

Late-Season Nitrogen Applications to Corn

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Objective

Determine the effect on corn grain yield from applying nitrogen to 17-collar corn with a Y-Drop system.

Background

Crop Year: 2017

Location: St. Marys, Ohio

County/Town: Auglaize County

Soil Type: Blount Silt Loam and Pewamo

Drainage: Systematic Sub-Surface

Previous Crop: Soybean

Tillage: Spring field cultivation

Soil Test: pH = 6.5; P = 46 ppm; K = 201 ppm

Planting Date: April 25, 2017

Nitrogen: Rates range from 160 to 225

Seeding Rate: 33,000

Harvest Date: October 4, 2017

Methods

A nitrogen trial was established with five treatments having three replications with a randomized complete block design. Pioneer P0506 corn was planted on April 25, 2017 at a depth of 1.75 inches in 30-inch rows. Corn was seeded at 33,000 seeds per acre with a final average stand of 28,666 plants per acre. Soil samples were collected between the rows for each replication at a depth of 8 inches the day after planting. Treatments in the trial consisted of the following nitrogen rates:

1. 160 lb/a total, split between applications at planting and sidedress
2. 180 lb/a total, split between applications at planting and sidedress
3. 231 lb/a total, split between applications at planting and sidedress
4. 140 lb/a total, split between applications at planting and sidedress with an additional 20 lb/a applied at 17 collar stage
5. 140 lb/a total, split between applications at planting and sidedress with an additional 40 lb/a applied at 17 collar stage

All treatments received 31 pounds of nitrogen/a at planting as a mixture of 28-0-0 and 10-34-0 at 7.5 gallons per acre. Anhydrous ammonia was applied at a rate to meet the total plot N need for the treatment at 4 to 5 inches deep on June 6, 2017 to corn at 5 to 6-leaf collar stages. A Y-Drop system was used to apply 28-0-0 on July 10, 2018 to 17-leaf collar corn for treatments four (20 LBs N) and five (40 LBs N). The soil conditions at the time of Y-Drop application were wet with sprayer tracks being left in the field, but this was the only time we had available due to rains. It rained at least 0.5 inch within 12 hours after the Y-Drop application to incorporate the nitrogen. NDVI was recorded at 9 to 10:00 AM on July 7, 2017 with a Greenseeker when corn was 15-leaf collars. Corn was harvested October 4, 2017 with grain moisture recorded and grain yield calculated. Six rows were harvested so that the rows were not next to the sprayer wheel track of the late-season application and at least one row from the edge of the plot.



Results

Table 1. NDVI and Corn Grain Moisture and Yield Response to Nitrogen Rate and Application Timing

Pounds Nitrogen/acre	NDVI	Moisture (%)	Yield (bushels/acre)
160 plant + sidedress	0.855	17.3	209.3
180 plant + sidedress	0.852	17.4	211.7
231 plant + sidedress	0.862	17.4	211.0
140 plant + sidedress + 20 at 17 collar	0.858	17.3	208.3
140 plant + sidedress + 40 at 17 collar	0.850	17.3	209.9
	LSD (0.05)	N.S.	N.S.
	C.V.	0.58	1.1
			1.8

Summary

Equipment is now available to apply nitrogen late into the season. Research at Purdue University concluded that applying late-season nitrogen following a side-dress application did not improve corn yield (Effects of Late-Season Nitrogen Applications in Corn by Sarah M. Mueller and Tony J. Vyn). This current study confirms Purdue's results since there was no difference in grain moisture or yield with a late-season nitrogen application. The NDVI recorded by the Greenseeker already showed there was likely to be no difference in nitrogen rates prior to the late-season nitrogen application.

Ear leaf samples were collected at R1 and corn grain collected at harvest. There was no difference in nutrient content of the leaf or grain samples, other than manganese was lowest in the grain for the 160 pounds per acre of nitrogen applied at planting and side-dress. (data not shown)

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