

2006 RESEARCH PROGRESS REPORT

ARKANSAS CORN AND GRAIN SORGHUM PROMOTION BOARD

November 29, 2006

Title: Developing Guidelines for Foliar Fungicide Use in Field Corn to Control Southern Rust and Other Leaf Diseases

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Objectives and Progress: Year 2 of 3

1. Determine the economic benefit of preventative foliar fungicide applications on different corn hybrids. Field experiments were conducted on producer's fields in Little River County near Foreman, Yell County near Dardanelle and at the Lon Mann Cotton Branch Research Station near Marianna to evaluate the effect of a foliar fungicide application to two high yielding glyphosate resistant hybrids with varying foliar disease resistance (Dekalb 69-71 or Dekalb 66-23 and Pioneer 31G96). Crop rotations of corn after corn and corn after soybeans were evaluated at all three sites. Preventative foliar fungicide treatments of Quilt at 14 fl oz/acre and Headline at 6.4 fl oz /acre were applied near silking and brown silk using a modified Co2 backpack sprayer. Foliar diseases did not develop at Foreman or Marianna in these experiments. At Dardanelle, southern rust was detected as low levels late in the growing season, but too late to have an impact on grain yield. Yields were good in all experiments with the exception of the corn following corn experiments at Foreman, where a severe hail storm shortly after silking greatly reduced yield. In the absence of disease (Foreman and Marianna) and with low levels of southern rust developing late in the season at Dardanelle, no fungicide affect on yield was seen in any experiments conducted (Table 1) regardless of fungicide used or timing. These trials were planted from Mid-March to Mid-April.

Table 1. Effect of Quilt and Headline fungicide applied to corn at silk and brown silk.														
	Foreman				Marianna				Dardanelle					
	Dekalb 66-23 follow beans	Pioneer 31G96 follow beans	Dekalb 66-23 follow corn	Pioneer 31G96 follow corn	Dekalb 69-71 follow beans	Pioneer 31G96 follow beans	Dekalb 69-71 follow corn	Pioneer 31G96 follow corn	Dekalb 69-71 follow beans	Pioneer 31G96 follow beans	Dekalb 69-71 follow corn	Pioneer 31G96 follow corn		
	Yield bu/acre												Average	
Untreated	131.0 a	139.5 a	184.8 a	187.2 a	214.3 a	236.8 a	159.3 a	179.4 a	192.2 a	195.0 a	173.4 a	189.3 a	181.9	
Quilt @ silk	132.0 a	125.2 a	191.3 a	186.6 a	217.9 a	241 a	158.7 a	171.8 a	189.3 a	203.6 a	171.8 a	202.9 a	182.7	
Headline@ silk	139.0 a	140.1 a	193.0 a	186.3 a	214.0 a	236.9 a	154.6 a	183.8 a	192.7 a	214.0 a	182.7 a	195.4 a	186.1	
Quilt@ brown silk	134.0 a	138.7 a	187.9 a	191.2 a	220.1 a	238.3 a	156.8 a	182.2 a	196.5 a	183.3 a	177.3 a	190.1 a	183.0	
Headline @brown silk	133.5 a	126.9 a	187.4 a	187.3 a	213.8 a	231.5 a	153.3 a	186.4 a	193.6 a	188.8 a	182.9 a	197.3 a	181.9	

Means within the same column followed by the same letter do not significantly differ according to LSD (0.05)

In addition, field experiments evaluating a single preventative application of Quilt, Headline, Propimax, or Stratego were conducted in Desha County near Dumas in a Corn Research Verification Program Field and in a late planted corn field in Jackson County, near Tuckerman. Treatments were applied at the silk stage. Corn hybrids evaluated were Pioneer 31G96 at Dumas and Pioneer 32B29 at Tuckerman. Corn was essentially disease free at Dumas while Southern Rust was at moderate to high levels at the Tuckerman site. Yields at both sites were excellent. At Dumas in the absence of disease, fungicide treatments failed to statistically increase yields or increase seed weight. At Tuckerman, even though southern rust was present at moderate to high levels late in the season, dry conditions slowed disease development and resulting yields were not statistically increased by a fungicide application. (Table 2) Lodging was <1% in both trials. Late season plant health effects were visible from fungicide treatments at Tuckerman with plants treated with a fungicide being much greener near maturity than the untreated check plots.

