick 2.25 kg + Phostrol @ 5.6 L + Proline @ 365 ml (AF) Manzate Pro-Stick 2.25 kg + Phostrol @ 5.6 L (CH) PHOSTROL (ILOQTU)	309 cd	20.59 ab	273 ab	8077 a	27 a
11. Proline @ 365 ml (AF) Parasol @ 4.25 kg + Vegol @ 1% v/v (CHILOQTU)	132 cd	20.04 ab	263 ab	7201 a	27 a
12. Proline @ 365 ml (AF) Phostrol @ 5.6 L (CHILOQTU)	466 c	19.58 ab	258 ab	7373 a	28 a
13. Phostrol @ 5.6 L + Proline @ 365 ml (AF) Phostrol @ 5.6 L (CHILOQTU) Parasol @ 4.25 kg + Vegol @ 1% v/v (ILOQTU)	89 cd	19.78 ab	260 ab	7159 a	27 a
<i>Calendar application interval</i>					
14. Proline @ 365 ml (BG) Manzate Pro-Stick 2.25 kg (DJNRV)	143 cd	20.47 ab	272 ab	7506 a	27 a
15. Manzate Pro-Stick 2.25 kg (BDGJNRV)	217 cd	20.08 ab	265 ab	7347 a	27 a
16. Manzate Pro-Stick 2.25 kg (BDGJ) Parasol @ 4.25 kg + Vegol @ 1% v/v (NRV)	194 cd	20.23 ab	266 ab	7047 a	26 a
17. Manzate Pro-Stick 2.25 kg + Phostrol @ 5.6 L (BDGJ) Phostrol @ 5.6 L (NRV)	337 cd	20.13 ab	266 ab	7838 a	29 a
18. Manzate Pro-Stick 2.25 kg + Phostrol @ 5.6 L (BDGJ) Parasol @ 4.25 kg + Vegol @ 1% v/v + Phostrol @ 5.6 L (NRV)	174 cd	20.31 ab	272 ab	8383 a	30 a
19. Parasol @ 4.25 kg + Vegol @ 1% v/v (BDGJNRV)	162 cd	20.33 ab	268 ab	7909 a	29 a
20. Phostrol @ 5.6 L (BDGJNRV)	856 b	19.37 ab	256 ab	7022 a	27 a
21. Parasol @ 4.25 kg + Vegol @ 1% v/v + Phostrol @ 5.6 L (BGNRV) Phostrol @ 5.6 L (DJ)	241 cd	20.10 ab	266 ab	8018 a	29 a

^a BEETcast™ moderate application programs were made on B = June 19 (41 DSV), E = July 6 (36 DSV), H = July 18 (26 DSV), K = July 30 (27 DSV), M = Aug 6 (17 DSV), P = Aug 17 (24 DSV), S = Aug 27 (20 DSV), U = Sept 4 (16 DSV). BEETcast™ susceptible application programs were made on A = June 12 (35 DSV), C = June 26 (21 DSV), F = July 9 (29 DSV), H = July 18 (18 DSV), I = July 27 (20 DSV), L = Aug 3 (19 DSV), O = Aug 12 (16 DSV), Q = Aug 21 (18 DSV), T = Aug 28 (18 DSV), and U = Sept 4 (13 DSV). Calendar applications were made on a 12 to 14-day interval on B = June 19, D = July 2, G = July 15, J = July 28, N = Aug 10, R = Aug 24, V = Sept 8.

^b Disease severity ratings from September 18, 2020, which was the final assessment before harvest.

^c Disease severity values were used to calculate the area under the disease progress curve (AUDPC) using the formula $AUDPC = \sum_{i=1}^n [(Y_{i+1} + Y_i)/2][X_{i+1} - X_i]$ where Y_i is the mean rating at day X_i and Y_{i-1} is the mean rating at day X_{i-1} . A lower number is better.

^d Values followed by the same letter are not significantly different at $p \leq 0.05$, Tukey's HSD.

Funding: Ontario Agri-Food Innovation Alliance.

Epidemiological studies of *Cercospora* leaf spot of sugar beet for improved management

Alexandra Hernandez¹, Daniel Bublitz¹, Tom Wenzel¹, Chris Bloomingdale¹, Cameron Pincumbe¹, Cheryl Trueman², Linda E. Hanson^{1,3}, and Jaime F. Willbur¹; ¹Michigan State University; ²University of Guelph – Ridgetown; ³United States Department of Agriculture – Agricultural Research Service

Background:

Cercospora leaf spot (CLS) is the most important foliar disease of sugar beet in Michigan and several other sugar beet growing regions (Harveson et al. 2009; Lartey et al. 2010). This research aims to identify, develop, and deploy novel short-term and long-term CLS management strategies. Observations made of the disease, including early-season inoculum presence, changes in *Cercospora beticola* fungicide resistance, and performance of CLS prediction models have helped us to identify opportunities for further improvement in CLS management. Strategies which were investigated to aid in CLS management include creating improved disease prediction tools through an innovative spore abundance model, identifying alternative strategies to reduce inoculum survival for long-term management, and evaluating fungicide resistance management tactics in Michigan *C. beticola* populations. Continued population monitoring, model development and refinement, and multi-year and -location validation is ongoing.

Methods:

Objective 1. Monitor *C. beticola* spore presence and abundance using spore traps and sentinel beets to refine existing predictive modeling tools. Aerial spores were captured using Burkard spore traps and highly susceptible sentinel beet traps at the MSU Crop and Soils Farm, Frankentrost, MI, and Ontario, Canada in 2019 and the Saginaw Valley Research and Extension Center (SVREC) in 2020. Environmental factors were monitored using on-site or local MSU Enviroweather stations and evaluated for correlations to spore abundance. Stepwise regression analyses were conducted to assess the accuracy of the model variables separately and together.

Objective 2. Assess potential end-of-season management strategies to reduce inoculum levels and disease.

Treatments included a nontreated control, plowing immediately post-harvest, applying heat with a burner at 1 mph prior to defoliation at-harvest, and applying a desiccant (saflufenacil, Sharpen) 7 days pre-harvest. Leaf samples were collected from each plot at harvest before topping and evaluated 0-, 45-, 90-, and 135-days post-harvest to assess *C. beticola* survival over the winter. Survival was determined by observing the percentage of lesion sporulation and viability. In 2020, highly susceptible sentinel beets and bi-weekly CLS ratings in re-planted plots were used to assess the long-term efficacy of inoculum reduction strategies. Yield and sugar data were also collected to assess the long-term efficacy of inoculum reduction strategies. A repeated trial was initiated in 2020 with the addition of a second burner treatment applied at 3 mph.

Objective 3. Determine fungicide sensitivity of *C. beticola* populations recovered from resistance management trials. Treatment programs evaluated at the SVREC included: a nontreated control; a mixed application, where both high-risk (pyraclostrobin) and low-risk (mancozeb) fungicides were applied at each spray timing; high-low, where alternate sprays of pyraclostrobin and mancozeb were applied, with pyraclostrobin sprayed first; and low-high, which is similar to the previous treatment but with low-risk applied first. Symptomatic leaves were sampled from field trials in July (after three treatments) and September (after all six treatments). Mono-conidial *C. beticola* isolates were then tested for in vitro pyraclostrobin sensitivity. A spiral gradient dilution method was used to find the effective concentration inhibiting growth by 50% (EC50). Resistance management trials were conducted in 2019 and 2020.

For all objectives, statistical analyses (analysis of variance and simple and linear mixed model regression) were conducted in SAS v. 9.4 and evaluated at the $\alpha=0.05$ significance level. Fisher's protected Least Significance Difference was used for mean comparisons.

Results & Conclusions:

Objective 1. In 2019, a preliminary model to predict spore number was developed using significantly correlated weather predictors ($R^2 = 0.23$, $P < 0.0001$). The initial model predicted daily spore abundance based on daily total precipitation, minimum daily relative humidity, maximum daily soil temperature, and maximum daily wind speed. With additional observations from Ontario in 2019 and Michigan in 2020, significant correlations were observed between spore abundance and maximum air temperature ($r = 0.35$, $P < 0.0001$) and maximum soil moisture ($r = 0.22$, $P < 0.05$), though precipitation ($r = 0.12$, $P = 0.11$) and maximum wind speed ($r = 0.17$, $P = 0.06$) were also noted. Additional locations and years will be added to the spore abundance and initial disease observations for further model refinement and validation. A preliminary model will be used in field validations conducted in 2021. Initial detections and general trends of abundance suggest a spore presence or abundance model will complement existing tools to better predict early-season risk and improve subsequent CLS management.

Objective 2. In 2019, significant treatment differences were detected in percentages of lesion sporulation ($P < 0.0001$) and lesion viability ($P < 0.05$) in at harvest samples ($N=133$ leaves and 240 lesions). In 2020, reduced numbers of CLS lesions were observed on sentinel beets collected in 2019 burner treated plots from May 26-June 1 ($P < 0.05$, Fig. 1A) and June 2-9 ($P < 0.01$, Fig. 1B). The heat treatment also significantly reduced the area under the disease progress curve (AUDPC), calculated from ratings in re-planted plots ($P < 0.01$, Fig. 1C). In the repeated trial initiated in 2020, lesion sporulation was reduced in at harvest ($P < 0.0001$, Fig. 2) and 45-days post-harvest samples ($P < 0.01$). Continued monitoring will occur until harvest in 2021. Novel management strategies, particularly the use of a foliar burner at-harvest, have the potential to reduce inoculum overwintering and aid in long-term CLS control.

Remaining leaf samples from inoculum overwintering studies will continue to be evaluated for the repeated trial initiated in 2020. In 2021, early-season spore presence and abundance, weekly disease ratings, and final yield and sugar data will be collected to validate the long-term efficacy of inoculum reduction strategies.

Objective 3. In 2019, no significant differences were found in mean pyraclostrobin EC_{50} values for isolates collected from the fungicide treatment programs in July ($N=145$ isolates) or September ($N=75$ isolates, *in progress*). All programs resulted in similar yields ($P < 0.001$), relative area under the disease progress curves (RAUDPC; $P < 0.01$) and performed better than the non-treated control. So far, 43% of isolates from July and 20% of isolates from September are considered highly resistant ($EC_{50} \geq 25$ ppm). All isolates tested were sensitive to pyraclostrobin concentrations below label rates (1,200-1,500 $\mu\text{g ml}^{-1}$). In 2019, resistance management tactics were found to have little effect on mid-season populations of *C. beticola*.

Testing of the remaining end-of-season *C. beticola* populations from 2019 and 2020 is in-progress and will continue. These samples received the full-season treatments. Isolate pyraclostrobin sensitivity will be tested and results will be evaluated by treatment. In 2021, *C. beticola* populations will be monitored for sensitivity to critical fungicide groups.

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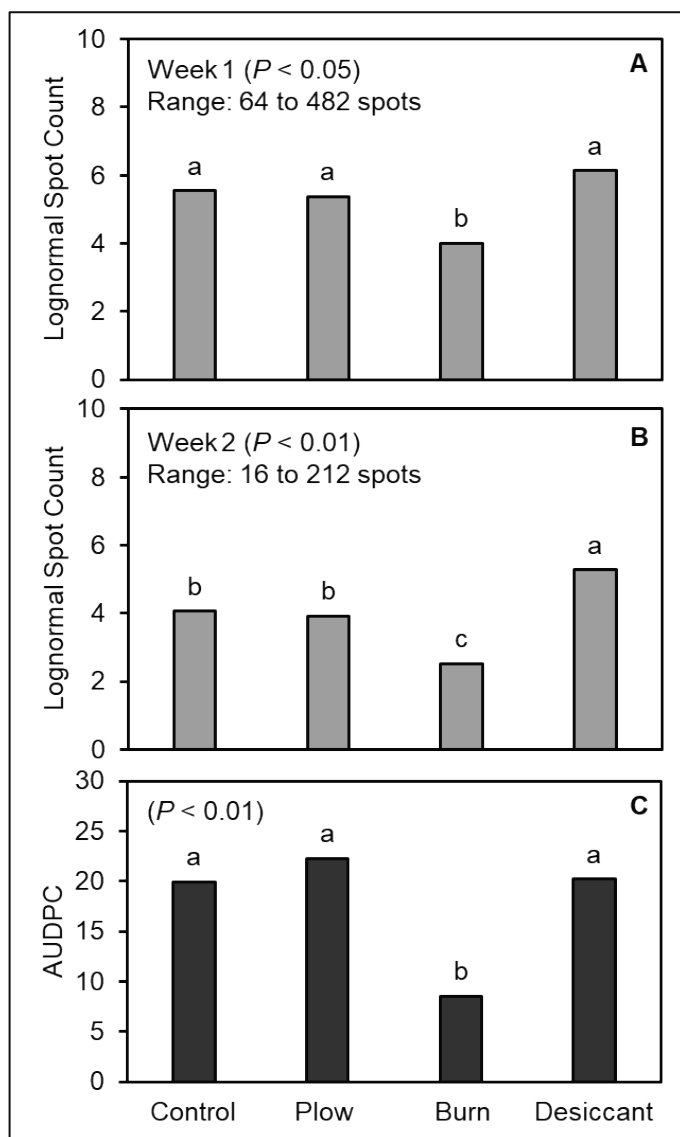


Figure 1. Early-season inoculum and subsequent CLS observations in 2020 following end-of-season treatments applied in 2019. Leaf spot counts were collected from sentinel beets placed in plots between **A**, May 26-June 1 and **B**, June 2-9. Subsequent bi-weekly CLS ratings were used to calculate **C**, the area under the disease progress curve (AUDPC). Means of bars with the same letters were not different based on Fisher's protected LSD at $\alpha=0.05$.

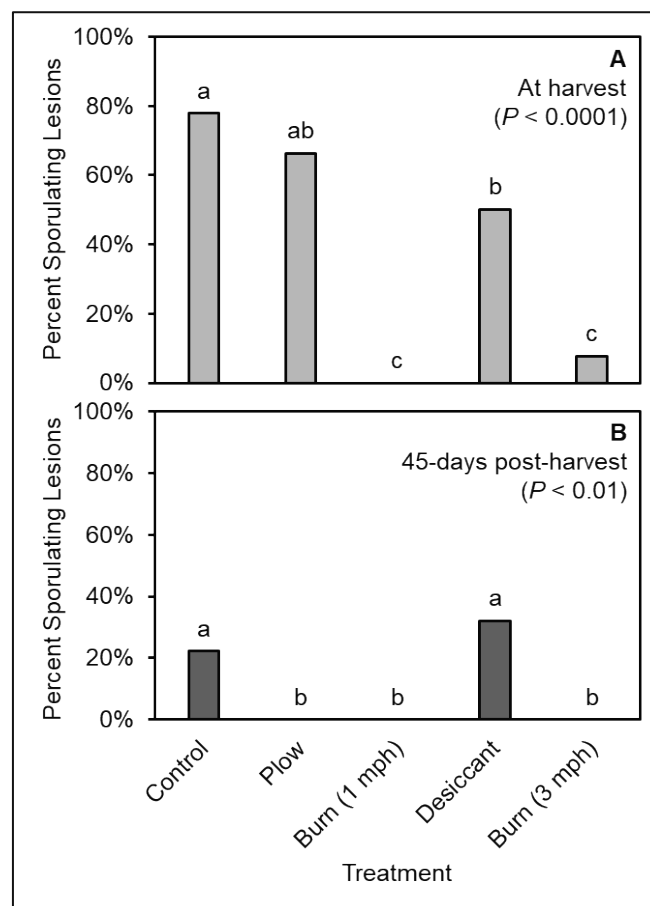


Figure 2. **A**, At-harvest and **B**, 45-days post-harvest lesion sporulation in repeated trial initiated in 2020, following desiccant application 7-days pre-harvest, heat treatment immediately prior to defoliation, and plowing immediately following harvest. Means of bars with the same letters were not different based on Fisher's protected LSD at $\alpha=0.05$.

Evaluation of foliar fungicide treatments to manage Cercospora leaf spot of sugar beet

Chris Bloomingdale and Jaime Willbur, Michigan State University

Location: Frankenmuth (SVREC)	Treatment Timings: 14-day interval starting at 35 DSV
Planting Dates: April 7, 2020	Pesticides: see table
Soil Type: Loam	O.M.: 5.0 pH: 7.5
Replicates: 4	Variety: C-G333NT

Summary: Differences in area under the disease progress curve (AUDPC) were observed in this trial. All fungicide programs had significantly lower CLS severities than the non-treated control ($P < 0.0001$). The lowest AUDPC value was observed in program 11, however, it did not perform differently than over half of the other tested programs. Estimated mean yield values ranged between 13.9 and 20.5 t/A, but no differences were observed among treatments ($P > 0.05$). Additionally, percent sugar and RWST were not different among treatments ($P > 0.05$).

Table 1. Area under the disease progress curve (AUDPC) and yield parameters from the tested fungicide programs.

No.	Treatment, Rate ^a , and Timing ^b	AUDPC ^{c, d}	Yield (t/A)	Sugar (%)	RWST ^e
11	Manzate Max (1.6 qt) ABCD + Provysol (5 fl oz) B + Super Tin (8 fl oz) C + Priaxor (8 fl oz) D + Topsin (20 fl oz) D	22.3 k	17.5	17.9	229.7
25	Exp ^f 3 (58 fl oz) A + Manzate Max (1.6 qt) ABCD + Super Tin (8 fl oz) BCD	24.0 g-k	16.5	17.5	223.9
26	Inspire XT (7 fl oz) A + Manzate Max (1.6 qt) ABCD + Super Tin (8 fl oz) BC + Exp 3 (58 fl oz) D	25.8 jk	18.6	17.8	226.6
24	Inspire XT (7 fl oz) A + Manzate Max (1.6 qt) ACD + Super Tin (8 fl oz) BCD + Dexter Max (2.1 lb) B	26.8 ijk	15.4	18.0	231.1
12	Manzate Max (1.6 qt) ABCD + Proline (5.7 fl oz) B + Super Tin (8 fl oz) C + Flint Extra (3.6 fl oz) D + Topsin (20 fl oz) D	28.5 h-k	19.3	18.1	232.1
10	Manzate Max (1.6 qt) ABD + Provysol (5 fl oz) B + Serifel (4 oz) C + Super Tin (8 fl oz) C + Priaxor (8 fl oz) D + Topsin (20 fl oz) D	30.3 h-k	15.7	17.5	224.5
27	Exp 3 (58 fl oz) A + Topsin (20 fl oz) A + Super Tin (8 fl oz) BCD + Dexter Max (2.1 lb) B + Manzate Max (1.6 qt) CD	32.0 f-k	19.3	17.8	227.1
2	Manzate Max (1.6 qt) ABCD + Inspire XT (7 fl oz) BD + Super Tin (8 fl oz) C	32.1 f-k	18.7	17.6	225.8
21	Minerva Duo (16 fl oz) ACD + Exp 2 (8 fl oz) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B	32.1 f-k	15.1	17.6	224.9
23	Manzate Max (1.6 qt) ABCD + Inspire XT (7 fl oz) A + Super Tin (8 fl oz) BCD	33.8 f-k	17.9	17.8	229.2
7	Propulse (13.6 fl oz) ABCD	34.6 e-k	19.9	18.3	236.6
17	Minerva Duo (16 fl oz) AD + Super Tin (8 fl oz) BC + Koverall (1.5 lb) B + Brixen (21 fl oz) C	34.6 e-k	17.4	17.6	225.9
20	Minerva Duo (16 fl oz) ACD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B	35.5 e-k	14.9	17.3	220.7
18	Exp 1 (32 fl oz) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B + Minerva Duo (16 fl oz) C	35.6 e-k	17.4	18.3	236.4
6	Manzate Max (1.6 qt) ABCD + Aqueus (1.28 fl oz/gal) ABCD + Inspire XT (7 fl oz) BD	40.0 e-j	18.6	18.0	229.9
14	Manzate Max (1.6 qt) ABCD + Eminent (13 fl oz) B +	41.0 d-j	18.3	17.7	226.1

	Super Tin (8 fl oz) C + Provysol (5 fl oz) D				
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Table 1. Continued from previous page.

