2004 SOYBEAN RESEARCH REPORT

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VARIETY TRIALS

Geneva/Coffee County Soybean Variety Demonstration, 2004

D. P. Delaney and R. L. Petcher

One of the most critical decisions a soybean producer makes each year is which variety to plant. On-farm field trials are important to verify University research and to show how different varieties perform under typical management practices in producers' fields.

Eight Maturity Group III and IV and 11 MG V soybean cultivars, all Roundup Ready®, were planted with conventional tillage after winter grazing near Enterprise, Alabama, on the farm of Tim and Clay Wise. Group III and IV varieties were planted in 20-inch rows in approximately quarter-acre blocks on April 28, 2004, while Group V varieties were drilled in half-acre blocks on May 6, 2004, in the same field. Weeds were controlled by two broadcast applications of Roundup Ultra Max® at 26 ounces per acre post-emergence at the appropriate stage for each block. Sodium chlorate was applied to the Group V soybeans to desiccate late-emerging weeds.

Rainfall was excellent, and was reflected in excellent yields, particularly for the early maturing cultivars (Table 1). Group III and IV plots were harvested with the producer's combine and a weigh wagon on September 5, 2004, while Group V plots (Table 2) were harvested on October 5, 2004. Yields were adjusted to 13 percent moisture and 60 pounds per bushel.

TABLE 1. GENEVA/COFFEE COUNTY GROUP III AND IV RR SOYBEAN VARIETIES

Variety	Maturity group	Bu/A @ 13.0%
Asgrow 3602 RR	III	42.6
Asgrow 3702 RR	III	49.1
Dyna-Gro 3373 RR	III	44.9
Dyna-Gro 3390 RR	III	42.4
Pioneer 94B13 (RR)	IV	50.1
Pioneer 94M1 (RR)	IV	56.6
Asgrow 4403 RR	IV	45.8
Pioneer 94M90 (RR)	IV	74.0

TABLE 2. GENEVA/COFFEE COUNTY GROUP V RR SOYBEAN VARIETIES

Variety	Maturity group	Bu/A @ 13.0%
Asgrow 5301 RR	V	44.8
Pioneer 95B42 (RR)	V	42.3
DPL 5414 (RR)	V	44.7
DPL 5644 RR	V	42.7
Dyna-Gro 3562 nRR	V	41.2
DPL 5634 RR	V	37.4
Dyna-Gro 38K57 RR	V	29.3
DPL 5806 RR	V	43.1
Pioneer 95M80 (RR)	V	35.6
Asgrow AG 5901 RR	V	26.9
DPL 5915 RR	V	44.3

2004 High pH Group V Roundup Ready® Soybean Variety Demonstration in Hale County

D.P. Delaney, R. P. Yates, and E. J. Sikora

One of the most critical decisions a soybean producer makes each year is which variety to plant. Yield and other traits such as disease resistance can vary substantially between varieties in response to their environment. On-farm field trials are important to verify University research and to show how different varieties perform under typical producer management practices.

Eight Maturity Group V soybean cultivars, all Roundup Ready®, were planted on May 27, 2004, in Hale County near Gallion on Ken Diller's farm. The Black Belt soil had an initial pH of 7.8 to 7.9, making it prone to iron chlorosis problems. All varieties were planted in eight 30-inch rows, in strips 20 feet wide and 460 to 500 feet long. A streak of light chalky soil was evident in the middle third of each strip.

Weather conditions were conducive to development of iron chlorosis in early summer and frogeye leaf spot *(Cercospora sojina)* in late summer. Plots were rated on June 22, July 14, and August 25, 2004, (see the table) as needed. Plots were harvested with the producer's combine and a weigh wagon on October 7, 2004, and yields were adjusted to 13 percent moisture and 60 pounds per bushel, as shown in the table.

2004 HALE COUNTY HIGH PH GROUP V RRR SOYBEANS

	Iron chlorosis*		Frogeye**	Bu/A
	June 22	July 14	Aug. 25	@ 13.0%
Asgrow 5501 RR	8	9	6	34.7
Pioneer 95M80	6	6	4	48.4
Deltapine 5414 RR	5	7	2	48.1
Deltapine 5806 RR	7	5	5	30.5
Pioneer 95B42	6	5	8	30.6
Deltapine 5644 RR	5	7	2	35.3
Pioneer 95B53	5	8	7	21.6
Deltapine 5634 RR	4	2	1	50.6
Asgrow 5501 RR	6	5	6	

*Chlorosis rating 10 = dead.

*Frogeye leafspot 10 = 100% leaf area infection.

High pH Group V Conventional Soybean Varieties, 2004, in Pickens County

D. P. Delaney, E. J. Sikora, O. S. Wiggins, and W. G. Griffith

One of the most critical decisions a soybean producer makes each year is which variety to plant. A problem in Alabama unique to Black Belt soils is iron chlorosis on high pH soils. Variety selection is the only practical way to control this problem on these soils. On-farm field trials are important to verify University research and to show how different varieties perform under typical producer management practices.

Nine conventional (non-GMO) Maturity Group V soybeans were planted at the Dee River Ranch near Aliceville, Alabama, on a high pH Black Belt soil. Each variety was planted on May 30, 2004, in six to 12 30-inch rows in blocks of approximately half- to three-quarters-acre each. Plots were harvested on October 7, 2004, using the producer's combine and yield monitor (see the table).

