

On-Farm Soybean Date of Planting Demonstration Trials

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Mike Witt, On-Farm trials coordinator,
extension field agronomist

Jim Rogers, Armstrong Farm, ag specialist

Gary Thompson, McNay Farm, ag specialist

Chris Beedle, Western Farm, superintendent

Brandon Zwiefel, Northern Farm, ag specialist

Zack Koopman, AEA Farm, ag specialist

Chad Hesseltine, Southeast Farm, ag specialist

Ken Pecinovsky, Northeast Farm,
superintendent

Andrew Weaver, Northwest Farm,
ag specialist

Introduction

Timely soybean planting and choosing soybean varieties of the appropriate relative maturity is important to optimize soybean yields. Soybean management systems that include a foliar fungicide can improve soybean yields if foliar diseases are present. The objective of these trials was to investigate the effect of planting date, soybean variety, and fungicide use on soybean yield.

Materials and Methods

In 2020, nine trials investigated the effects of planting date, fungicide, and soybean variety on soybean yield. All nine trials were planted in 30-in. row spacings in fields that were corn the previous season. Eight of nine trials were planted at a population of 140,000 seeds/acre. Trial five was planted at 175,000 seeds/acre. All trials were conducted on research farms. Strips were arranged in a randomized complete block design with at least three replications/treatment. Strip length and width varied from field-to-field depending on field and equipment size. All plots were machine harvested for grain yield. In three of the trials (200001, 200701, 200306), varieties were compared based on planting date, maturity, and fungicide usage (Table 2). In eight trials,

an early- and a late-maturity soybean were planted on an early- and late-planting date. In trial 200306, three different varieties (an early-, mid-, and late-maturity) were planted early and late. In all trials with fungicide applications, Miravis Neo® fungicide was applied at 13.7-20 oz/acre at R3-R4 to the soybean.

Results and Discussion

In Trials 200001 and 200701, there was no difference in yields when comparing maturity by planting date by fungicide application at the $P = 0.10$ level (Table 2). Trials 200001 and 200701 showed a significant yield increase when fungicides were applied versus none ($P < .010$) regardless of planting date or maturity (Table 3). Trial 200001 was not significant to the $P = 0.10$ level when comparing planting dates with fungicide, but was without fungicides (Table 4). Trial 200701 had a stand loss noted due to an early season frost event that affected the overall yields of the early planting date, which is reflected in results. Trials 200306, 200117, 200801, 200601, and 200607 had no difference in yield between the treatments ($P = 0.10$). Trials 200405 and 200501 each had a variety that was significantly affected by planting date (Table 5).

These trials suggest soybean planted in late April or early May may tend to yield more than later plantings. Late-maturity, full-season varieties tended to yield more than shorter season varieties. In 2 of 5 trials, the fungicide application resulted in yield gains.

Acknowledgements

This project was a collaboration with ISU On-Farm Demonstration Trials and the Iowa Soybean Association.

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, fungicide rates, application dates, and tillage practices in the 2020 date of planting trials on soybean with and without fungicide usage.

Trial	County	Variety	Planting date	Fungicide rate and date applied	Tillage
200001	Lucas	Pioneer P31A22X	5/2/20	Miravis Neo	Vertical
		Pioneer P37A27X	6/2/20	18 oz/ac 7/28/2020	
200701	Washington	Merschman Osage 2025E	4/21/20	Miravis Neo	Fall chisel, spring soil finish
		Merschman Mohawk 1928E	5/5/20	13.7 oz/a. 7/13/2020	
200306	Monona	LG Seeds LG 1776	5/3/20	Miravis Neo	No-till
		LG Seeds LG 2444	5/21/20	13.7 oz/ac 8/11/2020	
		LG Seeds LG 3060			
200117	O'Brien	Pioneer P23A32X	4/24/20	Miravis Neo	Conv.
		Pioneer P28A42X	5/22/20	20 oz/ac 7/10/2020	
200801	Floyd	Pioneer P18A98X	4/20/20	Miravis Neo	No-till
		Pioneer P25A04X	5/13/20	13.7 oz/ac 8/5/2020	
200405	Hancock	NuTech 20N03E	4/20/20	None	Conv.
		NuTech 26N04E	5/7/20		
200501	Boone	Pioneer P24T76E	4/21/20	None	Fall ripped, spring cult
		Pioneer P28T14E	5/8/20		
200601	Pottawattamie	BASF CZ 2550 GTLL	4/24/20	None	No-till
		BASF CZ 3099 GTLL	5/7/20		
200607	Adair	BASF CZ 2830 GTLL	5/6/20	None	No-till
		BASF CZ 3250 GTLL	5/30/20		

