

2017

RESEARCH RESULTS

growing the best sugarbeets



MICHIGAN SUGARBEET

REACH

Research & Education Advisory Council

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	Corey Guza		
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	Dexter Auernhamer	1	2018
Michigan Sugar Company District Board Members (1 year)	Darrin Siemen (Secretary)	1	2018
	Mark Sylvester (Chairman)	1	2018
	Rick Leach	1	2018
Michigan Sugar Company At Large Growers (3 years)	Chris Ziehm	2	2019
	Kurt Hrabal	1	2018
	Scott Roggenbuck (Treasurer)	3	2020
	Andy Shaffner (Vice President)	2	2019
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		1	2018
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Sugar Beet Seed Company (2 years)	Rob Gerstenberger	2	2019
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Agri-Business Manufacturing (2 years)	David Reif	1	2018
Michigan Sugar Company Board of Directors (1 year)	Jeff Gulick	1	2018
	Kent Houghtaling	1	2018
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Ex-Officio Members

Company	Name
Chairman of Board of Directors - MSC	Rick Gerstenberger
CEO of Michigan Sugar Company	Mark Flegenheimer

MISSION STATEMENT:

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

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

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

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2017 Research Results

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RESEARCH SPECIALISTS:

MICHIGAN SUGAR COMPANY

Corey Guza, PhD, Director of Agronomy

Cell.....989.415.3419

Emailcorey.guza@michigansugar.com

Jim Stewart, Director of Research

Cell.....989.225.6720

Emailjames.stewart@michigansugar.com

Dennis Bischer, Agronomist

Cell.....989.551.4416

Emaildennis.bischer@michigansugar.com

Brian Groulx, Research Assistant

Cell.....989.225.6709

Emailbrian.groulx@michigansugar.com

MICHIGAN STATE UNIVERSITY

Tom Wenzel, Research Technician

Cell.....989.737.9447

Emailwenzelth@msu.edu

CORPORATE AGRICULTURAL OFFICE

122 UpTown Dr. Suite 300

Bay City, MI 48708

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



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Compare Quadris to Generic Azoxystrobin Formulations for Control of Rhizoctonia* Root Rot

Crumbaugh, Breckenridge, MI - 2017

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Trial Quality: Good

Variety: SX-RR1245N

Planted: May 15

Harvested: Sep 13

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Clay Loam

% OM: 3.0 **pH:** 7.1 **CEC:** 12.7

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Soybeans

Rhizoc Level: High

Cerc Control: Good

Problems: Extended flooding

Seeding Rate: 4.5 inches

Rainfall: 17.9 inches

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

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

No.	Treatment**	Applic Timing	Dead Beets /100 ft 29-Aug	Net \$/A	Vigor Rating*** 0-10			Sugarbeet Stand Beets / 100 ft	
					21-Jul	29-Aug		23-May	18-Aug
3	Agistar Azoxystrobin	In-Fur	15.7 c	\$880 a	7.9	8.3 a		178	162
5	AZteroid FC	In-Fur	17.0 bc	\$835 a	7.8	8.3 a		183	165
1	Quadris	In-Fur	18.0 bc	\$838 a	7.8	8.2 ab		179	161
6	Quadris	8 If	20.6 bc	\$792 a	7.6	8.0 abc		187	167
2	Azoxystrobin	In-Fur	21.3 bc	\$819 a	7.8	8.1 abc		179	158
10	AZteroid FC	8 If	22.1 bc	\$727 a	7.3	8.0 abc		191	169
4	Equation SC	In-Fur	24.1 bc	\$814 a	7.8	8.0 abc		186	162
9	Equation SC	8 If	27.4 bc	\$722 a	7.5	7.9 bc		195	167
8	Agistar Azoxystrobin	8 If	28.4 bc	\$758 a	7.8	7.8 c		197	168
7	Azoxystrobin	8 If	33.4 b	\$730 a	7.6	7.8 c		193	160
11	Untreated Check		58.2 a	\$541 b	7.3	6.4 d		210	151
Average			26.0	\$769	7.7	7.9		188.8	161.9
LSD 5%			14.6	139.7	n.s.	0.3		n.s.	n.s.
CV %			48.2	15.7	8.4	3.0		10.4	14.0

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

* *Rhizoctonia solani*

** Treatments: In-Fur was applied at 9 fl oz/A in a 3.5 inch band on May 15th, and 8 If was applied at 14.25 fl oz/A in a 7 inch band on June 16th. (AZtereoid at 11.6 and 18.3 fl oz/A).

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

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Compare Quadris to Generic Azoxystrobin Formulations for Control of Rhizoctonia Root Rot

Crumbaugh, Breckenridge, MI - 2017

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No.	Treatment	Applic Timing	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
3	AgriStar Azoxystrobin	In-Fur	\$880 a	6486 a	303 a	21.2 a	20.4 a	95.0 a
1	Quadris	In-Fur	\$838 a	6180 a	303 a	20.3 a	20.3 a	95.1 a
5	AZteroid FC	In-Fur	\$835 a	6156 a	295 a	20.9 a	19.9 a	94.6 a
2	Azoxystrobin 2SC	In-Fur	\$819 a	6041 a	297 a	20.3 a	19.9 a	95.0 a
4	Equation SC	In-Fur	\$814 a	5999 a	299 a	20.1 a	20.2 a	94.7 a
6	Quadris	8 lf	\$792 a	5886 a	293 a	20.0 a	19.9 a	94.3 ab
8	AgriStar Azoxystrobin	8 lf	\$758 a	5641 a	284 a	19.7 a	19.2 a	94.8 a
7	Azoxystrobin 2SC	8 lf	\$730 a	5436 a	293 a	18.5 a	19.9 a	94.4 ab
10	AZteroid FC	8 lf	\$727 a	5412 a	289 a	18.6 a	19.7 a	94.4 ab
9	Equation SC	8 lf	\$722 a	5374 a	293 a	18.3 a	19.9 a	94.4 ab
11	Untreated Check		\$541 b	3939 b	258 b	15.3 b	17.9 b	93.7 b
Average			\$769	5686	291	19.4	19.7	94.6
LSD 5%			139.7	1017.3	22.3	2.7	1.2	0.7
CV %			15.7	15.4	6.61	11.9	5.4	0.6

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Comments: Azoxystrobin 2SC, AZteroid FC, AgriStar Azoxystrobin, and Equation SC (generic azoxystrobin formulations) were applied in-furrow at planting and at the 6 to 8 leaf stage for control of Rhizoctonia root rot and compared to Quadris SC. This was a non-inoculated small plot replicated trial and the disease level was high. The untreated check had the highest stand count early in the season but the differences were not significant. Late in the season, the untreated check had the lowest live beet count, and all azoxystrobin formulations had significantly higher counts. In general in-furrow applications performed better than foliar (6-8 lf) applications. An average of 19 dead beets were found in the in-furrow treatments compared to an average of 26 dead beets per 100 ft of row in the foliar applications. No significant differences existed between the different formulations. The untreated plots had 58 dead beets per 100 feet of row and sustained a 5.5 ton per acre yield loss and also lost 2.1 points of sugar, compared to the average of the treatments.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Compare Quadris to Generic Azoxystrobin Formulations for Control of Rhizoctonia* Root Rot

Mennonite Church, Pigeon, MI - 2017

(Page 1 of 2)

Trial Quality: Fair - Good

Variety: SX-RR1245N

Planted: April 29

Harvested: Oct 12

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

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

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

Soil Info: Sandy Loam

% OM: 2.0 **pH:** 6.9 **CEC:** 10.3

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

High: Mn **Low:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: see trts.

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 16.4 inches

No.	Treatment**	Applic Timing	Dead B/100 ft 21-Aug	Net \$/A	Vigor Rating***		Sugarbeet Stand	
					0-10		Beets / 100 ft	
					17-Jul	21-Aug	24-May	18-Aug
3	AgriStar Azoxystrobin	In-fur	1.8 c	\$1,055	7.0	8.3 a	191	188 abc
1	Quadris	In-fur	1.9 c	\$1,153	7.9	8.3 a	196	193 abc
10	AZteroid FC	8 lf	2.8 c	\$1,111	8.4	8.3 a	194	187 abc
4	Equation SC	In-fur	3.3 c	\$1,112	7.8	8.1 a	197	190 abc
8	AgriStar Azoxystrobin	8 lf	3.5 c	\$1,079	8.1	8.0 a	203	197 ab
5	AZteroid FC	In-fur	4.5 c	\$1,058	7.6	8.1 a	195	189 abc
7	Azoxystrobin 2SC	8 lf	5.5 bc	\$1,070	7.8	8.1 a	190	181 bcd
6	Quadris	8 lf	6.3 bc	\$1,038	7.6	8.4 a	210	198 a
2	Azoxystrobin 2SC	In-fur	9.5 b	\$1,052	7.9	8.1 a	186	180 cd
9	Equation SC	8 lf	9.8 b	\$1,050	7.9	8.3 a	192	181 bcd
11	Untreated Check		20.5 a	\$843	7.4	6.8 b	192	167 d
Average			6.3	\$1,056	7.8	8.1	195	186
LSD 5%			4.4	n.s.	n.s.	0.4	n.s.	14.6
CV %			48.01	10.4	12.2	3.4	7.5	5.4

Means followed by the same letter are not significantly different. Duncan's New MRT 5%.

**Rhizoctonia solani*

** Treatments: In-Furrow was applied at 9 fl oz/A in a 3.5 inch band on April 29th, and 8 lf was applied at 14.25 fl oz/A in a 7 inch band on May 30th.

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

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Compare Quadris to Generic Azoxystrobin Formulations for Control of Rhizoctonia Root Rot

Mennonite Church, Pigeon, MI - 2017

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No.	Treatment	Applic Timing	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
3	Agristar Azoxystrobin	In-fur	\$1,055	7616 a	284 a	26.9	18.9 a	95.7
1	Quadris	In-fur	\$1,153	8313 a	293 a	28.4	19.4 a	95.8
10	AZteroid FC	8 lf	\$1,111	8054 a	293 a	27.4	19.3 a	96.1
4	Equation SC	In-fur	\$1,112	8025 a	292 a	27.5	19.2 a	96.0
8	Agristar Azoxystrobin	8 lf	\$1,079	7829 a	295 a	26.5	19.5 a	95.9
5	AZteroid FC	In-fur	\$1,058	7636 a	293 a	26.1	19.3 a	96.0
7	Azoxy 2SC	8 lf	\$1,070	7763 a	296 a	26.2	19.5 a	96.0
6	Quadris	8 lf	\$1,038	7534 a	288 a	26.2	19.0 a	95.9
2	Azoxy 2SC	In-fur	\$1,052	7593 a	282 a	27.0	18.8 a	95.5
9	Equation SC	8 lf	\$1,050	7622 a	286 a	26.6	19.0 a	95.7
11	Untreated Check		\$843	6023 b	264 b	22.8	17.7 b	95.3
Average			\$1,056	7637	288	26.5	19.1	95.8
LSD 5%			n.s.	1134.4	15.4	n.s.	0.9	n.s.
CV %			10.4	10.29	3.72	9.8	3.1	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Comments: Azoxy 2SC, AZteroid FC, Agristar Azoxystrobin, and Equation SC (generic azoxystrobin formulations) were applied In-Furrow at planting and at the 6 to 8 leaf stage for control of Rhizoctonia root rot and compared to Quadris SC. This was a non-inoculated small plot replicated trial and disease level was moderate (20 dead beets / 100 ft in the untreated). There were no differences in the initial stand counts but all of the treatments had better stands than the untreated check late in the season. In general In-Furrow applications performed better than foliar (6 to 8 lf) applications. An average of 4 dead beets were found in the In-Furrow treatments compared to an average of 6 dead beets per 100 ft of row in the foliar applications. The untreated plots had 21 dead beets per 100 feet of row and sustained a 3 ton per acre yield loss and also lost 1.5 points of sugar, compared to the average of the treatments. Overall, the azoxystrobin formulations performed similarly.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Registered and Experimental Fungicides Applied In-Furrow at Planting and at the 6-8 Leaf Stage for Control of Rhizoctonia Root Rot in Sugarbeets

Crumbaugh, Breckenridge, MI - 2017 (Page 1 of 2)

Trial Quality: Good
Variety: SX-RR1245N
Planted: May 19
Harvested: Sept 15
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
%OM: 3.0 **pH:** 7.1 **CEC:** 12.7
Above Opt: P **Opt:** K
High: Mn **Med:** B
Added N: 140 lbs
Prev Crop: Soybeans

Rhizoc Level: See trts.
Cerc Control: Good
Problems: Flooding
Seeding Rate: 4.5 inches
Rainfall: 17.9 inches

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

No.	Treatment	Rate/A fl oz	Appl	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
10	Quadris Quadris Preference	10 14.25 0.125%	IF T-Band 8 lf 4 lf	\$764 a	6109 a	309	19.7 a	20.7	95.1
7	Proline	5.7	IF T-Band	\$746 a	5856 ab	309	19.0 ab	20.7	94.8
3	Quadris	14.25	IF T-Band	\$739 a	5807 abc	307	18.9 abc	20.7	94.8
20	Quadris + Preference	14.25 + .125%	8 lf	\$722 ab	5675 a-d	308	18.2 a-d	20.7	94.9
6	Moncut	35.3	IF T-Band	\$708 abc	5649 a-d	306	18.4 a-d	20.6	94.8
19	Quadris	14.25	8 lf	\$698 abc	5495 a-d	302	18.1 a-e	20.4	94.7
17	Quadris	14.25	4 lf	\$691 abc	5437 a-d	302	18.0 a-e	20.2	95.2
16	Proline Proline + Preference	5.7 5.7 + .125%	IF T-Band 8 lf	\$689 abc	5578 a-d	305	18.3 a-d	20.6	94.7
26	Moncut + Preference	23.5 + .125%	8 lf	\$687 abc	5406 a-d	304	17.7 a-e	20.3	95.2
4	Moncut	17.7	IF T-Band	\$685 abc	5353 a-d	307	17.4 b-e	20.7	94.7
8	Headline	9.2	IF T-Band	\$678 abc	5320 a-d	306	17.3 b-e	20.5	95.2
23	Priaxor + Preference	8 + .125%	8 lf	\$676 abc	5337 a-d	300	17.8 a-e	20.1	95.0
22	Quadris + Preference	14.25 + .125%	12 lf	\$671 abc	5287 a-d	304	17.4 b-e	20.2	95.5
2	Quadris	10	IF T-Band	\$669 abc	5212 a-d	305	17.0 b-e	20.4	95.1
27	Moncut	35.3	8 lf	\$667 abc	5296 a-d	307	17.3 b-e	20.6	94.9
12	Moncut Moncut + Preference	35.3 35.3 + .125%	IF T-Band 8 lf	\$664 abc	5425 a-d	301	18.1 a-e	20.2	94.9
1	Quadris	7.1	IF T-Band	\$655 abc	5067 a-d	300	16.9 b-e	20.1	95.0
24	Proline + Preference	5.7 + .125%	8 lf	\$643 abc	5074 a-d	304	16.7 b-e	20.5	94.7
18	Quadris + Preference	14.25 + .125%	4 lf	\$642 abc	5071 a-d	295	17.0 b-e	20.1	94.4
5	Moncut	23.5	IF T-Band	\$638 abc	5083 a-d	307	16.4 de	20.6	94.9
21	Quadris	14.25	12 lf	\$629 abc	4971 bcd	299	16.6 cde	20.0	95.1
11	Moncut Moncut + Preference	23.5 23.5 + .125%	IF T-Band 8 lf	\$629 abc	5080 a-d	305	16.7 b-e	20.5	94.8
28	Moncut + Preference	35.3 + .125%	8 lf	\$625 abc	4974 bcd	303	16.4 de	20.5	94.6
14	Priaxor Priaxor + Preference	8 8 + .125%	IF T-Band 8 lf	\$597 bc	4919 bcd	297	16.6 cde	20.1	94.7
9	Priaxor	6.7	IF T-Band	\$590 bc	4683 d	291	16.1 de	19.6	94.8
25	Moncut	23.5	8 lf	\$590 bc	4671 d	296	15.8 e	20.2	94.2
15	Headline Headline + Preference	9.2 9.2 + .125%	IF T-Band 8 lf	\$587 bc	4764 cd	294	16.2 de	20.0	94.4
13	Priaxor Priaxor + Preference	6.7 6.7 + .125%	IF T-Band 4 lf	\$576 c	4716 d	289	16.3 de	19.7	94.3
29	Untreated Check			\$449 d	3413 e	262	13.0 f	18.2	93.6
Average				\$655	5196	301	17.2	20.3	94.8
LSD 5%				114.3	868.0	n.s.	1.9	n.s.	n.s.
CV %				12.4	11.9	6.8	7.9	5.6	0.6

Net \$/A: Assume a \$40 beet payment and trial average with fungicide costs subtracted off.

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



Evaluate Registered and Experimental Fungicides Applied In-Furrow at Planting and at the 6-8 Leaf Stage for Control of Rhizoctonia Root Rot in Sugarbeets

Crumbaugh, Breckenridge, MI - 2017

(Page 2 of 2)

No.	Treatment	Rate/A fl oz	Appl	Net \$/A	Stand B/100'		Dead B/100'		Vigor* 1-10	
					13-Jun	24-Aug	5-Sep	3-Aug	25-Jul	24-Aug
10	Quadris	10	IF T-Band	\$764 a	202	182 a-d	9 k	5 h	8.1 a	8.3 a
	Quadris	14.25	8 lf							
	Preference	0.125%	8 lf							
7	Proline	5.7	IF T-Band	\$746 a	215	187 a-d	20 ijk	11 gh	8.1 a	8.2 ab
3	Quadris	10	IF T-Band	\$739 a	218	188 a-d	23 g-k	13 fgh	7.6 a-d	7.8 a-d
20	Quadris + Preference	14.25 + .125%	8 lf	\$722 ab	229	182 a-d	31 c-j	21 d-g	7.5 a-e	7.6 a-e
6	Moncut	35.3	IF T-Band	\$708 abc	211	188 a-d	17 jk	12 gh	7.9 ab	8.0 abc
19	Quadris	14.25	8 lf	\$698 abc	223	194 ab	21 h-k	15 e-h	7.5 a-e	7.6 a-e
17	Quadris	14.25	4 lf	\$691 abc	223	183 a-d	31 d-j	21 d-g	8.0 ab	7.8 a-d
16	Proline	5.7	IF T-Band	\$689 abc	208	169 a-e	31 c-j	18 d-g	7.8 abc	7.9 a-d
	Proline + Preference	5.7 + .125%	8 lf							
26	Moncut + Preference	23.5 + .125%	8 lf	\$687 abc	219	181 a-d	22 h-k	20 d-g	7.5 a-e	7.8 a-d
4	Moncut	17.7	IF T-Band	\$685 abc	217	173 a-e	40 b-f	20 d-g	7.8 abc	7.8 a-d
8	Headline	9.2	IF T-Band	\$678 abc	209	169 a-e	37 c-h	26 b-e	7.5 a-e	7.5 a-f
23	Priaxor + Preference	8 + .125%	8 lf	\$676 abc	203	172 a-e	25 f-j	20 d-g	7.8 abc	7.8 a-d
22	Quadris + Preference	14.25 + .125%	12 lf	\$671 abc	230	193 abc	28 d-j	18 d-g	8.1 ab	7.9 a-d
2	Quadris	10	IF T-Band	\$669 abc	218	180 a-d	32 c-j	24 def	6.9 b-f	7.1 c-g
27	Moncut	35.3	8 lf	\$667 abc	225	182 a-d	39 b-g	21 d-g	7.5 a-e	7.6 a-e
12	Moncut	35.3	IF T-Band	\$664 abc	206	169 a-e	31 c-j	19 d-g	7.5 a-e	7.6 a-e
	Moncut + Preference	35.3 + .125%	8 lf							
1	Quadris	7.1	IF T-Band	\$655 abc	207	159 cde	41 b-f	30 bcd	6.4 ef	6.5 gh
24	Proline + Preference	5.7 + .125%	8 lf	\$643 abc	205	165 a-e	32 c-j	25 c-f	7.5 a-e	7.6 a-e
18	Quadris + Preference	14.25 + .125%	4 lf	\$642 abc	224	170 a-e	47 bc	29 bcd	6.9 b-f	7.0 d-g
5	Moncut	23.5	IF T-Band	\$638 abc	205	160 b-e	41 b-e	23 def	7.5 a-e	7.6 a-e
21	Quadris	14.25	12 lf	\$629 abc	227	199 a-e	26 e-j	15 e-h	7.4 a-e	7.6 a-e
11	Moncut	23.5	IF T-Band	\$629 abc	212	166 a	35 c-i	22 d-g	7.5 a-e	7.6 a-e
	Moncut + Preference	23.5 + .125%	8 lf							
28	Moncut + Preference	35.3+ .125%	8 lf	\$625 abc	224	182 a-d	33 c-j	25 cde	7.0 a-f	7.3 b-g
14	Priaxor	8	IF T-Band	\$597 bc	220	175 a-d	42 b-e	24 def	7.3 a-e	7.4 a-g
	Priaxor + Preference	8 + .125%	8 lf							
9	Priaxor	6.7	IF T-Band	\$590 bc	207	157 cde	47 bc	28 bcd	6.6 c-f	6.8 efg
25	Moncut	23.5	8 lf	\$590 bc	207	162 b-e	39 b-g	36 b	6.6 c-f	6.7 efg
15	Headline	9.2	IF T-Band	\$587 bc	218	170 a-e	43 bcd	26 b-e	7.3 a-e	7.3 a-g
	Headline + Preference	9.2 + .125%	8 lf							
13	Priaxor	6.7	IF T-Band	\$576 c	215	154 de	54 b	35 bc	6.5 def	6.6 fg
	Priaxor + Preference	6.7 + .125%	4 lf							
29	Untreated Check			\$449 d	221	139 e	73 a	49 a	6.0 f	5.8 h
Average				\$655	215.4	174.2	34.1	22.4	7.4	7.4
LSD 5%				114.3	n.s.	28.6	13.2	9.4	1.0	0.8
CV %				12.4	7.0	11.7	27.6	29.9	9.3	7.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

* Vigor: 0 to 10 rating, 10 is best. *Sprayed: 4 lf - June 12th, 8 lf - June 27th, 12 lf - July 7th

Comments: The *Rhizoctonia solani* (root rot) level was very high in this trial. Quadris applied in-furrow followed by an 8 leaf application gave the best results, followed by Quadris applied in-furrow, then by Quadris at the 8 leaf stage, followed by the 12 leaf stage then the 4 leaf stage. Proline and Moncut applied in-furrow also provided good control. Headline and Priaxor were somewhat less effective.

Net \$/A: Assume a \$40 beet payment and trial average with fungicide costs subtracted off.

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



Control of Rhizoctonia Root in Sugarbeets with Quadris Applied In-Furrow at Planting and at the 6-8 Leaf Stage Crumbaugh, Breckenridge, MI - 2017

Trial Quality: Good
Variety: SX 1245N
Planted: May 19
Harvested: Sept 15
Plots: 6 rows X 38 ft,
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
%OM: 3.0 **pH:** 7.1 **CEC:** 12.7
Above Opt: P **Opt:** K
High: Mn **Med:** B
Added N: 140 lbs
Prev Crop: Soybeans

Rhizoc Level: See trts.
Cerc Control: Good
Problems: Flooding
Seeding Rate: 4.5 inches
Rainfall: 17.9 inches

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

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

No.	Treatment	Appl	fl oz/A	Net \$/A	RWSA	RWST	T/A	% SUC	16-Jun Beets 100 ft	31-Aug Dead B/100 ft
1	Quadris FI	IF 3.5" T-Band	10.0	\$914 a	7543 a	340 a	22.2 a	22.4 a	241 b	13 b
2	Quadris FI	6-8 lf 7" Band	14.25	\$861 a	7149 a	331 ab	21.6 a	21.8 ab	255 a	19 b
3	Untreated			\$616 b	5004 b	303 b	16.5 b	20.3 b	252 a	43 a
Average				\$797	6565	325	20.1	21.5	249.1	24.9
LSD 5%				92.7	752.8	29.4	1.5	1.7	8.9	10.2
CV%				6.7	6.6	5.2	4.2	4.5	2.1	23.6

Means followed by same letter are not significantly different (P=.05, Duncan's New MRT)

Comments: Quadris was applied in-furrow at planting in a 3.5 inch t-band and at the 6-8 leaf stage in a 7 inch band. The *Rhizoctonia solani* (root rot) level was high. The in-furrow treatments gave better root rot control than the 6-8 leaf treatments. The in-furrow treatments caused about 4% stand loss. Both Quadris treatments had significantly higher yield, quality and net income than the untreated check.

Net \$/A: Assume a \$40 beet payment and trial average with fungicide costs subtracted off.

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



Evaluate Fungicide Application Timings (BEETcast) for Control of Cercospora Leafspot in Sugarbeets

Answer Plot, Bach, MI - 2017

(Page 1 of 4)

Trial Quality: Good

Varieties: C-RR059, B-149N, B-1399

Planted: May 9

Harvested: Oct 31

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 3.2 **pH:** 7.7 **CEC:** 14

Above Opt: P, K

High: Mn **Med:** B

Added N: 140 lbs

Previous Crop: Corn

Rhizoc Level: Low

Cerc. Control: See trts.

Problems: Alternaria LS

Seeding Rate: 4.5 inches

Rainfall: 19.1 inches

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

No.	Treatment	Variety	Cerc % Leaf Damage	Altern % Leaf Damage	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
4	Bcast Aggressive***	B-1399	1.3 g	1.4 hi	\$1,561 ab	12257 ab	302 abc	40.6 bcd	19.7 bcd	96.4 ab
5	Bcast Aggressive***	C-RR059	1.5 g	2.8 efg	\$1,636 ab	12813 ab	319 a	40.3 cd	21.0 a	95.8 abc
7	ND/MN**	B-1399	1.5 g	1.8 ghi	\$1,565 ab	12028 b	301 abc	39.9 cd	19.8 bcd	96.1 ab
6	Bcast Aggressive***	B-149N	1.8 fg	1.5 hi	\$1,688 ab	13269 a	308 abc	43.1 abc	20.1 a-d	96.4 a
10	New Model*	B-1399	1.8 fg	1.5 hi	\$1,662 ab	12818 ab	303 abc	42.4 abc	19.8 bcd	96.3 ab
8	ND/MN**	C-RR059	2.5 efg	3.8 e	\$1,533 b	11791 b	302 abc	39.1 d	20.0 a-d	95.6 bc
12	New Model*	B-149N	2.9 d-g	2.5 fgh	\$1,702 a	13297 a	311 abc	42.9 abc	20.5 abc	95.8 abc
11	New Model*	C-RR059	3.4 d-g	3.0 ef	\$1,704 a	13313 a	304 abc	43.7 ab	19.9 bcd	96.2 ab
1	BEETcast	B-1399	4.4 def	1.5 hi	\$1,618 ab	12488 ab	300 abc	41.7 bcd	19.7 bcd	96.2 ab
9	ND/MN**	B-149N	4.8 de	1.3 i	\$1,616 ab	12400 ab	293 c	42.4 abc	19.3 d	96.1 ab
2	BEETcast	C-RR059	5.5 d	5.3 d	\$1,706 a	13328 a	314 ab	42.5 abc	20.7 ab	95.8 abc
3	BEETcast	B-149N	5.5 d	1.5 hi	\$1,697 a	13337 a	295 bc	45.3 a	19.6 cd	95.7 abc
13	Untreated Check	B-1399	58.0 c	6.4 c	\$1,192 c	8820 c	264 d	33.4 e	17.5 e	96.0 ab
14	Untreated Check	C-RR059	80.8 b	17.5 a	\$1,141 c	8443 c	261 d	32.4 e	17.7 e	94.9 d
15	Untreated Check	B-149N	93.8 a	7.7 b	\$1,142 c	8449 c	266 d	31.9 e	17.9 e	95.3 cd
Average			17.9	3.9	\$1,544	11923	296	40.1	19.5	95.9
LSD 5%			2.4	1.0	136.2	1007.8	17.4	2.9	0.9	0.6
CV %			9.4	18.4	6.1	5.9	4.1	4.9	3.4	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***New Model:** Developed by Michigan Sugar Co. and MSU (Hanson/Bublitz).

****ND/MN:** Red River Valley model modified by Daniel Bublitz

*****Bcast Aggressive:** BEETcast with earlier start date and closer timings

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

Comments: Leafspot disease severity (*Cercospora beticola* and *Alternaria Alternata*) has been increasing in recent years. To maintain control BEETcast recommendations need to be adjusted yearly. In this trial we evaluated the normal BEETcast recommendations, a more aggressive BEETcast program, a new model developed by Michigan Sugar with help from Dr. Linda Hanson and Daniel Bublitz and a modified, ND/MN leafspot model. With respect to disease control, the more aggressive BEETcast treatments provided the best disease control, however, the New Model and current BEETcast recommendations provided the highest dollar per acre return. Providing better disease control has value, even if the additional costs reduce the payment slightly. Less disease means better processing, better pile storage and fewer spores to infect future crops. With respect to varietal tolerance, B-1399 had less damage from leafspot but yielded less and generated less income. C-RR059 gave fairly good Cercospora control but had the worst ratings for Alternaria control. B-149N had the worst Cercospora ratings but yielded well and provided the highest income. Better varieties are coming, however, it appears that growers will need to be aggressive in their approach to leafspot control for the foreseeable future. This was a good quality trial with a favorable sugarbeet stand.



Evaluate Fungicide Application Timings (BEETcast) for Control of Cercospora Leafspot in Sugarbeets

Answer Plot, Bach, MI - 2017

(Page 2 of 4)

Trial Quality: Good

Variety: B-149N, C-RR059, B-1399

Planted: May 9

Harvested: Oct 31

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

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

Soil Info: Loam

% OM: 3.2 **pH:** 7.7 **CEC:** 14.0

Above Opt: P, K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: See trts.

Problems: Alternaria LS

Seeding Rate: 4.5 inches

Rainfall: 19.1 inches

Application Timing Effect (averaged over varieties)

No.	Treatment	Net \$/A	% Cerc Damage	% Altern Damage	RWSA	RWST	T/A	% SUC
4	New Model*	\$1,689 a	2.7 bc	2.3 b	13143 a	306 ab	43.0 a	20.1 ab
1	BEETcast Current Rec.	\$1,674 a	5.1 b	2.8 b	13051 a	303 ab	43.2 a	20.0 ab
2	Bcast Aggressive***	\$1,629 a	1.5 c	1.9 b	12780 a	310 a	41.3 a	20.3 a
3	ND/MN**	\$1,571 a	2.9 bc	2.3 b	12073 a	299 b	40.5 a	19.7 b
5	Untreated Check	\$1,158 b	77.5 a	10.53 a	8570 b	263 c	32.6 b	17.7 c
Average		\$1,544	17.9	4.0	11923	296	40.1	19.6
LSD 5%		155.6	3.5	1.5	1151.2	9.9	4.9	0.6
CV%		11.3	21.7	43.0	10.9	3.7	13.8	3.3

Variety Effect (averaged over fungicide treatments)

No.	Treatment	Net \$/A	% Cerc Damage	% Altern Damage	RWSA	RWST	T/A	% SUC
3	B-149N	\$1,569	21.7 a	2.9 b	12150	295	41 a	19.5 ab
2	C-RR059	\$1,544	18.7 b	6.5 a	11937	300	40 b	19.9 a
1	B-1399	\$1,520	13.4 c	2.5 b	11682	294	40 b	19.3 b
Average		\$1,544	17.9	4.0	11923	296	40	19.6
LSD 5%		n.s	1.1	0.5	n.s.	n.s	1.3	0.4
CV%		6.1	9.3	18.4	5.9	4.1	4.9	3.3

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***New Model:** Developed by Michigan Sugar Co. and MSU (Hanson/Bublitz).

****ND/MN:** Red River Valley model modified by Daniel Bublitz

*****Bcast Aggressive:** BEETcast with earlier start date and closer timings

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Fungicide Application Timings (BEETcast) for Control of Cercospora Leafspot in Sugarbeets

Answer Plot, Bach, MI - 2017

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No.	Trt	App	DSV	Date	Treatment
1	Current Rec B-1399	1	51	6-Jul	Inspire + Manzate + MasterLock
		2	100	28-Jul	Super Tin + Manzate + MasterLock
		3	122	14-Aug	Proline + NIS + Manzate + MasterLock
		4	147	1-Sep	Super Tin + Badge + Masterlock
2	Current Rec C-RR059	1	49	5-Jul	Inspire + Manzate + MasterLock
		2	84	21-Jul	Super Tin + Manzate + MasterLock
		3	109	4-Aug	Proline + NIS + Manzate + MasterLock
		4	124	16-Aug	Super Tin + Badge + MasterLock
		5	147	1-Sep	Enable + NIS + Manzate + MasterLock
3	Current Rec B-149R	1	49	5-Jul	Inspire + Manzate + MasterLock
		2	73	15-Jul	Super Tin + Manzate + MasterLock
		3	94	25-Jul	Proline + NIS + Manzate + MasterLock
		4	115	9-Aug	Super Tin + Badge + MasterLock
		5	139	23-Aug	Enable + NIS + Manzate + MasterLock
		6	147	1-Sep	Manzate + Badge + MasterLock
4	Aggressive*** B-1399	1	49	5-Jul	Inspire + Manzate + MasterLock
		2	93	24-Jul	Super Tin + Manzate + MasterLock
		3	115	9-Aug	Proline + NIS + Manzate + MasterLock
		4	139	25-Aug	Super Tin + Badge + MasterLock
		5	147	1-Sep	Manzate + Badge + MasterLock
5	Aggressive*** C-RR059	1	49	5-Jul	Inspire + Manzate + MasterLock
		2	73	15-Jul	Super Tin + Manzate + MasterLock
		3	94	25-Jul	Proline + NIS + Manzate + MasterLock
		4	115	9-Aug	Super Tin + Badge + MasterLock
		5	139	23-Aug	Enable + NIS + Manzate + MasterLock
		6	147	1-Sep	Manzate + Badge + MasterLock
6	Aggressive*** B-149R	1	36	27-Jun	Inspire + Manzate + MasterLock
		2	60	11-Jul	Super Tin + Manzate + MasterLock
		3	84	21-Jul	Proline + NIS + Manzate + MasterLock
		4	113	7-Aug	Super Tin + Badge + MasterLock
		5	124	16-Aug	Enable + NIS + Manzate + MasterLock
		6	147	1-Sep	Manzate + Badge + MasterLock
		7	157	11-Sep	Manzate + Badge + MasterLock
7	ND/MN** B-1399	1	53	7-Jul	Inspire + Manzate + MasterLock
		2	94	25-Jul	Super Tin + Manzate + MasterLock
		3	117	11-Aug	Proline + NIS + Manzate + MasterLock

***New Model:** Developed by Michigan Sugar Co. and MSU (Hanson/Bublitz).

****ND/MN:** Red River Valley model modified by Daniel Bublitz

*****Bcast Aggressive:** BEETcast with earlier start date and closer timings



Evaluate Fungicide Application Timings (BEETcast) for Control of Cercospora Leafspot in Sugarbeets

Answer Plot, Bach, MI - 2017

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No.	Trt	App	DSV	Date	Treatment
8	ND/MN** C-RR059	1	53	7-Jul	Inspire + Manzate + MasterLock
		2	94	25-Jul	Super Tin + Manzate + MasterLock
		3	117	11-Aug	Proline + NIS + Manzate + MasterLock
9	ND/MN** B-149N	1	53	7-Jul	Inspire + Manzate + MasterLock
		2	94	25-Jul	Super Tin+ Manzate + MasterLock
		3	117	11-Aug	Proline + NIS + Manzate + MasterLock
10	New Model* B-1399	1	36	27-Jun	Manzate + MasterLock
		2	53	7-Jul	Inspire + Manzate + MasterLock
		3	100	28-Jul	Super Tin + Manzate + MasterLock
		4	134	21-Aug	Proline + NIS + Manzate + MasterLock
		5	147	1-Sep	Manzate + Badge + MasterLock
11	New Model* C-RR059	1	36	27-Jun	Manzate + MasterLock
		2	53	7-Jul	Inspire + Manzate + MasterLock
		3	94	25-Jul	Super Tin + Manzate + MasterLock
		4	115	9-Aug	Proline + NIS + Manzate + MasterLock
		5	134	21-Aug	Super Tin + Manzate + MasterLock
		6	147	1-Sep	Manzate + Badge + MasterLock
12	New Model* B-149N	1	36	27-Jun	Manzate + MasterLock
		2	53	7-Jul	Inspire + Manzate + MasterLock
		3	93	24-Jul	Super Tin + Manzate + MasterLock
		4	106	3-Aug	Proline + NIS + Manzate + MasterLock
		5	139	24-Aug	Super Tin + Manzate + MasterLock
		6	147	1-Sep	Manzate + Badge + MasterLock
13	UTC B-1399				
14	UTC C-RR059				
15	UTC B-149N				

***New Model:** Developed by Michigan Sugar Co. and MSU (Hanson/Bublitz).

****ND/MN:** Red River Valley model modified by Daniel Bublitz

*****Bcast Aggressive:** BEETcast with earlier start date and closer timings



Evaluate Fungicides (with and w/o EBDC Tank Mix) for Control of *Cercospora beticola* (leafspot) in Sugarbeets

Herford, Elkton, MI - 2017

(Page 1 of 4)

