

IMPACT OF SPRING-APPLIED WHEAT HERBICIDES ON NO-TILL DOUBLE-CROPPED SOYBEANS

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INTRODUCTION:

A number of herbicides are being evaluated for weed control in wheat in Kentucky, yet their potential to persist in soil and injure such rotational crops as double-cropped soybeans is not well understood. The fact that many of these herbicides are grouped in the sulfonylurea class of chemistry makes it important to clarify this issue.

OBJECTIVE:

As a part of an ongoing project, a number of herbicides were evaluated for their potential to carryover and injure double-cropped soybeans. Furthermore, this work was done to determine if a soybean variety with the sulfonylurea tolerant (STS) trait would minimize the injury from herbicides that present a risk of carryover problems.

METHODS:

Ally (metsulfuron), Everest (flucarbazone), Maverick (sulfosulfuron), Peak (prosulfuron), and AEF-13006000 (mesosulfuron) were applied on March 28, 2002 to Pioneer 2552 wheat. Herbicide treatments were applied with a CO₂ pressurized back pack sprayer in a spray volume of 26 gallons/A. A non-treated check was used for comparing with the herbicide treatments.

Nitrogen was applied as a split application at 30 units/A on February 15 and 70 units/A on March 11. Warrior was applied at 3.5 oz/A in the fall and spring and Tilt was applied at 4 oz/A in the spring.

Wheat was mowed and removed on June 21. Once wheat was removed, soybeans were planted in 14-inch rows on June 22. (i.e.

approximately 12 weeks after herbicide application in wheat). About 16.7 inches of precipitation occurred during this period, which was approximately 3.5 inches above normal for this period. However, rainfall from planting until mid September was only 5 inches, which was 6 inches below normal for this period. The test area had a soil water pH of 5.7 and a buffer pH of 6.6.

The two soybean varieties included in this study were AsGrow AG4403 (Roundup Ready) and Caverndale CF 472 (STS plus Roundup Ready). The variety stacked with STS was used to determine if this trait would minimize impact from any sulfonylurea herbicide residue remaining in soil following the spring treatments.

Roundup UltraMax was applied postemergence to soybeans on June 28 to control scattered populations of johnsongrass, volunteer wheat, and honeyvine milkweed.

Several measurements were used to evaluate soybean injury. Stand counts from sections of two rows, each 3 ft in length, were made on July 15. Visual ratings of percent crop injury were also made on July 15, with 0 = no injury and 100 = complete death. Plant heights for 5 randomly selected plants were noted on October 16. Soybean plots were harvested with a plot combine to determine yield.

RESULTS:

The Roundup Ready (RR) soybeans had approximately 3% injury on July 15 (approximately 16 weeks after herbicide application) where Peak was previously applied (Table 1). This was the only treatment that had any injury and it was not statistically different from the non treated

check.

The difference in soybean stand counts observed between the two varieties on July 15 was likely due to differences in seeding rate than herbicide treatment. None of the herbicides affected soybean stands of either soybean variety.

Plant heights of the variety stacked with the Sulfonyl Tolerant and Roundup Ready traits (STS/RR) were equal across all treatments; therefore, indicating there was no stunting from the herbicides. However, the RR variety was slightly stunted in plots where Peak was applied in the spring.

The soybean yields for the STS/RR variety were equal across all treatments including the non treated check. However,

the yield of the RR variety for Maverick and Peak was reduced 5.7 and 6.8 bu/A, respectively, when compared with the non treated check.

SUMMARY:

The results of this study were similar to those reported last year. Maverick and Peak applied to wheat in the spring persisted long enough in soil to cause a reduction in soybean yield. However, soybean varieties with the STS trait provided sufficient protection to avoid significant injury or yield loss from these herbicides. The fact the soil pH was slightly acidic may have enhanced dissipation of the sulfonylurea herbicides. More work is needed to evaluate the risks for soils with a higher pH.

Chemicals	Rate	Crop Injury (%)		Plant Stand (Plants /A)		Plant Height (Inches)		Yield (Bu/A)	
		RR	RR + STS	RR	RR + STS	RR	RR + STS	RR	RR + STS
Ally Surfactant	0.1 oz/A 0.25%	0	0	219,489	179,016	23	22	26.2	21.9
Everest Surfactant	0.62 oz/A 0.25%	0	0	227,273	166,563	24.2	22.6	26.1	25.2
Maverick Surfactant	0.67 oz/A 0.25%	0	0	233,499	166,563	23.7	23	24.5	22
Peak Surfactant	0.5 oz/A 0.25%	3	0	189,913	158,780	22.6	22.4	23.4	23.5
AEF-13006000 AEF-10789200 COC Liquid N	0.29oz/A 1.7oz/A 1.5 pt/A 1 qt/A	0	0	211,706	185,243	23.6	22.8	25.1	22.7
Non treated check		0	0	188,875	166,563	25.2	23	30.2	24.1
LSD (0.05)			NS	NS	NS	2.3	NS	5.3	NS

