

## In-season Nitrogen Application on Corn Following Rye Cover Crop

**Study ID:** 0710067201801

**County:** Gage

**Soil Type:** Wymore silty clay loam

**Planting Date:** 5/1/18

**Harvest Date:** 9/17/18

**Population:** 24,000

**Row Spacing (in):** 30

**Hybrid:** Pioneer® P0805AM

**Reps:** 5

**Previous Crop:** Corn

**Tillage:** No-Till

**Herbicides:** **Pre:** 32 oz/ac Roundup PowerMAX®, 1 pt/ac metolachlor, and 1.5 oz/ac Sharpen® at 8.5 gal/ac on 5/4/18 to terminate cover crop **Post:** 32 oz/ac Roundup PowerMAX® and 3 qt/ac Lexar® at 15 gal/ac

**Seed Treatment:** None

**Soil Tests (April 2018):**

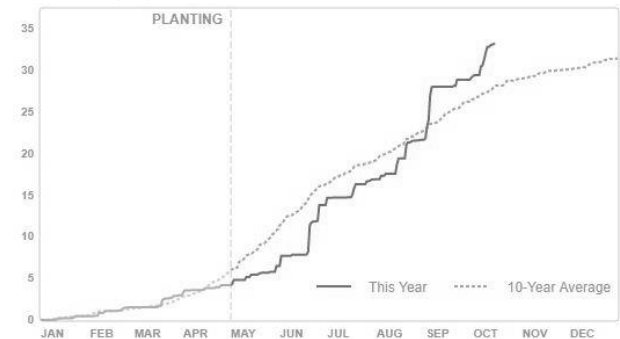
**Foliar Insecticides:** None

**Foliar Fungicides:** None

**Fertilizer:** 150 lb N/ac as 32% UAN in April; 5 gal/ac 10-34-0 in-furrow as starter

**Irrigation:** None

**Rainfall (in):**



Soil pH 1:1	Buffer pH	CEC	OM	Nitrate (0-8")	Nitrate (8-24")	Nitrate (24-36")	Mehlich-P3	K	Mg	Ca	S	Zn	K	Mg	Ca	H
		mg/100g	%		(lb/ac)				(ppm)				---	% Base Saturation--		
6.2	6.6	18.1	3.6	7	9	6	22	207	2032	363	6.1	1.36	3	17	56	24

### Introduction:

The corn in this study followed a rye cover crop. The rye cover crop was grazed for a couple of weeks in April. The corn was planted on May 1, and the rye cover crop was terminated with herbicide application of Roundup® and Sharpen® on May 4. As the rye cover crop breaks down, nitrogen may be temporarily unavailable to the growing corn crop. Because of this, many growers are trying to better understand nitrogen management for corn following a rye cover crop. A total of 156 lb/ac N was applied prior to emergence.

This study tested three rates of nitrogen sidedress applied as ammonium sulfate (21% N, 24% S). Ammonium sulfate was applied on May 25 at V4. For analysis, two rows of 15 foot length were hand harvested, shelled, and weighed.



**Figure 1.** Cover crop post-grazing regrowth on May 4 at time of termination (left) and corn growing in terminated rye on May 25 at time of hand application of ammonium sulfate (right).

**Results:** Because of the variability in stand counts, harvest stand count was included as a confounding variable (covariate) in the model so that yield and net return can be evaluated for the N rates without the complicating factor of stand count. The yield and net return analysis was completed with the GLIMMIX procedure in SAS 9.4 (SAS Institute Inc., Cary, NC). Mean separation for yield and net return was performed with Tukey's HSD.

	Harvest Stand Count (plants/ac)	Yield <sup>†</sup> (bu/ac)	Marginal Net Return <sup>‡</sup> (\$/ac)
0 lb/ac Sidedress	19,768 A*	137 B	442.97 A
50 lb/ac Sidedress	20,814 A	161 A	484.55 A
100 lb/ac Sidedress	19,535 A	151 AB	414.59 A
P-Value	0.547	0.0124	0.0251

\*Values with the same letter are not significantly different at a 90% confidence level.

<sup>†</sup>Bushels per acre adjusted to 15.5% moisture.

<sup>‡</sup>Marginal net return based on \$3.23/bu corn and \$305/ton ammonium sulfate.

#### Summary:

- There was no difference in stand counts between the three nitrogen rates tested.
- The 50 lb N/ac treatment resulted in a yield increase compared to no additional N application. However, the 100 lb N/ac treatment did not result in a yield increase over the 0 lb N/ac or 50 lb N/ac treatment.
- There was no difference in marginal net return between the three treatments.

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