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Kenneth T. Pecinovsky
Iowa State University, kennethp@iastate.edu

Daren S. Mueller
Iowa State University, dsmuelle@iastate.edu

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Abstract

Use of foliar fungicides by soybean producers has gained increased interest since 2004, with the potential threat of soybean rust. Although yield responses have not consistently recouped the cost of the applications, foliar fungicides may provide benefits in a different economic situation (i.e., specialty soybean crop). In addition, there may be a possibility of fungicide-treated soybeans producing higher quality seed.

Keywords

Plant Pathology

Disciplines

Agricultural Science | Agriculture | Plant Pathology

Effect of Fungicide on Disease and Yield of Low Lin/Food Grade Soybeans

Ken Pecinovsky, superintendent
Daren Mueller, extension specialist
Department of Plant Pathology

Introduction

Use of foliar fungicides by soybean producers has gained increased interest since 2004, with the potential threat of soybean rust. Although yield responses have not consistently recouped the cost of the applications, foliar fungicides may provide benefits in a different economic situation (i.e., specialty soybean crop). In addition, there may be a possibility of fungicide-treated soybeans producing higher quality seed.

The objective of this study was to evaluate how 12 low-linolenic or high protein soybean varieties respond to an application of foliar fungicide.

Materials

On May 17, 12 food grade soybean varieties were planted at 196,000 plants/acre. The trial area was fall chisel plowed and cultivated prior to planting. Weed and insect control followed ISU Extension recommendations.

On August 4, Headline[®] (pyraclostrobin, BASF) was applied at a 6 oz rate to half of each variety plot. The majority of the soybean varieties were at growth stage R3. All other soybeans were the non-treated controls. There

were three replications of each soybean variety and fungicide treatment combination.

On September 3, Septoria brown spot, Cercospora leaf blight, frogeye leaf spot, and downy mildew were assessed by estimating the severity (0–100 percent) on 20 leaves/plot. Ten of the leaves were in the lower canopy and ten leaves in the upper canopy.

In the fall, grain was harvested and yields were calculated.

Results and Discussion

Headline application increased soybean yield 2.9 bushels/acre across all 12 varieties. There was no difference in harvest moistures. Yield response from the treatment ranged from -0.2 to 7.1 bushels/acre. The greatest yield increase was with Asgrow 2222VLL.

Septoria brown spot was the only disease observed in the lower canopy. Diseases found in the upper canopy included Cercospora leaf blight, frogeye leaf spot, and downy mildew. Brown spot ranged from 1.1 to 8.4 percent severity in the lower canopy of non-treated plots. In the treated plots, brown spot ranged from 0.9 to 3.6 percent severity. The total severity (all diseases added) in the upper canopy was less than 2 percent for all varieties, treated or non-treated.

Table 1. Yield and moisture for 12 specialty soybeans treated or not treated with foliar fungicide.

| Variety | Yield | | | Moisture | | |
|-----------------------------|-------------|----------|------------|-------------|----------|------------|
| | Non-treated | Headline | Difference | Non-treated | Headline | Difference |
| 1 percent LL | | | | | | |
| Asoyia 2505LL | 48.9 | 51.1 | 2.2 | 12.0 | 11.8 | -0.2 |
| Asoyia 2525LL | 45.2 | 45.7 | 0.5 | 11.3 | 11.5 | 0.2 |
| Asoyia 2677LL | 46.0 | 49.1 | 3.1 | 11.7 | 11.6 | -0.1 |
| 3 percent LL | | | | | | |
| Asgrow2222VLL | 43.3 | 50.4 | 7.1* | 11.2 | 11.2 | 0.0 |
| Asgrow2422VLL | 48.6 | 48.4 | -0.2 | 11.4 | 11.4 | 0.0 |
| Asgrow2423VLL | 49.4 | 51.5 | 2.1 | 11.6 | 11.5 | -0.1 |
| Asgrow2521VLL | 48.5 | 52.8 | 4.3 | 11.5 | 11.6 | 0.1 |
| Asgrow2822VLL | 50.8 | 54.2 | 3.4 | 14.7 | 14.6 | -0.1 |
| Non LL/ high protein | | | | | | |
| PBB7422 | 45.9 | 51.0 | 5.1* | 11.5 | 11.7 | 0.2 |
| PBB 7522 | 47.0 | 48.6 | 1.6 | 11.8 | 11.7 | -0.1 |
| PBB 7809 | 43.9 | 45.2 | 1.3 | 11.2 | 11.3 | 0.1 |
| NK S20-F8 | 47.6 | 52.4 | 4.8* | 11.3 | 11.3 | 0.0 |

*Statistically different (P = 0.05) than the non-treated equivalent.

Table 2. Disease for 12 specialty soybeans treated or not treated with foliar fungicide.

| Variety | Lower canopy disease severity (%) ^a | | | Upper canopy disease severity (%) ^b | | |
|-----------------------------|--|----------|------------|--|----------|------------|
| | Non-treated | Headline | Difference | Non-treated | Headline | Difference |
| 1 percent LL | | | | | | |
| Asoyia 2505LL | 3.1 | 1.7 | 1.5 | 0.2 | 0.0 | 0.2 |
| Asoyia 2525LL | 2.0 | 1.8 | 0.2 | 0.2 | 0.3 | -0.1 |
| Asoyia 2677LL | 1.1 | 1.5 | -0.4 | 0.4 | 0.1 | 0.3 |
| 3 percent LL | | | | | | |
| Asgrow2222VLL | 6.7 | 1.4 | 5.3* | 0.6 | 0.2 | 0.4 |
| Asgrow2422VLL | 2.9 | 0.9 | 2.0 | 2.0 | 1.1 | 0.9 |
| Asgrow2423VLL | 2.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.0 |
| Asgrow2521VLL | 8.4 | 1.7 | 6.7* | 0.1 | 0.0 | 0.1 |
| Asgrow2822VLL | 2.1 | 1.4 | 0.7 | 0.3 | 0.1 | 0.2 |
| Non LL/ high protein | | | | | | |
| PBB7422 | 2.0 | 0.9 | 1.1 | 0.6 | 0.1 | 0.5 |
| PBB 7522 | 3.9 | 3.6 | 0.3 | 1.7 | 0.7 | 1.0 |
| PBB 7809 | 2.3 | 0.8 | 1.5 | 1.7 | 0.6 | 1.1 |
| NK S20-F8 | 1.3 | 0.6 | 0.7 | 1.3 | 0.2 | 1.1 |

^aLower canopy = Septoria brown spot was assessed for 10 leaves in the lower canopy.

^bUpper canopy = Cercospora leaf blight, frog-eye leaf spot, and downy mildew (added together) were assessed from 10 leaves in the upper canopy.

*Statistically different (P = 0.05) from the non-treated equivalent.