2025 Research Report

Southern Minnesota Beet Sugar Cooperative

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SMBSC Research Vision Statement

Conduct industry leading agronomic and sugar beet storage research that enables Shareholder's data driven decisions to increase productivity and profitability and empowers the Cooperative's sustainability into the future.

SMBSC Research Mission:

Conduct industry leading research.
Generate high quality data.
Work to discover novel agronomic practices to solve the needs of SMBSC shareholders.
Increase productivity and profitability of SMBSC shareholders.

SMBSC Official Variety Trial Procedures and Sugar Beet Seed Approval

Lynsey Lies[1] and **Mark Bloomquist**[2]
[1]Production Agronomist, [2]Research Director, SMBSC, Renville, MN

Southern Minnesota Beet Sugar Cooperative (SMBSC) growers face several challenges to producing a high-quality, high-yielding sugar beet crop. These challenges include managing sugar beet diseases such as Aphanomyces root rot, Rhizoctonia root rot, and Cercospora leaf spot. An important tool that SMBSC growers can utilize in managing these diseases is the varieties' genetic tolerance to these diseases. Genetic tolerance combined with a better understanding of genetic sugar content and yield potential allow for the accurate placement of varieties in fields. SMBSC has a Seed Policy that provides guidelines for approving varieties to be sold to SMBSC growers. This policy creates a competitive system where varieties compete against each other to be approved for sale, ensuring that the best varieties are available for growers to plant.

Research Objective

- Generate yield and disease tolerance data on new candidate varieties submitted by seed companies.
- Utilize this data to move candidate varieties through the SMBSC Seed Approval process and approve varieties for sale to SMBSC growers.

Methodology

The SMBSC Official Variety Trials (OVTs) utilize Yield Trials and Disease Nursery Trials.

Four OVT-Yield Trial locations were planted in 2025. These trials were located near Hector, Murdock, Lake Lillian and Prinsburg. Trials were planted with a modified twelve-row John Deere 7300 vacuum planter. The plots were four twenty-two inch-rows wide by forty feet long. Each variety was replicated six times across each trial, for a total of twenty-four plots per variety when combining all locations (four locations * six replications per location). The experimental design of the trials was a partially balanced lattice. Five-foot alleys were cut perpendicular to the rows. These are removed from the total forty-foot plot length, so final plot lengths were approximately thirty-five feet after the alleys were cut. Emergence counts were taken approximately twenty-eight days after planting. After the emergence counts were taken, plots were thinned to a uniform spacing, and all doubles were removed. The final stand counts varied by trial location in 2025 due to differences in emergence between the trial locations. A fungicide was applied at approximately the four to six leaf stage to suppress Rhizoctonia root rot.

Weed control was accomplished by applying pre-emergence and post-emergence split lay-by herbicides at the appropriate rates and timing. The weeds present dictated the weed control products used at each location. Pre-emergence applications were made using a side-by-side sprayer going down the rows while all post-emergence spraying operations were conducted by a tractor sprayer driving perpendicular to the rows down the tilled alleys. The trials received CLS fungicide applications starting around row closure and continuing approximately every 10-14 days.

Between late August and early September, row lengths were taken on each harvest row. These row lengths were used to calculate the harvest area of each plot, which is then used to calculate the yield. All plots were defoliated using a four-row defoliator. After defoliation, the beets within the two feet of row immediately adjacent to the bare soil alleys were marked using food-grade paint. This identified these "end-beets," allowing them to be screened from the quality samples collected on the harvester. The end beets are not included in the quality samples to avoid the potential negative impact on quality, given their access to nutrients and moisture from the alley throughout the growing season. The center two rows of each plot were harvested using a two-row research harvester. All beets harvested from the center two rows were weighed on a scale on the harvester, and a sample of beets was taken for quality analysis at the SMBSC Tare Lab.

SMBSC screens all varieties for Aphanomyces root rot, Rhizoctonia root rot, and Cercospora leaf spot. SMBSC operates an Aphanomyces nursery near Renville and submits all varieties to a second Aphanomyces nursery operated by KWS Seed in Shakopee, MN. SMBSC also operates a Rhizoctonia nursery near Renville and submits all varieties to a second Rhizoctonia nursery operated by the Beet Sugar Development Foundation and the USDA/ARS in Michigan. SMBSC also conducts a Cercospora leaf spot nursery near Renville and submits all varieties to a KWS Seed Cercospora nursery near Randolph, MN. Each disease nursery is designed to utilize best management practices to mitigate all other diseases except for the disease of interest at that location.

Foliar disease ratings for the CLS nurseries occurred two or three times per week between mid-July and mid-August. These ratings were taken using the KWS (1-9) scale. Root ratings for the Aphanomyces and Rhizoctonia nurseries occurred in late August and early September. For both the Aphanomyces nursery and Rhizoctonia nursery, the beets were defoliated and lifted out of the ground. The beets in each individual plot were cleaned and laid out for rating. Multiple raters conducted root ratings using the KWS (1-9) scale for Aphanomyces. A (1-7) scale was utilized for Rhizoctonia root ratings. All disease nursery ratings were adjusted by the baseline varieties to remove year-to-year variation in disease levels.

Results and Discussion

In 2025, data from all four Yield Trials was utilized for CY26 Seed Approval. Data was also used from both Aphanomyces and Rhizoctonia nurseries. For CLS, the ratings were used from the SMBSC nursery but not the KWS owing to inconsistent ratings between the two likely due to differences in inoculum. To approve varieties to be planted in CY26, data produced in CY25 was combined with the data generated in CY24 and CY23.

In the following pages, you will find tables that share 2025 trial site specifications, one, two, and three-year combined OVT data, Disease Nursery data, Agriculturalist Variety Strip Trial results, and the data from each of the 2025 individual yield trial locations.

Conclusion

Data generated for the SMBSC Sugar Beet Seed Approval through the Official Variety Trials can be found in this report and other formats on the SMBSC website under the Agronomy section by selecting the Variety and Seed tab. This robust data set guides SMBSC producers to place varieties on their farms to optimize each field's production potential.

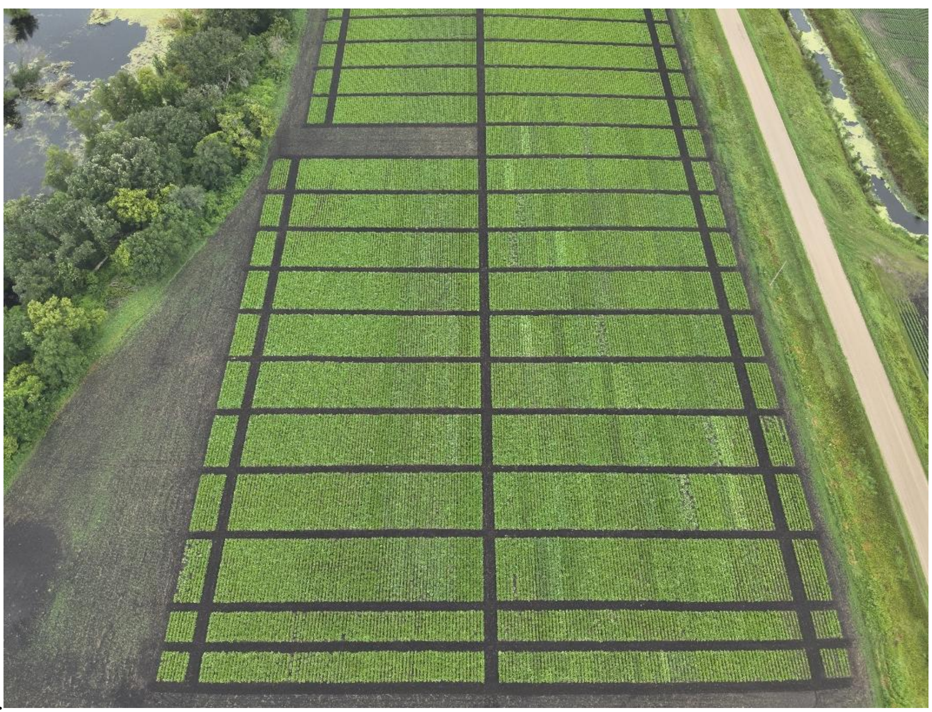
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Figure 1. Drone image from July 16th showing the Lake Lillian Official Variety Trial.

2025 SMBSC Official Variety Trials

Yield Trials Specifications

Trial Type	Cooperator	Trial Location	Previous Crop	Starter Fertilizer	Planting Date	Thinning Date	Harvest Date	Notes
Yield	Kurt and Matt Sandgren	Hector	Sweet Corn	-	4/23/2025	6/2/2025	10/7/2025	Low levels of cercospora and rhizoc.
Yield	Jeff Schmoll	Lake Lillian	Corn	-	5/6/2025	6/11/2025	9/30/2025	Low levels of cercospora and rhizoc.
Yield	Petersen Farms	Murdock	Corn Silage	-	4/30/2025	6/5/2025	9/23/2025	Moderate level of cercospora
Yield	Tom Bakker	Prinsburg	Corn	-	4/25/2025	6/9/2025	9/26/2025	Moderate level of cercospora, bacterial leaf spot, and rhizoc. Some hail damage in late July.

Disease Nursery Trials Specifications

Trial Type	Investigator	Trial Location	Rating Performed by	Use of Ratings in 2025 Variety Approval System
Aphanomyces	SMBSC	Renville	SMBSC Staff	50% of the 2025 Aph Rating
Aphanomyces	KWS	Shakopee	KWS, M. Bloomquist, L. Nass, A. Chanda	50% of the 2025 Aph Rating
Cercospora	SMBSC	Renville	SMBSC Staff	100% of the 2025 CLS Rating
Cercospora	KWS	Randolph	KWS Staff	Not used in 2025 due to inoculum not being representative of SMBSC growing area
Rhizoctonia	SMBSC	Renville	SMBSC Staff	50% of the 2025 RHC Rating
Rhizoctonia	BSDF - USDA/ARS	Michigan	Linda Hanson and USDA/ARS Staff	50% of the 2025 RHC Rating

Table 1. Comparison of 2026 Fully Approved Varieties to Test Market and Specialty Approved Varieties - Three Years of Data (2023-2025)

			Recoverable Sugar Per Ton		Recoverable Sugar Per Acre		Sugar Percent		Purity Percent		Yield Tons Per Acre		Aphanomyces Root Rating [1]		Cercospora Leaf Spot [1]		Rhizoctonia Root Rating [1]		Emergence (%)		Revenue per Ton [2]	Revenue per Acre [2]
	Variety	Specialty	3 yr avg	% of mean	3 yr avg	% of mean	3 yr avg	% of mean	3 yr avg	% of mean	3 yr avg	% of mean	3 yr avg	% of mean	3 yr avg	% of mean	3 yr avg	% of mean	3 yr avg	% of mean	% of mean	% of mean
Fully Approved	Beta 9131	RHC	268.3	99.2	9735.9	100.9	16.0	99.1	90.5	100.1	36.3	101.8	3.7	100.6	2.6	86.6	3.2	84.6	67.7	101.7	98.4	100.3
	Beta 9284	RHC	270.3	99.9	9622.0	99.7	16.1	100.0	90.4	99.9	35.5	99.7	3.3	87.8	3.7	123.8	3.6	96.1	64.8	97.4	99.7	99.4
	Beta 9369		276.7	102.3	9987.3	103.5	16.4	101.8	90.7	100.2	36.0	101.0	3.9	105.6	2.2	73.0	3.9	103.0	66.8	100.4	105.6	106.7
	Crystal M106		269.9	99.7	9545.4	98.9	16.1	99.9	90.3	99.8	35.5	99.6	3.6	97.1	3.7	123.7	3.8	100.7	65.6	98.5	99.3	99.0
	Crystal M168		267.8	99.0	9376.5	97.1	16.0	99.1	90.4	100.0	34.9	97.9	4.1	108.9	2.8	93.0	4.3	115.6	68.0	102.1	98.0	96.1
	Mean of Fully Approved:		**270.6**	**100.0**	**9653.5**	**100.0**	**16.1**	**100.0**	**90.5**	**100.0**	**35.6**	**100.0**	**3.7**	**100.0**	**3.0**	**100.0**	**3.8**	**100.0**	**66.6**	**100.0**	**100.0**	**100.0**
Specialty	Crystal M977	RHC	261.9	96.8	9826.1	101.8	15.6	97.1	90.4	99.9	37.1	104.3	3.6	96.6	4.1	137.2	3.2	84.3	66.9	100.5	91.6	95.4
Test Market	Crystal M339		268.0	99.0	9640.9	99.9	16.0	99.3	90.3	99.9	35.8	100.6	3.7	99.4	2.4	81.8	3.7	98.2	67.5	101.4	97.7	98.2
	Hilleshog 2395		260.1	96.1	9222.2	95.5	15.5	96.5	90.4	99.9	35.4	99.6	4.5	119.9	4.0	133.9	4.5	120.4	61.4	92.3	90.0	89.5
Last Year	SV 863		266.0	98.3	8584.6	88.9	15.9	98.5	90.4	100.0	32.3	90.6	5.1	137.5	3.8	127.7	3.9	102.7	51.8	77.8	96.4	87.5

1. Lower numbers are better for all disease nursery ratings.

2. **Revenue per Ton** and **Revenue per Acre** figures were produced using the payment calculation for the final 2024 crop payment.

Table 2. Comparison of 2026 Fully Approved Varieties to Test Market and Specialty Approved Varieties - Two Years of Data (2024-2025)

			Recoverable Sugar Per Ton		Recoverable Sugar Per Acre		Sugar Percent		Purity Percent		Yield Tons Per Acre		Aphanomyces Root Rating [1]		Cercospora Leaf Spot [1]		Rhizoctonia Root Rating [1]		Emergence (%)		Revenue per Ton [2]	Revenue per Acre [2]
	Variety	Specialty	2 yr avg	% of mean	2 yr avg	% of mean	2 yr avg	% of mean	2 yr avg	% of mean	2 yr avg	% of mean	2 yr avg	% of mean	2 yr avg	% of mean	2 yr avg	% of mean	2 yr avg	% of mean	% of mean	% of mean
Fully Approved	Beta 9131	RHC	262.9	99.4	9120.4	100.7	15.6	99.4	90.7	100.1	34.7	101.3	3.6	101.6	2.9	93.1	3.6	90.9	70.5	101.6	98.0	99.3
	Beta 9284	RHC	264.6	100.0	9217.9	101.8	15.7	100.1	90.7	100.0	34.8	101.6	3.1	87.5	3.5	111.7	3.8	96.0	68.9	99.3	99.8	101.4
	Beta 9369		270.9	102.4	9489.7	104.8	16.0	101.9	91.0	100.3	35.0	102.2	3.7	106.0	2.5	78.2	4.0	101.0	71.0	102.3	106.0	108.3
	Crystal M106		263.0	99.4	8930.6	98.6	15.7	99.7	90.5	99.8	34.2	99.8	3.5	99.5	3.6	113.4	3.8	96.0	66.0	95.0	99.0	98.9
	Crystal M168		261.0	98.7	8510.3	94.0	15.5	99.0	90.6	99.9	32.6	95.1	3.7	105.4	3.3	103.7	4.6	116.2	70.6	101.7	96.0	91.4
	Mean of Fully Approved:		**264.5**	**100.0**	**9053.8**	**100.0**	**15.7**	**100.0**	**90.7**	**100.0**	**34.2**	**100.0**	**3.5**	**100.0**	**3.2**	**100.0**	**4.0**	**100.0**	**69.4**	**100.0**	**100.0**	**100.0**
Specialty	Crystal M977	RHC	256.1	96.8	9358.4	103.4	15.3	97.2	90.6	99.9	35.9	104.9	3.6	101.6	4.1	131.0	3.3	83.3	70.1	101.0	92.5	97.0
Test Market	Beta 9415		262.5	99.3	9110.6	100.6	15.6	99.2	90.8	100.1	34.6	101.0	3.9	110.5	4.2	133.0	3.4	85.9	72.9	105.0	98.4	99.4
	Beta 9497		268.9	101.7	9627.8	106.3	15.9	101.2	91.0	100.3	35.8	104.5	3.7	104.8	2.8	88.7	3.6	90.9	71.6	103.1	104.3	109.0
	Crystal M339		261.2	98.8	9141.5	101.0	15.6	99.1	90.6	99.8	34.9	101.8	3.4	97.3	2.8	87.0	4.0	101.0	69.5	100.1	97.7	99.6
	Crystal M432		268.0	101.3	9208.6	101.7	15.9	101.1	90.8	100.1	34.2	100.0	3.5	100.3	4.1	128.7	4.0	101.0	72.6	104.5	103.6	103.4
	Crystal M445		266.3	100.7	9425.5	104.1	15.8	100.8	90.6	99.9	35.4	103.5	3.6	104.0	2.1	66.6	3.4	85.9	63.3	91.3	101.1	104.5
	Hilleshog 2395		254.7	96.3	8797.1	97.2	15.2	96.7	90.6	99.8	34.5	100.7	4.4	125.7	4.1	129.0	4.3	108.6	59.8	86.1	90.8	91.5
Last Year	SV RR863		260.8	98.6	8036.4	88.8	15.5	98.7	90.7	100.0	30.9	90.3	4.8	136.5	3.8	120.9	3.9	98.5	50.0	72.1	96.3	86.9

1. Lower numbers are better for all disease nursery ratings.
2. **Revenue per Ton** and **Revenue per Acre** figures were produced using the payment calculation for the final 2024 crop payment.

Table 3. Comparison of 2026 Fully Approved Varieties to Test Market and Specialty Approved Varieties - 1 Year of Data (2025)

			Recoverable Sugar Per Ton		Recoverable Sugar Per Acre		Sugar Percent		Purity Percent		Yield Tons Per Acre		Aphanomyces Root Rating [1]		Cercospora Leaf Spot [1]		Rhizoctonia Root Rating [1]		Emergence (%)		Revenue per Ton [2]	Revenue per Acre [2]
	Variety	Specialty	1 yr avg	% of mean	1 yr avg	% of mean	1 yr avg	% of mean	1 yr avg	% of mean	1 yr avg	% of mean	1 yr avg	% of mean	1 yr avg	% of mean	1 yr avg	% of mean	1 yr avg	% of mean	% of mean	% of mean
Fully Approved	Beta 9131	RHC	254.2	99.1	9359.4	100.9	15.0	99.0	91.5	100.2	36.8	101.8	3.4	102.0	3.7	100.9	3.4	89.6	65.8	100.3	97.9	99.7
	Beta 9284	RHC	255.1	99.4	9381.4	101.2	15.1	99.4	91.4	100.0	36.8	101.9	2.9	87.3	3.7	102.5	3.6	93.7	65.2	99.4	99.4	101.3
	Beta 9369		263.8	102.8	9609.5	103.6	15.5	102.6	91.4	100.0	36.4	100.8	3.9	118.8	3.1	85.6	3.8	99.5	67.1	102.3	106.9	107.7
	Crystal M106		257.2	100.2	9293.9	100.2	15.2	100.2	91.3	99.9	36.2	100.2	3.1	94.3	3.6	100.3	3.9	103.8	63.1	96.1	100.9	101.1
	Crystal M168		252.7	98.5	8725.6	94.1	14.9	98.7	91.3	99.9	34.4	95.2	3.2	97.6	4.0	110.8	4.3	113.4	66.8	101.9	95.3	90.7
	Mean of Fully Approved:		**256.6**	**100.0**	**9273.9**	**100.0**	**15.1**	**100.0**	**91.4**	**100.0**	**36.1**	**100.0**	**3.3**	**100.0**	**3.6**	**100.0**	**3.8**	**100.0**	**65.6**	**100.0**	**100.0**	**100.0**
Specialty	Crystal M977	RHC	249.2	97.1	9437.8	101.8	14.7	97.3	91.3	100.0	37.8	104.7	3.4	102.5	3.9	108.3	3.3	87.8	69.0	105.1	91.5	95.8
Test Market	Beta 9415		253.9	98.9	9047.5	97.6	15.0	99.2	91.2	99.9	35.6	98.5	3.6	109.6	4.3	119.5	3.5	91.6	71.3	108.8	96.8	95.4
	Beta 9497		258.6	100.8	9470.2	102.1	15.2	100.5	91.5	100.2	36.6	101.2	3.3	100.0	3.4	94.7	3.5	92.3	72.3	110.3	101.6	103.0
	Crystal M339		255.4	99.5	9128.7	98.4	15.1	99.5	91.4	100.1	35.6	98.6	3.2	98.4	3.4	92.8	4.2	110.2	60.1	91.7	99.4	98.0
	Crystal M432		261.7	102.0	9544.7	102.9	15.4	101.6	91.6	100.2	36.5	101.1	3.4	103.5	4.0	109.2	4.1	107.5	69.7	106.2	105.8	106.9
	Crystal M445		258.6	100.8	9727.2	104.9	15.3	100.8	91.3	99.9	37.5	103.9	3.4	103.3	2.8	78.4	3.6	95.5	62.1	94.7	102.8	106.7
	Hilleshog 2395		246.9	96.2	9051.8	97.6	14.6	96.4	91.4	100.0	36.7	101.6	4.0	122.0	4.0	110.4	4.2	111.1	55.5	84.7	90.0	91.5
Last Year	SV RR863		253.2	98.7	8828.4	95.2	14.9	98.5	91.6	100.2	34.7	96.0	4.5	136.4	3.9	108.7	4.2	109.6	61.0	93.0	96.4	92.6

1. Lower numbers are better for all disease nursery ratings.

2. **Revenue per Ton** and **Revenue per Acre** figures were produced using the payment calculation for the final 2024 crop payment.