Trial Quality: Good

Variety: B-149N

Planted: April 26

Harvested: Oct 9

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Loam

% OM: 3.2 **pH:** 7.5 **CEC:** 12

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

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: Alternaria LS

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

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

Treatment	% Cerc Damage		Net \$ / A		RWSA		RWST	
	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix
Inspire XT + Enable** + NIS	0.5 I	2.3 i-l	\$1,150 abc	\$1,095 a-d	9612 a	8945 a-d	296 abc	284 a-f
Minerva Duo	0.5 I	2.0 jkl	\$1,107 a-d	\$1,173 ab	9088 abc	9269 ab	287 a-e	290 a-e
Inspire XT	0.8 kl	4.2 g-l	\$1,128 a-d	\$1,082 a-d	9047 abc	8448 a-f	300 a	279 b-g
Super Tin	1.0 jkl	1.5 jkl	\$1,186 ab	\$1,207 a	9178 abc	9040 abc	297 ab	286 a-f
Proline + NIS	1.0 jkl	2.0 jkl	\$1,091 a-d	\$1,137 abc	8974 a-d	8989 a-d	283 a-f	281 b-g
Enable + NIS	1.3 jkl	6.9 e-i	\$1,072 a-f	\$1,072 a-f	8747 a-d	8472 a-f	289 a-e	279 b-g
Echo	1.4 jkl	2.0 jkl	\$1,178 ab	\$1,193 ab	9077 abc	8900 a-d	282 a-f	285 a-f
Inspire XT + Potassium Biocarbonate	2.0 jkl	5.6 f-j	\$1,105 a-d	\$1,031 a-g	8974 a-d	8177 b-f	290 a-e	276 d-g
Tilt	2.5 h-l	10.7 de	\$1,009 b-g	\$1,019 a-g	7912 c-f	7702 def	279 b-g	275 d-g
Priaxor	2.5 h-l	9.7 def	\$941 d-g	\$891 efg	7900 c-f	7341 efg	273 efg	272 efg
Topsin	2.6 h-l	4.8 g-l	\$1,013 b-g	\$1,105 a-d	7967 b-f	8329 a-f	276 d-g	277 c-g
Eminent	3.4 g-l	12.2 d	\$1,075 a-e	\$971 c-g	8726 a-d	7706 def	280 b-g	269 fg
Topguard	4.5 g-l	5.5 f-k	\$1,010 b-g	\$1,099 a-d	8269 b-f	8594 a-e	293 a-d	281 b-g
Minerva	6.9 e-i	7.0 e-h	\$1,031 a-g	\$1,057 a-f	8417 a-f	8303 a-f	272 efg	283 a-f
Headline	7.9 d-g	41.8 c	\$1,008 b-g	\$886 fg	8386 a-f	7262 fg	278 b-g	263 g
Untreated	78.8 b	93.8 a	\$853 g	\$893 efg	6229 g	6229 g	235 h	235 h
Average	7.3	13.25	\$1,060	\$1,057	8531	8231	282	276
LSD 5%	4.0		155.7		1085.7		15.4	
CV %	27.3		10.4		9.1		3.9	

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

**** Fungicide Rates:** Recommended rates except for Inspire XT + Enable, Enable is a half rate (4 fl oz/A)

Spray Dates: A - June 28th, B - July 17th, C - Aug 1st, D - Aug 18th, E - Aug 28th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

*** Tank Mix:** Treatment is tank mixed with Manzate Max (1.6 qt/A), **NIS:** Preference

Evaluate Fungicides (with and w/o EBDC Tank Mix) for Control of *Cercospora beticola* (leafspot) in Sugarbeets

Herford, Elkton, MI - 2017

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Treatment	T/A		% SUC		% CJP	
	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix
Inspire XT + Enable** + NIS	32.4 a	31.5 abc	19.6 abc	18.8 a-h	95.7	95.9
Minerva Duo	31.6 abc	32.0 abc	19.0 a-g	19.2 a-f	95.9	95.8
Inspire XT	30.2 a-e	30.3 a-e	19.8 a	18.6 b-h	96.0	95.5
Super Tin	30.9 a-d	31.6 abc	19.7 ab	19.0 a-g	95.5	95.8
Proline + NIS	31.8 abc	32.0 abc	18.9 a-g	18.8 a-h	95.4	95.4
Enable + NIS	30.3 a-e	30.3 a-e	19.2 a-f	18.6 c-h	95.6	95.7
Echo	32.3 ab	31.2 a-d	18.7 a-h	19.1 a-g	95.7	95.4
Inspire XT + Potassium Biocarbonate	30.9 a-d	29.7 a-e	19.3 a-e	18.5 c-h	95.5	95.4
Tilt	28.4 a-e	28.0 b-e	18.6 c-h	18.4 d-h	95.6	95.4
Priaxor	29.0 a-e	27.0 de	18.3 e-h	18.2 fgh	95.4	95.4
Topsin	28.8 a-e	30.0 a-e	18.5 c-h	18.4 d-h	95.4	95.7
Eminent	31.2 a-d	28.8 a-e	18.7 a-h	18.0 gh	95.6	95.5
Topguard	28.3 a-e	30.6 a-e	19.5 a-d	18.7 a-h	95.6	95.6
Minerva	31.0 a-d	29.3 a-e	18.2 fgh	18.8 a-h	95.5	95.7
Headline	30.1 a-e	27.7 cde	18.6 c-h	17.7 h	95.5	95.2
Untreated	26.5 e	26.5 e	16.0 i	16.0 i	95.2	95.2
Average	30.2	29.8	18.8	18.4	95.6	95.5
LSD 5%	3.6		0.9		n.s.	
CV %	8.4		3.5		0.4	

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

**** Fungicide Rates:** Recommended rates except for Inspire XT + Enable, Enable is a half rate (4 fl oz/A)

Spray Dates: A - June 28th, B - July 17th, C - Aug 1st, D - Aug 18th, E - Aug 28th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

*** Tank Mix:** Treatment is tank mixed with Manzate Max (1.6 qt/A), **NIS:** Preference

Fungicide Effect (Average of Tank mix and No Tank Mix)

No.	Treatment	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
		15-Sep	15-Aug						
7	Minerva Duo (A&C), Manzate (B&D), Badge (E)	1.3 i	0.5 bc	\$1,140 abc	9178 ab	289 ab	31.8 ab	19.1 a	95.8 a
8	SuperTin (A&C), Manzate (B&D), Badge (E)	1.3 i	0.4 c	\$1,196 a	9109 abc	291 a	31.3 abc	19.4 a	95.6 a-d
13	Inspire + Enable + Preference (A&C), Manzate (B&D), Badge (E)	1.4 i	0.5 c	\$1,123 a-d	9278 a	290 ab	32.0 a	19.2 a	95.8 ab
3	Proline + Preference (A&C), Manzate (B&D), Badge (E)	1.5 hi	0.4 c	\$1,114 b-e	8982 a-d	282 b-e	31.9 a	18.8 a-e	95.4 cde
12	Echo (A&C), Manzate (B&D), Badge (E)	1.7 hi	0.8 bc	\$1,186 ab	8989 a-d	284 a-e	31.7 ab	18.9 a-d	95.5 a-d
1	Inspire (A&C), Manzate (B&D), Badge (E)	2.5 ghi	0.6 bc	\$1,105 cde	8747 b-e	289 ab	30.2 a-d	19.2 a	95.7 abc
11	Topsin (A&C), Manzate (B&D), Badge (E)	3.7 f-i	0.5 c	\$1,059 def	8148 fgh	277 def	29.4 c-f	18.5 c-f	95.6 a-d
15	Inspire + Potassium Biocar (A&C), Manzate (B&D), Badge (E)	3.8 f-i	0.6 bc	\$1,068 c-f	8576 def	283 a-e	30.3 a-d	18.9 abc	95.5 b-e
6	Enable + Preference (A&C), Manzate (B&D), Badge (E)	4.1 e-h	0.7 bc	\$1,072 c-f	8609 c-f	284 a-d	30.3 a-d	18.9 a-d	95.7 a-d
2	Topguard (A&C), Manzate (B&D), Badge (E)	5.0 d-g	0.5 bc	\$1,054 def	8432 ef	287 abc	29.5 c-f	19.1 ab	95.6 a-d
9	Priaxor (A&C), Manzate (B&D), Badge (E)	6.1 c-f	0.7 bc	\$916 h	7620 h	272 f	28.0 fg	18.2 ef	95.4 cde
14	Tilt (A&C), Manzate (B&D), Badge (E)	6.6 cde	0.6 bc	\$1,014 fg	7807 gh	277 def	28.2 efg	18.5 b-f	95.5 a-d
4	Minerva (A&C), Manzate (B&D), Badge (E)	6.9 cd	0.8 bc	\$1,044 ef	8360 ef	278 c-f	30.2 a-d	18.5 b-f	95.6 a-d
5	Eminent (A&C), Manzate (B&D), Badge (E)	7.8 c	0.8 bc	\$1,023 f	8216 fg	274 ef	30.0 b-e	18.3 def	95.5 a-d
10	Headline (A&C), Manzate (B&D), Badge (E)	24.8 b	1.5 b	\$947 gh	7824 gh	271 f	28.9 def	18.2 f	95.3 de
16	Untreated Check	86.3 a	23.3 a	\$873 h	6229 i	235 g	26.5 g	16.0 g	95 e
Average		10.3	2.1	\$1,058	8382	279	30.0	18.6	95.5
LSD 5%		2.6	1.0	75.7	527.8	9.4	1.9	0.6	0.3
CV %		24.9	49.3	7.1	6.3	3.3	6.3	3.1	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: A - June 28th, B - July 17th, C - Aug 1st, D - Aug 18th, D - Aug 28th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Fungicides (with and w/o EBDC Tank Mix) for Control of *Cercospora beticola* (leafspot) in Sugarbeets

Heford, Elkton, MI - 2017

(Page 4 of 4)

Tank Mix Effect (Average of all Fungicide Treatments)

No.	Treatment	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
		15-Sep	15-Aug						
1	Tank Mix	7.3 b	1.4 b	\$1,060	8531 a	282 a	30.2	18.8 a	95.6
2	No Tank Mix	13.2 a	2.8 a	\$1,057	8232 b	276 b	29.8	18.4 b	95.5
Average		10.3	2.1	\$1,058	8381	279	30.0	18.6	95.5
LSD 5%		1.0	0.5	n.s.	271.4	3.8	n.s.	0.9	n.s.
CV %		27.3	73.6	10.3	9.1	3.9	8.4	3.5	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: A - June 28th, B - July 17th, C - Aug 1st, D - Aug 18th, E - Aug 28th.

Comments: Fungicides were evaluated with and without an EBDC tank mix partner for control of *Cercospora* leafspot in sugarbeets. The disease level was very high and *Alternaria alternata* (leafspot) was present at a lower level. The addition of an EBDC clearly improved leaf spot control in the triazole and strobilurin treatments. Tank mixing improved the efficacy of Super Tin and Echo (chlorothalonil) to a lesser degree. Inspire XT, Minerva Duo, Super Tin, Echo, Proline and Enable provided the best leafspot control. Priaxor and Topsin provided adequate control (probably because of *Alternaria* infections), however, Headline failed to control the diseases adequately. None of the treatments caused sugarbeet injury.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Fungicides (with and w/o EBDC Tank Mix) for Control of *Cercospora beticola* (leafspot) in Sugarbeets

Mennonite Church, Pigeon, MI - 2017 (Page 1 of 4)

Trial Quality: Good

Variety: C-G333NT

Planted: April 28

Harvested: Oct 9

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Loam

% OM: 2.0 **pH:** 6.9 **CEC:** 10.3

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

High: Mn **Low:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 15.3 inches

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

Treatment	% Cerc Damage		Net \$ / A		RWSA		RWST	
	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix
Inspire XT + Enable** + NIS	0.15 g	0.43 fg	\$1,278 a	\$1,145 a-d	10230 a	9113 b-e	307 a	287 a-d
Minerva Duo	0.23 g	0.55 fg	\$1,141 a-d	\$1,160 a-d	9045 b-e	9038 b-e	290 abc	298 abc
Inspire XT	0.23 g	0.55 fg	\$1,273 a	\$1,189 a-d	9899 ab	9146 b-e	295 abc	293 abc
Proline + NIS	0.25 g	0.55 fg	\$1,183 a-d	\$1,177 a-d	9287 a-d	9098 b-e	300 abc	299 abc
Super Tin	0.25 g	0.93 efg	\$1,149 a-d	\$1,207 a-d	8854 b-e	9133 b-e	285 a-d	298 abc
Topguard	0.88 efg	2.25 d-g	\$1,220 abc	\$1,231 ab	9527 abc	9463 a-d	296 abc	299 abc
Eminent	0.88 efg	1.25 d-g	\$1,166 a-d	\$1,127 a-d	9135 b-e	8706 cde	289 a-d	286 a-d
Enable + NIS	1.06 efg	2.25 d-g	\$1,135 a-d	\$1,125 a-d	8939 b-e	8723 cde	288 a-d	288 a-d
Echo	1.13 d-g	2.50 d-g	\$1,190 a-d	\$1,195 a-d	9109 b-e	9000 b-e	295 abc	304 abc
Minerva	1.50 d-g	3.19 d-g	\$1,183 a-d	\$1,084 b-e	9261 a-d	8391 cde	301 abc	283 bcd
Priaxor	2.00 d-g	4.8 cde	\$1,116 bcd	\$1,115 bcd	8873 b-e	8720 cde	292 abc	298 abc
Inspire + Potassium Biocarbonate	2.25 d-g	4.4 c-f	\$1,059 de	\$1,114 bcd	8385 cde	8640 cde	283 bcd	299 abc
Topsin	2.25 d-g	4.4 c-f	\$1,135 a-d	\$1,162 a-d	8751 cde	8799 b-e	294 abc	294 abc
Headline	3.10 d-g	7.9 c	\$1,145 a-d	\$1,067 cde	9072 b-e	8355 de	296 abc	293 abc
Tilt	3.35 d-g	5.1 cd	\$1,206 a-d	\$1,064 cde	9254 a-d	8075 e	300 abc	280 cd
Untreated Check	62.5 b	84.8 a	\$968 ef	\$908 f	7130 f	6621 f	267 de	256 e
Average	5.1	7.9	\$1,159	\$1,129	9047	8689	292	291
LSD 5%	3.3		127.6		930.3		18.7	
CV %	35.8		7.8		7.4		4.5	

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

**** Fungicide Rates:** Recommended rates except for Inspire XT + Enable, Enable is a half rate (4 fl oz/A)

Spray Dates: A - June 29th, B - July 17th, C - July 28th, D - Aug 15th, E - Aug 25th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

*** Tank Mix:** Treatment is tank mixed with Manzate Max (1.6 qt/A), **NIS:** Preference

Evaluate Fungicides (with and w/o EBDC Tank Mix) for Control of *Cercospora beticola* (leafspot) in Sugarbeets

Mennonite Church, Pigeon, MI - 2017

(Page 2 of 4)

Treatment	T/A		% SUC		% CJP	
	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix	EBDC Tank Mix*	NO Tank Mix
Inspire XT + Enable** + NIS	33.4 ab	31.7 a-d	20.3 a	19.3 abc	95.7 ab	95.0 b-g
Minerva Duo	31.2 a-f	30.3 c-f	19.3 abc	19.9 ab	95.4 a-e	95.3 a-f
Inspire XT	33.7 a	31.2 a-f	19.7 ab	19.6 ab	95.4 a-f	95.2 a-g
Proline + NIS	30.9 b-f	30.4 c-f	20.1 ab	19.8 ab	95.2 a-g	95.7 ab
Super Tin	31.0 b-f	30.6 c-f	19.2 abc	19.8 ab	95.1 b-g	95.6 abc
Topguard	32.1 abc	31.6 a-e	19.8 ab	19.8 ab	95.3 a-g	95.6 ab
Eminent	31.6 a-e	30.4 c-f	19.4 abc	19.4 ab	95.2 a-g	94.7 g
Enable + NIS	30.9 b-f	30.3 c-f	19.3 abc	19.3 abc	95.4 a-f	95.1 a-g
Echo	30.9 b-f	29.6 c-f	19.7 ab	20.1 ab	95.2 a-g	95.8 a
Minerva	30.8 b-f	29.6 c-f	20.1 ab	19.1 abc	95.2 a-g	94.9 efg
Priaxor	30.4 c-f	29.2 def	19.5 ab	19.9 ab	95.2 a-g	95.4 a-e
Inspire + Potassium Biocarbonate	29.6 c-f	28.9 efg	19.1 abc	20.0 ab	95.0 c-g	95.3 a-g
Topsin	29.7 c-f	29.9 c-f	19.8 ab	19.6 ab	94.9 d-g	95.5 a-e
Headline	30.7 b-f	28.6 fg	19.7 ab	19.5 ab	95.6 a-d	95.4 a-e
Tilt	30.8 b-f	28.7 fg	20.0 ab	18.8 bc	95.3 a-g	95.1 a-g
Untreated Check	26.7 gh	25.9 n	18.1 cd	17.4 d	94.9 d-g	94.7 fg

Average	30.9	29.8	19.6	19.5	95.3	95.3
LSD 5%	2.2		1.1		0.5	
CV %	5.2		3.9		0.4	

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

** **Fungicide Rates:** Recommended rates except for Inspire XT + Enable, Enable is a half rate (4 fl oz/A)

Spray Dates: A - June 29th, B - July 17th, C - July 28th, D - Aug 15th, E - Aug 25th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

* **Tank Mix:** Treatment is tank mixed with Manzate Max (1.6 qt/A), **NIS:** Preference

Fungicide Effect (Average of Tank mix and No Tank Mix)

No.	Treatment	% Cerc Damage 15-Sep	Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
13	Inspire + Enable + Preference (A&C), Manzate (B&D), Badge (E)	0.3 e	\$1,211 ab	9672 a	297 a	32.5 a	19.8 a	95.3
1	Inspire (A&C), Manzate (B&D), Badge (E)	0.4 de	\$1,231 a	9522 ab	294 a	32.4 a	19.6 a	95.3
7	Minerva Duo (A&C), Manzate (B&D), Badge (E)	0.4 de	\$1,151 a-d	9041 a-d	294 a	30.7 bcd	19.6 a	95.4
3	Proline + Preference (A&C), Manzate (B&D), Badge (E)	0.4 de	\$1,180 abc	9192 abc	300 a	30.7 bcd	19.9 a	95.4
8	SuperTin (A&C), Manzate (B&D), Badge (E)	0.6 de	\$1,178 abc	8993 bcd	292 a	30.8 bc	19.5 a	95.3
5	Eminent (A&C), Manzate (B&D), Badge (E)	1.1 de	\$1,146 a-d	8920 bcd	288 a	31.0 abc	19.4 a	94.9
2	Topguard (A&C), Manzate (B&D), Badge (E)	1.6 cde	\$1,225 a	9495 ab	298 a	31.9 ab	19.8 a	95.5
6	Enable + Preference (A&C), Manzate (B&D), Badge (E)	1.7 cde	\$1,130 bcd	8831 cd	288 a	30.6 bcd	19.3 a	95.2
12	Echo (A&C), Manzate (B&D), Badge (E)	1.8 cde	\$1,192 abc	9054 a-d	299 a	30.2 cd	19.9 a	95.5
4	Minerva (A&C), Manzate (B&D), Badge (E)	2.3 cde	\$1,133 bcd	8826 cd	292 a	30.2 cd	19.6 a	95.0
15	Inspire + Potassium Biocar (A&C) Manzate (B&D), Badge (E)	3.3 bcd	\$1,086 d	8513 d	291 a	29.2 d	19.5 a	95.1
11	Topsin (A&C), Manzate (B&D), Badge (E)	3.3 bcd	\$1,148 a-d	8775 cd	294 a	29.8 cd	19.7 a	95.2
9	Priaxor (A&C), Manzate (B&D), Badge (E)	3.4 bcd	\$1,115 cd	8796 cd	295 a	29.8 cd	19.7 a	95.3
14	Tilt (A&C), Manzate (B&D), Badge (E)	4.2 bc	\$1,135 bcd	8664 cd	290 a	29.8 cd	19.4 a	95.2
10	Headline (A&C), Manzate (B&D), Badge (E)	5.5 b	\$1,106 cd	8714 cd	294 a	29.6 cd	19.6 a	95.5
16	Untreated Check	73.6 a	\$938 e	6875 e	262 b	26.3 e	17.8 b	94.8
Average		6.5	\$1,144	8868	292	30.4	19.5	95.3
LSD 5%		3.0	86.5	630.9	13.9	1.5	0.8	n.s.
CV %		45.9	7.5	7.1	4.7	5.0	3.9	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: A - June 29th, B - July 17th, C - July 28th, D - Aug 15th, E - Aug 25th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Tank Mix Effect (Average of all Fungicide Treatments)

No.	Treatment	% Cerc Damage 15-Sep	Net \$/A	RWSA	RWST	T/A	% Suc	% CJP
1	Tank Mix	5.1 b	\$1,159	9047 a	292	30.9 a	19.6	95.2
2	No Tank Mix	7.9 a	\$1,129	8667 b	291	29.8 b	19.5	95.3
Average		6.5	\$1,144	8857	292	30.4	19.5	95.3
LSD 5%		0.8	n.s.	232.6	n.s.	0.6	n.s.	n.s.
CV %		35.8	7.8	7.4	4.5	5.2	3.9	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: A - June 29th, B - July 17th, C - July 28th, D - Aug 15th, E - Aug 25th.

Comments: Fungicides were evaluated with and without an EBDC tank mix partner for control of *Cercospora* leafspot in sugarbeets. The disease level was high. Fungicides tank mixed with an EBDC provided significantly better leafspot control than the same fungicides that were not tank mixed. Sugarbeet yields were also improved when fungicides were tank mixed with an EBDC. Inspire XT, Minerva Duo, Proline and Super Tin were the top treatments. Topguard, Enable, chlorothalonil and Minerva also provided good control. Topsin, Priaxor, Tilt and Headline were fairly effective. None of the treatments cause sugarbeet phytotoxicity.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Protectant Fungicides for Control of *Cercospora beticola* (leafspot) in Sugarbeets

Herford, Elkton, MI - 2017

(Page 1 of 3)

Trial Quality: Fair - Good
Variety: B -149N
Planted: April 27
Harvested: Oct 4
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Loam
% OM: 2.9 **pH:** 7.7 **CEC:** 12.8
Above Opt: P **Opt:** K
High: Mn **Med:** B
Added N: 140 lbs
Prev Crop: Wheat

Rhizoc Level: Low
Cerc Control: See trts.
Problems: None
Seeding Rate: 4.5 inches
Rainfall: 22.2 inches

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

No.	Treatment*	Rate/A	% Cerc Damage 19-Sep	% SB Phyto 18-Aug	Net \$/A	RWSA	RWST	T/A	% SUC
27	Super Tin + Echo (3 applications)	8 fl oz + 3 pt	0.9 o	2.5 c	\$1,401 a	10196 a	304 abc	33.5 a	20.1 abc
	Echo 720 (4 applications)	3 pt							
23	Super Tin + Badge (3 applications)	8 fl oz + 3 pt	1.0 o	1.9 c	\$1,214 bcd	9112 bc	309 ab	29.5 b-e	20.4 ab
	Badge (4 applications)	3 pt							
21	Super Tin + Manzate (3 applications)	8 fl oz + 1.6 qt	1.3 o	1.3 c	\$1,246 bc	9284 b	308 abc	30.2 bc	20.3 abc
	Manzate (4 applications)	1.6 qt							
26	Super Tin + Echo (3 applications)	8 fl oz + 2 pt	1.5 o	1.9 c	\$1,284 ab	9273 b	298 a-d	31.2 ab	19.7 a-d
	Echo (4 applications)	2 pt							
25	Echo (8 applications)	3 pt	2.0 no	0.0 c	\$1,199 bcd	8693 b-e	311 a	27.9 b-h	20.5 a
22	Super Tin + Badge (3 applications)	8 fl oz + 2 pt	2.5 mno	1.3 c	\$1,200 bcd	8833 bcd	296 a-d	29.9 bc	19.7 a-d
	Badge SC (4 applications)	2 pt							
24	Echo (8 applications)	2 pt	3.4 mno	0.0 c	\$1,240 bc	8850 bcd	293 a-d	30.1 bc	19.5 a-d
2	Manzate (4 applications)	1.6 qt	4.5 l-o	0.0 c	\$1,139 cde	8493 b-e	302 abc	28.1 b-g	20.1 abc
	Badge (4 applications)	3 pt							
4	Cuprofix (8 applications)	3 lb	5.4 k-o	0.0 c	\$1,121 cde	8343 b-e	290 cde	28.8 b-f	19.3 cde
6	Badge (8 applications)	3 pt	7.1 k-n	0.0 c	\$1,100 cde	8250 cde	298 a-d	27.7 c-h	19.8 abc

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: Trts 1-20, 24, 25 : A - June 28th, B - July 6th, C - July 17th, D - July 29th, E - Aug 8th,

F - Aug 18th, G - Aug 29th, H - Sept 9th.

Trts 21-23, 26, 27: A - June 28th, B - July 11th, C - July 21st, D - Aug 8th, E - Aug 18th,

F - Aug 29th, G - Sept 6th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Protectant Fungicides for Control of *Cercospora beticola* (leafspot) in Sugarbeets Herford, Elkton, MI - 2017

(Page 2 of 3)

No.	Treatment*	Rate/A	% Cerc Damage 19-Sep	% SB Phyto 18-Aug	Net \$/A	RWSA	RWST	T/A	% SUC
1	Manzate Max (4 applications)	1.6 qt	8.0 j-m	0.0 c	\$1,108 cde	8179 cde	297 a-d	27.7 c-h	19.7 a-d
	Badge (4 applications)	2 pt							
3	Cuprofix (8 applications)	2 lb	9.5 i-l	0.0 c	\$1,188 bcd	8811 bcd	298 a-d	29.6 bcd	19.8 a-d
5	Badge (8 applications)	2 pt	10.3 ijk	0.0 c	\$1,180 bcd	8600 b-e	293 bcd	29.4 b-e	19.4 bcd
18	Potassium Biocarbonate + Badge (8 applications)	5 lb + 2 pt	12.8 ij	0.0 c	\$1,035 ef	7763 ef	281 def	27.7 c-h	18.8 def
12	Badge + Round up (3 applications)	2 pt + 32 fl oz	14.5 i	17.5 ab	\$1,076 de	7974 de	294 a-d	27.2 c-i	19.5 a-d
	Badge (4 applications)	2 pt							
14	Cueva (8 applications)	4 qt	38.5 h	0.0 c	\$922 fg	6959 fg	275 efg	25.3 ghi	18.4 efg
9	AGRILIFE** (8 applications)	57 fl oz	51.5 g	0.0 c	\$820 gh	6810 gh	269 fgh	25.4 f-i	18.1 fgh
8	AGRILIFE** (8 applications)	32 fl oz	58.0 f	0.0 c	\$895 g	6770 gh	267 f-i	25.4 f-i	18.0 f-i
7	AGRILIFE (OLD) (8 applications)	38 fl oz	61.3 f	0.0 c	\$889 g	6732 gh	268 fgh	25.2 ghi	18.2 fgh
15	Cueva + Double Nickel (8 applications)	2 qt + 1 qt	69.0 e	0.0 c	\$812 gh	6751 gh	257 hij	26.3 d-i	17.5 g-k
13	Cueva (8 applications)	2 qt	73.5 de	0.0 c	\$825 gh	6284 gh	263 ghi	24.0 i	17.8 g-j
11	AGRILIFE** + Round up (3 applications)	57 fl oz + 32 fl oz	76.0 d	18.8 a	\$663 i	5810 h	233 l	25.0 ghi	16.5 lm
	AGRILIFE** (4 applications)	57 fl oz							
19	Ammonium Bicarbonate (8 applications)	5 lb	81.8 c	0.0 c	\$926 fg	6596 gh	251 h-k	26.1 e-i	17.1 i-m
10	AGRILIFE** + Round up (3 applications)	32 fl oz + 32 fl oz	81.8 c	16.3 b	\$820 gh	6345 gh	254 hij	25.0 ghi	17.3 h-l
	AGRILIFE** (4 applications)	32 fl oz							

** New Formulation of AgriLife

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: Trts 1-20, 24, 25: A - June 28th, B - July 6th, C - July 17th, D - July 29th, E - Aug 8th,

F - Aug 18th, G - Aug 29th, H - Sept 9th.

Trts 21-23, 26, 27: A - June 28th, B - July 11th, C - July 21st, D - Aug 8th, E - Aug 18th,

F - Aug 29th, G - Sept 6th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

No.	Treatment*	Rate /A	% Cerc Damage 19-Sep	% SB Phyto 18-Aug	Net \$/A	RWSA	RWST	T/A	% SUC
20	Sodium Bicarbonate (8 applications)	5 lb	83.0 bc	0.0 c	\$863 g	6161 gh	251 ijk	24.5 hi	17.0 j-m
17	Potassium Biocarbonate (8 applications)	5 lb	84.5 bc	0.0 c	\$846 g	6046 gh	245 jkl	24.8 ghi	16.7 klm
16	Potassium Biocarbonate (8 applications)	3 lb	87.8 b	0.0 c	\$810 gh	5790 h	241 jkl	24.0 i	16.4 lm
28	Untreated Check		95.5 a	0.0 c	\$ 698 hi	4847 i	235 kl	20.6 j	16.1 m
Average			36.7	2.2	\$1,018	7591	278	27.1	18.6
LSD 5%			4.9	1.6	123.4	857.2	15.2	2.9	0.9
CV %			9.5	71.5	8.6	8.0	3.9	7.6	3.3

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: Trts 1-20, 24, 25 : A - June 28th, B - July 6th, C - July 17th, D - July 29th, E - Aug 8th,
F - Aug 18th, G - Aug 29th, H - Sept 9th.

Trts 21-23, 26, 27 : A - June 28th, B - July 11th, C - July 21st, D - Aug 8th, E - Aug 18th,
F - Aug 29th, G - Sept 6th

Comments: Non-systemic protectants including EBDCs, Coppers, Super Tin, Bicarbonates and Chlorothalonil were evaluated for control of *Cercospora* leafspot. The disease level was very high and included lower infections from *Alternaria alternata* (leafspot.) Super Tin combinations and Echo (chlorothalonil) provided the best control of leafspots in this trial and kept the damage below an economic level. Manzate, Badge and Cuprofix were somewhat less effective. Leafspot control (suppression) with AgriLife and Cueva was unacceptable. Tank mixing coppers with Roundup caused leaf spotting and decreased leafspot control. Sodium, potassium and ammonium bicarbonates were the least effective of the treatments, but were an improvement over the untreated check. Depending upon cost, the bicarbonates may be useful as a tank mix additive, not to replace, but in addition to an EBDC or Copper. It should be noted that chlorothalonil is not approved for use in sugarbeets.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Protectant Fungicides for Control of *Cercospora beticola* (leafspot) in Sugarbeets Ziel, Pigeon, MI - 2017

(Page 1 of 3)

Trial Quality: Fair - Good

Variety: B-149N

Planted: April 26

Harvested: Oct 6

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Loam

% OM: 3.2 **pH:** 7.5 **CEC:** 12.0

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

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: Field variation

Seeding Rate: 4.5 inches

Rainfall: 15.1 inches

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

No.	Treatment*	Rate / A	% Cerc Damage		Phyto %*	Net \$/A	RWSA	RWST	T/A	% SUC
			19-Sep	2-Aug	14-Aug					
27	Super Tin + Echo (3 applications)	8 fl oz + 3 pt	0.8 f	0.9 e	1.3 de	\$1,477 ab	8997 ab	253 bcd	35.6 a	17.2 bcd
	Echo (4 applications)	3 pt								
25	Echo (8 applications)	3 pt	0.9 f	0.9 e	0 e	\$1,460 ab	8813 a-d	261 abc	33.6 abc	17.5 abc
23	Super Tin + Badge (3 applications)	8 fl oz + 3 pt	0.9 f	1.1 b-e	2.5 de	\$1,419 abc	8841 abc	251 bcd	35.2 ab	17.0 cd
	Badge SC (4 applications)	3 pt								
21	Super Tin + Manzate (3 applications)	8 fl oz + 1.6 qt	1.1 f	1.1 cde	2.5 de	\$1,424 abc	8827 abc	253 bcd	34.9 abc	16.9 cd
	Manzate (4 applications)	1.6 qt								
22	Super Tin + Badge (3 applications)	8 fl oz + 2 pt	1.3 f	1.1 b-e	3.1 d	\$1,526 a	9310 a	261 abc	35.6 a	17.5 abc
	Badge SC (4 applications)	2 pt								
26	Super Tin + Echo (3 applications)	8 fl oz + 2 pt	2.5 f	0.9 e	1.3 de	\$1,395 a-d	8426 a-e	252 bcd	33.4 abc	17.0 bcd
	Echo 720 (4 applications)	2 pt								
4	Cuprofix (8 applications)	3 lb	2.5 f	1.3 bcd	0 e	\$1,436 abc	8834 abc	270 a	32.8 abc	18.1 a
3	Cuprofix (8 applications)	2 lb	3.8 ef	1.2 b-e	0 e	\$1,343 bcd	8294 a-e	252 bcd	33.0 abc	17.0 bcd
2	Manzate (4 applications)	1.6 qt	5.9 ef	1.1 cde	0 e	\$1,373 a-d	8491 a-e	266 ab	31.9 bc	17.9 ab
	Badge SC (4 applications)	3 pt								
24	Echo (8 applications)	2 pt	6.5 ef	1.1 cde	0 e	\$1,440 abc	8592 a-e	251 bcd	34.2 abc	17.0 bcd

*Phyto: % Injury to sugarbeet leaves caused by fungicide treatment.

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates : Trts 1-20, 24, 25: A - June 27th, B - July 6th, C - July 17th, D - July 27th, E - Aug 7th,

F - Aug 16th, G - Aug 26th, H - Sept 9th.

Trts 21-23, 26, 27 : A - June 27th, B - July 11th, C - July 21st, D - July 31st, E - Aug 9th,

F - Aug 23rd, G - Sept 5th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Evaluate Protectant Fungicides for Control of *Cercospora beticola* (leafspot) in Sugarbeets Ziel, Pigeon, MI - 2017

(Page 2 of 3)

No.	Treatment*	Rate / A	% Cerc Damage		Phyto % 14-Aug	Net \$/A	RWSA	RWST	T/A	% SUC
			19-Sep	2-Aug						
1	Manzate (4 applications)	1.6 qt	6.8 ef	1.0 de	0 e	\$1,335 bcd	8180 b-e	254 bcd	32.4 abc	17.3 a-d
	Badge SC (4 applications)	2 pt								
6	Badge (8 applications)	3 pt	7.6 ef	1.3 bcd	0 e	\$1,241 d	7742 e	241 de	32.2 abc	16.4 de
5	Badge (8 applications)	2 pt	9.3 ef	1.4 ab	0 e	\$1,281 cd	7808 de	249 cd	31.4 cd	16.9 cd
12	Badge + Round up (4 applications)	2 pt + 32 fl oz	12.8 e	1.4 abc	14 c	\$1,272 cd	7830 cde	246 cd	31.8 bc	16.7 cd
	Badge SC (4 applications)	2 pt								
18	Potassium Biocarb.* + Badge (8 applications)	5 lb + 2 pt	46.8 d	1.4 abc	0 e	\$1,043 e	6560 f	230 ef	28.5 de	15.7 ef
9	AGRILIFE** (8 applications)	57 fl oz	48.3 d	1.3 bcd	0 e	\$819 fg	5704 fg	223 fg	25.5 ef	15.2 fg
14	Cueva (8 applications)	4 qt	57.8 c	1.4 abc	0 e	\$911 efg	5776 fg	221 fgh	26.1 e	15.2 fg
8	AGRILIFE** (8 applications)	32 fl oz	70.8 b	1.3 bcd	0 e	\$959 ef	6052 fg	228 efg	26.5 e	15.6 ef
15	Cueva + Double Nickel (8 applic)	2 qt + 1 qt	77.0 b	1.3 a-d	0 e	\$765 g	5390 g	215 ghi	25.1 ef	14.8 fgh
17	Potassium Biocarb. (8 applications)	5 lb	90.8 a	1.3 a-d	0 e	\$852 fg	5105 gh	204 ij	25.1 ef	14.1 hi
13	Cueva (8 applications)	2 qt	90.8 a	1.3 a-d	0 e	\$824 fg	5266 gh	207 hij	25.4 ef	14.3 ghi
20	Sodium Bicarb. (8 applications)	5 lb	92.0 a	1.4 ab	0 e	\$902 efg	5394 g	204 ij	26.5 e	14.1 hi
7	AGRILIFE (OLD) (8 applications)	38 fl oz	92.0 a	1.6 a	0 e	\$853 fg	5439 g	207 hij	26.3 e	14.5 ghi
19	Ammonium Bicarb. (8 applications)	5 lb	93.8 a	1.4 ab	0 e	\$894 efg	5350 g	204 ij	26.2 e	14.2 hi
11	AGRILIFE** + Roundup (3 applic)	57 fl oz + 32 fl oz	93.8 a	1.6 a	21 a	\$768 g	5486 g	213 ghi	25.7 ef	14.8 fgh
	AGRILIFE* * (4 applications)	57 fl oz								

*BiCarb: Bicarbonate.

**New Formulation of AgriLife.

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: Trts 1-20, 24, 25: A - June 27th, B - July 6th, C - July 17th, D - July 27th, E - Aug 7th,

F - Aug 16th, G - Aug 26th, H - Sept 9th.

Trts 21-23, 26, 27: A - June 27th, B - July 11th, C - July 21st, D - July 31st, E - Aug 9th,

F - Aug 23rd, G - Sept 5th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Protectant Fungicides for Control of *Cercospora beticola* (leafspot) in Sugarbeets

Ziel, Pigeon, MI - 2017

(Page 3 of 3)

No.	Treatment*	Rate / A	% Cerc Damage		Phyto % 14-Aug	Net \$/A	RWSA	RWST	T/A	% SUC
			19-Sep	2-Aug						
16	Potassium Biocarb (8 applications)	3 lb	95.0 a	1.3 bcd	0 e	\$918 efg	5492 g	207 hij	26.5 e	14.3 hi
10	AGRILIFE** + Roundup (3 applic)	32 fl oz + 32 fl oz	96.3 a	1.4 ab	18 b	\$852 fg	5509 g	208 hij	26.5 e	14.4 ghi
	AGRILIFE** (4 applications)	32 fl oz								
28	Untreated Check		100.0 a	1.4 ab	0 e	\$756 g	4404 h	196 j	22.5 f	13.7 i
Average			43.1	1.3	2.3	\$1,126	6997	233	30	15.9
LSD 5%			8.55	0.3	2.1	148.9	867.9	13.8	3.0	0.8
CV %			14.1	16.3	65.1	9.4	8.8	4.2	7.3	3.5

**New Formulation of AgriLife.

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: Trts 1-20, 24, 25 : A - June 27th, B - July 6th, C - July 17th, D - July 27th, E - Aug 7th,

F - Aug 16th, G - Aug 26th, H - Sept 9th.

Trts 21-23, 26, 27: A - June 27th, B - July 11th, C - July 21st, D - July 31st, E - Aug 9th,

F - Aug 23rd, G - Sept 5th.

