2003 COTTON RESEARCH REPORT

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VARIETY TRIALS

Cherokee County Cotton Variety Trial

C.H. Burmester and D. Derrick

Each season a cotton variety trial is conducted in Cherokee County to supplement yield results from the Alabama Cotton Variety Trials. This large, cotton-growing area has unique soil types and farmers often use results of this test to evaluate new cotton varieties for northeast Alabama.

In 2003, the trial was conducted on the farm of Randall and Nick McMichen on a Holston fine sandy loam soil. Cotton was planted into a winter cover crop of wheat on April 30 and consisted of eight rows of each variety planted the length of the field. The test was replicated twice across the field.

A total of nine cotton varieties were planted in 2003. All varieties were genetically modified and contained the Roundup Ready gene that allows weed control applications with Roundup Ultra until the 4th leaf stage. All varieties were spindle picked, and seed cotton was weighed in a boll buggy. A seed cotton sample from each variety was ginned on a tabletop gin for lint percentage and quality.

A very wet May flooded the first replication and was not used in the test results. Although the cotton maturity was delayed by the cold, wet weather in May, late summer rainfall was good and produced an excellent crop. Insect pressure was low and only minimal control measures were required. Yields of all varieties were more than two bales per acre and quality was also excellent. DP 444 BG/RR did have a low micronaire value of 3.4 that was in the discount range.

Yield and Quality of Cotton Varieties in the Cherokee County Trial

Variety	Seed cotton yield *lbs/ac*	Lint[1] *%*	Lint yield *lbs/ac*	Mic.[2] *units*	Length *staple*	Unif.[3] *%*	Strength *g/tex*
DP 555 BG/RR	3150	45.7	1450	4.2	35	82	28.6
PM 1218 BG/RR	3358	42.4	1420	4.2	34	84	30.1
FM 960 BR	3477	43.6	1520	3.8	36	84	33.0
DP 444 BG/RR	3632	45.2	1640	3.4	36	84	29.6
ST 4892 BR	3384	44.7	1510	4.4	37	83	31.5
FM 989 BR	3398	42.1	1430	3.8	37	82	33.1
ST 5599 BR	3528	44.0	1550	4.4	37	83	31.5
ST 5303 R	3361	42.7	1440	3.9	36	85	32.9
DP 449 BG/RR	3416	43.0	1470	4.2	36	84	31.4

[1] Lint % determined on a small cotton gin without cleaners. This percentage is usually higher than normal turn-out at a cotton gin. [2] Mic.=micronaire. [3] Unif.=uniformity.

2003 Elmore County Roundup Ready Cotton Variety Trial

D.P. Delaney, C.D. Monks, L. Kuykendall, R. Beauchamp, and K. Glass

One of the most critical decisions a cotton producer makes each year is which variety to plant. Many factors, such as yield potential and lint quality, are heavily influenced by seed selection. Area cotton producers often ask for more site-specific information on the unique soils and situations on their farms. On-farm field trials are important to verify University research and to show how different varieties perform under typical management practices in producers' fields.

A field was selected on the Sanford Peeples farm near Holtville in Elmore County, Alabama. Fertilization and weed and insect control were maintained at optimum levels, according to Alabama Cooperative Extension System recommendations. No significant worm damage was noted. The same production practices were carried out across all varieties, regardless of technology or genetically engineered traits.

Thirteen cotton varieties, all containing the Roundup Ready gene were planted on April 23, 2003, with three replications of each variety in a complete block design. Each plot was eight field-length rows of a single variety.

The center four rows of each plot were harvested on September 25 with a spindle picker, and a weighing boll buggy was used to weigh each plot. One-pound grab samples were ginned on a mini-gin, and analyzed with HVI equipment at the USDA-AMS Birmingham Classing Office.

Results showed that there was a difference of 258 pounds per acre of lint between the highest and lowest yielding cultivars (see table). When USDA loan values were applied to lint yield and quality values (not shown), there was a difference in total value of more than $140 per acre from the lowest to highest valued variety, mainly due to yield differences.

Area cotton producers can use these results to compare the performance of these varieties with the potential for significantly higher returns from their crop. Producers should not rely on any single source, however, to guide their choices, but should also use other information such as the multi-year data from the Alabama Agricultural Experiment Station official variety trials (http://www.alabamavarietytesting.com) and other public and private sources.

ELMORE COUNTY ROUNDUP READY ON-FARM COTTON VARIETY TRIAL

Variety	Lint yield *lbs/ac*	Turnout *%*	Mic. *units*	Length *in*	Strength *g/tex*	Uniformity *%*
DP 555 BG/RR	952	44	4.5	1.14	28.8	83.3
ST 4892 BR	883	41	4.6	1.10	29.2	83.3
FM 991 BR	881	40	4.6	1.14	31.5	84.0
FM 989 RR	865	41	4.0	1.14	30.0	84.0
DP 5690 RR	862	40	4.4	1.11	30.3	82.0
ST 5599 BR	860	41	4.5	1.14	27.3	83.0
DP 451 B/RR	842	38	4.4	1.14	27.2	83.0
FM 960 BR	837	40	4.4	1.14	31.2	84.0
FM 991 RR	835	40	4.3	1.16	30.4	83.7
ST 5503 R	815	40	4.4	1.09	30.4	84.7
FM 989 BR	751	39	3.9	1.14	29.7	83.0
DP 655 B/RR	737	40	4.2	1.13	29.9	82.0
DP 449 BG/RR	694	40	4.2	1.10	29.6	83.0
LSD ($P \leq 0.10$)	**124**	**1**	**0.2**	**0.03**	**1.4**	**1.4**

2003 SHELBY COUNTY ROUNDUP READY COTTON VARIETY TRIAL

D.P. Delaney, C.D. Monks, R. Colquitt, and K. Glass

One of the most critical decisions a cotton producer makes each year is which variety to plant. Many factors, such as yield potential and lint quality, are heavily influenced by seed selection. Area cotton producers often ask for more site-specific information on the unique soils and situations on their farms. On-farm field trials are important to verify University research and to show how different varieties perform under typical management practices in producers' fields.

A field was selected on the Phillip Barber farm near Harpersville in Shelby County, Alabama. Fertilization and weed and insect control were maintained at optimum levels, according to Alabama Cooperative Experiment Station recommendations. No significant worm damage was noted. The same production practices were carried out across all varieties, regardless of technology or genetically engineered traits.

Twelve cotton varieties, all containing the Roundup Ready gene were planted on April 21, 2003, with three replications of each variety in a complete block design. Each plot was four, field-length rows of a single variety.

The center two rows of each plot were harvested on October 3 with a spindle picker, and a weighing boll buggy was used to weigh each plot. One-pound grab samples were cleaned and ginned on a mini-gin, and analyzed with HVI equipment at the USDA-AMS Birmingham Classing Office.

Results showed that there was a difference of 204 pounds per acre of lint between the highest and lowest yielding cultivars (see table). There were also several significant differences in quality measurements between varieties.

SHELBY COUNTY ROUNDUP READY ON-FARM COTTON VARIETY TRIAL

Variety	Lint yield *lbs/ac*	Mic. *units*	Length *in*	Strength *g/tex*
DP 444 BG/RR	1181	3.7	1.12	28.5
ST 5599 BR	1179	4.2	1.10	29.7
ST 4892 BR	1171	4.3	1.11	29.6
ST 4793 R	1159	4.3	1.08	28.5
DP 449 BG/RR	1137	4.1	1.08	29.7
FM 989 RR	1135	3.6	1.11	31.8
FM 991 RR	1121	3.9	1.13	31.8
DP 555 BG/RR	1102	4.4	1.08	27.4
ST 5303 R	1088	4.2	1.08	30.4
SG 215 BR	1070	4.4	1.07	27.4
DP 436 RR	1025	4.3	1.12	27.7
DP 655 B/RR	977	4.1	1.11	31.9
LSD ($P \leq 0.05$)	**95**	**0.3**	**0.04**	**1.5**

Area cotton producers can use these results to compare the performance of these varieties with the potential for significantly higher returns from their crop. Producers should not rely on any single source, however, to guide their choices, but should also use other information such as the multi-year data from the Alabama Agricultural Experiment Station Official Variety Trials (http://www.alabamavarietytesting.com) and other public and private sources.

No-Till Cotton Varieties at E.V. Smith Research Center

D.P. Delaney, K. Glass, C.D. Monks, and B. Durbin

An increasing acreage of cotton in Alabama is planted using conservation tillage of some kind. Growers have asked for information about performance of cotton varieties within the systems they use on their farms. The objective of this test was to compare the suitability of several commercially available cotton varieties in a strip-till conservation tillage system.

Twenty-two selected varieties were planted on a Cowarts loamy sand at the E.V. Smith Field Crops Unit on May 1 into a killed rye cover crop. After in-row subsoiling, four replications of two 40-inch rows, 20 feet long of each variety were planted with a no-till planter equipped with row cleaners and spoked closing wheels. Fertility and pesticide applications were made according to Alabama Cooperative Extension System recommendations.

Plots were defoliated on September 15. Fifty-boll samples were taken from two replications, and ginned on a mini-gin for lint quality and turnout. Plots were picked on September 29.

Yield and turnout results are presented in the table below. Lint yields were excellent and ranged from 1381 to 1793 pounds per acre. Lint turnout ranged from 38 to 45 percent. Producers can use these results to compare the relative performance of these varieties in various management systems.

E.V. Smith No-Till Cotton Variety Trial, 2003

Variety	Lint yield *lbs/ac*	Turnout *%*	Mic. *units*	Length *in*	Strength *g/tex*	Uniformity *%*
DP 493	1793	45	4.7	1.09	31	83
SG 747	1727	42	4.7	1.16	28	85
DP 444 BG/RR	1688	44	3.8	1.08	29	83
DP 555 BG/RR	1663	45	4.4	1.13	30	84
ST 4793 R	1595	42	5.0	1.08	28	84
DP 491	1581	43	4.3	1.17	32	82
FM 960 BR	1574	40	4.0	1.12	32	83
DP 5690 RR	1556	41	4.3	1.11	34	83
ST 5599 BR	1532	41	4.6	1.12	31	83
SG 215 BR	1528	41	4.4	1.09	28	83
DP NuCotn 33B	1522	39	4.4	1.13	30	83
FM 989 RR	1519	42	4.1	1.11	33	83
ST 5303 R	1498	43	4.5	1.08	33	85
FM 966	1467	41	4.1	1.14	35	84
FM 991 RR	1459	41	4.3	1.14	33	84
PHY 410 RR	1449	41	4.6	1.12	30	85
DP 436 RR	1445	38	4.4	1.12	28	83
ST 4892 BR	1440	42	4.6	1.11	30	85
DP 451 B/RR	1416	39	4.6	1.10	29	83
DP Delta Pearl	1396	42	4.2	1.17	31	84
PHY 510 RR	1386	40	4.7	1.12	32	84
DP 449 BG/RR	1381	40	4.5	1.13	32	84
LSD ($P \leq 0.10$)	**192.8**	**1**	**0.4**	**0.04**	**2**	**2**
CV	**10.68**	**1**	**5.7**	**1.87**	**4**	**1**

EVALUATION OF COLD TOLERANT AND CONVENTIONAL COTTON VARIETIES AND PLANTING DATES IN SOUTH ALABAMA

D.P. Delaney, C.D. Monks, M.D. Pegues, R. McDaniel, and K. Glass

Seed for cotton cultivars currently grown in Alabama require warm soils in order to germinate and develop properly. Soil temperatures must remain above 60°F for a period of several days; this normally occurs after early April in much of the state, but can be later. Cold fronts, rain, and heavy mulches used with conservation tillage can delay soil warming even further. Producers planting early run the risk of poor stands due to delayed germination and seedling disease, as well as stunting from chilling injury. If producers were able to plant earlier, soil moisture may be more favorable, and cotton would potentially have a longer growing season, would have peak flowering during the longest summer days, and might set bolls before soil moisture supplies are depleted by hot summer weather. In south Alabama, this may allow harvest before the peak of the hurricane season. Recently released cold-tolerant cotton varieties are claimed to germinate and grow well at temperatures well below the optimum for currently grown varieties.

Two varieties each of cold-tolerant and conventional cotton cultivars were planted at each of three planting dates at the Gulf Coast Research and Extension Center, Fairhope, Alabama. One variety of each type was an early maturity and the other full season. Four replications of each variety, consisting of four rows, 25 feet long with a between row spacing of 40 inches, were planted on April 1, April 14, and April 28, using conventional tillage. Initial land preparation and planting was delayed by persistent heavy rainfall.

Fertility and pesticide applications were made according to Alabama Cooperative Extension System recommendations. Rainfall was plentiful through most of the season, and harvest conditions were generally good. Boll rot was heavy on the earliest planting date treatments due to persistent rainfall in August.

Plots were defoliated and harvested with a spindle picker when each treatment was mature. One-pound grab samples were ginned on a mini-gin for lint quality and turnout, and lint analyzed for quality by HVI at the USDA-AMS lab at Pelham, Alabama.

Yield and turnout results are presented in the table. Lint yields were very good and ranged from 918 to 1811 pounds per acre. Lint turnout ranged from 40 to 43 percent (not shown).

Although initial stands were affected by variety (not shown), good growing conditions allowed poor stands to compensate and yield relatively well. The latest planting date yielded the highest for all varieties, while much of the difference can be attributed to severe boll rot and hardlock for the earlier planting dates. The early varieties tended to perform better than full season varieties at the earliest planting date, while the opposite was true at the latest planting date. Further testing will be needed to determine if these varieties have the potential to allow earlier planting for producers.

LINT YIELDS FROM COLD TOLERANT COTTON VARIETIES BY PLANTING DATES, GULF COAST RESEARCH AND EXTENSION CENTER, 2003

Variety	Maturity[1]	Cold tolerance[1]	Lint yield (*lbs/ac*) 4/01[2]	4/14[2]	4/28[2]
CT 110HQ	Early	Yes	1399	1390	1639
FM 958	Early	NA	1305	1264	1611
CT 310HQ	Full	Yes	918	1249	1811
DP 491	Full	NA	1045	1276	1717
LSD ($P \leq 0.10$)				**290**	

[1] As listed by seed company. [2] Planting dates.

EVALUATION OF COLD TOLERANT AND CONVENTIONAL COTTON VARIETIES AND PLANTING DATES IN NORTH ALABAMA

D.P. Delaney, C.H. Burmester, C.D. Monks, B.E. Norris, and K. Glass

Seed for cotton cultivars currently grown in Alabama require warm soils in order to germinate and develop properly. Soil temperatures must remain above 60°F for a period of several days; this normally occurs after early April in much of the state, but can be later. Cold fronts, rain, and heavy mulches used with conservation tillage can delay soil warming even further. Producers planting early run the risk of poor stands due to delayed germination and seedling disease, as well as stunting from chilling injury. If producers were able to plant earlier, soil moisture may be more favorable, and cotton would potentially have a longer growing season, would have peak flowering during the longest summer days, and might set bolls before soil moisture supplies are depleted by hot summer weather. For northern areas, this may enable harvest before cold, wet fall weather, and in south Alabama, may allow harvest before the peak of the hurricane season. Recently released cold-tolerant cotton varieties are claimed to germinate and grow well at temperatures well below the optimum for currently grown varieties.

Two varieties each of cold-tolerant and conventional cotton cultivars were planted at each of three planting dates at the Tennessee Valley Research and Extension Center, Belle Mina, Alabama. One variety of each type was an early maturity and the other full season. Four replications of each variety, consisting of four rows, 25 feet long with a between row spacing of 40 inches, were planted on March 26, April 14, and April 23, using conventional tillage.

Fertility and pesticide applications were made according to Alabama Cooperative Extension System recommendations. Rainfall was plentiful through most of the season, and harvest conditions were generally good.

Plots were defoliated and harvested with a spindle picker when each treatment was mature. One-pound grab samples were ginned on a mini-gin for lint quality and turnout, and lint analyzed for quality by HVI at the USDA-AMS lab at Pelham, Alabama.

Yield and turnout results are presented in the table. Lint yields ranged from 779 to 1171 pounds per acre. Lint turnout ranged from 40 to 44 percent (not shown).

Although initial stands were affected by variety (not shown), good growing conditions allowed poor stands to compensate and yield well. FM 958, a conventional variety, generally performed as well or better than the cold tolerant listed varieties. Further testing will be needed to determine if these varieties have the potential to allow earlier planting for producers.

LINT YIELDS FROM COLD TOLERANT COTTON VARIETIES BY PLANTING DATES, TENNESSEE VALLEY RESEARCH AND EXTENSION CENTER, 2003

Variety	Maturity[1]	Cold tolerance[1]	Lint yield (*lbs/ac*) 3/26[2]	4/14[2]	4/23[2]
CT 110HQ	Early	Yes	998	929	817
FM 958	Early	NA	1171	939	913
CT 310HQ	Full	Yes	823	878	779
DP 491	Full	NA	919	885	856
LSD ($P \leq 0.10$)				**103**	

[1] As listed by seed company. [2]Planting dates.

2003 FUSARIUM WILT/COMMERCIAL COTTON VARIETY TEST

W.S. Gazaway and K. Glass

Fifteen commercial cotton varieties commonly grown in Alabama were evaluated for Fusarium wilt resistance at the E.V. Smith Research Center, Plant Breeding Unit, Tallassee, Alabama. These varieties were grown on a Wickham fine, sandy loam.

Varieties were planted in single 20-foot rows on 40-inch centers, separated at each end by 5-foot alleys. Four replications of the test entries and the susceptible check, Rowden variety, were arranged in a randomized design. Ridomil at 8 pounds per acre was applied in the seed furrow at planting.

Plots were planted on May 19, 2003. Initial plant counts were made on June 6. Wilted plants were counted and removed on July 15, July 29, August 15, and August 29, 2003. The remaining live plants were counted and recorded on September 12, 2003. Four to six cotton plants per plot were also selected at random, carefully dug, and their roots rated for root-knot nematode severity using a gall rating index (5=80 percent roots galled; 1=few or no galls on roots).Total percentage for wilted plants was determined and a mean wilting percentage was calculated for each variety (see table). A root-knot gall rating is also included in the table.

COMMERCIAL VARIETIES RESPONSE TO FUSARIUM WILT AND TO ROOT-KNOT NEMATODES

Variety	Fusarium wilt (*%*) 2002	2003	Root-knot gall index[1] 2003
Rowden	76	61	4.00
FM 958	32	24	3.75
ST 4892 BR	—[2]	18	3.50
ST 4793R	20	—	—
ST 580	18	—	—
SG 215 BR	12	10	3.00
PM 1218 BG/RR	17	9	2.00
DP 555 BG/RR	15	9	3.65
PHY 410 RR	—	8	2.25
PHY 355	11	—	—
DP 491	12	7	3.00
FM 989 BR	10	6	2.50
FM 991 BR	10	6	2.80
DP 458 BRR	8	5	3.25

continued

Fusarium wilt incidence in 2003 was not as great as in 2002 but was sufficiently high to separate relative susceptibility of the cotton varieties in the test (see table). Most cotton varieties in the test (DP 451 BG/RR, DP 5690 RR, DP 458 BR/RR, Phytogen GA 161, Fiber Max 960 BR, Fiber Max 989 BR, and Stoneville 5599 BR) exhibited excellent to good resistance to Fusarium wilt. Most of these varieties had less root-knot nematode galls than the varieties more susceptible to wilt. Stoneville 4892 BR and Fiber Max 958 showed little resistance to wilt or to root-knot nematodes and should be avoided in fields where wilt or root-knot nematodes are a problem.

CONTINUED, COMMERCIAL VARIETIES RESPONSE TO FUSARIUM WILT AND TO ROOT-KNOT NEMATODES

Variety	Fusarium wilt *(%)*		Root-knot gall index[1]
	2002	2003	2003
FM 960 BR	—	5	2.75
DP 444 BG/RR	—	5	1.50
DP 5690 RR	7	4	2.60
ST 5599 BR	—	3	1.75
DP 451 BG/RR	—	3	1.75
PHY GA 161	7	—	—
SG 501 BR	7	—	—

[1] Root-knot nematode indices are determined as an average root gall rating from the roots of four plants per variety where: 1= few or no galls visible on the roots; 2=galls visible on 1 to 20 percent of the roots; 3=galls visible on 21 to 40 percent of the roots; 4=galls visible on 41 to 80 percent of the roots; 5=galls visible on over 80 percent of the roots.
[2]Cotton variety not in test that year.

EVALUATION OF EARLY SEASON COTTON VARIETIES FOR RESPONSE TO BOLL ROT DISEASE IN ALABAMA

J.R. Jones, K.S. Lawrence, S.R. Usery Jr., K. Glass, and M.D. Pegues

A cotton variety trial was planted on May 5 at the Gulf Coast Research and Extension Center, Fairhope, Alabama. The soil type was a Malbis fine sandy loam. Plots consisted of two rows, 25 feet long, with a between-row spacing of 38 inches. Plots were arranged in a randomized complete-block design with four replications. A 10-foot alley separated blocks.

Cotton boll rot was evaluated by recording the number of healthy bolls and diseased bolls from a 0.001 acre section within each plot. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Plots were harvested on September 30. Data were statistically analyzed using PROC ANOVA, and means were compared with Fisher's protected least significant difference test.

Although weather conditions were favorable, the incidence of boll rot was relatively low for the early season varieties in 2003. The disease index for boll rot ranged from 10 percent for Beltwide Cotton Genetics BCG 295 to a low rating of 1 percent for Deltapine DP 449 BG/RR. Seed cotton yields varied by 1315 pounds per acre between the Deltapine DP NuCotn 33B and Sure-Grow SG 747 varieties.