2004 Pickens County Conventional Group V Soybean Variety Trial

		---Iron chlorosis---		Frogeye	Stem canker	Yield
Brand	Variety	June 22	Aug. 8	Aug. 8	Aug. 8	Bu/A
DeltaKing	DK 5870	1.0	0	1	0	45.0
Public	Freedom	1.5	2	0	0	42.9
Public	Caviness	1.5	0	1	3	38.6
Public	Anand	2.5	0	1	0	34.6
Pioneer	9594	1.0	0	0	0	31.4
Public	Hutcheson	1.0	2	1	0	40.9
Deltapine	DP 5989	0.5	1	0	0	48.7
Deltapine	DP 5110S	1.0	2	1	0	40.5

*Ratings: 0 = no symptoms, 5 = very high

Evaluation of Forage and Oilseed Type Soybeans for Hay Production

D.P. Delaney, D. M. Ball, A. R. Blount, R. A. Dawkins, and R. M. Durbin

There is a need for high quality forage for cattle and other livestock in Alabama, particularly in late summer, when perennial grasses are often affected by dry weather and are of low quality. Research was conducted on the use of new and old forage types as well as adapted oilseed soybean cultivars to fill this need.

Two experiment station tests were conducted during 2004 to evaluate the use of new and old forage cultivars, as well as adapted oilseed types for forage production. Seven varieties, with four replications of each, were planted on May 12 with conventional tillage at the Sand Mountain Research and Extension Center (SMREC) in Crossville, Alabama. The same test was planted no-till into a killed rye cover crop on May 24 at the E.V. Smith Research Center (EVSRC) Field Crops Unit in Shorter. An additional Maturity Group V forage cultivar, Tara, was added to the tests in 2004.

Each variety was harvested at its early pod stage, to optimize quality and quantity of forage. Biloxi, an older forage variety, was harvested at early bloom due to leaf drop and foliar disease. Harvest began on July 30 at EVSRC and August 3 at SMREC.

Results are presented in the table. Tyrone, a tall-growing forage type, was numerically higher, but not significantly better than Kuell or Stonewall, late oilseed types, at SMREC. At EVSRC, late summer dry weather limited yields. Kuell, Stonewall, and Tyrone were again not significantly different from each other, or from Hinson or Tara. At both locations, Biloxi appeared promising, but then suffered severe leaf loss just before harvest from foliar disease. Quality tests are under way to determine the relative value of each variety for animal feed. These tests show that adapted late maturity oilseed varieties can be as productive for forage use as specific forage lines.

Forage Soybean Yields at SMREC and EVSR, 2004

		Dry matter yield, Ton/A	
Variety	Type	SMREC	EVSRC
Tyrone	Forage	6.0	3.4
Laredo	Forage	4.8	2.8
Hinson	LJ-Oilseed	4.3	3.4
Biloxi	Forage	3.4	2.7
Kuell	MG 8 - Oilseed	5.8	3.5
Stonewall	MG 7 - Oilseed	5.9	3.7
Tara	MG 5 - Forage	4.7	3.3
LSD (P=0.10)		***0.9***	***0.6***

Evaluation of Roundup Ready® Maturity Group VI and VII Soybean Varieties on High pH Soil in Montgomery County, 2004

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

Eight maturity Group VI and VII Roundup Ready® soybean varieties of varying or unknown iron chlorosis tolerance were planted on May 25, 2004, in Montgomery County, Alabama. The field was a typical Black Belt clay soil, with soil pH varying through the field, including several areas of white calcitic soil. Commercially available varieties were planted, including Asgrow 6202 RR, DP 7870 RR, Asgrow 7601RR, DP 6880 RR, DP 6299 RR, DP 6215 RR, Pioneer 96M20, and DP 7220 RR. Plots were each 24 to 32 rows of 30-inch spacing and approximately one-third mile in length.

Evaluation of Round-Up Ready®, Maturity Group VI and VII Soybean Varieties on High pH Soil, Montgomery County, 2004

Variety	Yield Bu/A @13%	Iron chlorosis*	Frogeye leaf spot
Asgrow 6202 RR	24.2	2	1
DP 7870 RR	23.0	3	0
Asgrow 7601 RR	22.5	2	0
DP 6880 RR	20.9	2	0
DP 6299 RR	15.0	4	1
DP 6215 RR	13.9	4	0
Pioneer 96M20	12.4	2	0
DP 7220 RR	2.1	5	2

* Iron chlorosis and frogeye leafspot ratings were based on a 0-5 scale with 0 = no symptoms, 1= trace severity, 2 = low severity, 3 = moderate severity, 4 = high severity, and 5 = very high severity.

The experiment was scouted periodically for insect pests using established scouting procedures. Iron chlorosis symptom severity was determined on July 23, 2004, when the majority of varieties were at the R3 developmental stage. Frogeye leafspot ratings were taken on August 23, 2004. The experiment was harvested on November 10, 2004, using the producer's combine and a weigh wagon. Yields were adjusted to 13 percent moisture and 60 bushels per acre.

Planting and harvest were each delayed up to three weeks due to wet conditions. These delays, combined with dry weather in late summer, likely resulted in the relatively poor yields and the poor seed quality (data not shown) observed in the experiment. Three of the four lowest yielding varieties also received the highest iron chlorosis severity ratings. DP 7220 RR had the highest iron chlorosis rating and plants were extremely stunted as a result. This variety, which yielded only 2.1 bushels per acre on this soil, also had the highest frogeye leaf spot rating among the varieties evaluated.

