2009 AU Crops

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CONTENTS

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VARIETY TRIALS

Enhancing Cotton Variety Selection Through On-Farm Evaluations, 2009

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On-farm cotton variety evaluations were initiated in 2009 in the following Alabama counties: Barbour, Cherokee, Elmore, Fayette, Macon (2), Shelby, Escambia, and Monroe. The primary purpose for conducting on-farm cotton variety trials in 2009 was to compare and evaluate the performance of soon-to-be-released Roundup Ready Flex varieties. Specifically, this was an effort to evaluate new releases for their potential as a replacement of DP555 BGRR. While we requested "Class of '10" varieties from Delta and Pine Land, we were not provided seed; therefore, we are still lacking a strong on-farm database for those varieties on which to base our recommendations. One of the reasons given for not providing seed for Extension trials was that they had not made their final decisions on which varieties would ultimately be released. Seed companies that were included in the Flex trials included Delta and Pine Land (Class of '09), Stoneville, FiberMax, and Phytogen. Conventional variety trials were conducted at E.V. Smith Field Crops Unit, Prattville Agricultural Research Unit, and Elmore, Monroe, and Macon counties.

Planting dates ranged from May 2009 to early June due to early season rains. Extremely wet extended fall weather prevented us from harvesting the trials in Shelby, Fayette, and Macon (1) counties. In general, yields were generally high but not without significant losses in some fields given the severe fall harvest conditions. Final analysis of the HVI data is still underway. Yield and fiber quality data will be made available at www.alabamacrops.com.

Breeding Cotton for Yield and Quality in Alabama, 2009

D. B. Weaver

There are four major aspects to this project: (1) development of cotton germplasm or cultivars with improved yield and fiber properties, (2) evaluation and development of cotton germplasm for resistance to reniform nematode, (3) evaluation and development of cotton germplasm for resistance to abiotic stresses, particularly heat and drought, and (4) evaluation of the effect of exotic germplasm introgression on cotton yield and fiber properties.

For the first objective, experimental breeding lines from several different cotton populations were developed using bulk and pedigree methods. In 2009, we evaluated experimental lines for yield and fiber properties at two locations: Tallassee and Prattville. Good data were collected at both locations, and yield and fiber data analysis is in progress. Complete yield and fiber quality data are now available from the 2008 Regional Breeders Testing Network at 10 locations across the Cotton Belt. Auburn experimental lines ranked 12th, 15th, and 26th in the 34-entry test (31 experimental lines plus three checks). We have cooperated in this test for the past seven growing seasons. Three new lines were submitted for evaluation in 2009, and preliminary data show that Auburn lines were the top-performing lines in several locations. In continuing our germplasm improvement work, single plants were harvested from F_3 populations and will be used to generate lines for testing in future years. For other populations, $F_{3:4}$ plant progeny rows were selected for testing in 2010.

Several populations were developed for the purpose of incorporating the moderate levels of reniform nematode resistance in TX 245 and TX 1419. Four adapted lines (FM966, SG747, PM1218, and Delta Pearl) were crossed with the two germplasm lines, and $F_{2:3}$ progenies were evaluated in a series of greenhouse tests. Unfortunately, the resistance in the two germplasm lines proved to be unstable, and we were not able to repeat the results we obtained in previous screenings. The germplasm lines proved to be no more resistant to reniform nematodes than the susceptible control. Therefore we turned our attention to the LONREN source of resistance, and evaluated 100 F2:3 lines from crosses between LONREN and Fibermax 966. Of these, 21 lines showed levels of resistance equal to LONREN. These lines will be evaluated in a series of further field and greenhouse experiments with a variety of objectives. We also investigated the possibility of relationships between seedling vigor and response to greenhouse evaluation for nematode resistance. No relationship was found.

We are continuing to develop similar type populations using heat tolerant genotypes. We have identified seven accessions as having significantly greater vegetative heat tolerance than Deltapine 90 and have demonstrated a relationship between chlorophyll fluorescence following heat stress and vegetative heat tolerances. F_2 populations from five of these accessions have been developed, but we have not be able to screen the populations successfully to date.

Finally, using materials described above in the reniform nematode work, we have developed a series of 144 advanced lines [eight populations, each with 15 lines (five lines each at 25, 50, and 75 percent adapted germplasm)] to study the effect of exotic (unadapted) germplasm on yield and fiber quality of upland cotton. Lack of genetic progress in cotton has been at least partially ascribed to a very narrow genetic base, and the purpose of this research is to assess the impact that exotic germplasm has on cotton yield and fiber properties, and determine if genetic variation can be improved by introgression of exotic lines. These lines were evaluated at two locations (Tallassee, Alabama, and Florence, South Carolina) in replicated plots in 2009. Yield and fiber data are still being analyzed.

ECONOMIC CONSEQUENCES OF USING DIFFERENT COTTON VARIETY TECHNOLOGY SYSTEMS IN NORTH ALABAMA, 2009

T. Reed, C. H. Burmester, and E. Schavey

A test was conducted at the Tennessee Valley Research and Extension Center (TVREC) at Belle Mina, Alabama, to evaluate the economic consequences of using different cotton variety technology systems. Plots for this study received a rye cover crop burndown treatment of Roundup (22 ounces per acre) + Prowl (32 ounces per acre) on April 13. Cotton was planted on April 29 and Temik 15G was applied in-furrow with the seed. Due to cold, wet weather the stand deteriorated and cotton was replanted on May 20 after Roundup (22 ounces per acre) and Aim (2 ounces per acre) were applied to all plots to kill remaining cotton. Varieties planted were Stoneville 4554 B2RF (ST) (Bayer Crop Science), Phytogen 440 W (PHY) (Dow AgroSciences LLC) and a conventional variety CT210 (CT) (Seed Source Genetics).

The experimental design was a split split plot with varieties being the main plot variable. The main plots were then split by preemergence weed control. Half the plots received Cotoran 4L (32 ounces per acre) at first planting. At second planting half the plots received Cotoran (32 ounces per acre) + Prowl (1.5 pints per acre). Later herbicide treatments were as follows: No-Pre's (applied June 17) ST — Roundup (22 ounces per acre), PHY and CT — Staple (3 ounces per acre) + Select Max (9 ounces per acre) + non-ionic surfactant. Pre's (applied July 7) ST — Roundup (22 ounces per acre), PHY — Ignite (32 ounces per acre), and CT — Envoke (0.125 ounce per acre). All plots were treated at lay-by on July 24 with Roundup (22 ounces per acre) and Valor (1.5 ounces per acre).

The second split was by Heliothine (bollworm/budworm) control and included half the plots with larvicides for Heliothine control compared to plots without larvicides. All plots were treated with Vydate (16 ounces) on July 6 for tarnished plant bugs. Half the CT plots received applications for Heliothines on two occasions when treatment thresholds were reached: on July 15 (Belt 3 ounces per acre) and August 17 (Baythroid 2.5 ounces per acre). A Baythroid overspray was also made to half the ST and PHY plots on August 15. Plots without larvicides were treated with TriMax (2 ounces per acre) on August 17. ST and PHY plots were treated with Stance (3 ounces per acre) on July 16 and CT plots received Stance on July 24.

Plots were defoliated on October 19 and harvested on November 5. Cotton quality was determined by ginning a 50 boll sample from each plot using HVI analysis for color grade, staple, micronaire and uniformity.

An on-farm large plot (non-replicated) test was also included in this study. Each of three varieties were planted in Franklin County in adjacent 1.3 acre blocks (32 rows 40 inches in width rows x 517 feet in length) on May 21. The variety CT210 (CT) was planted between Phy 440W (PHY) and DP0935BG2RF (DP). The PHY and DP seed were treated with Avicta. The CT seed were treated only with fungicides. This resulted in significant thrips damage to the CT variety, which was shorter than the other two varieties at harvest. Weed and insect management programs were identical for all three varieties. The only herbicides used were a hooded spray application of Roundup + Select + Staple applied on July 20. Insect pressure was light and the only insecticide application was Hero, applied on August 21. Yields were obtained by harvesting eight rows of DP and the eight rows of CT cotton adjacent to the eight rows of DP. Eight rows of PHY cotton were harvested and the eight rows of CT next to these eight rows of PHY were also harvested. Pounds of seed cotton harvested were weighed using a boll buggy equipped with digital scales.

There was a significant variety by herbicide interaction with respect to June stand count (P>F=0.04), and plant height for each measurement date (P>F=0.0001 to 0.0005) (Table 1).

The CT-No Pre treatment had significantly fewer plants per 5 feet than the other variety x herbicide combinations. The CT-Pre treatment had significantly more plants per 5 feet than the other variety x herbicide combinations. The CT variety initially grew slower than the other varieties but caught up with the ST and PHY varieties by late October. Nodes above white flower (NAWF) counts made on July 28 showed that CT matured later than the other varieties. CT had significantly more (P>F= 0.0001) NAWF (8.2) than ST (7.4) and PHY (7.2) (LSD 0.05 = 0.2). There was a significant variety x insecticide interaction with respect to yield (P>F= 0.018). CT and PHY without larvicide yielded significantly less than the other variety x larvicide combinations. Note that Heliothines reduced CT yield by 236 pounds and PHY yield by 169 pounds per acre.

TABLE 1. EFFECT OF TECHNOLOGY ON STAND AND PLANT HEIGHT, TVREC, 2009

Variety	Herbicide	June stand	Plant height July 10	Plant height July 28	Plant height Oct. 26
		no/5 ft.	*in*		
ST	No pre's	19.7	22.4	36.0	38.2
ST	Pre's	19.5	22.7	36.0	39.4
PHY	No pre's	20.8	22.5	36.8	39.2
PHY	Pre's	20.5	23.4	36.8	39.2
CT	No pre's	18.3	19.8	37.3	41.0
CT	Pre's	24.9	17.8	35.0	38.9
LSD (0.05)		***0.7***	***0.9***	***0.9***	***1.0***

TABLE 2. EFFECT OF VARIETY AND LARVICIDE TECHNOLOGY ON COTTON YIELD, TVREC, 2008

Variety	Larvicide	Lint Yield *lb/A*
ST	None	1579
ST	Treated	1525
PHY	None	1356
PHY	Treated	1525
CT	None	1272
CT	Treated	1508
LSD (0.05)		***141***

The yields, cost, and net returns for each of the 12 treatments (variety x herbicide x larvicide combinations) in both 2008 and 2009 are shown in Table 3. Total cost includes cost for seed, technology costs, herbicides, and insecticides. Total costs in 2009 ranged from $76 per acre for CT-Pre Herb-No Larvicide to $139 per acre for ST- Pre Herb-Larvicide. Loan values were similar for all treatments in 2009 and ranged from 56.5 to 56.95 cents per pound. When loan values were multiplied by lint yields and costs deducted, the highest net return for each variety in 2009 was ST-No Pre Herb-No Larvicide ($782), PHY-No Pre Herb-Larvicide ($772) and CT-No Pre Herb-Larvicide ($795).

Seed cotton yields per acre for the 2009 on-farm large plot trial were as follows: DP2313 pounds and CT1621 pounds; PHY 1929 pounds and CT1706 pounds. CT yields were probably reduced by severe thrips damage due to the lack of an insecticide seed treatment.

NOTE: A similar cotton technology comparison study by C. D. Monks was conducted at the E.V. Smith Research and Extension Center near Shorter, Alabama. The results were very similar to the test at Belle Mina. The best net return per acre for each variety was ST-Pre Herb-Larvicide $710; PHY-Pre Herb-Larvicide $673; and CT-Pre Herb-Larvicide $678.

TABLE 3. AVERAGE COTTON YIELDS, VALUE, COSTS, AND RETURN OF THREE COTTON TECHNOLOGY SYSTEMS, TVREC, 2008 AND 2009

Variety[1]	Herb (Pre)	Larvicide	Lint/A 2008 lb/A	Lint/A 2009 lb/A	Value 2008 $/A	Value 2009 $/A	Costs[2] 2008 $/A	Costs[2] 2009 $/A	Returns[2] 2008 $/A	Returns[2] 2009 $/A
ST4554	No	No	1920	1600	1042	907	162	125	880	782
ST4554	No	Yes	1995	1576	1082	894	164	126	918	768
ST4554	Yes	No	1995	1558	1079	880	155	137	924	743
ST4554	Yes	Yes	1896	1473	1032	833	157	139	875	694
PHY	No	No	1817	1301	985	740	160	93	825[1]	647[1]
PHY	No	Yes	1999	1576	1081	867	162	95	919[1]	772[1]
PHY	Yes	No	1933	1409	1045	798	153	105	892[1]	693[1]
PHY	Yes	Yes	1964	1517	1062	860	155	107	907[1]	753[1]
CT210	No	No	1068	1294	578	736	109	70	469	666
CT210	No	Yes	1704	1550	923	883	146	88	777	795
CT210	Yes	No	1376	1248	720	708	102	76	618	632
CT210	Yes	Yes	1731	1465	941	834	139	94	802	740

[1] Phytogen 485 WRF was planted in 2008 and Phytogen 440W was planted in 2009

[2] Costs and returns include seed costs, technology fees, herbicide costs, and insecticide costs. Other production costs are not included.

Impact of Selected Cotton Varieties and Telone II on Cotton Production in a Reniform Nematode Infested Field, 2009

W. S. Gazaway, K. S. Lawrence, and J. R. Akridge

No commercial cotton varieties are known to be resistant or immune to reniform nematodes (*Rotylenchulus reniformis*). However, some commercial varieties may be able to tolerate damage and produce acceptable yields in moderate to heavily reniform-infested fields. The objective of this field study is to identify cotton varieties' tolerance to reniform and to determine if the addition of a nematicide will increase cotton yield in fields heavily infested with reniform nematodes.

A cotton field near Huxford, Alabama, was selected for the test. This field has historically experienced heavy losses to reniform nematodes. The field's soil type is a Ruston very fine sandy loam (56.25 percent sand, 28.75 percent silt, and 15 percent clay). The field was cultivated and plots were laid off in March. In April the entire test area was sub-soiled and bedded up into raised rows. Telone II (3 gallons per acre) was injected 18 inches deep in designated plots. Plots were two rows on 3-foot centers, 50 feet long. The test was arranged as a randomized split block design with treatments replicated four times. On May 20, selected cotton varieties were planted into paired blocks (Table 1). One of the paired blocks was fumigated with Telone and the other block was left untreated. Composite soil samples for nematode analyses were taken (1) at random locations in the test area prior to fumigation and (2) from all plots approximately one month after planting (June 16) and at harvest (October 29). Stand counts were made on June 16 or approximately four weeks after planting. Prowl (1 pint per acre) was applied at planting for weed control. Roundup (22 ounces per acre) and Gramaxone were applied later in the season. All cotton seed in the test were treated with Gaucho Grande to control early season insects. In addition, Bidrin (3.2 ounces per acre) was applied to control thrips and other early season insects. All other cultural practices including soil fertility, weed control, and insect control were followed according to Auburn University recommendations. Cotton was harvested on October 29. All data including soil samples, stand counts, and yield were taken from the two center rows of each plot.

Cotton yields in 2009 season were not much better than those in the 2008 season. Long periods of drought occurred in 2008 while in 2009 rainfall was more than adequate with the exception of a drought in the spring immediately following planting. Initially cotton yields in the 2009 season appeared to be promising with bountiful rainfall from March through May, but continued rainfall in August (8.17 inches), September (5.54 inches), and early October produced a high incidence of boll rot. Consequently, yields and cotton quality were significantly reduced (Table 1). Telone had no effect on cotton yields or reniform nematode populations (Table 2). The fumigant failed to control reniform nematodes as a result of the extremely hot, dry period following its application for two to three weeks after planting. Cotton stands did not appear to be adversely affected. No significant difference in stand count or skip index could be discerned among the varieties (Table 1). However, yields varied considerably among the selected cotton varieties (Table 2). Stoneville 5327 B2RF produced the highest yields followed closely by Stoneville 5458 B2RF and FM 9180 B2RF. Stoneville 4554 B2RF had the lowest yields (Table 2).

Stoneville 4554 B2RF appeared to be the best variety in this reniform infested field in 2009. However, it is interesting to note that while Telone was ineffective, reniform populations remained relatively low through the 2009 season. Perhaps, excessive wet conditions may have reduced reniform nematode populations as well as cotton yields.

Table 1. Impact of Varieties and Telone II on Reniform Nematode Populations, Plant Stands, and Yield

Trt. no.	Variety and treatment	–Reniform/100cc– June 16	Oct. 29	Plants/10 ft ———June 16———	Skip index	Seed cotton *lb/A*
1	ST4554B2RF + Telone	212	386	38.8	0.8	1668
2	ST5458B2RF + Telone	232	425	34.8	1.0	2061
3	ST5327BR + Telone	251	154	36.5	0.8	2258
4	FM9180B2RF + Telone	193	232	31.0	1.3	2005
5	DP0935 + Telone	309	444	39.0	1.0	1947
6	ST4554B2RF	406	869	34.8	1.3	1753
7	ST5458B2RF	541	541	34.0	0.5	2163
8	ST5327BR	464	676	33.8	1.3	2285
9	FM9180B2RF	695	580	31.5	0.8	2047
10	DP0935	811	753	35.5	1.0	1982
LSD (P=0.10)		***290***	***546***	***8.0***		***232***

Table 2. Average Seed Cotton Yield of Varieties Treated with Telone II and Untreated in Descending Order

Variety and treatment	Seed cotton yield *lb/A*	Avg. lint yield *lb/A*
ST 5327B2RF + Telone	2258	2271
ST 5327B2RF	2285	
ST5458B2RF + Telone	2061	2112
ST5458B2RF	2163	
FM9180B2RF + Telone	2005	2026
FM9180B2RF	2047	
DP0935 + Telone	1947	1965
DP0935	1982	
ST4554B2RF + Telone	1668	1711
ST4554B2RF	1753	
LSD (P=0.10)	***232***	

Comparison of FM1845 LLB2 and DP0935 B2RF Cotton Varieties

C. H. Burmester

The Liberty-Link herbicide system for cotton is new technology for many north Alabama cotton growers. A study was conducted in 2009 to compare a Liberty-Link variety (FM1845 LLB2) to a Roundup-Ready cotton variety (DP0935 B2RF) under northern Alabama growing conditions. Each variety was planted in eight row strips that were replicated three times across the field. Both varieties were managed separately throughout the season. Management decisions on weed and insect control were made based on scouting results of each variety (Table 1.) Ignite and Cotoran were used for weed control with the FM1845 LLB2 variety while Staple and Roundup were used with the DP0935 B2RF variety. Insect pressure was light in 2009 and both varieties received identical insect control treatments. Growth regulator and defoliation applications were also identical for each variety.

