2011 AU Crops

Cotton Research Report

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William Batchelor, Director
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VARIETY TRIALS

Breeding Cotton for Yield and Quality in Alabama, 2011

D. B. Weaver

A cotton breeding project was initiated at Auburn University in 2001. Most of our work is centered on four primary objectives: (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 effects of broadening the genetic base of upland cotton.

In 2011, we evaluated experimental lines for yield and fiber properties at E.V. Smith Research Center, Plant Breeding Unit, Tallassee, and Prattville Agricultural Research Unit. We tested 150 new lines in preliminary tests at Tallassee, and 30 lines in advanced tests at Prattville. F_2, F_3, and F_4 generations of various populations were grown at Tallassee, and $F_{4:5}$ progeny rows were grown, selected, and submitted for fiber quality analysis. Crosses were made to create new populations for future work. Most crosses have involved advanced experimental lines from Auburn and other public programs and newly released sources of resistance to reniform nematode. Complete yield and fiber quality data are now available from the 2010 Regional Breeders Testing Network at 11 yield locations and two disease evaluation locations. Auburn experimental lines ranked seventh, fourteenth, fifteenth, and nineteenth in the 33-entry test (30 experimental lines plus three checks). New lines were submitted for evaluation in 2011 with the best lines for 2010 being repeated in the test.

We have completed two years of field evaluation of LONREN-derived experimental lines, both susceptible and resistant sister-lines from the same cross. Twenty highly resistant lines (no nematode reproduction) and 20 highly susceptible sister lines (nematodes reproduce freely) were planted in two fields (one with nematodes, one without) at the Tennessee Valley Research and Extension Center in both years. Both years gave very similar results. In the nematode-infested field, resistant lines were shorter than susceptible lines. Yield in the nematode-infested field was also significantly reduced in the resistant lines compared to the susceptible progenies. Yields were not different in the nematode-free field. Fiber strength was significantly higher in lines with the RENlon gene (resistant lines) than in lines that did not carry the gene. There were no other fiber quality differences. Nematode populations were greatly reduced in the plots with lines carrying the RENlon gene, giving hope that this germplasm may yet play a significant role in the management of reniform nematodes. The new BARBREN-resistant germplasm was also included in this test and performed very well. Crosses were made to begin the process of developing advanced breeding lines with this resistance source.

We have continued to evaluate the cotton germplasm collection for heat tolerance using chlorophyll fluorescence as our assay both in the growth chamber and field. Forty-four wild upland cotton accessions were identified previously. Ten elite accessions were selected from these forty-four based on evaluation in a growth chamber. A field evaluation using chlorophyll fluorescence was conducted on these ten elite accessions and four commercial lines. We found that the top five accessions have higher chlorophyll fluorescence values than commercial lines throughout the growth season under high temperatures. Based on these results, the five elite accessions may have potential to be the genetic materials for development of heat tolerant germplasm. Studies were completed on the effect of germplasm introgression on various traits. Results showed that with few notable exceptions, most traits were negatively impacted with increased exotic germplasm percentage.

ALABAMA ON-FARM COTTON VARIETY TRIAL SUMMARY, 2011

W. C. Birdsong and B. A. Dillard

In 2011 an on on-farm cotton variety trial was conducted in Barbour, Geneva, and Covington counties and in the Wiregrass region of Alabama. Cotton hybrids were provided by participating seed companies based upon their top choices for the Southeast region of Alabama. The test was replicated at least twice at each site. Each hybrid was planted the length of the field with a 36-inch row spacing The Covington County trial was on planted on a 38-inch row spacing.

A LibertyLink variety trial was conducted in Geneva County on 36-inch spacing. The trial was replicated twice.

TABLE 1. ALABAMA ON-FARM COTTON VARIETY TRIAL

Variety	Barbour Co. lint lb/A	Geneva Co. lint lb/A	Covington Co. lint lb/A	Wiregrass lint lb/A
PHY 499	1856	1556	1484	1632
DP 0R052	1722	1538	1460	1573
DP 1137	1707	1526	1427	1553
DP 1048	1608	1549	1467	1541
DP 1133	1698	1563	1348	1536
DG 11622	1741	1530	1326	1532
DP 1050	1663	1520	1413	1532
DP 0R051	1699	1604	1272	1525
DG 2570	1609	1491	1397	1499
PHY 375	1666	1512	1229	1469
DP 0R020	1653	1534	1176	1455
FM 1740	1500	1412	1374	1429
ST 5458	1476	1519	1248	1414
ST 4288	1353	1523	1304	1393
ST 5288	1549	1424	1081	1351
PHY 565	1540	1365	1148	1351
DP 0912	1659	1658	—	1659
DP 1034	1685	—	—	1685
DP 0949	1656	—	—	1656

TABLE 2. LIBERTYLINK VARIETY TRIAL

Variety	Average
PHY 499	1489
PHY 565	1346
PHY 375	1314
FM 1845	1284
FM 1733	1130
ST 4145	1068

CROP PRODUCTION

The Old Rotation, 2011

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).

Non-irrigated cotton yields in 2011 on the entire test averaged 890 pounds of lint per acre, but irrigated yields averaged 1,120 in the two-year rotation with high N rates producing more than 1,700 pounds of lint per acre. Irrigation more than doubled corn yields in rotation with cotton. Where only winter legumes (crimson clover) provide the N, cotton yields were about the same as where no legume was planted, and 120 pounds of N per acre was applied at a cost of about $80 per acre. Corn and cotton yields reflect N availability more than any other factor. All crops responded dramatically to irrigation.

Crop Yields on the Old Rotation, 2011

Plot No.	Description	Crimson clover dry matter (lb/A)		Wheat bu/A	Corn bu/A		Cotton lint lb/A		Soybean bu/A	
		Irrigated	Non-irrigated		Irrigated	Non-irrigated	Irrigated	Non-irrigated	Irrigated	Non-irrigated
1	No N/no legume	0	0				811	546		
2	Winter legume	2350	3637				993	960		
3	Winter legume	1981	3727				1026	960		
4	Cotton-corn	2331	5020		87.7	46.6	corn	corn		
5	Cotton-corn + N	2479	4003		174.2	69.8	corn	corn		
6	No N/no legume	0	0				505	513		
7	Cotton-corn	3467	4514				1523	1159		
8	Winter legume	1855	3978				1225	1043		
9	Cotton-corn + N	0	4839				1705	1241		
10	3-year rotation	0	0				1084	753		
11	3-year rotation	3344	5281		184.3	95.6	corn	corn		
12	3-year rotation	0	0	43.5			soy	soy	51.9	47.6
13	Cont. cotton/no legume +N	0	0				1225	803		
	Mean	***2544***	***4375***		***148.7***	***70.7***	***1122***	***886***		

The Centennial Year of the 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. In commemoraton of the 2011 centennial year for this experiment, a comprehensive Alabama Agricultural Experiment Station bulletin was published covering the first 100 years of this experiment. http://www.aaes.auburn.edu/comm/pubs/bulletins/bull676.pdf. A poster was also presented at the 2012 Beltwide Cotton Conference.

This study was not irrigated, and yields reflected growing conditions during that season. Note the dramatic yield response by cotton to added K. Highest cotton yields (1,230 pounds of lint per acre) were produced on the treatment receiving a complete fertilizer plus micronutrients (boron). No added P (Plot 2) dramatically reduced 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. This type of comparison does not exist anywhere else in the U.S.

Crop Yields on the Cullars Rotation, 2011

Plot	Treatment description	Clover dry wt. (lb/A)	Wheat bu/A	Corn bu/A	Cotton lint lb/A	Soybean buA
A	no N/+legume	2361	23.2	50.4	877	44.5
B	no N/no legume	0	30.4	39.9	869	42.9
C	nothing	0	0.0	0.0	33	1.6
1	no legume	0	50.9	99.8	886	48.4
2	no P	1205	16.1	19.4	761	11.0
3	complete	3056	54.7	88.5	1035	45.0
4	4/3 K	1869	50.4	72.3	902	42.7
5	rock P	3053	38.0	85.4	1001	45.9
6	no K	2015	35.1	34.2	66	7.2
7	2/3 K	2699	51.0	78.0	1101	41.8
8	no lime (pH~4.9)	1191	0.0	48.7	0	10.2
9	no S	1565	54.2	63.1	1001	48.0
10	complete+ micros	3316	56.5	78.0	1233	44.8
11	1/3 K	2203	60.8	64.2	960	36.6
Mean of all treatments		***2230***	***43.5***	***63.2***	***975***	***33.6***

Enhancing Cotton Variety Selection Through On-Farm Evaluations, 2011

C. D. Monks, C. H. Burmester, W. C. Birdsong, D. Derrick, W. Griffith, L. Kuykendall, B. A. Dillard, R. P. Yates, and E. Schavey

The project Enhancing Cotton Variety Selection in On-Farm Trials was conducted during 2011. Cotton varieties were supplied by Delta and Pine Land, Bayer, Phytogen, and Seed Source seed companies. Conventional varieties were furnished by the University of Arkansas (Fred Bourland), Auburn University (David Weaver), University of Georgia, and LSU (Gerald Meyers). The trials were either Roundup Flex or conventional (also including LibertyLink) varieties and were initiated during April or May of 2011. (See table for trial locations and participants.)

Overall, yield results this year were very good. Although the season started out to be very disappointing, conditions in late July and early August produced excellent yields across the state. One exception was at the Lee County location where drought conditions reduced yield severely. Seed cotton samples were not taken at the Fayette County location.

Tables are also available for cotton yields and lint quality from the 2011 on-farm trials at www.alabamacrops.com.

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Maintenance and Expansion of the ACES/Auburn University Website for Alabama Crops, 2011

C. D. Monks, C. Dillard, D. Delaney, C. H. Burmester, and P. Mask

Funding for information distribution has become very difficult to obtain over the past several years; however, Alabama crop producers have had the forethought to see the need for having access to unbiased, research-based information available for making decisions. Through funding from the Alabama Cotton Commission, Alabama Soybean Producers, and the Wheat and Feed Grains Commission, Alabama Cooperative Extension System agronomists through the work of Jon Brasher, MBA, have been able to develop, maintain, and develop this information link. We have also used funding from Federal eXtension and private companies to complete the funds required for success of this vital unit. Crop producer funding covers approximately 65 percent of the costs incurred for this activity.

For the past several years, the alabamacrops.com website has served as the conduit through which much of the agronomic crop research and field information flows. Instead of waiting for information to be sent through the mail that inevitably results in a lag-time for usefulness, we are now able to post information that is instantly accessible for our producers and related industries.

The website covers information including, but not limited to, corn, cotton, soybean, forages, small grains, stored grains, hay and pasture weed control, precision ag (linked), soil fertility and soil testing, plant disease diagnostics, enterprise budgets, IPM guides, OVT research information, and on-farm research and development.

Web statistics for 2011 indicate that the website had 7,900 visits and 12,500 views. The primary months for activity have been October, November, and December.

Recently, www.alabamacorncrops.com was launched and will be further developed over the next year. Without funding from Alabama crop producers, these portals would not be possible.

