Late Season 28% Nitrogen Application for Corn Yield - V5 vs. V10

Eric Richer, Ohio State University Extension Educator, Fulton County, Ohio
Ben Eggers, Ohio State University Agronomy Intern, Fulton County, Ohio

Objective

To determine the effects of nitrogen timing on corn grain yield and profitability.

Background

Crop Year: 2016
County: Fulton
Location: Fayette, Ohio
Drainage: Old clay, random
Previous Crop: Soybeans
Plant Date: May 20, 2016
Harvest Date: October 24, 2016
Herbicide: Triple Flex, atrazine
Fungicide: Priaxor at V6

Soil Type: Colwood, Dixboro
Tillage: Fall chisel plow, Spring finisher
Soil Test (grid avg): pH 6.2
P 18 ppm (Bray-p1)
K 144 ppm
O.M. 3.7%
CEC 12.2 meq/100g
Starter Fertilizer: 92-52-90/acre
Pre-Sidedress Nitrogen Test: 18 ppm NO_3-N
Rainfall (May – August): 14.7”

Methods

Three corn nitrogen timing systems were replicated four times in a randomized complete block design. Plots were 24 rows wide (60 feet) by 1,000 feet long. The trial was planted, sprayed and harvested with commercial farm equipment. The sidedress treatments were made with commercial 28% UAN knife application equipment and late season nitrogen treatments were made with a high boy sprayer with drop tubes at each row. The total nitrogen budget for this farm was 212 units of nitrogen with a yield goal of 220 bushels per acre. All treatment received 92 units of nitrogen at plant (planter applied + pre-emerge). In this trial the sidedress treatments were made at V5 (June 15th) and the late season treatment was applied at V10 (July 13th). The first significant rain (.9”) fell 36 hours after late season application. A corn stalk nitrate test (CSNT) was taken by averaging 1 test of 12 stalks for every treatment replication (4 tests for each treatment) at black layer. Yields and moistures were measured using a calibrated yield monitor and shrunk to 15% moisture. Rainfall data was collected from the nearest CoCoRaHS station OH-FL-9 in Fayette.

Treatments:
1. Sidedress 28% (V5) 120 lbs N/acre
2. Late Season 28% (V11) 120 lbs N/acre
3. Split: Sidedress 28% (V5) 60 lbs N/ac and Late Season 28% (V11) 60 lbs N/ac

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Results

Table 1. N Application Timing in Corn (28% UAN)

Nitrogen Application and Source**	Yield (bu/ac)		CSNT (ppm NO_3-N)	System Application Cost ($/ac)*	Return Minus Application Cost ($/ac)*
28% Check (V5)	219.0	a	2,678	$9.25	$757
Late Season (V10)	218.8	a	4,756	$10.00	$756
Split (V5 & V10)	222.0	a	5,698	$19.26	$758
LSD (P<.05, CV .97)	3.68				

*Based on $9.25 28% application, $10.00 highboy application and $3.50/bu corn. (Source: 2016 Ohio Custom Farm Rates)

**All Systems used 110 lbs N/ac in season, 92 lbs N/ac at plant

Discussion

There was no statistical significant difference for yield among the three nitrogen timing systems in this 2016 trial (Table 1). CSNTs indicate that nitrogen was not a yield limiting factor in this research (Table 2).

A standard economics calculation shows that each of the systems have a very similar economic return, with the split nitrogen system (treatment 3) showing a slight economic edge in this trial. These returns will also vary depending on each producer's equipment and nitrogen cost.

With the development and use of in-season nitrogen application equipment, the risk of N loss can be minimized by applying later in season when the corn crop needs it. Further research in the form of multi-year replication will add to the validity of these results.

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For more information on this trial, contact:
Eric Richer
OSU Extension –Fulton County
8770 State Route 108
Wauseon, Ohio 43567
Richer.5@osu.edu

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