

Using Fungicide-treated Seed for Very Early Soybean Planting

John Lundvall, ag specialist
Keith Whigham, professor
and extension agronomist
Mark Westgate, associate professor
Dale Farnham, assistant professor
and extension agronomist
Department of Agronomy

Introduction

Modern, elite soybean varieties respond well to early planting. Multi-year results from ISU research farms suggest that mid-April to early May planting dates most often produce top yields. Research farm and on-farm strip trials also suggest that elite varieties yield similarly over a wide range of seeding rates and resulting harvest populations. Based on these results, producers are advised to plant soybeans as soon as spring field conditions allow, with a seeding rate of 150,000 to 175,000 seeds/acre.

Yield response of modern varieties to early planting leads to speculation about planting some soybean acres very early (late March or early April), when weather conditions allow. Therefore in 2000, a soybean “planting date × seed treatment” test was started to evaluate yield response of two adapted high-yield varieties to very early planting. Two research objectives were identified: 1) to determine whether planting soybeans before corn could be a viable management option for Iowa producers, and 2) to evaluate the need for fungicide seed treatments to make this practice profitable. Establishing similar statewide studies at four other university research farms allowed us comparison of soybean yield response to fungicide seed treatments in five environments.

Materials and Methods

Adapted high-yield conventional varieties from LG/Callahan Seed Company (C-9288 variety, relative maturity 2.8) and Merschman Seed

Company (“Mohave V” variety, relative maturity 2.8) were tested in 2000 and 2001. LG/Callahan and Merschman both offer fungicide-treated soybean seed. Fungicide seed treatments fight seedling diseases that can weaken or kill early planted soybeans. Each company was asked to furnish its varieties with and without seed-applied fungicide treatment; therefore, a total of four treatments were compared on each of four planting dates. Experimental plots were planted directly into standing corn stalks at a rate of 175,000 seeds/acre, using a John Deere 7100 planter with 30-inch row spacing. Planting dates included March 30, April 24, May 15, and May 30 (2000) and April 19, April 30, May 23, and June 11 (2001). Planting dates in 2001 were selected to approximately match the “March 1 to planting date” growing degree-day (GDD) accumulations for corresponding 2000 planting dates. Planting dates and treatments were included in a split-plot design with four replications. Main plot treatments were planting dates; subplot treatments were variety/seed treatment combinations. Plots were machine harvested on October 3, 2000 and October 17, 2001. Grain yields (adjusted to 13% moisture) and established plant population estimates are summarized in Tables 1–3.

Results and Discussion

Averaged across varieties and years, fungicide-treated and untreated soybean yields were statistically similar ($P>0.05$) on all planting dates. This yield response was consistent across four southern Iowa test environments (Table 1) and at the Southeast Research Farm (Table 2). Varieties responded similarly to seed fungicide treatment. As in previous studies, soybeans yielded best when planted by mid-May.

Producers considering very early soybean planting recognize the risk of stand losses

caused by seedling diseases in cooler soils. Other factors contributing to reduced plant stand levels (summarized in Table 3) included severe bean leaf beetle feeding with subsequent seedling death in 2000, and poor seed quality and germination in 2001.

Conclusions

Yield results from northern Iowa university research farms suggest that fungicide seed treatments are a valuable risk management tool for very early planted soybeans in Iowa, particularly in fields with a history of severe seedling disease pressure. However, fungicide seed treatments did not consistently improve soybean yields at southern Iowa test sites. Multi-year testing suggests that yield potential is maximized when soybean planting is completed

before mid-May. Depending on total soybean acres, producers might consider taking advantage of favorable spring weather and soil conditions to plant a portion of soybean acres ahead of corn; however, producers must consider stand establishment risks associated with planting before mid-April. Results of this study suggest the need for further testing of seed fungicide treatments for very early planted soybeans in Iowa.

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Table 1. Planting date and seed treatment effects on soybean yield in 4 southern Iowa environments (2000-2001).

Experimental treatment	Yield performance by average planting date				
	April 9	April 24	May 16	June 3	All planting dates
	------(Bushels/acre)-----				
Untreated seed (control)	43.5	45.4	47.9	46.1	45.7
Fungicide-treated seed	<u>44.3</u>	<u>44.7</u>	<u>48.0</u>	<u>45.1</u>	<u>45.6</u>
Mean	43.9 B ¹	45.0 B	47.9 A	45.6 B	45.6
LSD. (P=0.05)	NS ²	NS	NS	NS	NS

¹ Planting date mean yields followed by different letters are statistically different (P<0.05).

² "NS" indicates no statistically significant (P>0.05) seed treatment effect on soybean yield.

Table 2. Planting date and seed treatment effects on soybean yield in 2000 and 2001 at the Southeast Farm, Crawfordsville, IA.

Experimental treatment	Yield performance by average planting date				
	April 9	April 27	May 19	June 5	All planting dates
	------(Bushels/acre)-----				
Untreated seed (control)	48.0	51.4	50.8	49.9	50.0
Fungicide-treated seed	<u>48.6</u>	<u>51.1</u>	<u>51.5</u>	<u>48.5</u>	<u>49.9</u>
Mean	48.3 B ¹	51.2 A	51.1 A	49.2 AB	50.0
LSD (P=0.05)	NS ²	NS	NS	NS	NS

¹ Planting date mean yields followed by different letters are statistically different (P<0.05).

² "NS" indicates no statistically significant (P>0.05) seed treatment effect on soybean yield.

Table 3. Estimated established plant stand levels in 2000 and 2001 at the Southeast Farm, Crawfordsville, IA.

Experimental treatment	Date 1		Date 2		Date 3		Date 4	
	'00	'01	'00	'01	'00	'01	'00	'01
	------(Plants/acre × 1000)-----							
LG/Callahan with no seed treatment (control)	99	111	116	99	150	107	130	132
LG/Callahan with fungicide seed treatment	129	104	130	108	152	111	129	118
Merschman with no seed treatment (control)	133	112	136	109	154	94	142	120
Merschman with fungicide seed treatment	132	117	134	109	155	103	145	122