

Research 2021 Results

REACh/SUGARBEET ADVANCEMENT COMMITTEE LIST 2021 VOTING MEMBERSHIP

23 Voting Members

Company	Name	Terms Remaining	Expire		
	Jim Ruhlman (5 th Member)				
Michigan Sugar Company	Dennis Bischer	Downoort			
Michigan Sugar Company	Amanda Harden	Perma	lent		
	Corey Guza				
	Kerrek Griffes	2	2023		
Michigan Sugar Agriculturists	Kevin Messing	4	2025		
	Cassie Sneller	1	2022		
Michigan Sugar Company	Mark Richards	1	2022		
District Board Members	Troy Schuette (Secretary)	1	2022		
(1 year)	Terry Schindler (Treasurer)	1	2022		
	Scott Grifka	1	2022		
Michigan Sugar Company	Dan Keenan	3	2024		
(3 years)	Eric Gentner	2	2023		
	Andy Shaffner (Chairman)	1	2022		
Michigan State University.	Linda Hanson	2	2023		
University of Guelph, and USDA	Amanda Tracey	1	2022		
(3 years)	Jamie Willbur	1	2022		
Sugar Beet Seed Company (2 years)	Doug Ruppal	2	2023		
Agri-Business Retail (2 years)	Kyle Edler	2	2023		
Agri-Business Manufacturing (2 years)	David Reif	1	2022		
Michigan Sugar Company	Dean Haubenstricker	1	2022		
Board of Directors (1 year)	Mark Sylvester (Vice Chairman)	1	2022		
SBA Director	Daniel Bublitz	Permar	ent		

Ex-Officio Members

Company	Name
Chairman of Board of Directors - MSC	Adam Herford
CEO of Michigan Sugar Company	Mark Flegenheimer



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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Mennonite Church, Pigeon, MI - 2021

Trial Quality: Fair Variety: SX-1278 Planted: April 26 Harvested: September 29 Plots: 6 rows X 38 ft, 5 reps Row Spacing: 22 in. Soil Info: Clay Loam % OM: 2.7 pH: 7.2 CEC: 10.9 P: Above Opt K: Opt Mn: High B: Low Added N: 35 lbs. 2x2, 120 lbs. sidedress Prev Crop: Soybeans

Rhizoc Level: Moderate Cerc Control: Good Problems: Variable Stand Seeding Rate: 4.5 in. Rainfall: 10.42 in. Beets/100 ft: 190

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

No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets/ 100 ft	Vigor* 30-Jul	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
13	Quadris	10 fl oz	At Plant	In-Fur	6.4	7.15	\$1,302	6918	270	24.7	17.9	96.0
	Topsin	20 fl oz	At Plant	In-Fur								
	Quadris	14.25 fl oz	6 lf	Banded								
	Topsin	20 fl oz	6 lf	Banded								
9	Quadris	10 fl oz	At Plant	In-Fur	6.7	7.15	\$1,290	6745	273	24.6	18.0	96.3
	Serifel	4 oz	At Plant	In-Fur								
3	Quadris	14.25 fl oz	6 lf	Banded	6.7	7.55	\$1,391	7221	276	26.2	18.0	96.7
8	Proline 480 SC	5.7 fl oz	At Plant	In-Fur	7.1	7.15	\$1,381	7283	270	24.6	17.8	96.5
	Quadris	14.25 fl oz	6 lf	Banded								
4	Quadris	10 fl oz	At Plant	In-Fur	7.8	6.95	\$1,342	7024	270	23.4	17.9	96.0
	Quadris	14.25 fl oz	6 lf	Banded								
21	Minuet	12.8 fl oz	At Plant	In-Fur	8.1	7.40	\$1,248	6733	260	25.8	17.2	96.2
	Quadris	9.2 fl oz	At Plant	In-Fur								
	Proline 480 SC	5.7 fl oz	At Plant	In-Fur								
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
14	Quadris	10 fl oz	At Plant	In-Fur	9.5	7.15	\$1,217	6422	271	23.6	17.9	96.2
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
19	Quadris	14.25 fl oz	At Plant	In-Fur	9.8	7.10	\$1,223	6454	261	23.1	17.4	95.7
	Excalia	2 oz	6 lf	Banded								
12	Quadris	10 fl oz	At Plant	In-Fur	9.8	7.35	\$1,294	6713	272	22.6	17.9	96.3
	Topsin	20 fl oz	At Plant	In-Fur								
20	Quadris	9.2 fl oz	At Plant	In-Fur	10.5	7.25	\$1,245	6669	273	23.6	18.0	96.3
	Proline 480 SC	5.7 fl oz	At Plant	In-Fur								
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
5	Quadris	15.5 fl oz	6 lf	Broadcast	11.0	7.35	\$1,384	7194	275	25.1	18.1	96.3
10	Propulse	13.6 fl oz	At Plant	In-Fur	12.1	7.30	\$1,190	6444	267	23.8	17.7	96.0
	Quadris	14.25 fl oz	6 lf	Banded								

*Vigor 0 to 10 ratings, 10 is best.

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



Mennonite Church, Pigeon, MI - 2021

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No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets/ 100 ft	Vigor* 30-Jul	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
22	ADM.03509.F.3.B	12 fl oz	At Plant	In-Fur	13.4	7.0	\$1,317	6762	271	22.0	17.9	96.3
	ADM.03509.F.3.B	12 fl oz	6 lf	Banded								
18	Excalia	2 oz	6 lf	Broadcast	13.6	7.9	\$1,257	6630	275	24.0	18.1	96.2
	Quadris	15.5 fl oz	6 lf	Broadcast								
1	Untreated Check				14.0	7.1	\$1,189	6077	269	22.5	17.8	96.1
6	Quadris	15.5 fl oz	18 lf	Banded	15.3	6.8	\$1,096	5722	254	22.5	16.9	95.9
17	Excalia	2 oz	6 lf	Broadcast	17.1	6.9	\$1,182	6160	270	21.2	17.9	96.0
11	Propulse	13.6 fl oz	At Plant	In-Fur	17.8	7.4	\$1,128	6011	262	22.7	17.4	95.9
15	Excalia	.64 fl oz	6 lf	Banded	18.6	7.3	\$1,234	6367	257	23.8	17.1	96.2
2	Quadris	10 fl oz	At Plant	In-Fur	18.6	6.9	\$1,232	6349	261	21.0	17.5	95.7
7	Proline 480 SC	5.7 fl oz	At Plant	In-Fur	19.8	7.3	\$1,152	5998	259	22.8	17.1	96.3
16	Excalia	.64 fl oz	6 lf	Banded	20.9	6.8	\$1,248	6518	256	21.1	17.1	95.9
	Quadris	14.25 fl oz	6 lf	Banded								
A٧	rerage				12 5	72	\$1 252	6564	267	23.4	17 7	96 1
					12.0	1.2	φ1,202	4055.0	207	20.4	0.0	00.1
	5D 5%				13.2	0.9	245.8	1255.6	15.5	n.s.	0.9	0.5
C\	/%				84.1	10.0	15.6	15.2	4.6	18.3	4.2	0.4

*Vigor 0 to 10 ratings, 10 is best.

Comments: Excalia is a new fungicide from Valent intended for foliar broadcast applications at 2 oz/A. Treatment 19 was designed to apply Quadris in-furrow followed by excalia broadcasted at 2 oz/A, however, it was applied in a 7 inch foliar band with 22 inch rows so the application was equivalent to a 6 oz/A broadcast rate. Rhizoctonia pressure was moderate.

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



Blumfield East, Richville, MI - 2021

Trial Quality: Fair Variety: SX-1278 Planted: April 22 Harvested: October 7 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 inches Soil Info: Clay Loam
% OM: 3.2 pH: 8.1 CEC: 18.0
P: Above Opt K: Above Opt
Mn: High B: Medium
Added N: 35 lbs. 2X2, 120 lbs. sidedress
Prev Crop: Wheat & Radish

Rhizoc Level: Low
Cerc Control: Good
Problems: Variable Stand
Seeding Rate: 4.5 in.
Rainfall: 15.7 in.
Beets/100 ft: 154

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

No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets/ 100 ft	Vigor* 3-Aug	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
17	Excalia	2 oz	6 lf	Broadcast	0.2	7.8	\$1,827	9995	280	35.8	18.3	96.7
11	Propulse	13.6 fl oz	At Plant	In-Fur	0.2	8.1	\$1,802	9990	279	35.8	18.3	96.4
14	Quadris	10 fl oz	At Plant	In-Fur	0.4	8.6	\$1,802	9946	276	36.1	18.1	96.6
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
6	Quadris	15.5 fl oz	18 lf	Banded	0.4	7.8	\$1,636	8965	266	33.6	17.6	96.3
1	Untreated Check				0.4	8.4	\$1,719	9067	266	35.1	17.4	96.6
2	Quadris	10 fl oz	At Plant	In-Fur	0.4	8.3	\$1,785	9695	271	35.7	17.8	96.6
13	Quadris	10 fl oz	At Plant	In-Fur	0.6	8.5	\$1,751	9735	274	35.6	18.0	96.3
	Topsin	20 fl oz	At Plant	In-Fur								
	Quadris	14.25 fl oz	6 lf	Banded								
	Topsin	20 fl oz	6 lf	Banded								
8	Proline 480 SC	5.7 fl oz	At Plant	In-Fur	1.1	8.0	\$1,788	9893	261	37.9	17.2	96.4
	Quadris	14.25 fl oz	6 lf	Banded								
18	Excalia	2 oz	6 lf	Broadcast	1.3	8.4	\$1,722	9520	268	35.5	17.6	96.6
	Quadris	15.5 fl oz	6 lf	Broadcast								
12	Quadris	10 fl oz	At Plant	In-Fur	1.5	8.1	\$1,797	9814	273	36.1	17.8	96.9
	Topsin	20 fl oz	At Plant	In-Fur								
10	Propulse	13.6 fl oz	At Plant	In-Fur	1.9	8.6	\$1,863	10442	276	37.9	18.0	96.7
	Quadris	14.25 fl oz	6 lf	Banded								
4	Quadris	10 fl oz	At Plant	In-Fur	1.9	8.1	\$1,731	9525	274	34.8	18.0	96.5
	Quadris		6 lf	Banded								
22	ADM.03509.F.3.B	12 fl oz	At Plant	In-Fur	2.2	8.3	\$1,790	9702	273	35.7	17.9	96.6
	ADM.03509.F.3.B	12 fl oz	6 lf	Banded								
16	Excalia	.64 oz	6 lf	Banded	2.8	8.8	\$1,767	9690	262	37.1	17.2	96.6
	Quadris	14.25 fl oz	6 lf	Banded								
3	Quadris	14.25 fl oz	6 lf	Banded	2.8	8.3	\$1,833	10021	272	36.9	17.8	96.6
9	Quadris	10 fl oz	At Plant	In-Fur	3.0	8.4	\$1,735	9531	278	34.4	18.2	96.6
	Serifel	4 oz	At Plant	In-Fur								

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

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



Blumfield East, Richville, MI - 2021

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No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets/ 100 ft	Vigor* 3-Aug	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
5	Quadris	15.5 fl oz	6 lf	Broadcast	3.9	8.3	\$1,828	9998	277	36.2	18.3	96.1
21	Minuet	12.8 fl oz	At Plant	In-Fur	4.1	8.8	\$1,785	10016	276	36.3	18.1	96.5
	Quadris	9.2 fl oz	At Plant	In-Fur								
	Proline 480 SC	5.7 fl oz	At Plant	In-Fur								
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
7	Proline 480 SC	5.7 fl oz	At Plant	In-Fur	4.3	8.5	\$1,807	9874	261	37.8	17.3	96.2
15	Excalia	.64 fl oz	6 lf	Banded	5.4	8.3	\$1,651	8984	261	34.6	17.0	96.9
20	Quadris	9.2 fl oz	At Plant	In-Fur	5.6	8.4	\$1,822	10166	275	37.1	17.9	96.8
	Proline 480 SC	5.7 fl oz	At Plant	In-Fur								
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
19	Quadris	14.25 fl oz	At Plant	In-Fur	9.9	8.0	\$1,708	9440	276	34.2	18.3	96.1
	Excalia	2 oz	6 lf	Banded								
Av	erade				25	83	\$1 770	9728	271	35.9	17.8	96 5
					2.5	0.0	φ1,770 044.0	1010 5	211	00.0		00.0
LS	D 5%				5.9	0.9	244.6	1316.5	14.8	n.s.	0.8	n.s.
C/	/%				167.2	7.3	9.8	9.6	3.9	10.1	3.4	0.6

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

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

Comments: Excalia is a new fungicide from Valent intended for foliar broadcast applications at 2 oz/a. Treatment 19 was designed to apply Quadris in-furrow followed by Excalia broadcasted at 2 oz/A, however, it was applied in a 7 inch foliar band with 22 inch rows so the application was equivalent to a 6 oz/A broadcast rate. Rhizoctonia pressure was low.



Blumfield East & Mennonite Church - 2021

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				Blumfie	eld East		Mennonite Church				
No.	Treatment	Applic Mothod	Stand I	B/100 ft	Dead E	3/100 ft	Stand	B/100 ft	Dead E	3/100 ft	
		Methou	6-May	8-Jun	24-Aug	15-Sep	14-May	7-Jun	23-Aug	14-Sep	
1	Untreated Check		68	162	2	0	171	193	17	14	
2	Quadris	In-Fur	49	138	4	0	141	175	20	19	
3	Quadris	Banded	63	168	0	3	172	205	10	7	
4	Quadris	In-Fur	43	138	0	2	142	175	11	8	
	Quadris	Banded									
5	Quadris	Broadcast	62	158	5	4	164	199	11	11	
6	Quadirs	Banded	44	147	4	0	174	208	18	15	
7	Proline 480 SC	In-Fur	51	161	2	4	136	185	21	20	
8	Proline 480 SC	In-Fur	53	160	2	1	157	199	7	7	
	Quadris	Banded									
9	Quadris + Serifel	In-Fur	45	146	1	3	156	188	7	7	
10	Propulse	In-Fur	64	169	3	2	137	183	14	12	
	Quadris	Banded									
11	Propulse	In-Fur	46	155	4	0	146	177	21	18	
12	Quadris + Topsin	In-Fur	54	159	4	2	154	194	12	10	
13	Quadris + Topsin	In-Fur	45	146	6	1	137	174	9	6	
	Quadris + Topsin	Banded									
14	Quadris	In-Fur	45	151	0	0	145	183	10	9	
	Proline 480 SC	Banded									
15	Excalia	Banded	58	166	4	5	165	204	17	19	
16	Excalia + Quadris	Banded	67	164	4	3	189	208	28	21	
17	Excalia	Broadcast	64	148	3	0	162	198	19	17	
18	Excalia + Quadris	Broadcast	50	150	1	1	179	208	14	14	
19	Quadris	In-Fur	43	141	6	10	145	181	13	10	
	Excalia	Banded									
20	Quadris + Proline 480 SC	In-Fur	41	149	5	6	122	177	11	11	
	Proline 480 SC	Banded									
21	Minuet + Quadris +	In-Fur	58	157	0	4	143	186	9	8	
	Proline 480 SC										
	Proline 480 SC	Banded									
22	ADM.03509.F.3.B	In-Fur	51	156	0	2	137	187	14	13	
	ADM.03509.F.3.B	Banded									
Av	rerage		53	154	3	2	153	190	14	12	
LS	5%		18.6	18.0	n.s.	5.9	28.0	20.9	14.3	13.2	
C\	/%		24.9	8.3	172.3	167.2	14.5	8.7	79.9	84.1	



Rhizoctonia Management

Crumbaugh Legacy Inc., Breckenridge - 2021

Trial Quality:	See comments	Soil Type:	Loam	Rhizoc Control:	See treatments.	
Variety:	See below	Fertilizer:	PPI: 30 gal 28%; 2x2: 41#-22#-0#-			
Planted:	April 18		4#S + Mn & B; Multiple foliar apps	Cerc Control:	Very Good control:	
Harv/Samp:	Oct 1 / Sept 27		boron Total N = 160#		See treatments	
Plot Size:	4 reps	Prev Crop:	Corn			
Row Spacing:	30 inch	Weather:	Dry early in spring, heavy	Other Pests:	Fusarium,	
Seeding Rate:	60,000		damaging rains late June. Good weather for rest of season.		Aphanomyces	

Variety	Quadris	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft.	Dead Beets /
,	Apps					Ŭ		44 Day	1200 Ft
B-1606N	Both	\$1,373	7112	252	28.3	17.0	95.2	—	26
B-1606N	IF	\$1,362	7057	250	28.2	16.9	95.2	225	173
B-1606N	Foliar	\$1,292	6696	246	27.1	16.7	95.2	—	175
B-1606N	None	\$1,050	5439	245	22.1	16.6	95.1	214	446
HIL-2238NT	Both	\$956	4955	241	20.5	16.4	95.2	—	253
HIL-2238NT	Foliar	\$862	4465	239	18.6	16.2	95.0	—	492
HIL-2238NT	IF	\$772	4001	237	16.7	16.2	95.3	218	612
HIL-2238NT	None	\$709	3676	239	15.3	16.3	95.0	224	843
Average		\$1,047	5425	243	22.1	16.5	95.2	220	377
LSD 5%		N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %		16.0	16.0	2.8	14.4	2.3	0.2	9.0	41.0
p-value		0.5159	0.5159	0.6403	0.4945	0.6987	0.6852	0.3987	0.5463

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 while HIL-2238NT is more susceptible to root diseases. Both varieties have good yield potential and have performed well in SBA variety trials when Rhizoctonia is not excessive. This field received excessive and damaging rains in the end of June. These rains contributed to extremely high levels 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, and are the best indicator of a treatment's performance in a Rhizoctonia trial. Very few fields in the growing area have this much Rhizoctonia pressure. In addition to high levels of Rhizoctonia, the field also had high levels of Aphanomyces and Fusarium, especially in the HIL-2238NT variety. The T-band in-furrow applications of Quadris were 6 oz/acre with 4 oz/acre of Mustang. The check treatments did not receive either Quadris or Mustang. The foliar applications were 10.5 oz/acre applied in a 7" band on June 7 at the 4-8 leaf stage. The leafspot program was as follows: 6/24 Inspire XT, 7/12 Tin, 7/26 Topguard, 8/13 Tin, 8/25 Proline, 9/10 Tin. All applications included an EBDC and either Reguard or MasterLock. 2021 is the second year this trial was conducted. To see the results from the first year, go to page 6 of the 2020 REACh Research Results book.

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

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

N.S. - not significant



Trial Quality: Fair	Soil Info: Clay Loam	Rhizoc Level: Moderate
Variety: SX-1278	% OM: 2.7 pH: 7.2 CEC: 10.9	Cerc Control: Good
Planted: April 27	P: Above Opt K: Opt	Problems: None
Harvested: September 29	Mn: High B: Low	Seeding Rate: 4.5 in
Plots: 6 row X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Rainfall: 10.42 in.
Row Spacing: 22 in.	Previous Crop: Soybeans	Beets/100 ft: 139
Application ID 2520 treater mounted plat aprove	r comprosed air 15.2 and Failer 7" hand	

Application: JD 3520 tractor mounted plot sprayer, compressed air, 15.3 gpa - Foilar 7" band Monosem 6-row Agronomy Planter, compressed air, 30 psi, 9 gpa - IF, 3.5" band

No.	Treatment	Rate	Applic Timing	Applic Date	Applic Method	Dead Beets/ 100	Vigor*	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			Ū			14-Sep	30-Jul						
5	Howler	1 lb	At Plant	27-Apr	In-Fur	11.0	7.0	\$792	4204	240	17.2	15.9	96.4
	Howler	2 lb	6 lf	11-Jun	Banded								
6	Quadris	10 fl oz	At Plant	27-Apr	In-Fur	11.4	7.4	\$900	4739	237	19.7	15.8	96.4
	Quadris	10 fl oz	6 lf	11-Jun	Banded								
2	Not Inoculated Check					14.9	7.1	\$801	4093	243	16.9	16.1	96.7
1	Inoculated Check					17.2	6.6	\$801	4093	232	17.2	15.6	96.0
3	Howler	1 lb	At Plant	27-Apr	In-Fur	17.9	6.9	\$760	3922	239	16.4	16.0	96.0
4	Howler	2 lb	6 lf	11-Jun	Banded	19.0	6.9	\$930	4868	251	19.4	16.6	96.4
A	/erage		15.2	7.0	\$831	4320	241	17.8	16.0	96.3			
LS	SD 5%		n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.			
C	V%					80.3	14.8	20.6	20.2	5.1	18.0	4.3	0.8

Vigor* 0 to 10 ratings, 10 is the best

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

Comments: Howler fungicide was evaluated for Rhizoctonia efficacy. All plots were inoculated with Rhizoctonia at planting, excluding the Non-Inoculated check treatment.

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



Trial Quality: FairSoil InfeVariety: SX-1278% ONPlanted: April 26P: AtHarvested: September 29Mn: IPlots: 6 rows X 38 ft, 4 repsAdded IRow Spacing: 22 in.PreviouApplication: JD 3520 tractor mounted plot spr Monosem 6-row Agronomy Planted					: Clay Lo : 2.7 pł ove Opt ligh B: l: 35 lbs. s Crop: S ayer, com r, compres	am I: 7.2 (K: Opt Low 2X2, 120 Soybeans pressed ssed air,	CEC: 10. 0 lbs. side s air, 15.3 (30 psi, 9	9 edress gpa - Fol gpa - IF,	iar 7" bar 3.5" bar	nd	Rhizod Cerc C Proble Seedir Rainfa Beets/	c Level Control ems: V ng Rate II: 10.4 100 ft:	: Modera : Good ariable S : 4.1 in. 42 in. 152	ate tand	
No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets /	Vigor* 0-10	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft		
_					100 ft	30-Jul							14-May	7-Jun	
5	Zironar	15 fl oz	At Plant	In-Fur	11.4	7.1	\$986	5138	248	20.7	16.5	96.4	132	153	
6	Quadris	10.5 fl oz	At Plant	In-Fur	12.5	6.9	\$862	4460	235	18.9	15.6	96.4	131	149	
3	Zironar	9 fl oz	At Plant	In-Fur	14.4	7.3	\$935	4837	243	19.7	16.0	96.9	142	169	
2	Not Inoculat	ed Check			14.9	7.1	\$801	4093	243	16.9	16.1	96.7	129	146	
1	Inoculated C	Check		17.2	6.6	\$801	4093	232	17.2	15.6	96.0	136	143		
4	Zironar	12 fl oz	In-Fur	22.0	6.8	\$781	4072	234	17.4	15.5	96.7	137	155		
A١	Average				15.4	7.0	\$861	4449	239	18.5	15.9	96.5	134	152	
LS	SD 5%			n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		

*Vigor 0 to 10 ratings, 10 is the best

CV%

Comments: Zironar is a biological product and was applied in-furrow at 9 fl oz, 12 fl oz and 15 fl oz to examine Rhizoctonia efficacy This trial was inoculated with Rhizoctonia at planting, excluding the Non-Inoculated check treatment.

23.4

23.2

4.4

20.3

3.9

0.7

12.9

11.5

11.2

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

86.6



Trial Quality: Fair

Variety: SX-1278

Planted: April 27

Row Spacing: 22 in.

Harvested: September 29

Plots: 6 rows X 38 ft, 4 reps

Vive Product Efficacy trial

Mennonite Church, Pigeon - 2021

Rhizoc Leve

% OM: 2.7 pH: 7.2 CEC: 10.9 Added N: 35 lbs. 2X2, 120 lbs. sidedress

el: High Cerc Control: Good Problems: Low Stand Seeding Rate: 4.1 in. Rainfall: 10.32 in. Beets/100 ft: 136

(Page 1 of 2)

Application: JD 3520 tractor mounted plot sprayer, compressed air, 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

P: Above Opt K: Opt

Mn: High B: Low

Previous Crop: Soybeans

No.	Treatment**	Rate/A	Applic	Vig 0-	or * 10	Net \$/A	RWSA	RWST	T/A	%	%
			Timing	16-Jun	30-Jul					SUC	CJP
4	Azteroid FC 3.3 + 6-24-6 + Midac	5.7 fl oz + 3 gal + 13.6 fl oz	IF	7.3	7.6	\$1,267	6636	265	25.0	17.6	95.9
3	Azteroid FC 3.3 + Midac	5.7 fl oz +13.6 fl oz	IF	7.0	7.3	\$1,088	5674	256	21.8	17.2	95.4
8	Azteroid FC 3.3 + 6-24-6 + Midac	5.7 fl oz + 3 gal + 13.6 fl oz	IF	6.8	7.3	\$1,065	5692	263	21.6	17.5	95.9
	VCP-028	11.9 fl oz	6 lf								
2	6-24-6 + Midac	3 gal + 13.6 fl oz	IF	6.8	7.1	\$1,023	5329	258	20.6	17.5	95.0
7	Azteroid FC 3.3 + Midac	5.7 fl oz + 13.6 fl oz	IF	6.6	7.4	\$995	5250	258	20.2	17.3	95.5
	VCP-028	11.9 fl oz	6 lf								
1	Untreated Check			6.6	7.4	\$1,140	5873	263	22.2	17.5	96.0
	Midac	13.6 fl oz	IF								
6	VCP-028 + 6-24-6 + Midac	11.9 fl oz + 3 gal + 13.6 fl oz	IF	6.6	7.4	\$1,080	5669	260	21.8	17.3	95.8
5	VCP-028 + Midac	11.9 fl oz + 13.6 fl oz	IF	6.3	7.6	\$1,179	6123	251	24.4	16.8	95.8
Av	rerage			6.7	7.4	\$1,105	5781	259	22.2	17.3	95.7
LS	SD 5%			n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.74	n.s.
C/	/%			20.0	6.5	27.5	26.9	3.9	23.9	2.9	0.7

*Vigor 0 to 10 ratings, 10 is the best

**Application dates for all treatments: In-Furrow - 4/27, 6 If - 6/11

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



Vive Product Efficacy Trial

Mennonite Church, Pigeon - 2021

(Page 2 of 2)

No.	Treatment**	Applic	Vig 0-	or * 10	B/10	00 ft	Dead B/100 ft		
		Timing	16-Jun	30-Jul	14-May	7-Jun	23-Aug	14-Sep	
4	Azteroid FC 3.3 + 6- 24-6 + Midac	IF	7.3	7.6	136	168	6	6	
3	Azteroid FC 3.3 + Midac	IF	7.0	7.3	137 173		11	16	
8	Azteroid FC 3.3 + 6- 24-6 + Midac	IF	6.8	7.3	119	119 150		10	
	VCP-028	6 lf							
2	6-24-6 + Midac	IF	6.8	7.1	153	176	16	20	
7	Azteroid FC 3.3 + Midac	IF	6.6	7.4	130	165	13	13	
	VCP-028	6 lf							
1	Untreated Check		6.6	7.4	126	154	10	14	
	Midac	IF							
6	VCP-028 + 6-24-6 + Midac	IF	6.6	7.4	136	165	16	14	
5	VCP-028 + Midac	IF	6.3	7.6	147	179	11	12	
Av	verage		6.7	7.4	136	166	12	13	
LS	SD 5%		n.s.	n.s.	n.s. 24.67		n.s.	n.s.	
C١	/%		20.0	6.5	16.4	10.1	77.9	82.0	

*Vigor 0 to 10 ratings, 10 is the best

**Application dates for all treatments: In-Furrow - 4/27, 6 If - 6/11

Comments: This trial was designed to test the safety of Vive products applied in-furrow, and efficacy of Vive products applied in-furrow and foliar.

\$/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.

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University

AgBio**Research**

Evaluation of in-furrow and banded fungicide applications to manage Rhizoctonia root and crown rot, 2021 Chris Bloomingdale and Jaime Willbur, Michigan State University

Location: Frankenmuth (SVREC)	Treatment Timings: In-Furrow & Banded (6-8 leaf stage)
Planting Dates: May 11, 2021	Pesticides: see table
Soil Type: Loam	O.M.: 5.0 pH: 7.5
Replicates: 4	Sugar Beet Variety: SX-2283

Summary: Significant Rhizoctonia root rot pressure was observed uniformly throughout the study. Treatments significantly impacted percent stand loss (P < 0.0001), and all fungicide programs had significantly lower stand loss than the inoculated control. Significant differences were also observed among root disease index ratings (P < 0.01) and yield (P < 0.05). Root rot pressure significantly limited yield potential, and treatment yields were considered relative to the non-inoculated, non-treated control.

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

No.	Treatment, Rate ^a	Application	Stand Loss	Disease Index	Yield (t/A)	Relative
		Type ^b	(%) ^c	(%) ^d		Yield $(\%)^e$
7	Elatus, 7.1 oz	In-Furrow	6.1 d	7.9 c	11.1 a-c	75.4
	Elatus, 7.1 oz	Banded				
10	Excalia, 2.0 fl oz	Banded	6.7 d	9.8 c	13.0 a-c	88.1
5	Quadris, 13.9 fl oz	In-Furrow	7.6 cd	7.3 c	16.7 a	113.2
	Quadris, 13.9 fl oz	Banded				
6	Quadris, 13.9 fl oz	In-Furrow	8.3 cd	12.4 c	17.9 a	121.0
	Elatus, 7.1 oz	Banded				
1	Non-Inoculated	-	9.8 cd	21.1 bc	14.8 ab	100.0
	Control ^f					
11	Quadris, 13.9 fl oz	In-Furrow	21.6 b-d	15.8 c	12.8 a-c	86.6
	Growthful, 1.0 pt	In-Furrow				
	Quadris, 13.9 fl oz	Banded				
	Growthful Post, 12.8	Banded				
	fl oz					
9	Quadris, 12.0 fl oz	Banded	31.8 bc	30.3 c	7.1 b-d	48.3
4	Minuet, 12.8 fl oz	In-Furrow	37.6 b	17.0 bc	6.1 cd	41.2
	Quadris, 9.2 fl oz	In-Furrow				
	Proline, 5.7 fl oz	Banded				
8	Quadris, 13.9 fl oz	In-Furrow	41.3 b	40.4 ab	10.7 a-c	72.4
	Proline, 5.7 fl oz	Banded				
3	Quadris, 9.2 fl oz	In-Furrow	42.6 b	22.3 bc	6.3 b-d	42.9
	Proline, 5.7 fl oz	Banded				
2	Inoculated Control ^f	-	75.1 a	56.6 a	1.1 d	7.5

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

^b In-furrow treatments were applied at planting (11 May), banded applications were applied at the 6-8 leaf stage (22 Jun). ^c Stand loss percentages calculated from initial stand counts collected Jul 20 and final dead beet counts collected Aug 17. Column values followed by the same letter were not significantly different based on Fisher's Protected LSD (α =0.05). ^d 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.

^e Relative yield estimated from mean yields for each treatment and the non-inoculated, non-treated control.

^fNon-treated control.



EER · BIG CHIEF Cercospora Leafspot - Blumfield West - Richville, MI - 2021 (Page 1 of 7)

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: B-1703, C-G675, B-197N	% OM: 3.5 pH: 7.8 CEC: 14.4	Problems: None
C-G021 & HIL-9865	P: Above Opt K: Above Opt	Seeding Rate: 4.1 in.
Planted: April 14	Mn: High B: Low	Rainfall: 16.04 in.
Harvested: October 11	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Beets/100 ft: 134
Plots: 6rows X 38 ft, 4 reps	Previous Crop: Wheat & Clover	
Row Spacing: 22 in.		

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

No	Treatment	Variety	# of	CLS* Rate	Net \$/A	RWSA	RWST	Τ/Δ	%	%
NO.	mouthern	Functy	Applic	7-Oct	Ποιψη	NH0A			SUC	CJP
3	More Aggressive	B-1703	6	4.1	\$1,149	8390	251	33.4	16.9	95.4
4	1st and 15th	B-1703	7	4.6	\$1,275	9474	249	37.9	16.9	95.2
5	Less Aggressive	B-1703	4	4.9	\$1,176	8189	230	35.7	16.1	94.0
2	Standard	B-1703	5	4.9	\$1,193	8447	240	35.1	16.7	94.1
1	Untreated	B-1703	0	7.5	\$1,174	7190	223	32.4	15.4	94.4
9	1st and 15th	C-G675	7	4.1	\$1,387	10191	240	42.4	16.2	95.5
10	Less Aggressive	C-G675	5	4.5	\$1,388	9641	237	40.6	16.7	93.5
8	More Aggressive	C-G675	7	5.2	\$1,242	9341	244	38.3	16.7	94.5
7	Standard	C-G675	6	5.3	\$1,111	8256	226	36.5	15.9	93.7
6	Untreated	C-G675	0	7.1	\$1,099	6729	214	31.4	15.0	94.2
20	Less Aggressive	B-197	6	5.5	\$1,064	7967	225	35.5	15.8	93.7
19	1st and 15th	B-197	7	5.6	\$1,227	9180	236	38.9	16.4	94.3
18	More Aggressive	B-197	8	5.9	\$1,108	8575	236	36.4	16.2	94.7
17	Standard	B-197	7	6.5	\$1,202	8903	230	38.6	16.1	93.7
16	Untreated	B-197	0	7.1	\$1,087	6656	211	31.6	14.9	93.6
23	More Aggressive	C-G021	4	3.4	\$1,502	10256	255	40.3	17.2	95.3
22	Standard	C-G021	4	3.4	\$1,462	9970	245	40.6	17.0	94.0
24	Less Aggressive Early	C-G021	2	3.6	\$1,600	10353	252	41.1	17.1	95.0
25	Less Aggressive Late	C-G021	2	4.4	\$1,512	9817	241	40.7	16.6	94.5
21	Untreated	C-G021	0	4.5	\$1,536	9402	248	38.0	16.9	94.9
14	1st and 15th	HIL-9865	7	4.1	\$1,196	8993	245	36.7	16.6	95.0
13	More Aggressive	HIL-9865	8	4.6	\$1,057	8256	240	34.4	16.5	94.7
15	Less Aggressive	HIL-9865	6	4.6	\$1,107	8231	238	34.5	16.5	94.2
12	Standard	HIL-9865	7	5.8	\$1,020	7791	233	33.6	16.2	94.0
11	Untreated	HIL-9865	0	6.9	\$1,174	7186	217	33.2	15.1	94.3
Av	erage			5.1	\$1,242	8695	236	36.7	16.3	94.4
LS	LSD 5%			0.5	208.7	1278.0	14.9	4.5	0.9	1.2
C٧	/ %			6.9	11.9	10.4	4.5	8.8	3.8	0.9

*Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

Comments: Sugarbeet varieties included in this trial were selected to represent a range of cercospora leafspot tolerance: B-197 (poor), HIL-9865 (fair +), C-G675 (good), B-1703 (good+), and C-G021 (excellent). These ratings were determined in the 2020 Official Variety Trials conducted by Michigan Sugar Company. C-G021 is a CR+ variety which has high genetic tolerance to cercospora leafspot and B-1703 is a non CR+ variety with high tolerance. C-G675 has good leafspot tolerance and HIL-9865 is rated fair+. B-197 is known to be susceptible to leafspot pressure. Fungicide programs included a range of management strategies from less aggressive to more aggressive. The standard treatment ranges from 4-7 applications depending on the variety.