Table 2. Yields for on-farm soybean trials maturity x planting date x fungicide in 2020.

Trial	Variety	Maturity	Planting date	Fungicide	Yield (bu/ac) ^a	P-value ^b
200001	P37A27X	3.7	5/2/20	Yes	62 a	0.95
	P31A22X	3.1	5/2/20	Yes	61 a	
	P37A27X	3.7	6/2/20	Yes	59 ab	
	P37A27X	3.7	5/2/20	No	54 bc	
	P31A22X	3.1	6/2/20	Yes	53 bc	
	P31A22X	3.1	5/2/20	No	52 cd	
	P37A27X	3.7	6/2/20	No	51 cd	
	P31A22X	3.1	6/2/20	No	46 d	
200701	Mohawk 1928E	2.8	5/5/20	Yes	71 a	0.59
	Mohawk 1928E	2.8	5/5/20	No	68 ab	
	Osage 2025E	2.5	5/5/20	Yes	68 b	
	Osage 2025E	2.5	5/5/20	No	67 b	
	Mohawk 1928E	2.8	4/21/20	Yes	64 c	
	Osage 2025E	2.5	4/21/20	Yes	63 c	
	Osage 2025E	2.5	4/21/20	No	61 c	
	Mohawk 1928E	2.8	4/21/20	No	61 c	
200306	LG 2444	2.4	5/21/20	Yes	80 a	0.89
	LG 3060	3.0	5/21/20	Yes	79 a	
	LG 2444	2.4	5/3/20	Yes	79 a	
	LG 2444	2.4	5/3/20	No	79 a	
	LG 1776	1.7	5/21/20	Yes	75 a	
	LG 3060	3.0	5/21/20	No	74 a	
	LG 2444	2.4	5/21/20	No	72 a	
	LG 1776	1.7	5/3/20	No	72 a	
	LG 3060	3.0	5/3/20	Yes	72 a	
	LG 3060	3.0	5/3/20	No	72 a	
	LG 1776	1.7	5/21/20	No	70 a	
	LG 1776	1.7	5/3/20	Yes	70 a	

^aValues denoted with the same letter within a trial are not statistically different at the significance level of 0.10.

^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. This is consistent for demonstration trials.

Table 3. Yields for on-farm soybean trials effect of fungicide.

Trial	Treatment	Fungicide application rate	Fungicide application date	Yield (bu/ac) ^a	P-value ^b
200001	Miravis Neo	18 oz/ac	7/28/20	59 a	<0.01
	None			51 b	
200701	Miravis Neo	13.7 oz/ac	7/13/20	66 a	0.01
	None			64 b	
200306	Miravis Neo	13.7 oz/ac	8/11/20	76 a	0.36
	None			73 a	

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^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. This is consistent for demonstration trials.

Table 4. Yields for on-farm soybean trials maturity x planting date with fungicide in 2020.

