

2-22-2012

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### Recommended Citation

Robertson, Alison E.; Mueller, Daren S.; Wiggs, Stith N.; and Hodgson, Erin W., "2011 Evaluation of Fungicide and Insecticide Seed Treatments on Soybean in Iowa" (2012). *Integrated Crop Management News*. 261.

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# 2011 Evaluation of Fungicide and Insecticide Seed Treatments on Soybean in Iowa

## **Abstract**

The use of seed treatments on soybeans has increased considerably over the past few years. Seed treatments protect seed from seedling diseases, caused by *Pythium*, *Phytophthora*, *Fusarium* and *Rhizoctonia*, and also insect pests such as the bean leaf beetle. Although a seed treatment may help ensure uniform emergence and optimum stands, such benefits do not always result in greater yields.

In Iowa, the benefits of a seed treatment on soybean have not been well studied. A 2011 field study, funded with check off dollars from the Iowa Soybean Association, evaluated the effect of commercially available fungicide and insecticide seed treatments on seedling disease, insect pests and soybean yield. The study was done at three locations in Iowa: ISU Northeast Research and Demonstration Farm (NERF) at Nashua, ISU Southeast Research and Demonstration Farm (SERF) near Crawfordsville, and a farmer's field in Nevada (two planting dates). Twelve demonstration plots were also planted at the ISU Field Extension and Education Laboratory (FEEL) near Boone.

## **Keywords**

Plant Pathology and Microbiology, Entomology

## **Disciplines**

Agricultural Science | Agriculture | Entomology | Plant Pathology

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### 2011 Evaluation of Fungicide and Insecticide Seed Treatments on Soybean in Iowa

**Alison Robertson, Daren Mueller, Stith Wiggs, Department of Plant Pathology and Microbiology; Erin Hodgson, Department of Entomology**

The use of seed treatments on soybeans has increased considerably over the past few years. Seed treatments protect seed from seedling diseases, caused by *Pythium*, *Phytophthora*, *Fusarium* and *Rhizoctonia*, and also insect pests such as the bean leaf beetle. Although a seed treatment may help ensure uniform emergence and optimum stands, such benefits do not always result in greater yields.

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#### Materials and Methods

The experimental design at each location was a randomized complete block with four replications. Plot sizes were 10 feet wide (four rows) by 17.5 feet. Details on variety and planting and harvest dates are listed in Table 1. Unfortunately rain delayed our proposed planting dates by two weeks. Seed treatment products that were evaluated are listed in Table 2.

In addition, the effect of a seed treatment plus a foliar application of *Headline*® (6 oz/A) + *Leverage*® (3.8 oz/A) applied at growth stage R3 on yield was compared with a seed treatment alone. Seedling disease and insect damage were assessed at 14 days after planting (dap) and 28 dap. One-meter stand counts was taken 14 and 28 dap, and vigor (plant height) was assessed 28 dap. Foliar and stem disease was assessed at growth stage R5. Soybean aphid populations were assessed at growth stage R1 and R3 to R4.5. Plots were harvested with a plot combine. Grain moisture at harvest was determined and yields were converted to bu/acre at 13 percent moisture.

**Table 1. Variety, planting date, and harvest date for soybean seed treatment trials done at three locations in Iowa in 2011**

Location	Variety	Planting	Harvest
Crawfordsville	AG 3030	May 5	Oct 6
Nevada - early	AG 2531	May 4	Sept 30
Nevada - late	AG 2531	May 19	Sept 30
Nashua	AG 2330	May 18	Oct 16

**Table 2. Seed treatment products tested in soybean seed treatment trials at three locations in Iowa and mean yield (bu/A) of each treatment**

Treatment	Yield (bu/A)			
	SERF Crawfordsville	Nevada early	Nevada late	NERF Nashua
Untreated	63.3	51.3	51.1	57.9
Untreated <sup>a</sup>	72.7	52.5	47.1	64.7
Trilex 6000	61.0	56.1	53.6	60.8
Trilex 6000 <sup>a</sup>	64.3	59.3**	49.0	66.3
Inovate System	62.8	56.1	47.2	60.4
Inovate and Metastar	62.2	51.5	50.1	55.6
Inovate and Metastar <sup>a</sup>	61.9	58.7**	48.0	70.7**
AgriGardian foliar blend <sup>b</sup>	-	55.2	49.4	-
AgriGardian foliar blend <sup>c</sup>	-	56.5*	52.4	-
CruiserMaxx	62.3	58.1*	50.0	60.4
CruiserMaxx Plus	71.6*	58.1*	49.1	60.5
CruiserMaxx Plus <sup>a</sup>	63.6	50.4	51.2	67.1
"Pioneer Premium"	62.9	56.8*	50.7	63.9*
Trilex 6000 and Heads up	60.6	52.3	54.5*	64.3*
Trilex 6000 and L1940-A	64.2	52.7	49.8	62.3
Acceleron fungicide	62.5	55.4	48.8	62.1
Poncho / VOTIVO	63.6	55.8	52.1	60.1
Acceleron Fungicide and Insecticide	62.8	53.9	51.8	58.5
AgriGardian Micro Mix <sup>d</sup>	-	50.5	47.9	-
AgriGardian Micro Mix and Foliar blend <sup>e</sup>	-	51.0	47.5	-
LSD (0.1)	6.0	4.9	3.3	5.8

