

2005 RESEARCH PROGRESS REPORT
ARKANSAS CORN AND GRAIN SORGHUM PROMOTION BOARD PROPOSAL
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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 1 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, Faulkner County near Mayflower and the 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 and Pioneer 31G96). Crop rotations of corn after corn and corn after soybeans were evaluated in Little River County and at the Cotton Branch Station. In Faulkner County, a corn after soybean rotation was used. Preventative foliar fungicide treatments of Quilt at 14 fl oz/acre were applied near silking and brown silk using a modified Co2 backpack sprayer. Foliar diseases did not develop in any of these experiments and Quilt applications had no impact on corn yield (Table 1.). Yields were good in all experiments with the exception of Faulkner County, where wildlife feeding reduced yields to near 100 bu/acre with no differences among treatments.

Table 1. Effect of Quilt fungicide at 14 fl oz/acre applied to corn at silk and brown silk stage.								
	Little River County				Cotton Branch Station			
	Dekalb 69-71 following soybeans	Pioneer 31G96 following soybeans	Dekalb 69-71 following corn	Pioneer 31G96 following corn	Dekalb 69-71 following soybeans	Pioneer 31G96 following soybeans	Dekalb 69-71 following corn	Pioneer 31G96 following corn
	Yield bu/acre							
Untreated	243.8 a	250.9 a	160.5 a	196.7 a	213.5 a	236.3 a	209.9 a	220.9 a
Quilt at silking	234.9 a	255.0 a	163.7 a	205.3 a	213.6 a	233.1 a	214.3 a	232.8 a
Quilt at brown silk	236.0 a	253.4 a	147.6 a	208.9 a	206.1 a	232.4 a	216.2 a	232.3 a

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 corn research verification fields in Ashley, Little River, Poinsett, Green, and Woodruff counties. Treatments were applied at the silk to brown silk stage. Plots were essentially free of disease throughout the growing season at all locations and fungicide treatments did not have an impact on yield (Table 2). All fields were planted within the recommended planting window (Mid-March to Mid-April)

	Ashley Co.	Greene Co.	Little River Co.	Poinsett Co.	Woodruff Co.
	Yield Bu/acre				
Untreated	192.7 a	176.8 a	236.7 a	156.4 a	232.3 a
Quilt 10.5 fl oz/ac	231.2 a	174.6 a	235.1 a	153.3 a	224.9 a
Headline 6 fl oz/ac	187.2 a	167.6 a	246.2 a	158.2 a	230.9 a
Propimax 4 fl oz/ac	218.7 a	183.0 a	235.8 a	144.1 a	221.4 a
Stratego 10 fl oz/ac	206.2 a	171.1 a	248.7 a	169.7 a	236.1 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. Three application timing experiments were conducted on the Pioneer 31G96 (RR + Herculex) hybrid. Experiments were located in Little River County near Foreman on a producer’s field and two experiments were conducted at the Cotton Branch Station near Marianna. At Marianna, a typical planting date (April 12) and a late planting date (May 26) were evaluated. Quilt was applied at 14 fl oz/acre to corn from 40 inches tall to near black layer (depending on location) Foliar diseases were not present in experiments in Little River County or the early planted experiment at the Cotton Branch Station. However, in the late planted (May 26) corn experiment, Southern rust (Figure 1) was found late in the season at high levels. Quilt applications made prior to silking provided little or no control of southern rust. Quilt treatments applied after silking and particularly near brown silk provided the highest level of control. Corn yields however were not increased with any of the Quilt applications due to the late occurrence of the disease in the growing season (Table 3). Visually the later Quilt applications maintained plant greenness, which may reduce plant lodging (Figure 1). Plant lodging was high for all treatments due to a thunderstorm which resulted in approximately 30% plant lodging across the experiment. These experiments illustrate the importance of early planting to help potentially avoid foliar diseases in corn.

Table 3. Effect of Quilt Application Timing on Corn Yield and Disease Control			
	Little River Co.	Cotton Branch Station - Early Planted	Cotton Branch Station - Late Planted
Treatment	Yield Bu/acre		
Untreated	196.7 a	220.9 a	156.6 a
40 Inch corn			150.6 a
10 before silk		232.8 a	155.7 a
3 d before silk			173.3 a
Silk	205.3 a	232.3 a	163.8 a
Silk + 7 Days	208.9 a	237.1 a	162.1 a
Silk + 14 Days	196.4 a	227.1 a	
Silk + 21 Days	201.6 a	227.6 a	166.5 a
Silk + 28 Days	208.0 a	232.4 a	
Silk + 35 Days			
Silk + 42 Days			

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

Figure 1.



Southern Rust

Left: Quilt applied at brown silk, Right: Untreated

3. Determine treatment thresholds for fungicides on corn in Arkansas. Even though foliar disease did not develop in most trials, 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.