MICHIGAN SUGARBEET

REACh

Research & Education Advisory Council

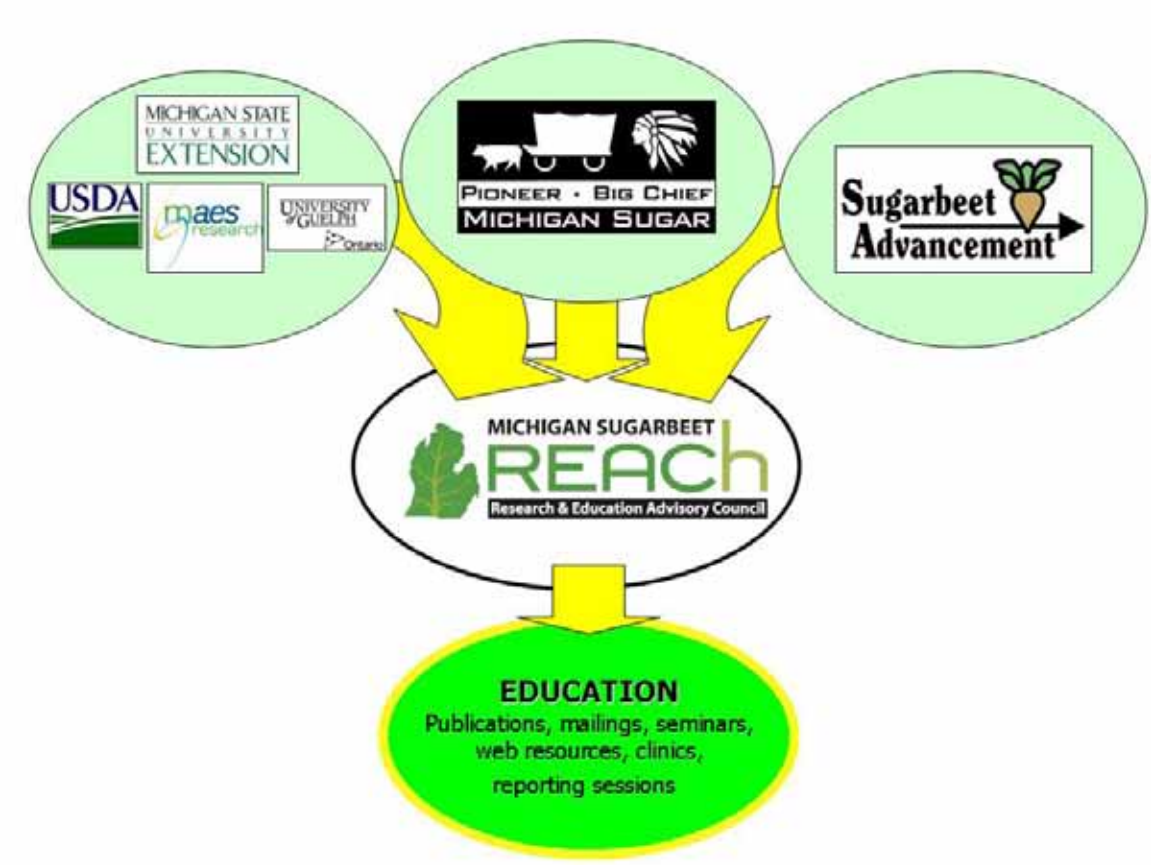
2010 Research Results

MISSION STATEMENT

The mission of
The Michigan Sugarbeet Research and 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 shareholders.



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MICHIGAN SUGARBEET REACh
Research & Education Advisory Council

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Summary of Narrow Row Trials

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Row spacing trials conducted in 2009 showed that sugarbeet yields were increased by 2.9 tons per acre when grown in narrow rows, however, sugar and purity levels were not increased. Research conducted by Sugarbeet Advancement and Michigan State University have reported similar yield results with increases in crop quality in narrow rows.

Trials were conducted in 2010 at two locations to evaluate sugarbeet production in narrow rows (22 inches) compared to sugarbeets grown in wide rows (30 inches). Beet populations of 15, 20, 25, 30, 40 and 50 thousand plants per acre were established for both row spacing. The trials were planted heavy and thinned to the appropriate populations at the 4 leaf stage. The plots were 6 rows wide and 38 feet long with 6 replications. A disease tolerant variety, HM 27RR, was utilized to reduce the risk of disease problems.

Sugarbeet yields increased by 3.4 tons/A at the Sandusky location and by 3.3 tons/A at the Kawkawlin site when grown in narrow rows. Sugar levels were 0.6 points higher at Sandusky and 0.3 points higher at Kawkawlin in the narrow row plots. There was a substantial increase in grower income in the narrow row plots ($263 per acre at Sandusky and $186 per acre at Kawkawlin) when compared to wide row plots.

Sugarbeet populations had a definite effect on sugarbeet yields and quality. In 22 inch row plots 50,000 beets per acre (210 beets/100 row ft) yielded the highest and populations of 30,000 to 40,000 (172 to 230 beets/100 row ft) were best in wide row plots. It appeared that 50,000 beets (287 beets/100 row ft) is too high of a population for 30 inch rows. Sugar and quality levels improved proportionally as sugarbeet populations increased.

There was a relationship between row spacing and canopy development. At Sandusky the 22 inch row plots achieve an average of 96 percent canopy closure compared to 82 percent for 30 inch row plots. At Kawkawlin canopy growth was less vigorous, however, the 22 inch row plots achieved 86 percent canopy closure compared to 69 percent for the 30 inch row plots. HM 27 is a small canopy variety. With respect to disease levels, there did not appear to be a difference between the 22 and 30 inch row treatments. Quadris was applied at both locations and three Cercospora applications were made. Neither site had disease problems. Nematodes were present at Kawkawlin.

	Sandusky	Kawkawlin
Planting Dates:	April 16th	April 21st
Harvest Dates:	Oct 16th	Sept 30th
Fertility:	Good	Good
Rainfall:	17.8 inches	16.1 inches
Soil Type:	Sandy Clay Loam	Sandy Clay Loam
Cooperator:	Stoutenburg	Schwab

Narrow Row Research

Evaluate Row Spacing and Sugarbeet Populations

Average of 2 Locations

Row Spacing	Beets/ Acre	Beets/ 100 ft	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close
22 inch	50000	211	$1,890	8318	249	33.3	17.3	93.9	92
22 inch	40000	168	$1,841	8103	254	32.0	17.4	94.4	89
22 inch	30000	126	$1,780	7835	248	31.6	17.4	93.6	88
22 inch	25000	105	$1,736	7643	243	31.4	17.0	93.7	90
22 inch	20000	84	$1,736	7640	240	31.9	16.9	93.3	88
30 inch	40000	230	$1,576	6937	245	28.4	16.9	94.4	73
30 inch	50000	287	$1,564	6883	249	27.7	17.1	94.5	75
30 inch	30000	172	$1,542	6787	238	28.7	16.6	93.9	73
30 inch	25000	143	$1,540	6777	240	28.4	16.8	93.8	73
22 inch	15000	63	$1,524	6709	233	28.7	16.7	92.7	84
30 inch	20000	115	$1,468	6464	232	27.9	16.5	93.1	73
30 inch	15000	86	$1,444	6355	232	27.5	16.2	93.8	70
Mean			$1,637	7204	242.0	29.8	16.9	93.8	80.5
LSD 5%			$120	526.9	9.9	2.0	0.5	0.6	4.0
CV%			$9	9.1	5.1	8.4	3.9	0.8	6.2

Row Spacing Effect (All Populations Combined)

Row Spacing	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close
22 inch	$1,751	7708	245	31.5	17.1	93.6	88
30 inch	$1,522	6701	239	28.1	16.7	93.9	73
LSD 5%	$49	214.6	4.0	0.8	0.2	0.3	1.7

Population Effect (Average of both Row Spacings)

Beets / Acre	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close
50000	$1,727	7601	249	30.5	17.2	94.2	83
40000	$1,708	7520	249	30.2	17.1	94.4	81
30000	$1,661	7311	243	30.1	17.0	93.7	80
25000	$1,638	7210	242	29.9	16.9	93.7	82
20000	$1,602	7052	236	29.9	16.7	93.2	80
15000	$1,484	6532	232	28.1	16.4	93.3	77
LSD 5%	$84	371.7	7.0	1.4	0.4	0.5	2.9

Narrow Row Research

Evaluate Row Spacing and Sugarbeet Populations

Sandusky, MI - 2010

Trial Reliability: Good

Row Spacing	Beets / Acre	Beets / 100 ft	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close 16-Jun	% Row Close 15-Jul
22 inch	50000	211	$2,070	9204	253	36.3	17.4	94.5	84	98
22 inch	40000	168	$2,062	9166	256	35.9	17.2	95.4	86	98
22 inch	30000	126	$1,955	8691	256	34.0	17.4	94.7	85	97
22 inch	20000	84	$1,910	8491	247	34.5	17.0	94.2	80	95
22 inch	25000	105	$1,885	8379	246	34.1	16.8	94.9	81	97
30 inch	40000	230	$1,761	7827	249	31.4	16.9	95.0	71	86
22 inch	15000	63	$1,738	7725	240	32.1	16.8	93.7	78	92
30 inch	25000	143	$1,712	7608	239	31.8	16.4	94.5	68	83
30 inch	50000	287	$1,711	7608	247	30.7	16.8	95.2	70	83
30 inch	30000	172	$1,640	7292	236	30.9	16.3	94.4	68	82
30 inch	20000	115	$1,624	7217	231	31.3	16.3	93.5	68	81
30 inch	15000	86	$1,599	7109	235	30.3	19.2	94.5	65	80
Mean			$1,806	8027	244.5	32.8	16.8	94.5	75.4	89.2
LSD 5%			$152	694.7	12.9	1.8	0.8	0.7	6.0	4.0
CV %			$7	7.4	4.5	4.7	4.0	0.6	6.6	4.0

Row Spacing Effect (All Populations Combined)

Row Spacing	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close 16-Jun	% Row Close 15-Jul
22 inch rows	$1,937	8609	250	34.5	17.1	94.6	82	96
30 inch rows	$1,675	7444	239	31.1	16.5	94.5	68	82
LSD 5%	$62	273.0	5.1	0.7	0.3	0.3	2.5	1.6

Population Effect (Average of both Row Spacings)

Beets/Acre	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close 16-Jun	% Row Close 15-Jul
40000	$1,911	8497	252	33.7	17.1	95.2	78	92
50000	$1,891	8406	250	33.5	17.1	94.8	76	91
25000	$1,798	7994	242	32.9	16.6	94.7	75	90
30000	$1,797	7992	246	32.5	16.9	94.5	76	89
20000	$1,767	7854	239	32.9	16.7	93.8	74	88
15000	$1,668	7417	238	31.2	16.5	94.1	72	86
LSD 5%	$107	473.0	8.9	1.2	0.5	0.5	4.2	2.8

Narrow Row Research

Evaluate Row Spacing and Sugarbeet Populations

Kawkawlin, MI - 2010

Trial Reliability: Fair-Good

Row Spacing	Beets/ Acre	Beets/ 100 ft	$/ Acre	RWSA	RWST	Tons/ Acre	% Sug	% CJP	%Row Close	Cerc 0-9	Rhizoc/ 100 ft
22 inch	50000	211	$1,705	7438	248	30.1	17.5	93.2	89	2.1	1.5
22 inch	40000	168	$1,613	7039	252	28.1	17.6	93.5	83	1.9	1.7
22 inch	30000	126	$1,599	6979	241	29.2	17.3	92.5	85	1.8	0.7
22 inch	25000	105	$1,583	6906	241	28.7	17.3	92.6	88	1.8	1.2
22 inch	20000	84	$1,556	6788	233	29.3	16.8	92.4	86	1.5	1.2
30 inch	30000	172	$1,456	6352	241	26.7	16.9	93.5	69	1.8	0.8
30 inch	50000	287	$1,411	6157	252	24.7	17.4	93.9	71	1.9	2.3
30 inch	40000	230	$1,386	6048	241	25.3	16.8	93.7	68	1.9	0.5
30 inch	25000	143	$1,363	5945	241	24.9	17.1	93.0	70	1.9	0.7
30 inch	20000	115	$1,309	5710	233	24.6	16.7	92.7	68	1.5	0.8
22 inch	15000	63	$1,305	5693	226	25.3	16.5	91.8	84	1.5	1.0
30 inch	15000	86	$1,289	5623	229	24.7	16.3	93.1	67	1.5	1.4
Mean			$1,464	6390	239.8	26.8	17.0	93.0	77.4	1.8	1.1
LSD 5%			$198	856.1	16.2	3.8	0.8	1.1	6.9	0.5	1.9
CV%			$12	11.5	5.7	12.3	3.9	1.0	7.6	24.0	na

Row Spacing Effect (All Populations Combined)

Row Spacing	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	%Row Close	Cerc 0-9	Rhizoc/ 100 ft
22 inch	$1,560	6808	240	28.5	17.2	92.7	86	1.8	1.2
30 inch	$1,369	5973	240	25.2	16.9	93.3	69	1.8	1.1
LSD 5%	$80	346.8	6.3	1.6	0.3	0.4	2.7	0.2	0.8

Population Effect (Average of both Row Spacings)

Beets / Acre	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	%Row Close	Cerc 0-9	Rhizoc/ 100 ft
50000	$1,558	6798	250	27.4	17.5	93.6	80	2.0	1.9
30000	$1,528	6666	241	27.9	17.1	93.0	77	1.8	0.7
40000	$1,500	6544	247	26.7	17.2	93.6	76	1.9	1.1
25000	$1,473	6426	241	26.8	17.2	92.8	79	1.9	0.9
20000	$1,432	6249	233	27.0	16.7	92.6	77	1.5	1.0
15000	$1,297	5658	227	25.0	16.4	92.5	75	1.5	1.2
LSD 5%	$138	600.6	10.9	2.7	0.5	0.8	4.8	0.34	1.3

Narrow Row Research*

Evaluate Row Spacing and Variety Canopy Size

Sandusky, MI - 2010

Trial Reliability: Good

Row Spacing	Beets / Variety	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close	Dead Beets
22 inch	C 827	$2,054	9544	278	34.3	19.1	94.1	98	0.6
30 inch	C 827	$1,919	8920	277	32.2	18.9	94.3	80	0.7
22 inch	HM 27	$1,592	7400	241	30.6	16.7	94.2	95	0.1
30 inch	HM 27	$1,462	6795	233	29.2	16.1	94.3	76	0.0
Mean		$1,757	8165	257.4	31.6	17.7	94.3	87.4	0.3
LSD 5%		$77	356.6	5.2	1.1	0.4	0.4	3.0	0.5
CV %		$7	6.5	3.0	5.2	2.9	0.6	3.6	na

Row Spacing Effect (All Populations Combined)

Row Spacing	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	% Row Close	Dead Beets
22 inch rows	$1,823	8472	260	32.45	17.89	94.2	97	0.3
30 inch rows	$1,691	7858	255	30.67	17.53	94.3	78	0.3
LSD 5%	$33	153.2	2.8	0.6	0.2	0.3	1.8	0.4

Variety Effect (Average of both Row Spacings)

Variety**	$/ Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	%Row Close	Dead Beets
Crystal RR827	$1,986	9232	278	33.24	19.00	94.2	89	0.6
HM 27RR	$1,527	7097	237	29.90	16.40	94.2	86	0.1
LSD 5%	$57	266.6	3.7	0.8	0.3	0.2	1.5	0.2

* This was a separate trial from the previous pages comparing two varieties over populations.

** Use of these varieties is subject to them being lawful to purchase, receive, distribute and plant.

Summary

This trial was established to measure weed growth and development in narrow rows compared to wide rows and between large and small canopy varieties. The plot was oversprayed with Roundup by mistake and weed control differences could not be evaluated but yield and quality differences were obtained. The 22 inch row plots out yielded the 30 inch row plots by 1.8 tons per acre and had 0.35 points higher sugar. The planting/harvest dates, rainfall and soil information is the same as the other Sandusky trial.

Tachigaren Seed Treatments

Evaluate Tach 20 Seed Treatments in Sugarbeets

Average of 5 Locations

2010

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Treatment	Rate		First Count Beets/100'	Last Count Beets/100'
Tach 20	20 g/unit		191.8	192.2
No Tach	0 g/unit		191.3	192.1
Mean			191.6	192.2
LSD 5%			N/S (12.4)	N/S (14.1)
CV%			3.7	4.2

Summary

Averaged over 5 locations emergence was not improved by using Tach 20 seed treatments. Tach 20 did not cause any injury to sugarbeets. At the Sandusky location Tach 20 had increased stand but the difference was not statistically significant. At the Kawkawlin location high levels of Rhizoctonia interfered with the trial. When applying Quadris in addition to the Tach 20 there was not a significant reduction in stand.

Tachigaren Seed Treatments

Evaluate Tach 20 and Quadris in Sugarbeets

Kawkawlin, MI
2010

Trial Quality: Good

Treatment Name	Rate	RWSA	RWST	Tons/A	% Sug	% CJP	Stand b/100' 5/18	Stand b/100' 5/27
No Tach		8237	268	30.7	18.3	94.5	192	194
Quadris	7 fl oz/a							
Tach 20	20 g/unit	7896	264	29.8	18.4	93.7	176	183
Quadris	7 fl oz/a							
Tach 20	20 g/unit	7583	262	29.0	18.3	93.3	192	196
No Tach		6317	263	24.0	18.2	93.8	203	204
Mean		7508	264.4	28.4	18.3	93.8	190.7	194.1
LSD 5%		N/S (1213.4)	N/S (18.3)	4.6	N/S (.9)	N/S (1.4)	N/S (46.2)	N/S (41.8)
CV%		9.7	4.1	9.8	2.9	0.9	15.2	13.5

Planted: April 30th Harvested: Sept 27th

Tachigaren Seed Treatments

Evaluate Tach 20 and Quadris in Sugarbeets

Blumfield, MI
2010

Trial Quality: Fair-Good

Treatment Name	Rate	Stand b/100' 5/24 31 DA-A	Stand b/100' 5/18 25 DA-A	RWSA	RWST	Tons/A	% Sug	% CJP
Tach 20	20 g/unit	214	213	4865	275	17.7	18.6	94.9
No Tach		207	213	4735	277	17.2	18.7	95.0
Tach 20 Quadris	20 g/unit 7 fl oz/a	204	202	4713	281	16.9	18.8	95.3
No Tach Quadris	 7 fl oz/a	193	188	4740	271	17.5	18.3	95.0
Mean		204.6	203.8	4764	275.8	17.3	18.6	95.1
LSD 5%		N/S (34.7)	N/S (44.3)	N/S (1040.4)	N/S (13.1)	N/S (3.6)	N/S (.7)	N/S (.5)
CV%		10.6	13.6	13.1	2.9	12.3	2.2	0.3

Planted: April 20th Harvested: Sept 15th

Tachigaren Seed Treatments

Evaluate Tach 20

in Sugarbeets

Sandusky, MI
2010

Trial Quality: Fair-Good

Treatment Name	Rate	Stand b/100' 5/25 2 lf 34 DA-A	Stand b/100' 5/19 Cot 28 DA-A	RWSA	RWST	Tons/A	% Sug	% CJP
Tach 20	20 g/unit	173	167	8745	257	34.0	17.5	94.7
No Tach	0 g/unit	158	151	7990	247	32.3	16.9	94.5
Mean		165.6	158.9	8367	251.9	33.2	17.2	94.6
LSD 5%		N/S	N/S	N/S	N/S	N/S	N/S	N/S
		(24.7)	(24.7)	(829.9)	(12.5)	(2.5)	(.66)	(.68)
CV%		10.1	10.5	6.7	3.4	5.1	2.6	0.5

Planted: April 16th Harvested: Oct 6th

Tachigaren Seed Treatments

Evaluate Tach 20 in Sugarbeets

Breckenridge, MI
2010

Trial Quality: Very Good

Treatment Name	Rate	Stand b/100' 5/17	Stand b/100' 5/24
No Tach	0 g/unit seed	203.3	201.7
Tach 20	20 g/unit seed	201.7	200.6
Mean		202.5	201.1
LSD 5%		N/S (18.7)	N/S (16.2)
CV%		6.2	5.4

Planted: April 29th

Quanicassee, MI
2010

Trial Quality: Very Good

Treatment Name	Rate	Stand b/100' 5/17 35 DA-A	Stand b/100' 5/24 49 DA-A
No Tach	0 g/unit	187.7	189.5
Tach 20	20 g/unit	184.7	177.1
Mean		186.1	183.3
LSD 5%		N/S (13.6)	N/S (11.9)
CV%		7.3	6.5

Planted: April 20th

BEET LIME TRIAL

Fergus Farms LLC, Rob Eickholt

Location:	Saginaw Co., St. Charles	**Tillage:**	Fall - Moldboard & Field Cult. Spring - Stale Seed Bed
Variety:	B-17RR32	**Harvest Date:**	Mid Oct/2010
Plant Date:	3/19/2010	**Sample Date:**	10/5/2010
Previous Crop:	Wheat	**Herbicides:**	2x Glyphosate
Soil Type:	Clay Loam	**Insecticide:**	Lorsban 4E for Flea Beetle 5/3/10
Spacings:	Rows - 30", Seeds - 58,000 / Ac.	**Replicated:**	4x
Fertilizer:	2x2 - 21.4 Gal. 11-28-0 w/ 2S-0.1Mn Sidedress - 28 Gal 28% Fall - 145 Lbs of K_2O	**Fungicide:**	Proline Headline Inspire XT

TREATMENT	$ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	RHIZOCTONIA Dead Beets / 1200' of Row
Beet Lime 2 Ton / Acre	—	**8827**	**276**	**32.0**	**19.1**	**93.9**	**78**
Check	—	**8695**	**279**	**31.2**	**19.2**	**94.0**	**90**
AVERAGE	—	**8761**	**278**	**31.6**	**19.1**	**93.9**	**84**
LSD (5%)	—	**1090 NS**	**15 NS**	**2.2 NS**	**0.7 NS**	**0.8 NS**	**145 NS**
C.V. (%)	—	**6**	**2**	**3.1**	**1.6**	**0.4**	**77**

TRIAL RELIABILITY: **Good**

EMERGENCE:	Excellent	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Low, Patches	**NEMATODES:**	Not Detected
QUADRIS APP:	4-6 Leaf, 9 oz.	**WEATHER:**	Dry

Comments: Beet lime strips were spread at 2 ton/acre. The field was moldboard plowed, fall worked and stale seed bed planted. Soil samples done prior to beet harvest did not show a difference in pH, with both the limed and non-limed strips having a pH of about 6.4. No significant differences were found in yield or Rhizoctonia counts.

