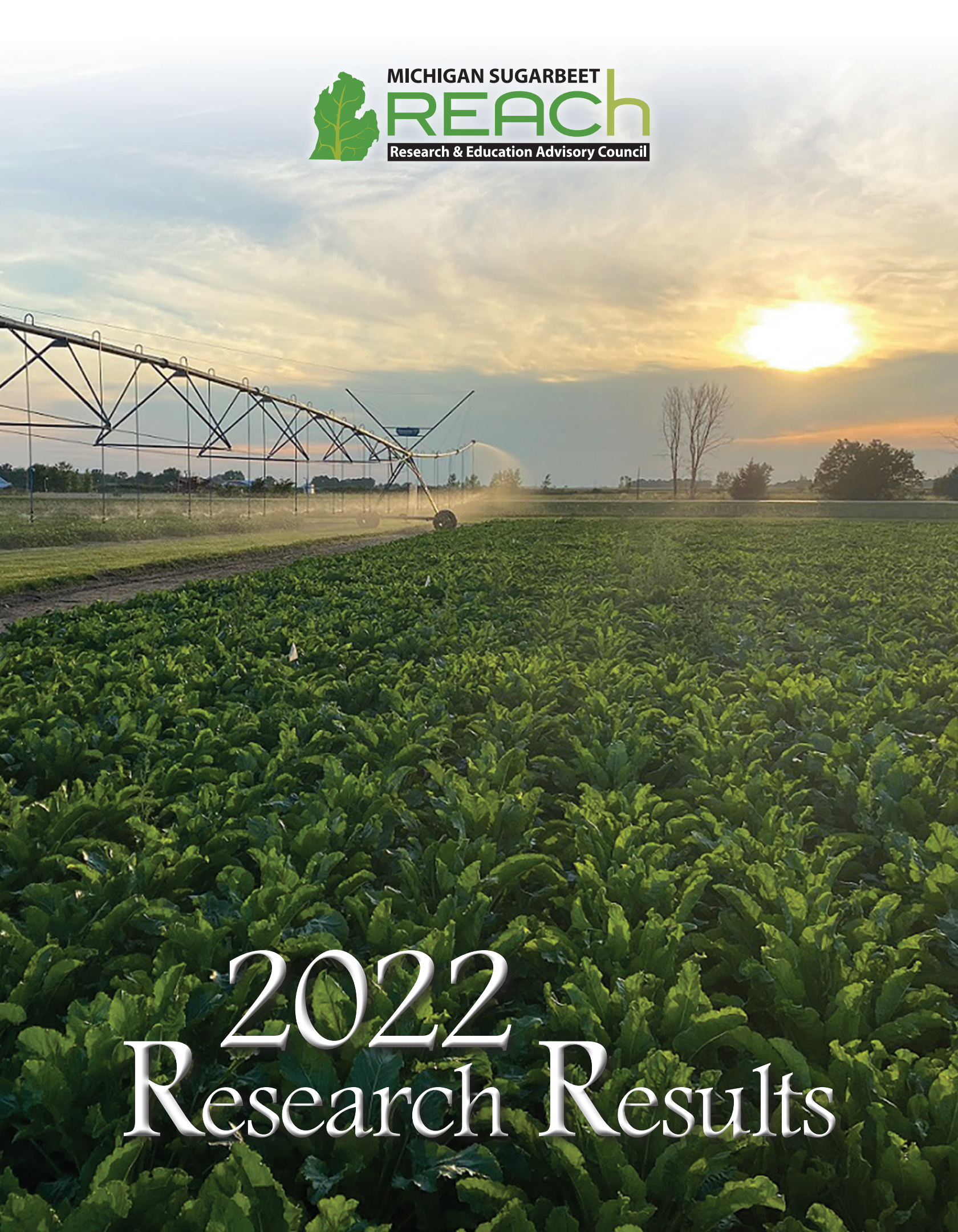
MICHIGAN SUGARBEET REACh
Research & Education Advisory Council



2022 Research Results

REACh/SUGARBEET ADVANCEMENT COMMITTEE LIST
2022 VOTING MEMBERSHIP

23 Voting Members

Company	Name	Terms Remaining	Expire
Michigan Sugar Company	Thomas Bignall (5th Member)	Permanent	
	Dennis Bischer		
	Amanda Harden		
	Corey Guza		
Michigan Sugar Agriculturists (4 years)	Kerrek Griffes	1	2023
	Kevin Messing	3	2025
	Adam Maurer	4	2026
Michigan Sugar Company District Board Members (1 year)	Mark Richards	1	2023
	Troy Schuette (Secretary)	1	2023
	Terry Schindler (Treasurer)	1	2023
Michigan Sugar Company At Large Growers (3 years)	Troy Gingrich	3	2025
	Dan Keenan	2	2024
	Eric Gentner	1	2023
	Andy Shaffner (Chairman)	3	2025
Michigan State University, University of Guelph, and USDA (3 years)	Linda Hanson	1	2023
	Cheryl Trueman	3	2025
	Jamie Willbur	3	2025
Sugar Beet Seed Company (2 years)	Doug Ruppal	1	2023
Agri-Business Retail (2 years)	Kyle Edler	1	2023
Agri-Business Manufacturing (2 years)	Brian Devine	2	2024
Michigan Sugar Company Board of Directors (1 year)	Ben Wilson	1	2023
	Mark Sylvester (Vice Chairman)	1	2023
SBA Director	Daniel Bublitz	Permanent	

Ex-Officio Members

Company	Name
Chairman of Board of Directors - MSC	James Roggenbuck
COO of Michigan Sugar Company	Jim Ruhlman

Updated 11-7-2022

MICHIGAN SUGARBEET REACh
Research Education Advisory Council

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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MICHIGAN SUGARBEET REACh
Research Education Advisory Council

Sugarbeet Advancement

UNIVERSITY of GUELPH

USDA

2022 Research Results

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Research Education Advisory Council

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MICHIGAN SUGAR

2022 Research Results

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Rhizoctonia Crown Rot Product Efficacy Trial

Blumfield East - Richville, MI - 2022

Trial Quality: Fair
Variety: SX-2294
Planted: May 10
Harvested: September 23
Plots: 6 rows X 38 ft, 5 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.6 **CEC:** 19.2
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 20 lbs. Sidedress
Prev Crop: Wheat/Raddish

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 11.71 in.
Beets/100 ft: 223

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*	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
					22-Aug	23-Jun						
11	Propulse	13.6 fl oz	At Plant	In-Furr	**1.7**	**7.4**	**$1,645**	**6782**	**243**	**27.8**	**16.4**	**95.4**
	Quadris	14.25 fl oz	6 lf	Banded								
12	Propulse	13.6 fl oz	At Plant	In-Furr	**2.4**	6.6	$1,472	6009	**241**	25.0	**16.2**	**95.7**
14	Quadris Topsin**	10 fl oz 20 fl oz	At Plant	In-Furr	**2.4**	**6.9**	**$1,833**	**7449**	**241**	**31.0**	**16.4**	95.0
	Quadris Topsin	14.25 fl oz 20 fl oz	6 lf	Banded								
5	Quadris	15.5 fl oz	6 lf	Broadcast	**3.0**	6.8	**$1,558**	**6250**	**246**	25.3	**16.4**	**96.2**
2	Quadris	10 fl oz	At Plant	In-Furr	**3.0**	**7.1**	**$1,697**	**6750**	**242**	**27.9**	**16.3**	**95.6**
19	Excalia Quadris	2 oz 15.5 fl oz	6 lf	Broadcast	**3.2**	**7.9**	**$1,819**	**7352**	**236**	**31.3**	**15.9**	**95.6**
1	Untreated Check				**3.4**	**7.4**	$1,421	5615	**232**	24.4	**15.8**	**95.3**
8	Proline 480 SC	5.7 fl oz	At Plant	In-Furr	**3.7**	**6.9**	**$1,622**	**6498**	**239**	**27.3**	**16.2**	**95.4**
13	Quadris Topsin**	10 fl oz 20 fl oz	At Plant	In-Furr	**4.1**	**7.5**	**$1,560**	**6246**	**242**	25.8	**16.1**	**96.3**
7	Quadris	15.5 fl oz	18 lf	Broadcast	**4.5**	**7.6**	**$1,649**	**6612**	**238**	**27.7**	**16.0**	**95.6**
18	Excalia	2 oz	6 lf	Broadcast	**4.7**	6.7	**$1,534**	**6155**	**243**	25.4	**16.4**	**95.6**
4	Quadris	10 fl oz	At Plant	In-Furr	**4.7**	**7.3**	**$1,515**	6120	230	**26.6**	**15.6**	**95.5**
	Quadris	14.25 fl oz	6 lf	Banded								
10	Quadris Serifel	10 fl oz 4 oz	At Plant	In-Furr	**5.4**	**7.7**	**$1,634**	**6577**	**235**	**28.0**	**15.9**	**95.7**
17	Excalia Quadris	0.64 oz 14.25 fl oz	6 lf	Banded	**5.6**	**7.3**	$1,409	5679	**235**	**24.2**	**15.9**	**95.6**
23	6-24-6 Azteroid FC 3.3	3 gal 5.7 fl oz	At Plant	In-Furr	**6.0**	**7.4**	$1,501	6129	**235**	**26.1**	**16.0**	**95.3**
	Azterknot	16.6 fl oz	6 lf	Banded								
22	6-24-6 Azteroid FC 3.3	3 gal 5.7 fl oz	At Plant	In-Furr	**6.7**	**7.9**	**$1,614**	**6465**	**235**	**27.6**	**16.0**	**95.1**
21	Quadris Proline 480 SC	9.2 fl oz 5.7 fl oz	At Plant	In-Furr	**6.7**	**7.2**	$1,404	5789	**232**	25.0	**15.6**	**95.6**
	Proline 480 SC	5.7 fl oz	6 lf	Banded								

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

**** Topsin is not labeled for in-furrow applications.**

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Rhizoctonia Crown Rot Product Efficacy Trial

Blumfield East - Richville, MI - 2022

No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets/ 100 ft	Vigor*	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
					22-Aug	23-Jun						
9	Proline 480 Sc	5.7 fl oz	At Plant	In-Furr	**7.8**	**7.3**	**$1,537**	**6249**	**242**	25.9	**16.2**	**96.0**
	Quadris	14.25 fl oz	6 lf	Banded								
3	Quadris	14.25 fl oz	6 lf	Banded	**8.2**	**7.6**	$1,386	5568	226	24.5	**15.5**	**95.3**
16	Excalia	.64 oz	6 lf	Banded	**8.4**	**7.4**	**$1,599**	**6368**	**238**	**26.8**	**16.1**	**95.5**
15	Quadris	10 fl oz	At Plant	In-Furr	**10.1**	**7.3**	**$1,576**	**6385**	**239**	**26.8**	**16.3**	94.9
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
6	Quadris	12 fl oz	6 lf	Broadcast	**13.1**	**7.6**	$1,301	5219	228	22.8	**15.5**	**95.3**
20	Quadris	14.25 fl oz	At Plant	In-Furr	26.3	**7.3**	$1,486	**6029**	229	**26.6**	**15.7**	94.9
	Excalia	2 oz	6 lf	Broadcast								
Average					6.3	7.3	$1,555	6274	237	26.5	16.0	95.5
LSD 5%					16.6	1.0	328.5	1298.1	13.8	5.2	0.8	1.1
CV%					186.2	9.3	15.0	14.7	4.1	13.9	3.5	0.8

*__Vigor__ 0 to 10 ratings, 10 is best.

Comments: This trial was designed to test the efficacy of Rhizoctonia fungicides.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Rhizoctonia Crown Rot Product Efficacy Trial

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: SX-2294
Planted: May 17
Harvested: October 3
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Prev Crop: Soybeans

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.55 in.
Beets/100 ft: 183

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*	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
					23-Aug	20-Jul						
15	Quadris	10 fl oz	In- Furr	At Plant	**1.1**	**9.0**	**$1,604**	**7227**	**306**	**23.6**	**20.0**	**96.4**
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
13	Quadris Topsin**	10 fl oz 20 fl oz	In- Furr	At Plant	**1.1**	8.6	**$1,627**	**7239**	**302**	**23.9**	**19.7**	**96.4**
21	Quadris Proline 480 SC	9.2 fl oz 5.7 fl oz	In- Furr	At Plant	**1.3**	**9.3**	**$1,739**	**7911**	**319**	**24.8**	**20.6**	**96.8**
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
22	6-24-6 Azteroid FC 3.3	3 gal 5.7 fl oz	In- Furr	At Plant	**1.3**	**8.9**	**$1,755**	**7812**	**316**	**24.7**	**20.5**	**96.7**
24	Quadris	9.2 fl oz	In- Furr	At Plant	**1.7**	**8.8**	**$1,591**	**7164**	**302**	**23.7**	**20.1**	95.5
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
19	Excalia Quadris	2 oz 15.5 fl oz	6 lf	Broadcast	**2.0**	**9.1**	**$1,755**	**7894**	**313**	**25.2**	**20.4**	**96.3**
6	Quadris	12 fl oz	6 lf	Broadcast	**2.2**	**8.9**	**$1,671**	**7431**	**318**	**23.4**	**20.4**	**97.1**
23	6-24-6 Azteroid FC 3.3	3 gal 5.7 fl oz	In- Furr	At Plant	**2.4**	**9.2**	**$1,653**	**7487**	**306**	**24.4**	**19.9**	**96.6**
	Azterknot	16.6 fl oz	6 lf	Banded								
25	Minuet Quadris	12 fl oz 9.2 fl oz	In- Furr	At Plant	**2.6**	**8.9**	**$1,588**	**7190**	**313**	**23.0**	**20.3**	**96.6**
	Proline 480 SC	5.7 fl oz	6 lf	Banded								
7	Quadris	15.5 fl oz	18 lf	Broadcast	**2.6**	**9.3**	**$1,694**	**7550**	**307**	**24.6**	**20.0**	**96.4**
10	Quadris Serifel	10 fl oz 4 oz	In- Furr	At Plant	**2.8**	**9.0**	**$1,709**	**7646**	**315**	**24.3**	**20.5**	**96.5**
16	Excalia	0.64 oz	6 lf	Banded	**3.3**	**8.9**	**$1,723**	**7625**	**322**	**23.7**	**21.0**	**96.3**
26	Topsin**	20 fl oz	In- Furr	At Plant	**3.5**	**8.7**	**$1,586**	**7008**	**308**	**22.8**	**19.9**	**96.9**
8	Proline 480 SC	5.7 fl oz	In- Furr	At Plant	**3.5**	**8.6**	**$1,602**	**7136**	**305**	**23.3**	**19.9**	**96.4**
2	Quadris	10 fl oz	In- Furr	At Plant	**3.9**	**8.9**	$1,529	6767	**312**	21.7	**20.2**	**96.7**

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

**** Topsin is not labeled for in-furrow applications.**

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Rhizoctonia Crown Rot Product Efficacy Trial

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment	Rate/A	Applic Timing	Applic Method	Dead Beets/ 100 ft	Vigor*	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
					23-Aug	20-Jul						
20	Quadris	14.25 fl oz	In- Furr	At Plant	**4.1**	**8.8**	**$1,556**	**7010**	**315**	22.2	**20.1**	**97.5**
	Excalia	2 oz	6 lf	Broadcast								
9	Proline 480 Sc	5.7 fl oz	In- Furr	At Plant	**4.1**	**9.0**	**$1,592**	**7192**	**309**	**23.4**	**20.0**	**96.9**
	Quadris	14.25 fl oz	6 lf	Banded								
3	Quadris	14.25 fl oz	6 lf	Banded	**4.1**	**8.7**	**$1,675**	**7458**	**319**	**23.4**	**20.8**	**96.3**
11	Propulse	13.6 fl oz	In- Furr	At Plant	**4.1**	**9.3**	**$1,617**	**7415**	**309**	**24.1**	**20.1**	**96.6**
	Quadris	14.25 fl oz	6 lf	Banded								
4	Quadris	10 fl oz	In- Furr	At Plant	**4.3**	**9.0**	**$1,630**	**7311**	**303**	**24.1**	**19.9**	96.2
	Quadris	14.25 fl oz	6 lf	Banded								
5	Quadris	15.5 fl oz	6 lf	Broadcast	**4.6**	**8.9**	$1,529	6822	298	**22.7**	19.5	**96.5**
14	Quadris Topsin**	10 fl oz 20 fl oz	In- Furr	At Plant	**4.8**	**9.1**	**$1,639**	**7433**	**310**	**24.0**	**20.1**	**96.9**
	Quadris Topsin	14.25 fl oz 20 fl oz	6 lf	Banded								
12	Propulse	13.6 fl oz	In- Furr	At Plant	**5.0**	**9.2**	**$1,634**	**7394**	**308**	**24.0**	**20.2**	96.2
18	Excalia	2 oz	6 lf	Broadcast	**5.2**	**9.1**	**$1,743**	**7766**	**319**	**24.3**	**20.6**	**97.0**
17	Excalia Quadris	0.64 oz 14.25 fl oz	6 lf	Banded	6.7	**9.1**	**$1,564**	**6996**	**307**	**22.8**	**19.9**	**96.9**
1	Untreated Check				7.0	**8.9**	**$1,685**	**7405**	**316**	**23.5**	**20.6**	**96.3**
	Average				3.4	9.0	$1,642	7357	311	23.7	20.2	96.6
	LSD 5%				5.2	0.6	214.7	943.5	16.3	2.7	1.0	1.2
	CV%				108.1	4.6	9.3	9.1	3.7	8.1	3.7	0.9

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

****** **Topsin is not labeled for in-furrow applications.**

Comments: This trial was designed to test efficacy of Rhizoctonia fungicides.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Rhizoctonia Crown Rot Product Efficacy Trial

Blumfield East & Laker Agronomy Field - 2022

No.	Treatment	Applic Method	Blumfield East				Laker			
			Stand B/100 ft		Dead B/100 ft		Stand B/100 ft		Dead B/100 ft	
			20-May	8-Jun	29-Jun	22-Aug	26-May	8-Jul	5-Jul	23-Aug
1	Untreated Check		**125**	**221**	**2**	**3**	**184**	171	5	7
2	Quadris	In-Furr	**117**	214	**2**	**3**	**185**	178	**3**	**4**
3	Quadris	Banded	**137**	**222**	**2**	**8**	**195**	**184**	**2**	**4**
4	Quadris	In-Furr	**113**	214	**2**	**5**	**191**	**193**	**3**	**4**
	Quadris	Banded								
5	Quadris	Broadcast	**110**	**227**	**3**	**3**	179	176	**3**	**5**
6	Quadris	Broadcast	**119**	**236**	**3**	**13**	**196**	178	**3**	**2**
7	Quadris	Broadcast	**146**	**236**	**1**	**5**	**190**	**181**	**2**	**3**
8	Proline 480 SC	In-Furr	**108**	214	**2**	**4**	180	**186**	**3**	**3**
9	Proline 480 SC	In-Furr	**127**	**226**	**1**	**8**	**185**	**194**	**4**	**4**
	Quadris	Banded								
10	Quadris Serifel	In-Furr	**112**	**229**	**3**	**5**	**197**	**187**	**4**	**3**
11	Propulse	In-Furr	**108**	215	**2**	**2**	**186**	**200**	**5**	**4**
	Quadris	Banded								
12	Propulse	In-Furr	85	218	**3**	**2**	**199**	**195**	5	**5**
13	Quadris	In-Furr	96	**236**	**2**	**4**	**195**	**185**	**1**	**1**
	Topsin*									
14	Quadris Topsin*	In-Furr	**106**	215	**2**	**2**	**185**	**184**	**3**	**5**
	Quadris Topsin	Banded								
15	Quadris Proline 480 SC	In-Furr Banded	**121**	**221**	**3**	**10**	**203**	**190**	**3**	**1**
16	Excalia	Banded	**134**	**232**	**3**	**8**	**200**	180	**3**	**3**
17	Excalia Quadris	Banded	**119**	220	**2**	**6**	**185**	**181**	**5**	7
18	Excalia	Broadcast	**120**	193	4	**5**	**189**	179	**4**	**5**
19	Excalia Quadris	Broadcast	**150**	**252**	**2**	**3**	**199**	**184**	**4**	**2**

***Topsin is not labeled for in-furrow applications.**

Rhizoctonia Crown Rot Product Efficacy Trial

Blumfield East & Laker Agronomy Field - 2022

No.	Treatment	Applic Method	Blumfield East				Laker			
			Stand B/100 ft		Dead B/100 ft		Stand B/100 ft		Dead B/100 ft	
			20-May	8-Jun	29-Jun	22-Aug	26-May	8-Jul	5-Jul	23-Aug
20	Quadris	In-Furr	**112**	**223**	4	26	176	179	**5**	**4**
	Excalia	Broadcast								
21	Quadris Proline 480 SC	In-Furr	**105**	197	**2**	**7**	170	178	**4**	**1**
	Proline 480 SC	Banded								
22	6-24-6 Azteroid FC 3.3	In-Furr	**111**	**238**	**2**	**7**	**182**	170	**2**	**1**
23	6-24-6 Azteroid FC 3.3	In-Furr	95	**227**	**3**	**6**	**197**	**194**	**3**	**2**
	Azterknot	Banded								
24	Quadris	In-Furr	X	X	X	X	175	176	5	**2**
	Proline 480 SC	Banded								
25	Minuet Quadris	In-Furr	X	X	X	X	**183**	**189**	**2**	**3**
	Proline 480 SC	Banded								
26	Topsin*	In-Furr	X	X	X	X	**182**	171	5	**3**
Average			116	223	2	6	188	183	4	3
LSD 5%			45.4	30.5	2.6	16.6	21.4	19.0	3.1	5.2
CV%			27.7	9.7	78.6	186.2	8.1	7.4	60.6	108.1

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

*** Topsin is not labeled for in-furrow applications.**

Inoculated Rhizoctonia AgBiome

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: SX-2294
Planted: May 13
Harvested: October 3
Plots: 6 Rows X 38 ft, 4 Reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs Sidedress
Previous Crop: Soybeans

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 139

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 Timing	Applic Method	Dead Beets / 100 ft	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft	
					23-Aug	20-Jul							26-May	8-Jul
6	Quadris	10 fl oz	At Plant	In-Furr	2.4	**8.9**	**$1,600**	**7189**	**293**	**24.5**	**19.3**	**96.2**	**155**	**158**
	Quadris	10 fl oz	6 lf	Banded										
10	Quadris	10 fl oz	At Plant	In-Furr	6.5	**8.4**	**$1,436**	**6387**	**303**	**20.9**	**19.9**	**96.0**	**148**	**162**
13	Howler	1 lb	At Plant	In-Furr	6.5	7.9	**$1,538**	**6921**	**310**	**22.3**	**20.4**	**96.0**	**150**	**130**
	Quadris	14.25 fl oz	6 lf	Banded										
8	Howler Quadris	1 lb 10 fl oz	At plant	In-Furr	6.9	**8.4**	**$1,576**	**7154**	**317**	**22.6**	**20.5**	**96.8**	131	**147**
	Howler Quadris	1 lb 10 fl oz	6 lf	Banded										
1	Untreated Check				7.8	**8.8**	**$1,316**	**5784**	**291**	19.9	**19.4**	95.5	**175**	**133**
16	Howler	1 lb	At Plant	In-Furr	8.4	**8.2**	**$1,289**	**5797**	**290**	19.9	**19.0**	**96.4**	**150**	**134**
	Howler	1 lb	6 lf	Banded										
7	Howler	1 lb	At Plant	In-Furr	8.4	**8.5**	**$1,491**	**6698**	**301**	**22.0**	**19.9**	**95.8**	**158**	**126**
	Quadris	10 fl oz	6 lf	Banded										
14	Quadris	10 fl oz	At Plant	In-Furr	8.6	**8.9**	**$1,429**	**6471**	**302**	**21.4**	**19.9**	**96.1**	**153**	**149**
	Quadris Howler	10 fl oz 1 lb	6 lf	Banded										
15	Quadris	10 fl oz	At Plant	In-Furr	10.1	**8.3**	**$1,387**	**6320**	**291**	**21.4**	**19.2**	**95.9**	**147**	**134**
	Quadris Howler	10 fl oz 2 lb	6 lf	Banded										
12	Quadris	10 fl oz	At Plant	In-Furr	10.1	**8.4**	$1,150	5233	286	18.2	**18.8**	**96.4**	**166**	**148**
	Howler	2 lb	6 lf	Banded										
9	Howler Quadris	1 lb 10 fl oz	6 lf	Banded	10.1	**8.1**	**$1,335**	**5981**	289	20.4	**19.3**	95.6	140	119
11	Quadris	14.25 fl oz	6 lf	Banded	10.3	**8.1**	**$1,420**	**6336**	**303**	20.8	**20.1**	95.5	144	**127**
4	Howler	2 lb	6 lf	Banded	11.4	**8.2**	$1,219	5458	272	20.0	17.9	**96.3**	**154**	**137**
3	Howler	2 lb	At Plant	In-Furr	11.6	**8.8**	**$1,511**	**6740**	**300**	**22.4**	**19.8**	**95.9**	**149**	**143**
5	Howler	1 lb	At Plant	In-Furr	12.1	**8.4**	**$1,334**	**6029**	**293**	20.6	**19.0**	**97.0**	**151**	**145**
	Howler	2 lb	6 lf	Banded										
2	Inoculated Check				12.3	**8.3**	$1,063	4671	264	17.7	18.1	94.5	146	**137**
Average					9.0	8.4	$1,381	6198	294	20.9	19.4	96.0	151	139
LSD 5%					n.s.	0.8	331.2	1455.4	26.9	3.5	1.8	1.2	28.0	40.3
CV%					80.9	6.6	16.8	16.5	6.4	11.9	6.4	0.9	13.0	20.3

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

Comments: This trial was designed to test AgBiome's product Howler for Rhizoctonia control.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Inoculated Rhizoctonia DPH
Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Fair
Variety: SX-2294
Planted: May 12
Harvested: October 3
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 200

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 Timing	Applic Method	Dead Beets / 100 ft	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft	
					23-Aug	20-Jul							25-May	10-Jun
8	DPHF01=Companion BF DPHF03=Companion Max	8 oz 3 qt	At Plant	In-Furr	9.1	8.6	**$1,667**	**7376**	**311**	**23.8**	**20.1**	**96.9**	**172**	**205**
3	Quadris	10 fl oz	At Plant	In-Furr	9.9	8.6	**$1,897**	**8385**	**323**	**25.9**	**21.1**	**96.3**	**165**	**213**
9	DPHF01=Companion BF Quadris	8 oz 10 fl oz	At Plant	In-Furr	10.8	8.7	**$1,807**	**7991**	**332**	**24.1**	**21.6**	**96.5**	**168**	**193**
6	DPHF02	8 oz	At Plant	In-Furr	14.2	8.5	**$1,824**	**8019**	**316**	**25.3**	**20.8**	95.8	**167**	**193**
5	DPHF01=Companion BF	16 oz	At Plant	In-Furr	14.4	8.2	$1,414	6222	280	**22.2**	18.2	**96.8**	**173**	**200**
4	DPHF01=Companion BF	8 oz	At Plant	In-Furr	15.3	8.1	**$1,601**	**7041**	**312**	**22.5**	**20.5**	**96.2**	**177**	**209**
1	Untreated Check				15.9	8.5	$1,443	6342	302	21.0	19.8	**96.2**	**189**	**211**
2	Inoculated Check				17.0	8.4	$1,343	5903	**313**	18.8	**20.5**	**96.2**	161	180
7	DPHF02	16 oz	At Plant	In-Furr	18.5	8.4	**$1,563**	6877	292	**23.5**	19.1	**96.4**	**174**	**200**
	Average				13.9	8.5	$1,618	7128	309	23.0	20.2	96.4	172	200
	LSD 5%				n.s.	n.s.	338.1	1485.4	25.5	4.0	1.7	0.9	21.7	22.0
	CV%				55.9	6.4	14.3	14.3	5.7	12.0	5.7	0.6	8.7	7.5

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

Comments: This trial was designed to test DPH products for Rhizoctonia control.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

PIONEER · BIG CHIEF
MICHIGAN SUGAR

Inoculated Rhizoctonia FMC

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Fair
Variety: SX-2294
Planted: May 12
Harvested: October 3
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 195

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 Timing	Applic Method	Dead Beets / 100 ft	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft	
					23-Aug	20-Jul							25-May	10-Jun
1	Untreated Check				9.7	8.7	$1,831	8044	320	25.1	21.0	95.9	176	**206**
4	U8Z09-R002	12 fl oz	At Plant	In-Furr	9.9	8.6	$1,802	8007	321	24.9	21.0	96.0	164	**197**
3	U8Z09-R002	9 fl oz	At Plant	In-Furr	10.1	8.4	$1,698	7528	314	24.0	20.8	95.4	153	**194**
7	Quadris	10.5 fl oz	At Plant	In-Furr	10.8	8.4	$1,724	7624	315	24.2	20.9	95.4	152	**200**
6	X4QC56-R002	11 fl oz	At Plant	In-Furr	10.8	8.6	$1,803	7926	319	24.9	21.1	95.5	161	**198**
5	U8Z09-R002	15 fl oz	At Plant	In-Furr	13.4	8.2	$1,581	7058	314	22.5	20.6	96.0	171	**202**
2	Inoculated Check				23.5	8.1	$1,534	6740	316	21.2	20.9	95.5	152	169
	Average				12.6	8.4	$1,710	7561	317	23.8	20.9	95.7	161	195
	LSD 5%				n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	19.4
	CV%				94.5	5.2	13.2	13.1	4.6	12.0	4.0	0.6	10.7	6.7

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

Comments: This trial was designed to test FMC products for Rhizoctonia control.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

PIONEER · BIG CHIEF
MICHIGAN SUGAR

Inoculated Rhizoctonia FMC - Experimental

Blumfield East - Richville, MI - 2022

Trial Quality: Good
Variety: SX-2294
Planted: May 10
Harvested: September 23
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.6 **CEC:** 19.2
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Wheat/Raddish

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 11.71 in.
Beets/100 ft: 245

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 Timing	Applic Method	Dead Beets / 100 ft	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft	
					22-Aug	23-Jun							20-May	7-Jun
1	Untreated Check				**1.7**	**7.7**	**$2,154**	**9463**	**257**	**36.9**	**17.3**	**95.5**	**101**	256
6	X4QC56-R002	11 fl oz	At plant	In-Furr	**2.8**	**7.7**	**$2,077**	**9131**	**265**	**34.5**	**17.6**	**95.9**	71	248
7	Quadris	10.5 fl oz	At plant	In-Furr	**3.0**	**7.5**	**$1,927**	**8516**	**259**	32.9	**17.2**	**96.0**	63	238
4	U8Z09-R002 - EXP	12 fl oz	At plant	In-Furr	**10.8**	**7.4**	$1,846	8197	251	32.7	16.9	95.3	**83**	240
5	U8Z09-R002 - EXP	15 fl oz	At plant	In-Furr	**12.1**	**7.6**	$1,877	8356	**260**	32.2	**17.4**	**95.7**	**83**	243
3	U8Z09-R002 - EXP	9 fl oz	At plant	In-Furr	**12.3**	**7.7**	**$1,948**	**8624**	**257**	**33.6**	**17.2**	**95.7**	**105**	248
2	Inoculated Check				18.1	7.2	$1,900	8350	**258**	32.4	**17.3**	**95.4**	**101**	240
	Average				8.7	7.5	$1,961	8662	258	33.6	17.3	95.7	87	245
	LSD 5%				12.4	0.4	246.4	1082.5	10.9	3.5	0.6	0.6	29.4	n.s.
	CV%				96.3	3.9	8.5	8.4	2.8	6.9	2.4	0.4	22.8	5.6

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

Comments: This trial was designed to test FMC products for Rhizoctonia control.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Inoculated Rhizoctonia FMC - Experimental

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: SX-2294
Planted: May 12
Harvested: October 3
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs Sidedress
Previous Crop: Soybeans

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 185

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 Timing	Applic Method	Dead Beets / 100 ft	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft	
					23-Aug	20-Jul							25-May	10-Jun
4	U8Z09-R002 - EXP	12 fl oz	At Plant	In-Furr	**8.4**	**8.6**	**$1,757**	**7807**	**319**	**24.5**	**21.2**	**95.3**	**151**	**190**
1	Untreated Check				**10.3**	**8.7**	**$1,845**	**8107**	**311**	**26.1**	**20.5**	**95.7**	**167**	**198**
7	Quadris	10.5 fl oz	At Plant	In-Furr	**11.6**	**8.3**	**$1,720**	**7610**	**317**	**24.0**	**20.8**	**96.1**	**159**	**190**
5	U8Z09-R002 - EXP	15 fl oz	At Plant	In-Furr	**18.3**	**8.3**	$1,388	6207	**299**	20.6	**20.0**	**95.3**	**153**	**183**
2	Inoculated Check				**19.0**	**8.2**	$1,407	6184	**307**	20.1	**20.8**	94.5	144	157
6	X4QC56-R002	11 fl oz	At Plant	In-Furr	**23.1**	7.8	$1,485	6533	**305**	21.4	**20.2**	**95.5**	146	**186**
3	U8Z09-R002 - EXP	9 fl oz	At Plant	In-Furr	28.0	7.6	$1,353	6011	291	20.6	19.4	**95.4**	**150**	**187**
	Average				17.0	8.2	$1,565	6923	307	22.5	20.4	95.4	153	185
	LSD 5%				14.3	0.6	266.4	1170.8	19.6	3.4	1.1	0.9	18.0	19.4
	CV%				56.6	4.6	11.5	11.4	4.3	10.2	3.8	0.6	7.9	7.1

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

Comments: This trial was designed to test FMC products for Rhizoctonia control.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

PIONEER · BIG CHIEF
MICHIGAN SUGAR

Inoculated Rhizoctonia Vive

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: SX-2294
Planted: May 13
Harvested: October 3
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Moderate
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 207

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 Timing	Applic Method	Dead Beets / 100 ft	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft	
						20-Jul							25-May	5-Jul
4	Quadris	9.5 fl oz	At Pant	In-Furr	**1.9**	9.1	$1,676	7414	300	**24.7**	19.4	97.0	180	**213**
1	Untreated Check				**2.4**	9.0	$1,474	6479	299	**21.6**	19.3	97.1	188	**218**
5	Azteroid FC 3.3 6-24-6	5.7 fl oz 3 gal	At Plant	In-Furr	**5.6**	9.1	$1,404	6268	298	21.0	19.5	96.4	175	**216**
9	Azteroid FC 3.3 6-24-6	5.7 fl oz 3 gal	At Plant	In-Furr	**6.3**	9.0	$1,462	6647	295	**22.3**	19.1	97.0	189	**221**
	Azterknot	16.6 fl oz	4-8 lf	Banded										
3	6-24-6	3 gal	At Plant	In-Furr	**6.5**	9.1	$1,526	6751	290	**23.2**	18.9	96.6	175	**208**
8	Quadris	9.5 fl oz	At Plant	In-Furr	**6.7**	8.6	$1,553	6971	309	**22.4**	20.2	96.5	173	**209**
	Quadris	14.25 fl oz	4-8 lf	Banded										
6	Quadris	14.25 fl oz	4-8 lf	Banded	**7.5**	8.6	$1,405	6274	287	**21.4**	18.8	96.7	188	**204**
7	Azterknot	16.6 fl oz	4-8 lf	Banded	**8.2**	8.6	$1,464	6556	303	**21.6**	19.8	96.5	193	186
2	Inoculated Check				17.0	8.4	$1,389	6104	294	20.7	19.2	96.5	183	191
	Average				6.9	8.8	$1,484	6607	297	22.1	19.3	96.7	183	207
	LSD 5%				6.9	n.s.	n.s.	n.s.	n.s.	3.4	n.s.	n.s.	n.s.	22.7
	CV%				68.8	5.7	15.9	15.6	7.6	10.7	7.5	0.5	7.3	7.5

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

Comments: This trial was designed to test Vive products for control of Rhizoctonia.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Rhizoctonia Management

Schindler Farms, Kawkawlin - 2022

Trial Quality:	Very Good	**Soil Type:**	Loam	**Rhiz Control:**	See treatments
Variety:	See treatments	**Fertilizer:**	2x2: 40-32-0-8S + 1qt Mn + B; S.D.: 126# N; Fall: 200# potash		
Planted:	May 8			**Cerc Control:**	Low levels: See comments for materials
Harv/Samp:	Nov 9 / Oct 19				
Plot Size:	4 reps	**Prev Crop:**	Corn		
Row Spacing:	22 inch	**Weather:**	Dry throughout season. Not as bad as other areas.	**Other Pests:**	N/A
Seeding Rate:	61,500				

Variety	Quadris Apps	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Populat. 100 Ft. 8 Day	Dead Beets / 1200 Ft
B-1606N	Both	$1,712	9512	292	32.5	19.2	96.7	—	**1**
B-1606N	Foliar	$1,694	9409	290	32.4	19.1	96.9	—	**4**
B-1606N	IF	$1,651	9170	291	31.5	19.1	97.0	104	**10**
B-1606N	None	$1,656	9201	289	31.9	18.9	96.9	119	**22**
H-2238NT	Both	$1,490	8279	282	29.4	18.6	96.8	—	**52**
H-2238NT	Foliar	$1,508	8376	282	29.7	18.6	96.9	—	96
H-2238NT	IF	$1,481	8228	282	29.1	18.5	96.8	119	129
H-2238NT	None	$1,471	8173	281	29.1	18.6	96.9	108	212

Average	$1,583	8794	286	30.7	18.8	96.9	113	66
LSD 10%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	59.0
CV %	5.0	5.0	1.4	5.1	1.3	0.1	19.1	73.8
p-value	0.9229	0.9229	0.8963	0.9673	0.8020	0.3856	0.2526	0.0589

Comments: This trial was done to test four combinations of Quadris applications (in-furrow, foliar, both, or none) 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 more resistant varieties which are currently available. The variety B-1606N has good resistance to root diseases while HIL-2238NT is more susceptible to root diseases. This trial had a moderate level of root disease as indicated by the dead beet counts. These counts are taken in the fall, and are the number of beets that were dead or dying in 1200 foot of row. This variable is the best indicator of a treatment's performance in a Rhizoctonia trial. In this trial, all four of the B-1606N treatments, as well as H-2238NT with both Quadris applications, were in the statistical group with the lowest dead beet counts. The T-band in-furrow applications of Quadris were 9.7 oz/acre with 4 oz/acre of Mustang. The check treatments (none) did not receive either Quadris or Mustang. The foliar applications were 14.25 oz/acre applied in a 7" band on June 17 at the 8-10 leaf stage. The leafspot program was as follows: 7/7 Inspire XT, 7/22 Super Tin + Topsin, 8/5 Delaro + Proline, 8/23 Super Tin, 9/8 Provysol. All applications included an EBDC and Liberate surfactant. 2022 is the third year this trial was conducted. To see the results from the first 2 years, go to page 6 of the 2020 and page 8 of the 2021 REACh Research Results book.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Elatus & AZterknot Fungicides

Meylan Farms, Linwood - 2022

Trial Quality: Very Good
Variety: C-G752NT
Planted: April 26
Harv/Samp: Oct 22 / Oct 20
Plot Size: 4 reps
Row Spacing: 22 inch
Seeding Rate: 61,300

Soil Type: Loam
Fertilizer: 2x2: 16 gal 28%, 4 gal 10-34-0, 4 gal Thiosul + 1 qt Mn & B; PPI: 40 gal 28%
Prev Crop: Wheat & clover
Weather: Generally good

Rhiz Control: See treatments. All treatments included I.F. Satori (similar to Quadris) (8 oz) & Mustang (4 oz)
Cerc Control: Low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Dead Beets / 1200 Ft
AZterknot Banded	$1,877	10429	293	35.6	19.2	96.7	**21**
Quadris Banded	$1,818	10100	293	34.5	19.2	96.6	45
Elatus Banded	$1,864	10353	294	35.3	19.3	96.6	46
Check	$1,857	10316	296	34.9	19.4	96.5	70
Average	$1,854	10300	294	35.0	19.3	96.6	45
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	22.4
CV %	3.3	3.3	1.5	3.3	1.3	0.2	31.0
p-value	0.5761	0.5761	0.7911	0.6029	0.6595	0.6013	0.0064

Comments: This trial was done to evaluate new fungicides AZterknot and Elatus for their efficacy on Rhizoctonia. AZterknot fungicide, from Vive Crop Protection, is a combination of azoxystrobin (same chemical in Azteroid or Quadris) and the biological Extract of *Reynoutria sachalinensis*. Elatus fungicide, from Syngenta, is a combination of azoxystrobin and the SDHI fungicide benzovindiflupyr (Solatenol). Dead beet counts are the best indicator of a fungicide's performance in these trials. For this trial, the dead beet counts are statistically significant at the 95% confidence level. AZterknot was statistically better than Quadris and Elatus, while all of the fungicides were better than the check. All three fungicides were applied in a 7" band with 12 gpa of water on June 16. Quadris was applied at 14.25 oz/acre, AZterknot was applied at 17 oz/acre, and Elatus was applied at 7.1 oz/acre. All treatments including the check received an azoxystrobin in-furrow application. The leafspot program was as follows: 7/5 Inspire XT + Topsin, 7/21 Super Tin + Badge, 8/2 Delaro + Proline, 8/22 Super Tin, 9/1 Provysol, 9/20 EBDC. All applications included EBDC and Liberate surfactant.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Elatus & AZterknot Fungicides

Wishowski Farms, Auburn - 2022

Trial Quality: Good
Variety: B-1703
Planted: April 29
Harv/Samp: Oct 21 / Oct 19
Plot Size: 4 reps
Row Spacing: 30 inch
Seeding Rate: 52,000

Soil Type: Sandy Loam
Fertilizer: Fall: 200# Potash; 2x2: 40#-18#-7#-3.5S + Mn & Zn; S.D.: 42 gal of 28% + S & B; See comments
Prev Crop: Corn
Weather: Periods of dry, but generally good weather

Rhiz Control: Low/moderate level: See treatments. All treatments received AZteroid I.F. (2.5 oz)
Cerc Control: Low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Dead Beets / 1200 Ft
Elatus Banded	$1,343	7461	**271**	27.5	**17.9**	**97.0**	**31**
Quadris Banded	$1,345	7474	269	27.8	17.7	**96.8**	**44**
AZterknot Banded	$1,348	7486	**273**	27.4	**17.9**	96.7	**62**
Check	$1,348	7490	**274**	27.4	**18.1**	**96.9**	134
Average	$1,346	7478	272	27.5	17.9	96.9	67
LSD 10%	N.S.	N.S.	2.9	N.S.	0.2	0.2	61.3
CV %	5.7	5.7	0.8	5.2	0.7	0.1	70.2
p-value	0.9996	0.9996	0.0641	0.9798	0.0322	0.0504	0.0534

Comments: This trial was done to evaluate new fungicides AZterknot and Elatus for their efficacy on Rhizoctonia. AZterknot fungicide, from Vive Crop Protection, is a combination of azoxystrobin (same chemical in AZteroid or Quadris) and the biological Extract of *Reynoutria sachalinensis*. Elatus fungicide, from Syngenta, is a combination of azoxystrobin and the SDHI fungicide benzovindiflupyr (Solatenol). Including products with unique modes of action such as biologicals and SDHI's in a Rhizoctonia management program may help decrease the likelihood of Rhizoctonia developing resistance to azoxystrobins. Dead beet counts are the best indicator of a fungicide's performance in these trials. For this trial, the dead beet counts are statistically significant at the 90% confidence level. All of the fungicide treatments were statistically better than the check, but there was no difference between the fungicides. All three fungicides were applied in a 7" band with 10 gpa of water on June 21. Quadris was applied at 10.5 oz/acre, AZterknot was applied at 12.5 oz/acre, and Elatus was applied at 7.1 oz/acre. All treatments including the check received an AZteroid in-furrow application that included pop-up fertilizer. The in-furrow was T-band applied and included 2 gal of Nachurs Triple Option, 2.5 gal of water, 1 qt of Sure Crop Plen-T Sweet, Puric FC, and 2.5 oz of AZteroid per acre. The leafspot program was as follows: 1. EBDC, 2. Inspire XT, 3. Super Tin, 4. Topguard, 5. Super Tin. All applications included EBDC & Reguard.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Excalia Fungicide

