

NITROGEN MANAGEMENT FOR PROFITABLE SUGARBEET PRODUCTION

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Nitrogen (N) management is a key factor in sugarbeet profitability in a quality-based payment system. Over the past 25 years, numerous trials on N management have been conducted in Minnesota, North Dakota and Manitoba. Early trials stressed maximizing tonnage with little real concern for quality, due to the payment system in place at that time. Changes to payment systems based on recoverable sugar per acre (RSA) and later to recoverable sugar per ton (RST) of processed sugarbeet has placed greater emphasis on quality rather than tonnage, which can have a far greater effect on profitability. Sugarbeet varieties planted today are also much different than those planted 20 years ago and may well require a different N management system than varieties approved only one year ago. Results of these N trials over the past 25 years indicated a need to revise MN and ND N recommendations. In 2001, both states lowered the N recommendations (see article in Research Report or Pocket Guide) and made other pertinent revisions. Nitrogen trials continue to be run at various locations to validate recommendations and serve as a basis for further changes. As part of this long term and continuing process, an N rate trial was conducted at the NWROC, Crookston, MN in 2001.

Procedure: A fall nitrate test indicated 14 lb/A NO₃-N in the 0-24 inch soil profile and 4 lb/A in the 24-48 inch profile. Zero, 40, 80, 120, 160 and 200 lb/A N as urea were fall applied to treatments in a randomized block design. Seventy pounds of 0-46-0 was broadcast to bring the phosphate to recommended levels. Beta 6600 sugarbeet seed was planted in 22 inch rows on May 12, 2001 and thinned to a uniform population of 35640 seedlings per acre on June 19. The trial was harvested September 25 and quality determined at the American Crystal Quality Lab in East Grand Forks, MN.

Results and Discussion: Results of the trial are shown in [Table 1](#). A significant increase in yield occurred with the addition of the first 40 lb/A N. No further increase in yield was realized with additional N. Percent sucrose was maximized with the addition of 40 or 80 lb/A N. Levels above this decreased sucrose content, recoverable sugar per ton and gross return.

Results of this trial and others reported in this publication would support the decision made in 2001 to reduce the nitrogen recommendation for profitable sugarbeet production.

Table 1. Sugarbeet response to various N levels

Nitrogen Applied lb/A	Nitrogen Total ² (lb/A) (0-4')	Yield (T/A)	Sucrose (%)	LM (%)	Recoverable Sucrose (lb/A)	Recoverable Sucrose (lb/T)	Gross Return ³ (\$/T)	Gross Return ³ (\$/A)
0	28	20.3	17.18	1.05	6529	322.5	33.84	684
40	68	22.4	17.65	0.98	7476	333.5	36.15	810
80	108	22.9	17.50	1.00	7560	330.0	35.41	812
120	148	22.6	16.93	1.10	7139	316.5	32.58	735
160	188	23.2	16.80	1.08	7296	314.5	32.16	747
200	228	23.4	16.85	1.15	7357	314.0	32.05	751
Stat. Sign ¹		**	*	NS	**	*		
LSD ₀₅		1.2	.64	—	564	15.8		

¹ **, * statistically significant at the .01 and .05 level respectively

² Soil test N 0-4 ft plus applied

³ Basis - ACSC November 15, 2001 payment schedule