

# THE EFFECT OF AUXIGRO SEED TREATMENT AND FOLIAR APPLICATION ON SUGARBEET EMERGENCE, YIELD AND QUALITY-2000

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## Introduction

The Auxein Corporation has secured a supplemental label for the use of AuxiGro (gamma amino butyric acid and L-Glutamic acid) as a plant metabolic primer on sugarbeet in Minnesota and North Dakota. Data generated in 1999 was inconclusive in supporting the claim of increased rate of emergence and subsequent increased sugar content and root yield. Gamma amino butyric acid (GABA) is a naturally occurring amino acid found in all plants and is important in several important pathways. GABA acts as a metabolic primer allowing the plant to increase its efficiency. The objectives of this research were to determine if treating the seeds with AuxiGro prior to planting alone and in combination with foliar applications of AuxiGro might increase yield and sugar content of sugarbeet by at least 0.5%.

## Materials and Methods

Field experiments were established on Bearden silty clay loam (Fine-silty, mixed, super active, frigid, Aeric Calciaquoll) on the Kirk Watt farm at Glyndon, MN and on Fargo silty clay (Fine, smectic, frigid, Typic Epiaquert) north of the airport at Fargo, ND, during the spring of 2000. Each experiment was arranged in a randomized complete block design with six replications. Individual treatment plots measured 11 feet wide and 30 feet long at Glyndon and 35 feet long at Fargo. Soil nitrogen levels were adjusted with fertilizer to approximately 120 lbs/acre of available residual soil test plus added fertilizer N.

Sugarbeet, Crystal 222, seed was treated with 4 ounces (dry) active/100 pounds of seed with AuxiGro and standard fungicide prior to planting on May 3 and 6 at Glyndon and Fargo, respectively, with a John Deere MaxEmerge 2. Sugarbeet was placed 1.25 inches deep with 5-inch in-row spacing. A 22-inch row spacing was used. Counter was surfaced band applied at 11.9 lbs/a and incorporated with chain at planting. Post emergence herbicides, cultivation and hand labor was used as needed for weed control. One application of Super Tin and two applications of Eminent were applied for Cercospora leafspot control at Glyndon and one application of each fungicide at the Fargo location.

Three foliar treatments, 1) AuxiGro applied 45 days prior to harvest (dph), 2) AuxiGro applied 30 dph, 3) AuxiGro applied 15 dph, were applied at a rate of 4 ounces of AuxiGro per acre on sugarbeet from treated seed as well as untreated seed. An application of 2 ounces of AuxiGro per acre was included in each of the fungicide applications of as an additional treatment. A standard practice (no AuxiGro) treatment was also maintained as a check. The foliar applications were applied using a tractor-mounted sprayer calibrated to apply 10 gallons of solution per acre. Silwet 1-77 spray adjuvant was used at a rate of 6 ounces per 100 gallons of water. The middle four rows of each 6-row plot were sprayed.

Sugarbeet were harvested September 18 and 21 at Fargo and Glyndon, respectively. The middle two rows of each 6 row plot were harvested. Yield determinations were made and quality analysis performed at American Crystal Sugar Quality Tare Lab, East Grand Forks, MN.

## Results and Discussion

Since the foliar treatments were scheduled as to days prior to harvest (dph), an estimate of the approximate date of harvest was determined. Weather and other factors caused changes to the actual foliar application dates, so the treatments did not coincide exactly to the desired intervals. [Table 1](#) shows the actual days prior to harvest that the treatments were applied. In most cases the actual treatments were within 1 to 3 days of the desired.

Visual observations determined no significant difference in sugarbeet plant emergence and vigor of the seedlings through the 4-leaf growth stage. Harvest populations were not significantly affected by the seed treatment at either location ([Table 2 and 3](#)). However, recoverable sugar per acre yield was substantially decreased with the seed treatment alone. This was due more to the decrease in root yield than difference in sucrose percentage. The combination of seed treatment and foliar application was not consistent with the response from the foliar treatment alone at either of the locations. Likewise, the influence of days prior to harvest for the foliar application treatments was not consistent between the locations. The objective of this study was to determine if AuxiGro would improve sugar content in sugarbeet by at least 0.5%. The

application of Auxigro to the seed in combination with the foliar application 45 DPH at the Glyndon location was the only treatment to significantly increase the sucrose percent by at least that amount, which was statistically different.

**Table 1. Auxigro timing of foliar application, planting and harvest dates with actual days prior to harvest (DPH), Fargo, ND and Glyndon, MN, 2000.**

TREATMENT	FARGO		GLYNDON	
	DATE	ACTUAL DPH	DATE	ACTUAL DPH
Planting	5/6/00		5/3/00	
45 DPH	8/3/00	45	8/3/00	48
30 DPH	8/21/00	29	8/21/00	32
15 DPH	9/5/00	14	9/5/00	17
Fungicide	7/19/00, 8/14/00	61, 35	7/8/00, 7/27/00, 8/23/00	75, 56, 29
Harvest	9/18/00		9/21/00	

**Table 2. Effect of foliar application of Auxigro prior to harvest on root yield, sucrose percentage, sucrose loss to molasses, recoverable sugar production, and harvest population (September 18), Fargo, ND, 2000.**

TREATMENT (days prior to harvest)	ROOT YIELD Tons/A	SUCROSE Percent	LOSS TO MOLASSES Percent	RECOVERABLE SUGAR Lbs/Acre	RECOVERABLE SUGAR Lbs/Ton	HARVEST BEETS /100 FT
Check	22.2	16.8	1.27	6884	310	200
Seed	21.3	16.8	1.28	6587	310	212
45 DPH	22.1	16.9	1.29	6915	313	199
45 DPH w/seed	21.1	16.7	1.27	6479	308	194
30 DPH	21.1	17.0	1.24	6649	315	195
30 DPH w/seed	22.0	16.9	1.26	6915	314	201
15 DPH	21.4	17.0	1.24	6735	316	205
15 DPH w/seed	21.8	17.0	1.22	6907	316	210
With fungicide (2)	22.4	16.7	1.31	6887	307	195
LSD (.05)	1.0	NS	0.09	368	NS	15

**Table 3. Effect of foliar application of Auxigro prior to harvest on root yield, sucrose percentage, sucrose loss to molasses, recoverable sugar production, and harvest population (September 21), Glyndon, MN, 2000.**

TREATMENT (days prior to harvest)	ROOT YIELD Tons/A	SUCROSE Percent	LOSS TO MOLASSES Percent	RECOVERABLE SUGAR Lbs/Acre	RECOVERABLE SUGAR Lbs/Ton	HARVEST BEETS /100 FT
Check	24.9	16.2	1.33	7406	297	184
Seed	23.0	15.8	1.43	6631	288	178
45 DPH	25.6	16.3	1.27	7655	300	175
45 DPH w/seed	25.0	16.8	1.21	7791	311	184
30 DPH	25.2	16.3	1.23	7604	302	188
30 DPH w/seed	25.5	16.2	1.29	7617	299	181
15 DPH	25.1	16.5	1.32	7656	305	182
15 DPH w/seed	24.4	16.0	1.36	7161	294	184
With fungicide (3)	23.6	15.9	1.30	6875	292	194
LSD (.05)	NS	0.6	.12	843	13	NS

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