Meylan Farms, Linwood - 2022

Trial Quality: Excellent
Variety: 61,300
Planted: April 26
Harv/Samp: Oct 22 / Oct 20
Plot Size: 4 reps
Row Spacing: 22 inch
Seeding Rate: C-G752NT

Soil Type: Loam
Fertilizer: 2x2: 16 gal 28%, 4 gal 10-34-0, 4 gal Thiosul + 1 qt Mn & B; PPI: 40 gal 28%
Prev Crop: Wheat & clover
Weather: Generally good

Rhiz Control: See treatments. All treatments included I.F. Satori (similar to Quadris) (8 oz) & Mustang (4 oz)
Cerc Control: Low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Dead Beets / 1200 Ft
Excalia Broadcast	$1,867	10371	293	35.4	19.3	96.6	**12**
Excalia Banded	$1,846	10257	291	35.2	19.1	96.7	**31**
Quadris Banded	$1,797	9983	290	34.4	19.1	96.5	**35**
Quadris Broadcast	$1,911	10618	292	36.4	19.2	96.5	54
Check	$1,864	10356	295	35.1	19.3	96.6	64
Average	$1,857	10317	292	35.3	19.2	96.6	39
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	28.8
CV %	3.6	3.6	1.4	3.2	1.1	0.2	53.3
p-value	0.2570	0.2570	0.5235	0.2419	0.4197	0.3147	0.0339

Comments: Excalia fungicide, from Valent, is a new product for managing Rhizoctonia. It has two unique attributes when compared to other Rhizoctonia fungicides. One of these is that it is an SDHI, which is a different chemical structure and mode of action than Quadris. Another unique attribute of Excalia is that it is labeled to be applied as a broadcast application. If this product could be used in place of the second Quadris application, it would no longer be necessary to use a band sprayer to manage this disease. It may also decrease the likelihood of developing resistance to Quadris in Rhizoctonia. In this test, five different treatments were compared. Excalia was applied broadcast (2.0 oz/acre) and banded (0.64 oz/acre). Quadris was also applied broadcast (15.5 oz/acre) and banded (14.25 oz/acre). All treatments including the check received an azoxystrobin in-furrow application. Both fungicides were band applied in a 7" band with 12 gpa of water or broadcast applied with 20 gpa of water on June 16. The dead beet count is the best indicator of a treatment's performance in a Rhizoctonia trial. In this test, the dead beet counts were significantly different at the 95% confidence level. The two Excalia treatments, along with banded Quadris, were in the statistical group with the lowest dead beet counts at this location. The leafspot program was as follows: 7/5 Inspire XT + Topsin, 7/21 Super Tin + Badge, 8/2 Delaro + Proline, 8/22 Super Tin, 9/1 Provysol, 9/20 EBDC. All applications included EBDC and Liberate surfactant.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Excalia Fungicide

Wishowski Farms, Auburn - 2022

Trial Quality: Good
Variety: B-1703
Planted: April 29
Harv/Samp: Oct 21 / Oct 19
Plot Size: 4 reps
Row Spacing: 30 inch
Seeding Rate: 52,000

Soil Type: Sandy Loam
Fertilizer: Fall: 200# Potash; 2x2: 40#-18#-7#-3.5S + Mn & Zn; S.D.: 42 gal of 28% + S & B; See comments
Prev Crop: Corn
Weather: Periods of dry, but generally good weather

Rhiz Control: Low/moderate level: See treatments. All treatments received AZteroid I.F. (2.5 oz)
Cerc Control: Low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Dead Beets / 1200 Ft
Quadris Banded	$1,345	7474	269	27.8	17.7	96.8	**44**
Quadris Broadcast	$1,346	7479	274	27.3	18.0	96.9	**80**
Excalia Broadcast	$1,359	7548	270	28.0	17.8	96.9	**86**
Excalia Banded	$1,449	8051	271	29.7	17.8	97.0	**89**
Check	$1,348	7490	274	27.4	18.1	96.9	134
Average	$1,369	7608	271	28.1	17.9	96.9	86
LSD 10%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	46.4
CV %	7.8	7.8	1.2	7.6	1.0	0.1	42.7
p-value	0.6055	0.6055	0.2002	0.5235	0.1177	0.3903	0.0607

Comments: Excalia fungicide, from Valent, is a new product for managing Rhizoctonia. It has two unique attributes when compared to other Rhizoctonia fungicides. One of these is that it is an SDHI, which is a different chemical structure and mode of action than Quadris. Another unique attribute of Excalia is that it is labeled to be applied as a broadcast application. If this product could be used in place of the second Quadris application, it would no longer be necessary to use a band sprayer to manage this disease. It may also decrease the likelihood of Rhizoctonia developing resistance to azoxystrobins. In this test, five different treatments were compared. Excalia was applied broadcast (2.0 oz/acre) and banded (0.467 oz/acre). Quadris was also applied broadcast (15.5 oz/acre) and banded (10.5 oz/acre). Both fungicides were band applied in a 7" band with 10 gpa of water or broadcast applied with 20 gpa of water on June 21. The dead beet count is the best indicator of a treatment's performance in a Rhizoctonia trial. In this test, the dead beet counts were significantly different at the 90% confidence level. All four of the fungicide treatments were in the statistical group with the lowest dead beet counts at this location. Both of the Quadris treatments and the Excalia broadcast had statistically fewer dead beets than the check. All treatments including the check received an AZteroid in-furrow application that included pop-up fertilizer. The in-furrow was T-band applied and included 2 gal of Nachurs Triple Option, 2.5 gal of water, 1 qt of Sure Crop Plen-T Sweet, Puric FC, and 2.5 oz of AZteroid per acre. The leafspot program was as follows: 1. EBDC, 2. Inspire XT, 3. Super Tin, 4. Topguard, 5. Super Tin. All applications included EBDC & Reguard.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University AgBioResearch

Evaluation of in-furrow and banded fungicide applications to manage Rhizoctonia root and crown rot, 2022

Chris Bloomingdale and Jaime Willbur, Michigan State University

Location: Frankenmuth (SVREC)	**Treatment Timings:** In-Furrow & Banded (6-8 leaf stage)
Planting Dates: May 17, 2022	**Pesticides:** see table
Soil Type: Loam	**O.M.:** 5.0 **pH:** 7.5
Replicates: 4	**Sugar Beet Variety:** SX-2283

Summary: Significant differences in the percent stand loss were observed among tested programs ($P < 0.0001$). All programs had lower rates of stand loss, ranging from 0 to 35.2%, than the inoculated control (program 1), which had 59.4% loss. Stand reduction in programs 3, 7, 8, 9, and 10 did not differ from the non-inoculated control (program 2). Disease index values also differed significantly among fungicide programs ($P < 0.0001$). Programs 3, 8, 9, and 10 all had significantly lower disease indices than the inoculated control. Yield estimates also were significantly different among programs ($P < 0.01$). Fungicide programs 3 and 5-10 had estimated values ranging between 11.4 and 22.3 t/A and were significantly greater than the inoculated control, with 3.4 t/A.

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

No.	Treatment, Rate[a]	Application Type[b]	Stand Loss (%)[c]	Disease Index (%)[d]	Yield (t/A)
1	Inoculated Control[e]	-	59.4 a	68.2 ab	3.4 d
2	Non-inoculated Control[e]	-	0.7 d	1.2 d	13.0 bc
3	Quadris, 13.9 fl oz Quadris, 13.9 fl oz	In-Furrow Banded	0.0 d	14.9 d	17.8 ab
4	Experimental, 24 fl oz	In-Furrow	25.1 bc	59.0 a-c	9.1 cd
5	Experimental, 32 fl oz	In-Furrow	35.2 b	76.2 a	11.4 bc
6	Experimental, 48 fl oz	In-Furrow	22.2 bc	52.8 bc	12.5 bc
7	Experimental, 32 fl oz Experimental, 32 fl oz	In-Furrow Banded	2.7 d	47.3 bc	18.4 ab
8	Experimental, 32 fl oz	Banded	12.1 cd	38.3 c	14.7 bc
9	Quadris, 13.9 fl oz Elatus, 7.1 fl oz	In-Furrow Banded	0.6 d	7.5 d	22.3 a
10	Elatus, 7.1 fl oz	Banded	2.2 d	12.3 d	17.9 ab

[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] Non-treated control.

Rhizoctonia crown and root rot: fungicide efficacy, Ridgetown, 2022

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

Trial Quality:	fair	**Variety:**	SX 1264
Planted:	May 13	**Location:**	Ridgetown, Ontario, Canada
Harvested:	October 6	**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:	3.0 seeds/foot		

Highlights / Summary:

- Dry conditions observed in early season with below-normal precipitation in May, June and July.
- Rhizoctonia crown and root rot developed in September following near-normal rainfall in August.
- Plant stand counts were low. Incidence of Rhizoctonia crown and root rot was approximately 50% (48.8 – 54.6%) based on the number and weight of beets in the nontreated control at the harvest assessment. There was high variability between plots in terms of the incidence and disease severity and no differences were observed among treatments. There were no differences in beet yield.

Plant stand count, yield, incidence and severity of root rot caused by *Rhizoctonia solani* in sugarbeet 'SX 1264' treated with different fungicides, Ridgetown, ON, 2022.

Treatment [a]	Plant Stand Count [bc]	Yield (T/A)	RWST (lb/ton)	RWSA (lb/ac)	Rhizoctonia crown and root rot [d]			
					Incidence (%)		Dis. Sev. Index	
					number of beets	beet weight	number of beets	beet weight
Nontreated control	20.0	12.4	257	3139	48.8	54.6	23.9	25.9
Quadris @ 750 ml/ha (A)	23.9	14.7	268	3954	43.8	47.7	19.6	19.6
Quadris @ 750 ml/ha (B)	24.5	15.0	275	4130	43.8	45.7	22.5	17.9
Excalia @ 34.7 ml/ha (B)	22.3	14.1	263	3706	52.5	57.5	26.4	23.6
Excalia @ 34.7 ml/ha (C)	22.4	13.9	256	3559	55.0	61.8	28.9	27.7
Quadris @ 750 ml/ha (A) Excalia @ 34.7 ml/ha (B)	22.3	15.8	263	4186	26.3	32.8	14.3	14.7
Quadris @ 750 ml/ha (A) Excalia @ 34.7 ml/ha (C)	23.4	14.5	272	3959	27.5	30.8	10.9	11.1
Quadris @ 750 ml/ha (B) Excalia @ 34.7 ml/ha (C)	25.5	13.6	262	3535	50.0	54.9	22.7	22.3
Elatus A @ 750 ml/ha (A) Elatus B @ 750 ml/ha (A)	25.0	15.1	266	4025	35.0	32.4	16.8	14.5
Elatus A @ 750 ml/ha (B) Elatus B @ 750 ml/ha (B)	23.8	16.4	270	4452	37.5	34.1	16.4	13.7

[a] Treatments applied on A= May 13 (at planting), B= Jun 6 (2-4 leaf), C= Jun 16 (6-8 leaf). Excalia applied with a non-ionic surfactant (0.125% v/v). [b] Numbers in a column followed by the same letter are not significantly different at $P \leq 0.05$, Tukey's HSD. [c] Plant Stand Count is the total of two 7-metre treatment rows at 35 days after planting. [d] Harvest assessment was completed on Oct 6 (146 days after planting).

Funding: Ontario Agri-Food Innovation Alliance, Ontario Sugarbeet Growers' Association (OSGA), Michigan Sugar Company (MSC).

Evaluating Fungicide Application Timings (BEETcast) for control of Cercospora Leafspot - Blumfield West - Richville, MI - 2022

Trial Quality: Fair
Variety: B-1703, C-G675, B-197N C-G021 & HIL-9865
Planted: June 9
Harvested: November 2
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.
Soil Info: Clay Loam
% OM: 2.5 **pH:** 7.1 **CEC:** 10.8
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Wheat/Clover
Rhizoc Level: Low
Problems: Variable stand
Seeding Rate: 4.1 in.
Rainfall: 14.05 in.
Beets/100 ft: 126
Application: JD 3520 tractor mounted plot sprayer, compressed air, 100 psi, 25 gpa

No.	Treatment	Variety	# of Applic	CLS* Rate 6-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
5	Less Aggressive	B-1703	4	**0.8**	$1,524	9291	**299**	31.1	**20.1**	**94.8**
2	Standard	B-1703	5	**1.1**	$1,464	9052	**296**	30.6	**20.0**	**94.7**
3	More Aggressive	B-1703	6	**1.3**	$1,483	9158	**295**	31.1	**20.1**	**94.3**
4	1st and 15th	B-1703	7	**1.4**	$1,401	8849	**300**	29.5	**20.3**	**94.6**
1	Untreated Check	B-1703	0	4.1	$1,306	7256	268	27.0	19.0	92.7
8	More Aggressive	C-G675	7	**0.6**	$1,766	**10998**	**313**	35.1	**20.7**	**95.5**
9	1st and 15th	C-G675	7	**0.9**	$1,642	**10148**	291	34.3	**20.0**	**93.9**
7	Standard	C-G675	6	**1.0**	$1,474	9027	**312**	29.0	**20.9**	**94.9**
10	Less Aggressive	C-G675	5	**1.4**	**$1,861**	**11259**	291	**38.7**	19.8	**94.2**
6	Untreated Check	C-G675	0	5.0	$1,576	8753	270	32.2	19.1	92.9
18	More Aggressive	B-197N	7	2.8	$1,269	8402	282	29.8	**20.2**	92.3
19	1st and 15th	B-197N	7	2.8	$1,527	9549	288	33.1	**20.2**	93.1
20	Less Aggressive	B-197N	5	2.9	$1,165	7582	258	29.4	19.8	89.6
17	Standard	B-197N	6	2.9	$1,001	6858	268	25.8	19.3	91.9
16	Untreated Check	B-197N	0	4.9	$1,121	6229	246	25.2	18.2	91.3
22	Standard	C-G021	4	**0.6**	$1,598	9747	290	33.5	**20.0**	**93.8**
25	Less Aggressive Late	C-G021	2	**0.9**	**$2,039**	**11906**	292	**40.9**	**20.5**	92.9
23	More Aggressive	C-G021	4	**1.1**	$1,676	**10215**	288	**35.4**	**20.4**	92.6
24	Less Aggressive Early	C-G021	2	**1.3**	$1,693	9947	291	34.1	**20.2**	93.4
21	Untreated Check	C-G021	0	2.0	**$2,079**	**11550**	**304**	**38.0**	**20.7**	**94.4**
12	Standard	HIL-9865	6	**1.2**	$1,541	9572	**305**	31.3	**20.4**	**95.1**
14	1st and 15th	HIL-9865	7	1.5	$1,647	**10218**	**315**	32.4	**20.7**	**96.0**
13	More Aggressive	HIL-9865	7	1.5	$1,405	9156	**302**	30.3	**20.4**	**94.6**
15	Less Aggressive	HIL-9865	6	1.7	$1,480	9328	**296**	31.5	**20.1**	**94.6**
11	Untreated Check	HIL-9865	0	3.8	$1,308	7267	276	26.3	18.7	**94.9**
Average				2.0	$1,522	9253	289	31.8	20.0	93.7
LSD 5%				0.8	310.7	1726.3	21.3	5.5	0.9	2.4
CV %				27.7	14.5	13.2	5.2	12.2	3.1	1.8

***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-197N (poor), HIL-9865 (fair+), C-G675 (good), B-1703 (good+) and C-G021 (excellent). These ratings were determined using ratings from the 2021 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-197N 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 $.18 minus fungicide and application cost.

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

Evaluating Fungicide Application Timings (BEETcast) for control of Cercospora Leafspot - Blumfield West - Richville, MI - 2022

RWSA

Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	**11550**	1	0	7256	6	0	8753	11	0	7267	16	0	6229
Standard	22	4	9747	2	5	9052	7	6	9027	12	6	9572	17	6	6858
More Aggr	23	4	**10215**	3	6	9158	8	7	**10998**	13	7	9156	18	7	8402
1st & 15th	X	X	X	4	7	8849	9	7	**10148**	14	7	**10218**	19	7	9549
Less Aggr	X	X	X	5	4	9291	10	5	**11259**	15	6	9328	20	5	7582
Less Aggr Late	25	2	**11906**	X	X	X	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	**9947**	X	X	X	X	X	X	X	X	X	X	X	X

RWST

Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	**304**	1	0	268	6	0	270	11	0	276	16	0	246
Standard	22	4	290	2	5	**296**	7	6	**312**	12	6	**305**	17	6	268
More Aggr	23	4	288	3	6	**295**	8	7	**313**	13	7	**302**	18	7	282
1st & 15th	X	X	X	4	7	**300**	9	7	291	14	7	**315**	19	7	288
Less Aggr	X	X	X	5	4	**299**	10	5	291	15	6	**296**	20	5	258
Less Aggr Late	25	2	292	X	X	X	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	291	X	X	X	X	X	X	X	X	X	X	X	X

% Leaf Damage October 6th

Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	2.0	1	0	4.1	6	0	5.0	11	0	3.8	16	0	4.9
Standard	22	4	**0.6**	2	5	**1.1**	7	6	**1.0**	12	6	**1.2**	17	6	2.9
More Aggr	23	4	**1.1**	3	6	**1.3**	8	7	**0.6**	13	7	1.5	18	7	2.8
1st & 15th	X	X	X	4	7	**1.4**	9	7	**0.9**	14	7	1.5	19	7	2.8
Less Aggr	X	X	X	5	4	**0.8**	10	5	**1.4**	15	6	1.7	20	5	2.9
Less Aggr Late	25	2	**0.9**	X	X	X	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	**1.3**	X	X	X	X	X	X	X	X	X	X	X	X

Evaluating Fungicide Application Timings (BEETcast) for Control of Cercospora Leafspot - Answer Plot - Sebewaing, MI - 2022

Trial Quality: Good
Variety: B-1703, C-G675, B-197N C-G021 & HIL-9865
Planted: May 10
Harvested: October 6
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.0 **pH:** 7.3 **CEC:** 13.3
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Corn

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.76 in.
Beets/100 ft: 185

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

No.	Treatment	Variety	# of Applic	CLS* Rate 18-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
4	1st and 15th	B-1703	6	**0.2**	$1,625	8229	264	31.2	19.7	90.4
2	Standard	B-1703	5	**0.2**	$1,618	8078	264	30.6	19.6	90.7
3	More Aggressive	B-1703	5	**0.4**	$1,712	8503	271	31.4	**19.9**	91.1
5	Less Aggressive	B-1703	4	0.7	$1,781	**8738**	271	**32.2**	**19.9**	91.1
1	Untreated Check	B-1703	0	0.9	$1,725	7812	257	30.4	19.2	90.4
8	More Aggressive	C-G675	6	**0.3**	$1,743	**8860**	271	**32.8**	**20.1**	90.7
10	Less Aggressive	C-G675	5	**0.3**	$1,702	8455	263	**32.1**	19.6	90.5
9	1st and 15th	C-G675	6	**0.3**	$1,580	7994	261	30.6	19.4	90.7
7	Srandard	C-G675	5	**0.4**	**$1,855**	**9087**	**286**	**31.8**	**20.3**	**92.4**
6	Untreated Check	C-G675	0	1.9	**$1,875**	8492	264	**32.1**	19.5	90.9
20	Less Aggressive	B-197N	5	**0.3**	$1,697	**8590**	270	**31.9**	19.4	**92.1**
19	1st and 15th	B-197N	6	**0.4**	$1,629	8247	268	30.8	19.6	91.2
17	Standard	B-197N	7	**0.5**	$1,700	**8758**	267	**32.8**	19.4	**91.6**
18	More Aggressive	B-197N	7	0.7	$1,556	8150	266	30.7	19.5	91.2
16	Untreated Check	B-197N	0	3.4	$1,681	7612	261	29.2	**19.9**	89.7
22	Standard	C-G021	4	**0.2**	**$1,909**	**9354**	**273**	**34.3**	**20.2**	90.8
25	Less Aggressive Late	C-G021	2	**0.4**	**$1,991**	**9490**	**277**	**34.3**	**20.2**	91.4
21	Untreated Check	C-G021	0	**0.4**	**$1,922**	**8703**	267	**32.6**	19.7	91.0
24	Less Aggressive Early	C-G021	2	**0.5**	**$1,908**	**9084**	**273**	**33.3**	**20.1**	91.0
23	More Aggressive	C-G021	4	**0.6**	**$1,820**	**8978**	269	**33.4**	**19.9**	90.9
15	Less Aggressive	HIL-9865	5	**0.3**	$1,622	8250	**279**	29.6	19.6	**92.9**
12	Standard	HIL-9865	6	**0.4**	$1,666	8370	**287**	29.2	**20.7**	**91.7**
13	More Aggressive	HIL-9865	7	**0.5**	$1,558	8160	**280**	29.1	**20.0**	**92.3**
14	1st and 15th	HIL-9865	6	**0.6**	$1,679	8475	**282**	30.0	**20.1**	**92.4**
11	Untreated Check	HIL-9865	0	2.9	$1,763	7987	**275**	29.0	**20.0**	91.5
Average				0.7	$1,733	8498	271	31.4	19.8	91.2
LSD 5%				0.4	183.5	831.0	14.6	2.7	0.8	1.3
CV %				40.4	7.5	6.9	3.8	6.1	2.8	1.0

***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-197N (poor), HIL-9865 (fair+), C-G675 (good), B-1703 (good+) and C-G021 (excellent). These ratings were determined using ratings from the 2021 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-197N 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 $.18 minus fungicide and application cost.

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

Evaluating Fungicide Application Timings (BEETcast) for control of Cercospora Leafspot - Answer Plot - Sebewaing, MI - 2022

RWSA

Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	**8703**	1	0	7812	6	0	8492	11	0	7987	16	0	7612
Standard	22	4	**9354**	2	5	8078	7	6	**9087**	12	6	8370	17	6	**8758**
More Aggr	23	4	**8978**	3	6	8503	8	7	**8860**	13	7	8160	18	7	8150
1st & 15th	X	X	X	4	7	8229	9	7	7994	14	7	8475	19	7	8247
Less Aggr	X	X	X	5	4	**8738**	10	5	8455	15	6	8250	20	5	8590
Less Aggr Late	25	2	**9490**	X	X	X	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	**9084**	X	X	X	X	X	X	X	X	X	X	X	X

RWST

Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	197
Untreated	21	0	267	1	0	257	6	0	264	11	0	**275**	16	0	261
Standard	22	4	**273**	2	5	264	7	6	**286**	12	6	**287**	17	6	267
More Aggr	23	4	269	3	6	271	8	7	271	13	7	**280**	18	7	266
1st & 15th	X	X	X	4	7	264	9	7	261	14	7	**282**	19	7	268
Less Aggr	X	X	X	5	4	271	10	5	263	15	6	**279**	20	5	270
Less Aggr Late	25	2	**277**	X	X	X	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	**273**	X	X	X	X	X	X	X	X	X	X	X	X

% Leaf Damage October 18th

Program	Trt	# Spr	021	Trt	# Spr	1703	Trt	# Spr	675	Trt	# Spr	9865	Trt	# Spr	179
Untreated	21	0	**0.4**	1	0	0.9	6	0	1.9	11	0	2.9	16	0	3.4
Standard	22	4	**0.2**	2	5	**0.2**	7	6	**0.4**	12	6	**0.4**	17	6	**0.5**
More Aggr	23	4	**0.6**	3	6	**0.4**	8	7	**0.3**	13	7	**0.5**	18	7	0.7
1st & 15th	X	X	X	4	7	**0.2**	9	7	**0.3**	14	7	**0.6**	19	7	**0.4**
Less Aggr	X	X	X	5	4	0.7	10	5	**0.3**	15	6	**0.3**	20	5	**0.3**
Less Aggr Late	25	2	**0.4**	X	X	X	X	X	X	X	X	X	X	X	X
Less Aggr Early	24	2	**0.5**	X	X	X	X	X	X	X	X	X	X	X	X

Evaluating Fungicide Application Timings (BEETcast) for control of Cercospora Leafspot - Blumfield West & Answer Plot

No.	Program	Treatment**	App	Rate/A	Blum West		Answer	
					Date	DSV	Date	DSV
1	UTC - B-1703							
2	Standard B-1703	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	14-Jul	58	22-Jul	82
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	5-Aug	88	10-Aug	128
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	22-Aug	115	28-Aug	168
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	9-Sep	141	14-Sep	200
3	More Aggr B-1703	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	14-Jul	58	21-Jul	80
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	29-Jul	76	5-Aug	113
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	15-Aug	102	19-Aug	140
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	30-Aug	130	6-Sep	185
		EBDC* + Copper*	F	2 lbs + 2 pt	15-Sep	150		
4	1st and 15th B-1703	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	6-Jul	49	12-Jul	65
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	14-Jul	58	22-Jul	82
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	5-Aug	88	10-Aug	128
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	15-Aug	102	22-Aug	150
		EBDC* + Copper*	F	2 lbs + 2 pt	30-Aug	130	8-Sep	186
		Priaxor + Copper*	G	8 fl oz + 2 pt	15-Sep	150		
5	Less Aggr B-1703	Proline + EBDC*	A	5.7 fl oz + 1.6 qt	27-Jun	40	5-Jul	58
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	18-Jul	63	27-Jul	92
		Inspire XT + EBDC*	C	7 fl oz + 2 lbs	11-Aug	100	16-Aug	137
		Super Tin + EBDC*	D	8 fl oz + 2 lbs	1-Sep	132	6-Sep	185
6	UTC - C-G675							
7	Standard C-G675	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	14-Jul	58	21-Jul	80
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	29-Jul	76	5-Aug	113
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	15-Aug	102	19-Aug	140
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	30-Aug	130	6-Sep	185
		Priaxor + Copper*	F	8 fl oz + 2 pt	15-Sep	150		
8	More Aggr C-G675	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	11-Jul	54	19-Jul	76
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	26-Jul	72	2-Aug	104
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	11-Aug	100	16-Aug	137
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	25-Aug	120	28-Aug	168
		Priaxor + EBDC*	F	8 fl oz + 2 lbs	9-Sep	141	13-Sep	198
		EBDC* + Copper*	G	2 lbs + 2 pt	15-Sep	150		

*** EBDC = Manzate/ Manzate Pro-stick Copper = Badge **All Treatments included MasterLock @ 6.4 fl oz**

Evaluating Fungicide Application Timings (BEETcast) for control of Cercospora Leafspot - Blumfield West & Answer Plot

No.	Program	Treatment***	App	Rate/A	Blum West		Answer	
					Date	DSV	Date	DSV
9	1st and 15th C-G675	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	6-Jul	49	12-Jul	65
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	14-Jul	58	22-Jul	82
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	5-Aug	88	10-Aug	128
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	15-Aug	102	22-Aug	150
		EBDC* + Copper*	F	2 lbs + 2 pt	30-Aug	130	8-Sep	186
		Priaxor + EBDC*	G	8 fl oz + 2 lbs	15-Sep	150		
10	Less Aggr C-G675	Proline + EBDC*	A	5.7 fl oz + 1.6 qt	27-Jun	40	5-Jul	58
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	14-Jul	58	21-Jul	80
		Inspire XT + EBDC*	C	7 fl oz + 2 lbs	29-Jul	76	5-Aug	113
		Super Tin + EBDC*	D	8 fl oz + 2 lbs	15-Aug	102	19-Aug	140
		EBDC*	E	2 lbs + 2 pt	30-Aug	130	16-Sep	185
11	UTC - HIL-9865							
12	Standard HIL-9865	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	11-Jul	54	19-Jul	76
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	26-Jul	72	2-Aug	104
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	11-Aug	100	16-Aug	137
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	25-Aug	120	28-Aug	168
		EBDC*	F	2 lbs + 2 pt	9-Sep	141	13-Sep	198
13	More Aggr HIL-9865	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	8-Jul	52	18-Jul	75
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	20-Jul	63	29-Jul	96
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	5-Aug	88	10-Aug	128
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	15-Aug	102	22-Aug	150
		EBDC* + Copper*	F	2 lbs + 2 pt	30-Aug	130	2-Sep	179
		Priaxor + Copper*	G	8 fl oz + 2 pt	15-Sep	150	13-Sep	198
14	1st and 15th HIL-9865	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	6-Jul	49	12-Jul	65
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	14-Jul	58	22-Jul	82
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	5-Aug	88	10-Aug	128
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	15-Aug	102	22-Aug	150
		EBDC* + Copper*	F	2 lbs + 2 pt	30-Aug	130	8-Sep	186
		Priaxor + Copper*	G	8 fl oz + 2 pt	15-Sep	150		
15	Less Aggr HIL-9865	Proline + EBDC*	A	5.7 fl oz + 1.6 qt	27-Jun	40	5-Jul	58
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	14-Jul	58	21-Jul	80
		Inspire XT + EBDC*	C	7 fl oz + 2 lbs	29-Jul	76	5-Aug	113
		Super Tin + EBDC*	D	8 fl oz + 2 lbs	15-Aug	102	19-Aug	140
		Priaxor + EBDC*	E	8 fl oz + 2 lbs	30-Aug	130	6-Sep	185
		EBDC*	F	2 lbs + 2 pt	15-Sep	150		

*** EBDC = Manzate/ Manzate Pro-stick Copper = Badge ***All Treatments included MasterLock @ 6.4 fl oz**

Evaluating Fungicide Application Timings (BEETcast) for control of Cercospora Leafspot - Blumfield West & Answer Plot

No.	Program	Treatment***	App	Rate/A	Blum West		Answer	
					Date	DSV	Date	DSV
16	UTC - B-197N							
17	Standard B-197N	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	11-Jul	54	19-Jul	76
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	26-Jul	72	22-Jul	82
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	11-Aug	100	5-Aug	113
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	25-Aug	120	19-Aug	140
		EBDC*	F	2 lbs	9-Sep	141	2-Sep	179
		Priaxor + Copper*	G	8 fl oz + 2 pt			14-Sep	200
18	More Aggr B-197N	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	8-Jul	52	18-Jul	75
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	20-Jul	63	29-Jul	96
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	5-Aug	88	10-Aug	128
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	15-Aug	102	22-Aug	150
		EBDC* + Copper*	F	2 lbs + 2 pt	30-Aug	130	2-Sep	179
		Priaxor + Copper*	G	8 fl oz + 2 pt	15-Sep	150	13-Sep	198
19	1st and 15th B-197N	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Proline + EBDC*	B	5.7 fl oz + 1.6 qt	6-Jul	49	12-Jul	65
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	14-Jul	58	22-Jul	82
		Inspire XT + EBDC*	D	7 fl oz + 2 lbs	5-Aug	88	10-Aug	128
		Super Tin + EBDC*	E	8 fl oz + 2 lbs	15-Aug	102	22-Aug	150
		EBDC* + Copper*	F	2 lbs + 2 pt	30-Aug	130	8-Sep	186
		Priaxor + Copper*	G	8 fl oz + 2 pt	15-Sep	150		
20	Less Aggr B-197N	Proline + EBDC*	A	5.7 fl oz + 1.6 qt	27-Jun	40	5-Jul	58
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	14-Jul	58	21-Jul	80
		Inspire XT + EBDC*	C	7 fl oz + 2 lbs	29-Jul	76	5-Aug	113
		Super Tin + EBDC*	D	8 fl oz + 2 lbs	15-Aug	102	19-Aug	140
		Priaxor + Copper*	E	8 fl oz + 2 pt	31-Aug	131	6-Sep	185
21	UTC - C-G021							
22	Standard C-G021	EBDC*	A	1.6 qt	27-Jun	40	5-Jul	58
		Delaro + Proline + EBDC*	B	11 fl oz + 1.6 fl oz + 1.6 qt	6-Jul	49	12-Jul	65
		Super Tin + Topsin + EBDC*	C	8 fl oz + 20 fl oz + 2 lbs	5-Aug	88	2-Aug	104
		Provysol + EBDC*	D	5 fl oz + 2 lbs	1-Sep	132	13-Sep	198
23	More Aggr C-G021	Delaro + Proline + EBDC*	A	11 fl oz + 1.6 fl oz + 1.6 qt	30-Jun	42	5-Jul	58
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	22-Jul	66	22-Jul	82
		Provysol + EBDC*	C	5 fl oz + 2 lbs	11-Aug	100	12-Aug	130
		Super Tin + EBDC*	D	8 fl oz + 2 lbs	30-Aug	130	2-Sep	179
24	Less Aggr Early C-G021	Delaro + Proline + EBDC*	A	11 fl oz + 1.6 fl oz + 1.6 qt	6-Jul	49	5-Jul	58
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	11-Aug	100	10-Aug	128
25	Less Aggr Late C-G021	Delaro + Proline + EBDC*	A	11 fl oz + 1.6 fl oz + 1.6 qt	20-Jul	63	21-Jul	80
		Super Tin + Topsin + EBDC*	B	8 fl oz + 20 fl oz + 1.6 qt	30-Aug	130	28-Aug	168

*** EBDC = Manzate/ Manzate Pro-stick Copper = Badge ***All Treatments included MasterLock @ 6.4 fl oz**

Cercospora Fungicide Efficacy

Blumfield West - Richville, MI - 2022

Trial Quality: Fair
Variety: SX-2296N
Planted: May 9
Harvested: October 10
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.5 **pH:** 7.1 **CEC:** 10.8
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Wheat/Clover

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 12.18 in.
Beets/100 ft: 100

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

No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 6-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
10	EBDC*	1.6 qt	A B	**1.8**	**$1,848**	**9345**	**303**	**30.9**	**20.5**	**94.5**
	EBDC*	2 lbs	C D E							
	Super Tin	8 fl oz	B D							
	Topsin	20 fl oz	B D							
9	EBDC*	1.6 qt	A B	**1.9**	**$1,805**	**9052**	**283**	**32.0**	**19.5**	**93.9**
	EBDC*	2 lbs	C D E							
	Super Tin	8 fl oz	B D							
13	EBDC*	1.6 qt	A B	**2.1**	**$1,746**	**8984**	**297**	**30.2**	**20.0**	**94.8**
	EBDC*	2 lbs	C D E							
	Delaro	11 fl oz	B D							
	Proline	1.6 fl oz	B D							
26	EBDC*	1.6 qt	A B	**2.3**	$1,639	**8644**	**293**	29.7	**20.0**	**94.1**
	EBDC*	2 lbs	C D E							
	Howler	2.5 lbs	A C E							
	Super Tin	8 fl oz	B D							
	Topsin	20 fl oz	B D							
25	EBDC*	1.6 qt	A B	**2.3**	**$1,743**	**9195**	**285**	**32.3**	**19.7**	93.7
	EBDC*	2 lbs	C D E							
	Howler	2.5 lbs	A C E							
	Proline	5.7 fl oz	B D							
3	EBDC*	1.6 qt	A B	**2.3**	**$1,862**	**9473**	**291**	**32.7**	**19.9**	**94.2**
	EBDC*	2 lbs	C D E							
	Proline	5.7 fl oz	B D							
12	EBDC*	1.6 qt	A B	**2.3**	$1,590	8441	**298**	28.2	**20.1**	**94.9**
	EBDC*	2 lbs	C D E							
	Propulse	13.6 fl oz	B D							
20	EBDC*	1.6 qt	A B	**2.4**	**$1,763**	**8942**	**297**	**30.0**	**19.9**	**95.1**
	EBDC*	2 lbs	C D E							
	Soratel 250 EC	10.9 fl oz	B D							
16	EBDC*	1.6 qt	A B	**2.4**	**$1,774**	**8947**	**292**	**30.6**	**19.7**	**94.8**
	EBDC*	2 lbs	C D E							
	Copper*	2 pt	B D							
15	EBDC*	1.6 qt	A B	**2.6**	**$1,798**	**9086**	**300**	**30.4**	**20.3**	**94.5**
	EBDC*	2 lbs	C D E							
	Dexter Max	2.1 lbs	B D							
8	EBDC*	1.6 qt	A B	**2.6**	**$1,764**	**9101**	**291**	**31.2**	**20.0**	**94.0**
	EBDC*	2 lbs	C D E							
	Priaxor	8 fl oz	B D							
23	EBDC*	1.6 qt	A B	**2.6**	**$1,802**	**9012**	**298**	**30.1**	**20.2**	**94.7**
	EBDC*	2 lbs	C D E							
	OVON 70WSB	1 lb	B D							
	Verifact	.28% V/V	B D							

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

***** 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 $.18 minus fungicide and application cost.

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

Cercospora Fungicide Efficacy

Blumfield West - Richville, MI - 2022

No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 6-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
7	EBDC*	1.6 qt	A B	**2.8**	**$1,772**	**9076**	**290**	**31.4**	**20.2**	93.2
	EBDC*	2 lbs	C D E							
	Provysol	5 fl oz	B D							
2	EBDC*	1.6 qt	A B	**2.8**	**$1,795**	**9112**	**290**	**31.3**	**20.3**	93.2
	EBDC*	2 lbs	C D E							
	Inspire XT	7 fl oz	B D							
24	EBDC*	1.6 qt	A B	**2.8**	**$1,776**	**9313**	**290**	**32.1**	**20.2**	93.4
	EBDC*	2 lbs	C D E							
	Delaro	11 fl oz	B D							
	Luna Privilage	2 oz	B D							
	Proline	1.6 fl oz	B D							
18	EBDC*	1.6 qt	A B	2.9	$1,590	8294	**288**	28.6	**19.8**	**93.8**
	EBDC*	2 lbs	C D E							
	Veltyma	10 fl oz	B D							
17	EBDC*	1.6 qt	A B	2.9	**$1,720**	**8980**	**297**	**30.2**	**20.2**	**94.5**
	EBDC*	2 lbs	C D E							
	Priaxor	8 fl oz	B D							
	Topsin	20 fl oz	B D							
14	EBDC*	1.6 qt	A B	2.9	**$1,761**	**8974**	**300**	29.9	**20.2**	**94.8**
	EBDC*	2 lbs	C D E							
	Lucento	5.5 fl oz	B D							
5	EBDC*	1.6 qt	A B	2.9	**$1,956**	**9856**	**303**	**32.5**	**20.6**	**94.4**
	EBDC*	2 lbs	C D E							
	Enable	8 fl oz	B D							
4	EBDC*	1.6 qt	A B	2.9	**$1,840**	**9550**	**297**	**32.2**	**20.2**	**94.4**
	EBDC*	2 lbs	C D E							
	Topguard	14 fl oz	B D							
11	EBDC*	1.6 qt	A B	3.0	**$1,778**	**9071**	**303**	**30.0**	**20.4**	**95.0**
	EBDC*	2 lbs	C D E							
	Minerva Duo	16 fl oz	B D							
22	EBDC*	1.6 qt	A B	3.1	$1,590	8015	**279**	28.6	**19.7**	92.7
	EBDC*	2 lbs	C D E							
	ICC_F2201	20 fl oz	B D							
	Verifact	.25% V/V	B D							
27	EBDC*	1.6 qt	A B	3.2	**$1,839**	**9627**	**302**	**31.8**	**20.2**	**95.3**
	EBDC*	2 lbs	C D E							
	Howler	2.5 lbs	A-E							
19	EBDC*	1.6 qt	A B	3.3	**$1,830**	**9114**	**298**	**30.6**	**20.1**	**94.7**
	EBDC*	2 lbs	C D E							

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

***** 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 $.18 minus fungicide and application cost.

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

Cercospora Fungicide Efficacy

Blumfield West - Richville, MI - 2022

No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 6-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
21	EBDC*	1.6 qt	A B	3.5	$1,612	8004	**289**	27.7	**19.5**	**95.0**
	EBDC*	2 lbs	C D E							
	ICC_F2103	8 fl oz	B D							
	Verifact	.25% V/V	B D							
6	EBDC*	1.6 qt	A B	3.5	**$1,969**	**9927**	**297**	**33.5**	**20.0**	**94.9**
	EBDC*	2 lbs	C D E							
	Minerva	13 fl oz	B D							
1	Untreated Check			5.6	$1,474	6943	253	27.5	18.4	91.6
Average				2.8	$1,757	8966	293	30.6	20.0	94.2
LSD 5%				1.0	281.7	1327.1	24.3	3.5	1.2	1.5
CV %				25.8	11.4	10.5	5.9	8.0	4.3	1.1

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

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

Comments: Cercospora and Alternaria leafspot pressure was fair at the Blumfield location. Leafspot fungicides were tested for their efficacy for controlling Leafspot. Tested fungicides are rotated and mixed with an EBDC to allow leafspot to develop but not overtake the test fungicides.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Cercospora Fungicide Efficacy
Answer Plot - Sebewaing, MI - 2022

Trial Quality: Good
Variety: SX-2296N
Planted: May 10
Harvested: October 6
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.0 **pH:** 7.3 **CEC:** 13.3
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Corn

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.76 in.
Beets/100 ft: 159

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

No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
16	EBDC*	1.6 qt	A B	**0.2**	**$1,710**	**8310**	267	**31.1**	19.5	91.4
	EBDC*	2 lbs	C D E							
	Copper*	2 pt	B D							
15	EBDC*	1.6 qt	A B	**0.3**	**$1,800**	**8742**	**283**	**30.8**	**20.1**	**92.4**
	EBDC*	2 lbs	C D E							
	Dexter Max	2.1 lbs	B D							
10	EBDC*	1.6 qt	A B	**0.3**	**$1,697**	**8301**	270	**30.7**	**19.9**	91.0
	EBDC*	2 lbs	C D E							
	Super Tin	8 fl oz	B D							
	Topsin	20 fl oz	B D							
6	EBDC*	1.6 qt	A B	**0.3**	**$1,746**	**8535**	271	**31.5**	19.7	91.6
	EBDC*	2 lbs	C D E							
	Minerva	13 fl oz	B D							
20	EBDC*	1.6 qt	A B	**0.3**	$1,655	**8106**	**273**	29.5	19.7	91.7
	EBDC*	2 lbs	C D E							
	Soratel 250 EC	10.9 fl oz	B D							
9	EBDC*	1.6 qt	A B	**0.3**	**$1,907**	**9164**	**284**	**32.2**	**20.3**	**92.2**
	EBDC*	2 lbs	C D E							
	Super Tin	8 fl oz	B D							
11	EBDC*	1.6 qt	A B	**0.4**	**$1,665**	**8207**	**276**	**29.8**	**19.8**	**92.0**
	EBDC*	2 lbs	C D E							
	Minerva Duo	16 fl oz	B D							
7	EBDC*	1.6 qt	A B	**0.4**	**$1,729**	**8531**	**280**	**30.5**	**20.5**	91.2
	EBDC*	2 lbs	C D E							
	Provysol	5 fl oz	B D							
26	EBDC*	1.6 qt	A B	**0.4**	**$1,768**	**8892**	**291**	**30.5**	**21.0**	91.6
	EBDC*	2 lbs	C D E							
	Super Tin	8 fl oz	B D							
	Topsin	20 fl oz	B D							
23	EBDC*	1.6 qt	A B	**0.5**	**$1,847**	**8866**	**282**	**31.5**	**20.0**	**92.6**
	EBDC*	2 lbs	C D E							
	OVON 70WSB	1 lb	B D							
	Verifact	.25% V/V	B D							
21	EBDC*	1.6 qt	A B	**0.5**	**$1,850**	**8771**	**282**	**31.1**	**20.2**	**92.1**
	EBDC*	2 lbs	C D E							
	ICC_F2103	8 fl oz	B D							
	Verifact	.25% V/V	B D							
19	EBDC*	1.6 qt	A B	**0.5**	**$1,759**	**8441**	**275**	**30.6**	19.7	**92.2**
	EBDC*	2 lbs	C D E							

