Comparison of Swine Manure and Anhydrous Ammonia as Nitrogen Sources at Side-dress for Corn Yield

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Objective

To compare corn yield response to nitrogen applied at side-dress incorporated swine finishing manure and incorporated anhydrous ammonia.

Background

Crop Year:	2013	Soil Test	pH 6.2
Cooperator:	Roger Rader		P 32 ppm (64 lb/ac)
County:	Hancock		K 215 ppm (430 lb/ac)
Nearest Town:	McComb		Organic Mater 3.1%
Drainage:	Tile-40 feet spacing	Planting Date:	May 11, 2013
Soil type:	Hoytville	Row Width:	30 inch
Tillage:	Conventional	Herbicide:	Keystone 2.4 qts/acre
Previous Crop:	Soybeans	Harvest Date:	November 2, 2013
Variety:	DK 570		

Methods

A randomized block design with two treatments and four replications was used. Plots were 12 rows (30 feet) wide and approximately 2,200 feet long. Liquid swine manure from a finishing building was applied via incorporation using a 5,250 gallon Balzer tanker equipped with a Dietrich toolbar. The Dietrich toolbar incorporated the swine manure at a depth of five inches using shanks with five inch sweeps.

The swine manure and anhydrous ammonia were applied on the same day when the corn was in the V3 stage. Field conditions were firm at the time of application.

The anhydrous ammonia rate was 155 units of nitrogen per acre. All swine manure replications received 6,000 gallons per acre. Manure samples indicated 20.5 pounds of available nitrogen per 1,000 gallons. Swine manure treatments received 123 pounds of nitrogen, 122 lb/ac P_2O_5 and 110 lb/ac K_2O.

Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1st year)	20.5
Phosphorus as P_2O_5	20.3
Potassium as K_2O	18.4

Weather conditions during the time of manure applications were sunny with an ambient air temperature of 72 degrees. The plot received adequate rainfall throughout the growing season.

Table 1 Treatment Summary

Treatment	Description
Treatment 1 (T1)	155 pounds per acre of nitrogen as anhydrous ammonia
Treatment 2 (T2)	6,000 gal/ac incorporated liquid swine finishing manure (123# N/A)

Results and Discussion

Table 2 Yield Summary

Treatments	Yield (bu/ac)
Anhydrous ammonia (T1)	167.1_a
Incorporated manure (T2)	140.7_b
	LSD (0.05)

The results of this plot indicated a statistically significant yield difference between the treatments LSD (.05=13.89, C.V=4.01). The swine manure tested lower in nitrogen than expected and the lower total nitrogen amount applied to the manure treatments probably accounted for the lower yields.

The anhydrous ammonia cost $0.64 per pound or $99 per acre plus the cost of application. The manure was available from the farmer's swine finisher building. The manure application cost, using the Minnesota Manure Distribution Cost Analyzer spreadsheet, was calculated at $20 per 1,000 gallons of $.02 per gallon. The cost of applying 4,800 gallons per acre as side-dress nitrogen was $96 per acre.

Acknowledgement

The authors would like to thank Jeff Duling for the use of his manure application equipment and Roger Rader for the use of his corn field.

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