EVALUATION OF EARLY SEASON COTTON VARIETIES FOR RESPONSE TO BOLL ROT DISEASE IN ALABAMA, 2003

Variety	Healthy bolls[1]	Diseased bolls[1]	Disease index[2]	Seed cotton yield
	no.	*no.*		*lbs/ac*
BCG 28R	65.5	4.8	7.0ab	2284.8bc
BCG 295	66.0	6.5	10.3a	2150.4bc
DP 436 RR	78.0	7.3	9.8ab	2697.6abc
DP 444 BG/RR	88.8	5.0	5.7ab	2659.2abc
DP 449 BG/RR	78.0	0.8	1.2b	3043.2abc
DP 451 B/RR	71.0	3.0	4.3ab	3292.8a
DP NuCotn 33B	95.5	4.3	4.5ab	3408.0a
FM 958	71.5	3.3	4.2ab	3196.8ab
FM 958B	79.5	4.5	5.2ab	3292.8a
FM 960 BR	81.3	3.3	3.8ab	2860.8abc
FM 832B	78.3	2.3	2.9ab	2553.6abc
FM 966	62.3	2.5	4.7ab	2803.2abc

continued

Continued, Evaluation of Early Season Cotton Varieties for Response to Boll Rot Disease in Alabama, 2003

Variety	Healthy bolls[1]	Diseased bolls[1]	Disease index[2]	Seed cotton yield
	no.	*no.*		*lbs/ac*
FM 989 BR	96.8	4.0	4.3ab	2659.2abc
PM 1199 RR	77.3	6.5	6.8ab	2544.0abc
PM 1218 BG/RR	88.0	2.8	3.0ab	3043.2abc
PHY 410 RR	71.3	4.8	7.1ab	2880.0abc
ST 4793R	75.3	5.0	6.7ab	2534.4abc
ST 4892 BR	67.5	3.0	4.2ab	2870.4abc
STX 4646 BR	88.5	7.5	8.7ab	2966.4abc
SG 105	80.8	5.0	6.2ab	3312.0a
SG 215 BR	62.3	2.3	3.9ab	2793.6abc
SG 747	76.3	3.3	4.1ab	2092.8c
SG 521R	83.5	6.3	8.8ab	2870.4abc
LSD ($P \leq 0.05$)	**37.5**	**6.7**	**8.7**	**955.3**

[1] Number of bolls per 6.5 feet of row.
[2] Disease index = (no. of diseased bolls / total no. of healthy bolls) ×100.
Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.05$).

Evaluation of Full Season Cotton Varieties for Response to Boll Rot Disease in Alabama

J.R. Jones, K.S. Lawrence, S.R. Usery Jr., K. Glass, and M.D. Pegues

A cotton variety trial was planted on May 5 at the Gulf Coast Research and Extension Center, Fairhope, Alabama.The soil type was a Malbis fine sandy loam. Plots consisted of two rows, 25 feet long, with a between-row spacing of 38 inches. Plots were arranged in a randomized complete block design with four replications. A 10-foot alley separated blocks.

Cotton boll rot was evaluated by recording the number of healthy bolls and diseased bolls from a 0.001acre section within each plot. Plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Plots were harvested on October 16. Data were statistically analyzed using PROC ANOVA, and means were compared with Fisher's protected least significant difference test.

Disease index for boll rot ranged from 10 percent for Stoneville ST 4892 BR to a low rating of 3 percent for Fiber Max FM 991 BR. Seed cotton yields varied by 1133 pounds per acre for Delta Pine DP 449 BG/RR and Stoneville STX 5242 BR, respectively. Numerically, Fiber Max FM 991 BR had the lowest incidence of boll rot.

Evaluation of Full Season Cotton Varieties for Response to Boll Rot Disease in Alabama, 2003

Variety	Healthy bolls[1]	Diseased bolls[1]	Disease index[2]	Seed cotton yield
	no.	*no.*		*lbs/ac*
BCG 24R	101.5a	6.5ab	6.5a	3360.0c-g
Delta Pearl	79.3ab	4.5ab	5.3a	3801.6a-d
DP 448B	76.8ab	4.8ab	6.0a	4089.6ab
DP 449 BG/RR	89.5ab	5.8ab	6.9a	4185.6a
DP 458 BRR	104.3a	5.0ab	4.7a	3801.6a-d
DP 491	78.0ab	4.8ab	6.0a	3782.4a-e
DP 493	85.0ab	7.0ab	8.3a	3379.2c-g
DP 5415 RR	84.0ab	5.5ab	6.8a	3648.0a-f
DP 555 BG/RR	93.0ab	4.0ab	4.2a	3897.6abc
DP 5690 RR	92.0ab	7.3ab	8.9a	3763.2a-e
DP NuCotn 33B	92.5ab	7.0ab	7.5a	3859.2a-d
FM 991R	72.8ab	5.3ab	7.6a	3859.2a-d

continued

CONTINUED, EVALUATION OF FULL SEASON COTTON VARIETIES FOR RESPONSE TO BOLL ROT DISEASE IN ALABAMA, 2003

Variety	Healthy bolls[1]	Diseased bolls[1]	Disease index[2]	Seed cotton yield
	no.	*no.*		*lbs/ac*
FM 989	81.5ab	6.3ab	7.8a	3148.8fg
FM 989 RR	84.3ab	7.5ab	8.7a	3379.2c-g
FM 989 BR	86.5ab	6.3ab	8.0a	3398.4c-g
FM 991 BR	85.3ab	2.3b	2.7a	4166.4a
PHY 510 RR	90.0ab	3.0ab	3.0a	3609.6b-f
ST 4892 BR	85.8ab	8.8a	10.1a	3820.8a-d
ST 5599 BR	89.8ab	5.5ab	6.2a	3417.6c-g
ST 5303R	84.3ab	4.0ab	4.8a	3321.6d-g
STX 4646 BR	87.5ab	7.8ab	9.5a	3148.8fg
STX 5242 BR	72.5ab	4.0ab	5.7a	3052.8g
SG 747	67.0b	5.5ab	8.4a	3244.8efg
LSD ($P \leq 0.05$)	**34.3**	**6.3**	**8.1**	**553.8**

[1]Number of diseased bolls per 6.5 feet of row.
[2]Disease index = (no. of diseased bolls /total no. healthy bolls) × 100.
Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.05$).

COTTON VARIETY RESPONSE TO THE RENIFORM NEMATODE IN ESCAMBIA COUNTY, ALABAMA

S.R. Usery Jr., K.S. Lawrence, J.R. Jones, J.R. Akridge, K. Glass, and G.W. Lawrence

Thirty two cotton varieties were examined with and without Telone II for their response to the reniform nematode (*Rotylenchulus reniformis)* near Huxford, Alabama. The test was planted on May 1, 2003 in a producer's field naturally infested with the reniform nematode and monocultured in cotton. Telone II at 3 gallons per acre was applied a month before planting with a ripper/bedder injection device. Plots consisted of one row, 25 feet long with a 36-inch row spacing. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility practices as recommended by the Alabama Cooperative Extension System.

Population densities of reniform nematode were determined at planting and at harvest. Soil cores, 1 inch in diameter and 8 inches deep, were collected from each one-row plot in a systematic sampling pattern. Nematodes were extracted using gravity sieving and sucrose centrifugation technique from 150cc sub-samples. Data were statistically analyzed using PROC ANOVA, and means were compared with Fisher's protected LSD test.

COTTON VARIETY RESPONSE TO RENIFORM NEMATODE IN ESCAMBIA COUNTY, ALABAMA, 2003

Variety	Reniform/150cc —at planting[1]—		Reniform/150cc —at harvest—		Lint yield —*lbs/ac*—	
	Telone	no Telone	Telone	no Telone	Telone	no Telone
BCG 28R	2343	1802	1468	1057	726	549
Delta Pearl	2343	1802	1699	640	964	788
DP 436 RR	2343	1802	1236	794	689	336
DP 444 BG/RR	2343	1802	1545	960	601	583
DP 448B	2343	1802	695	3528	980	475
DP 449 BG/RR	2343	1802	1545	1646	836	689
DP 451 B/RR	2343	1802	927	1181	746	385
DP 458 BRR	2343	1802	1545	849	951	517
DP 491	2343	1802	1545	1176	932	398
DP 493	2343	1802	1004	1863	924	713
DP 5415 RR	2343	1802	927	1501	883	563
DP 555 BG/RR	2343	1802	1081	1773	1299	1072
DP 5690 RR	2343	1802	1545	1655	1025	694
DP NuCotn 33B	2343	1802	1004	2171	978	572
FM 991 RR	2343	1802	1030	694	1084	941
FM 958B	2343	1802	1313	1343	915	515

continued

CONTINUED, COTTON VARIETY RESPONSE TO RENIFORM NEMATODE IN ESCAMBIA COUNTY, ALABAMA, 2003

Variety	Reniform/150cc —at planting[1]—		Reniform/150cc —at harvest—		Lint yield —*lbs/ac*—	
	Telone	no Telone	Telone	no Telone	Telone	no Telone
FM 960 BR	2343	1802	2240	1929	866	589
FM 966	2343	1802	1622	1370	720	494
FM 989	2343	1802	1545	1169	772	504
FM 989 BR	2343	1802	1467	2333	857	470
FM 991 BR	2343	1802	952	1214	1145	1052
PM 1218 BG/RR	2343	1802	541	1260	730	588
PHY 410 RR	2343	1802	1236	1090	798	362
PHY 510 RR	2343	1802	1313	1430	920	582
ST 4793R	2343	1802	1545	1361	840	906
ST 4892 BR	2343	1802	1467	1089	804	595
ST 5303R	2343	1802	772	2327	912	482
ST 5599 BR	2343	1802	798	1490	706	523
ST 5242 BR	2343	1802	1159	965	745	498
SG 215 B/R	2343	1802	1184	1626	849	756
SG 521 RR	2343	1802	412	815	816	641
SG 747	2343	1802	695	1836	835	531
LSD (P≤0.05)	**—1856—**		**—1901—**		**—666—**	

[1]Average reniform populations before planting.

Reniform nematode disease pressure was moderate in 2003. Reniform nematode populations at harvest varied 2099 per 150cc of soil for DP 5690 RR with Telone II and ST 5242 BR with Telone II, respectively. Lint cotton yields varied 695 pounds per acre between DP 444 BG/RR and DP 555 BG/RR, respectively. Cotton plots treated with Telone out yielded the control plots (see table). The exceptions were the varieties FM 991 BR, SG 215 BR, ST 4793 RR, and DP 444 BG/RR, which produced higher seed cotton yields in the non-Telone treated plots than in the Telone-treated plots.

COTTON VARIETY RESPONSE TO THE RENIFORM NEMATODE IN LIMESTONE COUNTY, ALABAMA

S.R. Usery Jr., K.S. Lawrence, J.R. Jones, C.H. Burmester, K. Glass, and G.W. Lawrence

Twelve transgenic cotton varieties were examined with and without Telone II for their response to the reniform nematode (*Rotylenchulus reniformis)* in north Alabama. The test was planted on May 1, 2003 in a producer's field naturally infested with the reniform nematode and monocultured in cotton. The soil is a Decatur silt loam. Telone II at 3 gallons per acre was applied one month before planting with a ripper/bedder injection device. Plots consisted of two rows, 25 feet long with a 40-inch row spacing. All plots were maintained with standard production practices recommended by the Alabama Cooperative Extension System and commonly used in the area.

Population densities of reniform nematode were determined at planting, peak bloom, and at harvest. Soil cores, 1 inch in diameter and 8 inches

COTTON VARIETY RESPONSE TO RENIFORM NEMATODE IN LIMESTONE COUNTY, ALABAMA, 2003

Variety	Reniform at planting[1]	Reniform at harvest	Reniform reproductive index	Seed cotton yield *lbs/ac*
DP 5415 RR	57.9bc	463.5ab	8.0	4245.5cd
ST 4892 BR	112.7ab	598.8ab	5.3	4034.7de
DP 451 B/RR	80.5a-c	293.0b	3.6	4794.3ab
DP 436 RR	25.7c	434.8ab	16.9	4444.8a-d
DPL 444 BG/RR	74.0a-c	1100.9a	14.9	4818.8ab
DP 449 BG/RR	96.6a-c	347.8b	3.6	4516.6a-c
PM 1218 BG/RR	80.5a-c	833.9ab	10.4	4247.1cd
SG 215 B/R	86.9a-c	428.3ab	4.9	4475.8a-c
PM 1199 RR	64.4a-c	361.6b	5.6	3739.1e
ST 4793R	38.6bc	251.3b	6.5	4423.5b-d
ST 5599 BR	86.9a-c	730.8ab	8.4	4880.9a
FM 989 BR	138.4a	273.8b	2.0	4547.7abc
LSD (P≤0.05)	**77.9**	**675.3**		**439.1**
Telone	74.0a	471.7a	6.4	4595a
No Telone	83.2a	548.0a	6.6	4265b
LSD (P≤0.05)	**31.8**	**275.7**		**179**

[1]Average reniform populations before planting.

deep, were collected from the rows in each two-row plot in a systematic sampling pattern. Nematodes were extracted using gravity sieving and sucrose centrifugation technique. Plots were harvested on October 14. Data were statistically analyzed using PROC ANOVA, and means were compared with Fisher's protected LSD test.

Reniform nematode disease pressure was low in 2003. Reniform nematode numbers increased from planting to harvest in 100 percent of the plots as indicated by reproductive factors (Rfs). Rfs varied from 16.9 for DP 436 RR to 2.0 for FM 989 BR. No variety exhibited a Rf value below 1, indicating that they were all susceptible to the reniform nematode. Cotton seed yield varied 1141.8 pounds per acre between ST 5599 BR and PM 1199 RR, respectively. DP 451 B/RR, DP 444 BG/RR, and ST 5599 BR produced higher seed cotton yields (see table) than DP 5415 RR, ST 4892 BR, PM 1218 BG/RR, and PM 1199 RR. Cotton plots treated with Telone II out yielded the control plots.

COTTON VARIETY RESPONSE TO THE RENIFORM NEMATODE IN LAWRENCE COUNTY, ALABAMA

S.R. Usery Jr., K.S. Lawrence, J.R. Jones, C.H. Burmester, and B.A. Meyer

Transgenic cotton varieties were examined with and without Temik 15G for their response to the reniform nematode (*Rotylenchulus reniformis)* in a monocultured cotton field in Lawrence County, Alabama. The test was planted on April 19 in a producer's field naturally infested with the reniform nematode. The soil is a Decatur silt loam. Temik 15G (at a rate of 7 pounds per acre) was applied at planting in the seed furrow with chemical granular applicators attached to the planter. Cruiser-treated seeds were used to control thrips in all non-Temik plots. Plots consisted of one row, 200 feet long with a 30-inch row spacing. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility practices as recommended by the Alabama Cooperative Extension System. Plots were not irrigated.

Population densities of reniform nematode were determined at planting, peak bloom, and at harvest. Each row was sampled individually in a systematic sampling pattern. Nematodes were extracted using gravity sieving and sucrose centrifugation technique. Plots were harvested on October 6. Data were statistically analyzed using PROC ANOVA, and means were compared with Fisher's protected LSD test.

Reniform nematode disease pressure was extremely low throughout the growing season (see table). Reniform nematode numbers increased from planting to harvest in 100 percent of the plots as indicated by reproductive factors (Rfs). Rfs varied from 4.8 for SG 215 B/R without Temik to 1.2 for DPLX03L300 BR without Temik.

No variety exhibited an Rf value below 1, indicating that they were all susceptible to the reniform nematode. Cotton seed yield varied 1126 pounds per acre between DP 424 BGIIR plus Temik and DP 555 BR without Temik. Cotton plots with Temik out yielded the control plots.

COTTON VARIETY RESPONSE TO RENIFORM NEMATODE IN LAWRENCE COUNTY ALABAMA, 2003

Variety	Reniform —at planting[1]—		Reniform —at peak bloom—		Reniform —reproductive factor—		Seed cotton yield —*lbs/ac*—	
	Temik	no Temik	Temik	no Temik	Temik	no Temik	Temik	no Temik
ST 4892 BR	57.9	77.2	83.6b	199.5b	1.4	2.6	2692e-h	2523hi
FM 960 BR	57.9	77.2	100.0b	173.8b	1.7	2.3	3100bc	2980cd
DP 555 BG/RR	57.9	77.2	199.5b	173.8b	3.4	2.3	2526hi	2394i
DP 468 BIIR	57.9	77.2	180.1b	128.7b	3.1	1.7	2711e-h	2646g-i
DP 449 BG/RR	57.9	77.2	218.8b	167.3b	3.8	2.2	2851c-g	2938c-e
DP 424 BIIR	57.9	77.2	90.1b	122.3b	1.6	1.6	3520a	3308ab
PM 1218 BG/RR	57.9	77.2	122.3b	148.0b	2.1	1.9	2838d-g	2808d-g
DPLX03L300BR	57.9	77.2	173.8b	94.3b	3.0	1.2	3309ab	3099bc
SG 215 B/R	57.9	77.2	154.5b	373.3a	2.7	4.8	2695e-h	2683f-h
DP 444 BG/RR	57.9	77.2	218.8b	173.8b	3.8	2.3	2907c-f	2877c-g
LSD (P≤0.05)			—153.0—				—254.3—	

[1]Average reniform populations before planting; number per 150cc.

COTTON VARIETY RESPONSE TO THE RENIFORM NEMATODE FOLLOWING CORN IN LAWRENCE COUNTY, ALABAMA

S.R. Usery Jr., K.S. Lawrence, J.R. Jones, C.H. Burmester, and B.A. Meyer

Transgenic cotton varieties were examined with and without Temik 15G for their response to the reniform nematode (*Rotylenchulus reniformis*) following corn in north Alabama. The test was planted on April 19 in a producer's field naturally infested with the reniform nematode after a year of corn production. The soil is a Decatur silt loam. Temik 15G (at a rate of 7 pounds per acre) was applied at planting in the seed furrow with chemical granular applicators attached to the planter. Cruiser-treated seeds were used to control thrips in the non-Temik plots. Plots consisted of one row, 200 feet long with a 30-inch row spacing. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility practices as recommended by the Alabama Cooperative Extension System. Plots were not irrigated.

Population densities of reniform nematode were determined at planting, peak bloom, and at harvest. Each row was sampled individually in a systematic sampling pattern. Nematodes were extracted using gravity sieving and sucrose centrifugation technique. Plots were harvested on October 6. Data were statistically analyzed using PROC ANOVA, and means were compared with Fisher's protected LSD test.

Reniform nematode disease pressure was extremely low throughout the growing season (see table). Reproductive factors varied from a low of 0.4 in DP436 RR, PM 1199 RR, and PM 1218 BG/RR Cruiser-treated plots to a high of 3.3 in the SG 215 B/R Temik. Cotton seed yield varied 924 pounds per acre between SG 501 BR plus Temik and DP 5415 RR with Cruiser. Temik 15G application had no effect on seed cotton yield. The absence of a treatment effect is likely the result of the low reniform populations in this field at planting following the previous year in corn production.

COTTON VARIETY RESPONSE TO RENIFORM NEMATODE FOLLOWING CORN IN LAWRENCE COUNTY ALABAMA, 2003

Variety	Reniform —at planting[1]—		Reniform —at peak bloom—		Reniform —reproductive factor—		Seed cotton yield —*lbs/ac*—	
	Temik	no Temik	Temik	no Temik	Temik	no Temik	Temik	no Temik
DP 5415 RR	25.75	51.50	19.3c	45.0a-c	0.7	0.9	2630ef	2432f
ST 4793 R	25.75	51.50	12.8c	32.1bc	0.5	0.6	2994b-d	2840c-e
DP 436 RR	25.75	51.50	77.2ab	19.3c	3.0	0.4	2599ef	2782c-f
SG 521 R	25.75	51.50	12.8c	25.7c	0.5	0.5	3216ab	3236ab
PM 1199 RR	25.75	51.50	32.1bc	19.3c	1.3	0.4	2749d-f	2550ef
ST 4892 BR	25.75	51.50	32.1bc	25.7c	1.3	0.5	3131a-c	3340ab
SG 501 BR	25.75	51.50	32.1bc	25.7c	1.3	0.5	3356a	3245ab
SG 215 B/R	25.75	51.50	83.6a	38.6a-c	3.3	0.8	2617ef	2701d-f
PM 1218 BG/RR	25.75	51.50	19.3c	19.3c	0.7	0.4	2527ef	2454f
DP 451 B/RR	25.75	51.50	12.8c	45.0a-c	0.5	0.9	2542ef	2459f
LSD ($P \leq 0.05$)			**51.0**				**351**	

[1]Average reniform populations before planting; number per 150cc.

CROP PRODUCTION

COMPARISON OF GLYPHOSATE-TOLERANT AND NON-GLYPHOSATE-TOLERANT VARIETIES IN FULL AND REDUCED TILLAGE COTTON PRODUCTION SYSTEMS

W.H. Faircloth, M.G. Patterson, and R.W. Goodman

Glyphosate-tolerant (GT) cotton varieties continue to comprise nearly 90 percent of the acreage in Alabama. As a direct result, the use of reduced tillage systems, including strip-till and no-till, has increased from 35 to 67 percent since 1997. The compatibility of these two technologies has proven both economical and practical, especially as individual farm size has increased. GT varieties have many desirable agronomic traits and yield well. However, some producers have become increasingly concerned with the fiber quality of GT varieties: specifically, high micronaire (fineness) and low staple (length) versus non-GT varieties. These fiber traits may impact the cash price paid for lint and thus farm profitability. In order to quantify these concerns, a multi-year field study was begun in 2003 to investigate the interaction of tillage system and variety on yield, fiber quality, and net returns.

A factorial treatment arrangement of tillage (full vs. reduced) and variety (GT vs. non-GT) in a randomized complete block design with four replications was established at three locations in Alabama: the Tennessee Valley Research and Extension Center (TVREC), Belle Mina; the E.V. Smith Research Center (EVSRC), Shorter; and the Wiregrass Research and Extension Center (WREC), Headland. Experimental units were eight rows, 50 feet long. Full tillage plots were chiseled and disked twice before planting and cultivated after crop emergence. Reduced tillage plots were strip-tilled at two locations and the third location was a true no-till system. Varieties were selected based on location and growing season. Herbicide programs for each variety followed Alabama Cooperative Extension System recommendations, and were supplemented on a case-by-case basis, if needed. Visual estimations of weed control were recorded. Seed cotton was machine harvested, weighed, and subsamples were ginned for lint turnout and fiber analysis (HVI). Net returns were calculated based on total receipts, including discounts or premiums for fiber quality, subtracting total fixed and variable costs. A spot price of $0.66 per pound was selected and herbicide prices were the average of three Alabama chemical retailers.

At the TVREC, the reduced (no-till) tillage system precluded variety selection in net returns, with no differences in yield due to either variety or tillage. The reduced tillage system gave a net return of $317 per acre versus $241 per acre in a full-tillage system (see table). Lint yield ranged from 1020 pounds per acre for full tillage/non-GT variety (SG 501) to 1150 pounds per acre for reduced tillage/GT variety (SG 521R). Staple and fiber strength were greater in the non-GT variety; however, the GT variety had higher lint turnout. Weed control was excellent (greater than or equal to 90 percent) in all treatments with the following species present: common bermudagrass (*Cynodon dactylon*), pigweeds (*Amaranthus* spp.), ivyleaf morningglory (*Ipomoea hederacea*), and prickly sida (*Sida spinosa*).