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



Gercospora Leafspot - Blumfield West - Richville, MI - 2021

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RWSA															
Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	9402	1	0	7190	6	0	6729	11	0	7186	16	0	6656
Standard	22	4	9970	2	5	8447	7	6	8526	12	7	7791	17	7	8903
More Aggr	23	4	10256	3	6	8390	8	7	9341	13	8	8256	18	8	8575
1st & 15th	Х	Х	Х	4	7	9474	9	7	10191	14	7	8993	19	7	9180
Less Aggr	Х	Х	Х	5	4	8189	10	5	9641	15	6	8231	20	6	7967
Less Aggr Late	25	2	9817	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Less Aggr Early	24	2	10353	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
RWST															
Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	248	1	0	223	6	0	214	11	0	217	16	0	211
Standard	22	4	245	2	5	240	7	6	226	12	7	233	17	7	230
More Aggr	23	4	255	3	6	251	8	7	244	13	8	240	18	8	236
1st & 15th	Х	Х	Х	4	7	249	9	7	240	14	7	245	19	7	236
Less Aggr	Х	Х	Х	5	4	230	10	5	237	15	6	238	20	6	225
Less Aggr Late	25	2	241	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Less Aggr Early	24	2	252	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
					% Le	af Dama	age O	ctober	7th						
Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	4.5	1	0	7.5	6	0	7.1	11	0	6.9	16	0	7.1
Standard	22	4	3.4	2	5	4.9	7	6	5.3	12	7	5.8	17	7	6.5
More Aggr	23	4	3.4	3	6	4.1	8	7	5.2	13	8	4.6	18	8	5.9
1st & 15th	Х	Х	Х	4	7	4.6	9	7	4.1	14	7	4.1	19	7	5.6
Less Aggr	Х	Х	Х	5	4	4.9	10	5	4.5	15	6	4.6	20	6	5.5
Less Aggr Late	25	2	4.4	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Less Aggr Early	24	2	3.6	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х



Cercospora Leafspot - Answer Plot - Sebewaing, MI - 2021 (Page 3 of 7)

Trial Quality: Excellent	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: B-1703, C-G675, B-197N,	% OM: 4.2 pH: 7.4 CEC: 13.5	Problems: None
C-G021 & HIL-9865	P: Above Opt K: Above Opt	Seeding Rate: 4.1 in.
Planted: April 8	Mn: High B: Medium	Rainfall: 15.89 in.
Harvested: November 2	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Beets/100 ft: 172
Plots: 6 rows X 38 ft, 4 reps	Previous Crop: Alfalfa	
Row Spacing: 22 in.		

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

No	Treatment	Variety	# of	CLS* Rate	Net \$/A	RWSA	RWST	Τ/Δ	%	%
110.	noutmont	Farloty	Applic	18-Oct	Not wirt	INTO/A			SUC	CJP
2	Standard	B-1703	5	2.9	\$1,993	14058	259	54.3	17.2	96.1
3	More Aggressive	B-1703	6	3.1	\$1,973	14157	259	54.6	17.2	96.2
4	1st and 15th	B-1703	7	3.3	\$1,932	14223	262	54.2	17.4	96.2
5	Less Aggressive	B-1703	4	3.3	\$2,000	13941	260	53.7	17.2	96.1
1	Untreated	B-1703	0	6.3	\$1,858	11985	253	47.4	16.8	96.0
8	More Aggressive	C-G675	7	2.9	\$1,958	14461	260	55.7	17.2	96.1
7	Standard	C-G675	6	3.0	\$1,996	14406	265	54.3	17.5	96.2
9	1st and 15th	C-G675	7	3.1	\$1,820	13535	258	52.4	17.1	96.1
10	Less Aggressive	C-G675	5	3.4	\$1,913	13543	259	52.3	17.1	96.2
6	Untreated	C-G675	0	6.9	\$1,761	11360	246	46.2	16.4	95.8
18	More Aggressive	B-197	8	3.4	\$1,883	14032	256	54.8	17.0	96.1
17	Standard	B-197	7	3.5	\$1,871	13698	252	54.4	16.7	96.1
19	1st and 15th	B-197	7	3.8	\$1,851	13697	253	54.1	16.8	96.2
20	Less Aggressive	B-197	6	4.3	\$1,838	13388	252	53.2	16.7	96.2
16	Untreated	B-197	0	6.6	\$1,720	11096	244	45.4	16.3	96.0
22	Standard	C-G021	4	2.5	\$2,063	14384	260	55.4	17.2	96.2
23	More Aggressive	C-G021	4	2.6	\$2,050	14340	259	55.4	17.2	96.1
24	Less Aggessive Early	C-G021	2	3.3	\$2,106	14177	267	53.1	17.6	96.2
25	Less Aggessive Late	C-G021	2	3.5	\$2,056	13854	259	53.5	17.2	96.0
21	Untreated	C-G021	0	4.9	\$2,020	13030	255	50.9	17.0	96.1
12	Standard	HIL-9865	7	3.1	\$1,784	13138	271	48.5	17.7	96.6
15	Less Aggressive	HIL-9865	6	3.1	\$1,787	13061	272	48.1	17.8	96.8
13	More Aggressive	HIL-9865	8	3.2	\$1,741	13115	265	49.4	17.5	96.3
14	1st and 15th	HIL-9865	7	3.3	\$1,699	12719	268	47.5	17.6	96.5
11	Untreated	HIL-9865	0	6.3	\$1,516	9781	244	40.0	16.2	96.2
Av	erage			1.6	\$1,888	13327	258	51.6	17.1	96.2
LS	D 5%			0.8	131.4	847.9	8.7	2.7	0.5	0.5
C٧	′ %			37.6	4.9	4.5	2.4	3.8	2.0	0.4

*Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

Comments: Sugarbeet varieties included in this trial were selected to represent a range of cercospora leafspot tolerance: B-197 (poor), HIL-9865 (fair+), C-G675 (good), B-1703 (good+) and C-G021 (excellent). These ratings were determined in the 2020 Official Variety Trials conducted by Michigan Sugar Company. C-G021 is a CR+ variety which has high genetic tolerance to cercospora leafspot and B-1703 is a non CR+ variety with high tolerance. C-G675 has good leafspot tolerance and HIL-9865 is rated fair+. B-197 is known to be susceptible to leafspot pressure. Fungicide programs included a range of management strategies from less aggressive to more aggressive. The standard treatment ranges from 4-7 applications depending on the variety.

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



PIONEER · BIG CHIEF Cercospora Leafspot - Answer Plot - Sebewaing, MI - 2021 (Page 4 of 7)

RWSA															
Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	13030	1	0	11985	6	0	11360	11	0	9781	16	0	11096
Standard	22	4	14384	2	5	14058	7	6	14406	12	7	13138	17	7	13698
More Aggr	23	4	14340	3	6	14157	8	7	14461	13	8	13115	18	8	14032
1st & 15th	Х	Х	Х	4	7	14223	9	7	13535	14	7	12719	19	7	13697
Less Aggr	Х	Х	Х	5	4	13941	10	5	13543	15	6	13061	20	6	13388
Less Aggr Late	25	2	13854	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Less Aggr Early	24	2	14177	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
						R	WST								
Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197

	-			-			-			-					
Untreated	21	0	255	1	0	253	6	0	246	11	0	244	16	0	244
Standard	22	4	260	2	5	259	7	6	265	12	7	271	17	7	252
More Aggr	23	4	259	3	6	259	8	7	260	13	8	265	18	8	256
1st & 15th	Х	Х	Х	4	7	262	9	7	258	14	7	268	19	7	253
Less Aggr	Х	Х	Х	5	4	260	10	5	259	15	6	272	20	6	252
Less Aggr Late	25	2	259	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Less Aggr Early	24	2	267	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х

% Leaf Damage October 18th															
Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	179
Untreated	21	0	4.9	1	0	6.3	6	0	6.9	11	0	6.3	16	0	6.6
Standard	22	4	2.5	2	5	2.9	7	6	3.0	12	7	3.1	17	7	3.5
More Aggr	23	4	2.6	3	6	3.1	8	7	2.9	13	8	3.2	18	8	3.4
1st & 15th	Х	Х	Х	4	7	3.3	9	7	3.1	14	7	3.3	19	7	3.8
Less Aggr	Х	Х	Х	5	4	3.3	10	5	3.4	15	6	3.1	20	6	4.3
Less Aggr Late	25	2	3.5	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Less Aggr Early	24	2	3.3	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х



Cercospora Leafspot - Blumfield West & Answer Plot

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No			Ann	Doto/A	Blum	West	Ans	wer
NO.	Program	Treatment	Арр	Rate/A	Date	DSV	Date	DSV
1	UTC - B-1703							
2	Standard	EBDC*	А	1.6 qt	30-Jun	48	29-Jun	48
	B-1703	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	19-Jul	92	16-Jul	89
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	6-Aug	121	3-Aug	127
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	25-Aug	164	20-Aug	175
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	16-Sep	201	7-Sep	214
3	More Aggr	EBDC*	А	1.6 qt	30-Jun	48	29-Jun	48
	B-1703	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	16-Jul	86	19-Jul	94
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	2-Aug	116	4-Aug	129
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	18-Aug	148	23-Aug	184
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	3-Sep	181	8-Sep	216
		EBDC* + Copper*	F	1.6 qt + 2 pt	16-Sep	201	21-Sep	234
4	1st and 15th	EBDC*	А	1.6 qt	30-Jun	48	29-Jun	48
	B-1703	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	10-Jul	71	6-Jul	62
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	15-Jul	82	19-Jul	94
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	2-Aug	116	2-Aug	125
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	16-Aug	145	16-Aug	164
		EBDC* + Copper*	F	1.6 qt + 2 pt	31-Aug	180	1-Sep	209
		Priaxor + Copper*	G	8 fl oz + 2 pt	16-Sep	201	17-Sep	230
5	Less Aggr	Proline + EBDC*	А	5.7 fl oz + 1.6 qt	30-Jun	48	29-Jun	48
	B-1703	Super Tin + Topsin + EBDC*	В	8 fl oz + 20 fl oz + 1.6 qt	22-Jul	95	19-Jul	94
		Inspire XT + EBDC*	С	7 fl oz + 1.6 qt	13-Aug	142	9-Aug	145
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	3-Sep	181	31-Aug	208
6	UTC - C-675							
7	Standard	EBDC*	А	1.6 qt	30-Jun	48	29-Jul	48
	C-675	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	16-Jul	86	19-Jul	94
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	2-Aug	116	4-Aug	129
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	18-Aug	148	20-Aug	175
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	3-Sep	181	3-Sep	209
		Priaxor + Copper*	F	8 fl oz + 2 pt	16-Sep	201	17-Sep	230
8	More Aggr	EBDC*	А	1.6 qt	30-Jun	48	29-Jun	48
	C-675	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	15-Jul	82	12-Jul	75
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	28-Jul	108	26-Jul**	109
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	13-Aug	142	23-Aug	184
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	31-Aug	180	7-Sep	214
		Priaxor + EBDC*	F	8 fl oz + 1.6 qt	16-Sep	201	21-Sep	234
		EBDC* + Copper*	G	1.6 qt + 2 pt	1-Oct	217		

* EBDC = Manzate / Copper = Badge

***All Treatments included MasterLock @ 6.4 fl oz

** Sprayed twice Trt 8, Trt 12 and Trt 17 (C Timing), second application was applied on 8/9/2021. Answer Plot only.



Cercospora Leafspot - Blumfield West & Answer Plot

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Ne	D	T ue of us out \$***	A 10 10		Blum	West	Gru	ehn
NO.	Program	Treatment	Арр	Rate/A	Date	DSV	Date	DSV
9	1st and 15th	EBDC*	Α	1.6 qt	30-Jun	48	29-Jun	48
	C-675	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	10-Jul	71	6-Jul	62
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	15-Jul	82	19-Jul	94
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	2-Aug	116	2-Aug	125
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	16-Aug	145	16-Aug	164
		EBDC* + Copper*	F	1.6 qt + 2 pt	31-Aug	180	1-Sep	209
		Priaxor + EBDC*	F	8 fl oz + 1.6 qt	16-Sep	201	17-Sep	230
10	Less Aggr	Proline + EBDC*	А	5.7 fl oz + 1.6 qt	30-Jun	48	29-Jun	48
	C-675	Super Tin + Topsin + EBDC*	В	8 fl oz + 20 fl oz + 1.6 qt	16-Jul	86	19-Jul	94
		Inspire XT + EBDC*	С	7 fl oz + 1.6 qt	2-Aug	116	4-Aug	129
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	18-Aug	148	20-Aug	175
		EBDC*	Е	1.6 qt	3-Sep	181	3-Sep	209
11	UTC - HIL-9865							
12	Standard	EBDC*	А	1.6 qt	30-Jun	48	29-Jul	48
	HIL-9865	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	15-Jul	82	12-Jul	75
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	28-Jul	108	26-Jul**	109
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	13-Aug	142	23-Aug	184
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	31-Aug	180	7-Sep	214
		EBDC*	F	1.6 qt	16-Sep	201	21-Sep	234
		Priaxor + Copper*	G	8 fl oz + 2 pt	1-Oct	217		
13	More Aggr	EBDC*	А	1.6 qt	30-Jun	48	29-Jun	48
	HIL-9865	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	16-Jul	86	12-Jul	75
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	28-Jul	108	22-Jul	99
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	9-Aug	130	3-Aug	127
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	20-Aug	152	16-Aug	164
		EBDC* + Copper*	F	1.6 qt + 2 pt	3-Sep	181	1-Sep	209
		Priaxor + Copper*	G	8 fl oz + 2 pt	16-Sep	201	17-Sep	230
		Copper*	Н	2 pt	1-Oct	217		
14	1st and 15th	EBDC*	A	1.6 qt	30-Jun	48	29-Jun	48
	HIL-9865	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	10-Jul	71	6-Jul	62
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	15-Jul	82	15-Jul	85
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	2-Aug	142	2-Aug	125
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	16-Aug	145	16-Aug	164
		EBDC* + Copper*	F	1.6 qt + 2 pt	31-Aug	180	1-Sep	209
		Priaxor + Copper*	G	8 fl oz + 2 pt	16-Sep	201	17-Sep	230
15	Less Aggr	Proline + EBDC*	Α	5.7 fl oz + 1.6 qt	30-Jun	48	29-Jun	48
	HIL-9865	Super Tin + Topsin + EBDC*	В	8 fl oz + 20 fl oz + 1.6 qt	16-Jul	86	19-Jul	94
		Inspire XT + EBDC*	С	7 fl oz + 1.6 qt	2-Aug	116	4-Aug	129
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	18-Aug	148	20-Aug	175
		Priaxor + Copper*	Е	8 fl oz + 2 pt	3-Sep	181	3-Sep	209
		EBDC*	F	1.6 qt	16-Sep	201	17-Sep	230

* EBDC = Manzate / Copper = Badge

***All Treatments included MasterLock @ 6.4 fl oz

** Sprayed twice Trt 8, Trt 12 and Trt 17 (C Timing), second application was applied on 8/9/2021. Answer Plot only.



Cercospora Leafspot - Blumfield West & Answer Plot

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No	Program	Troatmont***	Ann	Pato/A	Blum	West	Grue	ehn
NU.	Flogram	meatment	Abb		Date	DSV	Date	DSV
16	UTC - B197N							
17	Standard	EBDC*	А	1.6 qt	30-Jun	48	29-Jun	48
	B-197N	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	15-Jul	82	12-Jul	75
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	28-Jul	108	26-Jul**	109
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	13-Aug	142	23-Aug	184
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	31-Aug	180	7-Sep	214
		EBDC*	F	1.6 qt	16-Sep	201	21-Sep	234
		Priaxor + Copper*	G	8 fl oz + 2 pt	1-Oct	217		
18	More Aggr	EBDC*	Α	1.6 qt	30-Jun	48	29-Jun	48
	B-197N	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	16-Jul	82	12-Jul	75
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	28-Jul	108	22-Jul	99
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	9-Aug	130	3-Aug	127
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	20-Aug	152	16-Aug	164
		EBDC* + Copper*	F	1.6 qt + 2 pt	3-Sep	181	1-Sep	209
		Priaxor + Copper*	G	8 fl oz + 2 pt	16-Sep	201	17-Sep	230
		Copper*	Н	2 pt	1-Oct	217		
19	1st and 15th	EBDC*	Α	1.6 qt	30-Jun	48	29-Jun	48
	B-197N	Proline + EBDC*	В	5.7 fl oz + 1.6 qt	10-Jul	71	6-Jul	62
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	15-Jul	82	15-Jul	85
		Inspire XT + EBDC*	D	7 fl oz + 1.6 qt	2-Aug	116	2-Aug	125
		Super Tin + EBDC*	Е	8 fl oz + 1.6 qt	16-Aug	145	16-Aug	164
		Priaxor + Copper*	F	8 fl oz + 2 pt	31-Aug	180	1-Sep	209
		EBDC*	G	1.6 qt	16-Sep	201	17-Sep	230
20	Less Aggr	Proline + EBDC*	А	5.7 fl oz + 1.6 qt	30-Jun	48	29-Jun	48
		Super Tin + Topsin + EBDC*	В	8 fl oz + 20 fl oz + 1.6 qt	16-Jul	82	19-Jul	94
		Inspire XT + EBDC*	С	7 fl oz + 1.6 qt	2-Aug	116	4-Aug	129
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	18-Aug	148	20-Aug	175
		Priaxor + Copper*	Е	8 fl oz + 2 pt	3-Sep	181	3-Sep	209
		EBDC*	F	1.6 qt	16-Sep	201	17-Sep	230
21	UTC - C-G021							
22	Standard	EBDC*	А	1.6 qt	30-Jun	48	29-Jun	48
	C-G021	Delaro + Proline + EBDC*	В	11 fl oz + 1.6 fl oz + 1.6 qt	10-Jul	71	6-Jul	62
		Super Tin + Topsin + EBDC*	С	8 fl oz + 20 fl oz + 1.6 qt	2-Aug	116	2-Aug	125
		Provysol + EBDC*	D	5 fl oz + 1.6 qt	31-Aug	180	1-Sep	209
23	More Aggr	Delaro + Proline + EBDC*	А	11 fl oz + 1.6 fl oz + 1.6 qt	1-Jul	51	1-Jul	54
	C-G021	Super Tin + Topsin + EBDC*	В	8 fl oz + 20 fl oz + 1.6 qt	22-Jul	95	22-Jul	99
		Provysol + EBDC*	С	5 fl oz + 1.6 qt	13-Aug	142	13-Aug	158
		Super Tin + EBDC*	D	8 fl oz + 1.6 qt	3-Sep	181	3-Sep	209
24	Less Aggr Early	Delaro + Proline + EBDC*	А	11 fl oz + 1.6 fl oz + 1.6 qt	10-Jul	71	6-Jul	62
	C-G021	Super Tin + Topsin + EBDC*	В	8 fl oz + 20 fl oz + 1.6 qt	9-Aug	130	9-Aug	145
25	Less Aggr Late	Delaro + Proline + EBDC*	А	11 fl oz + 1.6 fl oz + 1.6 qt	19-Jul	92	19-Jul	94
	C-G021	Super Tin + Topsin + EBDC*	В	8 fl oz + 20 fl oz + 1.6 qt	31-Aug	180	31-Aug	208

* EBDC = Manzate / Copper = Badge

***All Treatments included MasterLock @ 6.4 fl oz

** Sprayed twice Trt 8, Trt 12 and Trt 17 (C Timing), second application was applied on 8/9/2021. Answer Plot only.



MICHIGAN SUGAR Blumfield West, Richville, MI - 2021

Tri Va Pla	al Quality: Good riety: BTS-197N anted: April 14		Soil Info: Cla % OM: 3. P: Above	ay Loam 3 pH: Opt K:	7.8 CEC Above C	: 13.1 Opt	Rhizoc Problem Seeding	Level: ns: Nor g Rate:	Low ne 4.1 in .	
На	rvested: October 1	11 4 ropo		B: L0	W 2 120 lbc	sidadrass	Rainfall	16.04	IN. 20	
Ro	Sis. 010ws A 30 II	, 4 ieps	Previous Cro	n: Whe	e, 120103	/er	Deels/ I	00 II. 1	20	
Δn	plication: JD 3520	tractor mounted	l plot spraver	compres	sed air 1	00 nsi 25 a	na			
, .h.			pier oprayer,		ood all, I	ee pei, ze gi				
No.	Treatment**	Rate/A	Applic Timing	Rate 7-Oct	Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
13	EBDC*	1.6 qt	A, C, E	6.9	\$1,187	7574	228	33.3	15.8	94.2
	EBDC*	1.6 qt	B, D							
	Delaro	11 fl oz	B, D							
26	Proline	1.6 fl 0Z	B, D	6.0	¢4 460	7502	222	22.6	15 C	027
20	EBDC*	1.0 qt		0.9	\$1,102	7503	222	33.0	15.0	93.7
	Recev	8.5 fl.oz	B, D							
	Tonsin	20 fl oz	B D							
17	EBDC*	1.6 at	A, C, E	7.0	\$1.081	7156	225	31.7	15.8	93.9
	EBDC*	1.6 at	B. D		<i>••••••</i>			•		
	Priaxor	8 fl oz	B, D							
	Topsin	20 fl oz	B, D							
8	EBDC*	1.6 qt	A, C, E	7.0	\$978	6481	220	29.4	15.5	93.7
	EBDC*	1.6 qt	B, D							
	Priaxor	8 fl oz	B, D		· · ·					
20	EBDC*	1.6 qt	A, C, E	7.0	\$1,076	7166	219	32.5	15.2	94.6
	EBDC [*]	1.6 qt	B, D							
	Delaro Complete	16floz	B, D B D							
15	FRDC*	1.6 at	ACE	71	\$1 241	7705	219	35.2	15.2	94 5
15	EBDC*	1.6 gt	B D	1 1.1	Ψ1,241	1105	213	55.2	15.2	34.5
	Dexter Max	2.1 lb	B. D							
14	EBDC*	1.6 qt	Á, C, E	7.1	\$1,205	7564	214	35.5	15.4	92.7
	EBDC*	1.6 qt	B, D							
	Lucento	5.5 fl oz	B, D							
12	EBDC*	1.6 qt	A, C, E	7.1	\$1,129	7507	227	33.1	15.5	95.0
	EBDC*	1.6 qt	B, D							
4	Propulse	13.3 fl OZ	B, D		A 4 AAT				10.1	
4	EBDC*	1.0 qt	A, C, E	7.1	\$1,085	7180	232	30.9	16.1	94.3
	EBDC	1.0 qt 14 fl oz	B, D B D							
2	FBDC*	1 6 at	B, D	71	\$1 215	7634	228	33 5	15.8	9/3
~	EBDC*	1.6 gt	<u> </u>	1 1.1	ψ1,215	7034	220	55.5	15.0	34.5
	Inspire XT	7 fl oz	B, D							
19	EBDC*	1.6 qt	A - E	7.1	\$1,265	7725	219	35.3	15.4	93.7
21	EBDC*	1.6 qt	A, C, E	7.2	\$1,234	7719	222	34.8	15.4	94.2
	EBDC*	1.6 qt	B, D							
	Luna Flex	13.7 fl oz	B, D							
6	EBDC*	1.6 qt	A, C, E	7.2	\$1,182	7453	225	33.1	15.6	94.2
	EBDC*	1.6 qt	B, D							
	Minerva	13 fl oz	B, D							

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

*** Cercospora Rate (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

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



Blumfield West, Richville, MI - 2021

(Page 2 of 6)

			Applic	CLS***					%	%
No.	Treatment**	Rate/A	Timing	Rate 7-Oct	Net \$/A	RWSA	RWST	T/A	Suc	CJP
24	EBDC*	1.6 qt	A, C, E	7.2	\$1,145	7060	221	32.0	15.6	93.6
	EBDC*	1.6 qt	B, D							
	ADM.3500.F.2.B	5.7 fl oz	B, D							
7	EBDC*	1.6 qt	A, C, E	7.2	\$1,140	7308	211	34.6	14.9	93.7
	EBDC*	1.6 qt	B, D							
	Provysol	5 fl oz	B, D							
11	EBDC*	1.6 qt	A, C, E	7.3	\$1,012	6558	225	29.1	15.7	94.1
	EBDC*	1.6 qt	B, D							
	Minerva Duo	16 fl oz	B, D							
10	EBDC*	1.6 qt	A, C, E	7.3	\$1,184	7445	221	33.6	15.3	94.6
	EBDC*	1.6 qt	B, D							
	Super Tin	8 fl oz	B, D							
	Topsin	20 fl oz	B, D							
23	EBDC*	1.6 qt	A, C, E	7.3	\$935	6059	217	27.8	15.5	93.1
	EBDC*	1.6 qt	B, D							
	Bravo	2.5 pt	B, D							
25	EBDC*	1.6 qt	A, C, E	7.3	\$1,176	7232	226	31.9	15.5	94.7
	EBDC*	1.6 qt	B, D							
	ADM.03509.F.3.B	12 fl oz	B, D							
16	EBDC*	1.6 qt	A, C, E	7.3	\$1,047	6626	225	29.4	15.6	94.3
	EBDC*	1.6 qt	B, D							
	Copper*	2 pt	B, D							
3	EBDC*	1.6 qt	A, C, E	7.3	\$1,190	7552	225	33.5	15.6	94.5
	EBDC*	1.6 qt	B, D							
	Proline	5.7 fl oz	B, D							
9	EBDC*	1.6 qt	A, C, E	7.3	\$1,263	7782	225	34.6	15.8	93.6
	EBDC*	1.6 qt	B, D							
	Super Tin	8 fl oz	B, D							
5	EBDC*	1.6 qt	A, C, E	7.4	\$1,183	7442	217	34.4	15.4	93.4
	EBDC*	1.6 qt	B, D							
	Enable	8 fl oz	B, D							
22	EBDC*	1.6 qt	A, C, E	7.4	\$1,146	7310	220	33.5	15.3	94.1
	EBDC*	1.6 qt	B, D							
	Regev	8.5 fl oz	B, D							
18	EBDC*	1.6 qt	A, C, E	7.4	\$965	6361	213	29.8	15.1	93.7
	EBDC*	1.6 qt	B, D							
	Veltyma	10 fl oz	B, D							
1	Untreated Check			7.6	\$972	5400	209	25.9	14.8	93.8
Av	erage			7.2	\$1,131	7173	221	32.4	15.5	94.0
LS	D 5%			0.5	242.6	1347.1	13.1	5.4	0.7	1.5
C∖	/ %			5.2	15.2	13.3	4.2	11.9	3.4	1.1

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

*** Cercospora Rate (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

Comments: This trial evaluated the efficacy of various fungicides for management of cercospora leafspot.

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



er · Big Chief Answer Plot, Sebewaing, MI - 2021

Tri Va Pla Ha Plo Ro Ap	ial Quality: Excellen riety: BTS-197N anted: April 8 invested: October 19 ots: 6 rows X 38 ft, 4 ow Spacing: 22 inche oplication: JD 3520 tr	t reps es actor mounted	Soil Info: Cla % OM: 4. P: Above Mn: High Added N: 35 Previous Cro plot sprayer,	ay Loam 2 pH: Opt K: B: Mec 5 lbs. 2X2 op: Alfal compres	7.4 CEC Above O dium 2, 120 lbs fa ssed air, 1	: 13.5 pt . sidedress 100 psi, 25 gj	Problems: None Seeding Rate: 4.1 in Rainfall: 15.25 in. Beets/100 ft: 180				
No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% Suc	% CJP	
13	EBDC* EBDC* Delaro Proline	1.6 qt 1.6 qt 11 fl oz 1.6 fl oz	A, C, E B, D B, D B, D B, D	3.8	\$1,713	11144	234	47.6	16.8	92.4	
14	EBDC* EBDC* Lucento	1.6 qt 1.6 qt 5.5 fl oz	A, C, E B, D B, D	3.8	\$1,727	11107	228	48.9	16.7	91.7	
18	EBDC* EBDC* Veltyma	1.6 qt 1.6 qt 10 fl oz	A, C, E B, D B, D	4.0	\$1,665	10880	230	47.3	16.3	93.2	
15	EBDC* EBDC* Dexter Max	1.6 qt 1.6 qt 2.1 lb	A, C, E B, D B, D	4.0	\$1,670	10706	233	46.0	16.6	92.9	
23	EBDC* EBDC* Bravo	<u>1.6 qt</u> 1.6 qt 2.5 pt	A, C, E B, D B, D	4.0	\$1,705	10974	230	47.6	16.7	92.2	
8	EBDC* EBDC* Priaxor	<u>1.6 qt</u> 1.6 qt 8 fl oz	A, C, E B, D B, D	4.1	\$1,591	10496	222	47.4	16.2	91.8	
10	EBDC* EBDC* Super Tin Topsin	1.6 qt 1.6 qt 8 fl oz 20 fl oz	A, C, E B, D B, D B, D B, D	4.2	\$1,722	11078	225	49.3	16.4	92.1	
12	EBDC* EBDC* Propulse	1.6 qt 1.6 qt 13.6 fl oz	A, C, E B, D B, D	4.2	\$1,641	10991	234	47.0	16.8	92.5	
3	EBDC* EBDC* Proline	1.6 qt 1.6 qt 5.7 fl oz	A, C, E B, D B, D	4.2	\$1,667	10832	236	46.0	16.7	93.2	
20	EBDC* EBDC* Delaro Complete Proline	1.6 qt 1.6 qt 11 fl oz 1.6 fl oz	A, C, E B, D B, D B, D	4.2	\$1,646	10969	228	48.3	16.2	92.9	
22	EBDC* EBDC* Regev	1.6 qt 1.6 qt 8.5 fl oz	A, C, E B, D B, D	4.2	\$1,671	10858	230	47.2	16.7	92.1	
11	EBDC* EBDC* Minerva Duo	1.6 qt 1.6 qt 16 fl oz	A, C, E B, D B, D	4.3	\$1,770	11432	233	49.0	16.7	92.8	

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

*** Cercospora Rate (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

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



Answer Plot, Sebewaing, MI - 2021

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No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
7	EBDC*	1.6 qt	A, C, E	4.3	\$1,703	11079	227	48.7	16.4	92.5
	EBDC*	1.6 qt	B, D							
	Provysol	5 fl oz	B, D							
19	EBDC*	1.6 qt	A - E	4.3	\$1,726	10923	232	47.1	16.4	93.2
4	EBDC*	1.6 qt	A, C, E	4.3	\$1,768	11652	236	49.3	16.8	92.9
	EBDC*	1.6 qt	B, D							
	Topguard	14 fl oz	B, D							
24	EBDC*	1.6 qt	A, C, E	4.4	\$1,669	10585	225	47.2	16.4	91.9
	EBDC*	1.6 qt	B, D							
	ADM.3500.F.2.B	5.7 fl oz	B, D							
17	EBDC*	1.6 qt	A, C, E	4.4	\$1,753	11561	233	49.6	16.7	92.7
	EBDC*	1.6 qt	B, D							
	Priaxor	8 fl oz	B, D							
	Topsin	20 fl oz	B, D							
25	EBDC*	1.6 qt	A, C, E	4.4	\$1,763	11136	230	48.4	16.6	92.3
	EBDC*	1.6 qt	B, D							
	ADM.035093F.3	12 fl oz	B, D							
21	EBDC*	1.6 qt	A, C, E	4.5	\$1,802	11545	234	49.4	16.8	92.5
	EBDC*	1.6 qt	B, D							
	Luna Flex	13.7 fl oz	B, D							
6	EBDC*	1.6 qt	A, C, E	4.6	\$1,769	11369	229	49.6	16.5	92.4
	EBDC*	1.6 qt	B, D							
	Minerva	13 fl oz	B, D							
5	EBDC*	1.6 qt	A, C, E	4.7	\$1,694	10917	223	48.9	16.4	91.7
	EBDC*	1.6 qt	B, D							
	Enable	8 fl oz	B, D							
9	EBDC*	1.6 qt	A, C, E	4.7	\$1,696	10811	231	46.7	16.5	92.9
	EBDC*	1.6 qt	B, D							
	Super Tin	8 fl oz	B, D							
2	EBDC*	1.6 qt	A, C, E	4.9	\$1,610	10438	226	46.1	16.5	92.0
	EBDC*	1.6 qt	B, D							
	Inspire XT	7 fl oz	B, D							
16	EBDC*	1.6 qt	A, C, E	4.9	\$1,506	9737	230	42.4	16.5	92.5
	EBDC*	1.6 qt	B, D							
	Copper*	2 pt	B, D							
1	Untreated Check			7.1	\$1,574	9280	219	42.3	15.7	93.0
Δ١	erage			44	\$1 689	10900	230	47 5	16.5	92.5
	D 5%			 0 0	172 0	1014 4	12.8	43	0.7	13
	/%			14.3	72	66	4.0	4.5 6.4	2.8	1.0
	/0			14.0	ے. ۱	0.0	т.0	0.4	2.0	1.0

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

*** Cercospora Rate (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

Comments: This trial evaluated the efficacy of various fungicides for management of cercospora leafspot.

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



PIONEER · BIG CHIEF Blumfield West, Richville & Answer Plot, Sebewaing

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No.	Treatment**	Application	Blumfield West	Answer Plot
		Timing	Date	Date
1	Untreated Check			
2	EBDC*	A, C, E	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Inspire XT	B, D	7/14, 8/18	7/14, 8/18
3	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Proline	B, D	7/14, 8/18	7/14, 8/18
4	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Topguard	B, D	7/14, 8/18	7/14, 8/18
5	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Enable	B, D	7/14, 8/18	7/14, 8/18
6	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Minerva	B, D	7/14, 8/18	7/14, 8/18
7	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Provysol	B, D	7/14, 8/18	7/14, 8/18
8	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Priaxor	B, D	7/14, 8/18	7/14, 8/18
9	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Super Tin	B, D	7/14, 8/18	7/14, 8/18
10	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Super Tin + Topsin	B, D	7/14, 8/18	7/14, 8/18
11	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Minerva Duo	B, D	7/14, 8/18	7/14, 8/18
12	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Propulse	B, D	7/14, 8/18	7/14, 8/18
13	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Delaro + Proline	B, D	7/14, 8/18	7/14, 8/18
14	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Lucento	B, D	7/14, 8/18	7/14, 8/18
15	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Dexter Max	B, D	7/14, 8/18	7/14, 8/18
16	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Copper*	B, D	7/14, 8/18	7/14, 8/18
17	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Priaxor + Topsin	B, D	7/14, 8/18	7/14, 8/18
18	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Veltyma	B, D	7/14, 8/18	7/14, 8/18
19	EBDC*	A - E	6/30, 7/14, 8/4, 8/18, 9/10	6/28, 7/14, 8/4, 8/18, 9/8
20	EBDC*	A, C, D	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC * Delaro Complete +	B, D	7/14, 8/18	7/14, 8/18
	Proline	B, D		

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

PIONEER · BIG CHIEF MICHIGAN SUGAR

Cercospora Fungicide Efficacy

Blumfield West, Richville & Answer Plot, Sebewaing

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No	Troatmont**	Application	Blumfield West	Answer Plot
NO.	Treatment	Timing	Date	Date
21	EBDC*	A, C, E	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Luna Flex	B, D	7/14, 8/18	7/14, 8/18
22	EBDC*	A, C, E	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Regev	B, D	7/14, 8/18	7/14, 8/18
23	EBDC*	A, C, E	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Bravo	B, D	7/14, 8/18	7/14, 8/18
24	EBDC*	A, C, E	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + ADM.3500.F.2.B	B, D	7/14, 8/18	7/14, 8/18
25	EBDC*	A, C, E	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + ADM.03509.F.3.B	B, D	7/14, 8/18	7/14, 8/18
26	EBDC*	A, C, E	6/30, 8/4, 9/10	6/28, 8/4, 9/8
	EBDC* + Regev + Topsin	B, D	7/14, 8/18	7/14, 8/18

* EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz



🖁 Answer Plot, Sebewaing - 2021

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low							
Variety: BTS - 197	% OM: 4.2 pH: 7.4 CEC: 13.5	Problems: None							
Planted: April 8	P: Above Opt K: Above Opt	Seeding Rate: 4.1 in.							
Harvested: October 19	Mn: High B: Medium	Rainfall: 15.25 in.							
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Beets/100 ft: 169							
Row Spacing: 22 in.	Previous Crop: Alfalfa								
Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa									

No.	Treatment**	Rate/A	Applic Timing** *	Rate 0-9 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
2	EBDC*	1.6 qt	А	3.8	\$1,629	11019	226	48.8	16.1	92.9
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	В		. ,					
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Provysol + EBDC*	5 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	F							
6	EBDC*	1.6 qt	А	3.9	\$1,693	11431	229	50.0	16.6	92.0
	Topguard + EBDC*	14 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Enable + EBDC*	8 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	Е							
	Minerva + EBDC*	13 fl oz + 1.6 qt	F							
13	EBDC*	1.6 qt	Α	4.1	\$1,686	11420	232	49.3	16.3	93.5
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	С							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	F							
12	EBDC*	1.6 qt	А	4.1	\$1,596	10999	231	47.6	16.4	93.3
	Delaro + Proline + EBDC* + N. Demand + Boron	11 fl oz + 1.6 fl oz + 1.6 qt + 1 gal + 1 qt	В	4.1						
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Provysol + EBDC* + N. Demand + Boron	5 fl oz + 1.6 qt + 1 gal + 1 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	Е							
	Inspire XT + EBDC* + N. Demand + Boron	7 fl oz + 1.6 qt + 1 gal + 1 qt	F							

*EBDC = Manzate

**All treatments included MasterLock @ 6.4 fl oz

***Application dates for all treatments: A - 6/29, B - 7/12, C - 7/26, D - 8/9, E - 8/23, F - 9/7

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = very few spots, 5 = up to 25% injury, and 9 = leaves completely dead.

