

# EFFECT OF COMMERCIAL FERTILIZERS AND NUTRIENT MANAGEMENT PRODUCTS ON SUGARBEET YIELD AND QUALITY DURING 2015 GROWING SEASON

**A. Chatterjee, N. Cattanach, R. Thapa, M. Rakkar, K. Subedi, and U. Ghosh**  
**Department of Soil Science, North Dakota State University, Fargo, ND**

## Introduction

In addition to traditional NPK fertilizers, sugarbeet growers always look for new commercial products to that might result in an increase in recoverable sugar yield. Trial results of different starter fertilizer combinations, biologicals and nutrient management aids were evaluated in this research.

## Materials and Methods

Field trials were established on a Colvin silty clay loam location near Ada, MN in 2015. Planting was arranged in a randomized complete block design with four replications. Plots were 11 feet wide and 30 feet long. Due to moderate soil available P and K concentration (Table 1), we did not add any P and K fertilizers. Initial spring planting conditions on April 27 were warm and in most cases very dry. Timely precipitation resulted in excellent germination, plant stands and plant growth. Crystal-101 and -093 were planted for Agxplora and Yara trials, respectively. The middle two rows of each experimental were harvested except the outside 2 roots in each row due to border alley effects. Harvesting was conducted on September 21. Quality analysis was performed at the American Crystal Sugar Quality Tare Lab, East Grand Forks, MN.

**Table 1. Initial soil physical and chemical properties of Ada site**

Depth	NO <sub>3</sub> -N lb/ac	Olsen-P (ppm)	K (ppm)	pH	EC (mmohs/cm)	OM%	CEC (Meq/100g)
0-6"	25	22	100	8.2	0.27	2.40	20.10
6-12"	6						
12-24"	16						

**Table 2. Effect of different commercial fertilizers and nutrient management aids on mean sugar beet yield and sugar content. Same letters indicate the difference is not significant at 90% significance level**

Trial details	Treatments	Yield (tons/ac)	Sugar%
Amidas®-40%N, 5.6% sulfur-sulfur coated urea from Yara International, AS (ammonium sulfate), Agrotain® (NBPT-urease inhibitor) <u>This trial is funded by Yara Intl.</u>	1. Control (No N)	38.40 <sup>C</sup>	15.33 <sup>C</sup>
	2. Urea @120 lb N/ac	39.58 <sup>BC</sup>	15.48 <sup>BC</sup>
	3. Urea@150 lb N/ac	37.84 <sup>C</sup>	16.18 <sup>AB</sup>
	4. Urea+ AS@120 lb N/ac	39.98 <sup>BC</sup>	15.65 <sup>ABC</sup>
	5. Urea+ AS @150 lb N/ac	40.75 <sup>AB</sup>	16.30 <sup>A</sup>
	6. Amidas @ 120 lb N/ac	41.09 <sup>AB</sup>	15.00 <sup>C</sup>
	7. Amidas@ 150 lb N/ac	39.66 <sup>BC</sup>	15.50 <sup>BC</sup>
	8. Urea+ Agrotain@ 120 lb N/ac	39.77 <sup>BC</sup>	15.60 <sup>ABC</sup>
	9. Urea+ Agrotain@150 lb N/ac	42.42 <sup>A</sup>	15.40 <sup>C</sup>
	LSD (P=0.10)	2.28	0.73
<b>Conclusion</b>	Urea@ 150 lb N/ac with Agrotain increased yield over 120 lb N/ac with Agrotain. Amidas at 120 lb N/ac maximized yield, but not sugar%. Sulfur addition (in the form of ammonium sulfate) increased sugar content but not yield. Urea without inhibitor rate was maximized for root yield at the 120 lb N/ac rate.		
<b>AgXplora trial</b> NutriPak (8-10-2); Valupak (7-12-1), both contains with mycorrhiza and rhizobia <u>This trial is funded by Agxplora.</u>	1. Control	36.83 <sup>B</sup>	16.08 <sup>A</sup>
	2. Recommended N	39.55 <sup>AB</sup>	15.55 <sup>A</sup>
	3. NutriPak@32oz/ac at V2-V3	36.87 <sup>B</sup>	16.00 <sup>A</sup>
	4. ValuPak@12 oz/ac at V2-V3	39.16 <sup>AB</sup>	15.60 <sup>A</sup>
	5. NutriPak@32oz/ac at R1-R2	38.64 <sup>AB</sup>	15.95 <sup>A</sup>
	6. ValuPak@12oz/ac at R-R2	39.83 <sup>A</sup>	15.83 <sup>A</sup>
	7. NutriPak@32Oz/ac at V2-V3+ ValuPak@12oz/ac at R-R2	39.12 <sup>AB</sup>	16.15 <sup>A</sup>
	LSD (P=0.10)	2.92	0.70
<b>Conclusion</b>	There was no significant effect of NutriPak and Valupak additions on yield and sugar as compared to recommended N additions.		
Responses to Redline®, Ascend®, and Levosol®) and Sugarbeet-by Products (Betaine, Raffinate, Spent-lime). <u>This trial is funded by Sugarbeet Board.</u>	1. Check	32.50 <sup>C</sup>	16.38 <sup>AB</sup>
	2. Recommended N	36.07 <sup>AB</sup>	16.65 <sup>A</sup>
	3. Redline@3g/ac in furrow+ Recommended N	34.50 <sup>BC</sup>	16.38 <sup>AB</sup>
	4. Ascend @6 fl.oz/ac in furrow+ Recommended N	36.58 <sup>AB</sup>	16.30 <sup>AB</sup>
	5. Betaine@3g/ac in furrow+ Recommended N	37.62 <sup>A</sup>	16.75 <sup>A</sup>
	6. Raffinate@3g/ac in furrow+ Recommended N	34.65 <sup>BC</sup>	16.43 <sup>AB</sup>
	7. Levosol @64 Fl Oz/ac+ Recommended N	36.90 <sup>AB</sup>	16.38 <sup>AB</sup>
	8. Spentlime @ 10 ton/ac+ Recommended N	37.27 <sup>AB</sup>	16.08 <sup>B</sup>
	LSD (P=0.10)	2.89	0.45
<b>Conclusion</b>	There was no effect on yield or sugar content significantly greater than that of the recommended N rate. Lime application significantly reduce sugar content than recommended N only probably due to supply of N from lime.		