Yield at the EVSRC showed a tillage-by-variety interaction, with the non-GT variety (Delta Pearl)/reduced tillage system the top treatment (1405 pounds per acre) (see table). The non-GT variety/full tillage system was the lowest yielding treatment (1040 pounds per acre). The GT variety (DP 5415 RR) was more consistent, with no difference shown between tillage systems. Much like Belle Mina, fiber quality as expressed by micronaire, staple, and strength was greater for the non-GT variety. Control of goosegrass (*Eleusine indica*), bermudagrass, and pitted morningglory (*Ipomoea lacunosa*) was excellent, regardless of treatment. Control of sicklepod (*Senna obtusifolia*) was greater in the reduced tillage system versus the full tillage system. Net returns followed the same pattern as yield, with the non-GT variety/reduced tillage combination giving highest net return ($435 per acre). In a reduced tillage system, variety made no difference in net returns. Similarly, a GT variety performed equally under both tillage systems.

LINT YIELDS AND NET RETURNS FOR THREE LOCATIONS

	TVREC, Belle Mina[1]		EVSRC, Shorter[2]		WREC, Headland	
	Lint yield	Net return[3]	Lint yield	Net return	Lint yield	Net return
	lbc/ac	*$/ac*	*lbs/ac*	*$/ac*	*lbs/ac*	*$/ac*
Full tillage						
GT	1087	$259	1337	$376	1480	$474
Non-GT	1020	$224	1043	$206	1681	$577
Reduced tillage						
GT	1155	$317	1344	$403	1418	$455
Non-GT	1151	$318	1405	$435	1784	$655

[1] Cotton varieties: GT, SG 521R; non-GT, SG 501.
[2] Cotton varieties (Shorter and Headland): GT, DP 5415 RR; non-GT, Delta Pearl.
[3] Net returns based on a spot (cash) price of $0.66 per pound of lint.

A tillage-by-variety interaction was also demonstrated at the WREC (see table). The combination of non-GT variety (Delta Pearl)/reduced tillage gave highest yield (1784 pounds per acre) and the lowest yielding treatment was the combination of GT variety (DP 5415 RR)/reduced tillage (1418 pounds per acre). This difference in yield can be attributed to poor control of entireleaf morningglory (*Ipomoea hederacea* var. *integriuscula*) in the GT variety where glyphosate was used. Similarly, non-GT treatments were supplemented with sethoxydim for Texas panicum (*Panicum texanum*) control. Excellent control of sicklepod and large crabgrass (*Digitaria sanguinalis*) was obtained in both varieties. Gin turnout, staple, and strength were greater with the non-GT variety in both tillage systems. The GT variety gave an equivalent net return, regardless of tillage system. However, the non-GT variety gave best return under a reduced tillage system. At this location, the non-GT variety was the best treatment, regardless of tillage system.

EFFECTS OF VARIABLE RATE NITROGEN APPLICATIONS ON CONSERVATION TILLAGE COTTON

C.H. Burmester and S.H. Norwood

Conservation tillage is now the primary method farmers use for growing cotton in the Tennessee Valley area of northern Alabama. Much of the conservation tillage cotton is grown on the unique red silty clay soils that have been in cotton production for many years. As farmers have switched to conservation tillage, they have also increased the amount of nitrogen fertilizer historically applied to cotton grown on these soils.

North Alabama farmers are slowly adopting precision agriculture technology to help make better cotton production decisions. A replicated, field-size evaluation of nitrogen fertilizer rates, using variable rate technology was conducted in one conservation tillage cotton field in 2003. Yield monitor data from the field was used to evaluate if variable rate nitrogen fertilization was feasible on these soils. These data were also used to evaluate nitrogen fertilizer rates needed by conservation tillage cotton.

A field with a long-term history of conservation tillage was selected for the evaluation.This field is currently in a one-year cotton/corn rotation and has been in conservation tillage for more than 10 years. Yield maps from the previous corn crop were used to develop low, medium, and high yield zones across the field. Before planting, a "Veris" unit was used to measure soil electrical conductivity across the field. These measurements were used to develop another set of low, medium, and high yield zones for the field. The field's terrain provided a good mixture of slopes and valleys to evaluate variable nitrogen fertilizer rates compared to a blanket application of nitrogen fertilizer.

A nitrogen fertilizer rate of 40 pounds per acre was broadcast across the entire field prior to planting DP 5415 RR cotton in late April. Nitrogen solution (32 percent) was sidedressed in early June. Variable nitrogen fertilizer rates of 30, 50, and 70 pounds per acre were applied using a "Rawson" controller. These three rates correspond to the low, medium, and high yield zones established before planting. These variable rates of nitrogen fertilizer were compared to a blanket treatment (50 pounds per acre) applied the length of the field. All plots were 20 rows, 30 inches wide, planted the length of the field and replicated four times. Each plot was harvested with a cotton picker equipped with an "Ag-Leader" monitor to determine yield.

Many cotton fields in northern Alabama grew slowly in May due to saturated, cool soils, and stands were reduced especially on poorly drained areas. The crop was delayed, but produced excellent yields due to above average late summer rainfall (Table 1).

Three replications of each treatment were used for data analysis due to errors during side-dress application. In this study the blanket and variable nitrogen fertilizer treatments produced equal yields (Table 2). According to the application data, the blanket treatment averaged receiving a total of 89 pounds of nitrogen fertilizer per acre compared to 94 pounds of nitrogen fertilizer per acre when rates were varied either by the soil electrical conductivity measurements, or previous yield data (Table 2). The early season rainfall resulted in nitrogen fertilizer loss through leaching and denitrification on these soils. This may explain some of the response to higher nitrogen fertilizer rates than currently recommended for these soils. The large amount of corn residue in this test may have also immobilized some of the applied nitrogen fertilizer.

TABLE 1. WEATHER DATA, TENNESSEE VALLEY RESEARCH AND EXTENSION CENTER, 2003

Month	Rainfall *(in)*	DD60s
April	4.31	118
May	9.75	264
June	4.96	409
July	4.56	546
August	3.01	592
September	8.55	352

In this study the soil electrical conductivity measurements produced low to high yield zones similar to the previous corn yield maps of the field. Variable rate nitrogen fertilizer technology appears promising and will be evaluated in more field studies.

TABLE 2. EFFECT OF VARIABLE RATES OF NITROGEN FERTILIZER ON COTTON YIELDS AND TOTAL NITROGEN FERTILIZER

Treatment	Avg lint yield *lbs/ac*	Applied N fertilizer *lbs/ac*
Variable N – by yields	790	94
Variable N – by soil conductivity	768	94
Blanket N	757	89

EFFECT OF TIMING OF DEFOLIATION ON COTTON QUALITY

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

Cotton micronaire (thickness of the cotton fiber) is one of the measurements used to measure cotton quality. The standard for this measurement is a reading between 3.5 and 4.9. In recent years 30 to 40 percent of Alabama's cotton crop had micronaire grades above 4.9 and resulted in discounts to the farmers. The Hal-Lewis method of determining the micronaire of early season bolls and adjusting defoliation timing is being used in some areas of the United States to reduce the amount of cotton bales with high micronaire values.

In 2003 as cotton began opening, seed cotton samples were hand collected from more than 50 grower fields in northern Alabama. These samples were ginned and after micronaire was measured, the Hal-Lewis method was used to predict final cotton micronaire in each field. After harvest, the predicted values were compared to final classing office results. The effect of defoliation timing on micronaire, yield, and other cotton quality factors was researched in two small-plot, replicated trials. These trials were located at the Tennessee Valley Research and Extension Center (TVREC) and E.V. Smith Research Center (EVSRC) in north and central Alabama, respectively.

Evaluation of the Hal-Lewis method indicated that it accurately predicted that cotton micronaire values would be much lower in 2003 than previous years. On average, however, it underestimated final micronaire by about 0.3 points (Table 1). This was probably due to the cooler-than-normal growing condition experienced early in the growing season. In the replicated tests, defoliation timing had a greater effect on yield and quality at the TVREC site compared to the EVSRC site (Table 2). At the TVREC site there was a trend toward lower micronaire and yield when cotton was defoliated before 50 percent open bolls. There was also a trend toward lower micronaire at TVREC when a boll opener was applied at all defoliation timings. Other quality factors (staple, strength, and uniformity) were not affected by defoliation treatment at either site.

From this one year of data, it appears the Hal-Lewis method may be useful in determining cotton micronaire problems at early boll opening in Alabama. The data also indicate that the Hal-Lewis method could be more beneficial in lowering micronaire values in north Alabama than central Alabama. Research will continue in 2004 to continue to investigate this method under Alabama conditions.

TABLE 1. PROJECTED MICRONAIRE FOR FARMER'S COTTON FIELDS USING THE HAL-LEWIS METHOD COMPARED TO FINAL CLASSING RESULTS IN ALABAMA, 2003

Variety		———Micronaire readings———						Avg.	Diff.
DP 444 BG/RR	Projected mic.	3.40	3.50	3.40	3.30	3.70	3.40	3.43	-0.27
DP 444 BG/RR	Final mic.	3.90	3.90	3.90	3.30	3.80	3.40	3.70	
DP 1218 BG/RR	Projected mic.	4.00	4.70	4.50	4.00	4.10		4.26	-0.36
DP 1218 BG/RR	Final mic.	4.60	4.70	5.00	4.60	4.20		4.62	
DP 555 BG/RR	Projected mic.	4.10	4.60	4.50	4.10			4.33	+0.05
DP 555 BG/RR	Final mic.	4.20	4.50	4.20	4.20			4.28	
ST 4892 BG/RR	Projected mic.	4.00	4.30	4.50	4.20			4.25	-0.15
ST 4892 BG/RR	Final mic.	4.10	4.40	4.70	4.40			4.40	
DPLX 03L 300BR	Projected mic.	4.10	3.90	4.40				4.13	-0.44
DPLX 03L 300BR	Final mic.	4.90	4.40	4.40				4.57	
ST 5599 BR	Projected mic.	4.00	4.20					4.10	0.30
ST 5599 BR	Final mic.	4.50	4.30					4.40	
DP 451 BG/RR	Projected mic.	3.70	3.70					3.70	-0.30
DP 451 BG/RR	Final mic.	3.90	4.10					4.00	
FM 989 BGRR	Projected mic.	4.10	3.50					3.80	0.00
FM 989 BG/RR	Final mic.	3.80	3.80					3.80	

TABLE 2. COTTON LINT YIELDS AND MICRONAIRE READINGS AS AFFECTED BY DEFOLIATION AND BOLL OPENING TIMING AT TWO ALABAMA LOCATIONS, 2003

	—Lint yields *(lbs/ac)*—		—Micronaire—	
Treatment	TVREC	EVSRC	TVREC	EVSRC
1. Def. 30-40%	1166bcd	1126abc	3.50c	3.83d
2. Def. + opener 30-40%	1081d	1088bc	3.30d	4.18ab
3. Def. 40-50%	1154cd	1058c	3.63c	4.07bc
4. Def. + opener 40-50%	1086d	1100bc	3.55c	3.93cd
5. Def. 50-60%	1250ab	1167abc	4.00a	4.22ab
6. Def. + opener 50-60%	1303a	1195ab	3.85ab	4.20ab
7. Def. 60-70%	1207bc	1172abc	3.95ab	4.32a
8. Def. + opener 60-70%	1238abc	1234a	3.80b	4.05bc

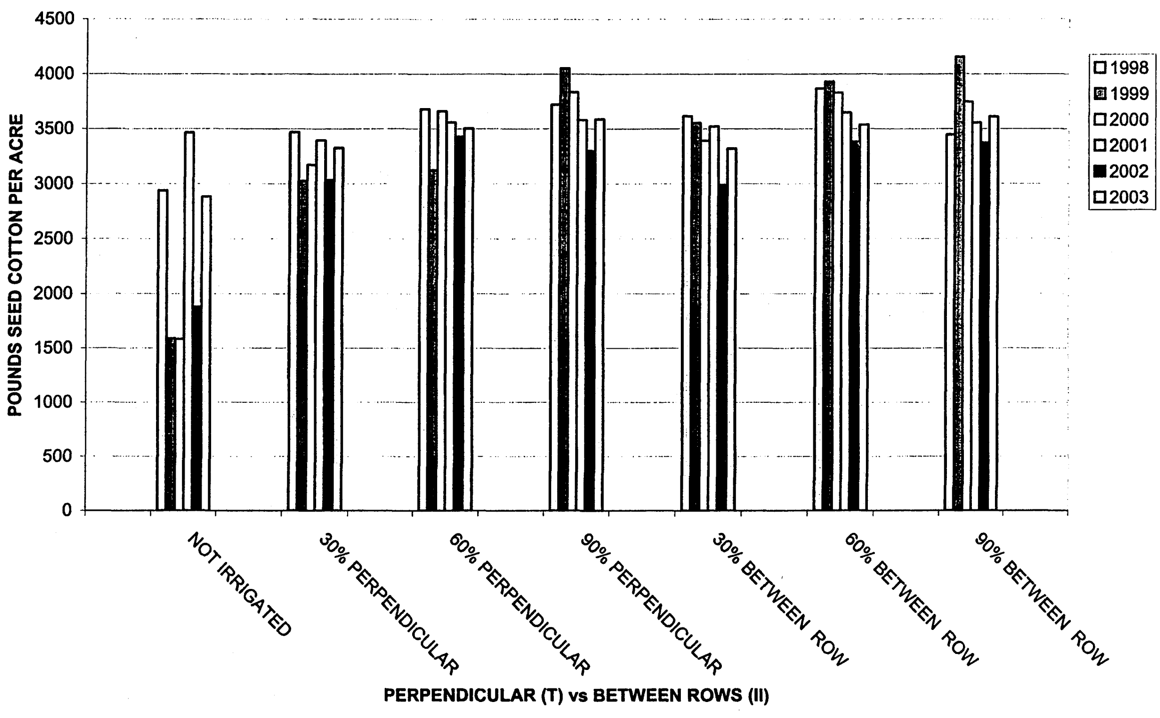
Means in each column followed by the same letter do not significantly differ ($P \leq 0.10$, Duncans' New MRT).

SUBSURFACE DRIP IRRIGATION PLACEMENT AND IRRIGATION WATER REQUIREMENTS, TENNESSEE VALLEY RESEARCH AND EXTENSION CENTER

L.M. Curtis, C.H. Burmester, D.H. Harkins, and B.E. Norris

This experiment was initiated in 1998 to evaluate placement of subsurface drip irrigation (SDI) relative to crop row direction and to evaluate water requirements for cotton production using SDI. Drip tubing was buried 15 inches deep with emitters at 2-foot intervals along the tubing. Tubing placement treatments were (1) between every other row—80 inch spacing between drip lines and (2) perpendicular to rows –80 inch spacing between drip lines. The varieties selected each year were as

Drip placement and irrigation scheduling.



follows: 1998 through 2001—DP NuCotn 33B, 2002 and 2003—DP 451 B/RR

Irrigation treatments were based on daily applications equal to 30, 60, or 90 percent of pan evaporation after full crop canopy, adjusted for percent canopy prior to full canopy cover. Yield results for six years (1998 through 2003) are presented in the figure.

Significant yield increases were achieved in four out of the six years of this study (see table). The average of all irrigation treatments for the six years was 1138 pounds per acre greater than the six-year average for the non-irrigated treatment.

AVERAGE SEED COTTON YIELD OVER SIX YEARS

Treatment	Seed cotton yield *lbs/ac*
Non-irrigated	2389
30% pan, perpendicular to rows	3236
60% pan, perpendicular to rows	3493
90% pan, perpendicular to rows	3680
30% pan, between rows	3699
90% pan, between rows	3649

SUBSURFACE DRIP IRRIGATION TAPE PRODUCTS AND FERTIGATION, TENNESSEE VALLEY RESEARCH AND EXTENSION CENTER

L.M. Curtis, C.H. Burmester, D.H. Harkins, and B.E. Norris

A subsurface drip irrigation (SDI) study initiated in 1998 was designed to compare five different drip irrigation tape products with a fertigation component included. This study was installed in an area where continuous crops have been produced for many years. Emitters were located in 2-foot intervals along the tape, with tape buried 15 inches between every other row. Rows 340 feet in length were used to better simulate field conditions. Fertilizer management for each tape product was evaluated using a single (conventional) surface applied sidedress versus multiple side-dress applications injected through the SDI system. One tape product was also used on the surface using a conventional fertilizer treatment. Fertility treatments are indicated in Table 1. The varieties selected each year were as follows: 1998 and 1999, DP NuCotn 33B; 2000 and 2001, DP 428B; 2002 and 2003, DP 451 B/RR.

Fertigated treatment yields in 2003 were reduced for three of the tape products when compared to conventional fertility treatments. This difference may be related to very wet conditions through much of the growing season resulting in a shallow root development and less uptake of nutrients at the 15-inch depth where fertigation delivered nutrients. However this possibility is speculative and is not based on field measurements.

In 1998, little difference between fertility treatments was observed. In 1998, sufficient rainfall occurred late in the growing season so that fertilizer in the upper layers of the soil was more readily available. In 1999, extremely dry conditions in the

TABLE 1. FERTILITY TREATMENTS

	Irrigated			Non-irrigated
	Fertigated	Conventional	Drip tape on surface[2]	
Preplant	75 lbs N + 60 lbs K	75 lbs N + 60 lbs K	75 lbs N + 60 lbs K	75 lbs + 60 lbs K
Sidedress[1]	60 lbs N + 60 lbs K	60 lbs N + 60 lbs K	60 lbs N + 60 lbs K	60 lbs N

[1]All sidedress was applied at early- to mid-square for conventional and drip tape treatments; the side-dress treatment was divided into eight equal applications for the fertigated treatments beginning at early- to mid-square. [2]The surface tape treatment was discontinued after 2000 because of damage and leaks caused by insects and animals.

TABLE 2. AVERAGE SEED COTTON YIELD OVER SIX YEARS

Treatment	—Yield seed cotton *(lbs/ac)*— Conventional	Fertigated
Not Irrigated	2165	
Surface T-Tape	545	
T-Tape	3385	3445
Raintape	3519	3572
Netafim	3479	3537
Eurotape	3519	3603

upper layers of the soil profile made conventional applied fertilizer less available, resulting in yield reduction compared to fertilizer applied through the irrigation system. In 2001 initiation of fertigation through the tape was inadvertently delayed more than two weeks. Even though the fertigation schedule was modified to insure that all scheduled fertilizer was applied, the delay reduced fertigated yields. Yields in 2002 were similar to previous years with little difference in fertilizer treatments but significant yield improvements over the non-irrigated treatment.

Significant yield differences were observed each year between non-irrigated plots and drip tape plots with fertility treatments. Figures 1 and 2 illustrate yield results for 1998 through 2003 for conventional and fertigated treatments. Average yields for the six years are shown in Table 2.

Figure 1. Conventional fertility program and tape comparison.

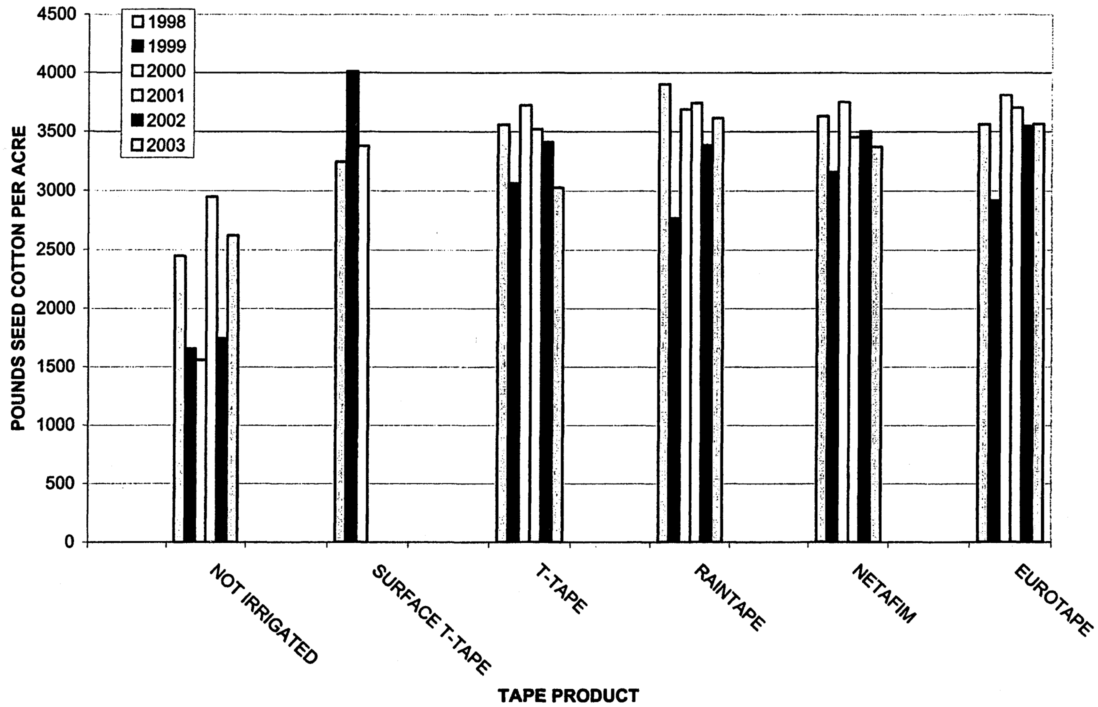
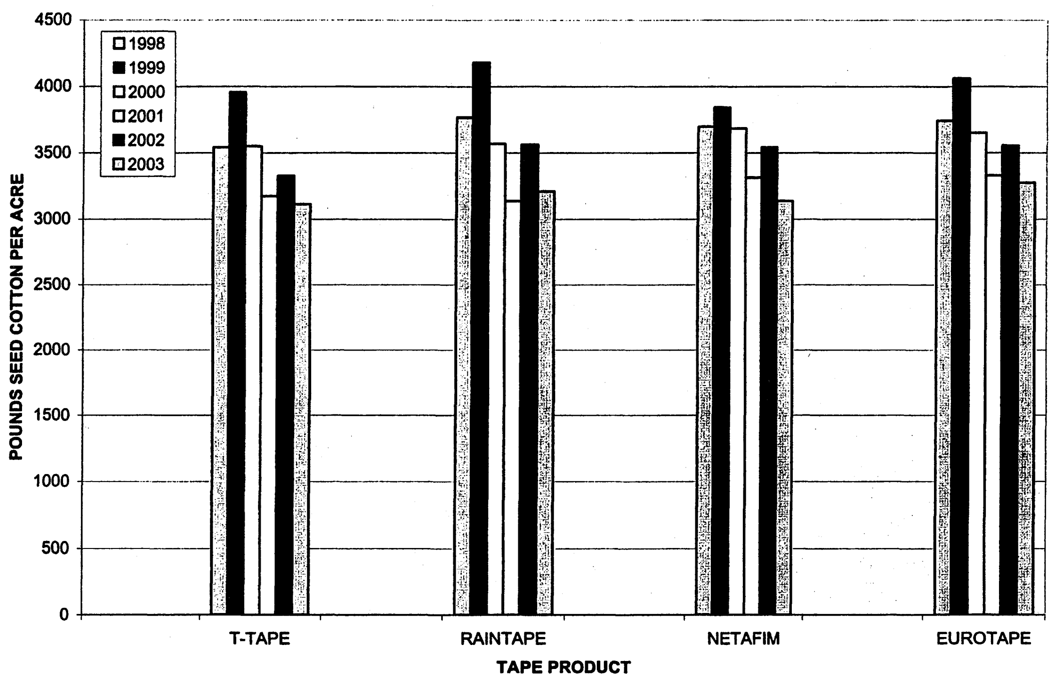


Figure 2. Fertigated program and tape comparison.