Comments: Non-systemic protectant fungicides including EBDCs, Coppers, Super Tin, Bicarbonates and chlorothalonil were evaluated for control of *Cercospora* leafspot. Super Tin combinations and Echo (chlorothalonil) provided the best control of leafspots in this trial and kept the damage below the economic damage level. Manzate, Badge and Cuprofix were somewhat less effective. Leafspot control with AgriLife, Cueva and the bicarbonates was unacceptable, but did provide an improvement over the untreated. When mixing coppers with Roundup, phytotoxicity occurred and leafspot control was reduced. The bicarbonates may be useful as a tank mix additive, not to replace, but in addition to an EBDC or Copper. It should be noted that chlorothalonil is not approved for use in Michigan. The disease level was very high.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

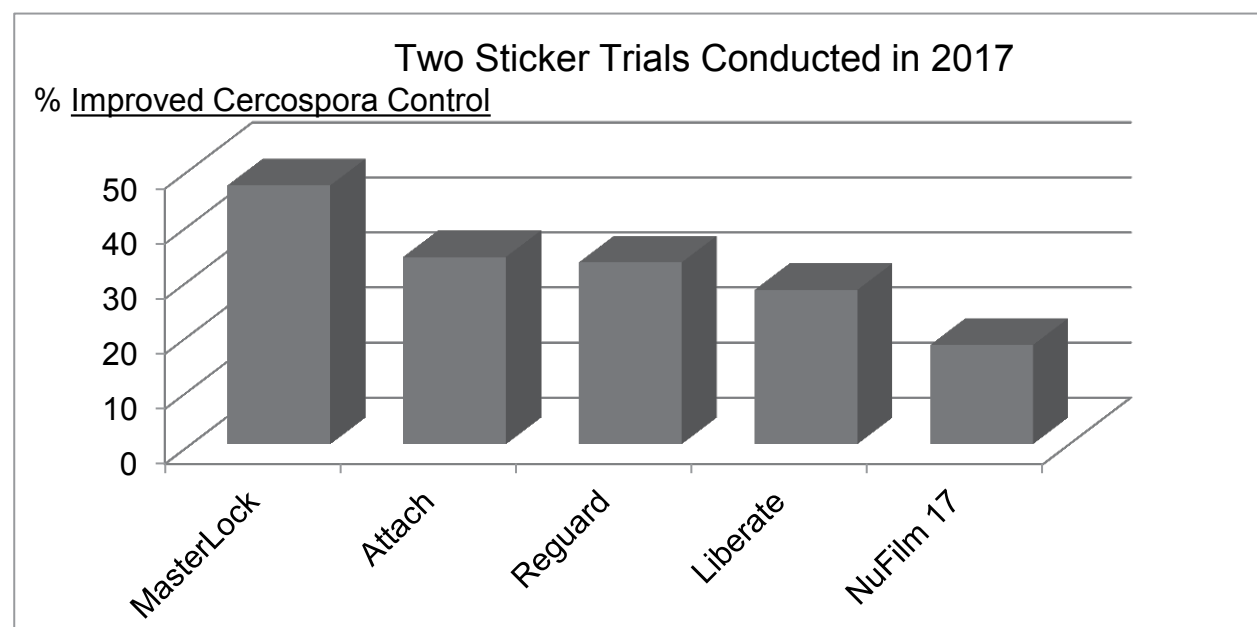
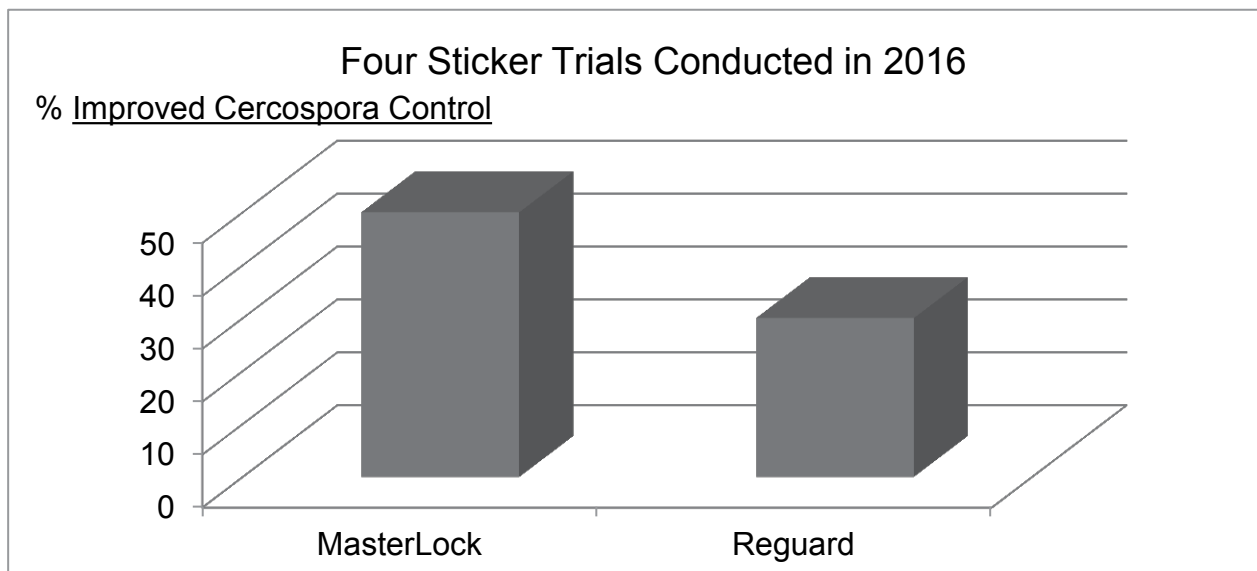
Bold: Results are not statistically different from top-ranking treatment in each column.



Influence of Sticker Spreaders on the Efficacy of Fungicides for Controlling *Cercospora Beticola* (Leafspot) in Sugarbeets

Two Year Summary

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Comments: Super Tin, Manzate, Badge and Eminent were applied with and without adjuvants (sticker / spreaders) in 2016 and 2017. MasterLock and Reguard were utilized in 2016 and MasterLock, Reguard, Attach, Liberate and NuFilm 17 were used in 2017. The disease pressure was high at most sites. The % values represent improvement in leafspot control using stickers compared to fungicides applied without a sticker. All of the stickers improved the efficacy of fungicides, however, MasterLock clearly performed better than the other stickers in the trials.



Evaluate Sticker / Spreaders added to Fungicides for Cercospora Leafspot Control in Sugarbeets

Mennonite Church, Pigeon, MI - 2017

(Page 2 of 5)

Trial Quality: Good

Variety: B-133N

Planted: April 28

Harvested: Oct 10

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Loam

%OM: 2.0 **pH:** 6.9 **CEC:** 10.3

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

High: Mn **Low:** K

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 15.3 inches

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

No.	Treatment	Sticker	% Cerc Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			5-Sep	22-Aug						
4	EBDC	Masterlock	3.5 d	1.0 f	\$1,061 a	8946 a	310 a	28.9 a	20.4 a	95.8 a
10	EBDC	Attach	3.8 d	1.0 f	\$940 c-f	8270 bcd	303 ab	27.3 bcd	20.1 ab	95.7 ab
12	EBDC	Liberate	4.3 d	1.3 f	\$1,003 b	8731 a	302 ab	28.9 a	20.1 ab	95.6 abc
6	EBDC	Reguard	4.5 d	1.0 f	\$990 bc	8631 ab	297 bc	29.0 a	19.7 bcd	95.7 ab
8	EBDC	NuFilm 17	6.0 d	1.0 f	\$930 def	8197 cde	299 bc	27.4 bcd	19.8 bc	95.6 abc
2	EBDC	None	6.5 d	2.2 f	\$972 b-e	8096 c-f	290 cd	27.9 abc	19.4 cde	95.4 bc
11	Triazole	Liberate	8.7 d	2.8 ef	\$883 f	7683 fg	283 d	27.1 cd	19.0 e	95.2 cd
3	Triazole	Masterlock	9.0 d	3.7 def	\$983 bcd	8323 bc	289 cd	28.8 a	19.3 cde	95.4 abc
9	Triazole	Attach	15.5 c	5.8 cde	\$911 f	7887 d-g	287 d	27.5 bcd	19.2 de	95.3 bc
5	Triazole	Reguard	15.7 c	6.3 bcd	\$926 ef	7989 c-g	282 d	28.3 ab	18.9 e	95.3 bc
7	Triazole	NuFilm 17	15.9 c	7.3 bc	\$906 f	7847 efg	284 d	27.6 bcd	18.9 e	95.7 ab
1	Triazole	None	21.3 b	9.3 b	\$897 f	7606 g	285 d	26.7 d	19.0 e	95.4 bc
13	Untreated Check		78.3	54.3	\$888 g	6465 h	259 e	25.0 e	17.6 f	94.9 d

Average	14.8	7.5	\$950	8052	290	27.7	19.3	95.5
LSD 5%	5.1	3.2	51.6	375.5	8.9	1.0	0.5	0.4
CV	28.9	36.1	4.6	4.0	2.6	3.1	2.3	0.3

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Effect of Fungicide Program

No.	Treatment	% Cerc Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
		5-Sep	22-Aug						
2	EBDC	4.8 b	1.3 b	\$983 a	8479 a	300 a	28.2 a	19.9 a	95.6 a
1	Triazole	14.4 a	5.9 a	\$918 b	7889 b	285 b	27.7 b	19.1 b	95.4 b
Average		9.6	3.6	\$950	8184	293	27.9	19.5	95.5
LSD 5%		2.1	1.3	21.1	153.3	3.6	0.4	0.2	0.2
CV %		45.0	75.6	4.6	3.9	2.6	3.0	2.3	0.3

Effect of Spreader / Sticker

No.	Treatment	% Cerc Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
		5-Sep	22-Aug						
2	Masterlock	6.3 c	2.3 b	\$1,022 a	8635 a	299 a	28.8 a	19.9 a	95.6 a
6	Liberate	6.5 c	2.1 b	\$944 b	8207 ab	293 a	28.0 ab	19.5 a	95.4
5	Attach	9.6 b	3.4 b	\$926 b	8079 b	295 a	27.4 b	19.6 a	95.5
3	Reguard	10.1 b	3.7 ab	\$958 ab	8310 ab	290 a	28.7 a	19.3 a	95.5
4	NuFilm 17	11.0 b	4.2 ab	\$918 b	8022 b	292 a	27.5 b	19.4 a	95.7
1	None	13.9 a	5.8 a	\$935 b	7851 b	287 a	27.3 b	19.2 a	95.4
Average		9.6	3.6	\$950	8184	293	27.9	19.5	95.5
LSD 5%		2.8	2.3	66.3	482.4	10.9	1.1	0.66	0.36
CV%		35.2	75.3	8.3	7.0	4.4	4.5	4.1	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

EBDC Program - June 29th, July 10th, July 19th, July 28th, Aug 8th, Aug 18th, Aug 28th.

Triazole Program - June 29th, July 17th, July 28th, Aug 14th.

Comments: Sticker / Spreaders were added to fungicides and evaluated for Cercospora leafspot control. The disease pressure was high and consisted of *Cercospora beticola* (70%) and *Alternaria alternata* (30%). All of the stickers provided better leafspot control than fungicides without stickers. MasterLock appeared to provide the best results. With respect to fungicides, the EBDC program was superior to the triazole program, probably because of the Alternaria infections. None of the treatments caused sugarbeet phytotoxicity. Results were similar in another trial conducted in 2017 and in four trials conducted in 2016.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Sticker / Spreaders added to Fungicides for Cercospora Leafspot Control in Sugarbeets

Ziel, Pigeon, MI - 2017

(Page 4 of 5)

Trial Quality: Good

Variety: B-133N

Planted: April 26

Harvested: Oct 9

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Sandy Loam

%OM: 3.2 **pH:** 7.5 **CEC:** 12

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

High: Mn **Low:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 15.3 inches

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

No.	Treatment	Sticker	% Cerc Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			19-Sep	28-Aug						
20	Super Tin	MasterLock	3.8 g	1.8 i	\$1,224 a	7694 a	236 ab	32.5 a	15.8 abc	95.8
23	Super Tin	Attach	4.1 g	2.3 hi	\$1,172 ab	7538 ab	232 abc	32.5 a	15.6 a-d	95.7
19	Super Tin	None	4.5 g	2.8 hi	\$1,157 abc	7185 a-d	237 ab	30.4 abc	15.9 abc	95.8
24	Super Tin	Liberate	4.8 g	2.3 hi	\$1,045 b-f	6823 a-h	223 b-f	30.7 abc	15.1 b-g	95.4
22	Super Tin	NuFilm 17	4.9 g	2.3 hi	\$1,129 a-d	7296 abc	237 ab	30.8 abc	15.9 abc	95.9
21	Super Tin	Reguard	5.1 g	2.0 i	\$1,084 a-e	7041 a-e	237 ab	29.7 a-d	15.9 ab	95.6
10	EBDC	NuFilm 17	5.5 g	2.3 hi	\$1,036 b-g	6955 a-f	227 a-d	30.5 abc	15.5 a-e	95.3
9	EBDC	Reguard	8.3 g	3.5 hi	\$1,045 b-f	7002 a-e	236 ab	29.6 a-d	15.9 abc	95.9
8	EBDC	MasterLock	12.5 fg	5.8 h	\$1,189 ab	7681 a	239 a	32.1 ab	16.2 a	95.5
11	EBDC	Attach	21.3 ef	9.0 g	\$830 ij	5796 j	209 fg	27.7 cd	14.3 gh	95.3
15	Copper	Reguard	26.0 de	10.5 fg	\$962 e-i	6357 d-j	233 abc	27.3 cd	15.9 abc	95.2
18	Copper	Liberate	29.0 cde	12.8 ef	\$1,045 b-f	6826 a-h	227 a-e	30.1 abc	15.4 a-e	95.2
12	EBDC	Liberate	29.5 cde	13.3 ef	\$879 g-j	6073 f-j	218 c-f	27.8 cd	14.9 d-g	95.2
14	Copper	MasterLock	33.5 cd	14.8 de	\$1,049 b-f	6711 b-i	225 a-e	29.8 a-d	15.2 b-g	95.8
7	EBDC	None	37.3 cd	16.8 d	\$981 d-i	6374 d-j	220 c-f	29.0 a-d	14.9 d-g	95.7
5	Triazole	Attach	37.3 cd	16.8 d	\$1,009 c-h	6879 a-g	229 a-d	30.0 abc	15.7 a-d	95.1
2	Triazole	MasterLock	40.0 c	17.0 d	\$1,010 c-h	6753 b-i	222 b-f	30.4 abc	15.2 b-g	95.1
17	Copper	Attach	40.5 c	17.3 d	\$935 e-i	6209 e-j	225 a-e	27.5 cd	15.3 a-f	95.5
13	Copper	None	54.8 b	24.8 c	\$946 e-i	6001 g-j	211 ef	28.4 bcd	14.5 fg	95.3
4	Triazole	NuFilm 17	59.5 b	25.0 c	\$860 hij	6044 g-j	209 fg	28.9 a-d	14.3 gh	95.2
1	Triazole	None	62.3 b	26.5 bc	\$890 f-j	5941 hij	214 def	27.6 cd	14.7 efg	95.1
16	Copper	NuFilm 17	63.5 b	27.5 bc	\$876 hij	5873 ij	223 b-f	26.3 d	15.1 b-g	95.5
6	Triazole	Liberate	65.8 b	28.5 b	\$950 e-i	6549 c-j	222 b-f	29.4 a-d	15.1 b-g	95.5
3	Triazole	Reguard	65.8 b	29.8 b	\$918 f-j	6368 d-j	220 c-f	29.0 a-d	15.0 c-g	95.2
25	Untreated	None	100.0 a	42.0 a	\$770 j	4324 j	197 f	22.0 d	13.6 g	95.0

Average	32.8	14.3	\$1,000	6572	224	29.2	15.2	95.4
LSD 5%	10.6	3.2	134.5	755.4	13.1	3.1	0.7	n.s.
CV%	22.9	15.7	9.5	8.1	4.1	7.4	3.5	0.5

Means followed by same letter are not significantly different (P=.05, Duncan's New MRT)

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Effect of Spreader / Sticker

No.	Treatment	% Cerc Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
		19-Sep	28-Aug						
2	MasterLock	22.4 c	9.8 d	\$1,118 a	7210 a	231 a	31.2 a	15.6 ab	95.5
5	Attach	25.8 c	11.3 cd	\$987 b	6605 b	224 b	29.4 b	15.2 bc	95.4
3	Reguard	26.3 c	11.4 c	\$1,002 b	6692 b	231 a	28.9 b	15.7 a	95.5
6	Liberate	32.3 b	14.2 b	\$980 b	6568 b	222 b	29.5 b	15.1 c	95.3
4	Nu Film 17	33.3 b	14.3 b	\$975 b	6542 b	224 b	29.1 b	15.2 c	95.5
1	None	39.7 a	17.7 a	\$994 b	6375 b	221 b	28.8 b	15.0 c	95.5
Average		30.0	13.1	\$1,009	6665	225	29.5	15.3	95.4
LSD 5%		5.3	1.6	67.2	377.7	6.5	1.5	0.4	n.s.
CV%		25.0	17.1	9.4	8.0	4.1	7.3	3.4	0.5

Effect of Fungicide Program

No.	Treatment	% Cerc Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
		19-Sep	28-Aug						
4	Super Tin	4.5 d	2.2 d	\$1,135 a	7263 a	233 a	31.1	15.7	95.7 a
2	EBDC	19.0 c	8.4 c	\$993 b	6647 ab	225 ab	29.5	15.3	95.5 b
3	Copper	41.2 b	17.9 b	\$969 b	6329 b	224 b	28.2	15.2	95.4 b
1	Triazole	55.1 a	23.9 a	\$939 b	6422 b	219 b	29.2	15.0	95.2 c
Average		30.0	13.1	\$1,009	6665	225	29.5	15.3	95.4
LSD 5%		6.6	1.5	116.1	652.3	9.1	n.s.	n.s.	0.1
CV%		33.9	17.1	17.6	15.0	6.2	13.0	5.6	0.2

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Triazole Program: June 29th, July 13th, July 24th, Aug 10th, Aug 21st, Sept 5th.

EBDC Program: June 29th, July 6th, July 19th, Aug 1st, Aug 9th, Aug 21st, Aug 30th, Sept 7th.

Copper Program: June 29th, July 6th, July 29th, Aug 1st, Aug 9th, Aug 21st, Aug 30th, Sept 7th.

Super Tin Program: June 29th, July 13th, July 21st, Aug 2nd, Aug 14th, Sept 2nd.

Comments: Sticker / spreaders were added to fungicides and evaluated for Cercospora leafspot control. The disease pressure was very high and consisted of *Cercospora beticola* (70%) and *Alternaria alternata* (30%). All of the stickers provided better leafspot control than fungicides without stickers. MasterLock appeared to provide the best results. With respect to fungicide, the Super Tin program was more effective than the other products. The triazole program was the least effective, probably because of the Alternaria infections. None of the treatments caused sugarbeet phytotoxicity. Results were similar in another trial conducted in 2017 and in four trials conducted in 2016.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Chlorothalonil for Control of Cercospora (*Cercospora beticola*) Leafspot in Sugarbeets

Herford, Elkton, MI - 2017

(Page 1 of 2)

Trial Quality: Good

Variety: B-149N

Planted: April 27

Harvested: Oct 4

Plots: 6 rows x 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low, Quadris 2X

Cerc Control: See trts.

Problems: Alternaria leafspot
was also present

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

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

No.	Treatment	Rate/A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			19-Sep	29-Aug						
15	Super Tin +	8 fl oz +	0.9 i	0.9 f	\$1,134 b	9442 abc	304 abc	31.0 a	20.2 ab	95.7 ab
	*Echo (3 Applic)	3 pt								
	*Echo (4 Applic)	3 pt								
11	Super Tin +	8 fl oz +	1.0 i	1.1 ef	\$1,068 b	9058 a-e	302 abc	30.0 ab	20.1 ab	95.5 abc
	Badge (3 Applic)	3 pt								
	Badge (4 Applic)	3 pt								
9	Super Tin +	8 fl oz +	1.3 hi	1.0 ef	\$1,112 b	9284 a-d	308 ab	30.2 ab	20.3 ab	95.9 a
	Manz (3 Applic)	1.6 qt								
	Manz (4 Applic)	1.6 qt								
14	Super Tin +	8 fl oz +	1.5 hi	0.9 f	\$1,254 a	9524 ab	305 abc	31.2 a	20.2 ab	95.8 ab
	*Echo (3 Applic)	2 pt								
	*Echo (4 Applic)	2 pt								
13	*Echo (8 applic)	3 pt	2.0 ghi	1.2 def	\$1,274 a	9678 a	311 a	31.1 a	20.5 a	95.9 a
10	Super Tin +	8 fl oz +	2.5 ghi	1.1 ef	\$1,106 b	8599 de	296 bc	29.1 ab	19.7 ab	95.3 abc
	Badge (3 Applic)	2 pt								
	Badge (4 Applic)	2 pt								
12	*Echo (8 Applic)	2 pt	3.0 ghi	1.2 def	\$1,158 b	8698 cde	293 bc	29.6 ab	19.5 b	95.5 abc
2	Manzate (4 applic)	1.6 qt	4.5 fgh	1.3 de	\$1,078 b	8481 de	302 abc	28.1 bc	20.1 ab	95.5 abc
	Badge (4 applic)	3 pt								

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Trt 1 and 2: Manzate - June 28th, July 7th, Aug 8th, Aug 29th; Badge - July 6th, July 29th, Aug 18th, Sept 7th.

Trt 3-8, 12, 13: 8 applications - June 28th, July 6th, July 17th, July 29th, Aug 8th, Aug 18th, Aug 29th, Sept 7th.

Trt 9-11, 14, 15: June 28th, July 11th, July 21st, Aug 4th, Aug 14th, Aug 29th, Sept 6th.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

***Echo:** Chlorothalonil, Chlorothalonil is not approved for sugarbeets.

Evaluate Chlorothalonil for Control of Cercospora (*Cercospora beticola*) Leafspot in Sugarbeets

Herford, Elkton, MI - 2017

(Page 2 of 2)

No.	Treatment	Rate/A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			19-Sep	29-Aug						
4	Cuprofix (8 applic)	3 lb	5.4 efg	1.3 def	\$1,097 b	8592 de	300 abc	28.7 bc	19.8 ab	95.7 ab
6	Badge (8 applic)	3 pt	7.1 def	1.5 cd	\$1,056 b	8348 e	299 abc	27.9 bc	19.9 ab	95.5 abc
1	Manzate (4 applic)	1.6 qt	8.0 de	1.3 def	\$1,112 b	8726 cde	297 bc	29.4 ab	19.7 ab	95.8 ab
	Badge (4 applic)	2 pt								
3	Cuprofix (8 applic)	2 lb	9.5 d	1.4 de	\$1,130 b	8827 b-e	294 bc	30.1 ab	19.5 b	95.6 ab
5	Badge (8 applic)	2 pt	10.3 d	1.6 cd	\$1,109 b	8735 cde	293 c	29.9 ab	19.4 b	95.6 ab
7	AgriLife (8 applic)	57 fl oz	51.5 c	1.8 bc	\$907 c	7202 f	269 d	26.8 c	18.1 c	95.2 bc
8	Cueva (8 applic)	2 qt	73.5 b	2.1 b	\$782 d	6291 g	263 d	24.0 d	17.8 c	95.0 cd
16	Untreated Check		95.5 a	2.9 a	\$647 e	4724 h	235 e	20.1 e	16.2 d	94.6 d
Average			17.3	1.4	\$1,064	8388	292	28.6	19.4	95.5
LSD 5%			3.0	0.4	94.9	692.7	12.1	2.0	0.7	0.5
CV %			12.3	18.0	6.2	5.8	2.9	4.9	2.7	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Trt 1, 2: Manzate - June 28th, July 7th, Aug 8th, Aug 29th; Badge - July 6th, July 29th, Aug 18th, Sept 7th.

Trt 3-8, 12,13: 8 applications - June 28th, July 6th, July 17th, July 29th, Aug 8th, Aug 18th, Aug 29th, Sept 7th.

Trt 9-11, 14, 15: June 28th, July 11th, July 21st, Aug 4th, Aug 14th, Aug 29th, Sept 6th.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Comments: Controlling leafspot in Michigan is much more difficult than it was a few years ago. *Cercospora* resistance to fungicides, and a new leafspot disease, *alternaria alternata*, which has become a significant problem in recent years, makes it difficult to control leafspot diseases in sugarbeets. Fungicides are also developing resistance to *Alternaria*. The objective of this trial was to determine the effectiveness of chlorothalonil (Echo) for controlling *Cercospora* and *Alternaria* leafspot. Chlorothalonil provided very good control of leafspot which was comprised of about 70% *Cercospora* and 30% *Alternaria*. Super Tin tank mix with chlorothalonil, Manzate, and Badge also provided good leafspot control. Manzate and coppers alone gave only fair disease control. None of the treatments caused sugarbeets phytotoxicity.



Control of Cercospora Leafspot Utilizing Fungicides

Approved for use in Canada

Herford, Elkton, MI - 2017

(Page 1 of 2)

Trial Quality: Good
Variety: B-149N
Planted: April 28
Harvested: Oct 3
Plots: 6 rows X 38 ft, 6 reps
Row Spacing: 22 inches

Soil Info: Loam
% OM: 2.9 **pH:** 7.7 **CEC:** 12.8
Above Opt: P **Opt:** K
High: Mn **Med:** B
Added N: 140 lbs
Prev Crop: Wheat

Rhizoc Level: Low
Cerc Control: See trts.
Problems: None
Seeding Rate: 4.5 inches
Rainfall: 22.4 inches

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

No.	Treatment	Rate/A	% Cerc Damage		Net \$/A	RWSA	RWST	T/A	% SUC
			12-Sep	21-Aug					
9	Inspire + Tilt + Manzate Pro Stick (3 applications)	7 fl oz + 6.5 fl oz + 2 lb	1.6 g	0.4 b	\$1,183 b	9564 a	307 a	31.1 a	20.4 a
	Manzate Pro Stick (3 applications)	2 lbs							
2	Proline + Preference + Manzate Pro Stick (3 applications)	5.7 fl oz + .125 % + 2 lb	1.8 g	0.6 b	\$1,154 b	9292 abc	306 a	30.4 ab	20.2 a
	Manzate Pro Stick (3 applications)	2 lb							
3	Minerva + Manzate Pro Stick (3 applications)	13 fl oz + 2 lb	2.3 fg	0.7 b	\$1,099 bcd	8844 bcd	294 ab	30.1 abc	19.4 ab
	Manzate Pro Stick (3 applications)	2 lb							
10	Manzate Pro Stick (8 applications)	2 lb	2.5 efg	0.6 b	\$1,269 a	9325 ab	305 a	30.6 ab	20.2 a
1	Inspire + Manzate Pro Stick (3 applications)	7 fl oz + 2 lb	2.5 efg	0.7 b	\$1,112 bcd	8919 bcd	292 ab	30.6 ab	19.4 ab
	Manzate Pro Stick (3 applications)	2 lb							
6	Priaxor + Manzate Pro Stick (3 applications)	8 fl oz + 2 lb	3.2 def	0.9 b	\$1,056 cd	8686 cd	302 a	28.8 cde	20.1 a
	Manzate Pro Stick (3 applications)	2 lb							
8	Topsin + Manzate Pro Stick (3 applications)	10.5 fl oz + 2 lb	3.3 def	0.8 b	\$1,105 bcd	8645 d	297 ab	29.2 bcd	19.7 ab
	Manzate Pro Stick (3 applications)	2 lb							

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: Trts 1-9 : A - June 28th, B - July 14th, C - July 24th, D - Aug 9th, E - Aug 18th, F - Sept 6th.

Trts 10-12 : A - June 28th, B - July 7th, C - July 17th, D - July 28th, E - Aug 7th, F - Aug 16th,

G - Aug 26th, H - Sept 6th.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

No.	Treatment	Rate/A	% Cerc		Damage		Net \$/A	RWSA	RWST	T/A	% SUC					
			12-Sep		21-Aug											
4	Caramba + Manzate Pro Stick (3 applications)	14 fl oz + 2 lb	3.5	de	1.0	b	\$1,058	cd	8546	d	292	ab	29.3	bcd	19.5	ab
	Manzate Pro Stick (3 applications)	2 lb														
5	Tilt + Manzate Pro Stick (3 applications)	6.5 fl oz + 2 lb	3.8	d	1.1	b	\$1,065	cd	8512	d	295	ab	28.8	cde	19.6	ab
	Manzate Pro Stick (3 applications)	2 lb														
11	Kocide 3000 (8 applications)	5.6 lb	4.2	cd	1.2	b	\$1,130	bc	8316	d	287	ab	29.0	cde	19.2	ab
7	Headline + Manzate Pro Stick (3 applications)	10 fl oz + 2 lb	5.0	c	1.6	b	\$1,029	d	8466	d	299	a	28.3	de	19.8	a
	Manzate Pro Stick (3 applications)	2 lb														
12	Cueva (Liquid Copper) (8 applications)	3 qt	7.8	b	2.1	b	\$1,046	cd	7699	e	278	b	27.7	e	18.6	b
13	Untreated Check		75.0	a	21.8	a	\$845	e	6163	f	238	c	25.9	f	16.3	c
Average			8.9		2.6		\$1,089		8537		292		29.2		19.4	
LSD 5%			1.0		1.6		78.6		573.4		17.2		1.3		1.0	
CV %			7.7		43.7		5.0		4.7		4.1		3.1		3.6	

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: Trts 1-9: A - June 28th, B - July 14th, C - July 24th, D - Aug 9th, E - Aug 18th, F - Sept 6th.

Trts 10-13 : A - June 28th, B - July 7th, C - July 17th, D - July 28th, E - Aug 7th, F - Aug 16th,
G - Aug 26th, H - Sept 6th.

Comments: Fungicides approved for use in Ontario, Canada, were evaluated for control of *Cercospora beticola* (leafspot) in this small plot replicated trial. Inspire (not XT) + Tilt + Manzate (applied 3 times) with Manzate as an in-between treatment provided very good *Cercospora* control. Other triazole programs based on Proline and Minerva also provided good leafspot control as did Manzate applied 8 times. Priaxor, Topsin, Caramba, Tilt programs and 8 applications of Kocide 3000 were somewhat less effective. Headline and Cueva provided suppression of leafspots. The disease level was very high. *Alternaria alternata* (leafspot) was also present.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Control of Cercospora Leafspot with Cueva (Liquid Copper Fungicide), Cuprofix, Badge and Manzate. Herford, Elkton, MI - 2017

Trial Quality: Fair - Good

Variety: B-149N

Planted: April 27

Harvested: Oct 4

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

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

No.	Treatment	Rate/A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			19-Sep	29-Aug						
3	Cuprofix (8 Applic)	3 lbs	5.4 d	1.9 d	\$1,057 a	8387 a	292 a	28.8 ab	19.3 a	95.7 a
1	Manz (4 Applic)	1.6 qt	8.0 d	2.4 d	\$1,029 a	8103 a	294 a	27.7 abc	19.5 a	95.8 a
	Badge (4 Applic)	2 qt								
2	Cuprofix (8 Applic)	2 lbs	9.5 d	2.9 d	\$1,111 a	8815 a	293 a	30.2 a	19.5 a	95.6 a
4	Badge (8 Applic)	2 pt	10.3 d	3.0 d	\$1,126 a	8741 a	293 a	29.9 a	19.4 a	95.6 a
6	Cueva (8 Applic)	4 qt	38.5 c	13.3 c	\$863 b	6959 b	275 b	25.3 bcd	18.4 b	95.4 ab
7	Double Nickel + Cueva (8 Applic)	2 qt + 1 qt	69.0 b	23.8 b	\$763 b	6814 b	257 c	26.6 abc	17.5 c	94.7 c
5	Cueva (8 Applic)	2 qt	73.5 b	25.8 b	\$772 b	6284 bc	263 c	24.0 cd	17.8 c	95.0 bc
8	Untreated Check		95.5 a	36.0 a	\$706 b	5206 c	235 d	22.1 d	16.1 d	94.6 c

Average	38.7	13.6	\$928	7414	275	26.8	18.5	95.3
LSD 5%	5.6	3.6	146.8	1083.2	10.6	4.1	0.7	0.4
CV %	9.9	17.9	10.8	9.9	2.6	10.3	2.4	0.3

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Trt 1: Manzate - June 28th, July 17th, Aug 8th, Aug 29th; Badge - July 6th, July 29th, Aug 18th, Sept 7th.

Trt 2 - 7: June 28th, July 6th, July 17th, July 29th, Aug 8th, Aug 18th, Aug 29th, Sept 7th.

Comments: The disease level was very high. Cuprofix at 3 lb/A gave the best *Cercospora beticola* (leafspot) control in this trial. Badge alone and alternating Manzate with Badge provided effective control. Cueva did not provide adequate leafspot control, however, it appeared that Double Nickel (added to Cueva) improved control marginally. All of the treatments were applied 8 times. *Alternaria alternata* (leafspot) was present in the trial. None of the fungicides caused sugarbeet injury.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Sodium, Potassium and Ammonium Bicarbonates for Cercospora Leafspot Control

Herford, Elkton, MI - 2017

Trial Quality: Good

Variety: B-149N

Planted: April 27

Harvested: Oct 4

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

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

No.	Treatment	Rate/A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			19-Sep	15-Aug						
9	Super Tin + Manzate (3 applications)	8 fl oz + 1.6 qt	1.3 d	0.2 d	\$1,304 a	9823 a	308 a	31.9 a	20.3 a	95.9 a
	Manzate (4 Applications)	1.6 qt								
1	Manzate (4 Applications)	1.6 qt	8.0 c	0.3 d	\$1,230 a	8717 b	297 a	29.4 abc	19.7 a	95.8 ab
	Badge (4 Applications)	2 pt								
2	Cuprofix (8 Applications)	2 lb	9.5 c	0.4 d	\$1,242 a	8875 b	293 ab	30.4 ab	19.4 ab	95.6 a-d
3	Badge (8 Applications)	2 pt	10.3 c	0.6 d	\$1,214 a	8741 b	293 ab	29.9 ab	19.4 ab	95.6 abc
6	Potassium Biocarbonate + Badge (8 Applications)	5 lb + 2 pt	11.0 c	0.4 d	\$1,070 b	7737 c	281 b	27.6 bcd	18.8 b	95.4 a-d
7	Ammonium Biocarbonate (8 Applications)	5 lb	81.8 b	2.3 bc	\$921 c	6340 d	242 cd	26.1 cd	16.5 c	94.9 de
8	Sodium Biocarbonate (8 Applications)	5 lb	83.0 b	1.0 cd	\$894 c	6161 d	251 c	24.5 d	17.0 c	95.0 cde
5	Potassium Biocarbonate (8 Applications)	5 lb	84.5 b	3.3 b	\$877 c	6046 d	245 cd	24.8 d	16.7 c	95.0 cde
4	Potassium Biocarbonate (8 Applications)	3 lb	87.8 b	3.4 b	\$843 cd	5820 de	241 cd	24.1 d	16.4 c	95.1 b-e
10	Untreated Check		95.5 a	5.8 a	\$732 d	4914 e	235 d	20.9 e	16.1 c	94.6 e

Average	47.3	1.7	\$1,033	7317	268	27.0	18.0	95.3
LSD 5%	5.7	1.5	136.0	912.7	13.7	3.2	0.8	0.6
CV %	8.3	59.5	9.0	8.6	3.5	8.1	3.1	0.5

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Trt 1: Manzate - June 28th, July 17th, Aug 8th, Aug 29th; Badge - July 6th, July 29th, Aug 18th, Sept 7th.

Trt 2 - 8 : June 28th, July 6th, July 17th, July 29th, Aug 8th, Aug 18th, Aug 28th, Sept 7th.

Trt 9 : Super Tin + Manzate - June 28th, July 21st and Aug 14th; Manzate - July 11th, Aug 4th, Aug 29th, Sept 6th.

Comments: Sodium, Potassium and Ammonium Bicarbonates have shown promise for controlling *Cercospora beticola* (leafspot) in laboratory studies at MSU. These bicarbonates were applied at 5 lb/A sequentially on a 7-10 day schedule for a total of 8 applications. Potassium bicarbonate was also tank mixed with Badge in this trial. The bicarbonate treatments gave "only" suppression of leafspot in this trial. Comparison treatments of Manzate and Coppers gave effective control and Super Tin + Manzate provided excellent leafspot control. The disease level was very high.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Effect of the Chemosensitization Agent Octyl Gallate on the Efficacy of Minerva for Cercospora Leafspot Control

Herford, Elkton, MI - 2017

(Page 1 of 2)

Trial Quality: Good

Variety: B-149N

Planted: April 28

Harvested: Oct 3

Plots: 6 rows X 38 ft, 6 reps

Row Spacing: 22 inches

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

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

No.	Treatment	Rate/A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC
			12-Sep	7-Aug					
2	Minerva + Manzate 3 applications (A,C & E)	13 fl oz + 1.6 qt	3.6 d	0.6 b	\$1,309 a	9210 a	283 a	32.6 a	18.8 a
	Manzate 2 applications (B & D)	1.6 qt							
	Badge SC (F)	3 pt							
7	Minerva + Octyl Gallate 3 applications (A, C & E)	13 fl oz + 290 g	18.6 cd	0.3 b	\$1,191 b	8486 b	269 ab	31.5 a	18.1 ab
	Manzate 2 applications (B & D)	1.6 qt							
	Badge SC (F)	3 pt							
6	Minerva + Octyl Gallate 3 applications (A,C & E)	13 fl oz + 145 g	21.2 cd	0.8 b	\$1,180 b	8298 b	267 abc	31.0 a	18.0 ab
	Manzate 2 applications (B & D)	1.6 qt							
	Badge SC (F)	3 pt							
3	Minerva + Octyl Gallate 3 applications (A,C & E)	13 fl oz + 2.9 g	22.6 bcd	0.7 b	\$1,118 bc	7784 b	256 bc	30.5 ab	17.2 b
	Manzate 2 applications (B & D)	1.6 qt							
	Badge SC (F)	3 pt							
4	Minerva + Octyl Gallate 3 applications (A,C & E)	13 fl oz + 14.5 g	24.2 bc	0.6 b	\$1,122 bc	7816 b	252 bc	31.1 a	16.9 b
	Manzate Max 2 applications (B & D)	1.6 qt							
	Badge SC (F)	3 pt							

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: A - June 29th, B - July 17th, C - July 28th, D - Aug 14th, E - Aug 24th, F - Sept 6th.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

No.	Treatment	Rate/A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC
			12-Sep	7-Aug					
5	Minerva + Octyl Gallate 3 applications (A,C & E)	13 fl oz + 29 g	24.8 bc	0.4 b	\$1,187 b	8250 b	267 abc	30.9 a	17.9 ab
	Manzate Max 2 applications (B & D)	1.6 qt							
	Badge SC (F)	3 pt							
1	Minerva 3 applications (A,C & E)	13 fl oz	41.2 b	0.5 b	\$1,023 c	7142 c	249 c	28.7 b	16.9 b
	Manzate Max 2 applications (B & D)	1.6 qt							
	Badge SC (F)	2 pt							
8	Untreated Check		94.0 a	7.9 a	\$909 d	5877 d	227 d	26.0 c	15.6 c
Average			31.3	1.5	\$1,130	7858	259	30.3	17.4
LSD 5%			18.1	1.1	98.4	636.6	16.8	1.9	1.1
CV %			44.6	58.3	6.7	6.3	5.0	4.8	4.7

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: A - June 29th, B - July 17th, C - July 28th, D - Aug 14th, E - Aug 24th, F - Sept 6th.