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

***** 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 $.18 minus fungicide and application cost. application cost.

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

Cercospora Fungicide Efficacy

Answer Plot - Sebewaing, MI - 2022

No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
13	EBDC*	1.6 qt	A B	**0.5**	**$1,848**	**9099**	**289**	**31.4**	**20.6**	**92.4**
	EBDC*	2 lbs	C D E							
	Delaro	11 fl oz	B D							
	Proline	1.6 fl oz	B D							
12	EBDC*	1.6 qt	A B	**0.5**	**$1,820**	**9155**	**279**	**32.8**	**19.9**	**92.3**
	EBDC*	2 lbs	C D E							
	Propulse	13.6 fl oz	B D							
2	EBDC*	1.6 qt	A B	**0.5**	**$1,775**	**8667**	**282**	**30.8**	**19.9**	**92.8**
	EBDC*	2 lbs	C D E							
	Inspire XT	7 fl oz	B D							
27	EBDC*	1.6 qt	A B	**0.6**	$1,658	**8440**	268	**31.4**	19.1	**92.5**
	EBDC*	2 lbs	C D E							
	Howler	2.5 lbs	A-E							
22	EBDC*	1.6 qt	A B	**0.6**	**$1,772**	**8529**	**278**	**30.7**	**20.0**	**91.9**
	EBDC*	2 lbs	C D E							
	ICC_F2201	20 fl oz	B D							
	Verifact	.25% V/V	B D							
17	EBDC*	1.6 qt	A B	**0.6**	**$1,714**	**8606**	**272**	**31.7**	19.4	**92.4**
	EBDC*	2 lbs	C D E							
	Priaxor	8 fl oz	B D							
	Topsin	20 fl oz	B D							
14	EBDC*	1.6 qt	A B	**0.6**	**$1,777**	**8698**	**275**	**31.7**	**20.1**	91.1
	EBDC*	2 lbs	C D E							
	Lucento	5.5 fl oz	B D							
3	EBDC*	1.6 qt	A B	**0.6**	**$1,809**	**8869**	**287**	**30.9**	**20.4**	**92.4**
	EBDC*	2 lbs	C D E							
	Proline	5.7 fl oz	B D							
4	EBDC*	1.6 qt	A B	**0.6**	$1,644	**8295**	**274**	**30.2**	19.7	**92.0**
	EBDC*	2 lbs	C D E							
	Topguard	14 fl oz	B D							
24	EBDC*	1.6 qt	A B	0.7	$1,590	**8112**	**280**	29.1	**19.8**	**92.5**
	EBDC*	2 lbs	C D E							
	Delaro	11 fl oz	B D							
	Luna Privilage	2 oz	B D							
	Proline	1.6 fl oz	B D							
8	EBDC*	1.6 qt	A B	0.7	**$1,704**	**8475**	**274**	**30.9**	19.2	**93.1**
	EBDC*	2 lbs	C D E							
	Priaxor	8 fl oz	B D							
25	EBDC*	1.6 qt	A B	0.8	**$1,699**	**8644**	**278**	**31.1**	**20.0**	**92.0**
	EBDC*	2 lbs	C D E							
	Howler	2.5 lbs	A C E							
	Proline	5.7 fl oz	B D							

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

***** 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 $.18 minus fungicide and application cost.

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

Cercospora Fungicide Efficacy

Answer Plot - Sebewaing, MI - 2022

No.	Treatment**	Rate/A	Applic Timing	CLS*** Rate 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
5	EBDC*	1.6 qt	A B	0.8	**$1,673**	**8192**	**283**	28.9	**20.1**	**92.5**
	EBDC*	2 lbs	C D E							
	Enable	8 fl oz	B D							
18	EBDC*	1.6 qt	A B	1.0	**$1,806**	**8949**	**279**	**32.1**	19.6	**92.9**
	EBDC*	2 lbs	C D E							
	Veltyma	10 fl oz	B D							
1	Untreated Check			3.1	**$1,769**	8014	267	**30.0**	19.5	91.3
	Average			0.6	$1,748	8578	278	30.9	19.9	92.1
	LSD 5%			0.4	245.0	1109.8	19.9	3.2	1.2	1.3
	CV %			41.5	10.0	9.2	5.1	7.3	4.2	1.0

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

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

Comments: Cercospora and Alternaria leafspot pressure was low at the Answer Plot location. Leafspot fungicides were tested for their efficacy for controlling leafspot. Tested fungicides are rotated and mixed with an EBDC to allow leafspot to develop but not overtake the test fungicides.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Cercospora Fungicide Efficacy

Blumfield West, Richville & Answer Plot, Sebewaing

No.	Treatment**	Application Timing	Blumfield West Date	Answer Plot Date
1	Untreated Check			
2	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Inspire XT	B D	7/11, 8/19	7/21, 8/24
3	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Proline	B D	7/11, 8/19	7/21, 8/24
4	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Topguard	B D	7/11, 8/19	7/21, 8/24
5	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Enable	B D	7/11, 8/19	7/21, 8/24
6	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Minerva	B D	7/11, 8/19	7/21, 8/24
7	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Provysol	B D	7/11, 8/19	7/21, 8/24
8	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Priaxor	B D	7/11, 8/19	7/21, 8/24
9	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Super Tin	B D	7/11, 8/19	7/21, 8/24
10	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Super Tin + Topsin	B D	7/11, 8/19	7/21, 8/24
11	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Minerva Duo	B D	7/11, 8/19	7/21, 8/24
12	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Propulse	B D	7/11, 8/19	7/21, 8/24
13	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Delaro + Proline	B D	7/11, 8/19	7/21, 8/24
14	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Lucento	B D	7/11, 8/19	7/21, 8/24
15	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Dexter Max	B D	7/11, 8/19	7/21, 8/24
16	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Copper*	B D	7/11, 8/19	7/21, 8/24
17	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Priaxor + Topsin	B D	7/11, 8/19	7/21, 8/24
18	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Veltyma	B D	7/11, 8/19	7/21, 8/24
19	EBDC*	A - E	6/27, 7/11, 8/5, 8/19, 9/9	7/5, 7/21, 8/10, 8/24, 9/13
20	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Soratel 250 EC	B D	7/11, 8/19	7/21, 8/24

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

Manzate @ 1.6 qt used for timings A and B, Manzate Pro-Stick @ 2 lbs used for timings C, D and E

Cercospora Fungicide Efficacy

Blumfield West, Richville & Answer Plot, Sebewaing

No.	Treatment**	Application Timing	Blumfield West Date	Answer Plot Date
21	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	ICC_F2103 + Verifact	B D	7/11, 8/19	7/21, 8/24
22	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	ICC_F2201 + Verifact	B D	7/11, 8/19	7/21, 8/24
23	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBEC* + OVON70WSB + Verifact	B D	7/11, 8/19	7/21, 8/24
24	EBDC*	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Delaro + Luna Privilage + Proline	B D	7/11, 8/19	7/21, 8/24
25	EBDC* + Howler	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* + Proline	B D	7/11, 8/19	7/21, 8/24
26	EBDC* + Howler	A C E	6/27, 8/5, 9/9	7/5, 8/10, 9/13
	EBDC* Super Tin + Topsin	B D	7/11, 8/19	7/21, 8/24
27	EBDC* + Howler	A - E	6/27, 7/11, 8/5, 8/19, 9/9	7/5, 7/21, 8/10, 8/24, 9/13

*** EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz - Except Treatment 21, 22, 23 (B/D Timing)**

Manzate @ 1.6 qt used for timings A and B, Manzate Pro-Stick @ 2 lbs used for timings C, D and E

Cercospora Leafspot Programs Standard Answer Plot - Sebewaing, MI - 2022

Trial Quality: Good
Variety: BTS-197N
Planted: May 10
Harvested: October 6
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.0 **pH:** 7.3 **CEC:** 13.3
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Corn

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.76 in.
Beets/100 ft: 154

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

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
18	EBDC*	1.6 qt	A	**0.5**	$1,394	**7466**	**250**	**29.9**	**18.8**	**90.4**
	EBDC* + Delaro + Proline + Microthiol Disperss	1.6 qt + 11 fl oz + 1.6 fl oz + 10 lbs	B							
	EBDC* + Super Tin + Topsin + Microthiol Disperss	2 lbs + 8 fl oz + 20 fl oz + 10 lbs	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin + Microthiol Disperss	2 lbs + 8 fl oz + 10 lbs	E							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	F							
6	EBDC*	1.6 qt	A	**0.5**	$1,425	**7434**	**250**	**29.8**	**18.4**	**91.2**
	EBDC* + Topguard	1.6 qt + 14 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Enable	2 lbs + 8 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Minerva	2 lbs + 13 fl oz	F							
29	EBDC* + Oxidate 5.0	1.6 qt + 32 fl oz	A	**0.6**	$1,351	**7331**	**262**	**28.1**	**19.5**	**90.6**
	EBDC* + Delaro + Proline + Oxidate 5.0	1.6 qt + 11 fl oz + 1.6 fl oz + 32 fl oz	B							
	EBDC* + Super Tin + Topsin + Oxidate 5.0	2 lbs + 8 fl oz + 20 fl oz + 32 fl oz	C							
	EBDC* + Provysol + Oxidate 5.0	2 lbs + 5 fl oz + 32 fl oz	D							
	EBDC* + Super Tin + Oxidate 5.0	2 lbs + 8 fl oz + 32 fl oz	E							
	EBDC* + Inspire XT + Oxidate 5.0	2 lbs + 7 fl oz + 32 fl oz	F							
16	EBDC*	2 lbs	A	**0.6**	$1,461	**7413**	**255**	**29.0**	**19.0**	**90.8**
	EBDC* + Lucento	2 lbs + 5.5 fl oz	C							
	Super Tin + Topsin	8 fl oz + 20 fl oz	D							
	EBDC* + Topguard	2 lbs + 14 fl oz	E							
	Priaxor + Super Tin	6.7 fl oz + 8 fl oz	F							
2	EBDC*	1.6 qt	A	**0.6**	$1,430	**7442**	**248**	**30.0**	**18.6**	**90.4**
	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	F							

***EBDC = Manzate / Manzate Pro-stick**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 7/29, D - 8/12 , E - 8/28, F - 9/13**

******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 $.18 minus fungicide and application cost.

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

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
19	EBDC*	1.6 qt	A	**0.7**	$1,241	**6856**	**244**	**27.9**	18.3	**90.5**
	EBDC* + Provysol + Microthiol Disperss	1.6 qt + 5 fl oz + 10 lb	B							
	EBDC* + Super Tin + Microthiol Disperss	2 lbs + 8 fl oz + 10 lb	C							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Proline + Microthiol Disperss	2 lbs + 5.7 fl oz + 10 lbs	E							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
13	EBDC*	1.6 qt	A	**0.7**	$1,202	6448	**244**	**26.4**	**18.4**	**90.1**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* Super Tin	2 lb + 8 fl oz	C E							
	EBDC* + Proline	2 lb + 5.7 fl oz	D							
	EBDC* + Priaxor + Topsin	2 lb + 8 fl oz + 20 fl oz	F							
21	EBDC* + Regev	1.6 qt + 8.5 fl oz	A	**0.8**	$1,293	**7428**	234	**31.8**	18.3	**89.0**
	EBDC* + Delaro + Proline + Regev	1.6 qt + 11 fl oz + 1.6 fl oz + 8.5 fl oz	B							
	EBDC* + Super Tin + Topsin + Regev	2 lbs + 8 fl oz + 20 fl oz + 8.5 fl oz	C							
	EBDC* + Provysol + Regev	2 lbs + 5 fl oz + 8.5 fl oz	D							
	EBDC* + Super Tin + Regev	2 lbs + 8 fl oz + 8.5 fl oz	E							
	EBDC* + Inspire XT + Regev	2 lbs + 7 fl oz + 8.5 fl oz	F							
17	EBDC*	2 lbs	A	**0.8**	$1,378	**6941**	**242**	**28.7**	**18.6**	**89.5**
	Copper* + Inspire XT	2 pt + 7 fl oz	C							
	Super Tin + Topsin	8 fl oz + 12.4 fl oz	D							
	EBDC* + Proline	2 lbs + 5 fl oz	E							
	Super Tin + Priaxor	8 fl oz + 6.7 fl oz	F							
12	EBDC*	1.6 qt	A	**0.8**	$1,467	**7745**	**254**	**30.6**	**19.6**	**89.3**
	EBDC* + Delaro + Proline + NDemand + Boron	1.6 qt + 11 fl oz + 1.6 fl oz + 1 gal + 1 qt	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol + NDemand + Boron	2 lbs + 5 fl oz + 1 gal + 1 qt	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT + NDemand + Boron	2 lbs + 7 fl oz + 1 gal + 1 qt	F							

***EBDC = Manzate / Manzate Pro-stick**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 7/29, D - 8/12 , E - 8/28, F - 9/13**

******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 $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Answer Plot - Sebewaing, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
24	Copper*	2 pt	B-F	**0.8**	**$1,565**	**7536**	**249**	**30.3**	**18.7**	**90.3**
22	EBDC* + Regev	1.6 qt + 8.5 fl oz	A	**0.8**	$1,132	**6738**	**245**	**27.5**	**18.9**	**89.3**
	EBDC* + Provysol + Regev	1.6 + 5 fl oz + 8.5 fl oz	B							
	EBDC* + Super Tin + Regev	2 lbs + 8 fl oz + 8.5 fl oz	C F							
	EBDC* + Priaxor + Topsin + Regev	2 lbs + 8 fl oz + 20 fl oz + 8.5 fl oz	D							
	EBDC* + Proline + Regev	2 lbs + 5.7 fl oz + 8.5 fl oz	E							
9	EBDC* + Topguard	1.6 qt + 14 fl oz	B	**0.8**	$1,344	**6944**	**253**	**27.5**	**18.4**	**91.6**
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Enable	2 lbs + 8 fl oz	D							
	EBEC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Eminent	2 lbs + 13 fl oz	F							
28	EBDC*	1.6 qt	A	**0.9**	$1,322	**6818**	234	**29.3**	**18.9**	87.8
	EBDC* + Proline	1.6 qt + 5.7 fl oz	B							
	EBDC* + Super Tin	2 lbs + 8 fl oz	C							
	EBDC* + Flint Extra + Topsin	2 lbs + 3.6 fl oz + 20 fl oz	D							
	EBDC* + Proline	2 lbs + 5.7 fl oz	E							
27	EBDC*	1.6 qt	A	**0.9**	$1,373	**7211**	**251**	**28.7**	**18.7**	**90.7**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Super Tin	2 lbs + 8 fl oz	C							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 8 fl oz	E							
15	EBDC*	2 lbs	A	**0.9**	$1,379	**6944**	227	**30.5**	17.7	**89.1**
	EBDC* + Provysol	2 lbs + 4 fl oz	C							
	Super Tin + Topsin	8 fl oz + 12.4 fl oz	D							
	EBDC* + Proline	2 lbs + 5 fl oz	E							
	Super Tin + Priaxor	8 fl oz + 6.7 fl oz	F							
7	EBDC*	1.6 qt	A	**0.9**	$1,235	**6694**	**243**	**27.5**	**18.6**	**89.8**
	EBDC* + Provysol	2 lbs + 5 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	D							
	EBDC* + Copper*	2 lbs + 2 pt	E							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	F							

***EBDC = Manzate / Manzate Pro-stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 7/29, D - 8/12 , E - 8/28, F - 9/13**

******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 $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Answer Plot - Sebewaing, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
4	EBDC*	1.6 qt	A	**0.9**	$1,422	**7443**	**253**	**29.4**	**18.6**	**91.2**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Super Tin	2 lbs + 8 fl oz	C F							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Proline	2 lbs + 5.7 fl oz	E							
31	EBDC* + DPHF01 = Companion BF	1.6 qt + 16 oz	A	**0.9**	$1,091	6255	**242**	25.8	**18.6**	**89.4**
	EBDC* + Delaro + Proline + DPHF01 = Companion BF	1.6 qt + 11 fl oz + 1.6 fl oz + 16 oz	B							
	EBDC* + Super Tin + Topsin + DPHF01 = Companion BF	2 lbs + 8 fl oz + 20 fl oz + 16 oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inpire XT + DPHF01 = Companion BF	2 lbs + 7 fl oz + 16 oz	F							
8	EBDC*	1.6 qt	A	**0.9**	$1,340	**7168**	**261**	**27.5**	**18.8**	**92.0**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	D							
	EBDC* + Flint Xtra	2 lbs + 3.6 fl oz	E							
	EBDC* + Proline	2 lbs + 5.7 fl oz	F							
10	EBDC* + Delaro + Proline	1.6 + 11 fl oz + 1.6 fl oz	A	**1.0**	$1,329	**7128**	236	**30.1**	**18.8**	88.2
	EBDC* + Super Tin	1.6 qt + 8 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	F							
26	Mastercop	2 pt	B-F	**1.1**	**$1,539**	**7283**	**249**	**29.3**	**18.5**	**90.9**
3	EBDC*	1.6 qt	A	**1.1**	$1,333	**7004**	**251**	**27.7**	**18.6**	**91.0**
	EBDC* + Inspire XT	1.6 qt + 7 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	F							

***EBDC = Manzate / Manzate Pro-stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 7/29, D - 8/12 , E - 8/28, F - 9/13**

******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 $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Answer Plot - Sebewaing, MI - 2022

No.	Treatment**	Rate/A	Applic Timing***	CLS**** Rate 0-9 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
20	EBDC*	1.6 qt	A	**1.1**	$1,250	**6872**	241	**28.4**	**18.7**	**89.1**
	EBDC* + Topguard + Microthiol Disperss	1.6 qt + 14 fl oz + 10 lbs	B							
	EBDC* + Super Tin + Topsin + Microthiol	2 lbs + 8 fl oz + 20 fl oz + 10 lbs	C							
	EBDC* + Enable	2 lbs + 8 fl oz	D							
	EBDC* + Super Tin + Microthiol Disperss	2 lbs + 8 fl oz + 10 lbs	E							
	EBDC* + Minerva	2 lbs + 13 fl oz	F							
5	EBDC*	1.6 qt	A	**1.2**	$1,269	**6687**	**252**	**26.6**	**18.6**	**91.0**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Proline	2 lbs + 5.7 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	F							
11	EBDC*	1.6 qt	A	1.3	$1,375	**7005**	**245**	**28.4**	**18.8**	**89.6**
	EBDC* + Copper*	1.6 qt + 2 pt	B							
	EBDC* + Copper*	2 lbs + 2 pt	C-F							
14	EBDC* + Growthful Foliar	1.6 qt + 12.8 fl oz	B	1.4	$1,378	**6740**	230	**29.2**	17.0	**91.3**
	EBDC* + Growthful Foliar	2 lbs + 12.8 fl oz	C-F							
30	DPHF01 = Companion BF	8 oz	B-F	1.4	$1,371	6459	233	**27.8**	**18.9**	87.7
25	Magna-Bon	24 oz	B-F	1.6	$1,361	6455	233	**27.7**	18.2	**89.1**
23	Mastercop	1.5 pt	B-F	1.6	$1,439	**6806**	240	**28.6**	**18.4**	**89.7**
1	Untreated Check			2.8	$1,329	6020	**244**	24.7	**18.4**	**90.3**
Average				1.0	$1,349	6991	245	28.5	18.6	90.0
LSD 5%				0.7	281.4	1274.4	19.8	4.4	1.1	2.6
CV%				54.8	14.9	13.0	5.8	11.0	4.2	2.0

***EBDC = Manzate / Manzate Pro-stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 7/29, D - 8/12 , E - 8/28, F - 9/13**

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

Comments: The Cercopora leafspot program standard trial was designed to test the efficacy of leafspot spray programs for leafspot with standard varieties. Leafspot pressure was low at the Answer Plot location.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Very Good
Variety: BTS-197N
Planted: May 20
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 12.18 in.
Beets/100 ft: 150

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

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
27	EBDC*	1.6 qt	A	**0.1**	$1,213	**7957**	323	**24.6**	21.6	**95.0**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Super Tin	2 lbs + 8 fl oz	C							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 5 fl oz	E							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
12	EBDC*	1.6 qt	A	**0.1**	$1,204	**8037**	312	**25.8**	21.1	94.4
	EBDC* + Delaro + Proline + NDemand + Boron	1.6 qt + 11 fl oz + 1.6 fl oz + 1 gal + 1 qt	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol + NDemand + Boron	2 lbs + 5 fl oz + 1 gal + 1 qt	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT + NDemand + Boron	2 lbs + 7 fl oz + 1 gal + 1 qt	F							
6	EBDC*	1.6 qt	A	**0.1**	**$1,309**	**8476**	319	**26.5**	21.4	**94.9**
	EBDC* + Topguard	1.6 qt + 14 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Enable	2 lbs + 8 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* Minerva	2 lbs + 13 fl oz	F							
31	EBDC* + DPHF01 = Companion BF	1.6 qt + 16 oz	A	**0.2**	**$1,270**	**8668**	**338**	**25.7**	**22.6**	**95.0**
	EBDC* + Delaro + Proline + DPHF01 = Companion BF	1.6 qt + 11 fl oz + 1.6 fl oz + 8 oz	B							
	EBDC* + Super Tin + Topsin +	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT + DPHF01 = Companion BF	2 lbs + 7 fl oz + 16 oz	F							

***EBDC = Manzate/ Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A = 7/8, B = 7/18, C = 8/2, D = 8/15, E = 8/29, F = 9/13**

*****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 $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
22	EBDC* + Regev	1.6 qt + 8.5 fl oz	A	**0.2**	$1,124	**8218**	**328**	**25.1**	**21.9**	**94.9**
	EDBC* + Provysol + Regev	1.6 qt + 5 fl oz + 8.5 fl oz	B							
	EBDC*+ Super Tin + Regev	2 lbs + 8 fl oz + 8.5 fl oz	C							
	EBDC* + Priaxor + Topsin + Regev	2 lbs + 8 fl oz + 20 fl oz + 8.5 fl oz	D							
	EBDC* + Proline + Regev	2 lbs + 5.7 fl oz + 8.5 fl oz	E							
	EDBC* + Super Tin + Regev	2 lbs + 8 fl oz + 8.5 fl oz	F							
21	EBDC* + Regev	1.6 qt + 8.5 fl oz	A	**0.2**	$1,049	7755	**326**	23.8	21.6	**95.5**
	EBDC* + Delaro + Proline + Regev	1.6 qt + 11 fl oz + 1.6 fl oz + 8.5 fl oz	B							
	EBDC* + Super Tin + Topsin + Regev	2 lbs * + 8 fl oz + 20 fl oz + 8.5 fl oz	C							
	EBDC* + Provysol + Regev	2 lbs + 5 fl oz + 8.5 fl oz	D							
	EBDC* + Super Tin + Regev	2 lbs + 8 fl oz + 8.5 fl oz	E							
	EBDC* + Inspire XT + Regev	2 lbs + 7 fl oz + 8.5 fl oz	F							
19	EBDC*	1.6 qt	A	**0.2**	$1,050	7347	320	23.0	21.4	**95.0**
	EBDC* + Provysol + Microthiol Disperss	1.6 qt + 5 fl oz + 10 lbs	B							
	EBDC* + Super Tin + Microthiol Disperss	2 lbs + 8 fl oz + 10 lbs	C							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Proline + Microthiol Disperss	2 lbs + 5.7 fl oz + 10 lbs	E							
	EBDC* + Super Tin + Microthiol Disperss	2 lbs + 8 fl oz + 10 lbs	F							
29	EBDC* + OxiDate 5.0	1.6 qt + 32 fl oz	A	**0.3**	**$1,220**	**8264**	**325**	**25.5**	21.5	**95.4**
	EBDC* + Delaro + Proline + Oxidate 5.0	1.6 qt + 11 fl oz + 1.6 fl oz + 32 fl oz	B							
	EBDC* + Super Tin + Topsin + Oxidate 5.0	2 ls + 8 fl oz + 20 fl oz + 32 fl oz	C							
	EBDC* + Provysol + Oxidate 5.0	2 lbs + 5 fl oz + 32 fl oz	D							
	EBDC* + Super Tin + Oxidate 5.0	2 lbs + 8 fl oz + 32 fl oz	E							
	EBDC* + Insipire XT + Oxidate 5.0	2 lbs + 7 fl oz + 32 fl oz	F							

***EBDC = Manzate/ Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A = 7/8, B = 7/18, C = 8/2, D = 8/15, E = 8/29, F = 9/13**

*****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 $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
28	EBDC*	1.6 qt	A	**0.3**	**$1,226**	7832	322	**24.3**	21.5	**95.1**
	EBDC* + Proline	1.6 qt + 5.7 fl oz	B							
	EBDC* + Super Tin	2 lbs + 8 fl oz	C							
	EBDC* + Flint Extra + Topsin	2 lbs + 3.6 fl oz + 20 fl oz	D							
	EBDC* + Proline	2 lbs + 5.7 fl oz	E							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
20	EBDC*	1.6 qt	A	**0.3**	$1,140	7820	**325**	24.1	21.5	**95.6**
	EBDC* + Topguard + Microthiol Disperss	1.6 qt + 20 fl oz + 10 lb	B							
	EBDC* + Super Tin + Topsin + Microthiol	2 lbs + 8 fl oz + 20 fl oz + 10 lbs	C							
	EBDC* + Enable	2 lbs + 8 fl oz	D							
	EBDC* + Super Tin + Microthiol Disperss	2 lbs + 8 fl oz + 10 lbs	E							
	EBDC* + Minerva	2 lbs + 13 fl oz	F							
18	EBDC*	1.6 qt	A	**0.3**	$1,169	**7907**	320	**24.7**	21.2	**95.5**
	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B							
	EBDC* + Super Tin +	2 lbs + 8 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	F							
17	EBDC*	2 lbs	A	**0.3**	$1,217	7619	316	24.1	21.3	**94.6**
	Copper* + Inspire XT	2 pt + 7 fl oz	C							
	Super Tin + Topsin	8 fl oz + 20 fl oz	D							
	EBDC* + Proline	2 lbs + 5.7 fl oz	E							
	Super Tin + Priaxor	8 fl oz + 6.7 fl oz	F							
13	EBDC*	1.6 qt	A	**0.3**	$1,189	7833	321	**24.4**	21.5	**95.0**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Super Tin	2 lbs + 8 fl oz	C							
	EBDC* + Proline	2 lbs + 5.7 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	F							
10	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	A	**0.3**	$1,128	7622	316	24.1	21.5	94.3
	EBDC* + Super Tin	1.6 qt + 8 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT	2 lbs + 7 fl zoz	F							

***EBDC = Manzate/ Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A = 7/8, B = 7/18, C = 8/2, D = 8/15, E = 8/29, F = 9/13**

*****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 $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
7	EBDC*	1.6 qt	A	**0.3**	$1,212	**8079**	**323**	**25.0**	21.6	**95.0**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	D							
	EBDC* + Copper*	2 lbs + 2 pt	E							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	F							
4	EBDC*	1.6 qt	A	**0.3**	$1,199	**7890**	322	**24.5**	21.6	**94.9**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* +Super Tin	2 lbs + 8 fl oz	C							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Proline	2 lbs + 5.7 fl oz	E							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
9	EBDC* + Topguard	1.6 qt + 14 fl oz	B	**0.3**	$1,217	7814	320	**24.4**	21.3	**95.2**
	EBDC* + Super Tin + Topsin	1.6 qt + 8 fl oz + 20 fl oz	C							
	EBDC* + Enable	2 lbs + 8 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Eminent	2 lbs + 13 fl oz	F							
5	EBDC*	1.6 qt	A	**0.3**	$1,208	7860	318	**24.7**	21.2	**95.2**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Proline	2 lbs + 5.7 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	F							
2	EBDC*	1.6 qt	A	**0.3**	**$1,226**	**7998**	319	**25.1**	21.4	**94.9**
	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	F							
15	EBDC*	2 lbs	A	**0.4**	$1,170	7355	314	23.5	21.1	**94.8**
	EBDC* + Provysol	2 lbs + 4 fl oz	C							
	Super Tin + Topsin	8 fl oz + 20 fl oz	D							
	EBDC* + Proline	2 lbs + 5 fl oz	E							
	Super Tin + Priaxor	8 fl oz + 6.7 fl oz	F							

***EBDC = Manzate/ Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A = 7/8, B = 7/18, C = 8/2, D = 8/15, E = 8/29, F = 9/13**

*****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 $.18 minus fungicide and application cost.

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

Cercospora Leafspot Programs Standard

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 0-9 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
11	EBDC*	1.6 qt	A	**0.4**	**$1,246**	7876	321	**24.6**	21.4	**95.0**
	EBDC* + Copper*	1.6 qt + 2 pt	B							
	EBDC* + Copper*	2 lbs + 2 pt	C-F							
3	EBDC*	1.6 qt	A	**0.4**	$1,211	**7912**	320	**24.7**	21.4	**95.1**
	EBDC* + Inspire XT	1.6 qt + 7 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Provysol	2 lbs + 5 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	E							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	F							
8	EBDC*	1.6 qt	A	**0.4**	**$1,304**	**8592**	**324**	**26.5**	21.5	**95.4**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	C							
	EBDC* + Inspire XT	2 lbs + 7 fl oz	D							
	EBDC* + Flint Xtra	2 lbs + 3.6 fl oz	E							
	EBDC* + Proline	2 lbs + 5.7 fl oz	F							
16	EBDC*	2 lbs	A	**0.5**	$1,198	7628	312	**24.4**	21.1	**94.5**
	EBDC* + Lucento	2 lbs + 5.5 fl oz	C							
	Super Tin + Topsin	8 fl oz + 20 fl oz	D							
	EBDC* + Topguard	2 lbs + 14 fl oz	E							
	EBDC* + Super Tin + Priaxor	2 lbs + 8 fl oz + 6.7 fl oz	F							
26	Mastercop	2 pt	B-F	0.9	**$1,355**	**7908**	320	**24.7**	21.5	**94.9**
25	Magna-Bon	24 oz	B-F	0.9	**$1,359**	**7908**	321	**24.7**	21.6	**94.5**
14	EBDC* + Growthful Foliar	1.6 qt + 12.8 fl oz	B	0.9	**$1,375**	**8250**	319	**25.9**	21.4	**94.8**
	EBDC* + Growthful Foliar	2 lbs + 12.8 fl oz	C-F							
24	Copper*	2 pt	B-F	1.2	**$1,263**	7567	312	**24.3**	21.4	93.8
23	Mastercop	1.5 pt	B-F	1.6	**$1,358**	**7902**	321	**24.6**	21.4	**95.1**
30	DPHF01=Companion BF	8 oz	B-F	2.4	$1,200	6970	299	23.3	20.5	94.0
1	Untreated Check			2.8	**$1,280**	7110	321	22.2	21.5	**94.8**
Average				0.5	$1,222	7870	320	24.6	21.4	94.9
LSD 5%				0.6	140.7	781.7	14.3	2.3	0.9	1.1
CV%				75.8	8.2	7.1	3.2	6.7	2.9	0.8

***EBDC = Manzate/ Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz**

*****Application dates for all treatments: A = 7/8, B = 7/18, C = 8/2, D = 8/15, E = 8/29, F = 9/13**

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

Comments: The Cercospora leafspot programs standard trial was designed to test the efficacy of leafspot spray programs for leafspot with standard varieties. Leafspot pressure was moderate at the Laker Agronomy Field location.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Cercospora Programs CR+

Answer Plot - Sebewaing, MI - 2022

Trial Quality: Good
Variety: C-G021
Planted: May 10
Harvested: October 5
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.0 **pH:** 7.3 **CEC:** 13.3
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Corn

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.76 in.
Beets/100 ft: 177

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

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
19	EBDC* + Copper*	1.6 qt + 2 pt	A B	**0.2**	**$1,803**	**8659**	**272**	31.8	**18.2**	95.4
	EBDC* + Copper*	2 lbs + 2 pt	D F							
27	EBDC*	1.6 qt	A	**0.4**	**$1,784**	**8663**	**289**	30.0	**19.0**	**96.2**
	EBDC* + Lucento	1.6 qt + 5.5 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 5 fl oz	F							
25	DPHF01=Companion BF	8 oz	A B D F	**0.4**	**$1,926**	**8834**	270	**32.7**	**18.1**	95.4
6	EBDC*	1.6 qt	A	**0.5**	**$1,822**	**8886**	**281**	31.6	**18.4**	**96.4**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
24	EBDC* + Oxidate 5.0	1.6 qt + 32 fl oz	A	**0.6**	$1,686	8420	270	31.2	**18.0**	**95.7**
	EBDC* + Delaro + Proline + Oxidate 5.0	1.6 qt + 11 fl oz + 1.6 fl oz + 32 fl oz	B							
	EBDC* + Super Tin + Topsin + Oxidate 5.0	2 lb + 8 fl oz + 20 fl oz + 32 fl oz	D							
	EBDC* + Provysol + Oxidate 5.0	2 lbs + 5 fl oz + 32 fl oz	F							
15	EBDC* + Copper*	1.6 qt + 2 pt	A B	**0.6**	$1,753	**8673**	**278**	31.1	**18.4**	**96.0**
	EBDC* + Copper*	2 lbs + 2 pt	C D E F							
10	EBDC*	1.6 qt	A	**0.6**	$1,731	8231	259	31.8	17.3	**95.9**
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	C							
	EBDC* + Super Tin + Topsin	2 lb + 8 fl oz + 20 fl oz	E							
9	EBDC* + Super Tin + Topsin	1.6 qt + 8 fl oz + 20 fl oz	B	**0.6**	**$1,892**	**9024**	**280**	**32.3**	**18.6**	**95.8**
	EBDC* + Delaro + Proline	2 lb + 11 fl oz + 1.6 fl oz	D							
	EBDC* + Super Tin + Topsin	2 lb + 8 fl oz + 20 fl oz	F							
23	EBDC*	1.6 qt	A	**0.6**	$1,760	**8610**	**271**	31.7	**18.2**	95.4
	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	F							

***EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz.**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 8/2, D - 8/16, E - 9/2, F - 9/14**

******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 $.18 minus fungicide and application cost.

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

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
17	EBDC* + Copper*	1.6 qt + 2 pt	B	**0.6**	$1,732	8412	**276**	30.4	**18.5**	95.3
	EBDC* + Copper*	2 lbs + 2 pt	C D E F							
14	EBDC*	1.6 qt	A B	**0.6**	**$1,796**	**8599**	**271**	31.8	**18.2**	95.2
	EBDC*	2 lbs	C D E F							
13	EBDC* + Minerva	2 lbs + 13 fl oz	C	**0.6**	**$1,857**	**8625**	**275**	31.3	**18.4**	95.4
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	E							
11	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	C	**0.6**	**$1,912**	**8920**	**275**	**32.4**	**18.2**	**95.9**
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	E							
7	EBDC* + Provysol	1.6 qt + 5 fl oz	B	**0.6**	**$1,883**	**9040**	**275**	**32.8**	**18.4**	95.4
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
21	EBDC* + Copper*	1.6 qt + 2 pt	B	0.7	**$1,913**	**8986**	**280**	**32.0**	**18.7**	95.5
	EBDC* + Copper*	2 lbs + 2 pt	D F							
4	EBDC*	1.6 qt	A	0.7	**$1,929**	**9259**	**271**	**34.2**	**18.2**	95.3
	EBDC* + Minerva	1.6 qt + 13 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Enable	2 lbs + 8 fl oz	F							
2	EBDC*	1.6 qt	A	0.7	$1,689	8273	**271**	30.5	**18.2**	95.3
	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 8 fl oz	F							
16	EBDC*	1.6 qt	B	0.8	**$1,917**	**9024**	**282**	**32.0**	**18.7**	**95.7**
	EBDC*	2 lbs	C D E F							
26	EBDC* + DPHF01 = Companion BF	1.6 qt + 8 oz	A	0.8	$1,707	8374	264	31.7	17.9	94.9
	EBDC* + Delaro + Proline + DPHF01 = Companion BF	1.6 + 11 fl oz + 1.6 fl oz + 8 oz	B							
	EBDC* + Super Tin + Topsin + DPHF01 = Companion BF	2 lbs + 8 fl oz + 20 fl oz + 8 oz	D							
	EBDC* + Provysol + DPHF01 = Companion BF	2 lbs + 8 fl oz + 8 oz	F							
20	EBDC*	1.6 qt	B	0.8	$1,719	7980	**281**	28.4	**18.4**	**96.6**
	EBDC*	2 lbs	D F							

***EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz.**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 8/2, D - 8/16, E - 9/2, F - 9/14**

******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 $.18 minus fungicide and application cost.

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

Cercospora Programs CR+

Answer Plot - Sebewaing, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
18	EBDC*	1.6 qt	A B	0.8	**$1,819**	**8553**	**271**	31.5	**18.3**	95.1
	EBDC*	2 lbs	D F							
5	EBDC* + Minerva	1.6 qt + 13 fl oz	B	0.8	**$1,786**	8497	**272**	31.2	**18.1**	**95.7**
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Enable	2 lbs + 8 fl oz	F							
3	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B	0.8	$1,713	8264	**273**	30.3	**18.2**	**95.7**
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 5 fl oz	F							
8	EBDC*	1.6 qt	A	0.9	$1,724	8349	**282**	29.7	**18.6**	**96.2**
	EBDC* + Super Tin + Topsin	1.6 qt + 8 fl oz + 20 fl oz	B							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
22	EBDC*	1.6 qt	A	0.9	**$1,898**	**8991**	**272**	**33.1**	**18.2**	95.5
	EBDC* + Revytek	1.6 qt + 15 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Revytek	2 lbs + 15 fl oz	F							
12	EBDC*	1.6 qt	A	1.0	**$1,823**	**8592**	**272**	31.5	**18.2**	95.5
	EBDC* + Minerva	2 lbs + 13 fl oz	C							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	E							
1	Untreated Check			1.0	**$1,803**	8084	266	30.5	**18.0**	95.0
	Average			0.7	$1,807	8623	274	31.5	18.3	95.6
	LSD 5%			0.4	168.2	754.2	17.9	2.2	1.0	1.0
	CV%			46.1	6.6	6.2	4.6	4.9	3.7	0.7

***EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz.**

*****Application dates for all treatments: A - 7/5, B - 7/15, C - 8/2, D - 8/16, E - 9/2, F - 9/14**

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

Comments: The Cercospora Programs CR+ trial was designed to test the efficacy of leafspot spray programs for leafspot control with CR+ varieties. Leafspot pressure was low at the Answer Plot location but higher than the Laker Agronomy field location.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Cercospora Programs CR+

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G021
Planted: May 20
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybean

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 155

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

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
26	EBDC* + DPHF01 = Companion BF	1.6 qt + 8 oz	A	**0.0**	**$1,242**	**7789**	319	**24.4**	21.3	**95.0**
	EBDC* + Delaro + Proline + DPHF01 = Companion BF	1.6 qt + 11 fl oz + 1.6 fl oz + 8 oz	B							
	EBDC* + Super Tin + Topsin + DPHF01 = Companion BF	2 lbs + 8 fl oz + 20 fl oz + 8 oz	D							
	EBDC* + Provysol + DPHF01 = Companion BF	2 lbs + 5 fl oz + 8 oz	F							
18	EBDC*	1.6 qt	A B	**0.0**	**$1,300**	**7712**	317	**24.4**	21.4	**94.4**
	EBDC*	2 lbs	D F							
15	EBDC* + Copper*	1.6 qt + 2 pt	A B	**0.0**	$1,154	**7420**	313	**23.7**	21.2	**94.5**
	EBDC* + Copper*	2 lbs + 2 pt	C D E F							
24	EBDC* + Oxidate 5.0	1.6 qt + 32 fl oz	A	**0.1**	$1,152	**7468**	313	**23.9**	21.2	**94.5**
	EBDC* + Delaro + Proline + Oxidate 5.0	1.6 qt + 11 fl oz + 1.6 fl oz + 32 fl oz	B							
	EBDC* + Super Tin + Topsin + Oxidate 5.0	2 lbs + 8 fl oz + 20 fl oz + 32 fl oz	D							
	EBDC* + Provysol + Oxidate 5.0	2 lbs + 5 fl oz + 32 fl oz	F							
14	EBDC*	1.6 qt	A B	**0.1**	**$1,217**	**7439**	321	**23.2**	21.8	**94.4**
	EBDC*	2 lbs	C D E F							
5	EBDC* + Minerva	1.6 qt + 13 fl oz	B	**0.1**	**$1,252**	**7556**	323	**23.3**	21.8	**94.6**
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Enable	2 lbs + 8 fl oz	F							
27	EBDC*	1.6 qt	A	**0.1**	$1,199	**7482**	314	**23.8**	21.2	**94.5**
	EBDC* + Lucento	1.6 qt + 5.5 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 5 fl oz	F							
23	EBDC*	1.6 qt	A	**0.1**	**$1,247**	**7815**	324	**24.1**	21.8	**94.6**
	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	F							

***EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz.**

*****Application dates for all treatments: A - 7/7, B - 7/15, C - 8/2, D - 8/15, E - 9/2, F - 9/15**

******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 $.18 minus fungicide and application cost.

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

Cercospora Programs CR+

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
22	EBDC*	1.6 qt	A	**0.1**	$1,155	7010	306	22.7	21.1	93.6
	EBDC* + Revytek	1.6 qt + 15 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Revytek	2 lbs + 15 fl oz	F							
21	EBDC* + Copper*	1.6 qt + 2 pt	B	**0.1**	**$1,358**	**8046**	315	**25.6**	21.5	94.0
	EBDC* + Copper*	2 lbs + 2 pt	D F							
17	EBDC* + Copper*	1.6 qt + 2 pt	B	**0.1**	**$1,217**	**7562**	320	**23.6**	21.6	**94.6**
	EBDC* + Copper*	2 lbs + 2 pt	C D E F							
16	EBDC*	1.6 qt	B	**0.1**	$1,203	**7211**	313	23.1	21.4	93.9
	EBDC*	2 lbs	C D E F							
12	EBDC*	1.6 qt	A	**0.1**	**$1,245**	**7432**	320	**23.3**	21.4	**95.1**
	EBDC* + Minerva	2 lbs + 13 fl oz	C							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	E							
9	EBDC* + Super Tin + Topsin	1.6 qt + 8 fl oz + 20 fl oz	B	**0.1**	**$1,306**	**7922**	322	**24.6**	21.8	**94.5**
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	D							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	F							
8	EBDC*	1.6 qt	A	**0.1**	$1,132	7050	321	21.9	21.8	**94.4**
	EBDC* + Super Tin + Topsin	1.6 qt + 8 fl oz + 20 fl oz	B							
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	D							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	F							
7	EBDC* + Proyvsol	1.6 qt + 5 fl oz	B	**0.1**	**$1,249**	**7674**	325	**23.5**	22.0	**94.4**
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
6	EBDC*	1.6 qt	A	**0.1**	**$1,234**	**7742**	320	**24.2**	21.8	**94.2**
	EBDC* + Provysol	1.6 qt + 5 fl oz	B							
	EBDC* + Priaxor + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Super Tin	2 lbs + 8 fl oz	F							
3	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B	**0.1**	**$1,250**	**7664**	327	**23.4**	21.9	**94.8**
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 5 fl oz	F							

***EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz.**

*****Application dates for all treatments: A - 7/7, B - 7/15, C - 8/2, D - 8/15, E - 9/2, F - 9/15**

******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 $.18 minus fungicide and application cost.

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

Cercospora Programs CR+

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment**	Rate/A	Applic Timing ***	CLS**** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
25	DPHF01 = Companion BF	8 oz	A B D F	**0.2**	**$1,391**	**7970**	324	**24.6**	21.9	**94.6**
20	EBDC*	1.6 qt	B	**0.2**	**$1,336**	**7763**	325	**23.9**	22.1	94.1
	EBDC*	2 lbs	D F							
4	EBDC*	1.6 qt	A	**0.2**	$1,201	**7424**	318	**23.4**	21.5	**94.5**
	EBDC* + Minerva	1.6 qt + 13 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Enable	2 lbs + 8 fl oz	F							
11	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	C	0.3	**$1,273**	**7500**	314	**23.8**	21.4	94.0
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	E							
10	EBDC*	1.6 qt	A	0.3	**$1,232**	**7425**	316	**23.5**	21.2	**94.7**
	EBDC* + Delaro + Proline	2 lbs + 11 fl oz + 1.6 fl oz	C							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	E							
2	EBDC*	1.6 qt	A	0.3	**$1,322**	**8210**	323	**25.3**	21.8	**94.5**
	EBDC* + Delaro + Proline	1.6 qt + 11 fl oz + 1.6 fl oz	B							
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	D							
	EBDC* + Provysol	2 lbs + 5 fl oz	F							
19	EBDC* + Copper*	1.6 qt + 2 pt	A B	0.3	**$1,261**	**7715**	324	**23.8**	21.6	**95.3**
	EBDC* + Copper*	2 lbs + 2 pt	D F							
13	EBDC* + Minerva	2 lbs + 13 fl oz	C	0.3	**$1,276**	**7453**	309	**24.0**	21.1	94.1
	EBDC* + Super Tin + Topsin	2 lbs + 8 fl oz + 20 fl oz	E							
1	Untreated Check			0.3	**$1,229**	6827	317	21.5	21.2	**95.1**
	Average			0.1	$1,246	7566	319	23.7	21.5	94.5
	LSD 5%			0.2	180.6	1003.5	n.s	2.4	n.s	1.1
	CV%			98.9	10.3	9.4	4.2	7.3	3.6	0.8