2023-2025 Disease Nursery Data for Aphanomyces, Cercospora, and Rhizoctonia

			Aphanomyces Root Ratings					Cercospora Leafspot Ratings					Rhizoctonia Root Ratings				
	Variety	**Specialty**	2025 Root Rating	2024 Root Rating	2023 Root Rating	2024-2025 2 Year Mean Root Rating	2023-2025 3 Year Mean Root Rating	2025 CLS Rating	2024 CLS Rating	2023 CLS Rating	2024-2025 2 Year Mean Foliar Rating	2023-2025 3 Year Mean Foliar Rating	2025 Root Rating	2024 Root Rating	2023 Root Rating	2024-2025 2 Year Mean Root Rating	2023-2025 3 Year Mean Root Rating
Fully Approved	Beta 9131	RHC	3.4	3.8	4.1	3.6	3.7	3.7	2.2	1.9	2.9	2.6	3.4	3.8	2.3	3.6	3.2
	Beta 9284	RHC	2.9	3.3	3.7	3.1	3.3	3.7	3.4	4.0	3.5	3.7	3.6	4.1	3.1	3.8	3.6
	Beta 9369		3.9	3.5	4.4	3.7	3.9	3.1	1.8	1.6	2.5	2.2	3.8	4.1	3.7	4.0	3.9
	Crystal M106		3.1	3.9	3.9	3.5	3.6	3.6	3.5	3.9	3.6	3.7	3.9	3.7	3.8	3.8	3.8
	Crystal M168		3.2	4.2	4.8	3.7	4.1	4.0	2.5	1.8	3.3	2.8	4.3	5.0	3.8	4.6	4.3
Specialty	Crystal M977	RHC	3.4	3.7	3.7	3.6	3.6	3.9	4.4	4.0	4.1	4.1	3.3	3.3	2.9	3.3	3.2
Test Market	Beta 9415		3.6	4.1		3.9		4.3	4.1		4.2		3.5	3.3		3.4	
	Beta 9497		3.3	4.1		3.7		3.4	2.2		2.8		3.5	3.8		3.6	
	Crystal M339		3.2	3.6	4.3	3.4	3.7	3.4	2.1	1.8	2.8	2.4	4.2	3.9	3.0	4.0	3.7
	Crystal M432		3.4	3.6		3.5		4.0	4.2		4.1		4.1	3.9		4.0	
	Crystal M445		3.4	3.9		3.6		2.8	1.4		2.1		3.6	3.1		3.4	
	Hilleshog 2395		4.0	4.8	4.6	4.4	4.5	4.0	4.2	3.9	4.1	4.0	4.2	4.5	4.9	4.3	4.5
Last Year	SV 863		4.5	5.1	5.8	4.8	5.1	3.9	3.7	3.8	3.8	3.8	4.2	3.7	3.7	3.9	3.9
			Aphanomyces Ratings from SMBSC Nursery in Renville and KWS Nursery in Shakopee.					Cercospora Ratings from SMBSC Nursery in Renville and KWS Nursery near Randolph MN.					Rhizoctonia Ratings from SMBSC Nursery in Renville and BSDF Nursery in Michigan.				
			Ratings are on scale of 1 - 9.					**Ratings are on scale of 1-9.**					**Ratings are on scale of 1 - 7.**				

* Lower Ratings mean more resistant to disease and are shown in green font.

**Higher Ratings mean more susceptible to disease and are shown in red font.

SMBSC Agricultural Staff Variety Strip Trial - Summary

Strip Trial Means Table

Variety*	Stand Count 28 DAP Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent of Mean Revenue per Acre**
Beta 9131	153	15.0	90.3	30.6	251.2	7680.6	101.1%
Beta 9369	153	15.1	90.2	31.0	252.6	7908.6	102.7%
Crystal M339	146	15.0	90.0	29.7	249.9	7420.6	95.2%
Hilleshog 2395	134	14.8	90.1	32.3	245.0	7915.4	101.0%
Mean	146.5	15.0	90.1	30.9	249.7	7731.3	100.0
%CV	12.3	2.1	0.4	9.0	2.3	10.2	13.5
PR>F	0.1916	0.1575	0.3304	0.3639	0.1123	0.6113	0.7432
LSD (0.05)	ns	ns	ns	ns	ns	ns	ns
Reps***	7	7	7	7	7	7	7

* Varieties are organized in alphabetical order. The top and bottom performers measured by 'Percent of Mean Revenue per Acre' vary by location, indicating an environmental effect.

** Revenue is calculated using the 2024 crop payment calculator, utilizing values released Oct. 23, 2025

*** Combined data from 7 locations with each location considered a replicate.

Locations: Redwood Falls, Renville, Hector, Appleton, Murdock, Cosmos, and Brooten

SMBSC Variety Strip Trial - Redwood Falls

Variety	28 DAP Stand Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent Rev/Acre	Variety
Beta 9131	180	15.7	90.4	43.4	262.7	11397	105%	Beta 9131
Beta 9369	185	16.0	91.0	43.6	270.3	11779	113%	Beta 9369
Crystal M339	155	15.8	90.6	41.0	265.3	10866	102%	Crystal M339
Hilleshog 2395	158	15.5	89.8	35.0	257.1	8987	80%	Hilleshog 2395
Beta 9284*	176	15.6	90.3	41.2	260.3	10729	97%	Beta 9284*
Average	**170**	**15.7**	**90.5**	**40.7**	**263.8**	**10757**	**100.0%**	**Average**

Planted: April 16, 2025
Harvested: October 21, 2025
Agriculturalist: Andrew Docter

* Denotes variety shown with final data but not included with average/statistical analysis

SMBSC Variety Strip Trial - Renville

Variety	28 DAP Stand Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent Rev/Acre	Variety
Beta 9131	156	14.4	91.1	23.9	242.9	5803	121.0%	Beta 9131
Beta 9369	114	13.3	90.3	19.9	220.8	4403	73.9%	Beta 9369
Crystal M339	131	14.4	89.7	20.2	236.6	4771	94.3%	Crystal M339
Hilleshog 2395	124	14.2	90.4	24.0	235.8	5654	110.9%	Hilleshog 2395
Crystal M106*	151	14.3	90.4	23.8	237.8	5668	113.1%	Crystal M106*
Average	**131**	**14.1**	**90.4**	**22.0**	**234.0**	**5158**	**100.0%**	**Average**

Planted: April 22, 2025
Harvested: October 2,2025
Agriculturalist: Chris Dunsmore

* Denotes variety shown with final data but not included with average/statistical analysis

SMBSC Variety Strip Trial - Appleton**

Variety	28 DAP Stand Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent Rev/Acre	Variety
Beta 9131	205	14.9	89.4	28.0	245.6	6870	100%	Beta 9131
Beta 9369	205	15.2	88.8	28.5	248.8	7100	106%	Beta 9369
Crystal M339	149	15.0	89.4	28.2	247.7	6975	103%	Crystal M339
Hilleshog 2395	136	14.5	89.2	28.1	237.1	6672	91%	Hilleshog 2395
Beta 9284*	198	15.2	89.5	30.5	250.7	7658	116%	Beta 9284*
Crystal M977*	206	14.7	89.4	28.2	242.3	6833	97%	Crystal M977*
Average	**174**	**14.9**	**89.2**	**28.2**	**244.8**	**6904**	**100.0%**	**Average**

Planted: April 18, 2025
Harvested: September 8,2025
Agriculturalist: Gavin Johnson

* Denotes variety shown with final data but not included with average/statistical analysis
**Denotes an irrigated strip trial

SMBSC Variety Strip Trial - Cosmos

Variety	28 DAP Stand Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent Rev/Acre	Variety
Beta 9131	140	15.6	90.3	33.8	261.5	8845	93%	Beta 9131
Beta 9369	165	16.2	90.4	37.8	271.6	10270	115%	Beta 9369
Crystal M339	163	15.7	90.2	35.0	263.1	9205	98%	Crystal M339
Hilleshog 2395	153	14.9	90.4	39.3	248.0	9752	94%	Hilleshog 2395
Average	**155**	**15.6**	**90.3**	**36.5**	**261.0**	**9518**	**100.0%**	**Average**

Planted: April 23, 2025
Harvested: October 10, 2025
Agriculturalist: Dylan Swanson

SMBSC Variety Strip Trial - Brooten**

Variety	28 DAP Stand Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent Rev/Acre	Variety
Beta 9131	149	15.4	90.5	22.7	258.4	5864	92%	Beta 9131
Beta 9369	148	15.8	90.6	25.3	266.6	6750	112%	Beta 9369
Crystal M339	156	15.4	90.4	19.6	257.5	5055	79%	Crystal M339
Hilleshog 2395	161	15.2	90.7	29.5	255.5	7540	117%	Hilleshog 2395
Beta 9284*	164	15.6	90.3	22.5	262.0	5896	95%	Beta 9284*
Crystal M977*	169	15.1	90.4	23.4	252.7	5917	90%	Crystal M977*
Average	**153**	**15.5**	**90.6**	**24.3**	**259.5**	**6302**	**100.0%**	**Average**

Planted: April 26, 2025
Harvested: October 17, 2025
Agriculturalist: Jared Kelm

* Denotes variety shown with final data but not included with average/statistical analysis
**Denotes an irrigated strip trial

SMBSC Variety Strip Trial - Hector

Variety	28 DAP Stand Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent Rev/Acre	Variety
Beta 9131	128	15.6	90.3	25.6	261.2	6683	94%	Beta 9131
Beta 9369	124	15.7	90.0	26.1	262.3	6849	97%	Beta 9369
Crystal M339	148	15.5	89.9	27.8	258.1	7165	99%	Crystal M339
Hilleshog 2395	106	15.4	90.2	31.7	257.2	8140	111%	Hilleshog 2395
Ses 863*	113	15.5	90.5	28.6	259.5	7431	103%	Ses 863*
Average	**126**	**15.6**	**90.1**	**27.8**	**259.7**	**7209**	**100.0%**	**Average**

Planted: April 21, 2025
Harvested: October 20, 2025
Agriculturalist: Ryan Kuester

* Denotes variety shown with final data but not included with average/statistical analysis

SMBSC Variety Strip Trial - Murdock

Variety	28 DAP Stand Beets/100' row	Sugar %	Purity %	Tons / Acre	Extractable Sugar per Ton	Extractable Sugar per Acre	Percent Rev/Acre	Variety
Beta 9131	114	13.7	90.1	36.7	226.1	8302	102%	Beta 9131
Beta 9369	128	13.8	90.0	36.0	227.8	8209	103%	Beta 9369
Crystal M339	121	13.5	89.6	35.8	221.0	7907	92%	Crystal M339
Hilleshog 2395	99	13.6	90.0	38.7	224.0	8663	104%	Hilleshog 2395
Ses 863*	83	12.7	89.7	31.3	207.7	6507	63%	Ses 863*
Average	**115**	**13.6**	**89.9**	**36.8**	**224.7**	**8270**	**100.0%**	**Average**

Planted: April 26, 2025
Harvested: October 9, 2025
Agriculturalist: William Luepke

* Denotes variety shown with final data but not included with average/statistical analysis

Hector OVT

Entry	Variety	Sugar		Tons		ES		EST		ESA		Purity		Emergence	
		Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %
901	Baseline 9 SV RR863	16.2	99.1	34.9	81.2	13.6	98.4	271.1	98.4	9208.0	78.0	90.3	99.5	23.6	35.0
902	Filler #1	16.4	100.5	44.0	102.4	13.9	100.6	277.3	100.7	12219.3	103.5	90.9	100.1	70.4	104.3
903	BTS 9497	16.6	101.6	43.5	101.2	14.0	101.9	280.8	102.0	12147.0	102.9	91.0	100.2	78.9	117.0
904	BTS 9369	16.7	102.3	43.6	101.5	14.1	102.7	282.8	102.7	12317.1	104.4	91.0	100.2	73.8	109.5
905	BTS 9512	16.2	99.4	45.4	105.8	13.7	99.3	273.6	99.3	12414.9	105.2	90.8	100.0	73.6	109.2
906	Crystal M106	16.5	101.4	43.7	101.8	14.0	101.5	279.6	101.5	12200.5	103.4	90.8	100.0	70.8	105.0
907	Crystal M445	16.5	101.4	45.8	106.6	14.0	101.3	278.9	101.3	12786.7	108.3	90.6	99.8	61.6	91.3
908	BTS 9564	16.3	99.9	43.7	101.7	13.8	100.5	276.9	100.5	12095.2	102.5	91.2	100.4	67.1	99.5
909	BTS 9599	16.4	100.7	42.2	98.4	13.9	100.6	277.1	100.6	11674.9	98.9	90.7	99.9	70.6	104.7
910	BTS 9533	16.5	101.3	41.8	97.3	14.0	101.4	279.3	101.4	11651.7	98.7	90.8	100.0	69.0	102.3
911	Crystal M977	16.0	98.4	46.7	108.8	13.5	98.3	270.7	98.3	12664.8	107.3	90.8	100.0	70.6	104.7
912	SV 851	16.1	98.9	41.8	97.5	13.6	98.7	271.9	98.7	11343.3	96.1	90.7	99.9	65.1	96.5
913	Crystal M339	16.4	100.5	43.1	100.3	13.9	100.6	277.0	100.6	11953.6	101.3	90.8	100.0	64.1	95.1
914	Crystal M561	15.9	97.2	45.0	104.8	13.3	96.8	266.7	96.8	11988.4	101.6	90.6	99.8	69.5	103.0
915	Crystal M168	16.3	100.1	41.1	95.7	13.8	100.1	275.7	100.1	11313.0	95.9	90.8	100.0	72.0	106.7
916	Crystal M515	16.6	101.6	42.3	98.6	14.0	101.3	279.0	101.3	11820.5	100.2	90.5	99.7	73.8	109.5
917	BTS 9131	16.1	98.9	44.5	103.7	13.6	98.7	271.8	98.7	12115.8	102.7	90.6	99.8	69.4	103.0
918	Crystal M583	16.5	101.3	43.9	102.3	14.0	101.4	279.3	101.4	12269.8	104.0	90.8	100.0	72.2	107.1
919	Baseline 11 Beta 9780	16.2	99.6	42.6	99.3	13.8	99.9	275.2	99.9	11742.1	99.5	91.0	100.3	73.8	109.5
920	BTS 9508	16.3	99.9	41.7	97.2	13.8	100.3	276.3	100.3	11565.4	98.0	91.1	100.3	75.9	112.6
921	Crystal M432	16.5	101.0	43.3	100.9	13.9	101.1	278.6	101.1	12051.4	102.1	90.8	100.0	73.2	108.5
922	BTS 9284	16.2	99.2	43.1	100.3	13.7	99.3	273.5	99.3	11757.9	99.6	90.9	100.1	73.6	109.1
923	Baseline 10 Crystal M623	16.3	99.9	40.9	95.3	13.7	99.6	274.4	99.6	10947.3	92.8	90.6	99.8	63.2	93.7
924	Hil 2559	16.2	99.2	41.9	97.6	13.6	98.8	272.2	98.8	11388.5	96.5	90.5	99.7	49.8	73.8
925	Baseline 12 Hilleshog 2327	16.2	99.4	42.1	98.0	13.7	99.4	273.8	99.4	11527.4	97.7	90.8	100.1	68.1	100.9
926	SV 852	16.2	99.6	43.0	100.2	13.7	99.6	274.2	99.6	11803.5	100.0	90.8	100.0	63.4	94.1
927	Hil 2395	15.7	96.3	45.3	105.6	13.2	95.9	264.2	95.9	11880.0	100.7	90.7	99.9	55.1	81.7
928	BTS 9415	16.2	99.5	42.7	99.3	13.7	99.1	273.0	99.1	11630.5	98.5	90.6	99.7	77.1	114.3
929	Filler #2	16.7	102.1	42.4	98.7	14.1	102.5	282.2	102.5	11943.6	101.2	91.0	100.2	69.2	102.6
930	SV 863	16.3	99.9	42.1	98.1	13.8	100.5	276.9	100.5	11631.5	98.6	91.2	100.4	64.6	95.8
	Grand Mean	16.31		42.93		13.77		275.45		11801.8		90.78		67.44	
	LSD	0.35		1.98		0.35		7.03		495.95		0.46		7.31	
	C.V.	1.86		4.03		2.23		2.23		3.67		0.44		9.5	

Lake Lillian OVT

Entry	Variety	Sugar		Tons		ES		EST		ESA		Purity		Emergence	
		Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %
901	Baseline 9 SV RR863	15.4	101.2	34.7	98.6	13.2	101.3	263.4	101.3	9135.4	99.9	92.0	100.0	77.8	106.7
902	Filler #1	15.3	100.4	36.3	103.1	13.0	100.3	260.8	100.4	9462.0	103.4	91.9	100.0	83.1	114.0
903	BTS 9497	15.5	102.0	35.8	101.7	13.1	100.8	262.1	100.8	9379.6	102.5	91.1	99.0	72.5	99.4
904	BTS 9369	15.3	100.6	35.4	100.6	13.0	100.0	260.0	100.0	9192.0	100.5	91.5	99.5	75.0	102.9
905	BTS 9512	15.2	99.8	33.7	95.8	13.0	100.0	259.9	100.0	8645.2	94.5	92.1	100.2	72.7	99.7
906	Crystal M106	15.4	101.0	35.6	101.1	13.1	101.1	262.8	101.1	9355.0	102.3	92.0	100.0	70.4	96.5
907	Crystal M445	15.1	99.3	36.7	104.2	13.0	99.7	259.2	99.7	9512.5	104.0	92.3	100.3	77.1	105.7
908	BTS 9564	15.5	101.8	34.4	97.7	13.2	101.7	264.3	101.7	9079.3	99.3	91.8	99.8	78.0	107.0
909	BTS 9599	15.3	100.9	35.5	100.9	13.1	101.1	262.7	101.1	9338.3	102.1	92.0	100.1	77.1	105.7
910	BTS 9533	14.9	98.3	37.2	105.6	12.8	98.2	255.2	98.2	9497.2	103.8	92.0	100.0	79.2	108.6
911	Crystal M977	15.1	99.4	35.5	101.0	13.0	99.7	259.1	99.7	9193.7	100.5	92.2	100.3	73.8	101.3
912	SV 851	15.0	98.9	36.0	102.2	12.8	98.8	256.7	98.8	9362.7	102.4	91.9	100.0	70.4	96.5
913	Crystal M339	15.1	99.5	35.7	101.4	12.9	99.4	258.3	99.4	9203.8	100.6	91.9	99.9	74.1	101.6
914	Crystal M561	14.9	97.8	34.7	98.5	12.7	97.5	253.4	97.5	8872.3	97.0	91.8	99.8	78.0	107.0
915	Crystal M168	15.4	101.5	35.9	102.1	13.3	102.0	265.1	102.0	9525.3	104.1	92.2	100.3	74.8	102.5
916	Crystal M515	15.1	99.2	35.8	101.6	12.9	99.4	258.4	99.4	9223.9	100.8	92.1	100.2	68.5	94.0
917	BTS 9131	15.5	101.7	36.9	104.9	13.2	101.9	264.8	101.9	9793.8	107.1	92.0	100.0	77.6	106.4
918	Crystal M583	15.3	100.6	33.9	96.4	13.0	100.3	260.6	100.3	8836.4	96.6	91.7	99.7	77.1	105.7
919	Baseline 11 Beta 9780	15.5	101.8	32.9	93.4	13.3	102.2	265.5	102.2	8719.0	95.3	92.1	100.2	75.0	102.9
920	BTS 9508	15.4	101.1	36.5	103.6	13.2	101.4	263.5	101.4	9590.0	104.8	92.1	100.2	81.3	111.4
921	Crystal M432	15.3	100.4	35.8	101.7	13.1	100.6	261.5	100.6	9342.7	102.1	92.1	100.1	74.3	101.9
922	BTS 9284	15.1	99.6	32.3	91.7	12.9	99.2	257.9	99.2	8331.6	91.1	91.7	99.7	69.7	95.6
923	Baseline 10 Crystal M623	15.1	99.6	35.1	99.8	13.0	99.6	258.9	99.6	9096.3	99.4	92.0	100.1	67.6	92.7
924	Hil 2559	15.0	98.6	35.0	99.5	12.8	98.8	256.8	98.8	8965.8	98.0	92.1	100.2	75.9	104.1
925	Baseline 12 Hilleshog 2327	15.2	100.2	36.4	103.3	13.1	100.5	261.2	100.5	9488.5	103.7	92.1	100.2	69.5	95.2
926	SV 852	14.7	96.6	34.1	97.0	12.6	96.7	251.3	96.7	8578.3	93.8	92.2	100.3	67.4	92.4
927	Hil 2395	15.0	98.7	36.0	102.3	12.7	98.0	254.7	98.0	9170.9	100.3	91.5	99.5	79.9	109.5
928	BTS 9415	15.2	100.2	34.2	97.1	13.0	100.3	260.7	100.3	8941.9	97.8	92.0	100.1	74.8	102.5
929	Filler #2	15.1	99.0	37.2	105.8	12.8	98.8	256.8	98.8	9556.8	104.5	91.9	99.9	68.3	93.7
930	SV 863	15.2		35.2		13.0		259.9		9147.0		92.0		72.9	
	Grand Mean	15.2		35.18		13		259.9		9146.97		91.95		72.92	
	LSD	0.32		2.54		0.35		6.96		679.8		0.74		6.29	
	C.V.	1.86		6.31		2.35		2.35		6.51		0.7		7.56	