No.	Treatment, Rate ^a , and Timing ^b	AUDPC ^{c, d}	Yield (t/A)	Sugar (%)	RWST ^e
22	Brixen (21 fl oz) AD + Spinnaker (1.5 lb) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B + Minerva Duo (16 fl oz) C	41.9 d-j	18.8	18.3	235.9
16	Koverall (1.5 lb) ABD + Minerva (13 fl oz) AD + Super Tin (8 fl oz) B + Minerva Duo (16 fl oz) C	43.8 d-i	20.5	17.6	226.0
8	Proline (5.7 fl oz) ABCD	44.6 d-h	19.2	17.8	227.6
15	Brixen (21 fl oz) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B + Minerva Duo (16 fl oz) C	48.9 def	16.3	17.7	225.9
5	Headline (12 fl oz) AC + Manzate Max (1.6 qt) ABCD	49.3 def	19.1	17.7	226.5
19	Koverall (1.5 lb) AD + Super Tin (8 fl oz) AD + Exp 1 (32 fl oz) B + Minerva Duo (16 fl oz) C	49.3 def	13.9	17.8	230.1
9	Delaro (11 fl oz) ABCD + Proline (1.71 fl oz) ABCD	51.9 de	18.2	17.9	230.0
13	Badge (2 pt) ABCD + Eminent (13 fl oz) B + Super Tin (8 fl oz) C + Provysol (5 fl oz) D	58.0 cd	15.5	17.6	225.8
4	Manzate Max (1.6 qt) ABD + Headline (12 fl oz) C	69.8 bc	16.7	17.7	226.6
3	Headline (12 fl oz) AC + Manzate Max (1.6 qt) BD	85.9 b	16.3	17.6	224.8
1	Non-Treated Control	141.1 a	16.6	17.9	229.7

^a All rates, unless otherwise specified, are listed as a measure of product per acre. MasterLock was added to all tank mixes at a rate of 0.25 % v/v.

^b Application letters code for the following dates: A=29 Jun, B=13 Jul, C=21 Jul, D=20 Aug.

^c Area under the disease progress curve was calculated using CLS severity (0-10 scale).

^d Column values followed by the same letter were not significantly different based on Fisher's Protected LSD ($\alpha=0.05$).

^e Pounds of recoverable white sugar per ton of beets.

^f Exp=experimental compound.

Evaluation of LifeGard and ManKocide fungicides to manage Cercospora leaf spot of sugar beet

Chris Bloomingdale and Jaime Willbur, Michigan State University

Location: Frankenmuth (SVREC)	Treatment Timings: 14-day interval starting at 35 DSV
Planting Dates: April 7, 2020	Pesticides: see table
Soil Type: Loam	O.M.: 5.0 pH: 7.5
Replicates: 4	Variety: C-G675

Summary: Despite late disease onset, significant differences were observed among treatment area under the disease progress curve (AUDPC) values ($P = 0.001$). All ManKocide treatments and LifeGard WG in a standard fungicide program (treatments 5, 6, and 7) had significantly lower CLS severities than the non-treated control and were comparable to the grower standard (treatment 2). AUDPC values in best performing programs ranged from 32.0 to 41.1; these programs did not differ from one another. LifeGard WG and LifeGard LC programs did not differ in AUDPC from the non-treated control. Differences were not observed among collected mean yield or sugar parameters ($P > 0.05$). Yield values in this trial ranged between 10.4 and 18.0 t/A, which is well below typical sugar beet yield in Michigan. Percent sugar and RWST values were comparable to state averages.

Table 1. Area under the disease progress curve (AUDPC) and yield parameters from the tested fungicide programs.

No.	Treatment, Rate ^a , and Timing ^b	AUDPC ^{c,d}	Yield (t/A)	Sugar (%)	RWST ^e
2	Manzate Max (1.6 qt) ABCD + Inspire XT (7 fl oz) BD + Super Tin (8 fl oz) C	32.0 b	14.6	18.3	235.6
5	Manzate Max (1.6 qt) ABCD + LifeGard WG (4.5 oz/100 gal) ABD + Super Tin (8 fl oz) C	33.8 b	16.2	18.2	235.5
6	ManKocide (4.3 lb) ABCD	36.5 b	18.0	18.7	241.0
7	ManKocide (4.3 lb) ABCD + Inspire XT (7 fl oz) BD + Super Tin (8 fl oz) C	41.1 b	17.4	18.1	232.7
3	LifeGard WG (4.5 oz/100 gal) ABCD	83.6 a	16.9	18.4	236.9
4	LifeGard LC (1 gal/ 100 gal) ABCD	95.1 a	17.2	18.3	234.6
1	Non-treated Control	96.1 a	10.4	17.7	226.0

^a All rates, unless otherwise specified, are listed as a measure of product per acre. MasterLock was added to all tank mixes at a rate of 0.25 % v/v.

^b Application letters code for the following dates: A=29 Jun, B=13 Jul, C=21 Jul, D=20 Aug.

^c Area under the disease progress curve was calculated using disease severity (0-10 scale).

^d Column values followed by the same letter were not significantly different based on Fisher's Protected LSD ($\alpha=0.05$).

^e Pounds of recoverable white sugar per ton of beets.



SAGINAW VALLEY
STATE UNIVERSITY



Fungicide Resistance Screening for *Cercospora beticola*

Daniel Bublitz (MSU Sugarbeet Extension Specialist, Sugarbeet Advancement Director), Dennis Gray (SVSU Associate Professor of Biology, Deceased), Linda E. Hanson (USDA-ARS Sugarbeet Pathologist), Jaime F. Willbur (MSU Potato and Sugarbeet Pathologist)

While the levels of *Cercospora* leaf spot (CLS) observed in Michigan were lower last year than they have been in several previous years, CLS is still a major foliar disease in this growing region. The use of fungicides is a critical component of the strategy for managing CLS. However, CLS management has been hindered by the development of fungicide resistance to several different fungicide classes. Resistance has been found in the Great Lakes region to the strobilurin, benzimidazole, and triazole fungicide classes. To further complicate CLS management, growers do not have a practical way of knowing what type or types of resistance they are facing on their farms. Therefore, the goal of this project was to develop a method for conducting in-season screening of the CLS-fungal strains present in individual fields for resistance to the strobilurin fungicides. Screening was done with a polymerase chain reaction restriction fragment length polymorphism (PCR-RFLP) assay (Rosenzweig et al., 2015). This is a much quicker screening method than standard plate-based methods which have been used for end of season resistance screening, but it does not report the level of resistance to the pathogen. The goal was to find a way to provide growers with in-season results indicating the prevalence of strobilurin resistance in their fields. Additionally, this information would provide a database for researchers in the area about how strobilurin resistance in *C. beticola* populations is changing in different areas and throughout the growing season. The work was done through a partnership between Sugarbeet Advancement, Saginaw Valley State University, the USDA, Michigan Sugar, and MSU.

In 2020, CLS generally developed late in the growing season and it remained at fairly low levels in most fields. However, samples were taken from 37 locations throughout the growing area and are presented in the table shown. Surprisingly, a very high percentage of the CLS population was found to be resistant to the strobilurins. Of the 530 individual lesions tested, 510 (96.2%) were found to carry the gene for strobilurin resistance. Even though a high percentage of the population has strobilurin

resistance, not all of it is up to field rates. Therefore, these products can still aid in CLS management, and in most cases should still be included as part of our leaf spot management program, particularly in areas where *Alternaria* leaf spot is a problem. Prior to making any major shifts in your leaf spot management program, it is recommended that you consult your local Michigan Sugar field consultant. This work will be continued in 2021.

2020 Cercospora Fungicide Resistance Screening Results					
Collection Date	Location	Strobilurin Resistance Test			
		Resistant Lesions	Susceptible Lesions	Total Lesions	Percent Resistant
20-Aug	Caro	16	0	16	100
20-Aug	Caro	4	0	4	100
20-Aug	Flint (red beet field)	16	0	16	100
20-Aug	Freeland	15	1	16	93.8
20-Aug	Auburn	16	0	16	100
18-Aug	Au Gres	16	0	16	100
18-Aug	Au Gres	13	0	13	100
19-Aug	Au Gres	2	13	15	13.3
25-Aug	Gagetown	16	0	16	100
31-Aug	Gilford	14	2	16	87.5
31-Aug	Quanicassee	13	1	14	92.9
31-Aug	Quanicassee	13	2	15	86.7
31-Aug	Elkton	15	0	15	100
31-Aug	Unionville	7	0	7	100
31-Aug	Ashley	15	0	15	100
31-Aug	Auburn	12	0	12	100
31-Aug	Auburn	16	0	16	100
2-Sep	Bay City	16	0	16	100
1-Sep	Saginaw	16	0	16	100
1-Sep	Saginaw	16	0	16	100
2-Sep	Elkton	16	0	16	100
6-Sep	Ruth	16	0	16	100
4-Sep	Reese	16	0	16	100
4-Sep	Reese	8	0	8	100
4-Sep	Munger	8	0	8	100
6-Sep	Sandusky	7	1	8	87.5
16-Sep	Brown City	16	0	16	100
24-Sep	Midland/Hope	15	0	15	100
15-Sep	Gladwin	16	0	16	100
15-Sep	Gladwin	16	0	16	100
9-Oct	Auburn	16	0	16	100
15-Sep	Auburn	16	0	16	100
6-Oct	Auburn	16	0	16	100
15-Sep	Gladwin	16	0	16	100
8-Oct	Midland	14	0	14	100
16-Oct	Sandusky	15	0	15	100
26-Oct	Freeland	16	0	16	100
Totals	37 Total Locations	510	20	530	96.2%

Movento Insecticide

Spartan Acres Farms, Freeland - 2020

Trial Quality:	Very Good	Soil Type:	Loam	Rhizoc Control:	Good control: Quadris I.F. only (8 oz)
Variety:	B-1703	Fertilizer:	2x2: 42#-14#-0-10#S-2#B; Streamers 6-8 Leaf: 120# N	Cerc Control:	Good control: See comments for materials
Planted:	April 11				
Harv/Samp:	Oct 27 / Oct 20				
Plot Size:	7 reps	Prev Crop:	Wheat		
Row Spacing:	20 inch	Weather:	Excess rain in May. Some periods of drought in July/August.	Other Pests:	N/A
Seeding Rate:	64,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Sugarbeet Cyst Nematode		
							Cysts	Eggs	J2's
Movento	\$1,500	9680	290	33.4	19.1	96.1	0	0	0
Check	\$1,498	9664	295	32.8	19.4	96.1	0	0	0
Average	\$1,499	9672	292	33.1	19.2	96.1	0	0	0
LSD 5%	N.S.	N.S.	4.2	N.S.	0.3	N.S.	—	—	—
CV %	2.3	2.3	1.1	2.2	1.0	0.2	—	—	—

Comments: Movento is an insecticide from Bayer Crop Science that the manufacturer believes could improve management of root aphid and sugarbeet cyst nematode. In 2020, Sugarbeet Advancement had two Movento trials (see the Gremel results). In both trials, Movento did not cause a significant difference in RWSA as compared to the Check. In this field, it was believed that there was a low population of sugarbeet cyst nematodes, but fall samples taken in the treatments did not find any. There was a significant decrease for RWST and % Sugar seen in the Movento strips. The reason for the difference is unknown and unexpected. The Movento applications were applied by themselves and not with any other herbicide or fungicide applications to reduce the chance for antagonism. Movento was applied at 2.5 oz/acre with 1% MSO on June 26 and July 10. The leafspot program was as follows: 6/25 EBDC, 7/6 Delaro + Proline + EBDC, 7/20 Priaxor + EBDC, 7/30 Tin + copper, 8/15 Provysol + EBDC, 8/31 Inspire XT + EBDC, 9/15 Gem + EBDC, 9/30 Badge.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Trial Quality:	Excellent	Soil Type:	Loam	Rhizoc Control:	Very Good control: Quadris I.F. on 1st planting only (8 oz) & foliar (14 oz)
Variety:	B-1606N/C-G752NT blend	Fertilizer:	Fall: V.R. application of P, K, and S; Fall: 15,000 gal of dairy manure; S.D.: 40 gal of 28%	Cerc Control:	Very Good control: See comments for materials
Planted:	April 23, Replant				
Harv/Samp:	Oct 17 / Oct 14				
Plot Size:	6 reps	Prev Crop:	Wheat w/ radish cover		
Row Spacing:	20 inch	Weather:	Good weather	Other Pests:	N/A
Seeding Rate:	63,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Sugarbeet Cyst Nematode		
							Cysts	Eggs	J2's
Movento	\$1,777	11464	304	37.7	20.0	96.1	12	502	108
Check	\$1,774	11446	305	37.5	20.0	96.1	9	743	225

Average	\$1,776	11455	305	37.6	20.0	96.1	10	623	167
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	102.3
CV %	3.4	3.4	1.2	3.1	1.1	0.1	76.4	74.3	41.4

Comments: Movento is an insecticide from Bayer Crop Science that the manufacturer believes could improve management of root aphid and sugarbeet cyst nematode. In 2020, Sugarbeet Advancement had two Movento trials (see the Spartan Acres results). In both trials, Movento did not cause a significant difference in yield or sugar as compared to the Check. In this location, nematode samples showed a lower amount of sugarbeet cyst nematode juveniles where Movento was applied. This trial was performed in a field that was replanted without tillage after the original planting with a 50/50 blend of B-1606N and C-G752NT. The Movento treatments were applied with the first 2 leaf spot applications. The first application was 2.5 oz/acre of Movento and 0.5% MSO tank mixed with EBDC, Reguard, and MAX-IN ZMB applied on 6/25. The second application was 2.5 oz/acre of Movento and 0.75% MSO tank mixed with Delaro, Proline, EBDC and Reguard applied on 7/14. The remaining leafspot program was as follows: 7/28 Tin + EBDC, 8/8 Provysol + EBDC, 8/21 Priaxor + Topsin + EBDC, 9/2 Tin + EBDC. All included MasterLock.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Evaluation of Selected Chemicals for the Management of Beet Cyst Nematode

Sita Thapa, Emilie Cole and Marisol Quintanilla. Michigan State University, Department of Entomology. Research Sponsored by Bayer, SureCrop, and Vive.

In 2020, a total of nine chemical treatments were evaluated with the intention of understanding the effect of Averland (abamectin; Vive), Plen-Tsweet (active carbon; SureCrop) and Movento HL (spirotetramat; Bayer CropScience) alone and in combination with fertilizer and the grower standard (Azteroid [azoxystrobin], and Midac[imidacloprid]). Treatments, rates and timing can be seen in Table 1.

Table 1. List of treatments, rates and application timing

NO.	TREATMENT	RATE/A	APPLICATION TIMING
1	Azteroid	5.7 fl oz	16-Apr
	Midac	6.8 fl oz	
2	Sure Vive	3.3125 gal	16-Apr
	Azteroid	5.7 fl oz	
3	Averland	3.47 fl oz	16-Apr
	Azteroid	5.7 fl oz	
	Midac	6.8 fl oz	
4	Averland	3.47 fl oz	16-Apr
	Sure Vive	3.3125 gal	
	Azteroid	5.7 fl oz	
	Midac	6.8 fl oz	
5	Averland	6.94 fl oz	16-Apr
	Azteroid	5.7 fl oz	
	Midac	6.8 fl oz	
6	Averland	6.94 fl oz	16-Apr
	Sure Vive	3.3125 gal	
	Azteroid	5.7 fl oz	
	Midac	6.8 fl oz	
7	Sugarbeet pop up with Plen-Tsweet	3.8 gal	16-Apr
8	Plen-Tsweet	1 gal	16-Apr
9	Movento HL	2.5 fl oz	30-Apr
	Destiny	0.25 % v/v	
	Movento HL	2.5 fl oz	22-May
	Destiny	0.25 % v/v	

Sugar Beet Cyst Nematode (SBCN) cysts and juveniles were not significantly impacted by the treatments. At the time of planting, cyst and juvenile counts were nearly zero. By harvest, cyst counts had increased in all plots (Fig. 2). Treatment 1 (Azteroid and Midac) did result in numerically the lowest cyst counts with 15.25 cysts per 100cc soil on average. For juvenile counts, the lowest average juveniles recovered was in Treatment 4 (Averland, Sure Vive, Azteroid, and Midac) but again there were not significant differences between treatments (Fig. 2). SBCN egg counts at the beginning of the season were relatively uniform across all treatments, by harvest, however, some treatments resulted in a significant increase in eggs while others resulted in similar eggs counts as found at planting. The most interesting case of this was in Treatment 7 (Sugarbeet pop up with Plen-Tsweet) which actually reduced nematode counts on average. Treatments 1 (Azteroid and Midac), 2 (Sure Vive and Azteroid), 3 (Averland, Azteroid and Midac), and 6 (Averland, Sure Vive, Azteroid and Midac) resulted in a significant increase in SBCN eggs over the course of the growing season (Fig 2).