***EBDC = Manzate / Manzate Pro-Stick - Copper = Badge**

****All treatments included MasterLock @ 6.4 fl oz.**

*****Application dates for all treatments: A - 7/7, B - 7/15, C - 8/2, D - 8/15, E - 9/2, F - 9/15**

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

Comments: The Cercospora Programs CR+ trial was designed to test the efficacy of leafspot spray programs for leafspot control with CR+ varieties. Leafspot pressure was very low at the Laker Agronomy Field location.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Cercospora Programs Ontario CR+

Gruehn - Sebewaing, MI - 2022

Trial Quality: Very Good
Variety: C-G021
Planted: May 10
Harvested: November 2
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.6 **CEC:** 14.2
P: Very High **K:** Very High
Mn: Very High **B:** High
Added N: 125 lbs. PPI + 35 lbs. 2X2
Previous Crop: Oats

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 11.55 in.
Beets/100 ft: 224

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

No.	Treatment*	Rate/A	Applic Date ***	CLS** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
8	Penncozeb	2 lb	A	**1.2**	**$2,167**	**12769**	**310**	41.3	**21.2**	**93.9**
	Penncozeb + Cevya	2 lb + 5 fl oz	C							
	Penncozeb + ChampION	2 lb + 2 lb	E							
	Penncozeb + Proline	2 lb + 5.7 fl oz	G							
	Penncozeb + ChampION	2 lb + 2 lb	I							
2	Penncozeb	2 lb	A	**1.2**	$2,076	**12201**	296	41.2	20.6	93.3
	Penncozeb + Cevya	2 lb + 5 fl oz	C							
	Penncozeb	2 lb	E							
	Penncozeb + Proline	2 lb + 5.7 fl oz	G							
	Penncozeb	2 lb	I							
9	Penncozeb + ChampION	2 lb + 2 lb	B , D, F, G, H	**1.3**	$1,940	11400	298	38.3	20.5	**93.8**
7	Penncozeb + Cevya + ChampION	2 lb + 5 fl oz + 2 lb	B	**1.4**	$2,031	**12048**	**310**	38.8	**21.1**	**94.3**
	Priaxor + Senator + ChampION	8 fl oz + 20 fl oz + 2 lb	F							
	Penncozeb + Proline + ChampION	2 lb + 5.7 fl oz + 2 lb	H							
3	Penncozeb	2 lb	A	**1.6**	**$2,165**	**12827**	**320**	40.1	**21.6**	**94.6**
	Penncozeb + Cevya	2 lb + 5 fl oz	B							
	Penncozeb + Priaxor + Senator	2 lb + 8 fl oz + 20 fl oz	F							
	Penncozeb + Proline	2 lb + 5.7 fl oz	H							

***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**

*****Application Dates for all treatments:** A - 6/30, B - 7/7, C - 7/12, D - 7/14, E - 7/25, F - 8/5, G - 8/16, H - 9/1, and I - 9/6

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Cercospora Programs Ontario CR+

Gruehn - Sebewaing, MI - 2022

No.	Treatment*	Rate/A	Applic Date ***	CLS** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
5	Penncozeb	2 lb	A	**1.8**	**$2,186**	**12719**	**311**	40.9	**21.4**	**93.7**
	Penncozeb + Cevya	2 lb + 5 fl oz	B							
	Penncozeb	2 lb	F							
	Penncozeb + Proline	2 lb + 5.7 fl oz	H							
4	Penncozeb + Cevya	2 lb + 5 fl oz	B	**1.8**	$2,065	**12182**	298	41.0	20.6	93.4
	Penncozeb + Priaxor + Senator	2 lb + 8 fl oz + 20 fl oz	F							
	Penncozeb + Proline	2 lb + 5.7 fl oz	H							
6	Penncozeb	2 lb	B, D , F ,G ,H	1.9	$2,028	11729	**307**	38.2	**21.0**	**94.1**
1	Untreated Check			2.1	**$2,317**	**12873**	**312**	41.3	**21.3**	**94.1**
	Average			1.6	$2,108	12305	307	40.1	21.0	93.9
	LSD 5%			0.6	192.9	1071.8	13.1	n.s	0.6	0.9
	CV%			24.3	6.3	6.0	2.9	5.4	2.0	0.6

***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**

*****Application Dates for all treatments:** A - 6/30, B - 7/7, C - 7/12, D - 7/14, E - 7/25, F - 8/5, G - 8/16, H - 9/1, and I - 9/6

Comments: This study was designed to compare Cercospora leafspot programs with products available in Ontario Canada for CR+ varieties.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Evaluate Sticker / Spreaders added to Fungicides for Cercospora Leafspot Control - Gruehn, Sebewaing, MI - 2022

Trial Quality: Very Good
Variety: C-G932NT
Planted: May 10
Harvested: October 5
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
%OM: 2.4 **pH:** 7.6 **CEC:** 14.2
P: Very High **K:** Very High
Mn: Very High **B:** High
Added N: 125 lbs. PPI + 35 lbs. 2X2
Prev Crop: Oats

Rhizoc Control: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 224

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

No.	Sticker	Rate/A	Applic Timing	CLS*** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
16	ICC_A2023	.25% v/v	A-F	**1.3**	**$2,009**	**9972**	**296**	**33.7**	**20.0**	94.8
9	WC-725	8 fl oz	A-F	**1.3**	**$1,921**	**9566**	291	**32.8**	**19.6**	**95.0**
7	FS Talent	4 fl oz	A-F	**1.3**	**$1,934**	**9607**	**294**	**32.7**	19.5	**95.7**
11	WC-618	8 fl oz	A-F	**1.4**	**$1,926**	**9594**	285	**33.6**	19.2	**95.1**
10	WC-716	8 fl oz	A-F	**1.4**	**$1,923**	**9576**	278	**34.5**	18.5	**95.8**
5	Reguard + MasterLock	12 fl oz + 6.4 fl oz	A-F	**1.4**	**$2,048**	**10376**	**296**	**35.0**	**19.9**	**94.9**
12	WC-701	4 fl oz	A-F	**1.5**	**$1,948**	**9687**	**292**	**33.2**	19.5	**95.4**
21	Plen-T Sweet + MasterLock	1 pt + 6.4 fl oz	A-F	**1.6**	**$1,980**	**9861**	**301**	**32.8**	**20.1**	**95.1**
8	WC-250	8 fl oz	A-F	**1.6**	**$1,985**	**9862**	**303**	**32.5**	**20.3**	**95.2**
20	Plen-T Sweet	1 pt	A-F	**1.7**	**$1,991**	**9828**	**295**	**33.3**	**19.7**	**95.3**
19	HM-9911	1 qt	A-F	**1.7**	**$1,968**	**9778**	288	**33.9**	19.4	94.9
15	ICC_A2002	.25% v/v	A-F	**1.7**	**$2,012**	**9987**	**295**	**33.9**	**19.7**	**95.4**
14	ICC_A2001	.25% v/v	A-F	**1.7**	**$1,971**	**9804**	**295**	**33.2**	**19.6**	**95.6**
4	Reguard + Diligence	12 fl oz + 1.5 fl oz	A-F	**1.7**	$1,900	**9681**	**304**	31.8	**20.2**	**95.5**
13	Bountiful	12.8 fl oz	A-F	**1.8**	$1,919	**9556**	**296**	**32.4**	**19.9**	94.9
2	MasterLock	6.4 fl oz	A-F	**1.8**	**$1,929**	**9602**	283	**33.9**	19.1	94.9
18	HM2020-83	1 qt	A-F	**1.9**	$1,865	9315	290	**32.1**	**19.9**	94.1
17	Verifact	.25 % v/v	A-F	**2.1**	$1,687	8531	274	31.1	18.4	**95.2**
3	Reguard	12 fl oz	A-F	**2.1**	**$1,956**	**9884**	**298**	**33.2**	**20.0**	**95.1**
6	FS CropStik	4 oz	A-F	**2.1**	**$1,993**	**9846**	**305**	**32.3**	**20.4**	**95.2**
1	Untreated Check			2.3	**$2,108**	9455	289	**32.7**	19.4	**95.3**
	Average			1.7	$1,951	9684	293	33.1	19.6	95.2
	LSD 5%			0.9	187.1	838.9	12.5	2.6	0.8	0.8
	CV%			39.1	6.8	6.1	3.0	5.5	2.8	0.6

Spray Program for treatments

A. EBDC* (1.6 qt) + Sticker
B. Provysol (5 fl oz) + EBDC* (1.6 qt) + Sticker
C. Supertin (8 fl oz) + EBDC* (2 lb) + Sticker
D. Priaxor (8 fl oz) + EBDC* (2 lb) + Sticker
E. Proline (5.7 fl oz) + EBDC* (2 lb) + Sticker
F. Supertin (8 fl oz) + EBDC* (2 lb) + Sticker

***EBDC = Manzate @ 1.6 qt/Manzate Pro-Stick @ 2 lb**

****Application dates for all treatments: A - 6/30, B - 7/14, C - 7/25, D - 8/10, E - 8/24, F - 9/8**

*****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 compare adjuvants as they are paired with fungicide programs for control of Cercospora leafspot, none of the adjuvants caused injury. The untreated check was not sprayed with fungicides.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Nozzle, Pressure and Volume for Managing Cercospora Leafspot

Gruehn, Sebewaing, MI - 2022

Trial Quality: Very Good
Variety: C-G932NT
Planted: May 10
Harvested: November 2
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.6 **CEC:** 14.2
P: Very High **K:** Very High
Mn: Very High **B:** High
Added N: 125 lbs. PPI + 35 lbs. 2X2
Previous Crop: Oats

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 11.55 in.
Beets/100 ft: 218

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

No.	Nozzle Type	GPA	PSI	CLS** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
8	JD Hypro 3D	20.8	75	0.8	**$1,999**	**12293**	312	**39.4**	21.0	94.7
2	JD Hypro 3D	20.8	75	0.8	**$2,056**	**12513**	312	**40.2**	21.1	94.6
7	JD Hypro 3D	17	50	0.9	**$2,020**	**12409**	313	**39.7**	21.2	94.4
1	JD Hypro 3D	17	50	1.0	**$2,056**	**12512**	311	**40.2**	21.2	94.2
5	Turbo TeeJet	20.8	75	1.0	**$2,093**	**12714**	314	**40.5**	21.2	94.6
4	Turbo TeeJet	17	50	1.0	**$2,079**	**12635**	314	**40.3**	21.1	94.8
6	Turbo TeeJet	25	100	1.2	**$2,098**	**12741**	309	**41.3**	21.1	94.1
11	Turbo TeeJet	20.8	75	1.2	**$2,045**	**12549**	313	**40.0**	21.2	94.6
9	JD Hypro 3D	25	100	1.2	**$2,020**	**12410**	311	**40.0**	21.1	94.3
12	Turbo TeeJet	25	100	1.3	**$1,991**	**12250**	303	**40.4**	20.7	94.0
10	Turbo TeeJet	17	50	1.3	$1,867	11559	306	37.8	20.8	94.4
3	JD Hypro 3D	25	100	1.3	**$2,114**	**12835**	315	**40.9**	21.1	94.9
Average				1.1	$2,036	12452	311	40.0	21.1	94.5
LSD 5%				n.s	143.2	795.7	n.s	2.3	n.s	n.s
CV%				52.6	6.1	5.5	3.5	4.9	2.2	0.8

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* (2 lb)
D. Super Tin (8 fl oz) + EBDC* (2 lb)
E. Inspire XT (7 fl oz) + EBDC* (2 lb)
F EBDC* (2 lb) + Copper* (2 pt)

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* (2 lb) + MasterLock (6.4 fl oz)
D. Super Tin (8 fl oz) + EBDC* (2 lb) + MasterLock (6.4 fl oz)
E. Inspire XT (7 fl oz) + EBDC* (2 lb) + MasterLock (6.4 fl oz)
F. EBDC* (2 lb) + Copper* (2 pt) + MasterLock (6.4 fl oz)

***EBDC = Manzate & Manzate Pro-Stick / Copper = Badge**

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

***** Application dates for all treatments: A - 6/30, B - 7/14, C - 7/29, D - 8/11, E - 8/29, F - 9/9**

Comments: This trial was designed to compare nozzle types under various application pressures and volumes and the effect on leafspot control.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Adama Cercospora Fungicide Efficacy

Answer Plot - Sebewaing, MI - 2022

Trial Quality: Good
Variety: BTS-197N
Planted: May 10
Harvested: October 5
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.0 **pH:** 7.3 **CEC:** 13.3
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Corn

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in
Rainfall: 8.76 in.
Beets/100 ft: 177

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

No.	Treatment**	Rate/A	Applic Timing****	CLS*** Rate 3-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
4	EBDC*	1.6 qt	A	**0.6**	**$1,812**	**8528**	285	**29.9**	19.9	93.1
	EBDC*	2 lb	C E							
	ADM.03506.F.1.C	36 fl oz	B D							
7	EBDC*	1.6 qt	A B	**0.8**	**$1,643**	**7989**	281	**28.4**	19.8	92.7
	EBDC*	2 lb	C D E							
	Inspire XT	7 fl oz	B D							
2	EBDC*	1.6 qt	A B	1.1	**$1,758**	**8362**	278	**30.1**	19.5	93.2
	EBDC*	2 lb	C D E							
	Soratel 250 EC	9.6 fl oz	B D							
9	EBDC*	1.6 qt	A B	1.1	**$1,698**	**8308**	286	**29.1**	19.8	93.5
	EBDC*	2 lb	C D E							
	Provysol	5 fl oz	B D							
6	EBDC*	1.6 qt	A B	1.2	$1,544	7533	278	27.0	19.3	93.5
	EBDC*	2 lb	C D E							
	Proline	4 fl oz	B D							
8	EBDC*	1.6 qt	A B	1.4	**$1,687**	**8287**	278	**29.9**	19.3	93.6
	EBDC*	2 lb	C D E							
	Delaro	11 fl oz	B D							
	Proline	1.6 fl oz	B D							
5	EBDC*	1.6 qt	A	1.5	**$1,636**	**7725**	278	**27.8**	19.2	93.9
	EBDC*	2 lb	C E							
	ADM.03506.F.1.C	49 fl oz	B D							
3	EBDC*	1.6 qt	A B	1.6	**$1,735**	**8261**	285	**29.1**	19.7	93.7
	EBDC*	2 lb	C D E							
	Soratel 250 EC	10.9 fl oz	B D							
1	Untreated Check			3.3	$1,506	6751	265	25.5	18.7	93.0
Average				1.4	$1,669	7972	279	28.5	19.5	93.4
LSD 5%				0.3	191.0	856.6	n.s.	2.5	n.s.	n.s.
CV %				19.7	8.9	8.3	5.7	6.8	5.3	1.2

*** EBDC = Manzate/Manzate Pro-Stick**

****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.**

******Application Dates: A = 7/5, B = 7/19, C = 8/10, D = 8/24, E = 9/13**

Comments: Trial was designed to test the efficacy of fungicides from Adama for cercospora leafspot. Leafspot pressure was relatively low at the Answer plot location.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Adama Cercospora Fungicide Efficacy

Gruehn - Sebewaing, MI - 2022

Trial Quality: Good
Variety: C-G932NT
Planted: May 10
Harvested: October 5
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.6 **CEC:** 14.2
P: Very High **K:** Very High
Mn: High **B:** High
Added N: 125 lbs. PPI + 35 lbs. 2X2
Previous Crop: Oats

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 207

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

No.	Treatment**	Rate/A	Applic Timing****	CLS*** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
5	EBDC*	1.6 qt	A	**1.3**	$1,967	**9208**	**302**	**30.4**	20.0	95.8
	EBDC*	2 lb	C E							
	ADM.03506.F.1.C	49 fl oz	B D							
8	EBDC*	1.6 qt	A B	**1.5**	$1,964	**9528**	**300**	**31.7**	20.0	95.5
	EBDC*	2 lb	C D E							
	Delaro	11 fl oz	B D							
	Proline	1.6 fl oz	B D							
9	EBDC*	1.6 qt	A B	**1.6**	$1,934	**9368**	**301**	**31.1**	20.0	95.5
	EBDC*	2 lb	C D E							
	Provysol	5 fl oz	B D							
6	EBDC*	1.6 qt	A B	**1.6**	$1,862	**8960**	**302**	29.6	20.1	95.4
	EBDC*	2 lb	C D E							
	Proline	4 fl oz	B D							
7	EBDC*	1.6 qt	A B	**1.6**	$1,844	**8890**	**300**	29.7	20.0	95.3
	EBDC*	2 lb	C D E							
	Inspire XT	7 fl oz	B D							
2	EBDC*	1.6 qt	A B	**1.6**	$2,016	**9522**	**304**	**31.3**	20.2	95.5
	EBDC*	2 lb	C D E							
	Soratel 250 EC	9.6 fl oz	B D							
4	EBDC*	1.6 qt	A	**1.7**	$1,840	8651	**301**	28.7	20.0	95.6
	EBDC*	2 lb	C E							
	ADM.03506.F.1.C	36 fl oz	B D							
3	EBDC*	1.6 qt	A B	**1.7**	$1,960	**9270**	295	**31.4**	19.8	95.2
	EBDC*	2 lb	C D E							
	Soratel 250 EC	10.9 fl oz	B D							
1	Untreated Check			2.7	$2,006	**8994**	**307**	29.2	20.3	95.8

Average	1.7	$1,932	9155	301	30.4	20.0	95.5
LSD 5%	0.8	n.s.	700.0	10.3	1.9	n.s.	n.s.
CV %	30.4	5.5	5.2	2.3	4.4	2.0	0.6

*** EBDC = Manzate/Manzate Pro-Stick**

****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.**

******Application Dates: A = 6/30, B = 7/14, C = 8/5, D = 8/19, E = 9/13**

Comments: Trial was designed to test the efficacy of fungicides from Adama for cercospora leafspot. Leafspot pressure was relatively higher at the Gruehn location vs. the Answer Plot location in 2022.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.
Bold: Results are not statistically different from top-ranking treatment in each column.

Evaluating Sipcam Fungicides for Cercospora Leafspot Control

Blumfield West - Richville, MI - 2022

Trial Quality: Good
Variety: BTS - 197N
Planted: May 9
Harvested: October 10
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.5 **pH:** 7.1 **CEC:** 10.8
P: Very High **K:** Very High
Mn: High **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Wheat/Clover

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 12.18 in.
Beets/100 ft: 117

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

No.	Treatment**	Rate/A	Applic Date	CLS*** Rate 6-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
5	EBDC*	1.5 lb	27-Jun	**2.9**	$1,227	6401	**259**	24.7	**18.5**	92.5
	SA-0040319 + EBDC*	21 fl oz + 1.5 lb	11-Jul							
	Super Tin + Topsin + EBDC*	8 fl oz + 10 fl oz + 1.5 lb	26-Jul							
	SA-0040318 + EBDC*	13 fl oz + 1.5 lb	11-Aug							
	Super Tin	8 fl oz + 1.5 lb	25-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	9-Sep							
9	SA-0040319 + Cercos	21 fl oz + 23 fl oz	27-Jun	**2.9**	**$1,499**	**7663**	**267**	**28.6**	**18.7**	93.4
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Jul							
	Cercos + SA-0040318	23 fl oz + 13 fl oz	26-Jul							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	25-Aug							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	9-Sep							
8	Brixen + Cercos	21 fl oz + 23 fl oz	27-Jun	**2.9**	**$1,333**	**7025**	**274**	**25.7**	**19.2**	93.1
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Jul							
	Cercos + Minerva	23 fl oz + 13 fl oz	26-Jul							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	25-Aug							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	9-Sep							
4	EBDC*	1.5 lb	27-Jun	**2.9**	**$1,434**	**7471**	**267**	**28.0**	**18.6**	93.4
	Brixen + EBDC*	21 fl oz + 1.5 lb	11-Jul							
	Sipcam TPTH + Topsin + EBDC*	8 fl oz + 10 fl oz + 1.5 lb	26-Jul							
	Minerva + EBDC*	13 fl oz + 1.5 lb	11-Aug							
	Sipcam TPTH + EBDC*	8 fl oz + 1.5 lb	25-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	9-Sep							
3	EBDC*	1.5 lb	27-Jun	**2.9**	**$1,401**	**7218**	**259**	**27.9**	18.3	92.9
	SA-0040318 + EBDC*	13 fl oz + 1.5 lb	11-Jul							
	Super Tin + Topsin + EBDC*	8 fl oz + 10 fl oz + 1.5 lb	26-Jul							
	SA-0040319 + EBDC*	21 fl oz + 1.5 lb	11-Aug							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	25-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	9-Sep							

***EBDC = Koverall**

****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 $.18 minus fungicide and application cost.

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

Evaluating Sipcam Fungicides for Cercospora Leafspot Control

Blumfield West - Richville, MI - 2022

No.	Treatment*	Rate/A	Applic Date	CLS*** Rate 6-Oct	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
6	Minerva + Cercos	13 fl oz + 23 fl oz	27-Jun	**3.0**	**$1,407**	**7369**	**268**	**27.4**	**18.8**	93.2
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Jul							
	Cercos + Brixen	23 fl oz + 21 fl oz	26-Jul							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	25-Aug							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	9-Sep							
7	SA-0040318 + Cercos	13 fl oz + 23 fl oz	27-Jun	**3.2**	**$1,463**	**7492**	**265**	**28.3**	**18.6**	93.1
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Jul							
	Cercos + SA-0040319	23 fl oz + 21 fl oz	26-Jul							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	11-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	25-Aug							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	9-Sep							
2	EBDC*	1.5 lb	27-Jun	**3.2**	**$1,328**	**7018**	**260**	**27.1**	**18.3**	93.1
	Minerva + EBDC*	13 fl oz + 1.5 lb	11-Jul							
	Super Tin + Topsin + EBDC*	8 fl oz + 10 fl oz + 1.5 lb	26-Jul							
	Brixen + EBDC*	21 fl oz + 1.5 lb	11-Aug							
	Super Tin + EBDC*	8 fl oz + 1.5 lb	25-Aug							
	Proline + EBDC*	5 fl oz + 1.5 lb	9-Sep							
1	Untreated Check			6.1	**$1,333**	6278	239	**26.2**	17.2	92.4
	Average			3.3	$1,380	7,104	262	27.1	18.5	93.0
	LSD 5%			0.8	198.1	933.4	16.6	3.1	0.8	n.s.
	CV%			15.5	9.8	9.0	4.3	7.9	3.1	1.0

***EBDC = Koverall**

****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 examine the efficacy of Sipcam fungicides for Cercospora leafspot control. Leafspot pressure was moderate at the Blumfield location for 2022.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Evaluating UPL Fungicides for Cercospora Leafspot Control

Gruehn - Sebewaing, MI - 2022

Trial Quality: Good
Variety: C-G932NT
Planted: May 10
Harvested: October 5
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.6 **CEC:** 14.2
P: Very High **K:** Very High
Mn: Very High **B:** High
Added N: 125 lbs. PPI + 35 lbs. 2X2
Previous Crop: Oats

Rhizoc Level: Low
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.68 in.
Beets/100 ft: 234

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

No.	Treatment	Rate/A	Applic Timing**	Applic Method	CLS*** Rate 29-Sep	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
4	Ultra Blazer + Roundup PowerMAX + AMS	16 fl oz + 32 fl oz + 17 lb/100 gal	C, D	Banded	**1.1**	$1,343	7405	277	26.8	19.2	**93.6**
	EBDC* + Cuprofix Ultra + Vacciplant + Microthiol Dispress + MasterLock	2 lb + 2 lb + 16 fl oz + 10 lb + 6.4 fl oz	E, F, G, H, I	Broadcast							
5	Ultra Blazer + Roundup PowerMAX + Warrant + AMS	16 fl oz + 32 fl oz + 48 fl oz + 17 lb/100 gal	C	Banded	**1.7**	$1,589	**8038**	290	27.8	19.7	**94.4**
	Roundup PowerMAX + AMS	32 fl oz + 17 lb/100 gal	D	Banded							
	Proline + EBDC* + MasterLock	5.7 fl oz + 2 lb + 6.4 fl oz	E	Broadcast							
	Super Tin + Topsin + EBDC* + MasterLock	8 fl oz + 20 fl oz + 2 lb + 6.4 fl oz	F	Broadcast							
	Inspire XT + EBDC* + MasterLock	7 fl oz + 2 lb + 6.4 fl oz	G	Broadcast							
	Super Tin + EBDC* + MasterLock	8 fl oz + 2 lb + 6.4 fl oz	H	Broadcast							
	EBDC* + Badge + MasterLock	2 lb + 2 pt + 6.4 fl oz	I	Broadcast							
3	Dual Magnum II	8 fl oz	B	Banded	**1.8**	$1,506	**7770**	273	**28.4**	19.3	92.7
	Ultra Blazer + Roundup PowerMAX + AMS	16 fl oz + 32 fl oz + 17 lb/100 gal	C	Banded							
	Roundup PowerMAX + AMS	32 fl oz +17 lb/100 gal	D	Banded							
	EBDC* + Cuprofix Ultra + Vacciplant + MasterLock	2 lb + 2 lb + 16 fl oz + 6.4 fl oz	E - I	Broadcast							
2	Topsin	20 fl oz	A	In-Furr	**1.8**	**$1,696**	**8473**	283	**30.0**	19.0	**95.1**
	Ethotron	32 fl oz	B	Banded							
	Ultra Blazer + Roundup PowerMAX + AMS	16 fl oz + 32 fl oz + 17 lb/100 gal	C	Banded							
	Roundup PowerMAX + AMS	32 fl oz + 17 lb/100 gal	D	Banded							
	EBDC* + Cuprofix Ultra + MasterLock	2 lb + 2 lb + 16 fl oz	E - I	Broadcast							
1	Untreated Check				2.8	**$1,834**	**8225**	285	**28.8**	19.5	**94.3**
Average					1.8	$1,594	7982	282	28.3	19.4	94.0
LSD 5%					0.7	162.2	727.3	n.s.	1.8	n.s.	1.4
CV%					24.3	6.6	5.9	3.8	4.1	3.6	1.0

***EBDC = Manzate Pro-stick**

****Application dates for all treatments: A - 5/10, B - 5/12, C - 6/21, D - 7/7, E - 7/14, F - 8/5, G - 8/16, H - 9/1, I - 9/15**

*****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 in cooperation with UPL to evaluate products for weed control and cercospora leafspot.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

PCR-based fungicide resistance screening in *Cercospora beticola* populations in Michigan, 2021-22

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Background:

There are multiple fungicide groups that are commonly used and registered for Cercospora leaf spot (CLS) management in sugar beet including methyl benzimidazole carbamates (MBC or benzimidazole, FRAC group 1), quinone outside inhibitors (QoI or strobilurins, FRAC group 11), demethylation inhibitors (DMI or triazoles, FRAC group 3), organo-tins (FRAC group 30), and multi-site contact activity (FRAC group M03) fungicide classes. Reduced sensitivity to QoI, MBC, DMI, and organo-tin fungicides has been detected in *C. beticola* populations in Michigan (Weiland and Halloin 2001, Kirk et al. 2012, Bolton et al. 2012a, Rosenzweig et al. 2015, Rosenzweig et al. 2020). Because of the fluctuating levels of resistant isolates, continuous monitoring is necessary for prompt identification and proactive management of shifts in *C. beticola* sensitivities. PCR-based methods to detect mutations associated with fungicide resistance could provide timely and field specific guidance to improve CLS management, but they must provide information that is reliable and relevant to field efficacy of the compounds.

Methods:

CLS-symptomatic leaf samples were collected from mid-July through the end of October. Twenty-nine and thirty field locations were sampled in 2021 and 2022, respectively, across nine counties in east-central Michigan. Approximately eight lesions from 8-15 leaves were collected at each timepoint from each field site and mono-conidial isolates were obtained from each lesion.

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. QoI resistance was determined using the G143A point mutation present in the fungal mitochondrial cytochrome b gene of *C. beticola* isolates previously 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 previously characterized to be resistant to benzimidazole, with EC50 values ≥ 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 rapid PCR-RFLP techniques were compared to current *in vitro* fungicide sensitivity testing methods. The effective concentrations required to inhibit mycelial growth by 50% (EC50) were determined through spiral gradient plating with each active ingredient of interest (Förster et al. 2004; Torres-Londoño et al. 2016; Rosenzweig et al. 2020). Isolates were tested for sensitivity to the QoI pyraclostrobin, the MBC thiophanate-methyl, the DMIs difenoconazole, tetraconazole, prothioconazole, fenbuconazole, and mefentrifluconazole, and the organotin, triphenyltin hydroxide.

Results:

Objective 1 - Evaluate rapid testing as a tool to monitor *C. beticola* sensitivity to critical fungicide groups.

Results for the three PCR-RFLP assays were successfully obtained from 399 isolates in 2021 and 498 isolates in 2022. Of these, 63 isolates collected in 2021 were tested for in vitro fungicide sensitivity and compared with the PCR-RFLP results. The benzimidazole PCR marker predicted resistance to thiophanate-methyl with 100% accuracy. All the tested isolates contained the genetic mutation associated with QoI resistance. However, the pyraclostrobin EC50 values measured by spiral plating ranged from

0.79 ppm (lower limit of assay) to 88.37 ppm (upper limit). Resistance to triazoles is a complex trait controlled by multiple genes (Rangel et al. 2020). The mutation used in this study successfully predicted levels of insensitivity (> 1 µg/ml; Bolton et al. 2012b) for certain triazole fungicides (difenoconazole; Figure 1A) but not for others (tetraconazole; Figure 1B). This study will continue to explore other mutations associated with DMI resistance to tetraconazole (Spanner et al. 2021) and evaluate the mutations' ability to predict fungicide sensitivity.

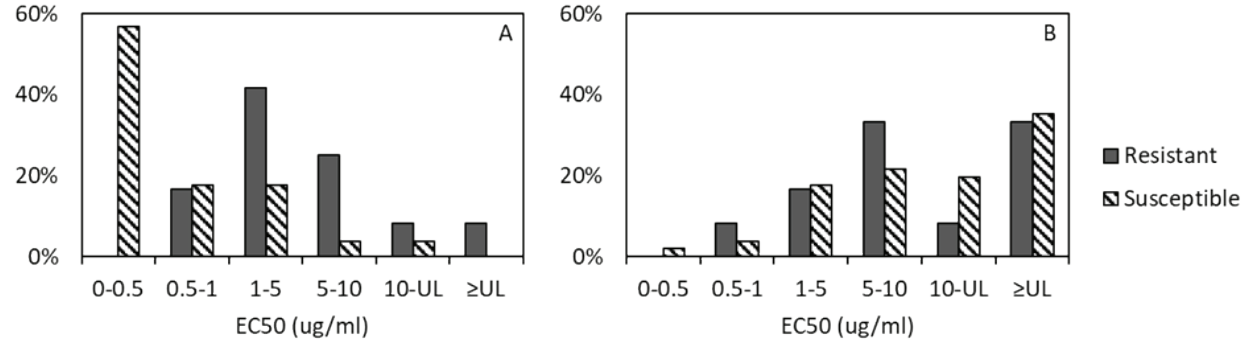

Figure 1. Isolate frequency distribution of *in vitro* fungicide sensitivity to (A) difenoconazole and (B) tetraconazole for *C. beticola* containing the mutation associated with high resistance (Resistant, N = 12; gray bars) and absence of the mutation meaning moderate resistant/susceptible (Susceptible, N = 51; striped bars) isolates (Nikou et al. 2009). The upper limit (UL) was 17.6 ppm for difenoconazole and 17.7 ppm for tetraconazole.

Objective 2 - Monitor levels of resistance to critical fungicide groups across Michigan growing regions.

Some isolates with reduced sensitivity were identified for every active ingredient tested. Resistance to DMI fungicides varied by active ingredient; isolates of *C. beticola* exhibited the highest level of resistance to prothioconazole, followed by tetraconazole (Figure 2). High frequencies of resistance to pyraclostrobin were observed across Michigan (Figure 3). Some reduced sensitivity to triphenyltin hydroxide was observed for isolates tested in this study. However, the degree of resistance was lower than that of other fungicide classes with no isolates having EC50 values >10ppm (Figure 3). Resistance to low doses of organotin fungicides is being observed in North Dakota and Minnesota as well (Secor et al. 2019). Tables 1&2 show the percentage of isolates with reduced sensitivity for each of the field locations sampled. These frequencies are associated with *in vitro* EC50 values > 1 µg/ml active ingredient (Secor et al. 2010, Bolton et al. 2012b). While these values do not correspond directly to field-level resistance, regions with high frequencies of resistant isolates may be more likely to experience reduced efficacies with corresponding fungicide groups.

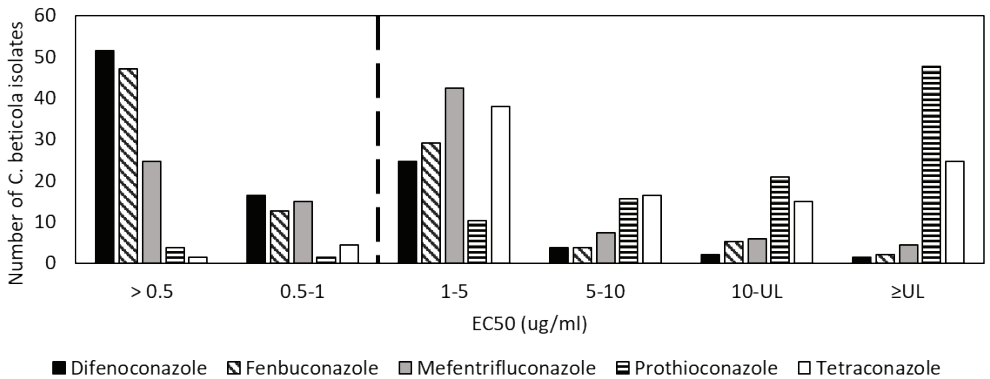

Figure 2. Isolate frequency distribution of in vitro fungicide sensitivity to difenoconazole (black), fenbuconazole (diagonal stripes), mefentrifluconazole (gray), prothioconazole (horizontal stripes), and tetraconazole (white) for *C. beticola* isolates. The dashed line represents a resistance threshold of 1 ppm (Bolton et al. 2012b). All isolates to the right of the dashed line are considered to have some resistance. The upper limit (UL) was 17.6 ppm for difenoconazole, 17.9 ppm for fenbuconazole, 17.6 ppm for mefentrifluconazole, 17.8 ppm for prothioconazole, and 17.7 ppm for tetraconazole.

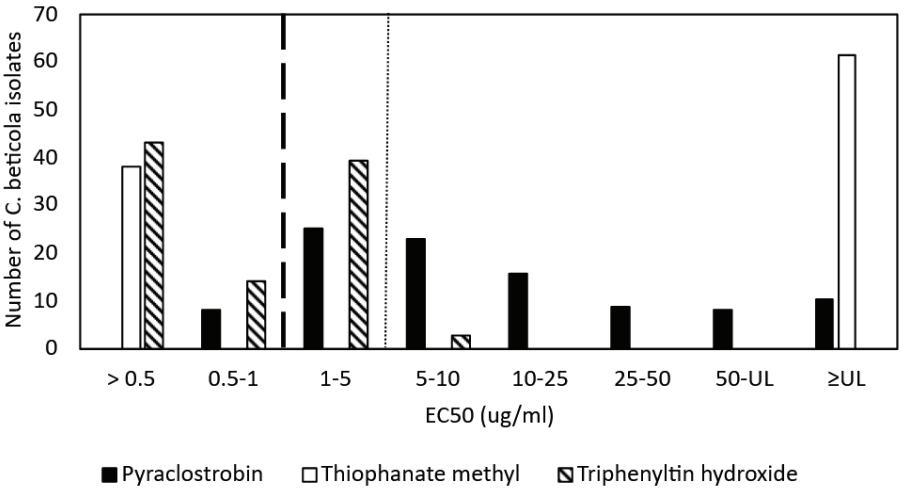

Figure 3. Isolate frequency distribution of *in vitro* fungicide sensitivity to a QoI, pyraclostrobin (black), an MBC, thiophanate methyl (white), and an organo-tin, triphenyltin hydroxide (diagonal stripes) for *C. beticola*. The dashed line represents a resistance threshold of 1 ppm used for pyraclostrobin and triphenyltin hydroxide. The dotted line represents a resistance threshold of 5 ppm used for thiophanate methyl (Secor et al. 2010). All isolates to the right of the corresponding threshold are considered resistant. The upper limit (UL) was 88.4 ppm for pyraclostrobin, 89.3 ppm for thiophanate methyl, and 17.8 ppm triphenyltin hydroxide.

Summary

- The PCR-RFLP rapid detection technique was accurate at predicting MBC resistance and can be deployed for screening isolates in future years. However, the genetic tests used in this study were not sufficient for accurately predicting QoI or DMI *in vitro* sensitivity for *C. beticola* isolates.
- Reduced sensitivity was observed for all active ingredients tested, but resistance was particularly widespread for the DMIs prothioconazole and tetraconazole as well as the QoI pyraclostrobin.

Future Directions

Isolates collected in 2022 will be tested using the spiral gradient method and compared to 2021 resistance levels to assess shifts in *C. beticola* populations. A subset of fields were sampled multiple times over the growing season and seasonal changes in resistance will be tracked and compared to the fungicide programs used. Fungicide sensitivities for *Alternaria alternata* isolates collected from similar Michigan sugar beet field locations will also be determined.

Additional mutations associated with DMI resistance will be tested for their ability to predict isolate sensitivity. Newer qPCR techniques (Shrestha et al. 2020) will also be investigated for rapid screening optimization. Collection and screening of symptomatic leaf samples will be repeated in 2023.

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 (Michigan State University) AgBioResearch, USDA-ARS, and the Beet Sugar Development Foundation.

Table 1. Frequencies of *C. beticola* resistance to five triazole active ingredients detected using in vitro sensitivity testing in 2021

Date	Field Location	County	No. Samples	% Resistant[a]				
				Difeno-conazole	Fenbu-conazole	Mefentriflu-conazole	Prothio-conazole	Tetra-conazole
14-Jul	Munger	Bay	4	50.0	0.0	75.0	100.0	100.0
15-Jul	Auburn	Bay	4	25.0	0.0	75.0	100.0	100.0
15-Jul	Auburn	Bay	4	25.0	0.0	75.0	100.0	100.0
22-Jul	Brown City	Sanilac	3	66.7	0.0	66.7	66.7	100.0
27-Jul	Ashley	Gratiot	5	0.0	0.0	60.0	80.0	80.0
16-Aug	Auburn	Bay	3	66.7	33.3	100.0	100.0	100.0
16-Aug	Freeland	Saginaw	3	33.3	33.3	0.0	100.0	100.0
17-Aug	Caseville	Huron	4	0.0	50.0	25.0	100.0	100.0
25-Aug	Akron	Tuscola	3	0.0	100.0	0.0	100.0	100.0
25-Aug	Gilford	Tuscola	5	0.0	80.0	40.0	100.0	100.0
1-Sep	Ruth	Huron	4	75.0	0.0	100.0	100.0	100.0
1-Sep	Freeland	Saginaw	5	20.0	40.0	40.0	100.0	100.0
7-Sep	Crump	Bay	6	50.0	50.0	50.0	100.0	100.0
7-Sep	Cass City	Tuscola	5	40.0	80.0	40.0	100.0	100.0
13-Sep	Gladwin	Gladwin	5	60.0	20.0	80.0	100.0	100.0
15-Sep	Midland	Midland	5	20.0	20.0	40.0	80.0	100.0
16-Sep	Standish	Arenac	4	50.0	25.0	100.0	100.0	100.0
16-Sep	Auburn	Bay	5	60.0	60.0	100.0	100.0	100.0
17-Sep	Au Gres	Arenac	3	33.3	33.3	66.7	100.0	100.0
17-Sep	Pinconning	Bay	3	0.0	0.0	33.3	33.3	33.3
18-Sep	Brown City	Sanilac	4	50.0	50.0	100.0	100.0	75.0
18-Sep	Croswell	Sanilac	3	0.0	66.7	0.0	66.7	66.7
22-Sep	Freeland/Saginaw	Saginaw	4	50.0	50.0	50.0	100.0	100.0
24-Sep	Beaverton	Gladwin	5	80.0	60.0	100.0	100.0	100.0
3-Oct	Munger	Bay	4	0.0	0.0	75.0	100.0	100.0
18-Oct	Sandusky	Sanilac	5	0.0	100.0	20.0	100.0	100.0
21-Oct	Freeland	Saginaw	5	40.0	60.0	40.0	80.0	80.0
23-Oct	Caseville	Huron	6	33.3	50.0	66.7	100.0	83.3
24-Oct	Breckenridge	Gratiot	5	40.0	60.0	40.0	80.0	80.0
Total	**29 Locations**	**9 Counties**	**124**	**33.4**	**38.7**	**57.2**	**92.6**	**93.0**

[a]Isolates with EC50 values ≥1µg/ml were considered resistant (Bolton et al. 2012b). While regions with high frequencies of resistant isolates are at greater risk for reduced efficacy of fungicides with these active ingredients, resistance rates are based on laboratory testing only and are not a direct measure of in-field control provided by these products.

Table 2. Frequencies of *C. beticola* resistance to QoI, MBC and organotin active ingredients detected using in vitro sensitivity testing in 2021

Date	Field Location	County	No. Samples	% Resistant[a]		
				Pyraclostrobin	Thiophanate methyl	Triphenyltin hydroxide
14-Jul	Munger	Bay	4	100.0	0.0	0.0
15-Jul	Auburn	Bay	4	50.0	50.0	25.0
15-Jul	Auburn	Bay	4	50.0	75.0	0.0
22-Jul	Brown City	Sanilac	3	100.0	0.0	0.0
27-Jul	Ashley	Gratiot	5	100.0	20.0	0.0
16-Aug	Auburn	Bay	3	100.0	0.0	33.3
16-Aug	Freeland	Saginaw	3	66.7	66.7	0.0
17-Aug	Caseville	Huron	4	75.0	100.0	75.0
25-Aug	Akron	Tuscola	3	100.0	100.0	33.3
25-Aug	Gilford	Tuscola	5	80.0	100.0	20.0
1-Sep	Ruth	Huron	4	100.0	50.0	50.0
1-Sep	Freeland	Saginaw	5	100.0	80.0	80.0
7-Sep	Crump	Bay	6	100.0	100.0	83.3
7-Sep	Cass City	Tuscola	5	100.0	60.0	40.0
13-Sep	Gladwin	Gladwin	5	100.0	60.0	60.0
15-Sep	Midland	Midland	5	100.0	60.0	40.0
16-Sep	Standish	Arenac	4	75.0	100.0	0.0
16-Sep	Auburn	Bay	5	100.0	80.0	80.0
17-Sep	Au Gres	Arenac	3	100.0	33.3	0.0
17-Sep	Pinconning	Bay	3	100.0	0.0	100.0
18-Sep	Brown City	Sanilac	4	100.0	25.0	25.0
18-Sep	Croswell	Sanilac	3	100.0	66.7	66.7
22-Sep	Freeland/Saginaw	Saginaw	4	75.0	75.0	25.0
24-Sep	Beaverton	Gladwin	5	100.0	80.0	80.0
3-Oct	Munger	Bay	4	100.0	100.0	0.0
18-Oct	Sandusky	Sanilac	5	100.0	80.0	100.0
21-Oct	Freeland	Saginaw	5	80.0	20.0	40.0
23-Oct	Caseville	Huron	6	100.0	66.7	33.3
24-Oct	Breckenridge	Gratiot	5	80.0	60.0	80.0
Total	**29 Locations**	**9 Counties**	**124**	**90.7**	**58.9**	**40.3**

[a]Isolates with EC50 values ≥1µg/ml for pyraclostrobin and triphenyltin hydroxide and ≥5µg/ml for thiophanate methyl were considered resistant (Secor et al. 2010, Bolton et al. 2012b). While regions with high frequencies of resistant isolates are at greater risk for reduced efficacy of fungicides with these active ingredients, resistance rates are based on laboratory testing only and are not a direct measure of in-field control provided by these products.