The DP0935 B2RF variety grew slightly taller and was slightly later in maturity than the FM1845 LLB2 cotton in this test. Yields were harvested and weighed on a boll buggy equipped with electronic scales. Each variety was picked separately and taken to the gin for lint turn-out and cotton grades. Two bales were ginned off each wagon, but there was insufficient cotton for a third bale. Because of this incomplete ginning, the lint turn-out of each variety could not be determined. Seed-cotton samples, however, were taken from each wagon and three samples were ginned on a small table top gin for lint turn-out. The DP0935 B2RF variety had about a 3 percent higher turn-out than FM1845 LLB2 (Table 2). Final lint yields showed that both varieties picked slightly more than 1200 pounds of lint with the FM1845 LLB2 variety producing just slightly higher yields (Table 2). The FM1845 LLB2 variety had a slightly better color grade but the DP0935 B2RF variety had a slightly longer staple, higher strength, and uniformity than FM 0935 LLB2 (Table 2). Because of the better color grade the FM1845 LLB2 had a slightly higher cotton loan rate than DP0935 B2RF (Table 2). Both varieties may have potential as new varieties for the Tennessee Valley area of Alabama and both weed control systems provided good control. Their later maturity, however, may limit their use in northern areas of the state that generally prefer earlier maturing varieties.

Table 1. In-Season Treatments applied to FM1845 LLB2 and DP0935 B2RF

Date	FM1845LLB2 (Aeris)	DP0935 B2RF (Avicta)
4/29	Cotoran 1 qt/A	No preemergence
5/29	Ignite 32 oz/A	Staple 2.6 oz/A
6/10		Roundup 22 oz/A
7/6	Oberon on spider mites	Oberon on spider mites
7/10	Ignite 32 oz/A	—
7/10	50 lb N on replanted	50 lb N on replanted
7/15	Stance 2.5 oz	Stance 2.5 oz
7/23	Trimax 1.37 oz for aphids	Trimax 1.37 oz for aphids
7/24	Valor 1.5 oz layby	Layby Roundup +Valor (1.5 oz)
8/17	Baythroid 2 oz/A	Baythroid 2 oz/A
8/17	Stance 4 oz on replant	Stance 4 oz on replant
10/19	Def (1 pt) + Finish (1 1/2pt)	Def (1pt) + Finish (1 1/2 pt)
11/9	Harvested	Harvested

Table 2. Cotton Yields in Comparison Trial of FM1845 LLB2 and DP0935 B2RF

Rep.	Acres	——Yield——		——Lint——	
		lb/plot	*lb/A*	*%*[1]	*lb/A*
DP0935 B2F					
1	0.3865	1055	2730	0.456	1245
2	0.3865	1032	2670	0.453	1210
3	0.3914	1034	2640	0.456	1204
Average	0.3881	1040	2680	0.452	1211
FM1845 LLB2					
1	0.3761	1095	2910	0.420	1222
2	0.3761	1122	2980	0.427	1272
3	0.3761	1121	2980	0.420	1252
Average	0.3761	1113	2958	0.422	1248

Table 3. Cotton Grades in Comparison Trial of FM1845 LLB2 and DP0935 B2RF

Variety	Grade	Leaf	Staple	Micronaire	Strength	Unifromity	Lint turnout [1]	Loan rate
FM1845 LLB2	31	3	37	4	26.8	80.6	0.422	56.05
FM1845 LLB2	31	4	36	3.9	25.9	77.9	0.422	54.80
DP0935 B2F	41	4	38	4.1	28.3	82.3	0.452	53.55
DP0935 B2F	41	4	38	4.2	30.1	81.5	0.452	53.55

[1] Based on ginning on 20 saw table top gin.

CROP PRODUCTION

Long-Term Research: The Old Rotation (circa 1896)

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

The "Old Rotation" experiment (circa 1896) is the oldest, continuous cotton study in the world and the third oldest field crops experiment in the U.S. on the same site. The complete history of this experiment was published in 2008 in the centennial issue of *Agronomy Journal* (C.C. Mitchell, D.P. Delaney and K.S. Balkcom. 2008. A historical summary of Alabama's Old Rotation (circa 1896): The world's oldest, continuous cotton experiment. Agron. J 100:1493-1498).

The experiment consists of 13 plots, each 136 feet long by 21.5 feet wide with a 3-foot alley between the plots. When the experiment began, each plot was a separate, non-replicated rotation treatment. However, over the years fertilizer treatments have changed but the rotation treatments have not. In 2003, the plots were split with half receiving irrigation for the summer crops only (corn, cotton, soybeans). The other half remains non-irrigated.

Crop yields in 2009 were at or slightly above long-term averages for this experiment. Dry matter yields of winter legumes (AU Robin crimson clover) have been disappointingly low for several years. Corn yields reflect N availability more than any other factor. Although we see a yield response to irrigation on corn, we cannot seem to break the 200 bushel-per-acre barrior. This may be due to the late planting of corn every year (mid- to late April). Cotton yields, like corn, seem to reflect N availability. Over all treatments, irrigation in 2009 actually reduced cotton yields.

After seven years of irrigation versus no irrigation on the Old Rotation, we see a significant ($P<0.05$) yield increase due to irrigation on all summer crops. With corn and soybeans, the response to irrigation has been rather consistent, with positive yield responses in five of seven years. However, with cotton, we have seen yield increases from irrigation in only three of the seven years, but when irrigation was needed, the yield response was dramatic. In three of the seven years, we actually saw a significant negative response to irrigation, i.e. the non-irrigated plots actually yielded more than the irrigated plots. This is no doubt a problem associated with our timing of irrigation and should be corrected so excess water is not applied in wet years as in 2009.

Table 1. Old Rotation Yields, 2009

Plot	Description	Clover dry matter Irrig.	Clover dry matter Non-irrig.	Wheat Non-irrig.	Corn Irrig.	Corn Non-irrig.	Cotton Irrig.	Cotton Non-irrig.	Soybean Irrig.	Soybean Non-irrig
		—lb/A—		–bu/A–	—bu/A—		—lb/lint/A—		—bu/A—	
1	No N/no legume	0	0				472	629		
2	Winter legume	1093	859				1001	1225		
3	Winter legume	1076	977				844	1175		
4	Cotton-corn	1246	2101		61.5	75.7	corn	corn		
5	Cotton-corn + N	1258	1948		156.3	113.9	corn	corn		
6	No N/no legume	0	0				463	819		
7	Cotton-corn	971	2589				1001	1424		
8	Winter legume	1133	2309				811	1208		
9	Cotton-corn + N	2459	2457				1424	1241		
10	3-year rotation	2242	2940		163.1	132.7	corn	corn		
11	3-year rotation	0	0	62.0			soy	soy	54.1	50.2
12	3-year rotation	0	0				803	877		
13	Continuous cotton No legume + N	0	0				1258	1275		
	Mean	***1435***	***2022***	**—**	***127.0***	***107.4***	***898***	***1097***		

Table 2. Effect of Irrigation on Mean Corn, Cotton, and Soybean Yields on The Old Rotation, 2003-2009

Plot	Treatment	Irrigated yield	Non-Irrigated yield
	CORN (bu/A)		
4,7	Legume N only	64.7 b	69.9 ab
5,9	Legume N + 120 lb N/A	167.4 a	98.9 a
10,11,12	3-yr rotation/legume N	131.1 a	52.6 b
	7-yr mean	121.1[1]	73.8
	COTTON (lb lint/A)		
1,6,	No N/no legume	514 d	390 d
2,3, 8	Legume N only	1020 c	990 b
13	120 lb N/A; no legume	1330 ab	930 b
4, 7	Corn rotation with legume	1270 b	1120 ab
5,9	Corn rotation with legume + 120 lb N/A	1500 a	1250 a
10, 11, 12	3-yr rotation/legume only	1190 bc	720 c
	7-yr mean	1040[1]	861
	SOYBEAN (bu/A)		
	3-yr rotation 7-yr mean	53.4[1]	39.4

[1] Significant at $P<0.05$

LONG-TERM RESEARCH: CULLARS ROTATION (CIRCA 1911)

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

The Cullars Rotation (circa 1911) is the oldest, continuous soil fertility study in the Southern U.S. The experiment was named for J.A. Cullars who owned and farmed the site when the experiment began in 1911. The site of the Cullars Rotation is believed to be the site where Professor George Atkinson did his research in the 1880s which lead to the discovery that "cotton rust" was related to a potash deficiency in cotton.

The Cullars Rotation consists of 14 soil fertility treatments replicated three times in a non-randomized block design. Treatments for plots 1 through 11 began in 1911 and treatments for plots A, B, and C were added in 1914. Each plot is 99 feet long by 20 feet wide with a 2-foot alley between plots. A different crop is planted in each of the three blocks in a three-year rotation the same as the three-year rotation in the "Old Rotation" experiment. The rotation sequence is (1) cotton followed by crimson clover, (2) corn for grain followed by winter wheat for grain, and (3) soybean for grain following wheat harvest.

This study is non-irrigated and yields reflect growing conditions during that season. Cotton and soybean yields in 2009 were very good while clover yields were poor. Wheat and corn grain yields in 2009 were reasonable. Note the dramatic yield response to added K by cotton and the apparent lack of response to added micronutrients. No added P (Plot 2) dramatically reduces wheat and soybean yields more than cotton yields. The Cullars Rotation Experiment is an excellent site to see dramatic nutrient deficiencies compared to healthy crops each year.

CULLARS ROTATION YIELDS, 2009

Plot	Description	Clover dry wt. *lb/A*	Wheat *bu/A*	Corn *bu/A*	Cotton *lb lint/A*	Soybean *bu/A*
A	No N/+legume	1404	34.5	64.7	1051	50.8
B	No N/no legume	0	28.8	31.1	977	55.4
C	Nothing	0	0.0	0.0	0	0.0
1	No legume	0	57.6	126.5	1233	62.2
2	No P	1444	18.8	107.4	339	9.0
3	Complete	2656	57.4	132.4	1150	62.2
4	4/3 K	2236	47.7	112.3	1084	65.2
5	Rock P	1718	45.8	112.6	1059	67.9
6	No K	747	47.0	57.9	0	53.4
7	2/3 K	2238	57.0	123.3	993	63.7
8	No lime (pH~4.9)	0	11.3	29.1	298	7.8
9	No S	1153	54.8	108.7	985	62.2
10	Complete+ micros	2624	51.2	111.0	1159	62.9
11	1/3 K	1612	47.8	117.8	463	49.1

Evaluation of Multi-Year Crop Rotation With and Without a Nematicide for Reniform Nematode Management in South Alabama, 2009

S. R. Moore, W. S. Gazaway, K. S. Lawrence, and J. R. Akridge

A trial to determine the economic benefits of crop rotation with and without a nematicide was established in 2005 in Escambia County, Alabama. The soil type of the field was a Ruston very fine sandy loam (59 percent sand, 33 percent silt, 8 percent clay) with a long history of reniform nematode infestation. Treatments were established as continuous cotton, or one-, two-, or three-year rotations of corn, soybeans, or peanuts with and without the nematicide 1, 3-dichloropropene (Telone II). The field trial was a split-plot design with nematicides as the primary factor and the rotational crops as the secondary factor, with four replicates. All plots were eight rows wide and 40 feet long. Cotton plots were split into two, four-row subplots with one subplot selected at random and treated with Telone II. All plots were planted in winter with a rye cover crop which was cut the following spring, plowed, and disked six weeks prior to summer crop planting. Telone II was injected 18 inches deep at a rate of 3 gallons per acre into raised seedbeds designated cotton plots three weeks before planting. Cotton seed (DP555 BGRR) was treated with thiamethoxam (Cruiser®) for early season insect control. Peanut (AP3), soybean (DP5634 RR), and corn (Pioneer 33M53 RR) were planted in the rotation crops. Nematode samples were collected at planting and at harvest in all rotation plots. Multiple core samples, 1 inch diameter by 6 inches deep, were collected from the center two rows of each plot in a systematic zigzag pattern. Samples were placed into plastic bags and transported to Auburn University within an insulated ice chest. The soil was then thoroughly mixed and a 150 cm^3 sample was removed for extraction. Nematodes were extracted by combined gravity screening and sucrose centrifugation (specific gravity = 1.13) and enumerated with an inverted microscope. Cotton yields were harvested with a mechanical plot cotton picker from the two center rows of each plot. Nematode populations and cotton yields were analyzed using the GLIMMIX procedure of SAS. Least squares means of treatments were compared using Dunnett's method and were considered significant where $P \leq 0.10$.

All rotation sequences, both with and without a nematicide, produced significantly lower initial *R. reniformis* populations compared to the continuous cotton. The two-year soybean rotation with a nematicide, the three-year corn rotations with and without a nematicide, the three-year peanut rotation with a nematicide, and the two-year corn rotation without a nematicide supported the lowest numbers of reniform nematodes at planting. Overall initial populations by rotation crop were lowest within the corn rotations followed by peanuts and soybeans. Final *R. reniformis* populations were significantly lowered in comparison to continuous cotton without a nematicide by all rotation sequences and the continuous cotton with a nematicide with the exception of the one-year rotations of corn and soybeans without a nematicide. In comparison to the continuous cotton with a nematicide, all rotations with a nematicide with the exception of the one-year soybean rotation significantly lowered final *R. reniformis* populations. Additionally, the three-year rotations of corn, soybeans, and peanuts significantly lowered final *R. reniformis* populations compared to the continuous cotton with a nematicide. All three-year rotations, both with and without a nematicide, produced the lowest final *R. reniformis* populations compared to the other rotations. Overall final populations by rotation crop were lowest within the peanut rotations followed by corn and soybeans. Cotton lint yields were significantly increased by all rotations compared to continuous cotton without a nematicide with the exception of the one-year soybean rotation without a nematicide. All rotations with the exception of the one-year corn without a nematicide and the one-year rotations of soybean with and without a nematicide produced significantly higher yields in comparison to the continuous cotton with a nematicide. Lint yields were higher on average by 37.6 pounds per acre following peanuts in comparison to corn and soybeans, which did not differ. While the three-year rotation sequences did, on average, produce the best results, it is not necessarily a practical option to grow these crops for three successive years due to disease and insect difficulties. The two-year rotations, however, significantly lowered *R. reniformis* populations and increased lint yields and can be a viable option for the management of *R. reniformis.*

LINT YIELDS AND *R. RENIFORMIS* POPULATIONS FOR ROTATION SEQUENCES IN SOUTH ALABAMA TRIAL, 2009

Treatment	Telone	Reniform/150 cm^3						Lint yield		
	applied	Plant	90% CI[1]	Rank	Harvest	90% CI	Rank	*lb/A*	90% CI	Rank
Cont. Cotton	No	1570	(952, 1402)	20	2095	(1627, 2563)	20	783.8	(650, 917)	20
Corn 1 Year	No	369	(55, 472)	13	1869	(1436, 2302)	18	842.0	(718, 966)	18
Corn 2 Year	No	156	(-198, 354)	5	1127	(553, 1670)	12	907.4	(744, 1071)	11
Corn 3 Year	No	97	(-293, 486)	2	386	(-425, 1197)	6	1002.1	(771, 1234)	3
Soybeans 1 Year	No	452	(132, 564)	17	2056	(1606, 2506)	19	815.9	(687, 944)	19
Soybeans 2 Year	No	286	(-133, 419)	9	1186	(612, 1759)	13	947.8	(784, 1111)	10
Soybeans 3 Year	No	425	(35, 815)	T15	232	(-579, 1043)	4	994.8	(763, 1226)	5
Peanuts 1 Year	No	217	(-32, 357)	T7	1297	(892, 1703)	15	880.8	(765, 996)	14
Peanuts 2 Year	No	188	(-182, 370)	6	1245	(672, 1819)	14	985.6	(822, 1149)	6
Peanuts 3 Year	No	425	(35, 815)	T15	155	(-656, 965)	1	1025.3	(794, 1257)	1
Cont. Cotton	Yes	921	(450, 866)	19	1429	(996, 1862)	17	849.8	(726, 974)	16
Corn 1 Year	Yes	303	(8, 424)	11	982	(549, 1416)	11	880.7	(757, 1004)	15
Corn 2 Year	Yes	294	(-129, 422)	10	910	(336, 1483)	9	956.2	(793, 1120)	9
Corn 3 Year	Yes	103	(-347, 553)	3	206	(-730, 1142)	2	957.8	(691, 1225)	8
Soybeans 1 Year	Yes	408	(98, 530)	14	1323	(874, 1773)	16	846.9	(719, 975)	17
Soybeans 2 Year	Yes	93	(-255, 335)	1	709	(96, 1322)	7	905.6	(731, 1081)	12
Soybeans 3 Year	Yes	464	(74, 853)	18	290	(-521, 1100)	5	1009.3	(778, 1241)	2
Peanuts 1 Year	Yes	217	(116, 506)	T7	933	(528, 1339)	10	895.4	(780, 1011)	13
Peanuts 2 Year	Yes	331	(-110, 441)	12	836	(262, 1409)	8	996.1	(832, 1160)	4
Peanuts 3 Year	Yes	155	(-235, 544)	4	212	(-598, 1023)	3	975.6	(744, 1207)	7

[1] CI = Confidence interval with the lower and upper range. All means outside this range are signicantly different ($P \leq 0.10$).

Becker Underwood® Inoculation Trials in Cotton in South Alabama

J. D. Castillo, K. S. Lawrence, S. R. Moore, and J. R. Akridge

Vigor and yield response of cotton to seven Becker Underwood® products were evaluated in a Ruston very fine sandy loam soil (59 percent sand, 33 percent silt, 8 percent clay) of a producer's field near Huxford, Alabama. Two-row plots were arranged in a randomized complete block design, with nine treatments and six replications. Treatments were applied to cotton seeds five days before the planting date of May 20. Control seeds were treated with distilled water. Plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended for Alabama. Vigor evaluations, stand and skip counts were recorded 26 days after planting (DAP) on June 16. Vigor evaluations were based on a 1 to 5 visual scale, where 1 represented a poor growing plant and 5 represented highest vigor. Stand counts were recorded as the number of plants per 10 feet of row, and skip index indicated the uniformity of the cotton stand. Plots were harvested 159 DAP on October 29. Data were statistically analyzed by analyses of variance using the general linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seasonal rainfall and temperature were generally good for the cropping period. Monthly average maximum temperatures from June to October were 94.2, 92.8, 90.3, 87.9, and 79.3 degrees F with average minimum temperature of 71, 71, 70, 70.1, and 59.5 degrees F. Total rainfall amounts were 3.04, 5.3, 6.45, 4.3, and 5.13 inches. The total rainfall for the growing season was 24.2 inches. Plant stand was improved by the biologicals BUCTNJ-1, BUCTNJ-3, BUCTNJ-4, BUCTNJ-5, BUCTNJ-6, and BUCTNJ-7 as compared to the control. Furthermore, plants treated with the biologicals were more vigorous than untreated plants in the control. Skip indexes of less than 1 indicate a uniform cotton stand across the field with no gaps; thus, all the biological treatments and the control produced a uniform cotton stand. Cotton yield was numerically greater in the biological BUCTNJ-6, which increased the yield 175 pounds per acre over the untreated control. This could represent a $35 increase in revenue with cotton prices at $0.50 per pound.

