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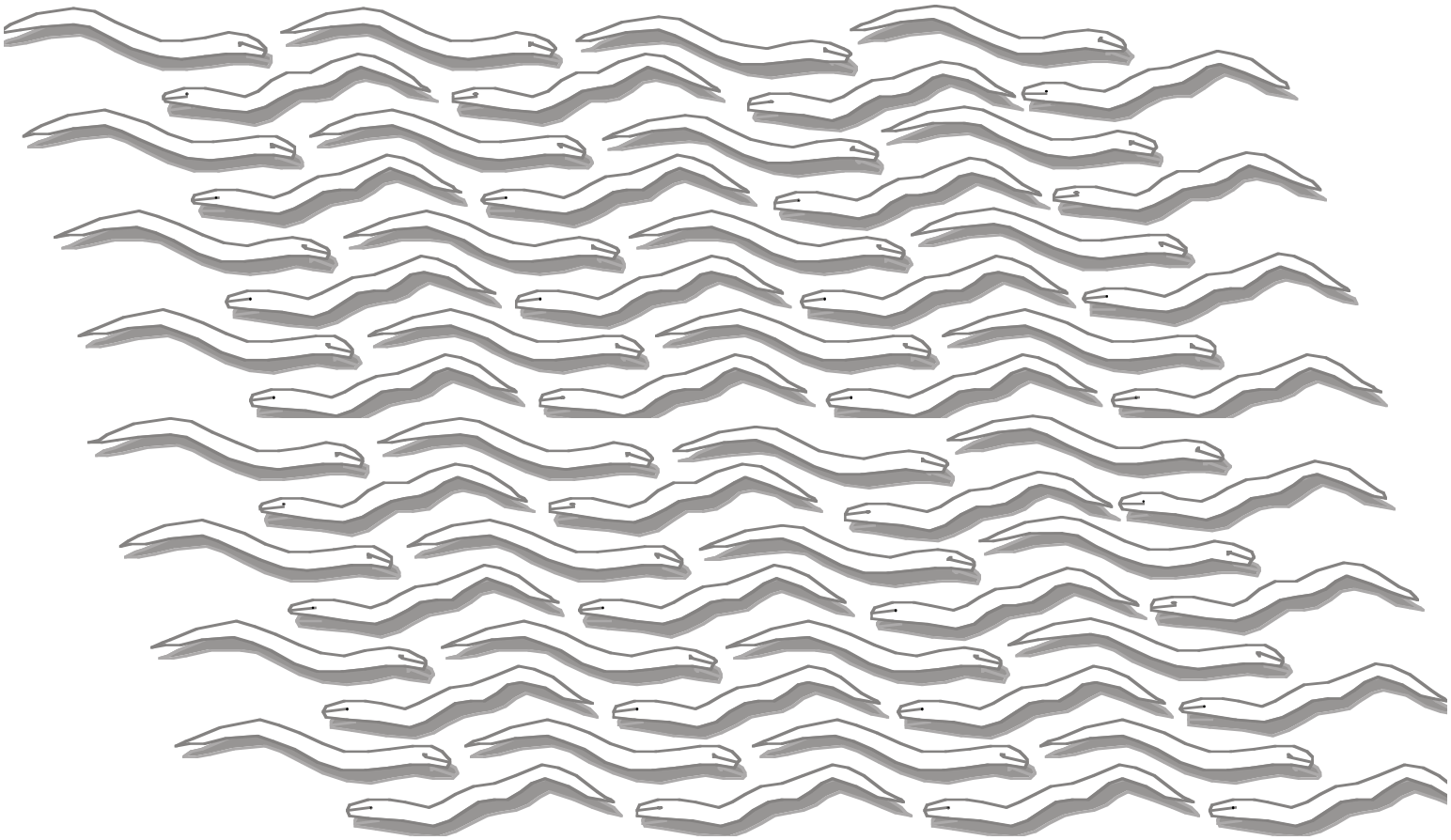
Nematode Management Investigations *in Mississippi, 2001*



Experiment Station
Vance H. Watson, Director

Mississippi Agricultural & Forestry Experiment Station
J. Charles Lee, President • Mississippi State University • Vance H. Watson, Vice President