Evaluating Pressure Compensating Subsurface Drip Irrigations (SDI) For No-Till Row Crop Production on Rolling, Irregular Terrain, 2011

J. P. Fulton, M. P. Dougherty, J. Shaw, C. H. Burmester, B. Durham, L. M. Curtis, and A. Brooke

This investigation was conducted on a 12-acre field located at the Tennessee Valley Research and Extension Center (TVREC), Belle Mina, Ala. The objective was to evaluate cotton production on rolling terrain irrigated with subsurface drip irrigation (SDI) in conjunction with cover crops. The experimental design was a randomized block design with two irrigation treatments, irrigated (Irr) and non-irrigated (No-Irr), and two cover crop treatments, cover (C) and no-cover (NC), with four replications. Each treatment was replicated four times for a total of 16 plots. Plots measured 27 feet by 1,250 feet with SDI tape installed in 1,250-foot runs on 80-inch spacing (every other row of 40-inch row cotton) and buried at an average depth of 13 inches. Plots receiving a cover crop treatment were planted with rye at a rate of 90 pounds per acre on November 9, 2010. The cover crop was desiccated on April 4, 2011. Cotton, variety ST 4288 B2RF, was planted on April 25, 2011 and replanted on May 16, 2011 in the northwest corner of the field because of standing water following the first planting. Cotton harvest took place on October 6 and 7, 2011 followed by a second picking on October 21, 2011. Accumulated yield per treatment was determined using a weighing system.

The cotton yield for 2011 was statistically similar for all treatments (Table 1). The Irr/NC treatment produced the lowest seed cotton yield of 3,073 pounds per acre (2.6 bales per acre) and the No-Irr/NC treatment produced the highest yield of 3,294 pounds per acre (2.7 bales per acre), a small difference of 221 pounds per acre. In the growing months of June, July, and August, there was 58 percent more rainfall in 2011 than 2010. The rainfall during the growing season was the primary factor for similar yields between treatments, and the C versus NC treatments were not significantly different.

A second harvest was collected; however, an error occurred collecting data and only three replications were included in the summary. The four treatments produced an additional cotton yield of 157 pounds per acre to 254 pounds per acre (4.6 percent to 7.8 percent). The Irr/NC produced the largest amount (254 pounds per acre) followed by Irr/C (242 pounds per acre), No-Irr/C (191 pounds per acre), and No-Irr/NC (157 pounds per acre). Table 2 presents the overall 2011 yield data.

In summary, the use of pressure compensated SDI has provided significant yield benefits in prior years, but substantial rainfall during the growing season in 2011 minimized the impact of irrigation. Also, the C versus NC treatments were not significantly different as measured in previous years. The treatment that produced the highest yield was the No-Irr/NC; the cotton crop actually was five inches shorter than the Irr/C treatment.

Table 1. Summary of Yield Averages by Treatment for 2010 and 2011†

	2010		2011	
Treatment	Seed cotton lb/A	Bales bales/A	Seed cotton lb/A	Bales bales/A
Irrigated / Cover	3,798	3.2	3,124	2.6
Irrigated / No-Cover	3,811	3.2	3,073	2.6
Non-Irrigated/Cover	2,208	1.8	3,163	2.6
Non-Irrigated / No-Cover	2,025	1.7	3,294	2.7

† Data from all four repetitions.

Table 2. Summary of the 2011 Yield Averages by Treatment for the Combined First and Second Harvests†

	Combined Harvest	
Treatment	Seed cotton lb/A	Bales bales/A
Irrigated / Cover	3,365	2.8
Irrigated / No-Cover	3,254	2.7
Non-Irrigated / Cover	3,365	2.8
Non-Irrigated / No-Cover	3,435	2.9

† Data from three repetitions

Variable-Orifice Nozzle Evaluation

J. Fulton, A. Sharda, R. Taylor, T. McDonald, E. van Santen, A. Brooke, and M. H. Hall

Variable-orifice nozzles, which are being supplied by a few tip manufacturers today, are gaining interest among farmers. Variable-orifice nozzles have larger turndown ratios than do traditional fixed-orifice tips and provide a larger flow range (Figure 1) over typical sprayer operating pressures—in some cases a 1:1 flow to pressure ratio. However, variable-orifice nozzles incorporate more components, including springs for adjustment of the orifice and thereby flow, which make them more difficult to regulate. The objective of this study was to evaluate the performance of variable-orifice nozzles in support of site-specific management of nutrients and other liquid inputs.

Tip flow testing was conducted using a 60-foot sprayer test-platform (Figure 2). Data collection consisted of two different nozzles evaluated at low, medium, and high flow rates: (1) VariFlow-Medium (Yellow) and (2) TurboDrop Variable-Rate. Placement along the boom was also investigated by placing nozzles at three random locations along the boom. All tests were replicated three times generating 27 tests per nozzle. Tip flow rate was measured using SpotOn Sprayer Calibrators. Recorded flows along with location along the boom were statistically analyzed to evaluate flow uniformity (coefficient of variation, CV) across the boom and detect off-rate errors (+/- 10 percent).

The following results have been determined from this study:

1. Nozzle flow uniformity across the spray boom ranged from 5 percent to 13 percent.
2. In many cases individual nozzles performed outside an acceptable flow rate.
3. Lower flow rates tended to generate less uniformity (higher CVs) across the spray boom.
4. As expected and reported by manufacturers of these nozzles, higher variability (CV) across the boom can occur compared to fixed orifice tips. However, the advantage afforded by these new nozzles is the higher attainable flows over normal operating pressures.
5. The SpotOn Sprayer Calibrator (<1gpm model) provided a quick and accurate method for measuring tip flow.

A more in-depth analysis is planned for 2012 to better understand the performance of these type nozzles.

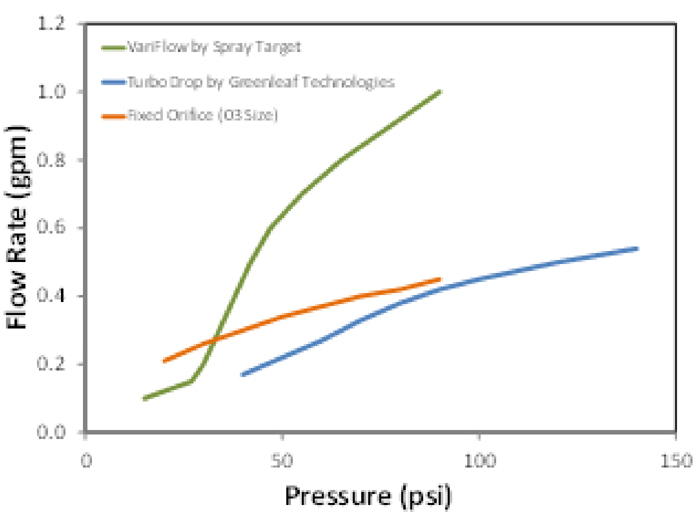


Figure 1. Illustration comparing available variable orifice nozzles versus a standard fixed orifice, 03 tip. Note the difference in possible flow rates by the variable orifice nozzles over the pressures presented.

Figure 2. Sprayer testing platform and illustration of flow data collection.

FERTILITY

New Technology Fertilizers for Cotton

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

Tests with new technology fertilizers were conducted at Prattville Agricultural Research Unit from 2007 to 2011. A comprehensive Alabama Agricultural Experiment Station Bulletin has been published summarizing the five-year results since 2007 (http://www.aaes.auburn.edu/comm/pubs/bulletins/bull677.pdf). Data were also presented at the 2012 Beltwide Cotton Conferences.

Mean relative cotton lint yields compared to the standard rate of ammonium nitrate (90 pounds total N per acre per year) are presented in the table. While results varied considerably from year to year, the general conclusions are that the new technology N products, particularly those that result in controlled release N, do not perform any better under most situations than conventional N products such as urea, UAN solutions, ammonium nitrate, and urea-ammonium sulfate blends. Under certain conditions, Agrotain® appeared to reduce N volatilization, but the cost versus the benefits of these products was not evaluated.

Treatments and Cotton Yields on a Lucedale s.c.l. at Prattville Agricultural Research Unit, 2007-2011†

Source	Total N at planting ‡	Total N at sidedressing ‡	Year				
			2007	2008	2009	2010	2011
	lb/A		lb lint/A				
No N	0	0	No yield; severe drought	360 d	400 f	390 b	570 c
$CaCl_2$	0	0		300 d	340 f	—	—
Am. nitrate	20	70		840 b	770 ab	460 ab	1310 ab
Am. nitrate 4/3	20	100		950 ab	—	460 ab	1140 b
Urea-am. sulfate blend	20	70		—	740 abc	560 a	1200 ab
Urea	20	70		990 a	700 abcd	420 ab	1150 b
Urea + Agrotain®	20	70		950 ab	720 abcd	470 ab	1150 b
Urea + Nutrisphere N®	20	70		—	—	420 ab	1150 b
UAN solution	20	70		700 c	640 de	420 ab	1270 ab
UAN + $CaCl_2$	20	70		890 ab	740 abc	—	—
UAN + Agrotain®	20	70		920 ab	760 abc	420 ab	1280 ab
UAN + Nutrisphere N®	20	70		—	—	400 b	1380 a
UAN 2/3	20	40		890 ab	740 abc	—	—
UAN 2/3 + $CaCl_2$	20	40		700 c	590 e	—	—
Nitamin Nfusion®	20	70		860 ab	—	460 ab	—
Nitamin Nfusion® 2/3	20	40		690 c	—	—	—
ESN	20	70		—	—	—	1100 b
Poultry Litter @ 120	0	120		—	690 bcd	460 ab	1110 b
Poultry Litter @ 160	0	160		—	780 a	510 a	1200 ab

† Sources and treatments changed each year which accounts for missing data for those years when that treatment was not included in test.
‡ N applied at planting as ammonium nitrate (34-0-0). Source variables were all applied as a side dressing at squaring.
Values followed by the same letter are not significantly different within year at P<0.05.

Impact of Fertilizer Source and Tillage on Greenhouse Gas Emissions and Cotton Yield

D. B. Watts and H. A.Torbert

This study was located at the E.V. Smith Research Center Field Crops Unit located in Shorter in central Alabama, on a Marvyn loamy sand soil.

A DP454 BG/RR variety was planted on May 17, 2011, into the no-till and conventional-till system and harvested on October 27, 2011.

Nitrogen sources applied were Urea (U), SuperU (SU), Chicken manure (M), Chicken manure + Agrotain-Plus (AM), polymer-coated urea (ESN), Urea Ammonium Sulfate (UAS), and Ammonium Sulfate (AS) in the no-till and UAS, U, and AS in the conventional-till at a rate of 90 pounds of N per acre (101 kg N/ha) as a surface application. The N sources were applied on June 16, 2011. Measurements of greenhouse gases started on June 16, 2011 (day of application) and halted approximately one month before harvest (ending before cotton defoliation).

Differences in yield between the fertilizer sources were observed. Agrotain with manure (AM) generated the highest yield compared to other nutrient sources applied. Cotton yields during the 2011 growing season were in the order of AM> AS> M> UAS> SU> ESN> U> control. No significant differences were observed among the inorganic fertilizer sources applied. However, compared to the control, AM and AS were the only sources to produce significantly higher yields compared to the control.

The treatment with the highest N_2O flux was M followed by U> AS> ESN > S> UAS > AM> C. No significant differences were observed between the inorganic fertilizer sources (AS, SU, U, ESN, UAS). However, chicken manure and urea were significantly different from the control treatment. The highest NH_3 volatilization occurred in the M treatment followed by AM> Urea> UAS> SU> ESN>AS> control. No significant differences were observed between the inorganic fertilizer sources (AS, SuperU, Urea, ESN, UAS). However, M and AM were significantly different from the control treatment. The treatment with the highest CO_2 flux was AM followed by M>AS> U> UAS> ESN> SU> C. No significant differences were observed between the inorganic fertilizer sources (AS, U, UAS, SU, and ESN) and the control. The chicken manure treatments (AM and M) were the only experimental treatments to produce higher CO_2 flux compared to the control treatments. No significant differences were observed for CH_4 flux. However, all N treatments generally functioned as CH sinks. When comparing no-till vs. conventional-till generally, higher N_2O losses occurred in the no-till system, and higher CO_2 losses occurred in the conventional-till system.