Murdock OVT

		Sugar		Tons		ES		EST		ESA		Purity		Emergence	
Entry	Variety	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %
901	Baseline 9 SV RR863	13.1	95.5	30.1	77.4	10.9	95.1	218.7	95.1	6612.9	73.8	90.9	99.8	23.9	36.4
902	Filler #1	13.6	99.3	40.6	104.5	11.4	99.4	228.7	99.4	9259.9	103.3	91.2	100.2	62.6	95.2
903	BTS 9497	14.0	101.9	39.8	102.4	11.8	102.3	235.4	102.3	9414.0	105.0	91.2	100.2	74.4	113.1
904	BTS 9369	14.4	105.1	40.1	103.1	12.2	105.8	243.3	105.8	9745.0	108.7	91.2	100.2	68.9	104.8
905	BTS 9512	13.9	101.2	42.2	108.5	11.7	101.5	233.5	101.5	9871.6	110.1	91.1	100.1	71.0	107.9
906	Crystal M106	13.9	100.9	41.5	106.6	11.6	100.4	231.1	100.4	9551.4	106.6	90.7	99.6	66.9	101.7
907	Crystal M445	14.1	102.8	41.8	107.4	11.8	102.9	236.6	102.8	9875.2	110.2	90.9	99.9	66.7	101.5
908	BTS 9564	13.9	100.9	40.1	103.1	11.7	101.3	233.1	101.3	9321.5	104.0	91.2	100.2	62.1	94.4
909	BTS 9599	14.1	103.0	39.5	101.4	12.0	104.0	239.2	104.0	9440.2	105.3	91.5	100.5	69.9	106.3
910	BTS 9533	14.2	103.4	40.7	104.5	12.0	103.9	239.0	103.9	9719.6	108.4	91.2	100.2	70.4	107.1
911	Crystal M977	13.3	96.6	41.9	107.7	11.1	96.4	221.8	96.4	9294.3	103.7	91.0	100.0	72.0	109.5
912	SV 851	13.4	97.7	34.4	88.4	11.2	97.4	224.1	97.4	7723.1	86.2	90.9	99.9	65.4	99.4
913	Crystal M339	13.7	100.0	39.4	101.3	11.5	100.0	230.2	100.1	9107.9	101.6	91.1	100.1	63.0	95.7
914	Crystal M561	13.5	98.5	40.9	105.1	11.3	98.0	225.5	98.0	9213.8	102.8	90.7	99.7	73.6	112.0
915	Crystal M168	13.7	100.0	39.0	100.1	11.5	99.6	229.3	99.6	8934.4	99.7	90.7	99.7	69.8	106.1
916	Crystal M515	14.0	101.8	40.0	102.8	11.7	101.8	234.1	101.8	9390.8	104.8	90.9	99.9	66.5	101.2
917	BTS 9131	13.7	99.6	39.8	102.4	11.5	100.2	230.6	100.2	9191.6	102.6	91.5	100.5	69.7	106.0
918	Crystal M583	14.0	101.9	42.0	107.9	11.8	102.6	236.0	102.6	9929.1	110.8	91.3	100.4	65.9	100.3
919	Baseline 11 Beta 9780	13.7	99.9	41.0	105.3	11.5	99.8	229.6	99.8	9391.7	104.8	91.0	99.9	68.1	103.5
920	BTS 9508	13.9	100.9	37.0	95.2	11.6	100.7	231.7	100.7	8571.5	95.6	90.9	99.8	69.2	105.2
921	Crystal M432	14.1	102.8	39.3	101.0	11.9	103.2	237.5	103.2	9337.8	104.2	91.1	100.1	68.0	103.4
922	BTS 9284	13.7	100.0	40.9	105.2	11.5	99.7	229.4	99.7	9382.6	104.7	90.8	99.8	71.3	108.3
923	Baseline 10 Crystal M623	13.4	97.9	36.3	93.3	11.2	97.5	224.4	97.5	8122.2	90.6	90.9	99.9	59.0	89.7
924	Hil 2559	13.5	98.1	34.2	87.9	11.2	97.5	224.4	97.5	7667.8	85.6	90.7	99.6	57.0	86.7
925	Baseline 12 Hilleshog 2327	13.2	96.3	34.4	88.3	11.1	96.2	221.3	96.2	7617.7	85.0	91.1	100.1	72.2	109.7
926	SV 852	13.3	96.6	34.9	89.8	11.1	96.2	221.4	96.2	7716.4	86.1	90.9	99.9	63.5	96.6
927	Hil 2395	13.4	97.3	41.2	106.0	11.1	96.7	222.5	96.7	9192.5	102.6	90.7	99.6	57.1	86.9
928	BTS 9415	14.0	101.9	38.0	97.6	11.7	102.0	234.8	102.0	8920.7	99.5	91.0	100.0	71.3	108.4
929	Filler #2	13.8	100.3	41.9	107.8	11.5	100.0	230.0	100.0	9626.6	107.4	90.8	99.7	70.0	106.5
930	SV 863	13.4	97.6	34.3	88.2	11.3	97.9	225.3	97.9	7737.3	86.3	91.4	100.4	63.6	96.7
	Grand Mean	13.7		38.9		11.5		230.1		8962.7		91.0		65.8	
	LSD	0.4		1.3		0.4		7.2		401.5		0.5		8.4	
	C.V.	2.3		3.0		2.7		2.7		3.9		0.5		11.2	

Prinsburg OVT

Entry	Variety	Sugar		Tons		ES		EST		ESA		Purity		Emergence	
		Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %	Mean	Mean %
901	Baseline 9 SV RR863	14.7	98.0	19.7	76.1	12.5	97.7	250.8	97.7	4926.0	74.1	91.8	99.9	16.3	33.2
902	Filler #1	14.8	98.5	27.3	105.5	12.6	98.2	252.1	98.2	6921.1	104.1	91.7	99.8	47.3	96.3
903	BTS 9497	15.1	100.5	27.4	105.6	12.9	100.6	258.3	100.6	7042.9	105.9	91.9	100.0	52.3	106.5
904	BTS 9369	15.5	103.2	26.3	101.4	13.3	103.9	266.7	103.9	6977.0	104.9	92.3	100.4	53.5	108.8
905	BTS 9512	14.8	98.6	27.7	106.8	12.7	98.8	253.6	98.8	7056.9	106.1	92.1	100.2	49.6	100.9
906	Crystal M106	15.1	100.5	25.5	98.4	12.9	100.2	257.3	100.2	6583.6	99.0	91.7	99.7	42.1	85.6
907	Crystal M445	15.1	100.2	26.6	102.8	12.8	99.9	256.4	99.9	6797.8	102.2	91.7	99.7	49.4	100.5
908	BTS 9564	15.1	100.2	28.2	108.7	12.9	100.8	258.7	100.8	7290.5	109.6	92.3	100.5	54.1	110.1
909	BTS 9599	15.3	101.6	26.1	100.6	13.1	101.9	261.6	101.9	6897.7	103.7	92.1	100.2	45.7	93.0
910	BTS 9533	15.5	102.9	26.2	101.1	13.3	103.5	265.7	103.5	7142.8	107.4	92.2	100.3	51.8	105.5
911	Crystal M977	14.7	97.9	25.7	99.1	12.5	97.3	249.8	97.3	6360.6	95.6	91.6	99.6	53.5	108.9
912	SV 851	14.9	99.4	26.4	102.0	12.7	99.3	254.8	99.3	6674.6	100.4	91.8	99.9	48.2	98.1
913	Crystal M339	15.1	100.1	24.2	93.4	12.9	100.3	257.3	100.2	6225.5	93.6	92.0	100.1	42.3	86.0
914	Crystal M561	15.0	99.5	25.8	99.6	12.7	99.0	254.2	99.0	6545.2	98.4	91.6	99.7	53.6	109.0
915	Crystal M168	14.8	98.5	22.8	88.1	12.6	98.1	251.9	98.2	5745.1	86.4	91.7	99.7	47.5	96.6
916	Crystal M515	15.2	101.3	27.5	106.0	13.0	101.4	260.2	101.4	7126.5	107.2	91.9	100.0	55.1	112.2
917	BTS 9131	15.0	99.7	27.0	104.1	12.8	99.5	255.4	99.5	7017.3	105.5	91.7	99.8	56.5	114.8
918	Crystal M583	15.4	102.6	27.7	106.7	13.2	103.2	264.8	103.2	7272.3	109.4	92.2	100.3	55.5	112.9
919	Baseline 11 Beta 9780	15.1	100.1	27.3	105.3	12.9	100.3	257.6	100.3	7060.2	106.2	92.1	100.2	61.6	125.3
920	BTS 9508	15.2	101.0	27.1	104.4	12.9	100.6	258.2	100.6	6945.7	104.4	91.6	99.6	52.1	106.0
921	Crystal M432	15.6	103.9	27.3	105.5	13.4	104.6	268.3	104.5	7294.1	109.7	92.2	100.3	56.8	115.6
922	BTS 9284	15.0	99.5	27.9	107.6	12.7	99.1	254.3	99.1	7047.7	106.0	91.7	99.7	42.1	85.7
923	Baseline 10 Crystal M623	14.9	99.4	22.7	87.6	12.7	98.9	253.9	98.9	5502.5	82.7	91.6	99.7	51.6	105.0
924	Hil 2559	14.8	98.2	24.2	93.4	12.6	98.2	252.1	98.2	6110.5	91.9	92.0	100.1	41.7	84.8
925	Baseline 12 Hilleshog 2327	15.0	99.6	24.3	93.9	12.8	100.0	256.6	100.0	6207.4	93.3	92.2	100.3	52.7	107.2
926	SV 852	15.0	99.5	25.7	99.0	12.8	99.8	256.2	99.8	6558.0	98.6	92.2	100.3	46.5	94.7
927	Hil 2395	14.7	97.6	26.1	100.8	12.5	97.4	250.1	97.4	6595.8	99.2	91.9	100.0	42.3	86.1
928	BTS 9415	14.9	98.8	25.1	96.9	12.7	98.7	253.3	98.7	6372.6	95.8	91.8	99.9	58.0	117.9
929	Filler #2	15.1	100.2	26.3	101.5	12.8	99.9	256.4	99.9	6777.3	101.9	91.7	99.7	48.0	97.6
930	SV 863	14.9	99.0	25.4	97.9	12.7	98.9	253.8	98.9	6427.4	96.7	91.9	100.0	46.9	95.5
	Grand Mean	15.0		25.9		12.8		256.7		6650.1		91.9		49.2	
	LSD	0.3		2.5		0.4		7.0		664.2		0.5		9.1	
	C.V.	1.9		8.3		2.4		2.4		8.7		0.5		16.1	

Out Of Area Variety Trial

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Over the last several years questions have arisen about why the SMBSC growing area often has less extractable sugar per acre than other growing regions. One question has been whether the varieties entered into the SMBSC Official Variety Trials have the same yield potential as those entered in other growing areas.

Research Objective

- Test varieties from the SMBSC market against those of other markets.

Methodology

Two trials were planted in 2025 using randomized complete block design. The first was near Murdock and the other was near Hector (Table 1). Of the eight varieties planted in these trials, four of them were from the SMBSC market, two were from MinnDak Farmer's Coop, and two were from Spreckels. From the SMBSC growing area Beta 9369 and Crystal M977 were chosen to be included because of their high sugar and high tons respectively. The other two varieties were Crystal M339 and Beta 9131, which were the two most popular varieties planted in commercial fields in 2025. The MinnDak varieties were similarly chosen to have one with high sugar and one that was the most popular in their growing region. The Speckels varieties on the other hand were chosen for popularity and for being a late harvest variety with higher tolerance for late season root rot. The trials were thinned to a uniform stand in early June. Throughout the season, standard practices were used to manage weeds and diseases at the sites. Each plot was 35ft long and four rows wide. The center two rows of each four-row plot were harvested using a four-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester, and a sample of those beets from each plot was used for quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4.

Table 1. Important dates at the two trial locations.

Site Name	Murdock	Hector
Planting Date	4/30/2025	4/23/2025
Thinning Date	6/5/2025	6/10/2025
Harvest Date	9/23/2025	10/7/2025

Results

At both locations, Beta 9369 had both the highest sugar and extractable sugar per acre and Crystal M977 had the highest tons per acre (Tables 2 & 3). While the MinnDak varieties each performed statistically similar to some of the SMBSC varieties, the Speckels varieties performed poorer than all SMBSC varieties. This may be partly due to the lack of tolerance to the diseases of the growing region in the Speckels varieties. Towards the end of the season the Speckels varieties had significantly more Cercospora than the others.

Conclusion

Based on the two trials planted in 2025, the varieties being entered into the Official Variety Trials and being approved for sale in the SMBSC growing area, do appear to be well suited to the region. Additional variety testing in the future may be requested, however, it is unlikely that variety entry differences between growing areas are the reason for low sugar content in the SMBSC growing area.

Table 2. Yield data for the Murdock Out of Area Variety Trial.

Entry	Variety	Percent Sugar	Tons per acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	Beta 9131	13.7 b	41.2 ab	11.3 b	226.7 b	9344 a	90.1
2	Beta 9369	14.6 a	39.4 d	12.1 a	241.8 a	9510 a	90.1
3	Crystal M977	13.4 b	41.9 a	11.0 b	220.5 b	9228 ab	89.7
4	Crystal M339	13.6 b	39.7 cd	11.2 b	223.8 b	8873 b	89.7
5	Spreckels - Popular	11.7 d	36.6 f	9.5 d	190.6 d	6985 d	89.7
6	Spreckels - Late harvest	12.6 c	38.1 e	10.3 c	205.5 c	7828 c	89.6
7	MDFC - High Sugar	13.7 b	40.7 ab	11.4 b	227.3 b	9244 ab	90.1
8	MDFC - Popular	13.4 b	40.6 ac	11.0 b	218.9 b	8884 b	89.7
	Mean	13.3	39.8	11.0	219.4	8737	89.8
	CV%	2.6	2.6	3.5	3.4	4.2	0.7
	Pr>F	<.0001	<.0001	<.0001	<.0001	<.0001	0.7605
	lsd (0.05)	0.41	1.22	0.45	8.75	429.45	ns

Table 3. Yield data for the Hector Out of Area Variety Trial.

Entry	Variety	Percent Sugar	Tons per acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	Beta 9131	16.0 bc	43.4 bc	13.5 bc	269.0 bc	11693 abc	90.4
2	Beta 9369	16.5 a	43.7 bc	14.0 a	279.2 a	12197 a	90.8
3	Crystal M977	15.6 d	46.1 a	13.2 c	263.5 c	12135 ab	90.7
4	Crystal M339	16.4 ab	42.5 c	13.8 ab	274.8 ab	11676 bc	90.4
5	Spreckels - Popular	15.0 e	43.2 bc	12.6 d	252.0 d	10884 d	90.9
6	Spreckels - Late harvest	15.6 d	43.6 bc	13.1 c	262.0 c	11412 c	90.8
7	MDFC - High Sugar	16.2 ab	44.2 b	13.7 ab	273.0 ab	12061 ab	90.8
8	MDFC - Popular	15.7 cd	44.5 ab	13.2 c	263.2 c	11696 abc	90.5
	Mean	15.9	43.9	13.4	267.1	11719	90.7
	CV%	1.9	3.3	2.5	2.5	3.7	0.5
	Pr>F	<.0001	0.0088	<.0001	<.0001	0.0001	0.3499
	lsd (0.05)	0.36	1.68	0.38	7.79	505.38	ns

Cercospora Leaf Spot Program Trials

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Cercospora leaf spot (CLS) is the most destructive foliar disease to impact sugar beet production in the SMBSC growing area. Without effective new fungicides, controlling the disease has become more difficult. Despite some advancements in variety tolerance to CLS, the key to control is still utilizing best management practices that include an appropriately timed fungicide program that incorporates multiple modes of action, along with planting sugar beet varieties with higher levels of genetic tolerance to CLS.

Research Objective

- High levels of cercospora inoculum and a favorable environment for the development of CLS have been major contributors in causing losses to profitability of sugar beet production in the past. Trials need to be conducted to evaluate the efficacy of individual fungicides and season long fungicide programs.

Methodology

In 2025 the CLS Program Trials were conducted as randomized complete block with four replications located near Renville and Bird Island. These trials evaluated fungicides in a program setting. The Bird Island site was planted on April 23rd, and the Renville site was planted on April 26th using Crystal M977 for the traditional (non-CR+) variety and Beta 9131 for the CR+ variety. Standard practices were used to keep the sites weed free. The sites were inoculated with pulverized leaves from the previous year that were infected with CLS. The inoculum was spread evenly across the sites with a Gandy Orbit-Air applicator shortly before canopy closure. Six fungicide applications were made in the Renville Program Trial beginning July 9th and the Bird Island Program Trial beginning on July 14th. The treatment list containing the fungicides used, rates, and timing of application can be found in Tables 5 and 6.

Applications were made using a custom-made tractor mounted sprayer traveling 3.3mph with a spray volume of 20gpa and 40psi, utilizing XR110025 spray nozzles (Photo 1). Each plot consisted of six rows that were 35ft in length. The sprayer used CO^2 as a propellant and was designed to apply the treatment to the center four rows, leaving rows one and six untreated. Plots were rated for foliar disease using a 1-9 scale with one being disease free and nine being completely necrotic. Plots were rated multiple times throughout the season by several members of the research staff. The center two rows of each six-row plot were harvested on September 16th for the Renville site and September 12th for the Bird Island site using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and a sample of those beets were used for a quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4.

Photo 1. Tractor mounted sprayer applying a fungicide treatment.

Results

At the Renville site there were significant yield differences with the untreated check for both CR+ and traditional varieties having lower extractable sugar per acre (Table 1). The late start three spray program also had lower ESA than many other treatments for the traditional variety. The foliar disease ratings in the Renville Program Trial were highest for the unsprayed checks followed by the programs with reduced applications or a late start (treatments 5-12) (Table 2). Differences in foliar disease ratings between all other treatments were minimal.

At the Bird Island site there were again significant yield differences with the untreated check for both CR+ and traditional varieties having lower extractable sugar per acre (Table 3). The rest of the treatments had similar yields. The foliar disease ratings in the Bird Island Program Trial were also highest for the unsprayed checks followed by treatments 11 and 12 which were a reduced spray program. The rest of the treatments had mostly similar disease ratings.

Table 1. Yield parameter results for the Renville CLS Program Trial. Values with different letters are significantly different. Table 5 contains a full description of each treatment.

