

Manure and Sidedress Nitrogen Rate Effects on Corn Yield

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Objective

To evaluate the effect of three nitrogen rates on yield of corn where manure was applied.

Background

Cooperator:	Paul Herringshaw	Fertilizer:	K-205ppm, pH-6.2
County:	Wood		60 lb N starter (see Methods for N treatments)
Nearest Town:	Weston	Planting Date:	May 7, 2005
Drainage:	Tile, well-drained	Planting Rate:	29,000 seed/acre
Soil type:	Mermill clay loam	Row Width:	30-inch
Tillage:	Minimum	Herbicides:	Fulltime, Simazine
Previous Crop:	wheat	Harvest Date:	October 12, 2005
Variety:	Pioneer 36K67		
Soil test:	OM 4.2%, P-52 ppm,		

Methods

The entries were replicated 4 times in a randomized complete block design. Plot size was 30 x 1500 feet for each entry. In September following the 2004 wheat harvest, liquid dairy manure was injected at an approximate rate of 7,000 gal/ac.(total nitrogen content of 172.2 lbs/ac). At corn planting, 60 lbs/ac actual nitrogen was sprayed with herbicide. Sidedress application of 0 , 50 , and 105 lb/ac actual liquid (28%) nitrogen was coulter injected on June 8, 2005. Leaf tissue samples were collected at initial silking on July 26, 2005 and analyzed for N concentration. Chlorophyll meter (SPAD 502) readings were taken during silking on July 29, 2005. Stalk nitrate samples were collected at kernel black layer on September 14, 2005. Harvest data was collected from the entire 12 rows.

Results for 2005

Table 1

Sidedress Nitrogen rate	Corn Yield Bu/ac	Tissue test % nitrogen	Chlorophyll SPADD meter	Stalk nitrate ppm
0 lb/ac	178.9	3.25	61.3	1235
50 lb/ac	179.3	3.32	60.5	1310
105 lb/ac	180.6	3.25	60.4	2035
LSD (0.05)	NS	NS	NS	NS

Multiple Year Averages (2003, 2004, 2005)**Table 2**

Sidedress Nitrogen rate	Corn Yield Bu/ac 3 years	Tissue test % nitrogen 2 years	Chlorophyll SPAD 3 years	Stalk nitrate ppm 2 years
0 lb/ac	178.7	3.30	61.3	1318
50 lb/ac	182.2	3.38	61.0	1393
105 lb/ac	183.8	3.43	62.1	2643
LSD (0.05)	NS	NS	NS	NS

PSNT (pre sidedress nitrogen test) AVERAGES**Table 3**

(12 inch soil test taken after 60 lb/ac preplant nitrogen applied but before additional sidedress nitrogen applied, A & L Lab analysis)

	Nitrate (NO ₃) ppm	Ammonium (NH ₄) ppm
June 3, 2003	23.0	6.3
June 3, 2004	24.1	5.0
June 3, 2005	34.7	15.7
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3 year average	27.3	9.0

Summary

Application of sidedress N did not significantly increase yield, chlorophyll readings, or stalk nitrate, or tissue nitrogen. Application of 7,000 gal/ac of liquid dairy manure in the fall and 60 lbs/ac of preplant nitrogen resulted in grain yields comparable to the treatments receiving 50 and 105 lb/ac N sidedressed. Additional sidedress nitrogen did not significantly increase yields. For this particular location, PSNT value of 27.3 ppm revealed that application of additional N would not result in increased yields. Additional research is needed to determine the N supplying ability of fall applied liquid dairy manure to the subsequent corn crop.

For additional information, contact:

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