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VARIETY TRIALS

Late-Planted Irrigated MG V and Late IV Roundup Ready® Soybean Varieties in Northeast Alabama, 2009

D. P. Delaney and D. Derrick

This trial was planted on the Randall and Nick McMichen Farm near Centre, Alabama, in Cherokee County on June 17, 2009. Seed was planted no-till into wheat stubble after grain harvest on a Holston fine sandy loam soil with very good moisture. Each cultivar was planted in a single field-length strip with 2- x 15-foot drill passes. Rainfall was generally plentiful for most of the season with some irrigation needed in early summer. The field was harvested on November 16 with the producer's combine and a weighing grain buggy after delays caused by wet soil conditions. Due to a wet area across the field, the ends were trimmed and 475 feet of the center 20 feet of each strip was harvested. Severe lodging was noted on some varieties and was rated at harvest (see table). Lodged plants were generally leaning into the direction of harvest so that header losses were less than they would have been with whole field (back and forth) harvesting.

MG V and Late IV Roundup Ready® Soybean Varieties, Cherokee County 2009

Brand	Variety	Yield[1]	Lodging[2]
		bu/A	
Asgrow	4907 RR	78.2	1
Asgrow	5503 RR	72.8	1
Armor	47-F8 RR	72.3	1
Pioneer	94Y80	65.8	3
Pioneer	94M50	65.7	1
Asgrow	4606 RR/STS	63.6	2
Armor	49-V6 RR	63.1	2
Dyna-Gro	37P49 RR	62.3	3
Dyna-Gro	35Z49 RR	58.5	1
Asgrow	4705 RR	55.8	4
Asgrow	5803 RR	55.5	4

[1] Adjusted to 13 percent moisture and 60 pounds per bushel.
[2] Rated at harvest: 1 = almost all plants erect; 5 = more than 80 percent of plants down.

CONVENTIONAL MG V AND LATE IV ROUNDUP READY® SOYBEAN VARIETIES IN CENTRAL ALABAMA, 2009

D. P. Delaney, W. Griffith, and E. J. Sikora

This trial was planted at the Dee River Ranch near Aliceville, Alabama, in Pickens County on June 2, 2009. Seed was planted no-till into wheat stubble after grain harvest on a Vaiden silty clay soil with very good soil moisture. Each cultivar was planted in a single field-length strip of 24-inch x 30-inch rows. The field was harvested on October 25 with the producer's combine and yield monitor. Rainfall was generally plentiful to excessive for most of the season with harvest delayed due to wet soil conditions. Yields were adjusted to 13 percent moisture and 60 pounds per bushel (see table).

CONVENTIONAL MG V AND LATE IV ROUNDUP READY® SOYBEAN VARIETIES, PICKENS COUNTY, 2009

Variety	Yield[1] *bu/A*	Seed quality[2]
Progeny 4949	49.6	Very good
Asgrow AG 5503	47.5	Very good
Deltapine DP 5915	44.0	Very good
Asgrow 4705	39.3	Fair
Asgrow 5304	45.7	Good
DeltaKing DK 4968	43.8	Very good
Dyna-Gro DG 33X55	40.5	Good
Pioneer 94Y80	44.2	Fair
Armor GP 500	—[3]	Very good
Pioneer 94M50	39.2	Fair
Asgrow AG 4907	49.1	Very good
AgVenture AV 54X4	39.8	Good
AgVenture AV 47G3N	45.1	Good
Progeny P 5706	54.4	Very good

[1] Adjusted to 13 percent moisture and 60 pounds per bushel.
[2] Relative seed quality at harvest.
[3] Yield not reported due to large, wet area.

MG V TO VI ROUNDUP READY® SOYBEAN VARIETIES IN SOUTHWEST ALABAMA, 2009

D. P. Delaney and R. Petcher

This trial was planted on the Russell Hendrix Farm near Fruitdale, Alabama in Washington County on June 10, 2009. Seed was planted with an IH 800 row crop planter into burned wheat stubble after grain harvest. Each cultivar was planted in a single block, 21 feet wide and approximately 650 feet long in 20-inch rows. Plots were maintained according to Extension recommendations. Rainfall was generally plentiful although short, dry spells occurred during the summer. Height was measured before harvest in a straight line perpendicular to the plots and no significant lodging was noted for any variety. Plots were harvested on November 6 with the producer's combine and a weighing grain buggy. Yields were adjusted to 13 percent moisture and 60 pounds per bushel (see table).

MG V TO VI ROUNDUP READY® SOYBEAN VARIETIES, WASHINGTON COUNTY, 2009

Brand	Variety	Yield[1]	Height
		bu/A	*in*
Pioneer	96M60	53.6	26
Asgrow - DeKalb	DKB 64-51 RR	52.9	32
Asgrow - DeKalb	DP 6568 RR	49.4	24
Pioneer	95M50	48.4	22
Armor	55-A5	44.3	26
NK	S 59-B8	42.3	24
Asgrow - DeKalb	5905 RR	42.0	26
NK	S 61-Q2	40.4	24
Dyna-Gro	SX09667	40.2	20
Dyna-Gro	V622nRR	39.1	27
Terral	59R16	37.1	21
Croplan	5007	30.3[2]	18

[1] Adjusted to 13 percent moisture and 60 pounds per bushel.
[2] Heavy shattering noted at harvest.

MG V and VI Roundup Ready® Soybean Varieties in High pH Soils in Central Alabama, 2009

D. P. Delaney and R. P. Yates

This trial was planted on the Allen Clark Farm near Forkland, Alabama in Greene County on June 6, 2009. Seed was planted in prepared soil with a history of iron chlorosis of soybeans on high pH Black Belt Leeper clay. Each cultivar was planted in a single field-length strip 19 feet wide and approximately 1300 to 1400 feet long in six, 38-inch rows. Initial soil pH was 7.8 with P and K levels rated as EH (extremely high). Soil moisture levels were very good at planting with a good stand obtained. Plots were maintained according to Extension recommendations. Rainfall was mostly abundant to excessive during the season although short periods of dry weather in early summer occurred. Iron chlorosis was observed within a month after planting with ratings made on July 15 (see table). Ratings were made again on August 18 after rain had encouraged new growth and lessened chlorosis symptoms.

