2006 Soybean Research Report

Research Report No. 31
January 2008
Alabama Agricultural Experiment Station
Richard Guthrie, Director
Auburn University
Auburn, Alabama

Printed in cooperation with the Alabama Cooperative Extension System
(Alabama A&M University and Auburn University)

ACKNOWLEDGMENTS

This publication is a joint contribution of Auburn University, the Alabama Agricultural Experiment Station, and the USDA Agricultural Research Service. Research contained herein was partially funded from check off dollars through the Alabama Soybean Producers and private industry grants.

CONFIDENTIAL REPORT

Publication, display, or distribution of data contained herein should not be made without prior written approval. Mention of a trademark or product does not constitute a guarantee of the product by Auburn University and does not imply its approval to the exclusion of other products.

Information contained herein is available to all persons regardless of race, color, sex, or national origin.

Issued in furtherance of Cooperative Extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, and other related acts in cooperation with the U.S. Department of Agriculture. The Alabama Cooperative Extension System (Alabama A&M University and Auburn University) offers educational programs, materials, and equal opportunity employment to all people without regard to race, color, national origin, religion, sex. age, veteran status, or disability.

CONTENTS

Editors

D. P. Delaney
Extension Specialist IV
Agronomy and Soils
Auburn University

K. S. Lawrence
Associate Professor
Entomology and Plant Pathology
Auburn University

Contributors

K. S. Balkcom
National Soil Dynamics Lab
Auburn University

T. Dawkins
Director
Sand Mountain Research and Extension Center
Crossville, Alabama

D. P. Delaney
Extension Specialist
Agronomy and Soils, Auburn University

M. A. Delaney
Research Epidemiologist
Entomology and Plant Pathology
Auburn University

D. Derrick
Regional Extension Agent
Cherokee County
Alabama Cooperative Extension System

B. Dillard
Regional Extension Agent
Geneva County
Alabama Cooperative Extension System

R. M. Durbin
Associate Director, Field Crops Unit
E.V. Smith Research Center
Shorter, Alabama

K. Glass
Advisor, Natural Resource Program
Agronomy and Soils, Auburn University

D. Harkins
Associate Director
Tennessee Valley Research and Extension Center
Belle Mina, Alabama

G. W. Lawrence
Associate Professor
Entomology and Plant Pathology
Mississippi State University

K. S. Lawrence
Associate Professor
Entomology and Plant Pathology
Auburn University

C Mitchell
Professor
Agronomy and Soils, Auburn University

S. P. Nightengale
Associate Director, Plant Breeding Unit
E.V. Smith Research Center
Tallassee, Alabama

B.E. Norris
Director
Tennessee Valley Research and Extension Center
Belle Mina, Alabama

M. Pegues
Associate Director
Gulf Coast Research and Extension Center
Fairhope, Alabama

R. L. Petcher
Regional Extension Agent
Washington County
Alabama Cooperative Extension System

A. Price
Weed Scientist
USDA—ARS

E. J. Sikora
Professor and Extension Plant Pathologist
Entomology and Plant Pathology
Auburn University

VARIETY TRIALS

Evaluating Maturity Group III and IV Soybean Varieties at Different Planting Dates, 2006

D. P. Delaney, K. S. Lawrence, E. J. Sikora, S. P. Nightengale, T. Dawkins, and K. Glass

Soybeans are traditionally planted in late April through June in Alabama, with Maturity Group (MG) V to VIII cultivars. This combination often places the critical blooming and pod fill stage during moisture deficit periods in late summer. Research has shown that when early maturing varieties from MG III and IV are planted, they mature before soil moisture deficits become critical and outyield later soybeans. Approximately 60 percent of soybeans in Mississippi were planted with early varieties in 2004 with a large increase in Alabama in 2005 and 2006, but little work has been done in Alabama with this system and adapted varieties.

Tests were conducted at the Plant Breeding Unit (PBU) of the E. V. Smith Research Center near Tallassee, Alabama, and at the Sand Mountain Research and Education Center (SMREC) near Crossville, Alabama, in 2005. Two MG III and four MG IV cultivars ranging from 3.8 to 4.9 were planted on each of two planting dates. Four replications in a split-plot design were used with planting dates as main plots with planting dates in early April and again in late April. All varieties were planted with conventional tillage in seven 7-inch rows.

Bloom and maturity dates, plant height at initial bloom and maturity, and height to the lowest pod were also recorded during the season. Each treatment was harvested at maturity. Yields were adjusted to 13 percent moisture and 60 bushels per acre, and samples taken for seed quality analysis.

Due to extremely dry conditions, yields ranged from 6 to 30 bushels per acre at SMREC, while yields were somewhat better at 27 to 53 bushels per acre at PBU. At SMREC, late April plantings yielded 3 bushels per acre greater than early April while at PBU later planting yielded 6 bushels per acre greater. Later maturity varieties (MG 4.7 to 4.9) also yielded significantly higher than earlier varieties, due to more favorable rainfall during vegetative growth and seed filling stages.

Irrigated Group IV and V Roundup Ready® Soybean Varieties, Geneva County, 2006

D. P. Delaney, B. Dillard, and R. L. Petcher

Seventeen Maturity Group (MG) IV and V soybean cultivars, all Roundup Ready®, were planted on May 16 on the Tim and Clay Wise farm near Coffee Springs in Geneva County, Alabama. MG IV cultivars were planted in a twin-row pattern, approximately 10 inches between twin-rows, with 30-inch main centers in approximate order of maturity. MG V cultivars were planted on 30-inch rows.

Although the field was irrigated, limited water availability and extremely hot and dry weather limited yields (see table). The field was harvested on September 28 after desiccation using the producer's combine and a weigh wagon. Yields were adjusted to 13 percent moisture and 60 pounds per bushel.