Becker Underwood® Inoculation Trials in Cotton in South Alabama

Trt. no.	Treatment	Rate	Stand	Vigor	Skip	Yield
			———	26 DAP	———	*lb/A*
1	BUCTNJ-1	0.02 g/kg	40.3 a	4.1 a	0.1 b	1897 ab
2	BUCTNJ-2	10 ml/kg	37.1 ab	4.7 a	0.0 b	1890 b
3	BUCTNJ-3	4 ml/kg	40.1 a	4.7 a	0.5 ab	1993 ab
4	BUCTNJ-4	4 ml/kg	42.6 a	4.7 a	0.1 b	1941 ab
5	BUCTNJ-5	10 ml/kg	42.0 a	4.8 a	0.5 ab	1918 ab
6	BUCTNJ-6	0.03 g/kg	41.8 a	4.8 a	0.8 a	2089 a
7	BUCTNJ-7	1 mg/kg	41.5 a	4.8 a	0.3 ab	2005 ab
8	BUCTNJ-6 BUCTNJ-7	0.03 g/kg 1 mg/kg	38.1 ab	4.7 a	0.1 b	2051 ab
9	Control	5 ml/kg	33.6 b	3.6 b	0.5 ab	1914 ab
LSD ($P \leq 0.10$)			***5.5***	***0.4***	***0.6***	***217***

Means followed by same letter do not significantly differ according to Fischer's least significant difference test ($P \leq 0.10$).

BECKER UNDERWOOD® GROWTH PROMOTION TRIALS IN COTTON IN CENTRAL ALABAMA, 2009

J. D. Castillo, K. S. Lawrence, S. R. Moore, and B. Durban

Seven Becker Underwood® products were evaluated to determine vigor and yield response of cotton to these products. The test was established in a Wickham sandy loam soil (70 percent sand, 16 percent silt, 18 percent clay) at the E.V. Smith Research Center near Shorter, Alabama. Two-row plots were arranged in a randomized complete block design, with nine treatments and five replications. Treatments were applied to cotton seeds on May 7, and five days later treated seeds were planted. Control seeds were treated with distilled water. Plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended for Alabama. Vigor evaluations and stand counts were recorded 20 days after planting (DAP) on June 2. Vigor evaluations were based on a 1 to 5 visual scale, where 1 represented a poor growing plant, 3 an average plant, and 5 the highest vigor. Stand counts were recorded as the number of plants per 10 feet of row. Plots were harvested at 160 DAP on October. 22 Data were statistically analyzed by analyses of variance using the general linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seasonal rainfall and temperature were generally good for the cropping period. Monthly average maximum temperatures from June to October were 91.5, 90.6, 89.4, 85.6, and 74.6 degrees F with average minimum temperature of 70, 68, 70, 68.7, and 55.7 degrees F. Total rainfall amounts were 3.9, 3, 7.6, 5.8, and 6.4 inches. The total rainfall for the growing season was 26.7 inches. Plant stand was improved by the biological BUCTNJ-5 as compared to the biological BUCTNJ-1 but neither was statistically different from the untreated control. However, plant vigor was visibly improved. Biological BUCTNJ-2, BUCTNJ-3, BUCTNJ-4, BUCTNJ-6, and BUCTNJ-7 produced larger more vigorous plants at 20 DAP as compared to the BUCTNJ-1 biological which also had the lowest plant stand. Seed cotton yield was greater in the biologicals BUCTNJ-1 and BUCTNJ-7, which increased yield an average of 226 pounds per acre over the untreated control. This would be an increase in revenue of approximately a $45 with cotton prices at $0.50 per pound.

BECKER UNDERWOOD® GROWTH PROMOTION TRIALS IN COTTON IN ALABAMA, 2009

Trt. no.	Treatment	Rate	Stand —26 DAP—	Vigor —26 DAP—	Yield *lb/A*
1	BUCTNJ-1	0.02 g/kg	35 b	2.8 b	2405 a
2	BUCTNJ-2	10 ml/kg	42 ab	3.4 a	2166 bc
3	BUCTNJ-3	4 ml/kg	36 ab	3.4 a	2083 bc
4	BUCTNJ-4	4 ml/kg	37 ab	3.6 a	1806 d
5	BUCTNJ-5	10 ml/kg	46 a	3.2 ab	2062 c
6	BUCTNJ-6	0.03 g/kg	36 ab	3.6 a	2207 bc
7	BUCTNJ-7	1 mg/kg	41 ab	3.4 a	2287 ab
8	BUCTNJ-6 + BUCTNJ-7	0.03 g/kg 1 mg/kg	37 ab	3.2 ab	1754 d
9	Control	5 ml/kg	40 ab	3.2 ab	2120 bc
LSD (P ≤ 0.10)			***10.1***	***0.53***	***223***

Means followed by same letter do not significantly differ according to Fischer's least significant difference test (P ≤ 0.10).

IRRIGATION

Sprinkler Irrigation of Cotton for Biodiesel Production

D. Mullenix, J. P. Fulton, M. P. Dougherty, M. H. Hall, and C. Brodbeck

A cottonseed response to sprinkler irrigation study was initiated in 2008 at the Tennessee Valley Research and Extension Center (TVREC). The intent of this study was to understand seed oil-free fatty acid variations and how that might impact biodiesel production. The study consisted of a continuous rotation of cotton that is evaluated for yield, oil, and oil-free fatty acid (FFA) responses to six sprinkler irrigation treatments ranging from 0 percent (rainfed) to 125 percent of calculated pan evaporation adjusted for percent canopy cover. Cottonseed yield and characteristic responses to irrigation are important to assess the economic feasibility and environmental impacts of irrigation for biodiesel production and quality with high yield and oil content and low FFA desired. The study was conducted on 48 plots (39 feet x 39 feet) arranged in a randomized split plot design with four replications and two rotations. One rotation was a nontraditional energy crop rotation but the other, containing 24 plots of continuous cotton rotation, is the focus of this report. Total seasonal rainfall (June through August) at TVREC for 2008 was 11.3 inches, which was near the normal average of 11.5 inches. Total seasonal rainfall at TVREC for 2009 was 12.4 inches. Statistical differences in yield and seed oil content were not found in 2009 most likely due to sufficient seasonal rainfall. Seed oil concentration, while not significantly different, was 2 percent to 3 percent higher in all treatments for 2009. FFA levels in 2008 were less than 1 percent for all treatments, but approximately 10 times higher in 2009 with significant differences observed. FFA levels from the 2009 cotton crop are not conducive to biodiesel production, and oil may require extensive pretreatment if biodiesel production is desired. Lower than expected yields in 2009 were due to boll shedding, with the higher FFA levels a result of high moisture and cool weather at the end of the season. Although oil content was consistently higher for 2009, average biodiesel production was down from the 67.2 gallons per acre estimated in 2008 due to overall lower seed cotton yields.

Irrigation Depth, Yield, Oil-Free Fatty Acid, and Oil for Sprinkler Trials, 2009

Irrigation treatment	Applied irrigation *in*	Seed cotton yield *lb/A*	Yield *bales/A*	Oil-free fatty acid *%*	Seed oil *% dry basis*	Biodiesel production *gal/A* [1]
Rainfed	0.0	2,691 a	2.1 a	8.1 ab	22.6 a	54.5
25%	3.1	2,501 a	2.0 a	6.7 b	22.1 a	47.3
50%	6.5	2,633 a	2.1 a	10.0 ab	22.0 a	49.6
75%	9.6	2,350 a	1.9 a	7.8 ab	22.3 a	44.8
100%	12.8	2,711 a	2.1 a	11.5 a	23.2 a	53.8
125%	16.6	2,420 a	1.9 a	10.3 ab	22.2 a	46.0
Average	—	2,551	2.0	9.1	22.4	49.3

[1] Assume a conversion ration of oil to biodiesel of 1:1 and 80 percent oil extratction efficiency.

Means followed by same letter do not significantly differ according to Fischer's least significant difference test ($P \leq 0.10$).

IRRIGATION MANAGEMENT FOR SUSTAINABLE, PRECISION COTTON PRODUCTION

M. P. Dougherty, J. P. Fulton, C. H. Burmester, A. H. Abdelgadir, B. E. Norris, D. H. Harkins, L. M. Curtis, and C. D. Monks

Sprinkler irrigation. A sprinkler irrigation scheduling study initiated in 2006 at the Tennessee Valley Research and Extension Center (TVREC) was continued in 2009. The study evaluated cotton yield response to six irrigation treatments ranging from 0 percent (rainfed) to 125 percent of calculated pan evaporation adjusted for percent canopy cover. In 2006 and 2007, the study was conducted on 48 plots (39 feet x 39 feet) arranged in a randomized complete block design with four replications. In 2008, a canola-soybean-cotton rotation was incorporated into 24 of the 48 sprinkler test plots to assess the economic feasibility of adding two oil crops to a northern Alabama cotton rotation. Total seasonal rainfall (June through August) at TVREC for 2008 was 11.27 inches, which was near the normal average of 11.50 inches. Comparable growing season rainfall in 2006 and 2007 was less than 6.5 inches. Total seasonal rainfall at TVREC for 2009 was 12.4 inches. Yield differences between irrigation treatments were not found in 2009 due to sufficient seasonal rainfall. Lower than expected yields in 2009 compared to 2007 and 2008 were a result of high moisture and cool weather at the end of the season.

Subsurface drip irrigation. A subsurface drip (SDI) irrigation study was installed at the Tennessee Valley Research and Extension Center in 2005 to evaluate four precision fertigation management scenarios. Approximately 7,500 feet of SDI tape and four positive displacement liquid fertilizer injectors were installed on five nutrient timing treatments with four replications in randomized complete block design. The twenty treatment plots were made up of eight, 345-foot rows of cotton on 40-inch row spacing, with drip tape between every other row of cotton. The four fertigation treatments and one non-fertigated control (Treatment 1) are described in Table 2.

Yield results for 2006 through 2009 are shown in Figure 1. Total seasonal rainfall at TVREC during June through August 2009 was 12.4 inches, which was above the 80-year average (11.5 inches). Seed cotton yields for 2009 season were lower than in 2006, 2007, and 2008. High moisture and cool weather at the end of the season caused hard locking of bolls and boll shedding during mechanical harvesting, resulting in lower yield in all treatments. Although fertigated treatments produced higher yields than the surface-applied control treatment in 2009, the differences were not significant ($\alpha = 0.1$) because of high variability within treatments. In 2009, a change in fertigation scheduling program may have resulted in better performance of fertigated treatments compared to the unfertigated control.

Lint yield (bales per acre) and lint quality parameters are presented in Table 3. None of the quality parameters was significantly affected by the different fertilizer treatments ($\alpha = 0.1$) similar to results obtained in previous seasons.

TABLE 1. IRRIGATION DEPTH AND YIELD FOR SPRINKLER-SCHEDULING TRIALS, 2006, 2007, 2008[1], 2009[2]

Irrigation treatment	2006 Irrig. in	2006 Yield bales/A	2007 Irrig. in	2007 Yield bales/A	2008 Irrig. in	2008 Yield bales/A	2009 Irrig. in	2009 Yield bales/A
0	0.00	1.2	0.00	1.0	0.00	2.3	0.0	2.1
25 %	4.87	1.7	4.29	2.2	3.16	3.0	3.1	2.0
50 %	10.1	2.0	9.63	3.4	3.70[1] (6.8)	—	6.5	2.1
75 %	15.2	2.2	14.7	3.8	5.86[1] (10.3)	—	9.6	1.9
100 %	20.4	2.8	19.3	4.0	7.91 (13.9)	3.3	12.8	2.1
125 %	25.2	2.9	24.4	3.9	17.3	3.1	16.6	1.9

[1] In 2008, two treatments were discarded due to irrigation malfunction. Numbers in parentheses indicate target irrigation that was not achieved due to malfunction.
[2] In 2006, N=4, turnout = 38 percent. In 2007, N=8, turnout = 41 percent. In 2008, N=4, turnout 40 percent, in 2009, N=4, turnout = 38 percent.

TABLE 2. TREATMENT DESCRIPTION, FERTIGATION MANAGEMENT TRIALS, 2006-2009

Treatment[1]	Description
1. Control – drip irrigated, but all fertilizers are surface applied.	Preplant – 60 lb/A N and K Post-Plant – 75 lb/A N, sidedressed at early square
2. Timing 1 – with surface preplant	Preplant – 20 lb N and K, surface applied Drip – 40 lb N and K, square to bloom (25 days) Drip – 75 lb N and K, bloom to 25 days
3. Drip timing 1 – no preplant	Planting Drip – 20 lb N and K Drip – 40 lb N and K, square to bloom (25 days) Drip – 75 lb N and K, bloom to 25 days
4. Drip timing 2 – no preplant "spoon-fed"	Planting Drip – 20 lb N and K Drip – 40 lb N and K, square to bloom (25 days) Drip – 75 lb N and K, bloom to 40 days
5. Timing 2 – with surface preplant	Preplant – 40 lb of N and K, surface applied Drip – 95 lb N and K, square through bloom (50 days)

[1] All treatments received 135 pounds per acre of nitrogen and potassium (K_2O), 20 pounds per acre of sulfur, and l.0 pound per acre of boron. Phosphorus fertilizer was surface-applied to maintain P at high soil test levels. Drip fertilizer was 8-0-8-1.2S-0.06B applied using 32 percent liquid N, potassium thiosulfate, fertilizer grade KCL, solubor, and water.

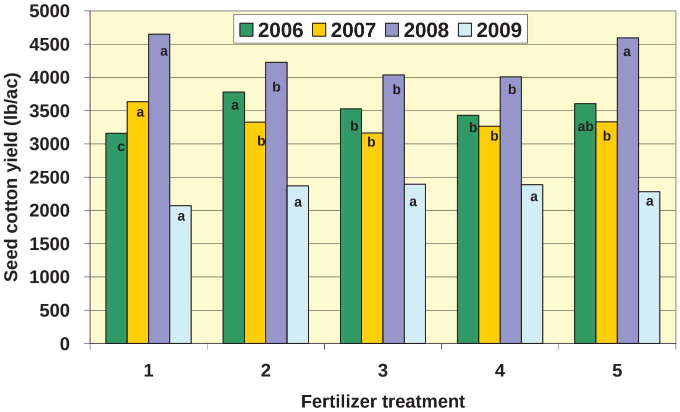


Figure 1. Seed cotton yield, pounds per acre, drip tier fertigation management study, Belle Mina, AL, 2006-2009. N = 4. Turnout = 38 percent. Different letters indicate significant difference (P ≤ 0.10).

Table 3. Lint Yield and Quality Analysis, Cotton Fertigation Management Trials, 2009

Trt. no[1]	Yield *bales/A*	Micronaire	Length *in*	Strength *g/tex*	Uniformity *%*
1	1.6 a	4.50 a	1.09 a	26.2 a	82.2 a
2	1.9 a	4.48 a	1.09 a	26.9 a	82.4 a
3	1.9 a	4.60 a	1.10 a	26.9 a	82.9 a
4	1.9 a	4.63 a	1.12 a	28.2 a	82.9 a
5	1.8 a	4.33 a	1.08 a	23.2 a	81.6 a

[1] Treatments were as follows: 1. Surface applied N-P-K with drip irrigation (control). 2. Preplant 20 pounds N-K surface with 2 N-K drip timings. 3. 20 pounds N-K drip at planting with 2 N-K drip timings (to 25 days after bloom). 4. 20 pounds N-K at planting with 2 N-K drip timings (to 40 days after bloom). 5. Preplant 40 pounds N-K surface with 1 N-K drip timing (square through bloom).

Means followed by same letter do not significantly differ according to Fischer's least significant difference test (P ≤ 0.10). N = 4. Turnout = 38 percent.

FERTILITY

Alternative Sources of N for Corn and Cotton and Ammonia Volatilization Losses

C. C. Mitchell, K. Smith, D. Watts, and D. Moore

Ammonia volatilization is the major process responsible for N losses from surface applied urea-based fertilizers, with potential losses accounting for up to 50 percent of the N applied. The use of N stabilizers mixed with urea-based N fertilizers decrease the rate of urea hydrolysis and it reduces ammonia volatilization losses, allowing the use of these less expensive sources of N. Objectives of the current study were to (1) determine the effect of N stabilizers on the rate of ammonia volatilization from surface applied urea-based N fertilizers and (2) determine the effect of alternative N sources on yields of cotton and corn in Central Alabama.

In 2007 through 2009 experiments were conducted on a Lucedale fine sandy loam (fine-loamy, siliceous, thermic Rhodic Paleudults) at the Prattville Research Unit in central Alabama with non-irrigated corn and cotton. Several N sources and N rates were used as a sidedress on the corn and cotton crops (see table). In 2009, two rates of broiler litter as a sidedess were added to replace two previously used slow-release N products that were included in 2008. In 2009, a urea-ammonium sulfate blend (33-0-0) replaced the low rate of ammonium nitrate used in previous years because this is the most accessible source of dry N fertilizers for most growers. Two N stabilizers (Agrotain® and liquid calcium chloride) were included in the treatments. Atmospheric ammonia was measured on selected treatments at 0, 1, 2, 3, 5, 7, and 14 days after sidedress fertilizer application, following a methodology similar to the one proposed by the GRACEnet Protocol. The statistical analysis was performed using the ANOVA procedure of SAS, considering effects as significant when P≤0.05. Only data from 2009 are presented. Plots consisted of five rows, on 36-inch centers, 15 feet wide by 35 feet long. Each treatment for each crop was replicated four times in a randomized block design.

Both corn and cotton yields in 2009 were disappointing (Figure 1). Across the entire test, corn grain yields averaged 2630 kg/ha (42 bushels per acre) with mean treatment yields ranging from 940 to 3640 kg/ha (15 to 58 bushels per acre). An extremely wet spring delayed planting and emergence. This was followed by a very hot and dry June and July during anthesis and grain fill (Figure 2). Cotton yields were also disappointing for some of the same reasons. A wet spring delayed planting until June when hot and dry weather hampered growth. Then a very wet fall delayed harvest and reduced yield. Cotton averaged 740 kg lint/ha (660 pounds per acre) with mean treatment yields ranging from 380 to 860 kg lint/ha (340 to 760 pounds per acre).

Among the fertilizer N sources for sidedressing corn, the dry materials, urea + ammonium sulfate blend (33-0-0), urea alone, and urea + Agrotain® all produced maximum grain yields (Figure 1). Liquid UAN (urea ammonium nitrate) at comparable total N rates produced the lowest corn grain yield. As reported in 2008, this is assumed to be because these products were not trapped by the surface residue in this no-till system as is the case with the broadcast liquid UAN solution. Also, all the N is in the ammonium form, which is less likely to leach or denitrify during heavy rainfall. The poultry broiler litter did not provide sufficient available N for optimum grain yields even when 134 kg total N per ha (120 pounds N per acre) was applied as a sidedress in the form of the litter. High measured NH_3 volatilization losses from litter may be partly responsible for this.