Evaluation of Soybean Varieties for Reniform Nematode Tolerance in Alabama, 2004

K. S. Lawrence, D. P. Delaney, C. D. Monks, D. E. Derrick, and W. R. Goodman

Seven soybean varieties were evaluated for tolerance to the reniform nematode *(Rotylenchulus reniformis)* in a naturally infested producer's field in Cherokee county near Centre, Alabama. The field had a history of reniform nematode infestation and the soil type was a loam. Soybeans plots were nine rows, 18 feet long, with an eight-inch-wide row spacing and were arranged in a randomized complete block design with four replications. Blocks were separated by a 10-foot alley. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Population densities of the reniform nematode were determined at planting and at harvest. Ten soil cores, one-inch in diameter and eight inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. The center five feet of each plot was harvested October 28, 2004. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test (P=0.05).

Reniform nematode disease pressure was low in 2004 as temperature and moisture levels were ideal throughout the season. Pre-plant populations of the reniform nematode averaged 275 vermiforms per 150 cubic centimeters (cm^3) of soil and increased to more than 1,400 nematodes per 150 cm^3 of soil by harvest Plant height was not different between soybean varieties nor influenced by nematicide application. Yields were not significantly affected by the application of a nematicide. Pioneer 95B42RR produced the highest yields, averaging 95.15 bushels per acre between treated and nontreated plots, and it supported the highest population of reniform nematodes. Pioneer 95M80 averaged 93.6 bushels per acre; however this variety supported the lowest population of reniform nematodes (see table).

EVALUATION OF SOYBEAN VARIETIES FOR RENIFORM NEMATODE TOLERANCE IN ALABAMA, 2004

Nematicide	Yield Bu/A		Plant height In.		*Rotylenchulus reniformis*/ 150cc soil	
	Nematicide	No nematicide	Nematicide	No nematicide	Nematicide	No nematicide
Garst 5812 R/N	84.6 cde	86.6 b-e	44.8	43.3	1159.0 abc	753.3 b-e
DP 5915 RR	89.2 e	90.1 a-d	34.3	36.9	656.5 cde	1062.3 a-d
SS RT 5930	91.3 abc	91.2 abc	35.2	33.5	502.3 de	1371.3 ab
SS RT 5999 N	80.3 de	79.9 e	42.8	41.1	907.8 a-e	850.0 a-e
ES XVT 41 RR	87.7 a-e	96.8 a	43.3	43.8	1159.0 abc	1120.3 a-d
Pioneer 95B42 RR	93.6 abc	96.7 a	39.4	40.1	1467.8 a	1043.0 a-d
Pioneer 95M80	91.2 abc	96.0 ab	40.8	38.4	405.5 e	734.0 cde
LSD (P≤0.05)	***9.85***		***3.51***		***536.8***	

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

D.P. Delaney, K. S. Lawrence, E. J. Sikora, S. P. Nightengale, S. A. Poague, and K. M. 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 in Mississippi has shown that early maturing varieties from MG III and IV, planted early, may mature before soil moisture deficits become critical, and out yield later soybeans. Approximately 60 percent of soybeans in Mississippi were planted with early varieties in 2004, but little work has been done in Alabama with this system and adapted varieties.

In 2004, a test was conducted at the Plant Breeding Unit (PBU) of the E.V. Smith Research Center near Tallassee, Alabama, to evaluate use of early maturing soybean varieties (Groups III and IV) under Alabama conditions, with the goal of avoiding late summer heat and moisture stress. Four cultivars from Maturity Group III and four cultivars from MG IV, ranging from 3.3 to 4.9, were planted on two planting dates. All varieties were planted with conventional tillage in seven seven-inch rows on April 6 and again on April 27, 2004. Four replications in a split-plot design were used.

Plots were maintained weed-free with recommended herbicides. One application of fungicide was made during early to mid pod-fill. Bloom dates, plant height at initial bloom and maturity, and height to the lowest pod were recorded during the season. Each variety was combined at maturity, with five harvest dates from August 6 to September 13. Yields were adjusted to 13 percent moisture and 60 bushels per acre (Table 1), and samples taken for seed quality (Table 2).

Yields were generally very good, due to plentiful rainfall in 2004. The late planting date, however, yielded better than the early planting by 17 bushels per acre. The Group III varieties in particular improved in yield from the first to the second planting.

Blooming began before May 21 for these earliest varieties, when many plants were less than 18 inches tall. Although some additional growth and height was gained before maturity, full canopy closure was not reached on these very early maturing plots. Stand was also somewhat poorer for the early planting, due to low soil temperatures after planting. Very low (average) pod heights of two inches for some varieties would also make it difficult for producers to harvest without a very level soil surface and excellent header height control.

Treatments varied in fungus infection (Table 2). The latest maturing treatments were harvested immediately before and after Hurricane Ivan, which may account for the high percentage of infection with the *Diaporthie* sp. + *Phomopsis* sp. complex.

