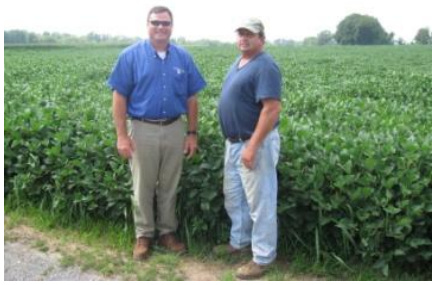
Pennsylvania On Farm Soybean Network

Field Trial Report

2011 Soybean Response to Starter Fertilizer: Centre County



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FIELD INFORMATION			
Field Name: 32F	Acres: 7	2010 Crop: corn	2011 Crop: Soybeans
Soil type: Morrison	Field Length: 500	Tillage: No Till	Planting Date: 5-26-11
Soybean Variety: NK S28-B4	Seed Treatment: Cruzer Max	Inoculants: Optimize	Planting Depth: 1 inch
Planter/Drill and width: 30 in. JD7000 2 row		Herbicide: RoundUp Weathermax	
Sprayer/width: 60	Combine/width: Wintersteiger Nursery Master Elite /4 ft	Yield Monitor: Yes	GPS capability: No
Guidance system: No			

This study was established to evaluate the potential for use of a starter fertilizer on soybeans. Starter fertilizers are being used in some areas, however responses to N-P-K starter fertilizers have been inconsistent in other research. A recent Missouri study (Nelson et al. 2010) showed responses of 5 bu/ac to preplant K applications on soils testing low or medium range for K. This effect was attributed in part to improved disease control with from the chloride in the KCl fertilizer. Our hypothesis is that a starter response may be likely on some soils due to a combination of K and some of the improved disease impacts noted by these authors. Another study has shown a 5% yield benefit from the use of N (15 lb N /acre) containing starters under no-till conditions in South Dakota (Osborne and Riedell, 2006) This yield increase was associated with an increase in early season biomass, perhaps increasing vigor during the period prior to nodule development in the soybean plants. Our hypothesis is that an N/K fertilizer starter program could result in yield increases under some Pennsylvania conditions. Based on feedback from producers, who indicate slow early season growth and occasional K deficiency are common problems in soybeans, then this program could have merit under some conditions. We also suspected that some fields might be responsive to an S application, since sulfur deposition rates have been declining in Pennsylvania. Based on these issues we selected a starter fertilizer that was a blend of muriate of potash 0-0-60 and ammonium sulfate (21-0-0-24) applied at 150 pounds/acre, which supplied a total of 15-0-45-18 in the row.

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TREATMENTS EVALUATED
1 Control
2. Starter 150lbs 10-0-30

RESULTS

This study was planted in later May following a wet spring. The field experienced some groundhog damage and despite our effort to control them, we eventually had to discard two of the replications. Subtle differences in color were apparent early in the season with the starter treated strips appearing a slightly darker green. Plant stands were evaluated on 6/27 (Table 1). No differences in plant height or nutrient content were apparent.

Table 1. Plant size and nutrient content on June 27.

Treatment	Population	Plant Height	N	P	K	S
	p/a	in	%	%	%	%
Control:	94K	8	4.33	0.36	2.90	0.25
Starter:	97K	9	4.31	0.34	2.83	0.25
Significant	NS	NS	NS	NS	NS	NS

Grain yields were measured on October 17. Grain yields averaged 39.2 bushels per acre in the control plots and 41.6 in the starter treatment. These averages are from only two replications and while significant we are not confident the effect is real. There was no impact on the moisture or test weight of the soybeans harvested.

Table 2.. Yield, grain moisture, and test weight response to the starter fertilizer.

Treatment	Yield	Moisture	Test Wt.
	Bu/ac	%	Lb/bu
Control:	39.3	14.7	53.8
Starter:	41.6	14.7	54.0
Significant	0.1	NS	NS
CV	0.6	1.5	1.3

Following the trial, soil samples were collected to assess nutrient levels and stratification in this soil. Soil pH and K levels were at or above optimum, but the P level in this soil was below optimum at each level, ranging from 28 ppm in the surface to 10 ppm in the 6-9 inch range. S levels were well close to average for the Penn State Ag Analytical Laboratory. High K and average S levels in this soil near the surface could explain the lack of a large response to starter.

Table 3. Soil nutrient levels as affected by depth

Treatment	pH	P	K	S
		ppm	ppm	ppm
0-3 inches	6.8	28	158	11.1
3-6 inches	6.5	16	137	9.8
6-9 inches	6.4	10	105	12.8
	6.6	18	133	11.0