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



Answer Plot, Sebewaing - 2021

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No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
5	EBDC*	1.6 qt	А	4.3	\$1,595	10801	227	47.6	16.3	92.6
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	F							
9	Topguard + EBDC*	14 fl oz + 1.6 qt	В	4.3	\$1,589	10816	226	47.8	16.1	93.1
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Enable + EBDC*	8 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Eminent + EBDC*	13 fl oz + 1.6 qt	F							
7	EBDC*	1.6 qt	А	4.3	\$1,643	11274	229	49.2	16.4	92.9
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	D							
	Badge + EBDC*	2 pt + 1.6 qt	Е							
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	F							
3	EBDC*	1.6 qt	А	4.4	\$1,639	11079	228	48.6	16.5	92.3
	Inspire XT + EBDC*	7 f oz + 1.6 qt	В							
-	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Provysol + EBDC*	5 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	Е							
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	F							

*EBDC = Manzate

**All treatments included MasterLock @ 6.4 fl oz

***Application dates for all treatments: A - 6/29, B - 7/12, C - 7/26, D - 8/9, E - 8/23, F - 9/7

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = very few spots, 5 = up to 25% injury, and 9 = leaves completely dead.

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



Answer Plot, Sebewaing - 2021

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			A	CLS****						
No	Treatment**	Rate/A	Applic	Rate	Net \$/A	RWSA	RWST	T/A	%	%
NO.	incutiinciit	NutorA	***	0-9	Νουψη	RIIGA			SUC	CJP
8	EBDC*	1.6.at	Α		\$1.532	10640	227	46 9	16.3	92 5
Ŭ	Provvsol + FBDC*	5 fl oz + 1 6 at	B		ψ1,00 2	10010		-10.0	10.0	02.0
	Priaxor + Topsin +	8 fl oz + 20 fl oz +								
	EBDC*	1.6 fl oz	С							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	D							
	Flint Extra + EBDC*	3.5 fl oz + 1.6 qt	Е							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	F							
4	EBDC*	1.6 qt	А	4.5	\$1,662	11279	230	49.1	16.5	92.7
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	С							
	Priaxor + Topsin +	8 fl oz + 20 fl oz +	D							
	EBDC*	1.6 fl oz	-							
	Proline + EBDC*	5.7 TI OZ + 1.6 QT	E							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	F							
10	EBDC*	+ 1.6 qt	А	A 4.5 B C	\$1,613	11109	232	48.0	16.5	93.0
	Super Tin + EBDC*	8 fl oz + 1.6 qt	В							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 fl oz	С							
	Provysol + EBDC*	5 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	F							
16	Cercos + Sipcam TPTH	23 fl oz + 8 fl oz	А	4.7	\$1,722	11311	236	47.9	16.8	92.9
	Minerva + Koverall	13 fl oz + 1.5 lb	В							
	Cercos + Sipcam TPTH	23 fl oz + 8 fl oz	С							
	Inspire XT + Koverall	7 fl oz + 1.5 lb	D							
	Sipcam TPTH + Koverall	8 fl oz + 1.5 lb	Е							
	Proline + Koverall	5 fl oz + 1.5 lb	F							
17	Minerva + Cercos	13 fl oz + 23 fl oz	А	4.8	\$1,588	10518	231	45.6	16.4	93.0
	Sipcam TPTH + Koverall	8 fl oz + 1.5 lb	В							
	Cercos + Inspire XT	23 fl oz + 7 fl oz	С							
╷┠	Sipcam TPTH + Koverall	8 fl oz + 1.5 lb	D							
	Proline + Koverall	5 fl oz + 1.5 lb	E							
	Sipcam TPTH + Koverall	8 fl oz + 1.5 lb	F							

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

****Application dates for all treatments: A - 6/29, B - 7/12, C - 7/26, D - 8/9, E - 8/23, F - 9/7

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = very few spots, 5 = up to 25% injury, and 9 = leaves completely dead.

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



Answer Plot, Sebewaing - 2021

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No.	Treatment**	Rate/A	Applic Timing***	CLS**** Rate 0-9 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
11	EBDC*	1.6 qt	А	4.8	\$1,650	10910	223	49.0	15.9	92.9
	EBDC* + Copper*	1.6 qt + 2 pt	B - F							
15	Koverall	1.5 lb	А	5.0	\$1,701	11041	224	49.2	16.3	92.2
	Minerva + Koverall	13 fl oz + 1.5 lb	В							
	Sipcam TPTH + Miramar	8 fl oz + 21.8 fl oz	С							
	Inspire XT + Koverall	7 fl oz + 1.5 lb	D							
	Sipcam TPTH + Koverall	8 fl oz + 1.5 lb	Е							
	Proline + Koverall	5 fl oz + 1.5 lb	F							
14	Sipcam TPTH + Koverall	8 fl oz + 1.5 lb	А	5.1	\$1,644	10758	229	47.0	16.5	92.5
	Minerva + Koverall	13 fl oz + 1.5 lb	В							
	Sipcam TPTH + Spinnaker	8 fl oz + 1.5 lb	С							
	Inspire XT + Koverall	7 fl oz + 1.5 lb	D							
	Sipcam TPTH + Koverall	8 fl oz + 1.5 lb	Е							
	Proline + Koverall	5 fl oz + 1.5 lb	F							
1	Untreated Check			7.1	\$1,654	9754	221	44.1	15.7	93.2
Av	Average			4.6	\$1,637	10950	228	48.0	16.3	92.8
LS	LSD 5%			0.7	115.9	684.4	9.9	2.6	0.6	1.2
C\	CV%			11.0	5.0	4.4	3.1	3.8	2.7	0.9

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

****Application dates for all treatments: A - 6/29, B - 7/12, C - 7/26, D - 8/9, E - 8/23, F - 9/7

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = very few spots, 5 = up to 25% injury, and 9 = leaves completely dead.

- **Comments:** This trial evaluates fungicide programs with a cercospora-susceptible sugarbeet variety. Leafspot pressure was above moderate in 2021. 75% leaf desiccation was observed in the Untreated Check Plots (CLS Rating: 7.1, October 18th). Most fungicide treatment programs in this trial prevented leaf injury from exceeding 25% (CLS Rating: 5.0).
- \$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.



Blumfield West, Richville - 2021

Soil Info: Clay Loam Trial Quality: Good Variety: BTS - 197 % OM: 3.5 pH: 7.8 CEC: 14.4 Planted: April 14 P: Above Opt K: Above Opt Harvested: October 11 Mn: High B: Low Plots: 6 rows X 38 ft, 4 reps Added N: 35 lbs. 2X2, 120 lbs. sidedress Row Spacing: 22 in. Previous Crop: Wheat/Clover

Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in. Rainfall: 16.04 in. Beets/100 ft: 113

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

No.	Treatment**	Rate/A	Applic Timing	CLS**** Rate 0-9	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
2		1.6 at	Δ	7-Oct	\$1 396	9575	247	38 7	16.8	95.2
2	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	B	4.7	φ1,590	9010	241	50.7	10.0	95.2
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	С							
	Provysol + EBDC*	5 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	F							
9	Topguard + EBDC*	14 fl oz + 1.6 qt	В	5.3	\$1,249	8707	241	36.2	16.8	93.9
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	С							
_	Enable + EBDC*	8 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Eminent + EBDC*	13 fl oz + 1.6 qt	F							
6	EBDC*	1.6 qt	Α	5.4	\$1,193	8422	236	35.8	16.3	94.5
	Topguard + EBDC*	14 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	С							
	Enable + EBDC*	8 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Minerva + EBDC*	13 fl oz + 1.6 qt	F							
5	EBDC*	1.6 qt	Α	5.5	\$1,443	9827	237	41.3	16.4	94.1
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	С							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	F							

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

***Application dates for all treatments: A - 6/30, B - 7/12, C - 7/28, D - 8/13, E - 8/25, F - 9/9

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = very few spots, 5 = up to 25% injury, and 9 = leaves completely dead.

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



Blumfield West, Richville - 2021

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			Applic	CLS****					0/	
No.	Treatment**	Rate/A	Timing	Rate 0-9	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			***	7-Oct						
10	Delaro + Proline +	11 fl oz + 1.6 fl	Δ	5.6	\$1 199	8602	236	36 5	16 1	94 9
10	Manzate	oz + 1.6 qt		0.0	ψ1,100	0002	200	00.0	10.1	54.5
	Super Tin + EBDC*	8 fl oz + 1.6 qt	В							
	Priaxor + Topsin +	8 fl oz + 20 fl oz	С							
	EBDC*	+ 1.6 qt								
	Provysol + EBDC*	5 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	F							
12	EBDC*	1.6 qt	Α	5.6	\$1,410	9830	245	40.1	16.7	94.9
	Delaro + Proline +	11 fl oz + 1.6 fl	_							
	EBDC* + N. Demand +	oz + 1.6 qt + 1	В							
	Super Tin + Tonsin +	gai + 1 qi 8 fl oz + 20 fl oz								
	EBDC*	+ 1.6 at	С							
	Provysol + EBDC* + N.	5 fl oz + 1.6 qt +								
	Demand + Boron	1 gal + 1 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	Е							
	Inspire XT + EBDC* +	7 fl oz + 1.6 qt +	F							
	N. Demand + Boron	1 gal + 1 qt	•							
3	EBDC*	1.6 qt	A	5.6	\$1,427	9752	241	40.3	16.8	93.8
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	В							
	Super Tin + Topsin +	8 fl oz + 20 fl oz	С							
	EBDC*	+ 1.6 qt								
	Provysol + EBDC*	5 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Delaro + Proline +	11 fl oz + 1.6 fl	F							
_	EBDC*	oz + 1.6 qt			A (ATA					
4	EBDC*	1.6 qt	A	5.8	\$1,270	8901	236	37.8	16.3	94.5
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	С							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 at	D							
	Proline + EBDC*	5.7 fl oz + 1.6 at	Е							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	F							

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

***Application dates for all treatments: A - 6/30, B - 7/12, C - 7/28, D - 8/13, E - 8/25, F - 9/9

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = very few spots, 5 = up to 25% injury, and 9 = leaves completely dead.

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



Blumfield West, Richville - 2021

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No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 7-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
8	EBDC*	1.6 qt	Α	5.9	\$1,061	7805	233	33.5	15.9	94.9
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	С							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	D							
	Flint Extra + EBDC*	3.6 fl oz + 1.6 qt	E							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	F							
13	EBDC*	1.6 qt	Α	5.9	\$1,259	8832	244	36.2	16.7	94.7
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	С							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	E							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	F							
11	EBDC*	1.6 qt	Α	5.9	\$1,244	8454	225	37.4	15.8	93.8
	EBDC* + Copper*	1.6 qt + 2 pt	B - F							
7	EBDC*	1.6 qt	А	6.1	\$1,236	8809	238	37.1	16.4	94.4
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	С							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	D							
	EBDC* + Badge	1.6 qt + 2 pt	E							
	Delaro + Proline +	11 fl oz + 1.6 fl	F							
	EBDC*	oz + 1.6 qt	•	7.0	<u> </u>	7070	000	00.0	45.0	
1	Untreated Check			1.2	\$1,242	7270	226	32.3	15.3	95.4
Av	Average			5.7	\$1,279	8830	237	37.2	16.3	94.5
LS	LSD 5%			0.4	238.1	1393.5	14.0	6.0	0.8	1.1
C∖	/%			5.4	13.0	11.0	4.1	11.3	3.6	0.8

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz

***Application dates for all treatments: A - 6/30, B - 7/12, C - 7/28, D - 8/13, E - 8/25, F - 9/9

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = very few spots, 5 = up to 25% injury, and 9 = leaves completely dead.

- **Comments:** Leafspot pressure was fairly high in 2021. 75% leafspot desiccation was observed in the Untreated Check plot (CLS Rating: 7.2, October 17th). Most fungicide treatments reduced injury to less than 50% leaf damage (CLS Rating: 6.0).
- \$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.



Cercospora Programs CR+

Answer Plot, Sebewaing - 2021

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: C-G021	% OM: 4.2 pH: 7.4 CEC: 13.5	Problems: None
Planted: April 8	P: Above Opt K: Above Opt	Seeding Rate: 4.1 in.
Harvested: October 19	Mn: High B: Medium	Rainfall: 15.25 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Beets/100 ft: 195
Row Spacing: 22 in.	Previous Crop: Alfalfa	

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

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
11	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	С	1.4	\$1,913	11821	235	50.3	16.7	93.0
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	E							
15	EBDC* + Copper*	1.6 qt +2 pt	A - F	1.5	\$1,786	11773	238	49.6	17.0	92.7
17	EBDC* + Copper*	1.6 qt + 2 pt	B-F	1.5	\$1,918	12342	242	50.9	17.2	93.0
8	EBDC*	1.6 qt	А	1.6	\$1,825	11631	236	49.2	16.7	93.1
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	В							
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	F							
12	EBDC*	1.6 qt	А	1.8	\$1,881	11725	239	49.1	16.9	93.1
	Minerva + EBDC*	13 fl oz + 1.6 qt	С							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	Е							
14	EBDC*	1.6 qt	A - F	1.9	\$1,984	12590	248	50.9	17.5	93.0
16	EBDC*	1.6 qt	B - F	1.9	\$1,896	11922	236	50.5	16.8	93.0
20	EBDC*	1.6 qt	BDF	1.9	\$1,964	12024	247	48.7	17.3	93.6
23	EBDC*	1.6 qt	А	1.9	\$1,954	12615	243	51.9	17.5	92.3
	Delaro Complete + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							
24	EBDC*	1.6 qt	А	1.9	\$1,877	11898	245	48.6	17.0	93.8
	Lucento + Koverall	5.5 fl oz + 2 lb	В							
	Super Tin + Topsin + Koverall	8 fl oz + 20 fl oz + 1.6 qt	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

***Application dates for all treatments: A - 6/29, B - 7/12, C - 8/2, D - 8/17, E - 9/1, F - 9/10

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

\$/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.

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Cercospora Programs CR+

Answer Plot, Sebewaing - 2021

(Page 2 of 6)

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
4	EBDC*	1.6 qt	А	1.9	\$1,912	12093	241	50.2	17.0	93.3
	Minerva + EBDC*	13 fl oz + 1.6 qt	В							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	D							
	Enable + EBDC*	8 fl oz + 1.6 qt	F							
3	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	В	2.0	\$1,886	11957	239	50.1	16.9	93.1
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							
21	EBDC* + Copper*	1.6 qt + 2 pt	BDF	2.0	\$1,927	11982	243	49.4	17.1	93.4
6	EBDC*	1.6 qt	А	2.0	\$1,881	12205	238	51.2	17.2	92.4
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Proline + EBDC*	5.7 fl oz + 1.6 q	F							
10	EBDC*	1.6 qt	А	2.0	\$1,926	12044	243	49.5	17.1	93.5
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	С							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	Е							
2	EBDC*	1.6 qt	А	2.0	\$1,978	12644	246	51.4	17.2	93.6
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							
9	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	В	2.0	\$1,886	11842	240	49.2	17.2	92.6
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	F							
18	EBDC*	1.6 qt	ABDF	2.2	\$1,987	12311	246	50.1	17.5	92.8

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

****Application dates for all treatments: A - 6/29, B - 7/12, C - 8/2, D - 8/17, E - 9/1, F - 9/10

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

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



Cercospora Programs CR+

Answer Plot, Sebewaing - 2021

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No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
22	Koverall	1.5 lb	А	2.2	\$1,895	11857	243	48.9	17.3	92.6
	Minerva Duo + Koverall	16 fl oz + 1.5 lb	В							
	Brixen + Koverall	21 fl oz + 1.5 lb	D							
	Spinnaker + Koverall	1.5 lb + 1.5 lb	F							
7	Provysol + EBDC*	5 fl oz +1.6 qt	В	2.3	\$1,837	11792	243	48.5	17.3	93.0
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	F							
19	EBDC* + Copper*	1.6 qt + 2 pt	ABDF	2.3	\$1,922	12159	247	49.2	17.5	92.9
13	Minerva + EBDC*	13 fl oz + 1.6 qt	С	2.3	\$1,915	11778	237	49.8	16.6	93.5
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	Е							
5	Minerva + EBDC*	13 fl oz + 1.6 qt	В	2.4	\$1,968	12274	242	50.8	17.2	92.8
	Super Tin + EBDC*	8 fl oz + 1.6 qt	D							
	Enable + EBDC*	8 fl oz + 1.6 qt	F							
1	Untreated Check			2.8	\$2,000	11793	232	50.7	16.7	92.5
Av	erage			1.98	1913.2	12044.6	241.2	49.94	17.10	93.02
LS	LSD 5%			0.83	154.4	n.s.	9.1	n.s.	0.59	1.15
C\	/%			29.7	5.7	5.4	2.7	4.4	2.4	0.9

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

***Application dates for all treatments: A - 6/29, B - 7/12, C - 8/2, D - 8/17, E - 9/1, F - 9/10

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

Comments: Cercospora leafspot pressure was moderately low at this location in 2021. Fungicide programs were applied to a CR+ variety; C-G021. CR+ varieties have high genetic tolerance to cercospora pressure and require fewer fungicide applications per season. Trial treatments were designed to compare a variable number of applications along with variable products and rates.

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



Blumfield West, Richville - 2021

Trial Quality: Good Variety: C-G021 Planted: April 14 Harvested: October 11 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 in. Soil Info: Clay Loam
% OM: 3.5 pH: 7.8 CEC: 14.4
P: Above Opt K: Above Opt
Mn: High B: Low
Added N: 35 lbs. 2X2, 120 lbs. sidedress
Previous Crop: Wheat & Clover

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Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in. Rainfall: 16.04 in. Beets/100 ft: 129

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

No.	Treatment**	Rate/A	Applic Timing	CLS**** Rate	Net \$/A	RWSA	RWST	T/A	%	%
			***	7-Oct					SUC	CJP
12	EBDC*	1.6 qt	Α	3.3	\$1,549	9201	237	38.9	16.7	93.4
	Minerva + EBDC*	13 fl oz + 1.6 qt	С							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	E							
14	EBDC*	1.6 qt	A-F	3.3	\$1,596	9701	233	41.6	16.3	93.9
15	EBDC* + Copper*	1.6 qt + 2 pt	A - F	3.3	\$1,664	10411	242	43.0	16.7	94.4
19	EBDC* + Copper*	1.6 qt + 2 pt	ABDF	3.5	\$1,518	9212	233	39.6	16.4	93.4
2	EBDC*	1.6 qt	А	3.6	\$1,621	9930	244	40.7	16.9	94.1
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							
4	EBDC*	1.6 qt	А	3.6	\$1,490	9047	247	36.5	17.4	93.3
	Minerva + EBDC*	13 fl oz + 1.6 qt	В							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	D							
	Enable + EBDC*	8 fl oz + 1.6 qt	F							
9	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	В	3.6	\$1,612	9634	233	41.4	16.3	93.8
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	D							
	Super Tin + Manzate	8 fl oz + 1.6 qt	F							
8	EBDC*	1.6 qt	А	3.7	\$1,634	9895	237	41.8	16.7	93.3
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	В							
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	D							
	Super Tin + EBDC*	8 fl oz + 1.6 qt	F							

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

***Application dates for all treatments: A - 6/30, B - 7/12, C - 8/2, D - 8/16, E - 8/31, F - 9/16

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

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



Cercospora Programs CR+

Blumfield West, Richville - 2021

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			Applic	CLS****					%	%
No.	Treatment**	Rate/A	Timing	Rate	Net \$/A	RWSA	RWST	T/A	SUC	CJP
5	Minerva + EBDC*	13 fl.oz + 1.6 at	B	7-0ct	\$1 532	9140	230	39.9	16 1	93.8
Ŭ	Super Tin + EBDC*	8 fl oz + 16 at	D	0.1	¢1,002	0140	200	0010	10.1	00.0
-	Enable + EBDC*	8 fl oz + 1.6 qt	E E							
	Delaro + Proline +	11 fl oz + 1.6 fl	1							
3	EBDC*	oz + 1.6 qt	В	3.8	\$1,648	9937	246	40.4	17.0	94.3
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							
24	EBDC*	1.6 qt	А	3.8	\$1,562	9452	244	38.7	16.8	94.3
	Lucento + Koverall	5.5 fl oz + 2 lb	В							
	Super Tin + Topsin + Koverall	8 fl oz + 20 fl oz + 1.6 qt	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							
17	EBDC* + Copper*	1.6 qt + 2 pt	B - F	3.8	\$1,580	9751	242	40.3	16.8	93.9
16	EBDC*	1.6 qt	B-F	3.9	\$1,679	10026	247	40.5	16.9	94.8
23	EBDC*	1.6 qt	А	3.9	\$1,520	9470	237	39.9	16.6	93.9
	Delaro Complete + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	В							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz -	D							
	Provysol + EBDC*	5 fl oz + 1.6 qt	F							
20	EBDC*	1.6 qt	BDF	3.9	\$1,716	9949	249	40.1	17.0	94.6
22	Koverall	1.5 lb	А	3.9	\$1,749	10357	243	42.7	17.0	93.7
	Minerva Duo + Koverall	16 fl oz +1.5 lb	В							
-	Brixen + Koverall	21 fl oz + 1.5 lb	D							
-	Spinnaker + Koverall	1.5 lb + 1.5 lb	F							
13	Minerva + EBDC*	13 fl oz	С	3.9	\$1,640	9566	238	40.1	16.4	94.4
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	E							
11	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	С	4.0	\$1,394	8249	242	34.1	17.1	93.2
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	E							

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

***Application dates for all treatments: A - 6/30, B - 7/12, C - 8/2, D - 8/16, E - 8/31, F - 9/16

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

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



Cercospora Programs CR+

Blumfield West, Richville - 2021

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No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 7-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
7	Provysol + EBDC*	5 fl oz + 1.6 qt	В	4.1	\$1,454	8980	239	37.6	16.5	94.5
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	F							
6	EBDC*	1.6 qt	А	4.1	\$1,752	10776	249	43.4	16.8	95.3
	Provysol + EBDC*	5 fl oz + 1.6 qt	В							
	Priaxor + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	D							
	Proline + EBDC*	5.7 fl oz + 1.6 qt	F							
10	EBDC*	1.6 qt	А	4.2	\$1,558	9297	234	39.7	16.2	94.4
	Delaro + Proline + EBDC*	11 fl oz + 1.6 fl oz + 1.6 qt	С							
	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	Е							
21	EBDC* + Copper*	1.6 qt + 2 pt	BDF	4.4	\$1,589	9408	237	39.6	16.4	94.5
18	EBDC*	1.6 qt	ABDF	4.5	\$1,651	9730	240	40.5	16.6	94.5
1	Untreated Check	-		5.0	\$1,548	8599	229	37.5	16.0	94.2
Av	rerage			3.9	\$1,594	9571	240	39.9	16.6	94.1
LSD 5%			0.7	244.9	1360.2	10.8	5.2	0.6	1.3	
C\	/%			12.1	10.9	10.1	3.2	9.3	2.6	1.0

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

****Application dates for all treatments: A - 6/30, B - 7/12, C - 8/2, D - 8/16, E - 8/31, F - 9/16

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

Comments: Cercospora leafspot pressure was moderate at Blumfield in 2021. Fungicide programs were applied to a CR+ variety; C-G021. CR+ varieties have high genetic resistance to cercospora pressure and require fewer fungicide applications per season. Trial treatments were designed to compare a variable number of applications along with various products and rates.

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



Cercospora Programs Ontario Standard

Answer Plot, Sebewaing - 2021

Trial Quality: Good Variety: BTS-197N Planted: April 8 Harvested: October 19 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 in. Soil Info: Clay LoamRi% OM: 4.2 pH: 7.4 CEC: 13.5PrP: Above Opt K: Above OptSeMn: High B: MediumRaAdded N: 35 lbs. 2X2, 120 lbs. sidedressBePrevious Crop: Alfalfa

Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in. Rainfall: 15.25 in. Beets/100 ft: 169

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

No.	Treatment*	Rate/A	Applic	CLS*** Rate	Net \$/A	RWSA	RWST	T/A	%	%
			Date	18-Oct					SUC	CJP
3	Penncozeb	2 lbs	29-Jun	3.6	\$1,616	10797	220	49.0	16.0	92.2
	Penncozeb + Proline	2 lbs + 5.7 fl oz	12-Jul							
	Penncozeb + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	26-Jul							
	Penncozeb + Provysol	2 lbs + 5 fl oz	9-Aug							
	Penncozeb + ChampION	2 lsb + 2 lbs	23-Aug							
	ChampION + Proline	2 lbs + 5.7 fl oz	7-Sep							
2	Penncozeb	2 lbs	29-Jun	3.7	\$1,578	10590	221	47.8	15.8	93.0
	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul							
	Penncozeb + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	26-Jul							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	9-Aug							
	Penncozeb + ChampION	2 lbs + 2 lbs	23-Aug							
	ChampION + Provysol	2 lbs + 5 fl oz	7-Sep							
5	Penncozeb	2 lbs	29-Jun	4.1	\$1,598	10413	217	48.0	15.9	91.8
	Penncozeb + Proline	2 lbs + 5.7 fl oz	12-Jul							
	Penncozeb	2 lbs	26-Jul							
	Penncozeb + Provysol	2 lbs + 5 fl oz	9-Aug							
	Penncozeb	2 lbs	23-Aug							
	ChampION + Proline	2 lbs + 5.7 fl oz	7-Sep							
6	Penncozeb	2 lbs	A - E**	4.1	\$1,723	10745	222	48.4	16.0	92.4
	ChampION	2 lbs	7-Sep							
9	Penncozeb	2 lbs	29-Jun	4.3	\$1,628	10675	220	48.5	15.8	92.9
	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul							
	Penncozeb + ChampION	2 lbs + 2 lbs	26-Jul							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	9-Aug							
	Penncozeb + ChampION	2 lbs + 2 lbs	23-Aug							
	ChampION + Cevya	2 lbs + 5 fl oz	7-Sep							

*All treatments included MasterLock @ 6.4 fl oz.

**Application Dates for treatments 6 and 7: A - 6/29, B - 7/12, C - 7/26, D - 8/9, E - 8/23

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spota, 5 = up to 25% injury and 9 = leaves completely dead.

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



Cercospora Programs Ontario Standard

Answer Plot, Sebewaing - 2021

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No.	Treatment*	Rate/A	Applic Date	CLS*** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
4	Penncozeb	2 lbs	29-Jun	4.6	\$1,733	11230	227	49.4	16.4	92.5
	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul							
	Penncozeb	2 lbs	26-Jul							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	9-Aug							
	Penncozeb	2 lbs	23-Aug							
	ChampION + Provysol	2 lbs + 5 fl oz	7-Sep							
8	Penncozeb + Phostrol	2 lbs + 11.8 pt	29-Jun	4.7	\$1,442	9495	216	44.0	16.0	91.4
	Penncozeb + Phostrol	2 lbs + 11.8 pt	12-Jul							
	Penncozeb + Phostrol	2 lbs + 11.8 pt	26-Jul							
	Penncozeb + Phostrol	2 lbs + 11.8 pt	9-Aug							
	Phostrol	11.8 pt	23-Aug							
	ChampION	2 lbs	7-Sep							
10	Penncozeb	2 lbs	29-Jun	4.9	\$1,520	10150	220	46.1	15.8	92.7
	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul							
	Penncozeb + Phostrol	2 lbs + 11.8 pt	26-Jul							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	9-Aug							
	Penncozeb + Phostrol	2 lbs + 11.8 pt	23-Aug							
	ChampION + Provysol	2 lbs + 5 fl oz	7-Sep							
7	Phostrol	11.8 pt	A-E**	5.3	\$1,433	9285	212	43.7	15.6	92.0
	ChampION	2 lbs	7-Sep							
1	Untreated Check			6.9	\$1,603	9454	222	42.7	15.8	93.0
Av	Average			4.6	\$1,587	10,284	220	46.8	15.9	92.4
LS	LSD 5%			0.7	124.5	734.2	7.2	2.6	0.3	1.3
C\	/%			10.8	5.4	4.9	2.3	3.9	1.5	1.0

*All treatments included MasterLock @ 6.4 fl oz.

**Application Dates for treatments 6 and 7: A - 6/29, B - 7/12, C - 7/26, D - 8/9, E - 8/23

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spota, 5 = up to 25% injury and 9 = leaves completely dead.

Comments: Fungicide programs that are available in Ontario were evaluated with cercospora-susceptible sugarbeet variety.

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



Cercospora Programs Ontario CR+

Answer Plot, Sebewaing - 2021

Trial Quality: Excellent Variety: C-G021 Planted: April 8 Harvested: October 19 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 in. Soil Info: Clay Loam
% OM: 4.2 pH: 7.4 CEC: 13.5
P: Above Opt K: Above Opt
Mn: High B: Medium
Added N: 35 lbs. 2X2, 120 lbs. sidedress
Previous Crop: Alfalfa

Rainfall: 15.25 in. Beets/100 ft: 180

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

No.	Treatment*	Rate/A	Applic Date	CLS** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
9	Penncozeb + ChampION	2 lbs + 2 lbs	12-Jul	1.3	\$1,846	11543	232	49.8	16.7	92.5
	Penncozeb + ChampION	2 lbs + 2 lbs	2-Aug							
	Penncozeb + ChampION	2 lbs + 2 lbs	20-Aug							
	Penncozeb + ChampION	2 lbs + 2 lbs	1-Sep							
	Penncozeb + ChampION	2 lbs + 2 lbs	17-Sep							
8	Penncozeb	2 lbs	29-Jun	1.8	\$1,846	11723	231	50.8	16.4	93.1
	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul							
	Penncozeb + ChampION	2 lbs + 2 lb	20-Aug							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	1-Sep							
	Penncozeb + ChampION	2 lbs + 2 lbs	17-Sep							
5	Penncozeb	2 lbs	29-Jun	1.9	\$1,923	12010	240	50.1	16.9	93.2
	Penncozeb + Provysol	2 lf + 5 fl oz	12-Jul							
	Penncozeb	2 lbs	20-Aug							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	17-Sep							
2	Penncozeb	2 lbs	29-Jun	2.0	\$1,908	12020	237	50.8	16.7	93.3
	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul							
	Penncozeb	2 lbs	20-Aug							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	1-Sep							
	Penncozeb	2 lbs	17-Sep							
3	Penncozeb	2 lbs	29-Jun	2.1	\$1,858	11867	232	51.1	16.6	92.7
	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul							
	Penncozeb + Priaxor +Topsin	2 lbs + 8 fl oz + 20 fl oz	20-Aug							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	17-Sep							

*All treatments included MasterLock @ 6.4 fl oz.

**Cercospora Rating (0-9 scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

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

Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in.



Cercospora Programs Ontario CR+

Answer Plot, Sebewaing - 2021

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No.	Treatment*	Rate/A	Applic Date	CLS** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
6	Penncozeb	2 lbs	12-Jul	2.4	\$1,970	12053	237	51.0	16.6	93.4
	Penncozeb	2 lbs	2-Aug							
	Penncozeb	2 lbs	20-Aug							
	Penncozeb	2 lbs	1-Sep							
	Penncozeb	2 lbs	17-Sep							
1	Untreated Check			2.4	1,897	11188	224	50.0	16.3	91.8
4	Penncozeb + Provysol	2 lbs + 5 fl oz	12-Jul	2.5	1,846	11698	229	51.2	16.3	92.9
	Penncozeb + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	20-Aug							
	Penncozeb + Proline	2 lbs + 5.7 fl oz	17-Sep							
7	Penncozeb + Provysol + ChampION	2 lbs + 5 fl oz + 2 lb	12-Jul	2.6	1,808	11542	235	49.0	16.5	93.5
	Penncozeb + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	20-Aug							
	Penncozeb + Proline + ChampION	2 lbs + 5.7 fl oz + 2 lb	17-Sep							
A١	verage			2.1	\$1,878	11738	233	50.4	16.6	92.9
LS	LSD 5%			0.9	n.s.	n.s.	10.4	n.s.	0.6	1.1
C'	CV%			28.0	6.3	5.9	3.1	4.3	2.3	0.8

*All treatments included MasterLock @ 6.4 fl oz.

Comments: This trial evaluated fungicides that are available in Ontario with a CR+ variety.

- \$/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.



Leafspot Control - Blumfield East, Richville - 2021

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Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Control: Good
Variety: C-G943	%OM: 2.8 pH: 8.1 CEC: 18.1	Problems: None
Planted: April 30	P: Above Opt K: Above Opt	Seeding Rate: 4.1 in.
Harvested: October 7	Mn: High B: Low	Rainfall: 15.7 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Beets/100 ft: 100
Row Spacing: 22 in.	Prev Crop: Wheat & Radish	

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

No.	Sticker	Rate/A	Applic Timing	CLS*** Rate	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				7-Oct						
10	FS Talent	4 oz	B-D, F	3.1	\$1,459	9219	259	35.5	17.4	95.6
9	HM-9911	1 qt	B-D, F	3.3	\$1,597	10100	266	38.0	17.8	95.5
15	True Experimental	9.6 fl oz	B-D, F	3.5	\$1,453	9353	264	35.5	17.7	95.5
17	Petrichor	3 fl oz	B-D, F	3.6	\$1,542	9683	265	36.5	17.7	95.9
16	Parachute II	3 fl oz	B-D, F	3.6	\$1,646	10243	266	38.5	17.7	95.8
8	HM-2020-83	1 qt	B-D, F	3.7	\$1,401	8920	268	33.3	17.9	95.7
5	MasterLock & Reguard	6.4 fl oz + 12 fl oz	B-D, F	3.7	\$1,603	10205	271	37.6	18.3	95.1
11	FS Cropstick	4 oz	B-D, F	3.8	\$1,295	8313	271	30.7	18.0	95.8
4	Reguard & Diligence	12 fl oz + 1.5 fl oz	B-D, F	3.8	\$1,419	9187	267	34.4	18.1	95.0
2	MasterLock	6.4 fl oz	A-F	3.8	\$1,612	10059	258	38.9	17.4	95.3
13	Cerium Elite	8 fl oz	B-D, F	3.8	\$1,687	10465	269	38.9	18.1	95.4
6	Cohere & Justified	4 oz + 4 oz	B-D, F	3.8	\$1,468	9295	269	34.6	18.1	95.3

Spray Program for treatments

- A. EBDC* + MasterLock (6.4 fl oz)
- B. Provysol (5 fl oz) + EBDC* + Sticker
- C. Super Tin (8 fl oz) + EBDC* + Sticker
- D. Priaxor (8 fl oz) + Topsin (20 fl oz) + EBDC* + Sticker
- E. Super Tin (8 fl oz) + EBDC* + MasterLock (6.4 fl oz)
- F. Proline (5.7 fl oz) + EBDC* + Sticker

*EBDC = Manzate

**Application dates for all treatments: A - 7/6, B - 7/14, C - 7/28, D - 8/13, E - 8/30, F - 9/16

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

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

PIONEER · BIG CHIEF Leafspot Control - Blumfield East, Richville - 2021

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No.	Sticker	Rate/A	Applic Timing	CLS*** Rate	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
12	FS Taylx	4 oz	B-D, F	3.8	\$1,530	9623	271	35.6	18.0	95.7
18	Last Chance Pro	16 fl oz	B-D, F	3.9	\$1,686	10461	271	38.7	18.0	95.8
14	True Experimental	6.4 fl oz	B-D, F	4.0	\$1,555	9903	260	38.1	17.6	95.1
7	HM-1101	8 oz	B-D, F	4.0	\$1,439	9174	266	34.5	18.0	95.0
3	Reguard	12 fl oz	B-D, F	4.2	\$1,680	10557	264	40.0	17.9	95.0
1	Untreated Check			6.0	\$1,586	8567	256	33.5	17.2	95.3
Av	Average				\$1,537	9,629	266	36.3	17.8	95.4
LS	LSD 5%				216.0	1166.6	9.0	4.5	0.6	0.8
C/	CV%			23.0	9.9	8.5	2.4	8.8	2.2	0.6

Spray Program for treatments

- A. EBDC* + MasterLock (6.4 fl oz)
- B. Provysol (5 fl oz) + EBDC* + Sticker
- C. Super Tin (8 fl oz) + EBDC* + Sticker
- D. Priaxor (8 fl oz) + Topsin (20 fl oz) + EBDC* + Sticker
- E. Super Tin (8 fl oz) + EBDC* + MasterLock (6.4 fl oz)
- F. Proline (5.7 fl oz) + EBDC* + Sticker

*EBDC = Manzate

**Application dates for all treatments: A - 7/6, B - 7/14, C - 7/28, D - 8/13, E - 8/30, F - 9/16

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

- **Comments:** Cercospora leafspot pressure was moderate at Blumfield East. Petrichor, HM-2020-83, Parachute II, True Experimental, Last Chance Pro, HM-1101 and HM-9911 are new products from Helena.
- \$/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.