Nematode Management Investigations in Mississippi, 2001

Gary W. Lawrence
Associate Professor of Nematology
Department of Entomology and Plant Pathology
Mississippi State University

Kathy S. Lawrence
Associate Professor of Plant Pathology
Department of Entomology and Plant Pathology
Auburn University

Amber T. Kelley
Graduate Research Assistant
Department of Entomology and Plant Pathology
Mississippi State University

Hee-Kyung Lee
Graduate Research Assistant
Department of Entomology and Plant Pathology
Mississippi State University

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Nematode Management Investigations in Mississippi, 2001

INTRODUCTION

This summary of 2001 nematode trials on cotton and soybeans was prepared for industry cooperators, colleagues at other universities, and other interested persons. The information presented is not an endorsement or recommendation. This information is intended for private use and may not be reproduced without permission.

Trade names are used throughout this report for clarity, except where they are unavailable. A list of all chemicals used in this research — including trade, common, and chemical names when available — and company sources are included in the Appendix. Nematicide rates are expressed as formulated rate per acre as suggested by manufacturers.

Data presented in this report were statistically analyzed using the Statistical Analysis System (SAS Institute, Inc., Cary, N.C.). Data were subjected to ANOVA appropriate for the experimental design used, and means were separated using the least significant difference test. All statistical tests were performed at the 5% level of significance.

Single-Rate Application Methods. Temik 15G was applied at planting in the seed furrow with a Case 900 Early Riser planter equipped with a granular chemical applicator.

Telone II, Vapam, and Kapam were applied with a modified ripper-hipper. A CO_2-charged system was used to propel the fumigant through flow regulators mounted on stainless steel delivery tubes attached to the trailing edge of forward-swept chisels. Rows were immediately hipped with disk-hillers to seal and prevent rapid loss of the fumigant.

Adage 5FS and Gaucho was added to the seed before planting at the rate of 300 and 402 grams of active ingredient per 100 kilograms of seed, respectively.

Vydate C-LV was applied as a foliar spray at the 6th-true-leaf stage and again 14 days later. Vydate C-LV was applied with a CO_2-charged backpack field plot spray system using two 8003 flat fan nozzles spaced over each row at 30 psi.

Nematode Counts. For most tests, population densities of plant-parasitic nematodes were determined at planting and at monthly intervals for the entire growing season. Ten soil cores, 1 inch in diameter and 8 inches deep, were collected from the two center rows of each plot in a systematic randomized sampling pattern. Cores from each plot were thoroughly mixed, and a 250-cubic-centimeter subsample was collected. Nematodes were extracted using a combination of gravity sieving and centrifugal flotation (sucrose sp. gr. 1.13).

Reniform Nematode Management with Adage 5FS

Objective: Adage 5FS was examined in Glen Allan, Mississippi, for the management of the reniform nematode (*Rotylenchulus reniformis*) in an established cotton production location. Adage 5FS was compared with applications of Temik 15G at 3.5, 5, and 7 pounds of formulated product per acre. Adage 5FS and Temik 15G were also included in combination with foliar applications of Vydate C-LV at 8 ounces per acre. The insecticide Di-Syston 8EC was included as an insecticide-treated control. All plots were treated with Orthene 75S at 4 ounces of formulated product per acre when thrips were detected in any plots.

Temik 15G was applied at planting with a Case 900 Early Riser planter equipped with granular chemical applicators. Vydate C-LV was applied as a foliar spray at the 6th-true-leaf stage and again 14 days later. Vydate C-LV was applied with a CO_2-charged backpack field plot spray system. A total volume of 10 gallons per acre was applied through two 8003 flat fan nozzles spaced over each row at 30 psi. All rows not treated with Vydate C-LV received a foliar spray of Orthene 75S at 4 ounces per acre.