TABLE 1. YIELDS AND HEIGHTS FOR GROUP III AND IV SOYBEANS, PBU 2004

Cultivar	Yield Bu/A @ 13%	June 4 height inch	Total height inch	Pod lowest ht. Inch
Planting Date: Early April				
DG 3373 NRR	47	19	23	2
DG 3390 NRR	49	19	22	2
AG 3702 RR	39	17	20	2
DP 3861 RR	49	18	23	2
Pioneer 94B13 RR	58	20	24	2
Pioneer 94M41 RR	60	21	25	2
DP 4724 RR	69	16	25	3
DP 4933 RR	46	19	32	4
Planting Date: Late April				
DG 3373 NRR	72	15	26	3
DG 3390 NRR	67	14	25	3
AG 3702 RR	59	13	24	2
DP 3861 RR	72	16	29	3
Pioneer 94B13 RR	75	16	30	3
Pioneer 94M41 RR	67	15	30	6
DP 4724 RR	67	13	31	4
DP 4933 RR	73	15	40	8
LSD (P=0.10)	***10***	***2***	***3***	***1***
CV	***15***	***10***	***9***	***29***
Planting Date Means				
Early April	52	19	24	2
Late April	69	13	29	4

TABLE 2. SEED QUALITY FOR GROUP III AND IV SOYBEANS, % INFECTED SEED

Variety	*Alternaria alternata*	*Aspergillus flavus*	*Cercospora* sp.	*Diaporthie* sp. + *Phomopsis* sp.
	Planting Date: Early April			
DG 3373 NRR	4	0	5	4
DG 3390 NRR	13	0	3	4
AG 3702 RR	9	0	1	5
DP 3861 RR	1	1	3	18
Pioneer 94B13 RR	2	17	0	27
Pioneer 94M41 RR	4	0	0	15
DP 4724 RR	3	0	1	14
DP 4933 RR	0	3	0	32
	Planting Date: Late April			
DG 3373 NRR	0	6	1	8
DG 3390 NRR	3	5	0	10
AG 3702 RR	7	0	0	10
DP 3861 RR	13	3	7	2
Pioneer 94B13 RR	2	3	4	16
Pioneer 94M41 RR	4	2	13	21
DP 4724 RR	4	0	1	26
DP 4933 RR	1	1	4	52
LSD (P=0.10)	***9***	***7***	***7***	***8***

Response of Selected Soybean Varieties to the Reniform Nematode in the Greenhouse, 2004

K. S. Lawrence, D. P. Delaney, K. M. Glass, and S. R. Usery

Sixty-three soybean varieties were screened in a greenhouse for resistance to the reniform nematode. Each variety was planted into a 150 cc container in sterile soil. Prior to emergence each container was inoculated with 1000 vermiform reniform. Varieties were arranged in a randomized complete block design with four replications per test. Sixty days after planting, varieties were harvested. The roots were carefully removed from each pot and reniform eggs were extracted from the roots with a 10% NaOCl solution. The soil was extracted using the Baermann funnel technique. Reniform nematodes were determined using a stereo microscope.

All varieties tested supported reproduction of the reniform nematode. Total reniform populations varied from a high of 29,245 for Ark. R 98-1817 to a low of 1204 for Deltapine 4933RR. Reproductive indexes (RI) indicate the ability of the variety to allow the reniform nematode to increase in population levels. An RI value of less than 1 indicates the nematode is not reproducing on the soybean variety. No varieties produced a RI value of less than 1; however, Deltapine 4933RR, G 6333RR/N, DK 5366RR, SS RT 4980, CG RC 5892, DKXT J548, Hutcheson, SS RT 5999, and Progeny 5660 RR all produced an RI of less than 2. This indicates the reniform nematode did not increase in population density as well on these varieties. Eighteen varieties produced an RI value of greater than 10, indicating the reniform nematode levels increased rapidly on these varieties (see table).

RESPONSE OF SELECTED SOYBEAN VARIETIES TO THE RENIFORM NEMATODE IN THE GREENHOUSE, 2004

MG	Variety	*Rotylenchulus reniformis* Vermiforms/ 150 cc soil	Eggs/root system	Total population	Reproductive index (RI)
MGIV	AG 4403	11,588	1,680	13,268	13.3
MGIV	AG 4603	9,463	90	9,553	9.6
MGIV	AG 4903	7,725	451	8,176	8.2
MGIV	CG RC4464	1,622	1,159	2,781	2.8
MGIV	CG RC4842	2298	1,416	3,714	3.7
MGIV	CG RC4992	2,318	579	2,897	2.9
MGIV	DG 3443	1,854	2,060	3,914	3.9
MGIV	DK 4763RR	6,759	39	6,798	6.8
MGIV	DK 4967RR	14,484	1,004	15,488	15.5
MGIV	DK 5366RR	1,159	277	1,436	1.4