Comments: In this trial a Minerva spray program was compared to a Minerva + Octyl Gallate spray program.

Octyl Gallate is a chemosensitization agent which has been shown to improve the efficacy of fungicides for control of *Cercospora beticola* (NDSU). A wide range of Octyl Gallate rates were evaluated in this *Cercospora* leafspot trial. Minerva + Octyl Gallate treatments provided better leafspot control than Minerva without a tank mix partner (Trt. 1). Higher rates of Octyl Gallate gave better results than the lower rates. Yield, quality and grower income were also improved with the addition of Octyl Gallate. Minerva tank mixed with Manzate, was clearly superior to Minerva + Octyl Gallate. Additional research is planned for 2018.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Control of Alternaria and Cercospora Leafspot with Registered and Experimental Fungicides

Answer Plot, Bach, MI - 2017

(Page 1 of 4)

Trial Quality: Good

Variety: C-RR059

Planted: May 9

Harvested: Oct 31

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Loam

%OM: 3.2 **pH:** 7.7 **CEC:** 14.0

Above Opt: P, K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Corn

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 19.1 inches

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

No	Treatment	Rate /A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC
			4-Oct	17-Aug					
31	Echo 720 (8 applic) - 10 days	3 pt	4.7 r	2.0 o	\$1,756 a	13622 ab	319 ab	42.8 ab	20.9 ab
7	Super Tin + Topsin + Manzate (3 applic) - 14 days	8 fl oz + 20 fl oz + 1.6 qt	8.0 qr	4.7 mno	\$1,710 ab	13642 ab	320 ab	42.7 abc	21.0 ab
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
30	Echo 720 (8 applic) - 10 days	2 pt	9.7 pq	6.3 l-o	\$1,704 ab	13111 a-e	320 ab	41.0 a-d	21.0 ab
23	Manzate + Badge (8 applic) - 10 days	1.6 qt + 2 pt	12.3 op	9.3 j-m	\$1,667 abc	13523 abc	317 ab	42.7 abc	20.7 ab
3	Super Tin + Manzate (3 applic) - 14 days	8 fl oz + 1.6 qt	12.7 op	8.3 k-n	\$1,699 ab	13400 a-d	324 a	41.4 a-d	21.2 a
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
26	Badge (8 applic) - 10 days	3 pt	14.7 o	11.3 ijk	\$1,572 b-g	12470 b-h	310 abc	40.3 a-e	20.3 a-e
15	Super Tin + Topsin + Badge (3 applic) - 14 days	8 fl oz + 20 fl oz + 2 pt	15.0 no	3.7 no	\$1,751 a	13911 a	316 ab	44.1 a	20.6 abc
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
11	Super Tin + Badge (3 applic) - 14 days	8 fl oz + 2 pt	15.7 mno	11.0 i-l	\$1,683 abc	13233 a-e	319 ab	41.6 a-d	20.9 ab
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
25	Badge (8 applic) - 10 days	2 pt	16.7 l-o	13.3 h-k	\$1,617 a-d	12611 b-g	314 ab	40.2 a-e	20.6 abc
24	Manzate Max (8 applic) - 10 days	1.6 qt	19.3 lmn	11.3 ijk	\$1,603 a-e	12650 b-f	304 a-f	41.6 a-d	20.1 a-g

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

No.	Treatment	Rate / A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC
			4-Oct	17-Aug					
14	Topsin + Badge (3 applic) - 14 days	20 fl oz + 2 pt	20.0 lm	14.0 hij	\$1,671 abc	13144 a-e	315 ab	41.8 a-d	20.7 ab
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
16	Minerva Duo (3 applic) - 17 days	16 fl oz	20.7 l	12.7 h-k	\$1,581 b-f	12613 b-g	307 a-e	41.2 a-d	20.3 a-f
	Badge (3 applic) - 10 days	2 pt							
8	Minerva Duo (3 applic) - 17 days	16 fl oz	20.7 l	16.0 ghi	\$1,536 c-h	12309 d-h	317 ab	38.9 b-g	20.8 ab
	Manzate Max (3 applic) - 10 days	1.6 qt							
12	Priaxor + Badge (3 applic) - 14 days	8 fl oz + 2 pt	26.3 k	17.3 fgh	\$1,417 g-k	11634 f-i	301 b-f	38.7 b-g	20.0 a-g
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
4	Priaxor + Manzate (3 applic) - 14 days	8 fl oz + 1.6 qt	30.7 j	16.0 ghi	\$1,433 f-j	11792 f-i	309 a-d	38.3 c-g	20.3 a-e
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
22	Super Tin + Sodium Bicarbonate (3 applic) - 14 days	8 fl oz + 5 lb	32.3 j	14.7 hi	\$1,564 b-g	12120 e-i	310 abc	39.1 b-g	20.5 abc
	Sodium Bicarbonate (3 applic) - 10 days	5 lb							
	Badge - 10 days	3 pt							
13	Headline + Badge (3 applic) - 14 days	10 fl oz + 2 pt	37.0 i	22.0 def	\$1,446 e-j	11829 f-i	308 a-d	38.4 b-g	20.3 a-e
	Badge (3 applic) - 10 days	2 pt							
	Manzate Max	1.6 qt							
	Badge - 10 days	3 pt							
5	Headline + Manzate (3 applic) - 14 days	10 fl oz + 1.6 qt	37.0 i	21.3 def	\$1,399 h-k	11514 f-j	306 a-e	37.7 d-g	20.1 a-g
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Control of Alternaria and Cercospora Leafspot with Registered and Experimental Fungicides

Answer Plot, Bach, MI - 2017

(Page 3 of 4)

No.	Treatment	Rate / A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC
			4-Oct	17-Aug					
1	Inspire + Manzate (3 applic) - 17 days	7 fl oz + 1.6 qt	39.3 hi	21.3 def	\$1,506 d-i	12108 e-i	312 abc	38.8 b-g	20.6 abc
	Badge (2 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
9	Inspire + Badge (3 applic) - 17 days	7 fl oz + 2 pt	42.0 gh	25.3 d	\$1,458 e-j	11688 f-i	311 abc	37.7 d-g	20.4 a-d
	Badge (2 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
6	Topsin + Manzate (3 applic) - 14 days	20 fl oz + 1.6 qt	44.0 g	20.0 efg	\$1,564 b-g	12381 c-h	313 abc	39.6 b-f	20.6 abc
	Badge (3 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
2	Minerva + Manzate (3 applic) - 17 days	13 fl oz + 1.6 qt	44.3 g	24.0 de	\$1,239 lm	10172 kl	283 f-i	35.9 e-h	18.9 g-j
	Badge (2 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
10	Minerva + Badge (3 applic) - 17 days	13 fl oz + 2 pt	46.0 fg	22.7 de	\$1,366 i-l	11011 i-l	305 a-e	36.2 e-h	20.2 a-g
	Badge (2 applic) - 10 days	2 pt							
	Badge - 10 days	3 pt							
21	Super Tin + Ammonium Biocarbonate (3 applic) - 14 days	8 fl oz + 5 lb	49.3 f	13.3 h-k	\$1,471 d-i	11419 g-j	292 c-g	39.1 b-g	19.3 c-h
	Ammonium Biocarbonate (3 applic) - 10 days	5 lb							
	Badge - 10 days	3 pt							
20	Super Tin + Potassium Biocarbonate (3 applic) - 14 days	8 fl oz + 5 lb	61.7 e	24.7 de	\$1,449 e-j	11272 h-k	298 b-f	38.0 d-g	19.8 b-g
	Potassium Biocarbonate (3 applic) - 10 days	5 lb							
	Badge - 10 days	3 pt							

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Control of Alternaria and Cercospora Leafspot with Registered and Experimental Fungicides

Answer Plot, Bach, MI - 2017

(Page 4 of 4)

No.	Treatment	Rate / A	% Leaf Damage		Net \$/A	RWSA	RWST	T/A	% SUC
			4-Oct	17-Aug					
19	Inspire + Sodium Biocarbonate (3 applic) - 17 days	7 fl oz + 5 lb	75.7 d	36.7 c	\$1,249 lmn	9947 l	285 e-i	35.0 ghi	19.0 f-j
	Sodium Bicarbonate (2 applic) - 10 days	5 lb							
	Badge - 10 days	3 pt							
17	Inspire + Potassium Biocarbonate (3 applic) - 17 days	7 fl oz + 5 lb	81.7 c	36.0 c	\$1,312 jkl	10419 jkl	287 d-h	36.3 e-h	19.1 d-i
	Potassium Biocarbonate (2 applic) - 10 days	5 lb							
	Badge - 10 days	3 pt							
18	Inspire + Ammonium Biocarbonate (3 applic) - 17 days	7 fl oz + 5 lb	85.0 c	37.3 c	\$1,279 klm	10168 kl	287 d-h	35.5 fgh	19.0 e-j
	Ammonium Biocarbonate (2 applic) - 10 days	5 lb							
	Badge - 10 days	3 pt							
27	Potassium Biocarbonate (8 applic) - 10 days	5 lb	91.7 b	45.0 b	\$1,074 o	8280 m	266 ij	31.1 ij	17.8 j
28	Ammonium Biocarbonate (8 applic) - 10 days	5 lb	94.0 b	43.3 b	\$1,118 no	8612 m	268 hij	32.1 hij	17.9 ij
29	Sodium Bicarbonate (8 applic) - 10 days	5 lb	95.3 b	40.7 bc	\$1,156 mno	8903 m	273 g-j	32.6 hij	18.2 hij
32	Untreated Check		100.0 a	56.7 a	\$1,069 o	8087 m	263 j	30.7 j	17.9 ij
Average			40.7	20.7	\$1,472	11675	302	38.5	20.0
LSD 5%			4.1	4.4	134.3	1015.6	18.3	3.7	1.1
CV %			6.2	12.9	5.6	5.3	3.7	5.8	3.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

All Treatments were started on June 30th.

Comments: Alternaria leafspot, *Alternaria alternata*, has become a significant problem in recent years. In a trial near Gagetown in 2016, the Alternaria infection was significant. In 2017, we conducted an Alternaria leafspot trial in the same field using C-RR059, a susceptible variety. Alternaria infected sugarbeets earlier in the year than did *Cercospora beticola*, however, Cercospora predominated in the late summer. Protectant fungicides provided better control of Alternaria than the triazoles and strobilurins. It was interesting that the strobilurins gave better control of the disease than did the triazoles (the opposite of Cercospora control). Chlorothalonil (an unapproved fungicide) provided very good control of Alternaria in this trial. Super Tin tank mixed with Manzate, Badge, or Topsin also gave good control. Manzate and Badge alone on a 10 day schedule gave adequate control. Bicarbonates have shown some promise for controlling Alternaria and Cercospora in laboratory studies. Sodium, potassium and ammonium bicarbonate treatments provided control early but were overwhelmed by the end of the season. Further work will be conducted using sodium bicarbonate (baking soda), which is very inexpensive, as a tank mix partner. Research at MSU shows that Cercospora and Alternaria have developed resistance to several fungicides and partial resistance to others.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Influence of Water Volume on the Effectiveness of Fungicides for Controlling Cercospora Leafspot

Herford, Elkton, MI - 2017

Trial Quality: Good

Variety: B-149N

Planted: April 27

Harvested: Oct 3

Plots: 6 rows X 38 ft, 6 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low, Quadris 2X

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

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

No.	Treatment	Rate/A	% Leaf Damage 12-Sep	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
3	36 GPA		1.9 c	\$1,312 a	10235 a	307 a	33.3 a	20.4 a	95.4 a
	Minerva + Manzate	13 fl oz + 1.6 qt							
	Super Tin + Manzate	8 fl oz + 1.6 qt							
	Proline + Preference + Manzate	5.7 fl oz + .125 % + 1.6 qt							
	Super Tin + Manzate	8 fl oz + 1.6 qt							
	Inspire + Manzate	7 fl oz + 1.6 qt							
	Badge	2 pt							
2	25 GPA		4.2 c	\$1,214 b	9530 b	302 a	31.6 ab	20.2 a	95.3 a
	Minerva + Manzate	13 fl oz + 1.6 qt							
	Super Tin + Manzate	8 fl oz + 1.6 qt							
	Proline + Preference + Manzate	5.7 fl oz + .125 % + 1.6 qt							
	Super Tin + Manzate	8 fl oz + 1.6 qt							
	Inspire + Manzate	7 fl oz + 1.6 qt							
	Badge SC	2 pt							
1	12.5 GPA		9.2 b	\$1,107 c	8766 c	291 b	30.1 b	19.5 b	95.1 ab
	Minerva + Manzate	13 fl oz + 1.6 qt							
	Super Tin + Manzate	8 fl oz + 1.6 qt							
	Proline + Preference + Manzate	5.7 fl oz + .125 % + 1.6 qt							
	Super Tin + Manzate	8 fl oz + 1.6 qt							
	Inspire + Manzate	7 fl oz + 1.6 qt							
	Badge SC	2 pt							
4	Untreated Check		95.0 a	\$917 d	6557 d	244 c	26.9 c	16.7 c	94.7 b
Average			27.6	\$1,137	8772	286	30.5	19.2	95.1
LSD 5%			3.4	77.8	556.1	8.5	1.9	0.5	0.5
CV %			10.0	5.6	5.2	2.4	5.0	2.1	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Spray Dates: A - June 29th, B - July 17th, C - July 31st, D - Aug 16th, E - Aug 30th.

Comments: Spray water volumes of 12.5, 25 and 35 gpa were utilized in this small plot Cercospora beticola trial.

Higher water volumes clearly provided better disease control, yield, quality and grower income. Leaf damage from Cercospora was 1.9%, 4.2% and 9.2%, with 36, 25 and 12.5 gpa, respectively. The disease pressure was very high.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Control of Cercospora Leafspot with Fungicides Using Six Different Spray Tips Herford, Elkton, MI - 2017

Trial Quality: Good

Variety: B-149N

Planted: April 28

Harvested: Sept 29

Plots: 6 rows X 38 ft, 5 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P, K

High: Mn **Low:** B

Added N: 140 lbs

Previous Crop: Wheat

Rhizoc Level: Low

Cerc. Control: See Trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.4 inches

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

No.	Treatment*	Droplet Size	% Cerc. Damage		Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
			12-Sep	11-Aug						
1	TeeJet 8002XR	V. Fine	3.0 c	2.2 c	\$1,383 a	10820 a	304 a	35.6 a	20.1 a	95.7 a
4	Air Induction 3070 02	Medium	3.6 c	2.3 c	\$1,354 ab	10614 ab	301 a	35.3 a	19.9 ab	95.9 a
3	VariTarget Red	Medium	4.4 bc	3.0 bc	\$1,330 ab	10443 ab	305 a	34.3 ab	20.1 a	95.7 a
6	Turbo TeeJet 11002	Fine	4.9 bc	3.0 bc	\$1,256 bc	9908 bc	294 ab	33.8 ab	19.5 abc	95.7 a
5	Air Induction XR 11002	Medium	4.9 bc	3.2 bc	\$1,207 c	9559 c	284 b	33.7 ab	18.9 c	95.6 a
2	TXR Cone Jet 8002	V. Fine	8.4 b	3.9 b	\$1,158 c	9206 c	285 b	32.2 b	19.0 bc	95.5 a
7	Untreated Check		81.0 a	12.6 a	\$926 d	6638 d	234 c	28.4 c	16.0 d	95.0 b
Average			15.7	4.3	\$1,230	9598	287	33.3	19.1	95.6
LSD 5%			4.1	1.4	113.7	815.1	13.3	2.7	0.8	0.5
CV %			20.1	25.5	7.1	6.5	3.6	6.3	3.3	0.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

* All Treatments received the same spray program.

A - June 29th: Proline @ 5.7 fl oz + Cuprofix @ 2 lbs + Masterlock @ 6.4 fl oz.

B - July 18th: Manzate @ 1.6 qt + Super Tin @ 8 fl oz + Masterlock @ 6.4 fl oz.

C - Aug 1st: Manzate @ 1.6 qt + Inspire @ 7 fl oz + Masterlock @ 6.4 fl oz.

D - Aug 15th: Super Tin @ 8 fl oz + Koverall @ 2 lbs + Masterlock @ 6.4 fl oz.

E - Sept 5th: Topguard @ 14 fl oz + Manzate @ 1.6 qt + Masterlock @ 6.4 fl oz.

Comments: Different nozzle types were evaluated for control of *Cercospora Beticola* leafspot in this trial. Fungicides were applied in 25 gpa and at 100 psi. It appeared the TeeJet XR and Air Induction 3070 nozzles provided the best disease control. VariTarget Red, Turbo TeeJet and Air Induction XR nozzles were somewhat less effective and the Cone Jet nozzles were the least effective. Some of the differences were not statistically significant. The disease level was high. This trial will be repeated in 2018.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Effect of Copper + Roundup Tank Mixes on Cercospora Leafspot Control and Sugarbeet Phytotoxicity

Herford, Elkton, MI - 2017

Trial Quality: Good

Variety: B-149N

Planted: April 27

Harvested: Oct 4

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

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

No.	Treatment	Rate/A	# App	% Cerc Damage 19-Sep	% Phyto 15-Aug	% Phyto 19-Sep	Net \$/A	RWSA	RWST	T/A	% SUC
1	Manzate Max alternate with Badge SC	1.6 qt 2 pt	8	8.0 c	0.0 b	0 b	\$1,104 ab	8359 ab	297 a	28.2 a	19.7 a
2	Cuprofix Ultra 40	2 lb	8	9.5 bc	0.0 b	0 b	\$1,123 ab	8464 ab	298 a	28.5 a	19.8 a
3	Badge SC	2 pt	8	10.3 bc	0.0 b	0 b	\$1,154 a	8741 a	293 a	29.9 a	19.4 a
4	Badge SC	2 pt	8	14.5 b	20.0 a	9 a	\$1,052 b	7974 b	294 a	27.2 a	19.5 a
	Roundup P Max in 1st, 3rd, 5th Applic	32 fl oz	3								
5	Untreated Check			95.5 a	0.0 b	0 b	\$709 c	4991 c	226 b	22.1 b	15.6 b
Average				27.6	4.0	1.9	\$1,028	7706	281	27.2	18.8
LSD 5%				5.3	2.8	0.9	80.4	565.5	15.1	2.8	0.9
CV%				12.5	45.6	29.8	5.1	4.8	3.5	6.6	3.0

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Comments: Badge SC was applied alone and in a tank mix with Roundup in this trial. The *Cercospora beticola* (leafspot) infection was very high. Badge by itself provided similar levels of leafspot control as Cuprofix and Manzate alternated with Badge. When Badge was tank mixed with Roundup, sugarbeet leaf injury occurred and the level of leafspot control was lowered. Yield and net income suffered due to the Badge plus Roundup tank mix.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Control of Cercospora Leafspot and Alternaria with Eminent VP and Badge SC in Sugarbeets

Herford, Elkton, MI - 2017

Trial Quality: Good

Variety: B-149N

Planted: April 28

Harvested: Oct. 3

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Soil Info: Loam

%OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P, K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 19.1 inches

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

No.	Treatment	Rate/A	# App	% Cerc Damage 19-Sep	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
2	Badge SC + Manzate Max	1.5 pt 1.6 qt	8	1.2 c	\$1,415 a	10434 a	283 a	36.8 a	19.0 ab	95.3 ab
1	Badge SC	2 pt	8	2.7 bc	\$1,340 a	9596 b	278 a	34.5 ab	18.6 b	95.6 a
3	Eminent VP + Badge SC	13 fl oz 1.5 pt	5	3.8 b	\$1,319 a	9589 b	280 a	34.3 ab	18.7 ab	95.4 a
	Manzate Max	1.6 qt								
	Super Tin 4L + Badge SC	8 fl oz 1.5 pt								
	Proline 480 SC + Preference + Badge SC	5.7 fl oz 0.13% 1.5 pt								
	Badge SC	2 pt								
4	Inspire XT + Badge SC	7 fl oz 1.5 pt	5	4.5 b	\$1,339 a	9729 ab	289 a	33.6 b	19.3 a	95.4 a
	Manzate Max	1.6 qt								
	Super Tin 4L + Badge SC	8 fl oz 1.5 pt								
	Eminent VP + Cuprofix Ultra 40	13 fl oz 2 lb								
	Badge SC	2 pt								
5	Untreated Check		0	95.0 a	\$1,025 b	7004 c	235 b	29.7 c	16.1 c	95.0 b
Average				21.4	\$1,288	9270	273	33.8	18.3	95.3
LSD 5%				2.0	107.1	732.1	11.6	2.6	0.6	0.4
CV%				7.8	6.9	6.6	3.5	6.4	2.9	0.3

Means followed by same letter are not significantly different (P=.05, Duncan's New MRT).

Leafspot: 70% Cercospora, 30% Alternaria.

Trts 1, 2: Start at 40 DSV, then 7-10 day schedule.

Trts 3, 4: Start at 40 DSV, then 17 days after triazole, 14 days after S Tin, 7-10 days after EBDC or Copper.

Comments: Leafspot pressure (*Cercospora beticola* (70%) and *Alternaria alternata* (30%)) was very high. Badge + Manzate (8 Appl) provided very good leafspot control in this trial. Badge (8 Appl) also gave good leafspot control. The triazole treatments were somewhat less effective. Eminent VP and Inspire XT provided similar levels of disease control.



Control of Cercospora Leafspot in Sugarbeets With K PHITE Systemic Fungicide Herford, Elkton, MI - 2017

Trial Quality: Good

Variety: B-149N

Planted: April 28

Harvested: Sept 29

Plots: 6 rows X 38 ft, 6 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.4 inches

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

No.	Treatment	Rate / A	# App	% Cerc Damage 12-Sep	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
3	K PHITE 7 LP +	2 qt	7	7 e	\$1,526 a	9941 a	281 a	35.4 a	18.7 a	95.7
	Manzate Max	1.6 qt								
4	Manzate Max	1.6 qt	7	14 d	\$1,498 a	9669 a	277 a	34.9 a	18.4 a	95.7
2	K PHITE 7 LP	4 qt	7	65 c	\$1,164 b	7499 b	241 b	31.1 b	16.3 b	95.3
1	K PHITE 7 LP	2 qt	7	75 b	\$1,092 b	6955 b	235 bc	29.5 b	15.9 bc	95.3
5	Untreated Check			91 a	\$935 c	5874 c	222 c	26.5 c	15.1 c	95.2
Average				50.4	\$1,243	7988	251	31.5	16.9	95.4
LSD 5%				6.1	130.2	817.9	18.2	2.1	1.0	n.s.
CV %				10.1	8.7	8.5	6.0	5.5	5.0	0.6

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Comments: K PHITE (potassium polyphosphite) from Plant Food Company was evaluated for control of *Cercospora* leafspot, *Cercospora beticola*, in this trial. K PHITE applied alone did not control leafspot adequately, however, it appeared that when tank mixed with Manzate, it improved the performance of Manzate. The leafspot pressure was high. It should be noted that this is our only experience with this product.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Regalia (Bio-Fungicide) for control of Cercospora Leafspot in Sugarbeets

Herford, Elkton, MI - 2017

Trial Quality: Good

Variety: B-149N

Planted: April 28

Harvested: Oct. 3

Plots: 6 rows X 38 ft, 6 reps

Row Spacing: 22 inches

Soil Info: Loam

% OM: 2.9 **pH:** 7.7 **CEC:** 12.8

Above Opt: P **Opt:** K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: Low

Cerc Control: See trts.

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 22.2 inches

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

No.	Treatment	Appl	Rate/A	CLS Rate % Injury 18-Sep	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
2	Regalia + Manzate Max	Row Close	2 qt 1.6 qt	2.8 c	\$1,264 a	9401 a	284 a	33.1 a	19.1 a	95.2 a
	Inspire XT + Manzate Max	+ 10 days	7 fl oz 1.6 qt							
	Regalia + Manzate Max	+ 18 days	2 qt 1.6 qt							
	Proline SC + Preference + Manzate Max	+ 10 days	7 fl oz 0.13% 1.6 qt							
	Regalia + Manzate Max	+ 18 days	2 qt 1.6 qt							
	Super Tin 4L + Manzate Max	+ 10 days	7 fl oz 1.6 qt							
1	Regalia + Manzate Max	Row Close	1 qt 1.6 qt	3.2 c	\$1,290 a	9235 a	282 a	32.7 a	18.9 a	95.2 a
	Inspire XT + Manzate Max	+ 10 days	7 fl oz 1.6 qt							
	Regalia + Manzate Max	+ 18 days	1 qt 1.6 qt							
	Proline SC + Preference + Manzate Max	+ 10 days	7 fl oz 0.13% 1.6 qt							
	Regalia + Manzate Max	+ 18 days	1 qt 1.6 qt							
	Super Tin 4L + Manzate Max	+ 10 days	7 fl oz 1.6 qt							
3	Regalia 8 Applications	Row Close then 10 days	2 qt	76.3 b	\$831 b	7087 b	250 b	28.4 b	17.1 b	94.7 b
4	Untreated Check			100.0 a	\$885 b	5647 c	230 c	24.6 c	15.9 c	94.3 b
Average				45.6	\$1,068	7842	262	29.7	17.8	94.8
LSD 5%				2.2	62.6	399.7	10.4	1.1	0.6	0.5
CV%				3.8	4.8	4.1	3.2	3.0	2.8	0.5

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Comments: It appeared that by adding Regalia (biological) to Manzate, *Cercospora beticola* (leafspot) control was improved in this trial, however, there should have been another check for treatments 1 and 2. Regalia by itself provided suppression of the disease.

***Net \$/A:** Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Strategies for Cercospora leaf spot: cultivar and fungicide program, Cedar Springs, 2017

Cedar Springs, Ontario, Canada

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

Trial Quality:	Fair	Variety:	B-1399, C-RR059, C-G333NT
Planted:	April 27	Location:	Cedar Springs, Ontario, Canada
Harvested:	October 16	Application Method:	hand-held boom, CO ₂ pressure
Plot Size:	2 rows x 23 feet	Application Water Volume:	25 gal/A except where indicated
Row Spacing:	2.5 feet	Reps:	4
Seeding Rate:	3.5 seeds/foot		

Key Findings:

- Disease severity:
 - All cultivars responded the same way to fungicide program and Cercospora leaf spot severity was similar among all cultivars.
 - Manzate Pro-Stick calendar sprays provided good control and sometimes required fewer fungicide applications (6 to 7 applications) than MSC Canada-adapted programs (6 to 8 applications). Manzate Pro-Stick beginning at 50 DSV using low water volume (12 gpa) had higher disease than the MSC Canada-adapted ‘susceptible’ program while the equivalent high water volume (25 gpa) treatment did not.
- Yield and sugar:
 - Fungicide program and cultivar did not affect beet or sugar yield, or sugar content.

Table 1. Area under the disease progress curve (AUDPC) for Cercospora leaf spot.

Program (# applications) ^b	AUDPC ^a	Sugar (%)	RWST	Yield (tons/acre)	RWSA
Unsprayed control	1616 a ^c	14.9 a	206 a	27.4 a	5640 a
Manzate Pro-Stick (begin 50 DSV, low water volume) (6)	1032 b	15.6 a	217 a	32.7 a	7093 a
Manzate Pro-Stick (begin 50 DSV) (6)	834 bc	15.1 a	210 a	31.0 a	6350 a
Manzate Pro-Stick (begin 40 DSV) (6)	740 bc	15.2 a	211 a	32.5 a	6866 a
Manzate Pro-Stick (begin 35 DSV) (7)	853 bc	15.5 a	215 a	32.0 a	6878 a
MSC Canada-adapted ‘tolerant cultivar’ program (6)	718 bc	15.6 a	218 a	29.3 a	6384 a
MSC Canada-adapted ‘moderate cultivar’ program (7)	756 bc	15.4 a	216 a	32.0 a	6881 a
MSC Canada-adapted ‘susceptible cultivar’ program (8)	567 c	14.9 a	215 a	33.2 a	7083 a
Cultivar					
B-1399	884 a	15.2 a	212 a	31.9 a	6769 a
C-G333NT	977 a	15.3 a	214 a	31.2 a	6680 a
C-RR059	807 a	15.5 a	215 a	30.6 a	6560 a

^a AUDPC = area under the disease progress curve. A lower number is better. **Mean severity on Oct 10 in control plots was 87% (high).** ^b Manzate Pro-Stick programs began at the BEETcast™ DSV threshold indicated and were applied approximately every 14 days. MSC Canada-adapted programs were as follows: ‘tolerant’ 1) Proline + Manzate Pro-Stick at 50 DSV, 2) Manzate Pro-Stick at 45 DSV or 21 days, 3) Proline + Manzate Pro-Stick at 35 DSV or 14 days, 4) Manzate Pro-Stick at 35 DSV or 14 days, 5+) Manzate Pro-Stick 21 DSV or 10 days, ‘moderate’ 1) Proline + Manzate Pro-Stick at 40 DSV, 2) Manzate Pro-Stick at 40 DSV or 18 days, 3) Proline + Manzate Pro-Stick at 25 DSV or 14 days, 4) Manzate Pro-Stick at 25 DSV or 14 days, 5+) Manzate Pro-Stick 18 DSV or 10 days, ‘susceptible’ 1) Proline + Manzate Pro-Stick at 35 DSV, 2) Manzate Pro-Stick at 35 DSV or 15 days, 3) Proline + Manzate Pro-Stick at 20 DSV or 12 days, 4) Manzate Pro-Stick at 20 DSV or 12 days, 5+) Manzate Pro-Stick 15 DSV or 10 days. For MSC Canada-adapted programs, where both DSV and number of days are listed, the fungicide was applied according to the criteria that was reached first. ^c Numbers in a column followed by the same letter are not significantly different at $P \leq 0.05$, Tukey’s HSD. Data for each cultivar is presented for interest only, there was no significant cultivar*schedule interaction.

Acknowledgements: This project was funded by the Michigan Sugar Company.

Strategies for Cercospora leaf spot: cultivar and fungicide program, Ridgetown, 2017

Ridgetown, Ontario, Canada

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

Trial Quality:	Good	Variety:	B-1399, C-RR059, C-G333NT
Planted:	April 26	Location:	Ridgetown, Ontario, Canada
Harvested:	October 23	Application Method:	hand-held boom, CO ₂ pressure
Plot Size:	2 rows x 23 feet	Application Water Volume:	25 gal/A except where indicated
Row Spacing:	2.5 feet	Reps:	4
Seeding Rate:	3.5 seeds/foot		

Key Findings:

- Disease severity (Table 1):
 - All cultivars responded the same way to fungicide program.
 - Cercospora leaf spot severity among cultivars was as expected (C-G333NT > CRR059 > B-1399).
 - Using a low water volume (12 gpa) was less effective than standard volume (25 gpa) for Manzate Pro-Stick.
 - Manzate Pro-Stick calendar programs provided good disease control and required fewer fungicide applications (7 to 8 applications) than MSC Canada-adapted programs (8 to 12 applications).
- Yield and sugar (Table 2):
 - Fungicide program did not affect beet yield.
 - Sugar yield was not affected by fungicide program. C-RR059 yielded higher sugar per acre than C-G333NT, which is more susceptible to Cercospora leaf spot than C-RR059. Sugar yield for B-1399 was equivalent to C-RR059 despite being more tolerant to Cercospora leaf spot than C-RR059.

Table 1. Area under the disease progress curve (AUDPC) for Cercospora leaf spot.

Program (# applications) ^b	AUDPC ^a			
	All cultivars	B-1399 'tolerant'	C-RR059 'moderate'	C-G333NT 'susceptible'
Unsprayed control	986 a ^c	538 a	977 a	1444 a
Manzate Pro-Stick (begin 50 DSV, low water volume)		207 b	542 b	546 ab
(7)	431 b			
Manzate Pro-Stick (begin 50 DSV) (7)	112 cd	53 bc	73 c	209 bc
Manzate Pro-Stick (begin 40 DSV) (7)	110 cd	72 bc	119 c	139 c
Manzate Pro-Stick (begin 35 DSV) (8)	112 cd	54 bc	96 c	185 bc
MSC Canada-adapted 'tolerant cultivar' program (8)	69 de	41 c	56 c	110 c
MSC Canada-adapted 'moderate cultivar' program (10)	45 e	30 c	40 c	67 c
MSC Canada-adapted 'susceptible cultivar' program (12)	59 e	40 c	30 c	108 c
Cultivar				
B-1399	129 c	-	-	-
C-G333NT	351 a	-	-	-
C-RR059	242 b	-	-	-

^a AUDPC = area under the disease progress curve. A lower number is better. **Mean severity on Oct 19 in control plots was 47% (moderate).** ^b Manzate Pro-Stick programs began at the BEETcast™ DSV threshold indicated and were applied approximately every 14 days. MSC Canada-adapted programs were as follows: 'tolerant' 1) Proline + Manzate Pro-Stick at 50 DSV, 2) Manzate Pro-Stick at 45 DSV or 21 days, 3) Proline + Manzate Pro-Stick at 35 DSV or 14 days, 4) Manzate Pro-Stick at 35 DSV or 14 days, 5+) Manzate Pro-Stick 21 DSV or 10 days, 'moderate' 1) Proline + Manzate Pro-Stick at 40 DSV, 2) Manzate Pro-Stick at 40 DSV or 18 days, 3) Proline + Manzate Pro-Stick at 25 DSV or 14 days, 4) Manzate Pro-Stick at 25 DSV or 14 days, 5+) Manzate Pro-Stick 18 DSV or 10 days, 'susceptible' 1) Proline + Manzate Pro-Stick at 35 DSV, 2) Manzate Pro-Stick at 35 DSV or 15 days, 3) Proline + Manzate Pro-Stick at 20 DSV or 12 days, 4) Manzate Pro-Stick at 20 DSV or 12 days, 5+) Manzate Pro-Stick 15 DSV or 10 days. For MSC Canada-adapted programs, where both DSV and number of days are listed, the fungicide was applied according to the criteria that was reached first. ^c Numbers in a column followed by the same letter are not significantly different at $P \leq 0.05$, Tukey's HSD. Data for each cultivar is presented for interest only, there was no significant cultivar*schedule interaction.

Strategies for Cercospora leaf spot: cultivar and fungicide program, Ridgetown, 2017

Ridgetown, Ontario, Canada

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

Table 2. Yield and sugar quality for beets treated with different fungicide schedules for Cercospora leaf spot.

Schedule (# applications) ^b		% Sugar	RWST	Total Yield (tons/acre)	RWSA
Unsprayed control		14.8 a	206 a	61.3 a	12643 a
Manzate Pro-Stick (begin 50 DSV, low water volume) (7)		15.1 a	212 a	60.8 a	12901 a
Manzate Pro-Stick (begin 50 DSV) (7)		15.0 a	212 a	65.3 a	13824 a
Manzate Pro-Stick (begin 40 DSV) (7)		15.1 a	213 a	62.4 a	13252 a
Manzate Pro-Stick (begin 35 DSV) (8)		15.4 a	219 a	61.2 a	13351 a
MSC Canada-adapted ‘tolerant cultivar’ program (8)		15.3 a	217 a	62.7 a	13599 a
MSC Canada-adapted ‘moderate cultivar’ program (10)		14.8 a	207 a	63.3 a	12963 a
MSC Canada-adapted ‘susceptible cultivar’ program (12)		15.2 a	215 a	63.5 a	13339 a
Cultivar					
B-1399		14.6 b	207 b	63.6 a	13155 ab
C-G333NT		15.0 b	209 b	60.8 a	12697 b
C-RR059		15.7 a	222 a	63.3 a	13850 a

^a Fungicide schedules are described in Table 1. ^b Numbers in a column followed by the same letter are not significantly different at $P \leq 0.05$, Tukey's HSD. Data from cultivars is pooled to conserve space because although there was a cultivar*schedule interaction for sugar and RWST there was no difference in spray schedules within cultivar.

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In-vitro fungicide sensitivity of *Cercospora beticola* isolates from sugarbeet 2016-17

Cercospora leaf spot (CLS) caused by *Cercospora beticola* is the most serious foliar disease of sugarbeet in Michigan and when conditions are conducive can cause yield losses. The need to preserve the usefulness of existing fungicide chemistries has been particularly important since the development of fungicide insensitivity issues in CLS. Additionally, from 2013-2016, there has been a steady increase in frequency of *C. beticola* isolates with triazole and QoI resistance collected from commercial production fields in Michigan and Ontario, CA. Major issues have developed over the past few years with the introduction of effective fungicides for control of this disease related to fungicide application timing and development of insensitivity to established and novel fungicides in *C. beticola* populations. This has led to the increase in the development of insensitivity to some fungicides previously recommended for CLS management, most notably thiophanate-methyl, benzimidazoles and QoIs. Therefore, this project continued to monitor fungicide sensitivity of pathogen populations to inform the development of resistant management and fungicide use recommendations.

Sample collection and geographical origin of isolates: Isolates of *C. beticola* were collected from leaves with symptoms of CLS sampled from sugarbeet fields in east-central Michigan during Sep and Oct in 2016 and 2017. Samples of up to 20 leaves from throughout a selection of sugarbeet production fields in Michigan and Ontario CA were used in sensitivity testing. Isolates of *C. beticola* were recovered from infected leaf tissue from multiple field locations using established methods. Pure cultures isolated from individual CLS lesions were obtained to determine sensitivity to each fungicide described below. Representative lesions were randomly selected from sugarbeet leaves, surfaced sterilized, and placed into plastic bags with moist paper towel to maintain humidity near 100 %, and placed under fluorescent light with an 8-h photoperiod at 24°C for 7 d to promote sporulation. Hyphal tipping was used to isolate pure cultures of *C. beticola* onto clarified V8 (CV8) media amended with CaCO₃ (900 ml of distilled H₂O, 100 ml of CV8, 15 g of Bacto Agar, and 1.5 g of CaCO₃) for subsequent fungicide sensitivity assays.