Irrigated Group IV and V Roundup Ready® Soybean Varieties, Geneva County, 2006

Company	Variety	Harvest moisture %	Yield *bu/A @ 13%*
MG IV varieties			
DeltaPine	4331 RR	14.8	35.6
Dyna-Gro	3443nRR	13.9	46.3
UniSouth	USG 7440nRR	14.1	45.1
Pioneer	94M50 (RR)	14.1	29.7
Dyna-Gro	3463nRR	13.7	27.6
DeltaKing	4763 RR	14.3	31.2
DeltaPine	4724 RR	13.8	26.4
Croplan	RC 4842 RR	13.1	30.5
Pioneer	94M80 (RR)	12.7	37.4
Progeny	P4805	13	39.0
DeltaKing	4866 RR	12.3	39.0
UniSouth	USG 7482nRR	12.8	30.7
Croplan	RC 4955 RR	13	50.1
Progeny	P4949	12.7	34.0
DeltaKing	4967 RR	13.1	37.2
MG V varieties[1]			
Croplan	RC 5003 RR	12.8	40.4
DeltaPine	5115 RR/STS	12.8	42.8

[1]Planted same as MG IV varieties, but with single 30-inch rows

GROUP III AND IV ROUNDUP READY® SOYBEAN VARIETIES, DEKALB COUNTY, 2006

D. P. Delaney and D. Derrick

Twenty-two Maturity Group (MG) III and IV soybean cultivars, all Roundup Ready®, were planted on May 18, 2006 with cooperator Allen Duke in DeKalb County, Alabama. All plots consisted of six 30-inch rows 15 feet wide and approximately 300 to 500 feet long.

The field was harvested on October 10, using the producer's combine and a weigh wagon. Extremely dry conditions during the growing season resulted in poor yields. Yields were adjusted to 13 percent moisture and 60 pounds per bushel (see table).

MATURITY GROUP IV ROUNDUP READY® SOYBEAN VARIETIES, DEKALB COUNTY, 2006

Company	Variety	Harvest moisture %	Yield *bu/ac @ 13 %*
Syngenta	NK 39K6	16.7	12.1
Croplan	RC 4095 RR	17.4	11.4
DeltaPine	4331 RR	16.6	9.5
Asgrow	4404 RR	15.6	10.0
Dyna-Gro	3443nRR	14.6	7.7
UniSouth	USG 7440nRR	15.0	7.5
Croplan	RC 4455 RR	13.7	10.4
Pioneer	94M50 (RR)	14.3	9.3
Dyna-Gro	3463nRR	17.2	10.1
Asgrow	4703 RR	13.1	12.2
Croplan	RC 4655 RR	14.5	11.4
DeltaKing	4763 RR	14.4	13.6
DeltaPine	4724 RR	15.4	11.1
Progeny	P4804	17.0	12.9
UniSouth	USG 7482nRR	12.5	12.6
DeltaKing	4866 RR	13.6	11.9
Progeny	P4805	12.1	13.7
Pioneer	94M80 (RR)	12.1	12.5
Asgrow	4903 RR	12.4	11.6
DeltaKing	4967 RR	11.6	11.7
Syngenta	S 49Q9	11.5	12.4
Progeny	P4949	12.9	12.2

FUNGICIDE EVALUATIONS

Evaluation of Absolute, Folicur, and Stratego on Soybean Rust and Yield in Alabama, 2006

K. S. Lawrence, D. P. Delaney, M. A. Delaney, E. J. Sikora, G. W. Lawrence, and M. Pegues

A fungicide trial was planted on May 23 with Asgrow 7601 RR soybeans at the Gulf Coast Research and Extension Center at Fairhope, Alabama. The soil type was a Malbis fine sandy loam. Plots consisted of four rows, 25 feet long, with a row spacing of 38 inches. Plots were arranged in a randomized complete-block design with four replications. Fungicide treatments were applied as a foliar spray at the R2 and again at the R4 plant growth stages. Fungicides were applied in 24 gallons per acre of water using a Lee Spider high clearance sprayer with Turbodrop TDXL 10002 flat fan on 15 inch centers at 60 pounds per square inch. Soybean foliar diseases were evaluated by rating severity of each disease in the plot at the R6 to R7 growth stage. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Plots were harvested on November 2. Data were statistically analyzed using PROC GLM, and means were compared with Fisher's protected least significant difference test ($P \leq 0.05$).

Weather conditions were favorable for moderate incidence of foliar diseases with adequate rainfall in July, August, and September. Asian soybean rust *(Phakopsora pachyrhizi)* leaf symptoms were first observed in mid-September at the R6 full seed growth stage in the untreated control plots in the lower leaf canopy. Rust was not observed in any of the fungicide treatments at this time. Two weeks later soybeans had matured to the R7 growth stage. Rust severity had increased in all plots but was significantly more severe ($P \leq 0.05$) in the untreated control as compared to the Folicur, Absolute, and Stratego treatments. Rust severity was rated in the lower canopy but was observed in the upper canopy only in the control plots at this stage. Soybean yields were increased ($P \leq 0.05$) by the Stratego + Induce fungicide treatment as compared to the Folicur and Absolute fungicides and the control. The Folicur and Absolute treatments increased yield over the control by 6 percent as compared to the 15 percent increase in the Stratego + Induce treatment.

Evaluation of Absolute, Folicur, and Stratego on Asian Soybean Rust and Yield in Alabama, 2006

			–Asian soybean rust—		Yield
Treatment	Rate	Timing	severity[1]	severity	*bu/A*
Untreated			2.25 a	8.50 a	61.39 b
Folicur 3.6F SC	4oz/A	R2 + R4	1.00 b	2.00 b	65.73 b
Absolute SC	5 oz/A	R2 + R4	1.00 b	2.00 b	65.97 b
Stratego + Induce	10 oz/A+ 0.125%v/v	R2 + R4	1.00 b	2.25 b	71.95 a
LSD (P ≤ 0.05)			***0.4***	***0.7***	***5.8***

[1]Disease severity : 1= no rust; 2 < 2.5%, 3 = 2.5 - 5%, 4 = 5 - 10%, 5 = 10 - 15%, 6 = 15- 25%, 7 = 25 - 35%, 8 = 35 - 67%, 9 = 67- 100%.

Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.05$).

