

Effect of Phosphorous (P) Starter Fertilizer on Corn Yield When Soil Tests are Above Tri-State Critical Level for P

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Objective:

To measure yield effect in corn with added P compared to a control.

Background

Crop Year: 2013

Location: Oxford Twp

County/Town: Milan, Ohio

Soil Type: Kibbie

Drainage: Systematic 60'

Previous Crop: Soybeans

Tillage: Chisel Plow

Soil Test: P 30ppm; K 175ppm; pH 6.2

Buffer pH 6.9; OM 4.3%; CEC 23 5/13

Planting Date: 5/3/2013

Nitrogen: 200 lbs/ac 28%

Seeding Rate: 35,000 30" rows

Harvest Date: 9/27/2013

Methods

Pioneer 1184 was planted on May 3, 2013 in 30" rows at a rate of 35,000 seeds per acre using an John Deere 7200 vacuum planter. The treatment (45 lbs P₂O₅) and control (0 lbs P) were planted into a Randomized Complete Block Design replicated 4 times. Liquid fertilizer was applied with the planter in a 2 X 2 placement. The treatment consisted of 12 gallons of 10-34-0 plus 5 gallons of 28% N per acre. The control received 9.7 gallons of 28% N plus 7.3 gallons of water per acre. At these rates of liquid fertilizer, the treated and untreated plots received equal amounts of nitrogen (28 lbs.) while the treated plot received an additional 45 lbs. of phosphorous. An additional 172 lbs of N was side dressed.

Treatments

- 1) 45 lbs. P₂O₅ plus 28 lbs. N
- 2) Control: 28 lbs. N

Treated and untreated plots were treated identically after planting. Weed control was achieved using 1.25oz./ac Resolve Q, 1.25 lbs./ac Atrazine and 1.5 qts. glyphosate at V3. Nitrogen as 28% was side dressed at V5 using a rolling injector. The plots which were roughly 0.70 acres in size, were harvested with a John Deere 9600 combine with a 8x30 corn head. Plots were roughly 1500 ft in length. Each plot was weighed on a certified scale at a local agribusiness in close proximity to the field.

Following harvest, composite soil samples were collected from the treatment and control plots. These samples were collected directly from the corn row.

Post-Harvest Soil Tests

Treatment plots: P 38 ppm (M3) K 170 ppm pH 6.3 buffer pH 6.8 CEC 24
Control plots: P 30 ppm (M3) K 150 ppm pH 6.1 buffer pH 6.8 CEC 24

Results

Table 1. Moisture and Yield of Corn (adjusted to 15% moisture)

Treatment	Ave. Moisture	Ave. Yield (bu/A)
45 lbs. added P ₂ O ₅	28.3	237
Control	28.2	239

F=.61; Not significant. CV =1.76

Summary

There was not a significant difference in yield between corn fertilized with additional phosphorus and the control. This result would substantiate Tri-State P recommendations for corn. The Tri-State Fertility Recommendations for Phosphorus (P) are based on the fundamental concept that at a soil test level of 15 ppm (called the 'critical level') the soil can supply adequate levels of P for crop growth, development and yield. This test clearly supported the Tri-State Recommendation that at a 31 ppm test level of P, which is greater than the critical level, not any additional P was needed to produce maximum yield.

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