Tissue samples made at the time of the first rating showed adequate levels of all nutrients except K, which had levels from 1.07 to 1.41 percent—well outside the accepted sufficiency range of 1.70 to 2.50 percent. Iron (Fe) levels were 175 ppm or higher for all plots, well within the sufficiency range of 50 to 300 ppm although chlorosis (iron deficiency) was observed. The adequate levels of Fe were likely due to soil splashed on stunted plants, masking internal Fe deficiency. This points out the difficulty of diagnosing Fe deficiency by tissue testing.

Plots were harvested on November 15 with the producer's combine and a weighing grain buggy after delay caused by wet soil conditions. Some yield was likely lost due to short plants and the inability to keep the combine head on the ground in muddy conditions. No significant lodging was noted for any variety. Yields were adjusted to 13 percent moisture and 60 pounds per bushel.

MG V and VI Roundup Ready® Soybean Varieties, Greene County, 2009

Company	Variety	Yield[1]	Chlorosis[2]		Seed
		bu/A	7/15	8/18	quality[3]
Dyna-Gro	33C59 RR	23.8	4	2	3
AgVenture	54X4 RR	21.7	3	1.5	4
Dyna-Gro	SX 09667 RR	21.4	3	1.5	3
Asgrow	6301 RR	17.6	3	2.5	2
Syngenta	NK-S-68-D4 RR	17.6	2	1.5	3
Asgrow	5905 RR	17.5	3	1.5	4
AgVenture	AV 51X5 RR/STS	17.1	4	2.5	4
Asgrow	6702 RR	16.6	3	3	3
Pioneer	96M60	16.1	4	2.5	4

[1] Adjusted to 13 percent moisture and 60 pounds per bushel.
[2] Rating scale: 1 = no chlorosis; 5 = very severe chlorosis with stunted growth or entire plants dead
Complete rating details at: www.soilsci.ndsu.nodak.edu/yellowsoybeans/yieldloss.html
[3] Seed quality at harvest: 1 = good; 5 = 50 percent damage

New Soybean Inoculants for Alabama, 2009

D. P. Delaney, Y. Feng, R. Petcher, B. Durbin, S. Nightengale, S. Scott, T. Dawkins, and J. Ducar

Effective infection of soybean roots by rhizobia bacteria (*Bradyrhizobium japonicum*) is critical for nitrogen fixation and high yields of soybeans without the addition of expensive nitrogen fertilizer. Several new rhizobia inoculants have been introduced in recent years with claims that they are more effective than existing strains or native soil rhizobia. The objective of this study was to evaluate several new commercial formulations of rhizobia inoculants under Alabama growing conditions.

Experiments were conducted in 2009 at three Experiment Stations locations with and without a recent history of soybean production, as well as one on-farm trial. Fields at E.V. Smith Field Crops Unit (EVS) and Sand Mountain Research and Extension Ccenter (SMREC) did not have soybeans planted in the last five years, while the field at Plant Breeding Unit (PBU) had been planted in soybeans in 2008. A randomized complete block design was used with four replications and four 30- to 36-inch rows, 20 to 25 feet long. Soybean seed were inoculated less than 24 hours before planting with inoculants according to manufacturers' recommendations. Formulations included peat-based, sterile-peat based, liquids, and a powder. The SMS location used a MG 4.8 RR variety with seven treatments, while the EVS and PBU used a MG 6.6 RR variety with nine treatments. Planters were sterilized between treatments with 95 percent ethyl alcohol and blown dry before the next treatment was planted. The EVS location was irrigated as needed to prevent extreme stress from short periods of dry weather in early summer, while the PBU location was affected by extremely wet periods. Roots of five plants from each of the outside rows (10 per plot) were dug approximately 6 weeks post-plant for nodule counts (Table 1). There were no differences in height, color, or other growth parameters noted

An on-farm trial was also planted on the James and Jason Weber farm near Atmore, Alabama, in Escambia County in a field with a history of soybean production. A MG 5.9 RR variety was planted in eight 30-inch rows 2540 feet long (1.17 acres) with three treatments and a check.

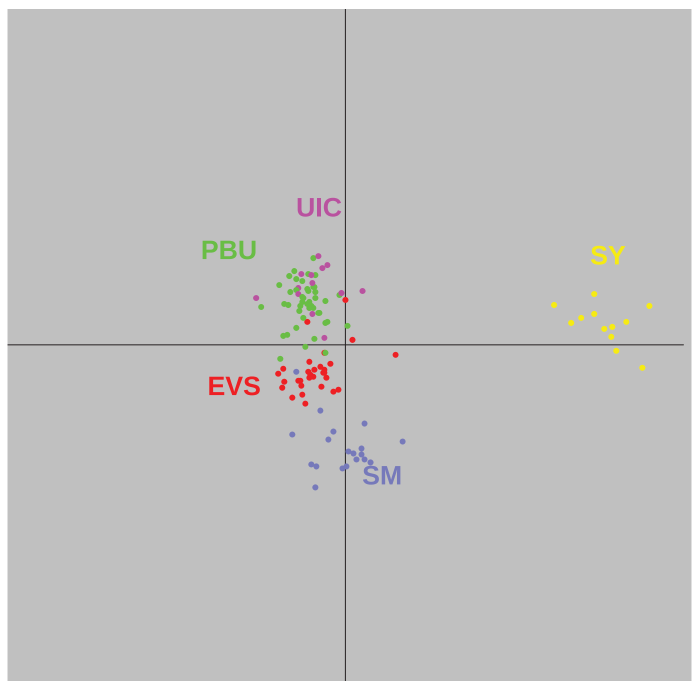
Rhizobia results. Because questions were raised in previous years regarding survivability of rhizobia from opened packages, in 2009 we determined the number of viable rhizobia in commercial inoculants twice: immediately after and six weeks after the containers were opened. This corresponds to the time period between the first and last soybean planting dates. The numbers of rhizobia did not change significantly in four of the six inoculants tested during the six-week period (Table 1). Rhizobia in Optimize, however, decreased from 8×10^9 cells per ml to below the detection limit. Rhizobia in Vault LVL decreased by an order of magnitude. Therefore, storage time significantly affected numbers of viable rhizobia present in Optimize and Vault LVL. Freshly opened packages were used for inoculation of seeds in 2009.