NITROGEN RATE TRIAL FOLLOWING WHEAT

D & B Karg Farms

Location:	Huron Co., Rapson	**Tillage:**	Summer Rip, Worked Wheat Cover
Variety:	C-824RR	**Harvest Date:**	11/9/2010
Previous Crop:	Wheat	**Sample Date:**	11/9/2010
Soil Type:	Loam	**Herbicides:**	3x Glyphosate
Spacings:	Rows - 22", Seeds - 63,000/Ac	**Replicated:**	3x
Fertilizer:	2x2 - 40# - 60# - 25#, Potash and Lime Variable	**Fungicide:**	Inspire XT Headline Inspire XT

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
125# N	**$2,262**	**13895**	**329**	**42.2**	**21.4**	**96.4**
100# N	**$2,245**	**13720**	**334**	**41.1**	**21.6**	**96.7**
175# N	**$2,200**	**13674**	**323**	**42.3**	**21.1**	**96.3**
150# N	**$2,209**	**13655**	**329**	**41.5**	**21.4**	**96.4**
AVERAGE	**2229**	**13736**	**329**	**41.8**	**21.4**	**96.4**
LSD (5%)	**—**	**646 NS**	**9**	**1.54 NS**	**0.3**	**0.4 NS**
C.V. (%)	**—**	**2**	**1**	**1.8**	**1.3**	**0.34**

TRIAL RELIABILITY: **Excellent**

EMERGENCE:	Excellent	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Very Low	**NEMATODES:**	Not Detected
QUADRIS APP:	In-Furrow (6 oz) & 8 Lf (14 oz)	**WEATHER:**	Heavy Early Rain

Comments: The nitrogen rates are total N from starter and sidedress. All treatments received 40# N from the starter. The PSNT done on May 17 showed a 44# credit. Eight inches of rain in early June saturated the soils for several days. The last manure application on this field was 3-4 years ago.

NITROGEN RATE TRIAL FOLLOWING WHEAT

Richmond Brothers Farms, LLC

Location:	Huron Co., Pigeon	**Tillage:**	Fall - Dominator, Field Cultivator Spring - Stale Seed Bed
Variety:	HM-29RR	**Harvest Date:**	11/4/2010
Planting Date:	3/25/2010	**Sample Date:**	10/14/2010
Previous Crop:	Wheat	**Herbicides:**	3x Glyphosate
Soil Type:	Loam	**Replicated:**	4x
Spacings:	Rows - 30"	**Fungicide:**	Gem Inspire XT Headline
Fertilizer:	2x2 - 10 Gal 28%, 8 Gal 10-34-0, 3 Gal Thiosul, 1 qt Mn, 1 pt B		

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
150 # of N	$1,682	8915	283	31.5	18.7	96.0
90 # of N	$1,663	8659	282	30.7	18.5	96.5
180 # of N	$1,645	8798	272	32.4	18.1	95.6
120 # of N	$1,641	8600	279	30.9	18.5	96.0
AVERAGE	$1,658	8743	279	31.4	18.4	96.0
LSD (5%)	—	698 NS	10	1.9 NS	0.7 NS	0.3
C.V. (%)	—	5	2	3.7	2.3	0.2

TRIAL RELIABILITY: **Good**

EMERGENCE:	Excellent	**CERC. LEAF SPOT:**	Excellent
RHIZOCTONIA:	Low	**NEMATODES:**	None Detected
QUADRIS APP:	Yes	**WEATHER:**	Good

Comments: All treatments received the same starter. Nitrogen rates were varied at the sidedress application on 6/11/10. Revenue is based on a $55/ton payment, an "average RWST" equal to the trial average, and a N price of $0.50/Lb.

NITROGEN RATE TRIAL FOLLOWING DRYBEANS

Richmond Brothers Farms, LLC

Location:	Huron Co., Pigeon	**Tillage:**	Fall - Dominator, Field Cultivator Spring - Stale Seed Bed
Variety:	HM-29RR		
Planting Date:	3/24/2010	**Harvest Date:**	11/4/2010
Previous Crop:	Drybeans	**Sample Date:**	10/14/2010
Soil Type:	Loam	**Herbicides:**	3x Glyphosate
Spacings:	Rows - 30"	**Replicated:**	4x
Fertilizer:	2x2 - 10 Gal 28%, 8 Gal 10-34-0, 3 Gal Thiosul, 1 qt Mn, 1 pt B	**Fungicide:**	Gem Inspire XT Headline

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
125 # of N	**$1,390**	**7572**	**288**	**26.3**	**19.0**	**96.0**
100 # of N	**$1,391**	**7485**	**289**	**26.0**	**18.9**	**96.6**
150 # of N	**$1,357**	**7451**	**290**	**25.7**	**19.2**	**96.0**
75 # of N	**$1,250**	**6699**	**280**	**24.0**	**18.3**	**96.4**
AVERAGE	**$1,347**	**7302**	**287**	**25.5**	**18.8**	**96.3**
LSD (5%)	**—**	**1075 NS**	**9.3 NS**	**3.8 NS**	**0.5**	**0.5 NS**
C.V. (%)	**—**	**9**	**2**	**9.0**	**1.5**	**0.3**

TRIAL RELIABILITY: **Fair**

EMERGENCE:	Excellent	**CERC. LEAF SPOT:**	Excellent
RHIZOCTONIA:	Moderate / Heavy Patches	**NEMATODES:**	Detected
QUADRIS APP:	Yes	**WEATHER:**	Good

Comments: All treatments received the same starter. Nitrogen rates were varied at the sidedress application on 6/11/10. Trial variation was increased by a moderate amount of Rhizoctonia and the presence of nematodes. Revenue is based on a $55/ton payment, an "average RWST" equal to the trial average, and a N price of $0.50/Lb.

NITROGEN RATE TRIAL FOLLOWING CORN

Schindler Farms LLC

Location:	Bay Co.	**Tillage:**	Fall - Chisel, Spring - S Tine
Variety:	B-18RR4N	**Harvest Date:**	10/29/2010
Previous Crop:	Corn	**Sample Date:**	10/7/2010
Soil Type:	Loam	**Herbicides:**	2x Glyphosate
Spacings:	Rows - 22", Seeds - 64,000 / Ac.	**Replicated:**	4x
Fertilizer:	2x2 - 20 Gal. 19-17-0 + Micros Sidedress - Varies	**Fungicide:**	1st - Inspire XT, 2nd - Headline, 3rd - Proline

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
180# N	**$1,253**	**8165**	**334**	**24.5**	**21.7**	**96.3**
150# N	**$1,246**	**8037**	**333**	**24.2**	**21.7**	**96.3**
120# N	**$1,192**	**7612**	**341**	**22.4**	**22.2**	**96.3**
90# N	**$1,086**	**6885**	**332**	**20.7**	**21.4**	**96.8**
AVERAGE	**$1,194**	**7675**	**335**	**23**	**21.7**	**96.4**
LSD (5%)	**—**	**949**	**8**	**2.9**	**0.5**	**0.5 NS**
C.V. (%)	**—**	**8**	**2**	**7.8**	**1.3**	**0.3**

TRIAL RELIABILITY: **Fair**

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Moderate	**NEMATODES:**	Yes
QUADRIS APP:	4-6 Leaf	**WEATHER:**	—

Comments: All treatments received the same starter amount. Nitrogen rates were varied at sidedress on 5/20/10. Trial variability was increased from a moderate level of Rhizoctonia. Revenue is based on a $55/ton payment, an "average RWST" equal to the trial average, and a N price of $0.50/Lb.

NITROGEN RATE TRIAL FOLLOWING CORN

Vader Farms

Location:	Bay Co.	**Tillage:**	Fall - DMI Spring - 1x
Variety:	B-18RR32		
Planting Date:	3/29/2010	**Harvest Date:**	11/2/2010
Previous Crop:	Corn	**Sample Date:**	10/19/2010
Soil Type:	Sandy Loam	**Herbicides:**	3x Glyphosate
Spacings:	Rows - 30", Seeds - 48,500 / Ac	**Replicated:**	3x
Fertilizer:	2x2 - 20 Gal. 19-11-0 + Micros, See Notes	**Fungicide:**	1st - Proline, 2nd - Gem, 3rd - Inspire XT, 4th - Headline, 5th - Kocide

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
150# Total N with 30# of N Banded	$1,502	8867	312	28.4	20.0	97.4
180# Total N	$1,450	8637	308	28.1	19.9	97.0
120# Total N	$1,470	8625	316	27.2	20.3	97.7
150# Total N	$1,404	8320	310	26.8	19.8	97.5
120# Total N with 30# of N Banded	$1,396	8181	304	26.9	19.8	96.8
90# Total N	$1,292	7509	304	24.7	19.5	97.4
AVERAGE	$1,419	8357	309	27.0	19.9	97.3
LSD (5%)	—	1800 NS	18 NS	5.4 NS	1.2 NS	0.9 NS
C.V. (%)	—	12	3	11.0	3.4	0.5

TRIAL RELIABILITY: **Poor**

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Excellent
RHIZOCTONIA:	Low/Moderate	**NEMATODES:**	Not Detected
QUADRIS APP:	Yes, 4-6	**WEATHER:**	—

Comments: The nitrogen rates are the total amounts from the starter, banded, and sidedress applications. All treatments received the same amount of starter (38# N). The treatments showing banded N had 10 gallons of 28% in a 10" band over the row at planting. The remainder of the total N was done at sidedress on 5/17/10. Field had significant variation. Use the data with caution. Revenue is based on a $55/ton payment, an "average RWST" equal to the trial average, and a N price of $0.50/Lb.

NITROGEN RATE FOLLOWING MANURE

Meadow Muth Farms - Daenzer's

Location:	Saginaw Co., Frankenmuth	**Tillage:**	Fall - Chisel Spring - Stale Seed Bed
Variety:	C-824RR		
Planting Date:	3/26/2010	**Harvest Date:**	10/21/2010
Previous Crop:	Corn Silage	**Sample Date:**	10/6/2010
Soil Type:	Loam	**Herbicides:**	2x Glyphosate
Spacings:	Rows - 30", Seeds - 46500 / Ac	**Replicated:**	4x
Fertilizer:	See Treatments - Starter was 80 percent 28% & 20 percent Thiosul	**Fungicide:**	Proline Headline

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
Starter Only 41# N	**$1,642**	**8349**	**281**	**29.7**	**19.4**	**93.9**
Starter + Sidedress 41# N + 45# N	**$1,596**	**8274**	**282**	**29.4**	**19.3**	**94.1**
Sidedress Only 45# N	**$1,543**	**7905**	**274**	**28.9**	**19.0**	**93.7**
Starter + Sidedress 25# N + 60# N	**$1,501**	**7805**	**264**	**29.5**	**18.7**	**92.8**
Check	**$1,541**	**7729**	**282**	**27.5**	**19.3**	**94.2**
AVERAGE	**$1,564**	**8012**	**277**	**29.0**	**19.1**	**93.7**
LSD (5%)	**—**	**657 NS**	**13**	**2.5 NS**	**0.6**	**0.9**
C.V. (%)	**—**	**5**	**3**	**5.5**	**2**	**0.6**

TRIAL RELIABILITY: **Good**

EMERGENCE:	Fair / Good	**CERC. LEAF SPOT:**	Poor Control
RHIZOCTONIA:	Low	**NEMATODES:**	Not Detected
QUADRIS APP:	Yes, 6-8 Leaf	**WEATHER:**	Dry Summer

Comments: Trial was conducted to look at different nitrogen rates and application methods after 10,000-12,000 gallons of dairy manure was applied the previous fall. Nitrogen rates in the starter treatments contained either 41 lbs or 25 lbs of nitrogen placed 2x2. Sidedress treatments were either 45 lbs or 60 lbs N and were applied on June 16. The check had the manure application only and no additional nitrogen. The check had the lowest tonnage. Starter 2x2 fertilizer treatment alone (41 lbs N/ac) had yield and quality as good as treatments with sidedress N applications. Applications that were sidedress only or the 60 lb sidedress rate tended to reduce quality. Earlier sidedress timing may have helped reduce the quality impact. Starter nitrogen appears to be beneficial even in manured fields. Revenue is based on a $55/ton payment, an "average RWST" equal to the trial average, and a N price of $0.50/Lb.

Nitrogen Fertility Research

Evaluate Application Methods, Rates and Timings

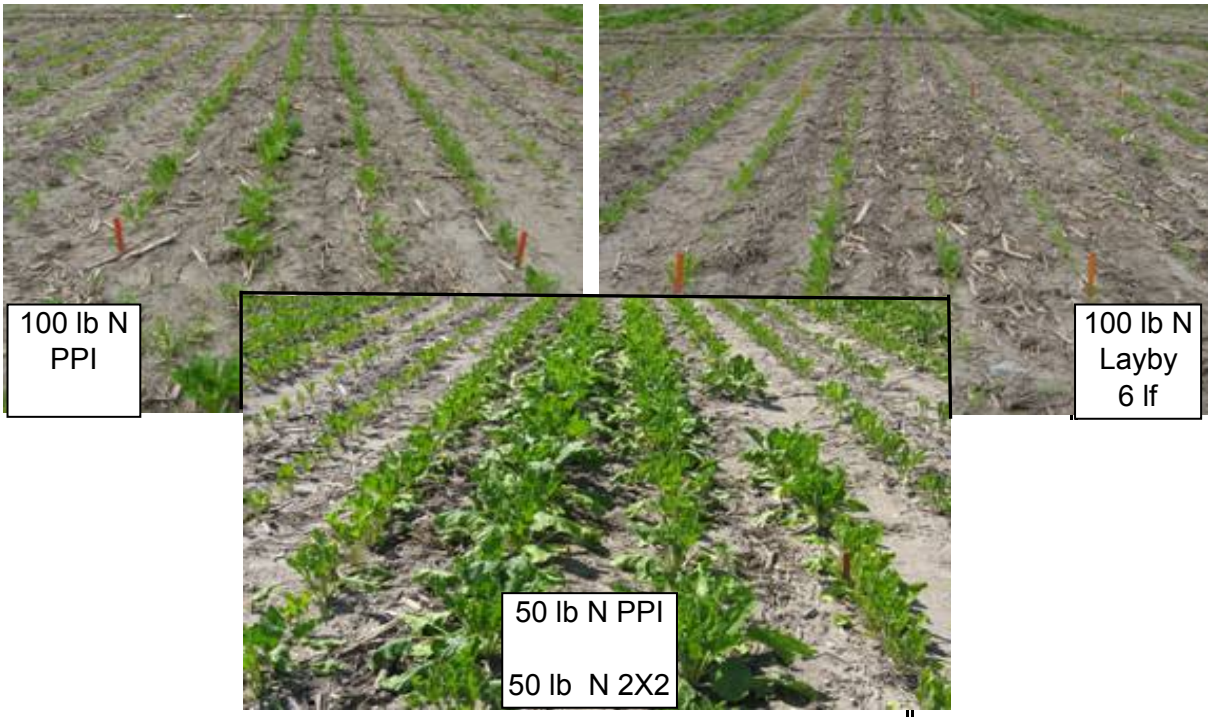
2010

Summary

Data on next page

It is important to have adequate nitrogen available in the spring to promote early season growth and development of the crop. However, excess nitrogen at harvest will lower sugar content and purity. We have conducted trials the past three years evaluating the best application method and timing for nitrogen fertilizers. In general, applying 50 lbs of nitrogen 2X2 in sequence with nitrogen applied PPI or Layby has provided the highest yield and quality. Applying all of the nitrogen either PPI or Layby has been less effective. Sugarbeets have better early season growth and earlier row closure when nitrogen 2X2 is applied. Side dressing needs to be completed early (by the 4-6 leaf stage) or sugar levels will be negatively affected. Total nitrogen rates of 100 to 150 lbs/A have given the best results (150 lbs following corn). Results from previous years support the findings of this trial.

These pictures demonstrate the early growth advantage of applying 50 lbs N 2X2 in addition to PPI or Layby nitrogen applications



Nitrogen Fertility Research
Evaluate Application Methods, Rates and Timings

Albee, MI - 2010

Trial Reliability: Fair - Good

Treatment	Actual N/Acre	App Timing	$/*** Acre	RWSA	RWST	Tons/ Acre	% Sug	% CJP	Amino	Beets/ 100 ft	% Row Close*	Color** 6-Jun
Urea Am Sulf	100 50	PPI 2X2	$1,664	7968	244	32.7	17.0	93.9	8.1	209	95	8.0
Am Sulf UAN	50 50	2X2 SD (4 lf)	$1,616	7651	246	31.1	17.2	93.8	6.9	199	97	7.3
Am Sulf UAN	50 100	2X2 SD (4 lf)	$1,615	7798	240	32.5	16.8	93.5	7.7	211	97	7.9
Urea Am Sulf	50 25	PPI 2X2	$1,602	7473	259	28.9	17.7	94.5	4.9	219	93	6.8
Urea	100	PPI	$1,566	7328	247	29.8	17.0	94.3	6.4	207	91	7.2
Urea P + N Mn + B	100 50 + 19 6 + 1	PPI 2x2 2x2	$1,542	7515	252	29.9	17.2	94.6	6.3	201	88	8.2
Am Sulf	50	2X2	$1,526	7088	262	27.1	17.7	95.1	4.8	200	84	6.7
UAN	100	SD (4 lf)	$1,521	7187	248	28.9	17.1	94.4	6.6	203	92	7.8
Am Sulf UAN	25 75	2X2 SD (4 lf)	$1,519	7200	247	29.1	17.1	94.0	6.6	210	93	7.2
Urea Am Sulf	75 25	PPI 2X2	$1,518	7146	252	28.4	17.2	94.6	6.5	202	92	6.8
Urea Am Sulf	50 50	PPI 2X2	$1,467	6953	250	27.8	17.1	94.4	6.3	184	89	6.9
UAN	150	SD (4 lf)	$1,445	6986	237	29.5	16.7	93.2	7.9	191	94	8.0
Urea Coron	50 5 qts	PPI 20 lf	$1,433	6640	254	26.1	17.3	95.0	5.7	221	84	7.2
Urea	150	PPI	$1,431	6862	237	28.9	16.8	93.2	7.9	200	90	8.0
Urea Coron Coron	50 10 qts 10 qts	PPI 12 lf 20 lf	$1,415	6666	244	27.3	16.9	94.2	5.6	217	84	7.4
UAN	50	SD (4 lf)	$1,412	6522	247	26.5	17.0	94.2	6.0	208	89	7.3
Urea Coron	50 10 qts	PPI 20 lf	$1,376	6431	255	25.2	17.4	94.8	4.8	195	83	7.3
Urea	50	PPI	$1,357	6253	249	25.2	17.1	94.5	5.8	215	80	7.2
OceanSol	plus 50 lbs N		$1,205	5727	252	22.7	17.2	94.6	4.7	206	71	6.3
Untreated			$1,194	5390	254	21.2	17.3	94.8	4.0	199	62	5.7
OceanSol	16 fl oz/A		$1,019	5011	251	19.9	17.2	94.5	4.8	206	71	5.9
Mean			$1,450	6847	248.9	27.6	17.2	94.3	6.1	204.9	87.5	7.2
LSD 5%				750.1	9.5	2.8	0.5	0.7	1.1	28.5	9.5	1.0
CV%				9.5	3.3	8.9	2.7	0.7	16.4	12.2	9.4	11.9

*Row Close: mid July

Planted: Apr 14th (heavy corn residue)

Harvested: Sep 21st

Plot Size: 6 rows X 50 ft X 6 reps

Applic Dates: PPI and 2X2: Apr 14th
Side Dress 4 lf: May 19th, 20 lf: Jun 25th

Variety: HM 131RR

*** $/Acre is after the cost of fertilizer is subtracted.

**Color: 10 = dark green

Soil Type: Sandy Clay Loam

pH: 6.7, OM%: 4.8

Nutrition: Normal except
Boron slightly low

Rhizoc: 6 lf spray - good cont

Cerc: 3 sprays - good control

Rainfall: 16.3 in

Apr	0.6 in
May	4.5 in
Jun	3.8 in
Jul	0.9 in
Aug	2.4 in
Sep	4.1 in

Micro-Nutrient Research

Evaluate Manganese and Boron Application Techniques

Albee Township, MI - 2010

Trial Quality: Good

Treatment	Rate a.i./ Acre	Applic Timing	Gross $/ Acre	RWSA	RWST	Tons/ A	% Sug	% CJP	Height Inches 8/4	Canopy % 8/4
Urea	100 lb ai/a	PPI	$1,702	7576	249	30.4	16.9	93.0	21.3	90.0
Manganese 27%	6 lb ai/a	2X2								
Urea	100 lb ai/a	PPI	$1,614	7181	254	28.2	17.0	92.9	20.5	88.3
Urea	100 lb ai/a	PPI	$1,590	7075	245	28.9	16.9	92.9	21.8	86.7
Solubor 20.5%	0.3 lb ai/a	8 lf								
Urea	100 lb ai/a	PPI	$1,572	6992	237	29.6	17.0	92.8	21.3	91.7
Boron 10%	1 lb ai/a	2X2								
Manganese 27%	6 lb ai/a	2X2								
Urea	100 lb ai/a	PPI	$1,534	6827	245	27.9	17.2	92.9	20.2	88.3
Boron 10%	1 lb ai/a	2X2								
Urea	100 lb ai/a	PPI	$1,526	6788	246	27.6	16.8	92.8	21.7	90.0
Tecmangam 32%	2 lb ai/a	8 lf								
Urea	100 lb ai/a	PPI	$1,442	6410	237	27.1	16.8	92.7	21.0	88.3
Solubor 20.5%	0.3 lb ai/a	8 lf								
Tecmangam 32%	2 lb ai/a	8 lf								
Mean			$1,568	6978	244.6	28.5	16.9	92.9	21.1	89.1
LSD 5%				618.9	11.8	2.0	N/S	N/S	N/S	N/S
							(.4)	(.7)	(2.2)	(5.1)
CV%				7.5	4.1	5.9	2.0	0.6	8.9	4.9

Planted: April 14th Harvested: Sept 21st

Summary

Results from this trial suggest that a 2X2 timing and placement is better than foliar sprays. We will continue to evaluate micronutrient fertilizer application techniques in the future.

