

Foliar Nutrient Trials

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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 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 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	K ₂ O (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%), K ₂ O (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