In vitro fungicide sensitivity of *Cercospora beticola* by dilution gradient: Difenconazole [DFZ; Inspire®, (Group 3)], fenbuconazole [FBZ; Enable®, (Group 3)], flutriafol [FTL; Topguard®, (Group 3)], prothioconazole [PTZ; Proline®, (Group 3)], tetraconazole [TTZ; Eminent®125 SL, (Group 3)], pyraclostrobin [PYR; Headline® 2.08SC, (Group 11)], thiophanate-methyl [TPN; Topsin® 4.5FL (Group 1)] and triphenyltin OH [TPT; Super Tin® 80WP (Group 30)] and stock solutions of 10,000 mg/liter of each fungicide were prepared by dissolving commercial-grade fungicides in a sterile solvent. 50 ml of CV8 agar was poured into each dish, to form a layer of CV8 agar with a constant volume, thus when a stock solution is added to the agar, it results in a gradient from 0 to 1000 mg/liter across the agar surface. A method using a spiral gradient plater was used to determine effective concentration in inhibiting growth by 50% (EC₅₀). Pure cultures of *C. beticola* were prepared as described above. Conidial suspensions were prepared by flooding colony Petri dishes with 1 mL distilled water and scraping the conidia free from the surface with a rubber policeman. The conidial suspension (10 µL) was spread across the fungicide gradient plate from edge to center. Isolates were incubated for 14 d, at 24°C (two replications). The point coordinates at which the colonies start and end was recorded and entered into a software program, which calculates the EC₅₀ for each isolate for each of the fungicides.

Results

The mean EC₅₀ values were estimated for each of the fungicides listed above. In 2016 a total of 180, 175, 185, 182, 186 and 177 isolates were screened against the fungicides DFZ, FBZ, FTL, PTZ, TTZ, and TPT respectively (Table 1). In 2017 a total of 243, 210, 233, 232, 220, 162, 158 and 232 and 177 isolates were screened against the fungicides DFZ, FBZ, FTL, PTZ, TTZ, PYR, TPN and TPT respectively (Table 2). For DFZ, FBZ, FTL, PTZ, TTZ, and TPT the mean EC₅₀ values were 39.5, 55.5, 61.4, 70.9, 71.8 and 4.5 respectively in 2016 (Table 1). For DFZ, FBZ, FTL, PTZ, TTZ, PYR, TPN and TPT the mean EC₅₀ values were 37.8, 33.6, 79.8, 70.5, 56.8, 54.0, 51.0 and 9.7 respectively in 2017 (Table 2). The distribution of *C. beticola* isolate sensitivity in EC₅₀ values (mg/L) for all fungicides tested in 2016 and 2017 ranged from <1 to >100 (Tables 1 and 2).

Table 1. Comparison of mean effective concentration in growth by 50% (EC₅₀) for isolates of *Cercospora beticola* isolates to DFZ, FBZ, FTL, PTZ, TTZ, and TPT 2016.

Active ingredient	FRAC ^b code	Total # of isolates	EC ₅₀ (mg/L) ^a		
			Mean (s.e.) ^c	Minimum	Maximum
Difenoconazole (DFZ)	3	180	39.5 ± 3.5	0.10	126.2
Fenbuconazole (FBZ)	3	175	55.5 ± 4.7	0.10	133.6
Flutriafol (FTL)	3	185	61.4 ± 4.3	0.10	130.2
Prothioconazole (PTZ)	3	182	70.9 ± 4.6	0.10	132.7
Tetraconazole (TTZ)	3	186	71.8 ± 4.3	0.10	129.7
Triphenyltin OH (TPT)	30	177	4.5 ± 0.4	0.10	24.2

^a EC₅₀ values determined for two replications based on mean effective concentration in growth by 50% by spiral gradient dilution method

^b FRAC=Fungicide Resistance Action Committee group name based on chemical relatedness and mode of action

^c s.e.=standard error of the mean

Table 2. Comparison of mean effective concentration in growth by 50% (EC₅₀) for isolates of *Cercospora beticola* isolates to DFZ, FBZ, FTL, PTZ, TTZ, PYR, TPN and TPT 2017.

Active ingredient	FRAC ^b code	Total # of isolates	EC ₅₀ (mg/L) ^a		
			Mean (s.e.) ^c	Minimum	Maximum
Difenoconazole (DFZ)	3	243	37.8 ± 2.3	0.10	155.0
Fenbuconazole (FBZ)	3	210	33.6 ± 2.8	0.10	105.2
Flutriafol (FTL)	3	233	79.8 ± 1.9	0.10	109.2
Prothioconazole (PTZ)	3	232	70.5 ± 1.7	0.10	40.3
Tetraconazole (TTZ)	3	220	56.8 ± 2.3	0.10	108.0
Pyraclostrobin (PYR)	11	162	54.0 ± 3.1	0.10	105.0
Thiophanate-methyl (TPN)	1	158	51.0 ± 3.5	0.10	105.0
Triphenyltin OH (TPT)	30	232	9.7 ± 0.9	0.10	99.00

^a EC₅₀ values determined for two replications based on mean effective concentration in growth by 50% by spiral gradient dilution method

^b FRAC=Fungicide Resistance Action Committee group name based on chemical relatedness and mode of action

^c s.e.=standard error of the mean

In-vitro fungicide sensitivity distributions of *Alternaria* spp. isolates from sugarbeet 2016

Alternaria leaf spot (ALS) disease caused by *Alternaria* spp. in the *alternata* and *tenius* species-group is common wherever sugarbeet is grown. Infection by *Alternaria* spp. has historically been considered a minor pathogen in sugarbeet production in the US, due to its more opportunistic or secondary nature. Recently, increased incidence and severity of ALS has been observed in MI at levels high enough to have the potential to cause yield loss due to defoliation. In 2015 and 2016 *Alternaria* spp. with higher levels of insensitivity to many classes of fungicides were also recovered from commercial production areas in Michigan. Isolates of *Alternaria* spp. were tolerant to the quinone outside inhibitor (QoI), triazole, triphenyltin OH and prothioconazole fungicides. Therefore, sensitivity monitoring of pathogen populations to inform the development of fungicide resistant management and fungicide use recommendations is essential.

Sample collection and geographical origin of isolates: Isolates of *Alternaria* spp. were collected from leaves with symptoms of ALS sampled from sugarbeet fields in east-central Michigan during Sep and Oct in 2016. Samples of up to 20 leaves from throughout a selection of sugarbeet production fields in Michigan and Ontario, CA were used in sensitivity testing. Isolates of *Alternaria* spp. were recovered from infected leaf tissue from multiple field locations using standard methods for the program. Mono-conidial isolates from individual ALS lesions were obtained to determine sensitivity to each fungicide described below. From each sugarbeet leaf representative lesions were cut with a cork borer; the lesions were chosen from similar sizes and in similar stages of sporulation and surfaced sterilized. All leaf disks derived from a particular sampling site were placed onto water agar media (WA) amended with streptomycin and CaCO₃ (1000 ml of distilled H₂O, 15 g of Bacto Agar, and 1.5 g of CaCO₃) for sporulation induction and positive identification. From individual lesions one conidium of *Alternaria* spp. was transferred to clarified V-8 (CV8) media amended with streptomycin and CaCO₃ (900 ml of distilled H₂O, 100 ml of CV8, 15 g of Bacto Agar, and 1.5 g of CaCO₃) for subsequent fungicide sensitivity assays.

In vitro fungicide sensitivity of *Alternaria* spp. by dilution gradient: Difenconazole [DFZ; Inspire®, (Group 3)], fenbuconazole [FBZ; Enable®, (Group 3)], flutriafol [FTL; Topguard®, (Group 3)], prothioconazole [PTZ; Proline®, (Group 3)], tetraconazole [TTZ; Eminent®125 SL, (Group 3)], pyraclostrobin [PYR; Headline® 2.08SC, (Group 11)] and triphenyltin OH [TPT; Super Tin® 80WP (Group 30)] and stock solutions of 10,000 mg/liter of each fungicide are prepared by dissolving commercial-grade fungicides in a sterile solvent. 50 ml of CV8 agar was poured into each dish, to form a layer of CV8 agar with a constant volume, thus when a stock solution is added to the agar, it results in a gradient from 0 to 1000 mg/liter across the agar surface. A method using a spiral gradient plater was used to determine effective concentration in inhibiting growth by 50% (EC₅₀). Pure cultures of *Alternaria* spp. were prepared as described above. Conidial suspensions are prepared by flooding colony Petri dishes with 1 mL distilled water and scraping the conidia free from the surface with a rubber policeman. The conidial suspension (10 µL) was spread across the fungicide gradient plate from edge to center. Isolates were incubated for 14 d, at 24°C (two replications). The point coordinates at which the colonies start and end was recorded and entered into a software program, which calculates the EC₅₀ for each isolate and fungicide.

Sugarbeet (*Beta vulgaris*)

***Alternaria* leaf spot; *Alternaria* spp.**

Results

The mean EC₅₀ values were estimated for each of the fungicides listed above. A total of 143, 140, 131, 131, 143, 147 and 144 isolates were screened against the fungicides DFZ, FBZ, FTL, PTZ, TTZ, PYR, and TPT respectively (Table 1). For DFZ, FBZ, FTL, PTZ, TTZ, PYR, and TPT the mean EC₅₀ values were 3.0, 70.9, 46.8, 52.4, 62.0, 16.4 and 87.4 respectively (Table 1). The distribution of *Alternaria* spp. isolate sensitivity in EC₅₀ values (mg/L) for all fungicides tested ranged from <1 to >100 (Table 1 and Figure 1).

Table 1. Comparison of mean effective concentration in growth by 50% (EC₅₀) for isolates of *Alternaria* spp. isolates to DFZ, FBZ, FTL, PTZ, TTZ, PYR, and TPT 2016.

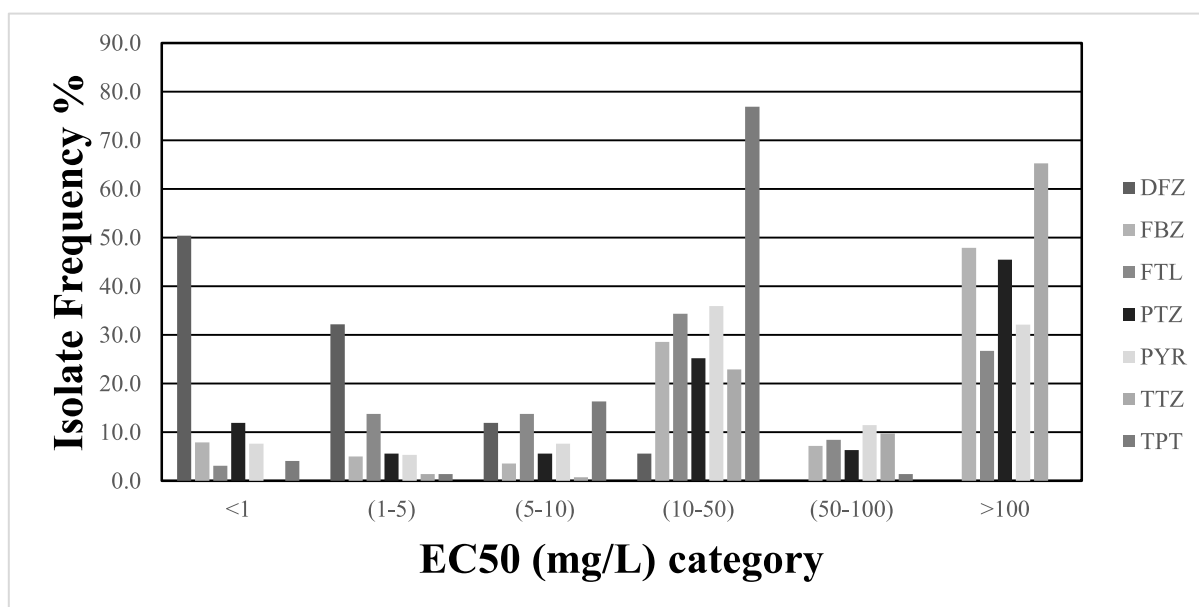
Active ingredient	FRAC ^b code	Total # of isolates	EC ₅₀ (mg/L) ^a		
			Mean (s.e.) ^c	Minimum	Maximum
Difenoconazole (DFZ)	3	143	3.0 ± 0.52	0.10	37.4
Fenbuconazole (FBZ)	3	140	70.9 ± 3.95	0.10	133.6
Flutriafol (FTL)	3	131	46.8 ± 3.64	0.10	130.2
Prothioconazole (PTZ)	3	131	52.4 ± 3.57	0.10	105.0
Tetraconazole (TTZ)	3	143	62.0 ± 4.01	0.10	132.7
Pyraclostrobin (PYR)	11	147	16.4 ± 0.89	0.10	63.4
Triphenyltin OH (TPT)	30	144	87.4 ± 2.80	3.96	129.7

^a EC₅₀ values determined for two replications based on mean effective concentration in growth by 50% by spiral gradient dilution method

^b FRAC=Fungicide Resistance Action Committee group name based on chemical relatedness and mode of action

^c s.e.=standard error of the mean

Figure 1. Frequency distributions of in vitro sensitivity of *Alternaria* spp. isolates collected in 2016 from sugarbeet leaves. Sensitivity expressed as 50% inhibition of fungal growth (EC₅₀) in vitro, fungicide concentration estimate based determined by the spiral gradient dilution method. Difenoconazole=DFZ; fenbuconazole=FBZ; flutriafol=FTL; prothioconazole=PTZ; tetraconazole=TTZ; pyraclostrobin=PYR and triphenyltin OH=TPT.



Sugarbeet (*Beta vulgaris*)

Alternaria leaf spot; *Alternaria* spp.



Evaluate Seed Treatments for Control of Rhizoctonia Root Rot in Sugarbeets

Average of 3 Locations

(Page 1 of 10)

Trial Quality: Good

Variety: SX 1245 N

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

Rhizoc Level: see trts.

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 inches

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

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

No.	Seed Treatment*	Quadris	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
18	Untreated Check	8 If	\$819 a	6478 ab	313	20.8 ab	20.7	95.5
19	Untreated Check	IF + 8 If	\$809 ab	6511 a	311	21.0 a	20.6	95.5
14	Tri-Pak	8 If	\$800 abc	6434 abc	314	20.6 abc	20.8	95.5
17	Untreated Check	IF	\$796 a-d	6261 a-d	317	19.9 abc	20.9	95.6
15	Tri-Pak	IF + 8 If	\$788 a-e	6443 abc	309	20.9 a	20.6	95.3
12	Vibrance	None	\$784 a-e	6137 a-d	312	19.8 abc	20.7	95.5
9	Vibrance	IF	\$778 a-e	6194 a-d	309	20.0 abc	20.6	95.3
5	Kabina ST	IF	\$777 a-e	6207 a-d	314	19.8 abc	20.8	95.6
16	Tri-Pak	None	\$776 a-e	6082 a-d	305	20.0 abc	20.3	95.3
1	Systiva	IF	\$776 a-e	6190 a-d	315	19.7 abc	20.9	95.5
13	Tri-Pak	IF	\$775 a-e	6178 a-d	312	19.8 abc	20.7	95.6
8	Kabina ST	None	\$771 a-e	6046 bcd	304	19.9 abc	20.3	95.4
11	Vibrance	IF + 8 If	\$769 a-e	6291 a-d	310	20.4 abc	20.6	95.4
4	Systiva	None	\$767 a-e	6015 cd	308	19.6 bc	20.5	95.4
10	Vibrance	8 If	\$759 b-e	6109 a-d	310	19.7 abc	20.6	95.4
2	Systiva	8 If	\$758 b-e	6112 a-d	310	19.7 abc	20.6	95.4
7	Kabina ST	IF + 8 If	\$749 cde	6141 a-d	307	20.1 abc	20.4	95.4
6	Kabina ST	8 If	\$739 de	5960 d	310	19.3 c	20.6	95.5
3	Systiva	IF + 8 If	\$731 ef	5999 cd	308	19.5 bc	20.5	95.5
20	Untreated Check	None	\$686 f	5279 e	299	17.6 d	20.0	95.2
Average			\$770	6153	310	19.9	20.6	95.4
LSD 5%			48.9	377.2	n.s.	1.1	n.s.	n.s.
CV %			5.52	5.3	2.4	4.8	2.0	0.3

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)

Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Evaluate Seed Treatments for Control of Rhizoctonia Root Rot in Sugarbeets

Average of 3 Locations

(Page 2 of 10)

No.	Seed Treatment*	Quadris	Net \$/A	Dead B / 100 ft	Vigor	Sugarbeet Stand B / 100 ft	
						Early	Late
18	Untreated Check	8 lf	\$819 a	4.6 def	7.9 ab	189.8 a	178.3 a
19	Untreated Check	IF + 8 lf	\$809 ab	3.2 f	8.0 ab	181.5 a-d	175.5 abc
14	Tri-Pak	8 lf	\$800 abc	4.5 def	7.8 b	188.4 a	172.2 a-e
17	Untreated Check	IF	\$796 a-d	4.9 c-f	8.0 ab	188.2 a	174.8 abc
15	Tri-Pak	IF + 8 lf	\$788 a-e	4.0 def	8.2 a	168.1 cde	164.6 def
12	Vibrance	None	\$784 a-e	5.5 b-e	8.1 ab	182.4 abc	175.7 abc
9	Vibrance	IF	\$778 a-e	4.2 def	8.1 ab	170.1 b-e	168.0 c-f
5	Kabina ST	IF	\$777 a-e	4.1 def	8.0 ab	167.9 cde	165.1 def
16	Tri-Pak	None	\$776 a-e	5.7 bcd	8.2 a	177.8 a-e	169.0 b-f
1	Systiva	IF	\$776 a-e	3.6 ef	8.0 ab	171.9 b-e	165.5 def
13	Tri-Pak	IF	\$775 a-e	3.8 def	7.9 ab	166.8 de	164.1 ef
8	Kabina ST	None	\$771 a-e	6.7 bc	7.9 ab	181.0 a-d	167.7 c-f
11	Vibrance	IF + 8 lf	\$769 a-e	2.9 f	8.0 ab	167.5 cde	162.3 f
4	Systiva	None	\$767 a-e	7.0 b	7.8 b	189.8 a	173.1 a-d
10	Vibrance	8 lf	\$759 b-e	4.4 def	7.9 ab	181.7 a-d	175.4 abc
2	Systiva	8 lf	\$758 b-e	3.7 def	7.9 ab	184.5 ab	172.7 a-d
7	Kabina ST	IF + 8 lf	\$749 cde	3.2 f	8.0 ab	165.8 e	162.8 f
6	Kabina ST	8 lf	\$739 de	5.6 b-e	7.7 b	192.5 a	177.5 ab
3	Systiva	IF + 8 lf	\$731 ef	4.4 def	7.9 ab	177.7 a-e	166.2 def
20	Untreated Check	None	\$686 f	14.1 a	7.4 c	188.2 a	169.3 b-f

Average	\$770	5.0	7.9	179.1	170.0
LSD 5%	48.9	1.7	0.3	12.7	7.2
CV %	5.52	29.4	3.0	6.2	3.7

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

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

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)
Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

Comments: Three trials were conducted in 2017 comparing the new *Rhizoctonia solani* seed treatments for control of Rhizoctonia root rot. All of the seed treatments provided effective control of the disease and performed similarly. The Systiva treatments had the highest stands but differences between seed treatments were small. Yield and quality values between the seed treatments were small. Quadris applications impacted the trial (positively) more than did the seed treatments. In-furrow treatments were more effective than foliar treatments, however, in-furrow treatments caused 6-8% stand loss.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Effect of Seed Treatments (avg. of all Quadris applic.)

No.	Seed Treatment*	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
1	Systiva	\$758	6079	311	19.6	20.6	95.5
2	Kabina ST	\$759	6088	309	19.8	20.5	95.5
3	Vibrance	\$772	6183	310	20.0	20.6	95.4
4	Tri-Pak	\$785	6284	310	20.3	20.6	95.4
5	Untreated Check	\$778	6132	310	19.8	20.6	95.5

Average	\$770	6153	310	19.9	20.6	95.5
LSD 5 %	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
CV %	5.7	5.5	2.0	4.6	1.7	0.3

Effect of Quadris Applic. (avg. of all Seed Treatments)

No.	Treatment	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
1	Quadris	\$780	6206 a	313 a	19.8 bc	20.8 a	95.5
2	Quadris	\$775	6219 a	311 ab	20.0 ab	20.7 ab	95.5
3	Quadris	\$769	6277 a	309 bc	20.4 a	20.5 bc	95.4
4	Untreated Check	\$757	5912 b	306 c	19.4 c	20.4 c	95.4

Average	\$770	6154	310	19.9	20.6	95.5
LSD 5 %	n.s.	168.7	3.9	0.5	0.2	n.s.
CV %	5.5	5.3	2.4	4.8	2.0	0.3

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)
Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Effect of Seed Treatments (avg. of all Quadris applic.)

No.	Seed Treatment*	Net \$/A	Dead B / 100 ft	Vigor	Sugarbeet Stand B / 100 ft	
					Early	Late
1	Systiva	\$758	4.7 bc	7.9 c	181 ab	169 b
2	Kabina ST	\$759	4.9 b	7.9 bc	177 b	168 b
3	Vibrance	\$772	4.2 c	8.0 a	175 b	170 ab
4	Tri-Pak	\$785	4.5 bc	8.0 ab	175 b	167 b
5	Untreated Check	\$778	6.7 a	7.8 c	187 a	174 a

Average	\$770	5.0	7.9	179	230
LSD 5%	n.s.	0.6	0.1	7.1	4.3
CV %	5.7	19.4	2.3	6.6	4.2

Effect of Quadris Applic. (avg. of all Seed Treatments)

No.	Treatment Rate	Net \$/A	Dead B / 100 ft	Vigor	Sugarbeet Stand B / 100 ft	
					Early	Late
1	Quadris 10 fl oz	\$780	4.1 bc	8.0 ab	173 b	167 c
2	Quadris 14.25 fl oz	\$775	4.5 b	7.8 c	187 a	175 a
3	Quadris 10 fl oz + 14.25 fl oz	\$769	3.6 c	8.0 a	172 b	166 c
4	Untreated Check	\$757	7.8 a	7.9 bc	184 a	171 b

Average	\$770	5.0	7.9	179	170
LSD 5%	n.s.	0.8	0.1	5.7	3.2
CV %	5.5	29.4	3.0	6.2	3.7

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)
Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

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

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Seed Treatments for Control of Rhizoctonia Root Rot in Sugarbeets

Crumbaugh, Breckenridge, MI - 2017

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Trial Quality: Fair
Variety: SX 1245 N
Planted: May 15
Harvested: Sept 13
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
% OM: 3.0 **pH:** 7.1 **CEC:** 12.7
Above Opt: P **Opt:** K
High: Mn **Med:** B
Added N: 140 lbs
Prev Crop: Soybeans

Rhizoc Level: See Trts
Cerc Control: Good
Problems: None
Seeding Rate: 4.5 inches
Rainfall: 17.9 inches

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

No.	Seed Treatment*	Quadris	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
5	Kabina ST	IF	\$768 a	6476 a	343 a	18.9 a	22.5 a	95.8
14	Tri-Pak	8 lf	\$747 ab	6371 ab	338 a	18.9 a	22.4 a	95.3
17	Untreated Check	IF	\$736 ab	6131 abc	341 a	18.0 ab	22.5 a	95.4
1	Systiva	IF	\$733 ab	6190 abc	340 a	18.2 ab	22.5 a	95.5
2	Systiva	8 lf	\$727 ab	6209 abc	328 ab	18.9 a	21.8 ab	95.3
13	Tri-Pak	IF	\$727 ab	6142 abc	328 ab	18.7 a	21.8 ab	95.2
18	Untreated Check	8 lf	\$706 ab	5938 abc	327 ab	18.2 ab	21.8 ab	95.1
19	Untreated Check	IF + 8 lf	\$698 ab	5991 abc	329 ab	18.2 ab	21.7 ab	95.7
9	Vibrance	IF	\$685 ab	5801 abc	323 ab	17.9 ab	21.6 ab	95.0
15	Tri-Pak	IF + 8 lf	\$685 ab	5979 abc	330 ab	18.1 ab	22.0 ab	95.0
4	Systiva	None	\$673 ab	5604 bc	323 ab	17.4 ab	21.4 ab	95.3
16	Tri-Pak	None	\$670 ab	5575 bc	315 bc	17.7 ab	21.1 bc	95.1
6	Kabina ST	8 lf	\$668 ab	5726 abc	328 ab	17.5 ab	21.7 ab	95.5
10	Vibrance	8 lf	\$665 ab	5703 abc	330 ab	17.3 ab	21.8 ab	95.4
7	Kabina ST	IF + 8 lf	\$663 b	5803 abc	324 ab	17.9 ab	21.5 ab	95.2
8	Kabina ST	None	\$661 b	5508 c	317 bc	17.4 ab	21.1 bc	95.2
11	Vibrance	IF + 8 lf	\$658 b	5757 abc	328 ab	17.6 ab	21.8 ab	95.2
3	Systiva	IF + 8 lf	\$646 b	5661 abc	327 ab	17.3 ab	21.6 ab	95.5
12	Vibrance	None	\$645 b	5378 c	326 ab	16.5 b	21.7 ab	95.1
20	Untreated Check	None	\$540 c	4415 d	302 c	14.6 c	20.2 c	95.2

Average	\$685	5818	327	17.8	21.7	95.3
LSD 5%	85.6	700.3	17.1	1.7	0.9	n.s.
CV %	10.87	10.5	4.5	8.1	3.7	0.5

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)
 Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

No.	Seed Treatment*	Quadris	Net \$/A	Dead B / 100 ft		Vigor** 0-10 Rating	Sugarbeet Stand B / 100 ft			
				14-Jul		21-Jul	Early		Late	
5	Kabina ST	IF	\$768 a	5.8	ef	8.5	200.0	b-e	190.3	b-f
14	Tri-Pak	8 lf	\$747 ab	7.5	def	8.3	207.5	a-d	195.2	a-d
17	Untreated Check	IF	\$736 ab	6.8	def	8.6	193.3	b-e	185.3	c-g
1	Systiva	IF	\$733 ab	4.5	f	8.3	193.5	b-e	187.8	c-g
2	Systiva	8 lf	\$727 ab	4.7	f	8.4	207.5	a-d	196.8	a-d
13	Tri-Pak	IF	\$727 ab	7.0	def	8.3	180.0	e	178.2	efg
18	Untreated Check	8 lf	\$706 ab	8.5	def	8.4	214.9	ab	204.5	ab
19	Untreated Check	IF + 8 lf	\$698 ab	4.5	f	8.4	194.0	b-e	188.2	c-g
9	Vibrance	IF	\$685 ab	7.0	def	8.4	198.3	b-e	187.7	c-g
15	Tri-Pak	IF + 8 lf	\$685 ab	6.7	def	8.3	180.2	e	176.2	fg
4	Systiva	None	\$673 ab	13.7	b	8.3	210.2	abc	194.0	a-e
16	Tri-Pak	None	\$670 ab	9.5	cde	8.3	192.7	b-e	180.3	d-g
6	Kabina ST	8 lf	\$668 ab	9.5	cde	8.3	226.5	a	208.8	a
10	Vibrance	8 lf	\$665 ab	5.7	ef	8.5	206.9	a-d	195.8	a-d
7	Kabina ST	IF + 8 lf	\$663 b	6.3	ef	8.1	184.4	de	175.2	fg
8	Kabina ST	None	\$661 b	13.0	bc	8.6	205.6	a-d	188.7	b-g
11	Vibrance	IF + 8 lf	\$658 b	5.5	ef	8.3	187.2	cde	177.0	fg
3	Systiva	IF + 8 lf	\$646 b	6.8	def	8.3	195.8	b-e	183.3	c-g
12	Vibrance	None	\$645 b	10.7	bcd	8.4	213.3	ab	199.8	abc
20	Untreated Check	None	\$540 c	27.5	a	8.2	203.9	a-d	173.7	g

Average			\$685	8.6	8.4	199.8	188.3
LSD 5%			85.6	3.5	n.s.	19.8	13.8
CV %			10.9	35.8	4.9	8.6	6.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Seed Treatments: Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)

Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

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

Comments: Systiva, Kabina, Vibrance and Tri-Pak (Metlock, Rizolex, Kabina) were applied to sugarbeet seeds to protect against *Rhizoctonia* root rot. The seed treatments were applied with and without Quadris (In-Fur, 8 leaf and In-Fur + 8 leaf). The seed treatments provided effective and similar levels of root rot control. Systiva, Kabina and Vibrance did not effect sugarbeet stand, however, Tri-Pak reduced stand by about 5%. Quadris applications appeared to have more impact than the seed treatments. Quadris In-Fur + 8 leaf was the most effective, followed by Quadris In-Fur and then Quadris 8 leaf.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Seed Treatments for Control of Rhizoctonia Root Rot in Sugarbeets

Blumfield West, Richville, MI - 2017

(Page 7 of 10)

Trial Quality: Fair-Good

Variety: SX 1245 N

Planted: April 26

Harvested: Sept 19

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

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

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

Soil Info: Sandy Clay Loam

% OM: 2.6 **pH:** 7.7 **CEC:** 13.0

Above Opt: P, K

High: Mn **Med:** B

Added N: 140 lbs

Prev Crop: Rye

Rhizoc Level: see trts.

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 13.1 inches

No.	Seed Treatment*	Quadris	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
18	Untreated Check	8 lf	\$890 a	6757	303	22.3	20.1	95.5
19	Untreated Check	IF + 8 lf	\$848 ab	6549	297	22.0	19.9	95.3
17	Untreated Check	IF	\$847 ab	6390	303	21.1	20.2	95.5
14	Tri-Pak	8 lf	\$843 ab	6493	300	21.7	19.9	95.5
16	Tri-Pak	None	\$842 ab	6338	290	21.8	19.5	95.0
12	Vibrance	None	\$836 ab	6299	302	20.9	20.1	95.3
4	Systiva	None	\$835 ab	6288	300	21.0	20.0	95.3
8	Kabina ST	None	\$815 ab	6138	292	21.1	19.6	95.0
15	Tri-Pak	IF + 8 lf	\$814 ab	6382	291	21.9	19.6	95.0
20	Untreated Check	None	\$806 ab	5987	299	20.0	20.0	95.3
13	Tri-Pak	IF	\$805 b	6154	301	20.4	20.0	95.5
7	Kabina ST	IF + 8 lf	\$787 b	6182	294	21.0	19.6	95.5
9	Vibrance	IF	\$786 b	6010	296	20.3	19.8	95.2
3	Systiva	IF + 8 lf	\$785 b	6169	296	20.8	19.7	95.5
11	Vibrance	IF + 8 lf	\$785 b	6166	294	21.0	19.7	95.2
10	Vibrance	8 lf	\$783 b	6049	297	20.4	19.9	95.2
1	Systiva	IF	\$781 b	5977	297	20.1	19.9	95.3
2	Systiva	8 lf	\$781 b	6036	298	20.3	19.9	95.2
6	Kabina ST	8 lf	\$771 b	5964	296	20.1	19.7	95.6
5	Kabina ST	IF	\$763 b	5840	292	20.0	19.6	95.0
Average			\$810	6208	297	20.9	19.8	95.3
LSD 5%			71.3	n.s.	n.s.	n.s.	n.s.	n.s.
CV %			7.7	7.4	3.2	7.1	2.6	0.5

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)

Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

No.	Seed Treatment*	Quadris	Net \$/A	Dead B / 100 ft		Vigor ** 0-10 Rating		Sugarbeet Stand B / 100 ft				
				29-Aug		1-Aug		Early		Late		
18	Untreated Check	8 lf	\$890 a	2.0	bc	7.8	b	157.5 ab	186.0 ab			
19	Untreated Check	IF + 8 lf	\$848 ab	1.7	bc	7.8	b	146.5 a-e	171.3 a-g			
17	Untreated Check	IF	\$847 ab	2.0	bc	8.0	b	146.7 a-e	181.9 abc			
14	Tri-Pak	8 lf	\$843 ab	1.8	bc	7.8	b	148.8 a-e	180.4 a-d			
16	Tri-Pak	None	\$842 ab	2.7	bc	8.4 a		147.9 a-e	182.3 abc			
12	Vibrance	None	\$836 ab	3.0	b	7.9	b	150.8 a-d	172.3 a-g			
4	Systiva	None	\$835 ab	2.5	bc	8.1 ab		153.9 abc	193.1 a			
8	Kabina ST	None	\$815 ab	2.7	bc	7.8	b	140.0	b-e	177.1 a-e		
15	Tri-Pak	IF + 8 lf	\$814 ab	1.7	bc	8.2 ab		141.0	b-e	169.0	b-g	
20	Untreated Check	None	\$806 ab	7.2 a		7.4	c	164.8 a	178.8 a-d			
13	Tri-Pak	IF	\$805	b	1.5	c	8.0	b	135.2	cde	159.4	c-g
7	Kabina ST	IF + 8 lf	\$787	b	1.7	bc	8.2 ab		133.4	de	156.7	d-g
9	Vibrance	IF	\$786	b	2.0	bc	8.1 ab		139.4	b-e	151.5	fg
3	Systiva	IF + 8 lf	\$785	b	1.8	bc	8.4 a		139.4	b-e	177.3 a-e	
11	Vibrance	IF + 8 lf	\$785	b	1.3	c	8.1 ab		134.6	de	150.6	g
10	Vibrance	8 lf	\$783	b	2.7	bc	8.1 ab		145.2	b-e	167.3	b-g
1	Systiva	IF	\$781	b	1.4	c	8.0	b	136.3	cde	160.2	c-g
2	Systiva	8 lf	\$781	b	1.8	bc	7.9	b	147.0 a-e		180.4 a-d	
6	Kabina ST	8 lf	\$771	b	2.2	bc	8.0	b	143.8	b-e	174.4 a-f	
5	Kabina ST	IF	\$763	b	1.7	bc	8.0	b	131.7	e	155.0	efg
Average			\$810	2.3		8.0		144.2		171.2		
LSD 5%			71.3	1.2		0.3		15.7		19.8		
CV %			7.7	46.3		3.8		9.4		10.1		

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)

Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

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

Comments: Systiva, Kabina, Vibrance and Tri-Pak (Metlock, Rizolex, Kabina) were applied to sugarbeet seeds to protect against Rhizoctonia root rot. The seed treatments were applied with and without Quadris (In-Fur, 8 leaf and In-Fur + 8 leaf). The seed treatments provided effective and similar levels of root rot control (Systiva slightly better). Systiva also had slightly higher stand counts compared to the other seed treatments. Quadris applications appeared to have more impact than the seed treatments. Quadris In-Fur + 8 leaf was the most effective, followed by Quadris In-Fur and then Quadris 8 leaf.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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



Evaluate Seed Treatments for Control of Rhizoctonia Root Rot in Sugarbeets

Mennonite Church, Pigeon, MI - 2017

(Page 9 of 10)

Trial Quality: Fair-Good

Variety: SX 1245 N

Planted: April 28

Harvested: Oct 10

Plots: 6 rows X 38 ft, 4 reps

Row Spacing: 22 inches

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

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

Soil Info: Sandy Loam

% OM: 2.0 **pH:** 6.9 **CEC:** 10.3

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

High: Mn **Low:** B

Added N: 140 lbs

Prev Crop: Wheat

Rhizoc Level: See trts.

Cerc Control: Good

Problems: None

Seeding Rate: 4.5 inches

Rainfall: 15.3 inches

No.	Seed Treatment*	Quadris	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
19	Untreated Check	IF + 8 If	\$881	6993	308	22.7	20.4	95.6
12	Vibrance	None	\$869	6734	307	22.0	20.2	96.1
15	Tri-Pak	IF + 8 If	\$866	6967	306	22.8	20.2	96.0
11	Vibrance	IF + 8 If	\$864	6950	308	22.6	20.3	95.8
9	Vibrance	IF	\$862	6771	309	21.9	20.5	95.6
18	Untreated Check	8 If	\$862	6740	308	21.8	20.3	95.8
8	Kabina ST	None	\$838	6491	305	21.4	20.1	95.9
10	Vibrance	8 If	\$829	6575	304	21.6	20.1	95.6
16	Tri-Pak	None	\$817	6333	309	20.5	20.4	95.8
1	Systiva	IF	\$814	6403	309	20.7	20.3	95.9
14	Tri-Pak	8 If	\$811	6439	304	21.2	20.1	95.7
17	Untreated Check	IF	\$806	6263	306	20.5	20.1	96.0
5	Kabina ST	IF	\$801	6304	308	20.4	20.3	95.8
7	Kabina ST	IF + 8 If	\$797	6439	304	21.3	20.2	95.5
4	Systiva	None	\$793	6153	303	20.3	20.1	95.6
13	Tri-Pak	IF	\$792	6237	306	20.3	20.1	96.1
6	Kabina ST	8 If	\$778	6191	306	20.2	20.3	95.5
2	Systiva	8 If	\$765	6091	305	20.0	20.2	95.7
3	Systiva	IF + 8 If	\$761	6167	303	20.4	20.1	95.4
20	Untreated Check	None	\$711	5435	297	18.3	19.9	95.2
Average			\$816	6434	306	21.0	20.2	95.7
LSD 5%			n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
CV %			12.7	12.3	4.6	10.8	4.0	0.6

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)

Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Evaluate Seed Treatments for Control of Rhizoctonia Root Rot in Sugarbeets

Mennonite Church, Pigeon, MI - 2017

(Page 10 of 10)

No.	Seed Treatment*	Quadris	Net \$/A	Dead B / 100 ft		Vigor** 0-10 Rating		Sugarbeet Stand B / 100 ft		
				22-Aug		4-Aug		Early		Late
19	Untreated Check	IF + 8 lf	\$881	3.5	bcd	7.7	abc	179.4	abc	191.8 a
12	Vibrance	None	\$869	2.9	bcd	7.8	ab	161.5	b-e	176.3 bc
15	Tri-Pak	IF + 8 lf	\$866	3.7	bcd	8.1	a	155.2	de	176.5 bc
11	Vibrance	IF + 8 lf	\$864	2.0	cd	7.7	abc	164.7	b-e	175.2 bc
9	Vibrance	IF	\$862	3.5	bcd	7.7	abc	160.5	b-e	176.8 bc
18	Untreated Check	8 lf	\$862	3.3	bcd	7.6	a-d	168.5	a-e	173.0 bc
8	Kabina ST	None	\$838	4.5	bcd	7.2	b-e	160.4	b-e	174.5 bc
10	Vibrance	8 lf	\$829	4.7	bc	7.3	b-e	171.0	a-e	185.2 ab
16	Tri-Pak	None	\$817	4.9	abc	7.8	ab	158.3	b-e	178.8 bc
1	Systiva	IF	\$814	4.9	abc	7.7	abc	162.1	b-e	172.3 c
14	Tri-Pak	8 lf	\$811	4.1	bcd	7.2	b-e	177.2	a-d	172.7 c
17	Untreated Check	IF	\$806	5.8	ab	7.3	a-e	189.5	a	192.3 a
5	Kabina ST	IF	\$801	4.8	bc	7.5	a-d	148.7	e	173.3 bc
7	Kabina ST	IF + 8 lf	\$797	1.7	d	7.8	ab	156.3	cde	179.8 bc
4	Systiva	None	\$793	4.8	abc	6.9	cde	166.0	b-e	171.5 c
13	Tri-Pak	IF	\$792	3.0	bcd	7.3	a-e	161.1	b-e	178.8 bc
6	Kabina ST	8 lf	\$778	5.1	ab	6.8	de	176.7	a-d	179.8 bc
2	Systiva	8 lf	\$765	4.5	bcd	7.3	b-e	165.6	b-e	174.3 bc
3	Systiva	IF + 8 lf	\$761	4.6	bcd	7.1	b-e	160.0	b-e	175.8 bc
20	Untreated Check	None	\$711	7.7	a	6.7	e	182.0	ab	169.5 c
Average			\$816	4.2		7.4		166.2		177.4
LSD 5%			n.s.	2.5		0.6		19.6		10.1
CV %			12.7	52.1		7.4		10.3		5.0

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

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

***Seed Treatments:** Systiva (5 g / unit), Vibrance (2 g / unit), Kabina (14 g / unit)

Tri-Pak: Metlock (2 g / unit) + Rizolex (2 g / unit) + Kabina (7 g / unit)

Comments: Systiva, Kabina, Vibrance and Tri-Pak (Metlock, Rizolex, Kabina) were applied to sugarbeet seeds to protect against Rhizoctonia root rot. The seed treatments were applied with and without Quadris (In-Fur, 8 leaf and In-Fur + 8 leaf). The seed treatments provided effective and similar levels of root rot control (Vibrance slightly better). Systiva had slightly higher stand counts compared to the other seed treatments. Quadris applications appeared to have more impact than the seed treatments. Quadris In-Fur + 8 leaf was the most effective, followed by Quadris In-Fur and then Quadris 8 leaf. The Quadris In-Fur treatments reduced sugarbeet stand by about 5%.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fungicide costs subtracted off.