Trial	Variety	Maturity	Planting		Yield (bu/ac) ^a	P-value ^b
			date	Fungicide		
200001	P37A27X	3.7	5/2/20	Yes	62 a	0.19
	P31A22X	3.1	5/2/20	Yes	61 a	
	P37A27X	3.7	6/2/20	Yes	59 ab	
	P31A22X	3.1	6/2/20	Yes	53 b	
200701	Mohawk 1928E	2.8	5/5/20	Yes	71 a	<0.01
	Osage 2025E	2.5	5/5/20	Yes	68 b	
	Mohawk 1928E	2.8	4/21/20	Yes	64 c	
	Osage 2025E	2.5	4/21/20	Yes	63 c	
200306	LG 2444	2.4	5/21/20	Yes	80 a	0.68
	LG 3060	3.0	5/21/20	Yes	79 a	
	LG 2444	2.4	5/3/20	Yes	79 a	
	LG 1776	1.7	5/21/20	Yes	74 a	
	LG 3060	3.0	5/3/20	Yes	72 a	
	LG 1776	1.7	5/3/20	Yes	70 a	
200117	P23A32X	2.3	4/24/20	Yes	71 a	0.23
	P28A42X	2.8	4/24/20	Yes	70 ab	
	P28A42X	2.8	5/22/20	Yes	68 bc	
	P23A32X	2.3	5/22/20	Yes	66 c	
200801	P18A98X	1.8	5/13/20	Yes	63 a	0.51
	P25A04X	2.5	5/13/20	Yes	62 ab	
	P18A98X	1.8	4/20/20	Yes	62 ab	
	P25A04X	2.5	4/20/20	Yes	61 b	

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^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. This is consistent for demonstration trials.

Table 5. Yields for on-farm soybean trials maturity x planting date without fungicide in 2020.

Trial	Variety	Maturity	Planting		Yield (bu/ac) ^a	P-value ^b
			date	Fungicide		
200001	P37A27X	3.7	5/2/20	No	54 a	0.02
	P31A22X	3.1	5/2/20	No	52 a	
	P37A27X	3.7	6/2/20	No	51 a	
	P31A22X	3.1	6/2/20	No	46 b	
200701	Mohawk 1928E	2.8	5/5/20	No	68 a	<0.01
	Osage 2025E	2.8	5/5/20	No	67 a	
	Osage 2025E	2.5	4/21/20	No	61 b	
	Mohawk 1928E	2.8	4/21/20	No	61 b	
200306	LG 2444	2.4	5/3/20	No	79 a	0.67
	LG 3060	3.0	5/21/20	No	74 a	
	LG 2444	2.4	5/21/20	No	72 a	
	LG 1776	1.7	5/3/20	No	72 a	
	LG 3060	3.0	5/3/20	No	71 a	
	LG 1776	1.7	5/21/20	No	70 a	
200405	NuTech 26N04E	2.6	4/20/20	No	80 a	<0.01
	NuTech 26N04E	2.6	5/7/20	No	79 a	
	NuTech 20N03E	2.0	4/20/20	No	74 b	
	NuTech 20N03E	2.0	5/7/20	No	70 c	

Table 5 (continued). Yields for on-farm soybean trials maturity x planting date without fungicide in 2020.

200501	P28T14E	2.8	4/21/20	No	55 a	<0.01
	P28T14E	2.8	5/8/20	No	54 a	
	P24T76E	2.4	4/21/20	No	52 b	
	P24T76E	2.4	5/8/20	No	51 c	
200601	CZ 2550 GTLL	2.5	4/24/20	No	68 a	0.51
	CZ 3099 GTLL	3.0	4/24/20	No	68 a	
	CZ 3099 GTLL	3.0	5/7/20	No	66 a	
	CZ 2550 GTLL	2.5	5/7/20	No	63 a	
200607	CZ 2830 GTLL	2.5	4/24/20	No	64 a	0.12
	CZ 3250 GTLL	3.0	4/24/20	No	63 ab	
	CZ 3250 GTLL	3.0	5/7/20	No	60 bc	
	CZ 2830 GTLL	2.5	5/7/20	No	59 c	

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^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. This is consistent for demonstration trials.