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Corn Nitrogen Rate Comparison – Defiance County

Objective

To evaluate the agronomic and economic impacts of two nitrogen rate fertilizer applications.

Background

Crop Year: 2023 corn
Location: Hicksville
County: Defiance
Soil Type: Hoytville clay loam
Drainage: Pattern
Tillage: No-till
Previous crop: soybeans
Fungicide: Quilt XL at brown silk
Herbicides: Pre plant terminate rye -Glyphosate 2,4-D, Atrazine, Anthem max, Calisto, glyphosate
Variety: Becks 5140
Seeding Rate: 32,000
Fertilizers: see below
Harvest Date: November 3, 2023
Planting Date: 5-13-23
Soil test : pH 5.9, P 33 ppm M3, K 203 ppm, CEC 16.8 , O.M. 3.6 %

Methods

Nitrogen fertilizer at two rates was applied when sidedress corn occurred. Treatments were replicated three times in a random block design. Treatments are 40 feet wide by 700 feet long. All treatments received the same inputs except for sidedress nitrogen fertilizer. On October 22, 2022, cereal rye cover crop was planted in twin rows at a rate of 50 lbs./acre after soybean harvest. Fall fertilizer was applied strip till at the same time. Yields and moistures were obtained by a calibrated yield monitor. Yields were adjusted to 15.5% moisture.

Fertilizers

Fall Strip Till; 97 lbs/ac of DAP (18-46-0), 40 lbs/ac of AMS (21-0-0-24S), 3 lbs/ac Boron
Planter 2x2; 45 lbs/ac (15 gal.) of 28% UAN
Sidedress V6 growth stage; 28% UAN

Treatments

1. 28% UAN at 110 lbs/ac (37 gal.) sidedress
2. 28% UAN at 162 lbs/ac (54 gal.) sidedress

Results

Table 1. Impact of Nitrogen Fertilizer Rates

Sidedress N Rate (gal/ac of 28% UAN)	Corn Yield (bu/ac)	Value of Corn ($/ac)	Cost of Nitrogen ($/ac)	Return Minus N Cost ($/ac)
37	192.2 a	$864.90	$111.00	$753.90
54	197.3 b	$887.85	$162.00	$725.85

Significant Difference in yield. LSD (4.40), CV 1.00; P<.05.
Based on $4.50/Bu corn and $560/ton UAN N ($3.00/gal.)

Table 2 Weather Data

	2023 Local Rainfall Weather Link (Innovative Ag)	Bryan Historic Rainfall www.weather-us.com
May	0.57 in.	3.15 in.
June	2.17 in.	3.27 in.
July	2.11 in.	2.87 in.
August	0.92 in.	2.52 in.
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Total	5.77 in.	11.81 in.

Summary

Corn yield was significantly greater by the addition of 17 gal./ac 28% UAN extra fertilizer. However, a loss of $28.05 per acre was incurred when additional nitrogen fertilizer was applied (table 1).

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Data collection and reporting was conducted by the Conservation Action Project. (www.capofohio.org)

For More Information Contact: Alan Sundermeier, Coordinator - Conservation Action Project

alansundermeier@gmail.com cell 419-261-0625 http://capofohio.org