Treatments Used on Corn and Cotton in 2009[1]

Plot	Fertillizer source and amendments	Corn			Cotton		
		Total N	Total N at planting	N rate at topdress	Total N	Total N at planting	N rate at topdress
		kg/ha					
1	None	0	0	0	0	0	0
2	$CaCl_2$	0	0	0	0	0	0
3	Urea	134	22	112	90	22	72
4	Ammonium nitrate	134	22	112	90	22	72
5	Urea-Ammonium sulfate (33-0-0)	134	22	112	90	22	72
6	UAN solution [2] (low N)	90	22	68	45	22	23
7	UAN solution (high N)	134	22	112	90	22	68
8	UAN + $CaCl_2$ (low N)	90	22	68	45	22	23
9	UAN + $CaCl_2$ (high N)	134	22	112	90	22	68
10	UAN + Agrotain®	134	22	112	90	22	68
11	Urea + Agrotain®	134	22	112	90	22	68
12	Poultry litter ~ 60 lb N/A	90	22	68	90	22	68
13	Poultry litter ~120 lb N/A	156	22	134	156	22	134

[1] Nitrogen applied at planting was a urea/ammonium sulfate blend (34-0-0). Treatment variables were topdress only.

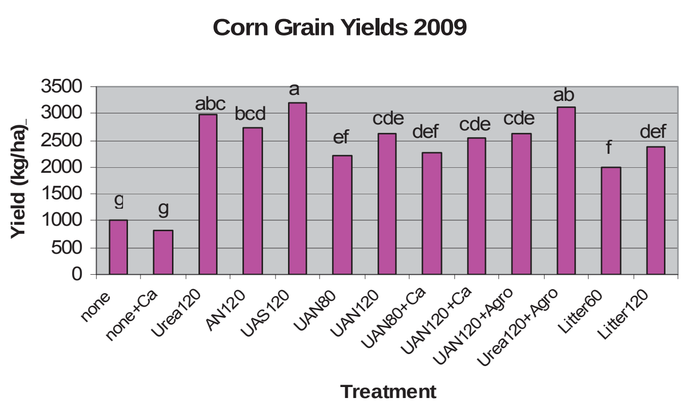
[2] 28-0-0-5S

In the cotton experiment, urea, ammonium nitrate, urea + ammonium sulfate blend (33-0-0), UAN solution + $CaCl_2$ and UAN solution + Agrotain® all produced optimum cotton yields (Figure 1). Again, the UAN solution alone as a broadcast sidedress N source produced the lowest cotton yields at a comparable N rate. The highest rate of poultry broiler litter, approximately 4.5 mg/ha (2.0 tons per acre) as a sidedress produced the highest cotton yield. This treatment provided approximately 134 kg N/ha (120 pounds per acre) of total N before volatilization losses.

In both the corn and the cotton experiment, most ammonia volatilized during the first two days after application when there were significant differences between treatments (Figure 3). After the second day in both tests, there were few significant differences between treatments. The only rainfall that occurred during the data collection period for the corn was four and five days after ammonia collection began when only 0.23 inch fell. Near the end of the two-week ammonia collection period, more than 0.95 inch fell. No rainfall occurred for the two-week period after sidedressing cotton although the soil was moist when ammonia measurement began. The extremely high N volatilization losses from the poultry broiler litter on day two after sidedressing corn is suspicious. While we acknowledge the possibility of high NH_3 losses from surface-applied broiler litter and saw this in the cotton test, the estimated quantity of loss in the corn test was much higher than we would have expected. Considering that total N in the litter applied was about 120 pounds per acre, it is unreasonable to expect that 160 pounds could volatilize. Nevertheless, considerable N may have been lost because corn grain yields where the litter was applied were among the lowest yielding treatments that received sidedress N.

Estimated net N volatilization losses from selected materials and additives indicated very low losses (less than 30 pounds N per acre) from all the N sources in the cotton test and less than 50 pounds N per acre loss from all treatments in the corn study except the high rate of poultry litter (163 pounds N per acre) and the urea (92 pounds N per acre) (Figure 4). The urease inhibitor, Agrotain®, appeared to reduce N volatilization slightly but had little effect on corn or cotton yields. Neither did the liquid $CaCl_2$ affect yields or volatilization losses.

Corn grain and cotton lint yields in 2009 suggest that most of the dry materials, urea, urea+ammonium sulfate blends, and ammonium nitrate are good materials to use when broadcast into a residue as a sidedress for corn or cotton. Liquid UAN solutions may be subject to volatilization losses when sprayed over a heavy residue. However, differences in material sources were minor and each material affected each crop differently when sidedressed. Most all the N loss occurred within two or three days after application. In 2007 (data not shown) Agrotain® , a urease inhibitor, reduced N losses from urea and UAN solutions but had little significant effect in 2008 and 2009. Liquid $CaCl_2$ had little measureable effect on N losses from liquid UAN solutions in this study. Significant N losses were measured from poultry broiler litter but the quantitative, estimated values are questionable especially in the corn test.



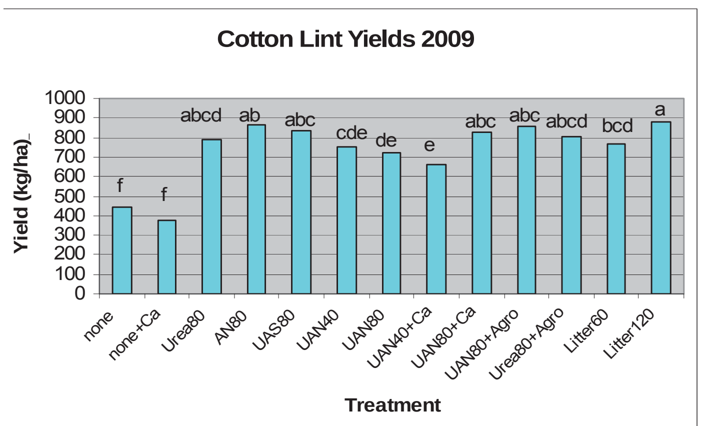


Figure 1. Corn grain and cotton lint yields from all treatments in 2009. Values following the treatment name is the rate applied in pounds per acre. Ca= liquid $CaCl_2$. Agro = Agrotain® at recommended rate.

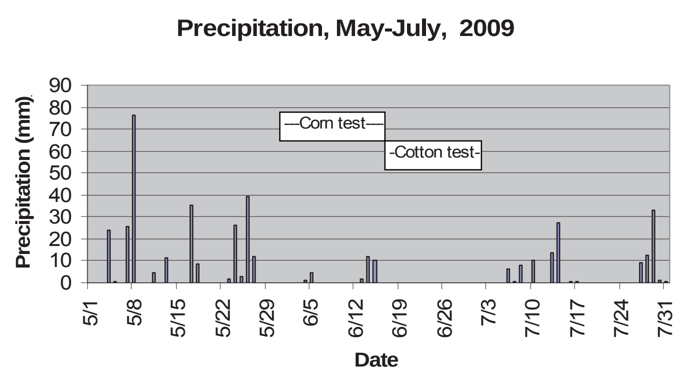


Figure 2. Precipitation during the period when crops were sidedressed and ammonia volatilization was measured in 2009.

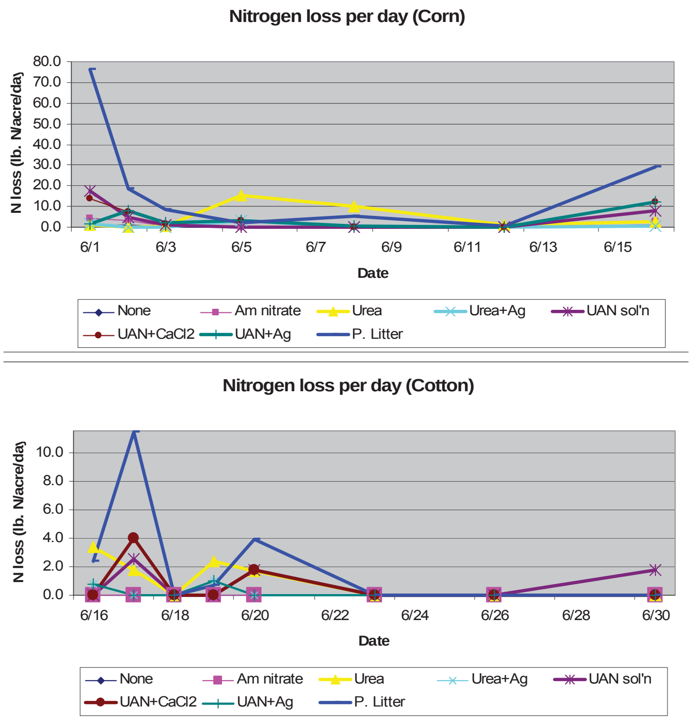


Figure 3. Estimated N loss through ammonia volatilization from selected sources. All sources of N compared were applied at the highest rate as a topdress application.

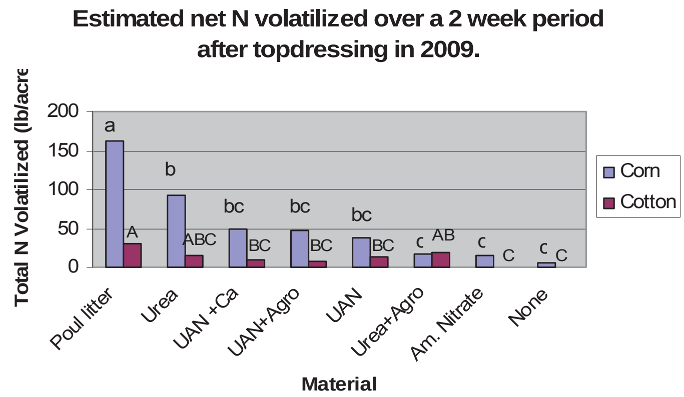


Figure 4. Estimated net N volatilized over a two-week period after topdressing. The same letters above each bar indicate no significant difference within that crop at P<0.05 using Duncan's Multiple Range test.

Fertilization of Cotton on Black Belt Soils

C. C. Mitchell, G. Huluka, R. P. Yates, D. P. Delaney, and J. Holliman

This experiment was laid out in 2004 and was designed to complement the "Rates of NPK Experiment" (circa 1929) on other outlying units of the Alabama Agricultural Experiment Station. The purpose of this experiment is to identify optimum rates of N, P_2O_5, and K_2O for cotton on Black Belt soils and to calibrate soil test P and K for these soils. The site is on an acid, Vaiden clay (very fine, smetitic, thermic, Vertic Hapludalfs) and is the only soil fertility experiment in Alabama on Black Belt soils.

Initial soil tests from the site indicated a very uniform site typical of unfertilized Black Belt area cropland (Table 1). Phosphorus was rated low using the Mississippi/Lancaster extract which is the preferred method for these soils and is used by both the Auburn University and Mississippi State University soil testing laboratories. Potassium is rated "very high". Soil samples have been taken from each plot every year of this experiment and are reported under a separate project.

The experiment consists of six N rates, four P rates, five K rates, and a no-lime treatment and an unfertilized treatment replicated four times in a randomized block design (Table 2). Plots consisted of five rows on 36-inch centers, 15 feet wide and 25 feet long. Each tier was separated by a 5-foot alley. Because of disappointing yields in 2005 when cotton was planted no-till into a rye cover crop and excessive rainfall occurred, the decision was made to switch to a ridge tillage system with no cover crop for 2006 through 2009. All the P and K and half of total N were applied within one week of planting in late April. Complement of N was applied in mid-June. Lint yields were estimated by hand-picking 20 feet from the two middle rows in each plot. Relative yields are yields compared to the mean yield of Treatment 5, the control treatment, which receives 90-100-100 pounds N-P_2O_5-K_2O per acre each year (see figure).

Excessive rainfall and anaerobic soil conditions dramatically reduced yields in 2005. Extreme drought plagued the test in 2006 through 2008. The current year, 2009, appeared to be one of the better seasons for cotton in this region until late summer and fall rains delayed harvest and reduced harvestable lint yields. Plots were not hand harvested until November 13, and the soil was

Table 1. Initial, Mean Plow-Layer Soil Test Value (N=4) from Site Taken in 2004

Extract used	Soil pH	P	K	Mg	Ca
		mg/kg and rating			
Mehlich-1	6.0	4 Very Low	88 High	35 High	2330 (not rated)
Miss/Lancaster	6.0	16 Low	180 V. High	60 High	10,000+

Table 2. Fertilizer Treatments and Cotton Lint Yields on a Vaiden Clay in West Alabama, 2005-2009

Trt. no.	Description	Rates of nutrients applied: N	P_2O_5	K_2O	Cotton lint yields: 2005	2006	2007	2008	2009
		lb/A							
	N rates								
1	No N	0	100	100	177	311	870	960	812
2	Low N	30	100	100	214	380	1040	1070	760
3	Moderate N	60	100	100	265	403	990	1220	855
5	Control	90	100	100	388	393	1076	1350	830
4	High N	120	100	100	237	400	1037	1340	858
6	No S/VH N	150	100	100	320	387	1040	1360	877
	P rates								
7	No P	90	0	100	280	378	910	1310	995
8	Very low P	90	20	100	205	394	940	1350	974
9	Low soil P	90	40	100	274	375	1091	1260	892
10	Moderate P	90	60	100	233	388	1027	1470	951
5	Control	90	100	100	388	393	1076	1340	830
	K rates								
11	No K	90	100	0	157	353	585	600	470
12	Very low K	90	100	20	170	324	784	770	444
13	Low K	90	100	40	253	295	803	1030	815
14	Moderate K	90	100	60	341	335	922	1030	747
15	High K	90	100	80	319	349	806	1150	1005
5	Control	90	100	100	388	393	1076	1340	830
	Other treatments								
16	No lime	90	100	100	196	413	1027	1350	852
17	Nothing	0	0	0	160	300	649	670	475
LSD P<0.1					***135***	***ns***	***220***	***210***	***179***

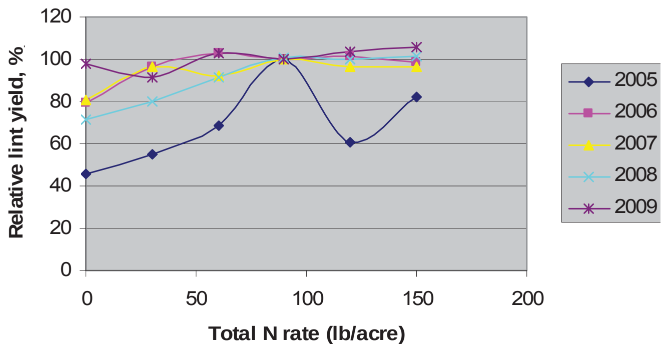
Table 3. Fiber Quality as Affected by Selected Treatment, 2008-2009

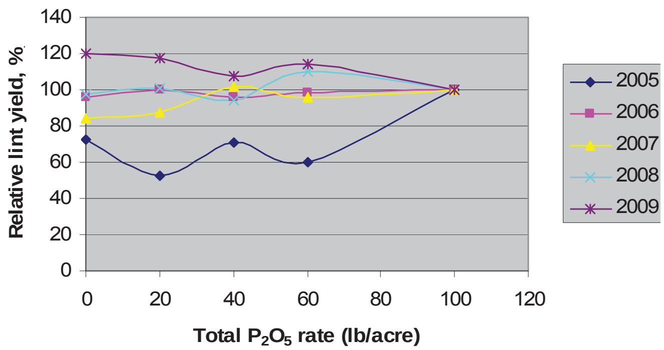
Trt. no.	Description	Lint %	Micronaire	Length	Strength	Uniformity
	2008					
1	No N	49.5 a	4.05 a	1.04	27.8 ab	81.9 ab
4	High N (120 lb N/A)	46.5 bc	4.22 a	1.07	28.8 a	83.0 a
7	No P	47.2 b	4.18 a	1.05	27.8 ab	81.0 b
11	No K	45.2 c	3.15 b	1.06	26.8 b	80.5 b
15	High K (80 lb K_2O/A)	46.0 bc	3.78 ab	1.06	28.8 a	82.0 ab
	2009					
1	No N	47 a	4.65 a	1.07 c	26.9 ab	82.0 a
4	High N (120 lb N/A)	43 c	4.05 b	1.14 a	28.5 ab	83.3 a
7	No P	45 b	4.50 a	1.10 bc	28.6 a	82.4 a
11	No K	43 c	3.47 c	1.10 bc	26.6 b	80.7 b
15	High K (80 lb K_2O/A,)	43 c	4.32 ab	1.12 ab	27.9 ab	82.7 a

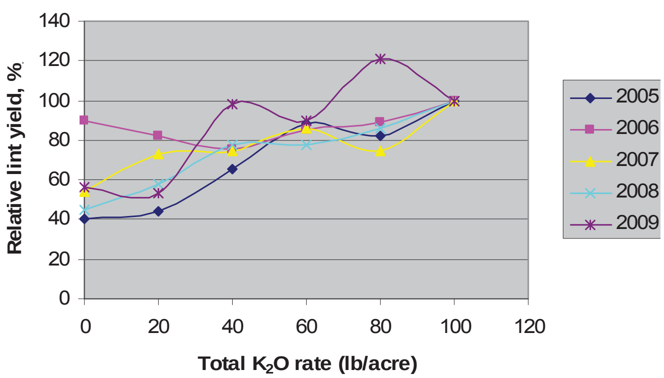
Values followed by the same letter are not significantly different at P<0.05. There were no treatment differences in length of fiber.

much too wet to consider machine harvesting. In 2008, rain in August helped to make a crop but also enhanced leaf spot diseases (*Alternaria*, *Cercospora*, and *Stemphylium*), which defoliated some plots, especially the low K treatments. This problem has become a serious limitation to cotton production on Black Belt Prairie soils in Alabama but it is also unpredictable. Leaf spot also occurred in 2009 but did not hurt yields as much as in 2008 because it occurred later in the season. If the 2006 through 2009 crops had been machine harvested, very little of the lint would have been saved because of hard locks and weak bolls.

Selected treatments are tested each year for lint quality. No treatment differences were observed in 2007 but there were significant difference in 2008 and 2009 (Table 2). The "No K" treatment had significantly lower overall fiber quality (Table 3).







Effect of rates of N, P_2O_5, and K_2O on relative cotton lint yields in five years on a Vaiden clay in West Alabama.

Because of the higher yields and significant differences in treatment on yield in 2007 through 2009, these data probably are more relevant to producers (Table 2).

N rates. Optimum total N rates over the 5 years of the experiment, appear to be around 60 pounds N per acre. Although there was a more dramatic response to N rates in 2005, yields were low because excessive rainfall resulted in severe denitrification losses on these poorly drained soils.

P_2O_5 rates. One would have anticipated more dramatic responses to rates of P than we found in these tests because of the low soil test P rating. Except for the low-yielding, wet year of 2005 and the drought year of 2007, the "no P" treatment has produced relative yields between 96 and 120 percent of the control treatment which gets 100 pounds P_2O_5 per acre per year. There really was no yield response to added P. This calls into question the current "low" rating for this soil test value for cotton.. The definition of a "low" soil test rating indicates that the soil will produce less than 75 percent of its potential without fertilization of that nutrient.