Looking at the yields, there were no significant differences in either the average yield per acre or in the average pounds of raw white sugar (Fig. 3). Numerically, Treatment 3 (Averland, Azteroid and Midac) did have the highest yields with 33.8 tons.

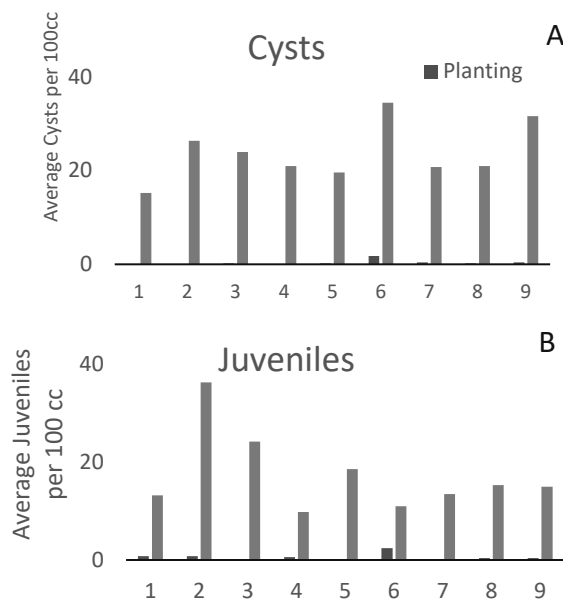


Figure 1. A) Average sugar beet cyst nematode cysts per 100 cc of soil and B) Average sugar beet cyst juveniles per 100 cc of soil. No significant differences were found between dates or treatments. Treatment number corresponds to treatment list in Table 1.

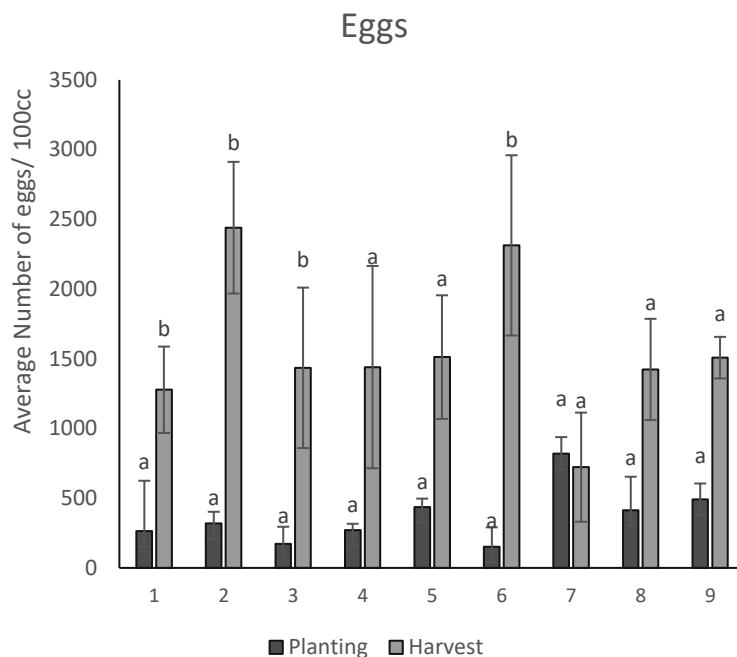


Figure 2. Average number of eggs per 100cc soil sample. Treatment numbers correspond to treatments listed in Table 1. Sampling dates labeled with different letters are significantly different (Tukey HSD, $\alpha=.05$)



Figure 3. Average yield in tons per acre and average raw white sugar in pounds. No statistical differences were found. Treatment numbers correspond to treatments in Table 1.

We would like to thank Michigan Sugar for funding and for assistance in planting, maintaining and harvesting this trial!



Nitrogen Application Strategies Trial

Gilford, Fairgrove - 2020

Trial Quality: Good

Variety: C-G855

Planted: May 5

Harvested: Oct 1

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Clay

% OM: 6.4 **pH:** 8.0 **CEC:** 24.3

P: Above Opt **K:** Above Opt

Mn: Medium **B:** Medium

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 in.

Rainfall: 21.08 in.

Beets/100 ft: ~273

Application: Pre-plant was applied broadcast. 2X2 was applied with the planter. 6 and 12lf applications were applied with a fluted coulter application or streamed on with a sprayer.

No.	Treatment	Rate/A	Applic Timing	Applic Method	Vigor*		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	B/100
					20-Jul	20-Aug							
4	UAN 28%	20 gal	Pre-plant	PPI	7.90	8.70	\$1,691	8268	292	28.3	17.1	96.9	270.2
	UAN 28%	13 gal	At Plant	2X2									
	UAN 28%	20 gal	6 lf	Streamer									
3	UAN 28%	40 gal	Pre-plant	PPI	8.50	8.65	\$1,778	8653	284	30.5	16.7	97.3	274.1
	UAN 28%	13 gal	At Plant	2X2									
11	UAN 28%	53 gal	6 lf	Fluted	7.60	8.55	\$1,604	7828	289	27.2	17.0	97.4	277.8
10	UAN 28%	53 gal	6 lf	Streamer	7.50	8.55	\$1,565	7637	282	26.9	16.6	96.6	259.1
6	UAN 28%	13 gal	At Plant	2X2	8.10	8.55	\$1,798	8755	314	27.9	18.3	96.8	255.7
	UAN 28%	40 gal	6 lf	Streamer									
9	UAN 28%	13 gal	At Plant	2X2	8.00	8.50	\$1,782	8693	302	28.7	17.6	97.0	270.3
	UAN 28%	40 gal	12 lf	Streamer									
2	UAN 28%	53 gal	Pre-plant	PPI	7.40	8.40	\$1,478	7213	291	24.8	17.0	97.8	273.1
8	UAN 28%	13 gal	At Plant	2X2	8.00	8.35	\$1,559	7621	287	26.6	16.8	97.6	284.8
	UAN 28%	40 gal	6 lf	Fluted									
7	UAN 28%	20 gal	Pre-plant	PPI	7.60	8.25	\$1,610	7876	298	26.5	17.4	97.3	274.5
	UAN 28%	13 gal	At Plant	2X2									
	UAN 28%	20 gal	6 lf	Fluted									
5	UAN 28%	13 gal	At Plant	2X2	7.70	8.10	\$1,653	8094	298	27.1	17.5	97.1	276.0
	UAN 28%	20 gal	6 lf	Streamer									
	UAN 28%	20 gal	12 lf	Streamer									
12	UAN 28%	13 gal	At Plant	2X2	7.60	7.95	\$1,387	6694	302	22.2	17.7	98.0	286.0
1	Untreated				6.40	7.55	\$1,225	5885	282	21.0	16.6	98.0	275.0
Average					7.69	8.34	\$1,594.2	7768.1	293.4	26.47	17.19	97.33	273.1
LSD 5%					0.67	0.39	241.2	1158.2	16.5	3.38	0.90	0.80	21.3
CV %					6.8	3.7	11.9	11.7	4.4	10.0	4.1	0.7	6.1

*Vigor: 0 to 10 Rating, 10 is best

Comments: Treatments are 13 gal/A of UAN 28% (40 lbs of actual nitrogen); 20 gal/A of UAN 28% (60 lbs of actual nitrogen); 40 gal/A of UAN 28% (120 lbs of actual nitrogen) and 53 gal/A of UAN 28% (160 lbs of actual nitrogen). Quadris at 10 fl oz/A and Mustang Maxx at 4 fl oz/A were applied in a 3.5 inch band In-furrow for all treatments.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



N & K Fertility Trial

Gilford, Fairgrove - 2020

Trial Quality: Good
Variety: C-G855
Planted: May 5
Harvested: Oct 1
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Clay
% OM: 6.4 **pH:** 8.0 **CEC:** 24.3
P: Above Opt **K:** Above Opt
Mn: Medium **B:** Medium
Prev Crop: Corn

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.5 in.
Rainfall: 21.08 in.
Beets/100 ft: ~274

Application: 2X2 on planter, 6 lf stage incorporated with fluted coulter (between rows)

No.	Treatment	Rate/A	Applic Timing	Vigor*		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/ 100ft
				20-Jul	20-Aug							
7	UAN 28%	13.3 gal	2X2	8.08	8.25	\$1,596	7811	275	28.4	17.8	97.4	263.1
	UAN 28%	40 gal	6 lf									
9	Potash K20	500 lbs	PPI	8.08	8.79	\$1,533	7808	292	26.8	18.8	97.4	276.0
	UAN 28%	13.3 gal	2X2									
	UAN 28%	40 gal	6 lf									
8	Potash K20	250 lbs	PPI	8.17	8.88	\$1,509	7554	292	26.0	18.6	97.9	276.1
	UAN 28%	13.3 gal	2X2									
	UAN 28%	40 gal	6 lf									
10	UAN 28%	13.3 gal	2X2	7.92	8.33	\$1,320	7455	276	27.0	17.7	97.8	267.8
	Nucleus	2 gal	2X2									
	10-34-0	6 gal	2X2									
	ATS 12-0-0-26	2 gal	2X2									
	UAN 28%	40 gal	6 lf									
	Nucleus	6 gal	6 lf									
6	Potash K20	500 lbs	PPI	7.58	8.33	\$1,371	6982	296	23.6	19.0	97.6	281.2
	UAN 28%	13.3 gal	2X2									
	UAN 28%	13.3 gal	6 lf									
5	Potash K20	250 lbs	PPI	7.50	8.21	\$1,391	6941	286	24.3	18.3	98.0	271.0
	UAN 28%	13.3 gal	2X2									
	UAN 28%	13.3 gal	6 lf									
4	UAN 28%	13.3 gal	2X2	7.67	8.29	\$1,394	6794	283	24.0	18.0	98.3	275.6
	UAN 28%	13.3 gal	6 lf									
3	Potash K20	500 lbs	PPI	7.00	7.88	\$954	4882	290	17.0	18.4	98.3	271.7
2	Potash K20	250 lbs	PPI	6.75	7.88	\$935	4649	268	17.2	17.1	98.1	266.8
1	Untreated			6.75	7.83	\$964	4630	269	17.2	17.0	98.5	265.4
Average				7.55	8.27	\$1,296.8	6550.6	282.8	23.15	18.06	97.93	271.5
LSD 5%				0.44	0.39	224.9	1080.3	19.5	3.73	1.16	0.42	N.S.
CV %				5.1	4.0	14.9	14.2	5.9	13.8	5.5	0.4	6.8

*Vigor: 0 to 10 ratings, 10 is the best.

Comments: This trial was designed to test N & K application rates and interactions in sugarbeets. No injury or stand loss was observed with the treatments. Quadris at 10 fl oz/A and Mustang Maxx at 4 fl oz/a were applied in a 3.5 inch band In-furrow for all treatments. Treatments are 13 gal/A of UAN 28% (40 lbs of actual nitrogen); 40 gal/A of UAN (120 lbs of actual nitrogen); 250 lbs of Potash K20 (150 lbs of actual K) and 500 lbs of Potash K2 (300 lbs of Actual K). Treatment 10 was the only treatment that received 10-34-0 applied 2X2.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



CHS West Central Plant Health Trial

Gilford, Fairgrove - 2020

Trial Quality: Good

Variety: C-G855

Planted: May 6

Harvested: Oct 2

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: JD 3520 Tractor mounted plot sprayer, compressed air, 20 psi, 9.9 gpa

Soil Info: Clay

%OM: 6.4 **pH:** 8.0 **CEC:** 24.3

P: Above Opt **K:** Above Opt

Mn: Medium **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 in.

Rainfall: 21.08 in.

Beets/100ft: ~254

No.	Treatment	Rate/A	Applic Timing	Vigor*		Net \$/A	RWSA	RWST	T/A	% SUC	%CJP
				0-10 Rating	0-10 Rating						
				20-Jul	20-Aug						
12	Potassium 19 Cerium Elite	32 fl oz 0.25%	22-Jun 22-Jun	8.63	8.50	\$1,912	9387	302	31.1	19.3	97.7
2	Redline	3 gal	In-Furr	8.50	8.44	\$1,850	9151	296	30.9	18.9	97.8
5	Levesol	2 qt	In-Furr	8.75	8.75	\$1,847	9039	287	31.4	18.3	97.8
3	Paralign	3 gal	In-Furr	8.63	8.56	\$1,808	8948	290	30.8	18.5	97.8
8	Levesol ZN	2 qt	In-Furr	8.13	8.50	\$1,772	8709	285	30.5	18.3	97.6
6	Levesol Fourscore	1 qt 1 qt	In-Furr In-Furr	8.38	8.63	\$1,763	8629	280	30.9	17.9	97.9
9	Cerium Elite	0.25%	22-Jun	8.63	8.50	\$1,761	8612	280	30.8	18.0	97.6
11	WC101 Cerium Elite	8 fl oz 0.25%	22-Jun 22-Jun	7.88	8.56	\$1,749	8601	286	30.1	18.4	97.6
10	WC597 Cerium Elite	32 fl oz 0.25%	22-Jun 22-Jun	8.00	8.63	\$1,698	8341	281	29.5	17.9	98.1
4	Paralign Cygin	3 gal 2 fl oz	In-Furr In-Furr	8.25	8.44	\$1,653	8217	275	29.9	17.8	97.2
1	Untreated			8.13	8.44	\$1,609	7824	269	29.0	17.4	97.5
7	Levesol Micropak	1 qt 1 qt	In-Furr In-Furr	8.00	8.50	\$1,543	7581	279	27.2	17.9	97.8
Average				8.32	8.54	\$1,747.1	8586.5	284.1	30.16	18.21	97.71
LSD 5%				0.55	0.24	208.4	1013.4	21.5	2.23	1.31	0.61
CV %				4.6	2.0	8.3	8.2	5.3	5.1	5.0	0.4

*Vigor: 0 to 10 ratings, 10 is the best.

Comment: This trial was designed to test CHS Plant Health products in sugarbeets. No Injury or stand loss was observed with the treatments. The untreated control is a baseline treatment of 28% at 8 gal/A, 10-34-0 at 6 gal/A, AMS at 4 gal/A all which were applied 2X2 and Quadris at 10 fl oz/A and Mustang Maxx at 4 fl oz/A which were applied in a 3.5 inch band In-furrow. All treatments include baseline treatment plus specified treatment.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Helena Plant Health Trial

Gilford, Fairgrove - 2020

Trial Quality: Good

Variety: C-G855

Planted: May 7

Harvested: Oct 2

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Clay

% OM: 6.4 **pH:** 8.0 **CEC:** 24.3

P: Above Opt **K:** Above Opt

Mn: Medium **B:** Medium

Added N: 35 lbs. 2x2, 120 lbs. side-dress

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: Low

Problems: None

Seeding Rate: 4.5 in.

Rainfall: 21.08 in.

Beets/100 ft: ~239

Application: 2X2 on planter, 4 lf stage incorporated with fluted coulter (between rows)

No.	Treatment	Rate/A	Applic Timing	Vigor*		Net \$/A**	RWSA	RWST	T/A	% SUC	% CJP
				20-Jul	20-Aug						
5	Zypro	8 oz	In-Furr	8.13	8.44	\$1,618	8720	298	29.2	19.1	97.6
	Nucleus O-Phos	2 gal	In-Furr								
	Quadris	10 fl oz	In-Furr								
	Mustang Maxx	4 fl oz	In-Furr								
	CoRon 12-0-0-5% Fullscale	2 pt 1 pt	3rd CLS 3rd CLS								
6	Zypro	8 oz	In-Furr	8.38	8.50	\$1,562	8383	286	29.3	18.7	96.4
	Nucleus O-Phos	2 gal	In-Furr								
	Quadris	10 fl oz	In-Furr								
	Mustang Maxx	4 fl oz	In-Furr								
	Receptor	1 pt	Side-Dress								
2	Zypro	8 oz	In-Furr	8.38	8.56	\$1,533	8128	276	29.5	18.1	96.7
	Nucleus O-Phos	2 gal	In-Furr								
	Quadris	10 fl oz	In-Furr								
	Mustang Maxx	4 fl oz	In-Furr								
1	Untreated			8.38	8.56	\$1,541	7977	268	29.7	17.9	95.6
4	Zypro	8 oz	In-Furr	8.38	8.50	\$1,484	7949	297	26.7	19.3	96.8
	Nucleus O-Phos	2 gal	In-Furr								
	Quadris	10 fl oz	In-Furr								
	Mustang Maxx	4 fl oz	In-Furr								
	Megafof	1 pt	3rd CLS								
3	Zypro	8 oz	In-Furr	8.13	8.56	\$1,465	7818	283	27.6	18.5	96.6
	Nucleus O-Phos	2 gal	In-Furr								
	Kickstand MM	1.5 pt	In-Furr								
	Kickstand MN	1.5 pt	In-Furr								
	Quadris	10 fl oz	In-Furr								
	Mustang Maxx	4 fl oz	In-Furr								
Average				8.29	8.52	\$1,533.9	8162.5	284.7	28.67	18.60	96.62
LSD 5%				N.S.	N.S.	142.9	739.8	13.1	1.99	0.93	0.77
CV %				3.8	2.2	6.2	6.0	3.0	4.6	3.3	0.5

*Vigor: 0 to 10 ratings, 10 is the best.

**Fertilizer costs are incorporated into Net \$/A.

Comment: This trial was designed to test Helena Plant Health products in sugarbeets. No injury or stand loss was observed with the treatments. The untreated control is a baseline of 28% at 8 gal/A, 10-34-0 at 6 gal/A, AMS at 4 gal/A which were applied 2X2 and Quadris at 10 fl oz/A and Mustang Maxx at 4 fl oz/A which were applied in a 3.5 inch band In-furrow. All treatments include baseline treatment plus specified treatment.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



MTS - LX7 Plant Health Trial

Gilford, Fairgrove - 2020

Trial Quality: Good

Variety: C-G855

Planted: May 7

Harvested: Oct 2

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Clay

% OM: 6.4 **pH:** 8.0 **CEC:** 24.3

P: Above Opt **K:** Above Opt

Mn: Medium **B:** Medium

Added N: 35 lbs. 2x2,
120 lbs. side-dress

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: Low

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 21.08 in.

Beets/100 ft: ~244

Application: Soil Carbon was applied 2X2 with the planter. LX7 was applied foliar.

