

Effects of Phosphorus, Potassium or the Combination on Soybean Yield and Profit

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Objective

To determine the effects of applications of phosphorus, potassium or the combination on soybean yield.

Background

Crop Year: 2014

Location: Metamora, OH

County: Fulton

Soil Type: Hoytville

Drainage: Systematic

Previous Crop: Corn

Tillage: No-till

Soil Test: pH 6.5, P 10 ppm*, K 116 ppm

Planting Date: May 8, 2014

Seeding Rate: 165,000 seeds/ac

Harvest Date: October 30, 2014

*Reported as Bray P1

Methods

This research trial included four treatments replicated four times in a randomized complete block design. Plots were approximately 1,200 feet long by 50 feet wide. Soybean variety was Asgrow 3034. Fertilizer treatments were broadcast in spring prior to planting with a 50 foot spreader using RTK autosteer technology. Soybeans were then planted with the same seeding rate and pesticide treatments across all treatments. Plot centers were harvested with a 35 foot header on a JD 9660 combine. Yield and moisture data was collected with a calibrated yield monitor and adjusted to 13% moisture content. Weather data was obtained from weather.com.

- Treatments:
1. No fertilizer
 2. 75 lbs/ac Mono-Ammonium Phosphate (MAP) 11-52-0
 3. 150 lbs/ac Potash 0-0-60
 4. 75 lbs/ac MAP and 150 lbs/ac Potash

Results

Table 1. Soybean Yield (bu/ac) Response to Phosphorus and Potassium

<u>Treatment</u>	<u>Moisture</u>	<u>Dry Yield</u> (per acre)	<u>Gross Revenue</u> (per acre)	<u>Fertilizer Cost</u> (per acre)	<u>Net Return</u> (per acre)
1. No fertilizer	12.7%	59.5 b	\$595	\$0	\$595
2. 75 lbs/ac MAP	12.6%	62.0 a	\$620	\$30.30	\$590
3. 150 lbs/ac Potash	12.8%	59.4 b	\$595	\$40.65	\$554
4. 75 lbs/ac MAP & 150 lbs/ac Potash	12.8%	59.0 b	\$590	\$62.40	\$528

LSD 2.55 (p<.05), CV 2.66 – Yes significant difference between treatments



Economics: Gross income = yield x \$10.00/bu;
MAP costs = \$0.32/lb (source: OFR collaborator)
Potash costs = \$0.23/lb (source: OFR collaborator)
Combined fertilizer = \$0.25/lb (source: OFR collaborator)
Application cost = \$6.15/ac (source: 2014 OSUE Custom Farm Rental Rates)

Discussion:

The only treatment that showed a statistically significant difference in yield was Treatment 2 (75 lbs/ac of MAP), showing at least a +2.5 bushel per acre advantage over all other treatments. However, Treatment 4 also contained 75 lbs/ac of MAP but did not have a similar yield increase. Further data in the form of multi-year replications will add to the validity of these results.

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