Efficacy of Foliar Fungicides Punch and Charisma for Soybean Rust Management and Yield Enhancement in Alabama, 2006

K. S. Lawrence, D. P. Delaney, M. A. Delaney, E. J. Sikora, G. W. Lawrence, and M. Pegues

A soybean fungicide trial was planted on May 23 with Asgrow 7601 RR at the Gulf Coast Research and Extension Center at Fairhope, Alabama. The soil type was a Malbis fine sandy loam. Plots consisted of four rows, 25 feet long, with a row spacing of 38 inches. Plots were arranged in a randomized complete-block design with four replications. The fungicide treatments were applied as a foliar spray at the R1 plant growth stage and repeated 21 days later. Fungicides were applied in 24 gallons per acre of water using a Lee Spider high clearance sprayer with Turbodrop TDXL 10002 flat fan nozzles on 15 inch centers at 60 pounds per square inch. Soybean foliar diseases were evaluated by rating severity of each disease in the plot at the R6 to R7 growth stage. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Plots were harvested on November 2. Data were statistically analyzed using PROC GLM, and means were compared with Fisher's protected least significant difference test ($P \leq 0.05$).

Weather conditions were favorable for moderate incidence of foliar disease on soybean with adequate rainfall in July, August, and September. Asian soybean rust *(Phakopsora pachyrhizi)* leaf symptoms were first observed in the untreated control plots only in mid-September when the soybeans were at the R6 full seed growth stage. Two weeks later, rust severity had increased in all plots but was significantly more severe ($P \leq 0.05$) in the untreated control as compared to all the fungicide treatments. Rust severity was less than 2.5 to 5 percent leaf coverage in all of the fungicide treatments. Rust severity was rated in the lower canopy but was also observed in the upper canopy of the control plots. Target spot incidence was also high in the control treatment, and again all fungicides reduced ($P \leq 0.05$) this foliar disease. Soybean yields were increased ($P \leq 0.05$) by all fungicide treatments as compared to the control. The average increase in yield over all fungicide treatments was 13.3 bushels per acre or a 19 percent increase as compared to the control.

Evaluation of Punch and Charisma on Asian Soybean Rust and Yield in Alabama, 2006

Treatment	Rate	Timing	Soybean rust[1]	Target spot[2]	Yield *bu/A*
Punch EC 400GL	4 floz/A	R1 + 21 D	2.25 b	0.75 b	71.098 ab
Punch EC 400GL	3 floz/A	R1 + 21 D	2.25 b	0.75 b	72.950 ab
Chrisma EC 207GL	10 floz/A	R1 + 21 D	2.25 b	1.25 b	72.190 ab
Punch EC 400GL + Headline EC	3 + 4.5 floz/A	R1 + 21 D	2.00 b	1.25 b	73.738 a
Punch EC 400GL + Quadris SC	3 + 4 floz/A	R1 + 21 D	2.50 b	1.25 b	72.445 ab
Headline EC	6 floz/A	R1 + 21 D	2.25 b	1.25 b	73.140 ab
Quadris SC	6 floz/A	R1 + 21 D	2.25 b	3.00 b	69.283 b
Uppercut EC	4 floz/A	R1 + 21 D	2.50 b	1.25 b	71.320 ab
Punch EC +	4 floz/A +	R1 +	2.25 b	1.25 b	72.963 ab
Punch EC 400GL + Headline EC	3 + 4.5 floz/A	21 D			
Untreated control			9.00 a	51.25 a	58.830 c
LSD P=0.05			***0.61***	***8.3***	***4.1***

[1] Disease severity : 1= no rust; 2 < 2.5%, 3 = 2.5 - 5%, 4 = 5 - 10%, 5 = 10 - 15%, 6 = 15- 25%, 7 = 25 - 35%, 8 = 35 - 67%, 9 = 67- 100%.

[2] Disease incidence was based on the percentage of plants affected per row: 0= 0%, 10 = 1-10%, 20 = 11-20%, 30 = 21- 30%, 40 = 31- 40%, 50 = 41- 50%, 60 = 51- 60%, 70 = 61 - 70%, 80 = 71-80%, 90= 81- 90%, 100 = 91-100%.

Means within columns followed by different letters are significantly different according to Fisher's LSD ($P < 0.05$).

EVALUATION OF SELECTED FUNGICIDES FOR SOYBEAN RUST MANAGEMENT AND YIELD ENHANCEMENT IN ALABAMA, 2006

K. S. Lawrence, D. P. Delaney, M. A. Delaney, E. J. Sikora, G. W. Lawrence, and M. Pegues

A soybean fungicide trial was planted on June 1 with Deltapine DP 7085 RR at the Auburn University Gulf Coast Research and Education Center at Fairhope, Alabama. The soil type was a Malbis fine sandy loam. Plots consisted of four rows, 25 feet long, with a row spacing of 38 inches. Plots were arranged in a randomized complete-block design with four replications. The fungicide treatments were applied as a foliar spray at the R2 and again at the R4 plant growth stages. Fungicides were applied in 24 gallons per acre of water using a Lee Spider high clearance sprayer with Turbodrop TDXL 10002 flat fan nozzles on 15 inch centers at 60 pounds per square inch. Soybean foliar diseases were evaluated by rating severity of each disease in the plot at the R6 to R7 growth stage. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Plots were harvested on November 2. Data were statistically analyzed using PROC GLM, and means were compared with Fisher's protected least significant difference test ($P \leq 0.05$).

Weather conditions were favorable for moderate incidence of foliar disease on soybean with adequate rainfall in July, August, and September. Asian soybean rust *(Phakopsora pachyrhizi)* leaf symptoms were first observed in mid-September at the R6 full seed growth stage in the lower leaf canopy. All fungicide treatments at the R6 growth stage reduced ($P \leq 0.05$) rust severity as compared to the untreated control except for the Microthiol disperse 80 percent DF + KFD-09-013.6 combination treatment. Two weeks later, rust severity had increased in all plots but was significantly more severe ($P \leq 0.05$) in the untreated control as compared to all the fungicide treatments. Rust severity was less than 2.5 to 5 percent leaf coverage in the Topsin 4.5 F, Folicur 3.6 F, and Headline 2.08 EC treatments. Rust severity was rated in the lower canopy but was observed only in the upper canopy of the control plots. Soybean yields were increased ($P \leq 0.05$) by all fungicide treatments as compared to the control. Headline 2.08 EC and Folicur 3.6 F treatments alone or in combination with Topsin 4.5 F, Penncozeb or KFD-09-013.6F increased yield by an average of 28 percent or 22 bushels per acre. The Cuprofix disperses ultra 40 percent DF, Penncozeb 4 FL, Microthiol disperse 80 percent DF, and Topsin 4.5 F treatments increased yield by an average of 17 percent, or 12 bushels per acre, over the untreated control.