We also isolated rhizobia from six inoculants and soybean root nodules from inoculated treatments and uninoculated controls. A total of 107 rhizobial isolates from soybean nodules and 12 isolates from the inoculants were obtained. Rep-PCR DNA fingerprinting technique was used to determine the similarity of rhizobial isolates. The results show that rhizobia from the commercial inoculants were different from those from soybean nodules as indicated by the two separate clusters in the figure. Rhizobia isolated from three different locations formed three sub-clusters by location within the large cluster formed by all root nodule isolates. There were geographical differences among rhizobial isolates from three experimental sites. The data

Table 1. Viable Rhizobia in the Inoculants

Product name	Target viable cells/ml	–Actual viable cells (CFU/ml)[1]– before first planting date	after last planting date
Vault NP	3×10^9	4.95×10^9	1.42×10^9
Vault LVL	5×10^9	9.9×10^9	3.5×10^8
Optimize	NA	8×10^9	0
Cell-Tech	2×10^9	4.8×10^9	2.52×10^9
Vault SP	3×10^9	2.6×10^9	4.75 x 10v
Nitrastik-s	2.5×10^8	6.95×10^8	7.6×10^8

[1] CFU = colony forming units.



Multivariate analysis of variance plot of rep-PCR DNA fingerprints of Rhizobium isolated from soybean root nodules. SY: inoculants; UIC: uninoculated controls; PBU: soybean planted at the Plant Breeding Unit in Shorter, AL; EVS: soybean planted at the Field Crops Unit in Shorter, AL; and SM: soybean planted in Crossville, AL.

suggest that rhizobia in the soybean root nodules were not the same as those in the inoculants and that rhizobia in the nodules of soybean without inoculation were similar to those in the nodules of inoculated soybean. This also suggests that native soil rhizobia out-competed applied inoculants.

Nodule counts and yields. There were no significant differences for nodule counts between any of the treatments at EVS and PBU. While some differences were noted at SMS, none had higher nodule counts than the untreated check (Table 2). There were no statistical significant differences in yield at any location.

Escambia County on-farm trial. All inoculation treatments from the on-farm trial showed a trend for higher yields compared to the untreated plot, from 1.2 to 1.8 bushels per acre. However, due to the lack of replication, it is difficult to determine if this is an effect due to treatments or planting order.

TABLE 2. NODULE COUNTS AND YIELD FOR SOYBEANS INOCULATED WITH *BRADYRHIZOBIUM JAPONICUM* AT PLANTING AT THREE LOCATIONS IN ALABAMA, 2009

Treatment	Type	Nodules/plant			Yield[1] (*bu/A*)		
		EVS	PBU	SMS	EVS	PBU	SMS
Untreated check	—	27.4 a	23.9 a	25.3 ab	71.2 a	43.5 a	57.2 a
Optimize with LCO	Liquid	28.4 a	29.4 a	19.0 c	69.6 a	47.6 a	54.7 a
Cell-Tech	Liquid	29.8 a	26.6 a	19.8 bc	69.3 a	40.2 a	54.6 a
Nitra-Stick-S	Sterile peat	32.5 a	24.6 a	26.2 a	70.1 a	43.1 a	58.0 a
Vault NP	Liquid	30.0 a	24.4 a	22.8 abc	72.6 a	46.4 a	49.1 a
Vault LVL	Liquid	31.5 a	22.1 a	26.4 a	73.8 a	57.4 a	62.7 a
Vault SP	Sterile peat	29.9 a	22.5 a	17.3 c	71.7 a	51.6 a	62.1 a
ABM XAR	Powder	27.6 a	20.5 a	—	69.6 a	43.1 a	—
Excalibre + ABMK1	Liquid	30.8 a	31.6 a	—	73.5 a	44.6 a	—
LSD(P=0.10)		***NS***	***NS***	***5.6***	***NS***	***NS***	***NS***
CV (%)		***19.8***	***28.3***	***11.5***	***7.7***	***25.0***	***16.3***

[1] Adjusted to 13 percent moisture and 60 pounds per bushel.
Means followed by same letter do not significantly differ (P=.10, Duncan's New MRT)

TABLE 3. 2009 ESCAMBIA COUNTY SOYBEAN INOCULATION TRIAL

Treatment	Yield[1]
	bu/A
Check - No Inoculant	56.2
Vault NP in furrow	57.4
Vault LVL liquid on seed	57.7
Vault SP	58.0

[1] Adjusted to 13 percent moisture and 60 pounds per bushel.

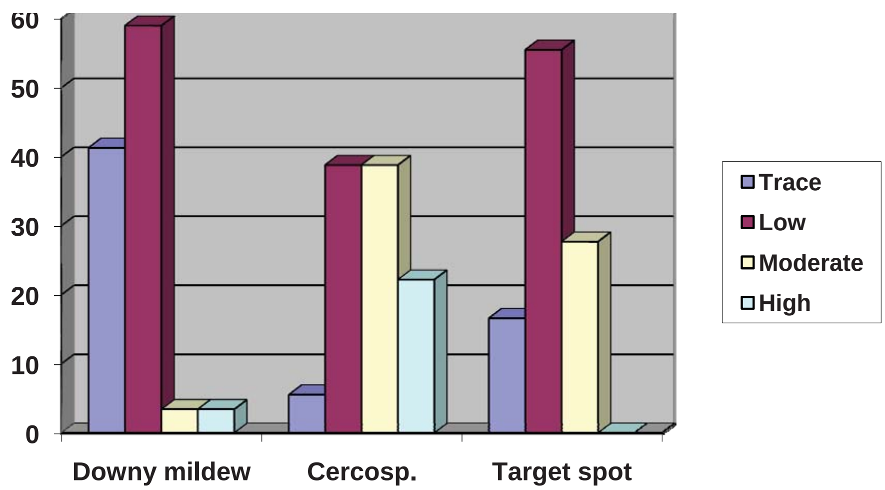
Survey of Foliar Fungal Diseases of Soybean Fields in Alabama

E. J. Sikora, J. Mullen, K. S. Lawrence, and J. Murphy

The first statewide survey of fungal diseases of soybeans in Alabama was conducted in 2008. Interest in diseases affecting soybean has increased in recent years due to the attention generated by soybean rust and because soybean acreage has nearly tripled in Alabama in recent years.

Forty commercial fields in 14 counties were surveyed in August or September with most plants at the R4 or R5 growth stage. A 1-acre section of each field was used for disease evaluations that included disease incidence and severity for foliar, stem, and root diseases. Disease severity was ranked as trace, low, moderate, or high levels for each pathogen detected.