No.	Treatment	Rate/A	Applic Timing	Vigor*		Net \$/A**	RWSA	RWST	T/A	% SUC	% CJP
				20-Jul	20-Aug						
3	LX7	1 pt	14 Days	8.50	8.50	\$1,636	8697	289	30.0	18.7	97.1
2	Soil Carbon	1 gal	2X2	8.00	8.50	\$1,532	8008	296	27.0	19.2	96.7
1	Untreated			8.38	8.56	\$1,541	7977	268	29.7	17.9	95.6
Average				8.29	8.52	\$1,569.8	8227.6	284.5	28.92	18.63	96.50
LSD 5%				N.S.	N.S.	N.S.	694.3	10.3	1.55	0.69	N.S.
CV %				4.8	1.9	4.9	4.9	2.1	3.1	2.1	0.9

***Vigor:** 0 to 10 ratings, 10 is the best.

****Fertilizer costs are incorporated into Net \$/A.**

Comment: This trial was designed to test MTS - LX7 Plant Health products in sugarbeets. No injury or stand loss was observed with the treatments. The untreated control is a baseline treatment of 28% at 8 gal/A, 10-34-0 at 6 gal/a, AMS at 4 gal/A all which were applied 2X2 and Quadris at 10 fl oz/a and Mustang Maxx at 4 fl oz/A which were applied in a 3.5 inch band In-furrow. All treatments include baseline treatment plus specified treatment. LX7 was applied every 14 days starting at the 1st leafspot spray which started July 1. Six applications of LX7 were made in total.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Nachurs Plant Health Trial

Gilford, Fairgrove - 2020

Trial Quality: Good

Variety: C-G855

Planted: May 7

Harvested: Oct 2

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Application: In-Furrow applications were made with the planter. Foliar treatments applied with JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa.

Soil Info: Clay

% OM: 6.4 **pH:** 8.0 **CEC:** 24.3

P: Above Opt **K:** Above Opt

Mn: Medium **B:** Medium

Added N: 35 lbs. 2x2,120 lbs. side-dress

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 in.

Rainfall: 21.08 in.

Beets/100 ft: ~242

No.	Treatment	Rate/A	Applic Timing	Vigor*		Net \$/A**	RWSA	RWST	T/A	% SUC	% CJP
				20-Jul	20-Aug						
2	Greenflag	2 gal	In-Furr	8.38	8.50	\$1,106	8275	283	29.3	18.5	96.5
	K-Fuel	.5 gal	In-Furr								
	Crop Max	.125 gal	In-Furr								
	Quadris	10 fl oz	In-Furr								
	Mustand Maxx	4 fl oz	In-Furr								
	K-Fuel	1 gal	1st CLS								
	Boron 10%	.125 gal	1st CLS								
3	K-Fuel	1 gal	3 weeks before harvest	8.25	8.50	\$1,087	8148	288	28.3	18.7	96.9
	Boron 10%	.125 gal	1st CLS								
	K-Fuel	1 gal	3 weeks before harvest								
	Boron 10%	.125 gal	1st CLS								
	K-Fuel	1 gal	3 weeks before harvest								
	Boron 10%	.125 gal	1st CLS								
	K-Fuel	1 gal	3 weeks before harvest								
1	Untreated			8.38	8.56	\$1,143	7977	268	29.7	17.9	95.6
Average				8.33	8.52	\$1,112.2	8133.3	279.7	29.09	18.38	96.34
LSD 5%				N.S.	N.S.	6.4	N.S.	8.8	N.S.	0.53	N.S.
CV %				2.7	1.3	123.7	6.1	1.8	7.1	1.7	0.9

***Vigor:** 0 to 10 ratings, 10 is the best.

****Fertilizer costs are incorporated into Net \$/A.**

Comment: This trial was designed to test Nachurs Plant Health products in sugarbeets. No injury or stand loss was observed with the treatments. The untreated control is a baseline treatment of 28% at 8 gal/A, 10-34-0 at 6 gal/A, AMS at 4 gal/A all which were applied 2X2 and Quadris at 10 fl oz/A and Mustang Maxx at 4 fl oz/A which were applied in a 3.5 inch band In-furrow. All treatments include baseline treatment plus specified treatment. 1st CLS is a foliar application was made at the time of 1st leafspot spray (July 1). The 3 weeks before harvest application was made as a foliar spray.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Sylvar Plant Health Trial

Gilford, Fairgrove - 2020

Trial Quality: Good

Variety: C-G855

Planted: May 7

Harvested: Oct 2

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Clay

% OM: 6.4 **pH:** 8.0 **CEC:** 24.3

P: Above Opt **K:** Above Opt

Mn: Medium **B:** Medium

Added N: 35 lb. 2X2,
120 lbs side dress

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: Low

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 21.08 in.

Beets/100 ft: ~239

Application: In-furrow treatments applied with the planter

No.	Treatment	Rate/A	Applic Timing	Vigor*		Net \$/A**	RWSA	RWST	T/A	% SUC	% CJP
				20-Jul	20-Aug						
2	P-45 - AmyProtec	100 ml	In-Fur	8.50	8.63	\$1,683	8811	294	30.0	19.1	96.7
	Quadris	10 fl oz	In-Fur								
	Mustang Maxx	4 fl oz	In-Fur								
1	Untreated Check			8.38	8.56	\$1,541	7977	268	29.7	17.9	95.6
4	P-45 - AmyProtec	200 ml	In-Fur	8.38	8.63	\$1,479	7755	275	28.2	18.2	96.2
	Boron 10%	50 ml	In-Fur								
	Quadris	10 fl oz	In-Fur								
	Mustang Maxx	4 fl oz	In-Fur								
3	P-45 - AmyProtec	200 ml	In-Fur	8.00	8.44	\$1,469	7738	278	27.9	18.1	96.8
	Quadris	10 fl oz	In-Fur								
	Mustang Maxx	4 fl oz	In-Fur								
Average				8.31	8.56	\$1,543.0	8070.3	278.9	28.95	18.33	96.34
LSD 5%				N.S.	N.S.	106.5	551.4	16.6	1.8	1.05	0.8
CV %				3.6	2.0	4.3	4.3	3.7	3.9	3.6	0.5

*Vigor: 0 to 10 ratings, 10 is the best.

**Fertilizer costs are incorporated into Net \$/A.

Comment: P-45 is a biological plant health product designed to improve plant growth.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

Clover vs. Radish Trial

Sylvester Farms, Quanicassee - 2020

Trial Quality: Very Good	Soil Type: Loam	Rhizoc Control: Good/Fair control: Quadris I.F. (10 oz + Mustang), 8-10 leaf (10 oz)
Variety: C-G752NT	Fertilizer: 2x2: 7 gal 28%, 7 gal Thiosul, 5 gal 10-34-0 + micros; PPI: 40 gal of 28%	
Planted: April 19		
Harv/Samp: Oct 12 / Oct 6		Cerc Control: Good control: See below for materials
Plot Size: 4 reps	Prev Crop: Wheat	
Row Spacing: 24 inch	Weather: Moderate rain shortly after planting, periods of dry weather in summer	Other Pests: Sugarbeet cyst nematode, Aphanomyces
Seeding Rate: 62,000		

Treatment	Net \$/A	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets/ 1200Ft	Sugarbeet Cyst Nematode		
								15 Day	46 Day		Cysts	Eggs	J2's
Clover	\$1,663	\$1,688	9793	296	33.1	19.5	95.9	16	226	74	9	599	85
Radish	\$1,567	\$1,655	9602	296	32.5	19.5	95.9	35	229	10	7	455	35
Check	\$1,509	\$1,519	8814	292	30.2	19.3	95.7	38	235	44	10	396	39
Average	\$1,580	\$1,621	9403	294	31.9	19.4	95.8	30	230	42	8	483	53
LSD 5%	85.7	85.7	497.4	N.S.	1.4	N.S.	0.1	N.S.	N.S.	45.3	N.S.	N.S.	N.S.
CV %	3.1	3.1	3.1	2.1	2.5	1.9	0.1	52.6	4.8	71.8	63.9	50.1	100.6

Comments: Here in Michigan, a popular crop to have in rotation with sugarbeet is wheat. Often, beets will be planted after wheat that has had some type of cover crop grown after harvest. This trial examined the impact different types of cover crops have on sugarbeet yield. Two of the most common cover crops, red clover and radish, were compared along with a check which had no cover crop. The clover (50/50 Michigan Mammoth & medium red) was planted into the wheat with a drill in spring of 2019, and the radish (Defender) was planted with a drill following wheat harvest in the summer of 2019. The check had a herbicide application to control weeds. The results of this trial indicate that both cover crops had a positive impact on yield, increasing RWSA, tons per acre, purity, and gross revenue as compared to the check. After the expenses associated with each cover crop were included, however, clover had a significantly higher net revenue than either the radish or the check. Expenses for each cover crop are: Clover, \$25 total per acre, including \$20/acre for seed (\$2/lb, 10lb/acre) and \$5/acre frost seeding with side by side; Radish, \$88.25 total per acre, including \$26.25/acre for seed (\$1.75/lb, 15lb/acre), \$15/acre seeding with grain drill, \$15/acre tillage (vertical tillage or high speed disk), and \$32/acre nitrogen (\$0.36/lb, 75lb/acre, \$5/acre application); No Cover Crop Check, \$10/acre for herbicide application. The leaf spot program was as follows: 6/18 EBDC only, 6/30 Propulse, 7/15 Tin, 7/30 Priaxor + Topsin, 8/7 Provysol, 8/24 Tin, 9/5 Delaro, 9/21 Tin. The 2nd and 6th apps had 2 gal/ac of calcium nitrate, 2 qt of Mg, & 1 qt of B. All applications included either EBDC or Badge and a spreader/sticker.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and the early delivery adjustments; Net includes costs in the comments.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Novus + Boron Trial

Ackerman Brothers Farm, Reese - 2020

Trial Quality:	Very Good	Soil Type:	Loam	Rhizoc Control:	Very Good control: Quadris I.F. (6 oz), 6-8 leaf (12 oz)
Variety:	B-1606N	Fertilizer:	Fall: 400# MESZ & potash; PPI: 55 gal 28%, 5 gal Thiosul	Cerc Control:	Very Good control: See below for materials
Planted:	April 23				
Harv/Samp:	Oct 9 / Oct 5				
Plot Size:	7 reps	Prev Crop:	Prevent plant, wheat cover		
Row Spacing:	22 inch	Weather:	Moderate rain shortly after planting, periods of dry weather in summer	Other Pests:	None
Seeding Rate:	66,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP
Check	\$1,744	9795	282	34.7	18.8	95.5
Novus + Boron	\$1,731	9722	283	34.3	18.9	95.4
Average	\$1,737	9758	283	34.5	18.8	95.4
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	2.6	2.6	0.8	2.2	0.6	0.2

Comments: It is a commonly held opinion that foliar nutrient applications can improve the health and disease tolerance of sugarbeets, leading to higher yields. In this trial, two foliar feed products from Innvictis were tested, including Novus B (25-0-0 with 0.5% B) and Boron 10%. Both products were applied a total of four times, with the second through fifth Cercospora leaf spot fungicide applications. The boron was applied at a rate of 1pt/acre each time, while the Novus was applied at a rate of 2qt/acre for the first two applications and 1gal/acre for the final two applications. The application of these products did not cause a significant difference in yield as compared to the untreated control. The leaf spot program was as follows: 6/24 EBDC only, 7/1 Delaro + Proline, 7/20 Topsin + Tin, 8/7 Provysol, 8/31 Tin. All applications included an EBDC and a spreader/sticker.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and the early delivery adjustments.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

CX-1™ & QLF BOOST™ Fertilizer

Nancy and Dwight Bartle, Brown City - 2020

Trial Quality:	Very Good	Soil Type:	Loam	Rhizoc Control:	Very Good control: See comments
Variety:	C-G675	Fertilizer:	Broadcast: 100# of 11-52-0 in fall, 325# of 33-0-0-12 in the spring; See comments for 2x2	Cerc Control:	Very Good control: See comments
Planted:	April 6	Prev Crop:	Corn - plowed	Other Pests:	N/A
Harv/Samp:	Sept 24 / Sept 22	Weather:	Frost early, then generally good, with periods of dry weather in summer		
Plot Size:	4 reps				
Row Spacing:	22 inch				
Seeding Rate:	62,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets / 1200 Ft
							25 Day	51 Day	
CX-1™ with QLF BOOST™	\$1,652	7718	253	30.5	17.3	94.0	112	151	17
Check	\$1,649	7705	247	31.2	16.9	94.2	94	136	25
QLF BOOST™	\$1,640	7661	250	30.7	17.1	94.3	101	144	12
Average	\$1,647	7695	250	30.8	17.1	94.2	102	144	18
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	2.7	2.7	3.0	2.3	2.5	0.4	13.7	9.9	62.9

Comments: The CX-1™ and QLF BOOST™ (4-0-3-2S) products were added to both the 2x2 blend and the Quadris T-band application. The check treatment 2x2: 10 gal of 10-34-0 and 10 gal of 28%. The check treatment Quadris: 7 gpa of water and 7 oz of Quadris. The QLF BOOST treatment 2x2: 9 gal of 10-34-0, 9 gal of 28%, and 2 gal of BOOST. The QLF BOOST treatment Quadris: 6 gpa of water, 1 gal of BOOST, and 7 oz of Quadris. The CX-1 with QLF BOOST treatment 2x2: 8.5 gal of 10-34-0, 8.5 gal of 28%, 2 gal of BOOST, and 1 gal of CX-1. The CX-1 with QLF BOOST treatment Quadris: 5 gpa of water, 1 gal of BOOST, 1 gal of CX-1, and 7 oz of Quadris.

CX-1 is a biological solution extracted from plant compost. Within the solution, there are a variety of soil fungi and bacteria, which the manufacturer claims can improve soil biology, nutrient availability, and disease tolerance. QLF BOOST is a carbon based liquid fertilizer additive. According to its manufacturer, this product is intended to provide sulfur to the crop, along with increasing the activity of soil microbes. While the overall quality of this trial was very good, neither the CX-1 with QLF BOOST nor the QLF BOOST treatments caused a significant increase in yield or disease tolerance as compared to the untreated check. At this location, there were low levels of both foliar and root diseases. The leafspot program was the same for all treatments: 7/8 EBDC + Boron + Pro-Manganese + Activator 90, 7/20 Inspire XT + EBDC + Boost + Reguard, 8/8 Super Tin + Topsin + EBDC + Reguard, 8/30 Propulse + EBDC + Boron + Reguard.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and the early delivery adjustments.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Trial Quality:	Very Good	Soil Type:	Loam	Rhizoc Control:	Very Good control: See comments
Variety:	C-G675	Fertilizer:	Broadcast: 100# of 11-52-0 in fall, 325# of 33-0-0-12 in the spring; See comments for 2x2	Cerc Control:	Very Good control: See comments
Planted:	April 6	Prev Crop:	Corn - plowed	Other Pests:	N/A
Harv/Samp:	Sept 24 / Sept 22	Weather:	Frost early, then generally good, with periods of dry weather in summer		
Plot Size:	7 reps				
Row Spacing:	22 inch				
Seeding Rate:	62,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets / 1200 Ft
							25 Day	51 Day	
Check	\$1,790	8363	253	33.0	17.3	94.1	99	132	14
QLF BOOST™	\$1,776	8297	254	32.7	17.3	94.2	106	143	12

Average	\$1,783	8330	253	32.9	17.3	94.2	102	137	13
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.0	3.0	2.8	2.7	2.3	0.3	6.0	9.2	86.1

Comments: The QLF BOOST™ (4-0-3-2S) fertilizer was added to both the 2x2 blend and the Quadris T-band application. The check treatment 2x2: 10 gal of 10-34-0 and 10 gal of 28%. The check treatment Quadris: 7 gpa of water and 7 oz of Quadris. The QLF BOOST treatment 2x2: 9 gal of 10-34-0, 9 gal of 28%, and 2 gal of BOOST. The QLF BOOST treatment Quadris: 6 gpa of water, 1 gal of BOOST, and 7 oz of Quadris.

QLF BOOST is a carbon based liquid fertilizer additive. According to its manufacturer, it is intended to provide sulfur to the crop, along with increasing the activity of soil microbes. While the overall quality of this trial was very good, the QLF BOOST treatment did not cause a significant increase in yield or disease tolerance as compared to the untreated check. At this location, there were low levels of both foliar and root diseases. The leafspot program was the same for both treatments: 7/8 EBDC + Boron + Pro-Manganese + Activator 90, 7/20 Inspire XT + EBDC + Boost + Reguard, 8/8 Super Tin + Topsin + EBDC + Reguard, 8/30 Propulse + EBDC + Boron + Reguard.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and the early delivery adjustments.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Levesol Applied In-Furrow

Houghtaling Farms, Reese - 2020

Trial Quality:	Fair	Soil Type:	Loam	Rhizoc Control:	Good control: Quadris I.F. (4 oz) and 6 lf (10 oz)
Variety:	B-1606N	Fertilizer:	Fall: 400# potash, 100# MESZ, 25# tigerS; PPI: 40 gal 28%; 2x2: 42#-20#-0-14S + 1 qt B & Zn	Cerc Control:	Fair control: See comments for materials
Planted:	April 20	Prev Crop:	Wheat w/ clover	Other Pests:	N/A
Harv/Samp:	Nov 3 / Oct 20	Weather:	Moderate rain shortly after planting, periods of dry weather in summer		
Plot Size:	5 reps				
Row Spacing:	22 inch				
Seeding Rate:	57,570				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row (3 reps)	
							22 Day	46 Day
Levesol, 1qt/acre	\$1,681	10848	313	34.6	20.5	96.2	196	197
Check	\$1,669	10769	314	34.3	20.5	96.2	184	195

Average	\$1,675	10809	314	34.4	20.5	96.2	190	196
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	6.3	6.3	3.2	3.4	2.9	0.2	6.9	4.9

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							22 Day	46 Day
Levesol, 2qt/acre	\$1,673	10794	312	34.6	20.4	96.1	148	183
Levesol, 1qt/acre	\$1,634	10541	316	33.3	20.6	96.2	160	191

Average	\$1,653	10668	314	33.9	20.5	96.2	154	187
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	6.2	6.2	1.5	5.2	1.4	0.1	11.7	5.3

Comments: Levesol, from West Central, is 2% nitrogen fertilizer and a pure chelating agent that can be mixed with fertilizer in-furrow. According to the manufacturer, the chelating agent makes nutrients more available for uptake by the plants. The treatments were T-band applied (1" band width) with the in-furrow Quadris. The Check treatment was 4 oz/acre of Quadris with 4 oz/acre of Mustang. The Levesol treatments contained the Quadris, Mustang and Levesol at either 1qt/acre or 2 qt/acre. Due to how the experiment was set up at this location, the test comparing 1qt/acre Levesol with the Check and the test comparing 1qt/acre Levesol with 2qt/acre Levesol were separate tests, which is why they are reported in two separate tables. In the first test, no significant differences were found between 1qt Levesol and the Check. In the second test, no significant differences were found between 1qt Levesol and 2qt Levesol. The leafspot materials were as follows: 1. EBDC, 2. Tin + EBDC, 3. Provysol + EBDC, 4. EBDC, 5. Tin + EBDC, 6. EBDC.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Levesol Applied In-Furrow

LAKKE Ewald Farms, Unionville - 2020

Trial Quality:	Good	Soil Type:	Loam	Rhizoc Control:	Very Good control: I.F. + foliar (13.8 oz). See comments.
Variety:	B-1606N	Fertilizer:	Fall: 350# potash; 2x2: 49#-16#-0-9#S + B & Mn; PP: 102# N	Cerc Control:	Very Good control: See comments for materials
Planted:	March 19, April 21	Prev Crop:	Wheat w/ clover	Other Pests:	N/A
Harv/Samp:	Oct 7 / Oct 6				
Plot Size:	6 reps*				
Row Spacing:	20 inch	Weather:	Replanted trial due to freeze damage. Excess rain in May.		
Seeding Rate:	60,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations** 100 Ft. of Row	
							20 Day	45 Day
Check	\$1,771	9727	289	33.7	19.1	95.7	122	214
Levesol	\$1,763	9684	292	33.2	19.3	95.7	130	217
Average	\$1,767	9706	290	33.4	19.2	95.7	126	216
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	2.7	2.7	0.9	2.0	0.7	0.2	11.8	8.9

Comments: Levesol, from West Central, is 2% nitrogen fertilizer and a pure chelating agent that can be mixed with fertilizer in-furrow. According to the manufacturer, the chelating agent makes nutrients more available for uptake by the plants. This trial was replanted due to lost stand from freezing of the first stand. Both plantings were stale seed bed planted. Both plantings included Levesol at 2 qt/acre, so that a total of 4 qt/acre would be near the seed for the Levesol treatments. Only the first planting was mixed with Quadris at 8 oz/acre, Mustang at 3.5 oz/acre, and Ascend SL at 5 oz/acre. The treatments were applied T-band in-furrow. The leaf spot program was as follows: 6/24 Propulse + EBDC + foliar fertilizer, 7/12 Tin + EBDC, 7/24 Priaxor + Topsin + EBDC + boron, 8/7 Proline, 8/21 Tin + EBDC, 9/1 Proline, 9/21 Tin. All leaf spot fungicide applications included a surfactant.

