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Fungicide-Insecticide Study on Soybeans

Nathan R. Bestor

Iowa State University, bestor@iastate.edu

Daren S. Mueller

Iowa State University, dsmuelle@iastate.edu

Alison E. Robertson

Iowa State University, alisonr@iastate.edu

Rebecca Ritson

Iowa State University

Matthew E. O'Neal

Iowa State University, oneal@iastate.edu

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Abstract

The purpose of this study was to determine the optimum application timing of insecticides and/or fungicides on soybean. We compared products applied at either one of two growth stages, R1 (flowering) and R3 (pod set), with a non-sprayed control or a threshold-based treatment. The effect of treatments on foliar disease severity and aphid populations was determined and related to yield.

Keywords

RFR A10102, Plant Pathology and Microbiology, Entomology

Disciplines

Agricultural Science | Agriculture | Entomology | Plant Pathology

Fungicide-Insecticide Study on Soybeans

RFR-A10102

Nathan Bestor, research associate
Daren Mueller, extension specialist
Alison Robertson, assistant professor
Department of Plant Pathology
Rebecca Ritson, graduate assistant
Matt O'Neal, associate professor
Department of Entomology

Introduction

The purpose of this study was to determine the optimum application timing of insecticides and/or fungicides on soybean. We compared products applied at either one of two growth stages, R1 (flowering) and R3 (pod set), with a non-sprayed control or a threshold-based treatment. The effect of treatments on foliar disease severity and aphid populations was determined and related to yield.

Materials and Methods

The field was planted May 19, 2010. Plot size was six 30-in. rows by 41 ft. The field was setup in a randomized block design with six replications.

Fungicide and insecticide products were sprayed either alone or in combination at growth stages R1 or R3. Only the middle four rows of each plot were sprayed. Two control treatments were included: an untreated control (UTC) and an IPM-based control, which used the 250-aphid threshold to trigger an insecticide application (Table 1). Growth stage R1 applications of products were made on July 6, 2010 and R3 applications were on July 28, 2010.

Data were collected for foliar disease at R5. Disease severity was assessed visually in the upper and lower canopies by estimating the total area of diseased tissue caused by fungal pathogens on 10 leaflets in each plot. Aphid populations were enumerated on all treatments

on a weekly basis throughout the summer and are reported as cumulative aphid days (CAD). Before harvest, stems from selected treatments were rated for anthracnose stem blight. Grain yield (adjusted to 13% moisture) and moisture were recorded.

Results and Discussion

Aphid populations at the ISU Northeast Research Farm, Nashua, IA did not reach threshold and consequently the IPM control treatments were not sprayed with insecticides.

The yield of all plots treated with pesticides exceeded the yield of the UTC (50.8 bu/ac) with the exception of Leverage applied at R1 (49.3). The yields of plots treated with pesticides at R3 were slightly higher than when pesticides were applied at R1. Differences between disease levels of R1 and R3 applications of fungicides were negligible. Insecticides applied at R3 reduced CAD when compared with R1 applications of insecticides, however, all CAD were far below economic damage threshold.

Insecticide treatments and tank mixes did not have as strong of yield response in 2010 because of low aphid pressure.

This project is a three-year study and data from 2010 represents the third year of the study. Each year of the study had a unique set of environmental conditions, which resulted in differing efficacies of fungicides and insecticides. However, pesticides were most effective when foliar disease pressure and/or aphid pressure were high. The use of fungicides and insecticides on soybean, alone or in combination, should be assessed in light of established crop management practices. Scouting and field history are also useful tools to consider when deciding whether to spray pesticides.

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Table 1. The effect of fungicides and insecticides alone and in combination on soybean yield and foliar disease control at the ISU Northeast Research Farm, Nashua, IA.

Treatment, timing ^a	Yield (bu/ac) ^b	Disease severity (%) ^c		
		Upper canopy	Lower canopy	CAD ^f
UTC ^d	50.83	2.3	6.9	119.8
IPM ^e	49.96	2.7	8.3	150.0
IPM ^e + Fung, R3	53.44	4.1	4.9	121.0
Stratego YLD, R1	51.03	3.5	4.8	129.2
Stratego YLD, R3	53.24	1.0	4.5	154.0
Leverage, R1	49.28	2.9	7.8	86.3
Leverage, R3	54.82	2.2	2.3	65.8
Stratego YLD + Leverage, R1	52.76	2.8	5.7	176.7
Stratego YLD + Leverage, R3	52.57	3.0	7.2	87.7
Mean	51.99	2.8	5.8	119.8

^aApplication timing is based on the growth stage of the soybeans. Reproductive growth stage 1 (R1) is when 50 percent of the plants are flowering and reproductive growth stage 3 (R3) is when 50 percent of plants have started forming pods.

^bYields adjusted to 13 percent moisture.

^cDisease severity was visually assessed in each plot at R5. Ten leaflets in the upper and lower canopies were assessed for any foliar diseases present. This season these diseases were Septoria brown spot, Cercospora leaf blight, frog-eye leaf spot, and downy mildew.

^dUTC = untreated control.

^eIPM = insecticide applied at 250-aphid threshold. In 2010, threshold was not reached and no insecticide was applied.

^fCAD = cumulative aphid days.