INSECT MANAGEMENT

Efficacy of Diamond Insecticide in Preventing Cotton Yield Losses to Tarnished Plant Bugs in North and Central Alabama

T. Reed and R. H. Smith

A study was conducted in north and central Alabama to determine the effects of Diamond insecticide on (1) tarnished plant bug and lepidopteran pests' damage to cotton and (2) beneficial arthropod populations, including fire ants. Test locations were at the Tennessee Valley Research and Extension Center at Belle Mina, Ala., and the Prattville Agricultural Research Unit. CT 210 conventional cotton was planted at Belle Mina on May 20 and DP174 RF cotton was planted at Prattville on May 9. Test plots were arranged in a randomized complete block design with four replications per treatment and eight rows per plot (40 to 45 feet long) at both locations. Specific treatments applied at both locations are presented in the table. Sweepnet samples taken 8 to 10 days after chemical applications indicated that in comparison with untreated plots the following chemical treatments reduced predator numbers as indicated in parentheses: Centric 2 ounces (14 percent), Diamond 6 to 9 ounces (25 percent) and Belt 3 ounces + bifenthrin 5 ounces (63 percent). There were no significant differences with respect to fire ant density among treatments at either location. Very low numbers of plant bugs and bollworms resulted in no significant treatment effect on yield in central Alabama. Plant bug numbers were also very low in north Alabama, but bollworm numbers were sufficient to allow significant differences among treatments with respect to both damaged blooms and yield. (see table).

Effect of Foliar Applications of Diamond and other Insecticides to Cotton on Bollworm Damage and Yields at Belle Mina in 2011

Treatments applied		Worms in blooms + worm-damaged blooms (%)		Seed cotton lb/A
7/19	7/30	7/30	8/19	
Centric 2 oz	Centric 2 oz	6	9.3	2063
Untreated	Centric 2 oz	0	8.8	2847
Untreated	Diamond 9 oz	2	5.3	3449
Centric 2 oz	Diamond 9 oz	4	4.6	2932
Centric 2 oz	Untreated	5	3.7	2557
Diamond 9 oz	Untreated	0	3.7	2675
Diamond 6 oz	Diamond 6 oz	0	3.3	3219
Centric 2 oz	Diamond 6 oz	2	2.7	2766
Untreated	Untreated	7	2.6	3469
Untreated	Untreated	1	2.3	3297
Diamond 9 oz	Diamond 9 oz	3	1.0	3258
Belt 3 oz + Bifenthrin 5 oz	Belt 3 oz + Bifenthrin 5 oz	0	0.3	3826
		P=0.04 LSD 0.1=4.1	*P=0.00 LSD 0.1=2.7*	*P=0.00 LSD 0.1=445*

Impact and Management of Fire Ants in the Alabama Cotton Production System, 2011

R. H. Smith, T. Reed, and D. Moore

This study was conducted in 2011 to determine the impact of the red imported fire ant, *Solenopsis invicta* Buren, on tobacco budworm/bollworm populations infesting cotton. The primary objective of this effort was to quantify the actual value of red imported fire ants (RIFA's) to producers of Bt and non-Bt cotton varieties. The study was conducted in central Alabama at the Prattville Agricultural Research Unit. The study utilized a split-split plot experimental design. The main plot variables were a normal RIFA population and an insecticide-reduced RIFA population. The fire ant population was reduced by applying insecticides to the soil prior to planting. The study examined the effect of these two population levels on the yields of three varieties (subplots): DP 1050 B2RF (Bollgard II), PHY 565 WRF (Widestrike), and DP 174 RF (non-Bt). The effect of a mid-season pyrethroid overspray (sub-subplot) was also assessed. RIFA population levels were determined in each plot by counting RIFA's on small sections of frankfurters placed in the plots, and RIFA density indexes were measured using a scale of 0 (= no RIFA's present) to 3 (= 11 or more RIFA's present).

The RIFA density indexes showed that fire ant numbers increased as the season progressed in the non-treated plots but remained extremely low in the plots treated preplant with insecticides. RIFA density index values indicated that over the growing season (three sampling dates) 12.7 times more RIFA's occurred in the plots with normal RIFA populations than in plots with a reduced population. The percent of worms in blooms + worm damaged blooms on August 9, 2011 was greater (P>F = 0.06) in the plots where fire ants were reduced (1.3 percent) than in plots where fire ants were maintained (0.4 percent) (LSD 0.1 = 0.7). This variable was also greater (P>F = 0.03) in the non-Bt variety (1.8 percent) than in the PHY WRF variety (0.3 percent) and the DP B2RF variety (0.5 percent) (LSD 0.01 = 1.0) . Although budworm and bollworm numbers were low in the test plots, after defoliation the number of worm-damaged bolls in the DP 174 RF (non-Bt) plots with reduced RIFA numbers was 4.3 times greater than in similar plots with normal RIFA numbers. The number of worm-damaged bolls in both Bt varieties was very low regardless of RIFA numbers. Despite having more damaged bolls in half the DP 174 RF plots (those with reduced RIFA numbers) the overall yield of DP 174 RF (3,224 pounds per acre) was significantly greater (P>F= 0.065) than that of PHY 565 WRF (3,005 pounds per acre) and numerically greater than DP 1050 B2RF (3,149 pounds per acre). A mid-season pyrethroid application significantly increased (P>F = 0.025) overall seed cotton yields by 140 pounds (LSD 0.1 = 101).

Demonstration and Validation of a More Rapid Survey Method for Monitoring Stink Bug Damage to Cotton

R. H. Smith

Stink bugs are the most damaging economic insect of cotton over much of Alabama and the southeastern U.S. Ninety-five percent of the acreage in southern and central Alabama is treated in most seasons. In spite of controls, yield losses were estimated to be 3.5 percent of yield in 2010. Losses in future years may be even greater based on the increased value of cotton. The most accurate sampling method for assessing stink bug damage is to pull and crush quarter-diameter bolls, observing for internal injury. However, this is a very time consuming process when each field requires a sample of 25 to 50+ bolls. Stink bugs do not evenly distribute throughout a field. Many scouts are utilizing a sample size that does not accurately represent the field-wide damage level in making treatment decisions. Research in recent years has indicated that there is a relationship between external boll feeding and internal injury.

The objective of the study was to validate a more rapid survey method for assessing stink bug damage to cotton, by collecting a larger sample size of bolls per field and observing for external damage only.

Cotton was grown in 12 to 16 row strips planted through a peanut field at the Wiregrass Research and Extension Center, Headland, Ala. Peanuts served to supply a migratory supply of stink bugs into cotton throughout the boll set period (weeks three through seven of bloom). Three methods of scouting and one automatic schedule was utilized as described below.

Each scouting method (treatment) consisted of a plot 50 feet long by 12 to 16 rows wide and replicated four times.

The following scouting method or treatment was used:

1. Collect 40 bolls (10 per replicate) weekly and observe for external damage only. Base treatment decisions on external damage and apply treatments when more than 25 percent of the quarter diameter bolls have external damage.
2. Collect 40 bolls weekly (10 per replicate) crush all bolls and observe for internal damage. Utilize current method (dynamic threshold) based on week of bloom, in making treatment decisions.
3. Collect 40 bolls (10 per replicate) weekly and observe for external feeding sites. Crush only bolls with external feeding to observe for internal damage. Use the dynamic threshold based only on those bolls with external feeding, if a threshold is reached. Otherwise, open the remaining bolls without external feeding and treat if a threshold is reached.
4. Conduct no surveys. Instead make automatic insecticide applications for stink bugs on the third, fifth, and seventh week of bloom to four replicates.

The trial area at the Wiregrass Research Center was monitored weekly for stink bugs, but no data were collected due to the absence of stink bugs in 2011.

Management of Insecticides for Bollworm Control in a Central Alabama Conventional Variety Cotton System

R. H. Smith

Due to the high upfront cost of cotton production, particularly seed and technology, interest continues in a reduced-input conventional cotton system. This is of particular interest to growers in central Alabama who have limited yield potential due to soil type, lack of irrigation, or other factors beyond their control. Insecticide selectivity and management are critically important in a low-input system. The preservation of beneficial insects, including fire ants, is an important component in the economics of such a system. Each economic insect (thrips, aphids, plant bugs, caterpillar species, and stink bugs) must be managed within the framework of the overall objective. This project considers the management of all insect pests but focus on the most optimum manner to deal with the caterpillar (Lepidoptera) species, primarily bollworms and budworms. Some of the newer "worm" chemistry may be most effective if utilized in a preventive manner against caterpillar species that can be predicted based on long-term trends.

The objective of the study was to determine the most effective and economic manner to control the July flight of bollworms and caterpillar species in conventional cotton in central Alabama, utilizing the caterpillar insecticide Prevathon (alone or in combinations), under several different timings.

Cotton with no insect traits (DP174RF) was grown at the Prattville Agricultural Research Unit for this trial. A small plot, replicated timing study was initiated in July to manage and control the July generation of bollworms. The insecticide Prevathon, alone or a combination of Coragen plus Karate (Besiege), was utilized. The timing of the applications was as follows: July 5, July 12, July 19, and August 4.

The bollworm population in the trial was non-detectable to extremely low throughout July and August 2011. Non-economic numbers of bollworms occurred over a three- to four-week period from July 15 to August 10. Bollworm pressure was too low to make any conclusions from this trial in 2011. All treatments were monitored weekly. A season end damage boll count was made and yields were taken, but bollworm damage was too low to make any conclusions from this trial.

WEED MANAGEMENT

Economic Comparison of LibertyLink, Roundup Ready Flex, and Conventional Systems for Resistant Pigweed Management in Alabama Cotton

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

Comparing Roundup Ready Flex, LibertyLink, and conventional cotton variety weed management systems in a glyphosate-resistant Palmer amaranth (pigweed) environment using significant soil-residual herbicide inputs, timely post applications, and having good activating rainfall for all residual herbicides revealed that Palmer could be managed adequately to provide good yields in all three systems. Soil-residual herbicides for all systems included Prowl + Reflex applied at planting. The conventional variety (CT2010) also received Cotoran at planting. Dual Magnum was applied to both Roundup Flex (DP1048 B2RF) and LibertyLink (FM1845 LLB2) varieties in the respective early post applications of Roundup or Ignite. Staple was applied to the conventional variety early post. Valor + Diuron + MSMA was applied as a layby to all systems. Escaped Palmer amaranth plants were counted and a value for hand weeding these escaped plants factored in the calculations. Although no system controlled 100 percent of the Palmer amaranth season long, economic analysis of the data obtained in 2010 and 2011 revealed that all three systems could be grown for optimum yield and net returns if environmental conditions favor the activation of soil-residual herbicides in a timely manner and residual control is maintained from planting through the layby application. Although the total weed management costs for the Roundup Ready Flex system in this particular trial were more than the LibertyLink or conventional systems, the additional lint produced by the Roundup Ready Flex variety in this particular instance more than compensated for the difference in input costs (see table).