K_2O rates. In spite of the fact that this soil initially tested "very high" in K, there were significant increases in yield with higher rates of K_2O up to 100 pounds per acre each year except 2006. These results provide credibility to grower's claims that additional K seems to increase yields even though the soils are rated "high" or "very high" for K and none is recommended from the Auburn University Soil Testing Laboratory. There may be justification to change soil test K ratings for these soils and increase K recommendations for cotton. Additional studies are on-going related to this issue.

Because of extreme weather conditions at this site, we are just beginning to see consistent trends in cotton response to N, P, and K after five years of fertilization and cropping. Only three of five years (2007, 2008, and 2009) have produced reasonably good lint yields (approximately two bales per acre). Surprisingly, yield responses to increasing N rates above 60 pounds per acre have not been evident. Significant differences in 2007 through 2009 due to treatments suggest a need for modification of soil test ratings for both P and K on these soils. Phosphorus may be currently rated too low and potassium may be rated too high for cotton on these soils. Since these are the only established soil fertility variable plots on the Black Belt Research and Extension Center, we hope that they will be maintained indefinitely as is the "Rates of NPK Experiment" at six other Alabama locations to provide more conclusive evidence for changes in soil test calibration for similar soils.

Effectiveness of Different Insecticides in Controlling Aphids Infesting Cotton in North Alabama, 2009

T. Reed

A test was conducted on a farm in northeastern Franklin County, Alabama, to evaluate the efficacy of different insecticides in controlling the cotton aphid in cotton. No foliar insecticides had been applied to the test area prior to conducting this test. Insecticide treatments were applied to CT210 conventional cotton plants on July 15 but 1.5 inches of rain fell starting one hour after plots were sprayed. Treatments were reapplied on July 17. Specific treatments applied are listed in the table. The maximum labeled rate of each chemical tested was used. Plots were four rows wide and 40 feet long with four replications per treatment arranged in a randomized complete block design. The row spacing was 40 inches. There was one buffer row between each plot. Treatments were applied using a CO_2 backpack sprayer with TX 10 nozzles, 30 psi, and 16 gpa water. Walking speed was 4 feet per second. No rain occurred between the time plots were retreated and when aphids were counted three days after the second application. Efficacy was measured by counting the number of aphids per leaf on each of 10 leaves per plot. The third leaf down from the upper most leaf was collected from each plant sampled. Plants in the middle two rows of each plot were sampled. Statistical analysis was conducted using Statistix 9 and included an ANOVA and LSD test at the 90 percent level of confidence.

All insecticide treatments gave a significant reduction in aphid numbers three days postapplication ($P>F = 0.00$). Leverage and Trimax Pro gave similar levels of control even though the amount of active imidacloprid applied as Leverage was 28 percent greater than the amount applied as Trimax Pro. Trimax Pro and Centric provided similar levels of control at the rates tested. Aphid counts were lowest in the Intruder and Carbine treatments but aphid counts in the Intruder plots were not significantly different from counts in Centric plots. Fungal disease had eliminated aphids in the test plots when plants were inspected seven days postapplication.

Effectiveness of Insecticides in Controlling Aphids Infesting Cotton

Treatment	Rate *oz/A*	Aphids *no/leaf*
Untreated	—	82 a
Leverage 2.7	5.0	36 b
Trimax Pro 4.4	1.4	32 bc
Centric 40 WG	2.0	24 cd
Intruder 70WP	1.1	16 de
Carbine 50WG	2.8	11 e

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

WEED MANAGEMENT

Weed Management Systems for Palmer Amaranth Control in Alabama

M. G. Patterson, B. Dillard, C. D. Monks, and W. C. Birdsong

Glyphosate-resistant palmer amaranth (*Amaranthus palmeri*) has spread across the southeastern U.S. cotton growing areas in the past five years. Historically palmer amaranth has not been a problem in Alabama cotton fields, but glyphosate-resistant palmer amaranth was documented recently on a farm in east central Alabama (Barbour County). Approximately 2000 acres is infested on this farm. Reports of additional fields containing escaped pigweed in Roundup Ready cotton indicates this problem will spread across south Alabama fields in the next few years. A field of soybeans infested with palmer amaranth was discovered in the Tennessee Valley region of North Alabama (Madison County) in 2009 where the weed was not controlled with glyphosate applications. Further investigation of this infestation will be conducted in 2010. A large, replicated weed control demonstration was conducted in one of the cotton fields on the Barbour County farm in 2009. This was done to demonstrate to local farmers and Extension employees what herbicide systems could be used to combat glyphosate-resistant palmer amaranth in an area already infested with this biotype.

A four-acre site located on the farm was selected to demonstrate different weed management systems for palmer amaranth control in cotton. Phytogen 375 WRF seed was planted on May 14 in reduced tillage, stale seedbed culture. Row spacing was 38 inches and seed were planted at the rate of two per foot of row. Twelve herbicide systems were used to demonstrate palmer amaranth control (Table 1.). Preemergence herbicides were applied immediately after planting and good activating rainfall occurred within two days. Early postemergence treatments were applied on June 11 and layby treatments were applied on July 14. Visual crop injury and palmer pigweed control was evaluated on June 11, July 23, and July 22. Ratings were made on a scale of 0 to 100 where 0 = no injury or control and 100 = cotton death or complete control. No yields were obtained due to excessive rainfall throughout the fall and winter.

Timely activating rainfall within two days following planting and preemergence herbicide application resulted in optimum conditions for preemergence activity. Minimal crop injury was observed 28 days following application (12 percent or less) and control of palmer amaranth ranged from 68 to 77 percent (Prowl H_2O alone) to 90 to 93 percent (Prowl + Reflex). Some early postemergence treatments resulted in significant crop injury, with Ignite 280 + Dual Magnum injuring cotton 15 to 23 percent at 12 days after treatment. Palmer amaranth control for all systems 12 days following early postemergence applications ranged from 85 to 95 percent with systems one to three having the lowest control (85 to 88 percent) and the remaining systems (4 to 12) providing 93 to 95 percent control. Crop injury was less than 11 percent for all layby treatments eight days following application. Palmer amaranth control ranged from 90 to 95 percent for all twelve herbicide systems at this time, with most plots having only three to four weeds per plot (four rows by 400 feet). These plants were hand weeded from the entire demonstration following the evaluation of layby treatments.

Table 1. Twelve Cotton Herbicide Systems for Controlling Glyphosate-Resistant Pigweed, 2009

Sys. no.	Preemergence	Early Post	Layby
1	Prowl H_20 (2 pt/A)	Ignite 280 (29 fl oz/A)	Valor 51DR (2 oz) + MSMA (2 pt/A)
2	Prowl H_20 (2 pt/A)	Rdup PMax (32 fl oz/A) + Dual Mag (1 pt/A)	Ignite 280 (29 fl oz/A)
3	Prowl H_20 (2 pt/A)	Rdup PMax (32 fl oz/A) + Staple LX (2 fl oz/A)	Rdup PMax (32 fl oz/A) + Envoke (0.1 oz/A)
4	Prowl H_20 (2 pt/A) + Staple LX (2 fl oz/A)	Ignite 280 (29 fl oz/A)	Valor 51DR (2 oz) + MSMA (2 pt/A)
5	Prowl H_20 (2 pt/A) + Staple LX (2 fl oz/A)	Ignite 280 (29 fl oz/A) + Dual Mag (1 pt/A)	Ignite 280 (29 fl oz/A)
6	Prowl H_20 (2 pt/A) + Staple LX (2 fl oz/A)	Rdup PMax (32 fl oz/A) + Dual Mag (1 pt/A)	Rdup PMax (32 fl oz/A) + Envoke (0.1 oz/A)
7	Cotoran 4F (3 pt/A) + Solicam DF (1.5 lb/A)	Ignite 280 (29 fl oz/A)	Valor 51DR (2 oz) + MSMA (2 pt/A)
8	Cotoran 4F (3 pt/A) + Solicam DF (1.5 lb/A)	Ignite 280 (29 fl oz/A) + Dual Mag (1 pt/A)	Ignite 280 (29 fl oz/A)
9	Cotoran 4F (3 pt/A) + Solicam DF (1.5 lb/A)	Rdup PMax (32 fl oz/A) + Staple LX (2 fl oz/A)	Rdup PMax (32 fl oz/A) + Envoke (0.1 oz/A)
10	Prowl H_20 (2 pt/A) + Reflex (1 pt/A)	Ignite 280 (29 fl oz/A)	Valor 51DR (2 oz) + MSMA (2 pt/A)
11	Prowl H_20 (2 pt/A) + Reflex (1 pt/A)	Ignite 280 (29 fl oz/A) + Dual Mag (1 pt/A)	Ignite 280 (29 fl oz/A)
12	Prowl H_20 (2 pt/A) + Reflex (1 pt/A)	Rdup PMax (32 fl oz/A) + Staple LX (2 fl oz/A)	Rdup PMax (32 fl oz/A) + Envoke (0.1 oz/A)

Table 2. Crop Injury and Palmer Amaranth Control after Treatments

	—Preemergence[1]—		—Early postemergence[2]—		——After layby[3]——	
Sys. no.	Crop injury	Palmer control	Crop injury	Palmer control	Crop injury	Palmer control
	————%————		————%————		————%————	
1	0	68	8	87	5	93
2	0	73	3	77	10	93
3	0	77	5	85	5	93
4	3	88	13	93	10	95
5	3	82	15	93	2	93
6	3	83	5	93	0	93
7	7	90	12	93	8	93
8	12	92	23	95	5	93
9	3	82	5	93	2	90
10	3	91	3	95	5	93
11	0	90	19	95	5	93
12	2	93	5	93	0	95
LSD ($P \leq 0.05$)	7	11	8	9	8	4

[1] Measured 28 days after preemergence treatments.
[2] Measured 12 days after early postemergence treatments.
[3] Measured 8 days after layby treatments.

DISEASE MANAGEMENT

Evaluation of OD-0704 SC Fungicide for Control of Early Season Cotton Diseases in North Alabama, 2009

S. R. Moore and K. S. Lawrence

Selected experimental seed treatments were evaluated to determine their efficacy against early season cotton diseases in north Alabama. The soil was a Decatur silt loam (23 percent, sand, 49 percent silt, 28 percent clay) that had a history of seedling diseases. Soil temperature was 68 degrees F at a 4-inch depth on the day of planting with adequate soil moisture. All fungicide treatments were applied to the seed by the manufacturer. For the high incidence disease trial, plots were infested with millet seed inoculated with *Rhizoctonia solani* and *Pythium ultimum*, while for the low incidence disease trial, plots were left naturally infested. Temik 15G (7.0 pounds per acre) was applied at planting on April 23 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S (0.12 pound per acre) was applied to all plots as needed for thrips control. For each of the low and high disease pressure trials, plots consisted of four rows, each 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Adjacent blocks were separated by 15-foot alleys. Standard herbicides, insecticides, and fertility production practices, as recommended by the Alabama Cooperative Extension System, were used throughout the season. Stand counts were recorded 7, 21, and 35 days after planting (DAP) to determine stand density and percent seedling loss resulting from cotton seedling diseases. Plots were harvested on October 21. Data were statistically analyzed by analysis of variance using the generalized linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seedling disease pressure was high for early planted cotton in 2009. Seedling emergence reached only 1.4 seedlings per foot of row in the high disease pressure trial and 1.8 seedlings per foot of row in the low disease pressure trial. Under low disease pressure, all treatments produced seedling stands comparable to the untreated control at 7 days after planting (DAP); however, Treatment 2 (OD-0704 SC 2.61 ml/kg seed) produced significantly higher seedling stands compared to Treatments 1 (OD-0704 SC 5.22 ml/kg seed) and 3 (OD-0704 SC 1.31 ml/kg seed). At 21 DAP, all treatments produced significantly higher seedling stands compared to Treatment 5 (OD-0704 SC 0.33 ml/kg seed). Seedling stands at 35 DAP were significantly higher for Treatment 1 compared to Treatments 5, 6 (Apron XL LS), and the untreated control. Treatment 3 (OD-0704 SC 1.31 ml/kg seed) produced significantly higher seedling stands at 35 DAP compared to the untreated control. Seed cotton yields were significantly higher for Treatment 1 compared to Treatments 4 (OD-0704 SC 0.65 ml/kg seed), 5, and the untreated control. Treatment 2 produced significantly increased seed cotton yields compared to Treatment 5 and the untreated control. Under high disease pressure Treatments 4 and 6 produced significantly higher cotton seedling stands compared to Treatment 1 at 7 DAP. At 21 DAP, Treatment 2 produced significantly higher cotton seedling stands compared to Treatments 4 and 5. Seedling stands at 35 DAP were significantly higher for Treatment 2 compared to Treatments 1, 4, 5 and 7. Treatment 3 produced significantly higher seedling stands compared to Treatments 4 and 5, while Treatment 6 seedling stands were significantly higher than Treatment 4. Seed cotton yields averaged 2438.5 pounds per acre with no significant differences between treatments.

Yield and Stand Count of Cotton in North Alabama Trial, 2009

	Treatment	Rate/ seed	Rate unit	Stand/10-ft row 7 DAP[1]	Stand/10-ft row 21 DAP	Stand/10-ft row 35 DAP	Yield *lb/A*
	Low Disease Pressure						
1	OD-0704 SC	5.22	mg/kg seed	8.8 b	22.0 a	22.2 a	2844 a
2	OD-0704 SC	2.61	mg/kg seed	13.0 a	22.2 a	20.4 abc	2762 ab
3	OD-0704 SC	1.31	mg/kg seed	9.0 b	19.2 a	21.2 ab	2690 abc
4	OD-0704 SC	0.65	mg/kg seed	9.2 ab	20.4 a	19.0 abc	2423 bcd
5	OD-0704 SC	0.33	mg/kg seed	10.0 ab	17.8 b	16.6 bc	2195 d
6	Apron XL LS	0.40	mg/kg seed	9.6 ab	20.8 a	16.2 bc	2511 abcd
7	Untreated			9.8 ab	21.4 a	15.0 c	2387 cd
	LSD (P ≤ 0.10)			***3.9***	***4.7***	***5.5***	***359***
	High Disease Pressure						
1	OD-0704 SC	5.22	mg/kg seed	5.8 b	17.6 ab	13.0 bcd	2498 a
2	OD-0704 SC	2.61	mg/kg seed	8.2 ab	21.2 a	18.2 a	2545 a
3	OD-0704 SC	1.31	mg/kg seed	7.6 ab	20.4 ab	16.8 ab	2424 a
4	OD-0704 SC	0.65	mg/kg seed	10.8 a	15.4 b	11.6 d	2474 a
5	OD-0704 SC	0.33	mg/kg seed	8.8 ab	15.2 b	12.2 cd	2409 a
6	Apron XL LS	0.40	mg/kg seed	10.2 a	19.8 ab	16.0 abc	2245 a
7	Untreated			11.0 a	16.6 ab	13.0 bcd	2475 a
	LSD (P ≤ 0.10)			***3.9***	***5.7***	***4.0***	***357***

[1] Days after planting.

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

Evaluation of Experimental Seed Treatments on Early Season Cotton Diseases in North Alabama, 2009

S. R. Moore and K. S. Lawrence

Selected experimental seed treatments were evaluated to determine their efficacy against early season cotton diseases in north Alabama. The soil was a Decatur silt loam (23 percent sand, 49 percent silt, 28 percent clay) that had a history of seedling diseases. Soil temperature was 68 degrees F at a 4-inch depth on the day of planting with adequate soil moisture. All fungicide treatments were applied to the seed by the manufacturer. For the high incidence disease trial, plots were infested with millet seed inoculated with *Rhizoctonia solani* and *Pythium ultimum*, while for the low incidence disease trial, plots were left naturally infested. Temik 15G (7.0 pounds per acre) was applied at planting on April 23 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S (0.12 pound per acre) was applied to all plots as needed for thrips control. For each of the low and high disease pressure trials, plots consisted of four rows, each 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Adjacent blocks were separated by 15-foot alleys. Standard herbicides, insecticides, and fertility production practices, as recommended by the Alabama Cooperative Extension System, were used throughout the season. Stand counts were recorded 21 and 35 days after planting (DAP) to determine stand density and percent seedling loss resulting from cotton seedling diseases. Plots were harvested on November 2. Data were statistically analyzed by analysis of variance using the generalized linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seedling disease pressure was high for early planted cotton in 2009. At 21 DAP, 83 percent and 90 percent of all seed planted did not emerge in the low and high disease incidence trials, respectively. Under low disease pressure, Treatment 8 (Treatment 4 + ARY527-1 + A15423) produced significantly higher seedling stands compared to Treatments 7 (Treatment 5 + Dynasty CST), 9 (Treatment 4 + A15701 + Awaken), and the Cruiser 5 FS-treated control at 21 DAP, with all other treatments producing seedling stands comparable to the Cruiser 5 FS-treated control. Cotton seedling stands at 35 DAP were comparable to the Cruiser 5 FS-treated control. All treatments with the exception of Treatment 9 produced numerically higher seed cotton yields compared to the Cruiser 5 FS-treated control by an average of 533.5 pounds seed cotton per acre with Treatment 3 (Treatment 1 + Apron XL 3 LS + Maxim 4 FS + Systhane 20 EW + A14911) producing seed cotton yields significantly higher than the Cruiser 5 FS-treated control. Under high disease pressure, Treatments 3, 6 (Treatment 4 + Dynasty CST), 7, and 8 produced significantly higher seedling stands at 21 DAP compared to the Cruiser 5 FS-treated control. Treatments 6 and 8 produced significantly higher seedling stands at 21 DAP compared to Treatments 2 (Treatment 1 + Apron XL 3 LS + Maxim 4 FS + Systhane 20 EW + Dynasty CST), 5 (Treatment 1 + Apron XL 3 LS + Maxim 4 FS + Systhane 20 EW + STP17170), and 9, while Treatment 3 produced significantly higher seedling stands compared to Treatment 5. As a result of the unusually severe incidence of seedling disease in 2009, all plants in the high disease pressure trial were dead at 35 DAP and, thus, resulted in no yields.