Foliar Nitrogen Trial

Evaluate 28% Nitrogen Applied Mid Season

Pigeon, MI - 2010

Trial Quality: Fair-Poor

Treatment	Rate/ Acre	Gross $/ Acre	RWSA	RWST	Tons/ A	% Sug	% CJP
UAN 28%	1 gal/a	$1,425	6776	268	25.3	17.9	95.5
UAN 28%	10 gal/a	$1,350	6422	256	25.1	17.3	95.3
UAN 28% NutrAsyst	5 gal/a 3.5 fl oz/a	$1,331	6358	270	23.5	18.0	95.7
UAN 28% NutrAsyst	10 gal/a 3.5 fl oz/a	$1,320	6291	251	25.0	17.2	94.5
Untreated		$1,260	5997	266	22.6	17.9	95.3
UAN 28% NutrAsyst	1 gal/a 3.5 fl oz/a	$1,236	5884	262	22.4	17.7	95.3
UAN 28%	5 gal/a	$1,236	5855	262	22.5	17.5	95.5
UAN 28% NutrAsyst	2.5 gal/a 3.5 fl oz/a	$1,226	5830	265	22.1	17.8	95.2
UAN 28%	2.5 gal/a	$1,186	5659	257	22.0	17.3	95.4
Mean		$1,297	6121	261.8	23.6	17.6	95.3
LSD 5%			N/S (1505)	N/S (17.2)	N/S (5.5)	N/S (.9)	N/S (1.1)
CV%			16.6	4.5	15.8	3.5	0.8

Planted: Apr 4th Harvested: Oct 12th

Sprayed: July 27th
Plot Size: 4 Rows X 35' X 4 Reps

Summary

28% nitrogen applied as a foliar spray at mid-season caused minor leaf burn at 5 gal/A and moderate leaf burn at 10 gal/A. The injury symptoms were not long lasting. NutrAsyst did not appear to safen the 28% nitrogen solution. Yield and quality differences were not statistically different, probably because the plot area was uneven.

Foliar Nitrogen Trial

Compare Coron and Alpine Applied Mid-Season

Blumfield, MI - 2010

Treatment Name	Rate / Acre	Lbs. N Applied	RWSA	RWST	Tons/ Acre	% Sug	% CJP
Coron 28%	8 qt	6	4801	293	16.3	19.5	95.6
Alpine 28% SLR	8 qt	6	4555	283	16.1	19.1	94.8
Untreated			3941	291	13.6	19.7	94.8
Mean			4432	289.1	15.3	19.4	95.1
LSD 5%			N/S (1768.7)	N/S (13.2)	N/S (5.7)	0.5	N/S (0.94)
CV%			15.4	1.8	14.3	1.1	0.4

Sprayed: June 11th
Planted: April 20th Harvested: Sept 15th

Summary

Foliar nutritional sprays appeared to improve sugarbeet yield, however, the differences were not statistically different.

Foliar Nitrogen Trial

Evaluate Mid-Season Nitrogen Applications

Replicated Strip Trial

Sandusky, MI - 2010

Trial Quality: Good

Treatment*	Rate	$/Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP	Amino	Leaf** Injury %	Leaf*** Color 1-10
Coron 25 + B	2.5 gal/a	$2,248	11242	291	38.6	19.4	95.5	8.1	0.6	7.3
Advantage	1 gal/a	$2,244	11221	293	38.3	19.5	95.6	8.0	0.0	7.3
Untreated		$2,222	11109	291	38.2	19.3	95.6	8.0	0.0	7.0
Advantage	3 gal/a	$2,220	11102	292	38.1	19.4	95.5	8.3	0.0	7.4
Upplause Plus	1 gal/a	$2,198	10990	293	37.5	19.5	95.4	8.4	0.0	7.4
Upplause Plus	0.5 gal/a	$2,142	10708	288	37.2	19.2	95.4	8.1	0.0	7.1
Advantage	0.5 gal/a	$2,133	10667	287	37.7	19.1	95.6	8.3	0.0	7.1
Upplause Plus	3 gal/a	$2,118	10588	282	37.5	19.1	94.7	8.4	0.6	7.5
Mean		$2,191	10953	289.6	37.9	19.3	95.4	8.2	0.2	7.3
LSD 5%		$154	770.1	9.5	2.2	0.4	0.8	0.5	0.1	0.4
CV%		$5	4.8	2.2	4.0	1.4	0.6	3.8	67.8	3.8

* UAN 28% Nitrogen was included in each treatment at 1.5 gal/A

** %Leaf Injury; injury was transient *** Color; 1 = Yellow, 10 = Dark Green
Ratings taken 15 days after applications

Harvested: November 2nd
Variety: Beta 17RR32
Cercospora level: Light
Rhizoctonia level: Light-Moderate

Treatments Applied: June 30th
Method: Foliar spray in 15 gpa
Plot Size: 6 Rows X 750 ft.
Reps: 4

Coron 25 + B: 25% Nitrogen including slow release and 0.5% Boron
Advantage: 4% Ammoniacal Nitrogen, 0.05% Magnesium, 4% Sulfur
Upplause Plus: 10% Nitrogen (9% from Urea, 1% Ammoniacal N), 0.07% Calcium, 0.1% Magnesium, 0.03% Iron, 0.02% Manganese

Summary

This was a nice uniform field which yielded very high, however, there were no significant differences between the treatments. The untreated check ranked fairly high in the trial. CV's and LSD's were low (which is good).

Soil Improvement Research

Evaluate Borregro On Sugarbeets

Blumfield, MI - 2010

Trial Quality: Fair

Treatment	Rate / Acre	Applic Timing	RWSA	RWST	Tons/ Acre	% Sug	% CJP	Stand Beets/100 ft 5/6	Stand Beets/100 ft 5/24	Rhizoc Beets/100 ft 8/31
Borregro HA	2 gal/a	In-furrow	6643	285	23.3	19.3	94.9	171	225	0.2
UAN	33 gal/a	6 lf								
Borregro HA	2 gal/a	In-furrow	6571	291	22.5	19.5	95.2	193	234	0.0
D-701	2 gal/a	6 lf								
UAN	31 gal/a	6 lf								
Untreated		6 lf	6493	300	21.5	20.0	95.5	175	249	0.2
Borregro HA	1 gal/a	In-furrow	6454	288	22.4	19.4	94.8	149	230	4.4
UAN	33 gal/a	6 lf								
D-701	2 gal/a	6 lf	6410	293	21.9	19.6	95.2	140	224	2.2
UAN	31 gal/a	6 lf								
Mean			6514	291.5	22.3	19.6	95.1	165.5	232.5	1.4
LSD 5%			N/S (1211)	N/S (15.4)	N/S (3.6)	N/S (.8)	N/S (.6)	N/S (57.6)	N/S (29.5)	N/S (6.0)
CV %			13.9	3.9	12.0	3.1	0.5	25.9	9.5	317.4

Planted: April 28th Harvested: Sept 15th
Sprayed: May 26th (6lf)
D-701 is a nitrogen source

Summary

Borregro is a solution containing primarily humic acid, fulvic acid, potassium and sulfur. The company claims that Borregro improves soil structure and helps with nutrient uptake, especially on low organic matter soils. We have tested Borregro in previous years with mixed results. In this year's work none of the treatments provided an increase in yield or quality.

Foliar Manganese Research
Evaluate Sysstem Ready in Sugarbeets

Summary: 3 Locations

Data on next 2 pages

Sysstem Ready is a chelated foliar nutrient which contains 35% P_2O_5, 4% zinc and 2.5% manganese. There are reports from other regions showing that Sysstem Ready is a more compatible Mn source when tank mixed with Roundup. We evaluated Sysstem Ready, another chelated Mn product (Axilo - 13% Mn) and Tecmangan (32% Mn) in combination with Roundup in small plot replicated trials. From the data, there does not appear to be a significant difference between Sysstem Ready and the other two Manganese sources. The trials had CV's in the range of 6 to 7 for yields which means that they were good quality trials.

Pigeon, MI - 2010

Trial Quality: Very Good

Treatment	Rate/ Acre	RWSA	RWST	Tons/ A	% Sug	% CJP
Sysstem Ready Roundup	6 pt/a 22 fl oz/a	8298	250	33.2	17.3	94.1
Axilo Mn (EDTA) Roundup	2 lb/a 22 fl oz/a	8211	243	33.7	17.0	93.7
Roundup	22 fl oz/a	7842	248	31.6	17.2	94.2
Tecmangan Roundup	6 lb/a 22 fl oz/a	7564	233	32.3	16.6	93.0
Mean		7979	243.7	32.7	17.0	93.7
LSD 5%		N/S (992.2)	N/S (18.6)	N/S (3.2)	N/S (.9)	N/S (1.2)
CV%		6.2	3.8	4.9	2.7	0.6

Planted: April 30th Harvested: Sept 14th
Sprayed: June 18th
Plot Size: 6 Rows X 30 Ft X 3 Reps

Foliar Manganese Research

Evaluate Sysstem Ready In Sugarbeets

Saginaw, MI - 2010

Trial Quality: Very Good

Treatment	Rate/ Acre	RWSA	RWST	Tons/ A	% Sug	% CJP	Vigor	Color
Sysstem Ready	6 pt/a	5601	269	20.8	18.8	93.3	8.8	6.7
Tecmangan	6 lb/a	5579	274	20.4	19.0	93.7	8.5	6.3
Roundup	22 fl oz/a	5435	276	19.7	19.1	93.6	8.7	7.3
Sysstem Ready Roundup	6 pt/a 22 fl oz/a	5419	279	19.5	19.5	93.3	8.3	6.0
Axilo Mn (EDTA)	2 lb/a	5353	280	19.1	19.5	93.4	8.7	7.0
Tecmangan Roundup	6 lb/a 22 fl oz/a	5144	271	19.0	19.0	93.3	8.3	6.3
Axilo Mn (EDTA) Roundup	2 lb/a 22 fl oz/a	5029	271	18.5	19.0	93.4	8.2	6.3
Mean		5366	274.3	19.6	19.1	93.4	8.5	6.6
LSD 5%		N/S (581)	N/S (12.2)	N/S (2.4)	0.6	N/S (.6)	0.5	1.1
CV%		6.1	2.5	7.0	1.9	0.4	3.4	9.3

Planted: April 15th
Sprayed: June 18th

Harvested: Sept 23rd

Foliar Manganese Research
Evaluate Sysstem Ready In Sugarbeets

Spaulding Township, MI - 2010

Trial Quality: Very Good

Treatment	Rate/ Acre	RWSA	RWST	Tons/ A	% Sug	% CJP
Tecmangan Roundup	6 lb/a 22 fl oz/a	7888	234	33.8	16.2	94.2
Sysstem Ready	6 pt/a	7762	230	33.7	16.1	93.8
Axilo Mn (EDTA) Roundup	2 lb/a 22 fl oz/a	7742	235	33.0	16.5	93.6
Tecmangan	6 lb/a	7739	239	32.4	16.6	94.1
Axilo Mn (EDTA)	2 lb/a	7652	236	32.5	16.4	93.9
Sysstem Ready Roundup	6 pt/a 22 fl oz/a	7343	241	30.4	16.6	94.4
Roundup	22 fl oz/a	7291	237	30.8	16.4	94.3
Mean		7631	236.0	32.4	16.4	94.0
LSD 5%		N/S (946.3)	N/S (15.0)	N/S (3.6)	N/S (.9)	N/S (.9)
CV%		7.0	3.6	6.2	3.0	0.6

Planted: April 22nd
Harvested: Sept 22nd
Sprayed: June 17th
Plot Size: 6 Rows X 38ft X 3 Reps

FOLIAR MANGANESE WITH GLYPHOSATE

Richmond Brothers Farms, LLC

Location:	Huron Co., Pigeon	**Tillage:**	Fall - Dominator, Field Cultivator Spring - Stale Seed Bed
Variety:	HM-29RR		
Planting Date:	3/24/2010	**Harvest Date:**	11/4/2010
Previous Crop:	Drybeans	**Sample Date:**	10/14/2010
Soil Type:	Loam	**Herbicides:**	3x Glyphosate
Spacings:	Rows - 30"	**Replicated:**	6x
Fertilizer:	2x2 - 10 Gal 28%, 8 Gal 10-34-0, 3 Gal Thiosul, 1 qt Mn, 1 pt B	**Fungicide:**	Gem Inspire XT Headline

TREATMENT	$ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
EEZYMAN Manganese 2 Applications	**—**	**7353**	**283**	**25.9**	**18.6**	**96.4**
Check	**—**	**6804**	**285**	**23.9**	**18.6**	**96.6**
AVERAGE	**—**	**7079**	**284**	**24.9**	**18.6**	**96.5**
LSD (5%)	**—**	**877 NS**	**15 NS**	**2.9 NS**	**0.9 NS**	**0.7 NS**
C.V. (%)	**—**	**8**	**4**	**8.0**	**3.2**	**0.5**

TRIAL RELIABILITY: **Fair**

EMERGENCE:	Excellent	**CERC. LEAF SPOT:**	Excellent
RHIZOCTONIA:	Moderate - Heavy Patches	**NEMATODES:**	Detected
QUADRIS APP:	Yes	**WEATHER:**	Good

Comments: Grower sprayed EEZYMAN chelated manganese (1 quart per acre) with two different glyphosate applications. EEZYMAN contains 5% chelated manganese and 2% combined sulfur from New Eezy Gro, Inc. No significant differences were found. Trial variability was increased from moderate Rhizoctonia and nematodes. The yield data for four of the six replications favored the manganese strips. In one of the strips that did not favor the manganese it was observed that the manganese strip was in a higher Rhizoctonia area. The growers are intriqued enough that they may repeat this trial next year. No noticeable difference in weed control was observed.

SYSSTEM-READY™ FOLIAR MN & ZN TRIAL

Wasmiller Farms

Location:	Saginaw Co.,	**Tillage:**	Fall - Disk Rip, Spring 1x
Variety:	B-18RR4N	**Harvest Date:**	10/19/2010
Previous Crop:	Corn	**Sample Date:**	10/6/2010
Soil Type:	Clay	**Herbicides:**	2x Glyphosate
Spacings:	Rows - 30", Seeds - 54,000/Ac	**Replicated:**	6x
Fertilizer:	2x2 - 20 Gal of 10-34-0 + ACA + Mn, Sidedress - 40 Gal of 28%	**Fungicide:**	Eminent Headline Proline

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
Check	**—**	**8319**	**235**	**35.4**	**16.6**	**93.4**
Sysstem Ready™ 1x Banded	**—**	**8229**	**231**	**35.6**	**16.3**	**93.3**
AVERAGE	**—**	**8274**	**233**	**35.5**	**16.4**	**93.3**
LSD (5%)	**—**	**482 NS**	**7 NS**	**1.3 NS**	**0.6 NS**	**0.4 NS**
C.V. (%)	**—**	**4**	**2**	**2.4**	**2.4**	**0.3**

TRIAL RELIABILITY: **Excellent**

EMERGENCE:	Excellent	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Low	**NEMATODES:**	Yes
QUADRIS APP:	Yes, 6-8 Leaf	**WEATHER:**	—

Comments: No significant differences were found. Sysstem Ready is a foliar manganese and zinc product that is designed to be compatible with glyphosate applications. This product was applied without glyphosate for this trial. The product was applied in a 7" band at 1 pint/acre in 10 gallons/acre of water. The intention was to apply a second application 2-3 weeks after the first application, but beet canopy height prevented the application. This farm was located in the prairie which typically has relatively high organic matter and high pH.

SYSSTEM-READY™ FOLIAR MN & ZN TRIAL

John Mossner

Location:	Frankenmuth	**Tillage:**	Fall - Moldboard, Spring - 1x
Variety:	HM-28RR	**Harvest Date:**	11/1/2010
Previous Crop:	Wheat / Clover	**Sample Date:**	10/6/2010
Soil Type:	Loam	**Herbicides:**	2x Glyphosate
Spacings:	Rows - 30", Seeds - 50,000 / Ac	**Replicated:**	4x
Fertilizer:	2x2 - 15 Gal. 11-22-0 + 1 pt B + 1 qt Mn, Sidedress - 25 Gal. of 28%, Variable Rate K_2O & P_2O_5	**Fungicide:**	1st - Proline, 2nd - Gem, 3rd - Eminent/Kocide, 4th - Headline

TREATMENT	$ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
Check	—	**4220**	**205**	**20.6**	**14.6**	**93.4**
Sysstem Ready™ 1x Banded	—	**3874**	**201**	**19.3**	**14.5**	**92.8**
LSD (5%)	—	**488 NS**	**30 NS**	**2.0 NS**	**1.8 NS**	**1.2 NS**
C.V. (%)	—	**5**	**7**	**4.4**	**5.4**	**0.6**

Sysstem Ready™ 1x Broadcast	—	**4784**	**204**	**23.5**	**14.6**	**93.0**
Sysstem Ready™ 1x Banded & 1x Broad	—	**4678**	**208**	**22.5**	**14.9**	**93.1**
LSD (5%)	—	**662 NS**	**24 NS**	**1.6 NS**	**1.5 NS**	**0.5 NS**
C.V. (%)	—	**8**	**7**	**3.9**	**5.8**	**0.3**

TRIAL RELIABILITY: **Good / Fair**

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Fair Control
RHIZOCTONIA:	Low / Moderate	**NEMATODES:**	—
QUADRIS APP:	6-8 Leaf	**WEATHER:**	Very Dry Summer

Comments: The two tables represent two individual trials within the same field. No significant differences were found. Sysstem Ready is a foliar manganese and zinc product that is designed to be compatible with glyphosate applications. The first trial had 1 banded application that was mixed with Quadris and applied at 1 pint per acre. The second trial compared a 1 time broadcast to 2 applications (1 broadcast and 1 banded). The broadcast application was at 1 quart per acre and was mixed with glyphosate.

Rhizoctonia Root Rot
Evaluation of Available and Experimental Fungicides

Blumfield, MI - 2010

Summary

Data on next page

The plot was planted a little late (Apr 28th) to promote disease and the ground was inoculated with a low level of Rhizoctonia AG 2-2. Several in-furrow treatments appeared to cause minor stand reduction (169 beets compared to 176 beets/100 ft) for Quadris applied as a foliar spray. Rhizoctonia symptoms were developing in early July when the untreated plots had approx. 3 dead beets/100 ft of row. There were 10 dead beets per 100 ft in the untreated plots in late July, 17 in mid August and 29 in early September. The plot was harvested on Sept 15, 2010. Quadris at 14.25 fl oz/A applied in-furrow in either a 7" band or a 3.5" band provided 100 percent control of Rhizoctonia. A reduced Quadris rate (7.1 fl oz) applied in-furrow in a 3.5 inch band gave 95% control. In-furrow applications of Moncut and Proline gave very good Rhizoctonia control. Foliar Quadris, Moncut and Proline treatments applied at the 4-6 leaf stage also provided very good control. Headline, Topsin and ActinoGrow (biological) were less effective but give fair Rhizoctonia control. Yield and quality data at this site was quite variable and is not as reliable as dead beet counts. However, all of the fungicide treatments yielded higher than the untreated check. Sugarbeet quality was not reduced very much in the check plots, possibly because rotted beets fell through the grab rolls on the harvester. The previous crop was corn and there was a lot of residue. The soil type was a sandy clay loam with a 2.1% OM and a pH of 7.6. Soil fertility levels were adequate.

