

On-Farm Corn and Soybean Management Demonstration Trials

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Introduction

Farmers are faced with many decisions in managing corn and soybeans as new technologies are introduced, such as new corn hybrids, new pesticides, and new seed treatments. It is also important for farmers to adopt tillage practices that not only maximize profits, but also conserve the soil. The objective of these trials was to investigate what effect various corn and soybean management practices would have on grain yield.

Materials and Methods

In 2018, 17 trials investigating various management practices in corn and soybeans were investigated (Table 1). 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 width and length varied from field-to-field depending on field and equipment size. All strips were machine harvested for grain yield.

In Trials 1, 11, 12, 13, 14, and 15, a weed management system in corn using Roundup® (glyphosate) plus Realm Q® (rimsulfuron plus

mesotrione) was compared with a weed management system using Impact® (topramezone) (Table 2). In Trial 2, the corn hybrid Wyffels W7246RIB was compared with Pioneer P1197AM. A windstorm occurred at R1 in this trial. In Trial 3, Generate® at 1 pt/acre was applied in-furrow to corn with a starter fertilizer and compared to starter fertilizer alone. Generate® is marketed by Agnition as a stimulant for microorganisms to liberate micronutrients. In Trial 4, Dakota REV™ at 1 qt/acre was applied to V15 corn. Dakota REV™ is a plant-based humus. In Trials 5 and 6, Tryptophan was applied at 4 gal/acre to V6 corn. Tryptophan is marketed by Ajinomoto as a biostimulant. In Trials 7 and 8, soybean yields were investigated using a tillage pass with a Degelman Pro Till compact disk cultivator compared with tillage with a Case IH ripper; both tillage passes were made in the fall. In Trial 9, corn yields were compared using strip tillage versus conventional tillage using Wyffels hybrids W4196RIM and W4796RIB. In Trial 10, soybean yields were investigated using tillage with a disk and field cultivator in the spring compared with no-till. In Trial 16, the effect of ILeVO® seed treatment on soybean yield was investigated. ILeVO® is promoted to lessen sudden death syndrome. In Trial 17, the effect of Cruiser Max® seed treatment on soybean yield was investigated. Cruiser Max® is an insecticide that is effective on bean leaf beetles and other insect pests.

Results and Discussion

In Trials 1, 11, 12, 13, 14, and 15 there was no difference in corn yield with corn planted using a weed management system utilizing the Roundup® and Realm Q® compared with a system using Impact® (Table 2). The weed

control was similar with the two systems, but there was greater crop injury with the Roundup® plus Realm Q® system. In Trial 2, the Wyffels hybrid yielded more than the Pioneer hybrid. In Trial 3, the Generate® had no effect on soybean yield. In Trial 4, the Dakota REV™ had no effect on corn yield. In Trials 5 and 6, the L-tryptophan had no effect on corn yield. In Trials 7 and 8, there was no difference in soybean yield with the two tillage systems. In Trial 9, within each hybrid there was no difference in yield between corn planted with strip tillage compared with conventional tillage. However, Wyffels W4196RIB planted with conventional tillage yielded 31 bushels/acre more than Wyffels W4796RIB planted with strip tillage ($P = 0.03$). In Trial 10, there was no difference in soybean yields when soybeans were planted following a spring disking and field cultivation compared with no-till. Other studies have shown there is seldom a yield difference with soybeans with various tillage

systems. In Trial 16, the soybeans with the ILeVO® seed treatment yielded 5 bushels/acre more than those without the seed treatment ($P = 0.06$). There was no sudden death syndrome seen in the field to account for the yield difference. In Trial 17, soybeans with the Cruiser Max® seed treatment yielded 12 bushels/acre more than soybeans not receiving the seed treatment ($P < 0.01$). There were some bean leaf beetles present in the field, but not enough to justify an insecticide application, so it is uncertain why there was this large yield increase with the seed treatment.

NOTE: The results presented are from replicated demonstration trials. Statistics are used to detect differences at a location and should not be interpreted beyond the single location.

Table 1. Variety, planting date, planting population, previous crop, and tillage practices in on-farm trials investigating various management practices in corn and soybean (SB) in 2018.