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Utilizing Boron to Improve Cercospora Leaf Spot Management

Jaime Willbur, Chris Bloomingdale, Daniel Bublitz, and Kurt Steinke, Michigan State University

See soil.msu.edu for more information

Location: Saginaw Valley Research and Extension Center	**Tillage**: Conv., 30-in. row
Planting Date: April 29, 2022 (Harvest 9/23/22)	**N Rates**: 150 lb./A
Soil Type: Clay loam; 2.8% OM; 6.2 pH; 22 ppm P (Olsen P); 178 ppm K	**Population**: 4 in. spacing
Variety: C-G932NT	**Replicated**: 4 replications

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

Treatment	Product Rate† and Timing‡
Non-treated Check	No Fungicide, No Foliar Boron
Grower Standard	Manzate Max (1.6 qt) ABCDE + Inspire XT (7 fl oz) BE + Super Tin (8 fl oz) C + Propulse (13.6 fl oz) D + Topsin (20 fl oz) D
Foliar Boron (FBH)	SprayBor (0.7 lb) ABCDE
Grower Standard + Foliar Boron High (FBH)	SprayBor (0.7 lb) ABCDE + Manzate Max (1.6 qt) ABCDE + Inspire XT (7 fl oz) BE + Super Tin (8 fl oz) C + Propulse (13.6 fl oz) D + Topsin (20 fl oz) D

†All rates, unless otherwise specified, are listed as a measure of product per acre.
‡Application letters code for the following dates: A=Jul 8, B=Jul 19, C=Aug 2, D=Aug 16, E=Aug 30. MasterLock 0.25% V/V was added to all treatments.

Table 2. Sugarbeet yield, recoverable sugar per ton (RWST), and sugar % in 2022.

Treatment	Tons/A	RWST†	% Sugar
Non-treated Check	15.3	210 ab	14.6 ab
Grower Standard	24.1	222 a	15.3 a
Foliar Boron High (FBH)	17.2	204 b	14.3 b
Grower Standard + FBH	21.3	221 a	15.3 a
Pr > *F*	NS	= 0.05	< 0.05

†Values followed by the same lowercase letter are not significantly different at (α=0.05).

Table 3. Gross grower payment and profitability analysis.

Treatment	Gross Grower Payment ($/A)
Non-treated Check	813
Grower Standard	1,354
Foliar Boron High (FBH)	888
Grower Standard + FBH	1,191

‡Gross grower payment and net economic returns based upon harvest date adjustment factor for tonnage and RWST on 9/23/2022 and $0.18 per pound of sugar payment.

Table 4. Final area under the disease progress curve (AUDPC) in 2022.

Treatment	Final CLS Severity Sept. 8	AUDPC†, ‡
Non-treated Check	7.9	200 a
Grower Standard	1.9	35 b
Foliar Boron High (FBH)	8.3	173 a
Grower Standard + FBH	1.8	47 b
Pr > F	-	<0.0001

†Values followed by the same lowercase letter are not significantly different at (α=0.05).
‡ AUDPC calculated from disease severity ratings recorded every 10-14 days post infection beginning July 26. Ratings were assigned using the KWS 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%.

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 N was 60 lbs N A^{-1} as UAN applied at the 4-6 leaf stage on June 2. Treatments initiated on July 8 and continued every 10-14 days through August 30. Applications were made using a CO_2 powered backpack sprayer equipped with four TJ 8004XR nozzles (30-in spacing), calibrated at 15 gal A^{-1}. Inoculation of *C. beticola* ($1x10^3$ spores mL^{-1}) was applied at 15 gal/A using a tractor mounted sprayer on July 12. Disease ratings were collected bi-weekly starting July 26 and continued until September 8. Significant CLS pressure was observed uniformly throughout this study. The grower standard fungicide program resulted in significantly lower AUDPC ($P < 0.0001$), and greater RWST and percent sugar ($P < 0.05$), than the non-treated control. Five applications of foliar boron at 0.7 lb A^{-1} did not significantly reduce CLS severity or improve sugar beet yield or quality.

Inoculum reduction strategies tested in the field for improved management of Cercospora leaf spot on sugar beets, 2021-22

Alexandra Hernandez[1], Daniel Bublitz[1], Tom Wenzel[1], Sarah Ruth[1], Chris Bloomingdale[1], Linda E. Hanson[1,2], and Jaime F. Willbur[1]; [1]Michigan State University; [2]United 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, 2022	**Variety:** C-G932NT (Inoculated July 12, 2021)
Harvest: September 23, 2022	**Replicates:** 4

Methods: From 2021-22, experiments were conducted to evaluate the following fall treatments: **1)** nontreated control, **2)** Wheeler rye cover crop at 67 kg/ha planted immediately post-harvest, **3)** factory lime at 3 and **4)** 6 tons/acre applied immediately post-harvest, and **5)** propane-fueled heat treatment at 3 mph prior to defoliation. In 2021, treatments were applied to 10 x 60 ft plots, surrounded by a 10-ft buffer of soybean followed by winter wheat, and replicated four times in a randomized complete block design. Leaf samples were collected from each plot at harvest before topping and evaluated 0-, 35-, 70-, and 168-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 2022, 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 2021 (following treatment application), significant reductions in percent lesion sporulation were detected for 3 mph heat treated at-harvest ($P < 0.0001$, Fig. 1A) samples (N=160 leaves and 200 lesions per timepoint). No differences were detected in sporulation for 35-, 70-, and 168-DPH or isolation frequencies of *C. beticola* from leaf samples evaluated at-harvest, 35-, 70-, and 168-DPH. Additionally, no differences were observed in percent sugar or RWST following fall treatments. Significant differences in percent leaf degradation, calculated using initial leaf weight at-harvest and final weight post-harvest, were detected in 70-DPH ($P < 0.05$, Fig. 1B) leaf samples. In 2022 (the year following treatment application), significant differences were seen in number of lesions on sentinel beets. Numerical reductions in sentinel beet CLS lesions were seen in Week 1 (May 17-24), Week 2 (May 24-31), and Week 4 (June 15-22) in the cover crop treated plots and Week 1 and 2 for the 3-mph heat treated plots compared to the non-treated control (Fig. 2A, N = 60 beets per timepoint). Area under the disease progress curve (AUDPC) values were significantly different among treatments ($P < 0.001$, Fig. 2B & C); the cover crop and 3 mph heat treatment resulted in significantly lower CLS than the non-treated control. Results from experiments suggest the use of a foliar heat treatment at 3 mph and a rye cover crop treatment at-harvest could have some potential to significantly reduce CLS disease pressure the following year.

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.

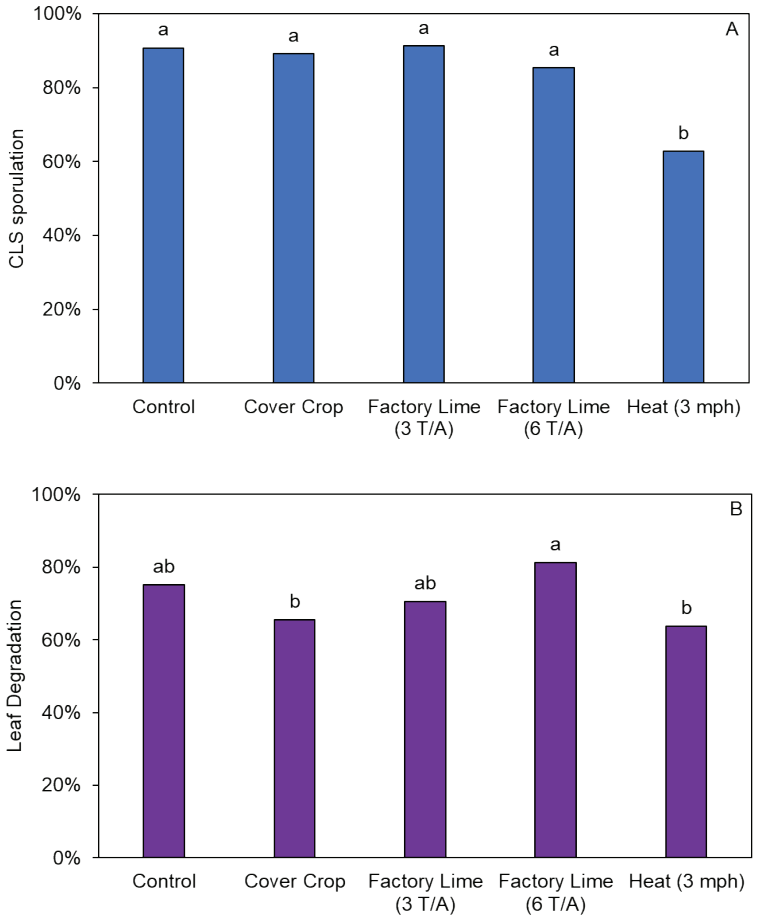

Figure 1. A) *90-day post-harvest lesion sporulation and* ***B)*** *leaf degradation following fall treatments applied in 2020. Leaf samples were weighed at initial and final collection from each treated plot, then placed in a moist chamber for three days. Then CLS lesions were assessed by observing 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.*

The 3-mph heat treatment significantly reduced sporulation over the winter. Leaf degradation for all treatments were not different from the control.

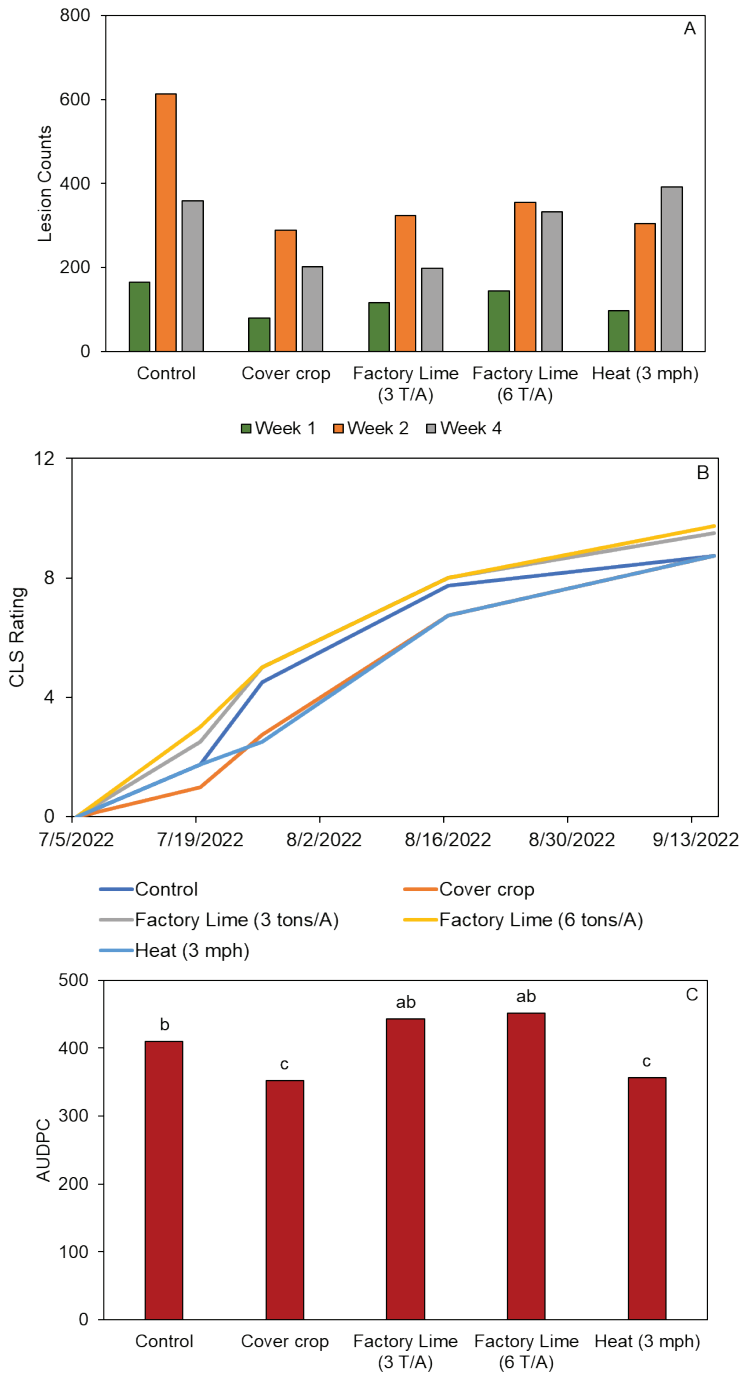

Figure 2. *Early-season inoculum and subsequent CLS observations in 2021 following end-of-season treatments applied in 2020.* ***A)*** *Spot counts were collected from four sentinel beets placed in the center of each treated plot, left for seven days, and quantified after 21 days.* ***B)*** *Progression of mean CLS severity ratings collected 7 July to 15 Sept.* ***C)*** *Area under the disease progress curve (AUDPC) generated from biweekly CLS ratings (0-10 scale). Means of bars with the same letters were not different based on Fisher's protected LSD at α=0.05.*

Decreased lesion counts were observed from mid-May to late June for the cover crop treatment. The cover crop and heat treatment reduced AUDPC and CLS ratings from late July to mid-August.

Cercospora beticola risk model and in-field validation for Cercospora leaf spot on sugar beets, 2021-22

Alexandra Hernandez[1], Chris Bloomingdale[1], Cheryl Trueman[3], Linda E. Hanson[1,2], and Jaime F. Willbur[1]; [1]Michigan State University; [2]United States Department of Agriculture – Agricultural Research Service; [3]Syngenta Canada

Methods: Aerial spores were collected in sugarbeet fields using a Burkard spore trap in Michigan from 2019, 2020, 2021 and 2022 and from Ontario, Canada 2019, 2020, and 2021 early in the season (May to July). Environmental factors were monitored using on-site or local MSU Enviroweather stations and evaluated for correlations to spore abundance. Stepwise regression analyses were conducted to assess the accuracy of the model variables separately and together.

A preliminary model was created in 2021 to predict elevated spore numbers with a threshold of 35 spores. Correlated weather predictors were identified, and logistic modeling was used to predict elevated spore counts ($R^2 = 0.18$, $P < 0.0001$). The model predicted whether daily spore abundance was 35 or more spores (Spore35) based on number of hours with leaf wetness greater than or equal to 25% from 11AM to 10AM (DurLW), average daily air temperature in Celsius from 11AM to 10AM (AvgTemp), and maximum daily wind speed in km/h (MaxWS). The following model equation was used to predict risk for elevated aerial spores.

Spore35 = 0.1132*DurLW + 0.1285*AvgTemp + 0.0369*MaxWS - 5.0814

A validation study was conducted in 2022 to test the ability of this model to assist in fungicide application timing and improved management. The field treatments were in a randomized complete block design with three treatments applied to both CLS susceptible and resistant sugarbeet variety.

Location: Frankenmuth (Saginaw Valley Research and Extension Center)	**Treatment Timings:** see table
Planting Dates: April 29, 2022 (Harvest September 23)	**Pesticides:** see table
Soil Type: Loam	**O.M.:** 5.0 **pH:** 7.5
Replicates: 4	**Variety:** C-G021 and C-G932NT

Table 1. Model validation treatment programs tested in 2022. After initiation, subsequent spray timings followed a 14-day interval for the susceptible (C-G932NT) and 28-day interval for the resistant variety (C-G021).

Trt	Variety	Program	Initiation Criteria [a]	Actual Initiation Date	No. App.	App. Interval	AUDPC [b]		Yield (T/A)
1	C-G021	Non-treated control	-	-	-	-	31.6	c	17.5
2	C-G021	Grower standard [c]	55 DSV	7/12/22	3	28-day	14.0	c	17.3
3	C-G021	Model Spore35	70% + DSV 3 or 4	7/8/22	3	28-day	27.6	c	20.0
4	C-G932NT	Non-treated control	-	-	-	-	264.1	a	15.3
5	C-G932NT	Grower standard	50 DSV	7/8/22	5	14-day	135.5	b	15.7
6	C-G932NT	Model Spore35	70% + DSV 3 or 4	7/8/22	5	14-day	102.5	b	14.1
				P-value			< 0.001		NS

[a] Model Spore35 was implemented to trigger at a 70% likelihood threshold for the presence of 35 or more *C. beticola* spores paired with a BEETcast DSV value of 3 or 4 on the same day.
[b] Grower standard program as follows for the susceptible variety: Manzate Max (1.6 qt) ACDFG; Inspire XT (7 fl oz) CF; Super Tin (8 fl oz) D; and resistant variety: Manzate Max (1.6 qt) ADG and BEH; Inspire XT (7 fl oz) DE; Super Tin (8 fl oz) GH. Application letters code for the following dates: A=8 Jul, B=12 Jul, C=19 July, D=2 Aug, E=9 Aug, F=16 Aug, G=30 Aug, and H=6 Sept.
[c] Area under the disease progress curve was calculated using disease severity scores (0-10 scale) collected Jul 26 through Aug 15.
[d] Column values followed by the same letter were not significantly different based on Fisher's Protected LSD (α=0.05).

Summary: The treatments in this study did not result in significant differences in yield. The model prediction spray timings triggered at the same time as the susceptible standard control treatment. Therefore, no significant differences in AUDPC were observed between the model-based spray timing and the grower standard control for the susceptible variety. Both the model-based, and the grower standard fungicide treatments resulted in significantly lower CLS pressure than the non-treated control. No significant difference in AUDPC was detected between treatments on the resistant variety. The addition of a resistant cultivar may not be necessary to test early-season risk models in future experiments.

Aerial spores were collected mid-May through mid-July of 2022 at SVREC in Frankenmuth, Michigan. The current model predicted correctly 73% of days where *C. beticola*-like conidia observed surpassed the 35-spore threshold on a small subset of 15 days monitored (final analyses in progress). Spore observations from 2022 and alternative modeling techniques will be used to further refine the risk models of interest, and final models will be validated in 2023.

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

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University AgBioResearch

Evaluation of foliar fungicides to manage Cercospora leaf spot of sugar beet in Michigan, 2022

Chris Bloomingdale and Jaime Willbur, Michigan State University

Location: Frankenmuth (SVREC)	**Treatment Timings:** 14-day interval starting at 35 DSV
Planting Dates: April 29, 2022	**Pesticides:** see table
Soil Type: Loam	**O.M.:** 5.0 **pH:** 7.5
Replicates: 4	**Variety:** SX-1278N

Summary: Significant CLS pressure was observed uniformly throughout this study; all fungicide programs had significantly lower AUDPCs than the non-treated control ($P < 0.0001$). AUDPCs for fungicide programs ranged between 38.0 and 72.5, while the control program had a AUDPC of 177.8. No differences were observed among estimated yields ($P > 0.05$), however, all programs had numerically greater yields (13.9-20.1 t/A) than the control (11.2 t/A). Yield was considerably reduced by root rot and wilt observed with an average of 14% stand impacted across the trial (range 0-40% stand impacted within plots). All fungicide programs had significantly greater sugar content than the control ($P < 0.0001$) and all programs resulted in significantly greater RWST than the control ($P < 0.0001$).

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

No.	Treatment, Rate[a], and Timing[b]	AUDPC[c, d]	Yield (t/A)	Sugar (%)	RWST[e]
1	Non-treated Control	177.8 a	11.2	14.9 c	215.9 d
2	Manzate Max (1.6 qt) ABCDE; Inspire XT (7 fl oz) BD; Super Tin (8 fl oz) C	53.5 cd	16.9	17.0 ab	251.8 a-c
3	Manzate Max (1.6 qt) ACE; Propulse (13.7 fl oz) BD; Super Tin (8 fl oz) C	38.0 d	20.1	16.9 ab	250.4 a-c
4	Manzate Max (1.6 qt) ACE; Proline (5.7 fl oz) BD; Super Tin (8 fl oz) C	45.5 d	15.7	16.7 ab	246.9 a-c
5	Manzate Max (1.6 qt) ACE; Delaro (11 fl oz) B; Super Tin (8 fl oz) C; Proline (1.7 fl oz) D	46.0 d	19.7	17.0 ab	253.1 a-c
6	Manzate Max (1.6 qt) AE; Delaro (11 fl oz) B; Luna Privilege (2 fl oz) C; Proline (1.7 fl oz) D	67.3 bc	15.2	16.6 ab	243.4 bc
7	Badge (2 pt) ABCDE; Domark (6.9 fl oz) B; Super Tin (8 fl oz) C; Inspire XT (7 fl oz) D	72.5 b	18.9	17.2 a	254.9 ab
8	Manzate Max (1.6 qt) ABCDE; Domark (6.9 fl oz) B; Super Tin (8 fl oz) C; Inspire XT (7 fl oz) D	44.5 d	15.9	17.0 ab	252.3 a-c
9	Badge (2 pt) ABCDE; Exp[f] (1.5 pt) A; Domark (6.9 fl oz) B; Super Tin (8 fl oz) C; Inspire XT (7 fl oz) D	54.8 b-d	13.9	16.7 ab	245.8 a-c
10	Manzate Max (1.6 qt) ABCDE; Domark (6.9 fl oz) B; Super Tin (8 fl oz) C; Exp (1.5 pt) C; Inspire XT (7 fl oz) D	46.0 d	15.2	16.5 b	242.7 c
11	Manzate Max (1.6 qt) ABCDE; Domark (6.9 fl oz) B; Super Tin (8 fl oz) C; Inspire XT (7 fl oz) D; Exp (1.5 pt) E	44.5 d	16.4	16.7 ab	246.6 a-c
12	Manzate Max (1.6 qt) ABCDE; Exp (1.5 pt) ACE; Domark (6.9 fl oz) B; Super Tin (8 fl oz) C	45.0 d	15.2	17.2 a	256.3 a

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

[b] Application letters code for the following dates: A=Jul 8, B=Jul 19, C=Aug 2, D=Aug 16, and E=Aug 30.

[c] Area under the disease progress curve was calculated using disease severity scores (0-10 scale) collected Jul 26, Aug 11, Aug 23, and Sep 8.

[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.

[f] Exp=Experimental compound

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University AgBioResearch

Evaluation of banded and foliar compounds to manage Cercospora leaf spot of sugar beet, 2022.

Chris Bloomingdale and Jaime Willbur, Michigan State University

Location: Frankenmuth (SVREC)	**Treatment Timings:** 14-day interval starting at 35 DSV
Planting Dates: April 29, 2022	**Pesticides:** see table
Soil Type: Loam	**O.M.:** 5.0 **pH:** 7.5
Replicates: 4	**Variety:** SX-2283

Summary: Tested programs had AUDPCs ranging from 44.3 to 142.3, compared to the control with an AUDPC value of 165.5. All programs, except for 7, had significantly lower AUDPCs than the non-treated control ($P < 0.0001$). No differences were observed among yields ($P > 0.05$); however, significant differences were observed among sugar content ($P < 0.05$) and RWST ($P < 0.05$). Yield was reduced by root rot and wilt observed with an average of 5% stand impacted across the trial (range 0-34% stand impacted within plots). The greatest sugar content was observed from programs 2, 3, and 5, which ranged between 15.4 and 16.3%; the greatest RWST was observed from programs 2, 3, and 5.

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

No.	Treatment, Rate[a], and Timing[b]	AUDPC[c, d]	Yield (t/A)	Sugar (%)	RWST[e]
1	Non-treated Control	165.5 a	9.2	14.6 c	210.0 c
2	Manzate Max (1.6 qt) ABCDE; Inspire XT (7 fl oz) BD	48.8 c	12.6	15.8 ab	231.0 ab
3	Manzate Max (1.6 qt) ABCDE; LifeGard (4.5 oz/100 gal) ACE; Inspire XT (7 fl oz) BD	44.3 c	15.2	16.3 a	238.9 a
4	LifeGard (4.5 oz/100 gal) AC; Manzate Max (1.6 qt) BDE; Inspire XT (7 fl oz) BD	88.0 b	8.2	15.2 bc	220.4 bc
5	LifeGard (4.5 oz/100 gal) ABCDE; Mankocide (4.3 lb) ABCDE	52.8 c	13.7	15.4 a-c	223.1 a-c
6	Sunergist (6.4 fl oz/100 gal) αβA	102.3 b	9.3	14.6 c	209.3 c
7	Sunergist+Chitosan (6.4 fl oz/100 gal) αβA	142.3 a	9.1	14.6 c	208.6 c
8	Sunergist (6.4 fl oz/100 gal) αβAB	105.0 b	13.2	14.9 bc	217.2 bc
9	Sunergist (6.4 fl oz/100 gal) αβAB; Proline (5.7 fl oz) B	102.5 b	14.0	15.0 bc	216.2 bc

[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] Banded application letters code for the following dates: α=Jun 13 and β=Jun 27. Foliar application letters code for the following dates: A=Jul 8, B=Jul 19, C=Aug 2, D=Aug 16, and E=Aug 30.

[c] Area under the disease progress curve was calculated using disease severity scores (0-10 scale) collected Jul 26, Aug 11, Aug 23, and Sep 8.

[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.

Cercospora leaf spot: Fungicide initiation and intervals with CR+, Ridgetown, 2022

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

Trial Quality:	Fair	**Variety:**	C-G021
Planted:	May 24	**Location:**	Ridgetown, Ontario, Canada
Harvested:	October 14	**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:	3.0 seeds/foot		

Highlights/Summary:

- CLS incidence was low, with disease severity ratings of ≤ 1% at the last rating date of September 27.
- Trt #3 (initiated June 30 with spray interval of 28 days) had a lower AUDPS than the nontreated control but was not significantly different from all other treatments except for Trt #12 (Model 3 with spray interval of 75 DSV) which had no applications made because the model was not triggered.
- There were no differences between the nontreated control and any of the fungicide treatment schedules in terms of beet yield (tons/acre,) sugar (%), RWST (lb/ton) or RWSA (lb/acre).

Disease severity (% leaf area affected), area under the disease progress stairs (AUDPS), sugar content and yield in CR+ sugarbeet variety 'C-G021' under different fungicide treatment schedules for management of Cercospora leaf spot, Ridgetown, ON, 2022.

Trt #	Fungicide Treatment Schedule: initiation trigger and spray interval (application codes in brackets) [a]	Dis. Sev. (%) [b] Sept 27	AUDPS [c]	Yield (T/A)	Sugar (%)	RWST [d] (lb/ton)	RWSA [e] (lb/acre)
1	Non-treated control	1	41 a	19.3	23	353	6800
2	55 DSV with interval of 50 DSV (CFL)	1	19 ab	19.4	23	351	6795
3	Jun 30 with interval of 28 d (ADJ)	0	13 b	20.7	22	348	7208
4	Jun 30 with interval of 75 DSV (AF)	1	31 ab	21.9	23	352	7707
5	55 DSV with interval of 28 d (CHM)	1	22 ab	21.4	23	355	7619
6	55 DSV with interval of 75 DSV (CI)	1	29 ab	20.7	22	343	7102
7	Model 1 with interval of 28 d (BEK) [f]	0	17 ab	21.6	22	349	7529
8	Model 1 with interval = 75 DSV (BG) [f]	1	23 ab	20.7	23	353	7309
9	Model 2 with interval of 28 d (I) [g]	1	29 ab	22.0	23	351	7721
10	Model 2 with interval = 75 DSV (I) [g]	0	30 ab	21.1	23	350	7379
11	Model 3 with interval of 28 d [h]	1	32 ab	19.5	23	351	6876
12	Model 3 with interval = 75 DSV [h]	1	39 a	20.1	22	345	6934

[a] Treatments applied on A=June 30, B= July 4, C= July 15, D=July 28, E=August 2, F=August 9, G=August 11, H=August 12, I=August 23, J=August 25, K=August 30, L=September 7, M=September 9. Fungicide program followed was Proline @ 365 mL ha^{-1} + Manzate Pro-Stick @ 2.25 kg ha^{-1} followed by Manzate Pro-Stick @ 2.25 kg ha^{-1} and then repeated. [b] Disease Severity expressed as % of leaf area affected. Numbers in a column followed by the same letter are not significantly different at $P \leq 0.05$, Tukey's adjustment. [c] AUDPS = area under the disease progress stairs. A lower number is better. [d] RWST= recoverable white sugar per ton. [e] RWSA= recoverable white sugar per acre. [f] Model 1: 30% probability of 35 spores/m^3 of air + daily BEETcast DSV of 3 or 4 (triggered July 3). [g] Model 2: 30% prob. of 35 spores/m^3 of air + daily DSV of 3 or 4 + approx. 75% row closure between rows (triggered August 22). [h] Model 3: 80% prob. of 35 spores/m^3 of air + daily DSV of 3 or 4 (not triggered).

Funding: Ontario Agri-Food Innovation Alliance, Ontario Sugarbeet Growers' Association (OSGA), and Michigan Sugar Company (MSC).

Effects of iron and boron on Cercospora leaf spot in sugarbeet, Ridgetown, 2022

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

Trial Quality:	Fair	**Variety:**	H-9908
Planted:	May 24	**Location:**	Ridgetown, Ontario, Canada
Harvested:	No harvest	**Application Method:**	hand-held boom, CO_2 pressure
Plot Size:	4 rows x 23 feet	**Application Water Volume:**	32 gal/A
Row Spacing:	2.5 feet	**Reps:**	4
Seeding Rate:	3 seeds/foot		

Highlights/Summary:

- Disease severity was very low throughout the season, but no Dissolvine (iron) or Bortrac (boron) fungicide treatment decreased Cercospora leaf spot (CLS) compared to the nontreated control.
- While soil boron levels were identified as being 'low-medium', repeated foliar applications of Bortrac did not alter tissue boron levels in those treatments compared to the nontreated control.
- Results from 2019, 2021 and 2022 would indicate that significant efficacy was not observed from using Dissolvine and Bortrac as alternative fungicides for the control of CLS in sugarbeet.

Disease severity (% leaf area affected), area under the disease progress steps (AUDPS), iron and boron leaf content ten days after the last application in sugarbeet grown under iron and boron treatment for management of Cercospora leaf spot, Ridgetown, ON, 2022.

#	Treatment Program (per ha) [a]	Disease Severity (%) [b] Sept 19	AUDPS [c]	Leaf Iron (mg/kg)	Leaf Boron (mg/kg)
1	Non-treated control	1	19	162.5	37.8
2	EDTA @ 1.77 kg (CDEFG)	1	42	147.5	41.8
3	Dissolvine @ 0.75 kg (CDEFG)	3	101	272.5	38.3
4	Dissolvine @ 1.5 kg (CDEFG)	0	18	240.0	36.8
5	Dissolvine @ 2.0 kg (CDEFG)	1	26	235.0	38.8
6	Bortrac @ 3.0 L (AB)	1	19	152.5	40.3
7	Bortrac @ 3.5 L (AB)	1	16	210.0	38.8
8	Bortrac @ 4.0 L (AB)	1	23	252.5	40.3
9	Bortrac @ 3.0 L (AB) Dissolvine @ 0.75 kg (CDEFG)	1	17	212.5	38.5
10	Bortrac @ 3.5 L (AB) Dissolvine @ 1.5 kg (CDEFG)	1	19	247.5	41.3
11	Bortrac @ 4.0 L (AB) Dissolvine @ 2.0 kg (CDEFG)	1	41	242.5	40.5

[a] Treatments were applied on A = June 22 (4-6 leaf stage), B = July 4, C = July 14 (50 DSV accumulated), D = July 28, E = August 11, F = August 25, G = September 9.

[b] Numbers in a column followed by the same letter are not significantly different at $P \leq 0.05$, Tukey's adjustment.

[c] AUDPS = area under the disease progress steps. A lower number is better.

Funding: Ontario Agri-Food Innovation Alliance.

Bayer Movento

SVREC - Richville, MI - 2022

Trial Quality: Good
Variety: BTS-1703
Planted: April 22
Harvested: October 11
Plots: 6 rows X 38 ft, 5 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.3 **CEC:** 13.2
P: High **K:** Medium
Mn: High **B:** Medium
Added N: 120 lbs. PPI + 35 lbs. 2X2
Prev Crop: Wheat

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 13.46 in.
Beets/100 ft: 133

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 Date	Dead Beets/ 100 ft 2-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
3	Mustang Maxx Destiny	4 oz .25% v/v	31-May	0.4	**$2,987**	**12976**	312	41.7	20.4	**96.2**
	Mustang Maxx Destiny	4 oz .25% v/v	8-Jun							
1	Untreated Check			0.6	$2,789	12008	305	39.4	20.0	**96.1**
2	Movento Destiny	9 oz .25% v/v	31-May	0.6	$2,668	12169	308	39.5	20.3	95.8
	Movento Destiny	9 oz .25% v/v	8-Jun							
Average				0.6	$2,815	12,384	308	40.2	20.2	96.0
LSD 5%				n.s	169.6	729.9	n.s	n.s	n.s	0.2
CV%				171.4	3.5	3.4	2.0	4.5	2.0	0.1

Comments: Movento was tested to examine the effect of insects on yield. Insect pressure was low at this location.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Movento Insecticide

Guza Farms, Minden City - 2022

Trial Quality: Good
Variety: B-1703
Planted: May 11
Harv/Samp: Nov 1 / Nov 1
Plot Size: 4 reps
Row Spacing: 22 inch
Seeding Rate: 66,000

Soil Type: Loam & clay loam
Fertilizer: In-furrow pop-up; 2x2: 40# N; PPI: 75# N; Streamer: 45# N
Prev Crop: Corn
Weather: Very dry throughout the season.

Rhiz Control: Low pressure: Quadris I.F. (7oz w/ Mustang) & Foliar (16 oz)
Cerc Control: Very low pressure: see below for materials
Other Pests: Heavy Root Aphid Pressure

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP
Movento	$1,504	8354	275	30.3	18.3	95.8
Check	$1,460	8109	270	30.0	18.0	95.7
Average	$1,482	8231	272	30.2	18.1	95.7
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	5.7	5.7	1.0	6.1	0.9	0.3
p-value	0.5155	0.5155	0.0761	0.8082	0.0578	0.6938

Comments: Movento is an insecticide from Bayer Crop Science that is intended to help manage root aphid and sugarbeet cyst nematode. In 2019 and 2020, Sugarbeet Advancement conducted several trials with this product. In those trials, Movento was applied twice during the late spring and early summer (end of June and beginning of July), which is typically how this product is used. This year's trial was set up differently. It was located adjacent to the Guza CR+ variety trial. In late August and early September, a very high population of root aphid was observed here. In response, this trial was done to see if a late season Movento application could help manage an active root aphid infestation. It was applied on September 16 at a rate of 5 oz/acre with 21 gpa of water and 1% MSO by volume. Unfortunately, the location had received about an inch of rain on September 11/12, and very few live root aphids could be found the day the product was applied. Generally, root aphids are most severe during periods of drought and populations decrease after rains. The leafspot program was the same for both treatments: 7/10 EBDC (Roper), 7/21 Delaro + Proline + EBDC, 8/10 Super Tin + EBDC, 8/24 Super Tin + EBDC. All applications included a spreader/sticker.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Evaluation of selected chemical and non-chemical treatments for the management of sugar beet cyst nematode

Ali Yaghoubi and Marisol Quintanilla. Michigan State University, Department of Entomology.

In 2022, some chemical and non-chemical treatments were evaluated in two varieties of sugar beet to understand the effects of Zironar, Movento, Mustang Max, Seed Trt- Aveo, Layer Ash Blend Compost, and BaSalt Sand on sugar beet cyst nematode (SBCN) populations. The details of sugar beet varieties, treatments, rates, and timing are shown in Table 1.

Table 1. List of sugar beet varieties, treatments, rates, and application timing.

No.	Variety	Treatment	Rate/A	Application time
1	BTS-1703	Untreated Check		
2	BTS-1703	Zironar	6 fl oz	In-Fur
3	BTS-1703	Zironar	9 fl oz	In-Fur
4	BTS-1703	Zironar	12 fl oz	In-Fur
5	BTS-1703	Movento + Destiny Movento + Destiny	9 oz + .25 % v/v 9 oz + .25 % v/v	14 days 30 days
6	BTS-1703	Mustang Max + Destiny Mustang Max + Destiny	4 oz + .25 % v/v 4 oz + .25 % v/v	14 days 30 days
7	BTS-1703	Seed Trt- Aveo	4.14 ml/unit seed	
8	BTS-1703	Layer Ash Blend Compost (LAB)	1.5 tons/acre	
9	BTS-1703	Layer Ash Blend Compost w/Gypsum (LAB-G)	1.5 tons/acre	
10	BTS-1703	BaSalt Sand	1 ton/acre	
11	BTS-1703	BaSalt Sand	3 tons/acre	
12	BTS-1703	BaSalt Sand	9 tons/acre	
13	BTS-197N	Untreated Check		
14	BTS-197N	Zironar	6 fl oz	In-Furrow
15	BTS-197N	Zironar	9 fl oz	In-Furrow
16	BTS-197N	Zironar	12 fl oz	In-Furrow
17	BTS-197N	Seed Trt- Aveo	4.14 ml/unit seed	
18	BTS-197N	LAB	1.5 tons/acre	
19	BTS-197N	LAB-G	1.5 tons/acre	
20	BTS-197N	BaSalt Sand	1 ton/acre	
21	BTS-197N	BaSalt Sand	3 tons/acre	
22	BTS-197N	BaSalt Sand	9 tons/acre	

SBCNs in each plot were sampled twice during the 2022 growing season. The initial samples were collected on May 16 and the final samples were collected on the day of harvest (October 30). The number of SBCN females and eggs was counted per 100 cc of soil. In the case of variety BTS-1703, there were no significant differences between treatments, and the treatments used had no effect on the population reduction of SBCN (Figures 1 and 2). SBCN cyst and egg population analyses on variety BTS-197N indicated that seed treatment with Aveo and application of 3 and 9 tons per acre of Basalt sand reduced the reproduction factor (dividing the final population of eggs by its initial population) in SBCN (Figures 3, 4 and 5). Although the reductions in nematode populations by Aveo and BaSalt sand were not statistically significant, this experiment provided promising results, since these treatments combined with existing management methods can reduce nematode damage.

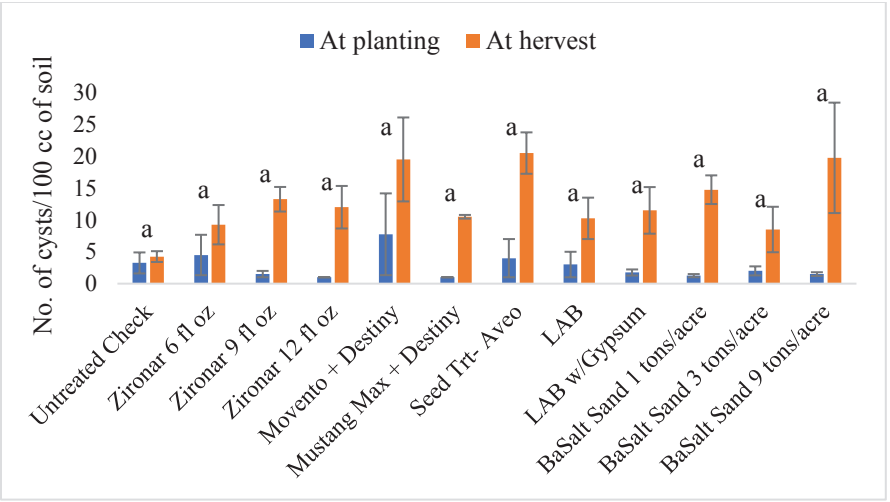

Figure 1. Average of sugar beet cyst nematode cysts per 100 cc of soil in BTS-1703. No significant differences were found between treatments.

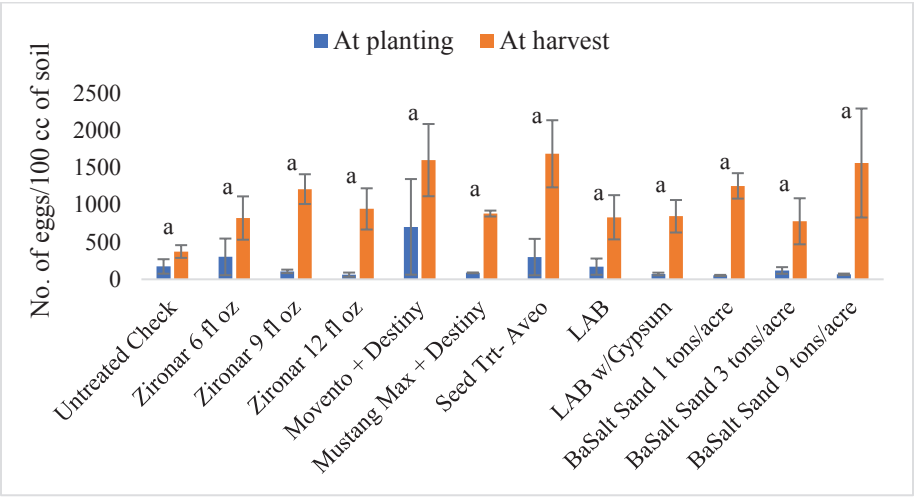

Figure 2. Average of sugar beet cyst nematode eggs per 100 cc of soil in BTS-1703. No significant differences were found between treatments.

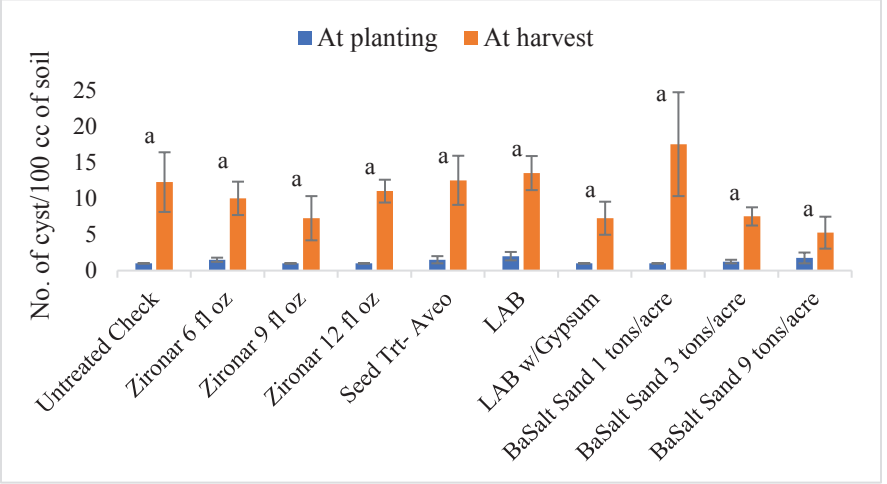

Figure 3. Average of sugar beet cyst nematode cysts per 100 cc of soil in BTS-197N. No significant differences were found between treatments.

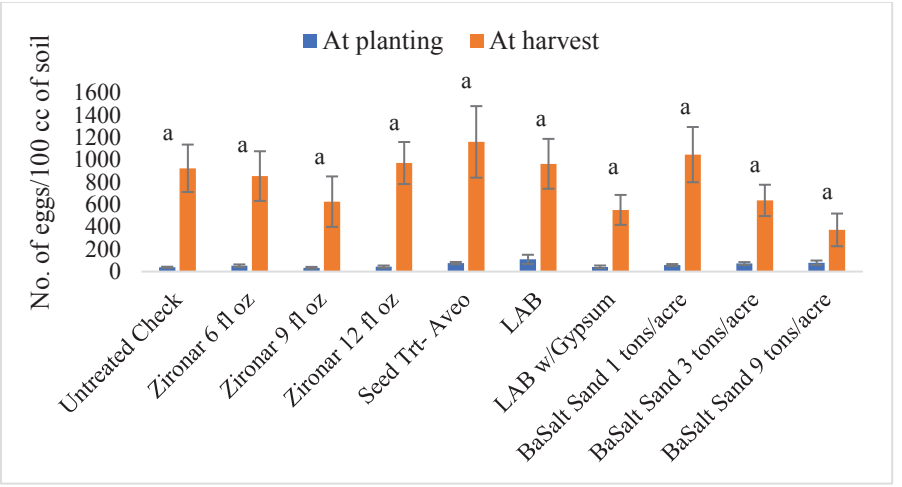

Figure 4. Average of sugar beet cyst nematode eggs per 100 cc of soil in BTS-197N. No significant differences were found between treatments.

