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Using Fungicide-treated Seed for Very Early Soybean Planting

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Using Fungicide-treated Seed for Very Early Soybean Planting

Abstract
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.

Keywords
Agronomy

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences

This southeast research and demonstration farm is available at Iowa State University Digital Repository: http://lib.dr.iastate.edu/farms_reports/1675
Using Fungicide-treated Seed for Very Early Soybean Planting

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Mark Westgate, associate professor
Dale Farnham, assistant professor
and extension agronomist
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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 x 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 (“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.

Acknowledgments
The authors wish to thank Matt Hunt and Kevin Van Dee for their assistance in conducting this research. We also thank LG/Callahan Seed Company and Merschman Seed Company for their cooperation on this research project.

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

<table>
<thead>
<tr>
<th>Experimental treatment</th>
<th>April 9</th>
<th>April 24</th>
<th>May 16</th>
<th>June 3</th>
<th>All planting dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated seed (control)</td>
<td>43.5</td>
<td>45.4</td>
<td>47.9</td>
<td>46.1</td>
<td>45.7</td>
</tr>
<tr>
<td>Fungicide-treated seed</td>
<td>44.3</td>
<td>44.7</td>
<td>48.0</td>
<td>45.1</td>
<td>45.6</td>
</tr>
<tr>
<td>Mean</td>
<td>43.9 B&lt;sup&gt;1&lt;/sup&gt;</td>
<td>45.0 B</td>
<td>47.9 A</td>
<td>45.6 B</td>
<td>45.6</td>
</tr>
<tr>
<td>LSD. (P=0.05)</td>
<td>NS&lt;sup&gt;2&lt;/sup&gt;</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

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

<sup>2</sup> “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.

<table>
<thead>
<tr>
<th>Experimental treatment</th>
<th>April 9</th>
<th>April 27</th>
<th>May 19</th>
<th>June 5</th>
<th>All planting dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated seed (control)</td>
<td>48.0</td>
<td>51.4</td>
<td>50.8</td>
<td>49.9</td>
<td>50.0</td>
</tr>
<tr>
<td>Fungicide-treated seed</td>
<td>48.6</td>
<td>51.1</td>
<td>51.5</td>
<td>48.5</td>
<td>49.9</td>
</tr>
<tr>
<td>Mean</td>
<td>48.3 B&lt;sup&gt;1&lt;/sup&gt;</td>
<td>51.2 A</td>
<td>51.1 A</td>
<td>49.2 AB</td>
<td>50.0</td>
</tr>
<tr>
<td>LSD. (P=0.05)</td>
<td>NS&lt;sup&gt;2&lt;/sup&gt;</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

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

<sup>2</sup> “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.

<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>99 111</td>
<td>116 99</td>
<td>150 107</td>
<td>130 132</td>
</tr>
<tr>
<td>LG/Callahan with fungicide seed treatment</td>
<td>129 104</td>
<td>130 108</td>
<td>152 111</td>
<td>129 118</td>
</tr>
<tr>
<td>Merschman with no seed treatment (control)</td>
<td>133 112</td>
<td>136 109</td>
<td>154 94</td>
<td>142 120</td>
</tr>
<tr>
<td>Merschman with fungicide seed treatment</td>
<td>132 117</td>
<td>134 109</td>
<td>155 103</td>
<td>145 122</td>
</tr>
</tbody>
</table>