Exp. no.	Trial	Management practice	County	Variety	Row spacing (in.)	Planting date	Planting pop. (seeds/ac)	Prev. crop	Tillage
180101	1	Impact vs. Roundup	Lyon	Pioneer P0157AMXT	22	5/19/18	36,000	Corn	Conventional
180618	2	Variety	Pottawattamie	Wyffels 7246RIB & Pioneer P1197AM	30	4/28/18	32,000	Corn	No-till
180113	3	Soil amendment	Osceola	Pioneer P20T79R2	30	6/10/18	140,000	Corn	No-till
180206	4	Plant growth regulator	Buena Vista	Golden Harvest GO2W74	30	5/19/18	35,600	SB	Spring mulch till
180501	5	Plant growth regulator	Story	Curry 729.96	30	4/29/18	34,000	SB	Conventional
180502	6	Plant growth regulator	Boone	Pioneer P1197AMXT	30	4/30/18	34,000	SB	Conventional
180407	7	Tillage	Wright	Nu Tech 3252	30	6/14/18	155,000	Corn	Degelman Pro Till vs. Case IH Ripper
180408	8	Tillage	Wright	Channel 2017R2X	30	5/28/18	139,000	Corn	Degelman Pro Till vs. Case IH Ripper
180409	9	Variety and tillage	Hancock	Wyffels W4796RIB & W4196RIB	30	5/18/18	35,000	SB	Strip till vs. conventional
180505	10	Tillage	Dallas	Stine 28BAO2	30	5/9/18	140,000	Corn	Disc, field cultivate vs. no till
180142	11	Impact vs. Roundup	Lyon	Pioneer PO589AMXT	22	5/20/18	36,000	Corn	Conventional
180143	12	Impact vs. Roundup	Lyon	Pioneer P9929AMXT	22	5/20/18	36,000	Corn	Conventional
180144	13	Impact vs. Roundup	Lyon	Pioneer P9929AMXT	22	5/21/18	36,000	Corn	Conventional
180145	14	Impact vs. Roundup	Lyon	Pioneer P0157AMXT	22	5/20/18	36,000	Corn	Conventional
180146	15	Impact vs. Roundup	Lyon	Pioneer P0157AMXT	22	5/20/18	36,000	Corn	Conventional
180803	16	Seed treatment	Floyd	Pfister 20R23	30	5/19/18	155,000	Corn	No-till
180817	17	Seed treatment	Bremer	Remington Seeds ML2663N	30	5/19/18	144,000	Corn	No-till

Table 2. Yields for on-farm corn and soybean trials investigating various management practices in 2018.

Exp. no.	Trial	Treatment	Yield (bu/ac) ^a	P-value ^b
180101	1	Impact @ 0.83 oz/ac	213 a	0.51
		Roundup @ 34 oz/ac + Realm Q @ 3 oz/ac	216 a	
180618	2	Wyffels W7246RIB ^c	177 a	<0.01
		Pioneer P1197AM ^c	120 b	
180113	3	Generate in-furrow at 1 pt/ac with 4 gal/ac of 4-24-6	47 a	0.91
		4 gal/ac of 4-24-6 in-furrow	47 a	
180206	4	Dakota REV applied at 1 qt/ac to corn at V15	191 a	0.73
		Control	190 a	
180501	5	Tryptophan applied at 4 gal/ac to V6 corn	157 a	0.36
		Control	147 a	
180502	6	Tryptophan applied at 4 gal/ac to V6 corn	224 a	0.34
		Control	230 a	
180407	7	Degelman Pro Till Compact Disk Cultivator in the fall	39 a	0.67
		Case IH Ripper in the fall	41 a	
180408	8	Degelman Pro Till Compact Disk Cultivator in the fall	55 a	0.52
		Case IH Ripper in the fall	54 a	
180409	9	Strip till with Wyffels W4196RIB	203 ab	0.03
		Conventional tillage with Wyffels W4196RIB	213 a	
		Strip till with Wyffels W4796RIB	182 b	
		Conventional tillage with Wyffels W4796RIB	194 ab	
180505	10	Disc and field cultivate in the spring	68 a	0.54
		No-till	71 a	
180142	11	Impact @ 0.83 oz/ac	224 a	0.81
		Roundup @ 34 oz/ac + Realm Q @ 3 oz/ac	223 a	
180143	12	Impact @ 0.83 oz/ac	223 a	0.87
		Roundup @ 34 oz/ac + Realm Q @ 3 oz/ac	223 a	
180144	13	Impact @ 0.83 oz/ac	209 a	0.49
		Roundup @ 34 oz/ac + Realm Q @ 3 oz/ac	206 a	
180145	14	Impact @ 0.83 oz/ac	217 a	0.69
		Roundup @ 34 oz/ac + Realm Q @ 3 oz/ac	219 a	
180146	15	Impact @ 0.83 oz/ac	220 a	0.61
		Roundup @ 34 oz/ac + Realm Q @ 3 oz/ac	222 a	
180803	16	ILeVo seed treatment	61 a	0.06
		No seed treatment	56 a	
180817	17	Cruiser Max seed treatment	88 a	<0.01
		No seed treatment	76 b	

^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.

^cFor these trials, the corn was damaged by wind at VT.