EVALUATION OF SELECTED FUNGICIDES ON ASIAN SOYBEAN RUST AND YIELD IN ALABAMA, 2006

Treatment	Rate	Growth stage	Asian rust severity[1] Sept. 16	Sept. 29	Yield[2] *bu/A*
Untreated control		R1-R3/R5	6.0 a	9.0 a	52.9 d
Cuprofix disperses ultra 40 % DF	2 lb/A	R1-R3/R5	2.8 bc	5.0 bcd	69.3 bc
Penncozeb 4 FL	2 pt/A	R1-R3/R5	3.3 bc	6.3 bc	62.4 c
Microthiol disperse 80% DF	2 lb/A	R1-R3/R5	3.3 bc	7.3 ab	62.4 c
Topsin 4.5 F	16 floz/A	R1-R3/R5	2.3 bc	6.5 bc	61.6 c
KFD-09-013.6 F	4 floz/A	R1-R3/R5	3.3 bc	3.8 de	70.9 ab
Cuprofix disperses ultra 40 % DF	2 lb/A	R1-R3/R5	2.8 bc	3.8 de	74.8 ab
+ KFD-09-013.6 F	4 floz/A	R1-R3/R5			
Penncozeb 4 FL	2 pt/A	R1-R3/R5	3.3 bc	2.3 e	75.5 ab
+ KFD-09-013.6 F	4 floz/A	R1-R3/R5			
Microthiol disperse 80% DF	2 lb/A	R1-R3/R5	4.0 abc	4.3 cde	69.3 bc
+ KFD-09-013.6 F	4 floz/A	R1-R3/R5			
Topsin 4.5 F + KFD-09-013.6 F	16 +4 floz/A	R1-R3/R5	2.3 bc	2.8 de	78.6 a
Folicur 3.6 F	4 floz/A	R1-R3/R5	3.0 bc	2.5 e	74.7 ab
Headline 2.08 EC	6 floz/A	R1-R3/R5	2.0 c	2.8 de	71.8 ab
LSD P=0.05			2.1	2.3	8.3

[1] Disease severity : 1= no rust; 2 < 2.5%, 3 = 2.5 - 5%, 4 = 5 - 10%, 5 = 10 - 15%, 6 = 15- 25%, 7 = 25 - 35%, 8 = 35 - 67%, 9 = 67- 100%.
[2] Yield was determined on November 2.
Means within columns followed by different letters are significantly different according to Fisher's LSD (P < 0.05).

EVALUATION OF FUNGICIDE COMBINATIONS FOR CONTROL OF ASIAN SOYBEAN RUST, 2006

E. J. Sikora, D. P. Delaney, K. S. Lawrence, M. A. Delaney, and M. Pegues

Field trials to evaluate fungicide applications and management for the control of Asian soybean rust and other foliar diseases were established at the Gulf Coast Research and Extension Center (GCREC) at Fairhope, Alabama, the E.V. Smith Research Center Field Crops Unit (FCU) at Shorter and the Plant Breeding Unit (PBU) near Tallassee. Due to extreme drought, only the Gulf Coast location experienced damaging levels of Asian Coybean rust or other fungus diseases in 2006.

At the GCREC, DP 7870 RR soybeans were planted on June 1. Fungicide treatments were applied as a foliar spray at R2 and repeated in 21 days (R4-R5). Weather conditions were favorable for moderate incidence of foliar disease on soybean with adequate rainfall in July, August, and September. Soybean rust leaf symptoms were first observed in the trial in mid-September at the R6 full seed growth stage in the lower leaf canopy. Soybean foliar diseases were evaluated by rating severity of Asian soybean rust and target spot in each plot at R4, R5-6, and R7-8 growth stages. Plots were harvested on November 3. Data were statistically analyzed using Duncan's New MRT. ($P \leq 0.10$). All fungicide treatments reduced the incidence of Asian soybean rust and target spot relative to the untreated control, reduced leaf percent defoliation ($P \leq 0.10$), and increased yields from 13 to 40 bushels per acre over the untreated control (Figures 1 and 2).

Topguard, a new triazole fungicide awaiting registration for 2007, exhibited extended control of Asian soybean rust, as noted by the delayed leaf defoliation ratings in Figure 1.

Similar results were noted with several other trials with new materials at the GCREC, where all materials tested gave yield increases of 25 to 35 bushels per acre over the untreated check. Weights of 100-seed samples were highly correlated with yield, indicating that the primary effect of Asian soybean rust was leaf loss that prevented seed fill.

Extremely dry conditions for fungicide trials at other locations (PBU and FCU) resulted in very little disease pressure and little significant differences in disease rating or yields.