**8 reps were used for the population data.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and the early delivery adjustments.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Levesol Applied In-Furrow

Reif Farms, Saginaw - 2020

Trial Quality:	Very Good	Soil Type:	Loam	Rhizoc Control:	Good control: Quadris I.F. only (8 oz)
Variety:	C-G675	Fertilizer:	PPI: 180# N, 18#S	Cerc Control:	Very Good control: See comments for materials
Planted:	April 18	Prev Crop:	Corn	Other Pests:	Sugarbeet cyst nematode
Harv/Samp:	Oct 19 / Oct 14	Weather:	Excess rain in May, drought periods during the summer		
Plot Size:	6 reps*				
Row Spacing:	22 inch				
Seeding Rate:	63,000				

Treatment	Gross \$/A*	RWSA*	RWST**	T/A*	% Sugar**	% CJP**	Populations** 100 Ft. of Row	
							18 Day	46 Day
Levesol	\$1,321	8520	296	28.8	19.5	95.9	62	166
Check	\$1,300	8385	294	28.5	19.3	96.0	59	172
Average	\$1,310	8452	295	28.7	19.4	95.9	60	169
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	4.5	4.5	1.3	3.5	1.1	0.2	25.2	9.4

Comments: Levesol, from West Central, is 2% nitrogen fertilizer and a pure chelating agent that can be mixed with fertilizer in-furrow. According to the manufacturer, the chelating agent makes nutrients more available for uptake by the plants. The treatments were T-band applied with the in-furrow Quadris. The Check treatment was 8 oz/acre of Quadris. The Levesol treatments contained the Quadris and Levesol at 2 qt/acre. No Mustang was used in-furrow. The leafspot materials were as follows: 1. Proline + EBDC, 2. EBDC, 3. Tin + Topsin + EBDC, 4. Inspire + EBDC, 5. Tin + EBDC, 6 EBDC.

*6 reps were used for Gross \$/acre, RWSA and T/A, all other metrics had **8 reps.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Levesol Applied In-Furrow

Schindler Farms, Kawkawlin - 2020

Trial Quality: Good	Soil Type: Loam	Rhizoc Control: Very Good control: I.F. only. See comments
Variety: B-1606N	Fertilizer: Fall: 150# potash; 2x2: 40#-32#-0#-8S + B + Mn; S.D. 126# N by 28%	Cerc Control: Good control: See comments for materials.
Planted: April 18		
Harv/Samp: Oct 20 / Oct 20		
Plot Size: 6 reps*	Prev Crop: Wheat	
Row Spacing: 22 inch	Weather: Excess rain in May. Some periods of drought in July/August.	Other Pests: N/A
Seeding Rate: 62,000		

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							16 Day	40 Day
Check	\$1,647	10625	304	34.9	20.0	96.2	130	180
Levesol	\$1,583	10215	304	33.5	20.0	96.2	126	182
Average	\$1,615	10420	304	34.2	20.0	96.2	128	181
LSD 5%	53.0	341.6	N.S.	0.8	N.S.	N.S.	N.S.	N.S.
CV %	2.2	2.2	1.2	1.5	1.1	0.2	23.3	8.6

Comments: Levesol, from West Central, is 2% nitrogen fertilizer and a pure chelating agent that can be mixed with fertilizer in-furrow. According to the manufacturer, the chelating agent makes nutrients more available for uptake by the plants. The treatments were T-band applied with the in-furrow Quadris. The Check treatment was 9.7 oz/acre of Quadris and 4 oz/acre of Mustang mixed with water and applied at 5.5 gal/acre. The Levesol treatment contained Quadris, Mustang and Levesol at 2 qt/acre. The reason for the decrease in yield from the Levesol treatment is not understood. The planting maps were used to verify that the treatments were accurate. The leafspot materials were as follows: 7/7 Inspire + Topsin + EBDC, 7/22 Tin + EBDC, 8/7 Provysol + EBDC, 8/24 Tin + EBDC, 9/16 Delaro + Proline + EBDC. All included Liberate surfactant. *10 reps were used for the population data.

**10 reps were used for the population data.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Pop-up Fertilizer with AZteroid

AMK Farms, Saginaw - 2020

Trial Quality:	Very Good	Soil Type:	Clay loam	Rhizoc Control:	Good control: I.F. AZteroid only (3.5 oz)
Variety:	C-G675	Fertilizer:	Fall: V.R. K-Mag, MESZ, and potash; PPI: 65 gal of 28%, 5 gal Power Sul, 10 gal of Power Cal. Comments: 2x2 & Pop-up	Cerc Control:	Good control: See comments for materials
Planted:	April 20	Prev Crop:	Corn	Other Pests:	N/A
Harv/Samp:	Oct 6 / Oct 5	Weather:	Damaging rains in May, periods of dry during the summer		
Plot Size:	6 reps				
Row Spacing:	22.5 inch				
Seeding Rate:	65,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets / 1200 Ft
							16 Day	38 Day	
Pop-up + AZteroid	\$2,298	12477	284	43.9	18.8	95.3	70	174	64
AZteroid Only	\$2,290	12436	283	44.0	18.7	95.3	82	185	17
Check	—	—	—	—	—	—	112	207	56

Average	\$2,294	12457	283	44.0	18.8	95.3	88	188	46
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	19.9	19.5	N.S.
CV %	3.6	3.6	1.1	3.9	1.0	0.1	17.6	9.1	196.2

Comments: This trial was performed to determine the impact of adding in-furrow pop-up fertilizer with the T-band in-furrow fungicide for Rhizoctonia. All treatments also included 2x2 starter fertilizer. The pop-up was sprayed T-band in-furrow with AZteroid FC3.3 fungicide. AZteroid fungicide is an azoxystrobin fungicide similar to Quadris but has better mixing compatibility with fertilizers. The treatment labeled Check did not have any in-furrow fertilizer or fungicide. To get the best trial data, the Check treatment was not meant to be harvested and was only done to evaluate the product's impact on emergence and disease control. The Pop-up + AZteroid treatment was 6.5 gal/acre of Agra Solutions' Power Starter (5-20-5-1S) plus 1 qt/acre of Mn and Zn EDTA with 3.5 oz/acre of Azteroid. Agra Solutions Power Starters contain 100% ortho phosphate. The AZteroid only treatment was 3.5 oz/acre of AZteroid applied with water at 7 gal/acre. The 2x2 blend included 15.75 gal of 28%, 3 gal of Power K, 1 qt of B, 3 gal of H₂O (48#-0#-9#-6#S-.28#B). There were no statistical differences found from using the pop-up fertilizer in this trial. This trial was performed on a very high yield potential soil with high soil fertility, which would make it less likely to find significant differences. The average P level is 110 lbs/acre and average K level is 582 lbs/acre. Both the Pop-up + AZteroid and AZteroid Only treatments had significantly lower early and final populations compared to the Check. It is not unusual to see a small decrease in populations from using in-furrow azoxystrobin, but it usually is not statistically significant and less than 10 beets per 100 foot of row. Many trials over several years have shown the benefit of in-furrow Quadris (azoxystrobin). The pop-up treatment had a numerically lower stand than the AZteroid only, indicating that it may also be impacting stand. The grower used a high rate of pop-up (6.5 gal/acre) and the manufacturer's recommendation for corn on clay soil types is 5 gal/acre and 3 gal/acre on sandy soil types. The leafspot materials were as follows: 7/2 Provysol + EBDC + 2 gal of Power Cal + 2 qt of Mn, 7/17 Tin + EBDC + 2 gal of Power Cal + 1 qt B + 2 qt of Mn, 8/8 Delaro + Proline + EBDC + 2 gal of Power Cal + 2 qt of Mn, 8/24 Tin + EBDC, 9/15 Propulse + EBDC. All applications included MasterLock.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and the early delivery adjustments.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Pop-up Fertilizer with AZteroid

Houghtaling Farms, Sandusky - 2020

Trial Quality: Fair	Soil Type: Loam	Rhizoc Control: Good control: I.F. Azteroid only (5.7 oz)
Variety: C-G675	Fertilizer: Fall: 400# potash, 100# MESZ, 25# tigerS; PPI: 40 gal 28%; 2x2: 42#-20#-0-14S + 1 qt B & Zn	Cerc Control: Good control: See comments for materials
Planted: April 17	Prev Crop: Wheat w/ clover cover crop	Other Pests: N/A
Harv/Samp: Oct 27 / Oct 19	Weather: Generally good, periods of dry during summer	
Plot Size: 4 reps		
Row Spacing: 22 inch		
Seeding Rate: 58,885		

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets / 1200 Ft
							18 Day	41 Day	
Check	\$1,386	8940	278	32.1	18.4	96.0	140	167	3
Pop-up + AZteroid	\$1,345	8678	272	31.9	18.1	96.1	115	147	4
AZteroid Only	\$1,331	8585	267	32.1	17.8	96.0	112	153	4
Average	\$1,354	8734	273	32.0	18.1	96.0	122	156	4
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	5.1	5.1	2.5	3.0	2.1	0.2	13.3	10.7	119.9

Comments: This trial was performed to determine the impact of adding in-furrow pop-up fertilizer with the T-band in-furrow fungicide for Rhizoctonia. All treatments also included 2x2 starter fertilizer. The pop-up was sprayed T-band in-furrow (1" band) with AZteroid FC3.3 fungicide. AZteroid fungicide is an azoxystrobin fungicide similar to Quadris but has better mixing compatibility with fertilizers. The Pop-up treatment was 3 gal/acre of water, 3 gal/acre of Sure Start pop-up (Sure Crop), 5.7 oz/acre of AZteroid, 13.6 oz/acre of Midac (insecticide), and 1 qt/acre of Levesol. The AZteroid only treatment was the same as above except 6 gal/acre of water and no pop-up. The treatment labeled Check was 6 gal/acre of water, 13.6 oz/ac of Midac, and 1 qt/acre of Levesol. There were no statistical differences in yield or sugar found from using the pop-up fertilizer or AZteroid in the trial. The dead beet counts showed a very low amount of root disease even in the Check, which had no azoxystrobin applied at all this year. Numerically, there was a lower early population found for both treatments that contained AZteroid. The grower used a fairly high rate of AZteroid (5.7 oz/acre) due to a previous history of bad Rhizoctonia in this field. The grower also uses a narrow 1 inch band width. AZteroid has double the active ingredient concentration of Quadris and this would be similar to a rate above 11 oz/acre in-furrow for Quadris. It is not unusual to see a small decrease in populations from using in-furrow azoxystrobin, but it usually is not statistically significant and less than 10 beets per 100 foot of row. The leafspot materials were as follows: 1. EBDC, 2. Tin + EBDC, 3. Provysol + EBDC, 4. EBDC, 5. Tin + EBDC, 6. EBDC.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Pop-up Fertilizer with AZteroid

Richmond Brothers, Pigeon - 2020

Trial Quality:	Very Good	Soil Type:	Loam	Rhizoc Control:	Very Good control: See treatments for in-furrow. Foliar 15 oz on 6/6
Variety:	C-G752N	Fertilizer:	PPI: 20 gal 28%; 2x2: 38#-39#-0-11.5#S-1qt B-2qt Mn, Streamer: 20 gal 28%	Cerc Control:	Very Good control: See comments for materials
Planted:	April 16	Prev Crop:	Wheat w/ Radish/Oat cover	Other Pests:	N/A
Harv/Samp:	Nov 4 / Oct 12	Weather:	Good weather through most of season. Periods of drought in summer		
Plot Size:	5 reps				
Row Spacing:	22 inch				
Seeding Rate:	72,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets / 1200 Ft
							17 Day	47 Day	
Great Start + AZteroid	\$1,926	12429	267	46.5	17.9	95.4	169	242	9
Nutrio U.L. + Puric Prime + AZteroid	\$1,925	12419	273	45.5	18.2	95.3	169	236	7
AZteroid Only	\$1,865	12030	267	45.1	17.9	95.2	169	231	4
Check	\$1,845	11900	265	44.9	17.8	95.3	185	246	6

Average	\$1,890	12195	268	45.5	18.0	95.3	173	239	7
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.5	3.5	2.1	3.1	2.1	0.2	15.8	5.8	74.3

Comments: This trial was done to test Great Start pop-up fertilizer, Nutrio Unlock + Puric Prime & AZteroid fungicide applied in-furrow. Great Start, Nutrio Unlock & Puric Prime are Wilbur Ellis products. AZteroid fungicide from Vive Crop Protection, is an azoxystrobin fungicide similar to Quadris but has better mixing compatibility with fertilizers. There were no statistical differences found in this trial. This trial was performed in a field with high yield potential and high soil fertility. All treatments (including the Check) also included 2x2 starter fertilizer (38#-39#-0-11.5#S-1qt B-2qt Mn). The Great Start, Nutrio Unlock/Puric Prime, and AZteroid treatments were T-band in-furrow applied with water at a total of 8 gallons per acre. The rate of Great Start was 2 gal/acre, Nutrio Unlock and Puric Prime was 1 pt/acre for each, and AZteroid was 3 oz/acre. All three in-furrow treatments also included 4 oz/acre of Mustang. The Check treatment had nothing sprayed in the furrow. The leafspot materials used were as follows: EBDC. 6/25 Proline, 7/12 Priaxor, 7/23 Inspire XT, 8/6 Tin, 8/24 Delaro + Proline, 9/12 EBDC. All applications included the following leafspot materials: 10oz Boron, 50 oz of N-Demand, Diligence, Reguard and EBDC.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Pop-up Fertilizer with AZteroid

Wishowski Farms, Auburn - 2020

Trial Quality: Fair	Soil Type: Loamy sand	Rhizoc Control: Good control: I.F. (See treatments) & 8 leaf
Variety: SX-2283	Fertilizer: Pop-up + 2x2. See comments. Sidedressed 32 gal of 28% + 1 qt B	
Planted: April 20		
Harv/Samp: Oct 26 / Oct 23		Cerc Control: Fair control: See comments for materials
Plot Size: 5 reps*	Prev Crop: Corn	Other Pests: N/A
Row Spacing: 30 inch	Weather: Excess rain in May. Periods of drought in summer	
Seeding Rate: 50,000		

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets / 1200 Ft
							15 Day**	38 Day	
AZteroid + Pop-up	\$1,093	7050	284	24.8	18.9	96.1	121	200	6
Pop-up Only	\$1,062	6851	282	24.3	18.8	96.1	141	210	23
Check	\$1,061	6845	284	24.1	18.9	96.1	117	203	47
Average	\$1,072	6915	283	24.4	18.8	96.1	126	204	26
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	26.2
CV %	7.6	7.6	1.2	7.6	0.9	0.2	24.3	4.7	70.4

Comments: This trial was performed to test in-furrow pop-up fertilizer with and without AZteroid FC 3.3 fungicide on a sandy soil type. All treatments also included 2x2 starter fertilizer. A previous trial showed a significant benefit from including in-furrow pop-up fertilizer in addition to 2x2 starter on a sandy, lower yield potential type of soil. This trial was done in an area of the field with variable soils including approximately half the trial area that would be considered sandy (CEC 4.5). The trial area phosphorus Bray P1 ranged from 58 to 124 lb/acre. The potassium level ranged from 82 to 288 lbs/acre. AZteroid fungicide from Vive Crop Protection, is an azoxystrobin fungicide similar to Quadris but has better mixing compatibility with fertilizers. The Pop-up fertilizer treatment was 2 gallons/acre of Nachurs Triple Option with 1 pt/acre of Mn, 1 pt/acre of Zn, and 4 oz/acre of KaPre Spectra fulvic acid. The fertilizer products were mixed with water and T-band applied at a total rate of 4 gallons per acre. The AZteroid + Pop-up treatment added 4.2 oz/acre of AZteroid. No significant differences were seen in yield or sugar, but there was a significant improvement in dead beet counts between the AZteroid + Pop-up treatment and the Check. One of the differences between this trial and the previous trial that showed a large benefit for pop-up was that in the previous trial the pop-up was dribbled through Schaffert Rebounder Seed Firmers with a Ysplit and this trial was T-band sprayed. It is unknown if the delivery method was part of the reason no response was seen here or if it was related to other environmental factors. This field experienced a 6" rain on May 18 that damaged beets and likely moved nutrients away from the beets. The 2x2 fertilizer that was included with all treatments was 11 gal of 28%, 6 gal of 10-34-0, 3 gal of K-fuse (0-0-12-12). The leafspot materials were as follows: 1. Inspire XT, 2. Tin, 3. Lucento (Topguard + SDHI), 4. Tin, 5. Badge.