PIONEER · BIG CHIEF Leafspot Control - Gruehn, Pigeon, MI - 2021

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Trial Quality: Good	Soil Info: Clay Loam
Variety: C-G943	%OM: 3.8 pH: 6.9 CEC: 13.0
Planted: April 22	P: Above Opt K: Above Opt
Harvested: October 18	Mn: High B: Medium
Plots: 6 rows X 38 ft, 3 reps	Added N: 35 lbs. 2X2, 120 lbs. PPI
Row Spacing: 22 in.	Prev Crop: Wheat

Rhizoc Control: Good Problems: None Seeding Rate: 4.1 in. Rainfall: 16.3 in. Beets/100 ft: 153

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

No.	Sticker	Rate/A	Applic Timing	% Leaf Damage	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
٥		1 at	ΛE	18-Oct	¢1 005	13338	286	46.6	18 7	96.4
3	110-3311	· 9	7-1	5.7	ψ1,335	13330	200	40.0	10.7	30.4
12	FS Taylx	4 oz	A-F	3.8	\$1,972	13013	280	46.6	18.6	95.7
8	HM-2020-83	1 qt	A-F	3.8	\$2,057	13500	289	46.7	19.2	95.6
4	Reguard & Diligence	12 fl oz + 1.5 fl oz	A-F	3.8	\$2,040	13678	287	47.7	19.0	95.9
13	Cerium Elite	8 fl oz	A-F	3.8	\$2,053	13479	283	47.7	19.0	95.1
15	True Experimental	9.6 fl oz	A-F	4.0	\$1,994	13377	275	48.7	18.5	95.3
11	FS Cropstick	4 oz	A-F	4.0	\$2,042	13355	274	48.9	18.3	95.4
5	MasterLock & Reguard	6.4 fl oz + 12 fl oz	A-F	4.1	\$2,041	13725	279	49.1	18.8	95.3
16	Parachute II	3 fl oz	A-F	4.2	\$2,115	13843	289	48.0	18.9	96.3
10	FS Talent	4 oz	A-F	4.2	\$2,089	13662	286	47.8	18.9	96.0
7	HM-1101	8 oz	A-F	4.2	\$1,990	13190	277	47.7	18.5	95.3
3	Reguard	12 fl oz	A-F	4.3	\$1,936	13004	280	46.5	18.7	95.6

Spray Program for treatments

- A. EBDC* (1.6 qt) + Sticker
- B. Provysol (5 fl oz) + EBDC* (1.6 qt) + 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. Super Tin (8 fl oz) + EBDC* (1.6 qt) + Sticker
- F. Proline (5.7 fl oz) + EBDC* (1.6 qt) + Sticker

*EBDC = Manzate

**Application dates for all treatments: A - 7/10, B - 7/22, C - 8/5, D - 8/19, E - 9/2, F - 9/17

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

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



PIONEER · BIG CHIEF Leafspot Control - Gruehn, Pigeon, MI - 2021

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No.	Sticker	Rate/A	Applic Timing	% Leaf Damage 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
6	Cohere & Justified	4 oz + 4 oz	A-F	4.3	\$1,963	12966	275	47.2	18.4	95.3
18	Last Chance Pro	16 fl oz	A-F	4.3	\$1,998	13153	279	47.1	18.7	95.4
14	True Experimental	6.4 fl oz	A-F	4.4	\$1,899	12824	279	46.0	18.5	95.8
2	MasterLock	6.4 fl oz	A-F	4.6	\$2,062	13529	287	47.1	18.9	96.2
17	Petrichor	3 fl oz	A-F	4.8	\$1,965	12965	269	48.2	18.0	95.4
1	Untreated Check			7.8	\$1,760	10299	257	40.0	17.2	95.7
Av	rerage		4.3	\$1,998	13,161	279	47.1	18.6	95.7	
LS	D 5%	0.8	136.0	795.7	n.s.	2.3	0.8	n.s.		
C/	/%		11.1	4.1	3.6	3.1	2.9	2.7	1.0	

Spray Program for treatments

- A. EBDC* (1.6 qt) + Sticker
- B. Provysol (5 fl oz) + EBDC* (1.6 qt) + 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. Super Tin (8 fl oz) + EBDC* (1.6 qt) + Sticker
- F. Proline (5.7 fl oz) + EBDC* (1.6 qt) + Sticker

*EBDC = Manzate

**Application dates for all treatments: A - 7/10, B - 7/22, C - 8/5, D - 8/19, E - 9/2, F - 9/17

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

- **Comments:** Cercospora leafspot pressure was moderate. Petrichor, HM-2020-83, Parachute II, True Experimental, Last Chance Pro, HM-1101 and HM-9911 are new products from Helena.
- \$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.



Nozzle, Pressure and Volume for managing Cercospora Leafspot

Gruehn, Pigeon - 2021

Trial Quality: Excellent	Soil Info: Clay Loam
Variety: BTS - 197N	% OM: 3.8 pH: 6.9 CEC: 13.0
Planted: April 22	P: Above Opt K: Above Opt
Harvested: October 18	Mn: High B: Medium
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. PPI
Row Spacing: 22 in.	Previous Crop: Wheat

Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in. Rainfall: 16.3 in. Beets/100 ft: 146

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

No.	Nozzle Type	GPA	PSI	CLS**** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
8	JD Hypro 3D (fine) - D**	21	75	3.7	\$1,861	12309	246	50.0	17.3	93.5
4	Turbo TeeJet (V fine)	17	50	3.7	\$1,967	12827	255	50.3	17.8	93.5
11	Turbo TeeJet (V fine) - D**	21	75	3.7	\$1,846	12225	258	47.4	18.0	93.5
7	JD Hypro 3D (fine) - D**	17	50	3.8	\$1,870	12362	253	48.8	17.7	93.6
5	Turbo TeeJet (V fine)	21	75	3.8	\$2,023	13155	257	51.2	17.8	93.9
1	JD Hypro 3D (fine)	17	50	4.0	\$1,836	12058	239	50.5	16.8	93.4
10	Turbo TeeJet (V fine) - D**	17	50	4.0	\$1,785	11864	241	49.2	16.7	94.1
9	JD Hypro 3D (fine) - D**	25	100	4.1	\$1,868	12348	249	49.6	17.6	93.2
2	JD Hypro 3D (V fine)	21	75	4.1	\$1,997	12998	257	50.7	17.8	93.9
6	Turbo TeeJet (V fine)	25	100	4.1	\$2,036	13228	261	50.7	17.9	94.4
3	JD Hypro 3D (fine)	25	100	4.2	\$1,858	12186	240	50.7	17.1	93.0
12	Turbo TeeJet (V fine) - D**	25	100	4.3	\$1,871	12371	253	48.9	17.4	94.3
Average		3.9	\$1,902	12494	251	49.8	17.5	93.7		
LS	D 5%			n.s.	176.4	1031.7	16.8	3.0	0.9	n.s.
C\	/%			15.6	7.3	6.5	5.3	4.7	3.9	1.3

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 EBDC* (1.6 qt) + Copper* (2 pt)

*EBDC = Manzate / Copper = Badge

** D = Deposition aid added

*** Application dates for all treatments: A - 7/12, B - 7/26, C - 8/13, D - 8/26, E - 9/6, F - 9/17

****Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead.

- **Comments:** This trial compared nozzle type, pressure, and application rates with and without a deposition aid (MasterLock). Lower volumes and pressures can be as effective as higher rates based on nozzle selection, especially when a deposition aid is included. This trial was conducted in 2020 and repeated in 2021.
- \$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fungicide and application cost.

- 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. EBDC* (1.6 qt) + Copper* (2 pt) + MasterLock (6.4 fl oz)

Evaluating BASF Fungicides for Cercospora Leafspot Control

Pioneer · Big Chief Michligan Sugar Gruehn, Pigeon - 2021

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: BTS-197N, C-G021	% OM: 3.8 pH: 6.9 CEC: 13.0	Problems: None
Planted: April 22	P: Above Opt K: Above Opt	Seeding Rate: 4.1 in.
Harvested: October 18	Mn: High B: Medium	Rainfall: 16.3 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. PPI	Beets/100 ft: 155
Row Spacing: 22 in.	Previous Crop: Wheat	
Application: JD 3520 tractor mounted p	lot sprayer, compressed air, 100 psi, 25 gpa	

No.	Treatment**	Variety	Rate	Applic Date	Rate	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
6	EBDC*	C-G021	1.6 qt	10-Jul	2.4	\$1,912	11869	246	48.2	17.8	92.1
	EBDC* + Delaro + Proline		1.6 qt + 11 fl oz + 1.6 fl oz	16-Jul							
	EBDC* + Super Tin + Topsin		1.6 qt + 8 fl oz + 20 fl oz	16-Aug							
	EBDC* + Proline		1.6 qt + 5.7 fl oz	17-Sep							
5	EBDC*	C-G021	1.6 qt	10-Jul	2.5	\$2,000	12530	260	48.1	18.1	93.7
	EBDC* + Provysol		1.6 qt + 5 fl oz	16-Jul							
	EBDC* + Priaxor + Topsin		1.6 qt + 8 fl oz + 20 fl oz	16-Aug							
	EBDC* + Provysol		1.6 qt + 5 fl oz	17-Sep							
4	Untreated Check	C-G021			3.5	\$2,092	11961	255	46.8	17.9	93.2
3	EBDC*	B-197N	1.6 qt	10-Jul	4.1	\$1,977	12637	252	50.3	17.6	93.6
	EBDC* + Proline		1.6 qt + 5.7 fl oz	16-Jul							
	EBDC* + Super Tin		1.6 qt + 8 fl oz	3-Aug							
	EBDC* + Flint Extra + Topsin		1.6 qt + 3.5 fl oz + 20 fl oz	16-Aug							
	EBDC* + Proline		1.6 qt + 5.7 fl oz	31-Aug							
	EBDC* + Super Tin		1.6 qt + 8 fl oz	17-Sep							
2	EBDC*	B-197N	1.6 qt	10-Jul	4.2	\$1,852	12042	254	47.4	17.9	93.1
	EBDC* + Provysol		1.6 qt + 5 fl oz	16-Jul							
	EBDC* + Super Tin		1.6 qt + 8 fl oz	3-Aug							
	EBDC* + Priaxor + Topsin		1.6 qt + 8 fl oz + 20 fl oz	16-Aug							
	EBDC* + Provysol		1.6 qt + 5 fl oz	31-Aug							
	EBDC* + Super Tin		1.6 qt + 8 fl oz	17-Sep							
1	Untreated Check	B-197N			7.5	\$1,689	9659	232	41.5	16.3	93.7
Av	erage				4.0	\$1,920	11783	250	47.1	17.6	93.2
LS	D 5%		0.57	179.2	1024.8	14.0	2.7	0.6	1.0		
C\	/%				11.8	7.9	7.3	4.7	4.9	3.0	0.9

*EBDC = Manzate

**All treatments included MasterLock @ 6.4 fl oz.

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25 % injury and 9 = leaves completely dead.

Comments: BASF fungicide products were applied to a CR+ variety, C-G021, and a known susceptible variety, B-197N.

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



Evaluating UPL Fungicides for Cercospora Leafspot Control

Gruehn, Pigeon - 2021

(Page 1 of 2)

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: C-G932NT	% OM: 3.8 pH: 6.9 CEC: 13.0	Problems: None
Planted: April 22	P: Above Opt K: Above Opt	Seeding Rate: 4.1 in.
Harvested: October 18	Mn: High B: Medium	Rainfall: 16.3 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. PPI	Beets/100 ft: 158
Row Spacing: 22 in.	Previous Crop: Wheat	
Application: JD 3520 tractor mou	unted plot sprayer, compressed air, 100 psi, 25 gr	a

No.	Treatment**	Rate/A	Applic Date	CLS*** Rate	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				18-Oct						
2	Super Tin + Topsin +	8 fl oz + 20 fl oz + 1 6 ot	10-Jul	3.7	\$2,116	13493	259	52.1	17.9	93.9
	EDUC Devter Mey	1.0 qt	10 101							
			19-Jul							
	Super Tin + Devter Mex	7 11 02 + 1.0 ql	3-Aug							
	Super Till + Dexter Max	0 11 02 + 2.1 10 7 fl.oz + 1.6 at	17-Aug							
	Devter Mex	7 11 02 + 1.0 qt 2 1 lb	31-Aug							
5		2.1 ID 16 fl.oz	17-Sep	20	¢1 000	12906	252	E1 0	477	02.4
5	Vaccipiant	10 II 02	22 Jun	3.0	φ1,009	12090	202	51.2	17.7	93.4
		10 II 02 8 fl oz ± 16 fl oz ±	ZZ-JUII							
	EBDC*	1.6 qt	10-Jul							
	Cuprofix + Vacciplant + Microthiol Disperss	2 lb + 16 fl oz + 10 lb	19-Jul							
	Super Tin + Vacciplant + EBDC*	8 fl oz + 16 fl oz + 1.6 qt	3-Aug							
	Cuprofix + Vacciplant + Microthiol Disperss	2 lb + 16 fl oz + 10 lb	17-Aug							
	Cuprofix + Vacciplant + Microthiol Disperss + EBDC*	2 lb + 16 fl oz + 10 lb +1.6 qt	31-Aug							
	Cuprofix + Vacciplant + Microthiol Disperss	2 lb + 16 fl oz + 10 lb	17-Sep							
3	Super Tin + Topsin + EBDC*	8 fl oz + 20 fl oz + 1.6 qt	10-Jul	3.9	\$2,062	13461	256	52.5	17.9	93.5
	Dexter Max	2.1 lb	19-Jul							
	Topguard + EBDC*	14 fl oz + 1.6 qt	3-Aug							
	Super Tin + Dexter Max	8 fl oz + 2.1 lb	17-Aug							
	Topguard + EBDC*	14 fl oz + 1.6 qt	31-Aug							
	Dexter Max	2.1 lb	17-Sep							

*EBDC = Manzate

**All treatments included MasterLock @ 6.4 fl oz.

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = Leaves completely dead

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



Evaluating UPL Fungicides for Control of Cercospora Leafspot

Gruehn, Pigeon - 2021

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No.	Treatment**	Rate/A	Applic Date	CLS*** Rate 18-Oct	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
1	Super Tin + Dexter Max + Topsin	8 fl oz + 2.1 lb + 20 fl oz	10-Jul	4.0	\$2,106	13406	259	51.7	17.8	94.3
	Dexter Max	2.1 lb	19-Jul							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	3-Aug							
	Super Tin + Dexter Max	8 fl oz + 2.1 lb	17-Aug							
	Inspire XT + EBDC*	7 fl oz + 1.6 qt	31-Aug							
	Dexter Max	2.1 lb	17-Sep							
4	Vacciplant	16 fl oz	15-Jun	5.0	\$1,763	12522	251	49.8	17.8	92.9
	Vacciplant	16 fl oz	22-Jun							
	Vacciplant	16 fl oz	10-Jul							
	Vacciplant	16 fl oz	19-Jul							
	Topguard + Vacciplant + EBDC*	14 fl oz + 16 fl oz + 1.6 qt	3-Aug							
	Super Tin + Vacciplant + EBDC*	8 fl oz + 16 fl oz + 1.6 qt	17-Aug							
	Cuprofix + Vacciplant + Microthiol Disperss	2 lb + 16 fl oz + 10 lb	31-Aug							
	Topguard + Vacciplant + EBDC*	14 fl oz + 16 fl oz + 1.6 qt	17-Sep							
	Cuprofix + Vacciplant + Microthiol Disperss	2 lb + 16 fl oz + 10 lb	1-Oct							
6 Untreated Check				8.0	\$1,802	10545	249	42.4	16.8	95.2
Av	erage		4.8	1956	12721	254	50.0	17.7	93.9	
LS	5%		0.5	174.3	1019.6	n.s.	1.8	0.8	1.6	
C\	/%			9.1	7.5	6.7	5.9	3.1	3.7	1.5

*EBDC = Manzate

**All treatments included MasterLock @ 6.4 fl oz.

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = Leaves completely dead

Comments: This trial was designed to evaluate UPL fungicides for control of Cercospora leafspot. Vacciplant is a biological fungicide and Microthiol Disperss is a sulfur-based fungicide.

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



Evaluating FMC Fungicides for Cercospora Leafspot Control

Gruehn, Pigeon - 2021

Trial Quality: Good Variety: C-G932NT Planted: April 22 Harvested: October 18 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.8 pH: 6.9 CEC: 13.0
P: Above Opt K: Above Opt
Mn: High B: Medium
Added N: 35 lbs. 2X2, 120 lbs. PPI
Previous Crop: Wheat

Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in. Rainfall: 16.3 in. Beets/100 ft: 163

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

No.	Treatment**	Rate/A	Applic Date	CLS*** Rate	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
2	Koverall	2 lb	10-Jul	4.2	\$2,005	12873	264	48.7	18.3	93.7
	Koverall + Lucento	2 lb + 5.5 fl oz	19-Jul							
	Koverall + Super Tin + Topsin	2 lb + 8 fl oz + 20 fl oz	3-Aug							
	EBDC* + Lucento	1.6 qt + 5.5 fl oz	16-Aug							
	EBDC* + Super Tin	1.6 qt + 8 fl oz	30-Aug							
	EBDC* + Inspire XT	1.6 qt + 7 fl oz	17-Sep							
3	Koverall	2 lb	10-Jul	4.5	\$2,093	13431	273	49.2	18.8	93.9
	Koverall + Lucento	2 lb + 5.5 fl oz	19-Jul							
	Koverall + Super Tin + Topsin	2 lb + 8 fl oz + 20 fl oz	3-Aug							
	EBDC* + Proline	1.6 qt + 5 fl oz	16-Aug							
	EBDC* + Super Tin	1.6 qt + 8 fl oz	30-Aug							
	EBDC* + Inspire XT	1.6 qt + 7 fl oz	17-Sep							
4	Koverall	2 lb	10-Jul	4.6	\$2,001	12898	258	50.0	18.0	93.7
	Koverall + Provysol	2 lb + 5 fl oz	19-Jul							
	Koverall + Super Tin + Topsin	2 lb + 8 fl oz + 20 fl oz	3-Aug							
	EBDC* + Proline	1.6 qt + 5 fl oz	16-Aug							
	EBDC* + Super Tin	1.6 qt + 8 fl oz	30-Aug							
	EBDC* + Inspire XT	1.6 qt + 7 fl oz	17-Sep							
1	Untreated Check			7.8	\$1,795	10501	241	43.5	16.9	93.5
A١	Average			5.3	\$1,974	12426	259	47.9	18.0	93.7
LS	LSD 5%			0.6	181.8	1063.7	12.0	2.3	0.7	n.s.
C\	/%			8.8	6.7	6.2	3.4	3.5	2.7	0.7

*EBDC = Manzate

**All treatments included MasterLock @ 6.4 fl oz.

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead. **Comments:** FMC fungicide products were applied to C-G932NT. This variety is susceptible to leafspot.

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



Evaluating Gowan Fungicides for Cercospora Leafspot Control

🖫 Gruehn, Pigeon - 2021

Trial Quality: Good Variety: C-G932NT Planted: April 22 Harvested: October 18 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 in. Soil Info: Clay Loam
% OM: 3.8 pH: 6.9 CEC: 13.0
P: Above Opt K: Above Opt
Mn: High B: Medium
Added N: 35 lbs. 2X2, 120 lbs. PPI
Previous Crop: Wheat

Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in. Rainfall: 16.3 in. Beets/100 ft: 133

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

No.	Treatment**	Rate/A	Applic Date	CLS*** Rate	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				18-Oct						
2	EBDC*	1.6 qt	10-Jul	3.9	\$1,948	12623	270	46.8	18.6	94.1
	EBDC* + Proline	1.6 qt + 5.7 fl oz	19-Jul							
	EBDC* + Super Tin	1.6 qt + 8 fl oz	3-Aug							
	EBDC* + Provysol	1.6 qt + 5 fl oz	16-Aug							
	EBDC* + Super Tin	1.6 qt + 8 fl oz	31-Aug							
	EBDC*	1.6 qt	17-Sep							
3	Copper*	2 pt	10-Jul	4.0	\$2,008	12756	258	49.4	18.0	93.6
	Copper* + Eminent	2 pt + 13 fl oz	19-Jul							
	Copper* + Super Tin	2 pt + 8 fl oz	3-Aug							
	Copper* + Provysol	2 pt + 5 fl oz	16-Aug							
	Copper* + Super Tin	2 pt + 8 fl oz	31-Aug							
	Copper*	2 pt	17-Sep							
4	EBDC*	1.6 qt	10-Jul	4.0	\$1,923	12445	264	47.2	18.3	93.7
	EBDC* + Eminent	1.6 qt + 13 fl oz	19-Jul							
	EBDC* + Super Tin	1.6 qt + 8 fl oz	3-Aug							
	EBDC* + Provysol	1.6 qt + 5 fl oz	16-Aug							
	EBDC* + Super Tin	1.6 qt + 8 fl oz	31-Aug							
	EBDC*	1.6 qt	17-Sep							
1	Untreated Check			7.5	\$1,718	10048	239	41.9	16.7	93.9
A١	Average			4.8	\$1,899	11968	258	46.3	17.9	93.8
LS	LSD 5%			0.5	n.s.	1599.5	16.3	5.4	0.8	n.s.
C\	/%			7.4	10.5	9.7	4.6	8.4	3.2	1.0

*EBDC = Manzate / Copper = Badge

**All treatments included MasterLock @ 6.4 fl oz.

***Cercospora Rating (0-9 Scale): 0 = no spots, 1 = Very few spots, 5 = up to 25% injury and 9 = leaves completely dead

Comments: Gowan fungicides were applied to C-G932NT. This variety is susceptible to leafspot.

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

Cercospora leaf spot: fungicide efficacy, Ridgetown, 2021

Ridgetown, Ontario, Canada Christine Dervaric¹, Linda Hanson² & Cheryl Trueman¹, ¹University of Guelph, Ridgetown Campus, Ridgetown, ON. ²USDA-ARS, 612 Wilson Road, East Lansing, MI 48824, United States.

Trial Quality:	Very good	Variety:	HIL-9908
Planted:	May 11	Location:	Ridgetown, Ontario, Canada
Harvested:	October 18 and 19	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		

- Manzate Pro-Stick, Parasol, and Parasol with Vegol had a lower area under the disease progress curve (AUDPC) than the nontreated control.
- RWSA was higher in Cueva treatments than all other treatments but was statistically equivalent to the nontreated control.
- No significant differences were found in sugar, purity, or beet yield among treatments.

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

Treatment (product rate/Ha) ^a	Disease Severity (%) ^{b, c, d}	AUDPC	Sugar (%)	Purity (%)	RWSA (lbs/acre) ^e	Beet Yield (ton/acre)
Nontreated control	14 a ^f	476 a ^g	16 ns	95 ns	6018 ab	22 ns
Manzate Pro-Stick (2.25 kg)	11 a	144 bc	17	95	6476 ab	23
Milstop (5.6 kg)	14 a	436 a	16	95	5368 b	20
Phostrol (5.6 l)	12 a	339 ab	17	95	6405 ab	23
Cueva $(1\% \text{ v/v})$	12 a	259 abc	17	95	6982 a	25
Parasol (4.25 kg)	1 b	24 c	17	95	6923 ab	25
Vegol (1% v/v)	12 a	388 ab	16	95	5697 ab	21
Parasol (4.25 kg) + Vegol (1% v/v)	1 b	55 c	17	95	6513 ab	24
Double nickel (2.34 l)	15 a	443 a	16	95	6053 ab	23

^a Treatments were applied on June 21, July 2, July 9, July 19, July 28, August 5, August 12, August 19, August 26, September 3, September 14, and September 24. ^b Disease severity ratings from October 14, 2021, which was the height of the epidemic. ^c Means separation in this column is based on arcsine square root transformation to satisfy assumptions of normality. Original means are presented. ^d Ten plants per plot were rated on a 0-9 scale which was converted to a percent estimate of leaf area affected by CLS. ^e RWSA is the recoverable white sugar per acre. ^f Values followed by the same letter are not significantly different at p≤0.05, Tukey's HSD. ns = no significant differences. ^g Disease severity values collected biweekly were used to calculate the area under the disease progress curve (AUDPC) using the formula AUDPC = $\Sigma_{i=1}[(Y_{i+1}+Y_i)/2][X_{i+1}-X_i]$ 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.

Funding: Ontario Agri-Food Innovation Alliance.

Cercospora leaf spot: fungicide efficacy, Ridgetown, 2021

Ridgetown, Ontario, Canada Cheryl Trueman, University of Guelph, Ridgetown Campus, Ridgetown, ON

Trial Quality:	Good	Variety:	H-9908
Planted:	May 11	Location:	Ridgetown, Ontario, Canada
Harvested:	No harvest	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		

Highlights/Summary:

- Dissolvine and Bortrac did not affect Cercospora leaf spot severity compared to the control.
- Phytotoxicity symptoms were observed on leaves treated with Dissolvine at high rates (1.5 and 2.0 kg/ha).
- While soil boron levels were identified as being low, repeated foliar applications of Bortrac did not alter tissue boron levels in those treatments compared to the non-treated control.
- Baseline levels of iron in soil at the study site were 'very high' (56-72 ppm). Despite this, treatment differences were detected, but only applications of Bortrac (4.0 L/ha) following by Dissolvine (2.0 kg/ha) resulted in iron levels in plant tissue higher than the nontreated control.

Disease severity (% leaf area affected), area under the disease progress steps (AUDPS), boron and iron leaf content ten days after the last application in sugarbeet grown under iron and boron treatment schedules for management of Cercospora leaf spot, Ridgetown, ON, 2021.

	Treatment Program (per ha) ^a	Disease Severity (%) ^b Sept 2	AUDPC °	Leaf Boron (mg/kg)	Leaf Iron (mg/kg)
1	Non-treated control	6 a	59 a	52.0 a	113.5 bcd
2	EDTA @ 7.77 kg (CDEFG)	3 a	31 a	53.3 a	105.0 cd
3	Dissolvine ^b @ 0.75 kg (CDEFG)	2 a	27 a	54.3 a	125.0 a-d
4	Dissolvine @ 1.5 kg (CDEFG)	4 a	45 a	57.8 a	135.0 abc
5	Dissolvine @ 2.0 kg (CDEFG)	2 a	22 a	55.3 a	140.0 ab
6	Bortrac @ 3.0 L (AB)	3 a	37 a	55.5 a	100.8 d
7	Bortrac @ 3.5 L (AB)	4 a	37 a	55.0 a	94.3 d
8	Bortrac @ 4.0 L (AB)	3 a	31 a	54.0 a	115.0 a-d
9	Bortrac @ 3.0 L (AB)	4 a	44 a	56.5 a	112.5 bcd
	Dissolvine @ 0.75 kg (CDEFG)				
10	Bortrac @ 3.5 L (AB)	2 a	16 a	56.5 a	137.5 ab
	Dissolvine @ 1.5 kg (CDEFG)				
11	Bortrac @ 4.0 L (AB)	3 a	26 a	56.3 a	145.0 a
	Dissolvine @ 2.0 kg (CDEFG)				

^a Treatments applied: A=June 10 (4-6 leaf stage), B= June 23, C= June 29 (50 DSV accumulated), D=July 14, E=July 28, F=August 11, G=August 25. ^b Numbers in a column followed by the same letter are not significantly different at $P \le 0.05$, Tukey's adjustment. ^c AUDPC = area under the disease progress curve. A lower number is better.

Funding: Ontario Agri-Food Innovation Alliance.

Cercospora leaf spot: fungicide programs, Ridgetown, 2021

Ridgetown, Ontario, Canada Christine Dervaric¹, Linda Hanson² & Cheryl Trueman¹, ¹University of Guelph, Ridgetown Campus, Ridgetown, ON. ²USDA-ARS, 612 Wilson Road, East Lansing, MI 48824, United States.

Trial Quality:	Good	Variety:	G932NT
Planted:	April 27	Location:	Ridgetown, Ontario, Canada
Harvested:	Oct 4 & 5	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 those where three or more applications of Phostrol were applied and the calendar applications of Parasol and Vegol with and without Manzate Pro-Stick 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 purity (*data not shown*) were found among treatments.
- The calendar application of Manzate Pro-Stick with Phostrol, Parasol and Vegol (treatment 18) was the only treatment to have a greater percent sugar yield than the nontreated control (*data not shown*).

Treatment ^a (product rate/ Ha)	Disease Severity (%) ^{b,c}	AUDPC ^d	RWSA (lbs/acre) ^e	Beet Yield (ton/acre)
1. Nontreated control	50 abc $^{\rm f}$	1285 a	863 bc	38 ns ^g
BEETcast TM moderate application interval				
2. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (BG)				
Manzate Pro-Stick (2.25 kg) (EIKNPS)	28 cd	417 b-g	1032 abc	41
3. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (BG)				
Manzate Pro-Stick (2.25 kg) (EI)				
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ (KNPS)	16 d	236 e-h	1089 ab	43
4. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (BG)				
Manzate Pro-Stick (2.25 kg) (EI)				
Phostrol (5.6 L) (KNPS)	62 a	774 a-d	943 abc	39
5. Proline (365 ml) (BG)				
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ (EIKNPS)	14 d	240 e-h	1028 abc	42
6. Phostrol (5.6 L) + Proline (365 ml) (BG)				
Phostrol (5.6 L) (EIKNPS)	60 a	890 abc	905 abc	39
7. Phostrol (5.6 L) + Proline (365 ml) (BG)				
Phostrol (5.6 L) (EI)				
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ (KNPS)	16 d	295 d-g	975 abc	39
BEETcast [™] susceptible application interval				
8. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (AF)				
Manzate Pro-Stick (2.25 kg) (CGHJLNOR)	22 d	205 e-h	1058 abc	43

9. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (AF)				
Manzate Pro-Stick (2.25 kg) (CG)				
Parasol $(4.25 \text{ kg}) + \text{Vegol} (1\% \text{ v/v}) (\text{HJLNOR})$	11 d	95 h	1113 a	45
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) (CG)	(0)	165 6	004 1	4.1
Phostrol (5.6 L) (HJLNOR)	60 a	465 a-f	994 abc	41
11. Proline (365 ml) (AF) h(4.251.) + N = h(10(-1.5))(CCHH NOP)	12.1	147 1	1006 1	4.1
Parasol (4.25 kg) + Vegol (1% V/V) (CGHJLNOK)	13 d	14 / gn	1006 abc	41
12. Proline (365 ml) (AF) $Ph = 4\pi r^{1} (5 (L)) (CCLUL NOP)$	(1 -	000 -1	820 -	25
Phostrol (5.6 L) (CGHJLNOK)	61 a	880 abc	829 c	35
13. Phostrol (5.6 L) + Proline (365 ml) (AF)				
Phostrol (3.6 L) (CG) Demosal (4.25 kg) + Vagal (19(x/x) (LU NOD)	144	167 fab	1022 aba	41
Parasol $(4.25 \text{ kg}) + \text{Vegol} (1\% \text{ V/V}) (\text{HJLNOR})$	14 û	167 Ign	1023 abc	41
Calendar application interval				
14. Proline (365 ml) (BG)				
Manzate Pro-Stick (2.25 kg) (DIMQT)	30 cd	481 a-e	954 abc	40
15. Manzate Pro-Stick (2.25 kg) (BDGIMQT)	32 bcd	436 a-f	981 abc	40
16. Manzate Pro-Stick (2.25 kg) (BDGI)				
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ (MQT)	22 d	400 b-g	1065 abc	42
17. Manzate Pro-Stick (2.25 kg) + Phostrol (5.6 L)				
(BDGI)				
Phostrol (5.6 L) (MQT)	65 a	1037 ab	903 abc	39
18. Manzate Pro-Stick (2.25 kg) + Phostrol (5.6 L)				
(BDGI)				
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ + Phostrol (5.6 L)				
(MQT)	19 d	316 c-g	1113 a	44
19. Parasol (4.25 kg) + Vegol ($1\% v/v$) (BDGIMQT)	16 d	300 d-g	1027 abc	43
20. Phostrol (5.6 L) (BDGIMQT)	55 ab	984 ab	928 abc	40
21. Parasol (4.25 kg) + Vegol (1% v/v) + Phostrol (5.6				
L) (BGMQT)				
Phostrol (5.6 L) (DI)	25 d	451 b-f	941 abc	38
^a BEETcast TM moderate application programs were made	on B = Jun	e 21 (42 DSV	/), E = July 9 (33 DSV),
G = July 19 (26 DSV), I = Aug 2 (24 DSV), K = Aug 11 ((19 DSV), 1	$N = Aug \ 19 \ ($	19 DSV), $P = 1$	Aug 27
(18 DSV), and S = Sept 3 (16 DSV). BEETcast TM suscept	ible applica	ation progran	ns were made o	on A =
June 18 (33 DSV), $C = July 2$ (27 DSV), $F = July 12$ (21 DSV), $G = July 19$ (20 DSV), $H = July 27$ (16				
DSV), J = Aug 6 (13 DSV), L = Aug 12 (17 DSV), N = Aug 19 (16 DSV), O = Aug 26 (15 DSV), and R				
= Aug 31 (15 DSV).Calendar applications were made on a	a 12 to 14-c	lay interval c	on $B = June 21$	$_{\rm o}$ D = July
5, $G = July 19$, $I = Aug 2$, $L = Aug 12$, $Q = Aug 30$, and T	= Sept 14.	^D Disease sev	verity ratings fi	om
September 29, 2021, which was the height of the epidemi	c. ° Ten pla	nts per plot v	vere rated on a	0-9 scale
which was converted to a percent estimate of leaf area aff	ected by CI	LS. ^a Disease	severity value	S
collected biweekly were used to calculate the area under t	he disease i	progress curv	e (AUDPC) us	sing the

collected biweekly 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. ^e RWSA is the recoverable white sugar per acre. ^f Values followed by the same letter are not significantly different at p≤0.05, Tukey's HSD. ^g ns indicates no significant differences.

Funding: Ontario Agri-Food Innovation Alliance.

Cercospora leaf spot: fungicide programs, Ridgetown, 2021

Ridgetown, Ontario, Canada Christine Dervaric¹, Linda Hanson² & Cheryl Trueman¹, ¹University of Guelph, Ridgetown Campus, Ridgetown, ON. ² USDA-ARS, 612 Wilson Road, East Lansing, MI 48824, United States.

Trial Quality:	Good	Variety:	HIL-9908
Planted:	May 11	Location:	Ridgetown, Ontario, Canada
Harvested:	Oct 12 & 13	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 BEETcast moderate application of Proline with Phostrol, BEETcast susceptible application of Manzate Pro-Stick with Phostrol and the calendar application of Phostrol 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.
- All programs except BEETcast moderate application of Phostrol with Proline, Parasol, and Vegol and the BEETcast susceptible application of Proline with Parasol and Vegol had a percent sugar yield equivalent to that of the nontreated control.
- No significant differences in RWSA, purity (*data not shown*) or beet yield were found among treatments.