SPRINKLER IRRIGATION WATER REQUIREMENTS AND IRRIGATION SCHEDULING, TENNESSEE VALLEY RESEARCH AND EXTENSION CENTER

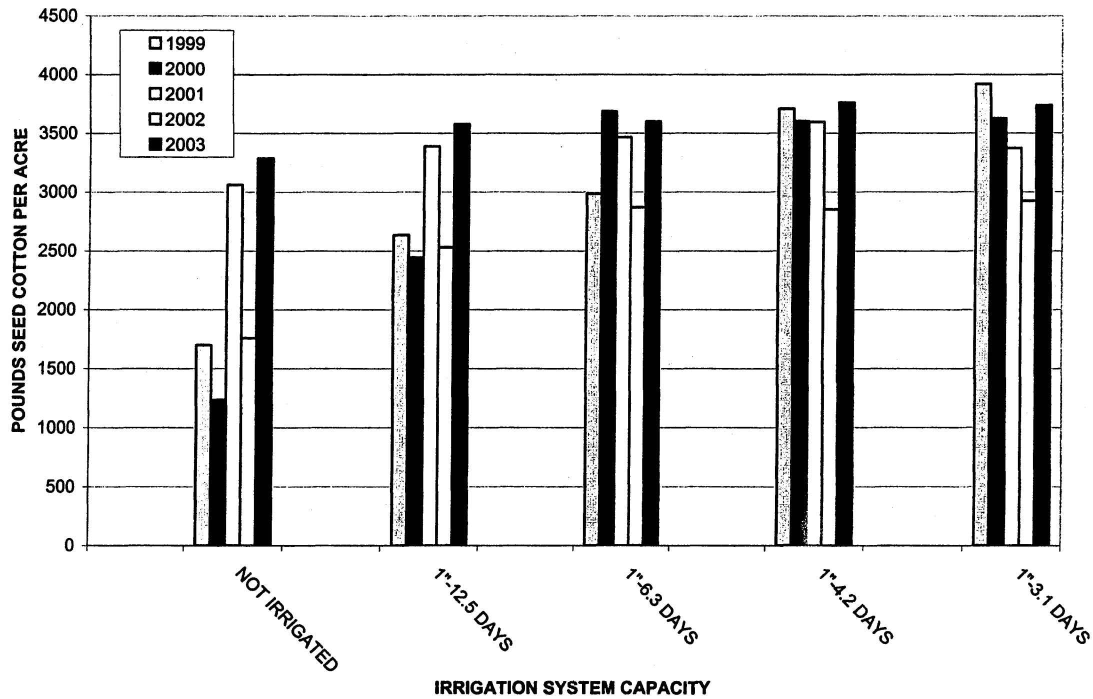
L.M. Curtis, C.H. Burmester, D. H. Harkins, and B.E. Norris

This experiment was established in 1999 to evaluate a range of irrigation application capabilities to identify the minimum design flow rate that will produce optimum yields.Treatments included four sprinkler irrigation capabilities and a non-irrigated treatment. Irrigation was managed using soil moisture sensors and Moiscot (a spreadsheet-based scheduling method). The irrigation capabilities were (1) 1 inch every 12.5 days, (2) 1 inch every 6.3 days, (3) 1 inch every 4.2 days, and (4) 1 inch every 3.1 days. These irrigation capabilities are equivalent to 1.5, 3, 4.5, and 6 gallons per minute per acre. This 1 inch represents the maximum amount of irrigation that could be applied in the time indicated. The varieties selected each year were as follows: 1999, DP NuCotn 33B; 2000 and 2001, DP 428 B; 2002 and 2003, DP 451 B/RR. The results for 1999, 2000, 2001, 2002 and 2003 are presented in the figure.

In 2003, rainfall was near optimum throughout much of the growing season. However, a 26-day dry period occurred between August 7 and September 4. A total of only 0.61 inches of rain occurred during this period and this rainfall occured in seven minor rainfall events. Three timely 1-inch irrigation applications during this period boosted irrigated yields 476 pounds of seed cotton per acre on the optimum irrigation treatment (1 inch every 4.2 days), compared to the non-irrigated treatment.

In 2002, irrigated yields were significantly higher than non-irrigated yields, but the highest yields were less than in other years for most treatments. The reason for this is unclear but may be related to shutdown of irrigation prior to sufficient boll maturity. Only very small yield differences were noted in 2001 while significant differences were measured in 2000 and 1999. Rainfall variability and treatment effects accounted for the wide range of yield responses for each of these years.

Sprinkler irrigation cotton yield results.



IMPACT OF NON-HOST CROP ROTATIONS AND WINTER COVER CROPS ON COTTON PRODUCTION IN RENIFORM NEMATODE-INFESTED FIELDS

W.S. Gazaway and J.R. Akridge

Previous rotation studies conducted in Alabama revealed that certain non-host crops reduced reniform nematode populations to manageable levels within one cropping year. Cotton alternated with summer non-host crops on alternate years produced significantly more cotton than continuous cotton with or without a nematicide. However, reniform nematode populations returned to damaging levels after just one growing season of cotton. Some cotton producers also believe that certain winter cover crops have a beneficial effect on cotton production in reniform-infested fields. The purpose of this test is to reaffirm non-host crops' ability to reduce reniform populations and to determine if certain winter cover crops or fallow will reduce reniform populations to safe levels.

This rotation study was initiated in a field on the Ward Brothers farm near Huxford, Alabama in 1997. The field (49 percent sand, 34 percent silt, 17 percent clay) has had a high infestation of reniform nematodes for more than 12 years and, consequently, has suffered substantial cotton yield losses over that period. The experimental design was a split plot, randomized design with five replications. Plots were four rows 25 feet long, with a between row spacing of 36 inches. Main plots were the winter cover crops that included vetch (Cahaba White), rye (Wren's Abruzzi), and fallow. Subplots were summer crops that included cotton (DP 655 BG/RR), corn (Garst AP-8251), soybean (AgriPro 5588-RR), and peanut (Southern Runner). The crop rotation scheme consisted of a one year rotation of a non-host summer crop with cotton. For example, peanut, corn and soybean were planted even years and cotton was planted odd years. Two treatments (i.e., continuous cotton) were planted to cotton every year. One continuous cotton treatment received a nematicide/ insecticide (Temik 15G) and the other continuous cotton treatment (i.e., no nematicide) received an insecticide, Di-Syston 15G. Winter cover crops were planted to the same designated plots every fall after summer crops had been harvested.

The rotation test began with the field being planted with winter cover crops or left to fallow in the fall of 1997. Cotton was grown in all plots the summer of 1997, 1999, 2001, and 2003. Non-host crops or cotton in the continuous cotton plots were planted to designated plots in the spring of 1998, 2000, and 2002.

All cotton plots, except the one continuous cotton plot that was treated with a nematicide, received Di-Syston 15G (at a rate of 7 pounds per acre) in the seed furrow at planting for early season insect control. Cotton plots treated with a nematicide received an in-furrow application of Temik 15G (at a rate of 7 pounds per acre) at planting. Soil samples were pulled for nematode analyses from the two inner rows of each plot in the spring prior to planting and in the fall immediately after crops had been harvested. All other cultural practices, weed control, and insect control were implemented according to Alabama Cooperative Extension System recommendations.

In 2003, all plots were planted to cotton. Soon after planting on May 1, 2003, plots were flooded with 10 inches of rain and had to be replanted on May 13. The test was again flooded with heavy rains which resulted in poor stands in several plots. Four plots (two peanut/cotton, one continuous cotton plus Temik, and one soybean/cotton) were not harvested due to a poor stand of cotton. However, nematode data from these plots were included. After heavy flooding in May, weather conditions were favorable for cotton growth for the rest of the season.

Reniform nematode fall populations were relatively high in the spring of 2003 (Table 1). In plots where peanut, soybean, and corn had been grown the previous summer (2002), populations were higher than most years but still much lower than in plots where continuous cotton was grown (Table 1). Soil moisture which remained relatively good throughout the early spring could have accounted for the higher than normal populations. A second possible explanation for the high nematode counts was the presence of henbit weeds over the field in the winter and early spring. Henbit can support and even increase reniform nematodes. Winter cover crops, as in previous years, had no effect on reniform populations (Table 2). Surprisingly, vetch, which increases reniform nematode populations in greenhouse tests, does not appear to increase reniform populations in the field any more than fallow during the winter months.

TABLE 1. IMPACT OF SUMMER CROPS ON RENIFORM NEMATODE POPULATIONS AND COTTON YIELD, 2003

Summer crop[1]	Reniform nematodes per 100cc soil		Seed cotton yield —lbs/ac—	
	4/30	10/15	10/30	difference
Cotton + Temik	1699	3597	2964	+464
Corn	540	2898	2952	+452
Soybean	900	3092	2816	+316
Peanut	838	2470	2680	+180
Cotton	2198	3043	2500	—
LSD ($P \leq 0.05$)	**449**	**—**	**268**	**—**

[1] Cotton grown in the summer of 2003.

TABLE 2. IMPACT OF WINTER COVER ON RENIFORM NEMATODE POPULATIONS AND COTTON YIELD, 2003

Winter cover	Reniform nematodes per 100cc soil		Seed cotton yield —lbs/ac—
	4/30	10/15	10/30
Vetch	1106	3086	2907
Rye	1285	3151	2737
Fallow	1314	2822	2702

Continuous cotton treated with Temik and the one-year corn rotation produced the highest cotton yields (Table 1). The soybean rotation plots also produced significantly higher yields than continuous cotton plots. However, the peanut rotation plots uncharacteristically yielded only slightly better than continuous cotton plots. The poorer than normal cotton yields following peanut was most likely due to an extraordinarily high population of volunteer peanut plants in the peanut/cotton rotation plots. Peanuts were not dug and left in the field the previous year (2002) due to heavy rains. Consequently, many germinated in the spring of 2003. Efforts to control the peanuts in 2003 in the affected cotton plots were not successful.

CROP ROTATION— AN EFFECTIVE TOOL FOR MANAGING RENIFORM NEMATODES IN COTTON

W.S. Gazaway

1994-1997 Rotation Study

In 1994, a long-term rotation study was initiated in Escambia County, Alabama, to determine the best non-host crops to use and the length of time needed in a rotation with cotton to reduce reniform nematode populations to a safe level in cotton. The initial study involved various rotation regimes using soybean, grain sorghum, bahiagrass, and corn (Table 1). The rotation study was arranged in a randomized complete design with eight replications. Plots were 16 rows wide and 50 feet long with a between row spacing of 40 inches. The study, originally intended as a twelve year study, was prematurely ended in 1997 with the loss of the field. However, valuable information on identifying effective non-host crops and the time required for them to reduce reniform to safe levels was gained in this abbreviated study. The results from this test indicate the following:

Corn, grain sorghum, and reniform-resistant soybean varieties reduced reniform nematode populations to below threshold down to a safe level after just one year of summer cropping with a non-host crop (Table 2).

Reniform populations returned to "damaging levels" after just one year of cotton.

One year of summer crops was about as effective as three years of non-host summer crops in reducing reniform populations.

Although cotton yields was superior following three consecutive years of a summer non-host crop to a single year with non-host summer crop, the increased yield was not from increased nematode control but probably from improved soil fertility and weed control (Table 3).

1998-2003 Rotation Study

The rotation study was altered in 1997 when it was placed in a new location in a field across the road. Based on the information gained from the 1994-1997 study, this new study (1998-2003) was redesigned to look at the effect of one year of non-host crops alternated with one year of cotton. This study, arranged in a split block with five replications, included winter cover crops, vetch, rye, and fallow, to determine if they affected reniform nematode populations or cotton production. Summer crops, peanut, soybean, and corn were for the same purpose.

Results of the 1998-2003 study indicate the following:

Winter cover crops do not affect reniform nematode popu-

TABLE 1. CROPPING SYSTEMS, 1994-1997 ROTATION STUDY

Rotation	1994	1995	1996	1997
1	corn	cotton	corn	cotton
2	corn	corn	cotton	corn
3	corn	corn	corn	cotton
4	GS	cotton	GS	cotton
5	GS	GS	cotton	GS
6	GS	GS	GS	cotton
7	bahia	bahia	cotton	bahia
8	bahia	bahia	bahia	cotton
9	soybean	cotton	soybean	cotton
10	soybean	soybean	cotton	soybean
11	cotton	cotton	cotton	cotton
12	cotton[1]	cotton[1]	cotton[1]	cotton[1]

[1]Cotton treated with Temik at a rate of 7 pounds per acre.

TABLE 2 . EFFECT OF ROTATION ON RENIFORM NEMATODE POPULATIONS, 1994-1997 ROTATION STUDY

Summer crop	Reniform nematodes per 100cc of soil		
	Fall 1996	Spring 1997	Fall 1997
Corn, 1 year	31	22	1101
Corn, 3 years	6	10	2398
Grain sorghum, 1 year	17	15	2189
Grain sorghum, 3 years	15	10	2439
Soybean, 1 year	12	30	1654
Bahia, 3 years	15	14	2384
Continuous cotton	836	174	2440

lations or adversely impact cotton yields. Vetch, which is highly susceptible to reniform nematode and increases its populations in the greenhouse, actually improved cotton yields without increasing reniform nematode populations in the field (Table 4).

All non-host summer crops (i.e. corn, peanut, and soybean) reduced reniform populations to safe levels within one growing season. Peanut followed by corn produced the highest cotton. The soybean reniform resistant variety was changed in the most recent study from Centennial to AgriPro5588 RR because seed were no longer available (Table 5).

TABLE 3. EFFECT OF COTTON ROTATION ON COTTON PRODUCTION, 1994-1997 ROTATION STUDY

Crop	Cotton (*lbs/ac*)		
	Seed cotton	Lint	Increase
Corn, 3 years	2166	867	268
Corn, 1 years	1791	716	117
Grain sorghum, 3 years	1902	761	162
Grain sorghum, 1 year	1733	693	194
Bahia, 3 years	1916	767	168
Soybean, 1 year	1898	759	160
Continuous cotton	1497	599	—
Cotton + Temik	1720	688	189

TABLE 4. WINTER COVER CROPS' IMPACT ON COTTON YIELD, 1998-2003 ROTATION STUDY

Cover crop	1999	2001	2003	Average
Fallow	2615	2916	2702	2744
Rye	2085	2742	2737	2521
Vetch	2849	2741	2907	2832

TABLE 5. COTTON YIELDS FOLLOWING ONE YEAR OF NON-HOST SUMMER CROPS, 1998-2003 ROTATION STUDY

Previous crop	Seed cotton (*lbs/ac*)				
	1999	2001	2003	Avg.	Avg. increase
Cotton	2175	2634	2500	2436	—
Corn	2808	2842	2952	2867	431
Soybean	2720	2729	2816	2755	319
Peanut	2739	3259	2680	2893	457

EVALUATION OF PLANTING DATE FOR RESPONSE TO BOLL ROT DISEASE IN ALABAMA

J.R. Jones, K.S. Lawrence, S.R. Usery Jr., K. Glass, and M.D. Pegues

A planting date trial was conducted at the Gulf Coast Research and Extension Center, Fairhope, Alabama. The soil type was a Malbis fine sandy loam. Plots consisted of two rows, 25 feet long, with a between-row spacing of 38 inches. Plots were arranged in a randomized complete-block design with four replications. A 20-foot alley separated blocks. Two varieties of cotton, Sure-Grow 215 BG/RR (early season) and Deltapine DP 555 BG/RR (late season), were planted on April 14 and then every two weeks until June 2. Cotton boll rot was evaluated by recording the number of healthy bolls and diseased bolls from a 0.001 acre section within each plot. Disease index (number of diseased bolls / total number of healthy bolls counted) × 100 was calculated for each variety on August 28, September 11, September 26, and Octo-

EVALUATION OF PLANTING DATE FOR RESPONSE TO BOLL ROT DISEASE IN ALABAMA

Variety	Planting date	Disease index				Yield seed cotton *lbs/ac*
		8/28	9/11	9/26	10/9	
SG 215 B/R	Apr 14	15.0ab	22.0a	harvested	harvested	2303ab
DP 555 BG/RR	Apr 14	15.0ab	21.8a	harvested	harvested	1862b
SG 215 B/R	Apr 28	18.0a	14.4ab	harvested	harvested	1917b
DP 555 BG/RR	Apr 28	5.7ab	13.4ab	harvested	harvested	2009ab
SG 215 B/R	May 13	3.4ab	9.0bc	10.6a	9.0a	2496a
DP 555 BG/RR	May 13	1.8b	10.2abc	7.4ab	5.7ab	2459a
SG 215 B/R	June 2	2.7b	2.1bc	1.0c	3.3b	2138ab
DP 555 BG/RR	June 2	0.6b	0.0c	2.5bc	3.6ab	1266c
LSD ($P \leq 0.05$)		**14.8**	**12.5**	**6.2**	**5.4**	**519**

[1] Number of bolls per 6 feet of row. [2] Disease index = (no. of diseased bolls / total no. of healthy bolls) × 100. Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.05$).

ber 9. Plots planted on April 14 and 28 were harvested on September 19. The remaining plots were harvested on October 16. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Data were statistically analyzed using PROC GLM, and means were compared with Fisher's protected least significant difference test.

Cotton boll rot disease incidence was relatively high in the earlier planting dates compared to the later planting dates in 2003 (see table). The initial disease index taken on August 28 for Sure-Grow 215 BG/RR and Deltapine DP 555 BG/RR was lowest for the June 2 planting. The September 11 disease index varied from a high of 22.0 for Sure-Grow 215 BG/RR to a low of 0 for Deltapine DP 555 BG/RR. The disease index recorded on September 26 and October 9 for Sure-Grow 215 BG/RR differed between the May 13 and the June 2 planting dates. Seed cotton yields varied by 1230 pounds per acre between Sure-Grow 215 BG/RR planted May 13 and Deltapine DP 555 BG/RR planted June 2, respectively. Seed cotton yields from all planting dates and varieties were higher than Deltapine DP 555 BG/RR planted on June 2.

FERTILIZATION OF COTTON ON BLACK BELT PRAIRIE SOILS IN ALABAMA

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

Most fine-textured, Black Belt soils test "high" or "very high" in potassium if recognized analytical techniques are used for these highly buffered, often calcareous soils. Nevertheless, cotton growers in this area sometime suspect K deficiency. Very little research has been conducted to verify soil test calibration or recommendations for cotton on these soils.

Nitrogen management is also a concern for cotton on these slowly permeable soils where N denitrification may be more of a concern than nitrate leaching. On-farm research has suggested higher N rates are needed for corn on these soils. Very little research has been conducted with cotton on these soils in Alabama. Standard N recommendations are based on research conducted on sandier, Coastal Plain soils or finer textured soils of the Tennessee Valley in northern Alabama.

This project was begun in 2001 and conducted on a cotton field managed by Octacot Farms near Browns, Alabama, on a Vaiden clay but had to be abandoned with no data collected. In 2002 and 2003, a different location was found on a Houston clay, 1 to 5 percent slope (very-fine, smectitic, thermic Oxyaquic Hapluderts).

The grower planted on raised beds formed several weeks prior to fertilizer application. All field operations other than fertilization were performed by the grower.

Fertility treatments were similar to those found on existing, long-term fertility experiments around Alabama where cotton and other crops have been produced (see table). Soil at the site initially tested "high" in P and "very high" in K with a pH of 6.1. Plot size was six rows wide and 25 feet long with a between row spacing of 38 inches. Eleven treatments were replicated four times in a randomized complete block design. All P, K, and sulfur (S) were applied as close to planting as possible. In 2002, the fertilizer N was applied half at planting and half as a sidedress during squaring. Fertilizer N at the rate of 50 pounds N per acre was mistakenly applied to the entire test area after planting in 2002. Therefore, side-dress N rates were adjusted such that total N treatments in 2002 were actually 50, 80, 95, 120, and 180 pounds N per acre. Boron was applied at sidedressing. In 2003, all the fertilizer treatments were applied at planting. Excessive rainfall during the entire 2003 growing season resulted in severe N denitrification and low yields.

Potassium: Very high soil K levels at this site precluded any expected response to added K. Leaf blade K levels suggest the need for growers to pay very close attention to the time of sampling when using leaf analyses to diagnose K sufficiency levels in cotton. Excessive K application appeared to suppress leaf-blade Mg concentrations and yields in 2002.

FERTILIZER TREATMENTS USED IN 2002 AND 2003

Treatment	N[1]	P_2O_5	K_2O	Other
		lbs/ac		
No K	95/90	60	0	
Moderate K	95/90	60	60	
High K	95/90	60	120	
Very high K	95/90	60	240	
High Sulfur	95/90	60	120	51 lbs S/ac as ammonium sulfate
High Boron	95/90	60	120	1 lb B/ac as Solubor™
No P	95/90	0	120	
No N	50/0	60	120	
Moderate N	80/60	60	120	
High N	120	60	120	
Very high N	180	60	120	

[1]The first value is the total N rate applied in 2002; the second value is the rate applied in 2003.

Phosphorus: Although soil test P was near the critical value used for Lancaster extractable P on Black Belt soils, there was no yield response to added P. This suggests that the current critical value is adequate.

Boron and sulfur: There was no yield response to B or S. Leafblade B and S were well within the established sufficiency ranges for mid bloom.

Nitrogen: Most of the total N should be applied as a sidedress even if it is applied as late as early bloom. This is to avoid denitrification losses from extremely wet springs such as occurred in 2003. In moderately dry years, as in 2002, the Auburn University standard recommendation of 90 pounds N per acre appeared sufficient for maximum yields. However, in extremely wet years, rates as high or higher than 120 pounds N per acre as a sidedress may be warranted.