Downy mildew (*Peronospora manshurica)* was found in 72.5 percent of surveyed fields and was the most common foliar disease observed (see figure). Cercospora leaf blight (*Cercospora kikuchii*) and target spot (*Corynespora cassiicola*) were observed in 45 percent of fields, respectively. Cercospora was the most significant disease detected being rated at moderate to high severity levels in nearly 80 percent of the fields surveyed. Downy mildew, though common, was rated at trace to low levels in the majority of fields. Charcoal rot (*Macrophomina phaseolina*) was found in 12 percent of the fields surveyed and was the only root and stem disease observed.



Percent of fields with downy mildew, Cercospora blight, and target spot, 2008.

STROBILURON FUNGICIDE GREENING EFFECTS ON SOYBEANS IN NORTH ALABAMA (CROSSVILLE), 2009

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

Many producers have noted retention of green leaves after pod maturity where strobilurin fungicides have been applied for control of Asian soybean rust (ASR) and other foliar diseases. Where this occurs, it can lead to seed deterioration, shattering losses, and greatly reduced harvest speeds with increased costs and foreign material dockage. This problem has been linked to plant physiological changes and secondary disease control with the use of strobilurin fungicides.

This trial at the Sand Mountain Research and Extension-Center (SMREC) in Crossville, Alabama, investigated the use of three strobilurin-containing fungicides (Headline, Quadris, and Stratego) as well as a triazole fungicide (Domark) labeled as controlling several foliar diseases applied at two growth stages.

Pioneer 95Y41 (RR) soybean seed was planted on May 15, 2009, in a Hartsells fine sandy loam and managed according to Extension recommendations. Plots consisted of four, 36-inch rows, 20 feet long, in a randomized complete block design with four replications. The three fungicides were applied in a factorial design at either the R2 growth stage (full bloom) on July 17 or the R2 + R5 (beginning seed fill) growth stage on August 7. Fungicides were applied in 20 gallons per acre of water with a backpack CO_2 sprayer equipped with Turbodrop TDXL 10002 flat fan nozzles on 19-inch centers at 60 psi. Per resistance management guidelines, a triazole fungicide (Folicur at 3 fluid ounces per acre) was added to the second strobilurin spray of Headline and Quadris. (Stratego is a premix containing a strobilurin and a triazole.)

The trial was rated for greening and foliar diseases at pod maturity (R7 stage) in early October. The center two rows of each plot were harvested with a plot combine on November 11, weighed, measured for moisture, and sampled.

Due to relatively sunny and dry weather in mid-summer, disease development was not severe, although low levels of Cercospora leaf blight and ASR were noted at the R7 stage. Headline at R2 and R2 + R5, Quadris at R2 + R5, Stratego at R2 + R5 and Domark at R2 + R5 all decreased Cercospora leaf blight, while there were small differences between materials for ASR (see table). There were no significant effects of individual fungicide treatments on leaf or stem greening or for yield.

DISEASE RATINGS AND YIELDS OF STROBILURIN-TREATED SOYBEANS WITH DIFFERENT APPLICATION TIMINGS, SMREC, 2009

Fungicide	Rate/A	Stage	—Greening[1]— Leaf	Stem	Cercosp.	ASR[2]	Yield *bu/A*
Headline	6 fl oz	R2	5.5	7.0	2.3	0.37	57.5
Headline	6 fl oz	R2+R5	6.8	7.5	2.3	0.03	55.6
Quadris	6 fl oz	R2	6.8	7.3	2.8	0.81	53.6
Quadris	6 fl oz	R2+R5	6.3	6.8	2.3	0.00	56.5
Stratego	10 fl oz	R2	6.8	8.3	2.8	0.88	59.3
Stratego	10 fl oz	R2+R5	5.0	6.5	2.5	0.59	56.2
Domark	5 fl oz	R2	6.5	6.5	2.8	0.00	56.7
Domark	5 fl oz	R2+R5	6.8	7.0	2.3	0.00	61.6
Check	—	—	6.3	7.0	3.5	0.59	58.4
LSD(p=0.10)			***(NS)***	***(NS)***	***0.90***	***0.82***	***(NS)***

[1] Greening: 1 = lush green, 10 = dry brown

[2] 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%.

Strobiluron Fungicide Greening Effects on Soybeans in North Alabama (Belle Mina), 2009

D. P. Delaney, E. J. Sikora, K. S. Lawrence, B. E. Norris, and D. Harkins

Many producers have noted retention of green leaves after pod maturity where strobilurin fungicides have been applied for control of Asian soybean rust (ASR) and other foliar diseases. Where this occurs, it can lead to seed deterioration, shattering losses, and greatly reduced harvest speeds with increased costs and foreign material dockage. This problem has been linked to plant physiological changes and secondary disease control with the use of strobilurin fungicides.

This trial at the Tennessee Valley Research and Extension Center (TVREC) investigated the use of three strobilurin-containing fungicides (Headline, Quadris, and Stratego), as well as a triazole fungicide (Domark) labeled as controlling several foliar diseases, applied at two growth stages.

Delta King 5068 RR soybean seed was planted on June 3, 2009 in a Decatur silt loam with conventional tillage and managed according to Extension recommendations. Plots consisted of four 30-inch rows, 30 feet long, in a randomized complete block design with four replications. Fungicides were applied in a factorial design at either the R2 growth stage (full bloom) on July 21 or R2 + R5 (beginning seed fill) growth stage on August 11. Fungicides were applied in 20 gallons per acre of water with a backpack CO_2 sprayer equipped with Turbodrop TDXL 10002 flat fan nozzles on 19-inch centers at 60 psi. Per resistance management guidelines, a triazole fungicide (Folicur at 3 fluid ounces per acre) was added to the second strobilurin spray of Headline and Quadris. (Stratego is a premix containing a strobilurin and a triazole.)

The center two rows of each plot were harvested with a plot combine on October 26, weighed, measured for moisture, and sampled.

Due to relatively sunny and dry weather in mid-summer, disease development was not severe enough to rate, The trial was rated for greening at pod maturity (R7 stage) in early October and there were no significant effects of fungicides on leaf or stem greening. Headline at R2 and R2 + R5, Quadris at R2 + R5, and Stratego at R2 + R5 all increased 100-seed weights compared to the check, although there were no significant differences of individual or treatments for yield (see table). However, when yields were analyzed for timing averaged across fungicides, the R2 application increased yield by 3.0 bushels per acre, while the R2 + R5 application increased yield by an additional 2.2 bushels per acre. (Averaged yields were as follows: Untreated check = 67.6, R2 = 70.6, and R2 + R5 = 72.8, LSD (p=0.10) = 2.1 bushels per acre).