Figure 1. Soybean leaf defoliation by Asian soybean rust at GCREC, 2006

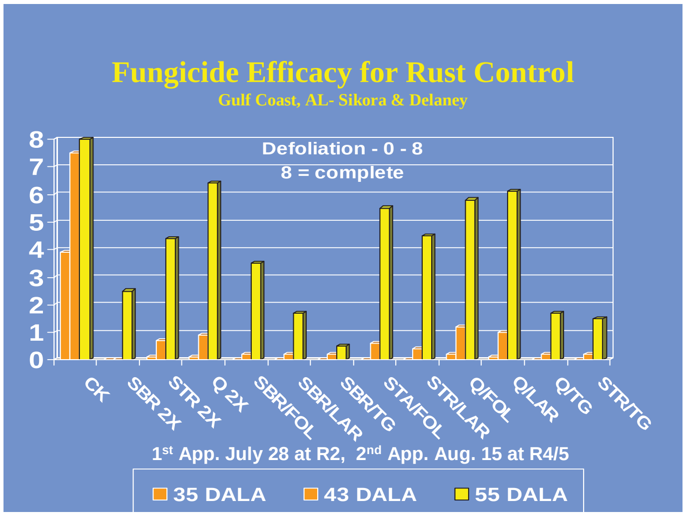
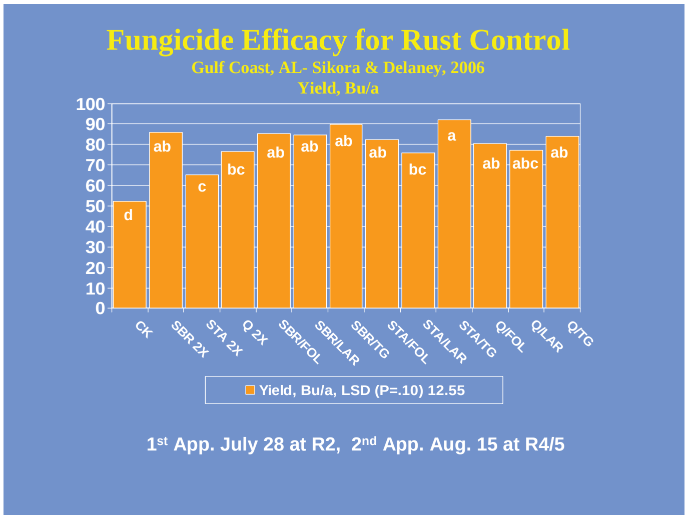


Figure 2. Soybean yields with fungicide treatments for Asican soybean rust at GCREC, 2006



Strobiluron Fungicide Greening Effects on Soybeans in Alabama: Application Timing and Desiccants, 2006

D. P. Delaney, E. J. Sikora, M. A. Delaney, K. S. Lawrence, T. Dawkins, B. Durbin, C. Norris, and D. Harkins

Many soybean fields in Alabama where strobiluron fungicides had been applied to prevent Asian soybean rust experienced retention of green leaves after pod maturity in 2005. Many producers delayed harvest until frost or weathering removed these leaves, leading to seed deterioration and shattering losses. Producers who harvested before sufficient drydown experienced greatly reduced speeds with increased fuel and machinery costs and foreign material dockage. Desiccant materials may dry up these green leaves and stems for more timely and efficient harvest, but have been little used in Alabama soybean production.

Three trials investigated strobiluron timing at different growth stages, with and without desiccant application to increase harvest efficiency. Trials were conducted in north and central Alabama at the Tennessee Valley Research and Extension Center (TVREC) in Belle Mina, Sand Mountain Research and Extension Center (SMREC) in Crossville, and the E.V. Smith Research Center Field Crops Unit (EVSRC) in Shorter. Headline® (pyraclostrobin) at 6 fluid ounces per acre was applied at R1, R3, and/or R5 in factorial combinations with or without desiccation. A tank mix of Gramoxone Inteon® 2L (paraquat) at 1 pint per acre plus sodium chlorate at 3 pounds a.i. per acre was applied to half the plots at pod maturity. All treatments were applied with flat fan nozzles in a volume of 20 gallons per acre. Desiccated treatments were harvested 10 to 15 days after treatment, while non-desiccated plots were harvested after natural leaf drop (10 to 21 days later). Grain yield and harvest moisture data were recorded. Seed samples were also analyzed for foreign matter content and seed weight.

The 2006 growing season was extremely dry in most of Alabama, particularly in spring/early summer and again in early fall. Likely due to the 40-year record drought, strobiluron greening effects were much reduced in 2006. In only one of three locations were greening differences noted between strobiluron application timings and seasonal rate treatments At TVREC, leaf greening was significantly increased by strobiluron applications at R1, R3, and R1+R3 compared to untreated plots and applications at R5 and R3+R5. Harvested grain yield was not affected by fungicide application at any location, but was increased by desiccation at all locations. Harvested yield was increased by 2.4 bushels per acre at SMREC and EVSRC, and by 3 bushels per acre at TVREC (see table).

Total moisture content was reduced from 16.3 to 12.7 percent at TVREC, while it was unaffected by fungicide or desiccation applications at other locations. Trash and seed weight was little affected by treatments, although small differences were noted at EVSRC for fungicide application timing on 100-seed

Yields of Strobiluron-Treated Soybeans with and Without Desiccant Application

Treatment	EVSRC	SMREC	TVREC
		bu/A	
No Desiccant	11.8	36.4	35.6
Desiccant	14.2	38.8	38.6
LSD (0.10)	1.1	2.1	2.9

WEED CONTROL AND DESICCATION

DESICCANT MATERIALS FOR SOYBEANS, 2006

D. P. Delaney, E. J. Sikora, M. A. Delaney, T. Dawkins, B. Durbin, and M. Pegues

The objective of these studies was to evaluate the use of various desiccants, combinations, and rates, particularly with early maturing and strobiluron fungicide-treated soybeans. The increasing use of these practices in Alabama has led to many fields with harvest-ready pods, but green leaves, stems, and sometimes weeds, which slow harvest and can affect grain quality. Desiccants may speed harvest and lower harvest costs and discounts, but little information is available to recommend the most effective and economical practices in Alabama.

Three locations were selected for these trials--Gulf Coast Research and Extension Center (GCREC) in Fairhope, E.V. Smith Research Center Field Crops Unit (EVSRC) in Shorter, and Sand Mountain Research and Extension Center (SMREC) in Crossville. All trials were sprayed three times during the growing season with a strobiluron (Headline at 6 to 9 fluid ounces per acre at R1, R3, and R5) or strobiluron/triazole tank-mix to encourage the strobiluron greening effect, which had been encountered in many soybean fields in 2005. At the GCREC, leaf drop was nearly complete at pod maturity, so this location was not treated with desiccants. In trials at EVSRC and SMREC ten harvest aid materials were applied with flat fan nozzles in a volume of 20 gallons per acre at pod maturity, and then rated for soybean leaf and weed desiccation at 3 and 10 days. Plots were harvested approximately two weeks after treatment, with moisture content, trash, seed weights, and yield measured. Data were analysed at p=0.10

All treatments increased soybean leaf desiccation at 4 and 10 days after treatment (DAT) at EVSRC and at 10 DAT at SMREC. At SMREC at 4 DAT, all treatments except Aim + crop oil increased leaf desiccation. Several treatments reduced total harvest moisture at EVSRC and SMREC compared to the check. Treatments which included paraquat (Gramoxone Inteon, Firestorm®) or sodium chlorate as active ingredients were most effective in reducing harvest moisture. Harvested grain yield was significantly increased by 3 to 4 bushels per acre with three treatments at EVSRC compared to untreated, but not at SMREC. There was no significant difference in trash content or 100-seed weights between any treatments.

