Beef Manure and 28% as Nitrogen Sources at Corn Side-dress

Eric Richer, Ohio State University Extension Educator, Fulton County, Ohio
Ben Eggers, Ohio State University Extension Agronomy Intern, Fulton County, Ohio

Objective

To compare corn yield response to nitrogen applied at side-dress as incorporated beef manure and soil applied 28% UAN at growth stage V8.

Background

Crop Year: 2016
County: Fulton
Location: Archbold, Ohio
Drainage: Systematic, 32' laterals
Previous Crop: Soybeans
Variety: Dekalb 5775
Population: 35,000 seeds per acre
Plant Date: May 9, 2016
Harvest Date: November 1, 2016
Herbicide: CinchATZ, Buccaneer
Soil Type: Latty, Fulton clay
Tillage: Chisel in Fall, Spring finish
Starter Fertilizer: 72-12-150-6s-2z
Pre-side-dress Nitrogen Test: 10 ppm NO_3-N
Rainfall (May – August): 12.3"

Methods

This trial was designed with two treatments of side-dress nitrogen sources replicated four times in a randomized complete block design. Plots were 12 rows wide (30 ft) by 1000 feet long.. The trial was planted, sprayed and harvested with commercial farm equipment. The commercial nitrogen treatment was made with a highboy sprayer and late season drops at approximately growth stage V8. The liquid manure was side-dressed using a 5,200 gallon Balzer tanker with Dietrich shanks that incorporated the manure to a depth of 5 inches at growth stage V3. All treatments received 72 units of nitrogen at plant (planter applied + pre-emerge). Manure samples were taken from tank and analyzed at a commercial lab. This beef manure had a nutrient analysis of 41-26-30 per 1,000 gallons. The side-dress application rate goal was 4,000 gallons/acre of the beef manure and 45 gallons/acre of 28% UAN. A corn stalk nitrate test (CSNT) was taken for every replication and then averaged. Yields and moistures were measured using a calibrated yield monitor and shrunk to 15% moisture. Rainfall data was collected at the nearest CoCoRaHS station OH-HY-9.

Treatments:
1. Liquid beef manure
2. 28% UAN

Results

Table 1. Steer Manure vs. 28% at Corn Side-dress

Nitrogen Source	Application Rate (gal/ac)	Units of N/ac Applied at Side-dress	Yield (bu/ac)		CSNT (ppm NO_3-N)
Beef (41-26-30/1,000 gal)	4,000	164	191.5	a	3,380
28% UAN (V8)	45	135	194.8	a	2,260
LSD (P<.05, CV 1.74)			7.55		

Discussion

There was no statistically significant difference in yield between the two nitrogen sources. A mid-season Pre-Side-dress Nitrogen Test (PSNT) suggested a rate of only 135 units was necessary to maximize yield. As such, the in-season rates and total rates of nitrogen were not constant in this trial. CSNTs indicated that nitrate nitrogen levels were not yield limiting for either treatment.

This site experienced early season drought stress. It is believed that the moisture and organic matter added from the manure offset potential compaction concerns in the manure treatments. In the future, dragline injected manure application to growing crops could further offset compaction concerns and improve yield. Further data in the former multi-year replications will add to the validity of these results.

Acknowledgement

The authors express appreciation to on-farm collaborator Jason Rufenacht/Rufenacht Farms for conducting this trial. The authors would also like to thank Unverferth Manufacturing for the use of the weigh wagon, Ohio Farm Bureau, and Farm Credit Mid America for supporting this research.