Seed Weights and Yields of Strobilurin-Treated Soybeans with Different Application Timings, TVREC, 2009

Fungicide	Rate/A	Stage	100-seed weight (*g*)	Yield *bu/A*
Headline	6 fl oz	R2	17.88	69.0
Headline	6 fl oz	R2+R5	18.18	73.1
Quadris	6 fl oz	R2	17.51	72.5
Quadris	6 fl oz	R2+R5	17.91	73.1
Stratego	10 fl oz	R2	17.32	71.2
Stratego	10 fl oz	R2+R5	17.78	72.5
Domark	5 fl oz	R2	17.60	69.6
Domark	5 fl oz	R2+R5	17.64	72.6
Check	—	—	17.25	67.6
LSD(p=0.10)			***0.500***	***(NS)***

STROBILURON FUNGICIDE GREENING EFFECTS ON SOYBEANS IN CENTRAL ALABAMA, 2009

D. P. Delaney, E. J. Sikora, K. S. Lawrence, and B. Durbin

Many producers have noted retention of green leaves after pod maturity where strobilurin fungicides have been applied for control of Asian soybean rust (ASR) and other foliar diseases. Where this occurs, it can lead to seed deterioration, shattering losses, and greatly reduced harvest speeds with increased costs and foreign material dockage. This problem has been linked to plant physiological changes and secondary disease control with the use of strobilurin fungicides.

This trial at the E.V. Smith Field Crops Unit (EVS) investigated the use of three strobilurin-containing fungicides (Headline, Quadris, and Stratego) as well as a triazole fungicide (Domark) labeled as controlling several foliar diseases, applied at two growth stages.

Pioneer 94Y80 (RR) soybean seed was planted on April 17, 2009, at 12 seed per foot in a Compass loamy sand into a killed rye cover crop with no-till with subsoiling and managed according to Extension recommendations. Plots consisted of four 36-inch rows, 25 feet long, in a randomized complete block design with four replications. Fungicides were applied in a factorial design at either the R3 growth stage (3/16-inch pods) on June 30 or R2 + R5 (beginning seed fill) growth stage on July 21.

Fungicides were applied in 18 gallons per acre of water with a Lee Spider high clearance sprayer with Turbodrop TDXL 10002 flat fan nozzles on 19-inch centers at 60 psi. Per resistance management guidelines, a triazole fungicide (Folicur at 3 fluid ounces per acre) was added to the second strobilurin spray of Headline and Quadris. (Stratego is a premix containing a strobilurin and a triazole.) The center two rows of each plot were harvested with a plot combine on September 24, weighed, measured for moisture, and sampled.

Due to relatively sunny and dry weather in mid-summer, disease development was not severe enough to rate, The trial was rated for greening at pod maturity (R7 and R8 stages) in early September and there were no significant effects of fungicide treatments on leaf or stem greening, although the entire test remained green enough to require a desiccant treatment at R8 on September 12.

Headline at R2, Quadris at R2 and R2 + R5, and Domark at R2 + R5 all increased 100-seed weights compared to the check, although there were no significant differences of individual or factorial treatments for yield (see table).

SEED WEIGHTS AND YIELDS OF STROBILURIN-TREATED SOYBEANS WITH DIFFERENT APPLICATION TIMINGS, EVS 2009

Fungicide	Rate/A	Stage	100-seed weight (*g*)	Yield *bu/A*
Headline	6 fl oz	R2	16.92	55.0
Headline	6 fl oz	R2+R5	16.40	56.2
Quadris	6 fl oz	R2	16.85	53.6
Quadris	6 fl oz	R2+R5	17.05	56.1
Stratego	10 fl oz	R2	16.38	52.8
Stratego	10 fl oz	R2+R5	16.52	55.0
Domark	5 fl oz	R2	16.43	55.2
Domark	5 fl oz	R2+R5	17.47	55.4
Check	—	—	16.00	52.1
LSD(p=0.10)			***0.745***	***(NS)***

TRIAZOLE FUNGICIDES AND TIMING FOR ASIAN SOYBEAN RUST CONTROL IN ALABAMA'S GULF COAST REGION, 2009

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

This trial was conducted to determine the relative effectiveness of several triazole fungicides for control of Asian soybean rust (ASR) (*Phakopsora pachyrhizi*) and other foliar diseases in soybean. At the Gulf Coast Research and Extension Center (GCREC), Asgrow DP 7330 RR soybeans were planted on June 12, 2009, in 38-inch bedded rows. Plots consisted of four 38-inch rows 25 feet long. The growing season was initially wet, but there were several periods of sunny dry weather in mid-summer. Triazole fungicides (Topguard, Domark, Folicur, Alto, and Proline) were applied as a foliar spray at either R3 or R5 (R3 + 21 days) to evaluate preventive (R3) and curative (R5) effects, and compared to preventive (R3) treatments with strobiluron fungicides (Headline, Quadris, and Stratego). Fungicides were applied in 18 gallons per acre of water with a Lee Spider high clearance sprayer with Turbodrop TDXL 10002 flat fan nozzles on 19-inch centers at 60 psi.

Soybean foliar diseases were evaluated by rating disease severity of ASR and target spot in each plot regularly after rust developed at the R5 to R7 growth stage. ASRust leaf symptoms were initially observed in nearby sentinel plots on August 4 and in the trial in mid-September in the lower leaf canopy of untreated plots.

Plots were harvested in mid-November. Topguard at 7 ounces applied at R3 decreased Cercospora leaf blight, while all fungicides reduced rust severity compared to the check at the R7 stage, including those delayed until the R5 stage However, fungicide treatments did not statistically increase yield or 100-seed weights (data not shown) in 2009 likely due to late onset of ASR.

