

Seed-Applied Fungicides for Very Early Planted Soybeans

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

Today's high-yielding soybean varieties respond favorably to early planting. Multi-year results from statewide university research farms suggest that mid-April to early May planting dates produce top yields in most comparisons. 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 150,000–175,000 seeds/acre.

The yield response of modern varieties to early planting raises questions about expanding the soybean-planting season when weather conditions allow (very early planting of some soybean acres, in late March or early April). In 2000, a soybean “planting date × seed treatment” study was initiated to evaluate yield response of two adapted, high-yield varieties to very early planting. Research objectives were to determine (a) whether planting soybeans earlier than corn could be a viable management option for Iowa producers and (b) if fungicide seed treatments are needed to make this practice profitable. Establishment of similar studies at four other university research farms in northern Iowa allowed comparison of soybean yield response to fungicide seed treatments in five environments.

Materials and Methods

Adapted, high yield conventional soybean varieties from LG/Callahan Seed Company (C-2200 variety, relative maturity 2.2) and Merschman Seed Company (“Comanche V” variety, relative maturity 2.2) were tested in 2000 and 2001. LG/Callahan and Merschman offer fungicide-treated soybean seed. Fungicide seed treatments fight soybean seedling diseases that can weaken or kill early-planted soybeans. Each company was asked to furnish 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 175,000 seeds/acre, using a Kinze planter with 30-inch row spacing. Planting dates were: (for 2000) March 30, April 18, May 10, and June 3; (for 2001) April 20, April 27, May 18, and June 10. In 2000, hail damage on July 25 reduced yield potential of all plots. In 2001, planting dates were selected to approximate “March 1 to planting date” growing degree-day (GDD) accumulations on corresponding 2000 planting dates.

Planting dates and treatments were included in a split-plot design, with four replications. Main plot treatments were on planting dates, and variety/seed treatment combinations were subplot treatments. Plots were machine harvested on October 2, 2000, and October 17, 2001. Grain yield data (adjusted to 13% moisture) are summarized in Tables 1–3.

Results and Discussion

For all varieties and years, soybean yield response to fungicide seed treatment, when averaged across all planting dates, was statistically significant ($P < 0.05$), but for only the earliest of four individual planting dates.

This yield response was consistent across four northern Iowa test environments (Table 1) and at the Northeast Research and Demonstration Farm (Table 2). Soybeans yielded best when planted by mid-May. Poor stand establishment limited yield potential of earlier planting dates. Yield response to seed fungicide treatment was most evident with the LG/Callahan variety (Table 3).

Producers considering very early soybean planting recognize the risk of stand losses caused by seedling diseases in cooler soils. Yield results suggest that fungicide seed treatments are a valuable risk management tool for very early-planted soybeans in northern Iowa, particularly in fields with a history of severe seedling disease pressure. 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 strongly suggest use of seed fungicide treatments for very early-planted soybeans in northern Iowa.

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Table 1. Planting date and seed treatment effects on soybean yield in four northern Iowa environments (2000–2001).

Experimental treatment	Yield performance by average planting date				All planting dates
	April 9	April 23	May 14	June 7	
	----- (bushels/acre) -----				
Untreated seed (control)	38.4 b ¹	39.6 a	45.4 a	39.7 a	40.8 b
Fungicide-treated seed	<u>43.1 a</u>	<u>41.4 a</u>	<u>45.8 a</u>	<u>39.8 a</u>	<u>42.5 a</u>
Mean	40.8 B ²	40.5 B	45.6 A	39.7 B	41.6
LSD (P = 0.05)	3.3	NS ³	NS	NS	1.7

¹ Within columns, experimental treatment mean yields followed by different letters are statistically different (P<0.05).

² Planting date mean yields followed by different letters are statistically different (P<0.05).

³ “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 Nashua, IA.

Experimental treatment	Yield performance by average planting date				All planting dates
	April 9	April 24	May 14	June 7	
	----- (bushels/acre) -----				
Untreated seed (control)	43.2 b ¹	46.4 a	51.1 a	46.2 a	46.7 b
Fungicide-treated seed	<u>48.4 a</u>	<u>48.2 a</u>	<u>51.5 a</u>	<u>46.7 a</u>	<u>48.7 a</u>
Mean	45.8 B ²	47.3 B	51.3 A	46.4 B	47.7
LSD (P = 0.05)	3.6	NS ³	NS	NS	1.2

¹ Within columns, experimental treatment mean yields followed by different letters are statistically different (P<0.05).

² Planting date mean yields followed by different letters are statistically different (P<0.05).

³ “NS” indicates no statistically significant (P>0.05) seed treatment effect on soybean yield.

Table 3. Planting date, variety, and seed treatment effects on soybean yield in 2000 and 2001 at Nashua, IA.

Experimental treatment	Yield performance by average planting date				All planting dates
	April 9	April 24	May 14	June 7	
	----- (bushels/acre) -----				
LG/Callahan untreated (control)	36.3 b ¹	43.9 c	49.3 b	45.7 b	43.8 c
LG/Callahan treated	47.2 a	46.5 bc	51.7 a	44.7 b	47.5 b
Merschman untreated (control)	50.1 a	49.0 ab	52.8 a	46.7 ab	49.6 a
Merschman treated	<u>49.6 a</u>	<u>50.0 a</u>	<u>51.3 ab</u>	<u>48.7 a</u>	<u>49.9 a</u>
Mean	45.8 B ²	47.3 C	51.3 A	46.4 C	47.7
LSD (P = 0.05)	3.3	2.9	2.3	2.2	0.7

¹ Within columns, experimental treatment mean yields followed by different letters are statistically different (P<0.05).

² Planting date mean yields followed by different letters are statistically different (P<0.05).