Return on Investment at $0.95 per Pound of Cotton Lint in 2010 and $1.25 per Pound of Cotton Lint, 2011

	DP1048 B2RF		FM1845 LLB2		CT 2010	
Parameter	2010	2011	2010	2011	2010	2011
Herb $/A	$53.85	$ 67.83	$57.75	$74.88	$62.75	$ 80.97
Hoe $/A	$23.29	$ 61.09	$2.69	$ 5.39	$20.49	$ 30.99
Total weed $/A	$77.14	$128.92	$60.44	$80.27	$83.28	$111.96
Tech and seed $/A	$65.00	$ 65.00	$28.00	$28.00	$ 6.00	$ 8.04
Total costs $/A	$589.00	$643.00	$536.00	$557.00	$536.00	$570.00
Lint lb/A	1668	937	1499	607	1331	638
Seed $/A	$167	$170	$15.0	$128	$133	$136
Net Return	$1115	$604	$1032	$269	$854	$298

DISEASE MANAGEMENT

Cotton Resistance to Root Knot Nematodes and Fusarium Wilt in Alabama, 2011

T. Z. Scott, K. S. Lawrence, K. Glass, and E. van Santen

Cotton cultivars were examined to determine their response to pathogens, root knot nematode (*Meloidogyne incognita*) and F*usarium oxysporum* f. sp. *vasinfectum*, causing Fusarium wilt of cotton. The test was located at the E. V. Smith Research Center Plant Breeding Unit, in Tallassee, Ala. Plots consisted of one row, 20 feet long, with a 36-inch row spacing, separated by 6-foot alleys, and was planted in a randomized complete block design with four replications. The set of four test cultivars was evaluated as a group with two control plots within each replicate. All plots were maintained throughout the season using standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Initial plant counts were made on June 9. Wilted plants were counted and removed on July 7, July 28, and August 18, 2011. Three plants per plot were removed on July 27 and root knot nematodes were extracted from the root systems using 0.6 percent NaOCl agitation for four minutes. Re-isolation of the Fusarium wilt fungus, *Fusarium oxysporum* f. sp. *vasinfectum*, was conducted to confirm the presence of the disease pathogen. The remaining live plants were counted and recorded on August 26. Data were statistically analyzed using Generalized Linear Mixed Models procedures as implemented in SAS® PROC GLIMMIX with a negative binomial distribution function for count variables.

Monthly average maximum temperatures from planting in April through harvest in September were 80.7, 84.9, 95.8, 92.9, 95.6, and 85.2 °F with average minimum temperatures of 52.5, 57.4, 69.3, 72.4, 70.2, and 62.7 °F, respectively. Rainfall accumulation for each month was 1.91, 2.22, 2.24, 8.02, 0.64, and 4.9 inches with a total of 19.93 inches over the entire season.

Root knot nematode numbers increased slowly this season on the cotton varieties. The standard susceptible cotton variety, Rowden, averaged 241 root knot eggs per gram of root while the M-315 resistant cotton supported 66 root knot eggs per gram of root. Nematode juveniles and eggs extracted from the root systems for all the submissions ranged from a high of 3,315 in FM 1740 B2RF to a low of 18 in PHY 367 WRF. The reproductive potential observed varied widely from highly susceptible to low susceptibilities, depending on the cotton submission. The average percentage of wilted plants for the susceptible, Rowden was 2 percent, with a range from 3 to 0 percent. The fungal pathogen was not isolated from the resistant M -315 cotton but was readily isolated from Rowden. From all the cotton submissions planted, 68 percent were colonized by *F. oxysporum* f. sp. *vasinfectum*. Yields ranged from 4,672 to 1,742 pounds per acre for ST 4288 B2F and M-315, respectively. The cotton varieties CG 3787 B2RF, DP 1028 B2RF, PHY 485 WRF, ST 4288 B2F, and ST 5458 B2F produced significantly higher yields than Rowden.

Cotton Resistance to Root Knot and Fusarium Wilt in Alabama, 2011

Variety	Fusarium wilt† %	Fusarium wilt† Dunnett's P-value vs. Rowden	Fusarium wilt† Dunnett's P-value vs. M-315‡	*M. incognita* 150 cm³ soil	*M. incognita* Dunnett's P-value vs. Rowden	*M. incognita* Dunnett's P-value vs. M-315	*M. incognita* Egg/g of root§	*M. incognita* Dunnett's P-value vs. Rowden	*M. incognita* Dunnett's P-value vs. M-315	Seed cotton Yield (lb/A)	Seed cotton Dunnett's P-value vs. Rowden	Seed cotton Dunnett's P-value vs. M-315
AM 1550 B2RF	0	0.988	0.957	194	1.000	0.537	75	0.999	1.000	3714	0.146	0.004
CG 3787 B2RF	1	1.000	0.995	528	1.000	0.158	57	0.989	1.000	4225	0.012	0.000
DG 2570 B2RF	1	0.993	0.960	205	1.000	0.397	161	1.000	1.000	3249	0.585	0.025
DP 0912 B2RF	1	0.995	0.969	316	1.000	0.222	295	1.000	0.969	3586	0.165	0.003
DP 0949 B2RF	1	1.000	0.998	281	1.000	0.362	273	1.000	0.990	2964	0.978	0.180
DP 1028 B2RF	3	1.000	1.000	544	1.000	0.282	125	1.000	1.000	4100	0.065	0.002
DP 1050 B2RF	1	1.000	0.997	36	0.843	1.000	89	1.000	1.000	3240	0.705	0.051
DP 10R052B2R2	3	1.000	1.000	19	0.539	1.000	85	1.000	1.000	3058	0.925	0.120
DP 1137 B2RF	2	1.000	1.000	185	1.000	0.728	119	1.000	1.000	3563	0.435	0.032
FM 1740 B2F	1	0.998	0.981	297	1.000	0.244	1315	0.922	0.300	3242	0.597	0.026
PHY 367 WRF	1	1.000	0.999	147	1.000	0.681	18	0.609	0.997	2915	0.991	0.219
PHY 375 WRF	1	0.984	0.943	431	1.000	0.137	1019	0.977	0.412	3579	0.170	0.003
PHY 485 WRF	0	0.992	0.972	227	1.000	0.637	81	1.000	1.000	4050	0.080	0.003
PHY 565 WRF	2	1.000	1.000	427	1.000	0.213	383	1.000	0.944	2954	0.982	0.187
ST 4288 B2F	1	0.997	0.977	26	0.696	1.000	161	1.000	1.000	4672	0.001	0.000
ST 5288 B2F	0	0.975	0.927	24	0.659	1.000	37	0.912	1.000	3765	0.117	0.003
ST 5458 B2F	0	0.932	0.852	344	1.000	0.283	54	0.985	1.000	4203	0.013	0.000
M-315	2	1.000		14	0.278		66	0.991		1742	0.756	
Rowden	2		1.000	270		0.278	241		0.991	2443		0.756

† Percent of wilted plants of the total per plot. Wilted plants were counted bi-weekly for 6 weeks.
‡ Dunnett's P-value greater than 0.05 indicate significant differences from the susceptible Rowden and the resistant M-315 standards.
§ Root knot extracted from three cotton root systems collected July 22.

Evaluation of Seed Treatment Fungicides for Seedling Disease Management in North Alabama, 2011

K. S. Lawrence, S. R. Moore, 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 Extension Center in Belle Mina, Ala. The field had a history of cotton seedling disease incidence and was infested by *Rhizoctonia solani*, *Pythium* spp., *Thielaviopsis basicola*, and *Fusarium* spp. The soil type was a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The seed treatments were applied to the seed by Bayer CropScience. Fungicide treatments were mixed with $CaCO_3$ 7 ounces per cwt, Secure 1 ounce per cwt, Cruiser 9 ounces per cwt, and Color Coat Red 1 ounce per cwt, and 2.75 percent RTU-PCNB. Water, $CaCO_3$, Secure, Cruiser, and dye also were applied to the non-treated seed treatment at the same rate. Temik 15G (5 pounds per acre) was applied at planting on April 13 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 30 days after planting (DAP) on May 13. Plots were harvested on September 29. 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 September were 74.3, 78.8, 91.3, 91.2, 91.6, 80.2, and 73.4 °F with average minimum temperatures of 52.2, 58.0, 68.3, 71.4, 68.1, 58.8, and 46.5 °F, respectively. Rainfall accumulation for each month was 10.22, 2.53, 3.11, 4.28, 1.15, 3.15, and 1.47 inches with a total of 25.91 inches over the entire season.

Seedling disease pressure was high in 2011 due to optimum moisture and cool temperatures. Plant stand was significantly greater in the Apron XL + Maxim 4FS + Systhane 40WP + Dynasty CST seed treatment as compared to the untreated control at 43 DAP. Plant stands were low with 26 to 13 percent seedlings surviving, producing 2.6 to 1.3 plants per foot of row. *Rhizoctonia solani*, *Pythium ultimum*, and *Fusarium* spp. were isolated from the diseased seedlings. Seed cotton yields were significantly increased by all fungicides that increased plant stand. Yields varied by 983 pounds per acre at harvest with an average of 174 pounds per acre average increase of seed cotton produced over all the fungicide treatments as compared to the untreated control. The Apron XL + Maxim 4FS + Systhane 40WP + Dynasty CST seed treatment, which supported the best stand, also produced the highest yield.

Evaluation of Seed Treatment Fungicides for Seedling Disease Management in North Alabama, 2011					
No.	**Seed treatment and rate (oz/cwt)**	**Stand/10 ft row† 43 DAP**	**Vigor 43 DAP**	**Skip index 43 DAP**	**Seed cotton (lb/A)**
1	Baytan 30 + Allegiance FL + Vortex FL + SP1020(Emerion)	19.2 ab	3.0 a	6.6 bc	3581
2	Baytan 30 + Allegiance FL + Vortex FL	15.4 b	2.6 a	8.0 abc	3135
3	Apron XL + Maxim 4FS + Systhane 40WP	13.8 b	2.4 a	7.0 bc	3459
4	Apron XL + Maxim 4FS + Systhane 40WP + Dynasty CST	26.0 a	2.8 a	5.6 bc	3660
5	Apron XL + Maxim 4FS + Systhane 40WP + Dynasty CST + Bion	17.2 ab	2.8 a	7.4 bc	3366
6	Maxim 4 FS + A16148C + Dynasty 100FS	13.8 b	2.6 a	8.4 abc	3096
7	Blind Seed Treatment	15.0 b	2.8 a	7.8 abc	3342
8	Vitavax-PCNB + Allegiance FL	12.2 b	2.2 a	10.2 ab	2676
9	RTU Baytan Thiram + Allegiance FL	16.4 b	2.8 a	4.4 c	3433
10	RTU-PCNB	13.2 b	2.6 a	9.0 abc	3387
11	Allegiance FL	15.0 b	3.0 a	9.6 ab	2976
12	Baytan 30 + Allegiance FL+ Vortex FL (w/o insecticide)	15.6 b	2.2 a	8.2 abc	2647
13	Control	16.4 b	2.8 a	12.2 a	3055
	LSD ($P \leq 0.10$)	***9.04***	***1.02***	***4.71***	***1020.2***

† Stand was the number of seedlings in a 10-foot row.
Means followed by same letter do not significantly differ according to Fishers LSD test ($P \leq 0.10$).