Treatment ^a (product rate/ Ha)	Disease Severity (%) ^{b, c}	AUDPC ^d	RWSA (lbs/acre) ^e	Beet Yield (ton/acre)
1. Nontreated control	9 a-f ^f	210 a	456 ns ^g	21 ns
BEETcast TM moderate application interval				
2. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (BG) Manzate Pro-Stick (2.25 kg) (EIKNPS)	2 b-h	63 c	524	21
3. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (BG) Manzate Pro-Stick (2.25 kg) (EI) Paragal (4.25 kg) + Vagal $(19(x)(x))$ (KNIPS)	2 fab	26.0	607	22
4. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (BG) Manzate Pro-Stick (2.25 kg) (EI)	2 1gn	30 0	007	22
Phostrol (5.6 L) (KNPS)	10 а-е	92 bc	591	21
5. Proline (365 ml) (BG) Parasol (4.25 kg) + Vegol (1% v/v) (EIKNPS)	1 h	10 c	622	22
6. Phostrol (5.6 L) + Proline (365 ml) (BG) Phostrol (5.6 L) (EIKNPS)	13 a	189 ab	593	21
7. Phostrol (5.6 L) + Proline (365 ml) (BG) Phostrol (5.6 L) (EI)				
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ (KNPS)	1 gh	20 c	640	22
BEETcast [™] susceptible application interval				
8. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (AF) Manzate Pro-Stick (2.25 kg) (CGHJLNOR)	1 gh	13 c	634	22
9. Manzate Pro-Stick (2.25 kg) + Proline (365 ml) (AF)	1 gh	18 c	649	23

Manzate Pro-Stick (2.25 kg) (CG)					
Parasol (4.25 kg) + Vegol (1% V/V) (HJLNOK)					_
Proline (365 ml) (AF)					
Manzate Pro-Stick (2.25 kg) + Phostrol (5.6 L) (CG)					
Phostrol (HILNOR)	11 abc	115 abc	580	20	
11 Proline (365 ml) (AF)	11 400				-
Parasol $(4.25 \text{ kg}) + \text{Vegol} (1\% \text{ v/v}) (CGHJLNOR)$	2 fgh	23 c	567	20	
12. Proline (365 ml) (AF)					-
Phostrol (5.6 L) (CGHJLNOR)	10 a-d	103 bc	549	29	
13. Phostrol (5.6 L) + Proline (365 ml) (AF)					
Phostrol (5.6 L) (CG)					
Parasol (4.25 kg) + Vegol ($1\% v/v$) (HJLNOR)	2 gh	16 c	600	22	
Calendar application interval					
14. Proline (365 ml) (BG)					
Manzate Pro-Stick (2.25 kg) (DIMQT)	7 a-g	89 bc	615	23	
15. Manzate Pro-Stick (2.25 kg) (BDGIMQT)	8 a-f	103 bc	419		
16. Manzate Pro-Stick (2.25 kg) (BDGI)					
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ (MQT)	5 c-h	42 c	606	21	
17. Manzate Pro-Stick (2.25 kg) + Phostrol (5.6 L)					
(BDGI)					
Phostrol (5.6 L) (MQT)	9 a-e	97 bc	585	22	_
18. Manzate Pro-Stick (2.25 kg) + Phostrol (5.6 L)					
(BDGI)					
Parasol (4.25 kg) + Vegol $(1\% \text{ v/v})$ + Phostrol (5.6 L)	7 11	47	5.00	20	
(MQ1)	5 d-h	47 c	560	20	_
19. Parasol (4.25 kg) + Vegol (1% v/v) (BDGIMQT)	4 d-h	55 c	558	20	_
20. Phostrol (5.6 L) (BDGIMQT)	11 ab	183 ab	519	17	
21. Parasol (4.25 kg) + Vegol (1% v/v) + Phostrol (5.6					
L) (BGMQT)					
Phostrol (5.6 L) (DI)	4 fgh	44 c	560	20	

^a BEETcastTM moderate application programs were made on B = June 21 (42 DSV), E = July 9 (33 DSV), G = July 19 (26 DSV), I = Aug 2 (24 DSV), K = Aug 11 (19 DSV), N = Aug 19 (19 DSV), P = Aug 27 (18 DSV), and S = Sept 3 (16 DSV). BEETcastTM susceptible application programs were made on A = June 18 (33 DSV), C = July 2 (27 DSV), F = July 12 (21 DSV), G = July 19 (20 DSV), H = July 27 (16 DSV), J = Aug 6 (13 DSV), L = Aug 12 (17 DSV), N = Aug 19 (16 DSV), O = Aug 26 (15 DSV), and R = Aug 31 (15 DSV).Calendar applications were made on a 12 to 14-day interval on B = June 21, D = July 5, G = July 19, I = Aug 2, L = Aug 12, Q = Aug 30, and T = Sept 14.

^b Disease severity ratings from September 29, 2021, which was the height of the epidemic.

^c Ten plants per plot were rated on a 0-9 scale which was converted to a percent estimate of leaf area affected by CLS. ^d Disease severity values collected biweekly 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.

^e RWSA is the recoverable white sugar per acre. ^f Values followed by the same letter are not significantly different at $p \le 0.05$, Tukey's HSD. ^g ns indicates no significant differences.

Funding: Ontario Agri-Food Innovation Alliance.





Utilizing Boron to Improve Cercospora beticola Resistance

Lacie Thomas, Jaime Willbur, Daniel Bublitz, and Kurt Steinke, Michigan State University See <u>soil.msu.edu</u> for more information

Location: Saginaw Valley Research and Extension Center	Tillage: Conv., 30-in. row
Planting Date: May 7, 2021 (Harvest 10/20/21)	N Rates: See below
Soil Type: Clay loam; 2.8% OM; 6.2 pH; 22 ppm P (Olsen P);	Population: 4 in. spacing
178 ppm K	
Variety: C-G932NT	Replicated: 4 replications

Table 1. Field trial treatments evaluating three rates of foliar boron on sugarbeet yield, quality, and resistance to *C. beticola*.

Treatment	Product Rate[†] and Timing[‡]
Grower Standard	Manzate Max (1.6 qt) ABCDEFG + Inspire XT (7 fl oz) BEG + Super
Fungicide	Tin (8 fl oz) CF + Priaxor (8 fl oz), Topsin (20 fl oz) D + Badge (2 pt) H
Foliar Boron – Low	
No Fungicide	SprayBor (0.1 lb) ABCDEFGH
Foliar Boron – Medium	
No Fungicide	SprayBor (0.25 lb) ABCDEFGH
Foliar Boron – High	
No Fungicide	SprayBor (0.5 lb) ABCDEFGH
Grower Standard +	SprayBor (0.1 lb) ABCDEFGH +Manzate Max (1.6 qt) ABCDEFG +
Foliar Boron Low	Inspire XT (7 fl oz) BEG + Super Tin (8 fl oz) CF + Priaxor (8 fl oz),
	Topsin (20 fl oz) D + Badge (2 pt) H
Grower Standard +	SprayBor (0.25 lb) ABCDEFGH +Manzate Max (1.6 qt) ABCDEF +
Foliar Boron Medium	Inspire XT (7 fl oz) BEG + Super Tin (8 fl oz) CF + Priaxor (8 fl oz),
	Topsin (20 fl oz) D + Badge (2 pt) H
Grower Standard +	SprayBor (0.5 lb) ABCDEFGH +Manzate Max (1.6 qt) ABCDEF +
Foliar Boron High	Inspire XT (7 fl oz) BEG + Super Tin (8 fl oz) CF + Priaxor (8 fl oz),
	Topsin (20 fl oz) D + Badge (2 pt) H
Check	No Fungicide, No Foliar Boron

[†]All rates, unless otherwise specified, are listed as a measure of product per acre.

[‡]Application letters code for the following dates: A=28 Jun, B=12 Jul, C=26 Jul, D=5 Aug E= 16 Aug F= 25 Aug G= 9 Sept H= 27 Sept.

Treatment	Tons/A	RWSA	RWST	% Sugar	% CJP
Grower Standard Fungicide	39.8 a	9599 a	241 a	16.4 a	94.9
Foliar Boron – Low (FBL), No Fungicide	24.2 c	4976 c	205 b	14.2 b	94.5
Foliar Boron – Medium (FBM), No Fungicide	20.0 d	4078 c	202 b	14.0 b	94.2
Foliar Boron – High (FBH), No Fungicide	23.3 cd	4757 с	204 b	14.2 b	94.7
Grower Standard + FBL	36.9 ab	8962 ab	243 a	16.4 a	94.5
Grower Standard + FBM	34.6 b	7996 b	232 a	15.8 a	94.7
Grower Standard + FBH	34.1 b	8741 ab	241 a	16.3 a	95.0
Check - No Fungicide, No Boron	24.1 cd	4930 c	205 b	14.2 b	94.5
Pr > F	< 0.01	< 0.01	< 0.01	< 0.01	NS

Table 2. Sugarbeet 2021 yield, recoverable sugar per acre (RWSA), recoverable sugar per ton (RWST), sugar %, and clear juice purity (CLP).

[†]Values followed by the same lowercase letter are not significantly different at (α =0.1).

Table 3. Gross grower payment and profitability analysis less trucking cost.

Treatment	Gross Grower Payment (\$/A)	Net Economic Return Minus Trucking [‡] (\$/A)
Grower Standard Fungicide	1004 a	855 a
Foliar Boron – Low (FBL), No Fungicide	520 c	430 c
Foliar Boron – Medium (FBM), No Fungicide	426 c	351 c
Foliar Boron – High (FBH), No Fungicide	497 с	410 c
Grower Standard + FBL	937 ab	799 ab
Grower Standard + FBM	836 b	707 b
Grower Standard + FBH	914 ab	778 ab
Check - No Fungicide, No Boron	515 c	426 c
Pr > F	< 0.01	< 0.01

[†]Values followed by the same lowercase letter are not significantly different at (α =0.1).

[‡]Gross grower payment and net economic returns based upon harvest date adjustment factor for tonnage and RWST and trucking costs of \$3.75/T.

Table 4. 2021 final disease index ratings.

Treatment	Disease Index [†] Sept. 9	Disease Index Sept. 27
Grower Standard Fungicide	17.3 b	41.5 c
Foliar Boron – Low (FBL), No Fungicide	89.0 a	73.8 a
Foliar Boron – Medium (FBM), No Fungicide	87.5 a	61.3 b
Foliar Boron – High (FBH), No Fungicide	88.8 a	71.3 ab
Grower Standard + FBL	21.3 b	30.0 cd
Grower Standard + FBM	20.3 b	31.3 cd
Grower Standard + FBH	12.5 b	28.0 d
Check - No Fungicide, No Boron	90.0 a	80.0 a
Pr > F	< 0.01	< 0.01

[†]Values followed by the same lowercase letter are not significantly different at (α =0.1).

[‡] Disease index calculated from disease incidence and severity ratings recorded every 10-14 days post infection.

Table 5. Boron tissue concentration at 14-16 leaf stage.

Treatment	14-16 Leaf Tissue B Analysis (ppm)
Grower Standard Fungicide	33
Foliar Boron – Low (FBL), No Fungicide	33
Foliar Boron – Medium (FBM), No Fungicide	34
Foliar Boron – High (FBH), No Fungicide	34
Grower Standard + FBL	37
Grower Standard + FBM	33
Grower Standard + FBH	36
Check - No Fungicide, No Boron	35
Pr > F	NS

[†]Values followed by the same lowercase letter are not significantly different at (α =0.1).

Table 6. Estimated EC50 values of boron compounds across C. beticola isolates 'Range A' and 'Blum 1-2.'

Isolate	Compound	EC50 [†] Estimate (ppm)
Blum 1-2	Boric Acid	>1,000
Blum 1-2	Sodium Tetraborate	761
Blum 1-2	Thiophanate-Methyl	< 1
Range A	Boric Acid	>1,000
Range A	Sodium Tetraborate	572
Range A	Thiophanate-Methyl	>1,000

[†]Value of half maximal effective concentration i.e., 50% growth reduction as compared to control.

Figure	1. Day 21	radial	growth of	С.	beticola	isolate	'Blum	1-2.	,
	2		0						



[†]Sodium tetraborate (1A), boric acid (1B), thiophanate-methyl (1C) concentrations displayed left to right (0, 1, 10, 50, 100, 300, 500 ppm).



Figure 2. Day 21 radial growth of C. beticola isolate 'Range A.'

[†]Sodium tetraborate (2A), boric acid (2B), thiophanate-methyl (2C) concentrations displayed left to right (0, 1, 10, 50, 100, 300, 500 ppm).

Summary: Trial quality was fair. Trial was established to evaluate the efficacy of foliar-applied boron for managing Cercospora leaf spot (CLS) in sugarbeet. Boron-containing compounds may have fungistatic properties as recent work has found reduced *in vitro* fungal growth and decreased disease severity in the field. All treatments received 90 lbs. N A⁻¹ as pre-plant urea. Sidedress at 60 lbs N A⁻¹ as UAN was applied at the 4-6 leaf stage on June 1. Warm April soil temperatures followed by a frost on April 20 resulted in stand loss and replant on May 7. Treatments initiated on June 28 and continued every 10-14 days through September 27. Applications were made using a CO₂ powered backpack sprayer equipped with four TJ 8002XR nozzles (30-in spacing), calibrated at 15 gal/A. Inoculation of *C. beticola* (100 spores/mL) was applied at 15 gal/A using a tractor mounted sprayer on July 12. Disease ratings were collected biweekly starting July 26 and continued until September 27. Plots were assigned a severity rating using the following scale based on infected leaf area: 1=0.1% (1-5 spots/leaf), 2=0.35% (6-12 spots/leaf), 3=0.75% (13-25 spots/leaf), 4=1.5% (26-50 spots/leaf), 5=2.5% (51-75 spots/leaf), 6=3%, 7=6%, 8=12% 9=25%, 10=50%. Disease incidence was recorded to represent the frequency of new lesion activity. First CLS observation was documented July 2.

Preliminary data indicate the grower standard fungicide program and grower standard fungicide + FBL boron maximized tonnage with the standard fungicide program driving differences in RWSA and RWST. *In vitro* analysis of boron-containing products demonstrated reduced relative growth with concentrations >100 ppm. Additional testing at field-representative rates will occur to validate current findings. Benzimidazole resistance was confirmed in *C. beticola* isolate 'Range A' (Figure 2C) via PCR-RFLP assay. *C. beticola* resistance to fungicides, sugarbeet varietal advancement, and production efficiency requirements encourages the search for alternative CLS management strategies.

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Evaluation of foliar fungicides to manage Cercospora leaf spot of sugar beet in Michigan, 2021

Location: Frankenmuth (SVREC)	Treatment Timings: 14-day interval starting at 35 DSV
Planting Dates: May 7, 2021	Pesticides: see table
Soil Type: Loam	O.M.: 5.0 pH: 7.5
Replicates: 4	Variety: SX-2296N

Chris Bloomingdale and Jaime Willbur, Michigan State University

Summary: Significant differences in area under the disease progress curve (AUDPC) were observed in this trial (P < 0.0001). All fungicide programs had significantly lower disease severity than the non-treated control. The lowest AUDPC values were observed in programs 7 and 11, however, these did not perform differently than half of the other tested programs. Significant differences were observed in estimated yield values for programs (P < 0.0001). Values ranged between 16.8 and 25.7 t/A, and 10 of the 20 programs had significantly greater yields than the non-treated control. Differences were also observed in the percent sugar (P < 0.0001) and RWST values (P < 0.0001).

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

No.	Treatment, Rate ^a , and Timing ^b	AUDP	C ^{c, d}	Yield	(t/A)	Sugar	r (%)	RWST	re
1	Non-treated Control	103.8	а	19.8	e-g	15.0	g	216.5	f
6	Provysol (2.5 fl oz) ABCDE	80.5	b	17.3	fg	15.1	fg	217.0	f
12	Luna Flex (13.7 fl oz) ABCDE	57.0	c	16.8	g	15.8	d-f	229.5	d-f
13	Koverall (2 lb) ABCDE; Lucento (5.5 fl oz) B;	56.5	c	24.3	a-d	16.4	a-e	239.0	a-e
	Super Tin (8 fl oz) CE; Topsin (20 fl oz) C;								
	Provysol (4 fl oz) D								
8	Proline (5.7 fl oz) ABCDE	56.3	c	25.3	ab	16.2	a-e	234.8	a-e
5	Inspire XT (7 fl oz) ABCDE	54.0	c	22.1	b-e	16.2	b-e	235.9	a-e
17	Koverall (1.5 lb) ABDE; Sipcam TPTH (8 fl oz)	53.8	cd	24.0	a-d	16.9	а	247.3	а
	ACE; Minerva (13 fl oz) B; Spinnaker (1.5 lb) C;								
	Inspire XT (7 fl oz) D								
14	Koverall (2 lb) ABCDE; Lucento (5.5 fl oz) B;	51.0	cd	24.5	a-d	16.5	a-d	243.0	a-d
	Super Tin (8 fl oz) CE; Topsin (20 fl oz) C;								
16	Proline (5 fl oz) D	51.0	1	21.5	1	16.0	1	0.45.1	1
16	Manzate Max (1.6 qt) ABCDE;	51.0	cd	21.5	de	16.8	ab	245.1	ab
	Eminent (13 fl oz) B; Super 1 in (8 fl oz) CE;								
10	$\frac{Provysol(5 II oz) D}{Caraoa} = \frac{Provysol(5 II oz) D}{Provysol(22 fl oz)}$	50.8		22.7	0.0	16.6	0.0	242.0	
19	ACE: Koverall (1.5 lb) RDE: Minerva (12 fl oz)	30.8	c-e	22.1	a-e	10.0	a-c	243.8	a-c
	ACE, Koverall (1.5 lb) BDE , While Va (15 ll 02) B: Inspire XT (7 fl oz) D								
2	Manzate Max (1.6 at) ABCDE ^{\cdot}	47.8	c-f	21.1	c-f	16.1	h-e	234.1	h-e
2	Inspire XT (7 fl oz) BD:	17.0	v I	21.1	U I	10.1	00	231.1	00
	Super Tin (8 fl oz) CE								
3	Growthful Post (3.5 fl oz) banded;	45.0	c-f	21.9	c-e	15.7	e-g	227.7	ef
	Manzate Max (1.6 qt) ABCDE;						0		
	Growthful Post (12.8 fl oz) ABCDE;								
	Inspire XT (7 fl oz) BD								
15	Badge (2 PT) ABCDE; Eminent (13 fl oz) B;	45.0	c-f	24.4	a-d	16.7	ab	243.4	a-d
	Super Tin (8 fl oz) CE; Provysol (5 fl oz) D								
18	Koverall (1.5 lb) ABDE; Minerva (13 fl oz) B;	42.0	c-f	25.7	a	16.5	a-d	240.8	a-d
	Sipcam TPTH (8 fl oz) CE; Miramar (21.8 fl oz)								
	C; Inspire XT (7 fl oz) D								

Table 1. Continued from previous page.

No.	Treatment, Rate ^a , and Timing ^b	AUDP	UDPC ^{c, d} Yiel		Yield (t/A)		Sugar (%)		re
20	Cercos (23 fl oz) AC; Minerva (13 fl oz) A;	42.0	c-f	22.6	a-e	16.1	b-e	232.9	b-e
	Sipcam TPTH (8 fl oz) BD; Koverall (1.5 lb)								
	BDE; Inspire XT (7 fl oz) C								
10	Delaro (11 fl oz); Proline (1.71 fl oz) ABCDE	36.0	d-f	24.5	a-d	16.6	a-d	244.4	a-c
9	Propulse (13.6 fl oz) ABCDE	33.0	ef	25.1	a-c	16.6	a-c	242.6	a-d
4	Experimental 1 (10.8 fl oz) ABCDE	32.8	f	23.7	a-d	16.2	a-e	236.5	a-e
7	Experimental 2 (12 fl oz) ABCDE	30.0	f	21.5	de	16.0	c-e	231.6	c-e
11	Delaro Complete (11 oz)	30.0	f	25.7	а	16.7	ab	244.5	ab
	Proline (1.71 fl oz) ABCDE								

^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: banded=22 Jun, A=6 Jul, B=20 Jul, C=3 Aug, D=17 Aug, E=2 Sep. ^c Area under the disease progress curve was calculated using disease severity scores (0-10 scale) collected Jul 1, Jul 23, and Aug 16.

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

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





Inoculum reduction strategies for improved management of Cercospora leaf spot on sugar beets, 2020-21

Alexandra Hernandez¹, Daniel Bublitz¹, Tom Wenzel¹, Chris Bloomingdale¹, Cameron Pincumbe¹ Sarah Ruth¹, Linda E. Hanson^{1,2}, and Jaime F. Willbur¹; ¹Michigan State University; ²United States Department of Agriculture – Agricultural Research Service

Background: This research aims to identify, develop, and deploy novel, long-term CLS management strategies. Observations of *C. beticola* survival over the winter, early-season inoculum and spore presence, and disease pressure overtime have helped us to identify opportunities for further improvement in CLS management. End-of-season management strategies were assessed to reduce *C. beticola* inoculum levels and CLS disease pressure in the field.

Location: Saginaw (SVREC)	Treatments: described below
Planting Date: May 7, 2021	Variety: C-G932NT (Inoculated July 9 and July 23, 2020)
Harvest: September 17, 2021	Replicates: 4

Methods: From 2020-21, experiments were repeated to evaluate the following fall treatments: 1) nontreated control, 2) plow immediately post-harvest, 3) heat treatment at 1 mph prior to defoliation at-harvest, 4) desiccant (saflufenacil) 7 days pre-harvest, and 5) heat treatment at 3 mph. In 2020, treatments were applied to 10 x 60 ft plots, surrounded by a 10-ft buffer of winter wheat followed by soybean, and replicated four times in a randomized complete block design. Leaf samples were collected from each plot at harvest before topping and evaluated 0-, 45-, 90-, and 135-days post-harvest (DPH) to assess *C. beticola* survival over the winter, determined using the percentage of lesion sporulation and isolation frequency from treated leaves. Leaf degradation over time was also evaluated.

In 2021, highly susceptible sentinel beets (germplasm F1042) and bi-weekly CLS ratings in re-planted plots were used to assess the efficacy of inoculum reduction strategies. Yield and sugar data were collected to assess the long-term efficacy of inoculum reduction strategies. Statistical analyses (mixed model ANOVA) were conducted in SAS v. 9.4 and evaluated at the α =0.05 significance level. Fisher's protected Least Significance Difference was used for mean comparisons.

Summary: In 2020 (following treatment application), significant differences were detected in percent lesion sporulation at-harvest (P < 0.0001, Fig. 1A), 45-DPH (P < 0.01, Fig 1B), and 90-DPH (P < 0.05, Fig. 1C) samples (N=160 leaves and 200 lesions per timepoint). No differences were detected in isolation frequencies of *C. beticola* from leaf samples evaluated at-harvest, 45-, 90-, and 135-DPH. Additionally, no differences were observed in percent sugar or RWST. Significant differences in percent leaf degradation, calculated using initial leaf weight at-harvest and final weight post-harvest, were detected in 90- (P < 0.05) and 135-DPH (P < 0.01) leaf samples. In 2021 (the year following treatment application), both heat treatments resulted in significantly fewer lesions on sentinel beets from June 1-8 (P < 0.05, Fig. 2A) and the 1 mph heat treatment resulted in significantly fewer lesions on sentinel beets June 15-22 (P < 0.05, Fig. 2B) compared to the non-treated control (N=60 beets per timepoint). Area under the disease progress curve (AUDPC) values were significantly different among treatments (P < 0.01, Fig. 2C); the plow and heat treatments resulted in significantly lower CLS than the non-treated control. Results from repeated experiments (2019-20 and 2020-21) consistently suggest the use of a foliar burner at-harvest has the potential to significantly reduce inoculum overwintering and CLS levels the following year.

An additional trial is in-progress to evaluate the following additional fall treatments: wheeler rye cover crop at 67 kg/ha planted immediately post-harvest, factory lime at 3 and 6 tons/acre applied immediately post-harvest, and heat treatment at 3 mph prior to defoliation. Evaluations will continue into the 2022 growing season.





Figure 2. Early-season inoculum and subsequent CLS observations in 2021 following end-of-season treatments applied in 2020. **A-B)** Spot counts were collected from four sentinel beets placed in the center of each treated plot, left for seven days, incubated in a moist chamber for 3 days, and kept in a greenhouse for 21 days to promote symptom development. **C)** Area under the disease progress curve (AUDPC) generated from CLS ratings (0-10 scale) collected 15 Jun to 10 Aug. Means of bars with the same letters were not different based on Fisher's protected LSD at α =0.05.

Acknowledgements: This work is supported by the Michigan Sugar Company, USDA-ARS, Project GREEEN, Sugarbeet Advancement, and the USDA National Institute of Food and Agriculture, Hatch project 1020281.

Figure 1. A) At-harvest, **B)** 45-, and **C)** 90-day post-harvest lesion sporulation following fall treatments applied in 2020. Leaf samples from each treated plot were placed in a moist chamber for three days. Then CLS lesions were assessed by observing characteristic C. beticola sporulation under a stereomicroscope (X7-X30 magnification). Means of bars with the same letters were not different based on Fisher's protected LSD at α =0.05.

Project **GREEEN**

AgBioResearch

100%

75%

50%

25%

0% 100%

75%

50%

25%

0%

100%

75%

50%

25%

0%

Percent Sporulating CLS Lesions

MICHIGAN STATE UNIVERSITY

а

а

а

control

ab

b

b

MICHIGAN STATE

UNIVERSITY

At harvest A

(P < 0.0001)

С

(P < 0.01)

(P < 0.05)

b

b

EXTENSIO

b

45-days post-harvest B

а

90-days post-harvest C

а

С

b

b

Plow Heat (1 mph) Desiccant (2 mph)





PCR-based fungicide resistance screening in *Cercospora beticola* **populations in Michigan, 2021** Alexandra Hernandez¹, Chris Bloomingdale¹, Sarah Ruth¹, Mio Sato-Cruz¹, Daniel Bublitz¹, Linda E. Hanson^{1,2}, and Jaime F. Willbur¹; ¹Michigan State University; ²USDA-ARS

Background: There are multiple fungicide groups that are commonly used and registered for CLS management in sugar beet including methyl benzimidazole carbamates (MBC or benzimidazole, FRAC group 1), quinone outside inhibitors (QoI or strobilurin, FRAC group 11), demethylation inhibitors (DMI or triazole, FRAC group 3), and multi-site contact activity (FRAC group M03) fungicide classes. Reduced sensitivity to QoI, MBC, and DMI fungicides has been detected and extensively monitored in *C. beticola* populations in Michigan (Weiland and Halloin 2001, Kirk et al. 2012, Bolton et al. 2012, Rosenzweig et al. 2015, Rosenzweig et al. 2020). PCR-based methods to detect mutations associated with fungicide resistance could provide timely and field specific guidance to improve CLS management.

Methods: Testing was conducted using polymerase chain reaction restriction fragment length polymorphism (PCR-RFLP) assays to detect point mutations in the *C. beticola* genome associated with fungicide resistance. Twenty-nine field locations were sampled across nine counties in east-central Michigan. QoI resistance was determined using the G143A point mutation present in the fungal mitochondrial cytochrome b gene of *C. beticola* isolates characterized to be resistant to pyraclostrobin, with EC₅₀ values >100 ppm (Rosenzweig et al. 2015). MBC resistance was determined using the E198A point mutation present in the beta-tubulin gene of *C. beticola* isolates characterized to be resistant to be resistant to benzimidazole, with EC₅₀ values \geq 60 ppm (Rosenzweig et al. 2015). DMI resistance was associated with the Glu169 (GAA to GAG) mutation present in the C-14 alpha-demethylase gene of *C. beticola* isolates characterized to be highly resistant to epoxiconazole, with EC₅₀ values of 65-115 ppm (Nikou et al. 2009). These results will be validated using *in vitro* methods (Truman et al. 2017, Rosenzweig et al. 2020).

Summary: High frequencies of QoI resistance were observed across all locations and dates; of the 386 isolates tested, 385 were found to contain the G143A mutation. The percentage of resistant isolates detected in a field ranged from 87-100% for QoIs, 0-100% for MBCs and 0-81% for DMIs. By the final sampling of the season, mutations for resistance to QoIs and MBCs were present in 100% of the fields tested, while the mutation conferring high levels of resistance to DMIs was found in 83% of fields. Many fields were sampled several times to investigate changes in fungicide resistance over time (in progress).

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	No	Total	Strabilurin (Ool)	Benzimidazole	Triazole (DMI)
County	INU.	Total Somplor ^a	% Desistent	(MBC)	% Highly
	Locations	Samples."	70 Resistant	% Resistant	Resistant
Arenac	2	16	100.0	62.5	23.1
Bay	7	117	100.0	58.1	29.6
Gladwin	2	16	100.0	80.0	37.5
Gratiot	2	32	100.0	21.9	53.6
Huron	3	32	100.0	87.5	6.7
Midland	1	8	100.0	62.5	50.0
Saginaw	3	48	97.9	47.8	15.2
Sanilac	4	48	100.0	51.1	17.0
Tuscola	5	69	100.0	80.3	28.4

Table 1. Frequencies of C. beticola resistance detected by Michigan county in 2021

^a Samples tested were either single sporulating lesions selected from 4-16 leaves per location or mycelial tissue collected from pure cultures after isolation of *C. beticola* from lesions on symptomatic leaves.





Table 2. Frequencies of C. beticola resistance detected at final sampling dates (Aug-Oct) in Michigan in 2021

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	Field		No	Strobilurin	Benzimidazole	Triazole (DMI)
Date	Location	County	Samples ^a	(QoI)	(MBC)	% Highly
	Location			% Resistant	% Resistant	Resistant
9-Aug	Sandusky	Sanilac	8	100.0	100.0	0.0
16-Aug	Auburn	Bay	16	100.0	75.0	37.5
1-Sep	Ruth	Huron	8	100.0	62.5	0.0
1-Sep	Ubly	Huron	8	100.0	100.0	0.0
1-Sep	Sandusky	Sanilac	8	100.0	100.0	28.6
7-Sep	Cass City	Tuscola	8	100.0	57.1	25.0
7-Sep	Crump	Bay	8	100.0	100.0	25.0
10-Sep	Freeland	Saginaw	8	100.0	83.3	12.5
13-Sep	Gladwin	Gladwin	8	100.0	71.4	12.5
15-Sep	Midland	Midland	8	100.0	62.5	50.0
15-Sep	Gilford	Tuscola	8	100.0	100.0	57.1
16-Sep	Standish	Arenac	8	100.0	62.5	14.3
16-Sep	Auburn	Bay	8	100.0	87.5	25.0
17-Sep	Pinconning	Bay	8	100.0	12.5	0.0
17-Sep	Au Gres	Arenac	8	100.0	62.5	33.3
18-Sep	Brown City	Sanilac	8	100.0	37.5	12.5
18-Sep	Croswell	Sanilac	8	100.0	50.0	12.5
22-Sep	Auburn	Bay	8	100.0	100.0	0.0
22-Sep	Freeland/	Saginaw	8	100.0	62.5	37.5
	Saginaw					
24-Sep	Unionville	Tuscola	8	100.0	100.0	12.5
24-Sep	Beaverton	Gladwin	8	100.0	87.5	62.5
3-Oct	Munger	Bay	8	100.0	87.5	28.6
3-Oct	Akron	Tuscola	8	100.0	87.5	37.5
10-Oct	Fairgrove	Tuscola	8	100.0	66.7	14.3
15-Oct	Ithaca	Gratiot	8	100.0	37.5	14.3
19-Oct	Auburn	Bay	8	100.0	37.5	25.0
21-Oct	Freeland	Saginaw	8	100.0	12.5	16.7
23-Oct	Caseville	Huron	8	100.0	87.5	14.3
24-Oct	Breckenridge	Gratiot	8	100.0	37.5	20.0
Total	29 Locations	9 Counties	240	100.0	70.0	21.7

^a Samples tested were either single sporulating lesions selected from 4-16 leaves per location or mycelial tissue collected from pure cultures after isolation of C. beticola from lesions on symptomatic leaves.

Acknowledgements: We thank the Michigan sugar beet industry for access to these fields and thank Sugarbeet Advancement and the Michigan Sugar Company for collection of sample materials. This work is supported by the Michigan Sugar Company, MSU AgBioResearch, USDA-ARS, and the Beet Sugar Development Foundation.

Title: Beet cyst nematode management using different types of compost

Objective: To evaluate the effect of Layer ash blend (LAB) and LAB and gypsum on beet cyst nematode (BCN) population and sugar beet yield.

Treatments:

Treatments	Rate/A	Application timing
Layer ash blend	1 ton	Planting time
Layer ash blend + gyp	1 ton	Planting time
Untreated Check		

Experiment Design and Location

The site for this trial was located at 43.507682°, -83.731216°. The site was prepared and sugar beets were planted on April 23, 2021. Four replications of each treatment were planted in a Randomly complete block design. As the sugar beets in this trial grew and developed, regular application of pesticides was made to control weeds, insects, and diseases in the plot area by Michigan Sugars' team.

Data Collection:

There were various forms and types of data collected as part of this trial. The key data collected for this study are listed in the following table. All data were collected from each plot unless otherwise indicated. Data were analyzed using R.

Data Collection	Unit of Measure	Timing of Data Collection	Comments
Plant (plot) vigor	Vigor	Mid-season vigor ratings	1-10 scale, 1 is optimal and 10 would be dead.
Nematode pressure	Nematode (juv / eggs /cysts / 100 cc soil)	At planting & at harvest	Composite soil sample for each plot
Sugar analysis	% & % purity	At harvest	
Yield	Tons / acre	At crop maturity	

Results:

Nematode study

Beet cyst nematodes present in each plot were sampled twice during the 2021 growing season. The initial samples were collected on April 23, before planting and the final samples were collected on the day of harvest (October 12). The number of beet cyst nematode females, eggs, and second-stage juveniles was counted per 100 cc of soil and the data has been presented below. Compost treatments used have no clear effect on BCN population reduction (Figures 1 and 2). There were no significant differences in the number of eggs and J2s by treatments. Further research is necessary to conclude the effectiveness of the compost layer ash blend and its combination with the gypsum for the management of BCN.


Fig. 1. The number of eggs and second stages juveniles (J2) during planting time of 2021 field season.



Fig. 2. The number of eggs and second-stage juveniles (J2s) during harvest time of 2021 field season.

Sugar beet plant vigor evaluation:

Plant vigor was evaluated as it related to plant development, size, and overall color of the plants in August 2021. All plots were visually evaluated on a scale of 1-10 with a 10 representing optimal development and color The plots with layer ash blend + gypsum have good plant vigor in comparison to control and just layer ash blend numerically but not significantly different.

Sugar beet yield evaluation Ton/acre and Sugar Contain:

Sugar beet was harvested on October 12 by the Michigan Sugar team and yield data was provided. The data were analyzed using R. Sugar beet yield per ton/acre by treatment was not significantly different (Figure 3). Similarly, the sugar content was not significantly different by treatment.



Fig. 3. Sugar beet yield (Ton/Acre) for the 2020 growing season by treatment.



Fig. 4. Sugar contains on sugar beets field season 2021 by treatment.

Conclusion:

The compost treatment has no clear effect on the nematode population and sugar beet plant vigor yield and sugar content. Further research might be useful to understand the effects of the treatment. Along with the repeat of the field trial, laboratory work on the effect of the treatment on the BCN egg hatching and juvenile mortality might give a clear picture.



Gilford - 2021

Trial Quality: Excellent	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7	Cerc Control: Good
Planted: April 20	P: Above Opt K: Above Opt	Problems: None
Harvested: October 15	Mn: Medium B: Medium	Seeding Rate: 4.1 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: see individual treatments	Rainfall: 12.32 in.
Row Spacing: 22 in.	Previous Crop: Corn	Beets/100 ft: 213

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

No.	Treatment	Rate/A	Applic Timing	Applic Method	Vigor* 0-10	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
4	Lintro ato d. Cha alí				27-May	¢1.000	0200	050	26.4	47.4	00.0
1	Untreated Check	400 1		DDI	7.5	\$1,626	9300	258	36.1	17.1	96.3
2	Nitrogen	160 lb	Pre-Plant	PPI	7.6	\$1,887	10929	245	44.7	16.3	96.3
3	Nitrogen	120 lb	Pre-Plant	PPI	8.4	\$1,914	11081	251	44.1	16.8	95.7
	Nitrogen	40 lb	At Plant	2X2				0.70		10.0	
4	Nitrogen	60 lb	Pre-Plant	PPI	8.3	\$1,992	11567	252	46.1	16.8	95.9
	Nitrogen	40 lb	At Plant	2X2							
	Nitrogen	60 lb	6 lf	Streamer		-					
5	Nitrogen	40 lb	At Plant	2X2	8.6	\$1,889	10993	236	46.6	15.8	96.1
	Nitrogen	60 lb	6 lf	Streamer							
	Nitrogen	60 lb	12 lf	Streamer							
6	Nitrogen	40 lb	At Plant	2X2	8.6	\$1,832	10623	240	44.2	16.2	95.5
	Nitrogen	120 lb	6 lf	Streamer							
7	Nitrogen	60 lb	Pre-Plant	PPI	7.6	\$1,938	11259	248	45.4	16.6	95.6
	Nitrogen	40 lb	At Plant	2X2							
	Nitrogen	60 lb	6 lf	Fluted							
8	Nitrogen	40 lb	At Plant	2X2	8.4	\$1,906	11050	241	46.0	16.2	95.5
	Nitrogen	120 lb	6 lf	Fluted							
9	Nitrogen	40 lb	At Plant	2X2	7.9	\$1,931	11193	239	46.8	16.0	96.0
	Nitrogen	120 lb	12 lf	Streamer							
10	Nitrogen	160 lb	6 lf	Streamer	7.5	\$1,926	11162	246	45.3	16.4	96.1
11	Nitrogen	160 lb	6 lf	Fluted	8.4	\$1,918	11118	253	43.9	16.9	95.8
12	Nitrogen	40 lb	At Plant	2X2	7.8	\$2,009	11516	260	44.2	17.3	96.0
13	Nitrogen	60 lb	Pre-Plant	PPI	8.6	\$1,808	10489	242	43.4	16.3	95.5
	Nitrogen	100 lb	6 lf	Streamer							
14	Nitrogen	100 lb	Pre-Plant	PPI	7.6	\$1,894	10980	253	43.5	16.9	95.8
	Nitrogen	60 lb	6 lf	Streamer							
A۱	verage				81	\$1 891	10947	247	44.3	16.6	95.9
1.9	LSD 5%			ns	211.6	1210 1	14.1	4.9	0.8	0.6	
C\	/%				11.0.	78	77	4.0	7.8	3.5	0.4
					11.7	1.0	1.1	ч. 0	7.0	0.0	0.7

*Vigor 0 to 10 ratings, 10 is the best

Comments: Nitrogen was applied as 28% UAN (40 lbs = 13 gal, 60 lbs = 20 gal, 120 lbs = 40 gal, 160 lbs = 53 gal). Quadris at 10 fl oz/A, and Mustang Maxx at 4 fl oz/A were applied in a 3.5 in band in-furrow for all treatments. No other nutrients were applied in this study.