**4 reps were used for the early population data.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant

Trial Quality:	Excellent	Soil Type:	Clay loam	Rhiz Control:	Good control: I.F. AZteroid only (3.5 oz)
Variety	C-G675	Fertilizer:	Fall: V.R. K-Mag, MESZ, and potash; PPI: 65 gal of 28%, 5 gal Power Sul. Comments: 2x2 & Pop-up	Cerc Control:	Good control: See comments for materials
Planted:	April 20	Prev Crop:	Corn	Other Pests:	N/A
Harv/Samp:	Oct 6 / Oct 5	Weather:	Damaging rains in May, periods of dry during the summer		
Plot Size:	5 reps				
Row Spacing:	22.5 inch				
Seeding Rate:	65,000				

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Dead Beets / 1200 Ft
Check	\$2,126	11546	282	40.9	18.7	95.4	12
Power Cal: 3 Times Foliar	\$2,090	11348	282	40.3	18.6	95.5	3
Power Cal: PPI & 3 Times Foliar	\$2,063	11203	271	41.3	18.0	95.5	1
Average	\$2,093	11366	278	40.8	18.4	95.5	5
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.3	3.3	2.9	2.3	2.4	0.1	230.5

Comments: This trial was performed to determine the impact of Power Cal on yield, sugar, and Cercospora leaf spot control. Power Cal from Agri Solutions is an 8-0-0 with 9% Ca liquid fertilizer product. Power Cal literature states that it improves soil properties, yield, and disease protection. No significant differences were found for yield, sugar, or dead beets. There was not enough Cercospora leaf spot in the field to evaluate Power Cal's impact on control. This trial was performed on a very high yield potential soil with high soil fertility, which would make it less likely to find significant differences. It is important to note that Power Cal should not be applied with phosphorus sources, Power KR, or glyphosate products. In this trial, the product was applied 3 times foliar or PPI plus 3 times foliar. The PPI treatment was 10 gal/acre applied with 28% and Power Sul. The foliar treatment was 2 gal/acre applied with the first 3 Cercospora fungicide applications. All treatments also included in-furrow pop-up and 2x2 starter fertilizer. The pop-up was sprayed T-band in-furrow and included 6.5 gal/acre of Agra Solutions' Power Starter (5-20-5-1S) plus 1 qt/acre of Mn and Zn EDTA with 3.5 oz/acre of AZteroid fungicide. The 2x2 blend included 15.75 gal of 28%, 3 gal of Power K, 1 qt of B, 3 gal of H₂O (48#-0#-9#-6#S-.28#B). The grower used a high rate of pop-up (6.5 gal/acre) and the manufacturer's recommendation for corn on clay soil types is 5 gal/acre and 3 gal/acre on sandy soil types. The leafspot materials were as follows: 7/2 Provysol + EBDC + 2 gal of Power Cal + 2 qt of Mn, 7/17 Tin + EBDC + 2 gal of Power Cal + 1 qt B + 2 qt of Mn, 8/8 Delaro + Proline + EBDC + 2 gal of Power Cal + 2 qt of Mn, 8/24 Tin + EBDC, 9/15 Propulse + EBDC. All applications included Masterlock.

\$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and the early delivery adjustments.

Bold: Results are not statistically different from top ranking treatment in each column.

N.S. – not significant



Nitrogen fertilizer on yield, sugar, and profitability in Ontario, Canada

Laura Van Eerd, Sean Vink, and Inderjot Chahal

Site	pH	OM	P	K	CEC	Planting	N applied	Harvest
Chatham	7.6	3.2	24	240	27.8	21-Apr	21-Apr	24-Aug
Angler	7.2	6.8	73	455	29.2	22-Apr	03-Jun	11-Sep
Mallard	7.6	7.6	16	214	34.9	01-Jun	19-Jun	11-Sep
Cedar Hedge	7.3	1.8	18	151	12.7	18-Mar	06-Apr	23-Sep
English E	7.1	2	28	306	10.2	04-May	15-Apr	24-Sep
English W	7.1	2.8	26	125	14.6	05-May	15-Apr	24-Sep
Indian	7.3	2.2	37	185	15.6	05-Apr	15-Apr	03-Sep
Fairweather	7.7	4.7	26	215	23.9	22-Apr	25-May	22-Sep
Water S	7.5	4.3	20	189	16.4	20-Apr	25-May	14-Sep
Water N	7.5	3.8	12	134	15.9	20-Apr	25-May	14-Sep
Dresden	7.5	2.8	9	210	27.2	05-Apr	06-Apr	27-Aug

Shading indicates narrow rows vs 30" rows in white.

Site	Trt No.	N rate lb N/A	Net \$/A	RWSA	RWST	T/A	%suc	%CJP
All 11 sites	1	0	\$1150b	8130b	250a	32.4c	19.1a	95.1
	2	60	\$1230ab	8870a	247a	35.7b	18.9a	95.2
	3	120	\$1270a	9400a	238b	39.3a	18.3b	95.1
	4	180	\$1230ab	9350a	232c	39.9a	17.9c	94.9
	SE		16.8	116	1.26	0.449	0.092	0.057

most profitable N rate at each location and corresponding yield at that N rate

Chatham	3	100+M	\$996	7680	206	37.3	16.1	94.5
Angler	2	60	\$986	7220	244	29.5	18.7	94.4
Mallard	1	0	\$707	5130	220	23.2	16.9	94.5
Cedar Hedge	4	165+15	\$1,720	12700	257	49.4	19.7	95.5
English E	3	100+33	\$1,620	11910	238	49.9	18.3	95.4
English W	4	160+33	\$1,660	12330	250	49.3	19.1	95.5
Indian	2	40+33	\$1,510	10870	240	45.2	18.5	95.2
Fairweather	3	80+M	\$1,690	12170	257	47.3	19.6	95.4
Water S	2	40+M	\$1,340	9690	238	40.6	18.5	95.1
Water N	3	80+M	\$1,270	9380	236	39.7	18.2	95.1
Dresden	4	160+20	\$942	7310	240	30.3	18.5	95.1

M=manure

Ave	\$1,310	9670	239	40.1	18.4	95.1
SE	\$76	539	4.09	2.29	0.29	0.168

Means followed by the same letter are not significant different at $P < 0.05$.

Net \$/acre= \$40/ton payment, trial ave RWST (242), subtract N fertilizer (\$0.50/lb), trucking \$6/T

Bold: Results are not statistically different from top ranking treatment in each column

A portion of this research was funded by the Canadian Agriculture Partnership, a five-year federal-provincial-territorial initiative, Ontario Sugarbeet Growers Association and Michigan Sugar Company



Weed Control and Crop Safety with Residual Herbicides and Stinger, Gilford, Fairgrove - 2020

(Page 1 of 2)

Trial Quality: Good
Variety: C-G855
Planted: May 7
Harvested: Oct 2
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Clay
%OM: 6.4 **pH:** 8.0 **CEC:** 24.3
P: Above Opt **K:** Above Opt
Mn: Medium **B:** Medium
Added N: 35 lbs 2x2,
120 lbs. side-dress
Prev Crop: Corn

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.5 in.
Rainfall: 21.08 in.
Beets/100 ft: ~254

Application: JD 3520 Tractor mounted plot sprayer, compressed air, 30 psi, 15.3 gpa

No.	Treatment	Rate/A	Applic Timing	RWSA	Vigor*		Net \$/A	% Leaf Damage	B/100	
					7-Jul	20-Aug		5-Jun	2-Jun	16-Jun
2	Roundup Powermax AMS Stinger	24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	8986	8.25	8.46	\$1,834	0.08	258.8	250.1
5	Dual Magnum Roundup Powermax AMS	1.33 pts 24 fl oz 17 lbs/100 gal	2 lf	8910	8.50	8.46	\$1,809	0.08	257.3	252.3
10	Warrant Roundup Powermax AMS Stinger	3 pts 24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	8822	8.42	8.63	\$1,789	0.17	253.7	260.1
4	Dual Magnum Roundup Powermax AMS	1.33 pts 24 fl oz 17 lbs/100 gal	Pre-Emerge 2 lf	8756	8.25	8.50	\$1,770	0.25	257.3	249.9
8	Dual Magnum Roundup Powermax AMS Stinger	1.33 pts 24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	8686	7.92	8.46	\$1,759	0.17	253.0	252.6
1	Roundup Powermax AMS	24 fl oz 17 lbs/100 gal	2 lf	8672	8.25	8.54	\$1,773	0.25	250.4	248.7
3	Dual Magnum Roundup Powermax AMS	.67 pts 24 fl oz 17 lbs/100 gal	Pre-Emerge 2 lf	8663	7.92	8.54	\$1,757	0.17	258.6	253.7
6	Outlook Roundup Powermax AMS	1 pt 24 fl oz 17 lbs/100 gal	2 lf	8512	8.25	8.50	\$1,727	0.17	258.0	257.5
7	Warrant Roundup Powermax AMS	3 pts 24 fl oz 17 lbs/100 gal	2 lf	8383	8.42	8.54	\$1,702	0.08	258.2	257.3
9	Outlook Roundup Powermax AMS Stinger	1.33 pts 24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	8195	8.00	8.50	\$1,658	0.00	260.8	256.2
Average				8658.7	8.22	8.51	\$1,757.8	0.14	256.6	253.8
LSD 5%				N.S.	0.39	0.16	N.S.	N.S.	N.S.	N.S.
CV %				9.1	4.1	1.6	9.2	170.9	5.5	5.7

*Vigor: 0 to 10 Rating, 10 is best

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Weed Control and Crop Safety with Residual Herbicides and Stinger, Gilford, Fairgrove - 2020

(Page 2 of 2)

No.	Treatment	Rate/A	Applic Timing	Vigor*		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				7-Jul	20-Aug						
2	Roundup Powermax AMS Stinger	24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	8.25	8.46	\$1,834	8986	301	29.9	19.2	97.6
5	Dual Magnum Roundup Powermax AMS	1.33 pts 24 fl oz 17 lbs/100 gal	2 lf	8.50	8.46	\$1,809	8910	301	29.6	19.2	97.7
10	Warrant Roundup Powermax AMS Stinger	3 pts 24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	8.42	8.63	\$1,789	8822	294	30.0	18.7	98.1
4	Dual Magnum Roundup Powermax AMS	1.33 pts 24 fl oz 17 lbs/100 gal	Pre-Emerge 2 lf	8.25	8.50	\$1,770	8756	295	29.6	18.8	98.0
8	Dual Magnum Roundup Powermax AMS Stinger	1.33 pts 24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	7.92	8.46	\$1,759	8686	294	29.6	18.7	98.1
1	Roundup Powermax AMS	24 fl oz 17 lbs/100 gal	2 lf	8.25	8.54	\$1,773	8672	282	30.8	18.1	97.7
3	Dual Magnum Roundup Powermax AMS	.67 pts 24 fl oz 17 lbs/100 gal	Pre-Emerge 2 lf	7.92	8.54	\$1,757	8663	296	29.3	18.8	98.1
6	Outlook Roundup Powermax AMS	1 pt 24 fl oz 17 lbs/100 gal	2 lf	8.25	8.50	\$1,727	8512	302	28.2	19.1	98.2
7	Warrant Roundup Powermax AMS	3 pts 24 fl oz 17 lbs/100 gal	2 lf	8.42	8.54	\$1,702	8383	297	28.3	19.1	97.5
9	Outlook Roundup Powermax AMS Stinger	1 pt 24 fl oz 17 lbs/100 gal 2 fl oz	2 lf	8.00	8.50	\$1,658	8195	279	29.4	17.8	98.0
Average				8.22	8.51	\$1,757.8	8658.7	294.1	29.47	18.75	97.90
LSD 5%				0.39	0.16	N.S.	N.S.	17.3	N.S.	1.05	0.58
CV %				4.1	1.6	9.2	9.1	5.1	7.2	4.8	0.5

*Vigor: 0 to 10 Rating, 10 is best

Comments: Residual weed control is becoming more important in sugarbeet production. Significant injury was not observed when adding residual herbicides to a Roundup Powermax and Stinger tank mix. Quadris at 10 fo oz/A and Mustang Maxx at 4 fl oz/a were applied in a 3.5 in band in-furrow for all treatments.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Ultra Blazer Crop Safety Trial

Gilford, Fairgrove - 2020

(Page 1 of 4)

Trial Quality: Good

Variety: C-G855

Planted: May 7

Harvested: Oct 2

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Clay

%OM: 6.4 **pH:** 8.0 **CEC:** 24.3

P: Above Opt **K:** Above Opt

Mn: Medium **B:** Medium

Added N: 35 lbs. 2x2,
120 lbs. side-dress

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 in.

Rainfall: 21.08 in.

Beets/100 ft: ~247

Application: JD 3520 Tractor mounted plot sprayer, compressed air, 30 psi, 15.3 gpa

No.	Treatment	Rate/A	Applic Timing	RWSA	Vigor*		% Leaf Damage		B/100	Dead Beets/ 100**
					20-Jul	20-Aug	23-Jun	30-Jul		
1	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	8820	8.50	8.38	1.13	0.50	262.3	0.2
2	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	6 lf	8639	8.38	8.38	1.13	0.25	251.7	0.2
3	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	8235	7.88	8.56	4.88	4.00	230.0	28.0
	Ultra Blazer Roundup Powermax AMS	16 fl oz 32 fl oz 17 lbs/100 gal	6 lf							
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf							
7	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	7552	8.00	8.63	5.38	4.25	246.8	20.5
	Ultra Blazer Mustang Max Roundup Powermax AMS	16 fl oz 4 fl oz 32 fl oz 17 lbs/100 gal	6 lf							
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf							
5	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	7519	7.88	8.69	4.50	4.50	248.1	8.4
	Ultra Blazer Warrant Roundup Powermax AMS	16 fl oz 3 pt 32 fl oz 17 lbs/100 gal	6 lf							
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf							

***Vigor:** 0 to 10 ratings, 10 is the best.

** **Dead Beets/100:** Beets lost from Ultra Blazer application.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Ultra Blazer Crop Safety Trial

Gilford, Fairgrove - 2020

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No.	Treatment	Rate/A	Applic Timing	RWSA	Vigor**		% Leaf Damage		B/100	Dead Beets/ 100**
					20-Jul	20-Aug	23-Jun	30-Jul		
4	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	6963	7.63	8.56	7.00	4.75	245.7	44.0
	Ultra Blazer Dual Magnum Roundup Powermax AMS	16 fl oz 1.33 pt 32 fl oz 17 lbs/100 gal	6 lf							
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf							
8	Roundup Powermax Stinger AMS	22 fl oz 2 fl oz 17 lbs/100 gal	2 lf	6870	7.50	8.81	7.75	5.00	250.9	33.0
	Ultra Blazer Dual Magnum Roundup Powermax Stinger AMS	16 fl oz 1.33 pt 32 fl oz 4 fl oz 17 lbs/100 gal	6 lf							
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf							
6	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	6616	7.38	8.75	8.50	4.75	241.8	84.1
	Ultra Blazer Outlook Roundup Powermax AMS	16 fl oz 16 fl oz 32 fl oz 17 lbs/100 gal	6 lf							
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf							
Average				7651.5	7.89	8.59	5.03	3.50	247.1	27.3
LSD 5%				767.5	0.53	0.33	2.36	1.68	N.S.	36.0
CV %				6.8	4.6	2.6	31.8	32.6	10.1	89.8

*Vigor: 0 to 10 ratings, 10 is the best.

**Dead Beets/100: Beets lost from Ultra Blazer application.

Comments: Resistant Pigweed species are becoming a larger issue. Ultra Blazer is being tested to see if it can be a solution to the issue. More injury was observed when Dual Magnum and Outlook were added to the tank-mix vs Warrant.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Ultra Blazer Crop Safety Trial

Gilford, Fairgrove - 2020

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No.	Treatment	Rate/A	Applic Timing	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
1	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	\$1,693	8820	293	30.1	18.7	98.0
2	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	6 lf	\$1,657	8639	290	29.8	18.6	97.8
3	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	\$1,546	8235	300	27.4	19.1	98.0
	Ultra Blazer Roundup Powermax AMS	16 fl oz 32 fl oz 17 lbs/100 gal	6 lf						
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf						
7	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	\$1,414	7552	279	27.1	17.8	98.0
	Ultra Blazer Mustang Max Roundup Powermax AMS	16 fl oz 4 fl oz 32 fl oz 17 lbs/100 gal	6 lf						
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf						
5	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	\$1,397	7519	288	26.1	18.2	98.4
	Ultra Blazer Warrant Roundup Powermax AMS	16 fl oz 3 pt 32 fl oz 17 lbs/100 gal	6 lf						
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf						

***Vigor:** 0 to 10 ratings, 10 is the best.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.



Ultra Blazer Crop Safety Trial

Gilford, Fairgrove - 2020

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No.	Treatment	Rate/A	Applic Timing	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
4	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	1,285	6963	275	25.4	17.7	97.5
	Ultra Blazer Dual Magnum Roundup Powermax AMS	16 fl oz 1.33 pt 32 fl oz 17 lbs/100 gal	6 lf						
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf						
8	Roundup Powermax Stinger AMS	22 fl oz 2 fl oz 17 lbs/100 gal	2 lf	1,256	6870	269	25.5	17.2	97.9
	Ultra Blazer Dual Magnum Roundup Powermax Stinger AMS	16 fl oz 1.33 pt 32 fl oz 4 fl oz 17 lbs/100 gal	6 lf						
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf						
6	Roundup Powermax AMS	22 fl oz 17 lbs/100 gal	2 lf	1,220	6616	271	24.3	17.5	97.6
	Ultra Blazer Outlook Roundup Powermax AMS	16 fl oz 16 fl oz 32 fl oz 17 lbs/100 gal	6 lf						
	Roundup Powermax AMS	32 fl oz 17 lbs/100 gal	10-12 lf						
Average				\$1,433.4	7651.5	283.2	26.97	18.09	97.90
LSD 5%				148.3	767.5	19.7	2.45	1.22	0.79
CV %				7.0	6.8	4.7	6.2	4.6	0.6

*Vigor: 0 to 10 ratings, 10 is the best.