continued

RESPONSE OF SELECTED SOYBEAN VARIETIES TO THE RENIFORM NEMATODE IN THE GREENHOUSE, 2004, CONTINUED

		Rotylenchulus reniformis			
MG	Variety	Vermiforms/ 150 cc soil	Eggs/root system	Total population	Reproductive index (RI) --
MGIV	DKB46-51	3,978	1,803	5,781	5.8
MGIV	DKXTJ548	1,545	219	1,764	1.8
MGIV	DP 4546 RR	2,723	773	3,496	3.5
MGIV	DP 4724 RR	3,418	901	4,319	4.3
MGIV	DP 4933 RR	560	644	1,204	1.2
MGIV	G 4612RR/N	4,828	1,584	6,412	6.4
MGIV	Garst XR49N99	2,665	2,575	5,240	5.2
MGIV	P 94B74 RR	2,279	3,927	6,206	6.2
MGIV	P 94M7	18926	464	19,390	19.4
MGIV	P 94M9	7596	837	8,433	8.4
MGIV	SS RT 446N	2,781	1,674	4,455	4.5
MGIV	SS RT 4502 N	4,577	3,605	8,182	8.2
MGIV	SS RT 4810 N	2,240	386	2,626	2.6
MGIV	SS RT 4980	888	644	1,532	1.5
MGIV	SS RT 5001N	1,912	515	2,427	2.4
MGIV	SS RT5130N	5,871	1,288	7,159	7.2
MGIV	U Ark. R 98-1817	26,651	2,594	29,245	29.2
MGIV	USG 7482nRR	2,607	966	3,573	3.6
MGIV	USG 7484nRR	1,043	966	2,009	2
MGIV	USG 7489RR	1,873	386	2,259	2.3
MGIV	USG 7494nRR	8,304	193	8,497	8.5
MGIV	USG 7499nRR	1,854	1,352	3,206	3.2
MGV	AG 5301	5,021	1,352	6,373	6.4
MGV	AG 5903	2,302	1,880	4,182	4.2
MGV	AG 5903	6,006	1,030	7,036	7
MGV	AG 5905	9,270	103	9,373	9.4
MGV	Anand	402	2,556	2,957	3
MGV	ANAND	2,124	39	2,163	2.2
MGV	CG RC 5003	11,201	418	11,619	11.6
MGV	CG RC 5222	2,575	412	2,987	3.0
MGV	CG RC 5555	5,021	206	5,227	5.2
MGV	CG RC 5892	1,839	1,339	3,178	3.2
MGV	CG RC 5892	1,545	180	1,725	1.7
MGV	CG RC 5972	2,897	567	3,464	3.5
MGV	DG SX04159	5,601	1,004	6,605	6.6
MGV	DG SX04557	2,124	618	2,742	2.7
MGV	DK 5161RR	10,429	586	11,015	11.0
MGV	DK 5967RR	1,792	4,912	6,704	6.7
MGV	DK 5967RR	5,408	90	5,498	5.5
MGV	DK B58-51	7,532	2,202	9,734	9.7
MGV	DKXTJ555	3,090	71	3,161	3.2
MGV	DP 5414RR	16,802	1,584	18,386	18.4
MGV	DP 5634RR	2,897	792	3,689	3.7
MGV	DP 5915RR	3,646	2,511	6,157	6.2
MGV	DP 5915RR	5,408	4,815	10,223	10.2
MGV	DPLX 5808RR	2,714	1,803	4,517	4.5
MGV	DPX5808R	2,704	470	3,174	3.2
MGV	ES Ranger RR	4,558	1,352	5,910	5.9
MGV	ESXVT 19RR	2,974	3,605	6,579	6.6
MGV	ESXVT 34RR	1,564	1,545	3,109	3.1
MGV	ESXVT 41RR	2,596	3,064	5,660	5.7
MGV	ESXVT 46RR	3,167	3,026	6,193	6.2
MGV	ESXVT-41	8,304	940	9,244	9.2
MGV	G 5212RR/N	2,897	348	3,245	3.2
MGV	G 5412RR/STS/N	2,318	496	2,814	2.8
MGV	G 5812RR/N	1,996	283	2,279	2.3
MGV	G 5924RR/N	6,566	515	7,081	7.1
MGV	Garst 5812 RR/N	1,097	1,082	2,178	2.2
MGV	HUTCHESON	1,738	39	1,777	1.8
MGV	OZARK	5,408	2,163	7,571	7.6
MGV	P 95B42	19,119	3,058	22,177	22.2

