Nitrogen Rate after Alfalfa

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Objective

Evaluate the effect of corn nitrogen rate on yield and profit when planted after applying manure to alfalfa.

Background

Crop Year: 2022	Tillage: No-Till
Location: Seiler Farms	Soil Test: 5/12/2022
County/Town: Fulton/ Fayette, Ohio	Planting Date: 5/14/2022
Soil Type: Nappanee Loam	Seeding Rate: 34,000 seeds/ac
Drainage: 40’ Parallel	Harvest Date: 11/24/2022
Previous Crop: 7-year alfalfa	

Methods

This study was a randomized complete block design and replicated four times. The manured alfalfa was chemically terminated prior to planting. Nitrogen was then applied in the form of 28% UAN at 4 rates: 80 lbs N/ac, 120 lbs N/ac, 180 lbs N/ac, 240 lbs N/ac. All treatments received 80 lbs of nitrogen/acre at planting and the remainder of the total nitrogen was applied at sidedress. Corn Stalk Nitrate Tests (CSNT) were conducted approximately 10 days prior to harvest to determine the levels of nitrate-nitrogen left in the corn stalk.

Table 1. Corn Yield Response to Nitrogen Rate (pounds per acre)

Rate	CSNT (ppm)	Yield(bushels/acre)	Return over N ($/ac)
80 lbs.	103	172 b	952
120 lbs.	140	184 a	984
180 lbs.	433	186 a	937
240 lbs.	848	188 a	885
		LSD (0.1) 6.0	

Summary
The study results indicated no significant difference in yield among the 120, 180, and 240 lbs N/ac rates. There was a significant difference in yield among the highest three rates and the 80 lbs N/ac. Based on Corn Stalk Nitrate Test results and university recommendations, we can see that the lowest two rates of applied nitrogen were considered low or yield-limiting. 180 lbs N/ac was listed in the marginal rate according to university recommendations which may have been a yield limiting factor, while the 240 lbs N/ac was considered the optimal amount of nitrogen during the growing season. 120 ln N/ac proved to have the greatest return over nitrogen cost when based on $0.85 per unit N and $6.00/bushel corn.

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