CERCOSPORA LEAF BLIGHT AND ASIAN SOYBEAN RUST RATINGS AND SOYBEAN YIELDS FOR TRIAZOLE TIMING FUNGICIDE TREATMENTS AT GULF COAST REC, 2009

Fungicide	Rate/A	Stage	Cercospora[1] R5	–Asian soybean rust[1]– R6	R6-R7	Yield *bu/A*
Check	—	—	2.8	0.2	2.1	59.0
Topguard	7 fl oz	R3	2.0	0	0	62.0
Topguard	7 fl oz	R5	2.3	0	0	57.4
Domark	5 fl oz	R3	3.0	0	0	61.1
Domark	5 fl oz	R5	2.3	0	0	59.8
Folicur	4 fl oz	R3	3.0	0	0	57.0
Folicur	4 fl oz	R5	3.0	0	0	60.8
Alto	4 fl oz	R3	2.8	0	0	59.8
Alto	4 fl oz	R5	2.5	0	0	63.4
Proline	3 fl oz	R3	3.0	0	0	61.5
Proline	3 fl oz	R5	2.3	0	0	60.5
Headline	6 fl oz	R3	2.3	0.03	0.2	62.8
Quadris	6 fl oz	R3	2.3	0.03	0.7	63.0
Stratego	10 fl oz	R3	2.3	0.03	1.2	57.8
LSD (p=0.10)			***0.8***	***0.09***	***0.30***	***NS***

[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%.

Topguard Fungicide Rates and Timing for Asian Soybean Rust Control in Alabama's Gulf Coast Region, 2009

D. P. Delaney, E. J. Sikora, K. S. Lawrence, and B. Durbin

This trial was conducted to determine the relative effectiveness of triazole fungicides (Topguard and Domark) for control of Asian soybean rust (ASR) (*Phakopsora pachyrhizi)* and other foliar diseases in soybean. At the Gulf Coast Research and Extension Center (GCREC), Asgrow DP 7330 RR soybeans were planted on June 12, 2009, in 38-inch bedded rows. Plots consisted of four 38-inch rows 25 feet long. The growing season was initially wet, but there were several periods of sunny, dry weather in mid-summer. Triazole fungicides were applied as a foliar spray at either R3 or R5 (R3 + 21 days) to evaluate preventive (R3) and curative (R5) effects at different rates. Fungicides were applied in 18 gallons per acre of water with a Lee Spider high clearance sprayer with Turbodrop TDXL 10002 flat fan nozzles on 19-inch centers at 60 psi.

Soybean foliar diseases were evaluated by rating disease severity of ASR and other diseases in each plot regularly after rust developed at the R5 to R7 growth stage. ASR leaf symptoms were initially observed in nearby sentinel plots on August 4, and in the trial in mid-September in the lower leaf canopy of untreated plots.

Plots were harvested in mid-November. All fungicide applications reduced rust severity compared to the check by the R7 stage (see table), while levels of other diseases were not severe. However, fungicide treatments did not statistically increase yield or 100-seed weights (data not shown) in 2009, likely due to late onset of ASR.

Asian Soybean Rust Ratings and Soybean Yields for Topguard Fungicide Timing and Rates at GCREC, 2009

Fungicide	Rate/A		Asian soybean rust[1]		Yield
		Stage	R6	R7	*bu/A*
Check	—	—	0.95	1.45	62.9
Topguard	7 fl oz	R3	0	0	62.0
Topguard	14 fl oz	R3	0	0	63.1
Domark	5 fl oz	R3	0	0	63.6
Topguard	7 fl oz	R3	0	0	65.9
fb Topguard	7 fl oz	+21day	0	0	61.6
Domark	5 fl oz	R3			
fb Domark	5 fl oz	+21day			
LSD (p=0.10)			***0.96 (NS)***	***0.67***	***5.58 (NS)***

[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%.

Evaluation of Foliar Fungicide Treatments for Control of Soybean Rust and Downy Mildew in Alabama's Gulf Coast Region, 2009

B. B. Ballard, K. S. Lawrence, D. Delaney, E. Sikora, and J. Jones

The trial was conducted to determine the ability of LEM17 EC and Picoxystrobin to control soybean rust (*Phakopsora pachyrhizi*) and downy mildew (*Peronospora manshurica*) in soybean.

Two-row plots were arranged in a randomized complete block design with seven treatments and seven repetitions. Asgrow 7330 soybeans were planted at a rate of 8 to 10 seed per foot of row on June 12, 2009, in a Marlboro very fine sandy loam soil. Each plot consisted of two rows, 25 feet long, with 38-inch spacing and were maintained according to Extension recommendations.

Fungicide applications were made and one visual symptom rating was taken for both downy mildew and soybean rust.

Visual survey ratings for downy mildew were taken at 91 DAP on a 1 to 8 scale where 1 = none, 2 < 5 percent, 3 = 5-10 percent, 4 = 10-15 percent, 5 = 15-25 percent, 6 = 25-35 percent, 7 = 35-67 percent, and 8 = 67-100 percent. soybean rust was rated at 119 DAP on the same scale. Entire plots were harvested mechanically 156 DAP on November 16. Data were statistically analyzed by GLM and means and compared using Fisher's protected least significant difference test.

Monthly average maximum temperatures from June to October were 90.7, 90, 88.2, 87, 78.9 degrees F, and average minimum temperatures were 76.1, 73.9, 72.1, 71.6, and 61.6 degrees F. Total rainfall amounts from June to October were 3.38, 5.93, 5.18, 6.32, and 7.33 inches. The total rainfall for the growing season was 28.04 inches.

The disease severity rating for downy mildew showed no significant difference between any of the treatments and the untreated check (see table). However, severity ratings for soybean rust showed significant differences in all fungicides as compared to the untreated check. Notably, Headline 6 fluid ounces (+ nonionic surfactant) showed increased protection as compared to the remaining fungicide treatments LEM17 EC at both rates. Picoxystrobin applied at 9 fluid ounces per acre reduced soybean rust to the 10 to15 percent infection level as compared to the 67 to 100 percent infection level in the untreated control. Yields varied by 5.6 bushels per acre at harvest with an average of 67.9 bushels per acre across all fungicide treatments. Final yields showed Picoxystrobin and Headline applied at 6 fluid ounces per acre produced an average of 1.8 bushels per acre above the test mean.