CULLARS ROTATION (C. 1911): AMERICA'S OLDEST CONTINUOUS COTTON FERTILITY EXPERIMENT

C.C. Mitchell and D.P. Delaney

The Cullars Rotation was designed primarily to study the long-term effect of potassium fertilization on a three-year rotation which included cotton, corn, small grain and summer legumes (cowpeas or soybean). Yield records since 1911 have been maintained by researchers in the Department of Agronomy and Soils. Today, the experiment is a three-year rotation of (1) cotton followed by winter legumes, (2) corn harvested for grain and followed by winter wheat or another small grain, and (3) soybean double cropped after the small grain is harvested. It is located on a Marvyn loamy sand (fine-loamy, siliceous, thermic Typic Kanhapludults) adjacent to the Auburn University campus (At one time, the soil was called a Norfolk loamy sand). In recent years, the test has been maintained as a (1) field laboratory for students and visitors studying crop nutrient deficiencies, (2) source of soil and plant material for greenhouse and laboratory research, and (3) site for continuous soil test calibration and sustainable crop production research.

The original design was 11 soil treatments replicated three times, one replicate for each of the three crops in the three-year rotation in an ordered block design. In 1914, an additional three treatments (designated A, B, and C) were added to study the effect of winter legumes in the rotation. Plot size is 20 x 99 feet with a 2-foot border between each plot and 20 feet between each tier (block). A 40-foot buffer to nearby parking lots and other development on each side is maintained.

Until 1997, all crops were conventionally tilled with moldboard plowing, disking, and regular cultivation. Since 1997, all crops are grown with minimum tillage. Cotton and corn are planted directly in the previous crop residue in narrow (30-inch) rows after paratilling (subsoiling) using a no-till planter. Soybeans are drilled into wheat residue in June using a no-till drill. In 1999, a Liberty-Link corn hybrid was used (Pioneer 34A55 LL) which allowed direct planting into crimson clover residue. A stacked gene cotton (Paymaster 1220 BG/RR) allowed cotton to be produced with only two applications of Roundup herbicide. *Since 1996, no insecticides have been applied for insect control.* This has been possible because of the boll weevil eradication program in East Alabama and the advent of Bollgard® technology. All crops are machine harvested although occasional yield estimates are made by hand harvesting portions of each plot.

In the early years of the Cullars Rotation, sources of plant nutrients were blood meal for nitrogen, superphosphate (0-18-0) and rock phosphate for phosphorus, and kainit (0-0-12) for potassium. In recent decades, phosphorus as concentrated superphosphate (0-45-0) or rock phosphate, potassium as muriate of potash (0-0-60), sulfur as gypsum, and a micronutrient mix containing B, Zn, Mn, Cu, and Fe are applied to appropriate plots in split applications in the spring prior to planting cotton and in the fall just prior to planting small grain. Nitrogen as ammonium nitrate (34-0-0) is applied to appropriate plots just prior to planting cotton and corn and as a side-dress application to these crops. The small grain is topdressed with 60 pounds N per acre in late February.

Few research areas exist in the United States where one can see such dramatic deficiencies of plant nutrients on one site. Particularly dramatic are the plots were no soil amendment has been applied since 1911 (treatment C), the "no K" plots (treatment 6), the "no lime" plots (treatment 8), and the "no P" plots (treatment 2). Deficiencies sometimes appear on the other treatments but are less dramatic. In general, cotton is most sensitive to low soil K in this experiment while corn, soybean, and small grain are most sensitive to low soil P (see table). Cotton yields also seem to be reduced more (12 percent of limed and fertilized control) in the no lime treatment than yields of the other crops. Without micronutrients (presumably boron), cotton lint yields were only 86 percent of the completely fertilized treatment. Other crops failed to respond to micronutrient fertilization. Mean yields of cotton, corn, soybean, and small grain from 1996 through 1999 reflect the long-term trends.

Soil samples taken in incremental depths to 48 inches from the K-variable treatments reveal that large quantities of K accumulate in the upper soil profile in this loamy sand with a CEC near 3.0 cmol/kg. Potassium leaching below 48 inches does occur with the higher K rates as indicated by Mehlich-1 extractable K. Therefore, routine plow-layer soil sampling appears to be adequate to predict responses to K fertilization. Note that the application of an anion in the form of sulfate-S (as gypsum), increases K leaching.

The Cullar's Rotation experiment continues to document long-term trends in non-irrigated crop yields and soil changes due to variable rates of P, K, S, micronutrients, and lime. It provides a valuable and accessible teaching tool for monitoring crop nutrient deficiences. It also is a source of uniform soil with variable fertility conditions for allied studies. No other such resource exists in the Coastal Plain of the southern United States. For these reasons, The Cullars Rotation was placed on the National Register of Historical Places in 2003.

MEAN YIELD RELATIVE TO FERTILIZED CONTROL IN SELECTED TREATMENTS IN CULLARS ROTATION

Factor	Cotton	Corn	Small grain	Soybean
	—% relative yield—			
No lime, pH=4.9	12	42	39	19
No K	8	44	73	58
No P	45	42	43	48
No S	87	93	100	86
No micronutrients	86	99	96	94
Fertilized control	100	100	100	100
LSD ($P \leq 0.05$)	**27**	**32**	**25**	**35**

INSECTICIDES

CONTROL OF COTTON APHIDS INFESTING COTTON

B.L. Freeman

The cotton aphid reemerged as a significant in-season pest of cotton in north Alabama during the mid 1980s and in a matter of a few years a high level of resistance to all registered cotton insecticides was observed. Not until a neonicitinoid insecticide received registration was management of this pest attempted. Three such insecticides are now labeled; the purpose of this test is to compare those compounds to the organophosphate standard Bidrin and to an untreated control.

The test was conducted on the B. Garrett farm in Limestone County, Alabama. All but one treatment was applied with a backpack sprayer to plots that were two rows wide and 200 feet long on June 22, 2003. The low rate of Centric was applied by the farmer to the remainder of the field one day later. An area abutting the test was used for posttreatment samples and, in fairness, the aphids found in this plot on the first posttreatment sample date are omitted. Aphid populations were estimated by counting the aphids on the bottom side of a 3-inch diameter terminal leaf from twenty plants per plot on June 23, 24, 25, 26, 27, 30, and July 3. Two hundred pretreatment, whole field samples were taken in a like fashion on June 22.

The pretreatment aphid population averaged 735 aphids per 20 leaves. On June 23 a fungal pathogen, *Erynia* sp., was found to be infecting 32 percent of the aphids, but the infection rate had declined to 4 percent by the end of the trial. This likely explains the early posttreatment decline in control aphids, but further decline found near the end of the test is most likely explained by predation and parasitism. The fungal pathogen *Neozygites fresenii* was not detected.

The three neonicitinoid products at standard rates provided greater than 91 percent control with Intruder being somewhat better than the other two (see table). The lower rate of Centric and Bidrin treatments averaged 80 percent and 66 percent control, respectively (see table). Those levels of control are generally not acceptable for the cotton aphid, unless the fungal pathogen *N. fresenii* is anticipated within the next week.

NUMBER OF COTTON APHIDS PER 20 LEAVES

Treatment	Aphid numbers							Seasonal	Decrease from
lbs. a.i./ac	6/23	6/24	6/25	6/26	6/27	6/30	7/3	average	control *(%)*
Intruder 0.047	40	9	5	3	6	3	3	10	97
Centric 0.047	73	26	6	22	13	18	23	26	93
Trimax 0.047	79	18	9	11	15	2	48	26	92
Centric 0.033	—	68	50	99	81	29	92	70	80
Bidrin 0.250	92	77	183	151	152	95	68	117	66
Control	795	431	302	377	313	123	75	345	—

MIDSEASON MANAGEMENT OF TARNISHED PLANT BUGS

B.L. Freeman

This trial compares six insecticide treatments for control of tarnished plant bugs in mid July. It was conducted on the Tennessee Valley Research and Extension Center in Limestone County, Alabama. The cotton variety Stoneville 4892 BR was planted on April 15, 2003 and was under irrigation. The test was conducted as a strip trial with each plot being four rows by 50 feet. Treatments were applied on July 18 at which time 95 percent of the plant bugs were in the nymphal stage. Plant bug populations were estimated by taking two, six-foot drop cloth samples per plot on July 21, 25, and 28.

NUMBERS OF PLANT BUGS PER 100 FEET OF ROW

	Plant bugs				Decrease from
Treatment	7/21	7/25	7/28	Average	control *(%)*
Bidrin 0.5	25	8	33	22	90
Karate Z 0.028	58	8	8	25	89
Centric 0.063	17	58	67	47	78
Mustang Max 0.025	75	33	42	50	77
Mustang Max 0.018	67	50	33	50	77
Diamond 0.065	108	42	67	72	67
Control	250	125	279	218	—

Insecticide treatments reduced the plant bug population by 67 to 90 percent over the three posttreatment sample dates (see table). Bidrin and Karate Z provided the most control and Diamond the least (see table). The average control of the two Mustang Max rates was surprisingly similar (see table).

EVALUATION OF WIDESTRIKE AND CONVENTIONAL VARIETIES FOR HELIOTHINE CONTROL

R.H. Smith and S. McLean

PHY 440 cotton seed containing the WideStrike trait was planted at Prattville, Alabama, in 2004 in a block 30 feet wide by 700 feet long. This block was surrounded on all four sides by a 40-foot buffer of PSC 355. One-half of each variety was treated as needed for lep (worm) pest while the remaining one-half was left untreated. The entire test area was treated for bugs and sucking pests as needed.

On July 17 a heavy bollworm flight was detected in the test area. Eggs and small newly hatched larvae were discovered in the terminals of nearly 100 percent of the plants on that date. Egg deposition continued for approximately 14 days. The lep-treated area of the trial was sprayed a total of three times with a combination of Karate plus Tracer (July 21, July 30, and August 12). Infestation and damage data were collected on six dates, at approximately six- to eight-day intervals from July 28 until September 2.

Discussion of this trial will primarily be on the PHY 440U (unsprayed for leps) versus PSC 355U. Yields were taken to indicate the value of lep treatments to both varieties and are reflected in the yield differences presented in the final paragraph.

Both PSC 355 and PHY 440 were infested in a similar manner, beginning with egg deposition and larval survival in the terminals, followed by small larvae damage and survival in squares. Terminal damage was heavy, more than 50 percent, in the PSC 355U for approximately three weeks (July 17 to August 11). During this same period, terminal damage in the PHY 440U ranged between 10 and 20 percent. Terminal larvae were about 25 percent in the PSC 355U on the July 28 and August 4 observation dates while in the PHY 440U terminal larvae were just under 15 percent on July 28 and zero on August 4.

When all observation dates were averaged together, terminal damage in the PSC 355U was more than 45 percent while in the PHY 440U it was about 12 percent. Terminal larval numbers were less than 15 percent in the PHY 440U compared to about 65 percent in the PSC 355U.

Square damage in the PSC 355U was more than 75 percent for three consecutive observation dates (July 28, August 4, and August 11). Square damage in the PHY 440U ranged from 20 to 35 percent on July 28 and August 4 but had fallen to 10 percent by August 11. Small larvae (less than 0.25 inch in size) were recorded in 25 percent of the squares in the PSC 355U on July 28 but dropped to 4 percent on August 4. The PHY 440U had between 10 and 15 percent of the squares infested with small larvae on both the July 28 and August 4 observation dates. Large larvae (larger than 0.25 inch) were found in about 28 percent of the PSC 355U squares on July 28 while none were found in the PHY 440U on that date, or any of the following observation dates.

Square damage across all observation dates was nearly 50 percent in the PSC 355U, compared to about 13 percent in the PHY 440U. However, the difference in the number of small larvae in squares was not that great between the PSC 355U and PHY 440U—33 percent compared to 26 percent, respectively. Large larvae were another story, with a seasonal average of more than 35 percent of the squares having large larvae in the PSC 355U compared to none in the PHY 440U.

There was a noticeable absence of large larvae in the squares of the PHY 440U. There was also a noticeable difference in the number of blooms with larval feeding, with the PSC 355U ranging from 30 to 80 percent on three observation dates. The PHY 440U had less than 10 percent flower damage on one date and none on the other dates. On the July 28 observation date, PSC 355U had 25 percent of the blooms with small larvae while the PHY 440U had none. However, on August 11 about 8 percent of the PHY 440U blooms had large larvae compared to only 4 percent in the PSC 355U.

Wide differences were recorded in the number of large larvae and damage in blooms. The PSC 355U had about 30 percent of the blooms damaged by worms while the PHY 440U had about 2 percent. No small larvae were found in the blooms of PHY 440U compared to more than 30 percent found in PSC 355U blooms. Large larvae varied from about 37 percent in the PSC 355U blooms to 8 percent in PHY 440U blooms.

Significant differences were observed in the level of boll damage between the PSC 355U compared to the PHY 440U. Slightly more than 50 percent of the PSC 355U had bolls damaged by bollworm larvae while the PHY 440U had only about 4 percent, when all observation dates were averaged. Up to 35 percent of the PSC 355U bolls had large larvae on August 4 while no larvae were found in PHY 440U bolls on any observation date.

Yields document the extent and differences in the damage to the various treatments in this test. The PHY 440U yielded 1329 pounds of lint (machine harvested) compared to 471 pounds in the PSC 355U. When lep controls were made, the PSC 355 yielded 1246 pounds of lint and the PHY 440 yielded 1365 pounds.

NEMATICIDES

EVALUATION OF EFFECTIVENESS OF TEMIK 15G ON RENIFORM NEMATODE CONTROL IN NORTH ALABAMA

C.H. Burmester, K.S. Lawrence, and S.H. Norwood

Two cotton fields historically infested with reniform nematodes *(Rotylenchulus reniformis)* were selected in this northern Alabama study in Limestone and Colbert Counties (Table 1). Soil at both sites was classified as a Decatur silt loam, which is the dominant cotton soil in the area. Temik 15G (at a rate of 5 pounds per acre) was applied with a planter in-furrow at both sites. Turning off Temik application on selected rows and marking with flags created the non-Temik areas. The non-Temik plots were treated with Karate Z 2.08 CS (at a rate of 1 gallon per 40 acres) after emergence to eliminate any early season insect problems.

Eight-inch deep soil samples were taken in-row after planting and every three to four days for 21 days in both the Temik and non-Temik areas. These samples were analyzed to determine Temik's longevity in this rooting area. Nematode soil samples were taken at early cotton squaring at both sites and also at harvest. Cotton was handpicked (two, 10-foot sections in each plot) to determine yield.

The growing season, although cool and wet in May, produced an excellent cotton crop in both locations due to timely late season rains. At both sites, Temik-treated cotton out-yielded the non-Temik treatment by nearly one-half bale (Table 2). Early season (June) nematode samples indicated Temik reduced reniform levels at both sites (Table 2). The fall nematode samples indicated extremely high nematode levels especially at the Limestone site. Fall populations of reniform nematodes were the highest where Temik was applied in the Limestone test. Why reniform populations were so much higher at harvest at the Limestone site compared to the Colbert site is not known.

TABLE 1. SITE AND EARLY SEASON RAINFALL INFORMATION[1]

	Limestone County	Colbert County
Soil type	Decatur silt loam	Decatur silt loam
Planting date	4/16	4/23
Variety	ST 5599	DPL 494
Reniform sampling	6/11, 9/23	6/18, 10/12
Harvest date	9/23	10/12
Rainfall *(in)*	4/22 – 0.7	4/25 – 0.23
	4/28 – 1.2	4/30 – 0.51
	5/8 – 6.0	5/14 – 1.07

[1]All samples dates were in 2003.

TABLE 2. COTTON LINT YIELD[1] AND RENIFORM NEMATODE POPULATIONS[2]

	Temik					No Temik				
	1	2	3	4	Avg	1	2	3	4	Avg
Lint lbs/ac – Limestone	860	980	1020	1170	1008	830	750	760	760	775
Lint lbs/ac – Colbert	1095	1160	1046	1154	1113	884	817	881	845	857
Reniform no. – Limestone (June)		2343		824	1584		5175		4223	4699
Reniform no. – Colbert (June)		1365		335	850		1004		1133	1069
Reniform no. – Limestone (August)	11742	12360	8343	4789	9309	5253	4944	6644	5407	5562
Reniform no. – Colbert (September)	1494	670	983	1210	1097	515	1056	1133	2549	1313

[1]Based on 37% turn-out.
[2]Nematode populations per 150cc soil.

EVALUATION OF TEMIK 15G SIDE-DRESS APPLICATION FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN CENTRAL ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., and D.P. Moore

Temik 15G was evaluated for the management of the reniform nematode (*Rotylenchulus reniformis*) in a naturally infested field near the Prattville Agricultural Research Unit in Prattville, Alabama. The field had a history of reniform nematode infestation and the soil type was a sandy loam. Temik 15G was applied on April 27 at planting in the seed furrow with chemical granular applicators attached to the planter. A side-dress application of Temik 15G (at a rate of 5 pounds per acre) was made on June 23 with a side-dress applicator with split coulters. Temik was applied 3 inches deep and 6 inches on either side of the row. Plots consisted of four rows, 25 feet long, with a 36-inch wide row spacing and were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. Terraclor Super X 18.8G (at a rate of 5.5 pounds per acre) was applied at planting to all treatments.All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Population densities of the reniform nematode were determined at planting, 30 days after planting, at midseason and at harvest. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. The initial nematode population was 345 vermiform per 150cc of soil. Plots were harvested on October 2. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Reniform nematode disease pressure was low in 2003. At 30 days after planting, the Temik 15G treatment applied at a rate of 7 pounds per acre reduced nematode population as compared to the control (see table). At 65 days after planting, at approximately full bloom, the treatments of Temik 15G applied at rates of 5, 7, and 5 plus 5 pounds per acre all reduced nematode numbers as compared to the control. However, by 108 and 132 days after planting, only the Temik 15G treatment at the 7 pounds per acre rate reduced nematode population as compared to the control. The season total of nematode populations for Temik 15G at a rate of 7 pounds per acre and also Temik 15G at a rate of 5 plus 5 pounds per acre was less than all other treatments.

Seed cotton yields varied 493 pounds per acre between Temik 15G applied at 7 pounds per acre and Cruiser 70 WS. The three Temik 15G treatments increased the yield of seed cotton an average of 144 pounds per acre over the control.

EVALUATION OF TEMIK 15G SIDE-DRESS APPLICATION FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN CENTRAL ALABAMA, 2003

Nematicide	Rate	5/29 30 dap[1]	7/3 65 dap	8/7 108 dap	10/2 132 dap	Season total	Seed cotton *lbs/ac*	Seed cotton over control *lbs/ac*
		Nematodes per 150cc soil						
Control	—	412ab	571a	1380ab	1344a	3708a	1606	
Temik 15G	5 lbs/ac	211bc	298b	1266abc	1019ab	2796a	1737	131
Temik 15G	7 lbs/ac	164c	113b	540c	772bc	1591b	1790	184
Cruiser 70 WS	7 fl oz/cwt	493a	345ab	1606a	1236a	3651a	1297	-309
Temik+Temik15G sidedress	5 + 5 lbs/ac	272abc	170b	664bc	494c	1601b	1723	117
LSD ($P \leq 0.05$)		**210**	**244**	**757**	**405**	**1138**	**588**	

[1]dap= days after planting.

Comparing Three Methods for Telone II Fumigation

W.S. Gazaway and J.R. Akridge

Reniform nematodes severely limit cotton production in Alabama. Currently, Temik 15G (at a rate of 5 pounds per acre), applied in the seed furrow at planting, and Telone II (at a rate of 3 gallons per acre), injected into a raised seed bed 7 to 10 days prior to planting, are the only two nematicides effective against reniform nematodes in cotton. However, most cotton producers in Alabama use minimum tillage rather than raised seedbeds. Previous efforts to incorporate Telone fumigation involving single shanks into minimum tillage systems have failed. Recently, a modified fumigation rig (Yetter), which uses a shank with a lateral spur at the foot of the shank, has been successful in minimum tillage systems at other locations in the Southeast. The purpose of the test was to compare the Yetter fumigation method to the standard raised bed method of fumigation.

The Telone II fumigation test was placed in a heavily reniform nematode-infested cotton field on the Ward Brothers farm near the Huxford community in Escambia County in south Alabama. This soil consisted of 49 percent sand, 34 percent silt, and 17 percent clay. Three fumigation methods were compared (see table). Plots were arranged in a complete randomized block. All plots that did not receive Telone II received the same tillage as those that received Telone.

The field was fumigated with Telone II on April 3, 2003. Soil temperature (76°F) and soil moisture were ideal for fumigation. Cotton (DP 458 B/RR) was planted on April 30, 2003. Di-Syston 15G was applied in the seed furrow at planting for early season insect control. The field was flooded (10.1 inches of rain) one day after planting and was replanted May 13, 2003. Cotton stand was evaluated June 1 for signs of phytotoxicity.

Soil samples for nematode analyses were taken April 3 and October 13. Cotton was picked on October 30, 2003.

Results are summarized in the table. Due to excessive rain and flooding following the initial planting on April 30, the test was replanted on May 13. The stand was evaluated for Telone toxicity on May 26—almost two months after fumigation. No toxicity was observed. Telone II was still effective against reniform despite the length of time between Telone II application and the second planting. The Yetter fumigation method proved to be as effective in increasing cotton yields as the raised bed fumigation method. Both methods were superior to strip tillage fumigation which appeared to have no effect against reniform nematodes (see table). The impact of Telone II on reniform nematode populations appeared be short-lived as evidenced by the fact that reniform populations were as high in the Telone-treated plots as in the untreated plots by the end of the season (see table).

Telone II fumigation using the Yetter rig is promising based on test results in the Ward Brothers field. However, more tests need to be conducted in fields with different soil types before this method can be recommended in all fields across the state.

Fumigation Methods' Impact on Cotton Production in a Reniform-Infested Field, 2003

Treatment	Application	Rate/acre	Nematodes per 100cc soil 4/03	10/13	Seed cotton *lbs/ac*
Telone II	Yetter	3 gal	1329a	2996a	1707a
No Telone	Yetter	—	1738a	2720a	1283b
Telone II	Strip	3 gal	1682a	3259a	1562ab
No Telone	Strip	—	1590a	3621a	1439ab
Telone II	Raised bed	3 gal	1589a	3466a	1752a
No Telone	Raised bed	—	2090a	3281a	1603ab
LSD ($P \leq 0.05$)			**753**	**727**	**270**

EVALUATION OF THE SOIL FUMIGANTS VAPAM AND TELONE II FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN NORTH ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., G.W. Lawrence, and C.H. Burmester

The soil fumigants Vapam and Telone II were evaluated for the management of the reniform nematode (*Rotylenchulus reniformis*) in a naturally infested field adjacent to the Tennessee Valley Research and Extension Center, Belle Mina, Alabama. The field had a history of reniform nematode infestation and the soil type was a silty loam. Vapam and Telone II were applied with a modified John Deere ripper hipper. A CO_2-charged system was used to move the fumigant through flow regulators mounted on delivery tubes attached to the trailing edge of forward-swept chisels. The fumigant was injected 12 inches deep 21 days prior to planting with one chisel per row. Rows were immediately hipped with disk hillers to seal and prevent rapid loss of the fumigant. A standard treatment of Temik 15G (at a rate of 5 pounds per acre) was applied at planting on May 1 in the seed furrow with chemical granular applicators attached to the planter. Plots consisted of two rows, 25 feet long, with a 40 inch wide row spacing and were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. Terraclor Super X 18.8G (at a rate of 5.5 pounds per acre) was applied at planting to all treatments. 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 throughout the season at monthly intervals. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 15. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Reniform nematode disease pressure was low in this location in 2003 compared to the previous year. Pre-plant populations of reniform nematodes averaged 172 nematodes per 150cc of soil in 2003. No significant differences in reniform nematode populations were observed throughout the season between any of the treatments. Cotton seed yields were numerically greater in the Vapam and Telone II treatments as compared to the standard Temik 15G treatment. The Telone II treatments increased yield an average of 586 pounds per acre while the Vapam treatments increased yield by 449 pounds per acre over the Temik 15G standard.