Evaluation of High and Low Vigor Cotton with Fungicides for Seedling Disease Management in North Alabama, 2011

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

Three fungicide combinations were evaluated for seedling disease management on high and low vigor ST 4554B2RF cotton seed. The field site has been cultivated in cotton for many years and is an infested field on the Tennessee Valley Research Center near Belle Mina, Ala. The soil is a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The cotton variety ST 4554B2RF was treated by Bayer Crop Science. Plots were planted on April 12 with a soil temperature of 64 °F at a depth of 4 inches and adequate soil moisture. 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. Nematode numbers were determined at monthly intervals. Plots were harvested on October 10. Data were statistically analyzed using SAS and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). One interaction was observed between vigor and fungicides for the yield parameter. All data are presented for comparisons. Monthly average maximum temperatures from planting in April through harvest in September were 74.3, 78.8, 91.3, 91.2, 91.6, 80.2, and 73.4 °F with average minimum temperatures of 52.2, 58.0, 68.3, 71.4, 68.1, 58.8, and 46.5 °F, respectively. Rainfall accumulation for each month was 10.22, 2.53, 3.11, 4.28, 1.15, 3.15, and 1.47 inches with a total of 25.91 inches over the entire season.

Seedling disease pressure was moderate for early planted cotton in 2011. Plant stand at 28 days after planting (DAP) ranged from 2.9 to 1.6 plants per foot of row for the high and low vigor seed, respectively. All three fungicide combinations increased plant stand compared to the control notwithstanding the seed vigor. Similar results were observed at 43 DAP for seedling stand. The low vigor seedling stand was reduced to 1.2 plants per foot of row while the high vigor seed was at an optimum of 2.5 plants per foot of row. The Trilex Advance alone or in combination with the Aeris/Poncho Votivo did protect more seedlings at the 43 DAP counts in both low and high vigor seed. Plant vigor was enhanced in the high vigor seed plots versus the low vigor seed plots although the Trilex Advance + Aeris/Poncho Votivo was the only fungicide combination that produced a perceptible increase in plant vigor at 43 DAP. The uniformity of the cotton plant stand was improved in the high vigor seed compared to the low vigor seed. The addition of the fungicide also increased cotton stand uniformity again in the Trilex Advance alone or in combination with the Aeris/Poncho Votivo, which averaged 5 feet of row without plants compared to 9 feet in the control. Yield was the only factor with a significant interaction between vigor and fungicide. All fungicides significantly increased yield in the low vigor seed. The low vigor cotton seed yield increased an average of 1,630 pounds over the control for the fungicide treatments. The high vigor seed yield increased an average of 442 pounds per acre for the fungicide treatment. Thus, the response of the high vigor seed to the funigicdes was only 27 percent of that observed in the low vigor seed. The addition of any of the three fungicide combinations significantly improved yield in low vigor cotton seed.

Evaluation of High and Low Vigor Cotton with Fungicides for Seedling Disease Management in North Alabama, 2011

Seed treatment and rate	Stand/10 ft row†		Vigor	Skip index	Seed cotton
(oz/cwt)	28 DAP	43DAP	43 DAP	43 DAP	lb/A
High Vigor					
Untreated control	24.8 a-d	24.4 ab	3.2 ab	6.2 cd	3468 a
Baytan (0.5) + Vortex (0.08) + Allegiance (0.75)	30.6 ab	22.6 ab	3.0 abc	5.4 cd	3864 a
Trt 2 + Trilex Advanced (3.0 +0.75 + 1.64)	28.8 a	27.0 a	3.4 a	3.2 d	3783 a
Trt 3 + Aeries/Poncho Votivo (3.0 + 0.75 + 22 + 12.7)	33.2 a	27.4 a	3.8 a	3.0 d	4086 a
Low Vigor					
Untreated control	7.4 e	5.8 d	2.2 c	13.8 a	2087 b
Baytan (0.5) + Vortex (0.08) + Allegiance (0.75)	18.2 cd	11.0 cd	2.4 bc	11.4 ab	3570 a
Trt 2 + Trilex Advanced (3.0 +0.75 + 1.64)	21.0 bcd	17.4 abc	2.4 bc	7.2 cd	3491 a
Trt 3 + Aeries/Poncho Votivo (3.0 + 0.75 + 22 + 12.7)	16.2 d	15.0 bcd	3.4 a	8.6 bc	4092 a
LSD (P ≤ 0.10)	***7.88***	***6.98***	***0.35***	***2.89***	***628.5***
Untreated Control	16.1 b	15.1 b	2.7 b	10.0 a	2778 c
Baytan (0.5) + Vortex (0.08) + Allegiance (0.75)	24.4 a	16.8 ab	2.7 b	8.4 a	3717 ab
Trt 2 + Trilex Advanced (3.0 +0.75 + 1.64)	24.9 a	22.2 a	2.9 b	5.2 b	3637 b
Trt 3 + Aeries/Poncho Votivo (3.0 + 0.75 + 22 + 12.7)	24.7 a	21.2 a	3.6 a	5.8 b	4089 a
LSD (P ≤ 0.10)	***5.68***	***5.73***	***0.70***	***2.19***	***1.4***
High Vigor	29.4 a	25.4 a	3.4 a	4.5 b	3800 a
Low Vigor	15.7 b	12.3 b	2.6 b	10.3 a	3310 b
LSD (P ≤ 0.10)	***4.02***	***4.05***	***0.49***	***1.55***	***263.9***

† Stand was the number of seedlings in a 10-foot row.
Means followed by same letter do not significantly differ according to Fishers LSD test ($P \leq 0.10$).

Evaluation of Seed Treatment Fungicides for the Control of Seedling Disease on Cotton in North Alabama, 2011

S. R. Moore, K. S. Lawrence, and B. E. Norris

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. On the day of planting, soil temperature was 64 °F at a 4-inch depth and with adequate soil moisture. All fungicide treatments were applied to the FM1740B2F cotton seed by the manufacturer. For the high incidence disease trial, plots were infested with millet seed inoculated with *Rhizoctonia solani*, *Thielaviopsis basicola*, and *Pythium ultimum*, while for the low incidence disease trial, plots were left naturally infested. Temik 15G (5 pounds per acre) was applied at planting on April 12 in the seed furrow with chemical granular applicators attached to the planter. For each of the low and high disease pressure trials, each plot consisted of two rows, each 25 feet long with 40-inch row spacing, and plots were arranged in a randomized complete block design with five replications. Adjacent blocks were separated by 20-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 28 and 43 days after planting (DAP) to determine stand density and percent seedling loss resulting from cotton seedling diseases. Vigor ratings were taken at 43 days after planting (DAP) to determine overall health of the plants. Plots were harvested October 10. 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 moderate for early planted cotton in 2011. At 28 DAP, 79 and 72 percent of all seed planted had emerged within the low and high incidence plots, respectively. Fungicide seed treatments produced cotton seedling stands comparable to the untreated control at 28 and 43 DAP, respectively, in both the low and high disease incidence plots. Cotton seedling vigor at 43 DAP was comparable to the untreated control in both the low and high disease incidence plots. Within the low disease incidence trial, all fungicide seed treatments with the exception of Treatment 7 (Dynasty + Maxim 4FS + Apron XL) produced higher seed cotton yields over the untreated control by an average of 17 percent. Treatment 5 (BAS 5001 2F + BAS 7000 2F high rate + Nu-Flow M-H + Acquire FL) produced significantly higher seed cotton yields over the untreated control. In the high incidence plots, fungicide seed treatments produced yields that averaged 9.1 percent more than the untreated control. Treatments 5 and 6 (Nu-Flow M-H high rate + Acquire FL) produced significantly higher seed cotton yields compared to the untreated control.

Evaluation of Seed Treatment Fungicides for the Control of Seedling Disease on Cotton in North Alabama, 2011

		Low Disease Pressure				High Disease Pressure			
	Seed treatment and rate	**Stand/10 ft row†**		**Vigor‡**	**Seed cotton**	**Stand/10 ft row†**		**Vigor‡**	**Seed cotton**
	(mg ai/kg seed)	**28 DAP**	**43 DAP**	**43 DAP**	**kg/ha**	**28 DAP**	**43 DAP**	**43 DAP**	**kg/ha**
1	Untreated Control	29.2 a	27.4 a	3.0 a	3668.6 b	27.6 a	20.6 a	3.0 a	3791 b
2	BAS 5001 2F (200) + BAS 7000 2F (60) + Acquire FL (50.3)	30.0 a	23.8 a	3.2 a	4425.8 ab	28.0 a	27.0 a	2.6 a	3999 ab
3	BAS 5001 2F (200) + BAS 7000 2F (120) + Acquire FL (50.3)	31.6 a	28.8 a	3.2 a	3868.0 ab	29.8 a	22.2 a	2.0 a	3959 ab
4	BAS 5001 2F (200) + BAS 7000 2F (60) + BAS 7000 2F (60) + Nu-Flow M-H (73.125) + Acquire FL (50.3)	28.8 a	23.4 a	3.2 a	4287.5 ab	29.4 a	27.6 a	2.4 a	4005 ab
5	BAS 5001 2F (200) + BAS 7000 2F (120) + Nu-Flow M-H (73.125) + Acquire FL (50.3)	37.6 a	31.8 a	3.4 a	4735.5 a	33.2 a	30.8 a	2.8 a	4386 a
6	Nu-Flow M-H (260) + Acquire FL (50.3)	32.6 a	26.4 a	3.4 a	4049.0 ab	28.0 a	24.4 a	2.6 a	4396 a
7	Dynasty (190) + Maxim 4 FS (6.25) + Apron XL (26.4)	30.2 a	35.8 a	3.4 a	3652.0 b	26.0 a	22.4 a	2.4 a	4144 ab
8	Dynasty (190) + Maxim 4 FS (6.25) + Apron XL (26.4) + Nu-Flow M-H (73.125)	32.6 a	32.8 a	3.4 a	4381.3 ab	29.4 a	20.4 a	2.4 a	4066 ab
	LSD ($P \leq 0.10$)	***8.92***	***6.98***	***0.35***	***628.53***	***9.51***	***10.71***	***0.79***	***372.3***

† Plant stand based on the number of seedlings in a 10-foot row.
‡ Vigor ratings based on a 0 to 5 scale.
Numbers within a column followed by the same letter are not significantly different based on Fisher's LSD at $P \leq 0.10$.

NEMATODE MANAGEMENT

EVALUATION OF THREE COTTON VARIETIES RESPONSE WITH FOUR NEMATICIDES TO THE RENIFORM NEMATODE IN NORTH ALABAMA, 2011

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

Three cotton varieties—Stoneville ST 5458B2F, ST-4288B2F, and Fiber Max FM1740B2F—were evaluated with four nematicide combinations for the management of the reniform nematode on cotton in an infested field on the Tennessee Valley Research and Extension Center in Belle Mina, Ala. The field was inoculated with the reniform nematode in May 2007. The soil was a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The cotton varieties were treated by Bayer Crop Science. Plots were planted on May 17 and consisted of two rows, 25 feet long with 40-inch row spacing, and were arranged in a randomized complete block design with four 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. Nematode numbers were determined at monthly intervals. Plots were harvested on October 21. Data were statistically analyzed using SAS and means compared using Fisher's protected least significant difference test ($P \leq 0.10$). No interactions were observed between variety and nematicide but all data are presented for comparisons. Monthly average maximum temperatures from planting in April through harvest in September were 74.3, 78.8, 91.3, 91.2, 91.6, 80.2, and 73.4 °F with average minimum temperatures of 52.2, 58.0, 68.3, 71.4, 68.1, 58.8, and 46.5 °F, respectively. Rainfall accumulation for each month was 10.22, 2.53, 3.11, 4.28, 1.15, 3.15, and 1.47 inches with a total of 25.91 inches over the entire season.

