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Evaluation of Foliar Fungicides and Insecticides on Soybean in 2011

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Abstract

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Evaluation of Foliar Fungicides and Insecticides on Soybean in 2011

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There are many fungicides and insecticides labeled for use in Iowa soybean. In this study, we evaluated common foliar fungicides and insecticides at six locations across Iowa in 2011 to determine yield responses to an R3 (beginning pod set) application timing (Fig. 1).

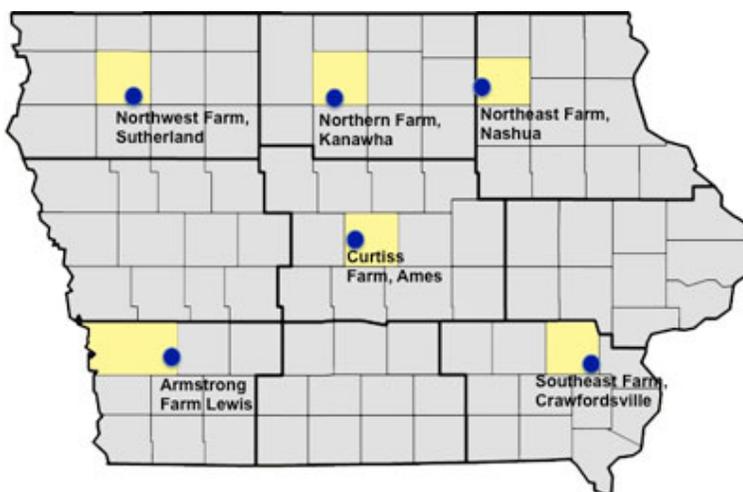


Figure 1. Iowa field locations for the 2011 soybean fungicide and insecticide study.

Materials and Methods

The experimental design was a randomized complete block with at least four replications at each location. Details on variety and planting, application and harvest dates are listed in Table 1. Treatments (Table 2) consisted of an untreated control, fungicides alone, insecticides alone, fungicides and insecticides in combination and pesticide application based on aphid scouting (IPM). In applicable treatments, fungicides and insecticides were applied at growth stage R3 (beginning pod) at all six locations. Disease was assessed when soybeans were at the R6 growth stage (full seed set). Soybean aphid populations were observed between R3 and R6 but an IPM spray was only necessary at Sutherland. Total seed weight and moisture was measured, seed weight was adjusted to 13 percent and yield was calculated.

Table 1. Variety, planting date, application date, harvest date for six fungicide and insecticide trials in Iowa in 2011

	Variety	Planting	R3 application	Disease assessment	Harvest
Ames	Asgrow 2531	May 19	Aug. 1	Aug. 30	Oct. 7
Armstrong	Pioneer 93M11	May 17	Aug. 1	Aug. 23	Oct. 5
Crawfordsville	Pioneer 93Y40	May 12	Aug. 1	Aug. 23	Oct. 6
Kanawha	Legend 2279	May 10	July 25	Aug. 25	Sept. 29
Nashua	Pioneer 92Y51	May 18	Aug. 4	Aug. 24	Oct. 6
Sutherland	Pioneer 92M32	May 17	July 21	Aug. 23	Oct. 10

Results

Yield varied across locations ranging from 39.4 to 75.9 bu/ac in the untreated control (Table 2). Differences were observed between pesticide treatments and the untreated control at the Sutherland and Ames locations (Table 2).

Foliar disease did not differ between fungicide and insecticide treatments and the untreated control at the Armstrong, Crawfordsville, Kanawha and Nashua locations. There were foliar disease differences between the fungicide treatments and the untreated control at the Ames location and insecticide treatments and the untreated control at the Sutherland location (Table 2). The two most predominant diseases found were Septoria brown spot and frogeye leaf spot.

Septoria brown spot did not move into the upper canopy before R6 at any of the six locations, thus it likely had minimal impact on yield. The average severity in the untreated control in the lower canopy was less than 3.5 percent at all locations except Nashua (7.5 percent) and Ames (6.6 percent). At both of these locations, fungicides reduced brown spot severity in the lower canopy, but again, disease probably had minimal impact on yield.

Frogeye leaf spot was found in a few locations, but was greater than 1 percent severity in the untreated control at only the Ames location (4.9 percent). All fungicides significantly reduced frogeye severity (averaged 1.1 percent). As expected, insecticides alone did not have any effect on frogeye leaf spot severity (averaged 5.2 percent severity). There were no significant differences in disease control between fungicide products.

Soybean aphids averaged 320 aphids per plant at the Sutherland location, which exceeded the economic threshold of 250 per plant. Aphids did not reach the threshold at any other location. At Sutherland, the IPM insecticide and insecticide+fungicide treatments were applied at the R4 growth stage on Aug. 3, which was 13 days after the R3 application. IPM treatments were not applied at the other five locations.

Seed moisture ranged from 8 to 11 percent depending on the location, but did not differ more than a few tenths of a percentage amongst treatments within any location.

Table 2. Yield response for foliar fungicide and insecticide treatments in 2011

Treatment	Ames	Arms trong	Crawfordsville	Kanawha	Nashua	Sutherland
Untreated control	52.3	75.9	63.0	39.4	68.4	49.9
Stratego YLD	60.3*	77.5	62.5	44.0	67.9	50.6
Priaxor	62.3*	75.0	67.8	39.6	68.3	53.0*
Domark	63.2*	75.4	65.2	40.6	67.9	49.2
Leverage 360 ^a	60.2*	79.5	66.6	40.4	68.6	60.5*
Fastac	56.0	77.0	65.6	38.8	68.5	59.9*
Belay	55.6	75.6	64.7	41.9	69.2	56.2*
Leverage 360 ^{a,b}	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c	62.0*
Stratego YLD + Leverage 360 ^a	65.2*	77.8	66.9	41.3	68.7	61.2* ^v
Priaxor + Fastac	63.3* ^o	77.3	71.0	39.3	67.8	59.1* ^v
Domark + Asana XL	60.3*	76.5	65.0	38.8	66.6	56.5* ^v
Stratego YLD + Leverage 360 ^{a,b}	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c	61.8*
Overall LSD (0.05)	5.8	NS	NS	NS	NS	1.9
CV (%)	7.6	4.5	6.1	13.6	5.0	2.3

^a Applied with COC 1% v/v

^b IPM, sprayed R4 (August 3) when aphids reached economic threshold

^c Aphid threshold never met, IPM treatments acted as controls

* Significantly different from untreated control

^v Significantly different from fungicide alone equivalent

^o Significantly different from insecticide alone equivalent

Summary

The results of this experiment illustrate the benefits of foliar fungicide and insecticide applications for the management of foliar diseases and insects. There were very small amounts of foliar disease across the state of Iowa in 2011 due to high heat and low rainfall amounts in July and August. Also, this was a moderate soybean aphid year across much of the state. At the four locations with very low insect populations and disease severity, there were no significant yield responses to either insecticides or fungicides. However, at the Ames location, fungicides reduced frogeye leaf spot in the upper canopy and the largest yield responses to fungicides were at this location.

Also, only one of the six locations (Sutherland) reached the threshold level to spray aphids and this was the only location where all insecticides had significant responses to insecticides. Using foliar fungicides and insecticides is an effective way to prevent yield losses to foliar diseases and insect pests. Also, only applying pesticides when needed can reduce overall production costs and preserve product efficacy for when severe outbreaks do occur.

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