EVALUATION OF THE SOIL FUMIGANTS VAPAM AND TELONE II FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN NORTH ALABAMA, 2003

Nematicide	Rate	Application timing	Nematodes per 150cc soil: 5/29 30 dap[1]	Nematodes per 150cc soil: Mid-season	Nematodes per 150cc soil: Harvest	Seed cotton *lbs/ac*	Seed cotton over standard *lbs/ac*
Telone II	1.5 gpa	–	41.2	2096	1406.0	4105.5	482.8
Telone II	3.0 gpa	21 dbp[2]	51.5	3723	1575.9	4314.3	691.6
Vapam	5.0 gpa	21 dbp	56.6	1993	1344.2	3972.4	349.7
Vapam	8.0 gpa	21 dbp	41.2	1885	1004.3	4170.8	548.1
Temik 15G	5.0 lbs/ac	At plant	41.2	2565	973.4	3622.7	
LSD ($P \leq 0.05$)			**31.8**	**2379**	**872.3**	**417.6**	

[1]dap = days after planting. [2]dbp = days before planting.

EVALUATION OF THE SOIL FUMIGANTS VAPAM AND TELONE II FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN SOUTH ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., G.W. Lawrence, and J.R. Akridge

The soil fumigants Vapam and Telone II were evaluated for the management of the reniform nematode (*Rotylenchulus reniformis*) in a naturally infested field near Huxford, Alabama. The field had a history of reniform nematode infestation and the soil type was a silty loam. Vapam and Telone II were applied with a modified John Deere ripper hipper. A CO_2-charged system was used to move the fumigant through flow regulators mounted on delivery tubes attached to the trailing edge of forward-swept chisels. The fumigant was injected 12 inches deep 14 days prior to planting with one chisel per row. Rows were immediately hipped with disk hillers to seal and prevent rapid loss of the fumigant. All remaining rows were sub-soiled 12 inches deep and hipped without applying the fumigant. A standard treatment of Temik 15G (at a rate of 5 pounds per acre) was applied at planting on May 1 in the seed furrow with chemical granular applicators attached to the planter. Di-Syston 15 G (at a rate of 6 pounds per acre) was applied similarly to the control. Plots consisted of two rows, 25 feet long, with a 36 inch wide row spacing and were arranged in a randomized complete block design with six replications. Blocks were separated by a 20-foot alley. Terraclor Super X 18.8G (at a rate of 5.5 pounds per acre) was applied at planting to all treatments. 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 throughout the season at monthly intervals. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on September 30. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Pre-plant populations of reniform nematodes averaged 1236 nematodes per 150cc of soil. Thirty days after planting reniform nematode populations were numerically lower in all the fumigated plots as compared to the control. No significant differences in reniform nematode populations were observed throughout the season; however, the season totals indicated the control supported more reniform than the Telone II treatment.

Cotton seed yields were greater in the Vapam and Telone II treatments as compared to the control and the Temik 15G treatment. The nematicides increased yield over the control by an average of 1389 pounds per acre in the fumigant treatments compared to 360 pounds per acre in the granular treatment. The average increase in yield across all nematicides was 1131 pounds per acre as compared to the control.

EVALUATION OF THE SOIL FUMIGANTS VAPAM AND TELONE II FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN SOUTH ALABAMA, 2003

Nematicide	Rate	Application timing	Nematodes per 150cc soil: 5/01 at planting	6/04 30 dap[1]	7/14 70 dap	8/14 100 dap	9/30 harvest	Season total	Seed cotton *lbs/ac*
Control	—	—	1009a	2770	2647	5140	2672	14238a	1397.2b
Vapam	5 gpa	14 dbp[2]	798ab	1936	2286	4233	2363	11616ab	2539.8a
Vapam	8 gpa	14 dbp	813ab	1967	2209	4635	2317	11941ab	2835.6a
Temik 15G	5 lbs/ac	At plant	968a	2101	1452	4635	2997	12153a	1757.4b
Telone II	3 gpa	14 dbp	633b	1035	1745	3090	2193	8696b	2983.5a
LSD ($P \leq 0.05$)			**317**	**1741**	**1356**	**2123**	**1042**	**3264**	**453**

[1]dap = days after planting. [2]dbp = days before planting.

EFFECT OF GAUCHO AND CRUISER SEED TREATMENTS VERSUS RECOMMENDED NEMATICIDES ON CONTROLLING RENIFORM NEMATODES IN COTTON

W.S. Gazaway and J.R. Akridge

A test was placed in a heavily reniform nematode infested cotton field on the Ward Brothers' farm near the Huxford community (Escambia County) in south Alabama. The field was a loam soil that consisted of 49 percent sand, 34 percent silt, and 17 percent clay. The purpose of this test was to evaluate the effectiveness of the seed treatments Gaucho and Cruiser for controlling reniform nematodes. Various combinations of seed treatments with and without Temik side-dress applications were compared to Alabama's standard recommended nematicides, Telone II and Temik 15G.

Weeds and the vetch cover crop were killed in the early spring prior to cultivation using Prowl and Roundup. The test area was cultivated and four row plots, 25 feet long, separated by 5-foot alleys were marked off. The test contained seven treatments (five repetitions) which were arranged in a randomized, complete block design. All plots were then ripped and bedded on April 3, 2003. The fumigant, Telone II, was injected 18 inches deep to raised beds in designated plots on the same date.

On April 30, the test was planted with the cotton variety DP 555 BG/RR. Gaucho-treated seeds (4 ounces per hundred weight) and Cruiser 70WP treated seeds (7 ounces per hundred weight) were planted to designated plots. Temik 15G (at a rate of 5 pounds per acre) was applied in the seed furrow at planting to designated plots. Di-Syston 15 (at a rate of 7 pounds per acre) was applied for early insect control to plots that received the fumigant, Telone II. Temik 15G (at a rate of 7 pounds per acre) was applied as a side-dress treatment to designated plots approximately six weeks after planting. See Table 1 for a summary of treatments. On June 24, Prowl, Roundup and MSMA were applied to control weeds and grass.

Soil samples for nematode analysis were taken from each plot (1) just prior to fumigation on April 3, 2003, (2) six weeks after planting on June 23, 2003, and (3) on August 4, 2003, six weeks after the Temik side-dress application. Plots were defoliated on September 17 and picked on September 30, 2003.

A 4-inch rain fell the day after planting on May 1, 2003, flooding the plots. Temik, which is highly water soluble, may have been leached from the soil and possibly rendered ineffective as a nematicide. If so, this may explain its ineffectiveness in reducing reniform populations and improving cotton yields (Table 2). Gaucho and Cruiser were also ineffective against reniform (Table 2). Only Telone II controlled reniform nematodes and increased cotton yields significantly (Table 3).

TABLE 1. LIST OF TREATMENTS EVALUATED FOR CONTROLLING RENIFORM NEMATODES

—Treatment— Number	Name	Rate	Application method
1	Di-Syston 15G	7 lbs/ac	In the seed furrow at planting
2	Gaucho	4 oz/cwt	Seed treatment
3	Gaucho +	4 oz/cwt	Seed treatment
	Temik 15G	7 lbs/ac	Side dress 6 weeks after planting
4	Temik 15G	5 lbs/ac	In the seed furrow at planting
5	Temik 15G +	5 lbs/ac	In the seed furrow at planting
	Temik 15G	7 lbs/ac	Side dress 6 weeks after planting
6	Gaucho +	4 oz/cwt	Seed treatment
	Temik 15G	5 lbs/ac	In the seed furrow at planting
7	Cruiser 70 70WP	7 oz/cwt	Seed Treatment
8	Telone II +	3 gpa	Injected 2 weeks prior to planting
	Di-Syston 15G	7 lbs/ac	In the seed furrow at planting

TABLE 2. IMPACT OF NEMATICIDE TREATMENTS ON RENIFORM POPULATIONS AND COTTON PRODUCTION

—Treatment— Number	Name	Application	—Nematodes per 100cc soil— 4/03	6/23	8/30	Seed cotton yield *(lbs/ac)* 9/30
1	Di-Syston	In-furrow	2828a	2448ab	3140a	2005b
2	Gaucho	Seed treatment	2486a	3353a	2460a	2090b
3	Gaucho + Temik	Seed treatment In-furrow	1849a	2116bc	2605a	2207b
4	Temik	In-furrow	2217a	1734bc	2244a	2420b
5	Temik + Temik	In-furrow Side dress	1831a	2375abc	2389a	2164b
6	Gaucho + Temik	Seed treatment In-furrow	1911a	2269abc	1935a	1986b
7	Cruiser	Seed treatment	2398a	2611ab	2842a	2174b
8	Telone + Di-Syston	Fumigant In-furrow	2399a	1247c	3214a	3153a
LSD ($P \leq 0.05$)			**1056**	**803**	**972**	**602**

EVALUATION OF VYDATE C-LV FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN NORTH ALABAMA

K.S. Lawrence, C.H. Burmester, J.R. Jones, and S.R. Usery Jr.

Vydate C-LV was evaluated for the management of the reniform nematode (*Rotylenchulus reniformis*) in a naturally infested field adjacent to the Tennessee Valley Research and Extension Center, Belle Mina, Alabama. The field had a history of reniform nematode infestation and the soil type was a silty clay loam. Vydate C-LV (at a rate of 17 ounces per acre) was applied as a broadcast foliar spray at the fifth true leaf stage on June 5 with an air-charged modified plot sprayer delivering 10 gallons per acre through four 8003 flat fan nozzles at 40 pounds per square inch. All rows not treated with Vydate C-LV received a foliar spray of Orthene 90S at 0.3 pound per acre. Temik 15G (at a rate of 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 a 40 inch wide row spacing and were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. Terraclor Super X 18.8G (at a rate of 5.5 pounds per acre) was applied at planting to all treatments. 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 throughout the season at monthly intervals. Ten soil cores, 1 inches in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 15. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Reniform nematode disease pressure was low in this location in 2003. Pre-plant populations of reniform nematodes averaged 167 nematodes per 150cc of soil and increased to more than 1,400 nematode per 150cc of soil in 2003 (see table). All nematicide treatments reduced reniform nematode populations at 30 days after planting. Cotton seed yields were numerically increased in all nematicide treatments as compared to the control. The Temik 15G (at a rate of 5 pounds per acre) plus Vydate (at a rate of 17 ounces per acre) treatments produced the highest seed cotton yield and season total nematode numbers. The increase in yield due to Temik 15G and Vydate appeared to be greater than additive when compared to either treatment alone.

EVALUATION OF VYDATE C-LV FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN NORTH ALABAMA, 2003

Nematicide	Rate	Application timing	——Nematodes per 150cc soil—— 5/29 30 dap[1]	7/07 60 dap	9/09 120 dap	10/21 harvest	Season total	Seed cotton *lbs/ac*	Seed cotton over standard *lbs/ac*
Control	—	—	194.7a	370.8	546ab	242.1	984ab	3280.2	
Temik 15G	5 lbs/ac	At plant	25.75b	324.5	737ab	448.1	1210ab	3510.8	230.6
Temik + Vydate	5 lbs/ac + 17 oz/ac	At plant + pinhead square	41.2b	633.5	1427a	309.0	1778a	3581.5	301.3
Temik + Vydate	3.5 lbs/ac + 17 oz/ac	At plant + pinhead square	46.35b	695.3	175ab	293.6	515b	3361.5	81.3
Vydate	17 oz/ac	Pinhead square	25.75b	602.6	26b	190.6	242b	3319.5	39.3
LSD ($P \leq 0.05$)				**115.8**	**519.4**	**1274**	**335**	**1225**	**530**

[1]dap = days after planting.

EVALUATION OF EQUITY FOR ROOT-KNOT NEMATODE MANAGEMENT IN COTTON IN CENTRAL ALABAMA

K.S. Lawrence, G.W. Lawrence J.R. Jones, and S.R. Usery Jr.

Equity was evaluated for the management of the root-knot nematode (*Meloidogyne incognita*) in a naturally infested field at the E. V. Smith Research and Extension Center, near Tallassee, Alabama. The field had a history of root-knot nematode infestation and the soil type was a sandy loam. Equity was applied as an in-furrow spray with flat tip 8002E nozzles calibrated to deliver 6 gallons per acre at 18 pounds per square inch. Plots consisted of two rows, 25 feet long, with a 40 inch wide row spacing and were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. Terraclor Super X 18.8G (at a rate of 5.5 pounds per acre) was applied at planting to all treatments. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

All plots received a foliar spray of Orthene 75S at 0.3 pound per acre at three weeks after planting for thrip control. Population numbers of the reniform nematode were determined at planting, midseason, and harvest. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on September 24. Data were statistically analyzed by ANOVA and means compared using Fisher's protected least significant difference test.

Root-knot nematode disease pressure was moderate in 2003. Pre-plant populations of root-knot nematodes averaged 26 nematodes per 150cc of soil and increased to more than 1,500 nematode per 150cc of soil in 2003 (see table). Equity applied at 2 quarts plus 2 quarts per acre and Equity plus Humate applied at a rate of 4 quarts per acre reduced root-knot nematode populations at 30 days after planting as compared to the Equity applied at a rate of 4 quarts per acre. However, populations were not reduced at any other sampling date. No statistical differences between any of the treatments were observed in seed cotton yields. However, yields were numerically increased an average of 361 pounds per acre in the Equity treatments as compared to the control.

EVALUATION OF EQUITY FOR ROOT-KNOT NEMATODE MANAGEMENT IN COTTON IN CENTRAL ALABAMA, 2003

Nematicide	Rate	Application timing	Nematodes per 150cc soil: 5/29 30 dap[1]	6/27 60 dap	8/05 90 dap	9/24 harvest	Seed cotton *lbs/ac*	Seed cotton over standard *lbs/ac*
Control	—	—	30.9ab	309.0	597.4	2616.2	1415	
Equity	4 qt/ac	At plant	51.5a	437.8	648.9	2101.2	1694	279
Equity	2 qt + 2 qt/ac	At plant + 14 dap	20.6b	339.9	432.6	1591.4	1695	280
Equity + Humate	4 qt/ac	At plant	20.6b	303.9	700.4	1545.0	1672	257
Equity + Humate	2 qt + 2 qt/ac	At plant + 14 dap	41.2ab	386.3	509.9	2178.5	1880	465
LSD ($P \leq 0.05$)			**23.4**	**258**	**453**	**1284.4**	**696**	

[1]dap = days after planting.

EVALUATION OF BIOLOGICALS FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN NORTH ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., G.W. Lawrence, and C.H. Burmester

Equity, Visible, and Jenner-8 Plus were evaluated for the management of the reniform nematode (*Rotylenchulus reniformis*) in a naturally infested field adjacent to the Tennessee Valley Research and Extension Center, Belle Mina, Alabama. The field had a history of reniform nematode infestation and the soil type was a silty loam. Equity was applied as an in-furrow spray with flat tip 8002E nozzles calibrated to deliver 6 gallons per acre at 18 pounds per square inch. Jenner-8 Plus was applied as a 6-inch band over the row immediately before planting with a CO_2-charged backpack sprayer at a rate of 10 gallons per acre through two 8003 flat fan nozzles at 30 pounds per square inch. Temik 15G (at a rate of 5 pounds per acre) and Visible (at a rate of 5 pounds per acre) were applied at planting on May 1 in the seed furrow with chemical granular applicators attached to the planter.

Plots consisted of two rows, 25 feet long, with a 40 inch wide row spacing and were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. Terraclor Super X 18.8G (at a rate of 5.5 pounds per acre) was applied at planting to all treatments. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

All plots received a foliar spray of Orthene 75S at 0.13 pound per acre at three weeks after planting for thrips control. Population numbers of the reniform nematode were determined at planting, midseason, and harvest. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 15. Data were statistically analyzed by ANOVA and means compared using Fisher's protected least significant difference test.

Reniform nematode disease pressure was low in this location in 2003. Pre-plant populations of reniform nematodes averaged 167 nematodes per 150cc of soil and increased to over 1,100 nematode per 150cc of soil in 2003 (see table). All biological treatments reduced reniform nematode populations at 30 days after planting. However, populations were not reduced at midseason or at harvest. No differences between any of the treatments were observed in seed cotton yields. Temik 15G, the standard nematicide treatment numerically increased yield by 230 pounds of seed cotton per acre as compared to the control.

EVALUATION OF EQUITY, VISIBLE, AND JENNER-8 PLUS FOR RENIFORM NEMATODE MANAGEMENT IN COTTON IN NORTH ALABAMA, 2003

Nematicide	Rate	Application timing	Nematodes per 150cc soil: 5/29 30 dap[1]	Mid-season	Harvest	Season total	Seed cotton *lbs/ac*	Seed cotton over standard *lbs/ac*
Control	—	—	195.7a	545.9	242.1	983.7	3280.2	
Temik 15G	5 lbs/ac	At plant	25.8b	736.5	448.1	1210.3	3510.8	230.6
Equity	4 qt/ac	At plant	25.8b	963.1	87.6	1076.4	3170.2	-110.0
Equity	2 qt + 2 qt/ac	At plant + 14 dap	51.5b	1112.4	309.0	1472.9	3285.5	5.3
Equity + Humate	4 qt/ac	At plant	25.8	412.0	288.4	726.2	3031.3	-248.9
Equity + Humate	2 qt + 2 qt/ac	At plant + 14 dap	25.8b	365.7	401.7	793.1	3099.5	-180.7
Visible	5 lbs/ac	At plant	25.8b	458.4	494.4	978.5	3149.2	-131.0
Jenner-8 Plus	15 gal/ac	At plant	41.2	453.2	221.5	715.9	3073.3	-206.9
LSD ($P \leq 0.05$)			**90.3**	**988.9**	**424.3**	**1019.7**	**489.3**	

[1]dap = days after planting.

EFFICACY OF EXPERIMENTAL SEED TREATMENT NEMATICIDES FOR MANAGEMENT OF THE ROOT-KNOT NEMATODE IN CENTRAL ALABAMA

K.S. Lawrence, S.R. Usery Jr., and J.R. Jones

A test to evaluate a new novel seed treatment on cotton for management of the reniform nematode was planted on May 8 at the E. V. Smith Research Center of the Alabama Experiment Station near Shorter, Alabama. The field had a history of root-knot nematode infestation and the soil type was a sandy loam. Plots consisted of two rows, 25 feet long with a row spacing of 40 inches. Plots were arranged in a randomized complete block design with five replications and blocks were separated by 15-foot alley. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Seed treatments were pre applied to the seeds by the manufacturer. Two treatments included Temik 15G, which was applied at planting in the seed furrow with chemical granular applicators attached to the planter.

Population numbers of the root knot nematode were determined at planting, midseason, and harvest. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on September 17. Data were statistically analyzed by ANOVA and means compared using Fisher's protected least significant difference test.

Root-knot nematode disease pressure was moderate in 2003. Pre-plant populations of root-knot nematodes averaged 26 nematodes per 150cc of soil and increased to more than 2100 nematode per 150cc of soil by September (see table). No differences in nematode numbers were observed between any treatment in May or June. However, in August, 90 days after planting, all seed treatments produced lower root-knot numbers than Dynasty 1.04 FS plus Temik 15G applied at a rate of 5 pounds per acre. The experimental seed treatments A14006-A plus Dynasty 1.04 FS and Cruiser 5 FS at the low and high rates produced the lower root-knot numbers compared to the experimental A14006-B plus Dynasty 1.04 FS and Cruiser 5 FS applied at the high rate. Seed cotton yields per acre varied from 3389 for Dynasty 1.04 FS plus Temik 15G 5 pounds per acre to 2265 for A14006-A plus Dynasty 1.04 FS and Cruiser 5 FS. The two Temik 15G treatments increased yield over the Dynasty 1.04 FS and Cruiser 5 FS treatment by an average of 945 pounds per acre. The seed treatments increased yield over the Dynasty 1.04 FS and Cruiser 5 FS treatment by an average of 129 pounds per acre.

EFFICACY OF EXPERIMENTAL SEED TREATMENT NEMATICIDES FOR MANAGEMENT OF THE ROOT KNOT NEMATODE IN CENTRAL ALABAMA

		Nematodes per 150cc of soil				Seed cotton
Treatment	Rate	5/27	6/27	8/5	9/24	*lbs/ac*
Dynasty 1.04 FS + Cruiser 5 FS	25.0 g/100kg + 32.0 g/100,000kg	72.1a	370.8a	468b	1436ab	2333c
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	97.8a	417.2a	561b	1205b	2529bc
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	41.2a	463.5a	448b	2147a	2286c
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	51.5a	370.8a	746b	1699ab	2571bc
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	113.3a	463.5a	484b	1127b	2265c
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	82.4a	401.7a	530b	1406ab	2529bc
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	66.9a	442.9a	741b	1684ab	2597bc
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 0.85 kg	128.7a	370.8a	1236a	1236ab	3389a
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 1.19 kg	139.0a	417.2a	628b	1699ab	3168ab
LSD ($P \leq 0.05$)		**104.8**	**331.2**	**377.0**	**926.3**	**1094**

Efficacy of an Experimental Seed Treatment Nematicide for Management of the Reniform Nematode in South Alabama

K.S. Lawrence, S.R. Usery Jr., J.R. Jones, J.R. Akridge, and G.W. Lawrence.

A test to evaluate a new novel seed treatment on cotton for management of the reniform nematode was planted on April 30 in a producer's field located in Huxford, Alabama. The field had a history of reniform nematode infestation and the soil type was a sandy loam. Plots consisted of two rows, 25 feet long with a between row spacing of 36 inches. Plots were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Seed treatments were pre applied to the seeds by the company. Temik 15G (at a rate of 5 pounds per acre) was applied at planting in the seed furrow with chemical granular applicators attached to the planter.

Population numbers of the reniform nematode were determined at planting, midseason, and harvest. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 25. Data were statistically analyzed by ANOVA and means compared using Fisher's protected least significant difference test.