LEAF DESICCATION AND YIELD FOR SOYBEANS TREATED WITH DESICCANTS AT POD MATURITY AT EVSRC AND SMREC

	–Leaf desiccation[1]—				Yield	
	—EVSRC—		—SMREC—		EVSRC	SMREC
Treatment	3 DAT[2]	10 DAT	3 DAT	10 DAT	*bu/A*	*bu/A*
Untreated check	1.0	1.0	0.3	5.3	20.4	19.1
Gramoxone Inteon @ 1/8 lb ai/A +NIS,	4.7	6.3	5.0	8.8	22.4	19.1
Gramoxone Inteon @ 1/4 lb ai/A +NIS	6.0	8.0	7.0	9.0	20.9	19.1
Gramoxone Inteon @ 1/2 lb ai/A +NIS	7.7	8.7	7.0	9.0	24.0	19.1
Gramoxone Inteon @ 1/4 lb ai/A +NIS + Sodium Chlorate @ 3 lb ai/A	7.0	9.0	6.3	9.0	23.9	18.7
Sodium Chlorate @ 6 lb ai/A	3.0	5.3	6.0	8.8	23.0	21.4
Firestorm @ 1/4 lb ai/A + NIS[3]	7.0	8.7	7.0	9.0	22.1	19.1
Aim @ 1.4 fl oz/A + COC[4]	5.0	6.3	1.8	6.0	22.5	18.7
Aim @ 1.4 fl oz/A + Gramoxone Inteon @1/8 lb ai/A + COC	3.7	4.4	7.0	9.0	24.6	17.3
Aim @ 1.4 fl oz/A + Roundup WM @ 22 fl oz/A	3.0	4.3	2.8	5.5	21.9	16.4
LSD (p = 0.10)	1.8	2.0	1.8	1.1	2.8	3.8

[1] 1= Green, 10 = Completely brown
[2] DAT = days after treatment
[3] NIS = Non Ionic Surfactant @ 0.5% volume
[4] COC = Crop Oil Concentrate

EVALUATION OF WEED SUPPRESSION PROVIDED BY A HIGH-RESIDUE COVER IN CONSERVATION TILLAGE SOYBEAN

A. Price and D. P. Delaney

Many soybean producers in Alabama have adopted some form of conservation tillage. Research has shown that by letting winter cover crops grow larger, improvements in weed suppression and soil quality—including organic matter and water infiltration and availability—can be attained. However, research has also shown that surface residue can decrease the effectiveness of preemergence herbicides. This experiment was designed to investigate whether preemergence herbicides can be replaced with a high-residue winter cereal cover crop.

Studies were conducted using glyphosate tolerant (RR), sulfonylurea tolerant (STS™), and conventional soybeans at the E.V. Smith Research Center (EVSRC) in Shorter, Alabama, and the Tennessee Valley Research and Extension Center (TVREC) in Belle Mina, Alabama. Factorial treatments consisted of three levels: winter cover (with or without rye), early season residual (with or without Valor at planting), and postemergence herbicide systems: glyphosate, Synchrony, or HADSS (Herbicide Application Decision Support System; http://www.webhadss.ncsu.edu/LocationIntro.asp?Location=Alabama) recommended treatments (applied as EPOST, POST, sequential, or none). Rye was established in half the plots as winter cover preceding a soybean crop managed in a conservation tillage system. In the spring, the winter cover and emerged weeds in fallow plots were killed with glyphosate. Soybeans were planted in four-row plots, with 30 inches between the rows, which were 20 feet long. The plots were replicated four times. Weed biomass and soybean height and yield were evaluated.

At EVSRC, the area received extremely little rainfall after planting and the soybean stand was not established. After replanting, no subsequent rainfall occurred to facilitate germination and the experiment was lost. At TVREC the experiment was established but yields reflected the extreme drought (Figures 1 and 2).

The RoundUp™ system provided higher weed control and yield compared to the conventional or STS™ herbicide systems for both winter fallow or the rye cover crop conservation tillage systems. Yield reflects weed control performance of each system. It is important to note that while yield was poor due to drought, yield was increased when rye was utilized as a cover crop.

Figure 1. Soybean yield following winter fallow and different herbicide intensities

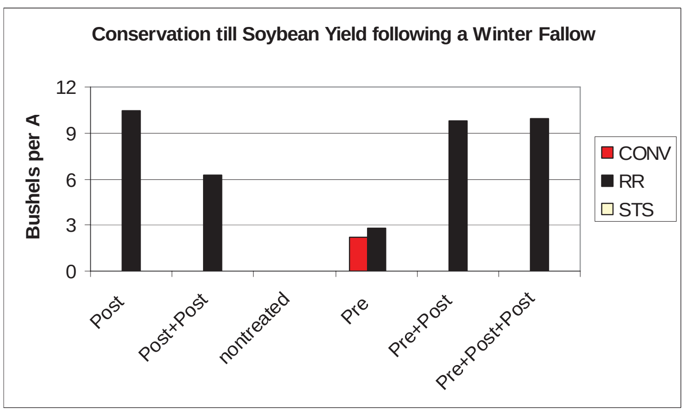
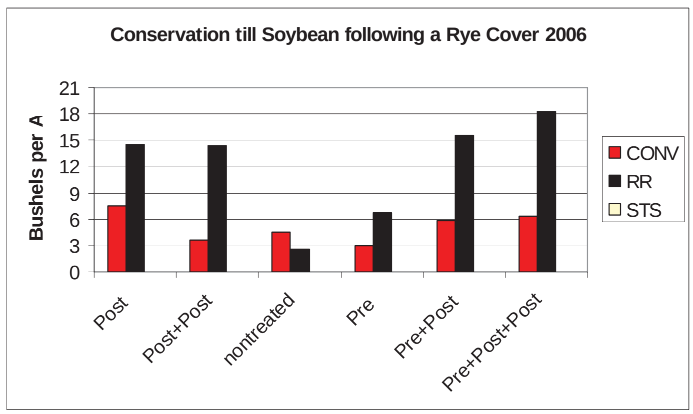


Figure 2. Soybean yield following a rye winter cover crop and different herbicide intensities



CROP ROTATION AND FERTILITY

THE TWO YEAR ROTATION (CIRCA 1929) AT TENNESSEE VALLEY, 2006

C. Mitchell

The Two-Year Rotation Experiment (17 fertility treatments replicated four times) is located at Tennessee Valley Research and Extension Center, Sand Mountain Research and Extension Center, Prattville Agricultural Research Unit, Wiregrass Research and Extension Center, and Brewton Agricultural Research Unit—all of these are assocationed with the Alabama Agricultural Experiment Station.