Rhizoctonia Root Rot

Evaluation of Registered and Experimental Fungicides

Blumfield, MI - 2010

Trail Quality: Fair-Good

Treatment Name	Rate / Acre	Appl Desc	Dead Beets/ 100 ft	$/A	RWSA	RWST	Tons/A	% Sugar	% CJP	Emerg Beets/ 100 ft
Moncut DF	8.8 oz/a	IF 3.5"	0.0	$1,169	6235	303	20.7	20.1	95.4	191
Moncut DF	17.6 oz/a	IF 3.5"	0.0	$1,257	6705	294	22.7	19.6	95.5	148
Proline SC	2.9 fl oz/a	IF 3.5"	0.0	$1,126	6003	291	20.7	19.5	95.3	158
Quadris FL	14.25 fl oz/a	IF 3.5"	0.0	$1,045	5573	290	19.2	19.4	95.5	168
Quadris FL	14.25 fl oz/a	4-6 lf	0.4	$1,159	6180	299	20.7	19.9	95.4	172
Quadris FL	14.25 fl oz/a	IF 7"	0.4	$1,150	6132	285	21.6	19.1	95.2	156
Proline SC	5.7 fl oz/a	IF 3.5"	1.0	$1,063	5669	295	19.2	19.7	95.3	200
Topsin M	8 oz/a	IF 3.5"	1.6	$1,109	5916	294	20.1	19.5	95.6	182
Quadris FL	7.1 fl oz/a	IF 3.5"	1.6	$1,244	6634	298	22.3	19.8	95.5	162
Headline EC	9 fl oz/a	IF 3.5"	2.8	$1,100	5866	296	19.8	19.7	95.4	166
Moncut DF	17.6 oz/a	4-6 fl	3.0	$1,139	6073	301	20.2	19.9	95.8	165
Headline EC	4.5 fl oz/a	IF 3.5"	3.4	$1,167	6223	295	21.1	19.7	95.4	173
Actinovate AG	6 oz/a	IF 3.5"	6.2	$1,123	5992	288	20.9	19.3	95.1	167
Actinovate AG	12 oz/a	IF 3.5"	6.6	$1,095	5842	285	20.6	19.2	95.1	159
Topsin M	4 oz/a	IF 3.5"	7.6	$1,134	6048	300	20.1	19.9	95.6	168
Topsin M	8 oz/a	4-6 fl	9.8	$1,121	5976	289	20.6	19.4	95.3	165
Untreated			31.7	$892	4759	291	16.3	19.4	95.4	201
Mean			4.5	$1,123	5990	293.8	20.4	19.6	95.4	170.7
LSD 5%			8.4	$157	835.6	12.6	3.2	0.7	0.7	32.5
CV %			na	$11	10.9	3.4	12.2	2.9	0.6	14.9

Planted: April 28th Harvested: Sept 15th

Sprayed: April 28th at planting for in-furrow trts, June 1st (4-6lf)

Rhizoctonia Root Rot

Evaluate Quadris In-Furrow Rates and Band Widths

Blumfield, MI - 2010

Row Spacing: 22 inches

Trial Quality: Good

Treatment	Rate fl oz/A	Applic Method	Band Width	Dead Beets/ 100 ft**	Gross $/ Acre	RWSA	RWST	Tons/ Acre	% Sug	% CJP
Quadris	14.25*	4-6 lf	5 in	0.0	$1,458	7848	306	25.7	20.5	94.9
Quadris Quadris	9.5 7.1	4-6 lf In-furrow	7 in 3.5 in	0.0	$1,374	7409	294	25.2	19.8	95.0
Quadris	14.25	In-furrow	3.5 in	0.0	$1,387	7472	290	25.8	19.8	94.3
Quadris	14.25	4-6 lf	7 in	0.5	$1,376	7414	300	24.7	20.2	95.0
Quadris	4.1	In-furrow	2 in	1.0	$1,390	7494	299	25.0	20.1	95.1
Quadris	14.25	In-furrow	2 in	1.3	$1,349	7281	293	24.8	20.0	94.2
Quadris	14.25	In-furrow	7 in	3.2	$1,310	7054	291	24.3	19.8	94.3
Quadris	7.1	In-furrow	3.5 in	4.2	$1,326	7138	297	24.0	20.0	94.8
Untreated				46.9	$1,075	5781	288	20.1	19.6	94.5
Mean (without untreated)				1.4	$1,372	7389	296.2	24.9	20.0	94.7
LSD 5%				8.2		694.0	13.5	1.9	0.7	N/S (.8)
CV%				na		8.2	3.9	6.6	3.0	0.7

*Treatment applied with 2502 flat fan nozzle, all other trts used 4002E nozzles.

Planted: Apr 20th

Harvested: Sept 15th

Variety: Crystal RR827

Plot Size: 6 rows (22 inch) X 38 ft

Reps: 6

** Dead Beet (Rhizoc) Count on Sep 14th

Plots inoculated in-furrow at planting

In-furrow trts applied in 10.8 gpa

Foliar spray applied on June 1st (6 lf)

Summary

All of the in-furrow treatments provided good control of Rhizoctonia. Full Quadris rates in narrow band widths did not reduce emergence. Reduced Quadris rates applied in 2 to 3 1/2 inch band widths provided good Rhizoc control. At this time we are recommending reduced band widths but with no less than 5.25 fl oz/A of Quadris in 30 inch rows or 7.1 fl oz/A in 22 inch rows.

Seed Crop in Oregon

Seed has Become an Important Issue in 2011

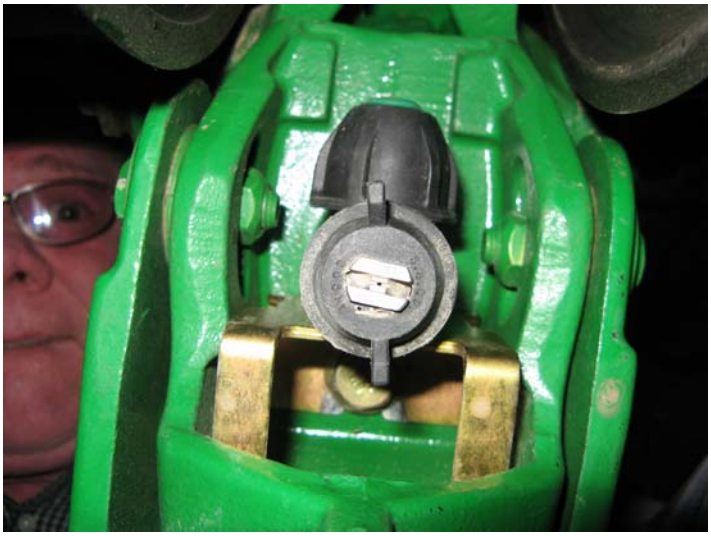
Clover Trial

Oil Seed Radish Roots

Heavy Residue Planting has Become the Norm

Frost Damage where Beet Leaves were Contacting Corn Residue

In Furrow Quadris Set-up
from Breckenridge Grower



Another In Furrow Set-up
Available from John Deere

Rhizoctonia
Check

Rhizoctonia
In Furrow Quadris
Difference in Variety Selection

Cercospora Burn Down due to
Telephone Pole Blocking Sprayer

Aphanomyces

Starter / No Nitrogen Effect

Planter Problems Showing the Effect of No Starter

No Starter or Nitrogen

50 Lbs N from 2x2 Starter

Strip Tillage in Soybean Stubble

Dodder—Plant Parasitic Weed Introduced from Contaminated Organic Clover Seed

Good Topping in Tough Situation.
Lots of Knock Outs from Rhizoctonia

Harvester Clinic with Richmond Brothers

Ropa Harvesting Beets

Maus Direct Delivery in Ruth

New Piler in Sandusky

Beets from Storage Test

Rhizoctonia Root Rot

Evaluate Quadris Application Timings

Blumfield - 2010

Row Spacing: 22 inches

Trial Validity: Good

Treatment	fl oz/ Acre	Soil Temp °F	Leaf Stage	Rhizoc* 14-Sep	Emerg B/100' 25 day	Income $ per Acre	RWSA	RWST	Tons / Acre	% Suc	% CJP
Quadris	14.25	52	In-fur	0.0	197	$1,268	6269	307	20.5	20.0	96.4
Quadris	7.1	52	In-fur	0.0	179	$1,211	5987	293	20.4	19.2	96.5
Quadris Quadris	7.1 10.7	52 73	In-fur 6-8 lf	0.2	203	$1,129	5586	302	18.6	19.8	96.3
Quadris	14.25	73	6-8 lf	0.2	202	$1,279	6325	299	21.2	19.6	96.1
Quadris	14.25	65	4 lf	0.7	205	$1,274	6212	297	21.0	19.6	96.0
Quadris	14.25	60	2 lf	0.8	194	$1,194	5903	297	20.0	19.6	96.0
Quadris	14.25	70	6 lf	1.0	187	$1,293	6394	301	21.3	19.6	96.5
Quadris	14.25	55	Cotyl	4.5	185	$1,218	6026	302	19.9	19.7	96.4
Untreated				30.9	183	$973	4813	295	16.4	19.3	96.4
Mean				4.25	193.0	$1,204	5956	299.2	19.9	19.6	96.3
LSD 5%				3.20	25.7	$109	541.0	8.3	1.7	0.5	0.5
CV%				69.0	12.4	$9	8.5	2.6	7.8	2.2	0.5

* Number of dead beets per 100 foot of row

Planted: Apr 20th

Harvested: Sept 15th

Variety: HM RR827

Soil was inoculated with Rhizoc Solani AG 2-2 IIIB at planting (30 g/100 row ft)

Previous Crop: Corn (heavy residue)

Sprayed: May 7th (Cot) May 24th (2lf) May 26th (4lf) May 31st (4-6lf) June 1st (6lf) June 4th (8lf)

Summary

The plot was planted 3 weeks later than grower fields. The inoculation method resulted in a desirable level of disease. Heavy corn residue seemed to hold the sugarbeets back and Coron was applied at the 8 leaf stage. Cercospora leaf spot was not a problem. Sugarbeets yields were low due to an extended drought period. The in-furrow treatments were applied in a 3.5 inch band and did not cause reduced emergence. The reduced rate (7.1 fl oz) was as effective as the 14.25 fl oz rate. The early post applications (Cotyl - 55 F, and 2 lf - 60 F) were less effective than later foliar treatments. Additional trials will be conducted to try to correlate Quadris application timings to leaf stage and soil temperature.

Rhizoctonia Root Rot

Late Season Quadris Applications

Breckenridge, MI - 2010

Trial Quality: Fair

Treatment*	Rate / Acre	Dead Beets #/100' 7/22/2010	Vigor 0-100** 8/25/2010
Quadris FL	14.25 fl oz/a	47.2	78.3
Quadris FL	10.5 fl oz/a	78.5	65.8
Untreated		141.2	33.3
Mean		88.9	59.2
LSD 5%		54.7	14.4
CV%		47.8	19.0

* Treatments were applied at the 14-16 leaf stage.
** Higher number is better.
Plot Size: 12 rows X 100 ft with 4 Reps
Variety: HM 27RR
30 inch rows

Summary

Quadris was applied as a "rescue" treatment (14 to 16 leaf stage) at this location. Quadris at the highest labeled rate (14.25 fl oz/A) provided 55 percent control of Rhizoctonia. The commonly recommended rate of 10.5 fl oz/a gave 33 percent control. Aphanomyces and cyst nematodes were also present in the trial. Yield information was not obtained.

Rhizoctonia Root Rot

Evaluate ActinoGrow For Control of Rhizoctonia*

Quanicassee, MI - 2010

Trial Quality: Fair

Treatment	Rate oz/A	Applic Timing	Dead** Beets	RWSA	RWST	Tons Acre	% Sug	% CJP	% Emerg
Quadris	7.1	In-Furr	0.5	6880	302	22.8	20.3	95.0	67
ActinoGrow	12	In-Furr	2.5	7258	299	24.3	20.2	94.8	65
ActinoGrow	6	In-Furr	3.3	7338	304	24.0	20.3	95.3	69
ActinoGrow	3	In-Furr	7.3	6924	289	23.8	19.9	94.0	66
Untreated***			17.5	6318	300	20.9	20.1	95.2	69
Mean			6.2	6943	299.0	23.2	20.1	94.9	67.1
LSD 5%			5.5	N/S (1642.6)	N/S (24.3)	N/S (4.1)	N/S (1.3)	0.93	N/S (6.7)
CV%			57.7	15.4	ns	11.5	4.2	0.6	6.5

** Rhizoc: Dead Beets per 100 ft

Planted: May 25th
Harvested: Oct 18th
Fungicide Applied: May 25th (in-furrow)
Plot Size: 6 rows X 38 ft X 5 reps
Trial was inoculated with Rhizoc at planting (30 grams/100 ft of row)
Variety: Crystal RR827

***Dead Beets in Untreated Plots

July 5th	7.5
Aug 5th	8.5
Sept 7th	17.5

*ActinoGrow contains a beneficial microbe, *Streptomyces lydicus* , which provides protection against Rhizoctonia solani

Summary

ActinoGrow applied at planting (in-furrow) at 6 and 12 oz/A provided fairly good control of Rhizoctonia solani in this small plot replicated trial. The low rate (3 oz) gave only suppression of the disease. Quadris at 7.1 fl oz/A applied in-furrow provided excellent Rhizoctonia control. All of the treatments were applied in-furrow in a 3.5 inch band in 10.8 gallons of water per acre. Nozzles: 4002E, Pressure: 25 psi, Speed 3 mph. The plot was planted late and inoculated to encourage disease. We plan to evaluate tank mixtures of Quadris and ActinoGrow as in-furrow treatments next year.

Rhizoctonia Seed Treatment and Priming Trials Research

2010 Research

We conducted several "confidential" research trials for chemical and seed companies looking at Rhizoctonia seed treatments and improved priming processes in 2010. Because of the competitive nature of the priming and seed treatment businesses we agreed to conduct trials which we will not be able to publish at this time. The companies that we worked with do not have their own staff available to conduct this work in Michigan. In general, it appears that improved priming processes are being developed for our market. It also appears that Rhizoctonia seed treatments will be available for our market in two to three years.

2010 Quadris In-Furrow Emergence Counts

Early Stands

	Bernia Shop	Bernia Dickerson	Gulick #1	Gulick # 2 & # 5	Gulick # 3	Gulick # 4	Gulick # 6	Wadsworth Stringer	Wadsworth Snover	Wadsworth Eddy	Bierlein	Meylan	Avg.
Band Width	*3"*	*3"*	*4"*	*4"*	*4"*	*4"*	*4"*	*3"*	*3"*	*3"*	*4"*	*3"*	
Rate	*6 oz/ac.*	*6 oz/ac.*	*6 oz/ac.*	*6 oz/ac.*	*6 oz/ac.*	*6 oz/ac.*	*6 oz/ac.*	*4.5 oz/ac.*	*4.5 oz/ac.*	*4.5 oz/ac.*	*6 oz/ac.*	*6 oz/ac.*	
# of Reps	*4*	*4*	*2*	*2*	*2*	*2*	*2*	*4*	*4*	*4*	*4*	*4*	*38*
Quadris	27	39	98	124	159	233	121	81	122	163	85	37	107
Check	31	41	92	135	159	246	142	92	140	182	84	59	117
LSD	38 NS	25 NS	--	--	--	--	--	14 NS	19 NS	31 NS	13 NS	44 NS	**6**
CV %	59	28	--	--	--	--	--	7	7	8	7	41	**6**

Final Stands

	Bernia Shop	Bernia Dickerson	Gulick #1	Gulick # 2 & # 5	Gulick # 3	Gulick # 4	Gulick # 6	Wadsworth Stringer	Wadsworth Snover	Wadsworth Eddy	Bierlein	Meylan **	Avg.
Quadris	145	146	117	132	158	237	150	170	204	194	175	104	161
Check	136	155	102	139	165	248	168	180	218	210	168	145	170
LSD	25 NS	13 NS	--	--	--	--	--	24 NS	**11**	33 NS	18 NS	**25**	9 NS
CV %	8	4	--	--	--	--	--	6	**2**	7	5	**9**	6

** The average without the Meylan trial: Quadris=166, Check= 172.

RHIZOCTONIA CONTROL TRIAL

Bierlein Farms Inc.

Location:	Tuscola County	**Tillage:**	Fall - Disk Rip
Variety:	C-824RR		Spring - 1x Field Cult.
Planting Date:	4/1/2010	**Harvest Date:**	10/31/2010
Previous Crop:	Corn	**Sample Date:**	10/5/2010
Soil Type:	Loam	**Herbicides:**	Glyphosate
Spacings:	Rows - 22", Seeds - 66,000 / Ac	**Replicated:**	4x
Fertilizer:	Fall - 15 Gal. of 28%	**Fungicide:**	Proline
	PPI- 40 Gal 28%, 5 Gal Thiosul, 5 Gal		Gem
	10-34-0, 1 Qt B, 1 1/2 Qt Mn		Proline

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	POPULATIONS 100 Ft. of Row		RHIZOCTONIA	
							20 DAY	40 DAY	1200 Ft. of Row	% Control vs Check
In Furrow + 6-8 Leaf - Low Rate	$1,614	8628	295	29.2	19.9	94.9	—	—	44	72%
In Furrow + 6-8 Leaf - Proline	$1,594	8550	292	29.3	19.8	94.6	—	—	47	70%
2-4 Leaf & 6-8 Leaf Low Rate Twice	$1,574	8453	288	29.4	19.5	94.7	—	—	32	80%
6-8 Leaf Low Rate	$1,571	8329	296	28.2	19.9	94.8	—	—	35	78%
In Furrow + 6-8 Leaf - Normal Rate	$1,547	8304	285	29.1	19.3	94.6	—	—	18	89%
6-8 Leaf - Proline	$1,524	8141	292	27.9	19.8	94.6	—	—	92	41%
6-8 Leaf Normal Rate	$1,511	8070	285	28.3	19.5	94.3	—	—	30	81%
2-4 Leaf Normal Rate	$1,499	8010	289	27.7	19.6	94.6	—	—	88	44%
In Furrow	$1,518	8009	281	28.5	19.3	94.2	85	175	56	64%
Check	$1,375	7233	283	25.5	19.3	94.4	84	168	157	—
AVERAGE	$1,533	8173	289	28.3	19.6	94.6	—	—	60	—
LSD (5%)	—	667	11	1.7	0.6 NS	0.6	13 NS	18 NS	33	—
C.V. (%)	—	6	3	4.1	2.0	0.4	7	5	38	—

TRIAL RELIABILITY: Good

EMERGENCE:	Very Good	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Moderate	**NEMATODES:**	Not Detected
QUADRIS APP:	See Treatments	**WEATHER:**	Dry Summer

Comments: Pay the most attention to the dead beet counts. This is the best indicator of a treatments performance. Trial used Rhizoctonia susceptible variety C-824RR. All treatments were Quadris unless otherwise noted. The 22" row rates were: Normal rate = 14.3 oz, Low Rate = 9.55 oz, In-Furrow = 6 oz, Proline = 5.7oz + NIS (0.25% v/v). The in-furrow treatments were T-Band applied in a 4" band with 7.5 gallons/acre of water. The nozzles were 40015E at a 6" height from the soil surface. The foliar treatments were applied in a 7" band with 12 gallons/acre of water. Revenue per acre is based on a $55 per ton payment, Quadris cost of $1.30 per ounce, Proline + NIS cost of $21.29, and a $7.50 foliar application cost.

RHIZOCTONIA CONTROL TRIAL

Meylan Farms Inc.

Location: Bay Co.
Variety: B-18RR4N
Planting Date: 3/27/2010
Previous Crop: Pickles / Oil Seed Radish
Soil Type: Loam
Spacings: Rows - 30", Seeds - 48,000 / Ac
Fertilizer: 2x2 - 17 Gal 19-17-0 + Micros
PPI - 25 Gal 28%

Tillage: Fall - Chisel
Spring - 1x Triple K
Harvest Date: 10/27/2010
Sample Date: 10/7/2010
Herbicides: 2x Glyphosate
Replicated: 4x
Fungicide: 1st -Eminent, 2nd - Headline, 3rd - Eminent

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	POPULATIONS 100 Ft. of Row		RHIZOCTONIA	
							Early	Final	1200 Ft. of Row	% Control vs Check
2-4 Leaf & 6-8 Leaf Low Rate Twice	$1,420	7908	305	25.9	20.2	95.7	—	—	20	87%
6-8 Leaf Normal Rate	$1,425	7851	306	25.7	20.3	95.7	—	—	13	91%
In Furrow + 6-8 Leaf - Normal Rate	$1,384	7676	311	24.7	20.7	95.3	—	—	19	—
6-8 Leaf Low Rate	$1,379	7594	293	25.9	19.5	95.6	—	—	19	88%
2-4 Leaf Normal Rate	$1,343	7373	304	24.4	20.1	95.7	—	—	74	51%
In Furrow + 6-8 Leaf - Low Rate	$1,322	7330	294	24.9	19.5	95.8	—	—	15	—
In Furrow	$1,321	7228	296	24.4	19.7	95.4	37	104	11	—
6-8 Leaf - Proline	$1,285	7122	288	24.8	19.4	95.0	—	—	77	49%
In Furrow + 6-8 Leaf - Proline	$1,273	7104	298	23.9	19.7	95.7	—	—	25	—
Check	$1,221	6629	295	22.5	19.6	95.7	59	145	152	—
AVERAGE	$1,337	7381	299	24.7	19.9	95.6	—	—	43	—
LSD (5%)	—	657	18	1.9	1.0	0.6	44	25	63	—
C.V. (%)	—	6	4	5.3	3.4	0.5	41	9	103	—

TRIAL RELIABILITY: **Fair / Good**

EMERGENCE:	Poor	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Low - Moderate	**NEMATODES:**	Yes
QUADRIS APP:	See Treatments	**WEATHER:**	—

Comments: The percent control was not calculated for the in-furrow treatments due to a 41 beet lower stand. Beet emergence was slow and in-furrow applications reduced the final stand and may have reduced yield. Trial used Rhizoctonia susceptible variety B-18RR4N. All treatments were Quadris unless otherwise noted. The 30" row rates were: Normal Rate = 10.5 oz, Low Rate = 7 oz, In-Furrow = 6 oz, Proline = 5.7oz + NIS (0.25% v/v). The in-furrow treatments were T-Band applied in a 3" band with 6 gallons/acre of water. The nozzles were 2502 at a 7" height from the soil surface. The foliar treatments were applied in a 7" band with 10 gallons/acre of water. Revenue per acre is based on a $55 per ton payment, Quadris cost of $1.30 per ounce, Proline + NIS cost of $21.29, and a $7.50 foliar application cost.