Comments: Resistant Pigweed species are becoming a larger issue. Ultra Blazer is being tested to see if it can be a solution to the issue. More injury was observed when Dual Magnum and Outlook were added to the tank-mix vs Warrant.

\$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

Bold: Results are not statistically different from top-ranking treatment in each column.

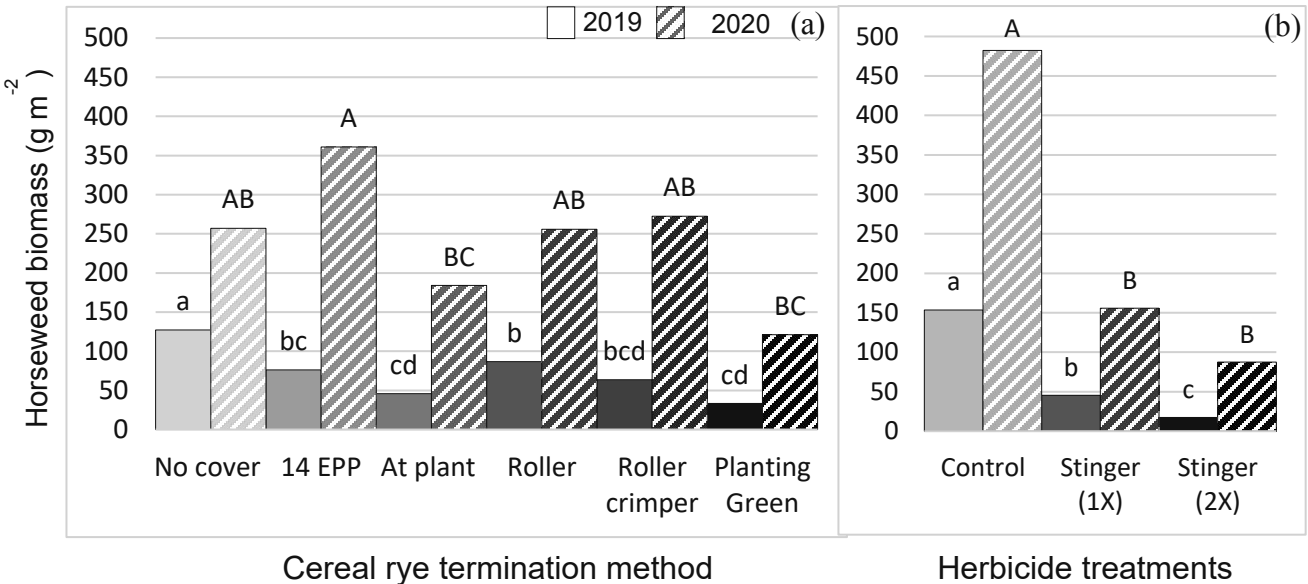
Integrating cereal rye to manage glyphosate-resistant horseweed in sugarbeet – Year 2

Brian Stiles II and Christy Sprague, Michigan State University

Location: MSU Agronomy Farm (East Lansing)	Cereal rye termination dates:
Soil Type: Clay Loam	Before planting (EBD): April 27, 2020
O.M.: 3.1%	At plant (PBD): May 12, 2020
pH: 6.1	Delayed burndown (DBD): May 23, 2020
Replicated: 4 times	Sugarbeet: Crystal G675
Cereal rye: ‘Wheeler’ at 60 lbs/A	Planting rate: 3 7/8” spacing
Planting date: October 15, 2019	Planting date: May 13, 2020

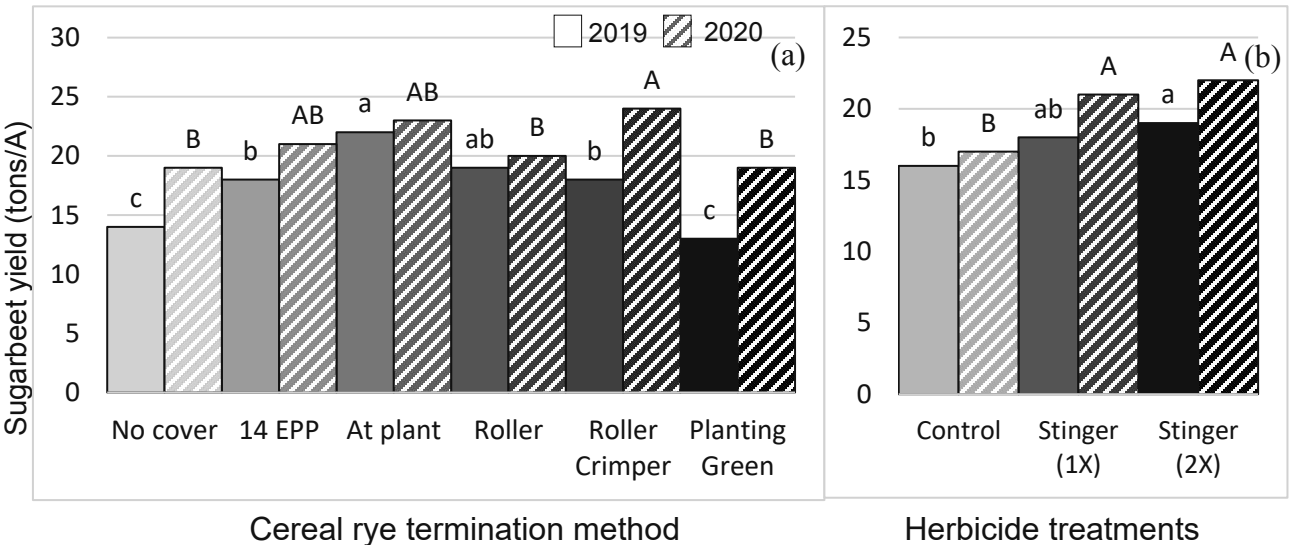
Summary: Glyphosate-resistant horseweed proves to be a challenge for many Michigan sugarbeet farmers. Integrating multiple management strategies, including a cereal cover crop, may improve horseweed control. Over the past two years, field studies were conducted in East Lansing, Michigan to evaluate the effects of fall-planted cereal rye termination time and method in combination with different postemergence (POST) herbicide treatments for horseweed control in sugarbeet. Cereal rye was drilled at 60 lb/A in the fall of 2018 and 2019. Cereal rye was terminated 1) 14 d prior to sugarbeet planting (14 EPP), burndown at planting (PBD), PBD + roller, and PBD + roller crimper, rye termination 14 d after planting (Planting Green), and a no cover control. Cereal rye was controlled with Roundup PowerMax (glyphosate) at 32 fl oz/A + AMS. When sugarbeet was at the 2 leaf and 6-8 leaf postemergence (POST) herbicides treatments were applied: 1) glyphosate applied twice (control), 2) glyphosate (32 fl oz/A) followed by glyphosate (22 fl oz/A) + Stinger (4 fl oz/A) (Stinger 1X), and 3) glyphosate (32 fl oz/A) + Stinger (2 fl oz/A) followed by glyphosate (22 fl oz/A) + Stinger (4 fl oz/A) (Stinger 2X). Horseweed biomass was not different between the no cover and cereal rye treatments terminated at sugarbeet planting. However, at the Planting Green termination horseweed biomass was 15-times lower for all treatments compared with the no cover control in 2019, and delayed horseweed emergence resulted in no differences in treatments at this time in 2020. By mid-July, regardless of termination time or method horseweed biomass was at least 38-64% lower than the no cover control in both years. Horseweed biomass at sugarbeet harvest was as much as 70% lower than the no cover control when a cereal rye cover crop was used in 2019. However, in 2020 horseweed suppression at sugarbeet harvest did not last throughout the season and none of the cover crop treatments resulted in less horseweed biomass than the no cover control (Figure 1). Horseweed biomass at harvest was as much a 67% lower when one or two applications of Stinger were used in 2020. Two applications were best in 2019. Averaged across herbicide treatments, the at plant termination timing was amongst the highest for sugarbeet yield in both years. Terminating cereal rye at planting followed by a roller or a roller crimper affected yield differently between years and did not follow any trend. In both years, the no cover control and Planting Green were amongst the lowest sugarbeet yields, likely due to greater horseweed pressure in the no cover control and early season competition with cereal rye from the Planting Green treatments (Figure 2). There have been some positive results in integrating cereal rye to suppress horseweed early in the season in sugarbeet production systems, however it will be important to further examine how these strategies can be refined to improve horseweed suppression, while maintaining sugarbeet yield.

Figure 1. Termination time and herbicide treatment influenced horseweed biomass prior to harvest. In 2020 horseweed suppression at sugarbeet harvest did not last throughout the season and none of the cover crop treatments resulted in less horseweed biomass than the no cover control. Data is averaged over termination method (a) and herbicide treatment (b).



^a Treatment bars with different letters are significantly different from each other.

Figure 2. Averaged across herbicide treatments, yield for the roller crimper termination timing was highest in 2020 (24 t/A), while the at plant termination timing was amongst the highest for sugarbeet yield (23 t/A), and the no cover control and Planting Green were amongst the lowest sugarbeet yields (19 t/A). Data is averaged over termination method (a) and herbicide treatment (b).



^a Treatment bars with different letters are significantly different from each other.

Sugarbeet tolerance to postemergence applications of Ultra Blazer

Christy Sprague, Gary Powell and Brian Stiles, Michigan State University

Location: Richville (SVREC)	Application timings: 2-lf beets (May 21), 6-lf beets (June 4), 12-lf beets (June 18)
Planting Date: April 20, 2020	Herbicides: see treatments
Soil Type: Clay loam	O.M.: 2.8 pH: 7.4
Replicated: 4 times	Variety: Crystal G675

Table 1. Sugarbeet tolerance to POST applications of Ultra Blazer (acifluorfen) applied at various sugarbeet stages and with various mixtures, 7 days after the 6- and 12-lf application and in September.

Herbicide treatments ^a	Timing	Injury (June 11) — % —	Injury (June 25) — % —	Injury (Sept. 17) — % —	Yield — ton/A —	RWSA — lb/A —
Roundup PowerMax (32/22/22 fl oz)		0	0	0	29.3	8483
Ultra Blazer (8/8 fl oz)	6, 12 lf	19* ^b	18*	1	30.2	8242
Ultra Blazer (16/16 fl oz)	6, 12 lf	29*	20*	0	26.8	7330
Ultra Blazer (16 fl oz)	6 lf	18*	12*	0	30.0	8628
Ultra Blazer (16 fl oz)	12 lf	0	25*	2*	28.8	8022
Ultra Blazer (16 fl oz) + Moccasin II Plus (1.33 pt)	6 lf	33*	25*	0	26.0	7450
Ultra Blazer (16 fl oz) + Warrant (3 pt)	6 lf	10*	11*	0	31.8	8734
Ultra Blazer (16 fl oz) + Outlook (16 fl oz)	6 lf	35*	22*	0	27.3	7422
Ultra Blazer (16 fl oz) + Ethofumesate (32 pt)	6 lf	24*	15*	1	26.0	7378
Stinger (2 fl oz) fb. Ultra Blazer (16 fl oz) + Stinger (4 fl oz)	2, 6 lf	24*	12*	1	28.0	7810
Stinger (2 fl oz) fb. Stinger (4 fl oz)	2, 6 lf	3	3	1	30.3	8602
LSD_{0.05}^c		8.9	9.0	1.6	5.68	1677

^a Roundup PowerMax was included in all postemergence treatments at the rates listed in the first treatment. These treatments also included AMS at 17 lb/100 gal.

^b Injury, yield and RWSA data with asterisks (*) are significantly different than the Roundup PowerMax alone control.

^c Means within a column greater than least significant difference (LSD) value are different from each other.

Summary: Options are extremely limited for POST control of glyphosate-resistant pigweed (waterhemp and Palmer) in sugarbeet. Ultra Blazer (acifluorfen) is a Group 14 herbicide that has activity on pigweed species. Over the last three years we have conducted field research evaluating sugarbeet safety to POST applications of Ultra Blazer. All applications of Ultra Blazer injured sugarbeet. Symptoms consist of leaf speckling/bronzing of the sugarbeet leaves. In 2019, we observed severe injury from applications to 2-leaf sugarbeet that reduced stand and yield. In all three years, Ultra Blazer applications to 6- and 12- leaf sugarbeet have also resulted in injury, however sugarbeet was able to recover and sugarbeet yield and recoverable white sugar were not affected. Examining our research and that of its of colleagues in North Dakota, it appears if an Ultra Blazer is label is granted, applications should be on larger beets (>6-leaf) at a 16 fl oz/A rate. Caution should be taken with making late season applications, two applications, or tank-mixing Ultra Blazer with other herbicides (except Roundup) or additional adjuvants.

Sugarbeet tolerance to overlapping residual herbicide programs

Christy Sprague, Gary Powell and Brian Stiles, Michigan State University

Location: Richville (SVREC)	Application timings: PRE (April 22), 2-lf beets (May 21), 6-8 lf beets (June 4)
Planting Date: April 20, 2020	Herbicides: see treatments
Soil Type: Clay loam	O.M.: 2.8 pH: 7.4
Replicated: 4 times	Variety: Crystal G675

Table 1. Comparison of sugarbeet tolerance of two-passes of overlapping residual herbicide programs applied POST alone and with ethofumesate (PRE) or a low rate of Dual II Magnum (PRE).

Herbicide treatments ^a		Injury ^b (14 DA-6-lf)	Harvest Stand	Yield	RWSA
PREs	POST at 2- and 6-lf beets	— % —	— #/100' row —	— ton/A —	— lb/A —
None	Roundup PowerMax (32/22 fl oz)	0	220	27.1	7716
None	Dual II Magnum (1.3/1.3 pt)	7	193	21.1	6081
None	Warrant (3/3 pt)	7	197	23.4	6672
None	Outlook (12/12 fl oz)	6	199	22.7	6432
None	Ethofumesate ^a (2/2 pt)	1	190	24.1	7015
Ethofumesate (2 pt)	Dual II Magnum (1/1 pt)	8* ^b	189	26.4	7525
Etho. (2 pt)	Warrant (3/3 pt)	9*	185	26.4	7562
Etho. (2 pt)	Outlook (12/12 fl oz)	0	212	29.6	8287
Etho. (2 pt)	Ethofumesate ^a (2/2 pt)	1	215	28.7	8261
Dual II Magnum (0.5 pt)	Dual II Magnum (1/1 pt)	6	193	22.0	6080
Dual II Magnum (0.5 pt)	Warrant (3/3 pt)	13*	190	23.3	6557
Dual II Magnum (0.5 pt)	Outlook (12/12 fl oz)	2	218	25.3	7165
Dual II Magnum (0.5 pt)	Ethofumesate ^a (2/2 pt)	4	193	26.3	7450
LSD_{0.05}^c		7.1^c	-NS-	6.52	1858

^a Roundup PowerMax was included in all postemergence treatments at the rates listed in the first treatment. These treatments also included AMS at 17 lb/100 gal. All POST applications of ethofumesate were applied with 1.5 pt/A of Destiny HC.

^b Injury, stand, yield and RWSA data with asterisks (*) are significantly different than the Roundup PowerMax alone control.

^c Means within a column greater than least significant difference (LSD) value are different from each other.

Summary: Overlapping residual herbicide programs may be the only way to effectively control glyphosate-resistant pigweed (waterhemp and Palmer) in sugarbeet. This is the third year, where a field trial was conducted at the Saginaw Valley Research and Extension Center to determine what effect multiple applications of residual herbicides have on sugarbeet injury, stand, yield and recoverable white sugar per acre (RWSA). The Group 15 herbicides, Dual II Magnum, Outlook and Warrant were all evaluated at maximum rates allowed per season. These treatments were also evaluated after a preemergence application of ethofumesate or Dual II Magnum at a low rate (currently not labeled). Postemergence ethofumesate was also evaluated. In general, sugarbeet injury was less than 15% at all evaluations and none of the treatments resulted in a loss of yield or RWSA compared with the Roundup PowerMax only control. These treatments were also examined for waterhemp control and should continue to be examined over more environments.

Waterhemp control with overlapping residual herbicide programs

Christy Sprague, Gary Powell and Brian Stiles, Michigan State University

Location: Isabella County	Application timings: PRE (May 13), 2-lf beets (June 2), 6-8 lf beets (June 25)
Planting Date: May 9, 2020	Herbicides: see treatments
Soil Type: Sandy loam	O.M.: 2.5 pH: 6.8
Replicated: 4 times	Variety: Crystal G675

Table 1. Comparison of waterhemp control with two-passes of POST overlapping residual herbicide programs alone and with ethofumesate (PRE) or low rates of Dual II Magnum (PRE).

		Waterhemp control ^b		
Herbicide treatments ^a		July 8 (14 DA-6-lf)	July 22 (27 DA-6-lf)	October 6 (103 DA-6-lf)
PREs	POST apps. at 2- and 6-lf beets	— % —	— % —	— % —
None	Roundup PowerMax (32/22 fl oz)	0	0	0
None	Dual II Magnum (1.3/1.3 pt)	78	66	54
None	Warrant (3/3 pt)	92	76	61
None	Outlook (12/12 fl oz)	85	65	52
None	Ethofumesate ^a (2/2 pt)	89	86	66
Ethofumesate (2 pt)	Dual II Magnum (2/2 pt)	100*	100*	100*
Etho. (2 pt)	Warrant (3/3 pt)	100*	100*	100*
Etho. (2 pt)	Outlook (12/12 fl oz)	100*	100*	100*
Etho. (2 pt)	Ethofumesate ^a (1/1 pt)	100*	100*	100*
Dual II Magnum (0.5 pt)	Dual II Magnum (1/1 pt)	100*	99*	95*
Dual II Magnum (0.5 pt)	Warrant (3/3 pt)	100*	100*	99*
Dual II Magnum (0.5 pt)	Outlook (12/12 fl oz)	100*	100*	100*
Dual II Magnum (0.5 pt)	Ethofumesate ^a (2/2 pt)	100*	100*	100*
LSD_{0.05}^c		6.9^c	9.4	12

^a Roundup PowerMax was included in all postemergence treatments at the rates listed in the first treatment. These treatments also included AMS at 17 lb/100 gal. All POST applications of ethofumesate was applied with 1.5 pt/A of Destiny HC.

^b Waterhemp control evaluations with asterisks (*) are similar to the best waterhemp control treatment.

^c Means within a column greater than least significant difference (LSD) value are different from each other.