	Dumas	Dumas	Tuckerman	Tuckerman	Tuckerman
	Yield Bu/a	Seed wt grams/400 kernels	Yield Bu/a	Seed wt grams/400 kernels	% Southern Rust ear leaf coverage
Untreated	215.9 a	137.2 a	200.2 a	124.1 a	13 a
Quilt 14 fl oz/ac	216.5 a	141.6 a	203.8 a	127.4 a	3 a
Headline 6 fl oz/ac	228.3 a	145.1 a	204.3 a	125.2 a	2 a
Propimax 4 fl oz/ac	222.3 a	139.3 a	201.8 a	123.4 a	5 a
Stratego 10 fl oz/ac	220.6 a	139.2 a	202.8 a	127.0 a	5 a

Means followed by the same letter do not significantly differ according LSD (0.05)

2. Determine proper foliar fungicide application timing on corn in Arkansas. Four application timing experiments were conducted on the Pioneer 31G96 (RR + Herculex) hybrid. Experiments were located in Little River County near Foreman, Yell County near Dardanelle, and two experiments (early and late planting) were conducted on the Lon Mann Cotton Branch Station near Marianna. Planting dates were March 15 to April 10 for the 3 early planted trials and May 28 for the late planted trial at Marianna. Fungicide treatments evaluated included; Quilt at 14 fl oz/acre and Headline at 6.4 fl oz/acre applied at early tassel, silk, brown silk and brown silk+2 weeks. Foliar diseases were not present in experiments in Little River County and the early planted trial at Marianna and corn yields were not affected by fungicide application. At Dardanelle, low levels of southern rust were found late in the season (5% or less leaf coverage) but disease development was minimal and formed late in the season and had no impact on grain yields. In the Marianna late planted trial, considerable southern rust was present late in the season and good visual ratings were obtained. Fungicide applied at silking resulted in the lowest level of southern rust. Little differences were seen between Quilt and Headline. Yields were not

statistically impacted by fungicide application, but the lowest yielding treatment was the untreated check. These experiments help illustrate the importance of early planting to help potentially avoid foliar diseases in corn.

	Foreman	Marianna	Dardanelle	Marianna Late	Marianna Late
Treatment	Yield bu/a				%Rust
Untreated	187.2 a	180.6 a	189.3 a	140.5 a	29 a
Quilt - E tassel	186.6 a	176.0 a	202.9 a	157.4 a	17 bc
Headline - E tassel	186.3 a	178.0 a	195.4 a	156.8 a	5 d
Quilt @ silk	191.2 a	179.7 a	190.1 a	150.8 a	2 d
Headline @ silk	187.3 a	185.5 a	201.3 a	144.1 a	2 d
Quilt @ brown silk	195.0 a	180.7 a	205.6 a	147.0 a	7 cd
Headline @ brown silk	189.3 a	175.5 a	202.4 a	147.4 a	5 d
Quilt @ brn silk+2wk	185.7 a	181.3 a	193.3 a	153.7 a	30 a
Headline @ brn silk + 2wk	192.6 a	176.7 a	208.2 a	152.9 a	26 a

Means followed by the same letter do not differ according to LSD (0.05)

3. Determine treatment thresholds for fungicides on corn in Arkansas. Even though foliar disease was limited this year except for late planted fields, important information was gathered to support the case that when disease is not present foliar fungicide applications do not statistically increase yield. As more trials are conducted in the coming years a better disease threshold picture will be developed.

4. Evaluate various monitoring methods for prediction of foliar disease occurrences in corn. Research plots, nearby corn fields, corn verification fields, and county corn hybrid demonstrations were monitored throughout the growing season for disease development. Weather data was collected from research sites and verification fields will be used to evaluate weather patterns that are favorable for foliar disease development.