YIELD AND STAND COUNT OF COTTON IN NORTH ALABAMA TRIAL, 2009

Trt. no.	Treatment	Rate/ seed	Rate unit	Low Disease Pressure: Stand/10-ft row 21 DAP[1]	Low Disease Pressure: Stand/10-ft row 35 DAP	Low Disease Pressure: Yield *lb/A*	High Disease Pressure: Stand/10-ft row 21 DAP[1]	High Disease Pressure: Stand/10-ft row 35 DAP	High Disease Pressure: Yield *lb/A*
1	Cruiser 5 FS	0.34	mg/seed	8.6 b	10.0 a	2477 b	4.4 d	0 a	0 a
2	Cruiser 5 FS +	0.34	mg/seed	17.4 ab	17.4 a	3016 ab	8.6 bcd	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	Dynasty CST 1.04 FS	0.03	mg/seed						
3	Cruiser 5 FS +	0.34	mg/seed	18.8 ab	12.4 a	3336 a	12.8 ab	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	A14911	0.45	mg/seed						
4	Cruiser 5 FS +	0.34	mg/seed	15.8 ab	15.8 a	2952 ab	9.8 abcd	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	STP15199	10.0	mg/seed						
5	Cruiser 5 FS +	0.34	mg/seed	16.4 ab	15.0 a	3018 ab	6.0 cd	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	STP17170	10.0	mg/seed						
6	Cruiser 5 FS +	0.34	mg/seed	17.2 ab	14.4 a	3027 ab	14.6 a	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	STP15199 +	10.0	mg/seed						
	Dynasty CST 1.04 FS	0.03	mg/seed						
7	Cruiser 5 FS +	0.34	mg/seed	13.2 b	15.0 a	2929 ab	10.6 abc	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	STP17170 +	10.0	mg/seed						
	Dynasty CST 1.04 FS	0.03	mg/seed						
8	Cruiser 5 FS +	0.34	mg/seed	32 a	13.6 a	2796 ab	15.2 a	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	STP15199 +	10.0	mg/seed						
	ARY527-1 +	6.5	ml/kg						
	A15423	0.024	mg/seed						
9	Cruiser 5 FS +	0.34	mg/seed	13.2 b	13.4 a	2316 b	9.0 bcd	0 a	0 a
	Apron XL 3 LS +	0.15	g/seed						
	Maxim 4 FS +	0.025	g/seed						
	Systhane 20 EW +	0.21	g/seed						
	STP15199 +	10.0	mg/seed						
	A15701 +	0.026	mg/seed						
	Awaken	3.25	ml/kg						
LSD ($P \leq 0.10$)				***17.4***	***9.1***	***755***	***5.5***	***0***	***0***

[1] Days after planting.

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

Efficacy of Bayer Crop Science Seed Treatment Combinations on Early Season Cotton Diseases in North Alabama, 2009

S. R. Moore and K. S. Lawrence

Selected experimental seed treatments were evaluated to determine their efficacy against early season cotton diseases in north Alabama. The soil was a Decatur silt loam (23 percent sand, 49 percent silt, 28 percent clay) that had a history of seedling diseases. Soil temperature was 68 degrees F at a 4-inch depth on the day of planting with adequate soil moisture. All fungicide treatments were applied to the seed by the manufacturer. For the high incidence disease trial, plots were infested with millet seed inoculated with *Rhizoctonia solani* and *Pythium ultimum*, while for the low incidence disease trial, plots were left naturally infested. Temik 15G (7.0 pounds per acre) was applied at planting on April 23 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S (0.12 pound per acre) was applied to all plots as needed for thrips control. For each of the low and high disease pressure trials, plots consisted of four rows, each 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Adjacent blocks were separated by 15-foot alleys. Standard herbicides, insecticides, and fertility production practices, as recommended by the Alabama Cooperative Extension System, were used throughout the season. Stand counts were recorded 21 and 35 days after planting (DAP) to determine stand density and percent seedling loss resulting from cotton seedling diseases. Plots were harvested on October 22. Data were statistically analyzed by analysis of variance using the generalized linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seedling disease pressure was high for early planted cotton in 2009. At 21 DAP 79 percent and 84 percent of all seed planted did not emerge in the low and high disease pressure trials, respectively. Under low disease pressure, all treatments produced stands comparable to the untreated control at both 21 and 35 DAP. All treatments produced numerically higher yields compared to the untreated control by an average of 249.8 pounds seed cotton per acre; however, only Treatment 3 (Treatment 2 + Trilex Advanced FL) was significantly higher than the untreated control. Under high disease pressure, all treatments produced higher seedling stands at 21 DAP compared to the untreated control with Treatment 4 (Baytan 30 + Allegiance FL + Vortex FL + Trilex FL) being significantly higher than the untreated control. As a result of the unusually severe incidence of seedling disease in 2009, all plants in the high disease pressure trial were dead at 35 DAP and, thus, resulted in no yields.

Yield and Stand Count of Cotton in North Alabama Trial, 2009

Trt. no.	Treatment	Rate/ seed	Rate unit	Low Disease Pressure: Stand/10-ft row 21 DAP[1]	Low: Stand/10-ft row 35 DAP	Low: Yield *lb/A*	High Disease Pressure: Stand/10-ft row 21 DAP	High: Stand/10-ft row 35 DAP	High: Yield *lb/A*
1	Untreated			22.2 a	21.2 a	2405 b	13.2 b	0 a	0 a
2	Baytan 30 +	0.104	g/kg seed	19.0 a	21.6 a	2436 ab	17.4 ab	0 a	0 a
	Allegiance FL +	0.155	g/kg seed						
	Vortex FL	0.025	g/kg seed						
3	Baytan 30 +	0.104	g/kg seed	23.2 a	19.6 a	2825 a	15.4 ab	0 a	0 a
	Allegiance FL +	0.155	g/kg seed						
	Vortex FL +	0.025	g/kg seed						
	Trilex Advanced FS300	0.313	g/kg seed						
4	Baytan 30 +	0.155	g/kg seed	20.4 a	21.8 a	2752 ab	20.2 a	0 a	0 a
	Allegiance FL +	0.31	g/kg seed						
	Vortex FL +	0.05	g/kg seed						
	Trilex FL	0.025	g/kg seed						
5	Apron XL LS +	0.067	g/kg seed	22.8 a	19.8 a	2711 ab	19.2 ab	0 a	0 a
	Maxim XL +	0.035	g/kg seed						
	Systhane 400 WP +	0.338	g/kg seed						
	Dynasty CST	0.25	g/kg seed						
6	Baytan 30 +	0.155	g/kg seed	18.8 a	17.0 a	2551 ab	15.0 ab	0 a	0 a
	Allegiance FL +	0.31	g/kg seed						
	Vortex FL +	0.025	g/kg seed						
	SP1020	0.05	g/kg seed						
LSD ($P \leq 0.10$)				***6.8***	***6.4***	***395***	***6.7***	***0***	***0***

[1] Days after planting.

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

EVALUATION OF SYNGENTA EXPERIMENTAL FUNGICIDE SEED TREATMENTS ON EARLY SEASON COTTON DISEASES IN NORTH ALABAMA, 2009

S. R. Moore and K. S. Lawrence

Selected experimental seed treatments were evaluated to determine their efficacy against early season cotton diseases in north Alabama. The soil was a Decatur silt loam (23 percent sand, 49 percent silt, 28 percent clay) that had a history of seedling diseases. Soil temperature was 68 degrees F at a 4-inch depth on the day of planting with adequate soil moisture. All fungicide treatments were applied to the seed by the manufacturer. For the high incidence disease trial, plots were infested with millet seed inoculated with *Rhizoctonia solani* and *Pythium ultimum,* while for the low incidence disease trial, plots were left naturally infested. Temik 15G (7 pounds per acre) was applied at planting on April 23 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S (0.12 pound per acre) was applied to all plots as needed for thrips control. For each of the low and high disease pressure trials, plots consisted of four rows, each 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Adjacent blocks were separated by 15-foot alleys. Standard herbicides, insecticides, and fertility production practices, as recommended by the Alabama Cooperative Extension System, were used throughout the season. Stand counts were recorded 21 and 35 days after planting (DAP) to determine stand density and percent seedling loss resulting from cotton seedling diseases. Plots were harvested on November 2. Data were statistically analyzed by analysis of variance using the generalized linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seedling disease pressure was high for early planted cotton in 2009. At 21 days after planting (DAP), 92 percent of all seed planted in the high disease pressure trial did not emerge compared to 77 percent in the low disease pressure trial. Under low disease pressure, all treatments produced seedling stands comparable to the Cruiser 5 FS-treated control at 21 DAP. Seedling stands at 35 DAP were significantly higher in Treatment 3 (Treatment 1 + Dynasty 100 FS) compared to Treatments 2 (Treatment 1 + Apron XL 3 LS + Maxim 4 FS + Systhane 40 WP), 5 (Treatment 1 + STP17170), 8 (Treatment 1 + A16148), and the Cruiser 5 FS-treated control. Treatment 10 (Treatment 1 + Dynasty CST 125 FS) produced significantly higher seedling stands at 35 DAP compared to Treatments 5, 8, and the Cruiser 5 FS-treated control. Treatments 2 and 9 (Treatment 2 + A16148) produced seed cotton yields significantly higher than Treatments 4 (Treatment 1 + STP15199), 5, 8, and the Cruiser 5 FS-treated control. Treatment 10 produced significantly higher seed cotton yields compared to Treatments 5 and 8. Under high disease pressure, Treatment 10 produced significantly higher seedling stands at 21 DAP compared to all other treatments with the exception of Treatment 3. As a result of the unusually severe incidence of seedling disease in 2009, all plants in the high disease pressure trial were dead at 35 DAP and, thus, resulted in no yields.

YIELD AND STAND COUNT OF COTTON IN NORTH ALABAMA TRIAL, 2009

Trt. no.	Treatment	Rate/ seed	Rate unit	—Stand/10-ft row— 21 DAP[1]	35 DAP	Yield *lb/A*	—Stand/10-ft row— 21 DAP[1]	35 DAP	Yield *lb/A*
				——Low Disease Pressure——			**——High Disease Pressure——**		
1	Cruiser 5 FS	0.34	mg/seed	22.4 a	4.6 c	2704 bc	4.6 b	0 a	0 a
2	Cruiser 5 FS +	0.34	mg/seed	23.4 a	6.4 bc	3015 a	6.4 b	0 a	0 a
	Apron XL 3 LS +	0.15	g/kg seed						
	Maxim 4 FS +	0.025	g/kg seed						
	Systhane 40 WP	0.31	g/kg seed						
3	Cruiser 5 FS +	0.34	mg/seed	24.0 a	10.4 a	2828 abc	10.4 ab	0 a	0 a
	Dynasty 100 FS	0.15	g/kg seed						
4	Cruiser 5 FS +	0.34	mg/seed	23.0 a	6.8 abc	2716 bc	6.8 b	0 a	0 a
	STP15199	0.01	g/kg seed						
5	Cruiser 5 FS +	0.34	mg/seed	23.6 a	4.8 c	2619 c	4.8 b	0 a	0 a
	STP17170	0.01	g/kg seed						
6	Cruiser 5 FS +	0.34	mg/seed	20.0 a	7.8 abc	2708 bc	7.8 b	0 a	0 a
	A16148	0.15	g/kg seed						
7	Cruiser 5 FS +	0.34	mg/seed	22.0 a	6.8 abc	2703 bc	6.8 b	0 a	0 a
	A16148	0.02	g/kg seed						
8	Cruiser 5 FS +	0.34	mg/seed	22.8 a	5.6 c	2630 c	5.6 b	0 a	0 a
	A16148	0.25	g/kg seed						
9	Cruiser 5 FS +	0.34	mg/seed	22.8 a	7.8 abc	3109 a	7.8 b	0 a	0 a
	Apron XL 3 LS +	0.15	g/kg seed						
	Maxim 4 FS +	0.025	g/kg seed						
	Systhane 40 WP +	0.31	g/kg seed						
	A16148	0.15	g/kg seed						
10	Cruiser 5 FS +	0.34	mg/seed	21.8 a	10.2 ab	3109 ab	16.2 a	0 a	0 a
	Dynasty CST 125 FS	0.034	mg/seed						
LSD ($P \leq 0.10$)				***6.6***	***3.9***	***289***	***7.0***	***0***	***0***

[1] Days after planting.

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

Evaluation of Valent Seed Treatments for Control of Early Season Cotton Diseases in North Alabama, 2009

S. R. Moore and K. S. Lawrence

Selected experimental seed treatments were evaluated to determine their efficacy against early season cotton diseases in north Alabama. The soil was a Decatur silt loam (23 percent sand, 49 percent silt, 28 percent clay) that had a history of seedling diseases. Soil temperature was 68 degrees F at a 4-inch depth on the day of planting with adequate soil moisture. All fungicide treatments were applied to the seed by the manufacturer. For the high incidence disease trial, plots were infested with millet seed inoculated with *Rhizoctonia solani* and *Pythium ultimum*, while for the low incidence disease trial, plots were left naturally infested. Temik 15G (7.0 pounds per acre) was applied at planting on April 23 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S (0.12 pound per acre) was applied to all plots as needed for thrips control. For each of the low and high disease pressure trials, plots consisted of four rows, each 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Adjacent blocks were separated by 15-foot alleys. Standard herbicides, insecticides, and fertility production practices, as recommended by the Alabama Cooperative Extension System, were used throughout the season. Stand counts were recorded 7, 21, and 35 days after planting (DAP) to determine stand density and percent seedling loss resulting from cotton seedling diseases. Plant vigor was measured as a visual health rating on a 5 point scale at 35 DAP. Plots were harvested on October 21. Data were statistically analyzed by analysis of variance using the generalized linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seedling disease pressure was high for early planted cotton in 2009. Seedling emergence reached only 5 percent of the seed population under high disease pressure and only 18 percent in the low disease pressure trial. Under low disease pressure all treatments produced comparable seedling stands at 7 DAP with the exception of Treatments 5 (V-10284 40.0 g/100 kg seed), 6 (V-10280 10.0 g/100 kg seed), and 7 (V-10280 12.0 g/100 kg seed), which were significantly lower compared to the untreated control. Treatment 8 (V-10280 11.0 g/100 kg seed) produced significantly higher seedling stands at 7 DAP compared to Treatments 5 and 6. Treatments 2 (Allegiance) and 9 (V-10280 14.0 g/100 kg seed) both produced significantly higher seedling stands compared to Treatment 6 at 7 DAP. At 21 DAP Treatment 10 (V-10280 39.0 g/100 kg seed) produced significantly higher seedling stands compared to Treatment 9; however, all other treatments were comparable to both. Treatment 10 produced significantly higher seedling stands at 35 DAP compared to Treatments 3 (V-10208 10.0 g/100 kg seed), 5, and 9 while all other treatments did not differ from either. Plants were more vigorous at 35 DAP in Treatment 10 compared to Treatments 3, 9, and the untreated control. Treatments 6 produced more vigorous plants compared to Treatment 3 and the untreated control. Treatments 4 (V-10208 15.0 g/100 kg seed), 5, 7, and 8 all produced significantly more vigorous plants compared to the untreated control. Seed cotton yields averaged 2684.7 pounds per acre with no significant difference between treatments. Under high disease pressure all treatments produced similar seedling stands at 7 DAP. Seedling stands at 21 DAP were significantly higher in Treatments 4, 6, 7, and 8 compared to Treatments 2 and 10. Treatments 1 and 3 produced significantly higher seedling stands at 21 DAP compared to treatment 10. At 35 DAP, Treatment 6 produced significantly higher seedling stands compared to Treatments 2, 8, 9, and 10. Treatments 5, 8, and 10 produced significantly more vigorous plants compared to the untreated control, while all other treatments were comparable to Treatments 5, 8, 10, and the untreated control. Seed cotton yields were significantly higher for Treatment 7 compared to Treatment 10 while all other treatments were comparable to both.

YIELD, SEEDLING VIGOR, AND STAND COUNT OF COTTON IN NORTH ALABAMA TRIAL, 2009

Trt. no.	Treatment	Rate/ seed	Rate unit	Stand/10-ft row 7 DAP[1]	Stand/10-ft row 21 DAP	Stand/10-ft row 35 DAP	Vigor[2] 35 DAP	Yield *lb/A*
	Low Disease Pressure							
1	Untreated			16.2 a	18.0 abc	16.8 ab	2.2 d	2719 a
2	Allegiance	15.0	g/100 kg seed	15.6 abc	18.0 abc	18.2 ab	2.8 abcd	2534 a
3	V-10208	10.0	g/100 kg seed	14.0 abcd	16.4 bc	12.8 b	2.4 cd	2615 a
4	V-10208	15.0	g/100 kg seed	14.0 abcd	17.4 abc	16.0 ab	3.2 abc	2579 a
5	V-10284	40.0	g/100 kg seed	12.4 cd	16.0 bc	13.2 b	3.2 abc	2875 a
6	V-10280	10.0	g/100 kg seed	11.8 d	20.4 ab	17.4 ab	3.4 ab	2781 a
7	V-10280	12.0	g/100 kg seed	12.8 bcd	19.0 abc	16.4 ab	3.2 abc	2608 a
8	V-10280	11.0	g/100 kg seed	16.0 ab	18.8 abc	16.8 ab	3.2 abc	2776 a
9	V-10280	14.0	g/100 kg seed	15.2 abc	15.6 c	15.2 b	2.6 bcd	2646 a
10	V-10280	39.0	g/100 kg seed	14.6 abcd	21.8 a	21.6 a	3.6 a	2714 a
LSD ($P \leq 0.10$)				***3.3***	***4.7***	***6.3***	***1.0***	***353***
	High Disease Pressure							
1	Untreated			5.0 a	5.2 ab	6.2 ab	2.0 b	2420 ab
2	Allegiance	15.0	g/100 kg seed	6.0 a	3.4 bc	3.6 bc	2.8 ab	2097 ab
3	V-10208	10.0	g/100 kg seed	4.4 a	6.0 ab	4.4 abc	2.8 ab	2221 ab
4	V-10208	15.0	g/100 kg seed	4.6 a	6.8 a	5.2 abc	2.8 ab	2146 ab
5	V-10284	40.0	g/100 kg seed	7.2 a	5.6 ab	5.2 abc	3.4 a	2343 ab
6	V-10280	10.0	g/100 kg seed	6.2 a	7.0 a	7.0 a	2.6 ab	2380 ab
7	V-10280	12.0	g/100 kg seed	7.2 a	6.2 a	5.4 abc	2.8 ab	2586 a
8	V-10280	11.0	g/100 kg seed	5.8 a	6.6 a	4.2 bc	3.2 a	2032 ab
9	V-10280	14.0	g/100 kg seed	4.6 a	4.4 abc	4.0 bc	2.6 ab	2141 ab
10	V-10280	39.0	g/100 kg seed	5.0 a	2.4 c	3.2 c	3.2 a	1931 b
LSD ($P \leq 0.10$)				***3.6***	***2.7***	***2.8***	***0.9***	***556***

[1] Days after planting.

[2] Vigor ratings based on a 0-5 scale.

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

Cotton Fungicide Sprays for Boll Rot Management in South Alabama, 2009

K. S. Lawrence, S. R. Moore, G. W. Lawrence, and J. R. Jones

Fungicide treatments were examined to determine their effect on cotton boll rot and hard lock. The test was located near Fairhope, Alabama, at the Gulf Coast Research and Extension Center, which has a history of cotton boll rot problems. Plots consisted of four rows, 25 feet long with 36-inch row spacing; they were planted in a randomized complete block design with five replications on May 15. 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. Fungicides were applied with a CO_2-charged backpack system calibrated to deliver 20 gpa at 30 psi through a two-row boom with #80014 flat fan nozzles. Applications were made at first bloom near July 4 and 14 days later. Boll rot ratings were conducted at cotton maturity on 5 feet of row and recorded. Entire plots were harvested mechanically after rating on November 11. Data were statistically analyzed by GLM and means, compared using Fisher's protected least significant difference test.

