

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

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Objectives

1. To compare corn yield response to nitrogen applied at side-dress as incorporated swine finishing manure and incorporated anhydrous ammonia.
2. To compare DON levels of corn sidedressed with swine manure to corn sidedressed with commercial fertilizer.

Background

Crop Year:	2012	Tillage:	Fall chisel and soil finisher
Cooperator:	Steve Allgyre	Soil Test	pH 6.6, P 30 ppm, K 205 ppm
County/Town:	Seneca, Attica		OM 3.4%
Soil Type:	Tiro silt loam	Planting Date:	May 16, 2012
Drainage:	Tile, systematic	Row Width:	30 inch
Previous Crop:	Soybeans	Herbicide:	Keystone 2.4 qts/acre
Corn Hybrid:	DK 570	Harvest Date:	November 10, 2012

Methods

A randomized block design with two treatments and four replications was used. Plots were 12 rows (30 feet) wide and approximately 1,100 feet long. Each plot length was individually measured. Liquid swine manure from a finishing building was incorporated as a sidedress 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 soil opening covered with soil.

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

Stand counts taken at the V3 stage indicated consistent stands of 32,500 plants per acre across both treatments.

Potassium (0-0-60) was broadcast at 100 lbs/ acre and worked with tillage as described above. Starter fertilizer was applied at planting at 100 pounds of 29-46-0-11 per acre.

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 P₂O₅ and 134 lb./ac K₂O.

At harvest time, three samples from each treatment were tested for DON. Deoxynivalenol (DON or vomitoxin) is a mycotoxin produced by certain species of *Fusarium*. The mycotoxin

deoxynivalenol causes reduced weight gain and suppresses animal feeding, especially in swine. At high concentrations (greater than 10 ppm) vomiting and total feed refusal may occur.

Table 1. Swine Finishing Manure Analysis (average of two samples)

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1 st year)	34.9
Phosphorus as P ₂ O ₅	11.3
Potassium as K ₂ O	27.9

Weather conditions during the time of manure application were sunny with an ambient air temperature of 75 degrees. The plot was planted into adequate soil moisture resulting in a very good stand. The plot received approximately nine inches of rain during the growing season.

Table 2. 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 3. Yield Summary

Treatments	Yield (bu/ac)
Anhydrous ammonia (T1)	186.2
Incorporated manure (T2)	188.3

LSD (0.05)

Table 4. DON Summary

Treatments	DON (ppm)
Anhydrous ammonia (T1)	0.37
Incorporated manure (T2)	0.40

The results of this plot indicated no statistically significant yield differences between the treatments LSD (.05=13.30, C.V=3.16). Tissue tests were collected from the manure and commercial fertilizer treatments at the V-4 growth stage. Results were similar between both treatments.

DON levels were low in both the corn sidedressed with commercial fertilizer and the corn sidedressed with swine finishing manure.

The anhydrous ammonia cost \$0.62 per pound or \$93 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 or \$.02 per gallon. The cost of applying 4,800 gallons per acre as sidedress nitrogen was \$96 per acre.

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