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

Trial Quality:	Good	Soil Info:	Loam	Rhiz Control:	See treatments
Variety:	C-G333NT	Fertilizer:	Fall: 150# K ₂ O; 2x2: 41#-32#-0#-7#S + Mn & B; S.D.: 41 gal of 28%	Cerc Control:	Good control: 1. Inspire + EBDC, Super Tin + EBDC, 3. Topguard + EBDC, 4. Super Tin + EBDC, 5. Enable + EBDC, 6. Copper
Planted:	April 28	Prev Crop:	Corn	Other Pests:	Aphanomyces
Harv/Samp:	Oct 19 / Oct 16	Weather:	Heavy June rain, dry late summer		
Plot Size:	4 reps				
Row Spacing:	22 inch				
Seeding Rate:	61,300				

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	Populations 100 Ft. of Row			Dead Beets / 1200 Ft. of Row	
						14 Days	28 Days	45 Days	Aug 11	Sept 28
No Systiva In-Furrow & Foliar	\$1,363	8321	315	26.4	20.5	56	186	178	5	9
Systiva In-Furrow & Foliar	\$1,347	8226	314	26.2	20.4	45	185	178	8	11
No Systiva Foliar Quadris	\$1,331	8133	318	25.6	20.7	50	177	168	8	14
Systiva Foliar Quadris	\$1,304	7970	320	24.9	20.8	38	182	171	9	19
No Systiva In-Furrow Quadris	\$1,279	7814	313	25.0	20.3	52	180	172	25	55
Systiva In-Furrow Quadris	\$1,268	7743	311	24.9	20.3	34	189	182	27	60
Systiva No Quadris	\$1,210	7402	305	24.2	20.0	31	171	163	55	93
No Systiva No Quadris	\$1,189	7282	310	23.4	20.2	46	179	170	57	114
Average	\$1,286	7861	313	25.1	20.4	44	181	173	24	47
LSD 5%	—	656	ns (11)	1.5	ns (0.6)	12	ns (18)	ns (16)	17	24
CV %	—	6	2	4.1	2.1	19	7	6	49	34

Comments: Systiva is a new systemic Rhizoctonia seed treatment from BASF. Trial was conducted to look at the effect of this seed treatment with and without Azoxystrobin (Quadris) applied in a T-band in-furrow and foliar. There appeared to be a small delay in emergence at the 14 day counts for the treatments that had Systiva. This trial had moderate Rhizoctonia pressure with most of the die off happening after the seedling stage. When Systiva with no Quadris was compared to a check with no Quadris, it appeared that Systiva improved the amount of dead beets. But it is important to note that any treatment that had Quadris applied, either in-furrow, foliar, or both, was not improved by adding Systiva in either dead beet counts or yield. That matches two SBA trials from 2016. The in-furrow Quadris treatments had 9.7 oz./acre of Quadris and 4 oz./acre of Mustang in a 4 inch band. The foliar Quadris treatments had 14.25 oz./acre of Quadris in a 7 inch band on 6/12/17 at the 8 leaf stage. This is a natural infection non-inoculated trial. Seed treatment is not a replacement for long term Rhizoctonia control that is seen with Quadris in furrow or foliar.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment, a company average RWST of 275, and early delivery premium.

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

Systiva® Seed Treatment

Hrabal Farms, Breckenridge - 2017

Trial Quality:	Poor / Fair	Soil Info:	Loam	Rhiz Control:	See treatments.
Variety:	C-G333NT	Fertilizer:	Fall: 2 ton turkey litter; 2x2: 12-12-12 w/ 2% Mn & 1%B; PPI: 90# N by 28%	Cerc Control:	Very good control: 1. Inspire + EBDC, 2. EBDC, 3. Super Tin + EBDC, 4. Topguard + EBDC, 5. Super Tin + EBDC
Planted:	April 28	Prev Crop:	Wheat w/ clover		
Harv/Samp:	Sept 17 / Sept 14	Weather:	Damaging June rains, very dry late season	Other Pests:	Aphanomyces
Plot Size:	4 reps				
Row Spacing:	30 inch				
Seeding Rate:	56,000				

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	Populations 100 Ft. of Row			Dead Beets / 1200 Ft. of Row	
						13 Days	28 Days	42 Days	July 20	Sept 13
No Systiva In-Furrow & Foliar	\$1,472	6449	301	21.3	20.2	123	225	200	4	15
Systiva In-Furrow & Foliar	\$1,455	6357	306	20.8	20.6	122	215	196	5	21
Systiva Foliar Quadris	\$1,382	6092	298	20.2	20.0	123	226	201	10	37
No Systiva In-Furrow Quadris	\$1,380	6050	285	21.2	19.2	139	224	197	16	59
Systiva No Quadris	\$1,362	5968	300	19.8	20.3	124	234	208	44	109
Systiva In-Furrow Quadris	\$1,352	5916	289	20.4	19.5	116	230	209	5	32
No Systiva No Quadris	\$1,328	5816	295	19.6	19.9	157	230	194	73	179
No Systiva Foliar Quadris	\$1,302	5725	284	20.1	19.1	116	199	180	11	37
Average	\$1,379	6047	295	20.4	19.9	127	223	198	21	61
LSD 5%	—	ns (1376)	ns (32)	ns (2.5)	ns (1.8)	ns (39)	ns (41)	ns (40)	34	68
CV %	—	15	7	8.4	6.1	21	13	14	111	76

Comments: USE DATA WITH CAUTION. Systiva is a new systemic Rhizoctonia seed treatment from BASF. This field received heavy rains immediately after planting and in June causing some variability in the data, especially the yield data. In trials that test for effectiveness against Rhizoctonia, the most reliable measure of effectiveness is the Dead Beet Counts. Results of Dead Beet Counts in this trial are very similar to the results of the same trial that was performed with Schindler Farms. Even though the variability is higher than desired, many of the trends in the yield data are similar to the results of the trial with Schindlers. By the time the third population count was taken there was significant seedling die off. The die off appeared to be consistent across all treatments and did not seem to be impacted by Systiva or Quadris. Samples were sent to Linda Hanson at the USDA. Based on the percentage of beets with the different pathogens, it looks like Fusarium was probably the major seedling issue, with a little Rhizoctonia, Aphanomyces and Colletotrichum. The in-furrow treatments received 6 oz. of Quadris and 4 oz. Mustang in a 4 inch band. The foliar treatments were 10.5 oz./acre of Quadris in a 7 inch band applied on June 9 at the 8 leaf stage. This is a natural infection non-inoculated trial. Seed treatment is not a replacement for long term Rhizoctonia control that is seen with Quadris in-furrow or foliar.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment, a company average RWST of 275, and early delivery premium.

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



Effect of Nitrogen Rates on Grower Income, Yield and Quality when Harvested Early, Mid and Late Season

Blumfield West, Richville, MI - 2017

(Page 1 of 5)

Trial Quality: Fair-Good
Variety: C-G351NT, B-133N
Planted: May 10
Harvested: Sept 1, Oct 1, Nov 1
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Clay Loam
% OM: 2.6 **pH:** 7.7 **CEC:** 13.0
Above Opt: P, K
High: Mn, **Med:** B
Added N: See Trts.
Prev Crop: Rye

Rhizoc Level: Low
Cerc Control: Good
Problems: Planted into rye cover crop which should have been killed earlier
Seeding Rate: 4.5 inches
Rainfall: 17.8 inches

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

No.	Variety	Nitrogen Rate*			Harvest Date	Net \$/T	Net \$/A	RWSA	RWST	T/A	% SUC	% Canopy Closure
		Total	2X2	4 lf								
14	C-G351NT	160	40	120	1-Oct	\$54	\$1,546 a	8879 efg	312 a-d	28.5 fgh	21.0 ab	88 a-d
29	B-133N	80	40	40	1-Oct	\$51	\$1,501 ab	8459 ghi	289 ghi	29.3 fg	19.8 e-j	86 a-e
8	C-G351NT	80	40	40	1-Oct	\$54	\$1,465 abc	8229 ghi	303 cde	27.2 ghi	20.5 bcd	84 b-f
17	C-G351NT	200	40	160	1-Oct	\$54	\$1,367 bcd	8001 g-j	313 abc	25.5 hij	21.1 ab	90 ab
30	B-133N	80	40	40	1-Nov	\$33	\$1,336 b-e	11088 a	273 klm	40.6 a	18.4 opq	84 b-f
11	C-G351NT	120	40	80	1-Oct	\$53	\$1,335 b-f	7623 ijk	305 cde	25.1 ij	20.7 abc	85 b-e
16	C-G351NT	200	40	160	1-Sep	\$64	\$1,307 c-g	5646 mn	277 j-m	20.4 kl	18.8 m-p	91 a
33	B-133N	120	40	80	1-Nov	\$32	\$1,305 c-g	11009 ab	270 lm	40.8 a	18.2 pq	86 a-e
32	B-133N	120	40	80	1-Oct	\$47	\$1,304 c-g	7512 ijk	274 klm	27.5 ghi	19.1 j-n	88 a-d
20	C-G351NT	240	40	200	1-Oct	\$53	\$1,303 c-h	7752 h-k	316 ab	24.5 ij	21.2 a	86 a-e
10	C-G351NT	120	40	80	1-Sep	\$64	\$1,298 c-h	5455 mno	270 lm	20.3 klm	18.6 n-q	89 a-d
41	B-133N	240	40	200	1-Oct	\$48	\$1,297 c-h	7770 h-k	290 ghi	26.9 ghi	19.8 e-i	88 a-d
13	C-G351NT	160	40	120	1-Sep	\$67	\$1,287 c-i	5469 mno	285 g-j	19.2 k-n	19.2 i-n	92 a
12	C-G351NT	120	40	80	1-Nov	\$34	\$1,243 d-j	10418 abc	287 g-j	36.3 bc	19.2 i-n	87 a-e
28	B-133N	80	40	40	1-Sep	\$56	\$1,241 d-j	5182 mno	234 p	22.2 jk	16.6 t	85 b-e
9	C-G351NT	80	40	40	1-Nov	\$36	\$1,224 d-j	10070 bcd	296 efg	34.1 cde	19.6 f-k	83 def
38	B-133N	200	40	160	1-Oct	\$49	\$1,202 d-j	7132 jk	290 ghi	24.6 ij	19.7 e-j	87 a-e
15	C-G351NT	160	40	120	1-Nov	\$36	\$1,187 d-j	10039 cd	306 b-e	32.7 de	20.2 cde	89 a-d
35	B-133N	160	40	120	1-Oct	\$49	\$1,178 e-j	6899 kl	287 g-j	24.1 ij	19.5 f-l	89 a-d
39	B-133N	200	40	160	1-Nov	\$33	\$1,174 e-j	10179 a-d	289 ghi	35.2 cd	19.1 j-n	86 a-e
42	B-133N	240	40	200	1-Nov	\$30	\$1,152 f-k	10284 a-d	266 mn	38.6 ab	18.1 qr	87 a-e
40	B-133N	240	40	200	1-Sep	\$56	\$1,151 g-k	5122 mno	248 o	20.7 kl	17.2 s	89 a-d
19	C-G351NT	240	40	200	1-Sep	\$64	\$1,131 g-k	4996 no	281 h-l	17.8 lmn	19.1 k-n	89 abc
37	B-133N	200	40	160	1-Sep	\$57	\$1,130 g-k	4953 no	248 o	20.0 k-n	17.2 s	87 a-e
36	B-133N	160	40	120	1-Nov	\$33	\$1,120 h-k	9612 cde	283 h-k	34.0 cde	18.9 l-o	87 a-e

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

* **Nitrogen Rate:** Nitrogen at planting (2X2) = 8 gal 28% N, 6 gal 10-34-0 and 4 gal ThioSul for a total of 40 lbs ai/A at planting, and at the 4 lf stage 28% N was the source, applied with fluted coulter.

Net \$/A: Assume a \$40 beet payment and Company average RWST.

Early Delivery Incentive, Freight costs and Fertilizer costs are all incorporated into Net \$/A.

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



Effect of Nitrogen Rates on Grower Income, Yield and Quality when Harvested Early, Mid and Late Season

Blumfield West, Richville, MI - 2017

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No.	Variety	Nitrogen Rate*			Harvest Date	Net \$/T	Net \$/A	RWSA	RWST	T/A	% SUC	% Canopy Closure
		Total	2X2	4 lf								
31	B-133N	120	40	80	1-Sep	\$55	\$1,114 ijk	4737 no	234 p	20.2 klm	16.6 t	86 a-e
21	C-G351NT	240	40	200	1-Nov	\$34	\$1,108 ijk	9774 cde	296 efg	33.0 cde	19.5 f-k	86 a-e
7	C-G351NT	80	40	40	1-Sep	\$66	\$1,102 jk	4557 op	274 klm	16.6 no	18.7 m-q	83 c-f
34	B-133N	160	40	120	1-Sep	\$60	\$1,096 jkl	4714 no	257 no	18.4 lmn	17.5 s	86 a-e
18	C-G351NT	200	40	160	1-Nov	\$35	\$1,087 jkl	9429 def	301 def	31.4 ef	19.9 d-g	88 a-d
6	C-G351NT	40	40	0	1-Nov	\$38	\$1,073 jkl	8665 fgh	305 cde	28.5 fgh	19.9 e-h	79 fgh
27	B-133N	40	40	0	1-Nov	\$34	\$988 klm	8076 g-j	280 i-l	28.8 fgh	18.6 n-q	84 b-f
5	C-G351NT	40	40	0	1-Oct	\$58	\$972 klm	5379 mno	319 a	16.9 mno	21.1 ab	75 h
26	B-133N	40	40	0	1-Oct	\$52	\$971 klm	5412 mno	292 fgh	18.5 lmn	19.7 e-j	81 efg
4	C-G351NT	40	40	0	1-Sep	\$72	\$925 lmn	3730 pq	289 ghi	12.9 pq	19.3 h-n	75 h
25	B-133N	40	40	0	1-Sep	\$63	\$901 mn	3662 q	256 o	14.3 op	17.4 s	77 gh
3	C-G351NT	0	0	0	1-Nov	\$37	\$770 no	6113 lm	297 efg	20.6 kl	19.3 g-m	66 i
24	B-133N	0	0	0	1-Nov	\$33	\$680 op	5479 mno	266 mn	20.6 kl	17.6 rs	64 i
1	C-G351NT	0	0	0	1-Sep	\$69	\$658 op	2561 r	269 lm	9.5 r	18.2 pq	67 i
2	C-G351NT	0	0	0	1-Oct	\$56	\$623 op	3363 qr	304 cde	11.1 qr	20.0 def	65 i
23	B-133N	0	0	0	1-Oct	\$50	\$548 p	2978 qr	271 lm	11.0 qr	18.3 opq	67 i
22	B-133N	0	0	0	1-Sep	\$61	\$386 q	1453 s	229 p	6.3 s	15.8 u	64 i
Average							\$1,114	6854	282	24.2	19.0	82.6
LSD 5%							150.1	848.4	9.7	3.0	0.5	4.9
CV %							9.6	8.8	2.4	8.8	2.0	4.2

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

* **Nitrogen Rate:** Nitrogen at planting (2X2) = 8 gal 28% N, 6 gal 10-34-0 and 4 gal ThioSul for a total of 40 lbs ai/A at planting, and at the 4 lf stage 28% N was the source, applied with fluted coulters.

Comments: Nitrogen was applied at rates of 0, 40, 80, 120, 160, 200 and 240 lb ai/A and harvested on 3 different dates, Sep 1st, Oct 1st and Nov 1st. The treatments were applied to 2 sugarbeet varieties, C-G351NT and B-133N. It appeared that the optimum N rate for Net \$/A was around 125 lbs. The sugarbeet crop was planted into a heavy stand of rye (cover crop) which grew vigorously in the spring. Without the rye cover crop, lower rates of nitrogen may have been optimum for Net \$/A. Low nitrogen rates (40 lbs) were definitely too low and high rates (over 200 lbs) were too high to maximize profits. With respect to harvest dates, Oct 1st returned the most income, followed by Sep 1st and then Nov 1st.

Net \$/A: Assume a \$40 beet payment and Company average RWST.

Early Delivery Incentive, Freight costs and Fertilizer costs are all incorporated into Net \$/A.

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

Variety Effect (Average of Harvest Dates and Nitrogen Rates)

No.	Variety	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	% Canopy Closure
1	C-G351NT	\$1,143	6959	295 a	23.4	19.8 a	95.2 a	83
2	B-133N	\$1,085	6748	268 b	24.9	18.2 b	94.6 b	83
Average		\$1,114	6854	282	24.2	19.0	94.9	83
LSD 5%		n.s.	n.s.	1.3	n.s.	0.1	0.2	n.s.
CV %		16.0	14.2	1.0	14.5	1.5	0.4	10.4

Nitrogen Rate Effect (Average of Varieties and Harvest Dates)

No.	Nitrogen Rate*			Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	% Canopy Closure
	Lb ai/Acre									
	Total	2X2	4 lf							
3	80	40	40	\$1,312 a	7931 a	278 c	28.3 ab	18.9 bc	94.6 d	84 a
4	120	40	80	\$1,267 ab	7792 a	273 d	28.4 a	18.7 c	94.2 e	87 a
5	160	40	120	\$1,236 ab	7602 a	288 a	26.1 c	19.4 a	95.1 b	88 a
6	200	40	160	\$1,211 ab	7557 a	286 ab	26.2 bc	19.3 a	94.9 bc	88 a
7	240	40	200	\$1,190 b	7616 a	283 b	26.9 abc	19.2 ab	94.7 cd	88 a
2	40	40	0	\$972 c	5821 b	290 a	20.0 d	19.3 a	95.5 a	79 b
1	0	0	0	\$611 d	3658 c	273 d	13.2 e	18.2 d	95.6 a	65 c
Average				\$1,114	6854	282	24.2	19.0	94.9	82.7
LSD 5%				103.8	609.7	4.1	2.2	0.2	0.3	4.6
CV %				15.9	15.2	2.5	15.3	2.2	0.5	9.5

Harvest Date Effect (Average of Varieties and Nitrogen Rates)

No.	Harvest Date	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	% Canopy Closure
2	October 1	\$1,186 a	6813 b	297 a	22.9 b	20.1 a	94.7 b	83
3	November 1	\$1,103 b	9303 a	287 b	32.5 a	19.0 b	95.7 a	82
1	September 1	\$1,052 c	4445 c	261 c	17.1 c	17.9 c	94.4 c	83
Average		\$1,114	6854	281	24.2	19.0	94.9	82.6
LSD 5%		40.1	226.7	2.6	0.8	0.1	0.1	n.s.
CV %		9.6	8.8	2.4	8.8	2.0	0.4	4.2

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fertilizer costs subtracted off.

Early Delivery Incentive, Freight costs and Fertilizer costs are all incorporated into Net \$/A.

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



Effect of Nitrogen Rates on Grower Income, Yield and Quality when Harvested Early, Mid and Late Season

Four Michigan Locations (2015, 2016, 2017)

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Nitrogen Rate Effect (Average of all Trials and Harvest Dates)

Total N Applied lb ai/A	2X2 lb ai/A	4 lf lb ai/A	*Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	Amino N
160	40	120	\$1,395 a	7807 a	270 b	28.8 a	18.1 bc	95.4 b	9.3 ab
80	40	40	\$1,364 a	7545 a	268 bc	27.9 a	18.1 bc	95.1 c	10.4 a
120	40	80	\$1,326 a	7503 a	264 d	28.3 a	17.9 cd	94.9 d	10.4 ab
240	40	200	\$1,330 a	7724 a	266 cd	29.0 a	18.0 bcd	95.1 cd	10.4 a
200	40	160	\$1,317 a	7563 a	270 b	27.8 a	18.2 b	95.2 bc	8.9 b
40	40	0	\$1,125 b	6114 b	278 a	21.9 b	18.5 a	95.7 a	7.4 c
0	0	0	\$809 c	4367 c	267 bcd	16.1 c	17.8 d	95.7 a	6.5 c
Average			\$1,238	6946	269	25.7	18.1	95.3	9.0
LSD 5%			78.7	442.6	3.4	1.6	0.2	0.2	1.4
CV %			14.8	14.85	3.0	14.7	2.6	0.5	36.7

Harvest Date Effect (Average of all Trials and Nitrogen Rates)

Harvest Date	*Net \$/A	RWSA	RWST	T/A	% SUC	% CJP	Amino N
October 1	\$1,310 a	7105 b	275 b	26.3 b	18.5 b	95.3 b	10.8 a
September 1	\$1,213 b	4591 c	245 c	18.8 c	16.7 c	94.8 c	7.5 c
November 1	\$1,191 b	9142 a	288 a	32.0 a	19.1 a	95.9 a	8.8 b
Average	\$1,238	6946	269	25.7	18.1	95.3	9.0
LSD 5%	27.2	139.4	1.8	0.5	0.1	0.1	0.9
CV %	8.2	7.4	2.4	7.8	2.1	0.4	35.0

Comments: Nitrogen was applied at rates of 0, 40, 80, 120, 160, 200 and 240 lb ai/A and harvested on 3 different dates, Sep 1, Oct 1 and Nov 1. A total of four trials were conducted during 2015, 2016 and 2017. Averaged over trials, it appeared that the 120 lb N rate produced the most grower income during early delivery. In each trial there were some issues that could have influenced results. In 2015, Cercospora leaf spot caused damage to the plots. In 2016, a thick crust caused uneven emergence and in 2017 a rye cover crop was allowed to get to big which created a need for more nitrogen. It is safe to say that less than 80 and over 200 pounds of N reduced grower income regardless of the harvest date.

Net \$/A: Assume a \$40 beet payment and trial average RWST with fertilizer costs subtracted off.

*Early Delivery Incentive, Freight costs and Fertilizer costs are all incorporated into Net \$/A.

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



Effect of Nitrogen Rates on Grower Income, Yield and Quality when Harvested Early, Mid and Late Season Four Michigan Locations (2015, 2016, 2017)

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Average of 4 Trials (2015, 2016, 2017) Harvested on September 1

Total N lb ai/A	2X2 lb ai/A	4 leaf lb ai/A	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
160	40	120	\$1,400 bc	5347 e	248 i	21.8 g	16.9 i	95.0 ij
80	40	40	\$1,337 cde	4980 ef	243 jk	20.6 gh	16.7 i	94.4 l
200	40	160	\$1,320 def	5175 ef	245 ij	21.1 gh	16.8 i	94.8 jk
240	40	200	\$1,316 def	5211 ef	244 ijk	21.6 gh	16.7 i	94.7 k
120	40	80	\$1,281 efg	4893 f	241 jk	20.3 h	16.6 i	94.3 l
40	40	0	\$1,141 h	4136 g	256 h	16.3 i	17.2 h	95.4 fg
0	0	0	\$692 j	2393 h	240 k	9.9 j	16.3 j	95.1 hi
Average			\$1,213	4591	245	18.8	16.7	94.8

Average of 4 Trials (2015, 2016, 2017) Harvested on October 1

Total N lb ai/A	2X2 lb ai/A	4 leaf lb ai/A	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
160	40	120	\$1,480 a	8060 b	275 f	29.6 de	18.5 ef	95.2 gh
80	40	40	\$1,478 a	7921 bc	274 f	29.2 def	18.5 ef	95.1 ghi
240	40	200	\$1,446 ab	8090 b	275 ef	29.9 d	18.6 e	95.1 hi
120	40	80	\$1,406 bc	7634 c	269 g	28.9 def	18.3 fg	94.8 jk
200	40	160	\$1,379 bcd	7675 c	275 f	28.4 ef	18.5 ef	95.1 ghi
40	40	0	\$1,126 h	5951 d	283 cd	21.4 gh	18.9 cd	95.7 cde
0	0	0	\$857 i	4403 g	272 fg	16.6 i	18.1 g	95.7 cd
Average			\$1,310	7105	275	26.3	18.5	95.3

Average of 4 Trials (2015, 2016, 2017) Harvested on November 1

Total N lb ai/A	2X2 lb ai/A	4 leaf lb ai/A	Net \$/A	RWSA	RWST	T/A	% SUC	% CJP
160	40	120	\$1,304 ef	10014 a	288 bc	34.9 abc	19.0 bc	95.9 bc
120	40	80	\$1,292 efg	9983 a	283 cd	35.6 a	18.9 cd	95.5 def
80	40	40	\$1,278 efg	9734 a	287 bc	34.1 bc	19.0 bc	95.8 c
200	40	160	\$1,251 fg	9839 a	290 b	34.0 c	19.2 ab	95.8 c
240	40	200	\$1,229 g	9871 a	280 de	35.5 ab	18.7 de	95.5 ef
40	40	0	\$1,107 h	8254 b	296 a	28.0 f	19.5 a	96.1 ab
0	0	0	\$879 i	6303 d	291 b	21.7 gh	19.1 bc	96.3 a
Average			\$1,191	9142	288	32.0	19.1	95.9
LSD 5%			72.1	368.8	4.7	1.4	0.3	0.2
CV %			8.2	7.4	2.4	7.8	2.1	0.4

Net \$/A: Assume a \$40 beet payment and trial average RWST with fertilizer costs subtracted off.

*Early Delivery Incentive, Freight costs and Fertilizer costs are all incorporated into Net \$/A.

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

Early-Harvest Sugarbeet Nitrogen Response

Kurt Steinke and Andrew Chomas, 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 26, 2016 (Harvest 8/29/17)	N Rates: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications
Prev. Crop: Non-interseeded winter wheat	

N Trt. (Total lb. N/A)	RWSA	RWST	Tons/A	% Sugar	% CJP	NH ₂	Amino-N
0 – Check	2294	259	8.9	17.3	95.9	56	3.8
40	3248	261	12.4	17.5	95.4	59	4.1
80	4614	269	17.1	18.0	95.7	70	4.5
120	4526	267	17.1	17.8	95.7	82	5.2
160	4728	263	18.0	17.7	95.2	104	6.7
200	4197	253	16.6	17.3	94.7	109	7.0
LSD_(0.10)^a	985	NS	3.8	0.4	0.6	21	1.1

^a LSD, least significant difference between means within a column at ($\alpha = 0.10$).

N Trt. (Total lb. N/A)	Gross Grower Payment (\$/A)	Net Economic Return Minus N Costs (\$/A) ^a	Net Economic Return Minus N Costs and Trucking (\$/A) ^b
0 – Check	636	636	602
40	895	880	835
80	1,273	1,243	1,179
120	1,260	1,214	1,150
160	1,300	1,239	1,172
200	1,161	1,085	1,021

^{a, b} Gross grower payment and net economic returns based upon a \$40/ton base payment with early delivery, volume, and quality incentives; N price of \$0.38/lb.; trucking costs of \$3.75/T.

Summary: Trial quality was average to good. All treatments received 40 lbs. N/A as 28%, 20 lbs. P₂O₅/A, 50 lbs. K₂O/A. and 2 lbs. Mn/A as starter placed 2x2 on April 26. Sidedress N applications were completed at the 2-4 leaf stage on May 30. In the current study, nitrogen treatments receiving 80 lb. total N (40 N as 2x2) resulted in the best combination of tonnage, sugar quality, and profitability for this early harvest date. Worth noting was that yield and RWSA were in some cases 50% reduced from 2016 early harvest data due to dry weather conditions.

Sugarbeet Nitrogen Response Following Wheat

Kurt Steinke and Andrew Chomas, 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 26, 2017 (Harvest 10/27/17)	N Rates: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications

N Trt. (Total lb. N/A)	RWSA	RWST	Tons/A	% Sugar	% CJP	NH ₂	Amino-N
0 – Check	5396	272	20	17.9	96.5	65	4.2
40	6576	274	24	18.1	96.3	60	3.9
80	6910	274	25	18.0	96.4	74	4.7
120	7599	274	28	18.2	96.0	73	4.6
160	7466	268	28	17.7	96.1	96	6.2
200	7151	263	27	17.6	95.7	119	7.8
240	7364	249	30	16.9	95.1	174	11.4
LSD_(0.10)^a	NS	13	NS	0.7	0.4	41	2.7

^a LSD, least significant difference between means within a column at ($\alpha = 0.10$).

N Trt. (Total lb. N/A)	Gross Grower Payment (\$/A)	Net Economic Return Minus N Costs (\$/A) ^a	Net Economic Return Minus N Costs and Trucking (\$/A) ^b
0 – Check	791	791	716
40	957	942	852
80	996	966	872
120	1,116	1,070	965
160	1,092	1,031	926
200	1,033	957	856
240	1,087	996	905

^{a, b} Gross grower payment and net economic returns based upon a \$40/ton base payment with volume and quality incentives, an N price of \$0.38/lb., and trucking costs of \$3.75/T.

Summary: Trial quality was average to good. All treatments received 40 lbs. N/A as 28%, 20 lbs. P₂O₅/A, 50 lbs. K₂O/A. and 2 lbs. Mn/A as starter placed 2x2 on April 26. Sidedress N applications were completed at the 2-4 leaf stage on May 30. Dry July through September soil conditions limited plant growth. In this particular study, 120 lb. total N (40 N as 2x2 and 80 N sidedress) resulted in the best combinations of tonnage, quality, and profitability. Rates greater than 120 lb. N did not increase yield or sugar and increased amino-N concentrations beyond 5.0.

Modern vs. Conventional Sugarbeet Nitrogen Application Strategies

Kurt Steinke and Andrew Chomas, 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 26, 2017 (Harvest 10/27/17)	Trt's: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications

N Strategy ^a	RWSA	RWST	Tons/A	% Sugar	% CJP	NH ₂	Amino-N
0 – Check	5197	265	20	17.5	96.5	87	5.5
Coulter SD 2-4 lf	8516	263	32	17.6	95.7	133	8.3
Y-Drop SD 2-4 lf	8130	265	31	17.6	95.8	102	6.7
Pre-Plant Inc.	8969	273	33	18.1	96.0	108	7.0
Surface Band SD 2-4 lf w/ UI ^b	8324	273	31	18.1	96.1	101	6.2
Rain Drop SD 2-4lf	8676	268	32	17.8	96.0	102	6.6
Streamer SD 2-4 lf	8817	275	32	18.1	96.3	93	5.6
LSD_(0.10)^c	1328	5	4.6	0.2	NS	NS	NS

^a ALL TREATMENTS OTHER THAN CHECK RECEIVED 40 N 2X2 AT-PLANT.

^b UI, Urease inhibitor

^c LSD, least significant difference between means within a column at ($\alpha = 0.10$).

Summary: Trial quality was average to good. Please note all treatments received 2x2 N at-plant (40 lb./A). Sidedress N applications were completed at the 2-4 leaf stage on May 30 for a total N application rate of 160 lb./A. Very few differences in tonnage and quality were observed in 2017 due to N strategy. Nitrogen still requires moisture for root uptake and the dry July through September soil conditions likely limited both N movement and plant growth resulting in few differences between N application methods. Trial will be repeated in 2018. Across cropping systems, 2x2 subsurface N applications have continued to offer the most consistency across variable spring and summer weather conditions but this may not translate to yield benefits each and every year. Nitrogen stabilizers, specifically urease inhibitors, can have both positive and negative effects on yield depending upon weather conditions soon after application. As N application strategies continue to evolve, remember that a more efficient strategy to apply N may not necessarily improve (and can also reduce) the efficacy of the applied N.

Raindrop Nozzles as a Sugarbeet N Application Strategy

Kurt Steinke and Andrew Chomas, Michigan State University

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Location: Saginaw Valley Research and Extension Center	Tillage: Conv., 30-in. row
Planting Date: April 26, 2017 (Harvest 10/27/17)	Trt's: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications

N Strategy	2x2 N (lb/A)	Method, Rate, Timing of SD N (lb/A)
1	40	Raindrop, 120 N, 2-4 lf
2	40	Raindrop, 80 N, 2-4 lf
3	40	Raindrop, 120 N in a 50% water solution, 2-4 lf
4	40	Raindrop, 80 N in a 50% water solution, 2-4 lf
5	40	Raindrop, 120 N, 8-10 lf
6	40	Raindrop, 80 N, 8-10 lf
7	40	Raindrop, 120 N in a 50% water solution, 8-10 lf
8	40	Raindrop, 80 N in a 50% water solution, 8-10 lf
9	40	Flat-fan, 120 N, 2-4 lf
10	40	Flat-fan, 120 N, 8-10 lf
11	40	Surface Band, 120 N, 2-4 lf
12	Check – 0 N	Check – 0 N

N Strategy ^a	RWSA	RWST	Tons/A	% Sugar	% CJP	NH2	Amino-N
1	9291	278	34	18.4	96.0	87	5.6
2	8816	279	31	18.3	96.3	65	4.2
3	7864	281	28	18.5	96.1	64	3.9
4	7832	275	28	18.1	96.3	70	4.5
5	8330	276	30	18.2	96.1	89	5.6
6	8984	272	32	18.0	96.1	86	5.7
7	8989	270	33	17.8	96.2	86	5.6
8	8752	273	32	18.0	96.2	75	4.8
9	9676	277	35	18.3	96.0	103	6.4
10	8731	269	33	17.8	96.0	70	4.7
11	9553	275	35	18.1	96.2	95	6.1
12	5567	266	21	17.5	96.4	79	4.9
LSD_(0.10)^b	1198	8	4.2	0.5	NS	NS	NS

^a ALL TREATMENTS OTHER THAN CHECK RECEIVED 40 N 2X2 AT-PLANT.

^b LSD, least significant difference between means within a column at ($\alpha = 0.10$).

Raindrop Nozzles as a Sugarbeet N Application Strategy (Cont'd)

Location: Saginaw Valley Research and Extension Center	Tillage: Conv., 30-in. row
Planting Date: April 26, 2017 (Harvest 10/27/17)	Trt's: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications

Preliminary Summary: Trial quality was average to good. Please note all treatments received 2x2 N at-plant (40 lb./A). Sidedress N applications were completed at the 2-4 or 8-10 leaf stage for a total N application rate of 120 - 160 lb./A (see treatment list). At the 2-4 lf stage, data show significantly less % foliar damage where UAN was blended with water using raindrop nozzles but yield declines were greater where UAN was blended with water as compared to straight UAN. These results carried through to RWSA. Few differences in tonnage and RWSA were observed among the 8-10 lf SD treatments. The two flat-fan application methods were intended to serve as a worst-case scenario comparison but resulted in comparable yield and RWSA to other treatments. Greater foliar damage was observed with the 8-10 lf flat-fan treatment as compared to the 2-4 lf flat-fan. The more conventional SD strategy banded to the side of the row at 2-4 lf resulted in one of the better combinations of tonnage and quality. Dry mid- and late-summer growing conditions may have influenced results of some treatments more than others. Trial will be repeated in 2018 to gauge the sugarbeet response to the raindrop nozzle application method under additional environmental conditions.

Nitrogen and Sulfur Combination Products in Sugarbeet

Kurt Steinke and Andrew Chomas, 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 26, 2017 (Harvest 10/27/17)	Trt's: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications

Treatment ^a	Products Used ^b	RWSA	RWST	Tons/A	% Sugar	% CJP	Amino-N
120 N	-----	5449	252	21	16.9	95.8	9.6
50 P ₂ O ₅ PPI, 110 N	MAP	8297	265	31	17.6	96.2	7.5
50 P ₂ O ₅ PPI, 30 S PPI, 84 N	MAP, AMS	7789	265	29	17.7	95.6	6.8
50 P ₂ O ₅ PPI, 30 S PPI, 86 N	MAP SymTRX20S	8903	274	32	18.1	96.4	5.7
50 P ₂ O ₅ PPI, 30 S PPI, 80 N	SymTRX12S	8982	273	33	18.1	96.1	6.5
50 P ₂ O ₅ PPI, 20 S PPI, 90 N	MAP SymTRX12S	8650	271	32	17.9	96.3	6.4
LSD_(0.10)^c	-----	1229	11	4.6	NS	NS	NS

^a ALL TREATMENTS RECEIVED 40 N 2X2 AT-PLANT with N equalized at 160 lb/A based on N contributions from other product usage.

^b MAP = Monoammonium Phosphate (11-52-0), AMS = Ammonium Sulfate (21-0-0-24S), SymTRX20S = (16-1-0-20S), SymTRX12S = (16-20-0-12S).

^c LSD, least significant difference between means within a column at ($\alpha = 0.10$).