Reniform nematode disease pressure was high in 2003. Pre-plant populations of reniform averaged 2009 nematodes per 150cc of soil and increased to more than 9100 nematode per 150cc of soil by September (see table). All treatments reduced reniform numbers in June at 30 days after planting as compared to the control. By 60 and 90 day after planting, none of the seed treatments reduced reniform numbers as compared to the control. However, by harvest, all seed treatments produced lower reniform numbers as compared to the Dynasty 1.04 FS and Cruiser 5 FS treatment except A14006-C plus Dynasty 1.04 FS and Cruiser 5 FS at the low rate. Seed cotton yields per acre varied from 1184 pounds per acre for A14006-A plus Dynasty 1.04 FS and Cruiser 5 FS applied at the high rate to 2017 pounds per acre for Dynasty 1.04 FS plus Temik 15G 7 pounds per acre. The two Temik 15G treatments increased yield over the Dynasty 1.04 FS and Cruiser 5 FS treatment by an average of 570 pounds per acre. The seed treatments did not increase yield over the the Dynasty 1.04 FS and Cruiser 5 FS treatment.

Efficacy of Experimental Seed Treatment Nematicides for Management of the Reniform Nematode in South Alabama

Treatment	Rate	Vigor[1]	—Nematodes per 150cc of soil— June	July	Aug.	Sept.	Seed cotton *lbs/ac*
Dynasty 1.04 FS + Cruiser 5 FS	25.0 g/100kg + 32.0 g/100,000kg	3.0b	2811a	1575b	4481a-d	9108a	1385c
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	3.0b	1349b	3708a	2905bcd	5191b	1184c
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	2.8b	1220b	2255ab	3662a-d	5624b	1291c
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	3.0b	1436b	1591b	5408a-c	4944b	1221c
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	3.2b	1421b	2286ab	6767a	4264b	1404c
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	3.0b	1081b	1560b	4666a-d	4702b	1568bc
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	3.2b	1421b	2858ab	5840ab	5933ab	1334c
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 0.85 kg	4.2a	1550b	2533ab	2348dc	5346b	1893ab
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 1.19 kg	4.0a	1328b	2719ab	2101d	4264b	2017a
LSD ($P \leq 0.05$)		**0.6**	**1077**	**1699**	**3193**	**3335**	**448**

[1] Vigor = 1-5 scale, with 5 = healthiest plant and 1 = dead plant.

EFFICACY OF AN EXPERIMENTAL SEED TREATMENT NEMATICIDE FOR MANAGEMENT OF THE RENIFORM NEMATODE IN CENTRAL ALABAMA

K.S. Lawrence, S.R. Usery Jr., J.R. Jones, J.R. Akridge, and D.P. Moore

A test to evaluate a new novel seed treatment on cotton for management of the reniform nematode was planted on April 28 in a naturally infested field near the Prattville Agricultural Research Unit, Prattville, Alabama. The field had a history of reniform nematode infestation and the soil type was a sandy loam. Plots consisted of two rows, 30 feet long with a between row spacing of 36 inches. Plots were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. Terraclor Super X 18.8G (at a rate of 5.5 pounds per acre) was applied at planting to all treatments. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Seed treatments were pre applied to the seeds by the company. Temik 15G (at a rate of 5 pounds per acre) was applied at planting in the seed furrow with chemical granular applicators attached to the planter.

Population numbers of the reniform nematode were determined at planting, midseason, and harvest. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 2. Data were statistically analyzed by ANOVA and means compared using Fisher's protected least significant difference test.

Reniform nematode disease pressure was moderate in this location in 2003. Reniform nematode numbers increased from the initial population of 345 to more than 1900 per 150cc of soil in all plots (see table). At 30 days after planting the Dynasty 1.04 FS plusTemik 15G (at a rate of 7 pounds per acre) and A14006-A plus Dynasty 1.04 FS and Cruiser 5 FS (high rate) reduced reniform numbers as compared to the A14006-B plus Dynasty 1.04 FS and Cruiser 5 FS (high rate) treatment. At midseason and harvest, no differences in reniform numbers were observed between any treatment and the control. Seed cotton yields per acre varied from 1563 pounds per acre for Dynasty 1.04 FS plus Temik 15G (at a rate of 5 pounds per acre) to 1026 pounds per acre for A14006-C plus Dynasty 1.04 FS and Cruiser 5 FS (high rate) with no treatment increasing yield over the Dynasty 1.04 FS and Cruiser 5 FS treatment.

EFFICACY OF EXPERIMENTAL SEED TREATMENT NEMATICIDES FOR MANAGEMENT OF THE RENIFORM NEMATODE IN CENTRAL ALABAMA

Treatment	Rate	—Nematodes per 150cc of soil— 5/27	8/5	10/2	Seed cotton *lbs/ac*
Dynasty 1.04 FS + Cruiser 5 FS	25.0 g/100kg + 32.0 g/100,000kg	226.6ab	3085a	2425a	1234a
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	92.7b	2781a	1993a	1142a
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	396.6a	1900a	2441a	1118a
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g/100,000kg	293.6ab	2518a	3352a	1026a
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	200.9ab	3013a	2394a	1558a
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	154.5ab	3028a	1900a	1476a
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g/100,000kg	206.0ab	2827a	2255a	1447a
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 0.85 kg	180.3ab	2132a	2935a	1563a
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 1.19 kg	82.4b	1947a	2827a	1500a
LSD ($P \leq 0.05$)		**299.7**	**2414**	**1686**	**610**

EFFICACY OF AN EXPERIMENTAL SEED TREATMENT NEMATICIDE FOR MANAGEMENT OF THE RENIFORM NEMATODE IN NORTH ALABAMA

K.S. Lawrence, S.R. Usery Jr., J.R. Jones, C.H. Burmester, and G.W. Lawrence

A test to evaluate a new novel seed treatment on cotton for management of the reniform nematode was planted on April 22 in a naturally infested field adjacent to the Tennessee Valley Research and Extension Center, Belle Mina, Alabama. The field had a history of reniform nematode infestation and the soil type was a silt loam. Plots consisted of two rows, 25 feet long with a between row spacing of 40 inches. Plots were arranged in a randomized complete block design with five replications. Blocks were separated by a 15-foot alley. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Seed treatments were pre applied to the seeds by the company. Temik 15G (at a rate of 5 pounds per acre) was applied at planting in the seed furrow with chemical granular applicators attached to the planter.

Population numbers of the reniform nematode were determined at planting, midseason, and harvest. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic sampling pattern. Nematodes were extracted using the gravity sieving and sucrose centrifugation technique. Plots were harvested on October 15. Data were statistically analyzed by ANOVA and means compared using Fisher's protected least significant difference test.

Reniform nematode disease pressure was low in 2003. Reniform nematode numbers increased in all plots throughout the season (see table). At 30 days after planting, no treatment reduced reniform numbers as compared to the control; however, nematode numbers were low. By August, Dynasty 1.04 FS plus Temik 15G (at a rate of 5 pounds per acre) supported more reniform than all other treatments. However, September and October sampling found no differences between any of the treatments and the non treated control. Seed cotton yields per acre varied from 4200 pounds per acre for A14006-A plus Dynasty 1.04 FS and Cruiser 5 FS (high rate) to 3599 pounds per acre for A14006-C plus Dynasty 1.04 FS and Cruiser 5 FS (high rate), with no treatment producing a greater yield than the Dynasty 1.04 FS and Cruiser 5 FS treatment.

EFFICACY OF EXPERIMENTAL SEED TREATMENT NEMATICIDES FOR MANAGEMENT OF THE RENIFORM NEMATODE IN NORTH ALABAMA

		——Nematodes per 150cc of soil——				Seed cotton
Treatment	Rate	5/29	8/5	9/15	10/21	*lbs/ac*
Dynasty 1.04 FS + Cruiser 5 FS	25.0 g/100kg + 32.0 g 100,000kg	72.1a	468.7b	2271.2a	746.8abc	4092.5ab
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g 100,000kg	108.1a	561.4b	1802.5a	484.1c	4199.5a
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g 100,000kg	87.5a	422.3b	1699.5a	1205.1a	4163.0ab
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	100.0 +25.0 g/100kg + 32.0 g 100,000kg	92.7a	746.8b	3223.9a	798.3abc	3599.2b
A14006-A + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g 100,000kg	82.4a	484.1b	2858.3a	648.9bc	4019.4ab
A14006-B + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g 100,000kg	41.2a	535.6b	1684.1a	422.3c	3787.1ab
A14006-C + Dynasty 1.04 FS + Cruiser 5 FS	10.0 + 25.0 g/100kg + 32.0 g 100,000kg	82.4a	741.6b	2564.7a	1004.3ab	3727.1ab
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 0.85 kg	92.7a	1236.0a	2889.2a	633.5bc	3638.3ab
Dynasty 1.04 FS + Temik 15G	25.0 g/100kg + 1.19 kg	118.4a	618.0b	2399.9a	406.9c	3865.4ab
LSD ($P \leq 0.05$)		**84**	**375**	**1911**	**494.5**	**598.9**

FUNGICIDES

EVALUATION OF SELECTED FUNGICIDES FOR CONTROL OF COTTON BOLL ROT DISEASE IN SOUTH ALABAMA

J.R. Jones, K.S. Lawrence, S.R. Usery Jr., and M.D. Pegues

A cotton fungicide test on the cotton variety DP 458 B/RR was planted on May 6 at the Gulf Coast Research and Extension Center at Fairhope, Alabama. The test site was a Malbis fine sandy loam soil. All fungicides were applied as a foliar spray using TX-12 cone nozzles mounted on a John Deere hiboy with two nozzles per row calibrated to deliver 14 gallons per acre at 60 pounds per square inch. Plots consisted of two rows, 50 feet long with a 38 inch wide row spacing arranged in a randomized complete block design with five replications. A 20-foot alley separated each block. All plots were maintained throughout the season with standard herbicide, insecticide and fertility production practices as recommended by the Alabama Cooperative Extension System.

Cotton boll rot was evaluated by recording the number of healthy bolls and diseased bolls from a 0.001 acre section within each plot. Disease index [(number of diseased bolls / total number counted) × 100] was calculated for each variety. Boll rot ratings were conducted on October 9 and plots were harvested on October 16. Data were statistically analyzed using PROC GLM, and means were compared with Fisher's protected least significant difference test.

Folicur applied at first plus full bloom reduced the number of rotted bolls as compared to the untreated control (see table). The incidence of boll rot was not reduced by one or two applications of any of the other fungicides. Seed cotton yields varied by 458 pounds per acre for the Quadris 2SC first bloom and Terraclor 4F first bloom applications. Seed cotton yields varied by 122 pounds per acre for Quadris 2SC applied at first bloom and the untreated control. A significant yield response was not observed by applying fungicides at first bloom or first plus full bloom. No fungicide significantly reduced the number of diseased cotton bolls as compared to the control.

EVALUATION OF SELECTED FUNGICIDES FOR CONTROL OF COTTON BOLL ROT DISEASE IN SOUTH ALABAMA

Treatment	Rate/acre	Spray schedule	Healthy bolls[1]	–Diseased bolls–		Seed cotton
			no.	*no.*	*%*	*lbs/ac*
Quadris 2SC	0.20 lb	First bloom	94.8	6.8abc	7.5	3424
Quadris 2SC	0.20 lb	First + full bloom	84.0	9.2abc	11.1	3247
Topsin M	2 lb	First bloom	74.8	8.4abc	10.5	3402
Topsin M	2 lb	First + full bloom	93.2	14.2a	15.2	3165
Folicur	4 oz	First bloom	72.0	5.8bc	8.5	3302
Folicur	4 oz	First + full bloom	80.2	5.4c	6.7	3192
Terraclor 4F	16oz	First bloom	81.2	10.4abc	12.4	2966
Terraclor 4F	16oz	First + full bloom	88.8	8.0abc	10.6	3137
Rovral 4F	4oz	First bloom	79.6	7.4abc	9.5	3247
Rovral 4F	4 oz	First + full bloom	96.6	11.2abc	11.8	3071
Procure 50WS	1 lb	First bloom	96.4	12.2abc	12.9	2999
Procure 50WS	1 lb	First + full bloom	82.6	10.2abc	13.1	3329
Control	—		91.6	13.0ab	14.1	3302
LSD ($P \leq 0.05$)			**30.6**	**7.4**	**18.4**	**514**

[1]Number of bolls per 6 feet of row.
Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.05$)

EVALUATION OF SELECTED IN-FURROW FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE IN NORTH ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., and B.E. Norris

This cotton fungicide test was planted on April 14 at the Tennessee Valley Research and Extension Center, Belle Mina, Alabama. The field had a history of cotton seedling disease and the soil type was a Decatur silty loam. Soil was 64°F at a 4-inch depth at 10 a. m. with adequate moisture at planting. Fungicides were applied as a seed treatment or as an in-furrow, spray, or granular application at planting. All in-furrow fungicide sprays were applied with flat tip 8002E nozzles calibrated to deliver 6 gallons per acre at 18 pounds per square inch. In-furrow granular applications were applied with chemical granular applicators attached to the planter. Plots consisted of two rows, 25 feet long, with a 40 inch wide row spacing and were arranged in a randomized complete block design with five replications. High disease incidence plots were infested with millet seed inoculated with *Pythium ultimum* and *Rhizoctonia solani*. Blocks were separated by a 20-foot alley. The nematicide Temik 15G (at a rate of 5 pounds per acre) was applied in-furrow at planting. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Stand counts and skip index ratings were recorded at three and six weeks after planting to determine the percent seedling loss and stand density due to cotton seedling disease. Plots were harvested on September 29. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Cotton seedling disease incidence was high in 2003 due to cold, wet weather. In the high disease incidence plots, differences in seedling stand were observed at three and six weeks after planting (see table). At three weeks after planting, Ridomil Gold PC 10.5G increased stand compared to the control. However, by six weeks after planting Quadris 2.08SC, Terraclor Super X 18.8PC, and Terraclor Super X EC increased the cotton stand compared to the control. A lower skip index, indicating a more evenly spaced seedling stand, was observed in six of the fungicide treatments as compared to the control at six weeks after planting. Five fungicide treatments increased yields over the control. The average

EVALUATION OF SELECTED IN-FURROW FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE UNDER HIGH AND LOW DISEASE PRESSURE IN NORTH ALABAMA

Treatment	Rate	Stand per 25 ft row 3 weeks	Stand per 25 ft row 6 weeks	Skip index 6 weeks	Seed cotton *lbs/ac*
High disease pressure					
Control	—	63.8bc	58.6ab	8.6ab	3129.0e
Ridomil Gold PC10.5G	9.8 lbs/ac	87.8a	65.2ab	2.8e	3735.4ab
Ridomil Gold 4EC	1.0 oz/ac	54.0c	55.6ab	9.4a	3361.6b-e
Ridomil Gold 4EC	1.5 oz/ac	54.8c	44.0b	7.6abc	3241.4de
Quadris 2.08SC	5.4 oz/ac	80.2ab	58.4ab	71.8ab	3819.1a
Quadris 2.08SC	7.8 oz/ac	85.0ab	68.8a	65.2b	3722.3abc
Ridomil Gold EC + Quadris 2.08SC	1.0 + 5.4 oz/ac	72.4abc	60.4ab	81.0ab	3523.7a-e
Ridomil Gold EC + Quadris 2.08SC	1.5 + 7.8 oz/ac	66.4abc	62.4ab	88.6a	3285.8cde
Catapult	11.75 fl oz/cwt	81.0ab	53.4ab	75.2ab	3609.9a-d
AZ101	11.75 fl oz/cwt	80.4ab	71.0a	71.0ab	3515.8a-e
Terraclor SuperX 18.8 G	5.5 lbs/ac	72.4abc	70.0a	74.2ab	3591.6a-d
Terraclor SuperX EC	48.0 oz/ac	73.0abc	64.4ab	74.0ab	3466.2a-e
Rovral CF + Ridomil Gold	6.5 + 2.0 fl oz/ac	58.0c	45.6b	82.0ab	3419.1a-e
Rovral 4F	6.5 fl oz/ac	80.2ab	45.6b	71.0ab	3285.8de
LSD (P≤ 0.05)		**22.0**	**22.7**	**20.3**	**447**
Low disease pressure					
Control	—	84.0	63.4b	2.4	3510.6ab
Ridomil Gold PC10.5G	9.8 lbs/ac	75.4	73.4ab	1.6	3657.0a
Ridomil Gold 4EC	1.0 oz/ac	84.6	79.2ab	2.4	3649.1a
Ridomil Gold 4EC	1.5 oz/ac	83.8	71.8ab	3.2	3683.1a
Quadris 2.08SC	5.4 oz/ac	85.8	65.2b	1.6	3583.8ab
Quadris 2.08SC	7.8 oz/ac	83.2	69.9ab	2.2	3617.8ab
Ridomil Gold EC + Quadris 2.08SC	1.0 + 5.4 oz/ac	77.4	81.0ab	3.0	3570.7ab
Ridomil Gold EC + Quadris 2.08SC	1.5 + 7.8 oz/ac	83.2	88.6a	1.8	3466.2ab
Catapult	11.75 fl oz/cwt	77.8	75.2ab	0.8	3332.9b
AZ101	11.75 fl oz/cwt	85.2	71.0ab	1.6	3406.0ab
Terraclor SuperX 18.8 G	5.5 lbs/ac	83.8	74.2ab	1.8	3662.2a
Terraclor Super X EC	48.0 oz/ac	86.0	74.0ab	1.6	3565.5ab
Rovral CF + Ridomil Gold	6.5 + 2.0 fl oz/ac	82.0	82.0ab	0.8	3628.2a
Rovral 4F	6.5 fl oz/ac	74.2	71.0ab	2.0	3625.6ab
LSD (P≤ 0.05)		**15.8**	**20.3**	**2.5**	**298**

seed cotton yield of all fungicide-treated plots was 377 pounds per acre greater than the untreated control plot.

Under low disease pressure, at three weeks after planting, no fungicide treatment increased stands as compared to the control. Ridomil Gold 4EC plus Quadris 2.08 SC increased stands compared to the control at six weeks after planting. However, no differences were observed between any treatment as measured by the skip index at six weeks after planting under low disease pressure. No fungicide treatment increased yields over the control. Yield was increased numerically by 62 pounds of seed cotton per acre as compared to the control under low disease pressure.

EVALUATION OF SELECTED IN-FURROW FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE IN CENTRAL ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., and D.P. Moore

This cotton fungicide test was planted on April 16 at the Prattville Agricultural Research Unit, Prattville, Alabama. The field had a history of cotton seedling disease and the soil type was a sandy loam (62.5 percent sand, 22.5 percent silt, 15 percent clay with a pH of 6.5). Soil was 75°F at a 4-inch depth at 10 a. m. with adequate moisture at planting. Fungicides were applied as a seed treatment or as an in-furrow, spray, or granular application at planting. All in-furrow fungicide sprays were applied with flat tip 8002E nozzles calibrated to deliver 6 gallons per acre at 18 pounds per square inch. In-furrow granular applications were applied with chemical granular applicators attached to the planter. Plots consisted of two rows, 30 feet long, with a 36-inch wide row spacing and were arranged in a randomized complete block design with six replications. High disease incidence plots were infested with millet seed inoculated with *Pythium ultimum* and *Rhizoctonia solani*. Blocks were separated by a 20-foot alley. The nematicide Temik 15G (at a rate of 5 pounds per acre) was applied in-furrow at planting. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Stand counts and skip index ratings were recorded at three and five weeks after planting to determine the percent seedling loss and stand density due to cotton seedling disease. Plots were harvested on September 24. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Cotton seedling disease incidence was high in 2003 due to extended wet weather. In the high disease incidence plots, differences in seedling stand were observed at three and five weeks after planting (see table). At three and five weeks after planting, Catapult and the experimental AZ101 increased stand compared to the control. The skip indexes were lower, indicating an evenly spaced seedling stand, in the Catapult and AZ101 fungicide treatments as compared to the control at five weeks

EVALUATION OF SELECTED IN-FURROW FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE UNDER HIGH AND LOW DISEASE PRESSURE IN CENTRAL ALABAMA, 2003

Treatment	Rate	Stand per 30 ft row 3 weeks	Stand per 30 ft row 6 weeks	Skip index 6 weeks	Seed cotton *lbs/ac*
High disease pressure					
Control	—	36b	33d	17.2a	2960.5b-d
Ridomil Gold PC10.5G	9.8 lbs/ac	46ab	45a-d	13.7ab	2863.7d
Ridomil Gold 4EC	1.0 oz/ac	46ab	42a-d	14.5ab	2819.3d
Ridomil Gold 4EC	1.5 oz/ac	37b	39b-d	17.0ab	3105.7a-d
Quadris 2.08SC	5.4 oz/ac	42ab	43a-d	13.8ab	3105.7a-d
Quadris 2.08SC	7.8 oz/ac	34b	38cd	14.5ab	2936.3cd
Ridomil Gold EC + Quadris 2.08SC	1.0 + 5.4 oz/ac	48ab	39b-d	14.8ab	3291.2a-d
Ridomil Gold EC + Quadris 2.08SC	1.5 + 7.8 oz/ac	48ab	46a-d	12.3ab	3537.2ab
Catapult	11.75 fl oz/cwt	57a	52a	12.2ab	3674.4a
AZ101	11.75 fl oz/cwt	54a	50ab	12.0b	3517.1a-c
Terraclor Super X 18.8 G	5.5 lbs/ac	44ab	45a-d	13.0ab	3597.7a
Terraclor Super X EC	48.0 oz/ac	45ab	39b-d	15.0ab	3113.7a-d
Rovral CF + Ridomil Gold	6.5 + 2.0 fl oz/ac	46ab	38b-d	14.5ab	3250.9a-d
Rovral CF	6.5 fl oz/ac	44ab	39b-d	16.8ab	3113.7a-d
LSD ($P \leq 0.05$)		**15**	**12**	**5.1**	**592**

continued

CONTINUED, EVALUATION OF SELECTED IN-FURROW FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE UNDER HIGH AND LOW DISEASE PRESSURE IN CENTRAL ALABAMA, 2003

Treatment	Rate	Stand per 30 ft row 3 weeks	Stand per 30 ft row 6 weeks	Skip index 6 weeks	Seed cotton *lbs/ac*
		Low disease pressure			
Control	—	55bc	45c	10.7a	3408.2ab
Ridomil Gold PC10.5G	9.8 lbs/ac	50c	52bc	9.8ab	3117.8b
Ridomil Gold 4EC	1.0 oz/ac	63a-c	60ab	9.0ab	3553.4ab
Ridomil Gold 4EC	1.5 oz/ac	53bc	62ab	6.8ab	3444.5ab
Quadris 2.08SC	5.4 oz/ac	57a-c	56a-c	10.7a	3537.5ab
Quadris 2.08SC	7.8 oz/ac	67ab	67a	7.3ab	3476.7ab
Ridomil Gold EC + Quadris 2.08SC	1.0 + 5.4 oz/ac	68ab	63ab	.2ab	3763.1a
Ridomil Gold EC + Quadris 2.08SC	1.5 + 7.8 oz/ac	66b	65ab	6.0b	3638.1a
Catapult	11.75 fl oz/cwt	66ab	62ab	7.0ab	3686.5a
AZ101	11.75 fl oz/cwt	65a-c	60ab	7.3ab	3613.9ab
Terraclor Super X 18.8 G	5.5 lbs/ac	67ab	60ab	8.3ab	3831.7a
Terraclor Super X EC	48.0 oz/ac	55bc	54a-c	10.8a	3771.2a
Rovral CF + Ridomil Gold	6.5 + 2.0 fl oz/ac	64a-c	58a-c	8.5ab	3827.6a
Rovral CF	6.5 fl oz/ac	71a	59a-c	8.2ab	3408.2ab
LSD ($P \leq 0.05$)		**15**	**14**	**4.2**	**508**

after planting. Catapult and Terraclor Super X 18.8G treatments increased yields over the control. The average yield of all fungicide-treated plots was 265 pounds of seed cotton per acre greater than the yield of the untreated control plots.