Monthly average maximum temperatures from April to November were 75.5, 82.7, 90.7, 90.0, 88.2, 87.0, and 72.8 degrees F with average minimum temperatures were 56.5, 70.3, 76.1, 73.9, 72.1, 71.6, 61.6 and 51.8 degrees F. Total rainfall amounts from April to November were 1.99, 0, 3.38, 5.93, 5.18, 6.32, 7.23, and 2.5 inches. The total rainfall for the growing season was 32.5 inches. Cotton boll rot was severe in 2009 with the extensive rainfall late in the season. No phytotoxicity was observed for any fungicide treatment. Hard lock ratings were not different for any fungicide treatment with the percent diseased bolls averaging 31 percent of the cotton bolls on the plant. The number of healthy bolls was not increased by the application of any fungicide. The disease index indicated similar cotton boll losses in 2009. Statistically, cotton yields were similar among all the treatments and the untreated control. The seed cotton yields averaged 2797 pounds per acre over all the fungicide treatments.

Cotton Fungicide Sprays Boll Rot Management in Southern Alabama, 2009

Trt. no.	Treatment	Rate	Timing	Hard lock % Nov. 1	Healthy bolls % Nov. 1	Disease index[1] Nov. 1	Seed cotton yield lb/A Nov. 11
1	Control			37.4 a*	73.8 a	32.8 a	2811 a
2	Quadris	6 fl oz/A	First bloom	31.0 a	79.2 a	28.1 a	2776 a
3	Quadris	6 fl oz/A	First bloom + 14 days	24.2 a	73.6 a	24.4 a	2858 a
4	Gromax	3 oz/A	First bloom	29.8 a	79.6 a	26.6 a	2904 a
5	ACT	6 oz/A	First bloom	38.4 a	77.2 a	33.3 a	2765 a
6	Regalia Max	8 oz/A	First bloom	38.2 a	73.8 a	33.8 a	2672 a
LSD ($P \leq 0.10$)				***14.7***	***16.5***	***12.5***	***269***

[1] Disease index is the number of diseased bolls divided by the total number of bolls multiplied by 100.
Means followed by same letter do not significantly differ according to Fischer's least significant difference test ($P \leq 0.10$). N = 4. Turnout = 38%.

Cotton Seed Treatments for Root-Knot Fusarium Wilt 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 36-inch row spacing, and were planted in a randomized complete block design with five replications on April 29. 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 subsample 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 with average minimum temperatures of 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. No phytotoxicity was observed for any seed treatment. Stand counts taken at 30 DAP on June 9 indicated the experimental A9625 supported a similar stand to the standard seed treatment fungicides in Treatment 3 (Allegiance LS + Baytan 30 +Thiram 42-S + Cruiser). The addition of Dynasty CST did not change the stand significantly. Vigor ratings were similar between all seed treatments. The uniformity of the stand, as indicated by the skip index, showed that the standard seed treatment fungicides in Treatment 3 (Allegiance LS + Baytan 30 +Thiram 42-S + Cruiser) had a similar uniformity of stand as compared to the experimental fungicide (A9625) in Treatment 5. Initial populations of the root-knot nematode were low compared to previous years in this field for all the treatments with no differences between any seed treatment. A hot, dry three weeks in June appears to have limited the nematode population development as nematode numbers did not increase as expected by the harvest sample. Statistically, cotton yields were similar among all the treatments and the untreated control. The seed cotton yields did vary by 334 pounds per acre at harvest with an average of 1468 pounds per acre produced over all treatments.

Cotton Seed Treatments for Root-Knot Fusarium Wilt Management in Central Alabama, 2009

Trt. no.	Treatment	Rate/ seed	Rate unit	Stand/ 10-ft row June 9	Vigor index[1] June 9	Skip index[2] June 9	*M. incognita* J2/150 cm^3 soil June 19	Oct. 9	Seed cotton yield *lb/A* Oct. 19
1	Cruiser 5 FS	0.34	mg/seed	27.9 b	3.8 a	3.5 a	46.4 a	185.4 a	1340 a
2	Apron XL 3 LS	15	g/100 kgseed	28.0 b	3.4 a	2.0 bc	30.9 a	154.5 a	1301 a
	Maxim 4 FS	2.5	g/100 kgseed						
	Systhane 40 WP	21	g/100 kgseed						
	Cruiser 5 FS	0.34	mg/seed						
3	Allegiance LS	15	g/100 kgseed	38.4 a	4.1 a	0.4 c	77.3 a	154.5 a	1535 a
	Baytan 30	10	mg/seed						
	Thiram 42-S	31	g/100 kgseed						
	Cruiser 5 FS	0.34	mg/seed						
4	Treatment 2 +			32.2 ab	3.4 a	1.8 bc	61.8 a	278.1 a	1303 a
	A9625	1	g/100 kgseed						
5	Treatment 3 +			35.8 ab	3.9 a	1.5 bc	30.9 a	154.5 a	1537 a
	A9625	1	g/100 kgseed						
6	Treatment 4 +			34.0 ab	4.5 a	0.5 c	61.8 a	170.0 a	1378 a
	Dynasty CST 125 FS	0.03	mg/seed						
7	Treatment 5 +	1	g/100 kgseed	35.4 ab	3.9 a	1.4 bc	61.8 a	170.0 a	1580 a
	Dynasty CST 125 FS	0.03	mg/seed						
8	Treatment 3 +			32.0 ab	4.1 a	1.6 bc	46.4 a	231.8 a	1638 a
	Treatment 4 +								
	Trilex flowable	10	g/100 kgseed						
9	Treatment 3 +			27.4 b	3.9 a	3.0 ab	46.4 a	108.2 a	1469 a
	Treatment 4								
LSD ($P \leq 0.10$)				***5.4***	***0.6***	***1.2***	***60.2***	***128.7***	***400***

[1] Vigor ratings based on a 0-5 scale.

[2] Skip index is the uniformity of the cotton plant population across the row. Empty spaces of 30 cm are given the value of 1 and each empty space increasing the value up to 25.

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

EVALUATION OF SEED TREATMENTS AND SEED QUALITY IN COTTON SEEDLING DISEASE MANAGEMENT IN ALABAMA, 2009

K.S. Lawrence and G. W. Lawrence

Experimental seed treatments placed on high and low quality cotton seed were evaluated for the management of cotton seedling disease in a naturally infested field on the Tennessee Valley Research and Education Center in Belle Mina, Alabama. The field has a history of cotton seedling disease incidence and is colonized by *Rhizoctonia solani*, *Pythium* spp., *Thielaviopsis basicola*, and *Fusarium* spp. The soil is a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The seed treatments were applied to the seed by Bayer Crop Science. Temik 15G (5 pounds per acre) was applied at planting on April 23 in the seed furrow with chemical granular applicators attached to the planter. Plots consisted of two rows, 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Blocks were separated by a 20-foot wide alley. 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 irrigated with a sprinkler system as needed. Seedling stand was determined at two and four weeks after planting on May 14 and 28. Plots were harvested on October 21. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures from planting in April through harvest in October were 70.1 76.8, 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F with average minimum temperatures of 48.8, 61.2, 66.7, 66.4, 66.9, 64.6, and 50.2 degrees F. Rainfall amounts for each month were 4.9, 9.5, 1.1, 5.5, 4.2, 4.6, and 6.5 inches with a total of 36.4 inches over the entire season.

Seedling disease pressure was high in 2009 due to excessive moisture before and immediately after planting. Plant stand was similar between fungicides and seed quality at 21 days after planting (DAP) on May 14. However, by 35 DAP on May 28 the untreated seed in both low and high seed qualities had fewer plants surviving as compared to all the fungicide treatments. The fungicide treatments increased stand as compared to the untreated control by 29 percent in the high quality seeds. The increase in stand was greater in the low quality seed treatments with an increase of 31 percent. However, seed quality did not affect yield. Seed cotton yields varied by 397 pounds per acre at harvest with an average of 2991 pounds per acre of seed cotton produced over all the fungicide treatments. The fungicide seed treatment combinations did not significantly increase yield over the controls in 2009. Cotton plants spread over the unoccupied space and each plant produced more cotton.

EVALUATION OF SEED TREATMENTS AND SEED QUALITY IN COTTON SEEDLING DISEASE MANAGEMENT IN ALABAMA, 2009

Trt. no.	Treatment	Rate/ *oz/cwt*	—Stand/10-ft row— May 14	May 28	Seed cotton yield *lb/A*
1	High vigor	Untreated	20.2 a	16.0 bc	2748 b
2	High vigor Baytan + Vortex + Allegiance	0.5 0.08 0.75	22.8 a	23.0 a	2864 ab
3	High vigor Treatment 2 + Trilex Advanced	 1.64	24.2 a	22.6 a	3030 ab
4	High vigor Treatment 2 + Dynasty CST	 3.94	23.8 a	21.6 a	2908 ab
5	Low vigor	Untreated	17.6 a	12.6 c	2809 ab
6	Low vigor Baytan + Vortex + Allegiance	0.5 0.08 0.75	19.6 a	19.4 ab	3041 ab
7	Low vigor Treatment 2 + Trilex Advanced	 1.64	19.8 a	17.4 ab	3127 a
8	Low vigor Treatment 2 + Dynasty CST	 3.94	20.8 a	19.0 ab	2975 ab
LSD ($P \leq 0.10$)			***4.8***	***3.6***	***378***

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

National Cotton Disease Council Fungicide Seed Treatments for Cotton Seedling Disease Management in Alabama, 2009

K. S. Lawrence, G. W. Lawrence, C. H. Burmester, and B. E. Norris

Experimental seed treatments were evaluated for the management of cotton seedling disease in a naturally infested field on the Tennessee Valley Research and Education Center in Belle Mina, Alabama. The field has a history of cotton seedling disease incidence and is colonized by *Rhizoctonia solani*, *Pythium* spp., *Thielaviopsis basicola*, and *Fusarium* spp. The soil type is a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The seed treatments were applied to the seed by Bayer Crop Science. Temik 15G (5 pounds per acre) was applied at planting on April 23 in the seed furrow with chemical granular applicators attached to the planter. Plots consisted of two rows, 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Blocks were separated by a 20-foot wide alley. 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 irrigated with a sprinkler system as needed. Seedling stand was determined at 28 days after planting (DAP) on May 21. Plots were harvested on October 21. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures from planting in April through harvest in October were 70.1 76.8, 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F with average minimum temperatures of 48.8, 61.2, 66.7, 66.4, 66.9, 64.6, and 50.2 degrees F. Rainfall accumulation for each month was 4.9, 9.5, 1.1, 5.5, 4.2, 4.6, and 6.5 inches with a total of 36.4 inches over the entire season.

Seedling disease pressure was high in 2009 due to excessive moisture. Plant stand was significantly greater in Treatment 8 (WECO 100 +Nu-Flow M HF + Apron XL + Nusan 30 EC + WECO 1090) as compared to Treatments 9 (Vitavax-PCNB + Allegiance) and 12 (Allegiance). Plant stand in all the seed treatment combinations was not different from the untreated control at 28 DAP. Plant stands were low with a 62 to 50 percent seedlings surviving producing 1.5 to 2.3 plants per foot of row. Seed cotton yields varied by 707 pounds per acre at harvest with an average of 3104 pounds per acre of seed cotton produced over all the fungicide treatments. Treatment 7 (WECO 100 + Nu-Flow M HF + Apron XL + Nusan 30 EC) did increase yield over the untreated control under these high disease pressure conditions.

Evaluation of Experimental Seed Treatments in Cotton Seedling Disease Management in Alabama, 2009

Trt. no.	Treatment	Rate/ *fl oz/cwt*	Stand/ 10-ft row May 21	Seed cotton yield *lb/A*
1	Baytan 30 + Allegiance FL + Vortex FL + SP1020	0.75 + 1.5 + 0.08 + 0.32	20.4 ab	3095 a-d
2	Baytan 30 + Allegiance FL + Vortex FL	0.5 + 0.75 + 0.08	16.8 ab	2788 d
3	RTU Baytan Thiram + Allegiance FL + Dynasty Extreme	3.0 + 0.75 + 3.0	20.8 ab	3198 a-d
4	RTU Baytan Thiram + Allegiance FL + Bion	3.0 + 0.75 + 0.03	19.0 ab	3014 bcd
5	RTU Baytan Thiram + Allegiance FL + Dynasty Extreme + Bion	3.0 + 0.75 + 3.0 + 0.03	21.6 ab	3093 a-d
6	WECO 100 + Nu-Flow M HF + Apron XL + Nusan 30 EC	4.0 + 4.0 + 0.32 + 2.0	20.0 ab	3371 ab
7	WECO 100 + Nu-Flow M HF + Apron XL + Nusan 30 EC	4.0 + 1.75 + 0.32 + 2.0	19.8 ab	3495 a
8	WECO 100 + Nu-Flow M HF + Apron XL + Nusan 30 EC + WECO 1090	4.0 + 4.0 + 0.32 + 2.0 + 0.2	22.8 a	3285 abc
9	Vitavax-PCNB + Allegiance	6.0 + 0.75	15.2 b	2953 bcd
10	RTU Baytan Thiram + Allegiance FL	3.0 + 0.75	19.0 ab	3001 bcd
11	RTU-PCNB	14.5	17.4 ab	2906 cd
12	Allegiance FL	1.5	15.0 b	3057 a-d
13	Argent	4.5	16.8 ab	3107 a-d
14	Untreated		18.6 ab	2959 bcd
LSD ($P \leq 0.10$)			***7.0***	***448***

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

NEMATODE MANAGEMENT

Biological Seed Treatments for Reniform Nematode Management in Cotton Crops in Alabama

J. D. Castillo, K. S. Lawrence, S. R. Moore, and J. R. Akridge

Eight cotton seed treatments with nematicides and a biological product were evaluated for the control of reniform nematode in cotton crops in south Alabama. The trial was located in a producer's field near Huxford, Alabama, in a Ruston very fine sandy loam soil (59 percent sand, 33 percent siltm 8 percent clay). Two-row plots were arranged in a randomized complete block design, with eight treatments and six replications. The planting date was May 20, and stand and skip counts and vigor evaluations were made 27 days after planting (DAP) on June 16. Vigor evaluations were based on a 1 to 5 visual scale, where 1 represented a poor growing plant and 5 represented highest vigor. Stand counts were recorded as the number of plants per 10 feet of row, and skip indexes indicated the uniformity of the cotton stand. Nematode population was monitored 0, 27, 57, and 155 DAP. Root zone soil from the cotton plants was sampled with a probe, and nematodes were extracted by the modified sucrose centrifugation-flotation method. Plots were harvested 155 DAP on October 29. Throughout the season plots were maintained with standard herbicide, insecticide, and fertility production practices as recommended for Alabama. Data recorded were analyzed by analyses of variance using the general linear models (GLM) procedure, and means compared using Fisher's protected least significant difference (LSD) test.

Seasonal rainfall and temperature was generally good for the cropping period. Monthly average maximum temperatures from May to October were 84.7, 94.2, 92.8, 90.3, 87.9, and 79.3 degrees F, with average minimum temperature of 66, 71, 71, 70, 70.1, and 59.5 degrees F. Total rainfall amounts were 6.8, 3, 5.3, 6.4, 4.3, and 5.1 inches. The total rainfall for the growing season was 24.2 inches. Average population across the field was 1044 *R. reniformis* per 150 cm^3 of soil at planting. Plant stand was improved in Treatments 3 (Aeris + GB126) and 6 (Gaucho Grande + GB126) when compared with Treatments 2 (Aeris), 4 (Aeris + GB126), and 7 (Cruiser + Avicta). No statistical differences were observed in the skip counts. Plants from Treatment 8 (Gaucho Grande + test compound) were more vigorous than plants from Treatments 2 (Aeris + GB126) and 5 (Aeris + GB126). Reduction of nematode population at 27 DAP was observed on Treatment 8 (Gaucho Grande + test compound) when compared to Treatments 2 (Aeris), 3 (Aeris + GB126), and 5 (Aeris + GB126). No differences in number of nematodes were observed 57 DAP. Treatment 2 (Aeris) had the lowest reniform population at 155 DAP. The highest yield was obtained with Treatment 8 (Gaucho Grande + test compound), which produced 276 pounds per acre more than Treatments 6 and 7. This represents an increase of $55.20 per acre based on a cotton price of $ 0.50 per pound.

Seed Treatments for Reniform Nematode Management in Cotton Crops in Alabama

Trt. no.	Treatment[1]	Rate of application[2]	Stand	Skip	Vigor	—*Rotylenchulus reniformis*/150 cm³—				Yield
			———28 DAP[3]———			0 DAP May 20	27 DAP June 16	57 DAP July 21	155 DAP Oct. 29	155 DAP *lb/A*
1	Gaucho Grande	0.375 mg a.i./seed	37.6 bcd	0.3 a	4.5 ab	836 b	193 abc	2536 a	1133 ab	2354 ab
2	Aeris Seed App. Syst.	0.75 mg a.i./seed	35.2 cd	0.1 a	3.9 c	1145 ab	244 a	2124 a	953 b	2320 ab
3	Aeris Seed App. Syst. GB 126 240FS[4]	0.75 mg a.i./seed 5 mui/seed	44.1 a	0.3 a	4.3 abc	875 b	206 ab	2201 a	1468 ab	2411 ab
4	Aeris Seed App. Syst. GB 126 240FS	0.75 mg a.i./seed 1 mui/seed	35.5 cd	0.8 a	4.5 ab	811 b	128 bc	1648 a	1429 ab	2501 ab
5	Aeris Seed App. Syst. GB 126 240FS	0.75 mg a.i./seed 10 mui/seed	38.6 bcd	0.5 a	4 bc	1519 a	206 ab	1686 a	1635 a	2487 ab
6	Gaucho Grande GB 126 240FS	0.375 mg a.i./seed 10 mui/seed	40.8 ab	0.3 a	4.5 ab	1261 ab	167 abc	2008 a	1055 ab	2302 b
7	Cruiser 600FS Avicta 500FS	0.34 mg/seed 0.15 mg a.i./seed	33.6 d	0.8 a	4.5 ab	965 ab	115 bc	2266 a	1146 ab	2295 b
8	Gaucho Grande Test Compound 1	0.375 mg a.i./seed 18.8 gr/100 kg	40.1 abc	0.3 a	4.6 a	939 ab	103 c	1622 a	1635 a	2571 a
LSD (P=0.10)			***5.2***	***0.7***	***0.5***	***594***	***100***	***1109***	***600***	***276***

[1] All seed were treated with calcium carbonate, Baytan 30, Vortex FL, and Allegiance F at 500 gr/100 kg, 32.5 mL/100 kg, 2.5 gr a.i./100 kg, and 15.6 gr a.i./100 kg, respectively.
[2] mui = millions of colony-forming units
[3] Days after planting.
[4] CP 126 240FS is a new name for VOTIVO.
Means within columns followed by different letters are significantly different according to Fisher's LSD (P ≤ 0.10).