Nematode disease pressure was moderate in 2011 due to the lack of rainfall in May, June, and August. Initial nematode numbers averaged 1201 vermiform life stages/150 cm^2 of soil at planting. Plant stand ranged from 2.6 to 3.2 plants per foot of row with no differences between any treatment and variety. Nematode numbers on average were increasing at 30 days after planting (DAP). The ST 4288B2F variety supported fewer reniform with the nematicides Poncho Votivo Gaucho 600 than with Gaucho 600 alone. There were no differences in reniform numbers between the three varieties or four nematicides. The 60 DAP samples were taken during a drought period and numbers of nematodes declined 80 percent over all varieties and nematicides. By harvest numbers had increased fourfold; however, all treatments and varieties supported similar numbers of reniform ($P \leq 0.10$). Yields varied by 1,145.7 pounds per acre over all variety + nematicide combinations. Seed cotton yields were 17 percent greater in the ST4288B2F variety compared to ST5458B2F which was 16 percent greater than the FM1740 B2F. Nematicides were ranked as follows: (1) Poncho Votivo Gaucho 600, (2) Poncho Votivo Aeris CMT 4586, (3) Poncho Votivo Aeris, and (4) Gaucho 600. The Poncho Votivo Gaucho 600 supported the greatest yields in two of the three varieties.

Evaluation of Three Cotton Varieties Response with Four Nematicides to the Reniform Nematode in North Alabama, 2011

Variety and Nematicides	Stand†	Reniform per 150 cm^3			Seed cotton
	10 ft. row	30 DAP	60 DAP	150 DAP	lb/A
ST5458B2F + Gaucho 600	31.8 a	869.3 ab	154.8 a	4268.3 a	2035 bcd
ST5458B2F + Poncho Votivo Gaucho 600	29.0 a	1217.0 ab	251.0 a	4384.0 a	2079 bcd
ST5458B2F + Poncho Votivo Aeris	29.8 a	907.8 ab	193.0 a	3225.3 a	2268 abc
ST5458B2F + Poncho Votivo Aeris CMT4586	28.8 a	1120.3 ab	193.3 a	4500.0 a	2369 abc
ST4288B2F + Gaucho 600	26.8 a	1854.0 a	212.8 a	4480.5 a	2626 ab
ST4288B2F + Poncho Votivo Gaucho 600	27.3 a	676.0 b	135.3 a	3534.3 a	2793 a
ST4288B2F + Poncho Votivo Aeris	29.5 a	1178.3 ab	251.3 a	3901.3 a	2552 ab
ST4288B2F + Poncho Votivo Aeris CMT4586	33.8 a	1854.0 a	193.3 a	3418.5 a	2643 ab
FM1740B2F + Gaucho 600	30.5 a	1313.3 ab	367.0 a	3051.8 a	1795 cd
FM1740B2F + Poncho Votivo Gaucho 600	31.5 a	1139.8 ab	405.5 a	4635.0 a	2109 bcd
FM1740B2F + Poncho Votivo Aeris	32.0 a	1332.8 ab	290.0 a	3399.3 a	1762 cd
FM1740B2F + Poncho Votivo Aeris CMT4586	28.3 a	1545.0 ab	173.8 a	3186.8 a	1647 d
LSD ($P \leq 0.10$)	***7.18***	***1134.02***	***343.55***	***2003.3***	***403.2***
Gaucho 600	29.7 a	1345.5 a	244.8 a	3933.5 a	2152 a
Poncho Votivo Gaucho 600	29.3 a	1010.9 a	263.9 a	4184.4 a	2327 a
Poncho Votivo Aeris	30.4 a	1139.6 a	244.8 a	3508.6a	2194 a
Poncho Votivo Aeris CMT4586	30.3 a	1506.4 a	186.8 a	3701.8 a	2220 a
LSD ($P \leq 0.10$)	***3.3***	***582.7***	***161.0***	***1486.8***	***226***
ST5458B2F	29.8 a	1028.6 a	198.0 a	4094.4 a	2188 b
ST4288B2F	29.3 a	1390.6 a	198.1 a	3833.6 a	2653 a
FM1740B2F	30.6 a	1332.7 a	309.1 a	3568.2 a	1828 c
LSD ($P \leq 0.10$)	***2.9***	***504.7***	***139.5***	***1287.6***	***195.8***

† Stand was the number of seedlings in a 10-foot row.
Means followed by same letter do not significantly differ according to Fishers LSD test ($P \leq 0.10$).

Efficacy of Experimental Seed Treatments on the Fusarium Wilt Complex in Alabama Cotton, 2011

T. Z. Scott, K. S. Lawrence, and S. R. Moore

Efficacy of experimental treatments was evaluated for the management of the Fusarium wilt root knot nematode complex on cotton in a naturally infested field on the E. V. Smith Research Center near Shorter, Ala. The field site soil was Kalmia loamy sand soil. All seed treatments were applied to the PHY 565 WRF cotton seed by Syngenta Crop Science. The test was planted on April 28, 2011; soil temperature was 64 °F at a 4-inch depth with adequate soil moisture. Plots consisted of two rows, 25 feet long with a 36-inch row spacing, and were arranged in a randomized complete block design with five replications. Blocks were separated by a 20-foot wide alley. Stand counts, plant vigor, and uniformity were counted and rated at 28 days after planting (DAP). Nematode eggs were extracted from three root systems per plot at 40 DAP. All production practices for herbicides, fertilizers, and insecticides were carried out as recommended by the Alabama Cooperative Extension System. Plots were harvested on September 26 with a plot harvester. Monthly rainfall totals for April through October were 1.91, 2.22, 2.24, 8.02, 0.64, 4.9, and 0.98 inch, respectively. Total rainfall over the growing season was 20.91 inches. Average monthly maximum temperatures for April through October were 80.7, 84.9, 95.8, 92.9, 95.6, and 85.2 °F, respectively, and average minimum temperatures were 52.5, 57.4, 69.3, 72,4 70.2, and 62.7 °F, respectively.

Nematode disease pressure was ideal for early planted cotton in 2011. Stand counts at 30 DAP indicated that five of the fungicide combinations increased plant stand over treatment 1 (Avicta Duo control). Plant vigor was similar for seedlings in all plots. Plant stand uniformity was also measured and was similar between all fungicide treatments (data not shown). Root fresh weight significantly increased in treatment 4 (Avicta Duo control + A9625, Apron XL 3LS, Maxim 4FS, Systhane 40WP, and Dynasty CST 125FS) and treatment 9 (Avicta Duo control + A9625, A17823, Apron XL 3LS, Maxim 4FS, Systhane 40WP, and ynasty CST 125FS). Root knot counts significantly decreased in treatments 7 and 9. Although root knot per gm of root was measured to show similar population, treatments 4, 7, and 9, which included the experimental A9625, reduced root knot numerically compared to the Avicto Duo standard. All yields among these treatments were similar to that of the Avicto Duo standard. Averaged over all fungicide treatments, however, yields were increased 56 pounds per acre in fungicide combinations compared to the Avicto Duo standard.

Efficacy of Experimental Seed Treatments on the Fusarium Wilt Complex in Alabama Cotton, 2011

No	Nematicide	Rate	Product/A rate unit	Plant count†	Plant vigor	Root fresh weight	J2-Root knot	Root knot/ gm of root	Yield lb/A
1	AVICTA DUO 4.03 SC	0.5	mgai/seed	32.4 b	3.4 a	5.688 a	5809.4 a	1235.8 a	1696 a
2	Apron XL 3 LS	7.5	gai/100kgseed	32.4 b	3.2 a	7.578 a	7338.8 a	1035.8 a	1973 a
	Maxim 4 FS	2.5	gai/100kgseed						
	Systhane 40 WP	21	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Dynasty CST 125 FS	0.03	mgai/seed						
3	Allegiance-LS	15	gai/100kgseed	38.8 a	3.8 a	5.6 a	7122.6 a	1365.2 a	1787 a
	Baytan 30	10	gai/100kgseed						
	Vortex 3.77 FS	2.5	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Dynasty CST 125 FS	0.03	mgai/seed						

continued

Efficacy of Experimental Seed Treatments on the Fusarium Wilt Complex in Alabama Cotton, 2011

No	Nematicide	Rate	Product/A rate unit	Plant count†	Plant vigor	Root fresh weight	J2-Root knot	Root knot/ gm of root	Yield lb/A
4	Apron XL 3 LS	7.5	gai/100kgseed	35.0 a	3.4 a	4.982 b	4635.2 a	822 a	1546 a
	Maxim 4 FS	2.5	gai/100kgseed						
	Systhane 40 WP	21	gai/100kgseed						
	A9625	1	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Dynasty CST 125 FS	0.03	mgai/seed						
5	Allegiance-LS	15	gai/100kgseed	35.2 a	3.2 a	6.41 a	9069.2 a	1434.8 a	1624 a
	Baytan 30	10	gai/100kgseed						
	Vortex 3.77 FS	2.5	gai/100kgseed						
	A9625	1	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Dynasty CST 125 FS	0.03	mgai/seed						
6	Apron XL 3 LS	7.5	gai/100kgseed	31.0 b	3.4 a	7.088 a	12576.6 a	1695.4 a	1849 a
	Maxim 4 FS	2.5	gai/100kgseed						
	Systhane 40 WP	21	gai/100kgseed						
	A9625	2	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Dynasty CST 125 FS	0.03	mgai/seed						
7	Apron XL 3 LS	7.5	gai/100kgseed	34.0 a	3.4 a	5.616 a	1313.4 b	316.6 a	1715 a
	Maxim 4 FS	2.5	gai/100kgseed						
	Systhane 40 WP	21	gai/100kgseed						
	A9625	4	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Dynasty CST 125 FS	0.03	mgai/seed						
8	Allegiance-LS	15	gai/100kgseed	39.8 a	3.6 a	5.704 a	6195.6 a	1224.6 a	1803 a
	Baytan 30	10	gai/100kgseed						
	Vortex 3.77 FS	2.5	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Allegiance-LS	15	gai/100kgseed						
	Baytan 30	5	mgai/seed						
	Trilex Flowable	10	gai/100kgseed						
9	Apron XL 3 LS	7.5	gai/100kgseed	32.8 b	3.2 a	4.63 b	2456.8 b	539 a	1712 a
	Maxim 4 FS	2.5	gai/100kgseed						
	Systhane 40 WP	21	gai/100kgseed						
	A9625	1	gai/100kgseed						
	A17823	21	gai/100kgseed						
	Avicta Duo 4.03 SC	0.5	mgai/seed						
	Dynasty CST 125 FS	0.03	mgai/seed						
	LSD P ≤ 0.05)			***6.31***	***0.73***	***2.32***	***8829.7***	***1381.9***	***778.2***

† Stand counts were the number of live plants in 3.1 m of row.
Means followed by same letter do not significantly differ (P≤.05)

Cotton Variety Trial for Resistance to Verticillium Wilt in North Alabama, 2011

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

Cotton cultivars were examined to determine their response to the root pathogen *Verticillium dahilae*, which causes wilt of cotton. The test was located on the Tate farms in northern Alabama. Plots were set up as replicated strips. Each plot consisted of one row, approximately 500 feet long (the length of the field) with a 40-inch row spacing. Irrigation was added with the center pivot and with four to six irrigation applications of 0.8 inch of water or less at each watering event, depending on the crops needs. All plots were maintained throughout the season using standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Wilted plants were counted on September 13, 2011. The total number of plants in 10 feet of row was counted and the number displaying wilt symptoms and vascular discoloration was recorded. Wilt severity was rated over the entire plot on a 1 to 5 scale with 1 representing no diseased plants, 3 representing wilted plants with chlorotic and necrotic leaf symptoms, and 5 representing plants with wilted necrotic leaves and dead plants present in each plot. Re-isolation of the Verticillium wilt fungus was conducted to confirm the presence of the disease pathogen. Data were statistically analyzed using Generalized Linear Mixed Models procedures as implemented in SAS. Means were separated using Fisher's protected least significant difference test ($P \leq 0.05$).