Evaluation of Foliar Fungicide Treatments for Control of Soybean Rust and Downy Mildew in Fairhope, Alabama, 2009

Treatment and Rate/A	Downy mildew severity[1] 91 DAP	Soybean rust severity[1] 119 DAP	Yield[2] *bu/A* 156 DAP
1 LEM17 EC 12 fl oz	3.0 ab	4.3 c	65.2 ab
2 LEM17 EC 24 fl oz	3.5 ab	4.3 c	65.1 ab
3 Picoxystrobin 6 fl oz 2.08 lb/gal+ NIS	4.3 a	6.0 b	67.4 a
4 Picoxysrtobin 6 fl oz 2.08 + 5 fl oz Coregan + NIS	2.8 b	4.8 bc	68.3 a
5 Picoxystrobin 9 fl oz 2.08 lb/gal+ NIS	3.5 ab	4.5 c	66.7 ab
6 Headline 6 fl oz + NIS	3.5 ab	2.5 d	68.7 a
7 Untreated check	4.0 ab	8.0 a	63.1 b
LSD ($P \leq 0.10$)	***1.45***	***1.44***	***4.14***
Standard Deviation	***1.18***	***1.17***	***3.37***
CV 33.82	***23.95***	***5.08***	

[1] Disease severity: 1= none; 2<5%, 3 =5-10%, 4 =10-15%, 5 = 15-25%, 6 = 25-35%, 7 = 35-67%, 8 = 67-100%

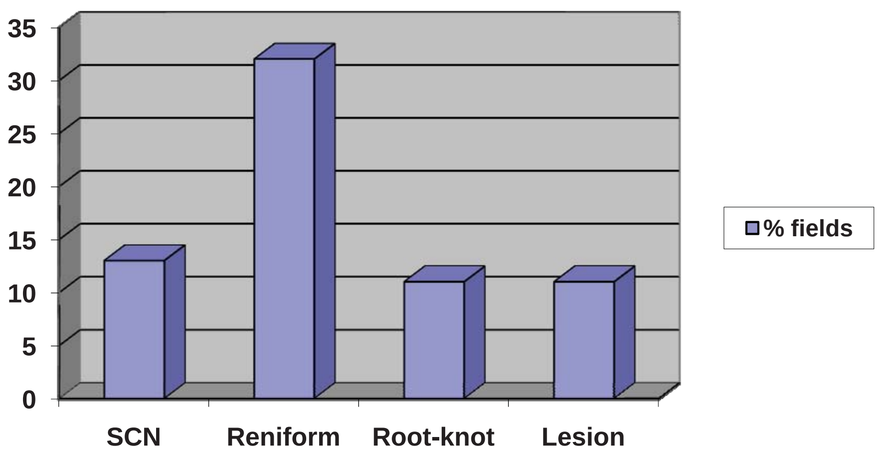
[2] Adjusted to 13 percent moisture and 60 pounds per bushel.

Survey of Plant-Parasitic Nematodes in Soybean Fields in Alabama

E. J. Sikora, K. S. Lawrence, and J. Murphy

Plant-parasitic nematodes can have a significant impact on soybean yields depending on the species present and their population levels. Nematodes such as soybean cyst, root-knot, and reniform have all been reported on soybeans in Alabama previously, but a formal survey of their prevalence has not been undertaken. In August and September of 2008 a statewide survey involving 14 counties was conducted. Soil was collected randomly from a 1-acre section of 40 soybean fields with a soil core probe taking soil cores 2.5 cm by 15 cm deep through the root zone of individual plants; cores were combined for processing and analysis. Additional soil samples from grower fields submitted to the Auburn University Plant Diagnostic Laboratory were also included in the survey so that a total of 54 fields were involved in the study. All soil samples were mixed and a 150 cc^3 subsample was extracted for plant parasitic nematodes by combined gravity screening followed by gradient sucrose centrifugation. All plant parasitic nematodes were identified with a Nikon TSX 100 inverted scope.

Reniform nematode (*Rotylenchulus reniformis*) was found in 32 percent of surveyed fields and was the most common plant-parasitic nematode detected (see figure). Soybean cyst nematodes (*Heterodera glycines*), root-knot nematodes (*Meloidogyne* spp.) and lesion nematodes (*Pratylenchus* spp.) were detected in 11 to 13 percent of the fields surveyed. The high incidence of reniform nematode was likely the result of the recent shift by growers from cotton to soybean in response to higher soybean prices. Reniform nematodes can reduce soybean yields and are also a significant economical pest of cotton in Alabama.



Percentage of soybean fields with soybean cyst, root-knot, reniform, and root-lesion nematodes from 54 locations in Alabama in 2008

Soybean Seed Treatment Trial for Reniform Nematode Management in North Alabama, 2009

B. B. Ballard, K. S. Lawrence, and C. H. Burmester

This trial was conducted to determine the effects of several different seed treatments to control the reniform nematode (*Rotylenchulus reniformis*) in soybean. The test was located at the Tennessee Valley Research and Extension Center using a randomized complete block design with five treatments and five repetitions. Each plot consisted of two rows, 25 feet long, with a 30-inch row spacing. All plots were maintained throughout the season using standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Stand counts were conducted at 18 days after planting (DAP) on 10 feet of row and recorded. Soil samples were taken from each plot at 30, 60, and 156 DAP. A 150 cm^3 sub-sample from each plot was processed and reniform nematodes were extracted by the sucrose centrifugation-flotation methods and counted under the inverted microscope. Entire plots were harvested mechanically 169 DAP on November 4. Data were statistically analyzed by GLM and means, compared using Fisher's protected least significant difference test.

Monthly average maximum temperatures from June to October were 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F; average minimum temperatures were 66.7, 66.4, 66.9, 64.6 and 50.2 degrees F. Total rainfall amounts from June to October were 1.1, 5.5, 4.18, 4.63, and 6.53 inches. The total rainfall for the growing season was 21.94 inches. In the stand counts at 18 DAP, Treatment 4 (Trilex 2000 with Aeris Seed Applied System) indicated a significant improvement in plant establishment as compared to Treatments 1 (untreated control) and 2 (Trilex with Yield Shield). The plant stand in the remaining seed treatments was similar to the control. Initial populations of the reniform nematode were low for all the treatments. In evaluations at 60 DAP, populations of reniform nematode from Treatments 1 (untreated control), 3 (Trilex with Gaucho 600 FS), and 4 (Trilex 2000 with Aeris Seed Applied System) showed increased numbers. However, these increased numbers were not significantly different from the other remaining treatments. Numbers at 156 DAP showed no differences between any treatment and the control.

Soybean yields varied by 3.2 bushels per acre at harvest with an average of 63.2 bushels per acre produced over all treatments. Statistically, soybean yields were similar among all the treatments and the untreated control. Economically, the Gaucho, Aeris, and Cruiser treatments averaged 1.8 bushels per acre more than the control for an average increase of $18 an acre at a price of $10.30 per bushel.

