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 6.5
Cooperator:	Steve Allgyre		P 32 ppm (64 lb/ac)
County:	Seneca		K 215 ppm (430 lb/ac)
Nearest Town:	Attica		Organic Mater 3.3%
Drainage:	Tile-40 feet spacing	Planting Date:	May 18, 2013
Soil type:	Tiro silt loam	Row Width:	30 inch
Tillage:	FC and soil finisher	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 900 feet long. Each plot length was individually measured. Liquid swine manure from a finishing building was incorporated as a side-dress to corn using a 5,000 gallon Kuhn tanker equipped with a Yetter toolbar with covering wheels. Manure was incorporated to a depth of approximately 6 inches and manure slot opening covered with soil.

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.

Stand counts taken at the V3 stage indicated inconsistent stands of 25,600 plants per acre across both treatments.

The anhydrous ammonia rate was 155 units of nitrogen per acre. All swine manure replications received 4,800 gallons per acre. Manure samples indicated 34.9 pounds of available nitrogen per 1,000 gallons. Swine manure treatments received 168 pounds of nitrogen, 54 lb/ac P_2O_5 and 134 lb/ac K_2O.

Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1st year)	34.9
Phosphorus as P_2O_5	11.3
Potassium as K_2O	27.9

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)	4,800 gal/ac incorporated liquid swine finishing manure (168# N/A)

Results and Discussion

Table 2 Yield Summary

Treatments	Yield (bu/ac)
Anhydrous ammonia (T1)	205.0
Incorporated manure (T2)	202.4
	LSD (0.05)

The results of this plot indicated no statistically significant yield differences between the treatments LSD (.05=9.81, C.V=2.14).

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.

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