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Evaluation of Foliar Fungicides and Insecticides on Soybeans in Northern Iowa

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

Warren L. Pierson
Iowa State University, wpierson@iastate.edu

Stith N. Wiggs
Iowa State University, stithw@iastate.edu

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Abstract
Iowa State University personnel assessed foliar fungicides and insecticide use on soybeans at seven locations across Iowa including the Northwest Farm (Sutherland), Northern Farm (Kanawha), Northeast Farm (Nashua), Curtiss Farm (Ames), Armstrong Farm (Lewis), McNay Farm (Chariton), and Southeast Farm (Crawfordsville).

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Daren Mueller, assistant professor
Warren Pierson, research associate
Stith Wiggs, research associate
Department of Plant Pathology and Microbiology

Introduction

Iowa State University personnel assessed foliar fungicides and insecticide use on soybeans at seven locations across Iowa including the Northwest Farm (Sutherland), Northern Farm (Kanawha), Northeast Farm (Nashua), Curtiss Farm (Ames), Armstrong Farm (Lewis), McNay Farm (Chariton), and Southeast Farm (Crawfordsville) (Figure 1).

Materials and Methods

The experimental design at each location was a randomized complete block with four replications. Details on variety and date of planting, pesticide application, and harvest are listed in Table 1. Fungicides and insecticides were applied with a self-propelled research sprayer (Figure 2) at growth stage R3 (beginning pod) at all seven locations, unless otherwise noted. Disease was assessed when soybeans were at the R6 (full seed) growth stage. Diseases found included Septoria leaf blight (brown spot) in the lower canopy and small amounts of downy mildew and soybean vein necrosis virus in the upper canopy. Only diseases that had more than 1 percent severity were analyzed and included in this report. Although soybean aphid populations were observed between R3 and R6, none of the seven locations reached threshold. Thus, an IPM insecticide treatment for soybean aphid never was applied. Total seed weight per plot and seed moisture were measured with a 2009 Almaco SPC20 research plot combine. Seed weight was adjusted to 13 percent moisture and yield was calculated.

Results and Discussion

This growing season had less than average rainfall, similar to 2012. Although it was abnormally dry across much of Iowa, there were parts that did catch timely rains, especially in the northeast portion of the state.

The dry weather conditions contributed to lack of foliar disease development at all locations. The only fungal disease with more than 1 percent severity in the plots was Septoria brown. This low level of disease was not severe enough to affect yield at any location. Soybean vein necrosis virus and soybean green stem syndrome also were identified at several locations.

The majority of fungicide and insecticide treatments had minimal or no effect on seed moisture.

Yields averaged between 45.4–71.7 bushels/acre across all locations. Yield response to fungicide, insecticide, and fungicide + insecticide application was minimal at all locations. There were both negative and positive responses to various treatments at some locations, but nothing consistent over the seven locations (Figure 3). The average yield response for all fungicides across all locations was 0.6 bushels/acre. The average yield response by chemical family is reported in Figure 4. SkyRaider™ insecticide alone averaged 2.6 bushels/acre more than the untreated control and was the only stand-alone insecticide in the trial.

We did not see an additive effect for fungicide + insecticide as yield response for these treatments averaged 2.2 bushels/acre more than the untreated control across all seven locations. See Table 2 for details on yield responses.

Acknowledgements

We thank the ISU Research Farm personnel who assisted with application of treatments. This project was partially funded by the Iowa Soybean Association and soybean checkoff.

Table 1. Research location, cultivar, planting population, planting date, chemical application date, disease assessment date, and harvest date for seven fungicide and insecticide trials.

Research location	Cultivar	Planting population	Planting date	Chemical application date	Disease assessment date	Harvest date
Armstrong Farm	AG2933	160,000	May 25	Aug 1	Sep 10	Oct 18
Curtiss Farm	AG2831	180,000	May 24	Jul 29	Sep 10	Oct 2
McNay Farm	Pioneer 93M11	160,000	Jun 12	Aug 9* Aug 14*	Sep 10	Oct 15
Northeast Farm	AG2534	189,000	Jun 11	Aug 13	Sep 9	Oct 10
Northern Farm	Stine 19RA02	157,000	Jun 3	Jul 30	Sep 9	Oct 8
Northwest Farm	Kruger 1901	161,000	May 19	Jul 31	Sep 11	Oct 21
Southeast Farm	Pioneer 93Y80	166,000	Jun 13	Aug 5	Sep 10	Oct 9

*Spray split into two days due to sprayer breakdown.

Table 2. Treatments and product rate evaluated for management of foliar disease and yield response at the Northern Farm, Kanawha, IA in 2013.

Treatment	Rate (oz/A)	Septoria Brown Spot (%)	Moisture (%)	Yield (bu/A)
Untreated Control	---	1.7	12.5	62.5
Headline®	6	1.4	11.9	62.1
Priaxor™	4	1.6	12.9	60.5
Stratego® YLD	4	1.6	12.3	53.9
Fortix™	5	1.2	11.9	60.0
Fortix™, R1[c]	5	1.7	11.9	50.9*
Quadris Top®	11	1.7	12.0	64.8
Topguard®	7	1.7	11.9	59.9
Aproach™	6	1.4	11.8	57.7
Custodia®	8.6	1.3	12.0	67.6
Domark® 230 ME	4	1.4	11.9	60.7
Quilt Xcel®	15	1.3	11.7*	58.0
Aproach™ + Alto®	5.6 + 5.6	1.5	11.8	51.8
Domark® 230 ME + Quadris®	3.5 + 4	1.7	12.0	64.4
SkyRaider™	6.4	1.8	11.9	64.0
Priaxor™ + Fastac™	4 +3.8	0.9[a]	11.8	66.6
Stratego® YLD + Leverage® 360 + COC [b]	4 +2.8	1.3	11.8*	61.4
Aproach™ + Asana® XL	6 + 9.6	1.3	11.9	68.4
Custodia® + SkyRaider™	8.6 + 6.4	1.6	12.0	56.8
LSD	---	0.7	0.8	10.9
CV (%)	---	31.0	4.4	12.3

*Least significant difference comparing treatments with untreated control.
[a]Significantly different from equivalent fungicide alone.
[b]Applied with COC 0.5% v/v.
[c]R1 applied treatment.
All products applied with nonionic surfactant (Induce at 0.3% v/v) unless otherwise noted.

