

Nitrogen – Cover Crop Residue vs. Commercial

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Objective

To determine the effect of cover crop residue on nitrogen (N) need in the following corn crop.

Background

Table 1. Plot background summary

Crop Year: 2021	Previous Crop: Wheat
Location: Leon Klopfenstein Farm	Tillage: No-Till, 10-15 years
County/Town: Paulding/Haviland	Planting Date: 5/20/2021
Primary Soil Type: Latty Silty Clay	Seeding Rate: 32,000 seeds/acre
Drainage: Systematic Tile, 20-ft spacing; parallel to study	Harvest Date: 11/8/2021

Methods

This experiment was a randomized complete block design. This field contained a 14-species cover crop mix following the previous wheat harvest. Species in the mix were as follows: mung bean, common vetch, hairy vetch, sweet clover, crimson clover, rape, turnip, radish, sunflower, pearl millet, oat, sorghum-sudan, flax, and buckwheat. Six of these species overwintered (common vetch, hairy vetch, crimson clover, rape, turnip, and flax). The cover crop was terminated by roller crimper attached to the front of the planter. The field received 80 lbs of N per acre at planting via 28% UAN. Three treatments were applied by the cooperators at sidedress (Table 2). The treatments were applied in rows of twelve, across four varieties of corn, replicated four times. Cover crop biomass was analyzed to determine N rates for the study. All cropping practices were held consistent across the field, other than the sidedress nitrogen rates. A calibrated yield monitor was utilized for harvest data collection. N use efficiency was calculated from yield data. Return to N value was calculated with the cost of a pound of N at \$0.64 and the value of a bushel of corn at \$6.00.

Results

Corn yield data showed a significant response to N rate ($P < 0.1$). The greatest N use efficiency was seen when 0 lbs of N was added, but the greatest return was seen with 40 lbs of N added (120 lbs total N).



Table 2. Trial Results

Treatment (lbs N/ac)	Moisture (%)	Yield (bu/ac)	N Use Efficiency	Return to N (\$/ac)
0	17.3	181 A	0.44 lbs N/bu	1035
20	17.4	187 B	0.53 lbs N/bu	1058
40	17.4	200 C	0.60 lbs N/bu	1123
LSD (0.1): 5.1 CV: 2.0%				

Summary

Corn yield showed a significant response to N rate. Wet weather at the beginning of the growing season may have affected N availability during early crop development, but all treatments appeared visually indistinguishable from one another. Economic impacts of this study suggest that the greatest return was seen at the rate of 120 lbs N/acre (40 lbs N/ac treatment). Highest N use efficiency was seen when no additional N was applied at sidedress.

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