Program	Variety	Trt	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
Check	CR+	1	13.4 i	17.4 f	11.2 j	223.6 j	3881.5 i	90.9 f
	Trad	2	13.3 i	17.9 f	11.0 j	220.6 j	3949.6 i	90.6 ef
Standard	CR+	3	15.7 bcde	22.9 abcd	13.5 abc	269.8 abc	6204.7 abcdef	92.1 a
	Trad	4	15.3 defg	22.4 bcde	13.1 cdefgh	261.2 cdefgh	5991.8 cdefg	91.7 abcd
4 Spray	CR+	5	15.0 gh	22.8 abcd	12.8 ghi	254.9 ghi	5798.1 efg	91.7 abcd
	Trad	6	15.1 gh	22.0 bcde	12.7 ghi	254.4 hi	5614.1 fg	91.2 cdef
3 Spray	CR+	7	15.2 fg	23.6 abcd	12.9 fghi	257.6 fghi	6075.7 bcdefg	91.4 abcde
	Trad	8	15.0 gh	21.4 de	12.7 ghi	254.3 hi	5435.2 gh	91.6 abcde
Late Start	CR+	9	15.4 cdefg	22.5 bcde	13.1 bcdefg	262.2 cdefgh	5874.2 defg	91.8 abcd
	Trad	10	15.0 gh	22.1 bcde	12.7 hi	254.0 hi	5602.0 fg	91.4 abcde
Late Start	CR+	11	15.2 fg	22.2 bcde	13.0 defgh	260.0 defgh	5719.9 efg	92.0 abc
3 Spray	Trad	12	14.7 h	19.5 ef	12.4 i	248.8 i	4822.6 h	91.3 abcdef
Standard	CR+	13	16.3 a	24.5 abc	13.9 a	278.7 a	6813.5 ab	91.9 abc
	Trad	14	15.8 bcd	23.5 abcd	13.4 bcde	267.8 bcde	6322.0 abcdef	91.4 abcde
Standard	CR+	15	16.0 ab	22.7 bcd	13.7 ab	273.6 ab	6162.7 abcdefg	92.0 ab
	Trad	16	15.9 ab	23.8 abcd	13.4 bcd	268.5 bcd	6389.2 abcde	91.3 bcdef
Standard	CR+	17	15.8 abc	24.4 abcd	13.5 abc	269.8 abc	6569.6 abcd	91.7 abcd
Fr. Copilot	Trad	18	15.3 efg	21.7 cde	12.9 efgh	258.6 efgh	5603.1 fg	91.1 def
Standard	CR+	19	15.6 bcdef	25.8 a	13.3 bcdef	265.4 bcdef	6831.5 a	91.6 abcd
no adjuvant	Trad	20	15.6 bcdef	25.0 ab	13.2 bcdefg	264.2 bcdefg	6678.4 abc	91.5 abcde
		Mean	15.2	22.3	12.9	258.4	5762.4	91.5
		CV%	2.1	9.6	2.7	2.7	9.0	0.6
		Pr>F	<.0001	0.0002	<.0001	<.0001	<.0001	0.0251
		lsd (0.05)	0.4501	3.06	0.4983	9.8182	743.35	0.7708

Table 2. Foliar ratings for the Renville Program Trial using the KWS (1-9) rating system with 1 being disease free and 9 being completely necrotic. Ratings with different letters are significantly different. Table 5 contains a full description of each entry.

Program	Variety	Trt	Aug 14th	Aug 20th	Aug 28th	Sep. 8th
Check	CR+	1	6.3 a	8.0 a	8.8 a	9.0 a
	Trad	2	6.5 a	8.1 a	8.9 a	9.0 a
Standard	CR+	3	3.1 de	3.2 hij	4.2 de	4.6 d
	Trad	4	2.3 e	3.0 hij	3.8 e	4.3 d
4 Spray	CR+	5	4.1 c	4.3 cdef	5.3 bc	6.6 b
	Trad	6	3.2 d	4.0 efg	4.8 cd	6.1 bc
3 Spray	CR+	7	5.0 b	5.0 b	5.6 b	6.5 b
	Trad	8	4.2 bc	4.2 def	5.0 bc	5.9 bc
Late Start	CR+	9	4.2 bc	4.6 bcde	5.0 bc	5.6 c
	Trad	10	4.5 bc	4.8 bcd	5.3 bc	5.7 c
Late Start 3 Spray	CR+	11	4.4 bc	4.9 bc	5.5 bc	6.1 bc
	Trad	12	4.2 bc	4.5 bcde	5.4 bc	5.9 bc
Standard	CR+	13	2.8 de	3.4 ghi	4.1 e	4.2 d
	Trad	14	2.8 de	3.1 hij	3.8 e	4.3 d
Standard	CR+	15	2.5 de	2.8 ji	3.8 e	4.1 d
	Trad	16	3.0 de	3.3 ghij	4.1 e	4.5 d
Standard Fr. Copilot	CR+	17	3.1 de	3.3 hij	4.1 e	4.5 d
	Trad	18	2.5 de	2.7 j	3.6 e	4.0 d
Standard no adjuvant	CR+	19	3.2 d	3.7 fgh	4.0 e	4.0 d
	Trad	20	2.5 de	2.9 ji	3.6 e	4.0 d
		Mean	3.7	4.2	4.94	5.439
		CV%	15.7	11.3	9.84	9.44
		Pr>F	<.0001	<.0001	<.0001	<.0001
		lsd (0.05)	0.82	0.67	0.69	0.73

Table 3. Yield parameter results for the Bird Island CLS Program Trial. Values with different letters are significantly different. Table 6 contains a full description of each treatment.

Fungicide Program	Variety	Trt	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
Check	CR+	1	13.4 f	18.0	11.2 e	224.4 e	4036.3 c	91.0
	Non-CR+	2	13.3 f	17.8	11.0 e	220.0 e	3906.3 c	90.6
Standard 6 spray Program	CR+	3	14.8 abc	22.0	12.5 ab	248.8 ab	5491.0 ab	90.9
	Non-CR+	4	14.4 cde	22.5	12.2 bcd	242.9 bcd	5448.8 ab	91.2
6 spray Veltyma not Inspire XT	CR+	5	14.7 abcd	21.8	12.3 abcd	246.4 abcd	5373.0 ab	90.9
	Non-CR+	6	14.6 abcd	22.3	12.4 abc	247.1 abc	5507.8 a	91.4
6 spray No QoI or Topsin	CR+	7	14.5 bcde	22.7	12.2 bcd	244.5 bcd	5538.6 a	91.1
	Non-CR+	8	14.3 de	22.5	12.0 cd	240.7 cd	5424.7 ab	91.2
6 spray Copper + Manzate	CR+	9	14.4 bcde	21.4	12.0 d	239.2 d	5134.1 ab	90.0
	Non-CR+	10	14.2 e	20.8	12.0 d	239.3 d	4971.2 ab	91.2
4 spray extended intervals	CR+	11	14.4 de	20.7	12.0 cd	240.0 cd	4954.2 ab	90.8
	Non-CR+	12	14.4 de	22.2	12.1 cd	241.9 bcd	5364.7 ab	91.2
6 spray Provysol not Inspire XT	CR+	15	14.4 de	22.6	12.1 cd	241.9 bcd	5469.4 ab	91.1
	Non-CR+	16	14.5 bcde	23.3	12.2 bcd	245.1 bcd	5696.7 a	91.4
6 spray Lucento not Proline	CR+	19	15.0 a	22.5	12.7 a	254.0 a	5725.7 a	91.4
	Non-CR+	20	14.4 de	21.3	12.1 cd	241.7 bcd	5139.6 ab	91.2
6 spray Minerva not Proline	CR+	21	14.8 ab	21.1	12.5 ab	249.2 ab	5262.6 ab	91.1
	Non-CR+	22	14.6 bcde	18.8	12.3 bcd	245.7 bcd	4601.0 bc	91.3
	Mean		14.4	21.6	12.1	242.5	5252.9	91.1
	CV%		1.9	11.5	2.2	2.2	12.1	0.6
	Pr>F		<.0001	0.0522	<.0001	<.0001	0.0025	0.2533
	lsd (0.05)		0.38	ns	0.37	7.6	900.5	ns

Table 4. Foliar ratings for the Bird Island Program Trial using the KWS (1-9) rating system with 1 being disease free and 9 being completely necrotic. Ratings with different letters are significantly different. Table 6 contains a full description of each entry.

Fungicide Program	Variety	Trt	31-Jul	11-Aug	20-Aug	8-Sep
Check	CR+	1	3.8 a	7.7 a	8.9 a	9.0 a
	Trad	2	3.5 a	7.1 a	8.8 a	9.0 b
Standard 6 spray Program	CR+	3	1.8 cde	3.3 def	4.5 bcdefg	6.0 defg
	Trad	4	1.9 bcde	3.3 def	4.3 defg	5.1 ij
6 spray Veltyma not Inspire XT	CR+	5	2.2 bcd	3.9 bcd	4.8 bcde	6.0 defg
	Trad	6	1.8 cde	3.3 def	4.1 efg	5.2 ij
6 spray No QoI or Topsin	CR+	7	1.9 bcde	2.8 ef	4.0 fg	5.2 ij
	Trad	8	1.6 e	2.6 f	3.8 g	4.7 j
6 spray Copper + Manzate	CR+	9	2.3 b	3.8 bcd	4.7 bcdef	6.5 cd
	Trad	10	2.3 bc	3.9 bcd	4.4 cdefg	5.9 defgh
4 spray extended intervals	CR+	11	1.7 de	3.8 bcd	4.8 bcde	7.3 b
	Trad	12	1.8 cde	4.3 b	5.2 b	7.1 bc
6 spray Provysol not Inspire XT	CR+	15	1.7 e	3.8 bcd	4.9 bcd	6.1 def
	Trad	16	1.8 cde	3.3 cde	4.4 cdefg	5.3 ghij
6 spray Lucento not Proline	CR+	19	1.8 cde	3.9 bcd	4.8 bcde	6.3 de
	Trad	20	2.0 bcde	3.8 bcd	4.8 bcde	5.5 fghi
6 spray Minerva not Proline	CR+	21	2.0 bcde	4.3 b	5.0 bc	6.2 de
	Trad	22	1.8 cde	3.5 cde	4.4 cdefg	5.2 ij
	Mean		2.0	4.0	5.0	6.1
	CV%		17.4	12.8	10.5	7.7
	Pr>F		<.0001	<.0001	<.0001	<.0001
	lsd (0.05)		0.50	0.71	0.74	0.67

Conclusions

The overall conditions for disease development were extremely high in 2025. Frequent rain events led to a delayed start in the fungicide programs and spray intervals that were not always in the targeted range of 10-12 days. The untreated checks at both locations reached a 9.0 rating in early September and programs with either a late start or reduced number of sprays had higher ratings than the six spray programs. These results were not surprising given the environment. It is worth noting that the Cuprofix Ultra tank mixed with Manzate Prostick for all six applications had similar ratings to the other more traditional programs at the Bird Island site. None of these programs provided acceptable control for the 2025 season as even the best treatments were at a 4.0 rating in early September and would have reached economic damage before the beginning of main harvest in October.

Table 5. Renville Program Trial treatment list. The application code indicates when the product was applied in the program.

2025 Renville CLS Program		Rate/A	Appl. Code
1	CR+ Check	n/a	abcdef
2	Traditional Check	n/a	abcdef
3 (CR+)	Manzate Prostick	2 lbs	acdef
	Masterlock	6.4 oz	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
4 (Trad)	Manzate Prostick	2 lbs	acdef
	Masterlock	6.4 oz	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
5 (CR+)	Manzate Prostick	2 lbs	adf
	Masterlock	6.4 oz	abdf
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bf
	Topsin	10 fl oz	b
	Headline	9 fl oz	d
6 (Trad)	Manzate Prostick	2 lbs	adf
	Masterlock	6.4 oz	abdf
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bf
	Topsin	10 fl oz	b
	Headline	9 fl oz	d
7 (CR+)	Manzate Prostick	2 lbs	ae
	Masterlock	6.4 oz	ace
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	c
	Topsin	10 fl oz	c
	Headline	9 fl oz	e
8 (Trad)	Manzate Prostick	2 lbs	ae
	Masterlock	6.4 oz	ace
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	c
	Topsin	10 fl oz	c
	Headline	9 fl oz	e
9 (CR+)	Manzate Prostick	2 lbs	bdef
	Masterlock	6.4 oz	bcdef
	Proline	5.7 fl oz	b
	Super Tin	8 fl oz	ce
	Topsin	10 fl oz	c
	Headline	9 fl oz	d
	Inspire XT	7 fl oz	f
10 (Trad)	Manzate Prostick	2 lbs	bdef
	Masterlock	6.4 oz	bcdef
	Proline	5.7 fl oz	b
	Super Tin	8 fl oz	ce
	Topsin	10 fl oz	c
	Headline	9 fl oz	d
	Inspire XT	7 fl oz	f
11 (CR+)	Manzate Prostick	2 lbs	bf
	Masterlock	6.4 oz	bdf
	Proline	5.7 fl oz	b
	Super Tin	8 fl oz	d
	Topsin	10 fl oz	d
	Headline	9 fl oz	f
12 (Trad)	Manzate Prostick	2 lbs	bf
	Masterlock	6.4 oz	bdf
	Proline	5.7 fl oz	b
	Super Tin	8 fl oz	d
	Topsin	10 fl oz	d
	Headline	9 fl oz	f
13 (CR+)	Manzate Prostick	2 lbs	acdef
	Masterlock	6.4 oz	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
	Sprout Stop	2 lbs ai	e
14 (Trad)	Manzate Prostick	2 lbs	acdef
	Masterlock	6.4 oz	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
	Sprout Stop	2 lbs ai	e
15 (CR+)	Manzate Prostick	2 lbs	acdef
	Masterlock	6.4 oz	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
	Sprout Stop	2 lbs ai	f
16 (Trad)	Manzate Prostick	2 lbs	acdef
	Masterlock	6.4 oz	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
	Sprout Stop	2 lbs ai	f
17 (CR+)	Manzate Prostick	2 lbs	acdef
	Franchise Copilot	0.25 % v/v	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
18 (Trad)	Manzate Prostick	2 lbs	acdef
	Franchise Copilot	0.25 % v/v	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
19 (CR+)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
20 (Trad)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e

Table 6. Bird Island Program Trial treatment list. The application code indicates when the product was applied in the program. All treatments contained 6.4oz of Masterlock with every application.

2025 BI CLS Program		Rate/A	Appl. Code
1	CR+ Check	n/a	abcdef
2	Traditional Check	n/a	abcdef
3 (CR+)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
4 (Trad)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
5 (CR+)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Veltyma	10 fl oz	e
6 (Trad)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Veltyma	10 fl oz	e
7 (CR+)	Manzate Prostick	2 lbs	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Inspire XT	7 fl oz	c
	Lucento	5.5 fl oz	e
8 (Trad)	Manzate Prostick	2 lbs	abcdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Inspire XT	7 fl oz	c
	Lucento	5.5 fl oz	e
9 (CR+)	Manzate Prostick	2 lbs	abcdef
	Cuprofix Ultra	2 lbs	abcdef
10 (Trad)	Manzate Prostick	2 lbs	abcdef
	Cuprofix Ultra	2 lbs	abcdef
11 (CR+)	Manzate Prostick	2 lbs	adf
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bf
	Topsin	10 fl oz	b
	Inspire XT	7 fl oz	d
12 (Trad)	Manzate Prostick	2 lbs	adf
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bf
	Topsin	10 fl oz	b
	Inspire XT	7 fl oz	d
15 (CR+)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Provysol	5 fl oz	e
16 (Trad)	Manzate Prostick	2 lbs	acdef
	Proline	5.7 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Provysol	5 fl oz	e
19 (CR+)	Manzate Prostick	2 lbs	acdef
	Lucento	5.5 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
20 (Trad)	Manzate Prostick	2 lbs	acdef
	Lucento	5.5 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
21 (CR+)	Manzate Prostick	2 lbs	acdef
	Minerva	13 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e
22 (Trad)	Manzate Prostick	2 lbs	acdef
	Minerva	13 fl oz	a
	Super Tin	8 fl oz	bdf
	Topsin	10 fl oz	b
	Headline	9 fl oz	c
	Inspire XT	7 fl oz	e

Date of Harvest Trials

Lynsey Lies[1] and **Mark Bloomquist**[2]
[1]Production Agronomist, [2]Research Director, SMBSC, Renville, MN

Since 2011, SMBSC has been conducting trials from mid-August through mid-October to measure the growth rate and sugar content of sugar beets, which increase yield until harvest. This growth can vary with annual environmental conditions and foliage health.

Research Objective

- These trials provided rate of growth data for each season for sugar percent, root yield, and extractable sugar per acre (ESA).

Methodology

These trials are replicated at 2-4 locations, often coinciding with the sites of the SMBSC Official Variety Trials. In 2025, the Date of Harvest Trials were conducted near Murdock, Hector, and Lake Lillian. These trials followed best management practices similar to the Official Variety Trials.

During the harvest season, approximately 180 feet of sugar beet row was harvested weekly from each location from mid-August to mid-October. Harvesting was performed using a tractor-mounted one-row defoliator and harvester. The harvested beets were placed in tare bags and sent to the SMBSC Tare Lab for weight and quality analysis, including tare, sugar content, and purity.

Each week, the length of the row harvested was measured, and these measurements were used to calculate the harvested area. This data was then utilized to determine the yield on a per-acre basis, providing valuable insights into the growth and sugar accumulation of the sugar beets during this period.

Results

The first harvest date for the trial was August 12, 2025. Due to adverse weather conditions, harvest did not take place the following week. Harvest resumed on August 27, 2025 and continued once per week until October 16, 2025. A total of nine harvest timings were completed in 2025. Trials sites had even stands, uniform canopy development, and minimal root rot. The Murdock site did have high levels of CLS by the end of the project. The other two sites had moderate levels of CLS by the last harvest timing.

The 2025 regression analysis of extractable sugar per acre in Figure 1 reveals a daily increase of 100.23 lbs per acre. This exceeds the ten-year average of 80.7 lbs per acre. (Table 1). Table 1 also contains the daily pounds of extractable sugar per acre increase for every year since 2015.

Figure 2 shows the sugar percent each week of the 2025 Date of Harvest Trial. The weekly sugar percent steadily increased throughout the ten-week period. Table 2 shows that the daily increase in sugar percent for 2025 was 0.04%, which is lower the ten-year average of 0.05%. Weekly increases in sugar percent followed a similar pattern, with the current year's gain at 0.29%, compared to the long-term average of 0.37%.

The 2025 root yield data in Figure 3 shows the weekly change in tons per acre during the 2025 Date of Harvest Trial. Table 3 has the root yield rate of gain for 2015-2025. In 2025, the average daily rate of gain of 0.31 tons per acre was above the 2015-2024 average of 0.22 tons. This trend was also reflected every week, with a gain of 2.19 tons per acre, which is above the 2015-2024 average of 1.55 tons per acre weekly gain.

Conclusion

The percent sugar continued to gain throughout the sampling period. The final sample timing did show a small decline in percent sugar possibly owing to Cercospora. The season ended with an average sugar of 15.2%. Tons and ESA showed steady gains throughout the season. It is important to note that these sites maintained lower levels of disease and were in areas of the fields that were less impacted by excess moisture than most commercial fields. This resulted in higher sugar and yield than most grower fields.

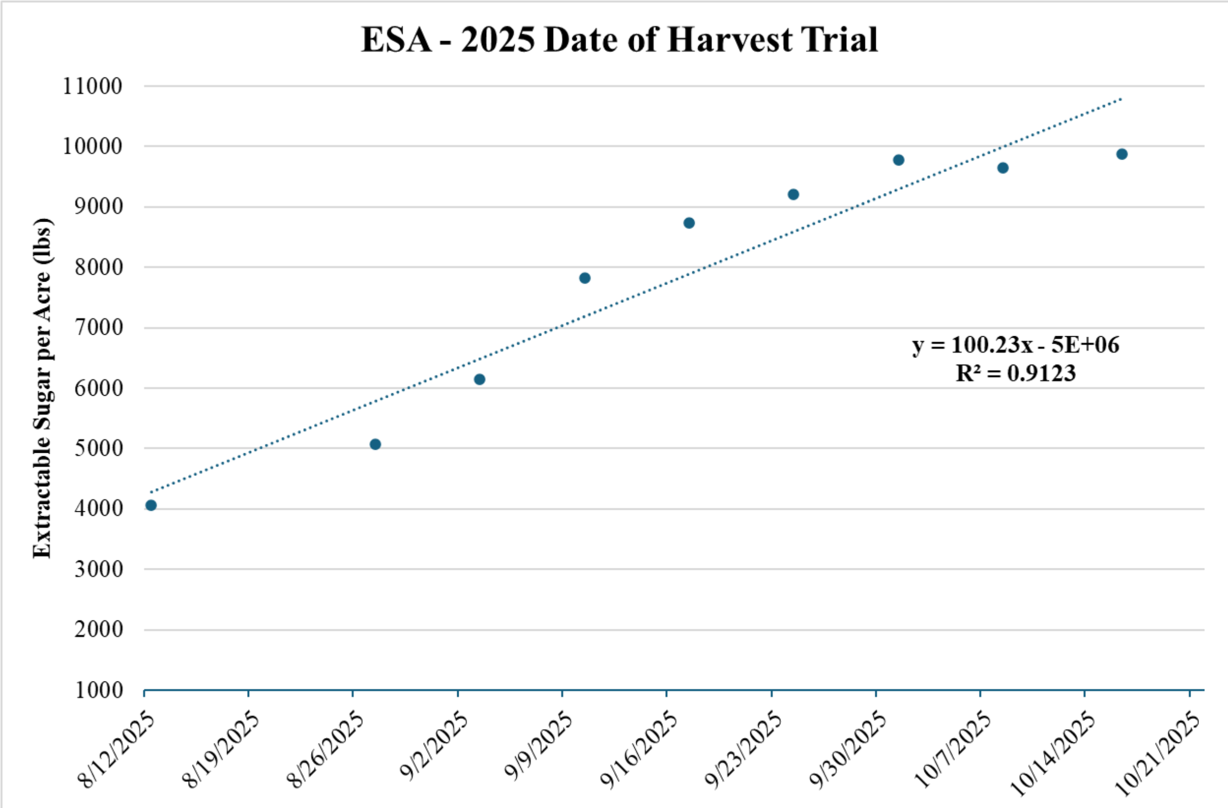

Figure 1. Extractable sugar per acre (ESA) data collected during the 2025 Date of Harvest Trials, plotted across the harvest period, depicting a positive linear trend.