Summary: Trial quality was average to good. Please note all treatments received 2x2 N at-plant (40 lb./A) with N equalized at 160 lb/A based on N contributions from other products.

Remaining N was applied sidedress at the 2-4 leaf stage on May 30. Phosphorus application individually resulted in increases of 10 T/A yield, 13 lb. RWST, and 2,848 lb RWSA. Note that soil test phosphorus levels were 23 ppm, below the critical threshold guideline of 25 ppm. The two N, P, S replacement products evaluated resulted in non-significant yield, RWST, and RWSA increases as compared to P applied individually and the P and S combination using MAP and AMS as the P and S sources, respectively.

Liquid Carbon-Based Fertilizers Applied In-Furrow and 2x2 in Sugarbeet

Kurt Steinke and Andrew Chomas, 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 26, 2017 (Harvest 10/27/17)	Trt's: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications

Treatment ^a	RWSA	RWST	Tons/A	% Sugar	% CJP	NH2	Amino-N
7-21-3, IF, 2 gpa	8406	262	32	17.5	96.0	139	9.2
7-21-3, 2x2, 5 gpa							
7-21-3, 2x2, 7 gpa	8183	264	31	17.6	95.9	133	9.2
10-34-0, IF, 2 gpa	8326	267	31	17.7	96.0	122	8.0
10-34-0, 2x2, 5 gpa							
10-34-0, 2x2, 7 gpa	8881	271	33	18.0	96.0	134	9.0
10-34-0, IF, 1 gpa	8695	272	32	18.0	96.1	122	7.8
4-0-3-2S, IF, 1 gpa							
10-34-0, 2x2, 5 gpa							
10-34-0, 2x2, 5 gpa	8138	266	31	17.7	95.8	148	10.0
4-0-3-2S, 2x2, 2 gpa							
N Only	5957	258	23	17.3	95.6	173	11.3
LSD_(0.10)^b	659	NS	NS	NS	NS	NS	NS

^a All treatments received 36 N 2X2 AT-PLANT with N equalized at 150 lb/A based on N contributions from other product usage. IF = In-furrow. In-furrow applications were equalized to 6 gpa using water.

^b LSD, least significant difference between means within a column at ($\alpha = 0.10$).

Summary: Trial quality was average to good. Please note all treatments received 2x2 N at-plant (36 lb./A) with total N equalized to 150 lb/A based on N contributions from other products. Remaining N was applied sidedress at the 2-4 leaf stage on May 30. Low initial soil test phosphorus readings (i.e., 23 ppm) likely explain the non-significant yield increases and significant gains in RWSA realized from both the IF and 2x2 P₂O₅ applications when compared to the N only standard. Among treatments receiving IF or 2x2 nutrient applications, very few differences were observed. Practices that emphasize the start-right capacity of the plant have the capability to carry the plant through adverse mid- and late-season weather variability.

Sugarbeet Response to Phosphorus Fertilizer

Kurt Steinke and Andrew Chomas, 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 26, 2017 (Harvest 10/27/17)	Trt's: See below
Soil Type: Clay loam; 2.9 OM; 8.0 pH; 23 ppm P; 122 ppm K	Population: 4 ¼ in. spacing
Variety: B1399	Replicated: 4 replications

P Trt. (Total lb. P ₂ O ₅ /A)	RWSA	RWST	Tons/A	% Sugar	% CJP	NH ₂	Amino-N
0 – Check	8243	269	31	17.8	96.2	103	7.1
25	8872	269	33	17.8	96.1	144	9.4
50	8161	269	30	17.8	96.0	101	6.8
100	8081	261	31	17.5	95.6	110	7.0
200	8608	268	32	17.8	96.0	98	6.5
LSD_(0.10)^a	NS	NS	NS	NS	NS	NS	NS

^a LSD, least significant difference between means within a column at ($\alpha = 0.10$).

P Trt. (Total lb. P ₂ O ₅ /A)	Gross Grower Payment (\$/A)	Net Economic Return Minus Trucking (\$/A) ^a
0 – Check	1,213	1,097
25	1,291	1,167
50	1,174	1,062
100	1,177	1,061
200	1,247	1,127

^a Gross grower payment and net economic returns based upon a \$40/ton base payment with volume and quality incentives and trucking costs of \$3.75/T.

Summary: Trial quality was average to good. All treatments received 40 lbs. N/A as 28% placed 2x2 on April 26. Phosphorus applications consisted of triple superphosphate applied as a 2x2 at-planting. The 200 lb. P₂O₅/A treatment was applied per-plant incorporated. Sidedress N applications (120 lb. N/A) were completed at the 2-4 leaf stage on May 30 for a total N application of 160 lb./A. In the current study, phosphorus application did not influence tonnage or quality. Producers will want to monitor residual soil P levels to determine whether or not a P application is warranted.

Nitrogen Rate

Laracha Farms, Frankenmuth - 2017

Trial Quality: Excellent
Variety: C-G351NT
Planted: April 19
Harv/Samp: Nov 7 / Oct 26
Plot Size: 8 reps
Row Spacing: 20 inch
Seeding Rate: 67,000

Soil Info: Tappan-Londo Loam
Fertilizer: PPI: 52 gal of 28 + 1.5% S, 2x2: 9 gal of 10-15-6-5.5S
Prev Crop: Corn
Weather: Dry late season.

Rhizoc Control: Good control: Quadris I.F. & foliar
Cerc Control: Good control: See below for materials
Other Pests: None

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. 45 Days
215#	\$1,564	10751	319	33.7	20.9	96.1	206
190#	\$1,523	10472	317	33.0	20.8	96.0	202
165#	\$1,466	10078	319	31.6	20.9	96.2	212
Average	\$1,518	10434	318	32.8	20.9	96.1	207
LSD 5%	—	321	ns (5)	0.8	ns (0.2)	ns (0.3)	ns (16)
CV %	—	3	2	2.4	1.1	0.3	5

Comments: This trial was performed to evaluate grower nitrogen rates. This trial followed a high residue corn crop that was disk ripped the previous fall. Nitrogen rate recommendations following high residue crops like corn have been closer to 160# of N. In this trial the whole field received 165# of nitrogen by the 2x2 starter and 52 gallons of 28% pre-plant incorporated. The two higher rates were then surface applied with the sprayer immediately after planting. Both of the higher rates yielded significantly better than the low rate. Previous research has found negative impacts to sugar content at rates like the two higher rates used in this trial. In this trial, no negative impacts were found to % Sugar, % CJP, RWST or amino N levels. This trial did not experience the heavy June rains like much of the growing area. The weather was generally favorable for the first half of the season and would not likely have caused high losses of nitrogen. The months of August and September were very dry. The Cercospora leafspot spray program was: 1. EBDC, 2. Inspire + EBDC, 3. Super Tin + EBDC, 4. Enable + EBDC, 5. Super Tin + Badge, 6. Proline + EBDC, 7. Super Tin + EBDC, 8. Badge + EBDC

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment and a company average RWST of 275.

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

Nitrogen Rate

Schindler Farms, Kawkawlin - 2017

Trial Quality: Excellent	Soil Info: Tappan-Londo Loam	Rhizoc Control: Excellent control: Quadris I.F. & foliar
Variety: C-G351NT	Fertilizer: Fall: 150# K ₂ O; 2x2: 41#-32#-0#-7#S + Mn & B; Nitrogen rates below	Cerc Control: Good control: See materials below
Planted: May 9		
Harv/Samp: Oct 18 / Oct 16		
Plot Size: 6 reps	Prev Crop: Wheat	
Row Spacing: 22 inch	Weather: Heavy rains in June followed by dry late season	
Seeding Rate: 61,300		Other Pests: Aphanomyces

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP
185#	\$1,367	8247	320	25.8	21.0	95.9
160#	\$1,341	8092	325	24.9	21.3	96.1
135#	\$1,290	7783	322	24.2	21.1	96.1
Average	\$1,333	8041	323	24.9	21.1	96.0
LSD 5%	—	341	ns (6)	0.9	ns (0.3)	ns (0.2)
CV %	—	3	1	2.7	1.2	0.2

Comments: This trial was performed to evaluate grower nitrogen rates. This trial followed a wheat crop with a wheat/oat cover crop that was disk ripped the previous fall. Nitrogen rate recommendations following high residue crops, like wheat, have been 140#-160# of total N. In this trial, 41# of N was applied in the 2x2 starter. The remainder of the nitrogen was sidedressed on June 1st. No significant impacts were seen for RWST, % Sugar, or % CJP. The highest rate of 185# was significantly higher than 160# and 135# in tons/acre. This result probably should not be unexpected since this field did experience heavy June rains that likely led to some loss of nitrogen. Considering the potential loss of nitrogen and the relatively low yield increase, growers should probably not use this trial to justify increasing nitrogen rates higher than the old recommendations. The Cercospora leafspot program is as follows: 1. Inspire + EBDC, Super Tin + EBDC, 3. Topguard + EBDC, 4. Super Tin + EBDC, 5. Enable + EBDC, 6. Copper.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment, a company average RWST of 275, and early delivery premium.

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

Nitrogen Rate

Spartan Acres (Knoerr), Saginaw - 2017

Trial Quality:	Good	Soil Info:	Londo Loam	Rhizoc Control:	Good control: Quadris I.F.
Variety:	B-1399	Fertilizer:	Fall: 200# potash; PPI: 70# N by 28%; 2x2: 30#-10#-0#-12#S-2#B; Remaining N by S.D.	Cerc Control:	Good control: All w/ EBDC. 1. Proline, 2. Priaxor, 3. Tin, 4. Inspire, 5. EBDC, 6. Proline
Planted:	April 25	Prev Crop:	Wheat	Other Pests:	None
Harv/Samp:	Nov 1 / Oct 31	Weather:	Heavy rains in June, dry late summer		
Plot Size:	6 reps				
Row Spacing:	20 inch				
Seeding Rate:	62,000				

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP
175#	\$1,309	8997	299	30.1	19.7	96.0
125#	\$1,268	8718	305	28.6	20.0	96.1
150#	\$1,259	8646	298	29.0	19.6	96.1
Average	\$1,278	8787	301	29.2	19.8	96.0
LSD 5%	—	ns (519)	ns (8)	ns (1.9)	ns (0.4)	ns (0.3)
CV %	—	5	2	4.9	1.7	0.2

Comments: This trial was performed to evaluate grower nitrogen rates. This trial followed a wheat crop that was disk ripped the previous fall. Nitrogen rate recommendations following high residue crops, like wheat, have been 140#-160# of total N. In this trial, 30# of N was applied in the 2x2 starter and 70# was pre-plant incorporated. The remainder of the nitrogen was sidedressed on June 6th. No significant differences were found in yield or sugar content. The tons per acre and RWSA were the highest for the highest N rate. This result probably should not be unexpected since this field did experience heavy June rains that likely led to some loss of nitrogen. Considering the potential loss of nitrogen and the relatively low yield increase, growers should probably not use this trial to justify increasing nitrogen rates higher than the old recommendations.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment and a company average RWST of 275.

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

Foliar Fertilizer & LX7 Foliar Spray

Laracha Farms, Bay City - 2017

Trial Quality: Excellent	Soil Info: Loam - Tappan & Londo	Rhizoc Control: Excellent control: Quadris I.F. & foliar
Variety: B-149N	Fertilizer: Fall: Potash, Mesz and S variable rate; PPI: 60 gal of 28 + 1.5% S, 2x2: 9 gal of 10-15-6-5.5S	Cerc Control: Good control: See below for materials
Planted: April 19		
Harv/Samp: Nov 14 / Oct 31		
Plot Size: 6 reps	Prev Crop: Corn	
Row Spacing: 20 inch	Weather: Heavy rain in June. Dry late season.	Other Pests: None
Seeding Rate: 67,000		

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP
LX7 Foliar	\$1,701	11697	312	37.5	20.6	95.8
Foliar Mix	\$1,661	11423	313	36.5	20.6	95.8
Check	\$1,660	11413	314	36.3	20.7	95.9
Average	\$1,674	11511	313	36.8	20.6	95.8
LSD 5%	—	ns (424)	ns (4)	ns (1.2)	ns (0.2)	ns (0.3)
CV %	—	3	1	2.4	0.8	0.2

Comments: This trial was performed to evaluate whether foliar fertilizer products will impact yield or quality even when there are no known nutrient deficiencies. Many growers add foliar nutrients to their Cercospora leafspot applications as part of their nutrient program. LX7 Foliar Blend is a product from MTS Environmental Holdings. LX7 Foliar blend is a fulvic acid solution with added micronutrients that supplies manganese, zinc, sulfur and boron. The Foliar Mix was a blended fertilizer with the analysis of 12-8-6-1.4S with 0.1 Zn, 0.1 Fe, 0.1 B, 0.35 Mn. No visual differences were seen. The LX7 did increase tonnage at the 10% significance level and this may return well more than the product cost. The products were applied at the same time as the Cercospora leafspot materials. LX7 was applied 5 times at 1 pint per acre on Cercospora applications 2,3,4,5,7. The foliar blend was applied 4 times at 2 quarts per acre on applications 2,3,4,5. The Cercospora leafspot spray program was: 1. 6/21 EBDC, 2. 6/30 Inspire + EBDC, 3. 7/17 Super Tin + EBDC, 4. 7/25 Enable + EBDC, 5. 8/10 Super Tin + Badge, 6. 8/21 Proline + EBDC, 7. 9/12 Super Tin + EBDC, 8. 9/29 Badge + EBDC.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment and a company average RWST of 275.

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

Trial Quality: Excellent	Soil Info: Loam	Rhizoc Control: Good control: Quadris I.F. and foliar
Variety: B-149N	Fertilizer: 2x2: 10 gal of 28-0-0 w/ Mn & B; PPI: 40 gal of 28%	Cerc Control: Good / Fair control: 1. Inspire + EBDC, 2. S.T. 3, Proline + Badge, 4. Minerva Duo, 5. Badge, 6. EBDC
Planted: April 28	Prev Crop: Wheat	Other Pests: None
Harv/Samp: Nov 6 / Oct 31	Weather: Good early, dry late season	
Plot Size: 3 reps		
Row Spacing: 22 inch		
Seeding Rate: 63,000		

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP
Check	\$1,472	10122	318	31.8	20.7	96.5
Foliar Fertilizer - SST 8% Calcium	\$1,449	9961	319	31.2	20.8	96.5
Average	\$1,461	10041	319	31.5	20.7	96.5
LSD 5%	—	ns (648)	ns (4)	ns (2.0)	ns (0.3)	ns (0.1)
CV %	—	2	1	1.8	0.9	0.1

Comments: A study performed in a different region found that foliar fertilization with calcium and silicon had a positive impact on root yield. In this trial, SST 8% Calcium with Stabilized Silica Technology was applied twice at one quart per acre. The first application was banded with foliar Quadris at 6-8 leaf and the second application was made 2 weeks later. No differences were found.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment and a company average RWST of 275.

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

Fertiactyl® GZ Biostimulant

Meylan Farms, Auburn - 2017

Trial Quality: Excellent
Variety: C-G333NT
Planted: April 28
Harv/Samp: Nov 1 / Oct 26
Plot Size: 6 reps
Row Spacing: 22 inch
Seeding Rate: 68,000

Soil Info: Loam
Fertilizer: Fall: 250# Potash; PPI:
 40 gal of 28%; 2x2: 20
 gal of 22-10-0 w/ Mn & B
Prev Crop: Corn
Weather: Heavy June rains,
 dry late summer

Rhizoc Control: Good control:
 Quadris I.F. & foliar
Cerc Control: Good control: See
 materials below
Other Pests: Sugarbeet cyst
 nematode

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. 35 Days
Check	\$1,236	8496	304	27.9	20.0	96.1	183
Fertiactyl GZ®	\$1,185	8144	303	26.9	19.9	96.1	175

Average	\$1,210	8320	304	27.4	19.9	96.1	179
LSD 5%	—	296	ns (6)	1.0	ns (0.3)	ns (0.5)	ns (19)
CV %	—	2	2	2.4	1.3	0.4	5

Comments: Fertiactyl GZ® is a liquid root biostimulant for early plant development. The product composition is 13% nitrogen urea, 5% soluble potash, 10% humic acid, 5% fulvic acid and 20% seaweed extract. The product was mixed into the 2x2 fertilizer at a 1 quart per acre rate. The check was 2x2 only, with no Fertiactyl. No visual differences were observed. Results showed significantly lower RWSA and tons per acre. There is no known reason that Fertiactyl would have actually lowered yield and this reduction may not be real. This field did experience heavy rains in June, as well as dry late summer conditions. The Cercospora leafspot spray program was: 1. Inspire + EBDC, 2. Super Tin + Badge, 3. Topguard + EBDC, 4. Super Tin + Badge, 5. Enable + EBDC, 6. EBDC, 7. EBDC.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment and a company average RWST of 275.

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

Trial Quality:	Excellent	Soil Info:	Loam	Rhiz Control:	Good control: Quadris I.F.
Variety:	C-RR059	Fertilizer:	2x2: 10 gal of 28-0-0 w/ Mn & B; PPI: 40 gal of 28%	Cerc Control:	Good control: 1. Proline + EBDC, 2. Inspire + EBDC, 3. Super Tin + EBDC, 4. Badge
Planted:	April 19	Prev Crop:	Soybeans	Other Pests:	None
Harv/Samp:	Aug 24 / Aug 23	Weather:	Good early, Dry late season		
Plot Size:	6 reps				
Row Spacing:	22 inch				
Seeding Rate:	63,000				

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. of Row	
							14 Day	48 Day
Stimulate	\$1,671	5890	302	19.5	20.4	94.5	121	190
Check	\$1,640	5780	298	19.4	20.3	94.3	130	191
Average	\$1,656	5835	300	19.4	20.4	94.4	126	191
LSD 5%	—	ns (281)	ns (8)	ns (0.9)	ns (0.4)	ns (0.5)	ns (31)	ns (25)
CV %	—	3	2	3.3	1.7	0.4	17	9

Comments: Product literature describes Stimulate™ crop biostimulant as a highly concentrated diverse microbial formulation with dozens of natural strains of beneficial micro-organisms selected to convert unavailable soil nutrients to available forms, produce non-symbiotic N, plant hormones, vitamins and many other substances that improve plant health and increase shoot and root growth. The product was applied T-band in-furrow at 1 pint/acre with Quadris fungicide. The product literature states that although some fungicides may be tough on the fungal components, they can still be mixed right before application. No significant differences were seen. This trial was harvested very early in the harvest season.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment, an average RWST of 275, and early delivery premium.

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

Preliminary 2017 Report: Response of 8 Varieties to Nitrogen Fertilizer

Dr. Laura L. Van Eerd and J. Mitchell MacFarlane University of Guelph, Ridgetown Couture Farmland Farms, Ontario 2018

Soil: 3.4% OM, 7.8 pH, 22.3 CEC, 28 P, 169 K, Silt Loam

Typical fungicide program: 5-6 fungicide sprays with N

Previous Crop: Grain corn

Planting Date: 14 April 2017

Trial quality: Excellent

Starter fertilizer: 11 lb N/ac (11-52-0)

Early Harvest: 27-28 Sept.

Late Harvest: 26-27 Oct.

28% N applied: 2 June 2017

Table 1: Impact of N fertilizer on sugarbeet production (8 varieties) in 2017 at Dover, Ontario*

N Rate (lb/ac)	RWSA	Yield ton/ac	RWST	% Sugar	Payment \$/ac
0	12,809 a	46.1 ns	278 a	18.4 a	\$ 2,390 a
40	12,845 a	46.8	275 a	18.2 a	\$ 2,400 a
80	12,530 a	46.8	268 a	17.8 b	\$ 2,331 a
140	11,956 b	46.8	257 b	17.3 c	\$ 2,226 b
200	11,602 b	47.3	246 b	16.7 d	\$ 2,164 b

*For each column, averages with different letters indicates a statistical difference.

N Fertilizer Results (Table 1)	
-In 2017, beets grown without N fertilizer looked less green but were similar in size.	
-The soil likely provided considerable N to the crop.	
- N fertilizer was applied in-season eliminating early spring N losses	
-Highest payment and RWSA were with 40 lb N/ac applied	

Table 2: Fertilizer N rate correlations with sugarbeet payment, yield, RWST, and RWSA at early (E) and late (L) harvest showing correlations of these factors with SPAD meter and GreenSeeker readings taken in June. Correlations indicated with *p=0.05, **p=0.01, ***p=0.001, or not significant ' '.

Variety	-----N Rate-----			-----Payment (\$/ac)-----						-----RWSA (lb/ac)-----						-----Yield (ton/ac)-----						-----RWST (lb/ton)-----						Variety						
	SPAD			GS			N Rate			SPAD			GS			N rate			SPAD			GS			N rate				SPAD			GS		
	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E		L	E	L			
B12RR2N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B12RR2N			
SX1251RR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SX1251RR			
B1399	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B1399			
CRR059	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	CRR059			
CG333NT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	CG333NT			
CG351NT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	CG351NT			
Hill9616	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Hill9616			
SX1245NRR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SX1245NRR			
all	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	all			

The higher the rate of N fertilizer applied the lower the payment, % sugar, RWST and RWSA, but the effect on yield was. For all varieties and harvest dates, when more N was applied %sugar and RWST were lower (inverse relationship). At both the early and late harvest dates 5 of 8 varieties showed significant negative response between payment and N rate. The SPAD meter and GreenSeeker are used to measure leaf and canopy greenness. Although SPAD and GreenSeeker can pick out greenness, they do not show much promise as a predictive tool in sugarbeets when readings were taken in June. Readings taken again at both harvest dates. These will be evaluated to determine if the tools can predict sugar at harvest.

Evaluation of various ethofumesate rates applied postemergence in sugarbeet

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

Location: Richville (SVREC)	Application timings: 4 and 6-leaf beets
Planting Date: April 18, 2017	Herbicides: see treatments
Soil Type: Sandy clay loam	O.M.: 2.4 pH: 7.7
Replicated: 4 times	Variety: ACH G515RR

Table 1. Sugarbeet injury, common lambsquarters control, yield, and recoverable white sugar per acre (RWSA) for Ethofumesate applied postemergence.

Herbicide treatments ^a	Injury (15 d after 4-lf) — % —	C. lambsquarters (28 d after 6-lf) — % —	Yield — ton/A —	RWSA — lb/A —
Roundup (32 oz) – 2X	0	99	22.8	6581
Ethofumesate (6 oz) + Destiny HC (1.5 pt) – 2X	4	18	13.6	3852
Ethofumesate (12 oz) + Destiny HC (1.5 pt) – 2X	6	25	8.9	2463
Ethofumesate (18 oz) + Destiny HC (1.5 pt) – 2X	2	33	15.1	4494
Ethofumesate (24 oz) + Destiny HC (1.5 pt) – 2X	4	40	16.6	4705
Ethofumesate (32 oz) + Destiny HC (1.5 pt) – 2X	4	47	17.1	5106
Ethofumesate (6 oz) + Roundup + Destiny HC – 2X	2	100	26.1	7334
Ethofumesate (12 oz) + Roundup + Destiny HC – 2X	4	100	24.4	6799
Ethofumesate (18 oz) + Roundup + Destiny HC – 2X	3	100	24.0	6907
Ethofumesate (24 oz) + Roundup + Destiny HC – 2X	3	100	25.3	7279
Ethofumesate (32 oz) + Roundup + Destiny HC – 2X	8	100	27.3	7797
Untreated	0	0	12.6	3558
LSD_{0.05}^b	6	9	6.5	1960

^a All treatments with Roundup PowerMax included ammonium sulfate at 17 lb/100 gal. See recommendations in the MSU Weed Control Guide for Field Crops.

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

Summary: A field trial was conducted to evaluate the effects of various ethofumesate rates applied postemergence (POST) to sugarbeet. With the increased issues with glyphosate-resistant weed and fewer herbicides available in sugarbeet, this trial was conducted to determine crop safety and weed control from higher rates of ethofumesate applied POST. Ethofumesate was applied alone and in tank-mixture with glyphosate to 4- and 6-leaf sugarbeet, and when common lambsquarters averaged 3 and 4 inches tall, respectively. Overall sugarbeet injury was low (6% or less) with ethofumesate applied alone with rates up to 32 fl oz/A, 15 days after the first application. By 15 days after the second application there was no sugarbeet injury. There was definite rate response for common lambsquarters control. However, common lambsquarters control only was 40 – 47% with the high rates of ethofumesate alone. There was no detriment to common lambsquarters control, sugarbeet yield, or recoverable white sugar per acre when any of the rates ethofumesate were added to Roundup PowerMax. Sugarbeet yield and recoverable white sugar per acre was only impacted by the lack of common lambsquarters control in the ethofumesate alone treatments. While the addition of ethofumesate did not improve common lambsquarters control it may be beneficial to help control glyphosate-resistant pigweed species, like common waterhemp. We will continue to examine higher rates of ethofumesate POST to determine if these treatments will control glyphosate-resistant weeds.

Effect of simulated tank-contamination with dicamba on sugarbeet

Michael Probst and Christy Sprague, Michigan State University

Locations: Richville and East Lansing	Application timings: 2-, 6-, and 14-leaf beets
Richville 2016 Planting Date: April 16 Variety: Hilleshog 9616	East Lansing 2016 Planting Date: April 18 Variety: ACH 059
Richville 2017 Planting Date: April 18 Variety: ACH G515	East Lansing 2017 Planting Date: May 17 Variety: ACH G515

Table 1. Sugarbeet injury (14 DAT) and yield resulting from sub-lethal rates of dicamba applied at three different growth stages.

Treatments ^{a,b}	Clarity rate fl oz/A	Richville			East Lansing		Richville Yield ^c — ton/A —
		Sugarbeet injury			Sugarbeet injury		
		2-leaf	6-leaf	14-leaf	2-leaf	14-leaf	
		— % —	— % —	— % —	— % —	— % —	
Non-treated control	0	0 a	0 a	0 a	0 a	0 a	29.0 a
Dicamba - 0.125%	0.04	4 ab	2 ab	4 a	5 ab	2 ab	29.1 a
Dicamba - 0.25%	0.08	8 b	6 bc	5 a	10 b	7 b	28.3 a
Dicamba - 0.5%	0.16	15 c	12 c	12 b	23 c	14 c	28.5 a
Dicamba - 1%	0.32	20 c	24 d	19 c	34 d	24 d	27.2 ab
Dicamba - 2%	0.64	32 d	36 e	37 d	40 d	37 e	24.2 b

Means followed by the same letter in the same column are not significantly different at $\alpha \leq 0.05$.

^a All treatments included 22 fl oz/A of Roundup PowerMax + 17 lb/100 gal of ammonium sulfate to simulate tank-contamination.

^b Rate percentages are based off of a field use rate for Clarity of 32 fl oz/A.

^c Values are averaged across application timings.

Summary: Field studies were conducted in 2016 and 2017 to determine the effects of tank-contamination with sub-lethal rates of dicamba on sugarbeets. These studies were conducted at the MSU Agronomy Farm in East Lansing and the Saginaw Valley Research and Extension Center in Richville. Significant sugarbeet injury was observed with rates starting at 0.25% for the 2- and 6-leaf exposure at Richville and the 2- and 14-leaf exposure at East Lansing. At the 14-leaf stage in East Lansing, it took 0.5% of dicamba for significant injury. The 2% rate of dicamba caused 32-37% injury at Richville and 37-40% injury at East Lansing, 14 DAT. Although injury was observed at all rates, only the 2% rate reduced sugarbeet yield. Combined over the two years, the 2% rate of dicamba reduced sugarbeet yield 17% at Richville, regardless of the stage of exposure. Even though there was significant injury at East Lansing there was no difference in sugarbeet yield in 2016, and plots were not harvested in 2017 due to poor conditions later in the season. Based on previous research, the expected rate of a tank-contamination following a three-rinse cleanout would fall within the 0.125-0.5% range. While rates within this range caused injury to sugarbeet, they did not cause a yield reduction. However, yield reduction is not the only concern following sugarbeet exposure to dicamba. The presence of dicamba residues in the harvested sugarbeets can result in their rejection. We are currently analyzing samples collected throughout both years to determine the level of dicamba residues two weeks after treatment and at harvest.

Effect of simulated tank-contamination with 2,4-D on sugarbeet

Michael Probst and Christy Sprague, Michigan State University

Locations: Richville and East Lansing	Application timings: 2-, 6-, and 14-leaf
Richville 2016 Planting Date: April 16 Variety: Hilleshog 9616	East Lansing 2016 Planting Date: April 18 Variety: ACH 059
Richville 2017 Planting Date: April 18 Variety: ACH G515	East Lansing 2017 Planting Date: May 17 Variety: ACH G515

Table 1. Sugarbeet injury (14 DAT) and yield resulting from sub-lethal rates of 2,4-D at three different growth stages.

Treatments ^{a,b}	Enlist Duo rate	Richville			E. Lansing	Richville	E. Lansing
		Sugarbeet injury					
		2-leaf	6-leaf	14-leaf			
	fl oz/A	— % —	— % —	— % —	— % —	— ton/A —	— ton/A —
Non-treated control	0	0 a	0 a	0 a	0 a	23.3 a	30.9 a
2,4-D - 0.125%	0.10	5 ab	3 ab	4 ab	5 a	24.4 a	28.9 ab
2,4-D - 0.25%	0.20	10 b	9 bc	8 b	10 b	24.5 a	28.7 ab
2,4-D - 0.5%	0.40	16 c	10 c	15 c	15 c	24.0 a	28.8 ab
2,4-D - 1%	0.80	21 c	21 d	23 d	26 d	22.2 a	26.0 ab
2,4-D - 2%	1.60	31 d	34 e	40 e	36 e	16.8 b	24.8 b

Means followed by the same letter in the same column are not significantly different at $\alpha \leq 0.05$.

^a All treatments included 22 fl oz/A of Roundup PowerMax and 17 lb/100 gal of ammonium sulfate to simulate tank-contamination.

^b Rate percentages are based off of a field use rate for Enlist Duo of 4.75 pt/A.

^c Values are averaged across application timings.

Summary: Field studies were conducted in 2016 and 2017 to determine the effects of tank-contamination with sub-lethal rates of 2,4-D on sugarbeets. These studies were conducted at the MSU Agronomy Farm in East Lansing and the Saginaw Valley Research and Extension Center in Richville. Significant sugarbeet injury was observed with rates starting at 0.25% for the 2-, 6- and 14-leaf exposure at Richville and at East Lansing, combined over exposure stage. The 0.25% rate of 2,4-D caused 10% injury at the 2-leaf exposure timing at Richville and East Lansing, while the 0.5% rate was needed to cause 10% injury or greater at the 6-leaf and 14-leaf timings at Richville. The 2% rate of 2,4-D caused 31-40% injury at Richville and 36% injury at East Lansing. Despite sugarbeet injury at rates lower than the 2% rate, only the 2% rate of 2,4-D reduced sugarbeet yield. Yield was reduced 28% and 20% over the two years at Richville and East Lansing, respectively. 2,4-D exposure at the 14-leaf stage of sugarbeet also reduced yield at both locations, causing a 17% and 8% yield reduction at Richville and East Lansing, respectively. Based on previous research, the expected rate of tank-contamination following a three-rinse cleanout would fall somewhere within the 0.125-0.5% range. While rates within this range caused injury to sugarbeet, they did not reduce yield. However, yield reduction is not the only concern following sugarbeet exposure to 2,4-D. The presence of 2,4-D residues in the harvested sugarbeets can result in their rejection. We are currently analyzing samples collected throughout both years to determine the level of 2,4-D residues 14 days after treatment and at harvest.

Herbicide-resistant waterhemp control in sugarbeet

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

Location: Isabella County	Application timings: PRE, 4-, 6-8, and 10-leaf beets
Planting Date: May 18, 2017	Herbicides: see treatments
Soil Type: Sandy loam	O.M.: 2.8 pH: 6.8
Replicated: 4 times	Variety: ACH G515MP

Table 1. Glyphosate (Group 9) and ALS (Group 2)-resistant waterhemp control in sugarbeet, 7 (July 17) and 36 days after the last application (DAT) (mid-August) for various weed control programs.

Herbicide treatments ^a		July 17 (7 DAT)		August 15 (36 DAT)	
		Ethofumesate 3 pt (PRE) ^b	POST only	Ethofumesate 3 pt (PRE) ^b	POST only
		———— % control ————		———— % control ————	
Roundup - applied 3X (32/22/22 fl oz)	4- fb. 6- fb. 10-lf	88 b ^c	48 d	40 cd	21 e
Betamix - applied 3X (2/3/3 pt)	4- fb. 6- fb. 10-lf	95 ab	56 d	41 cd	16 e
Spin-Aid (phenmedipham) -3X (2/3/3 pt)	4- fb. 6- fb. 10-lf	96 a	66 c	56 c	23 e
Ethofumesate - 3X (1/1/1 pt)	4- fb. 6- fb. 10-lf	100 a	100 a	81 ab	77 ab
Warrant - 2X (3/3 pt)	4- fb. 6-lf	100 a	--	80 ab	--
Ethofumesate + Warrant - 2X (2+3/2+3 pt)	4- fb. 6-lf	--	100 a	--	88 a
Spin-Aid + Warrant - 2X (2+3/2+3 pt)	4- fb. 6-lf	--	99 a	--	80 ab
Betamix + Warrant - 2X (2+3/3+3 pt)	4- fb. 6-lf	100 a	100 a	91 a	83 a
Betamix + Dual Magnum - 2X (2+1.33/3+1.33 pt)	4- fb. 6-lf	--	100 a	--	91 a
Betamix + Outlook - 2X (2 pt+10.5 fl oz/3 pt+10.5 fl oz)	4- fb. 6-lf	--	98 a	--	66 b

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

^b Control evaluations in this column are the POST herbicide treatments following a 3 pt/A application of ethofumesate PRE.

^c Means followed by the same letter in the group of two columns are not significantly different at $\alpha \leq 0.05$.

Summary: Several herbicide programs were evaluated for control of glyphosate- and ALS-resistant waterhemp. By mid-August treatments that provided the best control contained Ethofumesate, Warrant, or Dual Magnum postemergence in at least two applications. Unfortunately, these treatments were somewhat variable and only provided 77 to 91% control. While Betamix most likely will not be a viable option in future weed management programs, layby applications of Warrant or Dual Magnum will be important in a herbicide-resistant waterhemp management strategy. It also appears that ethofumesate applied preemergence and/or postemergence at higher rates may contribute to waterhemp control. We will be continuing to examine and refine waterhemp control strategies in sugarbeet in the future.



Effect of Harvest Date on Sugarbeet Yield, Quality and Grower Income

Average of 8 years, 20 Locations

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Harvest: 6 Dates, Aug 15 to Nov 1
Plot Size: 6 rows X 38 ft, various reps

Seeding Rate: 4.5 inches
Beet Population: About 190 B/100'

No.	Harvest Date	Net \$/A	\$/Ton	RWSA	RWST	T/A	% SUC	% CJP	Beets/100'
2	September 1	\$1,930 a	\$69 b	6216 e	218 d	28.5 c	15.2 d	94.2 c	187.3
3	September 15	\$1,922 a	\$63 c	7489 d	236 c	32.1 b	16.1 c	95.0 b	182.2
4	October 1	\$1,875 ab	\$59 d	8648 c	260 b	33.8 b	17.6 b	95.0 b	181.4
5	October 15	\$1,807 ab	\$52 e	9964 b	271 b	37.2 a	18.2 ab	95.3 b	187.1
1	August 15	\$1,793 ab	\$81 a	4679 f	209 d	22.5 d	14.7 d	93.7 d	186.0
6	October 30	\$1,752 b	\$50 e	10819 a	284 a	38.4 a	18.8 a	95.8 a	181.8
Average		\$1,847	\$62	7969	246	32.1	16.8	94.8	184.3
LSD 5%		134.0	3.7	430.9	12.2	1.8	0.7	0.4	6.6
CV %		11.6	9.5	8.6	7.9	8.7	7.0	0.6	5.7

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Comments: After 8 years and 20 locations of Harvest Date trials, we are seeing very consistent data. Yield tends to increase by approximately 1.6 tons per week, and RWST increases by approximately 7.5 pounds per week. Tonnage and RWST increases are directly affected by rainfall in the two week period prior to harvest, but when looked at over multiple years of trials the increases are consistent. The largest tonnage increases are typically seen in August and September, and the largest increases in RWST tend to happen in late September and October. On average, the October harvest date shows a significantly lower payment per acre. Trials in 2015 and 2016 had lower than anticipated revenue at later harvest dates due to disease problems and environmental conditions. Trials in 2017 saw no significant difference in revenue per acre when early delivery incentive, freight, and fungicide application cost were factored into the net dollars per acre.

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



Effect of Harvest Date on Sugarbeet Yield, Quality and Grower Income

Average of 3 Locations - 2017

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Trial Quality: Fair

Variety: B-149N

Planted: Blumfield West - May 9,
Shaffner - May 10, Sylvester - April 27

Harvested: See trts.

Plots: 6 rows X 38ft, 4 and 5 reps

Rhizoc Level: Low

Cerc Control: Good

Seeding Rate: 4.5 inches

Row Spacing: 22 inches

No.	Harvest Date	Net \$/A	\$/Ton	RWSA	RWST	T/A	% SUC	% CJP	Beets /100ft
3	September 15	\$1,688	\$63 ab	6993 b	253 a	28.0 c	17.6 a	93.9 bc	178.7
4	October 1	\$1,673	\$60 ab	8316 ab	284 a	29.4 bc	19.2 a	94.8 ab	165.5
5	October 15	\$1,557	\$50 bc	9284 a	279 a	33.5 ab	18.8 a	95.1 ab	163.9
2	September 1	\$1,481	\$63 ab	5201 c	214 b	24.6 cd	15.4 b	93.4 bc	167.2
1	August 15	\$1,366	\$70 a	3868 c	195 b	20.0 d	14.0 b	92.9 c	174.6
6	November 1	\$1,264	\$44 c	9630 a	274 a	35.2 a	18.3 a	95.8 a	162.8
Average		\$1,505	\$58	7215	250	28.5	17.2	94.3	168.8
LSD 5%		n.s.	12.4	1378.1	34.8	4.7	2.0	1.5	n.s.
CV %		13.8	11.5	10.3	7.5	9.0	6.2	0.9	9.5

Comments: Harvest Date trials continued in 2017. Dry periods in all locations during September slowed yield increases. October rains increased yield but slowed increases in sugar content. Thin stands at one location limited yield potential. When early delivery incentive was factored in to payment, there were no statistical differences between any harvest date.

Blumfield West, Richville, MI - 2017

Trial Quality: Fair

Variety: B-149N

Planted: May 9

Harvested: See trts.

