

Effect of Additional Sidedress Nitrogen Fertilizer on Corn Yield

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Objective

Evaluate the agronomic and economic impacts of varied nitrogen rate fertilizer applications in corn.

Background

Nitrogen amendments are essential to corn production and can be one of the most expensive inputs a farmer puts into their crop. Extensive research has been done, and tools created, to evaluate the most efficient and economically rational nitrogen rate available to producers (Ransom et al., 2020). Excess nitrogen, lost through leaching or volatilization pathways, poses an environmental risk. Corn producers want to be mindful that their nitrogen amendments are both economically friendly and environmentally safe. This study compares two different rates of nitrogen applied at sidedress on a Fulton County farm with a long history of no-till practices on a Haskins/Blount soil type.

Methods

This study utilized a randomized complete block design with six replications. On May 11, 2023, Pioneer P0995AM seed corn was planted with 85 pounds of N being applied with the planter. The two treatments in this study were 1) 25 gal of 28% UAN (equivalent of 74.2lbs of N) and 2) 35 gal of 28% UAN (equivalent of 103.9lbs of N) applied at sidedress (V6 growth stage). Each treatment replication was 20 feet wide by 1,300 feet long. All treatments received the same inputs except for sidedress nitrogen fertilizer. On September 15, 2022, cereal rye cover crop was flown on at a rate of 60 lbs./acre before soybean harvest.

Yields and grain moisture were obtained by using a calibrated yield monitor. Yields were adjusted to 15.5% moisture.

Results

Table 1. Impact of Nitrogen (N) Fertilizer Sidedress Rates		
Sidedress N Rate (gal/ac of 28% UAN)	Yield (bushels/acre)	Return Over N (\$/ac)
25 gal/acre	169.1 a	685.95
35 gal/acre	171.7 a	667.65
C.V.=1.68 (%); LSD (0.05) = 3.67		



Table 2. Weather Data		
	2023 Local Rainfall (Fayette Weather Link)	Historic Rainfall (Archbold, OH)
May	0.82 in	2.28 in
June	0.60 in	2.60 in
July	0.13 in	2.17 in
August	2.01 in	2.13 in
Total	3.55 in	9.18 in

Summary

There was not a statistical difference in corn yield with an additional 10 gallons per acre of 28% UAN applied at sidedress. The lack of N response could be in part to the lack of rainfall experienced in June and July, after the sidedress application. Additionally, there was an economic disadvantage to the additional nitrogen. The 35 gallons per acre treatment returned an \$18 per acre loss after the N cost was realized (Table 1). This is surprising as the MRTN rate suggests that the highest N rate that will return an economic advantage is around 187 lb N/ac. The higher sidedress rate was 189 lb N/ac whereas the lower was 159 lb N/ac applied. Further studies should be conducted on this farm, looking at N timing and the impact of the cereal rye cover long-term.

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References

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