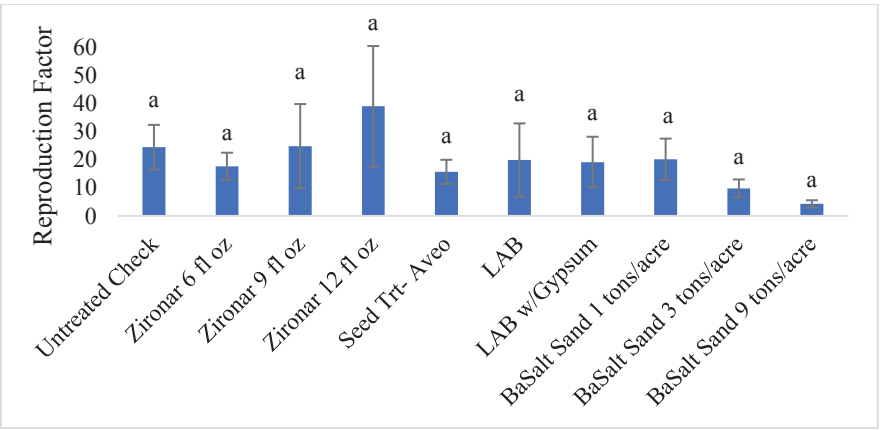

Figure 5. Sugar beet cyst nematode reproduction factor in BTS-197N. No significant differences were found between treatments.

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

Nitrogen Application Strategies Trial

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Very Good
Variety: BTS -1606
Planted: May 17
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: See individual treatments
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 277

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 11-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
1	Untreated Check				8.6	$1,418	7877	**335**	23.5	**22.0**	**95.8**
2	Nitrogen	160 lbs	16-May	PPI	9.2	**$1,709**	**10773**	**332**	**32.5**	**21.9**	**95.5**
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr							
	Mustang Maxx	4 fl oz									
3	Nitrogen	120 lbs	16-May	PPI	**9.3**	$1,636	**10453**	318	**32.9**	21.4	94.8
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr							
	Mustang Maxx	4 fl oz									
	Nitrogen*	40 lbs	At Plant	2X2							
4	Nitrogen	60 lbs	16-May	PPI	9.2	**$1,679**	**10721**	**329**	**32.6**	**22.0**	94.8
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr							
	Mustang Maxx	4 fl oz									
	Nitrogen*	40	At Plant	2X2							
	Nitrogen	60 lbs	6 lf	Streamer							
5	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr	**9.3**	$1,609	10322	**331**	31.2	**22.0**	95.3
	Mustang Maxx	4 fl oz									
	Nitrogen*	40 lbs	At Plant	2X2							
	Nitrogen	60 lbs	6 lf	Streamer							
	Nitrogen	60 lbs	12 lf	Streamer							
6	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr	**9.5**	**$1,681**	**10659**	322	**33.1**	**21.5**	95.0
	Mustang Maxx	4 fl oz									
	Nitrogen*	40	At Plant	2X2							
	Nitrogen	120 lbs	6 lf	Streamer							
7	Nitrogen	60 lbs	16-May	PPI	**9.5**	**$1,682**	**10772**	320	**33.7**	**21.5**	94.8
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr							
	Mustang Maxx	4 fl oz									
	Nitrogen*	40	At Plant	2X2							
	Nitrogen	60 lbs	6 lf	Fluted Coulter							

***Treatment includes sulfur and phosphorus**

****Treatment includes sulfur**

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

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

Nitrogen Application Strategies Trial

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment	Rate/A	Applic Timing	Applic Method	Vigor*** 0-10 11-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
8	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr	**9.6**	**$1,728**	**10922**	325	**33.6**	**21.5**	**95.5**
	Nitrogen*	40 lbs	At Plant	2X2							
	Nitrogen	120 lbs	6 lf	Fluted Coulter							
9	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr	**9.5**	$1,602	10221	304	**33.7**	20.2	**95.6**
	Nitrogen*	40 lbs	At Plant	2X2							
	Nitrogen	120 lbs	12 lf	Streamer							
10	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr	**9.3**	$1,553	9901	317	31.2	21.1	**95.4**
	Nitrogen**	40 lbs	6 lf	Streamer							
11	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr	**9.4**	$1,618	10262	**330**	31.1	**21.9**	95.3
	Nitrogen**	40 lbs	6 lf	Fluted Coulter							
12	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr	9.2	**$1,731**	10071	**342**	29.5	**22.3**	**96.0**
	Nitrogen*	40 lbs	At Plant	2X2							
13	Nitrogen**	40 lbs	16-May	PPI	9.2	$1,618	10365	324	32.0	**21.6**	95.2
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr							
	Nitrogen	100 lbs	6 lf	Streamer							
14	Nitrogen**	40 lbs	16-May	PPI	**9.3**	$1,604	10306	321	**32.1**	**21.5**	95.0
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr							
	Nitrogen	60 lbs	6 lf	Streamer							
Average					9.3	$1,633	10259	325	31.6	21.6	95.3
LSD 5%					0.3	83.3	462.7	12.6	1.4	0.8	0.6
CV%					2.4	3.6	3.2	2.7	3.2	2.5	0.5

***Treatment includes sulfur and phosphorus**

****Treatment includes sulfur**

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

Comments: A nitrogen rate of 160 lbs/A total was used to study application timing and methods. 6 gal/a of 10-34-0, 4 gal/a of ATS (thio-sul), and 9.5 gal/a of 28% UAN was used to make up 40 lbs of N in some cases. This was applied 2X2 for treatments 3-9 and 12. A rate of 4 gal/a of ATS was used for 5 lbs of N for treatments 10,11,13 and 14. 28% UAN was applied at rates of 160 lbs (53 gal), 150 lbs (51 gal), 120 lbs (40 gal), 95 lbs (32 gal), 60 lbs (20 gal) and 55 lbs (19 gal). Quadris at 10 fl oz/a and Mustang Maxx at 4 fl oz/A were applied in a 3.5 inch band in-furrow for all treatments. No other nutrients were applied in this study.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

N & K Fertility Trial Early Harvest

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 17
Harvested: October 3
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: See individual treatments
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 8.55 in.
Beets/100 ft: 252

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

No.	Treatment	Rate/A	Applic Timing	Applic Method	Vigor** 0-10		Net $/A	RWSA	RWST	T/A	% SUC	% CJP
					11-Aug	27-Jun						
1	Untreated Check				8.3	7.3	$1,216	5341	301	17.6	19.8	96.0
2	Nitrogen*	40 lbs	At Plant	2X2	**8.8**	7.8	$1,606	7189	309	23.3	20.3	**96.0**
3	Potassium	150 lbs	16-May	PPI	**8.8**	**7.9**	$1,618	7247	**322**	22.5	**21.2**	**95.7**
	Nitrogen*	40 lbs	At Plant	2X2								
4	Potassium	300 lbs	16-May	PPI	**9.1**	**8.3**	$1,698	7603	**331**	23.0	**21.8**	**95.8**
	Nitrogen*	40 lbs	At Plant	2X2								
5	Nitrogen*	40 lbs	At Plant	2X2	**8.7**	7.8	$1,528	7007	310	22.5	20.3	**96.0**
	Nitrogen	40 lbs	6 lf	Streamer								
6	Potassium	150 lbs	16-May	PPI	**9.1**	**8.0**	$1,676	7663	311	24.6	20.6	**95.8**
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	40 lbs	6 lf	Streamer								
7	Potassium	300 lbs	16-May	PPI	**9.1**	**8.1**	**$1,770**	**8080**	**323**	25.1	**21.4**	**95.3**
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	40 lbs	6 lf	Streamer								
8	Nitrogen*	40 lbs	At Plant	2X2	8.6	7.5	$1,518	6963	293	23.8	19.7	**95.0**
	Nitrogen	120 lbs	6 lf	Streamer								
9	Potassium	150 lbs	16-May	PPI	**8.9**	**8.0**	**$1,765**	**8053**	308	**26.2**	20.6	**95.2**
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	120 lbs	6 lf	Streamer								
10	Potassium	300 lbs	16-May	PPI	**9.1**	**8.3**	$1,733	7917	312	25.3	**21.1**	94.7
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	120 lbs	6 lf	Streamer								
11	Nitrogen*	40 lbs	At Plant	2X2	**9.1**	7.8	$1,687	7706	285	**27.0**	19.0	**95.5**
	Nitrogen	160 lbs	6 lf	Streamer								
12	Potassium	150 lbs	16-May	PPI	**9.3**	**8.4**	$1,650	7546	288	**26.2**	19.6	94.5
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	160 lbs	6 lf	Streamer								
13	Potassium	300 lbs	16-May	PPI	**9.3**	**8.3**	**$1,950**	**8870**	309	**28.7**	20.5	**95.5**
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	160 lbs	6 lf	Streamer								
Average					8.9	7.9	$1,647	7476	308	24.3	20.5	95.5
LSD 5%					0.5	0.5	190.0	834.9	16.5	2.3	0.9	1.0
CV%					4.2	4.6	8.0	7.8	3.7	6.7	3.0	0.7

***Treatment includes Sulfur (Thio-Sul) + Phosphorus (10-34-0)**

****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 interaction between nitrogen and potassium. N rates ranged from 0 to 200 lbs/A actual N. K rates ranged from 0 to 300 lbs/A actual K. In the 2 X 2 application, 40 lbs/A of actual N was applied as 6 gal/A 10-34-0 + 4 gal/A ATS + 9.5 gal/A of 28% UAN. 6 lf N applications were streamed on 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. Early harvest trial was harvested 10/3 and Late harvest trial was harvested on 10/25.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

N & K Fertility Trial Late Harvest

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 17
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: See individual treatments
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 261

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

No.	Treatment	Rate/A	Applic Timing	Applic Method	Vigor** 0-10		Net $/A	RWSA	RWST	T/A	% SUC	% CJP
					11-Aug	27-Jun						
1	Untreated Check				8.5	7.4	$1,337	7426	**333**	22.3	**21.8**	**96.1**
2	Nitrogen*	40 lbs	At Plant	2X2	8.8	**7.8**	$1,700	9611	**338**	28.5	**22.2**	**95.8**
3	Potassium	150 lbs	16-May	PPI	9.1	**8.4**	**$1,786**	10092	**340**	29.7	**22.5**	95.5
	Nitrogen*	40 lbs	At Plant	2X2								
4	Potassium	300 lbs	16-May	PPI	8.9	**8.3**	$1,661	9409	**335**	28.1	**22.0**	**95.8**
	Nitrogen*	40 lbs	At Plant	2X2								
5	Nitrogen*	40 lbs	At Plant	2X2	8.6	7.6	**$1,798**	**10360**	**337**	30.8	**22.1**	**95.8**
	Nitrogen	40 lbs	6 lf	Streamer								
6	Potassium	150 lbs	16-May	PPI	8.9	**7.8**	**$1,824**	**10512**	**343**	30.7	**22.5**	**95.8**
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	40 lbs	6 lf	Streamer								
7	Potassium	300 lbs	16-May	PPI	9.0	**8.3**	$1,777	10255	**339**	30.2	**22.4**	**95.6**
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	40 lbs	6 lf	Streamer								
8	Nitrogen*	40 lbs	At Plant	2X2	8.8	7.6	$1,731	9989	325	30.8	**21.7**	95.1
	Nitrogen	120 lbs	6 lf	Streamer								
9	Potassium	150 lbs	16-May	PPI	9.1	**8.3**	**$1,871**	**10773**	323	**33.3**	21.4	95.4
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	120 lbs	6 lf	Streamer								
10	Potassium	300 lbs	16-May	PPI	9.0	**8.1**	**$1,840**	**10608**	325	**32.7**	21.6	95.2
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	120 lbs	6 lf	Streamer								
11	Nitrogen*	40 lbs	At Plant	2X2	9.0	**8.0**	**$1,863**	**10722**	323	**33.2**	21.6	95.0
	Nitrogen	160 lbs	6 lf	Streamer								
12	Potassium	150 lbs	16-May	PPI	9.2	**8.1**	**$1,899**	**10926**	321	**34.0**	**21.7**	94.4
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	160 lbs	6 lf	Streamer								
13	Potassium	300 lbs	16-May	PPI	8.9	**8.0**	**$1,923**	**11066**	319	**34.7**	21.6	94.5
	Nitrogen*	40 lbs	At Plant	2X2								
	Nitrogen	160 lbs	6 lf	Streamer								
Average					8.9	8.0	$1,770	10134	331	30.7	21.9	95.4
LSD 5%					n.s.	0.7	140.1	778.4	12.7	2.2	0.8	0.5
CV%					5.2	5.8	5.5	5.4	2.7	4.9	2.6	0.4

***Treatment includes Sulfur (Thio-Sul) + Phosphorus (10-34-0)**

****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 interaction between nitrogen and potassium. N rates ranged from 0 to 200 lbs/A actual N. K rates ranged from 0 to 300 lbs/A actual K. In the 2 X 2 applications, 40 lbs/A of actual N was applied as 6 gal/A 10-34-0 + 4 gal/A ATS + 9.5 gal/A of 28% UAN. 6 lf N applications were streamed on as 28% UAN (40 lbs = 13 gal, 120 lbs = 40 gal, 160 lbs = 53 gal) Potassium was applied as Potassium (K20). No other nutrients were applied in this study. Early harvest trial was harvested 10/3 and Late harvest trial was harvested on 10/25.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

Foliar CHS Plant Health

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 18
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 254

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 Timing	Applic Method	Vigor* 0-10 11-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
3	UAN 28 % + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	At Plant	2X2	9.4	$1,716	10024	346	29.0	22.1	**97.2**
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr							
	WC-596 + WC-250	1 qt + 4.2	8-10 lf	Broadcast							
5	UAN 28 % + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	At Plant	2X2	9.4	$1,528	8990	335	26.8	21.8	96.4
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr							
	WC-597 + WC-121 + WC-250	1 pt + 1 pt + 4.2 fl oz	8-10 lf	Broadcast							
4	UAN 28 % + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	At Plant	2X2	9.4	$1,595	9343	336	27.7	21.6	**97.0**
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr							
	WC-597	1 p t	8-10 lf	Broadcast							
6	UAN 28 % + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	At Plant	2X2	9.3	$1,708	9982	346	28.9	22.3	**96.6**
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr							
	WC-496 + WC-250	1 qt + 4.2	8-10 lf	Broadcast							
1	UAN 28 % + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	At Plant	2X2	9.3	$1,536	8959	337	26.4	21.6	**97.1**
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr							
2	UAN 28 % + 10-34-0 + Thio-Sul	8 gal + 6 gal + 4 gal	At Plant	2X2	9.1	$1,616	9447	342	27.6	21.9	**97.2**
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr							
	WC-250	4.2 fl oz	8-10 lf	Broadcast							
Average					9.3	$1,616	9457	340	27.7	21.9	96.9
LSD 5%					n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.7
CV%					3.4	9.7	9.2	3.0	7.5	2.7	0.5

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

Comments: This study was designed to test CHS plant health products applied foliar compared to the standard treatment # 1. CHS products demonstrated trends for improvements in tonnage and RWST.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

CHS Sidedress

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 18
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: Medium **B:** Medium
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 254

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 Timing/ Date	Applic Method	Vigor* 0-10 11-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% PUR	B/100 26-May	B/100 10-Jun
1	UAN 28%	25 gal	16-May	PPI	9.4	$1,407	8925	**335**	26.6	**21.8**	96.4	**72.4**	253.0
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	UAN 28%	17 gal	6 lf	Streamer									
2	UAN 28%	25 gal	16-May	PPI	9.3	**$1,458**	**9228**	**331**	**27.9**	21.5	96.5	**72.4**	259.9
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	UAN 28% WC-596	17 gal 1 qt	6 lf	Streamer									
3	UAN 28%	25 gal	16-May	PPI	9.3	**$1,520**	**9570**	**332**	**28.8**	**21.7**	96.1	66.4	255.0
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	UAN 28% WC-597	17 gal 1 qt	6 lf	Streamer									
5	UAN 28%	25 gal	16-May	PPI	9.3	$1,373	8774	329	26.6	21.3	96.7	69.4	256.5
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	UAN 28% WC-101	17 gal 1 qt	6 lf	Streamer									
4	UAN 28%	25 gal	16-May	PPI	9.1	**$1,628**	**10194**	**343**	**29.7**	**22.4**	96.1	78.4	245.7
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	UAN 28% WC-647	17 gal 1 qt	6 lf	Streamer									
Average					9.3	$1,477	9338	334	27.9	21.7	96.3	71.8	254.0
LSD 5%					n.s.	179.6	997.5	11.4	2.3	0.8	n.s.	7.6	n.s.
CV%					4.3	7.9	6.9	2.2	5.3	2.2	0.5	6.9	5.6

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

Comments: This study was designed to test CHS products applied at sidedress timings with streamer nozzles. CHS products demonstrated some improvements in tonnage and $/A in this study.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

ICL Agrolution pHLow

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 17
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 260

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 Timing	Applic Method	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Dead B/100 ft	
					11-Aug							4-Aug	14-Jul
3	UAN 28% Agrolution pHLow Thio-Sul	11.5 gal 12 lb 4 gal	At Plant	2X2	**9.5**	**$1,783**	**10430**	335	**31.2**	**21.9**	**95.9**	2	**3**
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
1	UAN 28% Thio-Sul	12 gal 4 gal	At Plant	2X2	**9.5**	**$1,749**	**10134**	329	**30.8**	**21.6**	95.9	1	1
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
4	UAN 28% Agrolution pHLow Thio-Sul Moltop	10 gal 12 lb 4 gal 2 qt	At Plant	2X2	**9.3**	$1,701	10000	333	30.0	**21.9**	95.9	1	**2**
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
2	UAN 28% 10-34-0 Thio-Sul	10 gal 5 gal 4 gal	At Plant	2X2	9.1	$1,668	9715	325	29.9	21.2	**96.3**	2	**2**
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Pant	In-Furr									
Average					9.3	$1,725	10070	330	30.5	21.6	96.0	2	2
LSD 5%					0.3	64.7	359.3	n.s.	1.08	0.6	0.4	n.s.	1.8
CV%					2.5	3.1	2.9	2.6	2.9	2.3	0.3	95.0	80.5

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

Comments: This trial was designed to test ICL fertilizer products applied 2X2. Results were mixed in this study with some improvements found between treatments 2 and 3. Some treatments received additional nitrogen 2X2 at plant.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

ICL Polysulphate

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 18
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 35 lbs. 2X2 + 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 251

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 Timing	Applic Method	Vigor* 0-10 11-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	B/100 ft 10-Jun
2	KCl (Potash) Gypsum	3.36 lb 2.39 lb	16-May	PPI	9.6	**$1,676**	**10675**	333	**32.0**	21.9	95.7	251
	UAN 28% ATS 10-34-0	8 gal 4 gal 6 gal	18-May	2X2								
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	18-May	In-Furr								
5	KCl (Potash) Polysulphate	2.35 lb 4.32 lb	16-May	PPI	9.6	**$1,601**	**10597**	332	**31.9**	21.9	95.7	247
	UAN 28% ATS 10-34-0	8 gal 4 gal 6 gal	18-May	2X2								
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	18-May	In-Furr								
4	KCl (Potash) Polysulphate	2.57 lb 3.36 lb	16-May	PPI	9.5	**$1,685**	**10986**	335	**32.8**	22.1	95.6	255
	UAN 28% ATS 10-34-0	8 gal 4 gal 6 gal	18-May	2X2								
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	18-May	In-Furr								
1	KCl (Potash)	3.36 lb	16-May	PPI	9.3	**$1,605**	10275	336	30.6	22.1	95.8	251
	UAN 28% ATS 10-34-0	8 gal 4 gal 6 gal	18-May	2X2								
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	18-May	In-Furr								
3	KCl (Potash) Polysulphate	2.8 lb 2.39 lb	16-May	PPI	9.2	$1,543	10122	332	30.5	21.9	95.6	251
	UAN 28% ATS 10-34-0	8 gal 4 gal 6 gal	18-May	2X2								
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	18-May	In-Furr								
Average					9.4	$1,622	10531	334	31.6	22.0	95.7	251
LSD 5%					n.s.	123.7	687.4	n.s.	1.8	n.s.	n.s.	n.s.
CV%					3.7	5.0	4.2	1.7	3.7	1.2	0.4	5.9

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

Comments: This trial was designed to test a new fertilizer product from ICL, Polysulphate to determine if yield and sugar could be increased. Higher rates of Polysulphate resulted in tonnage improvements compared to treatment #1. Some treatments received additional nitrogen 2X2 at plant.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

MTS Fertility

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 17
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: None
Previous Crop: Soybeans

Rhizoc level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 258

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 Date**	Applic Method	Vigor*	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Dead Beets/100 ft	
					11-Aug							4-Aug	14-Jul
1	UAN 28% Soil Carbon	53 gal 1 gal	16-May	PPI	9.5	$1,643	**10415**	331	**31.4**	21.7	96.1	1	1
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	LX7	1 pt	C-H	Broadcast									
2	UAN 28% Soil Carbon	40 gal 1 gal	16-May	PPI	9.5	$1,574	**10321**	331	**31.2**	21.7	96.0	1	1
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	LX7	1 pt	C-H	Broadcast									
3	UAN 28% Soil Carbon	26.75 gal 1 gal	16-May	PPI	9.3	$1,607	**10227**	**337**	**30.4**	**22.0**	96.0	2	2
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	LX7	1 pt	C-H	Broadcast									
4	Soil Carbon	1 gal	16-May	PPI	9.3	$1,579	9434	**350**	27.0	**22.6**	96.5	2	2
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
	LX7	1 pt	C-H	Broadcast									
Average					9.4	$1,601	10099	337	30.0	22.0	96.1	1	2
LSD 5%					n.s.	n.s.	719.9	12.4	2.0	0.8	n.s.	n.s.	n.s.
CV%					3.6	6.6	5.8	3.0	5.3	2.8	0.4	82.5	67.1

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

****Application Dates:**

C - July 8
D - July 22
E - August 10
F - August 19
G - September 2
H - September 15

Comments: This trial was designed to test MTS fertility products for improvement in yield and sugar. Some treatments received additional nitrogen PPI.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Plant Health Trial DPH

SVREC - Richville, MI - 2022

Trial Quality: Very Good
Variety: C-G675
Planted: April 22
Harvested: October 11
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.3 **CEC:** 13.2
P: High **K:** Medium
Mn: High **B:** Medium
Added N: 120 lbs. PPI
Previous Crop: Wheat

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 13.46 in.
Beets/100 ft: 182

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 Timing	Applic Method	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					21-Jun							6-May	16-May
3	UAN 28% 10-34-0 Thio-Sul	8 gal 6 gal 4 gal	At Plant	2X2	7.5	$2,746	12342	**313**	39.5	**20.4**	96.4	95	184
	Azteroid FC 3.3 Mustang Maxx SP-1	6.3 fl oz 4 fl oz 3 gal	At Plant	In-Furr									
2	UAN 28% 10-34-0 Thio-Sul	8 gal 6 gal 4 gal	At Plant	2X2	7.5	$2,627	11765	304	38.7	20.0	96.1	96	179
	Azteroid FC 3.3 Mustang Maxx SP-1	6.3 fl oz 4 fl oz 2 gal	At Plant	In-Furr									
1	UAN 28% 10-34-0 Thio-Sul	8 gal 6 gal 4 gal	At Plant	2X2	7.3	$2,799	12049	**311**	38.8	**20.2**	96.6	99	181
	Azteroid FC 3.3 Mustang Maxx	6.3 fl oz 4 fl oz	At Plant	In-Furr									
4	UAN 28% 10-34-0 Thio-Sul	8 gal 6 gal 4 gal	At Plant	2X2	7.3	$2,685	12146	**316**	38.4	**20.6**	96.4	105	184
	Azteroid FC 3.3 Mustang Maxx SP-1	6.3 fl oz 4 fl oz 4 gal	At Plant	In-Furr									
Average					7.4	$2,714	12076	311	38.9	20.3	96.4	98.9	181.9
LSD 5%					n.s.	n.s.	n.s.	7.6	n.s.	0.5	n.s.	n.s.	n.s.
CV%					6.9	8.6	8.3	2.0	9.0	2.0	0.5	12.5	8.1

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

Comments: This trial was designed to test DPH products, SP-1 for yield improvements and crop safety when applied in-furrow. Stand loss was not observed with SP-1.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

Plant Health Helena

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Very Good
Variety: C-G675
Planted: May 19
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 226

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 Timing/ Date	Applic Method	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					23-Jun							10-Jun	8-Jul
2	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8 + 6 + 4 gal + 1 pt	At Plant	2X2	8.4	**$1,337**	**8923**	**332**	**26.8**	**22.2**	95.0	237	221
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr									
	UAN 28% + Receptor	40 gal + 2 pt	6 lf	Fluted Coulter									
6	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8.5 + 6 + 3 gal + 1 pt	At Plant	2X2	8.4	$1,197	**9041**	**332**	**27.2**	**21.9**	95.6	242	225
	Azteroid FC 3.3 + Mustang Maxx + Zypro + Nucleus O-Phos + Grounded	6.3 fl oz + 4 fl oz + + 8 oz + 2 gal + 1 pt	At Plant	In-Furr									
	UAN 28% + Nucleus 0-0-17 + Receptor + Zypro	38 + 2 gal + 2 pt + 1 pt	6 lf	Fluted Coulter									
	CoRoN Metra 25-0-0-5% Bn + Ele-Max HiPhos LC + Axiol BMZ + Fullscale + K-Leaf Versa 0-0-29	2 gal + 2 qt + 1 lb +1 pt + 2 qt	1-Aug	Broadcast									
7	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8.5 + 6 + 3 gal + 1 pt	At Plant	2X2	8.4	$1,071	8208	325	25.2	21.7	95.1	240	227
	Azteroid FC 3.3 + Mustang Maxx + Zypro + Nucleus O-Phos + Grounded	6.3 fl oz + 4 fl oz + + 8 oz + 2 gal + 1 pt	At Plant	In-Furr									
	UAN 28% + Nucleus 0-0-17 + Receptor + Zypro	38 + 2 gal + 2 pt + 1 pt	6 lf	Fluted Coulter									
	Ele-Max Hi-Phos LC + Axilo BMZ + Fullscale + K-Leaf Versa 0-0-29	2 qt + 1 lb + 1 pt + 2 qt	15-Aug	Broadcast									
8	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8.5 + 6 + 3 gal +1 pt	At Plant	2X2	8.4	$1,099	**8844**	**333**	**26.6**	**22.1**	95.2	248	233
	Azteroid FC 3.3 + Mustang Maxx + Zypro + Nucleus O-Phos + Grounded	6.3 fl oz + 4 fl oz + + 8 oz + 2 gal + 1 pt	At Plant	In-Furr									
	UAN 28% + Nucleus 0-0-17 + Receptor + Zypro	38 + 2 gal + 2 pt + 1 pt	6 lf	Fluted Coulter									
	CoRoN Metra 25-0-0-5% Bn + Ele-Max HiPhos LC + Axiol BMZ + Fullscale + K-Leaf Versa 0-0-29	2 gal + 2 qt + 1 lb +1 pt + 2 qt	1-Aug	Broadcast									
	Ele-Max Hi-Phos LC + Axilo BMZ + Fullscale + K-Leaf Versa 0-0-29	2 qt + 1 lb + 8 fl oz + 2 qt	15-Aug	Broadcast									
1	UAN 28% + 10-34-0 + Thio-Sul	8 + 6 + 4 gal	At Plant	2X2	8.3	**$1,221**	8094	324	25.0	21.5	95.5	241	218
	Azteroid FC 3.3 + Mustang Maxx	6.3 fl oz + 4 fl oz	At Plant	In-Furr									
	UAN 28%	40 gal	6 lf	Fluted Coulter									

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

No.	Treatment	Rate/A	Applic Timing/ Date	Applic Method	Vigor* 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					23-Jun							10-Jun	8-Jul
3	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8 + 6 + 4 gal + 1 pt	At Plant	2X2	8.3	**$1,290**	**8945**	328	**27.2**	21.7	95.5	247	223
	Azteroid FC 3.3 + Mustang Maxx + Zypro + Nucleus O-Phos + Grounded	6.3 fl oz + 4 fl oz + 8 oz + 2 gal + 1 pt	At Plant	In-Furr									
	UAN 28% + Receptor + Zypro	40 gal + 2 pt + 1 pt	6 lf	Fluted Coulter									
5	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8.5 + 6 + 3 gal + 1 pt	At Plant	2X2	8.3	**$1,283**	**9433**	**339**	**27.8**	**22.5**	95.2	241	230
	Azteroid FC 3.3 + Mustang Maxx + Zypro + Nucleus O-Phos + Grounded	6.3 fl oz + 4 fl oz + 8 oz + 2 gal + 1 pt	At Plant	In-Furr									
	UAN 28% + Nucleus 0-0-17 + Receptor + Zypro	38 + 2 gal +2 pt + 1 pt	6 lf	Fluted Coulter									
	CoRoN Metra25-0-0-5% Bn + Axilo BMZ + Fullscale + K-Leaf Versa 0-0-29	2 gal + 1 lb + 1 pt + 2 qt	1-Aug	Broadcast									
4	UAN 28% + 10-34-0 + Thio-Sul + Receptor	8.5 + 6 + 3 gal + 1 pt	At Plant	2X2	8.3	$1,054	8011	324	24.7	21.6	95.2	245	233
	Azteroid FC 3.3 + Mustang Maxx + Zypro + Nucleus O-Phos + Grounded	6.3 fl oz + 4 fl oz + 8 oz + 2 gal + 1 pt	At Plant	In-Furr									
	UAN 28% + Nucleus 0-0-17 + Receptor + Zypro	38 + 2 gal +2 pt + 1 pt	6 lf	Fluted Coulter									
	CoRoN Metra 25-0-0-5% Bn + K-Leaf Versa 0-0-29	2 gal + 2 qt	1-Aug	Broadcast									
Average					8.4	$1,194	8687	330	26.3	21.9	95.3	243	226
LSD 5%					n.s.	119.7	665.0	9.7	1.4	0.7	n.s.	n.s.	n.s.
CV%					3.6	6.8	5.2	2.0	3.7	2.1	0.4	4.4	7.8

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

Comments: This trial was designed to test Helena plant health products for safety when applied in-furrow and for yield and RWST increases. Multiple products and product combinations resulted in improvement in tonnage and RWST compaired to the standard treatment #1.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

Plant Health Trial

Laker Agronomy Field - Elkton, MI - 2022

Trial Quality: Good
Variety: C-G675
Planted: May 18
Harvested: October 25
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 12.4
P: Medium **K:** High
Mn: High **B:** High
Added N: 120 lbs. Sidedress
Previous Crop: Soybeans

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 10.55 in.
Beets/100 ft: 287

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 Timing/ Date	Applic Method	Vigor* 0-10		Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					11-Aug	23-Jun							26-May	10-Jun
12	**Sure Crop**				**9.5**	8.1	**$1,444**	**8950**	**348**	**25.7**	**22.9**	95.5	**73**	**248**
	UAN 28%	8 gal												
	10-34-0	6 gal	At Plant	2X2										
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	Sure Crop Foliar	1.25 gal	8-Jul	Broadcast										
	Sure Crop Foliar	1.25 gal	15-Jul	Broadcast										
	Sure Crop Foliar	1.25 gal	27-Jul	Broadcast										
	Sure Crop Foliar	1.25 gal	10-Aug	Broadcast										
7	**DPH**				**9.4**	8.2	**$1,400**	**8369**	338	**24.6**	22.2	**95.8**	**75**	**250**
	UAN 28%	8 gal												
	10-34-0	6 gal	At Plant	2X2										
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz												
	Mustang Maxx	4 fl oz	At Plant	In-Furr										
	SP-1	2 gal												
13	**Sure Crop**				**9.4**	8.4	**$1,411**	**8514**	**350**	**24.3**	**23.1**	95.5	**85**	**253**
	UAN 28%	8 gal	At Plant											
	10-34-0	6 gal	A	2X2										
	Thio-Sul	4 gal	A											
	Azteroid FC 3.3	6.3 fl oz	At Plant											
	Mustang Maxx	4 fl oz	B	In-Furr										
	Sure Crop Pop-up	3 gal	B											
3	**Azotic**				**9.3**	8.4	**$1,563**	**9231**	**350**	**26.3**	**23.2**	95.3	**75**	**248**
	UAN 28%	8 gal												
	10-34-0	6 gal	At Plant	2X2										
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	Envita	3.2 fl oz	6 lf	Broadcast										
4	**Aqueus**				**9.3**	8.3	**$1,421**	**8326**	**344**	**24.2**	**22.5**	**96.1**	**86**	**243**
	UAN 28%	8 gal												
	10-34-0	6 gal	At Plant	2X2										
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz												
	Mustang Maxx	4 fl oz	At Plant	In-Furr										
	Growthfull Soil	22 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 $.18 minus fertilizer and application cost.

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

No.	Treatment	Rate/A	Applic Timing/ Date	Applic Method	Vigor* 0-10		Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					11-Aug	23-Jun							26-May	10-Jun
10	**NutriAg**				**9.3**	8.3	**$1,470**	**8742**	**349**	**25.0**	**23.0**	**95.6**	**75**	**253**
	UAN 28% 10-34-0 Thio-Sul	8 gal 6 gal 4 gal	At Plant	2X2										
	Azteroid FC 3.3 Mustang Maxx Alexin	6.3 fl oz 4 fl oz 1 pt	At Plant	In-Furr										
	Alexin Roundup Ammonium Sulfate	1 pt 24 fl oz 17 lb/100 gal	6 lf	Broadcast										
	Alexin Roundup Ammonium Sulfate	1 pt 24 fl oz 17 lb/100 gal	12 lf	Broadcast										
16	**Gantec Inc.**				**9.3**	8.3	**$1,458**	**8566**	**341**	**25.1**	**22.5**	**95.6**	**76**	234
	UAN 28% 10-34-0 Thio-Sul	8 gal 6 gal 4 gal	At Plant	2X2										
	Azteroid FC 3.3 Mustang Maxx Gantac Pro 100	6.3 fl oz 4 fl oz 12 fl oz	At Plant	In-Furr										
17	**Gantec Inc.**				**9.3**	8.1	**$1,461**	**8693**	**351**	**24.8**	**23.0**	**95.8**	**82**	235
	UAN 28% 10-34-0 Thio-Sul	7 gal 5 gal 3 gal	At Plant	2X2										
	Azteroid FC 3.3 Mustang Maxx Gantac Pro 100	6.3 fl oz 4 fl oz 12 fl oz	At Plant	In-Furr										
	Gantac Pro 100	12 fl oz	12 lf	Broadcast										
	Gantac Pro 100	12 fl oz	8-Jul	Broadcast										
20	**Andersons Inc.**				**9.3**	8.4	$1,336	**8284**	**342**	**24.2**	**22.5**	**95.7**	**83**	**250**
	UAN 28% 10-34-0 Thio-Sul	8 gal 6 gal 4 gal	At Plant	2X2										
	Azteroid FC 3.3 Mustang Maxx Season Pass with MicroCarb Biopass	6.3 fl oz 4 fl oz 5 gal 1 pt	At Plant	In-Furr										
	Korrect Plus	1 gal	12 lf	Broadcast										
	Korrect Plus	1 gal	12-Sep	Broadcast										

*__Vigor__ 0 to 10 ratings, 10 is the best

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost.

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

No.	Treatment	Rate/A	Applic Timing/ Date	Applic Method	Vigor* 0-10		Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					11-Aug	23-Jun							26-May	10-Jun
2	**Azotic**				**9.3**	8.1	$1,333	7911	**340**	23.1	**22.5**	95.5	**73**	**255**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	Envita	3.2 fl oz												
6	**Aqueus**				**9.2**	8.3	$1,338	7976	**339**	23.4	**22.3**	95.7	**79**	**245**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	Growthfull Soil	22 oz												
	Growthfull	12.8 fl oz	15-Jul	Broadcast										
	Growthfull	12.8 fl oz	10-Aug	Broadcast										
8	**DPH**				**9.2**	8.1	$1,328	8050	**343**	23.5	**22.6**	95.6	**75**	**249**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	SP-1	3 gal												
9	**DPH**				**9.2**	8.2	**$1,426**	**8681**	**357**	**24.3**	**23.5**	95.5	67	**243**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	SP-1	4 gal												
15	**Sure Crop**				**9.2**	8.2	**$1,355**	**8131**	**341**	**23.7**	**22.5**	95.5	**76**	**248**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	4 gal												
	Sure Power-NK+2-0-20-6s	4 gal												
	Sure Grow-NS 9-0-0-20s	2 gal												
	Sure Activate	1 qt												
	Sure Plen-T Sweet	1 pt												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 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 $.18 minus fertilizer and application cost.

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

No.	Treatment	Rate/A	Applic Timing/ Date	Applic Method	Vigor* 0-10		Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					11-Aug	23-Jun							26-May	10-Jun
19	**Andersons Inc.**				**9.2**	8.3	$1,311	**8182**	**343**	**23.8**	**22.5**	**95.8**	**73**	**256**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	Season Pass with MicroCarb	5 gal												
	Biopass	1 pt												
	Over Pass 10-2-10	1 gal	12 lf	Broadcast										
	Korrect Plus	1 gal	12-Sep	Broadcast										
18	**Andersons Inc.**				**9.1**	8.6	**$1,434**	**8642**	**352**	**24.6**	**23.2**	95.5	**74**	**244**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	Season Pass with MicroCarb	5 gal												
	Biopass	1 pt												
5	**Aqueus**				8.9	8.3	**$1,369**	**8139**	**341**	**23.8**	**22.4**	**95.7**	**73**	**237**
	UAN 28%	8 gal	At Plant	2X2										
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 fl oz												
	Growthfull Foliar	12.8 fl oz	15-Jul	Broadcast										
	Growthfull Foliar	12.8 fl oz	10-Aug	Broadcast										
1	UAN 28%	8 gal	At Plant	2X2	8.9	8.2	$1,286	7568	**339**	22.2	**22.3**	**95.7**	**75**	**255**
	10-34-0	6 gal												
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz	At Plant	In-Furr										
	Mustang Maxx	4 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 $.18 minus fertilizer and application cost

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

Plant Health Trial

Laker Agronomy Field - Elkton, MI - 2022

No.	Treatment	Rate/A	Applic Timing/ Date	Applic Method	Vigor* 0-10		Net $/A	RWSA	RWST	T/A	% SUC	% CJP	Beets/100 ft	
					11-Aug	23-Jun							26-May	10-Jun
11	**NutriAg**				8.9	8.4	$1,219	7380	**341**	21.5	22.4	**95.7**	78	249
	UAN 28%	8 gal												
	10-34-0	6 gal	At Plant	2X2										
	Thio-Sul	4 gal												
	Azteroid FC 3.3	6.3 fl oz												
	Mustang Maxx	4 fl oz	At Plant	In-Furr										
	Alexin	1 qt												
	Roundup PowerMAX	24 fl oz												
	Ammonium Sulfate	17 lb/100	6 lf	Broadcast										
	Alexin	1 qt												
	Roundup PowerMAX	24 fl oz												
	Ammonium Sulfate	17 lb/100	12 lf	Broadcast										
	Alexin	1 qt												
14	**Sure Crop**				8.9	8.2	$1,213	7594	**344**	22.0	22.7	**95.6**	83	256
	UAN 28%	8 gal												
	10-34-0	4 gal												
	Sure Power-NK+2-0-20-6s	4 gal	At Plant	2X2										
	Sure Grow-NS 9-0-0-20s	2 gal												
	Sure Activate	1 qt												
	Sure Plen-T Sweet	1 pt												
	Azteroid FC 3.3	6.3 fl oz												
	Mustang Maxx	4 fl oz	At Plant	In-Furr										
	Sure Crop Pop-up	3 gal												
	Average				9.2	8.3	$1,379	8296	345	24.0	22.7	95.6	77	248
	LSD 5%				0.4	n.s.	209.3	1162.5	17.6	2.7	1.2	0.4	16.8	19.4
	CV%				3.0	3.1	10.7	9.9	3.6	8.0	3.6	0.3	15.5	5.5

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

Comments: This trial was designed to test multiple company's plant health products. Many of the products and treatments produced tonnage improvements and trend improvements in RWST compaired to the standard treatment #1.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fertilizer and application cost

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

Talc USA Soil Biological

A & G Ackerman Farms, Munger - 2022

Trial Quality:	Excellent	**Soil Type:**	Loam	**Rhizoc Control:**	Low levels: Quadris I.F. (6 oz) w/ Mustang (1 oz); Foliar: 10" band at 6-8 leaf (14 oz)
Variety:	C-G932NT	**Fertilizer:**	Fall: 300# potash, 200# MESZ PPI: 54 gal 28%, 6 gal Thiosulfate	**Cerc Control:**	Low levels: See below for materials
Planted:	April 29				
Harv/Samp:	Sept 22 / Sept 19	**Prev Crop:**	Wheat with clover		
Plot Size:	4 reps				
Row Spacing:	22 inch	**Weather:**	Good weather with adequate rainfall for most of season.	**Other Pests:**	N/A
Seeding Rate:	68,000				

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row		Dead Beets/ 1200Ft
							12 Day	32 Day	
Encompass + Inceptive	$2,448	9554	268	35.6	18.0	95.1	100	141	7
Check	$2,387	9314	265	35.1	17.8	95.0	112	156	4
MicroSurge + Inceptive	$2,314	9031	261	34.6	17.6	95.0	110	160	8
Average	$2,383	9300	265	35.1	17.8	95.0	107	152	6
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	2.9	2.9	2.5	1.5	2.0	0.2	14.2	12.2	51.6
p-value	0.0881	0.0881	0.3384	0.0881	0.3315	0.6879	0.3976	0.2256	0.3132

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 plant. 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. Sampling was done to determine the level of sugarbeet cyst nematode at this location, but none were found. The leafspot program was the same for all treatments: 6/28 EBDC + 20-20-20 + Boron, 7/10 Delaro + Proline + Novus, 7/29 Super Tin + Topsin + Boron + 20-20-20, 8/11 Provysol + Novus + Boron + Manganese, 8/30 Propulse + Boron + 20-20-20. All applications included an EBDC and a spreader/sticker.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA and the early delivery adjustments.

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

N.S. – not significant

Levesol Applied In-Furrow

Nancy and Dwight Bartle, Brown City - 2022

Trial Quality: Good
Variety: C-G049
Planted: April 30
Harv/Samp: Sept 26 / Sept 20
Plot Size: 4 reps
Row Spacing: 22 inch
Seeding Rate: 62,000

Soil Type: Loam
Fertilizer: PPI: 300# 33-0-0; 2x2: 10 gal 10-34-0, 10 gal 28%, 2 qt manganese, 1qt boron
Prev Crop: Oats w/ mixed cover crop
Weather: Very dry all season.

Rhiz Control: Very low levels: Quadris I.F. only (7 oz)
Cerc Control: Very low levels: See comments for materials.
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							13 Day	45 Day
Check	$1,830	7459	**246**	30.3	**16.8**	94.4	73	142
Levesol	$1,719	7008	234	29.9	16.1	94.2	76	146
Average	$1,775	7233	240	30.1	16.5	94.3	74	144
LSD 5%	N.S.	N.S.	9.3	N.S.	0.5	N.S.	N.S.	N.S.
CV %	3.6	3.6	1.7	2.4	1.3	0.1	17.5	15.4
p-value	0.0907	0.0907	0.0248	0.5526	0.0201	0.1118	0.6713	0.7128

Comments: Levesol, from CHS Agronomy, 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 7 oz/acre of Quadris. The Levesol treatment contained Quadris (7 oz/acre) and Levesol at 2 qt/acre. No significant differences were found between the Check and Levesol treatments for RWSA, tons/acre, or population, but the check was found to have significantly higher RWST and % Sugar. The leafspot materials were as follows: 7/10 EBDC (Roper) + Propulse, 8/10 Flint + EBDC (Roper).

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA and the early delivery adjustments.

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

N.S. – not significant

Maritime Foliar Applied Biological

Nancy and Dwight Bartle, Brown City - 2022

Trial Quality: Very Good
Variety: C-G021
Planted: May 9
Harv/Samp: Sept 26 / Sept 20
Plot Size: 5 reps
Row Spacing: 22 inch
Seeding Rate: 62,000

Soil Type: Loam
Fertilizer: PPI: 300# 33-0-0; 2x2: 10 gal 10-34-0, 10 gal 28%, 2 qt manganese, 1qt boron
Prev Crop: Corn - chisel plowed
Weather: Very dry all season.

Rhiz Control: Low levels: Quadris I.F. only (7 oz)
Cerc Control: Very low levels: see below for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP
Maritime	$1,804	7355	287	25.6	19.3	94.8
Check	$1,771	7217	291	24.8	19.5	94.9
Average	$1,788	7286	289	25.2	19.4	94.8
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.3	3.3	1.9	2.5	1.6	0.2
p-value	0.4096	0.4096	0.3152	0.1143	0.3632	0.8012

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 10 at 2 qt per acre and once on August 19 at 1 qt per acre. Both times it was applied with Cercospora leafspot fungicides. At this location, no significant increases in RWST or % Sugar were observed. Other than the addition of Maritime, the leafspot program was the same for both treatments: 7/10 EBDC (Roper) + Propulse, 8/10 Flint + EBDC (Roper), 8/19 Super Tin + Topsin + EBDC (Roper).