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



Gilford - 2021

Trial Quality: Excellent	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7	Cerc Control: Good
Planted: April 20	P: Above Opt K: Above Opt	Problems: None
Harvested: October 15	Mn: Medium B: Medium	Seeding Rate: 4.1 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: see individual treatments	Rainfall: 12.32 in.
Row Spacing: 22 in.	Previous Crop: Corn	Beets/100 ft: 212
Application: 2X2 on planter. 6 If stat	ge incorporated with fluted coulter (between rows).	

			Annlia	Vig	or*					0/	0/
No.	Treatment	Rate/A	Timina	0-	10	Net \$/A	RWSA	RWST	T/A		
			rinning	27-May	3-Aug					300	CJP
1	Untreated Check			5.5	8.3	\$1,695	9693	269	36.0	17.7	96.6
2	Potassium	150 lbs	PPI	6.9	8.4	\$1,844	10734	270	39.8	17.8	96.1
3	Potassium	300 lbs	PPI	5.9	8.6	\$1,787	10573	273	38.7	17.9	96.7
4	Nitrogen	40 lbs	2X2	7.5	8.6	\$1,974	11403	260	43.9	17.2	96.4
	Nitrogen	40 lbs	6 lf								
5	Potassium	150 lbs	PPI	7.8	9.0	\$2,025	11889	261	45.5	17.4	96.0
	Nitrogen	40 lbs	2X2								
	Nitrogen	40 lbs	6 lf								
6	Potassium	300 lbs	PPI	6.8	8.9	\$2,004	11934	266	44.8	17.5	96.5
	Nitrogen	40 lbs	2X2								
	Nitrogen	40 lbs	6 lf								
7	Nitrogen	40 lbs	2X2	6.8	9.1	\$1,934	11232	252	44.6	16.8	96.0
	Nitrogen	120 lbs	6 lf								
8	Potassium	150 lbs	PPI	7.5	9.3	\$2,065	12172	260	46.8	17.3	96.1
	Nitrogen	40 lbs	2X2								
	Nitrogen	120 lbs	6 lf								
9	Potassium	300 lbs	PPI	7.5	9.4	\$1,957	11719	251	46.6	16.8	95.8
	Nitrogen	40 lbs	2X2								
	Nitrogen	120 lbs	6 lf								
10	Nitrogen	40 lbs	2X2	6.4	8.8	\$1,835	10691	233	45.8	15.9	95.2
	Nitrogen	160 lbs	6 lf								
11	Potassium	150 lbs	PPI	7.0	9.3	\$2,027	11983	254	47.1	16.9	96.1
	Nitrogen	40 lbs	2X2								
	Nitrogen	160 lbs	6 lf								
12	Potassium	300 lbs	PPI	7.8	8.9	\$1,910	11477	243	47.2	16.3	95.7
	Nitrogen	40 lbs	2X2								
	Nitrogen	160 lbs	6 lf								
A١	Average			6.9	8.9	\$1,922	11292	258	43.9	17.1	96.1
LS	SD 5%			1.9	0.5	194.8	1113.8	16.5	3.3	0.9	0.7
C١	/%			18.8	3.9	7.1	6.9	4.5	5.3	3.8	0.5

*Vigor 0 to 10 ratings, 10 is the best

Conversions: 150 lbs of actual potassium (250 lbs Potash), 300 lbs potassium (500 lbs Potash). 40 lbs of actual nitrogen (13 gal/A UAN 28%), 60 lbs N (20 gal/A UAN 28%), 120 lbs N (40 gal/A UAN 28%), 160 lbs N (53 gal/A UAN 28%).

- **Comments:** Treatments were structured to evaluate the early-season interaction between nitrogen and potassium. Quadris and Mustang Maxx were applied in-furrow for all treatments. Trial management resulted in excellent disease control, excellent weed control, and pesticide applications were equal across treatments. This trial was conducted in 2020 and repeated in 2021 with an adjusted protocol. Treatment 12 includes our highest nitrogen and potassium rates at 160 lbs applied and 300 lbs applied, respectively, and resulted in high tons/A (47.2 tons/A) Treatments combining lower rates (for example, treatment 8) resulted in similar tonnage (46.8 tons/A), but RWST and % sugar were significantly greater. Nitrogen was applied as 28% UAN (40 lbs = 13 gal, 120 lbs = 40 gal, 160 lbs = 53 gal). Potassium was applied as Potash (K20). No other nutrients were applied in this study.
- \$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of \$.155 minus fertilizer and application cost.



Trial Quality: Good	Soil Info: Clay Loam
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7
Planted: April 21	P: Above Opt K: Above Opt
Harvested: October 15	Mn: Medium B: Medium
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress
Row Spacing: 22 in.	Previous Crop: Corn
Application: JD 3520 tractor mo	ounted plot sprayer, compressed air, 15.3 gpa - Foliar 7" ba

Rhizoc Level: Low Cerc Control: Good Problems: None Seeding Rate: 4.1 in. Rainfall: 12.32 in. Beets/100 ft: 213

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

No.	Treatment	Rate/A	Applic	Applic	Vigor*	Vigor* 0-10		RWSA	RWSA	RWSA RWS	RWSA RW	RWST	T/A	%	B/100	
			Date	Method	27-May	3-Aug					SUC	5-May	25-May			
7	Levesol + K-19	2 qt + 3 qt	21-Apr	2X2	7.5	9.3	\$2,106	12337	255	48.4	17.1	213	266			
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	21-Apr	IF												
3	Quadris + Mustang Maxx + Levesol	10 fl oz + 4 fl oz + 2 qt	21-Apr	IF	7.5	9.3	\$2,049	12016	249	48.3	16.9	219	263			
4	Quadris + Mustang Maxx + Levesol + Cygin	10 fl oz + 4 fl oz + 2 qt + 2 fl oz	21-Apr	F	7.4	8.9	\$2,087	12229	260	47.1	17.4	208	283			
5	Quadris + Mustang Maxx + Levesol + Cygin + K-19	10 fl oz + 4 fl oz + 2 qt + 2 fl oz + 3 qt	21-Apr	IF	7.4	9.1	\$1,979	11655	246	47.4	16.5	212	271			
2	Quadris + Mustang Maxx + Paralign	10 fl oz + 4 fl oz + 3 gal	21-Apr	IF	7.3	9.1	\$2,121	12422	257	48.4	17.1	213	272			
6	Levesol	2 qt	21-Apr	2X2	7.3	8.9	\$2,104	12286	254	48.4	17.0	213	263			
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	21-Apr	IF												
8	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	21-Apr	IF	7.1	9.4	\$2,121	12387	260	47.6	17.4	214	271			
	Levesol	2 qt	9-Jun	sidedress												
1	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	21-Apr	IF	7.0	9.4	\$2,070	12090	254	47.7	17.1	211	271			
Average			7.3	9.2	\$2,080	12178	254	47.9	17.1	213	270					
LSD 5%			n.s.	0.4	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	15.2					
C	V%				9.1	3.0	4.6	4.5	4.1	3.0	3.7	7.1	3.8			

*Vigor 0 to 10 ratings, 10 is the best

Comments: UAN 28% + 10-34-0 + Thio-Sul (8 gal + 6 gal + 4 gal) was applied 2X2 on April-21 for each treatment. Levesol was included in this application for treatments 6 and 7 at a rate of 2 qt/A. All treatments included Cerium Elite + Moxon MN + Moxon Boron + EB Mix + K-19 (.25 qt + 1 qt + 1 pt + 1 pt + 1 qt) applied on June-24.

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



Gilford - 2021

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7	Cerc Control: Good
Planted: April 21	P: Above Opt K: Above Opt	Problems: None
Harvested: October 15	Mn: Medium B: Medium	Seeding Rate: 4.1 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Rainfall: 12.32 in.
Row Spacing: 22 in.	Previous Crop: Corn	Beets/100 ft: 257
Anniliantiana, ID 2500 transfer manual	ad alat announce as was seen all all 45.0 and 5 Talian 71 has	

Application: JD 3520 tractor mounted plot sprayer, compressed air, 15.3 gpa - Foliar 7" band Monosem 6-row Agronomy Planter, compressed air, 30 psi, 9 gpa - IF, 3.5" band

No.	Treatment**	Rate/A	Applic Date	Applic Method	Vigor* 0-10	Net \$/A	RWSA	RWST	T/A	% SUC	Beets	s/100 ft
			Dato	mounou	3-Aug						5-May	25-May
4	Quadris + Mustang Maxx + Season Pass Plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	8.3	\$1,872	11013	256	43.0	17.2	189	267
	Korrect Plus	1 gal	6-Jul	Broadcast								
	Korrect Plus	1 gal	31-Aug	Broadcast								
10	Quadris + Mustang Maxx + Season Pass Plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	8.1	\$1,882	11108	258	43.0	17.2	181	261
	Over Pass 10-2-10	2 gal	6-Jul	Broadcast								
	Korrect Plus	1 gal	17-Sep	Broadcast								
8	Quadris + Mustang Maxx + Season Pass plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	8.0	\$1,953	11511	263	43.9	17.5	192	261
	Over Pass 10-2-10	2 gal	6-Jul	Broadcast								
	Korrect Plus	1 gal	31-Aug	Broadcast								
2	Quadris + Mustang Maxx + Season Pass plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	7.8	\$1,971	11484	261	43.9	17.4	160	254
	Korrect Plus	1 gal	6-Jul	Broadcast								
6	Quadris + Mustang Maxx + Season Pass Plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	7.6	\$1,964	11350	258	44.0	17.3	181	255

All Treatments** had UAN 28% (8 gal) + 10-34-0 (6 gal) and Thio-sul (4 gal) added 2X2 on April 21

*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 fertilizer and application cost.



The Andersons Plant Health Trial

Gilford - 2021

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No.	Treatment	Rate/A	Applic	Applic Mothod	Vigor* 0-10	Net \$/A	RWSA	RWST	T/A	%	Beets	/100 ft
			Date	Welliou	3-Aug					300	5-May	25-May
9	Quadris + Mustang Maxx + Season Pass Plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	7.5	\$1,951	11536	258	44.7	17.2	174	248
	Over Pass 10-2-10	2 gal	6-Jul	Broadcast								
	Over Pass 10-2-10	2 gal	31-Aug	Broadcast								
3	Quadris + Mustang Maxx + Season Pass Plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	7.5	\$1,907	11118	256	43.4	17.2	181	266
	Korrect Plus	1 gal	31-Aug	Broadcast								
5	Quadris + Mustang Maxx + Season Pass Plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	7.5	\$1,883	11073	247	44.9	16.6	172	262
	Korrect Plus	1 gal	6-Jul	Broadcast								
	Korrect Plus	1 gal	17-Sep	Broadcast								
7	Quadris + Mustang Maxx + Season Pass Plus Diamond Carb	10 fl oz + 4 fl oz + 4 gal	21-Apr	IF	7.1	\$1,948	11389	257	44.2	17.2	168	259
	Over Pass 10-2-10	2 gal	6-Jul	Broadcast								
1	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	21-Apr	IF	7.1	\$1,963	11224	255	44.0	17.0	188	245
Ave	Average				9.2	\$1,929	11281	257	43.9	17.2	179	258
LSD 5%				n.s.	n.s.	n.s.	7.4	n.s.	0.5	n.s.	n.s.	
CV	%				3.6	4.3	4.2	2.0	3.8	1.9	13.0	7.3

All Treatments** had UAN 28% (8 gal) + 10-34-0 (6 gal) and Thio-sul (4 gal) added 2X2 on April 21 *Vigor: 0 to 10 ratings, 10 is the best

Comments: This trial was designed to evaluate the Anderson's Plant Health products for safety, yield, and quality.

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



Gilford - 2021

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7	Cerc Control: Good
Planted: April 21	P: Above Opt K: Above Opt	Problems: None
Harvested: October 15	Mn: Medium B: Medium	Seeding Rate: 4.1 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Rainfall: 12.32 in.
Row Spacing: 22 in.	Previous Crop: Corn	Beets/100 ft: 249
Application: ID 3520 tractor m	ounted plot aprover, compressed air, 15.2 and Ediar	7" bond

Application: JD 3520 tractor mounted plot sprayer, compressed air, 15.3 gpa - Foliar 7" band Monosem 6-row Agronomy Planter, compressed air, 30 psi, 9 gpa - IF, 3.5" band

No	Treaturent	Dete/A	Applic	Vig	or*	Not ¢/A		DWet	T/A	%	%
NO.	Treatment	Nate/A	Date	0- 27-May	3-Aug	Nel \$/A	RWJA	RWSI	I/A	SUC	CJP
4	K-19 + Cerium Elite	1 qt + .25 qt	23-Jun	6.6	9.0	\$1,938	11375	258	44.1	17.2	95.9
	K-19 + Cerium Elite	1 qt + .25 qt	28-Jul								
	K-19 + Cerium Elite	1 qt + .25 qt	25-Aug								
1	Cerium Elite	.25 qt	23-Jun	6.6	9.1	\$2,011	11670	260	44.9	17.3	95.9
	Cerium Elite	.25 qt	28-Jul								
	Cerium Elite	.25 qt	25-Aug								
3	Moxon Boron + EB Mix + Cerium Elite	1 pt + 1 pt + .25 qt	23-Jun	6.5	9.0	\$1,992	11799	266	44.4	17.7	95.7
	Moxon Boron + EB Mix + Cerium Elite	1 pt + 1 pt + .25 qt	28-Jul								
	Moxon Boron + EB Mix + Cerium Elite	1 pt + 1 pt + .25 qt	25-Aug								
2	Moxon MN + Cerium Elite	1 qt + .25 qt	23-Jun	6.4	9.4	\$1,995	11699	261	44.8	17.3	96.2
	Moxon MN + Cerium Elite	1 qt + .25 qt	28-Jul								
	Moxon MN + Cerium Elite	1 qt + .25 qt	25-Aug								
Av	verage			6.5	9.1	\$1,984	\$11,636	\$261	44.6	17.4	95.9
LS	LSD 5%			n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
C١	/%			8.6	2.6	3.8	3.7	2.8	2.1	3.0	0.4

*Vigor 0 to 10 ratings, 10 is the best

Comments: 2X2, UAN 28 % + 10-34-0 + Thio-Sul (8 gal + 6 gal + 4 gal) as well as In-furrow, Quadris + Mustang Maxx (10 fl oz + 4 fl oz) were applied at planting to all plots. Each treatment included three applications of Cerium Elite.

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



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Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7	Cerc Control: Good
Planted: April 20	P: Above Opt K: Above Opt	Problems: None
Harvested: October 15	Mn: Medium B: Medium	Seeding Rate: 4.5 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Rainfall: 12.32 in.
Row Spacing: 22 in.	Previous Crop: Corn	Beets/100 ft: 187
Application: JD 3520 tractor mounted p	lot sprayer, compressed air, 15.3 gpa - Foliar 7" band	

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

No.	Treatment	Rate/A	Applic Date	Applic Method	Vige 0-1 27-Mav	or* 10 3-Aua	Net \$/A	RWSA	RWST	T/A	% suc	% CJP	B/1 5-Mav	00 ft 25-Mav
3	UAN 28% + 10-34-0 + Thio-Sul + Nucleus 0-0-21-13	8 gal + 6 gal + 4 gal + 2 gal	20-Apr	2X2	8.2	9.0	\$2,012	11878	263	45.3	17.5	95.8	202	258
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	IF										
	UAN 28% + HM2020-04 + Water	36 gal + 2 gal + 2 gal	11-Jun	Fluted Coultier										
	CoRon Metra 25-0-0-5% + K-Leaf Versa 0-0-29	2 gal + 2 qt	2-Aug	Broadcast										
6	UAN 28% + 10-34-0 + Thio -Sul + Zypro	8 gal + 6 gal + 4 gal + 8 fl oz	20-Apr	2X2	8.1	8.8	\$2,047	11828	255	46.4	16.9	96.0	180	246
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	IF										
	Zypro	8 fl oz	11-Jun	Broadcast										
2	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8 gal + 6 gal + 4 gal + 1 pt	20-Apr	2X2	7.7	9.1	\$1,989	11636	252	46.2	16.7	96.4	189	256
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	IF										
	Hydra-Hume	2 gal	11-Jun	Fluted Coultier										
4	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.6	9.0	\$2,035	11686	259	45.2	17.2	95.9	190	255
	Quadris + Mustang Maxx + Zypro + Grounded	10 fl oz + 4 fl oz + 8 fl oz + 1 pt	20-Apr	IF										

*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 fertilizer and

application cost.



Helena Plant Health

MICHIGAN SUGAR Gilford - 2021

No.	Treatment	Rate/A	Applic	Applic	Vig 0-1	or* I0	Net \$/A	Net \$/A	RWSA	RWST	T/A	%	%	B/1	00 ft
			Date	Method	27-May	3-Aug					500	CJP	5-May	25-May	
1	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.4	9.1	\$1,968	11254	256	43.9	17.1	95.9	186	244	
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	IF											
5	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.3	9.0	\$1,978	11495	257	44.8	17.0	96.4	177	242	
	Quadris + Mustang Maxx + Zypro + Grounded + Nucleus O-Phos	10 fl oz + 4 fl oz + 8 fl oz + 1 pt + 2 gal	20-Apr	IF											
A	Average					9.0	\$2,005	11630	257	45.3	17.1	96.1	187	250	
LS	LSD 5%					n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	
C	CV%				7.5	3.6	5.4	5.4	4.5	4.5	3.4	0.7	13.6	6.5	

*Vigor 0 to 10 ratings, 10 is the best

Comments: This trial was designed to test Helena Plant Health products. In-furrow products were tested for crop safety to help improve sugarbeet yield and quality.

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



Gilford - 2021

Trial Quality: Good	Soil Info: Clay Loam
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7
Planted: April 20	P: Above Opt K: Above Opt
Harvested: October 15	Mn: Medium B: Medium
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress
Row Spacing: 22 in.	Previous Crop: Corn
Application: JD 3520 tractor mounted	ed plot sprayer, compressed air, 15.3 gpa - Foliar 7" band

Rhizoc Level: Low Cerc Control: Good Problems: None Seeding Rate: 4.1 in. Rainfall: 12.32 in. Beets/100 ft: 246

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

No.	Treatment	Rate/A	Applic	Applic	Vig 0-′	or* 10	Net \$/A	RWSA	RWST	T/A	%	%	Beets	s/100 ft
			Date	Method	27-May	3-Aug					SUC	CJP	5-May	25-May
1	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.4	9.1	\$1,968	11254	256	43.9	17.1	95.9	186	244
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	In-Fur										
2	UAN 28% + 10-34-0 + Thio-Sul + Growth Boost	8 gal + 6 gal + 4 gal + 1 qt	20-Apr	2X2	7.4	8.9	\$1,910	11002	254	43.3	16.8	96.3	191	250
	Quadris + Mustang Maxx + SB-4400	10 fl oz + 4 fl oz + 1 pt	20-Apr	In-Fur										
3	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.3	9.3	\$2,082	12023	260	46.2	17.1	96.7	190	240
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	In-Fur										
	SB Super Sweet + Growth Supplement 30	1 qt + 8 fl oz	1-Jul	Broad										
	SB Super Sweet + Growth Supplement 30	1 qt + 8 fl oz	2-Aug	Broad										
	SB Super Sweet + Growth Supplement 30	1 qt + 8 fl oz	31-Aug	Broad										
Av	Average				7.4	9.1	\$1,987	11426	257	44.5	17.0	96.3	189.1	244.6
LS	LSD 5%				n.s.	n.s.	n.s.	n.s.	n.s.	2.6	n.s.	n.s.	n.s.	7.2
C\	/%				6.6	3.3	5.1	5.1	2.6	3.4	2.2	0.6	10.2	1.7

*Vigor 0 to 10 ratings, 10 is the best

Comments: This trial was designed to test SoilBiotics Plant Health products. Products did not resolve in significant injury. Treatment 3 improved sugar Ton/A and included SB Super Sweet and Growth Supplement 30 applied broadcast.

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



Gilford, MI - 2021

Trial Quality: Excellent	Soil Info: Clay Loam	Rhizoc level: Low
Variety: C-G675	% OM: 6.0 pH: 8.1 CEC: 26.7	Cerc Control: Goo
Planted: April 20	P: Above Opt K: Above Opt	Problems: None
Harvested: October 15	Mn: High B: Medium	Seeding Rate: 4.1
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress	Rainfall: 12.32 in.
Row Spacing: 22 in.	Previous Crop: Crop	Beets/100 ft: 250
Annie 10 2000 tractor manue	kard what a wave a second size of Company Callier 70 has	

Good

4.1 in.

Application: JD 3520 tractor mounted plot sprayer, compressed air, 15.3 gpa - Foliar 7" band Monosem 6-row Agronomy Planter, compressed air, 30 psi, 9 gpa - IF, 3.5' band

No.	Treatment	Rate	Applic	Applic	Vigor*		Net \$/A	RWSA	A RWST T/A	T/A	T/A %		/100 ft
			Date	Method	27-May	3-Aug					SUC	5-May	25-May
2	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	8.0	9.3	\$2,004	11516	252	45.6	16.8	192	258
	Quadris + Mustang Maxx + Envita	10 fl oz + 4 fl oz + 3.2 fl oz	20-Apr	In-Fur									
4	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.8	9.1	\$1,996	11566	248	46.6	16.6	188	251
	Quadris + Mustang Maxx + Envita	10 fl oz + 4 fl oz + 3.2 fl oz	20-Apr	In-Fur									
	Envita	3.2 fl oz	11-Jun	Band									
3	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.6	9.3	\$2,023	11663	254	45.9	17.0	193	246
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	In-Fur									
	Envita	3.2 fl oz	11-Jun	Band									
1	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	2X2	7.4	9.1	\$1,968	11254	256	43.9	17.1	186	244
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr	In-Fur									
Average					7.7	9.2	\$1,998	11500	253	45.5	16.9	190	250
LS	LSD 5%					n.s.	n.s.	n.s.	n.s.	2.1	n.s.	n.s.	n.s.
C	CV%					4.0	4.0	3.9	3.8	2.9	2.9	0.4	4.7

*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.

Comments: Envita ia a biological product with a reported potential for nitrogen fixation. Treatments including envita significantly increased tons/A.



Gilford - 2021

Trial Quality: GoodSoil Info: Clay LoamVariety: C-G675% OM: 6.0 pH: 8.1 CEC: 26.7Planted: April 20P: Above Opt K: Above OptHarvested: October 15Mn: Medium B: MediumPlots: 6 rows X 38 ft, 4 repsAdded N: 35 lbs. 2X2, 120 lbs. sidedressRow Spacing: 22 in.Previous Crop: CornApplication: JD 3520 tractor mounted plot sprayer, compressed air, 15.3 gpa - Foliar 7" band

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

Rhizoc Level: Low Problems: None Seeding Rate: 4.1 in. Rainfall: 12.32 in. Beets/100 ft: 251

		Rate/A	Applic	Vig	or*					%	%	B/100
NO.	Treatment	Rate/A	Date	0- 27-Mav	10 3-Aug	Net \$/A	RWSA	RWSI	I/A	SUC	CJP	25-Mav
3	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	8.4	9.3	\$1,943	11242	254	44.3	16.9	96.0	250
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr									
	Growthful In-Furrow	2 gal	26-Apr									
2	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	7.8	9.3	\$1,966	11248	250	44.9	16.8	95.4	252
	Quadris + Mustang Maxx + Growthful In- Furrow	10 fl oz + 4 fl oz + 22 fl oz	20-Apr									
4	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	7.7	9.1	\$2,079	12000	257	46.8	17.1	96.1	258
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr									
	Growthful Post Emergence	12.8 fl oz	2-Aug									
	Growthful Post Emergence	12.8 fl oz	2-Sep									
1	UAN 28% + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	20-Apr	7.4	9.1	\$1,968	11254	256	43.9	17.1	95.9	244
	Quadris + Mustang Maxx	10 fl oz + 4 fl oz	20-Apr									
Average					9.2	\$1,989	11436	254	45.0	17.0	95.8	251
LSD 5%					n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
C\	/%			5.5	3.3	7.4	7.4	4.0	5.9	3.5	0.5	5.4

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

Comments: This trial was designed to evaluate in-furrow and post-emergence formulations of Growthful. Treatments compare the soil-applied formulation (in-furrow) and the foliar-applied formulation (post emergence).

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



Clover vs. Radish Trial Sylvester Farms, Fairgrove - 2021

Trial Quality:	Very Good	Soil Type:	Loam	Rhizoc Control	Good control: Quadris		
Variety:	C-G752NT	Fertilizer:	Fall: Variable rate potash;		I.F. (10 oz + Mustang), Foliar et 8 loof (12 oz)		
Planted:	March 22		2x2: 7 gal 28%, 7 gal				
Harv/Samp:	Oct 13 / Oct 11		micros; PPI: 43 gal of 28%	Cerc Control:	Good/Fair control: See		
Plot Size:	5 reps	Prev Crop:	Wheat		below for materials		
Row Spacing	20 inch	Weather:	Freezing temps early. Dry	Other Pests:	Sugarbeet cyst		
Seeding Rate	: 68,000		spring, very good for remainder of season.		nematode		

Treatment	Net	Gross	RWSA	RWST	T/A			Populat 100 Ft.	Dead Beets/	Sug N	jarbeet (lematod	Cyst e
	\$/A	\$/A				Sugar		60 Day	1200Ft	Cysts	Eggs	J2's
Radish	\$1,892	\$1,981	11159	253	44.1	17.2	94.0	156	3	3	164	92
Check	\$1,948	\$1,958	11029	255	43.3	17.3	94.1	152	7	8	780	204
Clover	\$1,818	\$1,843	10385	238	43.6	16.3	93.9	153	16	6	284	116
	.	.	(0050	0.40	10 -	(0.0			_		100	40-
Average	\$1,886	\$1,927	10858	249	43.7	16.9	94.0	154	8	6	409	137
LSD 5%	N.S.	110.7	623.9	12.0	N.S.	0.7	N.S.	N.S.	8.8	N.S.	N.S.	N.S.
CV %	4.0	3.9	3.9	3.8	1.4	3.1	0.2	6.0	71.5	81.4	84.7	131.0
p-value	0.0744	0.0446	0.0446	0.0455	0.2042	0.0361	0.3332	0.7969	0.0276	0.2355	0.0506	0.6043

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 2020, and the radish (Defender) was planted with a drill following wheat harvest in the summer of 2020. The check had a herbicide application to control weeds. 2021 was the second year this trial was conducted. The results from the first year (2020 beet crop) showed that both cover crops had a positive impact on yield, increasing RWSA, tons per acre, and gross revenue as compared to the check. After the expenses for each cover crop were included, clover had a significantly higher net revenue than either the radish or the check. This year (2021 beet crop), the clover cover crop had a negative impact on the beet crop, with a significantly lower RWSA, RWST, % sugar, and gross revenue as compared to the other two treatments. When expenses were included, there was no significant difference between any of the treatments. One possible explanation for clover's surprisingly poor performance is that since this area experienced an exceptionally dry spring, the nitrogen produced by the clover was not used or leached out of the soil as quickly as in previous years. Since more nitrogen remained in the soil and was available later in the season, this may have caused the lower sugar levels observed in the clover treatment, thus negatively impacting RWSA. 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 a UTV; 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: 1. EBDC only, 2. Provysol, 3. Priaxor + Topsin, 4. Super Tin, 5. Delaro, 6. Super Tin, 7. Propulse. All applications included an EBDC and MasterLock. 2021 is the second year this trial was conducted. To see the results from the first year, go to page 78 of the 2020 REACh Research Results book.

\$/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.



Levesol Applied In-Furrow Harrington Farms Inc., Akron - 2021

Trial Quality: Variety: Planted: Harv/Samp:	Excellent C-G752NT April 3 Nov 3 / Oct 11	Soil Type: Fertilizer:	Loam Fall: 300# potash, 50# MAP; 2x2: 15 gal 28%, 10 gal 10-34-0 + micros; S.D.: 35 gal 28%	Rhizoc Control:	Good control: Quadris I.F. (6.4 oz) w/ Mustang (1 oz); Foliar: banded at 6-8 leaf with Quadris (10.5 oz) and Mustang (1 oz)
Plot Size:	6 reps	Prev Crop:	Wheat w/ clover & alfalfa	Cerc Control:	Good control: See
Row Spacing:	28 inch	Weather:	Freezing temps early. Dry		comments for materials.
Seeding Rate:	54,000		spring, warm fall with above average rain.	Other Pests:	Sugarbeet cyst nematode

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		
							12 Day	46 Day	
Check	\$1,788	11537	257	44.9	17.5	94.5	139	238	
Levesol	\$1,786	11524	257	44.9	17.4	94.2	142	240	
Average	\$1,787	11531	257	44.9	17.5	94.4	140	239	
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
CV %	2.9	2.9	2.2	1.2	1.5	0.4	15.7	4.0	
p-value	0.9501	0.9501	0.9340	0.9973	0.5412	0.1664	0.8015	0.6209	

Comments: Levesol, from West Central, is 2% nitrogen fertilizer and a pure chelating agent that can be mixed with fertilizer and fungicide in-furrow. According to the manufacturer, the chelating agent makes nutrients more available for uptake by plants. The treatments were T-band applied with the in-furrow Quadris. The Check treatment was 6.4 oz/acre of Quadris and 1 oz/acre of Mustang. The Levesol treatment contained Quadris, Mustang, and Levesol at 2 qt/acre. No significant differences were found between the Check and Levesol treatments. The leafspot materials were as follows: 6/24 EBDC + 20-20-20, 7/3 Provysol + EBDC + Manganese, 7/19 Tin + Topsin, 8/3 Inspire + EBDC + Boron, 8/17 Tin + Priaxor, 8/31 Proline + EBDC + Boron, 9/16 Tin + EBDC. All applications included MasterLock.

Gross \$/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 or Accomplish In-Furrow Schindler Farms, Kawkawlin - 2021

Trial Quality:	Excellent	Soil Type:	Loam	Rhizoc Control:	Very Good control: I.F.	
Variety:	B-197N	Fertilizer:	Fall: 200# potash; 2x2:		only. See comments	
Planted:	April 6		20 gal of 18-14.3-3.6S +	Cerc Control:	Good control: See	
Harv/Samp:	Nov 7 / Oct 19		28%		comments for materials.	
Plot Size:	6 reps	Prev Crop:	Wheat			
Row Spacing:	22 inch	Weather:	Generally very good.	Other Pests:	N/A	
Seeding Rate:	62,000					

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		
					S		16 Day	45 Day	
Levesol	\$1,820	11743	263	44.7	17.6	95.68	85	132	
Accomplish LM	\$1,817	11720	259	45.2	17.4	95.68	77	131	
Check	\$1,804	11641	257	45.3	17.3	95.48	91	139	
Average	\$1.81/	11701	260	45.1	17.4	95.61	85	13/	
Average	φ1,014	11701	200	45.1	17.4	95.01	00	134	
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	0.17	N.S.	N.S.	
CV %	2.0	2.0	1.5	1.8	1.3	0.1	21.9	13.4	
p-value	0.7467	0.7467	0.0620	0.3614	0.0509	0.0404	0.5186	0.7126	

Comments: Levesol, from West Central, is 2% nitrogen fertilizer and a pure chelating agent that can be mixed with fertilizer and fungicide in-furrow. According to the manufacturer, the chelating agent makes nutrients more available for uptake by the plants. Accomplish LM, produced by Agricen, is also designed to make nutrients more available to the plants. The manufacturer claims it does this by helping to convert organic nutrients into the readily available inorganic form. 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 Accomplish LM treatment contained Quadris, Mustang, and Accomplish at 1 qt/acre. The differences between the treatments for RWST and % Sugar were significantly different at a 10% confidence level, with Levesol being significantly higher than the check (LSD 10% of 4.1 and 0.2 respectively). The leafspot materials were as follows: 7/2 Inspire XT, 7/19 Tin, 8/2 Delaro + Proline, 8/16 Tin, 8/31 Priaxor, 9/18 Tin. All applications included an EBDC and Liberate surfactant.

Gross \$/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:	Fair, see comments	Soil Type:	Loam	Rhizoc Control: Excellent control:		
Variety:	C-G752NT	Fertilizer:	PPI: 33 gal 28%; 2x2: 13		AZteroid I.F. (5.5 oz)	
Planted:	Replanted April 29		gal 28% + 5 gal 10-34-0 + 4	Cerc Control:	Good control: See	
Harv/Samp:	Nov 5 / Oct 20		gai Thiosul + T qt Mh & B		comments for	
Plot Size:	5 reps	Prev Crop	:Wheat w/ clover		materials	
Row Spacing:	20 inch	Weather:	Generally very good. Frost	Other Pests:	N/A	
Seeding Rate:	60,000		contributed to need for replant.			

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP
Duo Maxx	\$1,876	12106	255	47.4	17.1	94.8
Check	\$1,850	11932	256	46.7	17.2	95.0
Average	\$1,863	12019	256	47.0	17.2	94.9
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.9	3.9	3.1	2.7	2.5	0.3
p-value	0.5904	0.5904	0.9693	0.4449	0.8158	0.4106

Comments: Duo Maxx is an NPK stabilizer and microbial activator produced by Timac Agro. According to the manufacturer, this product is intended to prevent fertilizer loss and encourage the growth of microorganisms in the soil. This location experienced freezing conditions in April, which reduced the stand drastically. The field was replanted into that poor stand. Duo Maxx was applied mixed with the 2x2 in the first planting at a rate of 8.0 oz per acre. As a result of needing to be replanted, this trial alone may not be the best representation of Duo Maxx's effectiveness. The leafspot program is as follows: 6/24 EBDC, 7/5 Propulse, 7/16 Priaxor, 8/1 Tin, 8/15 Provysol, 9/1 Gem, 9/15 Tin. All applications included and EBDC and Masterlock.

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

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



Aqueus Growthful Lutz Farm LLC, Unionville - 2021

Trial Quality:	Excellent	Soil Type:	Loam	Rhizoc Control	Good control: Quadris I.F.	
Variety:	B-188N	Fertilizer:	PPI: 25 gal 28%; 2x2: 12		only (11 oz)	
Planted:	April 6		gal 28 + 2 gal Loveland	Cerc Control:	Excellent control: See	
Harv/Samp:	Sept 30 / Sept 27		Black Label + 2 gal Thiosul		comments for materials.	
Plot Size:	6 reps	Prev Crop:	Wheat w/ clover			
Row Spacing:	28 inch	Weather:	Generally good. Periods of	Other Pests:	N/A	
Seeding Rate:	55,000		dry during summer.			