The expeiment was planted to cotton and soybean at the Tennessee Valley Research and Extension Center (see table) with differing crop rotations at other locations. Soybeans were planted no-till into a small grain residue. Due to the drought, both cotton lint yields and soybean yields were very low at the Tennessee Valley location.

YIELDS ON THE TWO-YEAR ROTATION EXPERIMENT AT TENNESSEE VALLEY IN 2006

Treatment	N-P_2O_5-K_2O *lb/A*	Cotton lint *lb/A*	Soybean *bu/A*
1. Untreated	0-0-0	333	10.5
2. No sulfur	150-60-60	429	20.0
3. Moderate P	90-30-60	436	18.9
4. No lime, low pH	90-60-60	441	18.3
5. Low Mg	90-60-60	362	16.6
6. No K	90-60-0	89	19.7
7. Low K	90-60-30	158	21.9
8. + micros	90-60-60	267	19.6
9. No NPK, + lime	0-0-0	138	10.8
10. High N	120-60-60	294	18.1
11. Low N	30-60-60	324	16.4
12. No P	90-0-60	280	12.5
13. Moderate N	60-60-60	424	18.6
14. NPK+lime	90-60-60	543	19.3
15. High K	90-60-120	544	21.6
16. No N	0-60-60	481	14.0
17. Fertilized 1978-82 only	0-0-0	425	12.4

HIGH YIELDS ON THE OLD ROTATION, 2006

C. Mitchell, D. P. Delaney, and K. S. Balkcom

The Old Rotation (circa 1896) is the third oldest field crop experiment on the same site in the United States and the oldest, continuous cotton experiment in the world. Its 13 plots on 1 acre of land on the Auburn University campus continue to document the long-term effects of crop rotations with and without winter legumes (crimson clover) as a source of nitrogen for cotton, corn, soybean, and wheat (see table).

CROP YIELDS ON THE OLD ROTATION IN 2006

Plot	Description	Clover dry matter *lb/A*	Wheat *bu/A*	—Corn— Irr. *bu/A*	Non-irr	—Cotton— Irr. *lint/A*	Non-irr	—Soybean— Irr. *bu/A*	Non-irr
1	no N/no legume	0				560	410		
2	winter legume	5710				1200	1240		
3	winter legume	6060				1330	1260		
4	cotton-corn	6400				1400	1650		
5	cotton-corn + N	6710				1730	1760		
6	no N/no legume	0				480	360		
7	cotton-corn	6270		62	54				
8	winter legume	5850		.	.	900	1400		
9	cotton-corn + N	7080		154	118				
10	3-year rotation	6880		103	74				
11	3-year rotation	0	66.8					66.1	48.3
12	3-year rotation	0				900	900		
13	Cont. cotton/no legume +N		0				1420	1260	

Figure 1. Rainfall at Auburn, Alabama, during the growing season in 2006

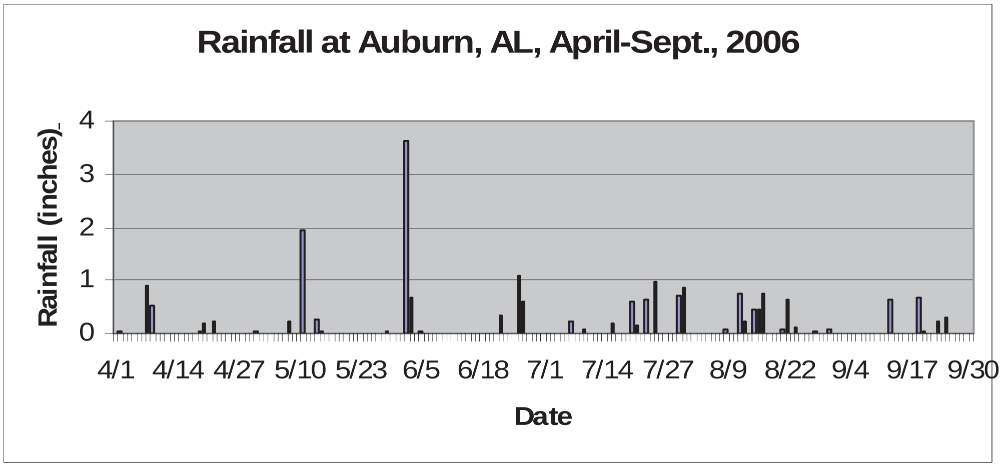
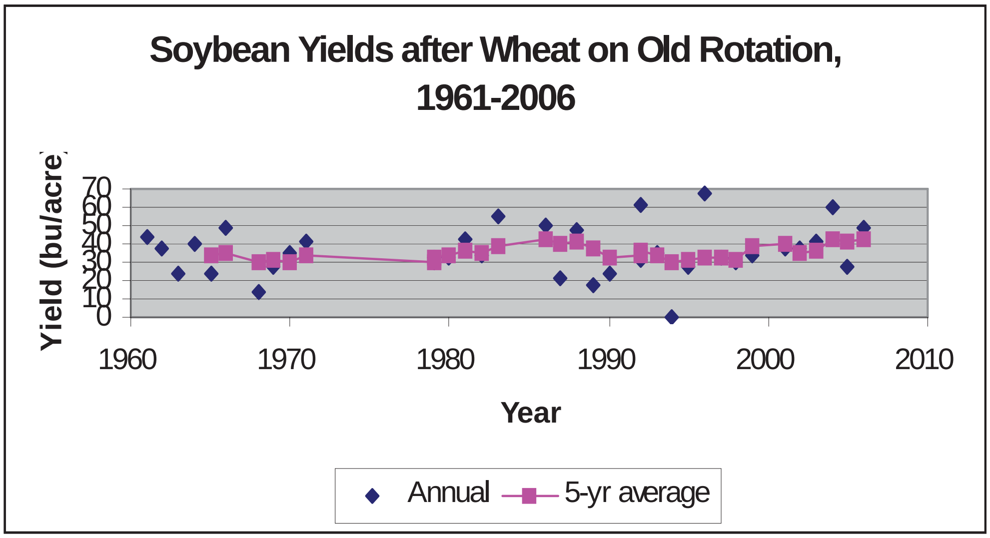