Gross $/A: Gross dollars per acre calculated using $0.18 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

Maritime Foliar Applied Biological

LAKKE Ewald Farms, Unionville - 2022

Trial Quality:	Good	**Soil Type:**	Loam	**Rhiz Control:**	Low levels: I.F. Quadris (8 oz) & 10 leaf (14 oz)
Variety:	C-932NT	**Fertilizer:**	2x2: 13.625 gal 28%, 4 gal 10-34-0, 3 gal Thiosul, 1 qt Mn, 1 pt B; PPI: 27 gal of 28%		
Planted:	April 23			**Cerc Control:**	Low levels: See comments for materials
Harv/Samp:	Nov 8 / Oct 24				
Plot Size:	6 reps	**Prev Crop:**	Wheat & clover		
Row Spacing:	20 inch	**Weather:**	Dry season. Not as bad as some other areas	**Other Pests:**	N/A
Seeding Rate:	61,500				

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP
Maritime	$1,986	11032	303	36.4	20.1	95.6
Check	$1,969	10939	304	36.0	20.1	95.5
Average	$1,977	10986	303	36.2	20.1	95.6
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	4.1	4.1	1.1	3.8	0.9	0.3
p-value	0.7390	0.7390	0.8724	0.6791	0.9498	0.3058

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 6 at 2 qt per acre and once on August 22 at 1 qt per acre. Both times it was applied with Cercospora leaf spot fungicides. No differences were found in this trial between the Maritime and check strips. The beet stand was a little thinner than ideal, but still adequate. This may have contributed to trial variability. Other than the addition of Maritime, the leafspot program was the same for both treatments: 6/23 EBDC, 7/6 Provysol + 1 pt Max-in Boron, 7/25 Super Tin, 8/9 Priaxor + Topsin, 8/22 Inspire XT + 1 pt Max-in Boron, 9/8 Super Tin, 9/30 Proline. All applications except the last one included an EBDC. All applications included Masterlock.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Maritime Foliar Applied Biological

M & K Farms, Quanicassee - 2022

Trial Quality:	Very Good	**Soil Type:**	Loam	**Rhiz Control:**	Low levels: Quadris I.F. (8 oz) & 8-10 leaf (11 oz)
Variety:	B-1606N	**Fertilizer:**	Fall: VR potash; 2x2: 17 gal 28% + 5 gal 10-34-0 + micros; S.D. 43 gal 28%		
Planted:	April 23			**Cerc Control:**	Low / moderate level: See comments for materials
Harv/Samp:	Oct 27 / Oct 20				
Plot Size:	7 reps	**Prev Crop:**	Corn		
Row Spacing:	28 inch	**Weather:**	Dry season, but not as bad as other locations	**Other Pests:**	N/A
Seeding Rate:	53,000				

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP
Maritime	$2,028	11266	290	38.8	18.9	96.5
Check	$1,969	10940	284	38.6	18.5	96.6
Average	$1,999	11103	287	38.7	18.7	96.6
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.0	3.0	2.7	1.5	2.5	0.2
p-value	0.1194	0.1194	0.1493	0.5456	0.1557	0.4958

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 7 at 2 qt per acre and on September 7 at 1 qt per acre. For both applications, the cooperator made his leafspot application and immediately followed it with applying the Maritime to the test strips. No statistical differences were found at the 95% confidence level, but the Maritime treatments would show an increase for Gross Revenue, RWSA, RWST, and % Sugar at the 80% confidence level. The leafspot program was as follows: 6/24 EBDC, 7/7 Provysol, 7/25 Super Tin, 8/7 Delaro + Proline, 8/23 Super Tin, 9/7 Inspire XT. All applications included EBDC and MasterLock.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Foliar Applied Boron

Gerstenberger Farms Inc., Sandusky - 2022

Trial Quality: Very Good
Variety: B-1703
Planted: May 8
Harv/Samp: Nov 9 / Nov 9
Plot Size: 5 reps
Row Spacing: 20 inch
Seeding Rate: 68,000

Soil Type: Loam
Fertilizer: 2x2: 20 gal 18-14-0, 0.6 B-0.29 Mn; Streamed 20 gal of 28% on June 20
Prev Crop: Soybeans
Weather: Dry throughout the season.

Rhiz Control: Low levels: Excalia broadcast (2 oz/acre)
Cerc Control: Very low levels: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP
Check	$1,817	10093	317	31.9	20.7	96.1
Boron	$1,758	9768	316	30.9	20.6	**96.3**
Average	$1,788	9930	316	31.4	20.7	96.2
LSD 10%	N.S.	N.S.	N.S.	N.S.	N.S.	0.1
CV %	4.8	4.8	1.1	4.3	0.8	0.1
p-value	0.3406	0.3406	0.7348	0.3434	0.8425	0.0526

Comments: This trial was part of a collaborative project between Sugarbeet Advancement and Dr. Kurt Steinke, Lacie Thomas, and Dr. Jaime Willbur of Michigan State University. The goal of this trial was to examine the potential benefits of foliar applied boron for Cercospora leafspot management, yield, and quality. This was a continuation of a project done last year at the Saginaw Valley Research and Extension Center. See pages 60-63 in the 2021 REACh Research Results book for last year's results. The boron product used in this study was SprayBor, a 16.5% boron product made by NutriAg and distributed by Wilbur-Ellis. SprayBor was applied at a rate of 0.5 lb/acre with each CLS fungicide application. While the impact of SprayBor on CLS management was a central part of this study, the level of CLS at this location was never high enough to rate. Yield data was still collected from the treatments, and even though most metrics were not statistically different, the purity was significantly better for the boron treatment at the 90% confidence level. This test was one of two boron tests SBA conducted this year, and in each case the boron treatment had significantly better purity than the check at the 90% confidence level. Soil test levels: B=0.7ppm (medium), P=50ppm (very high), K=115ppm (medium), OM=2.2, pH=6.9, CEC=7.6. The leafspot program was as follows: 7/2 Delaro + Proline, 7/27 Super Tin + Topsin, 8/10 Provysol, 8/27 Topguard. All applications included EBDC + MasterLock.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Foliar Applied Boron

J & L Gremel Farms, Sebewaing - 2022

Trial Quality: Excellent
Variety: C-G932NT
Planted: April 29
Harv/Samp: Oct 16 / Oct 16
Plot Size: 6 reps
Row Spacing: 20 inch
Seeding Rate: 64,000

Soil Type: Loam
Fertilizer: Fall: V.R. P & K; PPI: 28% for 140# N
Prev Crop: Wheat & radish
Weather: Very dry season

Rhiz Control: Very low level: Quadris I.F. (8 oz), Excalia broadcast (2 oz)
Cerc Control: Very low level: See comments
Other Pests: Low level of fusarium

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP
Boron	$2,064	10271	307	33.4	20.2	**96.3**
Check	$2,037	10135	303	33.4	19.9	96.1
Average	$2,050	10203	305	33.4	20.0	96.2
LSD 10%	N.S.	N.S.	N.S.	N.S.	N.S.	0.2
CV %	2.3	2.3	1.5	1.2	1.3	0.1
p-value	0.3595	0.3595	0.1880	0.9592	0.1430	0.0519

Comments: This trial was part of a collaborative project between Sugarbeet Advancement and Dr. Kurt Steinke, Lacie Thomas, and Dr. Jaime Willbur of Michigan State University. The goal of this trial was to examine the potential benefits of foliar applied boron for Cercospora leafspot management, yield, and quality. This was a continuation of a project done last year at the Saginaw Valley Research and Extension Center. See pages 60-63 in the 2021 REACh Research Results book for last year's results. The boron product used in this study was SprayBor, a 16.5% boron product made by NutriAg and distributed by Wilbur-Ellis. SprayBor was applied at a rate of 0.5 lb/acre with each CLS fungicide application. While the impact of SprayBor on CLS management was a central part of this study, the level of CLS at this location was never even high enough to rate. Yield data was still collected from the treatments, and even though most metrics were not statistically different, the purity was significantly better for the boron treatment at the 90% confidence level. This test was one of two boron tests SBA conducted this year, and in each case the boron treatment had significantly better purity than the check at the 90% confidence level. Soil test levels: B=1.7ppm (high), P=62ppm (very high), K=163ppm (high), OM=3.2, pH=7.7, CEC=13.7. The leafspot program was as follows: 6/27 EBDC, 7/5 Proline, 7/20 Super Tin, 8/3 Inspire XT, 8/17 Priaxor, 8/31 Tin, 9/14 Badge. All except the last applications included EBDC + MasterLock.

Gross $/A: Gross dollars per acre calculated using $0.18 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

Envita Biological

Harrington Farms Inc., Akron - 2022

Trial Quality:	Excellent	**Soil Type:**	Loam	**Rhiz Control:**	Low levels: 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)
Variety:	B-1606N	**Fertilizer:**	Fall: 300# potash, 50# MAP; 2x2: 12 gal 28% + 5 gal 10-34-0 + Thio + micros; S.D.: see below		
Planted:	May 8				
Harv/Samp:	Oct 29 / Oct 20				
Plot Size:	5 reps	**Prev Crop:**	Wheat w/ clover & alfalfa	**Cerc Control:**	Low levels: See comments for materials.
Row Spacing:	28 inch	**Weather:**	Abnormally dry during summer, not as bad as some areas.		
Seeding Rate:	54,000			**Other Pests:**	Sugarbeet cyst nematode

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							11 Day	37 Day
Check	$2,008	11155	332	33.6	21.5	96.8	151	214
Envita	$1,974	10969	334	32.8	21.6	96.9	143	210
Average	$1,991	11062	333	33.2	21.5	96.8	147	212
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.5	3.5	0.9	2.7	0.8	0.1	7.4	5.2
p-value	0.4944	0.4944	0.3477	0.2475	0.3734	0.2510	0.3396	0.5291

Comments: Envita is a biological product from Azotic Technologies. It is a nitrogen-fixing bacteria which the manufacturer claims is compatible with a number of crops, including sugarbeets. In theory, this bacteria grows systemically within the plant, providing a sustainable, season-long supply of nitrogen for the plant which results in higher yields. Sugarbeet Advancement had two trials looking at Envita this year. In this trial there were two treatments, Envita and the check. The Envita treatment had Envita applied twice, once in-furrow at a rate of 3.2 oz/acre with Quadris, and a foliar application on June 19 at 3.2 oz/acre banded with Quadris. Both treatments had the same starter fertilizer, but the Envita treatment only received 26 gpa of 28% during side dressing, while the check received 35 gpa. Thus, the check received a total of 148.2# of nitrogen, while the Envita treatment received 122.1# of nitrogen. No significant differences were found between the Envita and check treatments. The leafspot materials were as follows: 6/29 Provysol + EBDC + Manganese, 7/15 Super Tin + Topsin, 8/22 Inspire + EBDC + Boron, 8/18 Super Tin + Priaxor, 9/1 Proline + EBDC + Boron, 9/16 Super Tin + EBDC. All applications included MasterLock.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Envita Biological

Richmond Brothers, Pigeon - 2022

Trial Quality: Very good
Variety: C-G021
Planted: May 11
Harv/Samp: Nov 10 / Nov 10
Plot Size: 4 reps
Row Spacing: 22 inch
Seeding Rate: 72,000

Soil Type: Loam
Fertilizer: 2x2: 7 gal 28%, 10 gal 10-34-0, 4 gal Thiosul, 2 qt Mn, 1.5 qt B. See comments for N
Prev Crop: Wheat w/ radish & oats
Weather: Very dry all season, including harvest

Rhiz Control: Low levels: AZteroid I.F. (3.2 oz w/ 4 oz Fastac) & foliar (9.6 oz)
Cerc Control: Very low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							8 Day	33 Day
Check Low Nitrogen	$1,795	9973	334	29.9	21.9	96.0	—	221
Envita Foliar	$1,751	9728	331	29.4	21.7	96.0	—	225
Envita I.F. and Foliar	$1,736	9644	330	29.2	21.6	96.0	—	226
Check Full Nitrogen	$1,716	9532	329	29.0	21.6	96.1	66	221
Envita I.F.	$1,704	9466	331	28.6	21.7	96.0	54	222
Average	$1,740	9669	331	29.2	21.7	96.0	60	223
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.2	3.2	1.3	3.1	1.1	0.2	38.9	15.5
p-value	0.2287	0.2287	0.5749	0.3990	0.6155	0.8109	0.4157	0.9993

Comments: Envita is a biological product from Azotic Technologies. It is a nitrogen-fixing bacteria which the manufacturer claims is compatible with a number of crops, including sugarbeets. In theory, this bacteria grows systemically within the plant, providing a sustainable, season-long supply of nitrogen for the plant which results in higher yields. Sugarbeet Advancement had two trials looking at Envita this year. This trial had five treatments, which include: Envita applied in-furrow, Envita applied foliar, both applications of Envita, a check with the full rate of nitrogen, and a check with a low rate of nitrogen. All of the Envita treatments and the low rate check received 100# of nitrogen by the 2x2 starter and 20 gallon of 28% pre-plant incorporated. The full nitrogen check received 145# of nitrogen by the starter, PPI, and an additional 15 gallon of 28% streamed on June 2. All treatments received additional nitrogen by 3 applications of 80 oz/acre of NDemand applied with the leafspot fungicides. The in-furrow application of Envita was applied at 3.2 oz/acre with the in-furrow AZteroid, and the foliar application of Envita was banded at 2.0 oz/acre with AZteroid. No differences were found, including between the low N rate check and the full N rate check. This was a very dry year at this location and nitrogen was likely not the yield limiting factor. The leafspot program was as follows: 1. Provysol, 2. Super Tin + Headline, 3. Provysol. All applications included an EBDC, 80 oz/ac of NDemand, 20 oz/ac of Boron, Reguard and Crosshair.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Wex Wetting Agent, Location 1

D & B Karg Farms, Harbor Beach - 2022

Trial Quality: Excellent
Variety: B-1703
Planted: May 9
Harv/Samp: Oct 27 / Oct 21
Plot Size: 5 reps
Row Spacing: 22 inch
Seeding Rate: 58,000

Soil Type: Loam
Fertilizer: 2x2: 48# N, 40# P, 15# K; S.D. 80# N
Prev Crop: Wheat w/ radish
Weather: Very dry throughout season.

Rhiz Control: Very low levels: Quadris I.F. (7 oz) w/ Mustang (3 oz); Foliar: 7" band at 8 leaf with Quadris (14 oz)
Cerc Control: Very low levels: See comments for materials.
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. 31 Day
Wex	$2,007	11152	325	34.4	21.2	96.2	216
Check	$1,976	10979	317	34.7	20.7	96.1	**220**
Average	$1,992	11066	321	34.6	20.9	96.2	218
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	3.2
CV %	1.8	1.8	1.9	0.4	1.6	0.3	1.0
p-value	0.2408	0.2408	0.0763	0.0703	0.0797	0.3594	0.0278

Comments: Wex is a multipurpose wetting agent and non-ionic surfactant produced by Conklin Company Inc. This product can be used as a surfactant to help improve the efficacy of liquid fertilizer and pesticides. Additionally, it can be used as a soil amendment to help stimulate root development and improve water and nutrient uptake thanks to its nutrient-related action technology. In this test it was used as a soil amendment, being applied as a broadcast spray at a rate of 2 qt per acre within a few days after planting. At this location, no significant yield differences were observed between the Wex and check treatments. The leafspot program was as follows: 1. Delaro + Proline + EBDC 2. EBDC 3. Super Tin + Topsin + EBDC 4. Proline + EBDC 5. EBDC. Tons per acre, RWSA, and gross revenue had 5 reps, the other variables had 6 reps.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Wex Wetting Agent, Location 2

D & B Karg Farms, Harbor Beach - 2022

Trial Quality:	Excellent	**Soil Type:**	Loam	**Rhiz Control:**	Very low levels: Quadris I.F. (7 oz) w/ Mustang (3 oz); Foliar: 7" band at 8 leaf with Quadris (14 oz)
Variety:	B-1941	**Fertilizer:**	2x2: 48# N, 40# P, 15# K; S.D. 80# N		
Planted:	May 8				
Harv/Samp:	Oct 29 / Oct 21				
Plot Size:	5 reps	**Prev Crop:**	Wheat w/ radish	**Cerc Control:**	Very low levels: See comments for materials.
Row Spacing:	22 inch	**Weather:**	Very dry throughout season.		
Seeding Rate:	58,000			**Other Pests:**	N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. 32 Day
Wex	$2,162	12011	305	39.2	20.1	96.2	224
Check	$2,152	11958	306	39.0	20.2	96.2	222
Average	$2,157	11985	306	39.1	20.1	96.2	223
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	0.8	0.8	0.9	0.8	0.7	0.2	2.2
p-value	0.4512	0.4512	0.5924	0.4003	0.2742	0.9949	0.5539

Comments: Wex is a multipurpose wetting agent and non-ionic surfactant produced by Conklin Company Inc. This product can be used as a surfactant to help improve the efficacy of liquid fertilizer and pesticides. Additionally, it can be used as a soil amendment to help stimulate root development and improve water and nutrient uptake thanks to its nutrient-related action technology. In this test it was used as a soil amendment, being applied as a broadcast spray at a rate of 2 qt per acre within a few days after planting. At this location, no significant differences were observed between the Wex and check treatments. The leafspot program was as follows: 1. Delaro + Proline + EBDC 2. Super Tin + EBDC 3. Domark + EBDC. Tons per acre, RWSA, and gross revenue had 5 reps, the other variables had 6 reps.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Nitrogen Stabilizers

Richmond Brothers, Pigeon - 2022

Trial Quality: Excellent
Variety: C-G675
Planted: May 11
Harv/Samp: Nov 12 / Nov 12
Plot Size: 6 reps
Row Spacing: 22 inch
Seeding Rate: 72,000

Soil Type: Loam
Fertilizer: 2x2: 7 gal 28%, 10 gal 10-34-0, 4 gal Thiosul, 2 qt Mn, 1.5 qt B. See comments for N
Prev Crop: Wheat w/ radish & oats
Weather: Very dry all season, including harvest

Rhiz Control: Low levels: AZteroid I.F. (3.2 oz w/ 4 oz Fastac) & foliar (9.6 oz)
Cerc Control: Very low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. 33 Day
HumicBlaster	$1,651	9173	330	27.8	21.5	96.7	234
Check	$1,638	9102	331	27.5	21.6	96.8	232
NDure Triple Dry	$1,637	9092	329	27.6	21.4	96.8	230
Average	$1,642	9122	330	27.6	21.5	96.8	232
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	2.0	2.0	1.6	1.8	1.4	0.1	4.9
p-value	0.7229	0.7229	0.8593	0.6518	0.8098	0.9140	0.8837

Comments: This trial was done to evaluate the yield and quality impacts of the nitrogen stabilizer products HumicBlaster and NDure. Morgan's HumicBlaster, by Morgan Composting Inc., is a humic acid product designed to help soils hold nutrients and water more effectively, and to increase microbial activity within the soil. NDure Triple Dry is a nitrogen stabilizer made by Wilbur -Ellis which is intended to reduce nitrogen loss due to volatilization, leaching, and denitrification. All treatments received the same amount of nitrogen, which included 40# of nitrogen at planting with the 2x2, another 60# of nitrogen the day after planting in the form of 20 gpa of streamed 28%, and a final application on June 2 which was 45# of nitrogen in the form of 15 gpa of streamed 28%. In all, each treatment received a total of 140# of nitrogen. Blaster and NDure were applied with the May 11 and June 2 applications, at a rate of 1 gallon of Blaster per 20 gallons of 28% and 8 lb of NDure per 100 gallons of 28%. The check received no nitrogen stabilizer. No statistical differences were found between the three treatments. It was a very dry year at this location and nitrogen was likely not the yield limiting factor. The leafspot program was as follows: 1. Provysol, 2. Priaxor, 3. Inspire XT, 4. Super Tin, 5. Topguard + Headline, 6. EBDC. All applications included an EBDC, 40 oz/ac of NDemand, 10 oz/ac of boron, Reguard and Crosshair.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Pop-up Fertilizer with AZteroid

Shaffner Brothers, Freeland - 2022

Trial Quality: Good
Variety: C-G021
Planted: April 26
Harv/Samp: Sept 20/Sept 19
Plot Size: 7 reps
Row Spacing: 22 inch
Seeding Rate: 62,000

Soil Type: Loam
Fertilizer: Fall: 1 ton gypsum, 250# potash; 2x2x2: 20 gal 15-16-1 w/ Zn, Mn, S, B; PPI: Urea/AMS 100#N
Prev Crop: Wheat w/ clover
Weather: Very good weather

Rhiz Control: Low/moderate: Azteroid I.F. only (5.3 oz). See treatments
Cerc Control: Low level but starting to increase at harvest: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							13 Day	36 Day
Popup + AZteroid	$2,282	8711	223	39.0	15.4	94.8	55	157
AZteroid Only	$2,183	8334	220	37.8	15.2	94.8	56	169
Average	$2,233	8523	222	38.4	15.3	94.8	56	163
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	5.3	5.3	2.4	3.8	1.9	0.2	51.0	25.1
p-value	0.1695	0.1695	0.3500	0.1502	0.3512	0.9242	0.9614	0.6366

Comments: This trial was done to look at potential benefits of using pop-up fertilizer with AZteroid fungicide. AZteroid fungicide is an azoxystrobin, similar to Quadris, that has better mixing compatibility with fertilizer. There is a lot of interest in including pop-up fertilizer when growers are already setup to T-band fungicide for Rhizoctonia control. SBA has done several trials in 2020 and 2021 looking at different pop-up products mixed with AZteroid. In no trial was there found a statistical increase in yield and quality. One of the products tested was Great Start from Wilbur Ellis. In 2020 and 2021, Great Start was numerically but not statistically higher than the AZteroid only treatments (See page 88 and page 90 of the 2020 and 2021 REACh Results books). In this trial, Great Start was T-band applied in-furrow at 2.7 gal/acre with AZteroid at 5.3 oz/acre. The treatments were mixed with water for a total application volume of 10 gal/acre. For a while after emergence, the pop-up treatments were visually larger than the AZteroid only treatments. This is the first visual difference observed in any of the T-band pop-up trials that SBA has performed in the last 3 years. Yield and quality were not statistically different at the 95% confidence level, but tons/acre, RWSA, and gross $/acre were higher at the 80% confidence level. Soil test levels: P=high, K=medium, Mg=high, Ca=medium, S, Zn, Fe, Cu, B=high, Mn=medium, %OM=3.2, pH=7.8, CEC=10.4. Leafspot program was as follows: 7/12 Super Tin + EBDC + Reguard, 8/9 Provysol + Priaxor + Cohere, 9/7 Super Tin + EBDC + Vigil + Cohere.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA and the early delivery adjustments.

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

N.S. – not significant

Nitrogen Rate Following Clover

VanDenBoom Farms, Munger - 2022

Trial Quality: Very Good
Variety: C-G932NT
Planted: April 29
Harv/Samp: Oct 28 / Oct 24
Plot Size: 3 reps
Row Spacing: 28 inch
Seeding Rate: 56,000

Soil Type: Loam
Fertilizer: Fall: Potash 270#; 2x2: 42#-10#-2#-11#S-.2#Zn + 1 pt B & 1 qt Mn; S.D.: See comments
Prev Crop: Wheat / clover
Weather: Dry at times, but not as bad as other locations.

Rhiz Control: Very low level: Quadris I.F. (6.4 oz + 4 oz Mustang) & foliar (11 oz)
Cerc Control: Low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP
125 lbs N	$2,306	12814	306	41.9	20.2	96.0
200 lbs N	$2,272	12621	298	42.4	19.7	96.1
175 lbs N	$2,262	12565	297	42.4	19.7	95.6
150 lbs N	$2,233	12406	304	40.8	20.1	95.9

Average	$2,268	12602	301	41.9	19.9	95.9
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	3.0	3.0	1.8	1.7	1.5	0.3
p-value	0.6378	0.6378	0.1974	0.1045	0.1491	0.3170

Comments: This trial was done to investigate nitrogen rates following wheat with a clover cover crop. The amount of nitrogen supplied by a clover cover crop is difficult to predict, but estimates of credit often range from 30-60 lbs. Previous trials with clover have shown increases in tonnage but are often accompanied by lower quality. The clover crop for this trial was described by the grower as average. The rates shown in the table are the total nitrogen which included the 2x2 starter N (42# of N) and the remainder was applied by sidedress coulter cart. While the results of this test were not statistically different, the higher nitrogen rates tend to have a slightly higher yield and lower percent sugar than the lower nitrogen rates. **The gross $/A does not reflect the cost of nitrogen.** This location was dry at times, but not as bad as many other areas. Soil test levels: P=84ppm, K=178 ppm, OM=3.5, pH=7.8, CEC=15.9. The leafspot program was as follows: 6/23 EBDC, 7/6 Inspire XT, 7/25 Super Tin, 8/5 Provysol, 8/18 Super Tin, 9/1 Delaro + Proline, 9/16 Tin. All applications included EBDC & MasterLock.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Pop-up Fertilizer Delivery

Wishowski Farms, Auburn - 2022

Trial Quality: Fair
Variety: SX-2295
Planted: April 29
Harv/Samp: Nov 8 / Oct 19
Plot Size: 6 reps
Row Spacing: 30 inch
Seeding Rate: 52,000

Soil Type: Sandy Loam
Fertilizer: Fall: 200# Potash; 2x2: 40#-18#-7#-3.5S + Mn & Zn; S.D.: 42 gal of 28% + S & B; See comments
Prev Crop: Corn
Weather: Periods of dry, but generally good weather

Rhiz Control: Low level: No azoxystrobin in-furrow. foliar Quadris (9.6 oz)
Cerc Control: Low level: See comments for materials
Other Pests: N/A

Treatment	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Populations 100 Ft. of Row	
							13 Day	33 Day
Y Dribble	$1,514	8412	287	29.3	18.8	97.0	52	165
Check	$1,411	7838	285	27.5	18.7	96.9	56	176
T-band	$1,375	7638	285	26.7	18.7	97.0	70	172
Average	$1,433	7963	286	27.8	18.7	97.0	59	171
LSD 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
CV %	9.0	9.0	2.0	8.2	1.9	0.2	20.8	6.8
p-value	0.2018	0.2018	0.8165	0.1871	0.9186	0.8058	0.0642	0.2912

Comments: This trial was done to compare the delivery method of pop-up in-furrow fertilizer by either Y dribbling in the side of the seed trench or T-band over the trench. In 2018 SBA performed a trial on a sandy soil type that showed a large and statistical increase to using Y dribbled pop-up in-furrow fertilizer in the seed trench. Since then, SBA has done several trials using in-furrow fertilizer with no statistical increases. All of these trials have been T-band applied so that the fertilizer could be mixed with AZteroid fungicide. AZteroid is azoxystrobin similar to Quadris for control of Rhizoctonia, but has better mixing compatibility with fertilizer. Since the results from T-band pop-up have not shown consistent benefits, it led to the question of whether dribbling will cause a more consistent benefit. All treatments in this trial also received 2x2 starter fertilizer. The pop-up treatment was in addition to the 2x2 starter. For the dribble treatments, the grower used a Keeton Seed Firmer with a Y split at the end to deliver the pop-up fertilizer to the side wall near the bottom of the trench. It is important to note that no in-furrow fungicide was used for any treatment. The impacts of Y dribbled in-furrow fungicide on seed are not fully understood. The pop-up mixture that was used for both treatments was the same and included 2 gal of Nachurs Triple Option, 2.5 gal of water, 1 qt of Sure Crop Plen-T Sweet, 1 pt Puric FC. The mixture was delivered with a constant pressure pump, not a piston type often used for fertilizer. No yield or quality metrics were significant at the 95% confidence level, however the Y dribbled pop-up tonnage was higher than the T-band at 80% confidence. This field had some soil variability between sandy loam and loam which caused some higher measurement variation. Soil test levels: P=50 (very high), K=130 (medium), Mg=160 (high), Ca=1000 (medium), S, Mn, B (medium), Zn (high), pH=7.0, CEC=6.7, OM=2.0. The leafspot program was as follows: 1. EBDC, 2. Inspire XT, 3. Super Tin, 4. Topguard, 5. Super Tin. All applications included EBDC & Reguard.

Gross $/A: Gross dollars per acre calculated using $0.18 per pound of RWSA.

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

N.S. – not significant

Clover vs Radish Trial

Sylvester Farms, Fairgrove - 2022

Trial Quality: Very Good
Variety: C-G752NT
Planted: April 29
Harv/Samp: Oct 30 / Oct 20
Plot Size: 6 reps
Row Spacing: 20 inch
Seeding Rate: 64,000

Soil Type: Loam
Fertilizer: 2x2: 8 gal 28%, 5 gal 10-34-0, 7 gal Thiosul, 1 qt B, 1 qt Mn; PPI: 40 gal 28%
Prev Crop: Wheat - see treatments
Weather: Dry at times, but not as bad as other locations.

Rhiz Control: Low level: Quadris I.F. (12 oz); Foliar (8 leaf at 12 oz)
Cerc Control: Low level: 7 applications
Other Pests: Sugarbeet cyst nematode

Treatment	Net $/A	Gross $/A	RWSA	RWST	T/A	% Sugar	% CJP	Popula 100 Ft. 32 Day	Dead Beets/ 1200Ft	Sugarbeet Cyst Nematode Cysts	Eggs	J2's
Radish	**$1,913**	**$2,001**	**11117**	315	**35.3**	20.4	96.9	136	**5**	5	107	37
Check	$1,820	$1,830	10169	307	33.1	20.0	96.8	129	**18**	10	253	67
Clover	$1,815	$1,840	10222	307	33.3	20.0	96.9	146	35	5	170	47
Average	$1,849	$1,891	10503	310	33.9	20.1	96.8	137	19	7	177	50
LSD 5%	59.4	59.4	330.1	N.S.	1.1	N.S.	N.S.	N.S.	15.1	N.S.	N.S.	N.S.
CV %	2.5	2.5	2.5	2.8	2.7	2.4	0.3	17.5	61.5	95.7	74.1	58.1
p-value	0.0079	0.0001	0.0001	0.2748	0.0034	0.3221	0.9419	0.4868	0.0039	0.2426	0.2010	0.2459

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 oilseed 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 2021, and the oilseed radish (Defender) was planted with a drill following wheat harvest in the summer of 2021. The check had a herbicide application to control weeds. 2022 was the third 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, while in the second year (2021 beet crop), the clover cover treatment had 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. This year (2022 beet crop), the radish treatment had significantly higher tons per acre, RWSA, gross revenue, and net revenue than the other two treatments. The clover had a poor stand this year, which may have contributed to this treatment performing similar to the check. In all three years of the study, the radish treatment had significantly fewer dead beets than the clover treatment. Expenses for each treatment were kept the same year after year, and are as follows: 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. 2022 is the third year this trial was conducted. To see the results from the first year, go to page 78 of the 2020 REACh Research Results book. To see the results from the second year, go to page 84 of the 2021 REACh Research results book.

$/A: Gross dollars per acre calculated using $0.18 per pound of RWSA; Net includes costs in the comments.

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

N.S. – not significant

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Sugarbeet Yield Response to Input-Intensive Management

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See soil.msu.edu for more information

Location: Saginaw Valley Research & Extension Center	**Tillage: Conventional, 30-in. row**
Planting Date: 11 May 2022 (Harvest 24 Oct 2022)	**Treatments:** see Table 1
Pre-plant soil: 7.8 pH, 2.1% OM, 15 CEC, 30 ppm P (Bray equiv.), 152ppm K	**Population**: 4 in. spacing
Variety: C-G049	**Replications:** 4

Summary: Trial quality was good. Trial conducted to investigate the influence of more intensive early- and mid-season fertilizer management strategies on sugarbeet yield, sugar %, nutrient tissue response, and plant growth. Treatments were arranged in a randomized complete block design with four replications. Treatments represented stepwise increases in management intensity from 1) a baseline of 160 lbs N $acre^{-1}$ (Standard N, SN), 2) SN + in-furrow P, 3) SN + PPI Lime, 4) SN + SD ATS, 5) SN + Foliar B, 6) SN + Liquid K_2O, 7) SN + late-applied N, 8) All treatment combinations SN + in-furrow P + PPI Lime + SD ATS + Foliar B + Liquid K_2O + Late N, and 9) nontreated check (Table 1). See Table 1 for specific products used, quantity applied, application placements, and application timings.

Growing season (May-Oct) precipitation was down 18.4% from the 30-yr mean during 2022. May 2022 cumulative rainfall was 51% below average resulting in some saltation from in-furrow applications and reduced emergence with ammonium polyphosphate (10-34-0) [SN + in-furrow P and intensive] (Table 2). Despite 10-34-0 application rates within recommended thresholds, results highlight risks with in-furrow nutrient applications which include uncertainty regarding immediate climate conditions soon after application which in this case were extremely dry.

Preventative fungicide applications for Cercospora leaf spot combined with decreased precipitation, decreased soil moisture, and lower relative humidity during the growing season reduced the favorable environment for foliar disease. All fertilizer treatments yielded above the Michigan average of 37 tons A^{-1} except for the SN + in-furrow P treatment (33.29 tons A^{-1}) (Table 3). For the SN + in-furrow P treatment, recoverable white sugar per ton (RWST) was 17.4% lower than the SN treatment leading to reduced potential profitability. Aside from the standard N treatment, the application of other nutrient sources did not increase the recoverable white sugar per acre (RWSA) or impact sugar quality during the 2022 growing season (Table 3).

Table 1. Sugarbeet treatment design and application timing, Richville, MI, 2022.

Treatment Name	Fertilizer applied	Fertilizer grade	Amount (A^{-1})	Placement	Timing†
Standard N (SN)	**UAN**	**28-0-0**	**13.3 gal**	**2x2**	**Planting**
	UAN	**28-0-0**	**40 gal**	**Side-dress**	**2-4 LF**
SN + in-furrow P	Ammonium polyphosphate	10-34-0	5 gal	In-furrow	Planting
SN + PPI Lime	Agricultural lime	32% Ca	2 tons	Broadcast	Pre-planting
SN + SD ATS	UAN	28-0-0	13.3 gal	2x2	Planting
	UAN	28-0-0	37.5 gal	Side-dress	2-4 LF
	ATS	12-0-0-26S	5.6 gal	Side-dress	2-4 LF
SN + Foliar B	Sodium pentaborate	14% B	0.5 lb	Foliar	Weekly in July
SN + Liquid K_2O	K_2O Liquid	0-0-28	30.8 gal	Band	Early July
SN + Late N	UAN	28-0-0	26.7 gal	Side-dress	2-4 LF
	UAN	28-0-0	13.3 gal	Side-dress	2WASD
Intensive (all treatments)	Agricultural lime	32% Ca	2 tons	Broadcast	Pre-planting
	UAN	28-0-0	13.3 gal	2x2	Planting
	liquid ammonium phosphate	10-34-0	5 gal	In-furrow	Planting
	UAN	28-0-0	24.2 gal	Side-dress	2-4 LF
	ATS	12-0-0-26S	5.6 gal	Side-dress	2-4 LF
	UAN	28-0-0	13.3 gal	Side-dress	2WASD
	Sodium pentaborate	14% B	0.5 lb	Foliar	4x in July
	K_2O Liquid	0-0-28	30.8 gal	Band	Early July
Nontreated check	No fertilizer added		NA	NA	NA

† **Application Dates**: Pre-planting and Planting – 11 May 2022; 2-4 leaf stage (sidedress)– 01 June 2022; Late N– 14 June 2022; Liquid K_2O – 05 July 2022; Foliar B sprays – 08, 14, 19, 26 July 2022.

Table 2. Influence of early and mid-season fertilizer on percent sugarbeet stand count (emergence and pre-harvest), Richville, MI, 2022. †

Treatment	Emergence ‡	Pre-harvest	Change
		%	
Standard N (SN)	71 a	71	-
SN + in-furrow P	51 b	57	6
SN + PPI Lime	72 a	70	(2)
SN + SD ATS	71 a	70	(1)
SN + Foliar B	71 a	70	(1)
SN + Liquid K_2O	72 a	71	(1)
SN + Late N	71 a	67	(4)
Intensive (all treatments)	60 b	64	4
p-value	***0.0024***	**0.17**	**NA**
Nontreated check	**73**	**73**	**-**

† Treatments were compared at 0.10 probability level, Tukey's HSD. Values followed by the same lowercase letter are not significantly different.
‡ CG-049 variety average emergence = 61.5% Source: 2021 Variety Results. https://www.michigansugar.com/wp-content/uploads/2021/12/2021-Variety-Trial-Results-Book.pdf

Table 3. Early and mid-season fertilizer effects on sugarbeet root yield, recoverable sugar (RSWT and RSWA), sucrose concentration, and purity, Richville, MI, 2022. †

	Root Yield ‡	Recoverable Sugar		Sucrose	Purity
Treatment	**-T A^{-1}-**	**—RWSA—**	**—RWST—**	**%**	
Standard N (SN)	40.20 a	296.80	11,890.95 ab	22.44	95.76
SN + in-furrow P	33.29 b	295.06	9,816.01 b	22.29	95.80
SN + PPI Lime	41.97 a	293.17	12,282.47 ab	22.18	95.95
SN + SD ATS	40.98 a	300.16	12,306.13 a	22.70	95.88
SN + Foliar B	38.40 a	298.60	11,467.52 ab	22.52	95.74
SN + Liquid K_2O	39.24 a	300.11	11,797.13 ab	22.62	95.88
SN + Late N	39.27 a	301.38	11,817.85 ab	22.78	95.85
Intensive (all treatments)	38.52 a	291.20	11,221.15 ab	22.09	95.86
p-value	***<.0001***	***0.63***	***0.02***	***0.63***	***0.79***
Nontreated check	**24.61**	**295.17**	**7,236.45**	**22.29**	**95.72**

† Treatments were compared at 0.10 probability level, Tukey's HSD. Values followed by the same lowercase letter are not significantly different.
‡ Michigan 2021 average sugarbeet yield = 37 tons A^{-1}
https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=MICHIGAN

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Sugarbeet Varietal Response to Fertilizer Strategy and Harvest Timing

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See soil.msu.edu for more information

Location: Saginaw Valley Research and Extension Center	**Tillage**: Conv., 30-in. row
Planting Date: May 11, 2022 (Harvest 8/30/22 & 10/24/22)	**Trt's**: See below
Soil Type: Clay loam; 2.4% OM; 7.9 pH; 26 ppm P (Bray equiv.), 151 ppm K	**Population**: 4 in. spacing
Variety: C-G675 & C-G919	**Replicated**: 4 replications

Table 1. Overview of fertilizer rate, timing, and methods of application.

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

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

Summary: Trial quality was good. Trial 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 management, and interactions amongst these factors may help provide insight into producing the same or more sugar with less overall tonnage. The study was blocked by two harvest timings (early - 8/30/22 and conventional - 10/24/22), and two varieties (C-G675, a more aggressive, high tonnage/sugar variety C-G919, a more defensive variety with average tonnage/sugar but good resistance to Cercospora and Rhizoctonia). 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. K_2O/A (0-0-28) surface 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 and 100 lbs. K_2O/A

(0-0-28) surface applied next to row at canopy closure (~20 leaf stage). Nitrogen source was 28% UAN for both starter and sidedress N applications. Liquid potash (0-0-28) was used for mid-season K_2O applications. Canopy coverage was measured every two weeks until full canopy. Normalized Difference Vegetation Index (NDVI, i.e., greenness) and Fractional Green Canopy Cover via SPAD were measured at 6-8LF and 12-14LF.

Due to no more than 4 days between any rainfall event during March and April 2022, planting was delayed until 11 May. Sidedress N applications occurred 1 June while liquid K_2O was applied 22 June. At the 12-14 leaf growth stage, C-675 had a significantly higher NDVI reading and also greater percent canopy cover by 20-leaf than C-919 (data not shown). Fertilizer strategies consisting of both N timings (i.e., 2x2+SD N) had greater canopy coverage than those without (i.e., 2x2+K and 'All') on July 20. Due to known yield and quality differences from harvest timing, post-harvest statistics were sliced by harvest timing. No interactions between variety and fertilizer strategy occurred during early harvest (30 August). However, C-G675 produced 3.1 T A^{-1} and 647 lb. RWSA more than C-G919, respectively (Table 2). A full season N-rate produced on average 3.1 tons A^{-1} more than starter 2x2 N only, regardless of the addition of liquid K_2O. Further N-rate evaluation of early harvest sugar beet is necessary as 60 lb. A^{-1} (2x2) was not enough to maximize yields in 2022 but the 160 lb. A^{-1} (2x2+SD) rate may not have fully been utilized prior to harvesting.

Interactions between variety and fertilizer strategy occurred during regular harvest timing (24 October) on yield and RWSA (Tables 4, 5). C-G919 yield and RWSA were maximized by having both N applications while liquid K_2O did not influence yield (Table 5). C-G675 achieved maximum yield and RWSA within all treatments except '2x2+liquid K' where the in-season liquid K_2O may have decreased yield without the addition of sidedress N. Drier weather conditions later in the season may have decreased N loss opportunities or resulted in poor use of sidedress N resulting in the lower applied N rate maximizing yield and RWSA. C-G675 responded better to decreased applied N rates in a full season application than C-G919. Across varieties in early harvest 2022, tonnage responded to a full-season N rate but RWSA, RWST, % sugar, and profitability did not implying that 60 lbs N/A was sufficient for early harvest when compared to the full rate of 160 lb N/A. The more defensive variety (C-G919) did respond to the full N rate in 2022 with greater yield, RWSA, and profitability.

Table 2. Sugarbeet early harvest 2022 yield, recoverable sugar per acre (RWSA), recoverable sugar per ton (RWST), sugar %, and clear juice purity (CLP).

Early Harvest					
Treatment	**Tons**	**RWSA**	**RWST**	**Sugar**	**CJP**
Variety	—Tons—	—lbs—	—lbs—	—%—	—%—
C-G675	29.92 a*	7371 a	246.5 a	17.02 a	94.67 a
C-G919	26.80 b	6724 b	250.7 a	16.79 a	94.79 a
P > F	**0.002**	**0.06**	**ns†**	**ns**	**ns**
Fertilizer					
2x2 N Only	26.82 b	6694 a	248.8 ab	16.91 ab	94.60 a
2x2 + Sidedress N	30.20 a	7480 a	247.6 ab	16.82 ab	94.77 a
2x2 + Liquid K	26.82 b	6846 a	255.7 a	17.34 a	94.81 a
All	29.61 a	7169 a	242.2 b	16.56 b	94.74 a
P > F	**<0.001**	**ns**	**0.09**	**0.07**	**ns**
675 CHECK ††	23.37	5864	251.4	17.08	95.07
919 CHECK	20.35	5192	255.1	17.27	94.54

*Values followed by the same lowercase letter in the same column are not significantly different at α = 0.10. Values represent actual field data without early delivery program compensation factors.

† ns = not significantly different at α = 0.10.

†† CHECK plots were not statistically analyzed with all other plot factors.

Table 3. Sugarbeet regular harvest 2022 yield, recoverable sugar per acre (RWSA), recoverable sugar per ton (RWST), sugar %, and clear juice purity (CLP).

Regular Harvest					
Treatment	**Yield**	**RWSA**	**RWST**	**Sugar**	**CJP**
Variety	—Tons—	—lbs—	—lbs—	—%—	—%—
C-G675	†	†	311.0 a*	20.21 a	95.80 a
C-G919			305.0 a	19.96 a	95.80 a
P > F			**ns‡**	**ns**	**ns**
Fertilizer					
2x2 N Only			307.6 ab	20.05 ab	95.83 a
2x2 + Sidedress N			307.9 ab	20.08 ab	95.70 a
2x2 + Liquid K			314.8 a	20.50 a	95.80 a
All			301.6 b	19.70 b	95.84 a
P > F			**0.07**	**0.05**	**ns**
675 CHECK δ	31.92	9797	307.5	20.07	96.03
919 CHECK	23.46	7049	302.1	19.73	95.79

*Values followed by the same lowercase letter in the same column are not significantly different at α = 0.10.

† See below for interactions of variety and fertilizer strategy on RWSA and yield.

