2002

Seed Fungicide Treatments for Very Early Soybean Planting

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Recommended Citation

Lundvall, John; Whigham, Keith; Westgate, Mark E.; and Farnham, Dale E., "Seed Fungicide Treatments for Very Early Soybean Planting" (2002). *Iowa State Research Farm Progress Reports*. 1612.  
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Seed Fungicide Treatments for Very Early Soybean Planting

Abstract
Today’s high-yielding soybean varieties respond favorably to early planting. Multiyear 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 to 175,000 seeds/acre.

Disciplines
Agricultural Science | Agriculture

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Seed Fungicide Treatments for Very Early Soybean Planting

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Mark Westgate, associate professor, agronomy
Dale Farnham, assistant professor and extension agronomist

Introduction
Today’s high-yielding soybean varieties respond favorably to early planting. Multiyear 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 to 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 are 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 statewide afforded yield response comparisons of fungicide seed treatment effects in five environments.

Materials and Methods
Adapted, high yield conventional varieties from LG/Callahan (C-2200 variety, relative maturity 2.2) and Merschman (“Comanche V” variety, relative maturity 2.2) seed companies 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, causing profit-robbing stand reductions.

Each company was asked to furnish its varieties with and without respective fungicide treatments, thereby providing a total of four treatments to compare on each of four planting dates. Experimental plots were planted at 175,000 seeds/acre into a seedbed of lightly disked corn stalks, using a John Deere 7000 planter with 30-inch row spacing.

Planting dates were: (for 2000) March 31, April 18, May 10, and June 2; (for 2001) April 19, April 30, May 18, and June 11. Planting dates in 2001 were selected to match approximate “March 1 to planting date” growing degree-day (GDD) accumulations of corresponding 2000 planting dates.

Planting dates and treatments were included in a split-plot design with four replications. Main plot treatments were planting dates, and variety/seed treatment combinations were subplot treatments. Plots were machine harvested on October 11,2000, and October 17, 2001. Tables 1–3 summarize grain yields (adjusted to 13% moisture) and established plant population estimates.

Results and Discussion
Averaged across varieties and years, average soybean yield response to fungicide seed treatment was statistically significant (P<0.05) on only the earliest of four planting dates. This yield response was consistent across four northern Iowa test environments (Table 1) and at the Northwest Research Farm (Table 2). In all
of this study’s test environments, soybeans yielded best when planted in 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 poor seed germination and severe bean leaf beetle feeding with subsequent seedling death in 2000, and a period of extended cool, wet weather that hampered establishment of all late April-planted 2001 plots.

Results and Discussion
Yield results 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. Multiyear 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 Iowa.

Acknowledgments
The authors wish to thank Andy Christensen and Dave Haden for their assistance in conducting this research. Thanks also to LG/Callahan and Merschman seed companies for providing the seed used in this study.
Table 1. Planting date and seed treatment effects on soybean yield in 4 northern Iowa environments (2000–2001).

<table>
<thead>
<tr>
<th>Experimental treatment</th>
<th>April 9 (bushels/acre)</th>
<th>April 23</th>
<th>May 14</th>
<th>June 7</th>
<th>All planting dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated seed (control)</td>
<td>38.4 b¹</td>
<td>39.6 a</td>
<td>45.4 a</td>
<td>39.7 a</td>
<td>40.8 b</td>
</tr>
<tr>
<td>Fungicide-treated seed</td>
<td>43.1 a</td>
<td>41.4 a</td>
<td>45.8 a</td>
<td>39.8 a</td>
<td>42.5 a</td>
</tr>
<tr>
<td>Mean</td>
<td>40.8 B²</td>
<td>40.5 B</td>
<td>45.6 A</td>
<td>39.7 B</td>
<td>41.6</td>
</tr>
<tr>
<td>LSD (P=0.05)</td>
<td>3.3</td>
<td>NS³</td>
<td>NS</td>
<td>NS</td>
<td>1.7</td>
</tr>
</tbody>
</table>

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 Sutherland, IA.

<table>
<thead>
<tr>
<th>Experimental treatment</th>
<th>April 9 (bushels/acre)</th>
<th>April 24</th>
<th>May 14</th>
<th>June 7</th>
<th>All planting dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated seed (control)</td>
<td>33.6 b¹</td>
<td>32.8 a</td>
<td>39.8 a</td>
<td>33.2 a</td>
<td>34.8 b</td>
</tr>
<tr>
<td>Fungicide-treated seed</td>
<td>37.9 a</td>
<td>34.5 a</td>
<td>40.0 a</td>
<td>32.8 a</td>
<td>36.3 a</td>
</tr>
<tr>
<td>Mean</td>
<td>35.7 B²</td>
<td>33.6 C</td>
<td>39.9 A</td>
<td>33.0 C</td>
<td>35.6</td>
</tr>
<tr>
<td>LSD (P=0.05)</td>
<td>3.1</td>
<td>NS³</td>
<td>NS</td>
<td>NS</td>
<td>0.4</td>
</tr>
</tbody>
</table>

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. Estimated established plant stand levels in 2000 and 2001 at Sutherland, IA.

<table>
<thead>
<tr>
<th>Experimental treatment</th>
<th>Date 1</th>
<th>Date 2</th>
<th>Date 3</th>
<th>Date 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>'00 '01</td>
<td>'00 '01</td>
<td>'00 '01</td>
<td>'00 '01</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>LG/Callahan with no seed treatment (control)</td>
<td>28 109</td>
<td>77 69</td>
<td>109 130</td>
<td>86 108</td>
</tr>
<tr>
<td>LG/Callahan with fungicide seed treatment</td>
<td>89 121</td>
<td>92 82</td>
<td>111 136</td>
<td>83 115</td>
</tr>
<tr>
<td>Merschman with no seed treatment (control)</td>
<td>130 122</td>
<td>142 67</td>
<td>163 132</td>
<td>118 109</td>
</tr>
<tr>
<td>Merschman with fungicide seed treatment</td>
<td>137 128</td>
<td>133 70</td>
<td>150 135</td>
<td>117 110</td>
</tr>
</tbody>
</table>