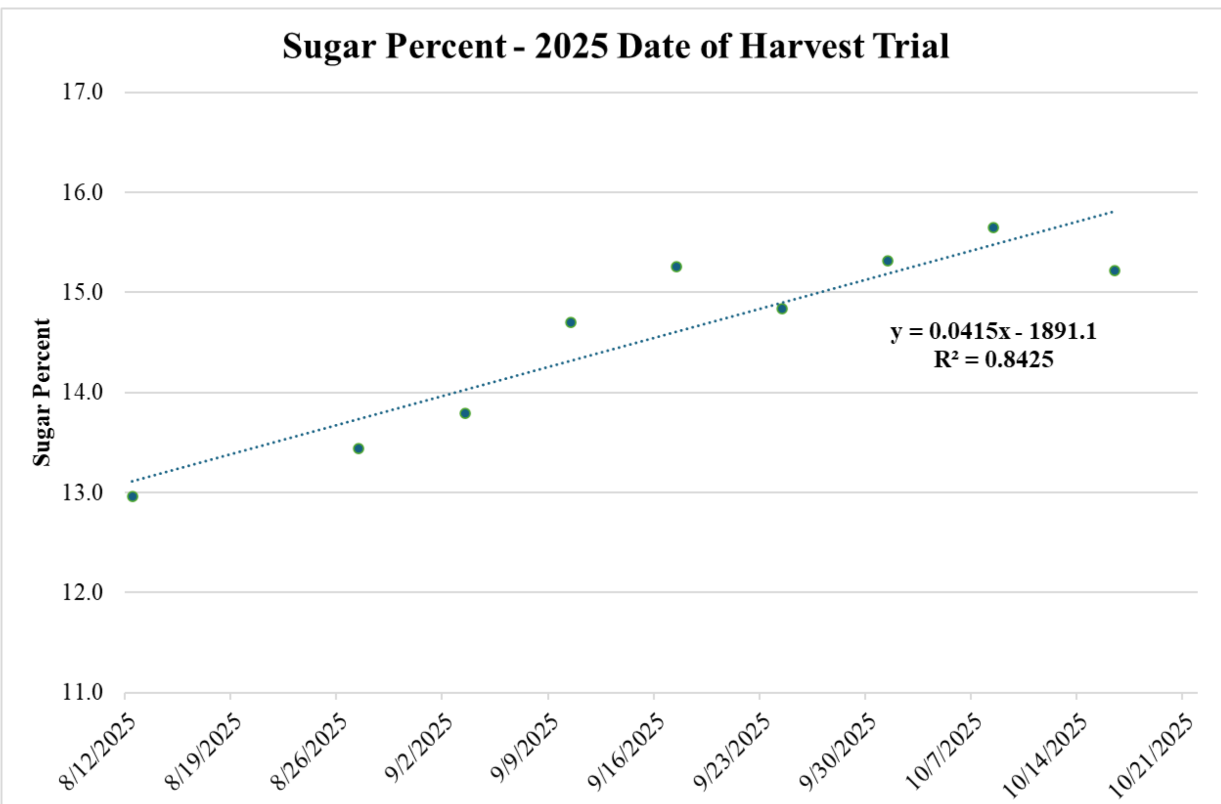

Figure 2. Sugar percent data collected during the 2025 Date of Harvest Trials, plotted across the harvest period, depicting a positive linear trend.

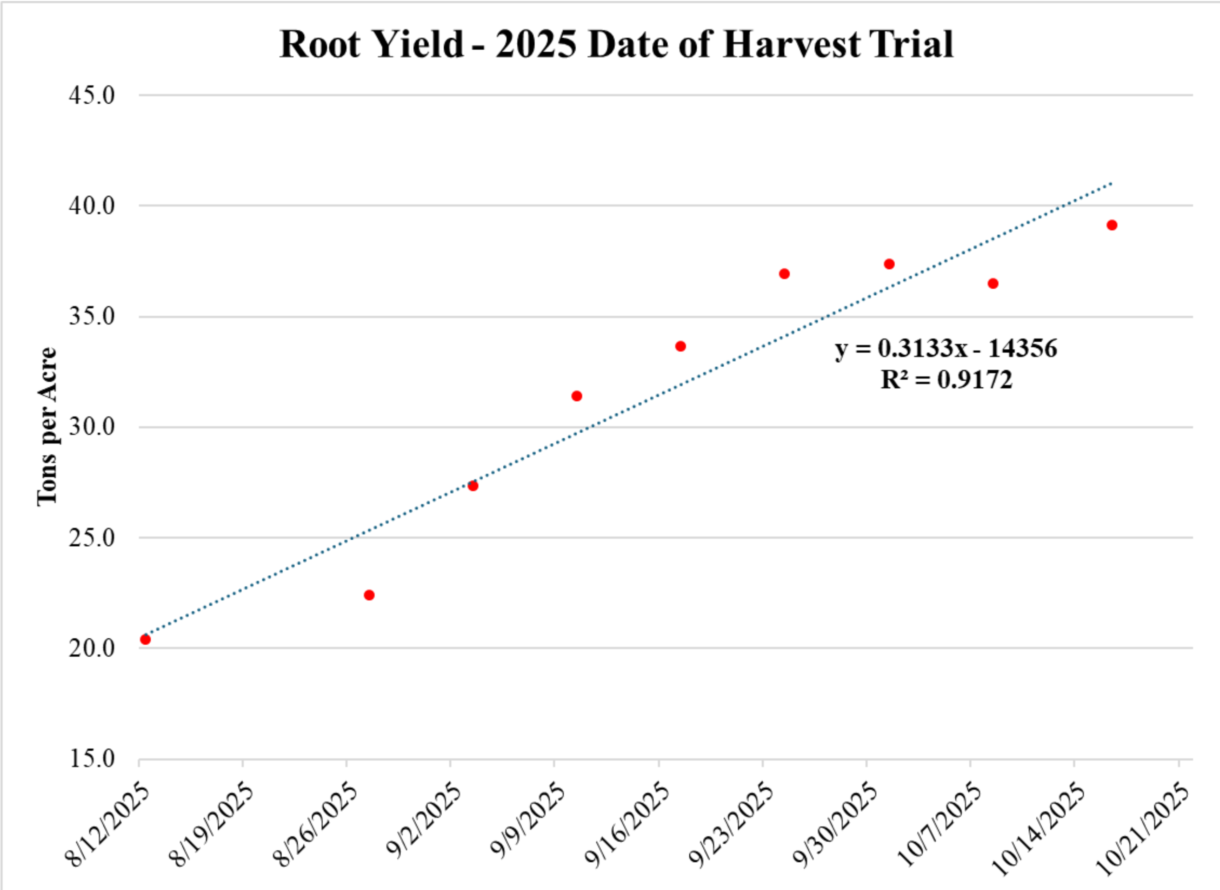

Figure 3. Root yield data collected during the 2025 Date of Harvest Trials, plotted across the harvest period, depicting a positive linear trend.

Table 1. 2015-2025 Regression Analysis of Extractable Sugar per Acre Increase per Day

Year	Extractable Sugar per Acre Increase per Day (lbs.)
2015	99.8
2016	45.7
2017	60.0
2018	63.8
2019	78.6
2020	79.0
2021	106.8
2022	91.3
2023	87.3
2024	94.2
Average (2015-2024)	80.7
2025	100.2

Table 2. 2015-2025 Regression Analysis of Percent Sugar Increase per Day

Year	Percent Sugar Increase per Day (%)	Percent Sugar Increase per Week (%)
2015	0.06	0.42
2016	0.03	0.21
2017	0.06	0.42
2018	0.01	0.04
2019	0.04	0.28
2020	0.07	0.49
2021	0.02	0.14
2022	0.09	0.65
2023	0.05	0.37
2024	0.09	0.66
Average (2015-2024)	0.05	0.37
2025	0.04	0.29

Table 3. 2015-2025 Regression Analysis Results of Root Yield Increase per Day

Year	Root Yield Increase per Day (tons/acre)	Root Yield Increase per Week (tons/acre)
2015	0.24	1.67
2016	0.14	0.99
2017	0.12	0.82
2018	0.27	1.87
2019	0.24	1.66
2020	0.16	1.12
2021	0.37	2.61
2022	0.24	1.68
2023	0.23	1.59
2024	0.21	1.45
Average (2015-2024)	0.22	1.55
2025	0.31	2.19

Planting Depth Trial

David Mettler[1] and **Mark Bloomquist**[2]
[1]Research Agronomist, [2]Research Director, SMBSC, Renville, MN

The establishment of a good stand is a contributing factor in overall yield, weed suppression, and ease of topping at harvest. Many factors can have a negative impact on stand: excess residue, crusting, root disease, and planter settings such as seeding depth. 1.25" is a common and recommended planting depth, however, growers may plant slightly shallower or deeper depending on the upcoming weather conditions and soil moisture.

Research Objective

- Evaluate the effect of planting depth on emergence and stand establishment.

Methodology

The trial was conducted near Renville following soybean and planted on April 21st using Beta 9131. Planting depth treatments started at 1" and increased to 1.75" using 0.25" increments. Normal agronomic practices were used to keep the trial weed and disease free. Stand counts were taken on 10' of row for the center two rows of six row plots. This trial was designed as randomized complete block and the data was analyzed for significance using SAS GLM version 9.4.

Results

On April 28th the trial site received 0.7" of rain in a short period of time. This resulted in significant crusting that reduced overall stand in the trial. The crusting likely impacted the results of the trial with the 1.0" and 1.25" planting depths having significantly higher emergence than the 1.5" and 1.75" planting depths (Table 1). The shallower planting depths were able to emerge more quickly before the crust hardened after the rain. Due to the significant crusting issues that occurred, the trial was not taken to harvest.

Conclusions

Overall conclusions on the best planting depth for sugar beets in the SMBSC growing area cannot be made from the results of one trial. In this scenario the shallower planting depths performed better. However, in a drier spring these results could easily be reversed as the deeper planting depths would likely be planted into moisture and emerge more evenly than the shallower planting depths.

Table 1. Stand counts taken on 10' of row for rows 3 and 4 and converted to stand per 100' of row.

Trt	Planting Depth	May 5th	May 13th
1	1.00	102.5 a	140.6 a
2	1.25	81.3 b	131.9 a
3	1.50	49.4 c	86.9 b
4	1.75	36.3 c	78.1 b
	Mean	67.3	109.4
	CV%	26.1	15.6
	Pr>F	<.0001	<.0001
	lsd (0.05)	18.3	17.7

Seed Treatment Trial

David Mettler[1] and **Mark Bloomquist**[2]
[1]Research Agronomist, [2]Research Director, SMBSC, Renville, MN

Any seed treatment that may increase root yield or quality of the sugar beet crop would be of benefit to SMBSC growers. Planter box products are generally easy to apply and would be a convenient option for growers. However, if a product applied in the pelleting process showed promise, a seed company could also partner with the company carrying that product to supply the market.

Research Objective

- Products applied in the pelleting process and planter box products were tested in this trial to evaluate their ability to improve the overall yield of the crop.

Methodology

This trial was conducted near Lake Lillian to screen products that may have the ability to improve sugar beet yield. The trial was planted on May 6th using SES 862 with seven different products and an untreated control (Table 1). Normal agronomic practices were used to keep the trial weed and disease free. The trial was designed as randomized complete block with five replications. The center two rows of each four-row plot were harvested for yield and quality analysis on October 2nd using a four-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and samples of those beets were used for a quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4.

Table 1.

Trt #	Product	Product Advertized Description	Application Method
1	Check	n/a	n/a
2	Bioforge	Nutrient formulation containing urea to encourage growth and ensure balanced nutriention to the plant.	Applied during pelleting process
3	Commence	Microbial catalyst stimulating microbes to deliever the nutrients plants need for a strong start.	Applied during pelleting process
4	Ascend ST3	Auxin-dominant 3-way PGR mixture for early season growth and root initiation.	Applied during pelleting process
5	Dash PBC	Contains eight strains of N-fixing and P-solubilizing microbes and amino acids to support germination, early plant vigor, and microbial nutrient release.	Planter box
6	Lalrise Shine DS	Contains a Bacillus velezensis bacteria that is supposed to colonize the rhizosphere and make nutrients more available to the plant.	Planter box
7	HomeLAND Sugarbeet	Contains a talc 80/20 graphite blend enhanced with micronutrients to promote early vigor and uniform germination.	Planter box
8	MicroSURGE = Inceptive	Contains a talc 80/20 graphite blend enhanced with microbes to achieve optimal plant health and robust growth.	Planter box

Results

None of the products tested made a significant impact on stand count or any yield parameters (Table 2).

Conclusions

None of the products tested made a meaningful impact on overall yield. However, this is only one year of testing and conclusions should not be drawn on one year of data.

Table 2. Stand counts and yield parameter results for the Lake Lillian Seed Treatment Trial.

Trt #	Product	Percent Sugar	Tons per acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Stand Count per 100' row 1-Jul	Stand Count per 100' row 16-Jul
1	Check	15.0	33.7	12.8	257.1	8659.9	92.1	152	225
2	Bioforge	14.9	34.0	12.6	252.1	8581.4	91.4	147	222
3	Commence	15.2	34.2	13.1	261.2	8928.8	92.3	150	227
4	Ascend ST3	14.9	35.5	12.7	253.9	9030.7	91.8	136	220
5	Dash PBC	15.0	33.3	12.7	253.9	8448.1	91.4	156	211
6	Lalrise Shine DS	15.1	35.6	13.0	259.6	9238.2	92.3	144	226
7	HomeLAND Sugarbeet	15.2	33.5	12.9	258.5	8568.9	91.8	159	227
8	MicroSURGE = Inceptive	14.8	33.2	12.5	250.5	8325.6	91.4	157	228
	Mean	15.0	34.1	12.8	255.7	8719.1	91.8	150.1	223.3
	CV%	2.9	6.3	3.4	3.4	7.0	0.8	17.0	5.5
	Pr>F	0.779	0.4861	0.5151	0.4769	0.2859	0.1791	0.8614	0.425
	lsd (0.05)	ns	ns	ns	ns	ns	ns	ns	ns

Variety x Nitrogen Rate Trial

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Nitrogen management is a priority for the production of high-quality sugar beets. Differences in nitrogen use efficiency between varieties would be beneficial information for growers to optimize yield potential and avoid overspending on fertilizer.

Research Objective

- Provide nitrogen fertilizer guidelines based on variety for sugar beet production in the Southern Minnesota Beet Sugar Cooperative growing area.

Methodology

The trial was established near Renville following field corn in 2025 using randomized complete block design. The site was soil sampled in the fall of 2024 to develop treatment rates and sampled again in the spring of 2025 to identify any changes in soil nitrate over the winter (Table 1). The site was planted on April 30th using Beta 9284 and Crystal M977. Prior to planting, the urea treatments were broadcast by hand and incorporated with a small field cultivator. Percent canopy cover ratings were taken on July 15th. Standard sugar beet production practices were used to keep the trial weed and disease free. Each plot was 35ft long and six rows wide. The center two rows of each six-row plot were harvested on September 25th using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester, and two samples of those beets from each plot were used for quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4.

Table 1. Soil test results from the fall soil sample in 2024.

Soil test	Renville
Fall Soil nitrate-N 0-4 ft. (lb N/A)	90
Spring Soil nitrate-N 0-4 ft. (lb N/A)	87
Olsen P 0-6 in. (ppm)	5
K 0-6 in. (ppm)	128
pH 0-6 in. (unitless)	7.7
Organic matter 0-6 in. (%)	4.9

Results

Soil nitrate levels were unchanged between fall and spring soil samples. Both varieties responded positively to the addition of nitrogen and had similar extractable sugar per acre (Table 2). The only significant difference between the two varieties and their response to nitrogen was the lower ESA for Crystal M977 when no additional nitrogen was applied. The percent canopy ratings taken in mid-July were highly correlated with final ESA for nitrogen rate for both varieties. 0.999 for Crystal M977 and 0.951 for Beta 9284.

Conclusions

The results of this trial and other trials in the recent past do not suggest a significant difference in nitrogen use efficiency between varieties that are generally considered to perform differently from a quality vs tons perspective. There may be small differences in nitrogen use efficiency, but those differences may not be large enough to change nutrient managements tactics depending on the variety being planted.

Table 2. Yield, stand counts, and mid-July canopy ratings.

Entry	Variety	N Rate	Total N	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	% Canopy Rating 15-Jul	Stand Count per 100' row 27-May
1	Beta 9284	0	90	14.6	27.6 c	12.4	247.9	6863.1 c	91.7 abc	47.5 c	157.5
2	Beta 9284	50	140	14.7	28.5 bc	12.5	250.2	7139.5 bc	91.8 ab	60.0 b	148.8
3	Beta 9284	100	190	14.7	31.7 a	12.6	251.2	7970.4 a	92.1 a	71.3 ab	145.0
4	Beta 9284	150	240	14.5	30.6 ab	12.2	244.6	7496.5 abc	91.5 bc	71.3 ab	130.0
5	Crystal M977	0	90	14.7	24.1 d	12.6	251.4	6045.3 d	92.1 a	46.3 c	150.0
6	Crystal M977	50	140	14.7	27.7 c	12.6	251.0	6958.0 c	91.9 ab	62.5 b	152.5
7	Crystal M977	100	190	14.6	29.8 abc	12.4	247.1	7362.9 abc	91.4 c	68.8 ab	141.3
8	Crystal M977	150	240	14.6	31.8 a	12.3	246.4	7840.3 ab	91.6 bc	76.3 a	160.0
			Mean	14.6	29.0	12.4	248.7	7209.5	91.8	63.0	148.1
			CV%	1.7	6.1	2.0	2.0	7.0	0.3	12.4	15.6
			Pr>F	0.7082	<.0001	0.2935	0.4237	0.0007	0.0132	<.0001	0.6846
			lsd (0.05)	ns	2.6	ns	ns	739.7	0.394	11.5	ns

Nitrogen Rate Trials

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Nitrogen management is important for optimizing yield while also managing production costs. Understanding the impacts that nitrogen deficiency or excess nitrogen can have on stand and yield is important information for making input decisions.

Research Objective

- Provide nitrogen guidelines for sugar beet production in the Southern Minnesota Beet Sugar Cooperative growing area.
- Screen various commercial products for any merit in increasing sugar beet production.
- Evaluate the potential for blends of ESN to reduce stand loss from spring applied urea.

Methodology

Four trials were established in 2025 using randomized complete block design. Trials were located near Lake Lillian, Bird Island, and Renville. Sites were soil sampled in the fall of 2024 to develop treatment rates for the trials and sampled again in the spring of 2025 to identify any changes in soil nitrate (Table 1). The nitrogen ladder increments for each site were identical, however two sites contained treatments with blends of ESN and all sites contained several additional foliar or in-furrow treatments (Tables 2, 3, 4, and 5). All of the trials were planted using Beta 9131. Planting and harvest dates are listed in Table 1. Prior to planting, the urea and ESN treatments were broadcast by hand and incorporated with a small field cultivator. The three sites with a low phosphorus test also had triple super phosphate broadcast applied. The in-furrow and foliar treatments are described above the individual site tables. Percent canopy cover ratings were taken in mid-July to assess the impact of nitrogen rates on canopy development. Ratings were taken on a 0-100 scale rating the percentage of canopy cover versus bare ground. CLS ratings (1-9) were taken on September 8th at the three sites following field corn to assess the impact that nitrogen may have on CLS disease severity. Standard sugar beet production practices were used to keep the trials weed and disease free. Each plot was 35ft long and 6 rows wide. The center two rows of each six-row plot were harvested using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and two samples of those beets from each plot were used for quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4. Only reps 1-3 were harvested at the Lake Lillian site due to flooding that negatively impacted rep 4.

Table 1. Soil test results for the four trial locations from fall soil sample in 2024 and important dates.