‡ ns = not significantly different at α = 0.10.

δ CHECK plots were not statistically analyzed with all other plot factors.

Table 4. Interaction between sugarbeet variety and fertilizer strategy on yield at regular harvest timing.

	Variety		
Fertilizer	**C-G675**	**C-G919**	***P > F***
	Tons A^{-1}		
2x2 N Only	40.14 a†A‡	29.99 bB	**<0.001**
2x2 + Sidedress N	41.41 aA	40.23 aA	**0.40**
2x2 + Liquid K	35.75 aB	29.62 bB	**0.03**
All	41.63 aA	41.13 aA	**0.85**
P > F	**0.09**	**<0.001**	

†Values followed by the same lowercase letter in the row are not significantly different at α = 0.10.
‡Values followed by the same uppercase letter in the same column are not significantly different at α = 0.10.

Table 5. Interaction between sugarbeet variety and fertilizer strategy on recoverable white sugar per acre at regular harvest timing.

	Variety		
Fertilizer	**C-G675**	**C-G919**	***P > F***
	Lbs. A^{-1}		
2x2 N Only	12,562 a†AB‡	9,071 bB	**<0.001**
2x2 + Sidedress N	12,786 aA	12,356 aA	**0.56**
2x2 + Liquid K	11,401 aB	9,212 bB	**0.007**
All	12,636 aAB	12,337 aA	**0.68**
P > F	**0.22**	**<0.001**	

†Values followed by the same lowercase letter in the row are not significantly different at α = 0.10.
‡Values followed by the same uppercase letter in the same column are not significantly different at α = 0.10.

Table 6. Early harvest main effects of sugarbeet variety and fertilizer strategy on 2022 gross grower payment and profitability analysis less trucking and or fertilizer costs.

Early Harvest			
Treatment	**Gross Grower Payment**	**Net Economic Return Less Trucking Cost ‡**	**Net Economic Return Less Fertilizer Costs and Trucking**
Variety	— $/A —	— $/A —	— $/A —
C-G675	2,515 a*	2,356 a	1,935 a
C-G919	2,294 b	2,152 b	1,730 b
P > F	**0.06**	**0.07**	**0.07**
Fertilizer			
2x2 N Only	2,284 a	2,142 a	2,067 a
2x2 + Sidedress N	2,252 a	2,392 a	2,172 a
2x2 + Liquid K	2,336 a	2,193 a	1,569 b
All	2,446 a	2,289 a	1,522 b
P > F	**nsδ**	**ns**	**<0.001**
675 CHECK †	1,413	1,325	1,325
919 CHECK	1,251	1,175	1,175

* Values followed by the same lowercase letter are not significantly different at α = 0.10.
† CHECK was not statistically analyzed with all other plot factors
‡ Trucking figured at $3.75/T
δ ns = not significant at α = 0.10.
Gross grower payment and net economic returns based upon harvest date adjustment factor for tonnage and RWST on 8/30/2022 and $0.18 per pound of sugar payment.

Table 7. Regular harvest interaction between variety and fertilizer strategy on gross grower payment.

	Variety		
Fertilizer	**C-G675**	**C-G919**	***P > F***
	— $/A^{-1} —		
2x2 N Only	3,026 a†A‡	2,185 bB	**<0.001**
2x2 + Sidedress N	3,080 aA	2,977 aA	**0.55**
2x2 + Liquid K	2,747 aA	2,219 bB	**0.007**
All	3,044 aA	2,972 aA	**0.68**
P > F	**0.23**	**<0.001**	

†Values followed by the same lowercase letter in the row are not significantly different at α = 0.10.
‡Values followed by the same uppercase letter in the same column are not significantly different at α = 0.10.

Table 8. Regular harvest interaction between variety and fertilizer strategy on grower payment less trucking expense ($3.75/T) of regular harvest timing.

	Variety		
Fertilizer	**C-G675**	**C-G919**	***P > F***
	$/A^{-1}		
2x2 N Only	2,876a†AB‡	2,073 bB	**<0.001**
2x2 + Sidedress N	2,925 aA	2,826 aA	**0.55**
2x2 + Liquid K	2,613 aB	2,108 bB	**0.007**
All	2,888 aAB	2,818 aA	**0.68**
P > F	**0.24**	**<0.001**	

†Values followed by the same lowercase letter in the row are not significantly different at α = 0.10.

‡Values followed by the same uppercase letter in the same column are not significantly different at α = 0.10.

Table 9. Regular harvest interaction between variety and fertilizer strategy on grower payment less trucking expense ($3.75/T), fertilizer costs, and application costs of regular harvest timing.

	Variety		
Fertilizer	**C-G675**	**C-G919**	***P > F***
	$/A^{-1}		
2x2 N Only	2,801a†A‡	1,998 bB	**<0.001**
2x2 + Sidedress N	2,705 aA	2,606 aA	**0.55**
2x2 + Liquid K	1,989 aB	1,484 bC	**0.007**
All	2,422 aB	2,051 aB	**0.68**
P > F	**<0.001**	**<0.001**	

†Values followed by the same lowercase letter in the row are not significantly different at α = 0.10.

‡Values followed by the same uppercase letter in the same column are not significantly different at α = 0.10.

Excalia with Herbicides, Crop Safety Trial

Sylvester - Fairgrove, MI - 2022

Trial Quality: Good
Variety: BTS-1606N
Planted: May 2
Harvested: September 29
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.2 **pH:** 7.6 **CEC:** 15.1
P: Very High **K:** Medium
Mn: High **B:** High
Added N: 115 lbs. PPI + 35 lbs. 2X2
Previous Crop: Wheat/Clover

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 13.07 in.
Beets/100 ft: 226

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 24-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
2	Roundup PowerMAX AMS Stinger Excalia	24 fl oz 17 lb/100 gal 2 fl oz 2 fl oz	2 lf	**8.0**	$2,508	10706	283	37.8	19.5	93.8
12	Roundup PowerMAX AMS Excalia Quadris	24 fl oz 17 lb/100 gal 2 fl oz 32 fl oz	2 lf	**7.9**	**$2,622**	**11320**	285	**39.6**	19.7	93.7
3	Dual Magnum Roundup PowerMAX AMS Excalia	0.5 pt 24 fl oz 17 lb/100 gal 2 fl oz	Pre-Emerge 2 lf	**7.8**	$2,588	11075	285	**38.8**	19.7	93.7
8	Dual Magnum Roundup PowerMAX AMS Stinger Excalia	1.33 pt 24 fl oz 17 lb/100 gal 2 fl oz 2 fl oz	2 lf	**7.8**	$2,577	11064	293	37.8	19.7	94.9
1	Roundup PowerMAX AMS Excalia	24 fl oz 17 lb/100 gal 2 fl oz	2 lf	**7.8**	**$2,753**	**11723**	289	**40.6**	19.9	93.9
4	Dual Magnum Roundup PowerMAX AMS Excalia Stinger Mustang Max	1.33 pt 24 fl oz 17 lb/100 gal 2 fl oz 2 fl oz 4 fl oz	2 lf	**7.8**	$2,595	11153	286	**38.9**	19.8	93.7
5	Dual Magnum Roundup PowerMAX AMS Excalia	1.33 pt 24 fl oz 17 lb/100 gal 2 fl oz	2 lf	**7.8**	**$2,744**	**11754**	292	**40.2**	20.1	93.9
7	Warrant Roundup PowerMAX AMS Excalia	3 pt 24 fl oz 17 lb/100 gal 2 fl oz	2 lf	**7.6**	**$2,608**	**11184**	291	38.4	20.0	94.0

Vigor* 0 to 10 ratings, 10 is the best

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Excalia with Herbicides, Crop Safety Trial

Sylvester - Fairgrove, MI - 2022

No.	Treatment	Rate/A	Applic Timing	Vigor* 0-10 24-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
9	Outlook Roundup PowerMAX AMS Stinger Excalia	1 pt 24 fl oz 17 lb/100 gal 2 fl oz 2 fl oz	2 lf	**7.6**	**$2,777**	**11894**	296	**40.2**	20.1	94.4
10	Warrant Roundup PowerMAX AMS Stinger Excalia	3 pt 24 fl oz 17 lb/100 gal 2 fl oz 2 fl oz	2 lf	**7.6**	$2,544	10925	282	**38.7**	19.6	93.6
11	Roundup PowerMAX AMS Excalia Quadris	24 fl oz 17 lb/100 gal 2 fl oz 15.5 fl oz	2 lf	**7.6**	$2,572	11031	281	**39.3**	19.4	93.8
6	Outlook Roundup PowerMAX AMS Excalia	1 pt 24 fl oz 17 lb/100 gal 2 fl oz	2 lf	7.4	**$2,727**	**11668**	290	**40.3**	20.0	93.8
Average				7.7	$2,635	11291	288	39.2	19.8	93.9
LSD 5%				0.4	174.4	735.3	n.s.	2.1	n.s.	n.s.
CV%				4.0	4.6	4.5	3.5	3.7	2.5	1.0

Vigor* 0 to 10 ratings, 10 is the best

Comments: Excalia is a new fungicide labeled for Rhizoctonia crown rot management. This study was designed to test tank mixtures of commonly used products to determine if there is an injury risk to the crop. Major injury was not observed with the mixtures in this study.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Residual Herbicides and Stinger

Sylvester - Fairgrove, MI - 2022

Trial Quality: Good
Variety: BTS-1606N
Planted: May 2
Harvested: September 30
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 3.2 **pH:** 7.6 **CEC:** 15.1
P: Very High **K:** Medium
Mn: High **B:** High
Added N: 115 lbs. PPI + 35 lbs. 2X2
Previous Crop: Wheat/Clover

Rhizoc Level: Low
Cerc Control: Good
Problems: None
Seeding Rate: 4.1 in.
Rainfall: 13.07 in.
Beets/100 ft: 229

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 24-Aug	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
2	Roundup PowerMAX AMS Stinger	24 fl oz 17 lb/100 gal 2 fl oz	2 lf	7.9	$2,639	11301	297	38.1	**19.8**	95.4
3	Dual Magnum Roundup PowerMAX AMS	0.5 pt 24 fl oz 17 lb/100 gal	Pre-Emerge 2 lf	7.8	$2,616	11236	308	36.4	**20.2**	96.2
5	Dual Magnum Roundup PowerMAX AMS	1.33 pt 24 fl oz 17 lb/100 gal	2 lf	7.8	$2,586	11128	303	36.8	**19.8**	96.2
9	Outlook Roundup PowerMAX AMS Stinger	1 pt 24 fl oz 17 lb/100 gal 2 fl oz	2 lf	7.8	$2,736	11774	308	38.2	**20.4**	95.7
10	Warrant Roundup PowerMAX AMS Stinger	3 pt 24 fl oz 17 lb/100 gal 2 fl oz	2 lf	7.7	$2,607	11236	298	37.8	**19.9**	95.3
6	Outlook Roundup PowerMAX AMS	1 pt 24 fl oz 17 lb/100 gal	2 lf	7.6	$2,759	11856	309	38.3	**20.5**	95.4
7	Warrant Roundup PowerMAX AMS	3 pt 24 fl oz 17 lb/100 gal	2 lf	7.6	$2,616	11258	302	37.2	**20.1**	95.4
4	Dual Magnum Roundup PowerMAX AMS	1.33 pt 24 fl oz 17 lb/100 gal	Pre-Emerge 2 lf	7.5	$2,638	11379	292	38.9	**19.6**	95.2
8	Dual Magnum Roundup PowerMAX AMS Stinger	1.33 pt 24 fl oz 17 lb/100 gal 2 fl oz	2 lf	7.5	$2,658	11450	297	38.6	**19.9**	95.1
1	Roundup PowerMAX AMS	24 fl oz 17 lb/100 gal	2 lf	7.4	$2,671	11425	292	39.0	19.5	95.2
Average				7.7	$2,652	11404	301	37.9	20.0	95.5
LSD 5%				n.s.	n.s.	n.s.	n.s.	n.s.	0.9	n.s.
CV%				4.5	7.8	7.7	4.2	5.5	3.3	0.8

*__Vigor__ 0 to 10 ratings, 10 is the best

Comments: This trial was designed to test the safety of mixing residual herbicides with Stinger herbicide, Roundup PowerMAX and AMS. Major injury was not observed in this study.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 minus fungicide and application cost.

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

Adama Copper Roundup

SVREC - Richville, MI - 2022

Trial Quality: Fair
Variety: BTS - 1703
Planted: April 22
Harvested: October 11
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 in.

Soil Info: Clay Loam
% OM: 2.4 **pH:** 7.3 **CEC:** 13.2
P: High **K:** Medium
Mn: High **B:** Medium
Added N: 120 lbs. PPI + 35 lbs. 2X2
Previous Crop: Wheat

Rhizoc Level: Low
Cerc Control: Good
Problems: Variable Stand
Seeding Rate: 4.1 in.
Rainfall: 13.46 in.
Beets/100 ft: 139

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***	Injury 0-10	Net $/A	RWSA	RWST	T/A	% SUC	% CJP
				5-Aug						
3	EBDC**	1.6 qt	A	**0.0**	**$2,447**	**11044**	309	**35.6**	20.2	**96.4**
	Copper**	2 pt	B							
	EBDC** + Provysol	2 lb + 5 fl oz	C							
	Copper**	2 pt	D							
1	EBDC**	1.6 qt	A	**0.0**	**$2,327**	**10467**	299	**35.0**	20.0	95.1
	Mastercop	1.5 pt	B							
	EBDC** + Provysol	2 lb + 5 fl oz	C							
	Mastercop	1.5 pt	D							
5	EBDC**	1.6 qt	A	**0.5**	**$2,275**	**10253**	305	**33.6**	19.9	**96.5**
	Mastercop	2 pt	B							
	EBDC** + Provysol	2 lb + 5 fl oz	C							
	Mastercop	2 pt	D							
2	EBDC**	1.6 qt	A	**0.9**	**$2,287**	**10329**	305	**33.8**	20.1	**95.9**
	Mastercop + Roundup PowerMAX + AMS	1.5 pt + 24 fl oz + 17 lbs/100 gal	B							
	EBDC** + Provysol	2 lb + 5 fl oz	C							
	Mastercop + Roundup PowerMAX + AMS	1.5 pt + 24 fl oz + 17 lbs/100 gal	D							
6	EBDC**	1.6 qt	A	1.8	**$2,147**	**9736**	300	**32.5**	19.9	**95.6**
	Mastercop + Roundup PowerMAX + AMS	2 pt + 24 fl oz + 17 lbs/100 gal	B							
	EBDC** + Provysol	2 lb + 5 fl oz	C							
	Mastercop + Roundup PowerMAX + AMS	2 pt + 24 fl oz + 17 lbs/100 gal	D							
4	EBDC**	1.6 qt	A	3.6	$1,796	8275	297	27.7	19.8	95.4
	Copper** + Roundup PowerMAX + AMS	2 pt + 24 fl oz + 17 lbs/100 gal	B							
	EBDC** + Provysol	2 lb + 5 fl oz	C							
	Copper** + Roundup PowerMAX + AMS	2 pt + 24 fl oz + 17 lbs/100 gal	D							
Average				1.1	$2,213	10017	303	33.1	20.0	95.8
LSD 5%				1.3	379.7	1634.4	n.s.	5.0	n.s.	0.9
CV%				76.1	11.4	10.8	2.7	10.1	2.1	0.6

*All treatments included MasterLock @ 6.4 fl oz

****EBDC =** Manzate/Manzate Pro-stick **Copper =** Badge

*****Application Dates: A - 6/24, B - 7/5, C - 7/20, D - 8/5**

Comments: This trial had stand issues due to soil crusting after planting. Many of the treatments were able to be evaluated for injury. The study was designed to evaluate injury with Mastercop copper mixed with Roundup PowerMAX plus AMS compared to Badge mixed with Roundup PowerMax plus AMS at different rates. While injury was lower with Mastercop vs Badge injury still occurred. Michigan Sugar Company does not recommend mixing Copper fungicides and glyphosate products with AMS at this time.

$/A: Payment calculated using early delivery adjustment where necessary, and a per pound payment of $.18 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 AgBioResearch

Waterhemp control with strategies using residual herbicides in sugarbeet

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

Location: Shiawassee County	**Application timings**: PRE (May 24), 2-lf beets (June 10), 6-8 lf beets (June 21)
Planting Date: May 24, 2022	**Herbicides:** see treatments
Soil Type: Sandy loam	**O.M.:** 2.0 **pH:** 5.7
Replicated: 4 times	**Variety:** Crystal G049RR

Table 1. Waterhemp control 14, 35, and 72 days after the last herbicide application (6-leaf beets).

		Waterhemp control[b]		
Herbicide treatments[a]		**July 5 (14 DA-6-lf)**	**July 26 (35 DA-6-lf)**	**Sept. 1 (72 DA-6-lf)**
PREs	***POST apps. at 2- and 6-lf beets***	—%—	—%—	—%—
None	Roundup PowerMax 3 (30/20 fl oz)	0	0	0
None	Dual II Magnum (1.3/1.3 pt)	30	20	13
None	Warrant (3/3 pt)	61	45	25
None	Outlook (12/12 fl oz)	38	23	13
None	Ethofumesate[a] (2/2 pt)	64	35	20
Dual Magnum (0.5 pt)	Dual Magnum (1.3 pt) – 2 lf only	94*	83	80
Dual Magnum (0.5 pt)	Warrant (3 pt) – 2 lf only	95*	90*	88
Dual Magnum (0.5 pt)	Outlook (16 fl oz) – 2 lf only	97*	89	86
Dual Magnum (0.5 pt)	Dual Magnum (1.3/1.3 pt)	96*	88	85
Dual Magnum (0.5 pt)	Warrant (3/3 pt)	100*	98*	96*
Dual Magnum (0.5 pt)	Outlook (12/12 fl oz)	98*	92*	89
Dual Magnum (0.5 pt)	Dual Mag. (1.3 pt)/Sequence (3 pt)	93	88	86
Dual Magnum (0.5 pt)	Warrant (3 pt)/ Sequence (3 pt)	97*	95*	92*
Ethofumesate (3 pt)	Warrant (3 pt) – 2 lf only	100*	99*	98*
Ethofumesate (3 pt)	Dual Magnum (1.3/1.3 pt)	100*	99*	99*
None	Ultra Blazer (16 fl oz) – 6 lf only	72	56	15
Dual Magnum (0.5 pt)	Ultra Blazer (16 fl oz) – 6 lf only	97*	90*	79
Ethofumesate (3 pt)	Ultra Blazer (16 fl oz) – 6 lf only	100*	94*	83
Dual Magnum (0.5 pt)	U. Blazer + Warrant (3 pt) – 6 lf only	100*	95*	91*
$LSD_{0.05}$[c]		*6.3*	*9.8*	*9.3*

[a] Roundup PowerMax 3 was included in all POST 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: 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. Additionally, Ultra Blazer POST was examined for waterhemp control once sugarbeet was at the 6-leaf stage. Due to late-planting, it was important to have initial PRE application to make sure no waterhemp emerged prior to the POST residual herbicides. These PRE residuals also helped reduce the size and number of waterhemp when an Ultra Blazer application could be made. We will continue to examine and refine waterhemp control strategies in sugarbeet.

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University AgBioResearch

Waterhemp control with Metamitron in sugarbeet

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

Location: Shiawassee County	**Application timings**: PRE (May 24)
Planting Date: May 24, 2022	**Herbicides:** see treatments
Soil Type: Sandy loam	**O.M.:** 2.0 **pH:** 5.7
Replicated: 4 times	**Variety:** Crystal G049RR

Table 1. Waterhemp control with increasing rates of Metamitron alone and with Ethofumesate.

	28 DAP		44 DAP		56 DAP
PRE Treatments	**Control**	**Counts**	**Control**	**Counts**	**Control**
	—%—	– #/0.5 m^2 –	—%—	– #/0.5 m^2 –	—%—
Dual Magnum (0.5 pt)	92*[a]	1*	85*	2*	86*
Ethofumesate (2 pt)	93*	1*	87*	3*	89*
Ethofumesate (3 pt)	98*	1*	92*	1*	91*
Metamitron (19.6 fl oz)	10	82	0	92	0
Metamitron (39 fl oz)	38	56	28	67	25
Metamitron (59 fl oz)	58	12*	63	22*	61
Metamitron (78 fl oz)	76	6*	70	9*	64
Metamitron (19.6 fl oz) + Etho (2 pt)	95*	1*	89*	2*	91*
Metamitron (39 fl oz) + Etho (2 pt)	93*	0*	88*	2*	87*
Metamitron (59 fl oz) + Etho (2 pt)	97*	0*	90*	1*	90*
Metamitron (78 fl oz) + Etho (2 pt)	93*	1*	90*	2*	88*
Metamitron (19.6 fl oz) + Etho (3 pt)	95*	1*	89*	2*	87*
Metamitron (39 fl oz) + Etho (3 pt)	91*	2*	86*	2*	82*
Metamitron (59 fl oz) + Etho (3 pt)	89	1*	83*	1*	83*
Metamitron (78 fl oz) + Etho (3 pt)	89	1*	82*	2*	84*
$LSD_{0.05}$[b]	*8.5*	*20.1*	*9.8*	*22.6*	*10.8*

[a] Waterhemp control or counts with asterisks (*) are similar to the best waterhemp control treatment.
[b] Means within a column with different letters are significantly different from each other.

Summary: Metamitron is a herbicide active ingredient that has been used in Europe for weed control in sugarbeet. Due to the issues with glyphosate-resistant weeds, especially the pigweed species common waterhemp and Palmer amaranth, additional options for weed control are needed. The goal of this research was to compare PRE applications of increasing rates of metamitron with Dual Magnum at 0.5 pt/A (24C registration) and ethofumesate at 2 and 3 pt/A. In addition to metamitron alone, each rate of metamitron was tank-mixed with 2 and 3 pt/A of ethofumesate. Across all treatments and evaluation times Dual Magnum at 0.5 pt/A and ethofumesate at either 2 or 3 pt/A provided better control than metamitron alone, up to 56 days after planting. These results show the importance of using one of these herbicides PRE to control waterhemp prior to an overlapping residual program. PREs are going to be an important component of sugarbeet weed control as glyphosate-resistant waterhemp and Palmer amaranth continue to expand across Michigan's sugarbeet growing region.

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 19), 6 lf beets (June 1), 10 lf beets (June 16)
Planting Date: April 20, 2022	**Herbicides:** see treatments
Soil Type: Sandy clay loam	**O.M.:** 2.5 **pH:** 7.4
Replicated: 4 times	**Variety:** Crystal G049RR

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

Herbicide treatments[a]	Timing	Injury (June 8)	Injury (June 23)	Injury (August 25)	Yield	RWSA
		—%—	—%—	—%—	– ton/A –	– lb/A –
Roundup PowerMax 3 (30/20/20 fl oz)	2-, 6-, 10 lf	0	0	0	28.7	6749
Ultra Blazer (8/8 fl oz)	6-, 10 lf	24*[b]	30*	0	23.1*	5238*
Ultra Blazer (16/16 fl oz)	6-, 10 lf	24*	25*	0	23.4*	5490*
Ultra Blazer (16 fl oz)	6 lf	34*	18*	0	25.8	6052
Ultra Blazer (16 fl oz)	10 lf	0	18*	0	26.8	6098
Ultra Blazer (16 fl oz) + Dual Magnum (1.33 pt)	6 lf	63*	40*	0	22.9*	5197*
Ultra Blazer (16 fl oz) + Warrant (3 pt)	6 lf	14*	8*	0	26.1	6046
Ultra Blazer (16 fl oz) + Outlook (16 fl oz)	6 lf	38*	14*	0	25.0	5690*
Ultra Blazer (16 fl oz) + Ethofumesate (32 pt)	6 lf	28*	6*	0	26.4	6195
Stinger (2 fl oz) fb. Ultra Blazer (16 fl oz) + Stinger (4 fl oz)	2-, 6 lf	34*	8*	0	24.0*	5670*
Stinger (2 fl oz) fb. Stinger (4 fl oz)	2-, 6 lf	8*	4	0	27.5	6373
$LSD_{0.05}$[c]		*7.4*	*5.8*	*0*	*4.4*	*969*

[a] Roundup PowerMax 3 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 3 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 five years we have conducted 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 Dual Magnum. This treatment along with two applications of Ultra Blazer at 8 or 16 fl oz/A, tank-mixtures with Outlook or Stinger resulted in significant yield and/or 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 without reductions in yield. This research helps support Michigan's 2022 Section 18 registration that allowed for Ultra Blazer applications on sugarbeets at the 6-leaf stage or larger at a 16 fl oz/A rate.

Weed control in sugarbeet with Rinskor

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

Location: Richville (SVREC)	**Application timings**: (A) Cotyledon-2 lf weeds (May 13); (B) + 10 days (May 25)
Planting Date: April 20, 2022	**Herbicides:** see treatments
Soil Type: Sandy clay loam	**O.M.:** 2.5 **pH:** 7.4
Replicated: 4 times	**Variety:** Crystal G049RR

Table 1. Sugarbeet tolerance and common lambsquarters control with Loyant (Rinskor), at the 2nd herbicide application (B), 14 and 51 d after the last herbicide application.

		Injury			c. lambsquarters		
Herbicide treatments[a]	**Timing**	**@ B**	**14 DA-B**	**51 DA-B**	**@ B**	**14 DA-B**	**51 DA-B**
		—%—	—%—	—%—	—%—	—%—	—%—
Roundup PowerMax 3 (25 fl oz)	A & B	0	0	0	96	100	96
Loyant (0.274 fl oz)	A & B	15*[b]	23*	3	70*	94*	78*
Loyant (0.41 fl oz)	A & B	16*	23*	10*	86*	96*	76*
Loyant (0.547 fl oz)	A & B	20*	24*	17*	85*	94*	88
Loyant (0.274 fl oz) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	20*	18*	6	100	100	94
Loyant (0.41 fl oz) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	26*	25*	20*	100	100	97
Loyant (0.547 fl oz) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	20*	23*	26*	100	100	98
Loyant (0.274 fl oz) + Dual (1 pt) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	23*	26*	3	100	100	100
Loyant (0.41 fl oz) + Dual (1 pt) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	33*	29*	13*	100	100	100
Loyant (0.547 fl oz) + Dual (1 pt) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	33*	25*	20*	100	100	100
Stinger HL (1.2/2.4 fl oz) + Dual (1 pt) + RUP 3 (25 fl oz)	A & B	3	15*	0	89	98	93
$LSD_{0.05}$[c]		*5.9*	*6.4*	*7.8*	*8.1*	*2.8*	*8.9*

[a] AMSOL at 2.5% v/v was included with all treatments with Roundup PowerMax 3, Destiny HC at 0.5% v/v was included with all Loyant treatments. Etho = Ethofumesate, RUP 3 = Roundup PowerMax 3, Dual = Dual Magnum.

[b] Injury and common lambsquarters control data with asterisks (*) are different than the Roundup PowerMax 3 alone control.

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

Summary: Rinskor (florpyrauxifen) is a new arylpicolinate Group 4 herbicide. Currently, this active is sold as Loyant in rice and has been used in sugarbeet in Europe. The goal of this research was to examine sugarbeet safety and weed control at various rates and tank-mixtures. Sugarbeet injury from Loyant consisted of typical growth regulator injury, fused and elongated leaves. All rates of Loyant resulted in sugarbeet injury and at the higher rates lasted throughout most of the season. Additionally, two applications of Loyant alone resulted in lower common lambsquarters than two applications of Roundup PowerMax alone until 51 DA-B. We expect to continue to examine this herbicide and determine if there is a fit for weed control in Michigan sugarbeet production.

MICHIGAN STATE UNIVERSITY EXTENSION

Michigan State University AgBioResearch

Sugarbeet tolerance with Rinskor

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

Location: Richville (SVREC)	**Application timings**: (A) 2 lf beets (May 19); (B) + 10 days (June 1)
Planting Date: April 20, 2022	**Herbicides:** see treatments
Soil Type: Sandy clay loam	**O.M.:** 2.5 **pH:** 7.4
Replicated: 4 times	**Variety:** Crystal G049RR

Table 1. Sugarbeet tolerance with Loyant (Rinskor) under weed-free conditions at the 2nd application, and 15 and 51 d after the last application.

		Injury				
Herbicide treatments[a]	**Timing**	**@ B**	**15 DA-B**	**44 DA-B**	**Yield**	**RWSA**
		—%—	—%—	—%—	– ton/A –	– lb/A –
Weed-free	A & B	0	0	0	30.5	7250
Loyant (0.274 fl oz)	A & B	13*[b]	19*	11*	23.3*	5363*
Loyant (0.547 fl oz)	A & B	19*	23*	23*	23.4*	5251*
Loyant (1.095 fl oz)	A & B	21*	29*	34*	22.7*	5018*
Loyant (0.274 fl oz) + Dual (1 pt) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	24*	25*	11*	25.9	6209
Loyant (0.547 fl oz) + Dual (1 pt) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	30*	32*	26*	22.0*	5126*
Loyant (1.095 fl oz) + Dual (1 pt) + Etho (6 fl oz) + RUP 3 (25 fl oz)	A & B	30*	36*	38*	20.2*	4564*
Stinger HL (1.2/2.4 fl oz) + Dual (1 pt) + RUP 3 (25 fl oz)	A & B	19*	6*	1	29.5	6849
Loyant (0.274 fl oz) + Dual (1 pt) + RUP 3 (25 fl oz)	A & B	21*	24*	13*	26.9	6265
Loyant (0.547 fl oz) + Dual (1 pt) + RUP 3 (25 fl oz)	A & B	26*	31*	25*	24.7*	5538*
$LSD_{0.05}$[c]		*6*	*5.6*	*7.1*	*5.41*	*1051*

[a] AMSOL at 2.5% v/v was included with all treatments with Roundup PowerMax 3, Destiny HC at 0.5% v/v was included with all Loyant treatments. Etho = Ethofumesate, RUP 3 = Roundup PowerMax 3, Dual = Dual Magnum.

[b] Injury, yield and RWSA data with asterisks (*) are significantly different than the weed-free control.

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

Summary: Rinskor (florpyrauxifen) is a new arylpicolinate Group 4 herbicide. Currently, this active is sold as Loyant in rice and has been used in sugarbeet in Europe. The goal of this research was to examine sugarbeet tolerance at various rates and tank-mixtures. Sugarbeet injury from Loyant consisted of typical growth regulator injury, fused and elongated leaves. All rates of Loyant resulted in significant sugarbeet injury. Loyant applications also resulted in lower yields and recoverable white sugar per acre with the exception of Loyant at 0.274 fl oz per acre tank-mixed with Dual + Roundup or Dual + Ethofumesate + Roundup. Even though applications of Stinger + Dual + Roundup caused some injury; this injury did not last throughout the season and sugarbeet yield and RWSA was similar to the weed-free control. We expect to continue to examine Loyant and determine if there is a fit for weed control in Michigan sugarbeet production.

Evaluation of Cercospora leaf spot and postharvest rot pathogen impacts on sugarbeet storage, 2021-22

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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 (>50% necrotic). Beets were harvested by hand and stored at 7 °C in plastic bags with wood shavings. Healthy-appearing beets of each variety were removed from storage, 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 common pathogens from 2019-21 MSC pile samples, *Penicillium vulpinum*, *Botrytis cinerea*, 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.

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

Location: Saginaw (SVREC)	**Treatments:** Non-treated (high CLS), grower standard (low CLS)
Planting Date: May 6th, 2021	**Variety:** C-G932NT
Harvest: October 11th, 2021	**Inoculated:** July 12th, 2021
"High CLS" average rating: 10	**"Low CLS" average rating:** 4.75

Summary: There was no evidence that CLS levels in the field affect rate of rot development for *Botrytis cinerea, Fusarium graminearum*, or *Penicillium vulpinum*. There were no significant differences between storage rot development in beets with high and low CLS levels at any timepoint in 2020 or 2021 ($P > 0.05$, Figure 1).

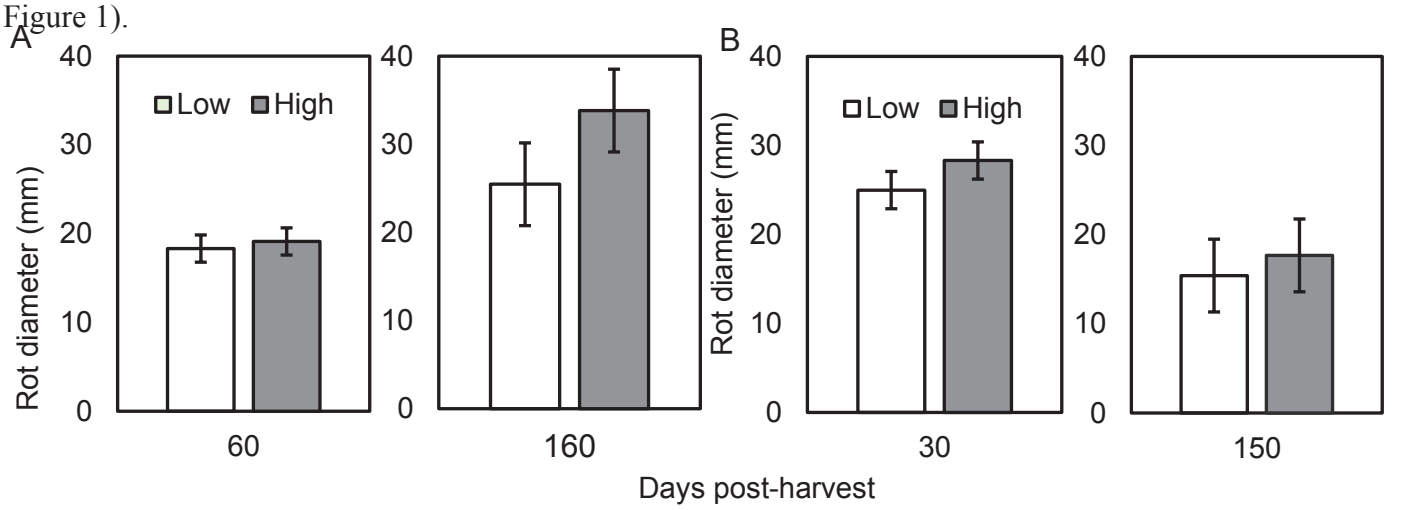

Figure 1. Mean diameter of necrotic tissue on beet slices with low and high CLS in the field after one week incubation. There was no significant difference between CLS levels in rate of rot development at any timepoint ($P > 0.05$) in 2020 (A) or 2021 (B). Observations were similar regardless of storage pathogen used, thus means across all pathogens are shown. Bars indicate 32 and 24 replicate roots for 2020 and 2021, respectively, and error bars indicate standard error. First and last timepoints shown of 3 timepoints in 2020 and 4 total timepoints in 2021.

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

Location: Saginaw (SVREC)	**Treatments:** Inoculated (high CLS), non-inoculated (low CLS)
Planting Date: May 6th, 2021	**Varieties:** F1042, EL50/2, C-G932NT, HIL-9865
Harvest: November 5th, 2021	**Inoculated:** July 12th, 2021
"High CLS" average rating: 6.58	**"Low CLS" average rating:** 3.79

Summary: 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 ($P > 0.05$, data not shown). There were significant varietal differences in lesion development across the three pathogens at all storage timepoints ($P < 0.05$, Figure 2). There were also significant differences ($P<0.05$) in rate of rot development among varieties in 2020 (data not shown).

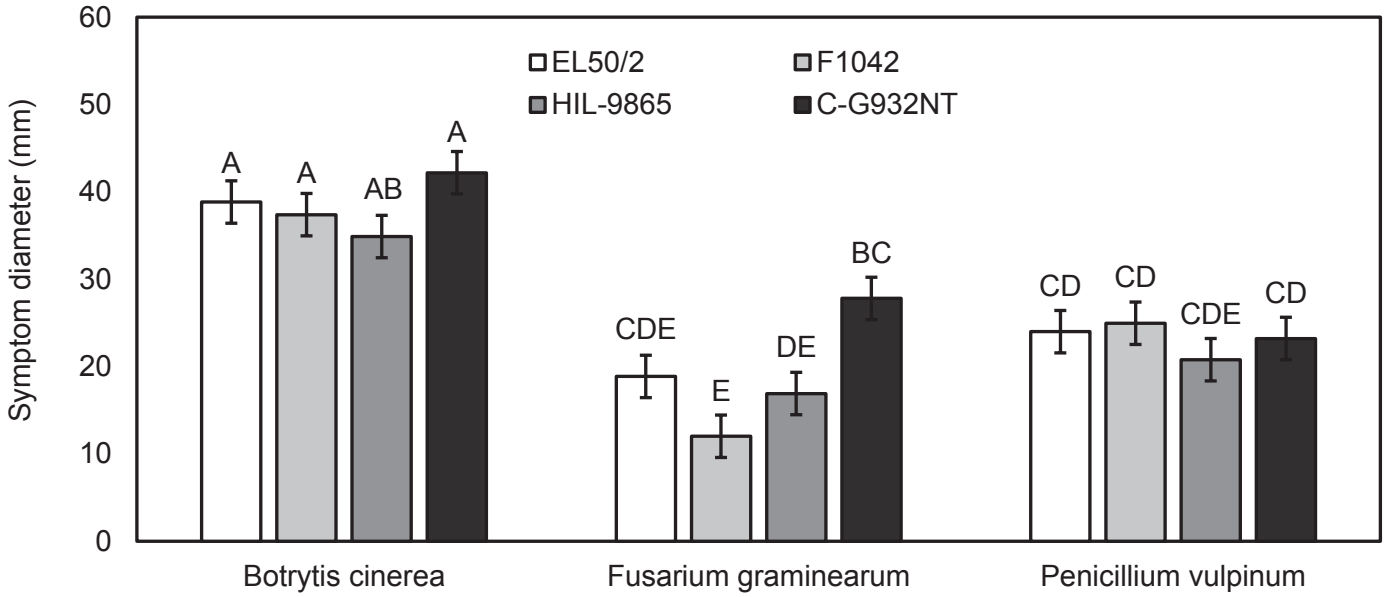

Figure 2: Comparison of mean diameter of necrotic tissue on beet slices among three storage pathogens, inoculated on roots originating from Trial 2, after one week incubation. Graph showing results from the 60-days postharvest timepoint tested in 2021. Bars indicate 8 replicate roots and error bars indicate standard error.

Objective 2: Investigate the effect of CLS infection and postharvest rot on beet respiration rate in storage. Roots of C-G932NT with high and low CLS levels (collected from Trial 1 described above) were inoculated at the crown by removing a plug of beet tissue, inserting a plug of *B. cinerea, F. graminearum*, *P. vulpinum* or PDA control, replacing the beet plug, and sealing with petroleum jelly. Respiration was measured weekly for two months.

Summary: Across three storage pathogens and a single beet variety, there was no difference in rate of respiration per kilogram of beet weight between beets classified as having high and low CLS in the field ($P > 0.05$, data not shown), consistent with work from K. Fugate (Fugate et al. 2022). Differences were observed in respiration rate among varieties. In addition, beets inoculated with *B. cinerea* had a significantly increased respiration rate compared to other storage pathogens by the end of the storage season ($P < 0.05$, Figure 3); this was not related to in-season CLS levels ($P > 0.05$).

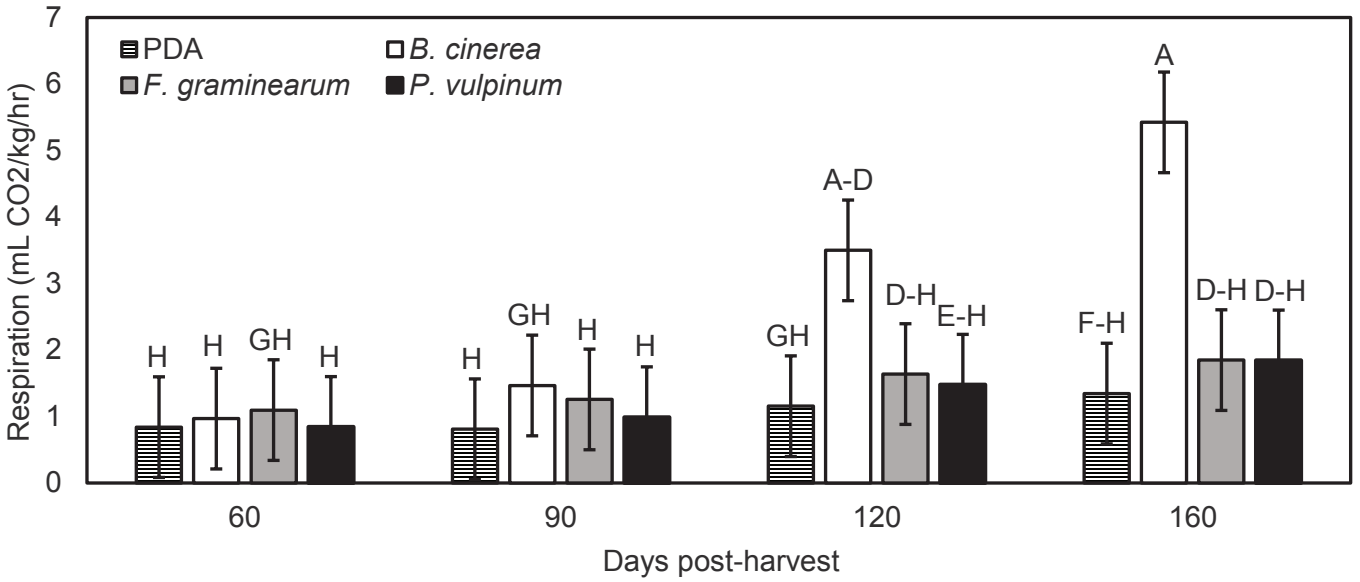

Figure 3. Comparison of mean respiration rate of beets inoculated with three storage pathogens or PDA control. Roots originated from Trial 1 in 2021. Bars indicate 6 replicate chambers and error bars indicate standard error.

Summary

- There is no evidence that CLS in the field causes an increase in rate of rot development or respiration in intact beets.
- There is variation among varieties in storage rot responses to different pathogens.
- One of the storage rots showed evidence of increasing respiration, we are repeating this experiment.
- We will continue to investigate the effects of CLS on storage pathology and beet storability.

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

High-Speed Planter

LAKKE Ewald Farms, Unionville - 2022

Trial Quality:	Good	**Row Spacing:**	20 inch	**Fertilizer:**	2x2: 21 gal. through the planter
Variety:	HIL-2332NT	**Seeding Rate:**	56,000	**In Furrow:**	Quadris (8 oz), Ascend SL (5 oz), Mustang (1.5 oz)
Planted:	May 2	**Soil Type:**	Loam		
Plot Size:	4 reps	**Prev Crop:**	Soybeans	**Weather:**	Good overall, some crusting

Treatment	Average Spacing (inches)	Average Standard Deviation of Spacing (Inches)	Population 100 ft of Row
5.0 mph	5.22	1.17	174
6.5 mph	5.28	1.28	177
8.0 mph	5.18	1.26	175
Average	5.2	1.2	175.3
LSD 5%	N.S.	N.S.	N.S.
CV %	2.3	19.1	4.2
p-value	0.5454	0.7983	0.8376

Comments: This trial was done to evaluate sugarbeet emergence and spacing at different speeds using a planter equipped with high speed planter technology. 2022 was the second year of this trial, and the results of the first year can be found on page 118 of the 2021 REACh Research Results book. Like last year, the trial this year 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 7.5 mph. At a speed of 8 mph, approximately 28 seeds are planted per second in each row. The trial used Hilleshog S2 (large) seed size. The field had soybeans as a previous crop, was fall ripped, and had one spring pass. The seedbed was typical of beet fields that follow soybeans in that it was in very good condition with no lumps or plant debris from the previous year. Emergence conditions after planting were average, with a little crusting that impacted stand. The average emergence in the field was still about 81.8%, 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. Similarly, any gaps larger than 8.40 inches (1.5 x 5.60" 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 4 different replications. On average, 15.25 measurements were used in the final calculation from each 12 ft section of row. The spacing standard deviation is a measurement of spacing variability from the average. A lower standard deviation would mean less variability and better planter performance. This year, there were no statistical differences found in spacing, spacing standard deviation, or population. Last year, there was a numeric but not statistically significant pattern in which population decreased as speed increased, however, that trial followed corn. No such pattern was observed this year, which could potentially be attributed to the more even nature of a seedbed prepared after soybeans as opposed to corn.

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

N.S. – not significant

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