RHIZOCTONIA CONTROL TRIAL - QUADRIS® TIMING

Schindler Farms LLC

Location:	Bay County	**Tillage:**	Fall - Chisel, Spring - S Tine
Variety:	B-18RR4N	**Harvest Date:**	10/29/2010
Previous Crop:	Corn	**Sample Date:**	10/7/2010
Soil Type:	Loam	**Herbicides:**	2x Glyphosate
Spacings:	Rows - 22", Seeds - 64,000 / Ac	**Replicated:**	4x
Fertilizer:	2x2 - 20 Gal. 19-17-0 + Micros Sidedress - 40 Gal. 28%	**Fungicide:**	1st - Inspire XT, 2nd - Headline, 3rd - Proline

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	RHIZOCTONIA	
							Dead Beets / 1200' of Row	% Control vs. Check
Week 5, 6/1 6-10 Leaf	$1,522	9046	327	27.7	21.5	95.9	78	75%
Week 1, 5/5 2-4 Leaf	$1,489	8853	332	26.7	21.8	96.0	87	73%
Week 4, 5/26 6-8 Leaf	$1,465	8708	323	27.0	21.2	95.9	95	70%
Rescue Broadcast 6/8, 10-14 Leaf	$1,392	8310	319	26.0	21.2	95.3	141	56%
Week 3, 5/19 4-6 Leaf	$1,385	8265	315	26.2	20.8	95.7	86	73%
Week 6, 6/8 10-14 Leaf	$1,384	8207	310	26.6	20.5	95.5	71	78%
Check	$1,265	7373	326	22.7	21.4	95.9	318	0%
AVERAGE	$1,415	8395	322	26.1	21.2	96	125	—
LSD (5%)	—	709	15	1.3	0.9	0.4	72	—
C.V. (%)	—	6	3	3.4	2.7	0.3	39	—

TRIAL RELIABILITY: **Good**

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Moderate/Heavy	**NEMATODES:**	Yes
QUADRIS APP:	See Treatments	**WEATHER:**	—

Comments: Trial was conducted to look at timing of Quadris application as compared to growth stage and soil temperature. A broadcast application of Quadris was also applied at the 10-14 leaf stage when Rhizoctonia dead beets were beginning to be found. This application was considered a rescue treatment. All banded treatments were better than the check, but did not show much control difference from week to week. This is not consistent with other trials that showed 6-8 leaf timings were much better than 2-4 leaf timings. The broadcast rescue treatment did not provide as good of control as a banded application on the same date. All treatments were the 22" row rate of 14.3 oz/acre of Quadris. Revenue per acre is based on a $55 per ton payment, Quadris cost of $1.30 per ounce, and a $7.50 foliar application cost.

RHIZOCTONIA RESCUE TREATMENTS & SYSSTEM-READY™ FOLIAR MN & ZN

Helmreich Farms LLC

Location:	Bay County	**Tillage:**	Fall - F.C., Spring - Triple K
Variety:	B-18RR4N	**Harvest Date:**	10/14/2010
Previous Crop:	Soybeans	**Sample Date:**	10/14/2010
Soil Type:	Loam	**Herbicides:**	Glyphosate
Spacings:	Rows - 30", Seeds - 48,000	**Replicated:**	3x
Fertilizer:	2x2 - 45-30-60 Units, PPI - 45# N	**Fungicide:**	Eminent Headline

TREATMENT	$ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	RHIZOCTONIA	
							Dead Beets / 1200' of Row	% Control vs. Check
Broadcast Quadris	—	**4899**	**268**	**18.1**	**17.8**	**95.9**	**209**	**17%**
Banded Quadris	—	**4896**	**259**	**18.9**	**17.6**	**94.8**	**76**	**70%**
Check	—	**4853**	**275**	**17.6**	**18.3**	**95.9**	**252**	—
Sysstem-Ready™ Foliar Mn & Zn	—	**4241**	**257**	**16.4**	**17.4**	**95.1**	**292**	—
AVERAGE	—	**4722**	**265**	**17.8**	**17.8**	**95.4**	**207**	—
LSD (5%)	—	**2074 NS**	**30 NS**	**6.1 NS**	**1.44 NS**	**1.74 NS**	**208 NS**	—
C.V. (%)	—	**22**	**6**	**17.1**	**4.1**	**0.9**		—

TRIAL RELIABILITY: Poor

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Heavy in Spots	**NEMATODES:**	Yes
QUADRIS APP:	See Comments	**WEATHER:**	—

Comments: Trial reliability was very poor. Trial was conducted in a field that had an early Rhizoctonia issue. The broadcast and banded treatments were meant as rescue treatments applied on 6/8/10 at the 10-14 leaf stage. These were the second Quadris applications, as all of the field received an in-furrow Quadris application (10 oz/ac in 2 1/2" T band). Banded applications were more effective in controlling Rhizoctonia than a broadcast application. The banded treatment was 10.5 oz/ac of Quadris with 10 gal./ac of water in a 7" band. The broadcast treatment was 14.32 oz/ac in 15 gal/acre water. The trial also included a treatment that was banded System Ready™ from Agro●K. Sysstem Ready™ was applied at 1 qt/acre in a 7" band. Sysstem Ready is a foliar manganese and zinc product that is designed to be compatible with glyphosate applications.

RHIZOCTONIA CONTROL TRIAL
1 vs 2 QUADRIS® APPLICATIONS
Wegener Farms

Location:	Bay Co., Auburn	**Tillage:**	Fall Chisel, Spring 1x Triple K
Variety:	80% B-18RR4N, 20% HM-27RR	**Harvest Date:**	10/20/2010
Previous Crop:	Dry Beans	**Sample Date:**	10/15/2010
Soil Type:	Loam	**Herbicides:**	2x Glyphosate
Spacings:	Rows - 30", Seeds - 46,000/Ac	**Replicated:**	6x
Fertilizer:	2x2 - 15 Gal. 19-17-0 + Mn PPI - 300# 33-0-0, Fall - 200# K_2O	**Fungicide:**	Eminent Headline Eminent

TREATMENT	NET $ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	RHIZOCTONIA	
							Dead Beets / 1200' of Row	% Control vs. Check
2 Quadris Applications	**$1,636**	**8083**	**303**	**26.7**	**20.3**	**95.1**	**42**	**—**
1 Quadris Application	**$1,625**	**7931**	**297**	**26.8**	**20.0**	**94.7**	**119**	**—**
AVERAGE	**—**	**8007**	**300**	**26.7**	**20.2**	**94.9**	**80**	**—**
LSD (5%)	**—**	**325 NS**	**7.8 NS**	**1.33 NS**	**0.45 NS**	**0.4 NS**	**59**	**—**
C.V. (%)	**—**	**3**	**2**	**3.4**	**1.5**	**0.3**	**50**	**—**

TRIAL RELIABILITY: Good

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Low/Moderate	**NEMATODES:**	Yes
QUADRIS APP:	See Treatments	**WEATHER:**	—

Comments: The whole field received an in-furrow Quadris application (5.25 oz/ac Quadris, 8.4 gal/ac water, and 2.75" T Band). The treatment with the 2nd application was a banded foliar 8-10 leaf application of 8 oz/acre of Quadris. The Rhizoctonia counts showed a significant difference from the second application. Each strip that was harvested had a progressively lower yield from east to west. This is likely hiding any potential yield increase from the improved control.

Nitrogen and weed control timing influences on Roundup Ready sugarbeet quality and yield (2010)

Alicia Spangler, Christy Sprague and Darryl Warncke, Michigan State University

Location: MSU Agronomy Farm, East Lansing Saginaw Valley Research & Extension Center	**Weed Removal:** 1, 3, 6, & 12" weeds
Planting Date: May 19, 2010 – E. Lansing March 31, 2010 - SVREC	**Nitrogen Rates:** 0, 60, 90, 120 and 60:60 lb/A
Soil Type: Clay Loam, OM 3.0%, pH 7.3 - E. Lansing Clay, OM 3.4%, pH 6.1 - SVREC	**Tillage:** Conventional
Herbicides: Roundup PowerMax (22 fl oz/A) + AMS	**Population:** 4 ¼" spacing
Variety: Hilleshog 9042, Roundup Ready	**Replicated:** 4 times

Table 1. Effect of weed removal timings on sugarbeet yield and quality averaged across nitrogen rates.

	EAST LANSING		SAGINAW	
WEED REMOVAL[a]	Yield	RWSA[b]	Yield	RWSA[b]
	—— tons/A ——	—— lbs/A ——	—— tons/A ——	—— lbs/A ——
<1 inch	16.1 a	4153 a	28.6 a	7359 a
3 inches	15.3 b	3926 b	24.6 b	6236 b
6 inches	14.5 c	3706 c	24.6 b	6216 b
12 inches	14.3 c	3726 c	22.6 c	5878 b

[a] Weeds were removed at heights using Roundup PowerMax (22 fl oz/A) + AMS (17 lb/100 gal)
[b] RWSA = Recoverable white sugar per acre.

Table 2. Effect of nitrogen on sugarbeet yield and quality averaged across weed removal timings.

	EAST LANSING		SAGINAW	
NITROGEN RATE	Yield	RWSA[c]	Yield	RWSA[c]
	—— tons/A ——	—— lbs/A ——	—— tons/A ——	—— lbs/A ——
0 lb/A[a]	13.8 b	3714 a	22.1 c	5845 b
60 lb/A[a]	14.5 b	3818 a	25.4 ab	6610 a
90 lb/A[a]	15.5 a	3998 a	24.6 b	6313 ab
120 lb/A[a]	15.6 a	3886 a	26.5 a	6617 a
60:60 lb/A[b]	16.0 a	3972 a	26.8 a	6727 a

[a] Nitrogen applied pre-plant.
[b] First application applied pre-plant; second application applied sugarbeet 4-6 leaf stage.
[c] RWSA = Recoverable white sugar per acre.

Summary: This trial was conducted to determine what effect weed removal time and nitrogen rate had on sugarbeet yield and quality. Weed removal timing had the greatest impact on yield and quality. At both locations, highest yield and recoverable white sugar were observed when weeds were removed prior to 3-inches. Nitrogen rate had little effect on yield and RWS. At East Lansing, both yield and RWS were similar at nitrogen rates of 90, 120 and 60:60 lb/A. Yield at Saginaw was similar at nitrogen rates of 120 and 60:60 lb/A, while RWS was similar at 90, 120 and 60:60 lb/A. Poor response to nitrogen may have been influenced by below normal precipitation, which was observed at both locations during the latter part of the growing season. This experiment will repeated during the 2011 growing season.

Control of volunteer Roundup Ready soybean in Roundup Ready sugarbeet (2009 & 2010)

Christy Sprague and Gary Powell, Michigan State University

Location: Saginaw Valley Research and Extension Center	**Tillage:** Conventional
Planting Date: April 16, 2009 & March 31, 2010	**Herbicides:** see treatments
Soil Type: Silty clay loam; 2.4 OM; pH 7.9 ('09) Clay; 3.0 OM; pH 6.8 ('10)	**Variety:** Hilleshog 9042
Replicated: 4 times	**Population:** 4 1/4-inch spacing

Table 1. Control of volunteer Roundup Ready soybean in Roundup Ready sugarbeet (mid-August) and recoverable white sugar yields for the various treatments. Data are combined for 2009 & 2010.

	VOLUNTEER RR SOYBEAN CONTROL		RECOVERABLE WHITE SUGAR PER ACRE	
Herbicide treatments	V2 soybean	V4-V6 soybean	V2 soybean	V4-V6 soybean
	——— % control ———		——— lb/A ———	
Roundup PowerMax (22 fl oz) + AMS[a] alone	0		5119	
+ UpBeet (0.5 oz)	15	12	5736	5453
+ UpBeet (0.5 oz) + COC	25	35	6073	6118
+ UpBeet (0.5 oz) + MSO	28	45	6068	7286
+ UpBeet (1 fl oz)	21	19	6278	5612
+ Stinger (1 fl oz)	92	91	7370	6279
+ Stinger (2 fl oz)	99	99	6953	6502
+ Stinger (4 fl oz)	99	99	7255	7181
$LSD_{0.05}$[b]	10		974	

[a] Abbreviations: AMS = ammonium sulfate; COC = crop oil concentrate; MSO = methylated seed oil

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

Summary: This trial was conducted to examine different control strategies for volunteer Roundup Ready soybean. While this may not be a wide-spread problem volunteer soybean has shown up on occasion in grower's fields. There were 15 different treatments that looked at two different application timings with UpBeet and Stinger combinations. The control treatment was two applications of Roundup PowerMax applied at 2-inch followed by 4-inch weeds. These application timings corresponded with V2 and V4 volunteer Roundup Ready soybean. Roundup PowerMax was applied alone and in combination with the treatments that are listed in Table 1 in either the first or second application timing. Results indicated that the greatest volunteer Roundup Ready soybean control that UpBeet provided was 45%. This treatment included methylated seed oil (MSO) at 1% v/v at the later application timing. All treatments that contained Stinger provided greater volunteer Roundup Ready soybean control than treatments with UpBeet. Volunteer Roundup Ready soybean control was complete with 2 to 4 oz of Stinger. All Stinger treatments, except the later application of Stinger at 1 oz, and UpBeet applied at the later timing with MSO protected sugarbeet yield from volunteer soybean competition.

Evaluation of Sequence for weed control in Roundup Ready sugarbeet

Christy Sprague and Gary Powell, Michigan State University

Location: Saginaw Valley Research and Extension Center	**Tillage:** Conventional
Planting Date: March 31, 2010	**Herbicides:** see treatments
Soil Type: Clay; 3.0 OM; pH 6.8	**Variety:** Hilleshog 9042
Replicated: 4 times	**Population:** 4 1/4-inch spacing

Table 1. Weed control and sugarbeet yield and recoverable white sugar for various treatments containing Sequence.

	WEED CONTROL (at Harvest)			SUGARBEET	
Herbicide treatments[a] (application timing beet stage)	C. lambsquarters	Pennsylvania smartweed	Pigweed spp.	Yield	RWSA
	% control			ton/A	lb/A
Touchdown + AMS[b] (2-, 6-, 8-lf)	99	99	95	23.9	6291
Touchdown + AMS (2-, 6-lf) Sequence + AMS (8-lf)	98	99	99	24.7	6673
Touchdown + AMS (2-, 8-lf) Sequence + AMS (6-lf)	99	99	99	23.9	6443
Sequence + AMS (2-lf) Touchdown + AMS (6-, 8-lf)	99	99	99	23.5	6442
Sequence + AMS (2-, 6-lf) Touchdown + AMS (8-lf)	99	99	99	24.2	6475
Sequence + AMS (2-lf)	40	73	95	18.6	5094
Touchdown + AMS (2-lf) Sequence + AMS (6-lf)	98	98	89	24.5	6742
$LSD_{0.05}$[b]	5	5	5	3.9	1077

[a] Herbicide rates: Touchdown Total (24 fl oz), Sequence (2.5 pt), and AMS (17 lb/100 gal)

[b] Abbreviations: AMS = ammonium sulfate; RWSA = recoverable white sugar per acre

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

Summary: This trial was conducted to examine different weed control strategies using the newly registered premixture Sequence (s-metolachlor + glyphosate). The rate of Sequence used in this trial was 2.5 pt/A. This use rate is equivalent to 0.98 pt/A of Dual Magnum and 22 oz of Touchdown Total. Crop safety was excellent with the different herbicide treatments, even Sequence applied twice at the 2- and 6-leaf sugarbeet stages. At harvest, control of common lambsquarters, Pennsylvania smartweed, and pigweed spp. (Powell amaranth and redroot pigweed) was excellent with all treatments that were applied three times (Table 1). Applying Sequence once at 2-leaf sugarbeet did not provide season-long control of common lambsquarters or Pennsylvania smartweed. Weed control was good to excellent when two herbicide applications were made Touchdown Total at 2-leaf sugarbeet and Sequence at 6-leaf sugarbeet. Sugarbeet yield and RWSA was similar for all treatments except for the one application of Sequence at 2-leaf sugarbeet. However, this was higher than the untreated control which yielded 5.7 tons/A.

Warrant (MON 63410) a potential new herbicide in sugarbeet

Christy Sprague and Gary Powell, Michigan State University

Location: Saginaw Valley Research and Extension Center	**Tillage:** Conventional
Planting Date: March 31, 2010	**Herbicides:** see treatments
Soil Type: Clay; 3.0 OM; pH 6.8	**Variety:** Hilleshog 9042
Replicated: 4 times	**Population:** 4 1/4-inch spacing

Table 1. Weed control and sugarbeet yield and recoverable white sugar for various treatments containing Warrant.

	WEED CONTROL (at Harvest)			SUGARBEET	
Herbicide treatments[a] (application timing beet stage)	C. lambsquarters	Pennsylvania smartweed	Pigweed spp.	Yield	RWSA
	% control			ton/A	lb/A
Roundup PMax + AMS[b] (2-, 6-lf)	97	94	93	23.2	6251
Warrant + Roundup + AMS (2-lf) Roundup + AMS (6-lf)	98	96	96	23.3	6094
Outlook + Roundup + AMS (2-lf) Roundup + AMS (6-lf)	99	99	99	23.3	6043
Dual + Roundup + AMS (2-lf) Roundup + AMS (6-lf)	99	98	98	23.4	6290
Roundup + AMS (2-lf) Warrant + Roundup + AMS (6-lf)	98	96	96	24.8	6622
Roundup + AMS (2-lf) Outlook + Roundup + AMS (6-lf)	98	98	98	23.0	6204
Roundup + AMS (2-lf) Dual + Roundup + AMS (6-lf)	99	97	97	22.1	5783
$LSD_{0.05}$[b]	n.s.	n.s.	4	n.s.	n.s.

[a] Herbicide rates: Roundup PowerMax (22 fl oz), Warrant (3 pt), Dual Magnum (1.33 pt), Outlook (22 fl oz) and AMS (17 lb/100 gal)

[b] Abbreviations: AMS = ammonium sulfate; RWSA = recoverable white sugar per acre

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

Summary: Warrant (MON 63410) is a new encapsulated acetochlor product that is being examined as a potential tank-mix partner with Roundup (glyphosate) in Roundup Ready sugarbeet. This trial compares crop tolerance, weed control and sugarbeet yield of two different application timings of Warrant with the current standards of Dual Magnum and Outlook. Sugarbeet tolerated applications of Warrant, Outlook, and Dual Magnum that were tank-mixed with Roundup at either 2- or 6-leaf sugarbeet. All herbicide treatments provided excellent control of common lambsquarters and Pennsylvania smartweed. There were some minor differences in control of late-season pigweed spp. (Powell amaranth and redroot pigweed). However, all treatments provided greater than 90% control. There were no herbicide treatment differences in sugarbeet yield or recoverable white sugar. However, the untreated control yielded only 6.5 tons/A.

Control of Volunteer Canola With UpBeet

Blumfield, MI - 2010

Treatment*	Rate	Canola Size at App 8-Sep	Canola Size at App 17-Sep	% Canola Control at days after 2nd Applic 36 day	% Canola Control at days after 2nd Applic 15 day	% Canola Control at days after 2nd Applic 7 day	% Dessic 15 day	% Chlorosis 15 day
UpBeet	2 oz/A	6-8 in		86.7	90.0	61.7	6.7	18.3
UpBeet	2 oz/A	6-8 in	10-12 in	83.3	73.3	56.7	10.0	18.3
Progress	3 pt/A	6-8 in	10-12 in	83.3	83.3	35.0	40.0	41.7
UpBeet	1 oz/A	6-8 in	10-12 in					
UpBeet	1 oz/A	6-8 in		75.0	80.0	53.3	3.3	16.7
UpBeet	1 oz/A	6-8 in	10-12 in	73.3	76.7	53.3	5.0	18.3
Progress	3 pt/A	6-8 in		65.0	66.7	26.7	25.0	28.3
UpBeet	1 oz/A	6-8 in						
UpBeet	0.5 oz/A	6-8 in	10-12 in	60.0	63.3	43.3	5.0	11.7
Progress	5 pt/A	6-8 in		40.0	53.3	30.0	30.0	36.7
UpBeet	1 oz/A	6-8 in						
UpBeet	0.5 oz/A	6-8 in		36.7	60.0	45.0	1.7	11.7
Untreated				0.0	0.0	0.0	0.0	0.0
Mean				60.3	64.7	40.5	12.8	20.0
LSD 5%				20.2	16.6	9.4	6.2	4.6
CV %				19.5	15.0	13.6	28.2	13.4

*All of the UpBeet and Progress treatments included NIS (0.25%) and AMS (17 lbs/100 gal)

Planted: Aug 5th
First Applic: Sep 8th (6-8 inches tall)
Second Applic: Sep 17th (10-12 inches tall)

Rated: Sep 24th, canola 14-16 tall
Rated: Oct 1st, canola 18-20 inches tall
Rated: Oct 22nd, canola 24-26 inches tall and starting to flower

Summary

The canola was planted in late August because we did not have time to conduct this trial in the spring. The canola was not Roundup Ready canola. We made the first application when the canola was 6-8" tall because most growers would not know that they have volunteer canola until after their first Roundup application - and by then the canola would be getting fairly tall. Canola would be fairly easy to kill when it is around 2 inches tall. UpBeet at 2 oz/A with a non-ionic surfactant and AMS gave 87% control of canola when sprayed at the 6-8 inch tall stage. Two applications did not do any better than one application. Progress at 3 pints/A + UpBeet at 1 oz/A was less effective. This trial will be repeated in 2011.

Cercospora Leafspot Research

BeetCast, Fungicide Spray Trials and Replicated Strip Trials

2010

General Information

Several Cercospora leafspot trials were conducted in 2010 including two BeetCast trials, two Inspire fungicide trials and 2 fungicide efficacy trials comparing the commercial fungicides. In addition, three replicated strip trials comparing application timings were established. Four Cercospora nursery trials were conducted as part of the Official Variety Trial program.

The small plot replicated trials are sprayed with a John Deere 990 tractor equipped with a compressed air plot sprayer. The sprayer has 16 three gallon stainless steel tanks which hold the individual fungicide treatments. Cercospora treatments are applied in 22.5 gpa with 80015 nozzles at 100 psi and 3 mph. Some trials are inoculated with Cercospora before the trial is started. BeetCast trials are not inoculated. The plots are 6 rows wide and 38 feet long with 6 replications. The plots are rated with a 0-9 visual rating scale (Table 1). Yield and quality measurements are also taken.

Research shows that if the first application is applied late (after spots are found) coming back earlier (35-45 DSV's) with the second application will help compensate for starting late.