Soil test	Bird Island	Lake Lillian	Renville Corn	Renville SB
Fall Soil nitrate-N 0-4 ft. (lb N/A)	55	90	85	55
Spring Soil nitrate-N 0-4 ft. (lb N/A)	58	104	112.5	108.5
Olsen P 0-6 in. (ppm)	11	6	5	6
K 0-6 in. (ppm)	242	114	128	163
pH 0-6 in. (unitless)	7.2	7.9	7.7	7.9
Organic matter 0-6 in. (%)	5.9	3.2	4.9	5.4
Planting Date	4/23/25	5/6/25	4/30/25	4/21/25 & 5/14/25
Harvest Date	9/12/25	10/2/25	9/25/25	9/15/25
Previous Crop	Field Corn	Field Corn	Field Corn	Soybean

Results

All of the sites following field corn had a significant increase in ESA with the first 60lbs of additional nitrogen but no significant increase in ESA over 60lbs applied (Figure 1). There was no response to additional nitrogen applied at the site following soybean. Any additional foliar or in-furrow treatments at any of the sites had no significant impact on ESA. Several of the sites had significant stand loss at higher rates of spring applied urea (Figure 2). Stand loss was reduced at the Lake Lillian site when blends of ESN were used to reduce the amount of urea applied but keeping total nitrogen the same (Table 5). The stand loss at the Renville SB site was severe due to crusting that occurred after planting. The crusting combined with high rates of spring urea caused severe stand loss and led to the trial being replanted. The stand count data in Table 3 is from the original planting. The percent canopy ratings taken in mid-July correlated highly with the extractable sugar per acre at the end of the season with R values of 0.918 at Lake Lillian, 0.903 at Renville, and 0.962 at Bird Island (Figure 3). The CLS ratings taken on September 8th showed either no impact on disease severity with nitrogen rates or that the disease severity was less for the plots with less nitrogen applied. The CLS ratings were highly correlated with percent canopy at two sites with R Values of 0.893 at Lake Lillian and 0.978 at Bird Island (Figure 4). The Renville Corn location had no significant differences in CLS ratings and only had an R value of 0.707.

Conclusions

The residual nitrogen only increased slightly following field corn when comparing fall and spring soil samples. However, the site following soybean almost doubled the residual nitrogen (Table 1). Between the high residual nitrogen and low crop residue compared to field corn it is not surprising to not see a response to additional nitrogen at the site following soybean (Table 3). Based on the fall soil samples the sites following field corn responded positively to additional nitrogen up to 115, 145, and 150lbs of total N. None of the commercial in-furrow or foliar applied products proved beneficial this year or in previous years of testing. The high correlation between percent canopy cover and extractable sugar per acre this year and last year indicate that it could be a useful tool in the future to compare treatments if plots are not able to be harvested. The impact of nitrogen on CLS disease severity was not overly surprising. The plots with the lower rates of nitrogen were slower to develop a full canopy so this would have delayed the onset of the disease by not providing an environment conducive to disease development as these plots would have had better airflow in the canopy compared to higher nitrogen plots with thick canopies. Overall, the testing from this year agreed with the current recommendation of 110 to 150lbs of total nitrogen based on a fall soil test. Crops with less residue and high organic matter soils can likely be on the lower side of the recommendations. For sugar beets following field corn it would be best to be at the high end of the recommendation. Going over 150lbs of total N is likely not going to cause a reduction in ESA. However, if rates over 90lbs of N as urea are applied in the spring it is possible to see some stand loss and significant stand loss under certain conditions.

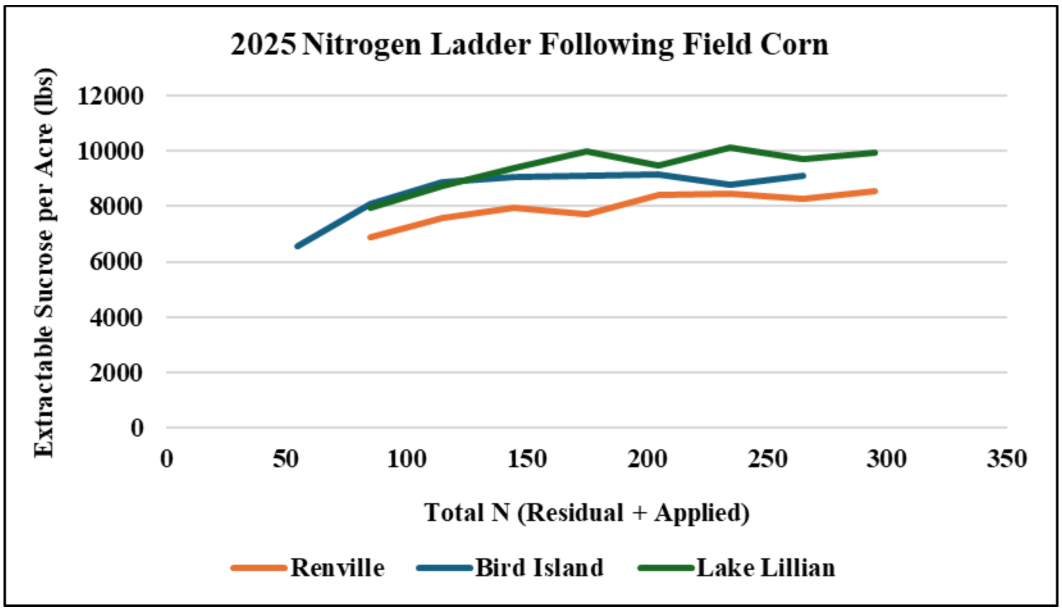

Figure 1. Nitrogen response following field corn.

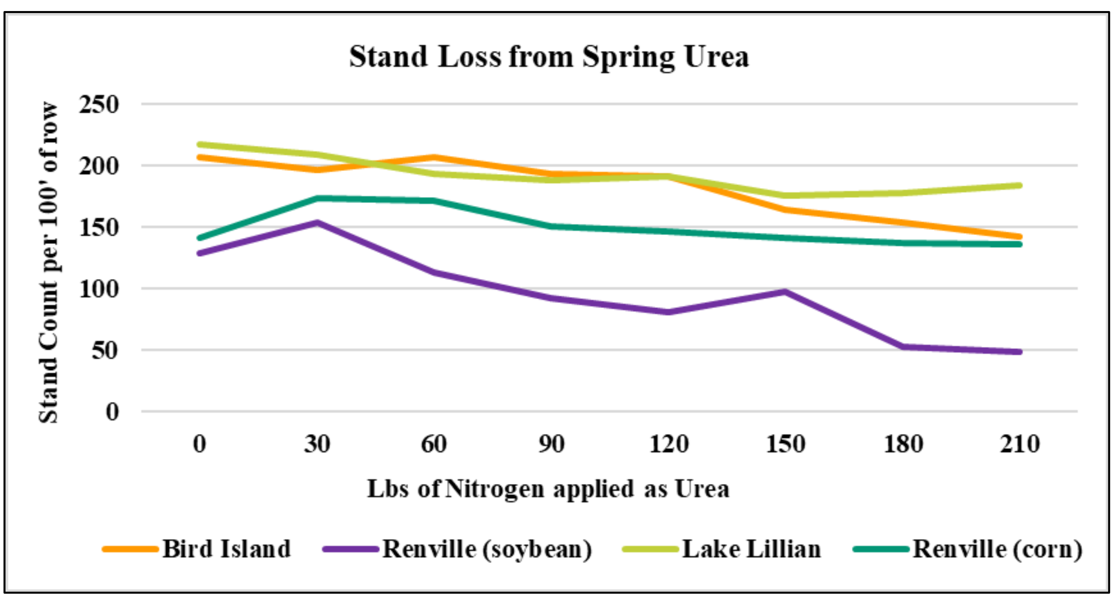

Figure 2. Stand loss from spring applied urea across all four sites.

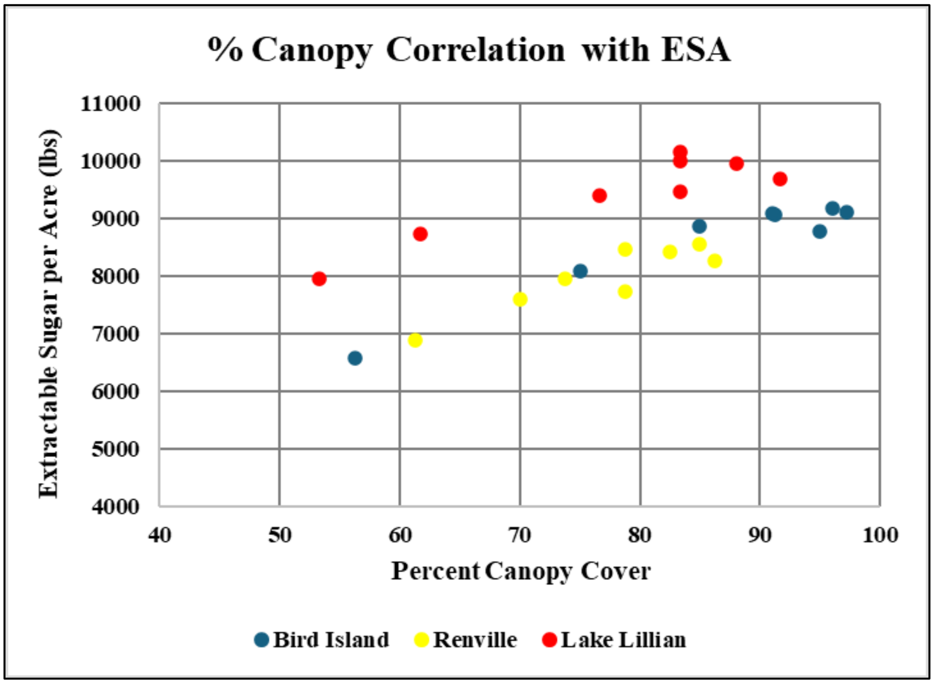

Figure 3. Percent canopy cover taken in mid-July and correlated with extractable sugar per acre for the nitrogen ladder treatments for the sites following field corn.

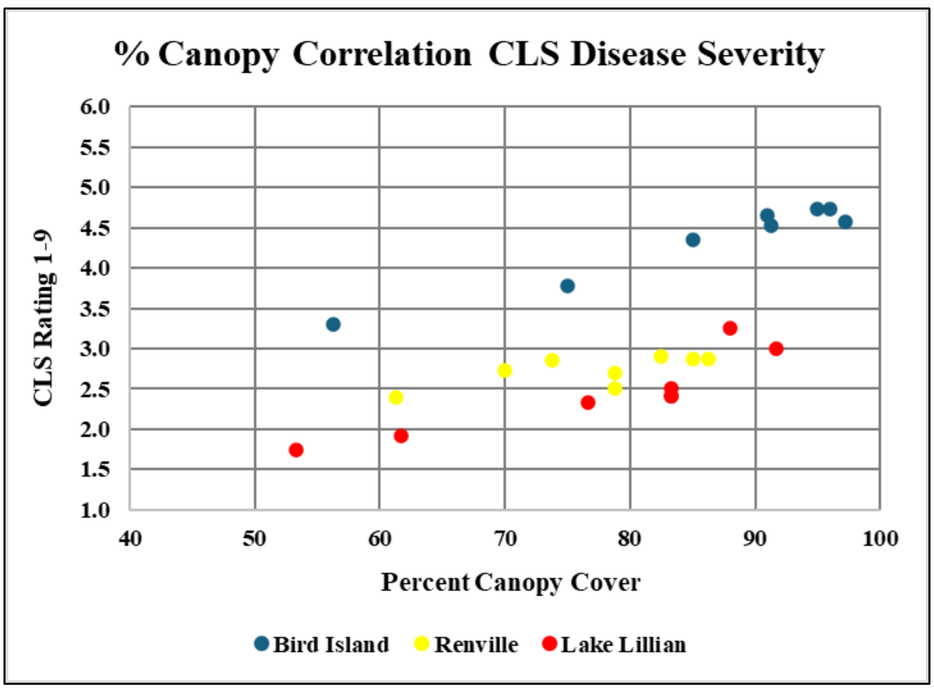

Figure 4. CLS ratings taken on September 8th and correlated with percent canopy cover taken in mid-July for the nitrogen ladder treatments for the sites following field corn.

Table 2. Yield, canopy rating, stand count, and CLS rating data for the Renville trial following field corn. Foliar applications for treatments 10 and 12 were made on June 21st, July 18th, and August 12th using a spray volume of 20gpa.

Entry	Treatment	N Rate	Total N	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	% Canopy Rating 15-Jul	CLS Rating (1-9) 8-Sep	Stand Count per 100' row 27-May
1		0	85	14.9 abcd	27.1 f	12.7 abcd	254.6 abcd	6885.1 d	91.8	61.3 f	2.4	141.3
2		30	115	15.1 ab	29.3 ef	13.0 a	258.9 ab	7595.5 cd	92.0	70.0 e	2.7	173.8
3		60	145	15.2 ab	30.7 de	12.9 ab	258.8 ab	7944.0 abc	92.0	73.8 cde	2.9	171.3
4		90	175	14.8 abd	30.7 de	12.6 abcd	251.8 abcd	7720.8 bc	91.7	78.8 bc	2.7	151.3
5		120	205	14.8 bcd	33.7 abc	12.5 bcd	250.3 bcd	8414.8 ab	91.6	82.5 ab	2.9	146.3
6		150	235	14.6 d	34.3 ab	12.3 d	246.6 d	8452.9 ab	91.5	78.8 bc	2.5	141.3
7		180	265	14.7 cd	33.1 abcd	12.5 cd	249.3 cd	8260.1 abc	91.6	86.3 a	2.9	137.5
8		210	295	14.6 d	34.7 a	12.3 d	246.1 d	8545.2 a	91.4	85.0 a	2.9	136.3
10	Max N Pact @ 2gal	60	145	15.0 abc	31.6 bcde	12.8 abc	255.7 abc	8087.0 abc	91.8	75.0 cde	2.9	163.8
12	Foliar K2O (20%), Mg (4%), Mn (2.5%), S (6.5%), B (0.05%), Mo (0.03%) @ 1gal	60	145	15.2 a	29.9 ef	13.0 a	259.7 a	7763.0 abc	91.9	76.3 cd	2.8	178.8
			Mean	14.9	31.4	12.7	253.3	7944.7	91.7	76.25	2.75	156.4
			CV%	2.0	6.3	2.4	2.4	7.0	0.3	5.53	9.67	15.5
			Pr>F	0.0399	0.0001	0.0305	0.0367	0.0127	0.0688	<.0001	0.1635	0.1004
			lsd (0.05)	0.4	2.8	0.4	8.9	800.7	ns	6.07	ns	ns

Table 3. Yield, canopy rating, and stand count data for the Renville trial following soybean. Foliar applications for treatments 9 and 10 were made on July 18th and August 13th using a spray volume of 20gpa.

Entry	Trt	N Rate	ESN Rate	Total N	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Canopy Rating 18-Jul	Stand Count per 100' row 4 leaf
1		0	0	55	15.5 ab	19.7	13.3 ab	265.7 a	5221.5	92.1	52.5	128.8 ab
2		30	0	85	15.3 abcde	21.2	13.0 abcde	260.2 abcd	5515.7	91.8	62.5	153.8 a
3		60	0	115	15.4 ab	20.1	13.2 ab	263.9 ab	5300.1	91.9	56.3	113.8 bcde
4		90	0	145	15.0 de	19.6	12.8 cde	255.1 cd	5010.6	91.7	58.8	92.5 cde
5		120	0	175	15.4 abcd	21.6	13.1 abc	262.4 abc	5678.7	91.7	62.5	81.3 ef
6		150	0	205	15.0 cde	20.5	12.8 cde	255.2 cd	5213.2	91.5	61.3	97.5 bcde
7		180	0	235	15.3 abcde	19.8	13.1 abcd	261.1 abc	5179.6	92.0	60.0	52.5 f
8		210	0	265	15.4 abc	20.0	13.1 abc	262.1 abc	5243.1	91.6	62.5	48.8 f
9	Max N Pact @ 2gal	90	0	145	15.5 ab	21.0	13.2 ab	264.5 ab	5538.5	91.9	63.8	88.8 de
10	Foliar K2O (20%), Mg (4%), Mn (2.5%), S (6.5%), B (0.05%), Mo (0.03%) @ 1gal	90	0	145	15.6 a	20.2	13.3 a	266.8 a	5372.1	92.1	61.3	101.3 bcde
11		60	30	145	14.9 e	19.8	12.7 de	253.4 d	5010.2	91.9	57.5	122.5 abc
12		30	60	145	15.4 ab	21.4	13.1 abc	262.4 abc	5622.8	91.6	62.5	116.3 bcd
13		0	90	145	15.4 abc	21.8	13.1 abc	262.9 ab	5738.6	91.8	65.0	100.0 bcde
14		120	60	235	15.2 bcde	22.5	12.9 bcde	257.8 bcd	5808.2	91.6	66.3	105.0 bcde
15		60	120	235	15.3 abcde	21.6	13.0 abcde	259.6 abcd	5607.3	91.6	67.5	106.3 bcde
16		0	180	235	14.9 e	20.9	12.7 e	253.3 d	5288.6	91.6	62.5	118.8 bcd
				Mean	15.3	20.7	13.0	260.4	5396.8	91.8	61.4	101.7
				CV%	1.8	11.2	2.0	2.0	11.1	0.4	14.03	23
				Pr>F	0.0062	0.8620	0.0078	0.0062	0.7704	0.2728	0.699	<0.001
				lsd (0.05)	0.4	ns	0.4	7.54	ns	ns	ns	33.3

Table 4. Yield, canopy rating, stand count, and CLS rating data for the Bird Island trial. Biopath was applied in-furrow at 1 quart for treatment 9 and Generate was applied at 1 pint for treatment 10. The in-furrow treatments were applied with a volume of 6gpa. Treatment 10 also included a broadcast treatment of Generate at 1 pint per acre using a bike sprayer at 17gpa at the 10-12lf stage.

Entry	Treatment	N Rate	Total N	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	% Canopy Rating 19-Jun	% Canopy Rating 16-Jul	CLS Rating (1-9) 8-Sep	Stand Count per 100' row 4 leaf
1		0	55	15.2	25.5 a	12.9	257.4	6574.7 a	91.4	28.8 e	56.3 d	3.3 d	207.5 a
2		30	85	15.1	31.5 b	12.8	256.6	8085.1 b	91.6	42.5 d	75.0 c	3.8 c	196.3 ab
3		60	115	15.2	34.2 bc	13.0	259.5	8864.0 bc	91.7	56.3 abc	85.0 b	4.4 b	207.5 a
4		90	145	15.3	34.9 c	13.0	260.2	9063.0 c	91.6	56.3 abc	91.3 ab	4.5 ab	177.5 bcd
5		120	175	15.3	35.0 c	13.0	260.0	9084.2 c	91.5	53.8 bc	91.0 ab	4.7 ab	191.3 abc
6		150	205	15.1	35.8 c	12.8	257.0	9174.9 c	91.6	62.5 ab	96.0 a	4.7 ab	164.1 cde
7		180	235	15.0	34.5 c	12.7	254.6	8765.6 c	91.5	52.5 c	95.0 a	4.7 ab	153.8 de
8		210	265	15.0	36.0 c	12.6	253.3	9118.4 c	91.4	65.0 a	97.3 a	4.6 ab	142.4 e
9	Biopath	90	145	15.1	36.2 c	12.8	257.2	9298.6 c	91.8	58.8 abc	91.3 ab	4.6 ab	193.8 ab
10	Generate	90	145	15.1	34.8 c	12.8	256.6	8929.6 c	91.7	60.0 abc	90.0 ab	4.9 a	195.0 ab
			Mean	15.1	33.9	12.8	257.1	8716.0	91.6	53.6	86.8	4.4	185.1
			CV%	1.5	5.9	1.9	1.9	6.3	0.4	11.8	6.2	6.51	11.1
			Pr>F	0.5502	<.0001	0.4732	0.6532	<.0001	0.9452	<.0001	<.0001	<.0001	0.002
			lsd (0.05)	ns	2.90	ns	ns	797.7	ns	9.16	7.79	0.42	29.3

Table 5. Yield, canopy rating, stand count, and CLS rating data for the Lake Lillian trial. Treatments 9 and 10 had Envita applied at 5g per acre with Prefer 90 NIS at 0.25% v/v using a bike sprayer at 17gpa spray volume at the 2-4lf stage and again at the 10-12lf stage.