Under low disease pressure, at three weeks after planting, Rovral CF increased stands as compared to the control. However, by five weeks after planting, eight of the fungicides increased stands as compared to the control. Only Ridomil Gold 4EC plus Quadris 2.08 SC produced a lower skip index compared to the control at five weeks after planting. No fungicide treatment increased yields over the control. Yield was increased numerically by 182 pounds of seed cotton per acre as compared to the control under low disease pressure.

EVALUATION OF SELECTED SEED TREATMENT FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE IN NORTH ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., and B.E. Norris

This cotton fungicide test was planted on April 14 at the Tennessee Valley Research and Extension Center, Belle Mina, Alabama. The field had a history of cotton seedling disease and the soil type was a Decatur silty loam. Soil was 64° F at 4 in. depth at 10 a. m. with adequate moisture at planting. All seed treatment fungicides were applied by the manufacturer except for Messenger which was applied as a dilution in the lab. Plots consisted of two rows, 25 feet long, with a 40 inch wide row spacing and were arranged in a randomized complete block design with five replications. High disease incidence plots were infested with millet seed inoculated with *Pythium ultimum* and *Rhizoctonia solani*. Blocks were separated by a 20-foot alley. The nematicide Temik 15G (at a rate of 5 pounds per acre) was applied in-furrow at planting. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Stand counts and skip index ratings were recorded at three and six weeks after planting to determine the percent seedling loss and stand density due to cotton seedling disease. Plots were harvested on September 29. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Cotton seedling disease incidence was high in 2003 due to cold, wet weather. In the high disease incidence plots, differences in seedling stands were observed at three and six weeks after planting (see table). At three and six weeks after planting, all seed treatments increased stands as compared to the control. A lower skip index, indicating an evenly spaced seedling stand,was observed in all the seed treatments, except for the Messenger treatment as compared to the control at six weeks after planting. All seed treatments increased yields over the control. The average yield of all fungicide-treated plots was 1471 pounds of seed cotton per acre greater than the untreated control plots.

Under low disease pressure, three seed treatments increased stands at three weeks after planting while six treatments increased stands after six weeks, as compared to the control. However, no differences were observed between any treatment as measured by the skip index at six weeks after planting under low disease pressure. Only the Dynasty 1.04 FS plus Systhane 40WSP seed treatment at the high rate increased yields over the control. Yield was increased numerically by 99 pounds of seed cotton per acre as compared to the control under low disease pressure.

EVALUATION OF SELECTED SEED TREATMENT FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE UNDER HIGH AND LOW DISEASE PRESSURE IN NORTH ALABAMA

Treatment	Rate	Stand per 25 ft row		Skip index	Seed cotton
		3 weeks	6 weeks	6 weeks	*lbs/ac*
	High disease pressure				
Check	—	14.4e	10.2d	18.4a	2033.7f
Dynasty 1.04 FS	25 g/100 kg seed	70.2ab	59.6a	6.0bcd	3670.1ab
Dynasty 1.04 FS + Systhane 40WSP	25 + 21 g/100 kg seed	71.2ab	70.4a	5.6c-e	3866.1a
Dynasty 1.04 FS	32 g/100 kg seed	71.6ab	66.8a	5.0c-e	3704.0ab
Dynasty 1.04 FS + Systhane 40WSP	32 + 21 g/100 kg seed	74.2ab	67.0a	4.0de	3617.8abc
Apron XL 3 LS + Maxim 4 FS + Systhane 40WSP	7.5 + 2.5 + 21 g/100 kg seed	70.6ab	57.2a	7.8bc	3523.7bc
RTU Baytan Thiram 1.76 + Allegiance LS	41 + 15 g/100 kg seed	50.6c	39.6bc	9.2b	3220.4d
Allegiance LS + Baytan 30 + Ascend 30 2.64 EC	15 + 10 + 19 g/100 kg seed	63.0bc	42.2b	9.2b	3325.0cd
Allegiance LS + RTU Baytan Thiram 1.76 + Delta Coat AD 3.24FS	15 + 41 + 300g/100 kg seed	80.0a	61.4a	2.8e	3481.8bcd
Allegiance LS + RTU Baytan Thiram 1.76 + Protege XT 61.3 DS	15 + 41 + 23 g/100 kg seed	62.8bc	57.4a	6.4bcd	3547.2bc
Allegiance LS + Baytan 30 + Thiram 42 S + Protege XT 61.3 DS	15 + 10 + 31 + 8 g/100 kg seed	72.6ab	63.2a	5.8b-e	3748.5ab
Messenger	187 g/100 kg seed	33.4d	28.0c	15.6a	2846.6e
LSD ($P \leq 0.05$)		**13.6**	**13.4**	**3.5**	**299**
	Low disease pressure				
Check	—	69.6c	61.4c	3.0	3745.9bc
Dynasty 1.04 FS	25 g/100 kg seed	87.6abc	87.7ab	1.4	3654.4c
Dynasty 1.04 FS + Systhane 40WSP	25 + 21 g/100 kg seed	78.0bc	77.6abc	2.6	3743.2bc
Dynasty 1.04 FS	32 g/100 kg seed	98.6a	87.6ab	1.6	4109.2a
Dynasty 1.04 FS + Systhane 40WSP	32 + 21 g/100 kg seed	93.0ab	69.2bc	1.6	4022.9ab
Apron XL 3 LS + Maxim 4 FS + Systhane 40WSP	7.5 + 2.5 + 21 g/100 kg seed	83.6abc	74.6abc	1.6	3884.4abc
RTU Baytan Thiram 1.76 + Allegiance LS	41 + 15 g/100 kg seed	86.2abc	92.0a	2.2	3887.0abc
Allegiance LS + Baytan 30 + Ascend 30 2.64 EC	15 + 10 + 19 g/100 kg seed	87.8abc	84.6ab	2.4	3756.3bc
Allegiance LS + RTU Baytan Thiram 1.76 + Delta Coat AD 3.24FS	15 + 41 + 300g/100 kg seed	87.2abc	72.4bc	2.2	3785.1abc
Allegiance LS + RTU Baytan Thiram 1.76 + Protege XT 61.3 DS	15 + 41 + 23 g/100 kg seed	91.6ab	85.2ab	2.4	3680.5bc
Allegiance LS + Baytan 30 + Thiram 42 S + Protege XT 61.3 DS	15 + 10 + 31 + 8 g/100 kg seed	84.0abc	84.8ab	1.8	3928.8abc
Messenger	187 g/100 kg seed	86.0abc	70.4bc	1.4	3727.6bc
LSD ($P \leq 0.05$)		**18.9**	**19.4**	**1.9**	**350**

EVALUATION OF SELECTED SEED TREATMENT FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE IN CENTRAL ALABAMA

K.S. Lawrence, J.R. Jones, S.R. Usery Jr., and D.P. Moore

This cotton fungicide test was planted on April 16 at the Prattville Agricultural Research Unit, Prattville, Alabama. The field had a history of cotton seedling disease and the soil type was a sandy loam (62.5 percent sand, 22.5 percent silt, and 15 percent clay with a pH of 6.5). Soil was 75°F at a 4-inch depth at 10 a. m. with adequate moisture at planting. All seed treatment fungicides were applied by the manufacturer except for the Messenger treatment which was applied as a dilution in the lab. Plots consisted of two rows, 30 feet long, with a 36-inch wide row spacing and were arranged in a randomized complete block design with six replications. High disease incidence plots were infested with millet seed inoculated with *Pythium ultimum* and *Rhizoctonia solani*. Blocks were separated by a 20-foot alley. The nematicide Temik 15G (at a rate of 5 pounds per acre) was applied in-furrow at planting. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Stand counts and skip index ratings were recorded at three and six weeks after planting to determine the percent seedling loss and stand density due to cotton seedling disease. Plots were harvested on September 24. Data were statistically analyzed by GLM and means compared using Fisher's protected least significant difference test.

Cotton seedling disease incidence was high in 2003 due to extended wet weather. In the high disease incidence plots, differences in seedling stand were observed at three and six weeks after planting (see table). At three weeks after planting,

EVALUATION OF SELECTED IN-FURROW FUNGICIDES FOR MANAGEMENT OF COTTON SEEDLING DISEASE UNDER HIGH AND LOW DISEASE PRESSURE IN CENTRAL ALABAMA, 2003

Treatment	Rate	Stand per 30 ft row 3 weeks	Stand per 30 ft row 6 weeks	Skip index 6 weeks	Seed cotton *lbs/ac*
	High disease pressure				
Check	—	55ef	49b	14a	1895.2b
Dynasty 1.04 FS	25 g/100 kg seed	86abc	80a	7bc	2391.8ab
Dynasty 1.04 FS + Systhane 40WSP	25 + 21 g/100 kg seed	99a	92a	4c	2653.2ab
Dynasty 1.04 FS	32 g/100 kg seed	82a-d	72ab	7bc	2627.1ab
Dynasty 1.04 FS + Systhane 40WSP	32 + 21 g/100 kg seed	90ab	92a	4c	2810.1ab
Apron XL 3 LS + Maxim 4 FS + Systhane 40WSP	7.5 + 2.5 + 21 g/100 kg seed	88ab	89a	7bc	3058.4a
RTU Baytan Thiram 1.76 + Allegiance LS	41 + 15 g/100 kg seed	66de	69ab	7bc	3293.6a
Allegiance LS + Baytan 30 + Ascend 30 2.64 EC	15 + 10 + 19 g/100 kg seed	76b-c	78a	8bc	2653.2ab
Allegiance LS + RTU Baytan Thiram 1.76 + 3.24FS Delta Coat AD	15 + 41 + 300g/100 kg seed	87ab	85a	7bc	3411.3a
Allegiance LS + RTU Baytan Thiram 1.76 + Protege XT 61.3 DS	15 + 41 + 23 g/100 kg seed	83a-d	84a	7bc	3372.1a
Allegiance LS + Baytan 30 + Thiram 42 S + Protege XT 61.3 DS	15 + 10 + 31 + 8 g/100 kg seed	68c-e	71ab	8bc	2927.7ab
Messenger	187 g/100 kg seed	43f	75ab	10ab	3123.7a
LSD (P≤0.05)		**18.5**	**28.5**	**5.1**	**1117.7**
	Low disease pressure				
Check	—	58c	52d	13a	2744.7b
Dynasty 1.04 FS	25 g/100 kg seed	81abc	84ab	7b	3947.1a
Dynasty 1.04 FS + Systhane 40WSP	25 + 21 g/100 kg seed	92a	74abc	9ab	3359.0ab
Dynasty 1.04 FS	32 g/100 kg seed	72ab	82ab	6b	3751.1ab
Dynasty 1.04 FS + Systhane 40WSP	32 + 21 g/100 kg seed	92a	81ab	6b	3921.0a
Apron XL 3 LS + Maxim 4 FS + Systhane 40WSP	7.5 + 2.5 + 21 g/100 kg seed	89a	80abc	6b	4224.7a
RTU Baytan Thiram 1.76 + Allegiance LS	41 + 15 g/100 kg seed	69ab	82ab	7b	4208.5a
Allegiance LS + Baytan 30 + Ascend 30 2.64 EC	15 + 10 + 19 g/100 kg seed	78a	90a	7b	4051.7a
Allegiance LS + RTU Baytan Thiram 1.76 + Delta Coat AD 3.24FS	15 + 41 + 300g/100 kg seed	85a	81abc	7b	3829.5a
Allegiance LS + RTU Baytan Thiram 1.76 + Protege XT 61.3 DS	15 + 41 + 23 g/100 kg seed	84a	74abc	8b	3829.5a
Allegiance LS + Baytan 30 + Thiram 42 S + Protege XT 61.3 DS	15 + 10 + 31 + 8 g/100 kg seed	71ab	67bcd	10ab	4169.3a
Messenger	187 g/100 kg seed	75ab	60cd	9ab	3711.9ab
LSD (P≤0.05)		**28.5**	**20.9**	**4.7**	**1008.1**

eight of the seed treatments increased stands while at six weeks seven treatments increased stands, as compared to the control. The skip indexes were lower in 10 of the 11 seed treatments as compared to the control indicating an evenly spaced seedling stand at six weeks after planting. Five seed treatments increased yields over the control. The average yield of all fungicide-treated plots was 1043 pounds of seed cotton per acre greater than the untreated control plots.

Under low disease pressure, at three weeks after planting, four seed treatments increased stands as compared to the control; however, by six weeks after planting, nine of the fungicides increased stands as compared to the control. The corresponding skip index was also lower in eight of the nine seed treatments which increased stand. Eight of the seed treatments increased yields over the control. The average yield of all fungicide-treated plots was 1164 pounds of seed cotton per acre greater than the untreated control plots. Yield was increased by 1103 pounds of seed cotton per acre averaged over high and low disease pressure as compared to the control.

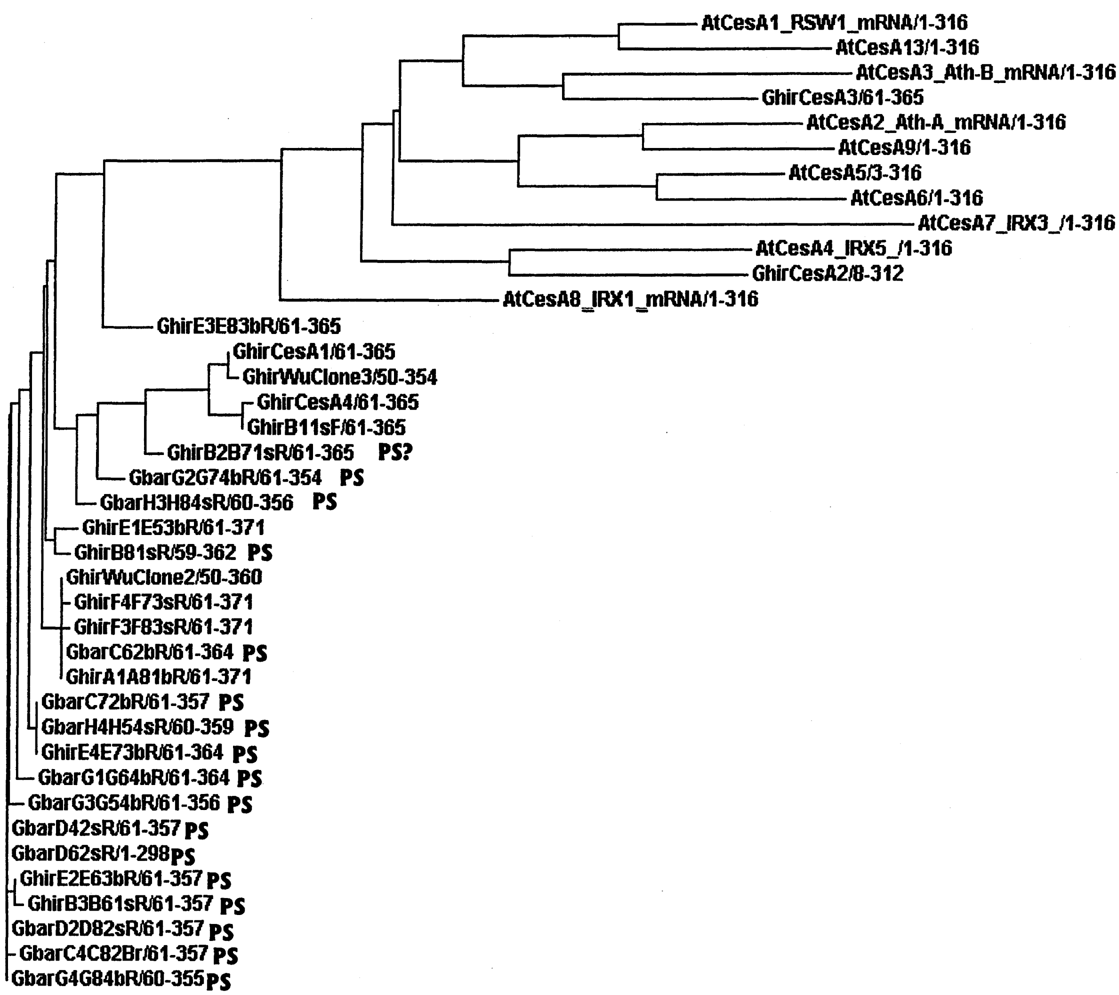
MOLECULAR STUDIES

FURTHER STUDIES OF A GENE IMPORTANT FOR COTTON FIBER—CELLULOSE SYNTHASE

O. Yurchenko, A. Zipf, K. Soliman, A. Jeffries, P. Hogan, and D. Delmer

Cotton, the world's most important natural fiber, is mostly cellulose. The enzyme that makes cellulose – cellulose synthase - has many subunits, of which the one we know the most about is the catalytic subunit *CesA*. We are trying to answer the question, Why does the simplest, fiberless, plant, *Arabidopsis* have 13 *CesA* genes (loci) while fibered cotton only contains 5 *CesA* genes? Genomic DNA was extracted from young leaves of Upland (*Gossypium hirsutum*) and Pima (*G. barbadense*) and used for a technique called the Polymerase Chain Reaction (PCR) that targets a specific portion (the 5' region) of the *CesA* gene. PCR makes many copies (amplified) pieces that can then be detected. Amplified fragments were sequenced and the consensus sequences aligned and analyzed using Web-based software. The sequences can be compared can be compared like the branches on a tree where the connecting branches are more similar to each other. Phylograms, including known *G. hirsutum* and *Arabidopsis CesA* sequences, revealed that tetraploid cottons have at least one new *CesA* family member. Also, there were indications that incomplete *CesA* genes (pseudogenes) may also exist in both species.

Phylogram generated using Neighbor-Joining method with No Gaps and Distance Corrected (available at CLUSTALW website) on non-redundant, intron-deleted, 5'- and 3'-trimmed sequences from *Gossypium hirsutum* var. TM-1, *G. barbadense* var. 3-79, *GhCesA1-4* and *AtCesA1-9, 13* aligned using CLUSTALW (website http://www.ebi.ac.uk/clustalw/#). **PS** indicates possible pseudogene.



An Efficient Method for Isolating Large Numbers of Viable Reniform Nematodes, *Rotylenchulus reniformis*

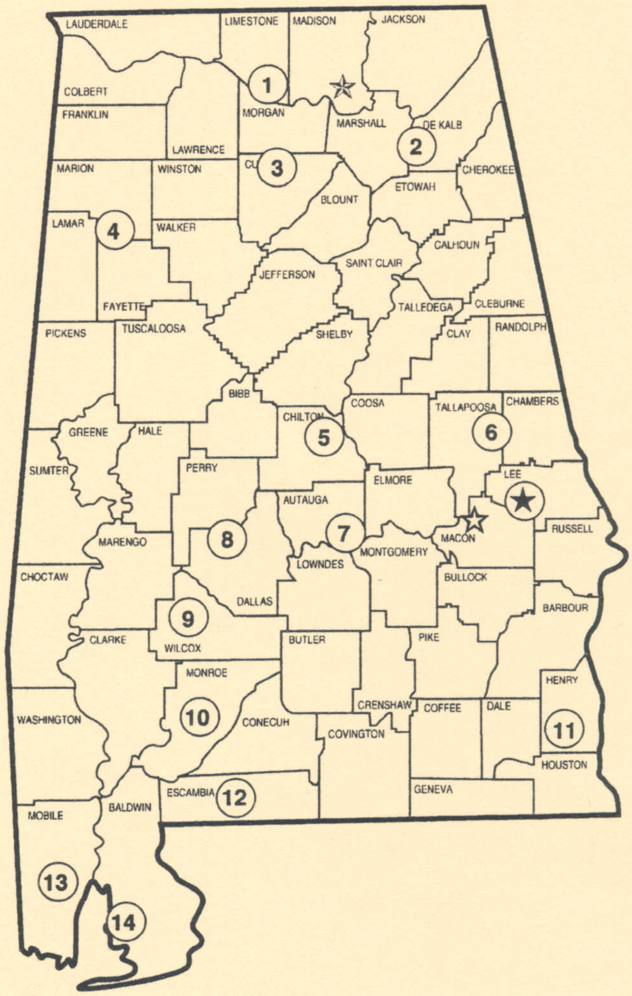
D. Deng, A. Zipf, Y. Tilahun, G.C. Sharma, J. Jenkins, and K.S. Lawrence

Reniform nematodes, *Rotylenchulus reniformis*, have become an extremely serious threat to Alabama cotton producers with their continued spread into uninfected cotton production areas. Studying reniform nematodes in controlled conditions is difficult because you need small numbers of living nematodes, a condition that current separation methods cannot give us.

A reniform nematode isolation technique was developed using a dense but inert density-gradient medium (OptiPrep™) that allows the nematodes to be separated from the soil and roots by spinning. This technique is convenient and relatively simple, with the added benefit of significantly higher numbers of clean eggs and nematodes that have higher viability than samples isolated with the current sucrose method. If we define "extraction efficiency" as the combination of motility and recovery rates, the extraction efficiency using OptiPrep™ was 85 percent, while the sucrose method was only 24 percent. To show the benign nature of this medium, nematodes survived exposure to OptiPrep™ for 22 hours without significant death whereas all nematodes died in the sucrose medium. OptiPrep™ is a suitable, non-toxic alternative to the traditional density gradient material for the isolation of nematodes. This is the first literature report of the use of the OptiPrep™ density-gradient medium for the isolation of nematodes. This method could be expected to be suitable for extraction of other soilborne nematodes.

AUTHORS' INDEX

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.