Evaluation of Syngenta Seed Treatments for Reniform Nematodes in Cotton in North Alabama, 2009

K. S. Lawrence, S. R. Moore, G. W. Lawrence, C. H. Burmester, and B. E. Norris

Experimental seed treatments were evaluated for the management of reniform nematodes in an infested field on the Tennessee Valley Research and Education Center in Belle Mina, Alabama. The field was infested with reniform nematodes in 2007 and the soil type is a Decatur silty loam (24 percent sand, 49 percent silt, 28 percent clay). The seed treatments were applied to the seed by Syngenta. Temik 15G (5 pounds per acre) was applied at planting on April 29 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S at 4 fluid ounces per acre was applied to all plots as needed for thrips control. Plots consisted of two rows, 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Blocks were separated by a 20-foot wide 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 monthly intervals. Ten soil cores, 1 inch in diameter and 6 inches deep, were collected from the two rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 22. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures from planting in April through harvest in October were 70.1 76.8, 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F with average minimum temperatures of 48.8, 61.2, 66.7, 66.4, 66.9, 64.6, and 50.2 degrees F. Rainfall accumulation for each month was 4.9, 9.5, 1.1, 5.5, 4.2, 4.6, and 6.5 inches with a total of 36.4 inches over the entire season.

Reniform nematode pressure was moderate in 2009. No phytoxicity was observed in any of the experimental treatments, Reniform nematode numbers at planting averaged 589 vermiform life stages per 150 cm^3 of soil. Reniform numbers increased to threshold levels by 30 days after planting (DAP) on May 27 in all but the Temik 15G and and Cruiser 5FS treatments, but there were no differences ($P \leq 0.10$) between the treatments. However, by 60 DAP on June 22, lower populations of reniform were observed in Treatments 6 (Syn546001 + Cruiser 5 FS) and 4 (Syn546000) as compared to Treatment 5 (the low rate of Syn546001). In July at 90 DAP, populations continued to be suppressed in Treatment 4 (Syn546001 at 0.3 mg a.i.). By harvest Treatment 4 supported the lowest population. The total reniform numbers across the season ranged from a high of 9424 to a low of 6086 vermiform per 150 cm^3 for Treatments 6 (Syn546001 + Cruiser 5 FS) and 4 (Syn546000), respectively. Seed cotton yields varied by 524 pounds per acre at harvest with an average of 2295 pounds per acre of seed cotton produced over all nematicide treatments. Treatments 6 (Syn546001 + Cruiser 5 FS), Treatment 7 (Syn546001 + Temik 15G), and Treatment 2 (A16115) increased yield as compared to Treatments 3 (Syn546000 at 0.15 mg a.i./100 kg seed) and 4 (Syn546000 at 0.30 mg a.i./100 kg seed).

Evaluation of Syngenta Seed Treatments for Reniform Nematodes in Cotton in North Alabama, 2009

Trt. no.	Treatment[1]	Rate	*Rotylenchulus reniformis*/150 cm³ May 27	June 22	July 28	Oct. 22	Yield *lb/A*
1	Cruiser 5 FS	0.342 mg a.i./seed	787.9 a	448.1 bc	2719.2 ab	3600.2 a	2346 ab
2	A16115	0.5mg a.i./100 kg	1390.5 a	942.5 ab	2997.3 ab	3383.8 a	2466 a
3	SYN546000	0.15 mg a.i./100 kg	1081.5 a	679.8 abc	2564.7 ab	3028.4	1983 b
4	SYN546000	0.3 mg a.i./100 kg	1637.7 a	355.4 c	1931.3 b	2163.2 a	1754 b
5	SYN546001	0.15 mg a.i./100 kg	1297.8 a	1066.1 a	2317.5 a	2611.4 a	2414 a
6	SYN546001	0.15 mg a.i./100 kg					
	Cruiser 5 FS	0.342 mg a.i./seed	1344.2 a	293.6 c	3847.1 a	3939.8 a	2478 a
7	SYN546001	0.15 mg a.i./100 kg					
	Temik 15 G	5 lb/A	695.3 a	803.4 abc	1807.7 a	2904.8 a	2429 a
LSD (P ≤ 0.10)			***1106.4***	***557.0***	***2421.0***	***1746.0***	***491***

[1] All seed treatments also contain the fungicides Apron XL (3LS 15 g a.i./100 kg seed) + Maxim 4FS (2.5 g a.i./100 kg seed) + Systhane 40 WP (21 g a.i./100kg seed) + Dynasty CST 125 FS (0.3 mg a.i./seed).
Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.10$).

Evaluation of Syngenta Seed Treatments for Reniform Nematodes in Cotton in South Alabama, 2009

K. S. Lawrence, S. R. Moore, G. W. Lawrence, and J. R. Akridge

Experimental seed treatments were evaluated for the management of reniform nematodes in a naturally infested producer's field near Huxford, Alabama. The field has a history of reniform nematode infestation, and the soil type is a Ruston very fine sandy loam (59 percent sand, 33 percent silt, 8 percent clay). The seed treatments were applied to the seed by Syngenta. Temik 15G (5 pounds per acre) was applied at planting on May 6 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S at 4 fluid ounces per acre was applied to all plots as needed for thrips control. Plots consisted of two rows, 25 feet long with 36-inch row spacing, and were arranged in a randomized complete block design with six replications. Blocks were separated by a 20-foot wide 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 on May 20, June 16, July 21, and October 29. Ten soil cores, 1 inch in diameter and 6 inches deep, were collected from the two rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 3. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures from June to October were 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F with average minimum temperatures of 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.

Reniform nematode pressure was moderate in 2009. No phytoxicity was observed in any of the experimental treatments, Reniform nematode numbers at planting averaged 344 vermiform life stages per 150 cm^3 of soil. Reniform numbers were lower ($P \leq 0.10$) in Treatments 2 (A16115), 3, 4 (SYN546000), and 5 (SYN546001) as compared to Treatment 7 (Temik 15 G + SYN546001). The sample taken on June 16 was during a three-week hot, dry spell and nematode numbers were low in all treatments. However, by mid-season, on July 19, lower populations of reniform were observed in Treatments 3 (SYN546000) and 6 (SYN 546001 + Cruiser 5 FS) as compared to Treatment 2 (A16115). By harvest, the renform numbers were similar between all treatments. Seed cotton yields varied by 289 pounds per acre at harvest with an average of 2541 pounds per acre of seed cotton produced over all nematicide treatments. Treatments 3 (Syn546000 at 0.15 mg a.i./100 kg seed) and 4 (Syn546000 at 0.30 mg a.i./100 kg seed) produced the highest yields as compared to the control. Yields were also greater in Treatment 7 (SYN546000 + Temik 15 G) as compared to the control.

Evaluation of Syngenta Seed Treatments for Reniform Management in Cotton in South Alabama, 2009

Trt. no.	Treatment[1]	Rate	*Rotylenchulus reniformis*/150 cm³ May 20	June 16	July 19	Oct. 29	Yield *lb/A*
1	Cruiser 5 FS	0.342 mg ai/seed	1107.3 ab	167.4	785.4 b	525.3	2337 b
2	A16115	0.5 mg ai/100 kg	630.9 b	180.3	1763.9 a	571.8	2536 ab
3	SYN546000	0.15 mg ai/100 kg	515.0 b	193.1	553.6 b	746.8	2588 a
4	SYN546000	0.3 mg ai/100 kg	695.3 b	296.1	965.6 ab	965.7	2626 a
5	SYN546001	0.15 mg ai/100 kg	630.9 b	347.6	1030.0 ab	579.5	2394 b
6	SYN546001	0.15 mg ai/100 kg	1017.1 ab	128.8	437.8 b	556.2	2507 ab
	Cruiser 5 FS	0.342 mg ai/seed					
7	SYN546001	0.15 mg ai/100 kg	1506.4 a	206.0	978.5 ab	402.0	2592 a
	Temik 15 G	5 lb/A					
LSD (P ≤ 0.10)			***478.0***	***131.4***	***815.7***	***536.3***	***206***

[1] All seed treatments also contain the fungicides Apron XL (3LS 15 g a.i./100 kg seed) + Maxim 4FS (2.5 g a.i./100 kg seed) + Systhane 40 WP (21 g a.i./100 kg seed) + Dynasty CST 125 FS (0.3 m g a.i./seed).
Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.10$).

EVALUATION OF EXPERIMENTAL SEED TREATMENT NEMATICIDES FOR RENIFORM MANAGEMENT IN COTTON IN NORTH ALABAMA, 2009

K. S. Lawrence, S. R. Moore, G. W. Lawrence, C. H. Burmester, and B. E. Norris

Experimental seed treatment nematicides were evaluated for the management of reniform nematodes in an infested field on the Tennessee Valley Research and Education Center in Belle Mina, Alabama. The soil type is a Decatur silty loam (24 percent sand, 49 percent silt, 28 percent clay) and was infested with the reniform nematode in 2007. The seed treatments were applied to the seed by Syngenta. Temik 15G (5 pounds per acre) was applied at planting on April 29 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S at 4 fluid ounces per acre was applied to all plots as needed for thrips control. Plots consisted of two rows, 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with five replications. Blocks were separated by a 20-foot wide 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 monthly intervals. Ten soil cores, 1 inch in diameter and 6 inches deep, were collected from the two rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 22. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures from planting in April through harvest in October were 70.1 76.8, 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F with average minimum temperatures of 48.8, 61.2, 66.7, 66.4, 66.9, 64.6, and 50.2 degrees F. Rainfall accumulation for each month was 4.9, 9.5, 1.1, 5.5, 4.2, 4.6, and 6.5 inches with a total of 36.4 inches over the entire season.

Reniform nematode pressure was moderate in 2009. No phytoxicity was observed in any of the experimental treatments, Reniform nematode numbers at planting averaged 589 vermiform life stages per 150 cm^3 of soil. Reniform numbers increased above threshold levels by 30 days after planting (DAP) on May 27 in all treatments. Treatment 6 (A16115 + A17230) supported the highest nematode numbers and was the only experimental higher than the ($P \leq 0.10$) control. However by 60 DAP on June 22, lower populations of reniform were observed in Treatments 1 (control), 8, and 9 (Temik 15G treatments), which were lower than Treatment 4 (A16115) alone. Further sampling at mid-season in July at 90 DAP found nematode numbers were lower in Treatment 8 (Temik 15) as compared to Treatment 9 (Temik 15 G + A16115). By harvest, nematode number varied, but Treatment 8 (Temik 15 G) continued to support fewer reniform. Seed cotton yields varied by 1012.5 pounds per acre at harvest with an average of 2389.6 pounds per acre of seed cotton produced over all nematicide treatments. Treatment 4 did not increase yields when the experimental A16115 was applied alone but when added in combination with A9890 in Treatment 5, with A17230 in Treatment 6, or with Temik 15G in Treatment 9, yield was increased ($P \leq 0.10$) over Treatment 1 (control) by 825 pounds per acre. Treatments 7 (STP 15273 + STP17217) and 3 (Cruiser 5FS + Avicta 500FS) also improved yield ($P \leq 0.10$) over Treatment 1 (control).

EVALUATION OF EXPERIMENTAL SEED TREATMENT NEMATICIDES FOR RENIFORM MANAGEMENT IN COTTON IN NORTH ALABAMA, 2009

Trt. no.	Treatment[1]	Rate	—*Rotylenchulus reniformis*/150 cm³— May 27	June 22	July 28	Oct. 22	Yield *lb/A*
1	Untreated control		1854 bc	1391 b	2627 ab	3307 ab	1909 d
2	Cruiser 5 FS	0.34mg a.i./100 kg	1127 c	1700 ab	2534 ab	1838 c	2004 cd
3	Cruiser 5 FS	0.34 mg a.i./100 kg	1962 abc	1685 ab	3971 ab	2642 bc	2452 abc
	AVICTA 500 FS	0.15 mg a.i./seed					
4	A16115	0.5 mg a.i./seed	4001 ab	3059 a	5176 ab	3863 a	1738 d
5	A16115	0.5 mg a.i./seed	2132 abc	2441 ab	4110 ab	3044 ab	2751 a
	A9890	20 mg a.i./seed					
6	A16115	0.5 mg a.i./seed	4218 a	1669 ab	3708 ab	2781 bc	2717 a
	A17230	0.15 mg a.i./seed					
7	Trilex F	10 g a.i./100 kg	1668 c	1761 ab	3183 ab	1947 c	2583 ab
	Baytan 30	5 g a.i./100 kg					
	Allegiance LS	15 g a.i./100 kg					
	STP15273	0.375 mg a.i./seed					
	STP17217	0.375 mg a.i./seed					
8	Temik 15 G	7.8 kg/ha	1406 c	1143 b	2163 b	1777 c	2195 bcd
9	A16115	0.5 mg a.i./seed	2441 abc	1761 ab	5438 a	3353 ab	2678 ab
	Temik 15 G	5 lb/A					
LSD (P ≤ 0.10)			***2309.8***	***1398.4***	***3064.0***	***1055.7***	***498***

[1] All seed treatments (except Treatment 7) also contain the fungicides Apron XL (3LS 15 g a.i./100 kg seed) + Maxim 4FS (2.5 g a.i./100 kg seed) + Systhane 40 WP (21 g a.i./100 kg seed) + Dynasty CST 125 FS (0.3 mg a.i./seed) .

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

Evaluation of Experimental Seed Treatment Nematicides for Reniform Management in Cotton in South Alabama, 2009

K. S. Lawrence, S. R. Moore, G. W. Lawrence, and J. R. Akridge

Experimental seed treatment nematacides were evaluated for the management of reniform nematodes in a naturally infested producer's field near Huxford, Alabama. The field has a history of reniform nematode infestation, and the soil type is a Ruston very fine sandy loam (59 percent sand, 33 percent silt, 8 percent clay). The seed treatments were applied to the seed by Syngenta. Temik 15G (5 pounds per acre) was applied at planting on May 6 in the seed furrow with chemical granular applicators attached to the planter. Orthene 90S at 4 fluid ounces per acre was applied to all plots as needed for thrips control. Plots consisted of two rows, 25 feet long with 36-inch row spacing, and were arranged in a randomized complete block design with six replications. Blocks were separated by a 20-foot wide 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 on May 20, June 16, July 21, and October 29. Ten soil cores, 1 inch in diameter and 6 inches deep, were collected from the two rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 3. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures from June to October were 90.1, 86.7, 87.1, 81.2, and 70.1 degrees F with average minimum temperatures of 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.

Reniform nematode pressure was moderate in 2009. No phytoxicity was observed in any of the experimental treatments, Reniform nematode numbers at planting averaged 433 vermiform life stages per 150 cm^3 of soil. Reniform numbers increased at 30 days after planting (DAP) on May 20 in all treatments. All the experimental treatments reduced reniform numbers as compared to Treatments 1 (untreated control) and 8 (Temik 15 G). All nematode numbers dropped on June 16 probably due to the intense drought. Nematode numbers increased again in the sample taken on July 19 with Treatments 5 (A16115 + A9890), 6 (A16115 + A17230), and Treatment 7 (STP 15273 + STP 17217) supporting the fewest nematode numbers ($P \leq 0.10$) as compared to Treatments 1 (untreated control) and 8 (Temik 15 G). Final populations at harvest were similar between all treatments. Seed cotton yields varied by 115 pounds per acre at harvest with an average of 2578 pounds per acre of seed cotton produced over all nematicide treatments.

Evaluation of Experimental Seed Treatment Nematicides for Reniform Management in Cotton in South Alabama, 2009

Trt. no.	Treatment[1]	Rate	—*Rotylenchulus reniformis*/150 cm^3— May 20	June 16	July 19	Oct. 29	Yield *lb/A*
1	Untreated control		1532.1 a	360.5	1493.5 a	1159.0	2558
2	Cruiser 5 FS	0.34 mg a.i./100 kg	849.8 b	309.0	1570.8 a	1274.8	2573
3	Cruiser 5 FS AVICTA 500 FS	0.34 mg a.i./100 kg 0.15 mg a.i./seed	643.8 b	463.5	1210.3 a	1351.8	2625
4	A16115	0.5 mg a.i./seed	875.5 b	270.4	1055.8 a	1107.3	2512
5	A16115 A9890	0.5 mg a.i./seed 20 mg a.i./seed	939.8 b	360.5	824.0 b	1249.0	2516
6	A16115 A17230	0.5 mg a.i./seed 0.15 mg a.i./seed	630.8 b	429.0	592.3 b	1352.2	2617
7	Trilex F Baytan 30 Allegiance LS STP15273 STP17217	10 g a.i./100 kg 5 g a.i./100 kg 15 g a.i./100 kg 0.375 mg a.i./seed 0.375 mg a.i./seed	965.6 b	334.8	708.1 b	1313.5	2580
8	Temik 15 G	7.8 kg/ha	1094.3 ab	360.5	1326.1 a	759.5	2576
9	A16115 Temik 15 G	0.5 mg a.i./seed 5 lb/A	811.1 b	334.8	1583.6 a	1081.7	2627
	LSD ($P \leq 0.10$)		***515.3***	***244.8***	***612.5***	***650.8***	***239***

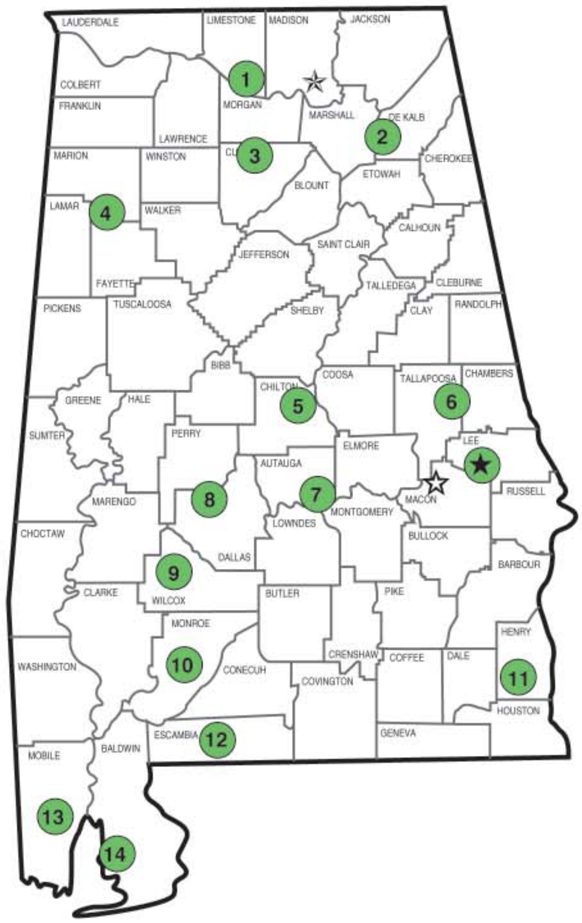
[1] All seed treatments (except Treatment 7) also contain the fungicides Apron XL (3LS 15 g a.i./100 kg seed) + Maxim 4FS (2.5 g a.i./100 kg seed) + Systhane 40 WP (21 g a.i./100 kg seed) + Dynasty CST 125 FS (0.3 mg a.i./seed).

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

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.