Entry	Treatment	N Rate	ESN Rate	Total N	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	% Canopy Rating 1-Jul	% Canopy Rating 16-Jul	CLS Rating (1-9) 8-Sep	Stand Count per 100' row 4 leaf
1		0	0	90	15.3 a	30.2 d	13.2 a	263.2 a	7956.2 de	92.2	28.8 g	53.3 g	1.8 e	217.5 a
2		30	0	120	15.2 ab	33.5 cd	13.0 abc	260.1 abcd	8725.3 cd	91.9	33.8 fg	61.7 fg	1.9 de	208.8 ab
3		60	0	150	15.1 abc	36.5 bc	12.9 abcd	258.0 abcde	9405.1 bc	92.0	43.8 ef	76.7 de	2.3 cde	193.8 abcde
4		90	0	180	15.2 ab	38.4 ab	13.0 abc	260.6 abcd	10008.4 ab	92.2	47.5 cde	83.3 bcd	2.4 bcd	188.8 bcde
5		120	0	210	14.9 bc	37.6 ab	12.6 bcde	252.3 cdef	9466.8 bc	91.7	50.0 bcde	83.3 bcd	2.4 bcd	191.3 bcde
6		150	0	240	15.0 abc	39.4 ab	12.9 abcd	257.8 abcde	10144.0 ab	92.3	51.3 bcde	83.3 bcd	2.5 bcd	176.3 e
7		180	0	270	14.4 d	39.7 ab	12.2 e	244.2 f	9689.5 ab	91.6	56.3 abc	91.7 ab	3.0 ab	177.5 de
8		210	0	300	14.7 cd	39.7 ab	12.5 de	250.4 ef	9947.0 ab	91.9	55.0 abcd	88.0 abcd	3.3 a	183.8 cde
9	Envita	0	0	90	15.3 a	30.1 d	13.1 ab	261.1 abc	7877.9 e	91.8	27.5 g	56.7 fg	1.9 de	210.0 ab
10	Envita	30	0	120	15.0 abc	33.3 cd	12.8 abcd	256.3 abcde	8538.1 de	92.0	33.8 fg	66.7 ef	2.3 cde	206.3 abc
11		60	30	180	15.3 ab	38.2 ab	13.1 ab	262.0 ab	10001.1 ab	92.2	50.0 bcde	81.7 bcd	2.5 bcd	203.8 abc
12		30	60	180	15.1 abc	38.6 ab	13.0 abc	259.2 abcde	10005.2 ab	92.1	48.8 bcde	76.7 de	2.4 bcd	200.0 abcde
13		0	90	180	15.1 abc	36.5 bc	12.9 abcd	257.8 abcde	9395.2 bc	92.0	45.0 de	80.0 cd	2.2 cde	201.3 abcd
14		120	60	270	14.9 abc	38.8 ab	12.6 bcde	253.2 bcde	9828.9 ab	91.6	52.5 abcde	89.0 abc	2.6 bc	188.8 bcde
15		60	120	270	14.7 cd	39.8 ab	12.6 cde	251.9 def	10023.1 ab	92.1	58.8 ab	91.7 ab	2.8 abc	202.5 abc
16		0	180	270	14.8 bcd	41.0 a	12.6 cde	252.1 def	10349.3 a	91.7	62.5 a	96.3 a	2.5 bcd	208.8 ab
				Mean	15.0	37.0	12.8	256.3	9460.1	92.0	46.6	78.8	2.4	197.4
				CV%	1.8	5.7	2.1	2.1	5.2	0.5	15.2	8.8	14.7	8.8
				Pr>F	0.0086	<.0001	0.0087	0.0086	<.0001	0.7607	<.0001	<.0001	0.0015	0.0401
				lsd (0.05)	0.44	3.5	0.44	8.9	816.4	ns	10.1	11.6	0.67	24.6

Late Season Nitrogen Trial

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Nitrogen management is important for optimizing yield while also managing production costs. Understanding potential impacts of late season nitrogen applications may help to manage nitrogen more efficiently.

Research Objective

- To compare nitrogen products and rates to improve yield in a late season application.

Methodology

This trial was conducted near Renville following soybean in an area that was replanted on May 14th using Beta 9131. This area was replanted due to severe crusting caused by intense rainfall after the first planting. Preplant nitrogen plus residual nitrogen totaled 130lbs. Normal agronomic practices were used to keep the trial weed and disease free. This trial was designed as randomized complete block. All treatments were applied on July 11th (Table 1). Foliar applications were made using a bike sprayer traveling 3.2mph with a spray volume of 17gpa and 40psi, utilizing XR11002 nozzles. The bike sprayer used CO2 as a propellant and was designed to apply the treatment to the center four rows, leaving rows one and six untreated (Figure 1). The urea and ESN treatments were applied by hand in between the rows and incorporated with an interrow cultivator. Each plot consisted of six rows that were 35ft in length. The center two rows of each six-row plot were harvested for yield and quality analysis on September 15th using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and samples of those beets were used for a quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4.

Results

There were no significant differences between any of the treatments for any yield parameters (Table 1).

Conclusions

The results of this trial were not surprising as we generally have not seen a response to late applications of nitrogen. Following soybeans and having sufficient nitrogen applied preplant also lessened the likelihood of seeing a respond to additional nitrogen.

Table 1. Description of treatments and yield results.

Entry	Product	Rate	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	Check	n/a	15.3	19.0	13.0	260.8	4993.4	92.0
2	urea	20lbs	15.2	19.5	13.0	260.5	5121.8	92.0
3	urea	40lbs	15.3	21.0	13.0	260.9	5515.8	92.0
4	urea	60lbs	15.2	19.5	13.1	260.9	5071.4	92.1
5	N Pact	3gal	15.2	21.1	13.0	260.0	5504.8	92.0
6	SloN	3gal	15.2	20.1	13.1	261.3	5240.9	92.2
7	ESN	40lbs	15.2	19.4	13.1	261.1	5072.0	92.2
		Mean	15.2	19.9	13.0	260.8	5213.9	92.1
		CV%	1.4	4.6	1.7	1.7	3.9	0.3
		Pr>F	0.9994	0.1433	0.9994	0.9997	0.058	0.9458
		lsd (0.05)	ns	ns	ns	ns	ns	ns

Figure 1. Bike sprayer applications being made on July 11th.

Phosphorus by Nitrogen Rate Trial

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Nitrogen management is a priority to produce high-quality sugar beets. However, many other nutrients also play a role in plant growth. It is important to understand how the availability of other major nutrients such as phosphorus may be impacted by varying levels of nitrogen.

Research Objective

- Provide phosphorus and nitrogen fertilizer guidelines for sugar beet production in the Southern Minnesota Beet Sugar Cooperative growing area.

Methodology

These trials were conducted as a 3 x 5 factorial with four replications from 2023-2025 in fields near Renville, Minnesota. Soil samples were taken in the fall prior to treatment application (Table 1). The applied nitrogen fertilizer rates were 0, 45, and 115lbs N/A in 2024 and 2025. In 2023 the applied nitrogen rate was 0, 70, and 140lbs N/A as that site had a lower soil residual. The phosphorus fertilizer rates were 0, 15, 30, 45, and 60lbs P_2O_5/A. The phosphorus and nitrogen treatments were applied broadcast in the spring and incorporated using a small field cultivator. The nitrogen source was urea (46-0-0), and the phosphorus source was triple super phosphate (0-46-0). Standard practices were used to keep the site weed and disease free. The center two rows of each six-row plot were harvested using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and two samples of those beets were used for a quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4. In 2024 and 2025 a starter fertilizer treatment of a mix of 3 gal 6-24-6 plus 3 gal of water applied at a rate of 6 gal/A was added to compare against the broadcast P_2O_5. Three gallons of 6-24-6/A delivers 2 lbs N/A, 8 lbs P_2O_5 /A, and 2 lbs K_2O /A.

Table 1. Soil test results and important dates for all three trial locations.

	2023	2024	2025
Fall Soil nitrate-N 0-4 ft. (lb N/A)	33	55	85
Spring Soil nitrate-N 0-4 ft. (lb N/A)	62	67	76
Olsen P 0-6 in. (ppm)	3	4	5
K 0-6 in. (ppm)	224	136	128
pH 0-6 in. (unitless)	8.0	8.1	7.7
Organic matter 0-6 in. (%)	5.3	5.8	4.9
Previous Crop	Soybean	Soybean	Field Corn
Planting Date	May 4th	April 23rd	April 30th
Harvest Date	September 18th	October 3rd	September 25th

Results

The application of phosphorus and nitrogen did not have an interaction on yield or quality. The application of phosphorus did not impact any quality parameters and only increased yield with the first rate of additional P_2O_5 (Tables 5, 6, and 7). The use of starter (3 gal/A of 6-24-6) alone had similar root yield to all other phosphorus treatments at the same nitrogen rate (Tables 8 and 9). The application of nitrogen had a negative impact on quality in 2023 and 2025 but no impact in 2024 (Tables 2, 3, and 4). The yield response to nitrogen was linear in 2024 but plateaued in 2023 and 2025 after 100 and 130lbs/A of total nitrogen (soil test plus fertilizer N) respectively.

Conclusions

Phosphorus having a significant impact on root yield was not surprising as the soil sample results indicated very low soil test levels of phosphorus (Table 1). What was surprising was that increasing the rate of phosphorus only improved root yield up to 15 – 30lbs of additional phosphate/A with no further increase in root yield after those rates (Table 5, 6, and 7). The response to additional nitrogen over the control was expected and consistent with previous studies when conducted on sites with low residual nitrogen (Tables 2, 3, and 4). After sufficiency levels were met there does not appear to be any benefit to increasing the rate of phosphorus if the rate of nitrogen is increased. However, if the phosphorus needs are not met, root yield will be reduced even with high levels of nitrogen. These trials stress the importance of soil sampling and understanding the underlying nutrient levels of a field prior to planting.

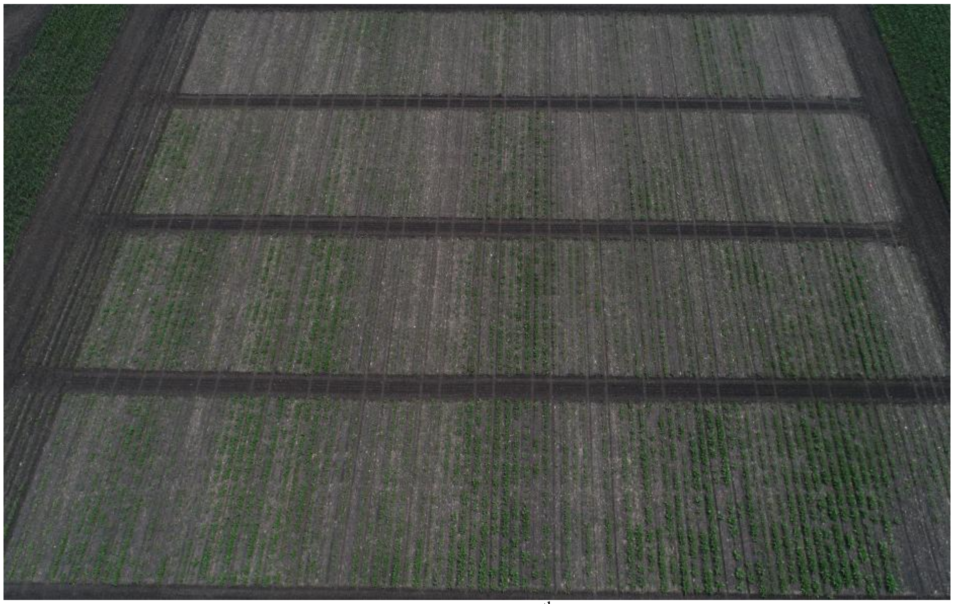

Figure 1. Drone image from 2023 trial on June 15th showing reduced foliage in plots that were deficient in phosphorus, nitrogen, or both.

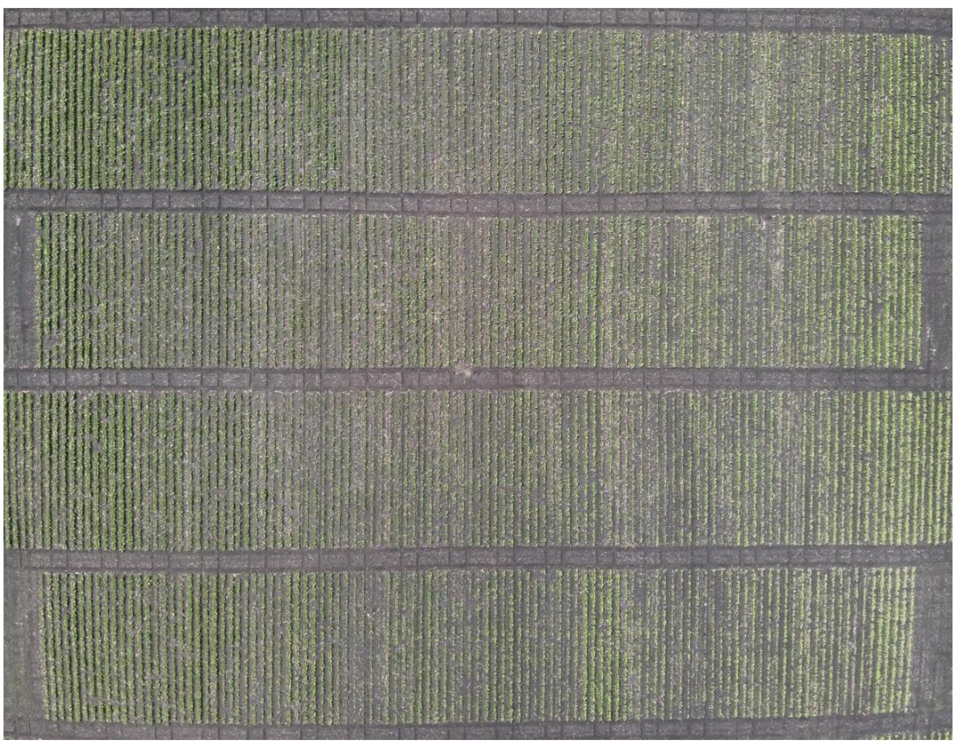

Figure 2. Drone image from the 2024 trial on June 13th showing reduced foliage in plots that were deficient in phosphorus, nitrogen, or both.

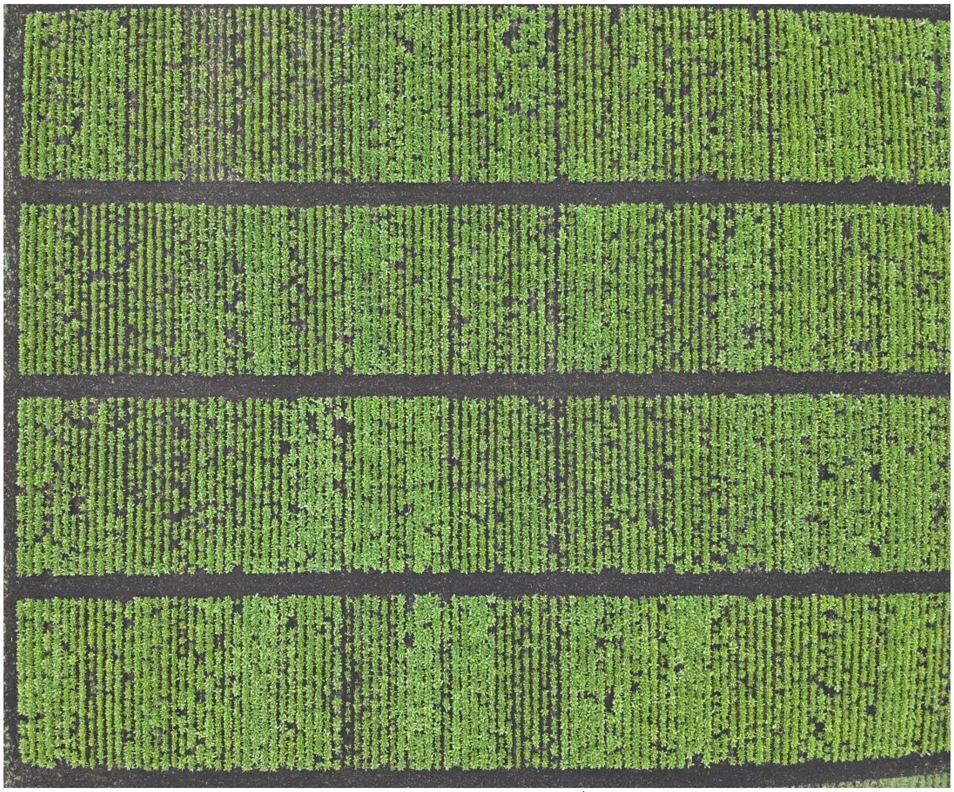

Figure 3. Drone image from the 2025 trial on July 16th showing reduced foliage in plots that were deficient in phosphorus, nitrogen, or both.

Table 2. 2023 The effect of fertilizer N on yield and quality averaged across P_2O_5 rates.

N Rate (lbs per acre)	Total N (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
0	33	17.2 a	28.0 b	14.4 a	288.8 a	8101.9 b	90.1
70	102	17.2 a	32.1 a	14.4 a	288.1 a	9269.8 a	89.9
140	173	16.9 b	31.7 a	14.1 b	283.0 b	8976.7 a	90.0
	Mean	17.1	30.6	14.3	286.6	8782.8	90.0
	CV%	1.7	10.6	1.7	1.7	11.0	0.4
	Pr>F	0.0011	0.0004	0.0008	0.0008	0.0012	0.2451
	lsd (0.05)	0.18	2.07	0.16	3.11	614.40	ns

Table 3. 2024 The effect of fertilizer N on yield and quality averaged across P2O5 rates.

N Rate (lbs per acre)	Total N (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
0	55	17.5	31.4 c	14.9	298.0	9343.3 c	90.9
45	100	17.5	35.5 b	14.8	296.3	10518.1 b	90.8
115	170	17.4	37.6 a	14.8	295.0	11081.5 a	90.6
	Mean	17.5	34.8	14.8	296.4	10314.3	90.8
	CV%	1.5	6.8	1.8	1.8	6.1	0.6
	Pr>F	0.5429	<.0001	0.2402	0.2216	<.0001	0.121
	lsd (0.05)	ns	1.5	ns	ns	403.8	ns

Table 4. 2025 The effect of fertilizer N on yield and quality averaged across P2O5 rates.

N Rate (lbs per acre)	Total N (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
0	85	15.1 a	26.7 b	12.9 a	258.6 a	6906.1 b	92.0
45	130	15.3 a	29.3 a	12.9 a	259.2 a	7589.9 a	91.5
115	200	14.9 b	30.9 a	12.7 b	254.5 b	7871.7 a	91.8
	Mean	15.1	29.0	12.9	257.4	7455.9	91.8
	CV%	1.8	9.3	1.9	1.9	9.3	1.5
	Pr>F	0.0014	<.0001	0.0105	0.0071	0.0002	0.527
	lsd (0.05)	0.17	1.7	0.15	3.1	442.9	ns

Table 5. The 2023 effect of increasing P_2O_5 rates on yield and quality averaged across nitrogen rates.

P2O5 Rate (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
0	17.0	24.8 c	14.2	284.5	7070.8 c	90.1
15	17.1	28.9 b	14.3	286.2	8295.0 b	89.8
30	17.1	32.6 a	14.3	286.5	9344.0 a	90.1
45	17.1	33.6 a	14.3	286.8	9637.1 a	90.1
60	17.3	33.1 a	14.5	289.1	9567.1 a	89.9
Mean	17.1	30.6	14.3	286.6	8782.8	90.0
CV%	1.7	10.6	1.7	1.7	11.0	0.4
Pr>F	0.1689	<.0001	0.2578	0.2578	<.0001	0.182
lsd (0.05)	ns	2.68	ns	ns	793.21	ns

Table 6. The 2024 effect of increasing P_2O_5 rates on yield and quality averaged across nitrogen rates.

P2O5 Rate (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
0	17.5	32.7 b	14.8	296.7	9675.6 b	90.6
15	17.6	35.3 a	14.9	298.8	10543.2 a	90.7
30	17.4	35.4 a	14.8	295.1	10444.9 a	90.7
45	17.4	35.1 a	14.8	295.8	10375.2 a	90.8
60	17.4	35.6 a	14.8	295.7	10532.5 a	90.9
Mean	17.5	34.8	14.8	296.4	10314.3	90.8
CV%	1.5	6.8	1.8	1.8	6.1	0.6
Pr>F	0.1945	0.0210	0.5976	0.4977	0.0081	0.4811
lsd (0.05)	ns	1.9	ns	ns	521.3	ns

Table 7. The 2025 effect of increasing P_2O_5 rates on yield and quality averaged across nitrogen rates.

P2O5 Rate (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
0	15.1	26.6 b	12.9	258.4	6860.5 b	92.0
15	15.1	28.6 ab	12.9	257.1	7363.5 ab	91.8
30	15.2	29.5 a	12.8	256.0	7557.4 a	91.1
45	15.0	29.7 a	12.8	256.5	7617.2 a	92.0
60	15.2	30.5 a	13.0	259.2	7881.0 a	92.0
Mean	15.1	29.0	12.9	257.4	7455.9	91.8
CV%	1.8	9.3	1.9	1.9	9.3	1.5
Pr>F	0.4866	0.0114	0.4414	0.4775	0.0128	0.4391
lsd (0.05)	ns	2.2	ns	ns	571.8	ns

Table 8. The effect of increasing rates of phosphorus and nitrogen analyzed as an RCBD with the addition of a starter fertilizer treatment of 3 gal 6-24-6 mixed with 3 gal of water/A in 2024.