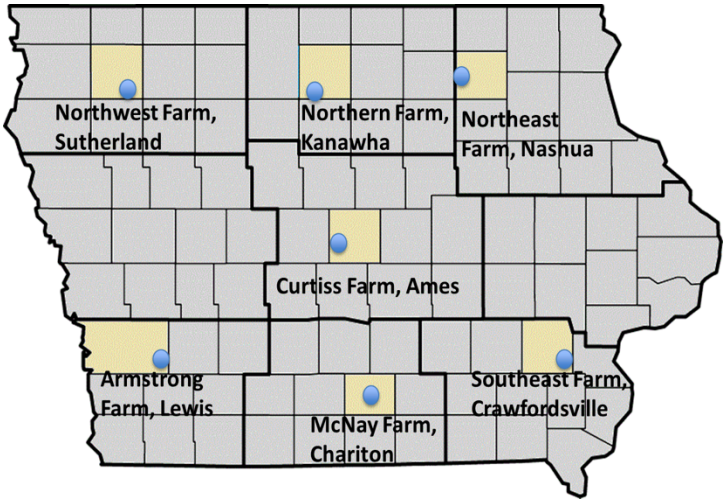

Figure 1. Field locations for 2013 fungicide and insecticide research.

Figure 2. Self-propelled research sprayer built by Iowa State personnel.

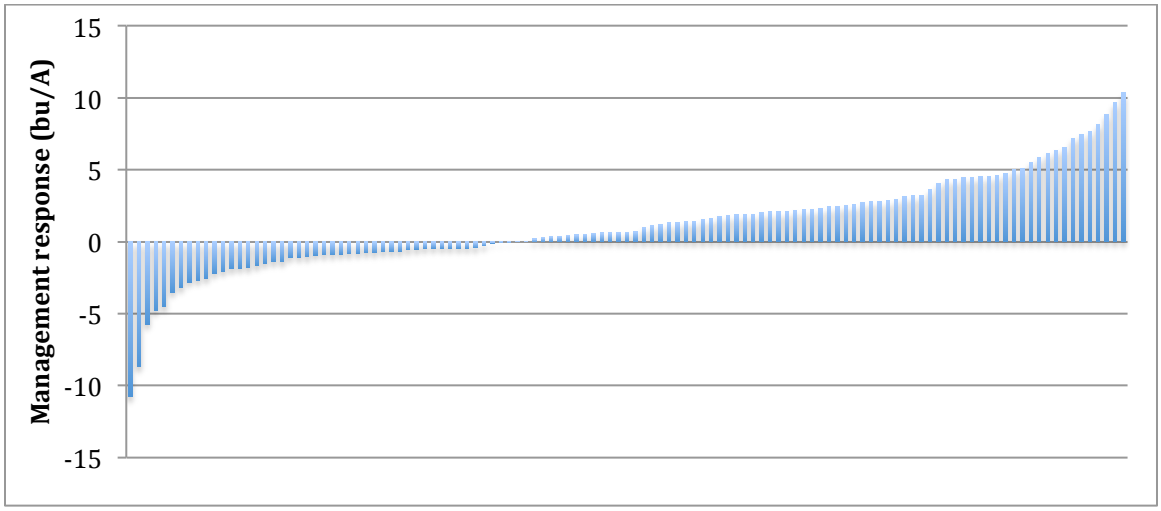

Figure 3. Yield response (bu/A) to treatments compared to untreated control on soybean at seven locations in Iowa during the 2013 growing season. Treatments consisted of 12 fungicides, 1 insecticide, and 4 fungicide and insecticide combinations. The average response to each treatment was plotted as management response (bu/A).

	Armstrong	Curtiss	McNay	Northeast	Northern	Northwest	Southeast	Average
Fc vs. UTC	1.0	1.0	0.8	-0.2	-2.4	3.3	0.6	0.6
Strobilurin vs. UTC	4.6	-0.4	2.0	-0.9	-2.6	3.2	0.9	1.0
Fc containing strobilurin vs. UTC	-2.5	0.6	0.1	0.5	3.0	1.3	1.3	0.6
Triazole vs. UTC	-0.4	2.6	-1.8	-1.9	-2.3	4.9	0.9	0.3
Premix vs. UTC	0.5	0.2	1.1	0.1	-2.4	2.5	0.7	0.4
Ic vs. UTC	-0.1	6.4	-0.5	0.7	1.4	9.7	0.4	2.6
Fc + IC vs. UTC	0.7	2.6	1.0	1.9	0.8	7.7	0.5	2.2
Fc + Ic vs. Ic	0.8	-3.7	1.5	1.2	-0.7	-2.0	0.1	-0.4

Figure 4. Yield response (bu/A) to different fungicide classes, insecticide, and combinations of fungicide and insecticide on soybean in Iowa during the 2013 growing season. Fc=fungicide, UTC=untreated control and Ic=insecticide.