

Indiana Soybean Alliance Proposal Final Report

Impact of In-Furrow Fungicides on Soil-Borne Diseases of Soybean 2015 Final Report

Kiersten Wise, Extension Specialist for Field Crop Diseases, Botany and Plant Pathology

Executive Summary:

Fungicide use in soybeans is at an all time high. While fungicides have traditionally been used as seed treatments and as foliar applications, new questions have emerged on the impact of in-furrow fungicide applications on seedling disease control and improvement of soybean stand. These applications are promoted widely in corn, and are now starting to gain attention as an “add-on” fungicide treatment in soybean, especially since farmers have experienced stand loss and stand establishment issues in the last few years. There is concern about the economic justification for adding fungicides in-furrow, and the potential negative impacts that this practice might have on soybean stand and on beneficial fungi in the environment. Research was conducted in Lafayette, Indiana to determine if in-furrow fungicides or fertilizer improve soybean health and yield. In-furrow fungicides and fertilizer treatments had no effect on plant characteristics such as biomass, height, stand or yield. This indicates that in-furrow fungicides may not consistently increase yield. This research was included as a larger multi-state trial and will be combined with data from other states to understand the broader impact of in-furrow fungicides on soybean yield. The results are expected to be published and distributed in 2016.

Relevance: Fungicides applied to the seed are designed to give the plant a competitive advantage against soil-borne pathogens, and allow plants to emerge and establish more quickly, thereby improving the chances of meeting yield potential. Fungicides applied in-furrow are marketed in a similar manner, but are intended to target two particular groups of soil-borne fungal pathogens: *Fusarium* spp. and *Rhizoctonia* spp. The current fungicides available for in-furrow application are thought to provide additional efficacy against these fungi and provide a broader spectrum of disease control, particularly in fields with a history of stand establishment issues. These results will help us provide unbiased research results and economic analysis to Indiana farmers about when and where fungicide treatments may improve plant health and yield.

Materials and Methods

Objective 1. Determine efficacy of in-furrow fungicide seed treatments on seedling blight pathogens and soybean yield.

Methods: Plots were established on the Meigs Farm at the Throckmorton Purdue Agricultural Center (TPAC) in Tippecanoe County. The experiment was designed as a randomized complete block with four replications. Plots were 10ft wide and 30ft long, and the two center rows were used for evaluation. The previous crop was soybeans. Prior to planting, the field was worked with a disk and then with a field cultivator on 27 May. Soybean variety W3103 was planted in 30 inch rows at a rate of 8 seeds/ft using a Haldrup plot planter. In-furrow fungicide applications were made using TJ-VS 8001 nozzles fitted to each row of the planter and operated with a compressed air system. Air pressure was regulated at 40 psi which delivered 20 gal/A while traveling at a speed of 1 mph. Plant samples were taken on 30 Jun at the V1-V2 growth stage. Plant samples were taken from the outside two rows of each plot to assess plant biomass. To manage weeds, Makaze at a rate of 32 oz/A, Fusion at a rate of 10 oz/A, COC at a rate of 1 gal/100gal, and Choice Weather Master at a rate of 3 pt/100gal was applied on 9 Jul at the V2 growth stage. Stand counts and height measurements were taken on 10 Jul at the V2 growth stage. Stand counts were taken by counting the plants in a random 10ft section of each plot and then converted to plants/A prior to analysis. Plant heights were recorded in 5 locations within each plot and then averaged before analysis. The inner 5ft of each plot was harvested with a Kincaid plot combine on 10 Nov and yields were adjusted to 13% moisture. Data were subjected to analysis of variance and means were compared at the 0.05 significance level using Fisher's protected least significant difference (LSD) test.

Findings:

Trial planting was delayed substantially due to excessive rainfall in April and May. Very little detectable disease was present when plants were rated for stand, plant height and biomass. Consequently, in-furrow treatments did not improve stand or plant characteristics in the trial compared to treatments with no seed treatment or in-furrow fungicide (Table 1). Treatments also did not improve yield compared to the non-treated controls.

Table 1: Impact of in-furrow fungicides on plant biomass, stand, and yield at the Throckmorton Purdue Agricultural Center.

Treatment	Plant biomass (grams)*	Plants/A *	Plant height (inches)*	Harvest moisture (%)	Test weight (lbs/bu)	Yield (bu/A)
Untreated seed	1.25	92,565	6.93	13.85	55.72	54.16
Priaxor	1.21	105,633	6.10	13.68	55.06	57.17
Headline	1.10	92,347	6.75	13.84	55.64	53.71
19-17-0	1.21	98,010	6.31	13.76	55.46	56.01
Priaxor + 19-17-0	1.14	108,464	7.15	13.79	55.93	53.84
LSD (0.05)	NS	NS	NS	NS	NS	NS
CV (%)	7.24	9.42	10.85	1.17	0.99	6.03

*Plant biomass, stand (plants/A), and plant height were taken at growth stage V2.

Application

The results from this trial are limited in application since it was a one-year trial with delayed planting. However, these data still contribute to our larger understanding of in-furrow fungicides in soybean under Indiana conditions. Fungicides are becoming more common in soybean, and a better understanding of the range and timing of use is essential to provide soybean farmers with updated and unbiased recommendations for fungicide use and disease control. This research was included in a larger multi-state project to understand the broader impact of in-furrow fungicides on soybean yield. The results are expected to be published and distributed in 2016, and ISA will be acknowledged in all outputs resulting from this multi-state summary. This research has been presented at several field days, and Certified Crop Advisor meetings across Indiana.