Entry	N Rate (lbs per acre)	P2O5 Rate (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	0	0	17.7	28.9 i	15.0	299.3	8641.8 h	90.7
2	0	15	17.7	33.0 efgh	15.0	300.8	9930.0 efg	90.8
3	0	30	17.5	32.7 fgh	14.9	297.9	9729.9 fg	91.0
4	0	45	17.5	30.8 hi	14.9	298.6	9195.1 gh	91.1
5	0	60	17.3	31.5 ghi	14.7	293.3	9219.6 gh	91.1
6	45	0	17.5	35.0 cdef	14.8	295.4	10332.7 cdef	90.7
7	45	15	17.6	34.1 defg	15.0	299.5	10210.1 cdef	90.9
8	45	30	17.4	35.7 bcdef	14.8	295.0	10535.9 bcdef	90.7
9	45	45	17.3	36.6 abcd	14.6	292.6	10687.3 abcde	90.7
10	45	60	17.6	36.2 abcde	15.0	298.8	10824.6 abcd	90.9
11	115	0	17.5	34.1 defgh	14.8	295.3	10052.3 defg	90.5
12	115	15	17.5	38.9 ab	14.8	296.0	11489.5 a	90.5
13	115	30	17.4	37.9 abc	14.7	292.4	11069.0 abc	90.4
14	115	45	17.5	38.0 abc	14.8	296.3	11243.2 ab	90.7
15	115	60	17.4	39.2 a	14.8	294.9	11553.4 a	90.9
16	45	Starter	17.8	35.7 bcdef	15.1	301.9	10779.1 abcde	90.7
		Mean	17.5	34.9	14.8	296.8	10343.3	90.8
		CV%	1.4	6.6	1.7	1.8	6.0	0.5
		Pr>F	0.1581	<.0001	0.2722	0.285	<.0001	0.7932
		lsd (0.05)	ns	3.3	ns	ns	883.6	ns

Table 9. The effect of increasing rates of phosphorus and nitrogen analyzed as an RCBD with the addition of a starter fertilizer treatment of 3 gal 6-24-6 mixed with 3 gal of water/A in 2025.

Entry	N Rate (lbs per acre)	P2O5 Rate (lbs per acre)	Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	0	0	15.2	25.5 f	13.0 abcd	259.1 abcde	6609.7 f	92.0
2	0	15	15.1	26.6 ef	12.9 abcde	257.5 abcdef	6851.9 ef	91.9
3	0	30	15.2	27.2 def	12.9 abcde	258.4 abcdef	7024.0 def	91.8
4	0	45	15.0	26.8 ef	12.9 abcde	257.0 bcdef	6885.2 ef	92.1
5	0	60	15.3	27.4 def	13.1 ab	261.1 abc	7160.0 cdef	92.1
6	45	0	15.3	26.4 ef	13.1 a	261.7 ab	6896.6 ef	92.0
7	45	15	15.2	29.6 bcde	13.0 abc	260.2 abcd	7687.3 abcde	92.0
8	45	30	15.4	29.7 bcde	12.6 e	251.4 f	7467.7 bcdef	89.5
9	45	45	15.2	30.9 abcd	12.9 abcde	258.5 abcdef	8000.9 abc	91.8
10	45	60	15.4	29.9 bcde	13.2 a	264.3 a	7897.3 abcd	92.2
11	115	0	14.9	27.8 cdef	12.7 bcde	254.3 cdef	7075.3 cdef	91.9
12	115	15	14.9	29.8 bcde	12.7 dce	253.6 def	7551.2 bcdef	91.4
13	115	30	15.1	31.7 ab	12.9 abcd	258.4 abcdef	8180.6 ab	91.9
14	115	45	14.9	31.4 abc	12.7 bcde	254.0 cdef	7965.7 abcd	92.0
15	115	60	14.8	34.1 a	12.6 de	252.2 ef	8585.6 a	91.7
16	45	Starter	15.2	28.3 bcdef	13.1 ab	260.7 abcd	7369.9 bcdef	92.2
		Mean	15.1	28.9	12.9	257.6	7450.5	91.8
		CV%	1.9	9.0	2.0	2.0	9.1	1.5
		Pr>F	0.1901	0.0014	0.0298	0.0284	0.0043	0.5368
		lsd (0.05)	ns	3.7	0.36	7.2	965.7	ns

Plant Growth Regulator Trial

David Mettler[1] and **Mark Bloomquist**[2]
[1]Research Agronomist, [2]Research Director, SMBSC, Renville, MN

The sugar content and total tons of a beet crop are major factors in how efficiently the factory can operate and ultimately how profitable the sugar beet crop will be to the shareholders. The SMBSC growing area has struggled to increase the sugar content of the beet crop in recent years. The impact of finding a product that could substantially increase the sugar content or increase overall extractable sugar per acre of the beet crop would be of great value.

Research Objective

- Products that are mostly not labeled for use in sugar beets at this time were tested in this trial to evaluate their ability to improve the extractable sugar per acre of the crop.

Methodology

The trial was conducted near Renville to screen products that may have the ability to improve sugar content or tons. The trial was planted on April 26th at Renville using Crystal M977 following field corn. Normal agronomic practices were used to keep the trial weed and disease free. This trial was designed as a randomized complete block. Treatments are found in Table 1. Applications were made using a bike sprayer traveling 3.2mph with a spray volume of 17gpa and 40psi, utilizing XR11002 nozzles at the 8-10lf stage. Applications made later in the season were done with a custom-made tractor mounted sprayer traveling 3.3mph with a spray volume of 20gpa and 40psi, utilizing XR110025 spray nozzles. Each plot consisted of six rows that were 35ft in length. The sprayers used CO2 as a propellant and were designed to apply the treatment to the center four rows, leaving rows one and six untreated. The center two rows of each six-row plot were harvested for yield and quality analysis on September 16th using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and samples of those beets were used for a quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4.

Results

None of the products tested made a significant impact on any yield parameters (Table 2).

Conclusions

Many foliar nutrient and plant growth regulator products have been tested in the past to improve the sugar content or tons of sugar beets here at SMBSC and in other sugar beet production areas. None of these products have been able to meaningfully increase sugar content or tons with any consistency.

Table 1. Description of treatments for the Renville plant growth regulator trial.

Trt	Description	Rate	Application Timing
1	Untreated Check	n/a	n/a
2	N (5%), S (1%), B (0.13%), Mn (0.5%), Mo (0.013%), Zn (0.5%), L-Proline (5,000ppm), and Phenolic Acids (19,800ppm)	32oz	8-10lf
3	18% $K_2$0 and 5% Mg	1gal	Aug 20th and Sep ~3
4	1.9% 6-Benzyladenine (6BA)	1gal per 100gal	8-10lf
5	40% Giberellins (GA3)	1 oz	8-10lf
6	6BA, GA4,7, and 0.5% citric acid	1gal per 100gal	8-10lf
7	Biostimulant, 0.5% Zinc	10 fl oz	8-10lf
8	18% $K_2$0 and 5% Mg	1gal	Sep ~3
9	Ca, Mg	20 fl oz	Aug 20th
10	19% P_2O_5, 26% K_2O, and 0.05% Mo	1gal	Aug 20th and Sep ~3

Table 2. Yield data for the Renville plant growth regulator trial.

Trt	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Stand Count per 100' row 28 Day
1	15.5	26.4	13.2	263.6	6949.4	91.6	136.3
2	15.3	27.3	13.0	260.5	7103.1	91.5	145.0
3	15.5	26.3	13.2	263.7	6940.5	91.7	142.5
4	15.5	26.7	13.2	265.2	7085.5	91.9	136.3
5	15.5	26.3	13.3	264.7	6964.2	91.7	160.0
6	15.5	27.5	13.2	263.6	7243.2	91.7	130.0
7	15.5	27.9	13.2	262.9	7322.5	91.6	140.0
8	15.3	25.9	13.0	259.2	6706.9	91.3	136.3
9	15.5	28.0	13.2	264.7	7397.9	91.8	138.8
10	15.3	27.7	13.1	260.8	7216.6	91.6	166.3
	15.4	27.0	13.1	262.9	7093.0	91.6	143.1
	1.7	7.0	2.2	2.1	6.4	0.3	13.7
	0.8707	0.7669	0.9044	0.8495	0.5695	0.2990	0.2575
	ns	ns	ns	ns	ns	ns	ns

Foliar Nutrient Trials

David Mettler[1] and **Mark Bloomquist**[2]
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The sugar content and total tons of a beet crop are major factors in how efficiently the factory can operate and ultimately how profitable the sugar beet crop will be to the shareholders. The SMBSC growing area has struggled to increase the sugar content of the beet crop in recent years. The impact of finding a product that could substantially increase the sugar content or increase overall extractable sugar per acre of the beet crop would be of great value.

Research Objective

- Products currently available were tested in these trials to evaluate their ability to improve the extractable sugar per acre of the crop.

Methodology

Trials were conducted near Renville and Murdock to screen products that may have the ability to improve sugar content or tons. The trials were planted on April 26th at Renville using Crystal M977 and April 30th at Murdock using Beta 9131. Both trials were following field corn in the rotation. Normal agronomic practices were used to keep the trial weed and disease free. These trials were designed as randomized complete block. Treatments are found in Tables 1 and 2. Applications were made using a bike sprayer traveling 3.2mph with a spray volume of 17gpa and 40psi, utilizing XR11002 nozzles at the Murdock location. Applications made at the Renville site were done with a custom-made tractor mounted sprayer traveling 3.1mph with a spray volume of 20gpa and 60psi, utilizing XR11002 spray nozzles. The Murdock applications were made June 21st, July 18th, and August 12th. Each plot consisted of six rows that were 35ft in length. The sprayers used CO_2 as a propellant and were designed to apply the treatment to the center four rows, leaving rows one and six untreated. The center two rows of each six-row plot were harvested for yield and quality analysis on September 22nd at Murdock and September 25th at Renville using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and samples of those beets were used for a quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS GLM version 9.4.

Results

None of the entries tested made a significant impact on extractable sugar per acre at either location (Tables 1 and 2).

Conclusions

Many foliar nutrient products have been tested in the past to improve the sugar content or tons of sugar beets here at SMBSC and in other sugar beet production areas. None of these foliar nutrient products have been able to meaningfully increase sugar content or tons with any consistency.

Table 1. Description of treatments and yield results for the Renville foliar nutrient trial.

Entry	Treatment	Rate	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Stand Count per 100' row 28 Day
1	Untreated Control	n/a	14.6	31.3	12.4	247.3	7728.4	91.8	126.3
2	Mg (4%) and Sulfur (5%)	1 gal	14.9	29.5	12.7	254.4	7501.3	92.1	147.5
3	K2O (20%), B (0.05%), and Mo (0.03%)	1 gal	14.9	29.5	12.6	252.8	7440.4	91.7	130.0
4	S (3%) and Mn (5%)	0.5 gal	14.7	31.7	12.4	247.8	7850.1	91.5	132.5
5	N (5%), S (1%), B (0.13%), Mn (0.5%), Mo (0.013%), Zn (0.5%), L-Proline (5,000ppm), and Phenolic Acids (19,800ppm)	1 quart	14.5	30.5	12.2	244.7	7447.7	91.4	163.8
6	N (28%)	2 gal	14.6	31.0	12.3	247.2	7648.8	91.7	148.8
7	Mg (2%) and Sulfur (3.75%), K2O (10%), B (0.025%), and Mo (0.015%), Mn (2.5%), N (28%)	1 gal	14.6	30.2	12.4	247.7	7480.6	91.8	146.3
		Mean	14.6	30.5	12.4	248.8	7585.3	91.7	142.1
		CV%	1.9	11.7	2.2	2.2	10.6	0.4	17.0
		Pr>F	0.3887	0.9602	0.2857	0.3461	0.9786	0.164	0.3548
		lsd (0.05)	ns	ns	ns	ns	ns	ns	ns

Table 2. Description of treatments and yield results for the Murdock foliar nutrient trial.

Entry	Treatment	Rate	Timing	Percent Sugar	Tons Per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Stand Count per 100' row 28 Day
1	Check	n/a	n/a	13.6	42.2	11.2 b	223.1	9416.9	89.7	185.0
2	Transit Foliar	10 fl oz	10-12lf	13.6	41.4	11.2 b	223.6	9261.7	89.7	172.5
3	GanticPro 100	12 fl oz	2lf, 10-12lf, and 70% canopy	13.5	41.2	11.1 b	222.7	9163.5	89.9	161.3
4	Gantic X1	12 fl oz	2lf, 10-12lf, and 70% canopy	13.6	41.6	11.3 b	224.9	9351.2	90.0	186.3
5	AscendSL	5 fl oz	10-12lf	13.9	42.2	11.5 a	230.5	9715.9	90.3	195.0
6	AscendSL+ZMB+	5 fl oz + 32 fl oz	10-12lf	13.6	42.3	11.2 b	224.0	9463.4	89.9	175.0
			Mean	13.6	41.8	11.2	224.8	9395.4	89.9	179.2
			CV%	1.2	2.7	1.5	1.5	3.4	0.3	9.2
			Pr>F	0.1193	0.6245	0.0442	0.0579	0.2627	0.1044	0.1174
			lsd (0.05)	ns	ns	0.26	ns	ns	ns	ns

Rhizoctonia Management Trial

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Rhizoctonia root rot can negatively impact plant stand by causing seedling damping off in the spring, but it can also cause a reduction in quality and yield from late season infections. This reduction in quality can have a negative impact on factory operations as well as the storage of the beets in piles.

Research Objective

- To compare products and application methods for control of Rhizoctonia root rot and develop recommendations for best management practices.

Methodology

The trial was conducted near Renville to compare fungicide products for control of rhizoctonia and to compare best management practices. The trials were planted on May 8th using Crystal M168. Prior to planting, the site was inoculated by broadcasting whole barley kernels infected with rhizoctonia provided by Dr. Chanda. The barley was then incorporated with a small field cultivator. Normal agronomic practices were used to keep the trials weed free. These trials were designed as randomized complete blocks with four replications. The treatment list can be found in Table 1. Each plot consisted of six rows that were 35ft in length. The first post applications took place on June 18th at the 6-leaf stage and the late post applications took place on July 9th. These applications were broadcast or banded using a custom-made bike sprayer. The sprayer used CO2 as a propellant and was designed to apply the treatment to the center four rows, leaving rows one and six untreated. Stand counts were taken on the center two rows in the spring, before and after the post application, and again prior to harvest. The center two rows of each six-row plot were harvested for yield and quality analysis on September 25th using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and samples of those beets were used for a quality analysis at the SMBSC tare lab. The beets on the harvester were also rated for root rot using a 1-7 scale; one being free of disease and 7 being severely rotten beets. The data was analyzed for significance using SAS GLM version 9.4.

Results

Significant differences were only observed for the rot ratings taken on the harvester (Table 2). Stand count data and yield data were all nonsignificant. The majority of the treatments with the lowest rot ratings contained Excalia or Elatus. The treatment with the lowest rating contained three applications. This treatment included an in-furrow application followed by two post-emerge applications.

Conclusions

While there were not any significant differences for the quality parameters tested, it is worthwhile to note the lower rot ratings of most of the entries compared to the untreated control. It appears that Excalia and Elatus, which contain Group 7 or SDHI products, are a good treatment option for Rhizoctonia to alternate with azoxystrobin products as those treatments generally had the lowest rot ratings. It is a good management practice to use a fungicide to reduce the negative impacts of Rhizoctonia. The late season application made on July 9th did not appear to be beneficial as treatments 10 and 11 had similar ratings to the untreated control.

Table 1. Treatment list and rates.

Entry	Entry Description	Infurrow	Post
1	Untreated Control	-	-
2	Elatus 45 WG	7oz	-
	Prefer 90 NIS	.25% v/v	-
3	AZteroid FC 3.3	5.7oz	-
4	Elatus 45 WG (Banded)	-	7.2oz
	Prefer 90 NIS	-	.25% v/v
5	Quadris (Broadcast)	-	15.5 oz
6	Quadris (Banded)	-	15.5 oz
7	AZteroid FC 3.3	5.7oz	-
	Quadris	-	15.5 oz
8	Excalia (Broadcast)	-	2 oz
9	Excalia (Broadcast)	-	2 oz
	Affiance - First CLS	-	19 oz
	Prefer 90 NIS	-	.25% v/v
10	Affiance - First CLS	-	19 oz
	Prefer 90 NIS	-	.25% v/v
11	Proline - First CLS	-	5.7 oz
	Prefer 90 NIS	-	.25% v/v
12	AZteroid FC 3.3	5.7oz	-
	Excalia (Broadcast)	-	2 oz
	Affiance - First CLS	-	19 oz
	Prefer 90 NIS	-	.25% v/v

Photo 1. Post treatment application using a bike sprayer.

Table 2. Yield, harvester rot rating, and stand count data.

Entry	Treatment	Percent Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Rot Rating (1-7)	28 Day Stand Count 100' row	6 leaf Stand Count 100' row	Final Stand Count 100' row
1	Untreated Control	14.4	25.2	12.2	243.2	6133.4	91.1	2.9 ab	170.0	158.8	162.4
2	Elatus Infurrow	14.8	27.8	12.5	249.2	6919.7	91.2	1.9 cdefg	151.3	162.5	151.7
3	Azteroid Infurrow	14.6	28.1	12.3	245.5	6909.4	91.2	2.4 abcde	148.8	153.8	162.5
4	Elatus Banded	14.3	28.9	12.0	239.0	6920.9	90.4	1.9 cdefg	150.0	162.5	153.1
5	Quadris Broadcast	14.4	28.3	12.1	241.6	6821.3	90.8	2.1 bcdef	168.8	162.5	155.4
6	Quadris Banded	14.4	27.8	12.1	242.4	6736.3	91.0	2.8 abc	162.5	146.3	153.5
7	Azteroid In. fb Quadris	14.4	28.5	12.1	242.5	6905.3	91.1	1.8 defg	141.3	147.5	148.7
8	Excalia Broadcast	14.8	26.1	12.5	249.4	6495.4	91.2	1.4 fg	162.5	155.0	150.6
9	Excalia fb Affiance (1st CLS)	14.6	27.8	12.3	245.8	6817.7	90.9	1.6 efg	157.5	168.8	164.3
10	Affiance (1st CLS)	14.4	27.7	12.1	242.5	6723.1	91.3	2.6 abcd	160.0	160.0	160.0
11	Proline (1st CLS)	14.7	28.0	12.4	247.2	6910.6	91.0	3.1 a	163.8	151.3	151.1
12	Azteroid In. fb Excalia fb Affiance	15.0	27.9	12.8	255.2	7126.9	91.6	1.0 g	180.0	177.5	160.3
	Mean	14.6	27.7	12.3	245.3	6785.0	91.1	2.1	159.7	158.9	156.1
	CV%	2.2	7.8	2.7	2.7	8.4	0.6	29.3	12.5	12.2	8.7
	Pr>F	0.1152	0.5428	0.1025	0.1042	0.6349	0.4417	0.0005	0.3556	0.5982	0.7759
	lsd (0.05)	ns	ns	ns	ns	ns	ns	0.9	ns	ns	ns

Appendix. Trials conducted in the SMBSC growing area but not reported in the 2025 Research Reports.

Trial	Location	Description
Fall/ Spring Applied Phosphorus	Renville	This trial was designed to test starter fertilizers and broadcast phosphorus rates in a fall/spring design. This is a cooperative project with Dan Kaiser from the University of Minnesota.
Nitrogen x Phosphorus Rate Trial	Renville	Abandoned due to excessive rain.
Proprietary Products Trials	Renville and Murdock	Two trials were conducted looking at proprietary products that may have the ability to increase sugar content. These products are currently not labeled for use in sugar beets.
Liquid Separated Dairy Manure Trial	Murdock	2025 was the 6th and final year for this trial. The data will be reported upon completion of the data analysis. Cooperative project with Melissa Wilson from the University of Minnesota and Minn-Dak Farmers Cooperative.
Weed Efficacy Trial	Renville	We conduct many weed control efficacy and tolerance trials with Dr. Tom Peters across the coop. Not all these trials are in this report as some may be proprietary or may be an incomplete data set.
UBS Proprietary Trials	Lake Lillian, Murdock, Hector, and Prinsburg	These variety trials were conducted on behalf of the breeding company. The data is the property of the seed company, and the seed company contracts the research work by SMBSC. As such, no data was published on these trials.
Minn-Dak and Amalgamated Aph Nurseries	Renville Aph Nursery	Trials conducted on behalf of Minn-Dak and Amalgamated. Data is property of Minn-Dak and Amalgamated.
Storage Trials	Renville Receiving Station and Cold Storage	Sugar beet storage trials monitoring sugar beet pile temperatures, sugar loss, regrowth, and respiration rates.