<sup>a</sup> Sprayed with Leverage and Headline at R3

<sup>b</sup> AgriGardian foliar blend in furrow 16 oz/ac followed by two 16 oz/ac foliar sprays with roundup

<sup>c</sup> AgriGardian foliar blend in furrow 8 oz/ac followed by two 8 oz/ac foliar sprays with roundup

<sup>d</sup> AgriGardian Micro Mix in furrow 6.4 oz/ac followed by 6.4 oz/ac foliar spray with roundup

<sup>e</sup> AgriGardian Micro Mix in furrow 6.4 oz/ac followed by two 6.4 oz/ac Micro Mix and 16 oz/ac Foliar blend tank mix with roundup

\*Indicates significantly different from untreated control with no application of Leverage and Headline at R3

\*\*Indicates significantly different from untreated control with an application of Leverage and Headline at R3

## Field Study Results

### Seedling disease and insect pests

No seedling disease or insect damage occurred at any location.

### Stand counts

There were no differences in stand counts at either 14 dap or 28 dap in three of the four trials. At Nevada 1, stand counts at 14 dap for the CruiserMaxx and CruiserMaxx Plus treatments were statistically greater than the control (untreated seed). At 28 dap, stand counts for the Trilex 6000 +Heads up treatment were statistically greater than the control.

### Vigor

At Crawfordsville, soybean seedlings from seed treated with CruiserMaxx were more vigorous (taller) ( $P < 0.1$ ) than untreated control. At the early planting date at Nevada, seedling vigor of the AgriGardian Micro Mix and Foliar blend treatment was lower than the untreated control ( $P < 0.1$ ). For all

other treatments, seedling vigor did not differ. There was no evidence of an effect of seed treatment on seedling vigor at Nashua or the later planting date at Nevada.

#### **Foliar and stem disease**

Weather conditions during grain fill were not favorable for foliar disease development. At Nashua, there was some *Cercospora* leaf blight, and an application of Headline+Leverage at R3, reduced disease severity ( $P < 0.0001$ ). Sudden death syndrome occurred in the trial at Crawfordsville but at very low incidence and no treatment effects were evident.

#### **Soybean aphid**

Soybean aphids were not present at all locations at R1, while at Nevada and Crawfordsville populations were extremely low (<10 aphids per plant) later in the growing season. At Nashua, the mean number of aphids per plant at growth stage R4.5 ranged from 41 to 63 in the treatments, well below threshold levels.

#### **Yield**

Yield varied across locations ranging from 51.1 to 63.3 bu/ac in the untreated control (Table 1). There was evidence of an effect of seed treatment on yield at all locations ( $P < 0.1$ ). At Crawfordsville, the yield of soybean treated with CruiserMaxx was greater than the untreated control (71.6 bu/A versus 63.3 bu/A). In the early planting date trial at Nevada, the CruiserMaxx (58.1 bu/A), CruiserMaxx Plus (58.1 bu/A), "Pioneer premium" (56.8 bu/A) and AgriGardian (56.5 bu/A) foliar blend treatments all yielded higher than the untreated control (51.3 bu/A). Yield of soybean treated with Trilex 6000 plus HeadUp was greater than that of the untreated control in the later planting date trial at Nevada (54.5 bu/A versus 51.1 bu/A). Lastly, at Nashua, the Trilex 6000 plus HeadUp (64.3 bu/A) and "Pioneer Premium" (64.3 bu/A) treatments yielded higher than the untreated control (57.9 bu/A).

### **Summary**

In our 2011 field trials, the benefit of a seed treatment on soybean stand establishment was not evident, and yield varied among product and locations. We did however, plant into good seedbed conditions.

At the ISU Field Extension and Education Laboratory (FEEL) near Boone, we planted twelve demonstration plots on April 15, just as two weeks of very wet, cold weather conditions started. Six of the plots were inoculated with *Pythium* spp., and six with the SDS pathogen, *Fusarium virgilliforme*. Untreated seed was planted in one plot inoculated with each pathogen; the remaining five plots inoculated with each pathogen were each planted with soybean seed treated with a commercial seed treatment. Stand count was assessed 21 dap and 28 dap. At 21 dap, three seedlings had emerged across the 12 plots; at 28 dap, 41 percent of the non-treated seeds had emerged in each plot compared to 78 to 84 percent of the treated seeds in the remaining 10 plots (Figure 1). The benefits of seed treatments on soybeans have been well documented when planting conditions are not optimum, specifically if conditions at planting or soon after planting are cold and wet, and the plots at FEEL clearly bore this out.



**Figure 1. Soybean stand counts of untreated and treated seed at 28 days after planting in demonstration plots inoculated with *Pythium* spp., and *Fusarium virgeliforme*. Plots were located at the ISU Field Extension and Education Laboratory near Boone, IA.**

#### **Acknowledgements**

*Funding for this study was provided by Iowa Soybean Association. Bayer CropScience, Syngenta and Valent treated seed for the study. Insect data was collected by Rebekah Ritson.*

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