

Two-Year Comparison of Fertility Systems: Commercial Fertilizer and Poultry Litter

Chris Bruynis, Agriculture and Natural Resources Extension Agent

Objective

With the construction of large poultry facilities in the area, local farmers now have approximately 500,000 tons of poultry litter available annually. This research was designed to compare the cooperating farmers' normal fertility program using commercial fertilizer to a fertility program using poultry litter plus commercial fertilizer.

Background

| | | | |
|----------------|----------------------|----------------|----------------------|
| Cooperator: | Tim Wood | Fertilizer: | See Methods |
| County: | Wyandot | Herbicide: | Frontier (28 oz/A) |
| Nearest Town: | Marseilles | | Canopy (6.4 oz/A), |
| Soil Type: | Blount | | Touchdown (1.6 pt/A) |
| Drainage: | Surface, no tile | Variety: | Madison GL2930 |
| Tillage: | Minimum-till | Planting Date: | May 2, 2000 |
| Previous Crop: | Soybeans (1998) | Planting Rate: | 180,000 |
| Soil Test: | pH 7.2, P 61 lbs/A, | Row Width: | 9 inches |
| | K 157 lbs/A, OM 2.6% | Harvest Date: | September 30, 2000 |

Methods

The plot was designed to compare the long-term returns of two different fertility systems. There were six replications of two treatments in side-by-side paired non-randomized strip plots. Individual plots were 25-feet wide and 1,200 feet in length. The study was conducted over two years with a corn/soybean rotation. The poultry litter, based on several analyses, contains ~100 lbs P₂O₅, ~70 lbs K₂O, and ~40 lbs nitrogen per ton. A single four-ton-per-acre application rate should supply sufficient nutrients for three or more crops. Commercial fertilizer application decisions were based on Extension Bulletin E-2567, Tri-State Fertilizer Recommendations for Corn, Soybeans, Wheat, and Alfalfa, for the two years of the study.

Table 1. Nutrient Applications and Times of Application.

| Poultry Litter plus Commercial Fertilizer | | | Commercial Fertilizer | | |
|---|----------|------------|-----------------------|----------|------------|
| Application | Amount/A | Date | Application | Amount/A | Date |
| Poultry Litter | 4 tons | March 1999 | 0-0-60 | 250 lbs | March 1999 |
| 6-19-6 starter | 120 lbs | April 1999 | 18-46-0 | 150 lbs | March 1999 |
| 28-0-0 sidedress | 320 lbs | June 1999 | 28-0-0 | 300 lbs | April 1999 |
| | | | 6-19-6 starter | 120 lbs | April 1999 |
| | | | 28-0-0 sidedress | 320 lbs | June 1999 |

Results

Table 2. Yields and Results.

| Crop/Year | Treatment | Yield (bu/A) |
|------------------|-----------------------------|---------------------|
| Corn (1999) | Commercial Fertilizer | 141.6 |
| | Poultry Litter & Commercial | 143.6 |
| | | F <1, NS |
| Soybean (2000) | Commercial Fertilizer | 43.1 |
| | Poultry Litter & Commercial | 41.5 |
| | | F = 1.9, NS |

NS = means not significantly different at P = 0.05.

Summary

After harvesting two crops, no significant yield differences were observed. The economic differences between the two systems should be examined. The poultry litter cost \$15 per ton plus application charges for a total of \$60 per acre. The additional fertilizer in the commercial fertilizer treatment cost \$57 per acre; that, along with the application charge, totalled \$61.50 per acre. No additional cost was assessed for the extra nitrogen application because under normal circumstances this would have been applied with the herbicide.

The costs of nutrient inputs were basically the same for the two different fertility systems. Two years of crop harvests indicate the yields were statistically the same, thus providing no difference in income. Soil samples taken from the plots indicate that the poultry-litter plots tend to be higher in phosphorous and pH than the commercial-fertilizer plots after two crops. These were not statistically analyzed and require further investigation to be conclusive results. This research does support the utilization of poultry litter to replace a portion of commercial fertilizer in crop production. The decision to use one fertility system over another should depend upon availability of poultry litter, cost of nutrient alternatives, and acceptance of animal nutrients by the surrounding neighborhood.

Acknowledgments

The poultry litter used in this research was partially donated by Organigro, Inc., Jack Lill, Sales Representative, 740-386-1807. Farmers Commission Company, Bill Thornton, agronomist, 419-294-1974, provided soil testing, commercial fertilizer application, and technical support. Farmers Commission Company also provided the weigh wagon.

For additional information, contact:

Chris Bruynis
The Ohio State University Extension
bruynis.1@osu.edu