The hot dry season was not conducive for Verticillium wilt in 2011, and disease symptoms were not as severe as seen in previous years. Environmental temperature and moisture was collected at the nearest research station. Monthly average maximum temperatures from planting in April through harvest in September were 76.2, 81.2, 90.1, 93.1, 94.2 and 88.4 °F with average minimum temperatures of 50.6, 61.2, 69.7, 71.0, 72.1, and 61.0 °F, respectively. Rainfall accumulation for each month was 4.07, 2.46, 4.99, 2.24, 3.70, 1.22, and 0.05 inches with a total of 18.74 inches over the entire season.

The most susceptible varieties with the greatest number of wilted plants were CP3787B2RF, DP1137B2RF, DP-1034B2RF, and DPX10R0135. These varieties produced an average percent of wilted plants of 70 percent or greater. These varieties along with PHY375WRF, DPX10R0110, and DPX10R052 formed the most severe Verticillium wilt severity ratings for the season. ST4288B2F, which is our most resistant variety, produced similar Verticillium wilt ratings as BX1261, DP1044B2RF, DPX10R020, BX1262, DPX10R0159, FM1740B2F, DPX10R011, and PHY367WRF. Verticillium wilt severity was low in all these varieties as well. Thus these eight varieties appear to support less Verticillium wilt.

Cotton Variety Trial for Resistance to Verticillium Wilt in North Alabama, 2011

Variety	Verticillium incidence % of plants in 10-ft row	Verticillium severity 1-5 scale
CROPLAN 3787 B2RF	81.59 a	2.875 abc
DP 1137 B2RF	77.79 ab	3.125 ab
DP 1034 B2RF	71.85 abc	2.875 abc
DPLX 11R135	70.59 abc	3.250 a
PHY 375 WRF	67.86 b-d	2.750 a-d
DPLX 11R110	66.83 b-e	2.875 abc
DPLX 10R052	59.62 b-e	2.875 abc
BCSX 1150	59.10 b-e	2.500 b-f
PHY 499 WRF	58.29 b-e	2.687 a-e
DPLX 10R051	56.36 c-g	2.500 b-f
DPLX 11R136	48.79 d-h	2.500 b-f
DP 1133 B2RF	46.92 e-h	2.250 c-h
DPLX 11R115	46.65 f-h	2.250 c-h
ST 5288 B2F	45.62 f-j	2.500 b-f
DP 0912 B2RF	39.86 f-k	2.375 c-g
DPLX 11R112	39.46 f-k	2.125 d-i
DPLX 11R154	36.78 g-l	2.125 d-i
DPLX 11R124	34.38 h-m	1.875 f-j
DPLX 10R013	33.78 h-m	2.000 e-j
ST 4288 B2F	32.57 h-m	1.875 f-j
BX 1261	32.44 h-m	1.625 hij
DP 1044 B2RF	28.65 h-m	2.000 e-j
DPLX 10R020	28.13 i-m	1.625 hij
BX 1262	25.53 j-m	1.500 ij
DPLX 11R159	22.87 k-m	1.750 g-j
FM 1740 B2F	22.61 k-m	1.500 ij
DPLX 10R011	17.18 l-m	1.375 j
PHY 367 WRF	15.01 m	1.875 f-j
LSD ($P \leq 0.05$)	***20.432***	***0.7046***

Evaluation of a *Pasteuria* sp. on Cotton for Reniform Nematode Management in North Alabama, 2011

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

The experimental biological nematicide *Pasteuria* sp. was evaluated for the management of the reniform nematode on cotton in an infested field on the Tennessee Valley Research and Extension Center in Belle Mina, Ala. The field was inoculated with the reniform nematode in May 2007. The soil was a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The FM1740 B2F seed were treated with a base fungicide insecticide mix of Baytan 30 10g + Vortex FL 2.5g + Allegiance FL 15.6 g ai/100 kg seed and Gaucho 600 FS applied at 0.375 mg ai per seed. *Pasteuria* sp. was applied by Pasteuria BioSciences. Plots were planted on May 17 and consisted of two rows, 25 feet long with a 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. Nematode numbers were determined at monthly intervals. Plots were harvested on October 25. Data were statistically analyzed by ARM and means compared using Fisher's protected least significant difference test ($P \leq 0.05$). Monthly average maximum temperatures from planting in April through harvest in September were 76.2, 81.2, 90.1, 93.1, 94.2 and 88.4 °F with average minimum temperatures of 50.6, 61.2, 69.7, 71.0, 72.1, and 61.0 °F, respectively. Rainfall accumulation for each month was 4.07, 2.46, 4.99, 2.24, 3.70, 1.22, and 0.05 inches with a total of 18.74 inches over the entire season.

Nematode disease pressure was moderate in 2011 due to the lack of rainfall in May, June, and August. Initial nematode numbers averaged 1198 vermiform life stages/150 cm^3 of soil at planting. Plant stand were uniform and no phytotoxity was observed. Nematode numbers doubled in samples taken 30 days after planting (DAP); however, there were no differences between any of the treatments. In the 60 DAP samples, nematode numbers were very low probably due to the drought and no differences were observed between the Pasteuria and control plots. At harvest, nematode numbers were significantly lower in the *Pasteuria* 2x rate treatment compared to *Pasteuria* applied at the1x rate. Seed cotton yields were similar between treatments with a range in yields of 413 pounds per acre.

Evaluation of a *Pasteuria* sp. on Cotton for Reniform Nematode Management in North Alabama, 2011

			Stand/10 ft row‡	*Rotylenchulus reniformis*			Seed cotton
No	Treatment†	Rate	6/8/11 22 DAP	6/22/11 30 DAP	7/20/11 60 DAP	10/25/11 150 DAP	lb/A 150 DAP
1	Control		35.0 a	2433 a	386 a	1506 ab	2508 a
2	Pasteuria	106 cfu/seed	30.5 a	4248 a	541 a	2955 a	2171 a
3	Pasteuria	107 cfu/seed	36.8 a	2182 a	309 a	1042 b	2217 a
4	Aeris	0.75 mg ai/seed	33.8 a	2317 a	502 a	2858 a	2584 a
	LSD (P≤0.05)		***9.15***	***3098.87***	***655.97***	***5372.4***	***861.4***

† Baytan 30 10g + Vortex FL 2.5g + Allegiance FL 15.6 g ai/100 kg seed and Gaucho 600 FS 0.375 mg ai/seed base coat applied to all treatments.
‡ Stand counted from 3.05 m of row.
Means followed by same letter do not significantly differ according to Fishers LSD test ($P \leq 0.05$).

Evaluation of an Experimental Nematicide, BCS-AR83685, on Cotton for Reniform Nematode Management in Alabama, 2011

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

The experimental nematicide BCS-AR83685 was evaluated for the management of the reniform nematode on cotton in an infested field on the Tennessee Valley Research and Extension Center in Belle Mina, Ala. The field was inoculated with the reniform nematode in May 2007. The soil was a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The FM1740 B2F seed were treated with a base fungicide mix of Baytan 30 10g + Vortex FL 2.5g + Allegiance FL 15.6 g ai/100 kg seed. Gaucho 600 FS, Aeris, Poncho + Votivo, or L1940A were applied to the seed for the specific treatments by Bayer Crop Science. Plots were planted on May 17 and 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. The B application of BCS-AR83685 + Admire Pro Systemic was applied as an in-furrow spray at planting. The C application of BCS-AR83685 + Admire Pro Systemic was applied to the soil, simulating a lay-by fertilizer application injecting the nematicides 2 inches away from the plant stem and 2 inches deep in the soil on June 22. 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. Nematode numbers were determined at monthly intervals. Plots were harvested on October 25. Data were statistically analyzed by ARM and means compared using Fisher's protected least significant difference test ($P \leq 0.05$). Monthly average maximum temperatures from planting in April through harvest in September were 76.2, 81.2, 90.1, 93.1, 94.2 and 88.4 °F with average minimum temperatures of 50.6, 61.2, 69.7, 71.0, 72.1, and 61.0 °F, respectively. Rainfall accumulation for each month was 4.07, 2.46, 4.99, 2.24, 3.70, 1.22, and 0.05 inches with a total of 18.74 inches over the entire season.

Nematode disease pressure was moderate in 2011 due to the lack of rainfall in May, June, and August. Initial nematode numbers averaged 1301 vermiform life stages/150 cm^3 of soil at planting. Plant stand averaged 3.3 plants per 1 foot of row with no differences between any nematicides. Nematode numbers were very low at 30 days after planting (DAP) due to the lack of rainfall. At 60 DAP populations were significantly lower in treatments 2 and 4 (the Gaucho 600 FS + BCS-AR83685 + Admire Pro Systemic combinations) as compared to treatment 7 (Aeris + Poncho + Votivo). At harvest, treatments 2 and 3 (the Gaucho 600 FS + BCS-AR83685 + Admire Pro Systemic combinations) continued to support the lowest populations; however, they were not different from the control. Seed cotton yields were significantly increased in treatments 2, 3, and 4 (the Gaucho 600 FS + BCS-AR83685 + Admire Pro Systemic combinations) as compared to the control. The Gaucho 600 FS + BCS-AR83685 + Admire Pro Systemic combinations increased the cotton yield by an average of 878 pounds per acre over the control.

Evaluation of an Experimental Nematicide, BCS-AR83685, on Cotton for Reniform Nematode Management in Alabama, 2011

				Stand§	*Rotylenchulus reniformis*/150 cm^3			Seed cotton
No	Treatment†	Rate and application	Timing of treatment	6/8 11 22 DAP	6/22/11 30 DAP	7/20/11 60 DAP	10/25/11 150 DAP	lb/A 150 DAP
1	Gaucho 600 FS	0.375 mg ai/seed	A‡	35.0 a	174.0 a	540.8 ab	5890.5 ab	2554 b
2	Gaucho 600 FS	0.375 mg ai/seed	A	30.5 a	212.8 a	340.8 b	3302.5 b	3489 a
	BCS-AR83685	250 g ai/ha	B					
	Admire Pro Systemic	210 g ai/ha	B					
3	Gaucho 600 FS	0.375 mg ai/seed	A	36.8 a	193.3 a	463.5 ab	2742.5 b	3451 a
	BCS-AR83685	125 g ai/ha	B					
	Admire Pro Systemic	210 g ai/ha	B					
4	Gaucho 600 FS	0.375 mg ai/seed	A	33.3 a	289.8 a	328.5 b	4442.0 ab	3356 a
	BCS-AR83685	125 g ai/ha	B					
	Admire Pro Systemic	210 g ai/ha	B					
	BCS-AR83685	125 g ai/ha	C					
5	Gaucho 600 FS	0.375 mg ai/seed	A	35.0 a	367.0 a	1081.8 ab	7223.0 ab	2398 b
	L1940-A	0.375 mg ai/seed	A					
6	Aeris	0.75 mg ai/seed	A	33.8 a	174.3 a	1081.5 ab	6508.3 ab	2678 b
	L1940-A	0.375 mg ai/seed	A					
7	Aeris	0.75 mg ai/seed	A	30.0 a	521.5 a	1274.5 a	4268.3 ab	2709 ab
	Poncho Votivo	0.424 mg ai/seed	A					
8	Gaucho 600 FS	0.375 mg ai/seed	A	33.0 a	289.8 a	965.8 ab	9811.0 a	2979 ab
	L1940-A	0.375 mg ai/seed	A					
	Poncho Votivo	0.424 mg ai/seed	A					
	LSD ($P \leq 0.05$)			***9.15***	***231.53***	***841.61***	***5372.4***	***740.8***

† Baytan 30 10g + Vortex FL 2.5g + Allegiance FL 15.6 g ai/100 kg seed applied to all treatments for seedling disease control
‡ Timing of treatment: A applied as seed treatment; B applied as foliar spray at planting; and C applied at pin head square as a lay-by fertilizer application.
§ Stand counted from 10 ft of row.
Means followed by same letter do not significantly differ according to Fishers LSD test ($P \leq 0.05$).