continued

RESPONSE OF SELECTED SOYBEAN VARIETIES TO THE RENIFORM NEMATODE IN THE GREENHOUSE, 2004, CONTINUED

		Rotylenchulus reniformis			
MG	Variety	Vermiforms/ 150 cc soil	Eggs/root system	Total population	Reproductive index (RI)
MGV	P 95B97	2,766	8,150	10,915	10.9
MGV	P 95B97	7,648	1,094	8,742	8.7
MGV	P 95M80	6,373	251	6,624	6.6
MGV	Progeny 5250 RR	2,221	258	2,479	2.5
MGV	Progeny 5404 RR	5,330	2,446	7,776	7.8
MGV	Progeny 5503 RR	2,781	515	3,296	3.3
MGV	Progeny 5660 RR	1,275	579	1,854	1.9
MGV	Progeny 5703 RR	3,322	966	4,288	4.3
MGV	Progeny 5714 RR	5,388	258	5,646	5.6
MGV	Progeny 5822 RR	3,013	644	3,657	3.7
MGV	SS RT 5302	4,828	161	4,989	5.0
MGV	SS RT 5450	1,931	251	2,182	2.2
MGV	SS RT 5540N	4,249	528	4,777	4.8
MGV	SS RT 557N	1,738	509	2,247	2.2
MGV	SS RT 5930	2,124	1,101	3,225	3.2
MGV	SS RT 5930N	1,684	4,056	5,740	5.7
MGV	SS RT 5999	1,609	264	1,873	1.9
MGV	SS RT 5999N	2,070	534	2,605	2.6
MGV	U Ark. R 97-1634	4,442	502	4,944	4.9
MGV	USG 7553nRS	4,957	142	5,099	5.1
MGV	USG 7562nRR	13,712	1,082	14,794	14.8
MGV	USG 7582nRR	4,249	670	4,919	4.9
MGVI	AG 6202	3,187	1,545	4,732	4.7
MGVI	AG 67-02	4,925	579	5,504	5.5
MGVI	CG RC 6767	2,086	515	2,601	2.6
MGVI	DG 37 M66	2,433	1,159	3,592	3.6
MGVI	DKB 64-51	3,592	901	4,493	4.5
MGVI	DP 6880RR	6,798	5,485	12,283	12.3
MGVI	G 6333RR/N	1,030	206	1,236	1.2
MGVI	G 66112RR/N	13,712	1,043	14,755	14.8
MGVI	Garst 6112 RR/N	2,750	3,476	6,226	6.2
MGVI	Musen	4,238	6,476	10,715	10.7
MGVI	P 96 M20 RR	3,478	1,416	4,894	4.9
MGVI	P 96M20 RR	4,172	5,427	9,598	9.6
MGVI	SS RT 6202	6,759	1,030	7,789	7.8
MGVI	SS RT 6202N	3,754	2,871	6,625	6.6
MGVI	USG 620nRR	2,124	586	2,710	2.7
MGVI	USG 7604nRR	4,442	567	5,009	5.0
MGVII	AG 7601	2,838	4,596	7,434	7.4
MGVII	AG 7601	11,394	1,043	12,437	12.4
MGVII	AU AX416	9,270	599	9,869	9.9
MGVII	CG RC 7402	3,734	1,590	5,324	5.3
MGVII	DESHA	10,236	1,506	11,742	11.7
MGVII	DG 34J71	11,588	2,367	13,955	14.0
MGVII	DG SX04370	2,318	315	2,633	2.6
MGVII	DP 7220 RR	2,144	1,288	3,432	3.4
MGVII	DP 7220RR	2,287	2,556	4,842	4.8
MGVII	DP 7870RR	2,472	6,270	8,742	8.7
MGVII	DP 7870RR	5,987	1,024	7,011	7.0
MGVII	H 7242RR	3,476	283	3,759	3.8
MGVII	MUSEN	2,897	393	3,290	3.3
MGVII	P 97B52 RR	1,989	258	2,247	2.2
MGVII	P 97B52RR	2,024	2,433	4,457	4.5
MGVII	SS RT 7499	4,635	579	5,214	5.2
MGVII	SS RT 7499N	2,549	5,620	8,169	8.2
MGVII	Stonewall	1,354	2,716	4,071	4
MGVII	STONEWALL	3,669	483	4,152	4.2
MGVII	UGA 03-G1126	1,738	509	2,247	2.2
MGVII	USG 7732nRR	19,699	3,566	23,265	23.3
MGVIII	KUELL	1,803	264	2,067	2.1
MGVIII	UGA 03-G113169	20,471	1,333	21,804	21.8

Evaluation of Non-GMO Soybeans Varieties in West-Central Alabama

E. J. Sikora and D. P. Delaney

The 2004 trial concluded a three-year project to evaluate non-GMO soybeans in Alabama. The trial was conducted at Dee River Ranch in Pickens County, Alabama, and included the varieties Hutcheson, Caviness, Asgrow 5547, Asgrow 5944, and Pioneer 9594. Each plot was planted with approximately 120,000 seed per acre treated with Apron Maxx + Moly at five ounces per 100 pounds. Plots were 24 rows wide and approximately 10 acres in size. There were three replications of each variety planted in a randomized complete block design. The trial was treated with the fungicide Quadris at five ounces acre at the R3 growth stage. The trial was scouted periodically for insect pests using established scouting procedures. Disease incidence and severity ratings were collected on August 6, 2004. Yield and seed quality were determined at harvest.

The low yield observed with Pioneer 9594 may have been related to stem canker. Stem canker was a consistent problem on Pioneer 9594 in each year of the project. Stem canker was not observed on the other varieties included in the test. Yield among varieties varied from year-to-year (Table 1). The three-year average indicated there was little difference in yield potential among Asgrow 5944, Caviness, Hutcheson, or Asgrow 5547. Pioneer 9594 produced between two to three bushels less than the other varieties. This reduction may partially be due to its susceptibility to stem canker. All varieties showed low to moderate levels of susceptibility to frogeye leafspot (Table 2). An application of Quadris at the R3 growth stage in 2004 likely prevented any significant yield loss from this disease.

Table 1. Yield of Five Non-GMO Soybean Varieties in West-Central Alabama, 2002-2004

Variety	2004 Bu/A	2003 Bu/A	2002 Bu/A	3-year avg. Bu/A
Caviness	44.5ab*	50.2a	64.1	52.9
Asgrow 5944	50.7a	46.9b	61.9	53.1
Hutcheson	48.6a	41.4c	66.5	52.2
Asgrow 5547	48.1a	45.3b	61.7	51.7
Pioneer 9594	37.1b	47.9ab	65.0	50.0

*Numbers followed by the same letter are not significantly different.

Table 2. Stem Canker, Frogeye Leafspot and Cercospora Leaf Blight Ratings and Yield, 2004

Variety	Disease ratings* (Aug. 6, 2004) Stem canker	Frogeye	Cercospora	Yield Bu/A
Caviness	0	2.0	1	44.5
Asgrow 5944	0	2.5	1	50.7
Hutcheson	0	1.5	1	48.6
Asgrow 5547	0	2.0	2	48.1
Pioneer 9594	2	2.0	1	37.1

*Disease ratings 1 = trace, 2 = low level, 3 = moderate level, 4 = high level, 5 = very high level.

Breeding Improved Soybean Cultivars for Alabama

D. B. Weaver

The testing and development of new soybean (*Glycine max* L.) cultivars continues to be an ongoing project of the Alabama Agricultural Experiment Station. Since its inception, the project has resulted in the release of three cultivars (Stonewall, Carver, and Kuell), two germplasm lines, and the release of a new Roundup-Ready® cultivar is pending.

