Corn Yield Response to Starter Phosphorus - Pettisville

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Objective

To evaluate the yield response to starter phosphorus.

Background

Crop Year: 2017
County: Fulton
Location: Pettisville, OH
Drainage: Pattern, 20' centers
Previous Crop: Soybeans
Variety: Rupp A03-91
Population: 33,000 seeds per acre

Planting Date: May 16
Harvest Date: October 18
Herbicide: Cinch ATZ, Instigate
Tillage: Fall-Chisel,
Spring-Cultivate
Rainfall (May-August): 18.7"

Soil Type: Latty, Fulton clay
Soil Test (5/2017):
pH 6.6
P 15 ppm (Bray–P1)
K 147 ppm
CEC 13.9 meq/100g
O.M. 3.0

Methods

Three corn phosphorus starter rates were replicated four times in a randomized complete block design. Plots were 6 rows wide (15 feet) by 1,250 feet long. The trial was planted, sprayed, sidedressed and harvested with commercial farm equipment. In order to ensure nitrogen rates and timing was consistent, the starter mixtures were nitrogen-balanced at planting so that all treatments began with 42 lbs N/ac. All treatments received 150 lbs N/acre at sidedress (V3-V4), for a total nitrogen rate of 192 lbs/acre. Yields were measured using a weigh wagon and moistures calculated with a commercial moisture tester and shrunk to 15% moisture. Rainfall data was sourced from CoCoRaHS station OH-FL-11 in Wauseon, Ohio.

Treatments

1. 0% Starter Rate – 0 gal/ac (Net: 42-0-0-6S per acre)
    a. Recipe: 13 gal 28-0-0 plus 2 gal 21-0-0-26 (thiosulfate) plus 5 gal water

2. 50% Starter Rate – 10 gals/ac (Net: 42-20-0-6S per acre)
    a. Recipe: 5 gal 10-34-0 plus 11 gal 28-0-0 plus 2 gal thiosulfate plus 2 gal water

3. 100% Starter Rate – 20 gals/ac (Net: 42-40-0-6S per acre)
    a. Recipe: 10 gal 10-34-0 plus 9 gal 28-0-0 plus 2 gal thiosulfate

Results

Table 1. Corn Yield Response to Starter Phosphorus - Pettisville

Starter P Rate (lbs/ac)	Starter P Rate (gal/ac of 10-34-0)	Yield (bu/ac)		Return Minus P Cost* ($/ac)
0	-	164.4	b	$575
20	5.0	175.3	a	$605
40	10.0	183.0	a	$623
LSD (P<.05, CV 4.06)		9.71		

*Based on $3.50/bu corn and $.43/lb P (Source: OSUE 2017 Corn Budget)

Discussion

There was no statistically significant difference in grain yield among the 20 and 40 lbs rates of starter. However, the zero rate of starter P did result in a statistically lower yield in 2017. This site did have soil phosphorus test levels at the Tri-State Fertility Guide's critical level (15 ppm Bray-P1) and as such, a yield response to starter phosphorus would be expected.

Standard economic calculations favor an application of starter phosphorus in this field and at this soil test phosphorus level. Knowing the soil test phosphorus level of a farm/field can help determine the economic value of a starter phosphorus application for corn.

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