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets /
							21 Day	49 Day	1200 Ft
Growthful	\$2,203	11336	264	42.9	17.8	95.3	187	201	42
Check	\$2,197	11306	263	43.0	17.7	95.4	189	206	32
			1	1	1				
Average	\$2,200	11321	264	43.0	17.8	95.3	188	204	37
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	1.3	1.3	1.5	1.2	1.3	0.1	13.3	10.9	63.9
p-value	0.7438	0.7438	0.7498	0.9265	0.7995	0.8602	0.8466	0.6727	0.4910

Comments: Growthful is a soil amendment produced by Aqueus. According to the manufacturer, Growthful provides a number of benefits to the soil, such as buffering pH, improving nutrient availability, and increasing water and nutrient retention. These soil benefits should help to improve overall plant health by increasing nutrient availability and tolerance to abiotic stress. In this trial, Growthful was applied 3 times: in-furrow with Quadris at 17.5 oz per acre, on June 3 (10-12 leaf stage) at a rate of 12.8 oz per acre, and finally on June 22 (nearly row closure) at 12.8 oz per acre. No significant differences were observed between Growthful and the Check. The leafspot program was as follows: 6/30 EBDC, 7/10 Inspire XT, 7/27 Tin + Topsin, 8/4 Provysol, 8/16 Tin, 8/23 Priaxor, 8/31 Proline, 9/19 Mastercrop (copper). All applications except the last one included an EBDC and Masterlock.

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

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



NDemand + Boron Trial LAKKE Ewald Farms, Unionville - 2021

Trial Quality:	Excellent	Soil Type:	Loam	Rhizoc Control:	Good/Fair control:
Variety:	B-197N	Fertilizer:	PPI: 150#N by 28%; 2x2:		Quadris I.F. & foliar
Planted:	April 25		14 gal 28% + 4 gal 10-34-0	Cerc Control:	Good control: See
Harv/Samp:	Sept 15 / Sept 14		+ 3 gal Thiosul + 1 qt Mn + 1 pt B		comments for
Plot Size:	6 reps	Prev Crop:	Drybeans		materials
Row Spacing:	20 inch	Weather:	Generally good. Very dry at	Other Pests:	N/A
Seeding Rate:	63,000		times during summer.		

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP
Check	\$2,188	10033	238	42.1	16.3	95.2
NDemand & Boron	\$2,140	9811	236	41.5	16.2	95.2
Average	\$2,164	9922	237	41.8	16.3	95.2
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	2.2	2.2	1.1	1.4	0.9	0.4
p-value	0.1377	0.1377	0.1655	0.1608	0.2302	0.8641

Comments: It is a commonly held opinion that foliar nutrient applications can improve the health and disease tolerance of sugarbeets, leading to higher yields. SBA has conducted other trials investigating the impact of foliar feed nitrogen and boron products, first in 2018 and again in 2020. In 2018, NDemand and Boron led to a significant increase in tons per acre. In 2020, Novus and Boron showed no significant difference in any of the observed metrics. In this 2021 trial, NDemand and FOLI-GRO Boron 10% were tested. Both the NDemand and Boron treatments were applied a total of five times, on the same day as the 2nd - 6th leafspot applications. For ease of doing the trial, the NDemand (40 oz/acre) and FOLI-GRO Boron 10% (10 oz/acre) treatment was made immediately before the leafspot application. This year, no significant differences were observed between the Check and the NDemand & Boron treatment. The leafspot program was as follows: 6/24 EBDC, 7/4 Propulse, 7/20 Tin, 8/2 Provysol, 8/17 Tin, 8/30 Proline. All applications included EBDC + Masterlock.

Gross \$/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 variety in each column. **N.S. –** not significant



Pop-up Fertilizer with AZteroid Richmond Brothers, Pigeon - 2021

Trial Quality:	Excellent	Soil Type:	Loam	Rhizoc Control:	Excellent control: see	
Variety:	C-G675	Fertilizer:	I.F. pop-up, 2x2, PPI,		treatments of I.F.	
Planted:	April 25		streamer, and manure.		received foliar	
Harv/Samp:	Nov 9 / Nov 1		products and rates.		azoxystrobin	
Plot Size:	6 reps	Prev Crop:	Wheat with oats & radish	Cerc Control:	Excellent control: See	
Row Spacing:	22 inch	Weather:	Drier summer than most		comments for materials	
Seeding Rate:	72,000		of the growing area, but generally very good	Other Pests:	N/A	

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. 30 Day	Dead Beets / 1200 Ft
AZteroid + Great Start + Mustang	\$1,877	12108	264	45.9	17.5	96.4	247	2
AZteroid + Mustang	\$1,870	12067	263	45.8	17.5	96.3	240	2
Check (No In-Furrow)	\$1,867	12046	264	45.6	17.6	96.3	249	4
Average	\$1,871	12074	264	45.8	17.6	96.3	245	3
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	0.1	1.9	2.0	1.1	1.7	0.2	5.6	141.7
p-value	0.8957	0.8957	0.9520	0.5405	0.9092	0.4066	0.5222	0.7254

Comments: In this trial, the impact of AZteroid FC 3.3 fungicide applied in-furrow with and without a pop-up fertilizer was investigated. All treatments also included 2x2 starter fertilizer. AZteroid, produced by Vive Crop Protection, is an azoxystrobin similar to Quadris but it has better mixing compatibility with fertilizers. The pop-up fertilizer used in this test was Great Start by Wilbur Ellis. The treatments were applied T-band in-furrow and mixed with water for a total application volume of 8 gpa. The Great Start rate was 2 gpa, the AZteroid rate was 3 oz/acre, and Mustang was 4 oz/acre. The Check received nothing in-furrow. No statistical differences were found between the treatments. The fertilizer on all treatments included: 2x2 - 7 gal 28% + 10 gal 10-34-0 + 4 gal Thiosul + 2 qt Mn + 1.5 qt B; PPI - 20 gal of 28%; Foliar streamer - 15 gal of 28%; Previous fall manure - 8000 gal. The leafspot program was as follows: 1. Provysol, 2. Priaxor, 3. Inspire XT, 4. Tin, 5. Topguard, 6. EBDC alone. All applications included an EBDC, Reguard, and Crosshair.

Gross \$/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.



Pop-up Fertilizer with AZteroid Wishowski Farms, Auburn - 2021

Trial Quality:	Fair	Soil Type	: Loamy sand	Rhizoc Contro	I: Good control: I.F. (See	
Variety:	SX-2283	Fertilizer:	Pop-up + 2x2. See		treatments) & 10 leaf	
Planted:	April 7		comments. Sidedressed 42 gal of 28% + 2 qt B			
Harv/Samp:	Nov 2 / Oct 19		42 gai 01 20 /0 + 2 qt B	Cerc Control:	Fair control: See	
Plot Size:	4 reps	Prev Crop	o Corn		comments for materials	
Row Spacing:	30 inch	Weather:	Generally good weather	Other Pests:	N/A	
Seeding Rate:	52,000					

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets /
							13 Day	55 Day	1200 Ft
Check	\$1,366	8812	243	36.3	16.6	95.2	145	189	18
Pop-up + AZteroid	\$1,317	8498	243	34.8	16.6	95.2	136	184	4
Popup	\$1,260	8128	240	33.8	16.4	95.1	144	180	20
Average	\$1.31/	8/170	242	34.0	16.5	95.2	1/2	18/	14
Average	ψ1,014	0475	272	04.0	10.0	55.2	172	104	14
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	7.6	7.6	2.8	6.4	2.3	0.1	6.6	9.0	84.3
p-value	0.3870	0.3870	0.7330	0.3311	0.7315	0.3982	0.3527	0.7527	0.2081

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 that would be considered sandy. The trial area phosphorus Bray P1 tested 72 ppm. The potassium level was 174 ppm. 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 from Sure Crop and was a 3.5 gallon/acre blend of Sure Start (5-20-5), Plen T Sweet (7-0-0), MicroPak, Manganese (6%), and Activate. The fertilizer products were mixed with water and T-band applied at a total rate of 6 gallons per acre. The AZteroid + Pop-up treatment added 4.2 oz/acre of AZteroid. No significant differences were seen in yield, sugar, population, or dead beet counts. Numerically the check had the highest yield, but there was a lot of field variation and low confidence that the yield difference is due to the treatments. The 2x2 fertilizer that was included with all treatments was 11 gal of 28%, 9 gal of 9-27-4-4S, 2 gal of K-fuse (0-0-12-12), & 1 pt of boron. The leafspot materials were as follows: 1. EBDC, 2. Inspire XT, 3. Tin, 4. Topguard, 5. Tin. All applications included an EBDC.

Gross \$/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.



L-CBF 7-21-3 Pop-Up Fertilizer

West Acres, Croswell - 2021

Trial Quality: Variety: Planted: Harv/Samp:	Good B-1606N April 19 Sept 20 / Sept 20	Soil Type: Fertilizer:	Clay loam Fall: 200# potash; PPI: 1 ton compost, 800# gypsum, 3 lb boron; 2x0: 20 gal 28%; Pop-up see below; S.D.: 40 gal 28%; Foliar feed 7-21-3	Rhizoc Control: Cerc Control:	Very Good control: No I.F., Foliar: 5" band of Trevo (10 oz, generic Quadris) at 6-8 leaf Good/Fair control: See
Plot Size:	6 reps	Prev Crop:	Wheat, no cover crop		comments for materials.
Row Spacing:	20 inch	Weather:	Very dry for much of the spring		
Seeding Rate:	66,000		and summer.	Other Pests:	N/A

Treatment	Gross \$/A	\$/A RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							21 Day	49 Day
Pop-up L-CBF 7-21-3	\$1,448	6919	238	29.1	16.4	95.3	147	212
Check	\$1,443	6897	242	28.5	16.6	95.3	172	214
Average	\$1,445	6908	240	28.8	16.5	95.3	160	213
LSD 5%	N.S.	N.S.	N.S.	N.S.	0.2	N.S.	N.S.	N.S.
CV %	5.8	5.8	1.3	5.1	0.9	0.3	27.2	3.6
p-value	0.9287	0.9287	0.0613	0.5252	0.0459	0.9130	0.2816	0.4930

Comments: L-CBF 7-21-3 MKP is a carbon based liquid fertilizer produced by Midwestern Bio Ag. According to the manufacturer, this product is intended to provide two unique benefits to young sugarbeets. Like other starter fertilizers, it provides N, P, and K to the plants. L-CBF contains a unique 70:30 ratio of orthophosphate to polyphosphate. Since orthophosphate (in this blend monopotassium phosphate, or MKP) is more mobile in the soil than polyphosphate, this ratio provides more readily available phosphorus to the plant early in the season. In addition to directly providing nutrients to the plants, L-CBF is 7% sugar, which can be used as a food source for soil microorganisms. Thus, L-CBF is intended to increase microbial activity in the soil around the seedlings, providing a number of plant health benefits throughout the season. In this test, L-CBF 7-21-3 was applied in-furrow at planting, at a rate of 8 gallons per acre. It was diluted in water, so the total volume applied was 11 gallons per acre. No L-CBF was applied to the Check infurrow, but all treatments received it as a foliar feed at a rate of 2 gallons per acre. At a 95% confidence level, the L-CBF was slightly lower than the Check for % Sugar, and at the 90% confidence level the L-CBF was lower for RWST with an LSD 10% of 3.5. There were no significant differences between the two treatments for the other metrics observed. The leafspot program was the same for both treatments: 7/12 Provysol + Copper; 8/6 Esquire (generic Inspire) + Agri-Life , 8/24 Tin + Manzate.

Gross \$/A: Gross dollars per acre calculated using \$0.155 per pound of RWSA and early delivery adjustments. **Bold:** Results are not statistically different from top ranking variety in each column.



Talc USA Soil Biological Ackerman Brothers Farms, Reese - 2021

Trial Quality:	Excellent	Soil Type:	Loam	Rhizoc Control:	Very good control: Quadris	
Variety:	B-1606N	Fertilizer:	Fall: 300# potash, 200#		I.F. (6 oz) w/ Mustang (1	
Planted:	March 23		MESZ		leaf (14 oz)	
Harv/Samp:	Oct 22 / Oct 11		Thiosulfate	Cerc Control:	Good control: See below for materials	
Plot Size:	4 reps	Prev Crop:	Wheat with clover			
Row Spacing:	22 inch	Weather:	Freezing temps early. Dry	Other Pests:	Sugarbeet cyst nematode	
Seeding Rate	: 68,000		spring, good weather for remainder of season.			

Treatment	Gross	RWSA	RWST	T/A	т/а %		Populations 100 Ft. of Row		Dead Beets/	Sı	igarbeet Nematoo	Cyst de
	\$/A				Sugar		16 Day	56 Day	1200Ft	Cysts	Eggs	J2's
MicroSurge + Inceptive	\$1,933	12468	255	49.0	17.3	94.1	78	150	11	15	780	200
Encompass + Inceptive	\$1,929	12447	252	49.3	17.2	94.0	79	147	5	8	412	157
Check	\$1,902	12270	254	48.4	17.3	94.0	79	145	11	11	379	118
A	¢4.004	40005	054	40.0	47.0	01.0	70	4 4 7	0	44	504	450
Average	\$1,921	12395	254	48.9	17.3	94.0	79	147	9	11	524	158
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 %	2.5	2.5	1.8	1.2	1.3	0.3	13.2	14.6	116.9	64.7	54.3	80.2
p-value	0.6337	0.6337	0.7190	0.1884	0.8608	0.9571	0.9478	0.8965	0.5934	0.3779	0.1031	0.6127

Comments: In this test, two biological products by Talc USA were tested, including MicroSurge and Encompass. MicroSurge is a dry inoculant which contains two strains of the bacterium *Azospirillum brasiliense*. This bacterium is intended to increase plant health and revenue per acre. Encompass is also a dry inoculant, but it includes five different microbials intended to fix nitrogen and mobilize phosphorous, making each nutrient more available to the plants. Both inoculants were pre-mixed with Inceptive, another biological intended to jump-start the crop's defense mechanism which in turn makes the plants more resistant to diseases and nematode parasitism. For each treatment, the mixes included either MicroSurge or Encompass, Inceptive, and Talc USA's 80/20 talc. The mixes were applied to the seed before planting, at a rate of 1 cup per 4 units of beet seed. No significant differences were observed between the treatments for any of the yield metrics or number of sugarbeet cyst nematodes detected. The leafspot program was the same for all treatments: 6/23 EBDC + 20-20-20, 7/10 Delaro + Proline + Boron + Novus, 7/23 Tin + Topsin + Boron, 8/14 Provysol + Novus + Boron + Manganese, 9/1 Tin + Boron. All applications included an EBDC and a spreader/sticker.

Gross \$/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



Maritime Foliar Applied Biologic Nancy and Dwight Bartle, Brown City - 2021

Trial Quality: Variety: Planted: Harv/Samp: Plot Size:	Very Good C-G675 April 9 Sept 21 / Sept 20 5 reps*	Soil Type: Fertilizer: Prev Crop	Loam Fall: 200# potash; PPI: 300# 33-0-0; 2x2: 10 gal 10-34-0, 10 gal 28%, 2 qt manganese, 1qt boron :Corn - plowed	Rhizoc Control: Cerc Control:	Very Good control: Quadris I.F. only (7 oz) Good control: see below for materials
Row Spacing: Seeding Rate:	22 inch 62,000	Weather:	Freezing temps early. Dry spring, good weather for remainder of season.	Other Pests:	N/A

Treatment	Gross \$/A	RWSA	RWST	T/A	% Sugar	% CJP
Maritime	\$1,468	7073	259	27.7	17.6	95.4
Check	\$1,393	6709	245	27.4	16.8	95.3
Average	\$1,431	6891	252	27.6	17.2	95.4
LSD 5%	N.S.	N.S.	8.6	N.S.	0.5	N.S.
CV %	4.0	4.0	2.6	2.1	2.4	0.2
p-value	0.1068	0.1068	0.0086	0.4573	0.0088	0.8622

Comments: Maritime is a kelp-based biological produced by Agricen. According to the manufacturer, this product provides a number of health benefits to plants. Perhaps the most notable of these health benefits is improving a plant's ability to tolerate abiotic stress. Additionally, it was suggested this product may help to improve the sugar concentration in beets if applied a few weeks before harvest. In order to test both of these claims, Maritime was applied twice, once on July 21 at 2 qt per acre and once on August 24 at 1 qt per acre. Both times it was applied with Cercospora leaf spot fungicides. In the Maritime treatment, a significant increase in both RWST and % Sugar were observed. Other than the addition of Maritime, the leafspot program was the same for both treatments: 7/10 EBDC (Roper), 7/21 Delaro + Proline + EBDC, 8/10 Tin + EBDC, 8/24 Tin + EBDC. All applications included a spreader/sticker. *7 reps for RWST, % Sugar, and Purity (% CJP).

Gross \$/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 variety in each column.





AgBioResearch MICHIGAN STATE UNIVERSITY

Reexamining Boron Applications in Sugarbeet

Kurt Steinke and Andrew Chomas, Michigan State University See <u>soil.msu.edu</u> for more information

Location: Saginaw Valley Research and Extension Center	Tillage: Conv., 30-in. row
Planting Date: April 19, 2021 (Harvest 10/20/21)	Trt's: See below
Soil Type : Clay loam; 2.5% OM; 7.8 pH; 29 ppm P; 133 ppm K	Population : 4 in. spacing
Variety: C-G675	Replicated : 4 replications

						Tissue B 12-14 leaf
Treatment	RWSA	RWST	Tons/A	% Sugar	% CJP	ppm
Check – No N, No Boron	10898	250	41	16.9	95.0	31
N Only, No Boron	11683	247	47	16.6	94.9	32
2 lb. B/A, 2x2 Applied	11427	247	46	16.7	94.8	37
1 lb B/A, 2-4 leaf	10845	243	45	16.4	94.8	83
1 lb B/A 2 weeks after	10045					
1 lb. B/A, 12-14 leaf	12501	253	48	17.0	94.6	80
1 lb. B/A, 2 weeks after	12501					
LSD (0.10) ^a	NS	NS	NS	NS	NS	10.2

^a LSD, least significant difference between means within a column at ($\alpha = 0.10$). ^b NS, not significant

Summary: Trial quality was good. Trial was conducted to determine whether supplemental B applications may affect root yield and quality. Prior to the late 1990's, B application was recommended as varieties would often respond to B applications. Limited B accumulation in the soil, lack of incidental B in other bulk fertilizers, changes in the microenvironment, and increased disease occurrence may all interact affecting sugarbeet B response. Soil B concentrations were at or above 1 ppm in this study indicating sufficiency. All treatments other than the check received 40 lbs. N/A applied 2x2 with 120 lbs. N/A at 2-4 leaf coulter-inject sidedress. Boron applications consisted of 1) 2 lb. B/A applied 2x2, 2) 1 lb. B/A foliar applied at 2-4 leaf and 1 lb. B/A again 2 weeks later, and 3) 1 lb. B/A foliar applied at 12-14 leaf and 1 lb. B/A again 2 weeks later. Boron source consisted of Borosol 10 containing 1.1 lbs. B per gallon. Yield and 2021 sugar quality were not affected by B application in the current environment tested. Boron application increased tissue B concentration at 12-14 leaf indicating that B applied was taken up by the plant. However, yield and sugar quality were similar regardless of B application. Study will be repeated in 2022.





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Sugarbeet Varietal Response to Fertilizer Strategy and Harvest Timing

Storm Soat and Kurt Steinke, Michigan State University See <u>soil.msu.edu</u> for more information

Location: Saginaw Valley Research and Extension Center	Tillage: Conv., 30-in. row
Planting Date: April 19, 2021 (Harvest 8/25/21 & 10/20/21)	Trt's: See below
Soil Type : Clay loam; 2.5% OM; 7.8 pH; 29 ppm P; 133 ppm K	Population: 4 in. spacing
Variety: C-G675 & C-G919	Replicated : 4 replications

Table 1. Overview of fertilizer inputs applied.

Fertilizer Strategy				
	(N-P-K)	Rate	Timing	Method
1)	28-0-0	60 lb. A	Planting	2x2†
2)	28-0-0	60 lb. A	Planting	2x2
	28-0-0	100 lb. A	4 Leaf (June 1)	Side dress
3)	28-0-0	60 lb. A	Planting	2x2
	0-0-28	100 lb. A	20 Leaf (June 22)	Banded next to row
4)	28-0-0	60 lb. A	Planting	2x2
	28-0-0	100 lb. A	4 Leaf (June 1)	Side dress
	0-0-28	100 lb. A	20 Leaf (June 22)	Banded next to row

†Two inches below and two inches to the side of the seed.

Summary: Trial quality was good. Trial was conducted to determine whether a higher tonnage/higher sugar variety as compared to a more defensive, disease resistant variety respond differently to specific fertilizer management strategies and early vs. conventional harvest intervals. Altering management decisions such as variety, harvest timing, fertilizer strategy, or combinations of each may provide insight into producing the same or more sugar with less overall tons. The study was blocked by two harvest timings (early - 8/25/21 and conventional - 10/20/21) and two varieties (C-G675 and C-G919). All treatments received 60 lbs. N/A at planting applied 2x2. Fertilizer strategies consisted of only 60 lbs. N/A applied 2x2 at-plant, 60 lbs. N/A applied 2x2 and 100 lbs. N/A sidedress coulter inject at 4 leaf stage, 60 lbs. N/A applied 2x2 and 100 lbs. N/A sidedress coulter inject at 4 leaf stage, 60 lbs. N/A applied 2x2 and 100 lbs. N/A applied next to row at canopy closure (~20 leaf stage), and 60 lbs. N/A applied 2x2 along with 100 lbs. N/A sidedress coulter inject at 4 leaf stage. Nitrogen source was 28% UAN for both starter and sidedress N applications. Liquid potash (0-0-28) was used for mid-season K₂O applications. Soil test nutrient concentrations were all above critical

thresholds for this study. Canopy coverage was measured every two weeks until full canopy. Normalized Difference Vegetation Index (NDVI) and Fractional Green Canopy Cover via SPAD were measured at 6-8LF and 12-14LF.

In the first 35 days following planting, 0.74" of rain total in combination with cool temperatures restricted plant growth. Preliminary data show that although C-675 did produce more tonnage than C-919 at each harvest timing, there was no interaction between variety and harvest timing. October harvested beets yielded 16 tons per acre more than August harvest, but sugar concentrations decreased 0.37% with the October harvest due in part to the moist soil conditions encountered throughout autumn 2021. In the current study and environment tested, mid-season liquid K application did not affect yield or sugar quality. Regarding early harvest specifically, no tonnage differences were observed between starter N only as compared to starter N plus sidedress N indicating 2x2 starter N was sufficient for the early harvest interval in 2021. This study will be repeated in 2022.

Treatment	Tons	RWSA	RWST	% Sugar	% CJP
Variety					
C-G675	29.53 a *	†	259.8 a	17.01 a	94.73 a
C-G919	27.41 b		257.4 a	16.76 b	94.62 a
P > F	0.06 *		NS	0.09	NS
Harvest Timing					
Early	20.47 b	5499 b	269.4 a	17.07 a	94.59 b
Conventional	36.47 a	9021 a	247.8 b	16.70 b	94.76 a
P > F	>0.001		>0.001	>0.01	0.09
Fertilizer					
2x2 N only	25.01 b		259.8 a	16.83 a	94.69 a
2x2 + Sidedress N	32.39 a		256.5 a	16.88 a	94.60 a
2x2 + Liquid K	24.95 b		260.3 a	16.86 a	94.66 a
All	31.53 a		257.6 a	16.98 a	94.75 a
P > F	>0.001		NS	NS	NS
CHECK ^{††}	23.69	6200	256.5	16.82	94.67

Table 2. Sugarbeet 2021 yield, recoverable sugar per acre (RWSA), recoverable sugar per ton (RWST), sugar %, and clear juice purity (CLP).

*Values followed by the same lowercase letter are not significantly different at $\alpha = 0.10$. † See below for RWSA response to variety by fertilizer strategy interaction. †† CHECK was not statistically analyzed with all other plot factors. **Table 3.** Interaction between sugarbeet variety and fertilizer strategy on 2021 recoverable sugar per acre (RWSA).

Treatment	RWSA
C-G675	
2x2 N only	6153 d *
2x2 + Sidedress N	8715 a
2x2 + Liquid K	6549 cd
All	8923 a
C-G919	
2x2 N only	6660 bcd
2x2 + Sidedress N	7671 b
2x2 + Liquid K	6241 cd
All	7167 bc
P > F	> 0.07

*Values followed by the same lowercase letter are not significantly different at $\alpha = 0.10$.

Table 4. No interaction occurred between sugarbeet variety and harvest timing on 2021 yield, recoverable sugar per acre (RWSA), recoverable sugar per ton (RWST), sugar %, and clear juice purity (CLP).

Treatment	Tons/A	RWSA	RWST	% Sugar	% CJP
Early Harvest					
C-G675	21.82 a *	5858 a	269.57 a	17.18 a	94.64 a
C-G919	19.12 a	5140 a	269.15 a	16.96 a	94.54 a
P > F	NS *	NS	NS	NS	NS
Conventional					
C-G675	37.24 a	9312 a	250.02 a	16.84 a	94.81 a
C-G919	35.70 a	8729 a	245.56 a	16.56 a	94.70 a
P > F	NS	NS	NS	NS	NS

*Values are not significantly different at $\alpha = 0.10$.

_	% Canopy Coverage	% Canopy Coverage	% Canopy Coverage	NDVI† June 14	% FGCC††
Treatment	June 14	June 29	July 12	(0-1)	June 14
Variety					
C-G675	32 a *	67 b	79 b	0.89 a	44.2 a
C-G919	38 a	74 a	82 a	0.88 a	43.6 a
P > F	NS	0.10	0.08	NS	NS
Fertilizer					
2x2 N only	36 a	69 bc	77 b	0.89 a	43.7 a
2x2 + Sidedress N	34 a	72 ab	86 a	0.88 a	44.1 a
2x2 + Liquid K	34 a	65 c	73 с	0.88 a	43.4 a
All	35 a	75 a	86 a	0.89 a	444 a
P > F	NS	>0.01	>0.001	NS	NS

Table 5. Main effects of sugarbeet variety and fertilizer strategy on 2021 % canopy coverage,NDVI measurements, and Percent Fractional Green Canopy Cover.

*Values followed by the same lowercase letter are not significantly different at $\alpha = 0.10$. † Normalized Difference Vegetation Index

†† Percent Fractional Green Canopy Cover

Table 6. Main effects of sugarbeet variety, harvest timing, and fertilizer strategy on 2021 gross grower payment and profitability analysis less trucking and or fertilizer cost.

Treatment	Gross Grower Payment (\$/A)	Net Economic Return Less Trucking Costs (\$/A) ††	Net Economic Return Less Fertilizer Costs and Trucking (\$/A)
Variety			
C-G675	1835 a *	1724 a	1060 a
C-G919	1665 b	1563 b	898 b
P > F	0.04	0.04	0.03
Harvest Timing			
Early	1767 a	1690 a	1026 a
Conventional	1733 a	1597 a	932 a
P > F	NS	NS	NS
Fertilizer			
2x2 N only	1552 b	1458 b	1414 b
2x2 + Sidedress N	1982 a	1860 a	1737 a
2x2 + Liquid K	1527 b	1433 b	228 d
All	1940 a	1822 a	537 с
P > F	>0.001	>0.001	>0.001
CHECK*	1416	1327	1327

*Values followed by the same lowercase letter are not significantly different at $\alpha = 0.10$.

†CHECK was not statistically analyzed with all other plot factors

††Trucking figured at \$3.75/T

Sugarbeet N Calculator:

UNIVERSITY #GUELPH

CAMPUS

RIDGETOWN Commercial field verification

- Laura Van Eerd, Sean Vink, and Inderjot Chahal

Site	pН	OM	Р	К	CEC	texture	Planting	N done	Harvest
Heritage	6.7	4.9	57	256	19.8	silty clay	22-Apr	11-May	20-Sep
Meadowvale	7.3	4.3	49	178	17.6		22-Apr	11-May	20-Sep
Union	6.4	4.5	36	189	19.9	loam	22-Apr	11-May	12-Aug
BelleRoseE	7.3	12.7	25	224	33.5	silty clay	7-Apr	20-Apr	10-Sep
BelleRoseW	7.3	14	79	269	33.8	silt loam	7-Apr	20-Apr	10-Sep
Baldoon	7.2	5.6	51	275	33.8	silty clay	7-Apr	20-Apr	23-Aug
Base line	7.5	5.4	13	198	19.2	silt loam	7-Apr	19-Apr	27-Sep
Home*	6.8	5.6	196	524	25.1	clay loam	24-Mar	10-May	30-Sep
Vroom*	6.8	5.2	177	442	23.5	loam	23-Mar	10-May	30-Sep
Tretheway*	7.2	4.3	74	294	25.5	clay loam	14-Apr	10-May	29-Sep
Deestra*	7.1	3.9	29	219	23.2	clay loam	25-Mar	10-May	29-Sep

Site	Trt no.	rate (lb N/acre)	Net \$/A	RWSA	RWST	T/A	%suc	%CJP
	1	0	\$1700a	12560ab	261a	47.9b	17.5a	95.6
	2	78	\$1770a	13260a	258a	51.2a	17.3a	95.5
All 11 sites	3	113	\$1740a	13210ab	252b	52.1a	17b	95.4
	4	148	\$1680a	12970ab	247b	52.2a	16.7b	94.5
	5	200	\$1520b	12070b	240c	49.3ab	16.3c	95.4

Means followed by a different letter indicate statistically significant difference at P < 0.05. Net \$/acre= \$40/ton beet payment, trial average RWST (252.5), subtract N fertilizer (\$0.50/lb), trucking \$6/T Bold: Results are not statistically different from top ranking treatment in each column

	avg. RWST	avg. T/A	Calculator N rate	Optimal N rate	Diff.	Calcula \$/a	ator c	0	ptimal \$/ac	Dif	f. \$/ac
Heritage	261	47	135	40.5	94.5	\$ 1,	,650	\$	1,663	\$	(13)
Meadowvale	261	49	135	83	52	\$1,	,720	\$	1,778	\$	(58)
Union	236	26	135	94	41	\$	737	\$	786	\$	(49)
Belle Rose E	251	46	130	184	-54	\$1,	450	\$	1,401	\$	49
Belle Rose W	256	46	130	74	56	\$ 1,	,490	\$	1,631	\$	(141)
Base line	241	61	133	70	63	\$ 1,	,910	\$	1,996	\$	(86)
Baldoon	242	38	125	63	62	\$ 1,	,170	\$	1,241	\$	(71)
Deels*	270	60	60	46	14	\$2,	,410	\$	2,312	\$	98
Home*	243	62	90	91	-1	\$ 1,	,840	\$	1,944	\$	(104)
Tretheway*	248	62	20	58	-38	\$2,	,130	\$	2,529	\$	(399)
Vroom*	266	62	30	53	-23	Ş 2,	,230	Ş	2,219	Ş	11
Average	252	51	102	78	24	Ş 1,	,703	Ş	1,773	Ş	(69)

Calculator N rate refers to the N rate applied at each site based on N fertilizer calculator recommendations and the previous crops grown in the rotation and history of manure*

Optimal N rate for each site was calculated from the response equation of \$/acre to N fertilizer treatment

In Ontario, the calculator appears to be a good starting point for the industry average. Results suggest that N fertilizer recommendations based on the calculator should be refined. Adjusting N rate based on the previous crop (i.e., more N after corn) would be helpful.

Thank you grower cooperators. Funding: Ontario Sugarbeet Growers Association + Michigan Sugar Company



Mennonite Church, Pigeon - 2021

Trial Quality: Fair	Soil Info: Sandy Clay Loam
Variety: BTS-1703	% OM: 2.5 pH: 7.1 CEC: 10.9
Planted: April 26	P: Above Opt K: Opt
Harvested: September 29	Mn: High B: Very Low
Plots: 6 rows X 38 ft, 4 reps	Added N: 35 lbs. 2X2, 120 lbs. sidedress
Row Spacing: 22 in.	Previous Crop: Soybeans
	te during the second size AF O and a

Rhizoc Level: Low Cerc Control: Good Problems: None Seeding Rate: 4.5 in. Rainfall: 10.42 in. Beets/100 ft: 152

Application: JD 3520 tractor mounted plot sprayer, compressed air, 15.3 gpa

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

No.	Treatment	Rate/A	Applic Timing	Vigor* 0-10	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
5	Dual Magnum Roundup Powermax	1.33 pt 24 fl oz	2 lf	7.9	\$1,033	5414	264	20.6	17.4	96.3
	Ammonium Sulfate	17 lb								
10	Warrant Roundup Powermax Ammonium Sulfate Stinger	3 pt 24 fl oz 17 lb 2 fl oz	2 lf	7.6	\$1,227	6400	269	23.7	17.7	96.6
3	Dual Magnum	.67 pt	Pre-Emerge	7.6	\$1,069	5593	260	21.3	17.1	96.6
	Roundup Powermax	24 fl oz	2 lf							
	Ammonium Sulfate	17 lb	2 lf							
8	Dual Magnum Roundup Powermax Ammonium Sulfate Stinger	1.33 pt 24 fl oz 17 lb 2 fl oz	2 lf	7.6	\$973	5125	255	20.1	16.9	96.2
7	Warrant Roundup Powermax Ammonium Sulfate	3 pt 24 fl oz 17 lb	2 lf	7.6	\$1,188	6179	264	23.4	17.6	96.0
2	Roundup Powermax Ammonium Sulfate Stinger	24 fl oz 17 lb 2 fl oz	2 lf	7.5	\$993	5147	264	19.5	17.4	96.3
4	Dual Magnum Roundup Powermax Ammonium Sulfate	1.33 pt 24 fl oz 17 lb	Pre-Emerge 2 lf 2 lf	7.3	\$1,114	5861	252	23.1	16.8	96.1

*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.

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Residual Herbicides and Stinger

Mennonite Church, Pigeon - 2021

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No.	Treatment	Rate/A	Applic Timing	Vigor* 0-10 30-Jul	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
6	Outlook	1 pt	2 lf	7.3	\$1,075	5616	266	21.1	17.4	96.8
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
1	Roundup Powermax	24 fl oz	2 lf	7.3	\$1,174	6052	263	23.0	17.3	96.3
	Ammonium Sulfate	17 lb								
9	Outlook	1 pt	2 lf	7.3	\$1,131	5917	260	22.8	17.3	96.0
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
	Stinger	2 fl oz								
Av	erage			7.5	\$1,098	5730	262	21.9	17.3	96.3
LS	D 5%			n.s.	n.s.	n.s.	13.4	n.s.	0.8	n.s.
C/	/%			5.6	15.3	15.0	3.5	14.4	3.1	0.5

*Vigor 0 to 10 ratings, 10 is the best

Comments: This study was designed to look at crop safety when applying Stinger with residual herbicides post emergence to beets. No major injury symptoms were observed and sugarbeet vigor was consistent across treatments.

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



Excalia with Herbicides, Crop Safety Trial

Mennonite Church, Pigeon - 2021

Trial Quality: Good	Soil Info: Clay Loam	Rhizoc Level: Low
Variety: BTS-1703	% OM: 2.7 pH: 7.2 CEC: 10.9	Cerc Control: Good
Planted: April 26	P: Above Opt K: Opt	Problems: None
Harvested: September 29	Mn: High B: Low	Seeding Rate: 4.1 in.
Plots: 6 rows X 38 ft, 4 reps	Added N: 35lbs. 2X2, 120 lbs. sidedress	Rainfall: 10.42 in.
Row Spacing: 22 in.	Previous Crop: Soybeans	Beets/100 ft: 162

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Application: JD 3520 tractor mounted plot sprayer, compressed air, 30 psi, 15.3 gpa Monosem 6-row Agronomy Planter, compressed air, 30 psi, 9 gpa - IF, 3.5" band

No.	Treatment	Rate/A	Applic Timing	Vigor* 0-10	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			9	30-Jul						
1	Roundup Powermax	24 fl oz	2 lf	7.5	\$1,187	6207	263	23.5	17.6	95.6
	Ammonium Sulfate	17 lb								
	Excalia	2 oz								
9	Outlook	1 pt	2 lf	7.5	\$1,233	6528	266	24.5	17.9	95.3
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
	Stinger	2 fl oz								
	Excalia	2 fl oz								
10	Warrant	3 pt	2 lf	7.5	\$1,180	6247	256	24.4	17.3	95.2
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
	Stinger	2 fl oz								
	Excalia	2 fl oz								
8	Dual Magnum	1.33 pt	2 lf	7.4	\$1,217	6439	268	24.0	17.9	95.6
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
	Stinger	2 fl oz								
	Excalia	2 fl oz								
3	Dual Magnum	.67 pt	Pre-Emerge	7.4	\$1,282	6771	258	26.1	17.3	95.4
	Roundup Powermax	24 fl oz	2 lf							
	Ammonium Sulfate	17 lb								
	Excalia	2 fl oz								
5	Dual Magnum	1.33 pt	2 lf	7.3	\$1,094	5812	253	22.9	17.1	95.4
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
	Excalia	2 fl oz								
6	Outlook	1 pt	2 lf	7.3	\$1,101	5837	259	22.4	17.4	95.4
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
	Excalia	2 fl oz								

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.