During 2004, we evaluated many experimental soybean lines including single-plant progeny rows (F5:6 lines), and many lines in later stages of development in initial and advance stages of testing. Fifty lines were tested in advanced trials at three locations, and 140 lines were tested in initial yield tests at one location. Auburn lines were also tested regionally in the USDA Uniform Cooperative tests, with four lines tested in each of the Preliminary VI and Preliminary VII tests and two lines tested in the Uniform VI tests. One of these was the top-yielding line in the test at the Tennessee Valley Research and Extension Center in Belle Mina. These are lower numbers than we usually test, but we are still recovering from the fire of 2002. Other populations are in various stages of development, with several F1 and F3 populations having been sent for generation advance to the USDA winter nursery in Puerto Rico. We continue to make crosses during the summer, using the best of the publicly available material as parents.

Foundation seed of Kuell were produced in 2004 and should be available to Registered and Certified Seed producers in 2005. This Maturity Group VIII cultivar continues to perform extremely well in state variety tests throughout the Southeast. Its vigorous production of vegetative mass and greater plant height make it an ideal cultivar for double-cropping. Seed quality is not as good as it should be in 2004 due to the effects of hurricane Ivan, but germination has been greater than 75 percent. Thirty bushels of Breeder seed of a new Roundup Ready® line with experimental designation AX416 was produced in 2004. We have received approval from the Variety Release Committee to release this line, but performance in the State Variety Tests in 2004 was disappointing, and a decision to release this line will be based on further testing in 2005.

In cooperation with Clemson University, we conducted the third year of a test into the performance of experimental lines with the long-juvenile trait (lack of photoperiod response) at two planting dates, early (April) and late (July), in central Alabama. Soybean cultivars that do not begin reproductive growth in response to day length have the potential to expand the range of planting dates with no detrimental effects on yield. This trait would allow lines to be planted either very early to avoid late-summer drought, or planted late, in a double-crop-

ping system following small grains or maize. Experimental lines have produced well at both planting dates, and outperformed check cultivars in many cases.

We also are continuing to be a cooperator in the USDA Uniform Cooperative Tests, growing 11 tests in three locations (Tallassee, Belle Mina, and Fairhope, Alabama) and evaluating a total of 219 public breeding lines of Maturity Groups V, VI, VII, and VIII in both Preliminary and Uniform Tests. This continues to be a major resource of genetic material, as well as a great testing network for evaluation of new genotypes. However, extensive resources, in terms of labor and materials, are required to conduct these tests. We receive no money from USDA. Most all of these tests conducted in the United States are supported by soybean checkoff funding.

DISEASE EVALUATIONS

Evaluation of Quadris for Frogeye Leaf Spot Control on Soybeans, Tallassee, 2004

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

The fungicide Quadris has been shown to be effective in controlling frogeye leafspot, pod and stem blight, and aerial blight at the manufacturer's labeled rates (12-15 fluid ounces per acre). However, growers are hesitant to use Quadris at these rates due to its relatively high cost (approximately $2 per ounce per acre). This study evaluated Quadris applied at two plant growth stages to determine its efficacy at low rates against frogeye leafspot of soybean.

DeltaPine DP 6299 RR soybean seed were planted on May 17, 2004, at the Plant Breeding Unit of the E. V. Smith Research Center in Tallassee, Alabama. There were six treatments, replicated four times in a randomized complete block design. Plots consisted of four 30-inch rows, 25 feet long, with the center two rows used for frogeye ratings and harvest. Treatments included: 1) Quadris applied at 3.1 ounces per acre at R3 (growth stage); 2) Quadris applied at 3.1 ounces per acre at R5; 3) Quadris applied at 6.2 ounces per acre at R3; 4) Quadris applied at 6.2 ounces per acre at R5; 5) Dimilin 2L applied alone at 2.0 ounces per acre at R3; and 6) a nontreated control. All treatments with the exception of the control received an application of Dimilin 2L at 2.0 ounces acre at R3. Some evidence suggests that Dimilin (an insecticide) may control frogeye leafspot and may increase yield in the absence of disease. Disease severity was rated on August 13 and harvest occurred on October 6, 2004. Yields were adjusted to 13 percent moisture and 60 bushels per acre.

Evaluation of Low Rates of Quadris for Control of Frogeye Leafspot on Soybeans, 2004

Treatment	Growth stage	Frogeye severity*	Yield Bu/A
Nonsprayed control	---	3.5a**	48.7c
Dimilin 2 oz/A	R3	3.8a	55.5b
Quadris 3.1 oz/A + Dimilin 2 oz/A	R3	1.4c	64.6a
Quadris 6.2 oz /A + Dimilin 2 oz/A	R3	1.5c	64.5a
Quadris 3.1 oz/A + Dimilin 2 oz/A	R5	3.1b	54.5b
Quadris 6.2 oz/A + Dimilin 2 oz/A	R5	2.9b	56.8b

*Rating scale was 0-9 with 9 representing the highest frogeye leafspot damage.