It is important to make an application late in the season if BeetCast calls for it. Cercospora will progress throughout the fall and under good leaf spot conditions the disease level on Sept 1 can double by mid October unless an additional spray is applied. Table 2 shows the yield and quality losses that can be expected at various levels of leaf damage.

Table 1. Cercospora 0-9 Rating Scale	
0	No spots
1	Very few spots, must search to find
2	Light infestation, find spots in 1-2 sec
2.5	Moderate infection, up to 25 spots/leaf
3	Heavily spotted (over 100 spots/leaf)
4	Spots merging to form larger dead areas
5	Up to 25% desiccated leaves, flagging
6	Up to 50% desiccated leaves, regrowth
7 to 9	Progressively worse until leaves are dead

Table 2. Yield Losses Caused by Cercospora		
0-9 Rating	Tons/ Acre	Points Sug
2.5	0	0
3	1	0.25
4	1.5	0.5
5	2	0.75
6	2.5	1
7-9	up to 5	up to 3

Cercospora Leafspot Research

Evaluate Registered Fungicides for Cercospora Control

Spaulding Township and Blumfield, MI - 2010

Summary

Commercially available fungicides (Inspire XT, Eminent, Headline, Proline, Gem, Enable, Super Tin, Dithane and Quadris) were evaluated for control of Cercospora leaf spot at two locations in 2010. BAS 703 02F, an experimental fungicide with a different mode of action was also tested. Inspire XT provided the best leaf spot control in these trials. Eminent, Proline and Headline also gave good Cercospora control. Gem was a little less effective than in past years. In 2008 trials, the addition of a surfactant and 28% nitrogen improved Cercospora control with Gem. Enable + Dithane + Crop Oil and Super Tin provided adequate results. The experimental fungicide from BASF gave fairly good results, similar to Gem. Early season Quadris applications suppressed Cercospora development somewhat. Disease levels in the trials were high and yield and quality were lowered significantly in the untreated plots.

Results from these trials are similar to what we have found in the past 3 to 4 years. In general, Inspire appears to be the best product followed closely by Eminent, Headline and Proline, with Gem slightly behind but still in a good range. Enable + Dithane + COC and Super Tin have been middle performers. The EBDC's (Dithane, Penncozeb, etc) and Copper are effective but lack residual activity. The Strobi's and Triazoles are more rainfast than the contact type fungicides. They are also much more prone to developing resistance and a sound rotation plan should be followed. Super Tin is a good rotation partner for managing resistance.

The treatments were applied with a John Deere 990 tractor equipped with a compressed air plot sprayer. The sprayer puts out 22.5 gpa with 80015 nozzles at 100 psi and at 3 mph. The plot area was inoculated with Cercospora before the treatments were applied. Plots were evaluated using the 0-9 scale described previously.

Cercospora Leafspot Research

Evaluate Registered Fungicides for Cercospora Control

Avg of 2 Michigan Locations - 2010

Trial Quality: Good

Treatment	Rate/A	Applic* Timing	CLS (0-9)** 9/19	CLS (0-9)** 8/28	$ per Acre***	RWSA	RWST	Tons / Acre	% Sug	% CJP
Inspire XT Super Tin	7 fl oz 5 oz	DF E	2.1	1.7	$1,978	9402	278	34.5	18.6	95.4
Eminent Super Tin	13 fl oz 5 oz	DF E	2.3	1.9	$1,933	9192	272	34.6	18.3	95.2
Proline SC Induce UAN Super Tin	5.7 fl oz 0.13% 1 qt 5 oz	DF DF DF E	2.4	1.8	$1,914	9106	270	34.3	18.3	94.9
Proline SC Induce Super Tin	5.7 fl oz 0.13% 5 oz	DF DF E	2.6	2.0	$1,903	9057	266	34.6	18.2	94.6
Headline Super Tin	9.2 fl oz 5 oz	DF E	2.6	2.3	$1,973	9379	271	35.2	18.3	95.1
Enable Dithane Crop Oil Super Tin	8 fl oz 2 lb 1% 5 oz	DF DF DF E	2.8	1.9	$1,944	9243	268	35.0	18.1	95.0
GemSC Super Tin	3.6 fl oz 5 oz	DF E	2.9	2.3	$1,934	9199	268	34.7	18.2	94.9
Super Tin	5 oz	DEF	3.0	2.1	$1,845	8694	272	32.7	18.3	95.2
Dithane	2 lb	DEF	3.6	2.3	$1,802	8446	264	32.6	18.0	94.5
Quadris	14.25 fl oz	C	4.6	2.2	$1,777	8308	263	32.0	17.8	94.8
Quadris	14.25 fl oz	A	5.4	2.7	$1,704	7971	254	31.9	17.5	94.4
Quadris	14.25 fl oz	B	5.4	2.8	$1,697	7936	256	31.4	17.4	94.7
Untreated			6.6	3.6	$1,689	7831	256	31.0	17.4	94.9
Mean			3.6	2.3	$1,853	8751	266.0	33.4	18.0	94.9
LSD 5%			0.3	0.3	$123	570.0	8.2	1.9	0.5	0.5
CV%			10.9	16.7	$8	7.4	3.5	6.4	2.8	0.5

Variety: Crystal RR827

* Application Timings:

A: 8 leaf stage
B: 14 leaf stage
C: 45 DSV
D: First Spot
E: 50 DSV
F: 40 DSV

*** Fungicide trt cost subtracted out.

Plot Size: 6 (22 inch) rows X 38 ft X 6 reps

Applic: Small Plot Tractor Sprayer, 100 psi, 24 gpa

** Cerc Rating Scale: 0 = no spots, 1 = very few spots, 2 = noticeable, 3 = numerous spots (not coalescing), 4 = 10% leaf damage, 5 = 25% leaf damage, 6 = 50% leaf damage, 9 = leaves dead

Cercospora Leafspot Research

Evaluate Registered Fungicides for Cercospora Control

Blumfield, MI - 2010

Trial Quality: Good

Treatment	Rate / Acre	*Applic Timing	Cercospora 0-9 Ratings** 9/16	8/28	RWSA	RWST	Tons / Acre	% Sug	% CJP
Inspire XT	7 fl oz	AC	1.9	1.7	8650	309	28.0	20.5	95.3
Super Tin	5 oz	B							
Eminent	13 fl oz	AC	2.3	1.8	8315	303	27.5	20.2	95.2
Super Tin	5 oz	B							
Proline SC	5.7 fl oz	AC	2.4	1.8	8582	299	28.7	20.1	94.7
Induce	0.125%	AC							
28%N	1 qt	AC							
Super Tin	5 oz	B							
Headline	9.2 fl oz	AC	2.4	2.3	8569	298	28.8	20.0	95.1
Super Tin	5 oz	B							
Proline SC	5.7 fl oz	AC	2.5	1.9	8549	295	29.0	19.9	94.8
Induce	0.125%	AC							
Super Tin	5 oz	B							
Enable	8 fl oz	AC	2.6	1.9	8901	296	30.0	19.9	94.9
Dithane	2 lb	AC							
Crop Oil Conc	1%	AC							
Super Tin	5 oz	B							
BAS 703 02F	6.75 fl oz	AC	2.8	2.0	8673	298	29.2	20.0	94.9
Super Tin	5 oz	B							
GemSC	3.6 fl oz	AC	3.0	2.1	8766	290	30.2	19.7	94.5
Super Tin	5 oz	B							
Super Tin	5 oz	ABC	3.1	1.9	7863	301	26.2	20.1	95.2
Dithane	2 lb	ABC	3.5	2.3	7921	294	27.1	19.8	94.8
Quadris	14.25 fl oz	45 DSV	5.0	2.3	7561	283	26.7	19.1	95.0
Quadris	14.25 fl oz	8 lf	5.2	2.4	7306	277	26.4	18.9	94.3
Quadris	14.25 fl oz	14 lf	5.4	2.4	7246	276	26.2	18.8	94.5
Untreated			6.5	3.4	7363	278	26.5	18.8	94.8
Mean			3.46	2.13	8162	292.4	27.9	19.7	94.9
LSD 5%			0.4	0.4	961.2	12.7	3.2	0.7	0.6
CV %			9.7	14.1	9.3	3.4	9.1	2.6	0.5

Planted: April 20th
Harvested: Oct 21st
Variety: Crystal RR 827
Plot Size: 6 rows X 38 ft
Reps: 6
100 psi, 22.5 gpa
** A lower number means less disease.

*The Quadris trts were applied only once. The other trts were applied twice, with a Super Tin trt in-between, for a total of 3 applications
Applic dates: Quadris (Jun 2, Jun 14 and Jun 27)
First applic for fung trts was Jul 16 (85 dsv)
in-between Super Tin was Aug 9 (50 dsv)
Second fung applic was Aug 31 (36 dsv)

Cercospora Leafspot Research

Evaluate Registered Fungicides for Cercospora Control

Spaulding Township, MI - 2010

Trial Quality: Good

Treatment	Rate / Acre	*Applic Timing	Cercospora 0-9 Ratings** 9/19	8/26	RWSA	RWST	Tons / Acre	% Sug	% CJP
Inspire XT	7 fl oz	AC	2.3	1.8	10154	248	41.0	16.7	95.4
Super Tin	5 oz	B							
Eminent	13 fl oz	AC	2.4	2.0	10069	241	41.8	16.4	95.1
Super Tin		B							
Proline SC	5.7 fl oz	AC	2.4	1.9	9630	242	39.8	16.5	95.0
Induce	0.125%	AC							
28%N	1 qt	AC							
Super Tin		B							
Proline SC	5.7 fl oz	AC	2.6	2.1	9564	238	40.1	16.5	94.3
Induce	0.125%	AC							
Super Tin		B							
Headline	9.2 fl oz	AC	2.8	2.3	10190	245	41.6	16.7	95.1
Super Tin		B							
GemSC	3.6 fl oz	AC	2.9	2.5	9632	245	39.3	16.6	95.2
Super Tin		B							
Enable	8 fl oz	AC	2.9	2.0	9586	240	40.0	16.3	95.1
Dithane	2 lb	AC							
Crop Oil Conc	1%	AC							
Super Tin		B							
Super Tin	5 oz	ABC	2.9	2.2	9525	243	39.2	16.5	95.1
Dithane	2 lb	ABC	3.6	2.4	8971	235	38.1	16.3	94.2
Quadris	14.25 fl oz	45 dsv	4.2	2.2	9054	242	37.3	16.6	94.7
Quadris	14.25 fl oz	14 lf	5.5	3.2	8627	235	36.6	16.1	95.0
Quadris	14.25 fl oz	8 lf	5.6	2.9	8635	232	37.3	16.0	94.4
Untreated			6.7	3.8	8298	234	35.4	16.0	95.0
Mean			3.6	2.4	9380	240.0	39.1	16.4	94.9
LSD 5%			0.5	0.6	711.8	10.1	2.0	0.6	0.7
CV %			11.3	18.2	5.9	3.3	3.9	2.8	0.6

Planted: April 22nd
Harvested: Sept 22nd
Variety: Beta 4N
Plot Size: 6 rows X 38 ft
Reps: 6
100 psi, 22.5 gpa
** A lower number means less disease.

* The Quadris trts were applied only once. The other trts were applied twice, with a Super Tin trt in-between, for a total of 3 applications
Applic dates: Quadris (May 30, Jun 11 and Jun 24)
First applic for fung trts was Jul 19 (93 dsv)
in-between Super Tin was Aug 12 (50 dsv)
Second fung applic was Sep 4 (45 dsv)

Cercospora Leafspot Research

Evaluate Inspire XT for Cercospora Control

Saginaw and Blumfield, MI - 2010

Data next 2 pages

Summary

Inspire XT was evaluated for control of Cercospora leaf spot in sugarbeets in small plot replicated trials. Inspire is a triazole fungicide which has less systemic properties than most other triazoles. Inspire is taken in by the leaf and redistributed short distances so that both the top and bottom of the sugarbeet leaves are protected. Inspire controls mycelial growth and prevents germinating spores from infecting the leaf, however, it is not very effective at stopping sporulation. It should be applied before or shortly after infection by Cercospora. Inspire becomes rainfast after it dries on the leaf.

In two trials Inspire provided very good Cercospora control when compared to Eminent, Proline and Enable treatments. A few spots were present before the initial fungicide applications which suggests that some level of curative activity occurred. High levels of yield and quality losses occurred in the untreated check plots (4-5 tons/A and 1-2 points of sugar). We have been testing Inspire for several years and it has consistently outperformed Headline, Eminent, Proline, Gem and Enable.

The treatments were applied with a John Deere 990 tractor equipped with a compressed air plot sprayer. The sprayer puts out 22.5 gpa with 80015 nozzles at 100 psi and 3 mph. The plot area was inoculated with Cercospora before the treatments were applied. Plots are evaluated for Cercospora control using a visual 0-9 rating scale.

Cercospora Leafspot Research

Evaluate Inspire XT for Cercospora Control

Saginaw, MI - 2010

Trial Quality: Good

Treatment	Rate Per Acre	App* Timing	CLS** 0-9 Rate 9/16	CLS** 0-9 Rate 8/27	RWSA	RWST	Tons/ Acre	% Sug	% CJP
Inspire XT	7 fl oz	A	2.8	1.0	5279	213	24.7	15.6	92.0
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Eminent	13 fl oz/a	A	3.0	0.9	4360	201	21.7	15.0	91.4
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Proline	5 fl oz	A	3.1	1.2	4856	210	23.1	15.3	92.3
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Enable + Dithane +	8 fl oz + 2 lbs	A	3.6	1.2	4643	205	22.6	15.0	92.2
Crop Oil Conc	1%	A							
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Untreated check			6.6	2.7	3567	186	19.3	14.1	91.1
Mean			4.3	1.6	4378	200.1	21.8	14.8	91.7
LSD 5%			0.4	0.4	430.9	21.0	2.0	1.2	N/S (1.4)
CV%			6.1	18.8	6.5	6.9	5.9	5.3	1.0

* Applic Timing: A on July 19th, B on Aug 3rd, C on Aug 18th, D on Sep 1st

** Cerc Rating Scale: 0 = no spots, 2 = minor spotting (up to 10/leaf), 3 = heavy spotting (over 100/leaf), 4 = 10% of leaf dessic, 6 = 50% of leaf dessic, 9 = entire leaf dead

Planted: Apr 15th Harvested: Sep 1st

Plot Size: 6 rows (22 inch) X 38 ft X 6 reps

Variety: C RR827

Cercospora Leafspot Research

Evaluate Inspire XT for Cercospora Control

Blumfield, MI - 2010

Trial Quality: Good

Treatment	Rate Per Acre	App* Timing	CLS** 0-9 Rate 9/22	CLS** 0-9 Rate 8/26	RWSA	RWST	Tons/ Acre	% Sug	% CJP
Inspire XT	7 fl oz	A	2.6	1.7	9211	298	30.9	19.8	95.5
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Eminent	13 fl oz/a	A	2.8	2.0	8850	286	30.9	19.2	95.2
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Enable + Dithane +	8 fl oz + 2 lbs	A	3.0	1.9	7927	291	27.3	19.4	95.5
Crop Oil Conc	1%	A							
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Proline	5 fl oz	A	3.3	2.1	8544	287	29.7	19.1	95.5
Headline	9 fl oz	B							
Topsin M + Dithane	8 oz + 2 lbs	C							
Super Tin	5 oz	D							
Untreated check			5.6	3.6	6951	271	25.7	18.2	95.2
Mean			3.4	2.2	8297	286.5	28.9	19.2	95.4
LSD 5%			0.5	0.4	985.6	10.5	3.3	0.5	N/S (.8)
CV%			11.4	13.5	8.9	2.7	8.5	2.1	0.6

* Applic Timing: A on July 16th, B on Aug 3rd, C on Aug 18th, D on Sep 1st

** Cerc Rating Scale: 0 = no spots, 2 = minor spotting (up to 10/leaf), 3 = heavy spotting (over 100/leaf), 4 = 10% of leaf dessic, 6 = 50% of leaf dessic, 9 = entire leaf dead

Planted: Apr 20th Harvested: Oct 21st

Plot Size: 6 rows (22 inch) X 38 ft X 6 reps

Variety: C RR827

Cercospora BeetCast Trials

Strip Trials Comparing 35/55 to 55/55 DSV's - Because of Early Row Closure

Akron, Auburn and Pigeon, MI - 2010

This was a cooperative research project between Michigan Sugar and Sugarbeet Advancement

Because of the advanced stage of the sugarbeet crop in 2010 we decided to test a very early first leafspot application (35 DSV's) on a highly susceptible variety, Crystal RR827. Fungicides were provided by Bayer and we asked growers to compare 35/55 to 55/55 DSV spray schedules. Growers at 3 locations did a good job of following the trial protocol. Cercospora leaf ratings were taken mid to late September. Yield and quality measurements were not obtained. The early application (35 DSV) improved leafspot control at all locations, however, the 55/55 treatment also provided good results. Neighboring fields at all of the test locations had considerably more leafspot problems than did the trial fields, especially at Pigeon. Based on these findings and considering other similar research we are recommending a 45/45/45 DSV spray schedule for susceptible varieties in a Red Zone. Other trial work has shown that if the first application is late, the second application should be applied earlier than planned.

Replicated Strip Trials

Application Timing	Cerc Rating (0-9) Sep 17		
	Akron	Auburn	Pigeon
35 / 55 / 55 (Proline/Gem/Eminent) Jun 12, Jull 13, Aug 9	1.10	1.13	2.38
55 / 55 / 55 (Proline/Gem/Eminent) Jun 24, Jul 22, Aug 15	1.40	1.38	2.50
Mean LSD 5% CV %	1.25 0.19 12.5	1.25 0.46 16.3	2.44 0.23 4.2

Planting Date: late Mar / early Apr
Variety: Crystal RR827
Pigeon location had 4 sprays, other's had 3 sprays

Cercospora BeetCast Trials

Evaluate Sugarbeet Varieties With Different Levels of Cercospora Tolerance

2010

BeetCast Summary

Cercospora infection levels and BeetCast DSV's increased significantly in 2010 following several years of moderate infestations (figures 1 and 2). Figure 1 shows the DSV levels from 2004-2010 and figure 2 shows the Cercospora infection levels (0-9) in BeetCast trials during the same time period. **Red Zone Trial:** The 45/45 DSV treatment was needed to protect the highly susceptible variety from leafspot damage while 55/55 and 1st spot/40/50 treatments provided only marginal control. The 55/55 and 1st spot/40/50 treatments provided adequate leafspot control with the moderately susceptible variety and good control with the tolerant variety. **Green Zone Trial**: Later fungicide application timings gave better leafspot control than starting at 55 DSV's, probably because the disease starts later in green zones. 1st spot/40/50, 70/70 and 80/80 DSV treatments worked well at this location.

The 1st spot treatment worked better this year than in the past for both Red and Green zone trials. We came back with the 2nd application at 40 DSV's and the 3rd application was applied at 50 DSV's. It appears that when spraying after spots are found that tightening up the 2nd and 3rd applications will improve Cercospora control.

Figure 1. DSV levels from 2004-2010

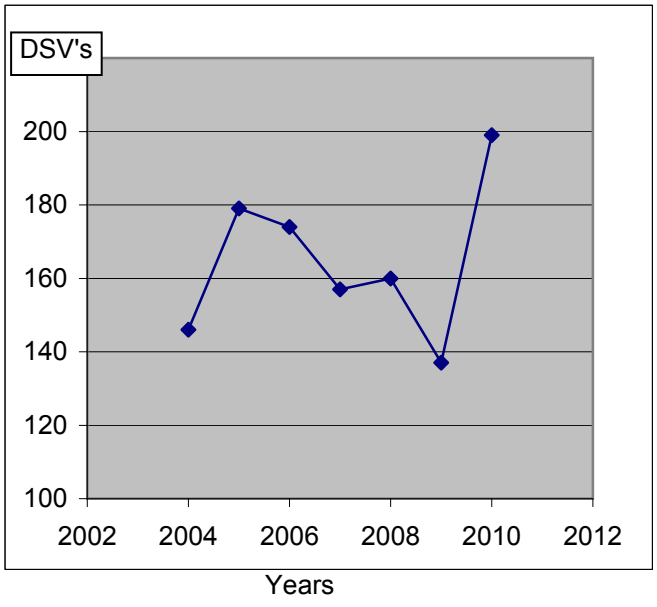
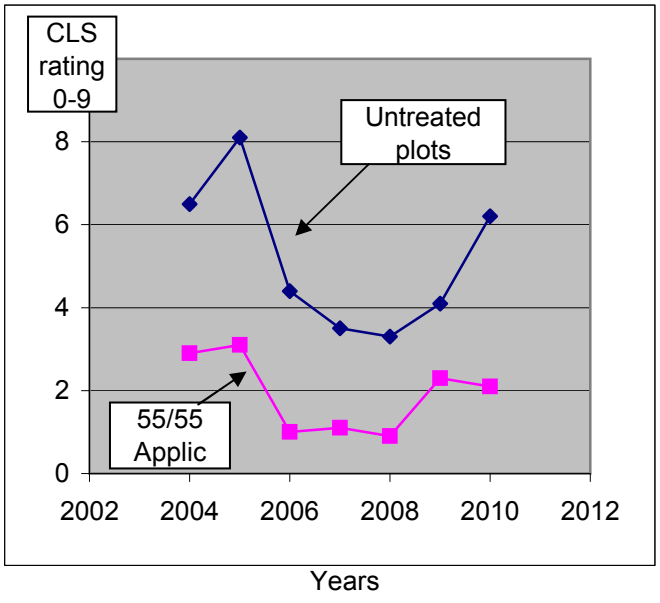


Figure 2. Disease levels (0-9) from 2004-2010



Cercospora BeetCast Trials

Evaluating Sugarbeet Varieties With Different Levels of Cercospora Tolerance

Red Zone

Quanicassee, MI - 2010

Trial Quality: Good

Application Timings (DSV's)	# App	*CLS 0-9	**Net Income $/A	RWSA	RWST	Tons / Acre	% Sug	% CJP
Resistant Variety (C RR840)*								
47/44/43/44	4	1.67	$1,383	7308	280	26.1	19.0	94.7
59/54/50	3	1.71	$1,384	7222	275	26.2	19.0	93.9
1st Spot = 74/39/50	3	1.92	$1,277	6687	280	23.8	19.0	94.6
74/62	2	2.63	$1,397	7201	283	25.4	19.2	94.6
Untreated	0	3.58	$1,341	6742	271	24.9	18.5	94.4
Moderately Tolerant (SX 1281RR)*								
47/44/43/44	4	1.92	$1,419	7486	278	26.9	19.1	94.0
59/54/50	3	2.00	$1,399	7301	276	26.4	19.0	94.0
1st Spot = 74/39/50	3	2.21	$1,313	6869	281	24.5	19.2	94.1
74/62	2	2.88	$1,383	7133	273	26.1	18.8	94.0
Untreated	0	4.08	$1,345	6765	272	24.9	18.7	94.0
Highly Susceptible (C RR824)*								
47/44/43/44	4	2.25	$1,684	8819	284	31.2	19.1	94.9
59/54/50	3	2.58	$1,685	8738	279	31.4	18.8	95.0
1st Spot = 74/39/50	3	2.83	$1,600	8313	282	29.5	19.2	94.4
74/62	2	3.67	$1,589	8168	274	29.7	18.5	95.1
Untreated	0	6.17	$1,443	7257	262	27.7	17.8	94.8
Overall Mean		2.8	$1,443	7467	276.6	27.0	18.9	94.4
LSD 5%		0.3	$132	663	10.4	2.4	0.7	0.6
CV %		10.0	$8	7.7	3.2	7.8	3.2	0.6

*** Use of these varieties is subject to them being lawful to purchase, receive, distribute and plant.

* Cercospora rating Oct 3. A lower number indicates less disease.