Evaluation of Counter, Temik, and Avicta on Cotton for Root Knot Nematode Management in Alabama, 2011

K. S. Lawrence, S. R. Moore, T. Reed, and S. Nightengale

Counter 20G, Temik 15G, and Avicta were evaluated for the management of the root knot nematode on cotton in an naturally infested field on the E. V. Smith Research Center near Shorter, Ala. The soil is a Kalmia loamy sand (80 percent sand, 10 percent silt, 10 percent clay). The PHY 565 WRF seed were treated with Avicta complete pack or with the fungicide and insecticide only by Syngenta Crop Science. Counter 20 G (4, 6, and 8 pounds per acre) and Temik 15G (3.5 and 7 pounds per acre) were applied at planting on April 28 in the seed furrow with chemical granular applicators attached to the planter. Plots consisted of two rows, 25 feet long with 36-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. Nematode numbers were determined by digging three root systems per plot at 30 days after planting (DAP). Plots were harvested on September 26. Data were statistically analyzed by ARM and means compared using Fisher's protected least significant difference test ($P \leq 0.05$). Monthly average maximum temperatures from planting in April through harvest in September were 80.7, 84.9, 95.8, 92.9, 95.6, and 85.2 °F with average minimum temperatures of 52.5, 57.4, 69.3, 72.4, 70.2, and 62.7 °F, respectively. Rainfall accumulation for each month was 1.91, 2.22, 2.24, 8.02, 0.64, and 4.9 inches with a total of 19.93 inches over the entire season.

Nematode disease pressure was ideal for early planted cotton in 2011. Initial nematode numbers averaged 77 J2/150 cm^2 of soil at planting. Plant stand was similar between all treatments with 2.6 to 3.6 plants per foot of row at 30 DAP. Thrips damage was evident and all nematicide treatments reduced foliar damage as compared to the control. Nematode eggs were also reduced by treatments 4 (Counter 20 G 8 pounds per acre), 7 (Avicta Complete), and 8 (Avicta Complete + Counter 20 G 4 pounds per acre) at 30 DAP. The numbers of eggs per gram of root followed this same pattern. Seed cotton yields were significantly increased by treatments 4 (Counter 20 G 8 pounds per acre), 5 (Temik 15 G 3.5 pounds per acre), 6 (Temik 15 G 7 pounds per acre), and 8 (Avicta Complete + Counter 20 G 4 pounds per acre) as compared to the control. The Counter 20 G treatments averaged an increase in yield of 409 pounds per acre over the control. The Temik 15 G rates increased yield an average of 584.6 pounds per acre. The Avicta seed treatment and Avicta + Counter 20 G (4-pounds-per-acre rate) produced 278.2 and 475.7 pounds per acre of cotton more than the untreated control, respectively.

Evaluation of Counter, Temik, and Avicta on Cotton for Root Knot Nematode Management in Alabama, 2011

		Stand†	Thrips damage‡	*Meloidogyne incognita* 30 DAP		Seed cotton
No	Nematicide	10 ft/row	30 DAP	Eggs	Eggs/gm root	lb/A
1	Control	32.2 a	2.5 a	8636.4 ab	1303.6 ab	2001 b
2	Counter 20G 4 lb/A	32.0 a	1.2 b	14291.4 a	2079.2 a	2416 ab
3	Counter 20G 6 lb/A	26.6 a	1.0 b	9502.0 ab	2166.2 ab	2245 ab
4	Counter 20G 8 lb/A	31.2 a	0.8 b	3677.4 b	557.0 b	2573 a
5	Temik 15G 3.5 lb/A	33.0 a	0.6 b	6411.8 ab	1049.8 ab	2675 a
6	Temik 15G 7.0 lb/A	36.6 a	0.6 b	6381.2 ab	1345.4 ab	2497 a
7	Avicta	30.2 a	1.7 b	3986.4 b	541.0 b	2280 ab
8	Avicta + Counter 20G 4 lb/A	29.0 a	1.0 b	2703.8 b	432.8 b	2477 a
	LSD ($P \leq 0.10$)	***8.45***	***0.74***	***9144.72***	***1342.65***	***411.1***

† Stand was the number of seedlings in a 10-foot row.
‡ Thrip damage rating were from 0 to 4 with 0 being no foliar damage and 4 being sever foliar damage.
Means followed by same letter do not significantly differ according to Fishers LSD test ($P \leq 0.10$).

Evaluation of Counter, Temik, and Avicta on Cotton For Reniform Nematode Management in Alabama, 2011

K. S. Lawrence, S. R. Moore, C. H. Burmester, T. Reed, and B. E. Norris

Counter 20G, Temik 15G, and Avicta were evaluated for the management of the reniform nematode on cotton in an infested field on the Tennessee Valley Research and Extension Center in Belle Mina, Ala. The field was inoculated with the reniform nematode in May 2007. The soil was a Decatur silt loam (24 percent sand, 49 percent silt, 28 percent clay). The PHY 565 WRF seed were treated with Avicta complete pack or with the fungicide and insecticide only by Syngenta Crop Science. Counter 20 G (4, 6, and 8 pounds per acre) and Temik 15G (3.5 and 7 pounds per acre) were applied at planting on May 17 in the seed furrow with chemical granular applicators attached to the planter. Plots consisted of two rows, 25 feet long with a 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. Nematode numbers were determined at monthly intervals. Plots were harvested on October 21. Data were statistically analyzed by ARM and means compared using Fisher's protected least significant difference test ($P \leq 0.05$). Monthly average maximum temperatures from planting in April through harvest in September were 82.9, 88.0, 97.5, 93.7, 96.7, 87.0 and 79.5 °F with average minimum temperatures of 56.7, 59.5, 70.7, 73.0, 71.8, 64.6, and 48.5 °F, respectively. Rainfall accumulation for each month was 3.57, 2.09, 4.56, 6.13, 1.76, 4.18, and 0.19 inches with a total of 22.48 inches over the entire season.

Nematode disease pressure was moderate in 2011 due to the lack of rainfall in May, June, and August. Initial nematode numbers averaged 1,241 vermiform life stages/150 cm^2 of soil at planting. Plant stand was significantly greater in the Temik 15 G (7 pounds per acre) and the Avicta + Counter 20 G (4 pounds per acre) nematicide treatments at 30 days after planting (DAP). Nematode numbers were very low at 30 DAP due to the lack of rainfall. The Avicta seed treatment did have more reniform in those plots than the control; however, the population levels across the field were low. At 60 DAP populations were still only reduced 80 percent from planting. By harvest nematode numbers did increase to an average of 5,694 vermiform life stages/150 cm^2 of soil with all populations levels being similar to the untreated control. Seed cotton yields were significantly increased by Counter 20 G at 4 pounds per acre as compared to the control. The yield in Counter 20 G at 4 pounds per acre was similar to Temik 15 G at 7 pounds per acre. the Avicta seed treatment, and Avicta + Counter 20 G (4 pounds per acre). Interestingly, Counter 20 G applied at 6 and 8 pounds per acre produced yields significantly less than the 4-pounds-per-acre rate. Yields varied by 652 pounds per acre at harvest with an average of 394 pounds per acre average increase of seed cotton produced over all the fungicide treatments as compared to the untreated control.

Evaluation of Counter, Temik, and Avicta on Cotton For Reniform Nematode Management in Alabama, 2010

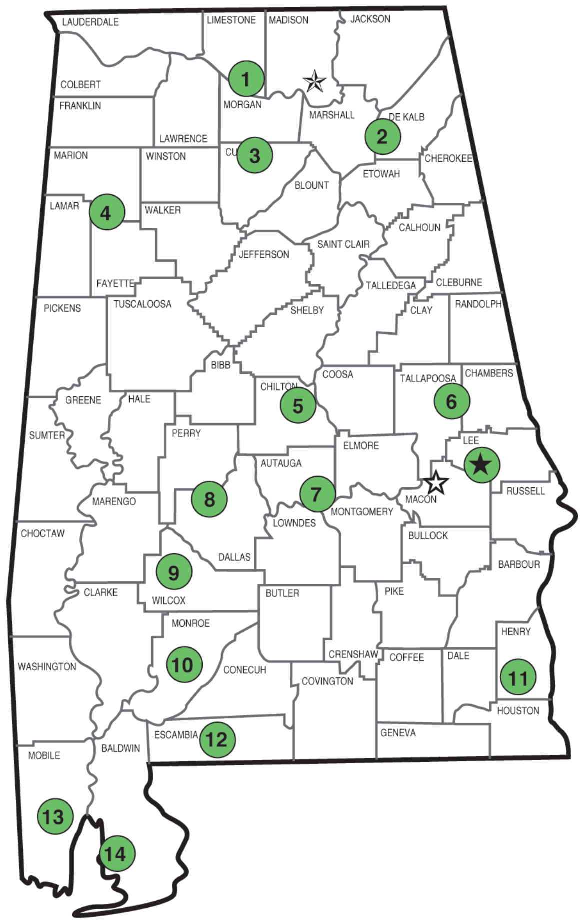
		Stand†	Reniform per 150 cm^3			Seed cotton
No	Nematicide	10 ft row	30 DAP	60 DAP	150 DAP	lb/A
1	Control	23.8 bc	270.5 b	251.3 a	4635.3 b	2076 bc
2	Counter 20G 4 lb/A	25.5 abc	212.5 b	251.3 a	5021.5 ab	2435 a
3	Counter 20G 6 lb/A	23.0 c	77.0 b	193.0 a	6006.5 ab	1854 bc
4	Counter 20G 8 lb/A	27.8 ab	270.3 b	116.0 b	8092.0 a	2067 bc
5	Temik 15G 3.5 lb/A	27.8 ab	115.8 b	116.0 b	4963.8 ab	1495 c
6	Temik 15G 7.0 lb/A	28.8 a	193.0 b	174.0 ab	6122.0 ab	2230 ab
7	Avicta	27.8 ab	811.3 a	154.8 ab	3920.3 b	2121 ab
8	Avicta + Counter 20G 4lb/A	28.3 a	173.8 b	232.0 ab	6798.0 ab	2345 ab
	LSD ($P \leq 0.10$)	***4.15***	***307.91***	***130.66***	***4344.19***	***577.5***

† Stand was the number of seedlings in a 10-foot row.
Means followed by same letter do not significantly differ according to Fishers LSD test ($P \leq 0.10$).

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.
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12. Brewton Agricultural Research Unit, Brewton.
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14. Gulf Coast Research and Extension Center, Fairhope.