

Sugar Enhancement Trial

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The sugar content and purity of a beet crop is a factor 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 of the beet crop would be a monumental achievement.

Research Objective

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

Methodology

Trials were conducted near Wood Lake and Murdock to screen products that may have the ability to improve sugar content. The trials were planted on May 15th at Wood Lake and May 10th at Murdock using Beta 9131. Normal agronomic practices were used to keep the trial weed and disease free. These trials were designed as randomized complete block (Table 1). Early applications were made using a bike sprayer traveling 3.2mph with a spray volume of 17gpa and 40psi, utilizing XR11002 nozzles. Applications made after canopy closure were done with a custom-made tractor mounted sprayer traveling 3.1mph with a spray volume of 20gpa and 60psi, utilizing XR11002 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 23rd at Murdock and September 26th at Wood Lake 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 of root yield or quality at either location (Tables 3 and 4).

Conclusions

Many foliar nutrient products have been tested in the past to improve the sugar content 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 with any consistency.



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Table 1. Description of treatments in the Murdock Sugar Enhancement Trial.

Entry	Entry Description	Product Rate	Application Timing	Date
1	Untreated Control	-	-	-
2	ZMB+	32oz/ac	Mid Aug (at least 30 days before harvest)	8/19/2024
3	Yield-On	24oz/ac	Mid - Late July fb 2 weeks later	7/19/2024 fb 7/29/24
4	LPI6612	32oz/ac	Mid July fb Mid Aug	7/19/2024
5	LPI6612	32oz/ac	Mid July fb Mid Aug	7/19/2024
	LPI6860	16oz/ac	Mid July	7/19/2024
6	LPI6612	32oz/ac	Mid July fb Mid Aug	7/19/2024
	LPI6860	16oz/ac	Mid July	7/19/2024
	LPI6728	4oz/ac	Mid Aug	8/19/2024

Table 2. Description of treatments in the Wood Lake Sugar Enhancement Trial.

Entry	Entry Description	Product Rate	Application Timing	Date
1	Untreated Control	-	-	-
2	Sugar Mover Premier	32oz/ac	~30 days before harvest	8/26/2024
	Sugar Power	128oz/ac	~12 days before harvest	9/9/2024
3	Energy Power	8oz/ac	At Plant	5/15/2024
	Fortified Stimulate Yield Enhancer Plus	4oz/ac	At Plant	5/15/2024
	Energy Power	8oz/ac	8-10 leaf	6/26/2024
	Keylate CoMo Classic	4oz/ac	8-10 leaf	6/26/2024
	Sugar Mover Premier	32oz/ac	Beginning of July fb 3-4 weeks later	7/12/2024 fb 8/12/24
4	Energy Power	8oz/ac	At Plant	5/15/2024
	Fortified Stimulate Yield Enhancer Plus	4oz/ac	At Plant	5/15/2024
	Energy Power	8oz/ac	8-10 leaf	6/26/2024
	Keylate CoMo Classic	4oz/ac	8-10 leaf	6/26/2024
	Sugar Mover Premier	32oz/ac	Beginning of July	7/12/2024
	Sugar Mover Premier	32oz/ac	~30 days before harvest	8/26/2024
5	Sugar Power	128oz/ac	~12 days before harvest	9/9/2024
	ZMB+	32oz/ac	8-10 leaf	6/26/2024
6	ZMB+	32oz/ac	Mid Aug (at least 30 days b4 harvest)	8/26/2024
	Ascend2	5.3oz/ac	At Plant	5/15/2024
7	Ascend2	5.3oz/ac	8-10 leaf	6/26/2024
	Yield-On	24oz/ac	Mid-late July fb 2 weeks later	7/29/2024 fb 8/12/24
8	6-24-6	3gal/ac	At Plant	5/15/2024
9	6-24-6	3gal/ac	At Plant	5/15/2024
	Lalrise Start SC	1oz/ac	At Plant	5/15/2024
10	6-24-6	3gal/ac	At Plant	5/15/2024
	Lalrise Start SC	1oz/ac	At Plant	5/15/2024
	Ascend2	5.3oz/ac	At Plant	5/15/2024

Table 3. Yield parameter results for the Murdock Sugar Enhancement Trial.

Entry	Percent Sugar	Tons per acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	16.2	42.2	13.4	268.0	11312.0	89.5
2	16.2	40.6	13.5	270.1	10960.4	89.9
3	16.0	39.6	13.4	267.1	10583.8	89.9
4	16.4	38.8	13.7	273.3	10599.8	89.7
5	16.3	41.3	13.7	273.7	11286.8	90.3
6	16.3	41.9	13.6	271.4	11384.9	90.0
Mean	16.2	40.7	13.5	270.6	11021.3	89.9
CV%	2.0	4.3	2.1	2.2	4.8	0.4
Pr>F	0.756	0.212	0.625	0.680	0.307	0.152
lsd (0.05)	ns	ns	ns	ns	ns	ns

Table 4. Yield parameter results for the Wood Lake Sugar Enhancement Trial.

Entry	Percent Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	16.5	30.4	13.6	272.0	8278.1	89.0
2	16.2	31.3	13.4	267.6	8376.0	89.2
3	16.1	29.8	13.2	263.7	7858.4	88.8
4	16.5	31.4	13.5	270.5	8480.8	88.9
5	16.6	31.1	13.7	274.5	8539.5	89.2
6	16.5	31.2	13.7	274.8	8675.3	89.7
7	16.4	30.3	13.6	271.5	8242.5	89.4
8	16.3	32.3	13.5	269.6	8694.5	89.2
9	16.4	31.8	13.6	271.4	8727.4	89.1
10	16.2	30.4	13.3	266.1	8080.4	89.1
Mean	16.4	31.1	13.5	270.1	8422.2	89.2
CV%	1.7	5.1	2.0	1.9	4.8	0.4
Pr>F	0.1882	0.859	0.1609	0.1627	0.3518	0.2775
lsd (0.05)	ns	ns	ns	ns	ns	ns