Soybean Seed Treatment Trial for Reniform Nematode Management in North Alabama, 2009

Treatment	Stand 18 DAP	*Rotylenchulus reniformis*/150 cc^3 30 DAP	60 DAP	165 DAP	Yield *bu/A*
1 Untreated	24.2 b	479.0 a	1035.2 a	587.2 a	62.1 a
2 Trilex 2000 Yield Shield Pro-Ized Red Colorant	24.4 b	463.5 a	479.0 a	448.4 a	63.5 a
3 Trilex 2000 Yield Shield Gaucho 600 FS Pro-Ized Red Colorant	25.6 ab	432.6 a	1050.6 a	587.4 a	62.2 a
4 Trilex 2000 Yield Shield Aeris Seed Applied System Pro-Ized Red Colorant	27.3 a	525.3 a	1220.6 a	927.2 a	65.3 a
5 Cruiser Maxx Beans	26.8 ab	386.3 a	587.1 a	556.4 a	63.0 a
LSD (P=0.10)	***2.8***	***399.3***	***778.8***	***541.8***	***4.6***
Standard Deviation	***2.54***	***361.59***	***705.31***	***490.72***	***4.21***
CV	***9.9***	***79.07***	***80.66***	***78.98***	***6.65***

Means within columns followed by different letters are significantly different according to Fisher's LSD (P≤0.10).

SOYBEAN SEED TREATMENTS FOR ROOT-KNOT NEMATODE MANAGEMENT IN CENTRAL ALABAMA, 2009

K. S. Lawrence, S. R. Moore, G. W. Lawrence, and S. Nightengale

Experimental seed treatments were examined to determine their effect on root-knot nematode (*Meloidogyne incognita*) in soybean. The test was located at the Plant Breeding center of the E. V. Smith Research and Extension Center, near Shorter, Alabama. The field had a long history of root-knot nematode infestation, and the soil type was classified as a Kalmia loamy sand (80 percent sand, 10 percent silt, and 10 percent clay). Plots consisted of two rows, 25 feet long, with a 36-inch row spacing and were planted in a randomized complete block design with five replications on April 29, 2009. Blocks were separated by a 10-foot alley. All plots were maintained throughout the season using standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Stand counts and vigor ratings were conducted at 30 days after planting (DAP) on 10 feet of plot row and recorded. Soil samples were taken from each plot 30 and 156 DAP. A 150 cm^3 sub-sample from each plot was processed and root-knot nematodes were extracted by the sucrose centrifugation-flotation methods and counted under the inverted microscope. Entire plots were harvested mechanically 169 DAP on October 29. Data were statistically analyzed by GLM and means, compared using Fisher's protected least significant difference test.

Monthly average maximum temperatures from June to October were 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F; average minimum temperatures were 66.7, 66.4, 66.9, 64.6 and 50.2 degrees F. Total rainfall amounts from June to October were 1.1, 5.5, 4.18, 4.63, and 6.53 inches. The total rainfall for the growing season was 21.94 inches. Stand counts and vigor ratings taken at 30 DAP indicated no differeneces in plant establishment between any of the treatments. No phytotoxicity was observed. Initial populations of the root-knot nematode were low for all the treatments. A hot, dry three weeks in June appears to have limited the nematode population development as nematode numbers did not increase by the harvest sample. Statistically, soybean yields were similar among all the treatments and the untreated control. Soybean yields varied by 12.1 bushels per acre at harvest with an average of 31.2 bushels per acre produced over all treatments

SOYBEAN SEED TREATMENTS FOR ROOT-KNOT NEMATODE MANAGEMENT IN CENTRAL ALABAMA, 2009

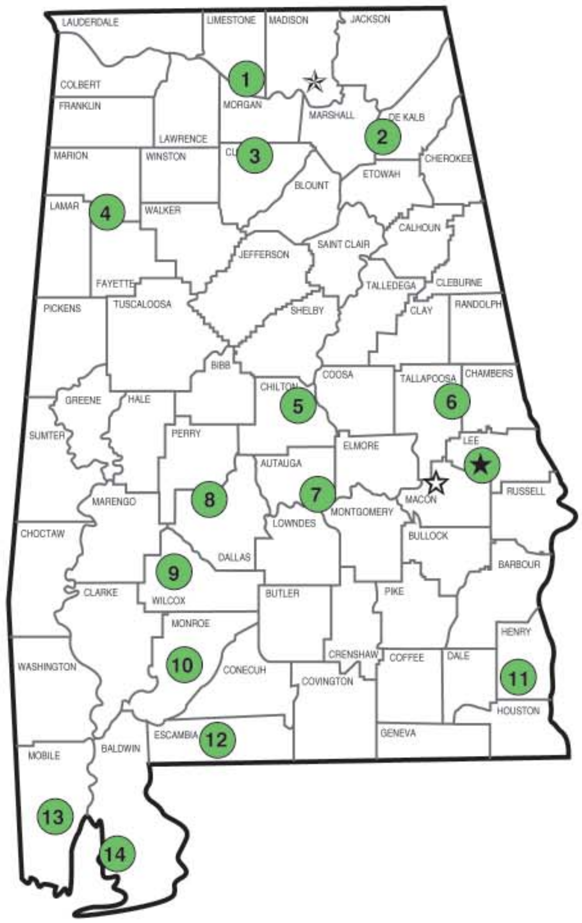
	Treatment	Stand/ 10 ft. row	Vigor index	—*M. incognita* J2/150 cm^3 soil— 30 DAP	169 DAP	Yield *bu/A*
1	Untreated	57.2 a	3.5 a	77.0 a	92.4 a	36.2 a
2	Trilex 2000 Yield Shield	55.6 a	3.2 a	92.4 a	77.0 a	30.0 a
3	Trilex 2000 Yield Shield Gaucho 600 Fs	57.6 a	3.4 a	77.0 a	123.4 a	30.8
4	Trilex 2000 Yield Shield Aeris Seed Applied System	58.2 a	3.8 a	92.4 a	123.4 a	24.1 a
5	Cruiser Maxx Beans	60.0 a	3.7 a	92.4 a	77.0 a	29.5a
LSD P ≤ 0.10		***8.9***	***0.5***	***28.2***	***78.0***	***14.5***

Means within columns followed by different letters are significantly different according to Fisher's LSD (P ≤ 0. 10).

Contributors Index

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.