Summary: Overlapping residual herbicide programs may be the only way to effectively control glyphosate-resistant pigweed (waterhemp and Palmer) in sugarbeet. A field trial was conducted in Isabella County with a high natural population of glyphosate- and ALS-resistant waterhemp. Several Group 15 herbicides (Dual II Magnum, Outlook, and Warrant) and Ethofumesate were evaluated at maximum rates allowed per season. These treatments were also evaluated after a preemergence application of ethofumesate or Dual II Magnum at a low rate (currently not labeled). At the end of the season, effective waterhemp control was observed when either Ethofumesate (PRE) or Dual II Magnum at 0.5 pt/A (PRE) was followed with overlapping residual herbicides. It was important to have initial PRE applied to make sure no waterhemp emerged prior to the POST residual herbicides. These treatments were also examined at SVREC to examine sugarbeet tolerance and yield responses from these treatments. We will continue to examine and refine waterhemp control strategies in sugarbeet.

Carryover potential from fall applications of tiafenacil to sugarbeet

Christy Sprague, Gary Powell and Brian Stiles, Michigan State University

Location:	East Lansing (2 locations)	Tillage:	Conventional
Planting Dates:	April 27, 2020	Row width:	30-inch
Replicated:	4 times	Dates treated:	Oct. 15, 2019 (LOC 1)
Varieties:	Crystal G675		Dec. 17, 2019 (LOC 2)

Table 1. Effect of fall applications of tiafenacil and Sharpen on sugarbeet planted the following spring.

	Location 1			Location 2		
	Injury (%)	Stand	Yield	Injury (%)	Stand	Yield
Treatments	(30 DAP)	#/100' row	cwt/A	(30 DAP)	#/100' row	cwt/A
Tiafenacil (0.5 fl oz) + MSO	0 b ^a	80 ab	22.3 a	0	85 ab	16.4 bcd
Tiafenacil (1 fl oz) + MSO	13 b	64 b	25.4 a	0	93 a	21.4 ab
Tiafenacil (2 fl oz) + MSO	23 b	60 bc	21.4 a	0	87 ab	24.3 a
Tiafenacil (3 fl oz) + MSO	25 b	82 ab	22.3 a	0	82 ab	12.8 cd
Tiafenacil (4 fl oz) + MSO	63 a	33 c	12.0 b	3	83 ab	17.7 bc
Sharpen (2 fl oz) + MSO	55 a	52 bc	20.0 b	5	69 b	17.0 bcd
Sharpen (4 fl oz) + MSO	65 a	37 c	13.3 b	6	92 a	24.1 a
Untreated	0 b	100 a	25.0 a	0	101 a	14.4 cd

^a Means within a column with different letters are significantly different from each other.

Summary: Tiafenacil is a new herbicide being evaluated for burndown weed control in various crops. Tiafenacil has similar characteristics to the herbicide saflufenacil (Sharpen). The objective of this research was to determine if there were any issues with carryover from tiafenacil to sugarbeet if it was applied in the fall. Since fall applications of Sharpen (saflufenacil), can lead to carryover to sugarbeet planted in the spring when it is applied at rates greater than 1 fl oz/A and less than 6 months have passed between application and planting, tiafenacil at various application rates was compared to saflufenacil. This year at two locations that were conducted in East Lansing, there was very significant injury at location 1 and yield was reduced where 4 fl oz/A of tiafenacil and both rates of Sharpen were applied. This soil was a clay loam with 3% organic matter and pH of 6.1. At the second location there was very little effect from tiafenacil or Sharpen on sugarbeet. Overall sugarbeet yield was variable and was lowest from the untreated control. The soil at this location was a loam with 2.6% OM and soil pH of 6.9. Currently, based on these results I would recommend that the rotation restrictions for tiafenacil at 4 fl oz/A or greater to sugarbeet be similar to Sharpen (saflufenacil).

Evaluation of *Cercospora* leaf spot and postharvest rot pathogen impacts on sugarbeet storage

Carly Hendershot¹, Chris Bloomingdale¹, Holly Corder¹, Tom Goodwill², Cameron Pincumbe¹, Randy Beaudry¹, Linda E. Hanson^{1,2}, and Jaime F. Willbur¹; ¹Michigan State University; ²USDA-ARS

Background: In 2020, storage studies were initiated to investigate: (1) the impacts of variety and *Cercospora* leaf spot (CLS) field infection on rate of storage rot symptom development, (2) the effect of CLS infection on beet respiration rate in storage, and (3) monitor and characterize storage pathogens affecting sugarbeets postharvest. In the following trials, sugarbeet varieties C-G333NT and F1042 [1] were selected as CLS-susceptible materials and HIL-9865 and EL50/2 [2] were selected as CLS-resistant materials. Both C-G333NT and HIL-9865 have been evaluated in Michigan Sugar Company storage trials for the past 3 years; HIL-9865 consistently resulted in lower storage rot ratings than C-G333NT. High and low CLS levels were established using combinations of fungicide treatments and field inoculation. After 60 days of storage at 42°F, beet slices were inoculated with *Botrytis cinerea*, *Penicillium vulpinum*, *Fusarium graminearum* and *Geotrichum* sp. Fungal growth was measured one-week post-inoculation. At least three timepoints are planned.

Trial 1: CLS infection impact on susceptibility of sugarbeet to four postharvest diseases

Location: Saginaw (SVREC)	Treatments: Non-treated (high CLS), grower standard (low CLS)
Planting Date: April 7, 2020	Variety: C-G333NT (Inoculated July 9 and July 23, 2020)
Harvest: September 18, 2020	Replicates: 4 plots/treatment in field, 3 roots/plot in storage
Storage Trial Timepoint 1: November 24, 2020	Days Postharvest Timepoint 1: 67

Trial 2: CLS inoculation and variety impacts on susceptibility of sugarbeet to four postharvest diseases

Location: Saginaw (SVREC)	Treatments: Inoculated (high CLS), non-inoculated (low CLS)
Planting Date: May 22, 2020	Varieties: F1042, EL50/2, C-G333NT, HIL-9865
Harvest: October 15, 2020	Inoculated: July 9 and July 23, 2020
Storage Trial Timepoint 1: December 15, 2020	Days Postharvest Timepoint 1: 61

Summary (1): Results from Trial 1 showed no significant differences between storage rot susceptibility in beets with high or low CLS levels in the field ($P > 0.05$; Fig. 1). Both length and depth of lesions caused by *P. vulpinum* and *B. cinerea* were similar, *F. graminearum* caused slightly less severe symptoms, and *Geotrichum* sp. did not cause symptoms statistically different from the control. In Trial 2, however, our results suggest that the interaction between CLS level, pathogen, and variety may have an effect on sugarbeet rot depth ($P < 0.05$; Table 1). There will be another timepoint at the end of the storage season, as well as a minimum of one mid-winter sample.

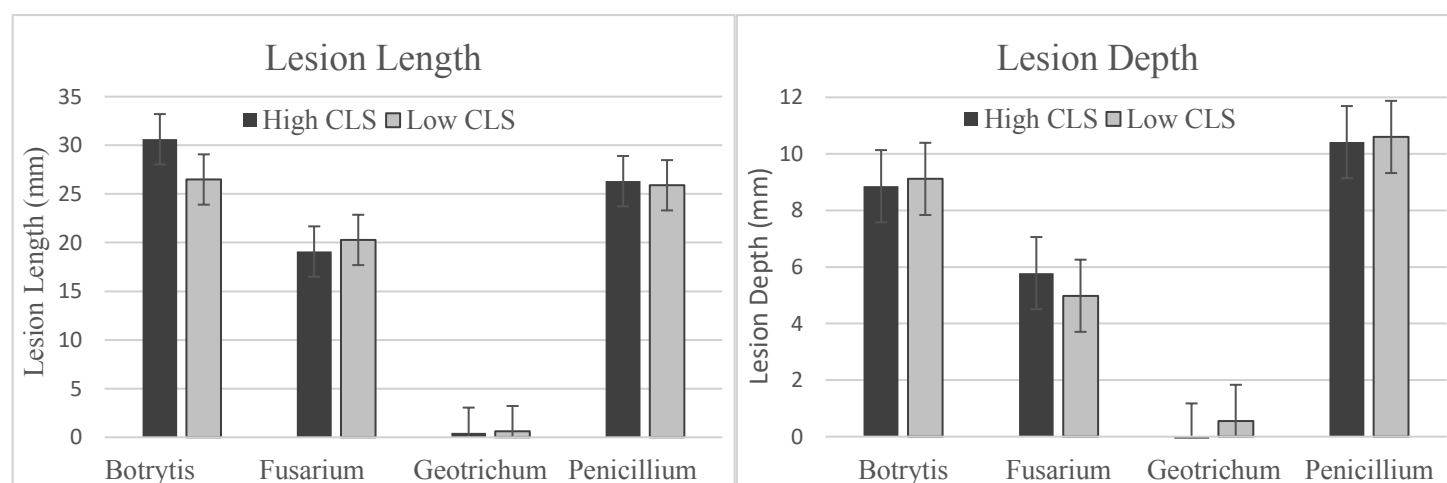


Figure 1. Mean lesion lengths and depths measured from sugarbeet roots inoculated with postharvest pathogens. Beet roots originated from plots with high or low levels of CLS in field studies, achieved from either a non-treated or grower standard treated check. Least Squares Difference showed difference of 6.6 mm is considered significant for length, and 3.5 mm for depth at $\alpha = 0.05$.

Table 1. Mean lesion lengths and depths measured from sugarbeet roots inoculated postharvest pathogens. C-G333NT and F1042 were selected as CLS-susceptible and HIL-9865 and EL50/2 were selected as CLS-resistant varieties. These varieties were subjected to high and low CLS pressure following inoculation or no inoculation. Statistics indicate that the interaction between CLS level, pathogen, and variety influences rot depth.

Type III Tests of Fixed Effects						
Effect	Num DF	Den DF	Lesion Length		Lesion Depth	
			F Value	Pr > F	F Value	Pr > F
CLS Level	1	2	3.52	0.2015	4.37	0.1717
Pathogen	3	48	24.49	<.0001	50.20	<.0001
CLS*Pathogen	3	48	0.05	0.9832	0.53	0.6654
Variety	3	12	0.77	0.5350	0.36	0.7809
CLS*Variety	3	12	0.19	0.9008	0.51	0.6836
Pathogen*Variety	9	48	2.09	0.0492	0.90	0.5351
CLS*Pathogen*Variety	9	48	2.02	0.0569	2.17	0.0415

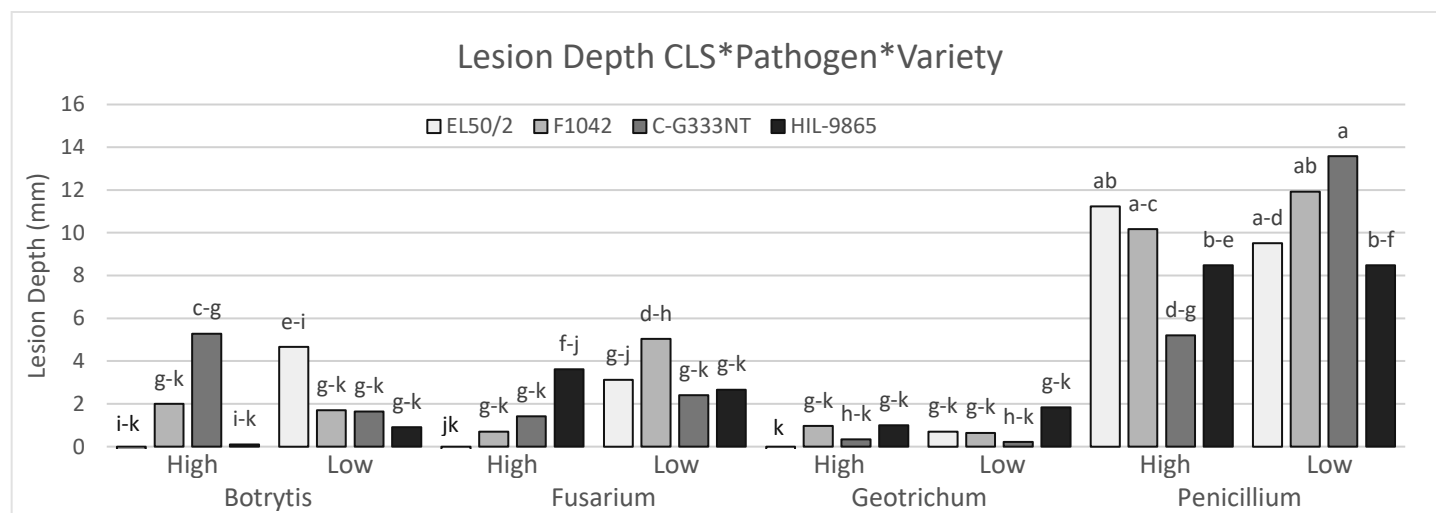


Figure 2. Mean lesion depths measured from sugarbeet roots inoculated with postharvest pathogens. Beet roots originated from plots with high or low levels of CLS in field studies, achieved from either inoculation or no inoculation. Least Squares Difference showed difference of 4.87 mm is considered significant at $\alpha = 0.05$.

Summary (2): Roots of C-G333NT and HIL-9865 with high and low CLS ratings from Trial 2 are being stored in vented respirometry chambers at 42 °F. These beets will not be inoculated with storage pathogens. Samples will be taken periodically throughout the storage season to measure the beet respiration rate/lb. The effect of CLS infection in the field on the respiration rate of beets in storage will be determined.

Summary (3): 2019-20 samples show different pathogens are colonizing the beets in storage compared to the field. The main organisms isolated from SVREC field were *Fusarium* spp., *Geotrichum* spp., *Rhizoctonia solani*, and *Trichoderma* spp. *Trichoderma* spp. have been used for biocontrol control and are commonly found in the environment. *Geotrichum* spp. were not previously reported on sugarbeet in Michigan but were detected in fall of 2019 (REACH, 2020). Prominent organisms isolated from a Michigan Sugar Co. piling facility in spring 2019 include *Botrytis cinerea*, *Penicillium* spp., and *Fusarium* spp. In addition to the pathogens found in the spring, December 2020 samples from Michigan Sugar Co. storage piles were also infected with *Geotrichum* spp. Future goals include determining the pathogenicity, virulence, and spore dispersal mechanisms of storage pathogens to help reduce infection.

Acknowledgements: This work is supported by the Michigan Sugar Company, USDA-ARS, Beet Sugar Development Foundation, and Project GREEN. We also thank Dennis Bischer, Corey Guza, and Michigan Sugar Company agronomists for their assistance in obtaining beet root samples.

[1] Campbell, L. G. 2015. PI 674103, *Beta vulgaris* L. subsp. *vulgaris*. U.S. National Plant Germplasm System. <https://npgsweb.ars-grin.gov/gringlobal/accessiondetail?id=1923721> ; [2] McGrath, J.M. 2012. Germplasm releases: EL50/2; EL58 through EL66; SR99 through SR101 [CD-ROM]. 2012 Annual Beet Sugar Development Foundation Research Report. Denver, Colorado: Beet Sugar Development Foundation

High-Speed Planter & Seed Size

Maxwell Farms, Saginaw - 2020

Trial Quality:	Good	Row Spacing:	30 inch	Fertilizer:	2x2: 30 gallons
Variety:	C-G752NT	Seeding Rate:	54,000	In Furrow:	5.5 gal of H ₂ O, Quadris (6.5 oz) & Mustang (4 oz)
Planted:	April 23	Soil Type:	High organic loam	Weather:	Crusting after planting, followed by excessive rain during emergence
Plot Size:	4 reps	Prev Crop:	Corn		

Treatment	Average Spacing (inches)	Average Standard Deviation of Spacing (Inches)	Population 100 ft of Row
ELS	3.90	1.29	222
Mini Pellet	3.91	1.37	216
LSD 5%	N.S.	N.S.	N.S.
CV %	3.1	17.4	5.3

Treatment	Average Spacing (inches)	Average Standard Deviation of Spacing (Inches)	Population 100 ft of Row
Reg Pellet	3.84	1.28	224
ELS	3.90	1.24	214
LSD 5%	N.S.	N.S.	N.S.
CV %	1.5	3.5	9.3

Comments: This trial was set up to check the plantability of different seed sizes with high speed planter technology. Most growers that have adopted high speed technology request ELS seed size, believing that it will plant better. The trial used a 24 row John Deere 1770NT CCS planter. The planter was equipped with Precision Planting's vSet 2 seed meter, SpeedTubes, and DeltaForce hydraulic down force. The planting speed was 7.4 mph. The trial was essentially set up as 2 different trials. The grower planted the ELS strips while leaving every other strip blank for the mini and regular pellets. The mini and regular pellet treatments were planted at the same time on different ends of the planter so that the grower did not have to stop to make multiple plate changes during planting. For each replication, the same planter row units were compared between either the ELS & Mini pellet or the ELS and Regular pellet. For each replication, 12 foot sections of 4 rows were used to determine population and spacing. On average, about 280 measurements for each treatment were used to calculate the spacing and standard deviation. Emergence conditions after planting were less than ideal with some crusting followed by excess rain. The average emergence in the field was about 71%, which is similar to many beet fields. The emergence in beet fields is never perfect, and to calculate spacing and standard deviation, any gaps less than 1 inch were not used as these could either be double seeds or twins within the same seed. Similarly, any gaps larger than 6.4 inches were not used for spacing and standard deviation since it is reasonable to assume that a seed may have been dropped in that size gap and the reason the plant was missing could be due to several factors not related to planter performance. The field had corn as a previous crop and was fall ripped. There was 1 pass of spring tillage with a Sunflower Soil Finisher and the seedbed was typical of beet fields that follow corn in that it wasn't perfectly smooth and had plenty of corn root balls and stover. There were no statistical differences found in spacing, spacing standard deviation, or population. The spacing standard deviation is a measurement of spacing variability from the average. So, a lower standard deviation would mean less variability and better planter performance. Be careful not to infer that the numerical difference in populations were due to the planter. The populations were being influenced by factors other than the planter, including seed lot germination/vigor and variability in the field. There was a noticeable difference seen in what the monitor (Precision 20/20 Gen 3) was reading for population, singulation, and skips. For the ELS seed, the monitor was averaging about 99% singulation, 1% skips, and 0% doubles. For regular pellet and mini pellet the monitor was averaging about 95% & 86% for singulation, 5% & 14% for skips, and 0% & 0% for doubles, respectively. While no statistical analysis was conducted on either skips or doubles, there was not a noticeable difference between the treatments in this regard. Furthermore, the population and spacing data does not seem to indicate that the population, singulation, and skip data is real but instead is likely due to the sensor not picking up the smaller seed size.

N.S. – not significant

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