Plots: 6 rows X 38 ft, 5 reps

Row Spacing: 22 inch

Soil Info: Sandy Clay Loam

% OM: 2.6 **pH:** 7.7 **CEC:** 13.0

Above Opt: P, K

High: Mn **Med:** B

Added N: 140 lbs.

Prev Crop: Rye (Fall Cover)

Rhizoc Level: Low

Cerc Control: Good

Problems: Extremely Dry
September

Seeding Rate: 4.5 inches

No.	Harvest Date	Net \$/A	\$/T	RWSA	RWST	T/A	% SUC	% CJP	Beets /100ft	GDD*	Rain Inch*
4	October 1	\$1,358	\$56 c	7471 a	290 a	25.8 a	19.3 a	95.4 b	155.0 b	35	0.5
2	September 1	\$1,226	\$68 b	4671 b	253 b	19.0 b	17.6 b	94.3 c	180.0 b	32	1.46
1	August 15	\$1,226	\$80 a	3728 b	241 b	15.5 b	16.6 c	94.6 c	206.7 a	34	1.1
5	October 15	\$1,161	\$47 d	7704 a	288 a	26.8 a	19.3 a	95.3 b	169.4 b	26	2.3
6	November 1	\$1,104	\$43 e	9027 a	290 a	31.1 a	19.1 a	96.2 a	173.7 b	15	1.85
Average		\$1,215	\$59	6520	272	23.6	18.4	95.2	176.9	28.0	1.4
LSD 5%		n.s.	3.3	1680.7	14.7	5.4	0.9	0.6	24.4		
CV %		15.5	4.1	19.1	4.0	17.2	3.7	0.5	10.3		

*GDD (Growing Degree Days): an average daily amount for the 2 weeks prior to that harvest date.

*Rain Inch: Actual rainfall amount including 2 weeks prior to the planting date.

Comments: Very dry September weather prevented a September 15th harvest date. A lack of precipitation in late August and early September slowed the increase in yield over that time period.

Net \$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment and a trial average RWST.

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



Effect of Harvest Date on Sugarbeet Yield, Quality and Grower Income

Shaffner Brothers LLC., Freeland, MI - 2017

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Trial Quality: Fair
Variety: B-149N
Planted: May 10
Harvested: See trts.
Plots: 6 rows X 38 ft, 5 reps
Row Spacing: 22 inches

Soil Info: Loam
% OM: 3.5 **pH:** 7.7 **CEC:** 13.7
Above Opt: P **Below Opt:** K
Med: Mn, B
Added N: 140 lbs.
Prev Crop: Corn

Rhizoc Level: Low
Cerc Control: Good
Problems: Some water damage
Seeding Rate: 4.5 inches

No.	Harvest Date	Net \$/A	\$/Ton	RWSA	RWST	T/A	% SUC	% CJP	Beets/100ft	GDD*	Rain Inch*
3	September 15	\$1,930 a	\$65 a	7354 b	234 b	31.5 b	16.1 b	94.4 bc	224.5 a	26	0.3
4	October 1	\$1,918 a	\$62 a	8609 b	260 a	33.2 b	17.5 a	95.2 abc	201.3 ab	36	0.2
5	October 15	\$1,885 a	\$52 bc	10160 a	261 a	39.0 a	17.4 ab	95.7 ab	199.3 b	26	2.9
6	November 1	\$1,518 b	\$46 c	10492 a	259 a	40.5 a	17.2 ab	96.3 a	190.8 b	14	3.0
2	September 1	\$1,499 b	\$62 a	4733 c	187 c	25.0 c	13.3 c	93.7 c	197.6 b	32	0.8
1	August 15	\$1,152 b	\$56 ab	2923 d	137 d	20.6 d	10.6 d	91.2 d	180.6 b	34	3.1
Average		\$1,651	\$57	7378	223	31.6	15.4	94.4	199.0	28	1.7
LSD 5%		354.8	8.3	1259.4	24.1	4.2	1.3	1.6	23.7		
CV %		16.3	11.0	12.9	8.2	10.0	6.4	1.3	9.0		

Comments: This trial suffered some water damage in June. Certain replications were avoided due to the damage.

Tonnage increased consistently by approximately 2.5 tons/week through the October 15th harvest date and then leveled off. Sugar content increased through October 1st, but saw no significant increase after that harvest date.

Sylvester, Akron, MI - 2017

Trial Quality: Fair
Variety: B-149N
Planted: April 27
Harvested: See trts.
Plots: 6 rows X 38 ft, 4 reps
Row Spacing: 22 inches

Soil Info: Sandy Loam
% OM: 2.5 **pH:** 7.4 **CEC:** 9.8
Above Opt: P, K
Med: Mn **Low:** B
Added N: 160 lbs.
Prev Crop: Wheat

Rhizoc Level: Low
Cerc Control: Good
Problems: Thin stand/dry
Seeding Rate: 4.5 inches

No.	Harvest Date	Net \$/A	\$/Ton	RWSA	RWST	T/A	% SUC	% CJP	Beets/100ft	GDD*	Rain Inch*
4	October 1	\$1,742 a	\$63 b	8869 a	302 a	29.4 c	20.8 a	93.7 ab	140.3	36	0.1
1	August 15	\$1,721 a	\$74 a	4955 d	207 d	23.8 d	14.9 d	92.9 bc	136.6	34	0.9
2	September 1	\$1,717 a	\$59 b	6198 c	201 d	29.9 bc	15.2 d	92.3 c	123.9	31	0.9
3	September 15	\$1,698 a	\$61 b	7371 b	250 c	29.4 c	17.8 c	92.6 bc	122.7	26	0.4
5	October 15	\$1,625 a	\$51 c	9989 a	287 ab	34.9 a	19.6 ab	94.2 a	122.8	24	0.4
6	November 1	\$1,171 b	\$43 d	9371 a	274 b	34.2 ab	18.6 bc	94.8 a	123.9	17	0.0
Average		\$1,612	\$59	58	7792	253.6	30.3	17.8	128.4	28	0.5
LSD 5%		253.8	5.8	5.9	1080.1	20.5	4.3	1.3	37.2		
CV %		10.4	6.5	6.6	9.1	5.3	9.4	4.8	19.2		

***GDD** (Growing Degree Days): an average daily amount for the 2 weeks prior to that harvest date.

***Rain Inch:** Actual rainfall amount including 2 weeks prior to the planting date.

Comments: This trial had emergence issues resulting in a thinner than desired stand. Dry conditions throughout the season also impacted yield potential. In September yield was stagnant, but October rains boosted yield on later dates. Sugar content was the highest near the end of the dry period on October 1st.

Net \$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment and a trial average RWST.

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

Population Trial - 22 Inch Rows

Gardner Farms, Croswell - 2017

Trial Quality: Fair	Soil Info: Loam	Rhizoc Control: Good control: Quadris I.F. & 8 leaf
Variety: C-RR059	Fertilizer: PPI: 19 gal of 28%; 2x2: 15 gal of 10-34-0; S.D.: 20 gal of 28%	Cerc Control: Fair Control: 1. Proline, 2. Gem + EBDC, 3. Inspire, 4. Super Tin
Planted: April 29		
Harv/Samp: Oct 13 / Oct 12		
Plot Size: 2 reps	Prev Crop: Soybeans	
Row Spacing: 22 inch	Weather: Good all season, except for crust at emergence	Other Pests: Late season leaf diseases
Seeding Rate: See treatments		

Treatment	\$/A	RWSA	RWST	T/A	% Sugar	% CJP	Population 100 Ft. 42 Days
71,000	\$1,642	9326	309	30.2	20.7	94.8	176
65,000	\$1,608	9275	312	29.3	21.0	94.7	164
59,000	\$1,525	8665	291	29.7	19.8	94.4	150
Average	\$1,592	9089	304	29.8	20.5	94.6	163
LSD 5%	—	ns	ns	ns	ns	ns	ns
CV %	—	—	—	—	—	—	—

Comments: USE DATA WITH CAUTION. Only 2 reps were able to be used for data. Trial was originally set up as 3 replications, but yields in 1 rep were not consistent. Previous research has found that emerged populations between 175 and 225 beets per 100 foot usually provide the best combination of yield and quality. Emergence in this trial were lower than normal due to soil crusting after planting. Emerged populations were about 60% of the planted populations. Typically, emerged populations usually range from 65-80%. Lower than normal emergence may be the reason the highest population performed the best. Note that 75% emergence in 22" rows would be about 224, 205, and 186 emerged plants per 100 foot of row for planting populations of 71000, 65000, and 59000, respectively.

\$/A: Gross payment unless noted as net. Calculated assuming a \$40 payment, a company average RWST of 275, and early delivery premium.

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



Determine the Number of Days and Growing Degree Days for Sugarbeets to Reach Row Closure

Average of 24 Trials (2015, 2016, 2017)

(Page 1 of 6)

No.	Treatment	Avg. Plant	GDD Accum	GDD	Days Accum	Days	% Emerg	Soil Temp	Soil Moisture	Rain
1	Planted	25-Apr	0	0	0	0	0	50	86	0.9
2	Early Emergence	7-May	196	195	12	12	21	52	91	1.3
3	Small Cotyledon	10-May	250	56	15	3	44	55	88	0.2
4	Cotyledon	13-May	317	65	18	3	59	58	86	0.4
5	Cotyl - 2 Leaf	17-May	386	70	22	4	62	58	83	0.3
6	2 Leaf	20-May	474	88	26	4	62	60	82	0.2
7	2 - 4 Leaf	24-May	569	97	29	4	63	62	85	0.4
8	4 Leaf	29-May	668	98	33	5	63	63	81	0.3
9	4 - 6 Leaf	31-May	767	99	36	3	63	63	84	0.5
10	6 Leaf	4-Jun	862	127	39	4	63	64	81	0.1
11	8 Leaf	9-Jun	994	133	43	4	63	66	80	0.4
12	10 Leaf	13-Jun	1124	131	48	4	63	67	81	0.6
13	12 Leaf	17-Jun	1258	134	52	4	63	69	87	1.3
14	14 Leaf	21-Jun	1378	120	56	4	63	69	85	0.7
15	16 Leaf	24-Jun	1496	118	60	4	62	70	82	0.6
16	18 Leaf	28-Jun	1611	114	63	3	62	71	79	0.3
17	20 Leaf (Full Canopy)	30-Jun	1716	106	66	3	62	72	81	0.2
Average			827.3	103.1	36.2	3.9	55.2	63.0	83.7	0.5
LSD 5%			38.4	18.3	1.6	0.5	3.2	2.6	5.3	0.4
CV%			4.7	17.9	4.4	13.3	5.9	4.2	6.4	70.6

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Growing Degree Days (Base 34): Began counting at planting date.

GDD: Growing Degree Days for each growth stage, **GDD Accum:** Growing Degree Days Accumulating

Soil Temp: Degrees F at 2-4 inches.

Soil Moisture: % of Field Capacity (0-4 inches). **50% FC:** Dry surface, moist at 1 inch;

60-70% FC: moist at 1/2 inch; **80-90% FC:** Surface mostly dry, moisture just below soil surface;

95-100% FC: Surface wet, no standing water.

Rain: Amount of rain in inches for each growth stage period.

Comments: Growing Degree Days (GDD) base 34 values were determined for sugarbeet growth stages from early emergence until canopy closure. The number of days to reach each growth stage were also determined. The average planting date was April 25th. For the most part, weather was favorable for sugarbeet growth in the trials. However, some trials experienced unfavorable conditions such as dry soil, crusting, and/or flooding. On average it took 12 days for sugarbeets to emerge and 66 days to achieve full canopy. The quickest site to emerge took only 6 days and the longest took 18 days. On average it took 195 GDD for sugarbeets to emerge and 1716 GDD to reach full canopy. The trials received around 8 inches of rain from 10 days before planting until row closure, or about 0.7 inches per week. This information is considered to be accurate, however, any one field could vary considerably from these findings. The most common soil type was sandy clay loam, however, there were also sandy loams, silt loams and clay loams. These were good quality soils, the average soil organic matter content, soil pH and CEC was 3%, 7.3 and 12.5, respectively. Thirty five pounds of nitrogen was applied 2X2 at planting.



Determine the Number of Days and Growing Degree Days for Sugarbeets to Reach Row Closure

Average of 8 Trials in 2017

(Page 2 of 6)

Trial Quality: Good

Soil Info: Sandy Loam to Clay Loam

Disease Control: Good

Variety: Several

OM: 2.9%; **pH:** 7.3; **CEC:** 11.9

Problems: Crusting, flooding, drought

Planted: Apr 27 (Avg of 8)

Nutrients: Favorable

Rainfall: ~ 1.0 inch / week

Plot Size: 4 rows X 20 ft, 4 reps

Added N: ~ 100 lbs, (35 lb 2X2)

Previous Crops: Corn, Soys, Wheat

No.	Treatment	Plant	GDD Accum	GDD	Days Accum	Days	% Emerg	Soil Temp	Soil Moisture	Rain
1	Planted	27-Apr	0	0	0	0	0.0	52	87	1.2
2	Early Emergence	11-May	204	204	14	14	24	54	92	1.6
3	Small Cotyledon	14-May	266	62	17	4	52	54	88	0.3
4	Cotyledon	17-May	353	88	21	3	58	60	84	0.2
5	Cotyl - 2 Leaf	21-May	435	82	24	4	61	56	85	0.3
6	2 Leaf	25-May	538	103	29	4	62	59	86	0.4
7	2 - 4 Leaf	29-May	646	108	32	4	63	61	87	0.2
8	4 Leaf	1-Jun	740	94	36	3	63	62	84	0.3
9	4 - 6 Leaf	4-Jun	842	105	39	3	63	64	84	0.2
10	6 Leaf	7-Jun	944	102	42	3	62	67	81	0.1
11	8 Leaf	11-Jun	1086	142	46	4	62	68	84	0.8
12	10 Leaf	16-Jun	1243	158	51	4	63	71	88	1.3
13	12 Leaf	20-Jun	1399	156	56	4	63	70	91	1.6
14	14 Leaf	24-Jun	1514	116	60	4	63	69	90	1.4
15	16 Leaf	27-Jun	1632	118	64	4	62	70	85	1.2
16	18 Leaf	30-Jun	1741	107	67	3	63	71	81	0.6
17	20 Leaf (Full Canopy)	3-Jul	1833	94	69	3	62	74	84	0.3

Average	906.7	108.0	39.1	4.0	55.7	63.7	85.9	0.7
LSD 5%	47.1	31.0	3.1	1.2	4.9	3.7	9.3	0.9
CV%	5.2	29.0	8.1	29.8	8.8	5.8	10.9	136.2

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Growing Degree Days (Base 34): Began counting at planting date.

GDD: Growing Degree Days for each growth stage, **GDD Accum:** Growing Degree Days Accumulating

Soil Temp: Degrees F at 2-4 inches.

Soil Moisture: % of Field Capacity (0-4 inches). **50% FC:** Dry surface, moist at 1 inch;

60-70% FC: moist at 1/2 inch; **80-90% FC:** Surface mostly dry, moisture just below soil surface;

95-100% FC: Surface wet, no standing water.

Rain: Amount of rain in inches for each growth stage period; Avg. 1 inch per week.



Determine the Number of Days and Growing Degree Days for Sugarbeets to Reach Row Closure

Average of 8 Trials in 2016

(Page 3 of 6)

Trial Quality: Good

Soil Info: Sandy Loam to Silt Loam

Disease Control: Good

Variety: Several

OM: 2.9% **pH:** 7.1 **CEC:** 12.4

Problems: Crusting, flooding, drought

Planted: Apr 26 (Avg of 8)

Nutrients: Favorable

Rainfall: ~ 0.5 inches / week

Plot Size: 4 rows X 20 ft, 4 reps

Added N: ~ 100 lbs, (35 lbs 2X2)

Previous Crops: Corn, Soys, Wheat

No.	Treatment	Plant	GDD Accum	GDD	Days Accum	Days	% Emerg	Soil Temp	Soil Moisture	Rain
1	Planted	26-Apr	0	0	0	0	0	51	83	0.5
2	Early Emergence	8-May	150	150	12	12	17	53	89	1.0
3	Small Cotyledon	11-May	203	53	16	3	35	58	91	0.5
4	Cotyledon	15-May	267	65	19	4	56	60	86	0.1
5	Cotyl - 2 Leaf	18-May	331	63	22	3	62	61	84	0.5
6	2 Leaf	21-May	404	73	26	3	63	62	85	0.0
7	2 - 4 Leaf	24-May	491	87	29	3	65	65	77	0.1
8	4 Leaf	28-May	602	111	33	4	65	67	78	0.3
9	4 - 6 Leaf	31-May	704	101	35	3	65	64	76	0.2
10	6 Leaf	3-Jun	802	99	38	3	66	64	81	0.2
11	8 Leaf	6-Jun	914	114	42	4	66	67	71	0.1
12	10 Leaf	10-Jun	1020	106	46	4	66	64	79	0.3
13	12 Leaf	14-Jun	1146	126	51	4	66	70	75	0.3
14	14 Leaf	18-Jun	1268	123	54	3	64	69	78	0.4
15	16 Leaf	21-Jun	1378	109	57	3	64	73	73	0.3
16	18 Leaf	24-Jun	1485	108	60	3	64	71	77	0.2
17	20 Leaf (Full Canopy)	27-Jun	1596	111	64	3	63	70	75	0.1

Average	750.6	94.0	35.5	3.7	55.7	64.0	79.9	0.3
LSD 5%	79.7	27.0	2.1	1.0	6.5	6.4	11.4	0.4
CV %	10.7	29.0	5.9	27.7	11.8	10.1	14.5	144.2

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Growing Degree Days (Base 34): Began counting at planting date.

GDD: Growing Degree Days for each growth stage, **GDD Accum:** Growing Degree Days Accumulating

Soil Temp: Degrees F at 2-4 inches.

Soil Moisture: % of Field Capacity (0-4 inches). **50% FC:** Dry surface, moist at 1 inch; **60-70% FC:** moist at 1/2 inch

80-90% FC: Surface mostly dry, moisture just below soil surface. **95-100% FC:** Surface wet, no standing water.

Rain: Amount of rain in inches for each growth stage period; Avg. 0.5 inches per week.



Determine the Number of Days and Growing Degree Days for Sugarbeets to Reach Row Closure

Average of 8 Trials in 2015

(Page 4 of 6)

Trial Quality: Good

Variety: Several

Planted: Apr 22 (Avg of 8)

Plot Size: 4 rows X 20 ft, 4 reps

Previous Crops: Corn, Soys, Wheat

Soil Info: Sandy Loam to Clay Loam

OM: 3.3%; **pH:** 7.4; **CEC:** 13.2

Nutrients: Favorable

Added N: ~ 100 lbs, (35 lbs 2X2)

Disease Control: Good

Problems: Crusting, flooding, drought

Rainfall: ~ 0.8 inches / week

No.	Treatment	Plant	GDD Accum	GDD	Days Accum	Days	% Emerg	Soil Temp	Soil Moisture	Rain
1	Planted	22-Apr	0	0	0	0	0	47	89	1.0
2	Early Emergence	1-May	236	232	9	9	21	50	93	1.2
3	Small Cotyledon	5-May	282	52	12	4	45	53	85	0.0
4	Cotyledon	7-May	329	44	14	3	61	55	88	0.8
5	Cotyl - 2 Leaf	12-May	392	66	18	4	61	58	81	0.2
6	2 Leaf	16-May	481	89	22	4	61	60	74	0.1
7	2 - 4 Leaf	20-May	571	97	26	4	62	61	90	1.0
8	4 Leaf	26-May	661	90	31	7	61	62	82	0.3
9	4 - 6 Leaf	29-May	754	92	34	3	62	62	93	1.1
10	6 Leaf	4-Jun	838	181	36	6	61	63	82	0.0
11	8 Leaf	9-Jun	981	142	41	5	61	64	85	0.2
12	10 Leaf	13-Jun	1109	129	46	5	61	65	76	0.0
13	12 Leaf	17-Jun	1231	121	51	4	61	66	95	2.0
14	14 Leaf	21-Jun	1352	121	55	4	61	68	88	0.3
15	16 Leaf	25-Jun	1479	128	58	4	61	68	88	0.3
16	18 Leaf	29-Jun	1606	127	62	4	60	70	78	0.0
17	20 Leaf (Full Canopy)	2-Jul	1721	115	65	3	60	72	84	0.3

Average	824.8	107.4	34.0	4.2	54.0	61.4	85.3	0.5
LSD 5%	86.3	37.6	2.7	1.0	1.8	0.1	2.5	0.1
CV%	10.6	35.3	8.0	24.5	3.3	0.1	2.9	18.4

Means followed by the same letter are not significantly different. Duncans New MRT 5%.

Growing Degree Days (Base 34): Began counting at planting date.

GDD: Growing Degree Days for each growth stage, **GDD Accum:** Growing Degree Days Accumulating

Soil Temp: Degrees F at 2-4 inches.

Soil Moisture: % of Field Capacity (0-4 inches). **50% FC:** Dry surface, moist at 1 inch; **60-70% FC:** moist at 1/2 inch

80-90% FC: Surface mostly dry, moisture just below soil surface. **95-100% FC:** Surface wet, no standing water.

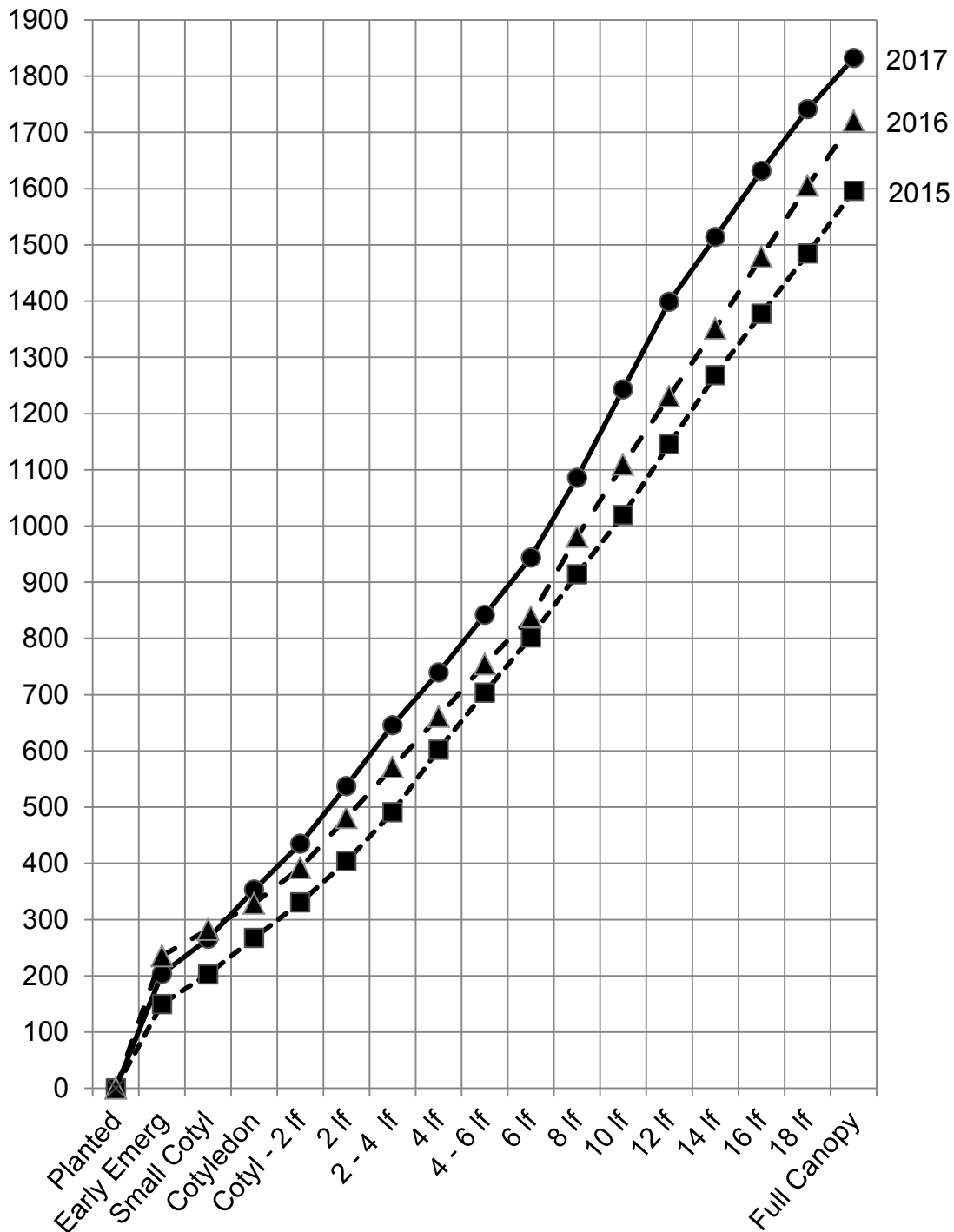
Rain: Amount of rain in inches for each growth stage period; Avg. 0.8 inches per week.



Determine the Number of Days and Growing Degree Days for Sugarbeets to Reach Row Closure
Average of 8 Trials / Year (2015, 2016, 2017)

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GDD

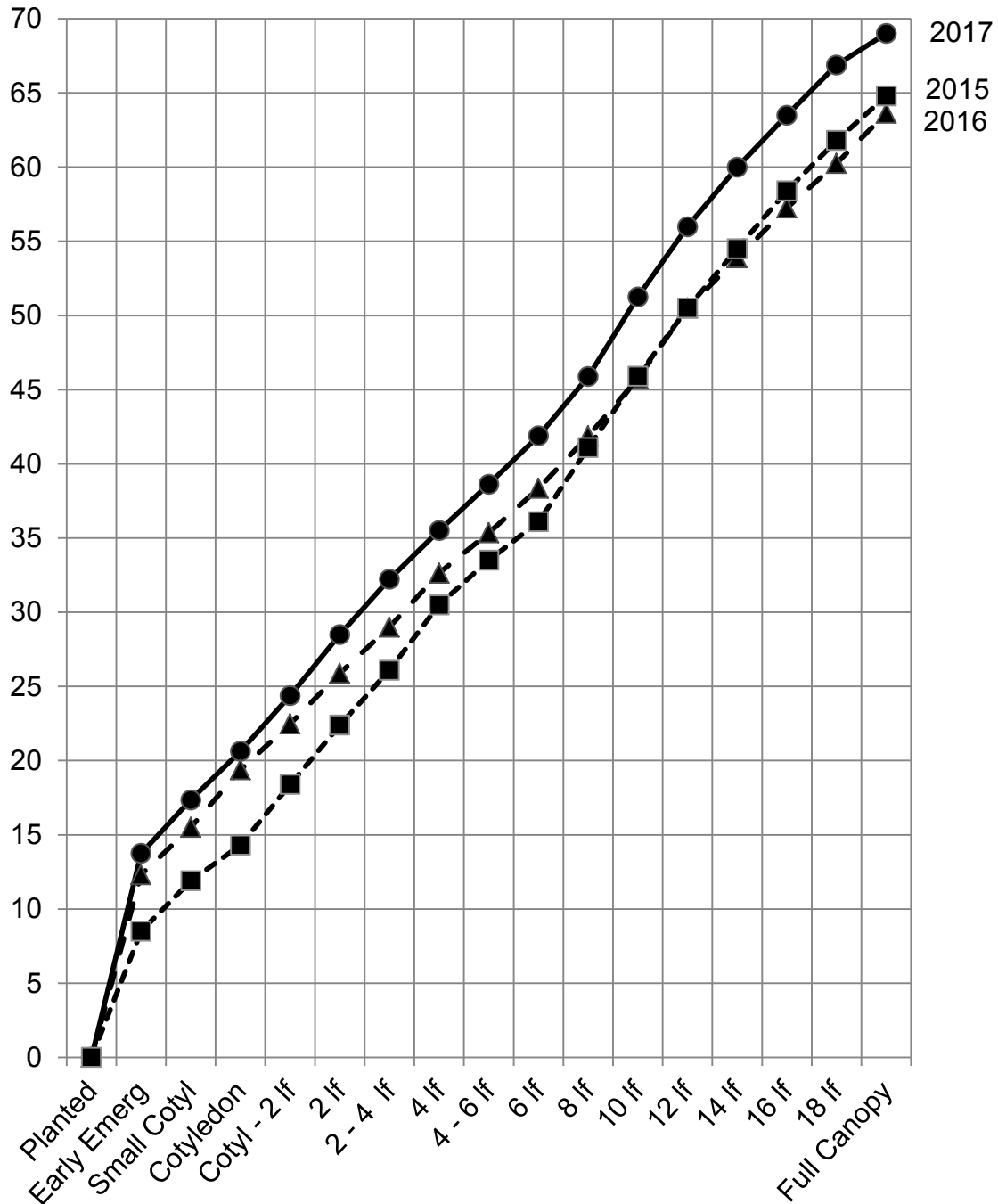




Determine the Number of Days and Growing Degree Days for Sugarbeets to Reach Row Closure
Average of 8 Trials / Year (2015, 2016, 2017)

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Days After
Planting



Sugar beet activities of the USDA-ARS East Lansing conducted in cooperation with Saginaw Research & Extension Center during 2017

Mitch McGrath, Linda Hanson, Tom Goodwill, and Holly Corder

Evaluation and rating plots were planted at the Saginaw Valley Research & Extension Center (SVREC) in Frankenmuth, MI in 2017 that focused on *Cercospora* leaf spot (CLS) and *Rhizoctonia* crown and root rot (CRR) disease performance of a wide range of *Beta vulgaris* materials. CLS and CRR trials were conducted in conjunction with the Beet Sugar Development Foundation (BSDF) and CLS trials included USDA-ARS cooperator germplasm as well as germplasm screening for the National Plant Germplasm System. All trials were planted following normal fall and spring tillage operations with a USDA-ARS modified John Deere / Almaco research plot planter. Plots were 15 ft long planted on 20 in rows. Weeds were controlled by a pre-plant application of ethofumesate, followed by intervals of post-plant mixtures of phenmedipham, desmedipham, triflurosulfuron methyl, and clopyralid (4 times), and finally with S-metolachlor. Hand weeding was done as needed to control larger weeds. We thank farm management and Michigan Sugar for their generous assistance in thinning and agronomic evaluations. Only two experiments are reported here in the interest in conserving words and engaging the attention of sugar beet growers.

Two genetic Recombinant Inbred (RI) populations were examined for sugars, the HSB6 population which is derived from a cross between C869 (moderate sugar) and L19 (high sugar) and the AYA6 population which was derived from a cross between C869 and wild beet (low sugar) (Table 1). A great deal of variability was observed among the RI lines, and since each one of these lines is genetically fixed, differences relate to their genetic performance in a common environment. These populations will be used to identify genes influencing sucrose content via modern genetic methods. Values measured are in line with expectations, with mean sucrose values of both RI lines showing a wide range of values.

Table 1: Summary statistics for RI lines constructed to deduce the genetics of sucrose content in beets.

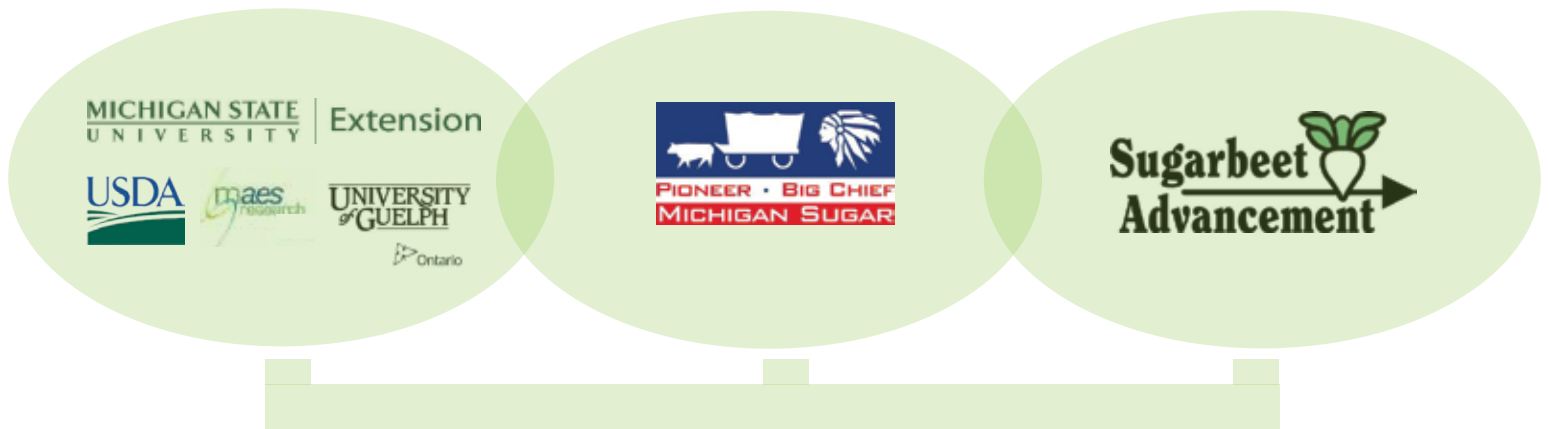
Population	Rows	Sucrose (NIR)	sd.dev.	range
AYA6	178	17.21	2.33	15.15
C869/CMS	10	16.12	0.99	3.06
HSB6	221	18.25	1.71	8.39
L19/2-ib	5	21.33	1.16	2.53

Agronomic observation of a wide range of previous East Lansing releases and candidate releases was done in support of efforts to understand genetic diversity as related to performance (Table 2). Genome sequencing of most of these entries is in progress, with assistance of the Beet Sugar Development Foundation members. Also included were representatives of beet crop types (fodder, table, and chard). Stand was generally excellent on the comparatively sandy soils where the trial was conducted. Results conformed to expectations with the lowest sugars and yield among the table beet materials, low sugar but higher yield among fodder beet accessions, higher sugar but low yield in chards, and higher sugar and yield among sugar beets. Direct plot weights are reported. Legacy sugar beet materials (generally indicated by a lower EL- or SR-prefaced name in Table 4) were generally lower in sucrose.

Table 2: Agronomic evaluation of previous East Lansing germplasm releases, potential germplasm releases, and crop types. Bold is not significantly different from the best.

Entry	Accession	Name	Weight(lbs)	Purity(NIR)	Sucrose(NIR)
978	EL-A024969	SR101	19.33	95.66	18.50
985	EL-A012189	SR96	18.67	95.30	18.18
951	EL-A1402159	NICStorage&SRRhiz(Grp7&8)	16.67	95.79	17.92
908	EL-A012200	EL52	12.67	94.22	17.63
983	EL-A012172	SR94	18.67	95.37	17.56
963	EL-A021482	EL50/2	8.00	94.97	17.46
1007	EL-A010286	SP85100	16.00	94.72	17.26
968	EL-A012174	SR97	17.33	94.77	17.14
909	EL-A013523	EL53(2)	23.33	95.79	17.09
974	EL-A12-00002	SF"B3"	12.67	95.91	16.69
1009	EL-A010292	SP85550	20.00	94.53	16.62
954	EL-A1402163	NematodeStorage&CercyRhizoc	15.33	95.62	16.60
919	EL-A027007	EL63	16.67	95.97	16.45
1017	EL-A024953	SR98&Cerc(not inoculated)	18.00	95.31	16.34
907	EL-A12-00030	EL51	8.67	94.84	16.30
988	EL-A024983	SR99	15.33	95.21	16.16
987	EL-A027149	SR98x	16.67	94.40	16.11
984	EL-A012168	SR95	18.00	96.53	16.10
887	EL-A15-00006	SR102	20.67	95.01	16.02
980	EL-A012187	SR80	28.67	95.92	15.95
916	EL-A021740	EL60	28.67	96.12	15.94
962	EL-A027152	SR100	22.00	94.34	15.90
E17	E17	E17(legacy&commercial hybrid)	18.67	93.95	15.90
981	EL-A012148	SR87	20.67	96.03	15.83
958	EL-A022776	EL64, & EL63	8.00	95.65	15.77
933	EL-A15-00005	storage	20.67	95.24	15.74
952	EL-A1402161	NICNematode&Sucrose group	19.33	94.80	15.74
940	EL-A16-00016	(entryFC16)-(BestFC&LSR&BestEL&LSR)...	39.33	95.24	15.70
925	EL-A029687	SF"B2"	16.00	94.50	15.64
914	EL-A022775	EL58	15.33	97.40	15.61
910	EL-A021483	EL54HerolM-fertile	11.33	97.07	15.52
961	EL-A029770	EL62	12.00	95.66	15.47
923	EL-A012858	EL0204	20.67	95.96	15.31
924	EL-A029686	SF"A"	8.67	95.35	15.24
915	EL-A029768	EL59	9.33	94.99	15.23
911	EL-A013698	EL5577OldSeed"	12.00	96.04	15.19
921	EL-A027017	EL65	16.67	95.94	15.15
1017	EL-A024953	SR98&Cerc(seedling Rhizoc inoc)	20.67	94.29	15.13
922	EL-A027143	EL66	16.67	95.54	15.10
996	EL-A022662	C37	13.33	93.79	14.95
917	EL-A029769	EL61	12.67	95.28	14.72
982	EL-A012191	SR93	22.67	95.44	14.66
904	EL-A012181	EL48	12.00	94.40	14.58
965	EL-A015030	SP7322	32.67	93.72	14.43
913	EL-A022809	EL57, SF&Mixer7B"	11.33	94.47	14.24
997	EL-A009913	L19(1992)	8.67	90.36	14.18
899	EL-A010299	EL42	8.67	95.10	13.49
1012	EL-A029004	M1-3	18.67	93.42	12.81
1016	EL-A024967	storage&Selections	12.00	92.63	12.14
912	EL-A022799	EL56	7.33	93.26	10.90
1018	EL-A011917	LUCULLUS&Swiss&chard	7.33	86.71	10.13
995		Ruby&Queen&table&beet	2.00	89.44	9.38
989	EL-A1402169	Rhubarb&Swiss&chard	8.00	80.05	8.06
994	EL-A1400588	W357B&table&beet	2.00	82.73	7.77
1019	EL-A011928	MAMMOTH&RED&fodder&beet	17.33	90.81	6.29
993	EL-A16-00011	Wintergold&fodder&beet	16.67	90.01	6.17
Burpee		Detroit&Dark&Red&table&beet	4.67	87.59	5.84
	mean		16.00	94.01	14.72
	FValue		11.63***	11.21***	11.19***
	LSD@.05		6.02	2.72	2.56

PRESENTED IN PARTNERSHIP





Michigan Sugar Company
122 Uptown Drive, Suite 300
Bay City, MI 48708

RETURN SERVICE REQUESTED

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