

Corn Yield Response to Starter Fertilizer

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Objective

To evaluate the yield response and economics to starter fertilizer.

Background

Crop Year:	2015	Harvest Pop:	32,500 plants/ac
Location:	Delta, OH	Soil Test:	pH 5.9, P 70 ppm*, K 448 ppm, CEC 19.4, O.M. 3.6%, (11/2014)
County:	Fulton County	Fertilizer:	Net 8-39-105/ac broadcast pre-plant
Soil Type:	Hoytville clay loam	Herbicide:	Cinch ATZ, glyphosate post
Drainage:	25' Systematic, perpendicular	Harvest Date:	October 21, 2015
Previous Crop:	Soybeans	Rainfall:	25.6" (Apr-Sept)
Tillage:	Minimum		
Planting Date:	May 9, 2015		
Plant Rate:	33,100 seeds/ac		

Methods

This study was designed to evaluate the impact that reducing phosphorus fertilizer would have on corn yield. The treatments were 1) farmer's normal starter rate, 2) 50% of farmer's normal rate and 3) a zero rate. The three treatments were arranged in a randomized complete block design with four replications. Treatment plots were planted 40 feet wide (16 rows) by 2,500 feet long (field length). Treatments were planted with a 1770 JD planter after one-pass, light spring tillage. Seed used was Pioneer 1197AM in all treatments.

The starter fertilizer used was a blended, liquid 11-25-0 analysis and was applied 2"x2" beside the row at planting. Nitrogen was balanced at growth stage V4 (sidedress) 4 weeks after planting so that all treatments received a season total of 200 units. Harvest (yield) measurements were made by harvesting the center 8 rows within each treatment using a JD 9660 commercial combine. Yield measurements were taken with a 2630 JD monitor and shrunk to 15% moisture. Weather data was collected from a National Weather Service station in Wauseon, Ohio.

Treatments

- 1) 100% Starter Rate – 20 gals/ac (Net: 23-53-0 per acre)
- 2) 50% Starter Rate – 10 gals/ac (Net: 12-27-0 per acre)
- 3) 0% Starter Rate – 0 gal/ac



Results

Table 1. Corn Yield Response to Starter

Treatment	Yield (bu/ac)	Gross Revenue/Ac ²	Cost per acre ³	Net Revenue/Ac
100% Starter Rate – 20 gal/ac	189.4 b	\$663	\$40.80	\$622
50% Starter Rate – 10 gal/ac ¹	204.9 a	\$717	\$20.40	\$697
0% Starter Rate – 0 gal/ac ¹	186.0 b	\$651	\$---	\$651
	LSD (p<.05)	10.7		

Coefficient of Variation = 2.44

¹The nitrogen component of the starter was balanced at V4, approximately 30 days after plant.

²Based on \$3.50/bushel marketing price

³Starter Cost = \$2.04/gal (based on \$.46/lb N and \$.57/lb P)

Summary

The research found a statistically significant difference in grain yield of the 50% starter rate treatment and the other treatments. The 50% starter rate treatment was +15.5 bu/ac better than the 100% starter rate treatment and +18.9 bu/ac better than the 0% starter rate treatment. Based on one year of data in this location, the 50% starter rate showed an economic advantage of \$75/acre to the farmer's normal, 100% starter rate.

Some of the yield difference in this plot could be attributed to the timing of the nitrogen balancing as the 50% treatment and 0% treatment had 12 units and 24 units more, respectively, of nitrogen applied at sidedress to achieve 200 total units of nitrogen for the season across all treatments. More than average rainfall accumulated in Northwest Ohio in 2015 in the early part of the growing season. Nitrogen applied later in the season was likely used in a more efficient manner by the corn plant. An improvement to these research methods would be to conduct the nitrogen balancing at planting as to remove the nitrogen timing variable in the research.

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