Figure 2. Long-term trends in soybean yields following a small grain on the Old Rotation experiment



SOYBEANS ON THE CULLARS ROTATION (CIRCA 1911), 2006

C. Mitchell, D. P. Delaney, and K. S. Balkcom

The Cullars Rotation is the oldest, continuous soil fertility study in the South and the second oldest cotton study in the world. It was started in 1911 by the Alabama Agricultural Experiment Station on the farm of J.A. Cullars and John P. Alvis by Prof. G.F. Atkinson, a biologist at the Agricultural and Mechanical College of Alabama. In 1938, the "Alvis Field" was sold to Alabama Polytechnic Institute which became Auburn University in 1960. The site was named to the National Register of Historical Places in 2003 with a national historical marker dedicated on November 3, 2006. The experiment consists of 14 soil fertility variables in three blocks that are rotated with cotton followed by a winter legume, corn followed by wheat, and soybeans planted after wheat.

In 2006, the wheat yield and soybean yields were very good wheat and cotton yields set a record. On the highest fertilized plots (plot 10), 54 bushels soybean per acre were produced following a 47-bushels-per-acre wheat crop. An all-time record cotton lint yield of 2050 pounds of lint per acre was produced on the treatment that receives complete N-P-K fertilization (plot 3). This surpassed the previous record cotton yield of 1880 pounds of lint per acre on this same plot in 2004. Good wheat (54 bushels per acre) and corn yields (110 bushels per acre) were made on this treatment in spite of a drought throughout the rest of Alabama (see table). Timely rainfall and the long-term benefits of conservation tillage are given credit for high yields in a drought year.

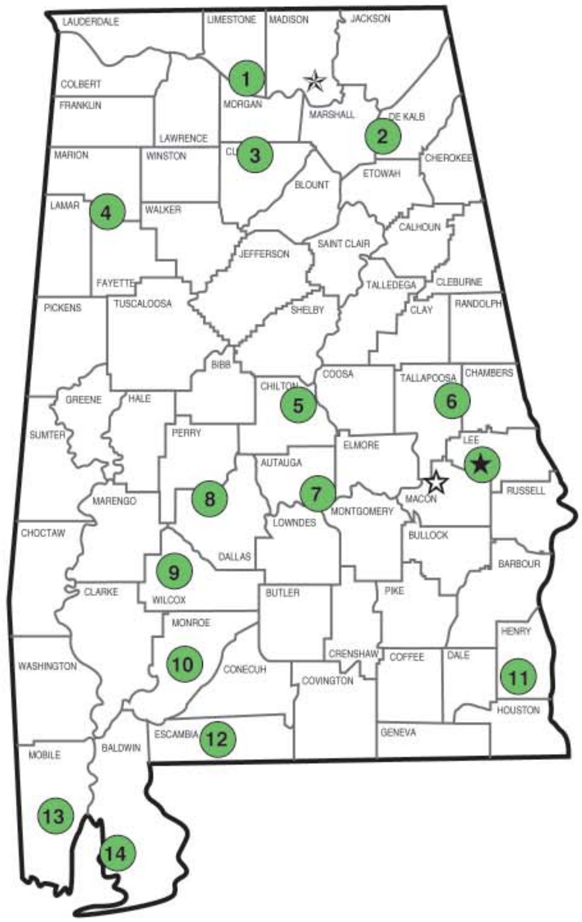
While long-term trends seem to indicate higher yields on the well-fertilized plots, the plots with low levels of one or more nutrient or factor e.g., plot C (nothing), plot 2 (no P), plot 6 (no K), and plot 8 (no lime), continue a trend toward lower and lower yields.

CULLARS ROTATION YIELDS IN 2006

Plot	Description	Clover	Wheat	Corn	Cotton	Soybean
		dry lb/A	*bu/A*	*bu/A*	*lint/A*	*bu/A*
A	no N/+legume	5560	20.3	43	1130	51.2
B	no N/no legume	0	24.6	11	1260	53.8
C	nothing	0	0	0	0	0
1	no legume	0	45.3	94	1820	48.5
2	no P	4740	14.9	50	215	11.6
3	complete	5580	53.3	110	2050	47.5
4	4/3 K	5060	46	85	1820	49.9
5	rock P	6230	47.6	96	1800	48.2
6	no K	3130	40.3	54	0	21.3
7	2/3 K	510	46.1	93	1650	50.3
8	no lime	0	0	25	0	0
9	no S	4580	41	102	1600	50.6
10	complete+ micros	6780	47.1	96	1830	54.0
11	1/3 K	2490	45.3	96	720	50.8

Alabama's Agricultural Experiment Station
AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the state has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.
☆ Alabama A&M University.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Research and Extension Center, Belle Mina.
2. Sand Mountain Research and Extension Center, Crossville.
3. North Alabama Horticulture Research Center, Cullman.
4. Upper Coastal Plain Agricultural Research Center, Winfield.
5. Chilton Research and Extension Center, Clanton.
6. Piedmont Substation, Camp Hill.
7. Prattville Agricultural Research Unit, Prattville.
8. Black Belt Research and Extension Center, Marion Junction.
9. Lower Coastal Plain Substation, Camden.
10. Monroeville Agricultural Research Unit, Monroeville.
11. Wiregrass Research and Extension Center, Headland.
12. Brewton Agricultural Research Unit, Brewton.
13. Ornamental Horticulture Research Center, Spring Hill.
14. Gulf Coast Research and Extension Center, Fairhope.