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1. Is there any value to starter fertilizer on soybeans?

Soybeans can respond to starter fertilizer, but it depends on several factors. The most important factor is the fertility level of the soil. Soybeans will respond to direct fertilizer application on low-testing soils.

K-State soil test recommendation guidelines for soybeans include phosphorus (P), potassium (K), sulfur (S), zinc (Zn), and boron (B). If fertilizer is recommended by soil test results, then fertilizer should either be applied directly to the soybeans or applied indirectly by increasing fertilizer rates to another crop in the rotation by the amount needed for the soybeans.

Banding fertilizer to the side and below the seed at planting is an efficient application method for soybeans. This method is especially useful in reduced-till or no-till soybeans because P and K have only limited mobility into the soil from surface broadcast applications.

However, with narrow row soybeans, it may not be possible to install fertilizer units for deep banding. In that situation, producers can surface-apply the fertilizer. Fertilizer should not be placed in direct seed contact with soybeans because the seed is very sensitive to salt injury.

The most consistent response to starter fertilizer with soybeans would be on soils very deficient in one of the nutrients listed above, or in very high-yield-potential situations where soils have low or medium fertility levels.

-- David Whitney, Soil fertility specialist  
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## 2. Spring applications of herbicides in wheat

Residual herbicides applied to wheat in early spring can provide good weed control for several weeks after harvest, in some situations. This strategy should only be used in a wheat/row crop/fallow, wheat/fallow, or continuous wheat cropping system.

The application timing and length of residual activity depends on the herbicide being used, the weeds present, soil pH level, and moisture conditions. The residual activity from Amber, Finesse, Glean, and Rave will be longer on soils with higher pH levels, and where conditions have been dry. Rave (a premix of dicamba and the active ingredient in Amber herbicide) can be applied up until the start of jointing. Amber, Finesse, and Glean can be applied slightly later, until early jointing.

These herbicides will provide residual control of many winter annual and summer annual broadleaf weeds, but not ALS-resistant weeds. The residual activity means that row crops cannot be doublecropped after the wheat. In a wheat/row crop/fallow system, there is usually enough time to allow grain sorghum and soybeans to be safely planted the following spring. Producers have to be more careful when planting corn the following spring. Corn is more sensitive to sulfonyleurea herbicide carryover, and it is planted earlier in the spring than grain sorghum and soybeans. Producers need to consult the respective herbicide labels for specific crop rotation guidelines.

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### 3. Managing for maximum irrigated corn yields

In high-yield, irrigated environments, recent research at the Irrigation Experiment Field near Scandia and on a producer's field in Republic County has shown that a combination of high plant populations and high fertility levels can result in higher yields and profitability. Increasing either component alone did not produce the same kind of results.

This research used two seeding rates: 28,000 and 42,000 seeds per acre. The fertilizer treatments included three nitrogen rates: 160, 230, and 300 pounds per acre, in split applications. Yields were maximized at about 230 pounds per acre.

Farmer Field, Republic County (sandy loam soil) 2000-2002			
	3-year Average Corn Yield (bu/acre)		Response to higher rate of N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O-S
	Fertilizer Rate (lbs/acre N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O-S)		
Seeding Rate	230-30-0-0	230-100-80-40	
28,000	162	205	+43
42,000	159	223	+64
Response to higher seeding rate (bu/a)	-3	+18	

Irrigation Experiment Field (silt loam soil) 2003-2004			
	3-year Average Corn Yield (bu/acre)		Response to higher rate of N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O-S
	Fertilizer Rate (lbs/acre N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O-S)		
Seeding Rate	230-30-0-0	230-100-80-40	
28,000	202	225	+23
42,000	196	262	+66
Response to higher seeding rate (bu/a)	-6	+37	

In both of these tests, increasing populations had no effect on corn yields unless higher fertilizer rates of P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-S were also used. Also, about a third of the response to higher fertilizer rates was lost if higher seeding rates were not used.

Each added fertilizer nutrient increased yields in both tests. The higher rates of P and K paid in both tests. The sandy loam soil had a soil test P level (Bray-1) of 20 ppm, a K level of 240 ppm, and an S level of 6 ppm. The silt loam soil had a soil test P level of 25 ppm, a K level of 170 ppm, and an S level of 15 ppm. The addition of S was economical on the sandy loam soil (with a low organic matter level of 2.0 percent), and borderline on

the silt loam soil (with an organic matter level of 2.6 percent). In general, fertilizer S for corn is more likely to pay on sandy or eroded soils.

Irrigated Corn Yield Response to Each Added Fertilizer Nutrient				
Fertility treatment	Sandy loam soil		Silt loam soil	
P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O-S	Yield (bu/a)	Added yield increase	Yield (bu/a)	Added yield increase
None	80	--	137	--
N (300-0-0-0)	151	+71	187	+50
N+P (300-100-0-0)	179	+28	243	+56
N+P+K (300-100-80-0)	221	+42	256	+13
N+P+K+S (300-100-80-40)	239	+18	265	+9

For complete details, see the 2005 Agronomy Field Research report, SRP 956.

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These e-Updates are a regular weekly item from K-State Extension Agronomy. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader  
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