**Numbers followed by a different letter are significantly different.

Frogeye was observed in plots prior to the initial R3 applications (July 23). Results show that frogeye severity was significantly less when Quadris at either 3.1 or 6.2 ounces per acre plus Dimilin 2L, was applied at R3, just after the onset of frogeye symptoms (see the table). These treatments also produced significantly higher yields than all other treatments. Frogeye severity was significantly less when Quadris at both 3.1 and 6.2 ounces per acre plus Dimilin, was applied at R5 (August 6) compared to Dimilin alone and to the nonsprayed control. However there were no significant differences in yield among the Dimilin treatment and the 3.1- and 6.2-ounce Quadris treatments applied at R5. All treatments had significantly higher yields than the nonsprayed control. There were no apparent differences in seed quality measured by post-harvest fungal contamination (data not shown).

Results suggest that an early season application of Quadris at relatively low rates at the R3 growth stage prior to, or at the onset of, frogeye leafspot symptoms can reduce frogeye severity and significantly increase yields. Application of Quadris at low rates at R5 can also reduce frogeye severity and increase yields compared to nontreated soybeans, but yield increases are not as great as soybeans treated at R3. Dimilin applied alone at R3 did not reduce frogeye severity but did increase yields compared to the untreated control, indicating that the insecticide had a beneficial effect other than controlling frogeye.

Evaluation of Quadris on Soybeans at Low Rates in West-Central Alabama

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

The fungicide Quadris has been shown to be effective in controlling frog-eye leafspot, pod and stem blight, and aerial blight at the manufacturer's labeled rates (12 to 15 fluid ounces per acre). However, growers are hesitant to use Quadris at these rates due to its relatively high cost (approximately $2 per ounce per acre). Field observations and preliminary results from research conducted in the Southeast suggest Quadris may be effective at relatively low rates (3.1 to 6.2 ounces per acre) if applied prior to disease onset.

A large-scale field trial was conducted at the Dee River Ranch in Pickens County, Alabama, in 2004. The trial was planted on April 7, 2004, with the soybean variety Hutcheson. The trial consisted of three treatments, replicated two times, in a randomized complete block. Each block was approximately 6.4 acres in size. Treatments included: 1) Quadris at 3.1 ounces per acre plus Dimilin 2L at 2 ounces per acre, 2) Quadris at 6.2 ounces per acre plus Dimilin 2L at 2 ounces per acre, or 3) Dimilin 2L at 2 ounces per acre. All treatments were applied on July 11 at the R3 growth stage, in 19 gallons of water per acre using a Case IH 4260 sprayer. Trace levels of frogeye leafspot were observed in the trial at the time of application. Cercospora leaf blight and Rhizoctonia aerial blight developed in the trial, but as with frogeye leafspot, remained at relatively low levels for the duration of the test. The trial was evaluated on July 18, July 25, and August 10, but there were no significant differences in disease severity among treatments (data not shown). Plots were harvested on September 22 and yield was determined. A sample from each block was evaluated for post-harvest fungal colonization.

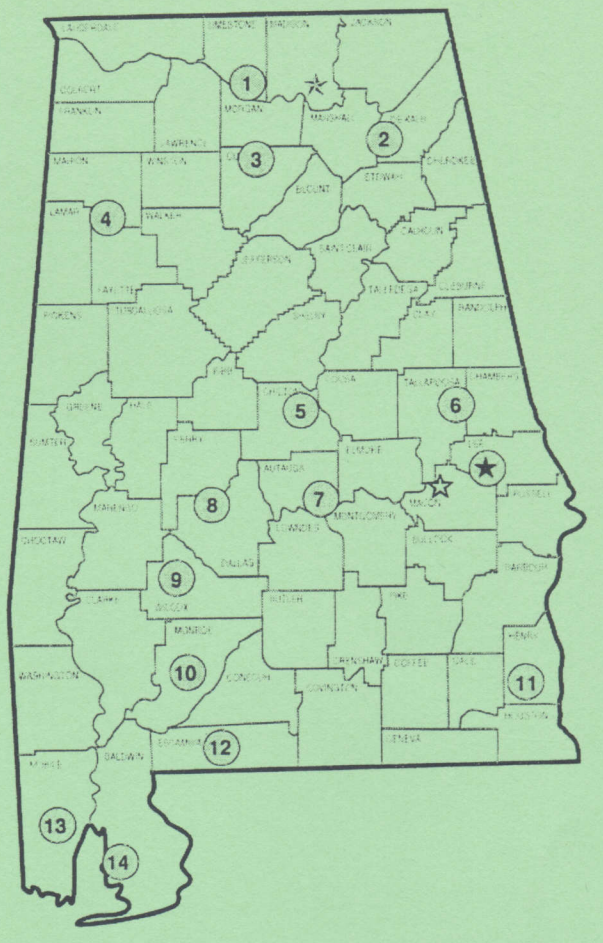
There were no apparent differences in yield among the treatments (see the table). Low levels of foliar disease did not allow for a good examination of the treatments' disease control capabilities. However, it did appear that applications of Quadris at the R3 growth stage at both the 3.1 and 6.2 ounces per acre rate did reduce post-harvest seed colonization of pathogenic fungi compared to Dimilin alone.

Evaluation of Low Rates of Quadris for Reduction in Post-Harvest Fungal Colonization of Soybeans, 2004

Treatment	Yield	Percent seed colonized		
	Bu/A	*Cercospora kikuchii*	*Fusarium oxysporum*	*Phomopsis* sp.
Dimilin 2 oz	57.8	34	12.5	13
Quadris 3.1 oz + Dimilin 2 oz	58.5	13	7.0	3
Quadris 6.2 oz + Dimilin 2 oz	59.4	10	2.5	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.