Excalia with Herbicides, Crop Safety Trial

Mennonite Church, Pigeon - 2021

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No.	Treatment	Rate/A	Applic Timing	Vigor* 0-10 30-Jul	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
7	Warrant	3 pt	2 lf	7.2	\$1,048	5552	250	22.1	16.6	96.2
	Roundup Powermax	24 fl oz								
	Ammonium Sulfate	17 lb								
	Excalia	2 fl oz								
2	Roundup Powermax	24 fl oz	2 lf	7.2	\$1,153	6052	255	23.5	17.3	95.1
	Ammonium Sulfate	17 lb								
	Stinger	2 fl oz								
	Excalia	2 fl oz								
4	Dual Magnum	1.33 pt	Pre-Emerge	7.0	\$913	4921	248	19.7	16.8	95.1
	Roundup Powermax	24 fl oz	2 lf							
	Ammonium Sulfate	17 lb								
	Excalia	2 fl oz								
A١	verage			7.3	\$1,141	6037	258	23.3	17.3	95.4
LS	SD 5%			n.s.	236.6	1208.8	14.9	3.8	0.9	0.7
C/	/%			4.3	14.3	13.8	4.0	11.4	3.5	0.5

Vigor* 0 to 10 ratings, 10 is the best

Comments: Excalia is a new product used for Rhizoctonia management in sugarbeets. The product is designed for foliar application with Stinger and residual herbicides. This research was conducted to evaluate the safety of these applications and observe impacts on sugarbeet yield and quality.

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



Weed Control Strategies with Ultra Blazer, UPL

Mennonite Church, Pigeon - 2021

Trial Quality: Fair Variety: BTS-1703 Planted: April 26 Harvested: September 29 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 in. Soil Info: Sandy Clay Loam
% OM: 2.5 pH: 7.1 CEC: 10.9
P: Above Opt K: Opt
Mn: High B: Very Low
Added N: 35 lbs. 2X2, 120 lbs. sidedress
Previous Crop: Soybeans

Rhizoc Level: Low Cerc Control: Good Problems: Low Stand Seeding Rate: 4.1 in. Rainfall: 10.42 in. Beets/100 ft: 148

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

No.	Treatment	Rate/A	Applic Timing	Vigor* 0-10	Damage 0-10	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				30-Jul	17-Jun						
5	Roundup Powermax + AMS	22 fl oz + 17 lb	21-May	7.8	4.3	\$1,026	6606	264	25.0	17.8	95.2
	Ultra Blazer + Warrant + Roundup Powermax + AMS	16 fl oz + 3 pt + 32 fl oz + 17 lb	11-Jun								
	Roundup Powermax + AMS	32 fl oz + 17 lb	24-Jun								
8	Roundup Powermax + Stinger + AMS	22 fl oz + 2 fl oz + 17 lb	21-May	7.7	5.5	\$935	6149	266	23.1	17.9	95.3
	Ultra Blazer + Moccasin II + Roundup Power Max + AMS + Stinger	16 fl oz + 1.33 pt + 32 fl oz + 17 lb + 4 fl oz	11-Jun								
	Roundup Powermax + AMS + Stinger	32 fl oz + 17 lb + 4 fl oz	24-Jun								
7	Roundup Powermax + AMS	22 fl oz + 17 lb	21-May	7.7	6.4	\$995	6477	260	24.9	17.6	95.0
	Ultra Blazer + Ethofumesate + Roundup Powermax + AMS	16 fl oz + 32 fl oz + 32 fl oz + 17 lb	11-Jun								
	Roundup Powermax + AMS	32 fl oz + 17 lb	24-Jun								
4	Roundup Powermax + AMS	22 fl oz + 17 lb	21-May	7.7	5.9	\$930	6015	255	23.6	17.3	95.1
	Ultra Blazer + Moccasin II + Roundup Powermax + AMS	16 fl oz + 1.33 pt + 32 fl oz + 17 lb	11-Jun								
	Roundup Powermax + AMS	32 fl oz + 17 lb	24-Jun								
1	Roundup Powermax + AMS	22 fl oz + 17 lb	21-May	7.5	0.7	\$1,131	6993	264	26.5	18.0	94.8

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.

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Weed Control Strategies with Ultra Blazer, UPL

Mennonite Church, Pigeon - 2021

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No.	Treatment	Rate/A	Applic Timing	Vigor* 0-10	Damage 0-10	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
				30-Jul	17-Jun						
2	Roundup Powermax + AMS	32 fl oz + 17 lb	24-Jun	7.5	1.0	\$1,092	6759	262	25.8	17.6	95.2
9	Ultra Blazer + Warrant + Roundup Powermax + AMS	16 fl oz + 1.5 pt + 32 fl oz + 17 lb	11-Jun	7.5	7.0	\$980	6257	253	24.7	17.2	95.1
	Roundup Powermax + AMS	32 fl oz + 17 lb	24-Jun								
6	Roundup Powermax + AMS	22 fl oz + 17 lb	21-May	7.5	4.4	\$970	6280	248	25.3	17.0	94.6
	Ultra Blazer + Outlook + Roundup Powermax + AMS	16 fl oz + 16 fl oz + 32 fl oz + 17 lb	11-Jun								
	Roundup Powermax + AMS	32 fl oz + 17 lb	24-Jun								
3	Roundup Powermax + AMS	22 fl oz + 17 lb	21-May	7.3	6.6	\$1,031	6574	256	25.5	17.3	95.2
	Ultra Blazer + Roundup Powermax + AMS	16 fl oz + 32 fl oz + 17 lb	11-Jun								
	Roundup Powermax + AMS	32 fl oz + 17 lb	24-Jun								
Average			7.6	4.6	\$1.010	6457	259	24.9	17.5	95.1	
LSD 5%			n.s.	2.4	172.5	n.s.	12.6	n.s.	0.8	n.s.	
CV%				3.8	34.7	11.7	11.2	3.3	9.3	3.0	0.5

Vigor* 0 to 10 ratings, 10 is the best

- **Comments:** This trial was designed to test herbicide programs using Ultra Blazer. Ultra Blazer received an emergency use label in 2021 for control of herbicide-resistant pigweed species. Resistant waterhemp has appeared in Michigan counties sporadically thus far, and is expected to become a more common issue. Ultra Blazer was applied May-24 or June-11 in this study. Damage ratings were collected 6 days after the June-11 application. Treatment 9 was added mid-season to observe crop injury with a half rate of Warrant (1.5 pt), therefore, plots did not receive the May-21 application of Roundup Powermax + AMS. The half rate of Warrant resulted in greater crop injury compared to the full rate (3 pt). Herbicide treatments resulted in excellent weed control. Control treatments excluding Ultra Blazer had higher T/A and RWSA, however, the results were not statistically significant.
- \$/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.


Mennonite Church, Pigeon - 2021

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Trial Quality: Fair Variety: BTS-1703 Planted: April 26 Harvested: September 29 Plots: 6 rows X 38 ft, 4 reps Row Spacing: 22 in. Soil Info: Clay Loam % OM: 2.7 pH: 7.2 CEC: 10.9 P: Above Opt K: Opt Mn: High B: Low Added N: 35 lbs. 2X2, 120 lbs. sidedress Previous Crop: Soybeans Rhizoc Level: Low Cerc Control: Good Problems: Low Stand Seeding Rate: 4.1 in. Rainfall: 10.42 in. Beets/100 ft: 138

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

No	Treatment	Rate/A Applic \$/A RWSA RV		RWST T/A	%	%	B/100				
NO.	ricatilient	RatorA	Timing	Ψ	NIIOA		1/A	SUC	CJP	14-May	8-Jun
10	Roundup	32 fl oz	2 lf	\$1,175	6002	247	24.1	16.2	96.9	133.0	153.7
	Roundup	32 fl oz	6 lf								
	Roundup	32 fl oz	10-12 lf								
13	Rovic	2 qt	PPI	\$1,164	5947	229	26.0	15.5	95.3	103.0	122.8
	Roundup + Stinger +	32 fl oz + 2 fl oz + 1 33 pt	2 lf								
-	Roundun + Stinger	32 fl oz + 4 fl oz	6 lf								
-	Roundup + Stinger	32 fl 02 + 4 fl 02	10-12 lf								
8	Rovic	2 at	PPI	\$1.103	5636	231	24.4	15.3	96.8	116.8	149.1
	Roundup	32 fl oz	2 lf	<i>,</i> , <i>, , , , , , , , ,</i>							
	Roundup + Ultra Blazer	32 fl oz + 16 fl oz	6 lf								
	Roundup	32 fl oz	10-12 lf								
11	Roundup + Stinger	32 fl oz + 4 fl oz	2 lf	\$1,082	5530	226	24.4	15.4	95.4	165.9	180.4
	Roundup + Stinger	32 fl oz + 4 fl oz	6 lf								
	Roundup + Stinger	32 fl oz + 4 fl oz	10-12 lf								
7	Rovic	2 qt	PPI	\$1,042	5324	244	21.9	16.2	96.4	86.2	116.6
	Roundup	32 fl oz	2 lf								
	Roundup + Dual Magnum	32 fl oz + 1.33 pt	6 If								
-	+ Ultra Blazer	+ 16 fl oz	011								
	Roundup	32 fl oz	10-12 lf								
6	Rovic	2 qt	PPI	\$1,030	5261	248	21.2	16.4	96.6	86.2	124.6
	Roundup	32 fl oz	2 lf								
_	Roundup + Dual Magnum	32 fl oz + 1.33 pt	6 lf								
	Roundup	32 fl oz	10-12 lf								
2	Rovic	2 qt	PPI	\$1,015	5184	233	21.9	15.8	95.6	98.1	125.4
14	Rovic	2 qt	PPI	\$983	5020	237	21.2	16.3	94.5	91.4	122.6
	Roundup + Stinger	32 fl oz + 2 fl oz	2 lf								
	Roundup + Stinger + Dual Magnum	32 fl oz + 4 fl oz + 1.33 pt	6 lf								
	Roundup + Stinger	32 fl oz + 4 fl oz	10-12 lf								

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

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



Rovic Herbicide Trial, Helm Agro

Mennonite Church, Pigeon - 2021

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No.	Treatment	Rate/A	Applic Timing	\$/A	RWSA	RWST	T/A	% SUC	% CJP	B/1	100
										14-May	8-Jun
9	Rovic	2 qt	PPI	\$964	4925	243	20.1	16.1	96.3	98	118
	Roundup	32 fl oz	2 lf								
	Roundup	32 fl oz	6 lf								
	Roundup + Ultra Blazer	32 fl oz + 16 fl oz	10-12 lf								
12	Rovic	2 qt	PPI	\$926	4731	232	20.3	15.6	95.7	115	141
	Roundup + Stinger	32 fl oz + 2 fl oz	2 lf								
	Roundup + Stinger	32 fl oz + 4 fl oz	6 lf								
	Roundup + Stinger	32 fl oz + 4 fl oz	10-12 lf								
3	Rovic	2 qt	PPI	\$892	4558	237	19.0	15.9	95.7	115	136
	Roundup	32 fl oz	2 lf								
	Roundup	32 fl oz	6 lf								
	Roundup	32 fl oz	10-12 lf								
5	Rovic	2 qt	PPI	\$873	4462	231	19.2	15.7	95.5	113	134
	Roundup + Dual Magnum	32 fl oz + 1.33 pt	2 lf								
	Roundup	32 fl oz	6 lf								
	Roundup	32 fl oz	10-12 lf								
4	Rovic	2 qt	PPI	\$859	4387	234	18.7	15.7	96.2	121	150
	Roundup	32 fl oz	6 lf								
	Roundup	32 fl oz	10-12 lf								
1	Untreated Check	-		\$682	3486	222	15.7	14.7	97.0	144	156
Av	erage			\$985	5032	235	21.3	15.8	96.0	113	138
LS	5%			216.4	1105.6	20.0	3.85	1.23	1.79	36.4	33.0
C\	/%			15.4	15.4	5.9	12.7	5.5	1.3	22.5	16.7

Comments: The active ingredient in the Rovic herbicide is cycloate. Rovic is effective when applied pre-plant incorporated. This trial examines the safety of Rovic applications when applied with other herbicides targeting early-season control of pigweed species. Environmental factors resulted in inconsistent sugarbeet stands. Rovic may also be impating sugarbeet stand count, however, additional research is needed to clarify results.

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

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



Suppression of horseweed in sugarbeet with cereal rye- Year 3

Brian Stiles II and Christy Sprague, Michigan State University

Location:	MSU Agronomy Farm (East Lansing)	Cereal rye termination dates:
Soil Type:	Loam	Before planting (EBD): April 23, 2021
O.M.:	2.7%	At plant (PBD): May 5, 2021
pH:	6.0	Delayed burndown (DBD): May 21, 2021
Replicated	: 4 times	Sugarbeet: Crystal G675
Cereal rye	: 'Wheeler' at 60 lbs/A	Planting rate: 3 7/8" spacing
Planting	g date: October 16, 2020	Planting date: May 5, 2021

Summary: The use of cover crops as a weed suppression tool is becoming increasingly popular amongst cropping systems in the United States due to herbicide-resistant weeds. Glyphosate-resistant (GR) horseweed is a significant problem for sugarbeet growers in Michigan fields and new management approaches are needed. One approach that has been shown to suppress horseweed in other cropping systems is the use of cereal rye. From 2019 to 2021, field studies were conducted in East Lansing, Michigan to evaluate the use of cereal rye as part of a management program for glyphosate-resistant horseweed in sugarbeet. 'Wheeler' cereal rye was drilled at 60 lb/A in the fall prior to each sugarbeet year. This study was established in a split-plot design with cereal rye termination as the main plot factor and herbicide treatment as the sub-plot factor. Cereal rye was then terminated by applying Roundup PowerMax (glyphosate) at 32 fl oz/A + AMS. Cereal rye termination treatments included: early burndown (EBD) 14 d prior to sugarbeet planting, burndown at planting (PBD), PBD + roller, and PBD + roller crimper, and a delayed burndown (DBD) 7 d after planting. These treatments were all compared with a no cover control. In 2020 and 2021, additional treatments included a sugarbeet that was strip-tilled prior to planting with a delayed burndown and no cover control. Cereal rye biomass was 5-, 2.5- and 6-times higher at the Planting Green timing than compared to the early termination timing in 2019, 2020 and 2021, respectively. When the sugarbeets were at the 2 leaf and 6-8 leaf stage postemergence (POST) herbicide 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). Early-season horseweed suppression showed the greatest results with the DBD treatment. By mid-July, regardless of termination time or method horseweed biomass was at least 38-64% lower than the no cover control in 2019 and 2020 respectively. However, in 2021 none of the cereal rye cover crop treatments suppressed horseweed. By time of sugarbeet harvest, horseweed biomass was as much as 70% lower than the no cover control when a cereal rye cover crop was used in 2019 however, in 2020 and 2021 horseweed suppression at the time of sugarbeet harvest was not influenced by any of the cereal rye cover crop treatments compared with the no cover control. Main effect herbicide treatments showed that regardless of the number of Stinger applications horseweed biomass was reduced when compared with the control in all three years (Figure 1). Sugarbeet yield was reduced in the DBD treatment in all three years due to reduced sugarbeet growth, however when strip-till was included sugarbeet yield was higher (Figures 2-3). The addition of Stinger for horseweed control improved sugarbeet yield in 2 of three years. Cereal rye has shown some positive signs of horseweed suppression in sugarbeet; however these results can be variable.



Figure 1. Main effect of herbicide treatment on horseweed biomass combined over 3 years. Horseweed biomass was 69 and 83% lower with one and two applications of Stinger compared with the glyphosate only application. Regardless of cover crop treatment, horseweed biomass was reduced more by two-applications of Stinger.



Figure 2. In 2019, combined over the control and two Stinger treatments, sugarbeet yield was reduced in the delayed burndown (DBD) treatment and was similar to the no cover control. The highest yield was when cereal rye was controlled at planting.

2020



Figure 3. In 2020, combined over the control and two Stinger treatments, sugarbeet yield was lowest in the no cover strip treatment and was similar to the no cover control.



Figure 4. In 2021, combined over the control and two Stinger treatments, sugarbeet yield was lowest in the delayed burndown (DBD) treatment. Strip-tillage in the delayed burndown treatment improved yield over the DBD treatment alone.

2021

Michigan State University



AgBio**Research**

Sugarbeet tolerance to postemergence applications of Ultra Blazer

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

Location: Richville (SVREC)	Application timings: 2 lf beets (May 7),			
	6 lf beets (May 27), 10 lf beets (June 9)			
Planting Date: April 6, 2021	Herbicides: see treatments			
Soil Type: Clay loam	O.M.: 2.6 pH: 7.9			
Replicated: 4 times	Variety: Crystal G675RR			

Table 1. Sugarbeet tolerance to POST applications of Ultra Blazer (aciflurofen) applied at various sugarbeet stages and with various mixtures, 7 d after the 6- and 10-lf application and in late-August.

		Injury	Injury	Injury		
Herbicide treatments ^a	Timing	(June 3)	(June 16)	(August 24)	Yield	RWSA
		%	%	%	- ton/A -	-lb/A -
Roundup PowerMax (32/22/22 fl oz)	2-, 6-, 10 lf	2	0	0	35.8	8109
Ultra Blazer (8/8 fl oz)	6-, 10 lf	29* ^b	28*	0	28.7*	6535*
Ultra Blazer (16/16 fl oz)	6-, 10 lf	30*	30*	0	26.9*	6156*
Ultra Blazer (16 fl oz)	6 lf	30*	12*	0	33.1	7372
Ultra Blazer (16 fl oz)	10 lf	4	23*	0	30.8	7007
Ultra Blazer (16 fl oz) + Moccasin II Plus (1.33 pt)	6 lf	69*	19*	0	28.3*	6381*
Ultra Blazer (16 fl oz) + Warrant (3 pt)	6 lf	24*	6	0	36.3	8003
Ultra Blazer (16 fl oz) + Outlook (16 fl oz)	6 lf	36*	10*	0	33.3	7688
Ultra Blazer (16 fl oz) + Ethofumesate (32 pt)	6 lf	28*	8*	0	33.7	7833
Stinger (2 fl oz) fb. Ultra Blazer (16 fl oz) + Stinger (4 fl oz)	2-, 6 lf	29*	9*	0	31.1	7365
Stinger (2 fl oz) fb. Stinger (4 fl oz)	2-, 6 lf	4	6	0	30.7	7105
		7	7	0	5.9	1432

^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 waterhemp in sugarbeet. Ultra Blazer (aciflurofen) is a Group 14 herbicide that has activity on pigweed species. Over the past four years we have conducted field research evaluating sugarbeet safety to POST applications of Ultra Blazer. Ultra Blazer injury to sugarbeet consists of leaf speckling/bronzing. The greatest injury from Ultra Blazer was when Ultra Blazer was tank-mixed with Moccasin II Plus (similar to Dual II Magnum). This treatment along with two applications of Ultra Blazer at 8 or 16 fl oz/A resulted in significant yield and RWSA reductions. Other tank-mixtures with/or Ultra Blazer alone at the 6- or 10-lf stage also resulted in injury, however sugarbeet was able to recover and sugarbeet yield and recoverable white sugar were not affected. This research helps support Michigan's 2021 Section 18 registration that allowed for Ultra Blazer applications on sugarbeets >6-leaf at a 16 fl oz/A rate.



AgBio**Research**

Sugarbeet tolerance to overlapping residual herbicide programs

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

Location: Richville (SVREC)	Application timings: PRE (April 7), 2-lf beets (May 7),
	6-8 lf beets (May 27)
Planting Date: April 6, 2021	Herbicides: see treatments
Soil Type: Clay loam	O.M.: 2.6 pH: 7.9
Replicated: 4 times	Variety: Crystal G675RR

Table 1. Comparison of sugarbeet tolerance and common lambsquarters control (CHEAL) of overlapping residual herbicide programs applied POST alone and with a low rate (0.5 pt/A) of Dual Magnum (PRE).

		Injury	CHEAL control		
Herbicide treat	tments ^a	(7 DA-6lf)	(90 DA-6lf)	Yield	RWSA
PREs	POST at 2- and 6-lf beets	%	%	-ton/A -	-lb/A -
None	Roundup PowerMax (32/22 fl oz)	5	83	34.8	8307
None	Dual Magnum (1.3/1.3 pt)	6	90	31.4	7453
None	Warrant (3/3 pt)	6	57*	28.7*	6867*
None	Outlook (12/12 fl oz)	14* ^b	96	36.0	8592
Dual Magnum	Dual Magnum $(1.33 \text{ pt}) - 2 \text{ lf only}$	2	84	36.6	8222
Dual Magnum	Warrant $(3 \text{ pt}) - 2 \text{ lf only}$	1	79	34.3	8428
Dual Magnum	Outlook (16 fl oz) – 2 lf only	0	86	36.9	8812
Dual Magnum	Dual Magnum (1.3/1.3 pt)	7	99	34.8	7914
Dual Magnum	Warrant (3/3 pt)	3	47*	24.4*	5649*
Dual Magnum	Outlook (12/12 fl oz)	5	93	32.4	7745
Dual Magnum	Warrant (3 pt)/	7	93	32.5	7821
Dual Magnum	Dual Magnum (1.3 pt) Outlook (16 fl oz)/ Dual Magnum (1.3 pt)	7	95	34.0	8147
Dual Magnum	Stinger (2/4 fl oz)	10*	82	33.9	8119
Dual Magnum	Stinger (2 fl oz) + Warrant (3 pt) Stinger (4 fl oz) + Dual Mag. (1.3 pt)	8	85	33.3	7751
LSD _{0.05} ^c		5^c	9	5.9	1394

^a Dual Magnum was applied PRE at 0.5 pt/A. Roundup PowerMax was applied at the 2- and 6-leaf stages at the rates listed in the first treatment. All treatments included AMS at 17 lb/100 gal.

^b Data with asterisks (*) indicate significantly higher injury, and lower CHEAL control, yield and RWSA 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 glyphosateresistant pigweed (waterhemp and Palmer) in sugarbeet. The Group 15 herbicides, Dual II Magnum, Outlook and Warrant were all evaluated at various rates and timings to determine sugarbeet tolerance and common lambsquarters control, including PRE applications of a low rate of Dual Magnum (24C label). In general, sugarbeet injury was less than 15%. This year the combination of Warrant + Roundup PowerMax resulted in reduced common lambsquarters control, this resulted in a significant reduction in yield and RWSA from common lambsquarters competition. This antagonistic response is not common and could be due to colder air temperatures <60°F at the time of application. This response needs to be examined further. Several of these treatments were also examined for waterhemp control and should continue to be examined over more environments.

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University

AgBio**Research**

Overlapping residual herbicides for waterhemp control in sugarbeet

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

Location: Shiawassee County	Application timings: PRE (May 20), 2-lf beets (June 9),
	6-8 lf beets (June 23)
Planting Date: May 20, 2021	Herbicides: see treatments
Soil Type: Clay loam	O.M.: 4.2 pH: 6.6
Replicated: 4 times	Variety: Crystal G675RR

Table 1. Waterhemp control 14, 28, and 50 days after the last herbicide application (6-leaf beets) overlapping residual herbicides.

		Waterhemp control ^b			
		July 7	July 21	August 11	
Herbicide treatments	1	(14 DA-6-lf)	(28 DA-6-lf)	(50 DA-6-lf)	
PREs	POST apps. at 2- and 6-lf beets	<u> % </u>	<u> % </u>	<u> % </u>	
None	Roundup PowerMax (32/22 fl oz)	0	0	0	
None	Dual II Magnum (1.3/1.3 pt)	72	66	53	
None	Warrant (3/3 pt)	83	80	75	
None	Outlook (12/12 fl oz)	83	76	67	
None	Ethofumesate ^a (2/2 pt)	91*	77	68	
Dual Magnum (0.5 pt)	Dual Magnum $(1.3 \text{ pt}) - 2 \text{ lf only}$	94*	87*	79	
Dual Magnum (0.5 pt)	Warrant $(3 \text{ pt}) - 2 \text{ lf only}$	99*	96*	89*	
Dual Magnum (0.5 pt)	Outlook (16 fl oz) – 2 lf only	95*	92*	89*	
Ethofumesate (3 pt)	Warrant $(3 \text{ pt}) - 2 \text{ lf only}$	100*	98*	89*	
Dual Magnum (0.5 pt)	Dual Magnum (1/1 pt)	93*	87*	83*	
Dual Magnum (0.5 pt)	Warrant (3/3 pt)	99*	95*	92*	
Dual Magnum (0.5 pt)	Outlook (12/12 fl oz)	95*	91*	86*	
Dual Magnum (0.5 pt)	Warrant (3 pt)/Dual Mag. (1.3 pt)	100*	98*	95*	
LSD _{0.05} ^c		10 ^c	11	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 were 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 waterhemp in sugarbeet. A field trial was conducted evaluating several Group 15 herbicides (Dual Magnum, Outlook, and Warrant) and ethofumesate were evaluated. These treatments were also evaluated after a preemergence application of Dual Magnum at a low rate (24C labeled). At the end of the season, effective waterhemp control was observed when either ethofumesate (PRE) followed by two overlapping applications of Warrant or when Dual Magnum at 0.5 pt/A (PRE) was followed with one or two overlapping residual herbicides. The only exception to this was Dual Magnum PRE followed by only one application of Dual Magnum at the 2-leaf stage. Due to late-planting, closer to initial waterhemp emergence, 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.

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University

AgBio**Research**

Sugarbeet safety to high load Warrant applications

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

Location: Richville (SVREC)	Application timings: 4 lf beets (May 19)
Planting Date: April 6, 2021	Herbicides: see treatments
Soil Type: Clay loam	O.M.: 2.6 pH: 7.9
Replicated: 4 times	Variety: Crystal G675RR

Table 1. Evaluation of a new high load formulation of Warrant (MON 301668) on sugarbeet tolerance and common lambsquarters control.

	7 DAT		14 DAT		28 DAT	
Treatments ^a	Injury	Control	Injury	Control	Injury	Control
Warrant (48 fl oz)	8	74	6	73	2	59
Warrant (64 fl oz)	15	71	14	70	5	55
MON 301668 (30 fl oz)	7	77	7	68	2	55
MON 301668 (42 fl oz)	16	72	12	69	5	33
Roundup PowerMax 3 (30 fl oz)	2	100	0	100	3	97
MON 301668 (42 fl oz) + Roundup PowerMax 3 (30 fl oz)	15	98	14	100	6	96
Stinger (8 fl oz) +						
MON 301668 (42 fl oz) +	34	100	24	100	9	100
Roundup PowerMax 3 (30 fl oz)						
Ethofumesate (12 fl oz) +	10	0.0	_	100		100
MON 301668 (42 fl oz) +	12	99	7	100	4	100
Roundup PowerMax 3 (30 fl oz)						
SelectMax (9 fl oz) +	1.5	00	10	100	6	07
MON 301668 (42 fl oz) +	15	98	13	100	6	97
Roundup PowerMax 3 (30 fl oz)						
Dual Magnum $(1.33 \text{ pt}) +$	6	96	3	100	4	100
Roundup PowerMax 3 (30 fl oz)						
Outlook (16 fl oz) +	0	99	1	100	3	100
Roundup PowerMax 3 (30 fl oz)	1.0			0.0	• •	
LSD _{0.05} "	4.8	7.5	5.5	8.9	3.8	13.1

^a Roundup PowerMax 3 at 30 fl oz/A + AMS at 17 lb/100 gal was applied to the entire plot area at 2-leaf sugarbeet.

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

Summary: Warrant (acetochlor) is a Group 15 herbicide that is commonly applied with glyphosate as a layby residual product in sugarbeet, once sugarbeet has reached the 2-leaf stage or greater. A new high load formulation of Warrant (MON 301668) was examined for crop tolerance and weed control. The high load formulation is a 4.61 L versus the current formulation of Warrant 3 L, resulting in lower product rates. Sugarbeet tolerance was similar between the high load and current formulation of Warrant. Warrant does not have foliar activity, so control is only in the form of residual activity. Therefore, it is important to apply it with herbicide that will control the emerged weeds. The addition of the high load formulation did not reduce herbicide activity on c. lambsquarters with any of the tank-mix partners. Sugarbeet injury that was observed was similar to the high load formulation alone with the exception of the Stinger tank-mixture, where injury was consistent with the high rate of Stinger.

MICHIGAN STATE UNIVERSITY EXTENSION

Evaluation of Cercospora leaf spot and postharvest rot pathogen impacts on sugarbeet storage, 2020-21 Carly Hendershot¹, Chris Bloomingdale¹, Holly Corder¹, Tom Goodwill², Sarah Ruth¹, Cameron Pincumbe¹, Randy Beaudry¹, Linda E. Hanson^{1,2} and Jaime F. Willbur¹; ¹Michigan State University; ²USDA-ARS

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
Hui vesti September 10, 2020	repretetest i proto, i calment in nord, 5 100to, prot in storage

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

Objective 1: Evaluate the impacts of variety and Cercospora leaf spot (CLS) field infection on rate of storage rot symptom development. CLS was rated on the KWS scale of 0 (disease-free) to 10 (foliage dead). At time of harvest, non-treated beets had an average rating of 5.44 (classified as high CLS) and treated beets averaged 2.34 (low CLS). Beets were harvested by hand and stored at 7 °C in plastic bags with wood shavings. Healthy beets of each variety were removed from storage every 4 weeks, washed, and cut into approximately 3-cm thick sections. Root sections were inoculated with a known storage rot pathogen or with a sterile potato dextrose agar (PDA) plug as a control. There were four replications of each variety x pathogen combination. Based on 2019-20 samples, *Penicillium vulpinum, Botrytis cinerea, Geotrichum* sp. and *Fusarium graminearum* were chosen for storage trials (REACh, 2020). Inoculated beets were incubated for 24 hours before removal of agar plugs, and after one week at ambient temperature, the lesion length and depth were measured and compared across varieties. Four timepoints were completed at 30, 90, 120 and 150 days postharvest.

Summary: Results show no evidence that CLS levels in the field affect rot development in storage for *Botrytis cinerea, Fusarium graminearum, Geotrichum* spp. or *Penicillium vulpinum* for the varieties tested. There were no significant differences between rot susceptibility in beets with high or low CLS in the field at any timepoint among the four varieties (P > 0.05, Figure 1). In trial 2, no significant effects were observed between CLS severity and rot diameter or depth at any timepoint (P > 0.05, data not shown). For all trials, lesions formed by *Geotrichum* sp. were not statistically different from the control (P > 0.05); additional screening will be conducted to assess diversity and aggressiveness. There were significant varietal differences in lesion development across the various pathogens at all storage timepoints (P < 0.05, Figure 2).

The relationship between beet variety and storage pathogen symptom development on beet root response to storage pathogens will be evaluated again during storage 2021-22. Depending on results from 2021-22 experiments, additional investigations of CLS impacts on beet storability may also be conducted. In 2022-23, varieties of interest are: EL-A18-0002, EL-A021482, C-G932NT and HIL-9865, with storage pathogens *B. cinerea*, *F. graminearum*, and *P. vulpinum*.



Figure 1: Mean lesion diameters measured from trial 1 roots inoculated with postharvest pathogens 160 days postharvest (n=54 beet slices per treatment).



Figure 2: Mean lesion diameter on roots of 4 varieties inoculated with storage pathogens 160 days postharvest (n=8 variety x pathogen replications per timepoint).

Objective 2: Investigate the effect of CLS infection and post-harvest rot on beet respiration rate in

storage. The effect of in-season CLS severity on storage respiration was also evaluated in collaboration with Dr. Randolph Beaudry. Roots of C-G333NT and HIL-9865 with high and low CLS levels were stored in vented respirometry chambers at $6^{\circ}C/42^{\circ}F$. These beets were not inoculated with storage pathogens. Samples were taken monthly throughout the storage season to measure respiration rate (mL CO₂/kg/hr). A preliminary inoculated respiration trial was completed using the Objective 2 beet varieties. Beets were inoculated at the crown by removing a 4-mm plug of beet tissue, inserting a 4-mm plug of 7-10 day old *P*. *vulpinum* or PDA control, replacing the beet plug, and sealing with petroleum jelly. Respiration was measured weekly for two months.

Summary: There was no difference in rate of respiration per kilogram of beet weight between beets with high and low CLS in the field (P > 0.05), although there was a difference in respiration rate among varieties. We will continue to evaluate the difference in varietal respiration in the future. Preliminary results show beets inoculated with *P. vulpinum* had a significantly increased respiration rate (P < 0.05), but no difference between high and low CLS levels (P > 0.05, Figure 4). In 2021-22, beets of variety C-G932NT with high and low CLS levels were placed in respirometry chambers as described above. These beets were inoculated at the crown with *F. graminearum*, *P. vulpinum*, *B. cinerea* or a PDA control in the method described previously. The respiration rate will be measured weekly throughout the storage season to examine the effects of storage pathogen infection on beet respiration.

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High-Speed Planter LAKKE Ewald Farms, Unionville - 2021

Trial Quality:	Good	Row Spacing:	20 inch	Fe
Variety:	C-G752NT	Seeding Rate:	63,000	In
Planted:	April 6	Soil Type:	Loam	
Plot Size:	6 reps	Prev Crop:	Corn	W

Fertilizer:	2x2: 21 gal. through the planter	
In Furrow:	Quadris (8 oz), Ascend SL (5 oz), Mustang (3.5 oz)	
Weather:	Frost after planting impacted	

emergence

Average Average Standard Population Good Ride 100 ft of Treatment Spacing Deviation % (inches) of Spacing Row (Inches) 5.0 mph 4.72 1.09 184 98.2 1.09 179 94.2 6.5 mph 4.66 4.73 1.14 172 90.8 8.0 mph 1.1 178.2 94.4 Average 4.7 LSD 5% N.S. N.S. N.S. 1.7 CV % 2.0 7.4 7.4 1.4 0.4376 0.3538 < 0.0001 0.4468 p-value

Comments: This trial was done to evaluate sugarbeet emergence and spacing at different speeds using a planter equipped with high speed planter technology. The trial used a 36 row DB60 with Precision Planting's vSet seed meters, SpeedTubes, and DeltaForce hydraulic down force. The target planting speeds were 5, 6.5, and 8 mph, but the 8 mph speed averaged about 7.7 mph. At a speed of 8 mph, approximately 28 seeds are planted per second in each row. The trial used regular pellet seed size. The field had corn as a previous crop, was fall ripped and leveled, and had one spring field cultivator pass. The seedbed was typical of beet fields that follow corn in that it had plenty of corn root balls and stover. Emergence conditions after planting were less than ideal, with multiple freeze and thaw events impacting the stand. The average emergence in the field was still about 74%, which is similar to many beet fields. Emergence in beet fields is never perfect, so to calculate spacing and standard deviation, any gaps less than 1 inch were not used as these could be either double seeds or twins within the same seed. Similarily, any gaps larger than 7.47 inches (1.5 x 4.98" target spacing) 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. To calculate seed spacing, standard deviation, and population, the same 4 rows across the planter were measured for 12 feet in 6 different replications. The data represents approximately 1540 spacing measurements. 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. A lower standard deviation would mean less variabiliity and better planter performance. Though not statistically significant, the population did trend lower as the speed increased. There was a noticeable difference seen in what the monitor (Pecision 20/20) was reading for "Good Ride %". The Good Ride averaged 98.2%, 94.2%, and 90.8%, respectively for 5, 6.5 and 8 mph speeds. Since sugarbeet emergence is sensitive to planting depth, it is reasonable to assume that ride quality could impact seed placement/depth enough to potentially impact emergence. This would be especially true in high residue situations like following corn. More trials should be done to see if the lower emergence trend is real.

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

N.S. - not significant

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