**Subtracted $17.50 per fungicide applic

45/45 applied: 6/23, 7/16, 8/4, 8/27

55/55 applied: 7/4, 7/29, 8/16

70/55 applied: 7/9, 8/9

1st Spot/55 applied: 7/9, 8/4, 8/27

Planted: Apr 20st

Harvested: Sep 15th

Plot Size: 6 rows (22 inch) X 38 ft

Reps: 6

Cercospora BeetCast Trial

Evaluating Sugarbeet Varieties With Different Levels of Cercospora Tolerance

Red Zone

Quanicassee, MI - 2010

Trial Quality: Good

Effect of Application Timing (Avg of 3 Varieties)

Application Timing (DSV's)	# Applic	CLS* Oct 3 0-9	RWSA	RWST	Tons / Acre	% Sug	% CJP
47/44/43/44	4	1.9	7871	281	28.1	19.1	94.6
59/54/50 dsv	3	2.1	7754	277	28.0	18.9	94.9
1st Spot=74/39/50	3	2.3	7290	281	25.9	19.2	94.4
74/62	2	3.1	7501	277	27.1	18.8	94.5
Untreated	0	4.6	6922	268	25.8	18.4	94.4
LSD 5%	na	0.19	380	5.9	1.4	0.4	0.36

Variety Effect (Avg of all Treatments)

Variety**	# Applic	CLS* Oct 3 0-9	RWSA	RWST	Tons / Acre	% Sug	% CJP
Crystal RR840	2.4	2.3	7032	278	25.3	19.0	94.5
SX 1281RR	2.4	2.6	7111	276	25.8	19.0	94.0
Crystal RR824	2.4	3.5	8259	276	29.9	18.7	94.8
Overall Mean		2.8	7467	276.6	27	18.9	94.4
LSD 5%		0.15	294	4.6	1.08	0.31	0.28

* Lower number indicates less disease.

** Use of these varieties is subject to them being lawful to purchase, receive, distribute and plant.

Cercospora BeetCast Trial

Evaluating Sugarbeet Varieties With Different Levels of Cercospora Tolerance

PIONEER • BIG CHIEF MICHIGAN SUGAR

Green Zone

Sandusky, MI - 2010

Trial Quality: Good

Application Timings (DSV's)	# Applic	*CLS 0-9	**Net Income $/Acre	RWSA	RWST	Tons / Acre	% Sug	% CJP
Resistant Variety (C RR840)*								
1st Spot = 73/44/53	3	1.50	$1,656	8643	279	31.1	18.8	95.1
73/92	2	1.67	$1,658	8622	284	30.5	19.1	95.2
86/84	2	1.71	$1,671	8725	276	31.6	18.7	94.8
59/58/53	3	2.04	$1,725	8997	286	31.5	19.2	95.2
Untreated	0	2.75	$1,629	8502	275	31.0	18.6	94.7
Moderately Susceptible (SX 1281RR)*								
1st Spot = 73/44/53	3	1.54	$1,625	8492	266	32.0	18.1	94.6
73/92	2	1.96	$1,681	8707	272	31.9	18.4	94.8
86/84	2	2.00	$1,715	8841	279	31.7	18.9	94.8
59/58/53	3	2.33	$1,734	9034	284	31.9	19.2	94.9
Untreated	0	3.00	$1,631	8530	275	30.9	18.7	94.7
Highly Susceptible (C RR824)*								
1st Spot = 73/44/53	3	2.04	$1,775	9260	271	34.1	18.3	95.1
73/92	2	2.33	$1,908	9842	285	34.5	19.0	95.4
86/84	2	2.58	$1,945	10010	284	35.3	18.9	95.7
59/58/53	3	2.67	$1,893	9814	285	34.6	19.1	95.2
Untreated	0	3.50	$1,835	9294	274	33.9	18.5	95.1
Overall Mean		2.2	$1,739	9021	278.0	32.4	18.8	95.0
LSD 5%		0.3	$154	663	10.4	2.4	0.7	0.6
CV %		10.0	$8	7.7	3.2	7.8	3.2	0.6

*** Use of these varieties is subject to them being lawful to purchase, receive, distribute and plant.

* Cercospora rating Oct 3rd

**Subtracted $17.50 per fungicide applic

55/55 applied: 6/29, 7/26 and 8/16

1st Spot/55 applied: 7/9, 7/26 and 8/16

70/70 applied: 7/9 and 8/14

80/80 applied: 7/14 and 8/16

Planted: Apr 20th

Harvested: Sep 15st

Plot size 6 rows (22 inch) X 38 ft

Reps: 6

Cercospora BeetCast Trial

Evaluating Sugarbeet Varieties With Different Levels of Cercospora Tolerance

Green Zone

Sandusky, MI - 2010

Trial Quality: Good

Effect of Application Timing (Avg of 3 Varieties)

Applic Timing	# Applic	CLS* Oct 3 0-9	RWSA	RWST	Tons/A	Sug	CJP
1st Spot = 74/39/50	3	1.7	8798	272	32.4	18.4	94.9
86/84	2	2.0	9091	278	32.7	18.7	95.0
73/92	2	2.1	9158	282	32.5	19.0	95.2
59/58/53	3	2.4	9281	285	32.6	19.1	95.1
Untreated	0	3.1	8775	275	31.9	18.6	94.8
LSD 5%		0.24	447.1	6.71	1.52	0.42	0.33

Variety Effect (Avg of all Treatments)

Variety**		CLS* Oct 3 0-9	RWSA	RWST	Tons/A	Sug	CJP
Crystal RR840	2.5	1.9	8697	280	31.1	18.9	95.0
SX 1281RR	2.5	2.2	8721	275	31.7	18.7	94.8
Crystal RR824	2.5	2.6	9644	280	34.5	18.8	95.3
LSD 5%		0.18	346.3	5.2	1.18	0.33	0.26

* Lower number indicates less disease.

** Use of these varieties is subject to them being lawful to purchase, receive, distribute and plant.

Nematode Strip Trial

Evaluate a Nematode Tolerant Variety in a Nematode Problem Field

Spaulding Township, MI - 2010

Trial Quality: Good

Variety**	$/ Acre	RWSA	RWST	Tons / Acre	% Suc	% CJP	Nematode Rating 0-3*
BTS 18RR4N	$1,423	6616	258	25.7	17.4	95.3	0.1
BTS 17RR32	$972	4519	253	17.8	17.2	95.0	0.8
Mean		5567	255.7	21.8	17.3	95.2	0.47
LSD 5%		564	NS (8.4)	2.1	NS (.28)	NS (1.2)	NS (.30)
CV		5.8	1.9	5.4	0.9	0.7	36.1

** Use of these varieties is subject to them being lawful to purchase, receive, distribute and plant.

Planted: Apr 22nd
Harvested: Sep 22nd
Plot Size: 6 rows X 150 ft X 5 reps
Soil Type: Silty Clay Loam
18% sand, 44% Silt, 39% clay
PH: 7.7
OM: 6.3%
CEC: 22.7

* Nematode Rating 0-3 Scale:
0 = no nematodes
1 = up to 3 cysts per root
2 = up to 10 cysts per root
3 = over 10 cysts per root

Summary

The nematode tolerant variety (Beta 4N) out yielded Beta 32 by nearly 8 tons per acre and by 0.2 points of sugar. Averaged over 2 years in trials without nematodes, Beta 4N has out yielded Beta 32 by about 1 ton per acre with similar levels of sugar content. The nematode infestation was not apparent by looking at the tops, however, when examining roots it was not difficult to find cysts on the susceptible variety. This trial demonstrates that nematodes cause significant yield losses when above ground symptoms are not apparent.

Cyst Nematode Trial

Evaluate ProAct for Protecting Sugarbeets From Nematodes

Quanicassee, MI - 2010

Trial Quality: Fair - Poor

Treatment	Rate/ Acre	Root Shape 0-3 9/2/2010	Root Nematode 0-5 9/2/2010	RWST	% Sug	% CJP	NH2	Amino
ProAct	1 oz/a	2.2	2.5	180	13.9	90.2	280.3	24.3
Untreated		2.4	2.7	167	12.7	91.1	192.3	18.9
Mean		2.3	2.6	173.4	13.3	90.6	236.3	21.6
LSD 5%		N/S	N/S	17.8	0.8	N/S	55.2	3.2
		(.9)	(.7)			(2.7)		
CV%		13.3	9.0	3.4	2.0	1.0	7.7	4.9

Planted: May 26th Harvested: Sept 2nd Applied: June 10th

Summary

ProAct contains harpin proteins which have been shown to activate a plant's defenses against disease or nematode infections. Research in other crops has been somewhat promising. ProAct applied at 1 oz/A as a foliar spray at the 2-4 leaf stage increased sugar content and tended to reduce nematode symptoms on the roots. More testing would be required before we can recommend this product to growers.

ProAct® FOLIAR SPRAY TRIAL

Schindler Farms LLC

Location:	Bay County	**Tillage:**	Fall - Chisel, Spring - S Tine
Variety:	B-18RR4N	**Harvest Date:**	10/29/2010
Previous Crop:	Corn	**Sample Date:**	10/7/2010
Soil Type:	Loam	**Herbicides:**	2x Glyphosate
Spacings:	Rows - 22", Seeds - 64,000 / Ac	**Replicated:**	4x
Fertilizer:	2x2 - 20 Gal. 19-17-0 + Micros Sidedress - 40 Gal. 28%	**Fungicide:**	Inspire XT Headline Proline

TREATMENT	$ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	RHIZOCTONIA	
							Dead Beets / 1200' of Row	% Control vs. Check
ProAct® Foliar Spray	**—**	**8960**	**325**	**27.6**	**21.4**	**95.8**	**80**	**—**
Check	**—**	**8708**	**323**	**27.0**	**21.2**	**95.9**	**95**	**—**
AVERAGE	**—**	**8834**	**324**	**27.3**	**21.3**	**95.9**	**88**	**—**
LSD (5%)	**—**	**959 NS**	**9 NS**	**2.2 NS**	**0.6 NS**	**0.5 NS**	**116 NS**	**—**
C.V. (%)	**—**	**5**	**1**	**3.6**	**1.3**	**0.2**	**59**	**—**

TRIAL RELIABILITY: Good

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Good Control
RHIZOCTONIA:	Moderate/Heavy	**NEMATODES:**	Yes
QUADRIS APP:	See Treatments	**WEATHER:**	—

Comments: Trial was part of the Schindler Rhizoctonia control trial. ProAct was band applied with Quadris on 5/26/10 at the 6-8 Leaf stage. The check was a Quadris only treatment. Applications were made in a 7" band with 12 gal./ac of water. ProAct is a harpin protein that may induce plant growth effects and increased pathogen resistance to diseases and nematodes. This field had nematodes and rhizoctonia issues. No significant differences were seen.

ProAct® FOLIAR SPRAY TRIAL

Double D Farms - Maurer

Location:	Huron Co., Verona	**Tillage:**	Fall - Dominator & Vertical Tillage
Plant Date:	3/31/2010		Stale Seed Bed
Variety:	SX-1281RR	**Harvest Date:**	9/20/2010
Previous Crop:	Corn	**Sample Date:**	9/20/2010
Soil Type:	Sandy Loam	**Herbicides:**	4x Glyphosate
Spacings:	Rows - 28", Seeds - 60,000/Ac.	**Replicated:**	3x
Fertilizer:	2x2 - 200# 11-16-7-3Mn-0.3B Sidedress 115# N by A.A. Variable Rate - K_2O	**Fungicide:**	Proline Inspire XT Headline

TREATMENT	$ / ACRE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP
Check	**—**	**4920**	**242**	**20.3**	**16.4**	**95.5**
ProAct® Foliar Spray	**—**	**4762**	**242**	**19.7**	**16.4**	**95.2**
AVERAGE	**—**	**4841**	**242**	**20.0**	**16.4**	**95.4**
LSD (5%)	**—**	**830 NS**	**42 NS**	**2.6 NS**	**2.9 NS**	**1.1 NS**
C.V. (%)	**—**	**5**	**5**	**3.7**	**5.0**	**0.3**

TRIAL RELIABILITY: Good

EMERGENCE:	Good	**CERC. LEAF SPOT:**	Good
RHIZOCTONIA:	Moderate / Heavy	**NEMATODES:**	Yes
QUADRIS APP:	In-furrow & 6-8 Leaf	**WEATHER:**	Heavy June Rainfall

Comments: Two ProAct applications were made. ProAct is a harpin protein that may induce plant growth effects and increased pathogen resistance to diseases and nematodes. This field had nematodes and rhizoctonia issues.The first ProAct application was band applied with a 6-8 leaf Quadris application (14" Band, 1/2 oz/acre of ProAct). The second application was 1 oz./acre and made with the first leafspot spray. Trial had nematode and Rhizoctonia pressure and experienced heavy early rains. No differences were found.

DATE OF HARVEST STUDY

Laracha Farms

Location:	Saginaw Co.	**Tillage:**	Fall - Ripper, Spring 1x
Planting Date:	3/29/2010	**Variety:**	B-18RR4N
Previous Crop:	Corn	**Sample Date:**	Off Harvester
Soil Type:	Loam	**Herbicides:**	3x Glyphosate
Spacings:	Rows - 28", 56,000 Seeds / Ac.	**Replicated:**	4x
Fertilizer:	2x2 - 26.3# N, 16.6# P_2O_5, 0 K, 1.35# Mn, 1.35# B, 1.35# Zn	**Fungicide:**	55 DSV - Proline 108 DSV - Headline 154 DSV - Eminent

HARVEST DATE	RWSA	RWST	TONS / ACRE	% SUGAR	% CJP	REVENUE				
						2010 Early Dig Premium	Early Dig Charge	Net Payment - Base $55	Revenue	Diff. from Oct. 20
#1 8/23/10	**6406**	**309.0**	**20.7**	**20.8**	**94.9**	**$14.00**	**$0.00**	**$69.00**	**$1,653**	**-$215**
#2 9/8/10	6971	311.2	22.4	21.1	94.4	$12.00	$0.00	$67.00	$1,746	-$121
#3 9/14/10	**7431**	**317.3**	**23.4**	**21.0**	**95.5**	**$11.00**	**$0.00**	**$66.00**	**$1,834**	**-$34**
#4 9/20/10	7481	297.7	25.1	20.2	94.6	$9.00	$0.00	$64.00	$1,790	-$77
#5 9/29/10	**8057**	**298.3**	**27.0**	**20.1**	**94.9**	**$7.00**	**$0.00**	**$62.00**	**$1,868**	**$0**
#6 10/6/10	8511	315.0	27.0	21.0	95.3	$5.00	$0.00	$60.00	$1,910	$42
#7 10/28/10	**10113**	**347.3**	**29.1**	**22.5**	**96.4**	**$0.00**	**$2.47**	**$52.53**	**$1,987**	**$119**
*** 10/13/10*	*8991*	*325.3*	*27.6*			*$5.00*	*$0.00*	*$60.00*	*$2,017*	*$150*
***** 10/20/10***	***9508***	***335.6***	***28.3***			***$0.00***	***$2.47***	***$52.53***	***$1,868***	

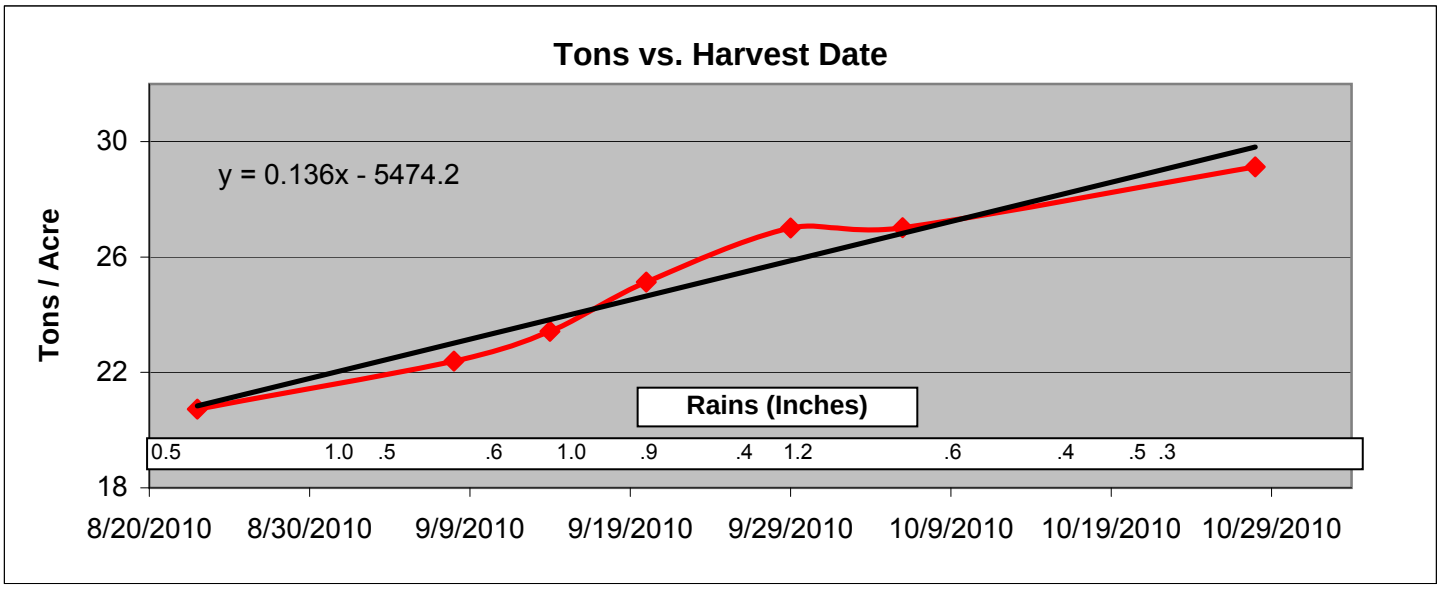
** The data for 10/13 and 10/20 is not from harvested results, but is an estimate for revenue comparison purposes.

