

On-Farm Corn and Soybean Plant Growth Regulator Trials

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Introduction

Farmers continue to search for ways to increase corn and soybean yields, including the use of plant growth regulators. Plant growth regulators, such as gibberellic acid and cytokinins, are organic compounds that modify plant growth processes at very low concentrations. Gibberellic acids control cell elongation and division in plant shoots. Cytokinins affect cell division, cell enlargement, senescence, and transport of amino acids in plants. Plant growth regulators are more commonly used on fruit and vegetable crops than on grain crops. The purpose of these trials was to investigate the effect of plant growth regulators on corn and soybean yield.

Materials and Methods

In 2015, four trials on corn (Table 1) and one trial on soybean (Table 2) investigated the effect of plant growth regulators on grain yield. All trials were conducted on-farm by farmer cooperators using the farmer's equipment. Strips were arranged in a randomized complete block design with at least three replications per treatment. Strip length and width varied from field to field

depending on field and equipment size. All strips were machine harvested for grain yield.

In Trials 1 and 2, RyzUp SmartGrass[®] was foliar applied to corn at V5. RyzUp SmartGrass contains a gibberellic acid and is marketed by Valent. It is promoted to increase yields and overcome the effects of heat and drought. In Trial 3, Ascend[®] was applied in-furrow to corn. Ascend contains a cytokinin, a gibberellic acid, and indole butyric acid. It is marketed by Winfield AgriSolutions and is promoted to stimulate plant growth. In Trial 4, Ryzup SmartGrass and Ascend were foliar applied to corn at V5.

In Trial 5, Enersol and Radiate were foliar applied to soybean at V3-V4. Enersol is marketed by Amcol and is promoted to enhance nutrient uptake and utilization. It contains humic, fulvic, and ulmic acids as well as micronutrients. Radiate is marketed by Loveland Products and is promoted to stimulate root growth. It contains indole butyric acid and cytokinins.

Results and Discussion

None of the plant growth regulators had a significant effect on corn or soybean yield (Tables 3, 4, and 5). This agrees with most past research, which has shown that although plant growth regulators can affect corn and soybean growth, effects on grain yield are less common.

Table 1. Hybrid, row spacing, planting date, planting population, previous crop, and tillage practices in the 2015 growth regulator trials on corn.

Exp. no.	Trial	County	Hybrid	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage
150709	1	Henry	Burris 5Z44	30	4/29/15	35,000	Soybean	Conventional
150711	2	Henry	Dekalb 64-87	30	4/17/15	33,500	Soybean	Spring field cultivate
150718	3	Muscatine	Mycogen 2H721	30	5/3/15	32,000	Soybean	Spring harrow
150508	4	Story	Pioneer P1197	30	4/28/15	35,500	Soybean	Spring field cultivate

Table 2. Variety, row spacing, planting date, planting population, previous crop, and tillage practices in the 2015 growth regulator trials on soybean.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage
150506	5	Story	FCBrandFC25R249	30	5/21/15	143,000	Corn	Fall disk ripped, spring field cultivate

Table 3. Yield from on-farm corn growth regulator trials in 2015.

Exp. no.	Trial	Treatment	Rate (oz/ac)	Application timing	Yield (bu/ac)			
					Treated	Control	Response	P-value ^a
150709	1	Ryzup	0.5	V5	235	237	-2	0.70
150711	2	Ryzup	0.5	V5	216	213	3	0.81
150718	3	Ascend	6	At planting	181	180	1	0.69

^aP-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.

Table 4. Yield from an on-farm corn growth regulator trial in 2015.

Exp. no.	Trial	Treatment	Rate (oz/ac)	Application timing	Yield (bu/ac) ^a	P-value ^b
150508	4	Control			233 a	0.49
		Ascend	8	V5	240 a	
		Ryzup	0.5	V5	243 a	

^aValues denoted with the same letter within a trial are not statistically different at the significance level of 0.05.

^bP-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.

Table 5. Yield from an on-farm soybean growth regulator trial in 2015.

Exp. no.	Trial	Treatment	Rate (oz/ac)	Application timing	Yield (bu/ac) ^a	P-value ^b
150506	5	Control			63 a	0.56
		Enersol	13	V3-V4	65 a	
		Radiate	2	V3-V4	64 a	

^aValues denoted with the same letter within a trial are not statistically different at the significance level of 0.05.

^bP-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.