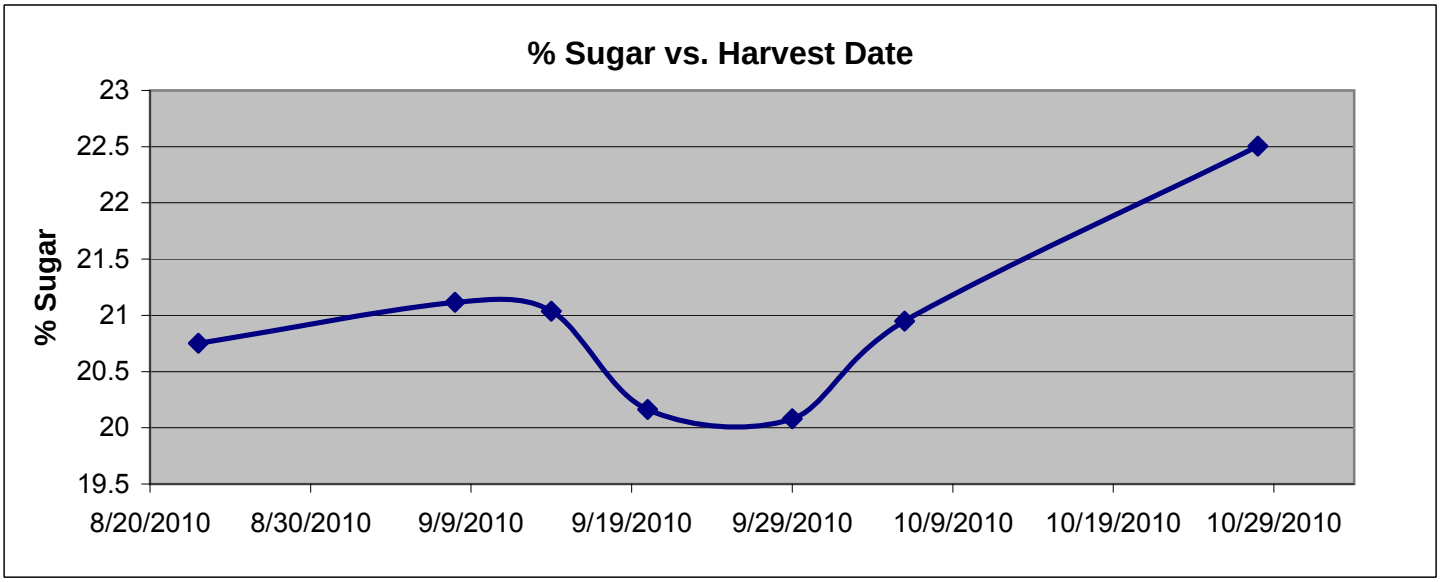
TRIAL RELIABILITY: Excellent

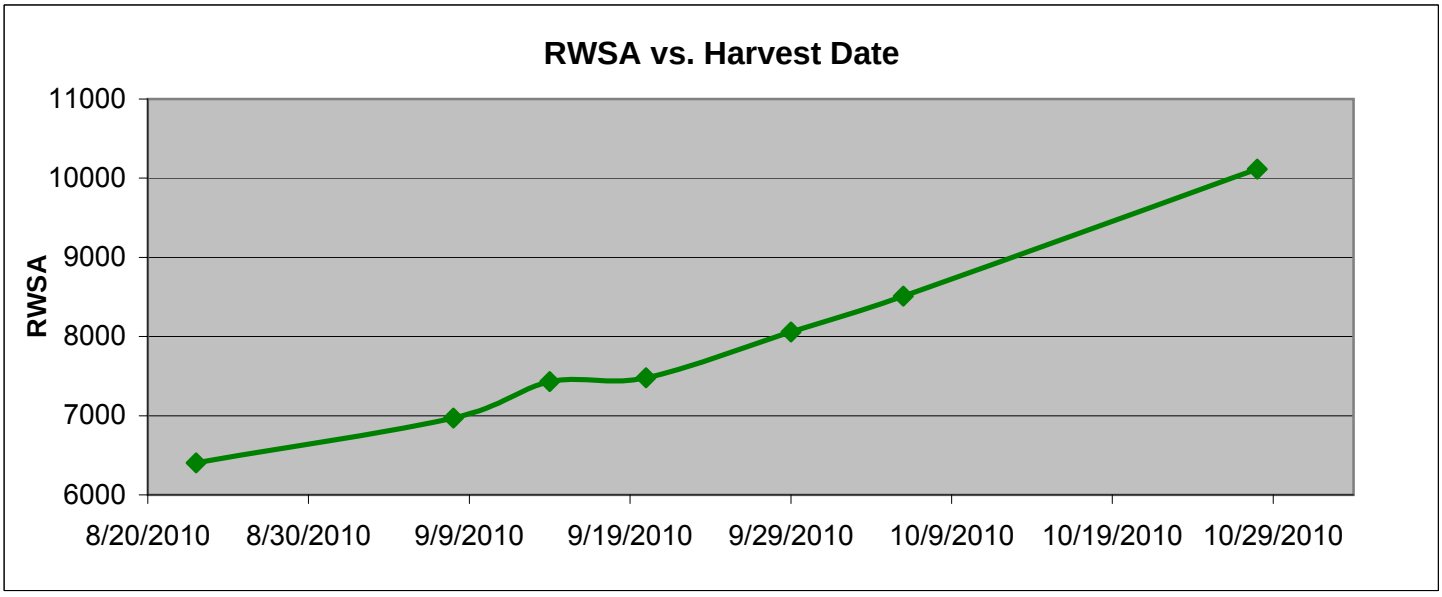
EMERGENCE:	Excellent	**CERC. LEAF SPOT:**	Excellent Control
RHIZOCTONIA:	Low	**NEMATODES:**	None Detected
QUADRIS APP:	Yes	**WEATHER:**	Dry - Late Summer & Early Fall

Comments: This was a very even field for this study. The field had excellent emergence with low disease pressure. The variety was B-18RR4N. This field was very dry in July and August. The study was done by opening 2 lands in the field, and harvesting 4 strips for each harvest date. The data for 10/13/10 and 10/20/10 is not from harvested results, but is an estimate for revenue comparison purposes. The estimate is from the fit curve of the data for each of the two dates provided. The tonnage gain was relatively linear and was approximately 0.996 ton per week. Revenue is based on "company average RWST" equal to 267.42.

LARACHA FARMS - DATE OF HARVEST STUDY







EARLY DELIVERY REVENUE ANALYSIS (WEEKLY)

Supplement to Laracha Date of Harvest Study

Based on Grower Average Tonnage and RWST

The following table is being provided to give a revenue analysis for early delivery based on "Average Yield and Sugar". The 2010 Laracha Farms Date of Harvest study had unusually high sugar content and therefore might give a misleading impression of revenue from early delivery. The following table was created with the following assumptions:

1. The table was built from the 2010 company average tonnage per acre of 26.08 occurring on Oct. 20. The weekly yield gain (0.996 tons/week) from the Laracha Study is assumed linear and is subtracted from 26.08 to provide the tonnage for the rest of the dates.
2. The 2010 grower average RWST of 267.42 occurred on Oct. 20. Since RWST increases through harvest, all dates prior to Oct. 20 received the early delivery RWST allowance of 97.25%.
3. The additional trucking cost is deducted from the net revenue as tonnage increases at a rate of $5/ton.

Variables					
	Payment	**$55.00**	**Average RWST**	**267.42**	**Lbs/Ton**
	Early Dig Charge	**$2.47**	**RWST Daily Growth Rate**	**1.47**	**Lbs / Ton**
	Trucking Cost/Ton	**$5.00**	**Tonnage at Oct. 20**	**26.08**	**Tons/Acre**
			Tonnage Daily Growth Rate	**0.138**	**(0.996 per Week)**

			2010 Revenue Results							**Premium to Match Oct. 20 Revenue**	
	Tons / Acre	**Effective RWST**	2010 Early Dig Premium	Early Dig Charge	2010 Net Payment per Ton	Trucking Cost Compared to Oct. 20	2010 Gross Revenue	**Gross Revenue Diff. From Oct. 20**	**Net Revenue Diff. from Oct. 20**	**Required Payment to Match Oct. 20**	**Required Premium**
10/20/2010	**26.08**	**267.4**	$0.00	$2.47	$52.53	$0	$1,370.01			**$52.53**	**-$2.47**
10/13/2010	25.11	260.1	$5.00	0	$60.00	-$4.83	$1,465.40	**$95.39**	**$100.22**	**$55.90**	**$0.90**
10/6/2010	24.15	260.1	$5.00	0	$60.00	-$9.66	$1,409.04	**$39.03**	**$48.69**	**$57.93**	**$2.93**
9/29/2010	23.18	260.1	$7.00	0	$62.00	-$14.49	$1,397.76	**$27.75**	**$42.24**	**$60.13**	**$5.13**
9/22/2010	22.22	260.1	$9.00	0	$64.00	-$19.32	$1,382.72	**$12.72**	**$32.04**	**$62.52**	**$7.52**
9/15/2010	21.25	260.1	$11.00	0	$66.00	-$24.15	$1,363.93	**-$6.08**	**$18.07**	**$65.13**	**$10.13**
9/8/2010	20.28	260.1	$12.00	0	$67.00	-$28.98	$1,321.65	**-$48.35**	**-$19.37**	**$67.98**	**$12.98**
9/1/2010	19.32	260.1	$14.00	0	$69.00	-$33.81	$1,296.29	**-$73.72**	**-$39.91**	**$71.12**	**$16.12**
8/25/2010	18.35	260.1	$14.00	0	$69.00	-$38.64	$1,231.47	**-$138.54**	**-$99.90**	**$74.60**	**$19.60**

Early Harvest Research

Evaluate Early, Mid and Late Harvest Dates

Bay City, MI - 2010

Trial Quality: Good

Harvest Date	$/Acre*	RWSA	RWST	Tons/ Acre	% Sug	% CJP
Nov 1	$1,891	9277	269	34.4	18.2	95.0
Oct 15	$1,948	8581	254	33.8	17.5	94.2
Oct 1	$1,646	6920	229	30.2	16.2	93.4
Sept 15	$1,734	6768	227	29.8	15.6	94.8
Sept 1	$1,673	6133	214	28.6	15.4	92.7
Mean	$1,778	7535	238.8	31.4	16.6	94.0
LSD 5%		940.9	10.1	3.8	0.6	0.7
CV%		10.3	3.5	10.2	3.0	0.7

* $/Acre include the early season tonnage and RWST premium.

Weather Conditions During Harvest	Temperature (F) High	Low	Rainfall inches
Aug 15-31	84	57	0.11
Sep 1 - 14	73	51	0.95
Sep 16 - 30	72	47	1.01
Oct 1 - 14	67	39	0.9
Oct 15 to Nov 1	60	38	1.07

Summary

With an increasing need for early harvesting more research is needed to determine the yield and sugar levels at various harvest dates. A small plot replicated trial was established near Bay City to evaluate the progression of the crop from Sep 1 until Nov 1. Plots were 4 rows wide and 35 ft long with 6 reps. Sugarbeets were harvested Sep 1, Sep 15, Oct 1, Oct 15 and Nov 1. Sugarbeet yields increased by 5.8 tons per acre and sugar levels increased by 2.8 percentage points during the 62 day harvest period. Environmental conditions were very conducive for sugarbeets to add tons and sugar in the fall of 2010.

Carryover Seed Research

Evaluate Different Methods of Storing Left Over Seed

Seed from 2009

Storage Method	Avg of 4 Locations Beets/100 ft
USDA (Cool and low Humidity)	184.3
SP Freezer	182.1
SP Lab (Heated and Air Conditioned)	179.1
SP Shop (Heated Shop - 65 F)	176.8
SVRF Shop Non Heated Shop	174.9
SP Vacuum Pack (Room Temp)	164.0
Mean LSD 5% CV%	177.1 8.1 6.8

Variety Effects	Beets/100'
SX 1260RR	192.2
HM 27RR	186.6
HM 50RR	167.5
Beta 17RR32	161.2

Summary

Trials were conducted to evaluate different methods of storing carry-over seed in Michigan. The following facilities were used as seed storage methods: 1) USDA climate controlled room at E. Lansing; 2) Freezer at Research Center; 3) Lab at Research Center - heated and cooled; 4) Shop at Research Center - heated (65 F) in winter but not cooled; 5) Shop at new SVRF - not heated or cooled; 6) Vacuum packed and stored at Research Center Lab. The seeds were put into storage in late spring of 2009 and planted into research plots the spring of 2010. These same seeds are being stored for planting in 2011. The best emergence came from seeds stored at the E. Lansing storage room. The second best emergence came from the freezer followed by the lab at the Research Center, then the heated shop, the unheated shop and last was the vacuum packed seeds. There were also differences between varieties but it was not clear if differences were due to storage methods.

Carryover Seed Research

Evaluate Different Methods of Storing Left Over Seed

Treatment	Variety**	Emergence, Beets/100 ft.				
		Avg of 4 Loc.	Trost	Schwab	Roggenbuck	Stoutenburg
SP Freezer	SX 1260RR	199.4	224.2	176.9	207.2	189.2
SP Shop	SX 1260RR	198.1	228.2	173.6	203.9	186.7
SP Lab	SX 1260RR	192.7	211.1	164.9	219.8	175.0
SVRF Shop	SX 1260RR	191.8	218.0	175.7	200.2	173.3
USDA Storage	SX 1260RR	190.3	210.4	166.8	207.6	176.3
SP Vac Pack	SX 1260RR	180.7	190.0	172.1	204.6	156.3
SP Lab	HM 27RR	190.5	210.2	173.7	206.3	171.7
USDA Storage	HM 27RR	189.2	195.6	163.2	211.8	186.3
SP Shop	HM 27RR	185.6	213.3	164.8	194.6	169.6
SP Freezer	HM 27RR	185.0	197.6	178.4	201.5	162.5
SVRF Shop	HM 27RR	185.0	189.8	177.7	203.7	168.7
SP Vac Pack	HM 27RR	184.6	195.3	162.4	205.7	175.0
USDA Storage	HM 50RR	175.5	188.0	159.3	181.1	173.8
SP Lab	HM 50RR	173.4	205.3	162.8	175.9	149.6
SP Freezer	HM 50RR	167.5	177.8	163.5	175.7	152.9
SVRF Shop	HM 50RR	166.3	181.3	168.2	157.8	157.9
SP Shop	HM 50RR	163.4	182.9	163.1	154.2	153.3
SP Vac Pack	HM 50RR	158.7	181.1	151.9	162.0	140.0
USDA Storage	BTS 17RR32	182.2	189.1	170.0	199.6	170.0
SP Freezer	BTS 17RR32	176.6	168.0	170.7	194.2	173.5
SP Shop	BTS 17RR32	160.2	164.4	156.0	174.6	145.8
SP Lab	BTS 17RR32	159.7	146.2	155.2	178.7	158.8
SVRF Shop	BTS 17RR32	156.5	153.6	138.6	166.7	167.1
SP Vac Pack	BTS 17RR32	131.9	140.7	136.8	122.8	127.5
SX Stored	SX 1260RR	192.6	220.9	162.2	194.8	192.5
Beta Stored	BTS 17RR32	167.7	176.8	149.0	169.6	175.4
Mean		177.1	190.8	163.8	187.5	166.5
LSD 5%		17.1	31.3	16.7	26.1	24.3
CV%		6.8	13.0	8.8	12.1	10.3

** Use of these varieties is subject to them being lawful to purchase, receive, distribute and plant.

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BEETcast™ Advisories "The Last Seven Years in Perspective"
Karla Jackson, Weather INnovations Incorporated
January 21, 2011

The BEETcast™ model is developed by Weather INnovations Incorporated ten years ago and publically used by growers in 2004. The model has been widely used by growers in Michigan and Ontario since 2004. The model is a fungicide advisory model to reduce the damage from Cercospora leaf spot on sugar beets. The model runs from May 15th to September 15th and daily disease severity values (DSVs) are calculated based on the daily weather conditions, which ranges 0-4 values. The BEETcast™ model aims to spray early before the first sign of symptoms; and spray to stay ahead of the disease, rather than spray to "catch up".
The BEETcast™ advisories in several locations of Michigan and Ontario from 2004 to 2010 have been summarized in this report. Yearly comparison (2004 to 2010) of disease pressure in Michigan and Ontario showed 2004 and 2009 had the lowest disease pressure, 2007 and 2008 had moderate disease pressure and 2005, 2006 and 2010 had the highest disease pressure. In particular, 2010 had the highest accumulated DSV with locations ranging from 200 to 220 (an average of 204), in Michigan and Ontario and no locations had low disease pressure. In Michigan, the lowest accumulated DSV was 140 in 2009, while the 2004 season challenged 2009 for the lowest pressure year. The lowest accumulation in Ontario occurred in 2004 with 159 DSVs, 2009 was not far off. Some locations in Ontario showed relatively high disease pressure than other locations for e. g. the Wallaceburg area had higher disease pressure in the 2005, 2006, 2007 and 2008 seasons, while Ridgetown had moderately higher pressure than the rest of the area in 2004, 2007 and 2009. Similarly, variation among locations was observed in Michigan for e. g. higher disease pressure was observed in 2005 in Sandusky and St. Charles in 2006. This illustrates that each year was different; and highs and lows varied by location every year. The BEETcast™ model helps growers adapt to these changes.

In both Ontario and Michigan, the first spray ranged between June 26th and July 24th, depending on the location and the year's disease conditions. With 2010 having higher pressure, many growers required a fourth spray in September. Previously, growers sprayed 2 to 3 times in a season. This led to a comparison of different spray intervals to see which seasons would have required a 4th spray. The most common interval was a first spray at 55 DSVs and repeated every 55 DSVs thereafter. With a threshold of 220 for a 4th spray; there were no locations in Michigan that required an extra spray from 2004-2010. The first spray at 70 DSVs and repeated every 35 DSVs thereafter showed that a spray was consistently required every year, locations varied, but still needed. The 2010 season saw a 4th spray applied across upper Michigan.
The different spray intervals were applied and compared to the Ontario conditions and similar results were observed. The 55 + 55 intervals did not require a 4th spray in September. The 70 + 35 intervals would require a 4th spray every year at varying locations, except in 2010 where every location needed an extra spray. New spray intervals for maximum control, a first spray at 45 DSVs and every 45 DSVs after and a spray interval of 45 + 55 DSVs were analyzed to see if a fourth spray would be needed in September under different weather conditions. The 45 + 45 intervals would see consistent sprays in September in Wallaceburg every year. Where 45 + 55 would not need a 4th spray until 2010 like conditions occurred and the number of locations would be limited as well.
The 45 + 45 interval proved to be similar to the 70 + 35 interval. A fourth spray was needed every year and 2010 needed a 4th spray across the area. The 45 + 55 interval would be similar to the 55 + 55 interval. It would not have needed a 4th spray, until 2010 type conditions were encountered. However, a limited number of sites would need the extra application.

In conclusion, 2010 had the highest disease pressure BEETcast™ has seen in the last seven years in both Michigan and Ontario. The 2005 and 2006 seasons had favourable conditions for Cercospora and were similar to 2010. The 2004 and 2009 seasons saw the lowest disease pressures. Most importantly, the high and low disease pressures varied by location each year; therefore, it is difficult for growers to spray based on the previous year's spray schedule When the spray intervals were compared to each year's conditions, it showed that the 70 + 35 and 45 + 45 DSV intervals required a 4th spray in September every year. Overall, the spray timing of 55 and 55 interval has the best economic value. Growers continue to adjust their spraying schedules to the BEETcast™ model.

Comparison of Mycotoxin Profile and Population Structure of Fusarium graminearum Isolates from Sugarbeet and Cereal Crops.

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Fusarium graminearum has been reported to cause Yellows and storage rots of sugarbeet, although the pathogen is a principal pathogen of small grains. However, the genetic relationships and mycotoxin diversity of the F. graminearum populations collected from sugarbeet and small grains have not well understood. Using molecular markers, mycotoxin diversity and the genetic structure of F. graminearum populations collected from wheat, barley, sugarbeet and potato from upper Midwest in 2004 and 2005 were compared. The fungal populations from these four hosts were genetically close and low population differentiation was observed among them. Sequence analysis revealed that all the representative isolates were in the same clade 7 of F. graminearum. All the isolates were DON Chemotype and 15ADON chemotype was more prevalent compared to 3ADON chemotype. In a separate study, F. graminearum isolates from sugarbeet and potato were inoculated to wheat in the greenhouse; FHB severity were assessed, fungal DNA were quantified using real-time PCR technique and mycotoxins produced in wheat grains were analyzed. These isolates induced FHB symptoms in wheat grains and produced fungal biomass and DON in wheat grains. Overall, these findings will be useful formulating Fusarium disease management strategies and assessing mycotoxin risk in both cereal and non-cereal crop including sugarbeet. It will also help to conduct future epidemiological research and develop resistant sugarbeet cultivars for Fusarium yellows.

Breeding, Genetics, and Genomics of Sugar Beet -2010

Mitch McGrath, USDA-ARS, East Lansing, MI

Perhaps the first choice growers face for the coming season is which variety is best for them. Fortunately, there's information to guide choices, and while an occasional miss happens, varieties marketed in 2010 are better than those from 2000, and are much, much better than what was available 50 years ago. The choice of variety determines the potential maximum return on investment, and various problems that happen during the growing season can only reduce this potential return. Thus, all things being equal for yield potential, investing in varieties that tolerate adversity is a good strategy. In fact, the vast majority of efforts to improve the genetics of beets in the public sector, such as the program at East Lansing, are geared to finding new sources and new combinations of tolerance to overcome yield limitations for growers. These are then fed to the private breeding companies who, if the need is felt, will improve the yield of what we refer to as 'USDA germplasm releases' through further selection and the making of hybrids for sale. Since it may take 3 – 5 years for the seed companies to bring product to market from such materials in the best-case scenario, having a long-term pipeline of materials is essential for continued progress.

All varieties and germplasm can be thought of as a collection of genes that allow development to occur in the right conditions as well as respond to changing conditions once development has begun. Genes can be thought of as beads on a string, where each bead has a role to play. If the bead is red, there may be a penalty, if green a benefit. The goal of breeding is to make all beads green. However, genetics and genomics tell us there are 29,000 beads on nine strings in the pollen and eggs of the beet, or twice this number in the parts of the beet we can see. Getting them all green is improbable, especially if we are continually bringing in red beads just to get that one green one needed in the right spot. And red and green only depended on the environment the beets are grown in, so breeding in the environment where the beets are to be grown is essential, since we really don't know much about what genes control most traits in sugar beet, and much less about whether we should be looking for red or green or perhaps something entirely different. This approach of selecting the best, crossing the best, and hoping for the best, works. Period. It is the oldest form of plant breeding. In the past year, we have made substantial progress in selecting for good performance under Rhizoctonia seedling disease and nematode pressure, but not in the same germplasm. Combining them is an entirely different ball of wax.

Each new breeding project starts with a cross. Given the unknown state of red and green beads, each new cross resets the counter, so to speak. Often performance can be predicted from knowledge of the parents, but it is an inexact science. To make this process more exact, and hopefully more efficient, we need to find a way to sort the genes by what they do, as well as their color. Fortunately, each beet carries a record of its parentage with it, and we've made some progress in the past year in learning how to decipher this code. A couple of things are needed, and these are coming together nicely. Realizing the potential to use this code is perhaps the single most important beet improvement activity of this century. This year, the entire genome sequence of sugar beet was obtained, but it is not yet assembled in a meaningful form. And from only one beet, and as such, the beads are all the same color, for now. Also, doing the kind of genetics needed to dissect sugar beet traits has been cumbersome, and after 10 years of work, the first 'easy' populations are ready for analyses. Some of these will be at the Bean and Beet Farm in 2011. Please have a look.

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