Cultivar: PayMaster 1218 BG/RR

Experimental design: Randomized complete block with five replications

Plot design: Two-row plots; rows 40 feet long, 40 inches wide; blocks separated by 20-foot alley

Application date:

May 5, 2001	Adage 5FS-treated seed planted Temik 15G applied in-furrow
May 15, 2001	Orthene 75S applied to all treatments
June 5, 2001	Orthene 75S applied to all treatments
June 7, 2001	Vydate C-LV 6- to 7-true-leaf-stage application Orthene 75S applied to all treatments
June 21, 2001	Vydate C-LV 14 days after 6- to 7-true-leaf-stage application Orthene 75S applied to all treatments

Planting date: May 5, 2001

Seed rate: 210 seeds per row

Nematode sample date: May 10, 2001
June 4, 2001
July 18, 2001
November 17, 2001

Plant heights: September 5, 2001

Harvest date: November 5, 2001

Results: See Table 1, Table 2, Table 3, Table 4, and Table 5

Table 1. Effect of Adage 5FS on population development of reniform nematode on PayMaster 1218 cotton.[1]

Treatment	Rate per acre[2]	Application method	*R. reniformis* per 250 cm soil at 0-179 days after planting				
			0	25	69	179	Mean[3]
Control	—	—	3,315 b	7,956 a	6,409 a	6,205 c	5,971 a
Adage 5FS	300 g a.i./100 kg seed	Seed treatment	4,335 ab	7,735 a	6,732 a	8,755 bc	6,889 a
Temik 15G	3.5 lb/A	In-furrow	4,522 b	6,630 a	6,732 a	14,076 a	7,990 a
Temik 15G	5.0 lb/A	In-furrow	7,973 a	5,406 a	5,916 a	11,220 ab	7,629 a
Temik 15G	7.0 lb/A	In-furrow	4,981 b	8,670 a	7,157 a	7,140 bc	6,987 a
Temik 15G + Vydate C-LV	3.5 lb/A + 8.5 oz	In-furrow + 6th leaf + 14 days	3,196 b	5,916 a	6,834 a	8,772 bc	6,180 a
Adage 5FS + Vydate C-LV	300g a.i./100 kg seed	Seed treatment + 6th leaf + 14 days	4,845 b	8,568 a	6,817 a	7,820 bc	7,013 a
LSD *(P=0.05)*			2,750	NS	NS	4,414	NS

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significant level according to the least significant difference test.
[2]Rates calculated are based on 40-inch row spacing.
[3]Average reniform nematode population density across sample dates.

Table 2. Effect of Adage 5FS seed treatment on the plant height, number of nodes produced, and first fruiting node on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Plant height (in)	Nodes per plant	Node of first fruiting branch
Control	—	—	41.8 b	20.1 a	6.1 a
Adage 5FS	300 g a.i./100 kg seed	Seed treatment	42.8 b	22.0 a	5.8 a
Temik 15G	3.5 lb/A	In-furrow	48.9 ab	21.1 a	5.0 a
Temik 15G	5.0 lb/A	In-furrow	48.8 ab	20.6 a	5.7 a
Temik 15G	7.0 lb	In-furrow	48.3 ab	19.8 a	5.3 a
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	In-furrow + 6th leaf + 14 days	49.6 ab	21.1 a	5.3 a
Adage 5FS + Vydate C-LV	300 a.i./100 kg seed + 8.0 oz	Seed treatment + 6th leaf + 14 days	51.7 a	21.9 a	5.7 a
LSD *(P=0.05)*			8.6	NS	NS

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Table 3. Effect of Adage 5FS seed treatment on the number of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Open bolls[3]			Total open bolls per plant
			Position 1	Position 2	Position 3	
Control	—	—	5.6 a	2.0 c	0.0 c	7.5 b
Adage 5FS	300 g a.i./100 kg seed	Seed treatment	6.6 a	4.5 a	2.4 ab	13.5 a
Temik 15G	3.5 lb	In-furrow	5.7 a	4.0 ab	3.8 a	13.4 a
Temik 15G	5.0 lb	In-furrow	5.2 a	4.3 a	2.2 ab	11.8 a
Temik 15G	7.0 lb	In-furrow	6.9 a	3.9 ab	1.0 c	11.8 a
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	In-furrow 6th leaf + 14 days	5.6 a	3.1 b	3.4 a	12.1 a
Adage 5FS + Vydate C-LV	300 a.i./100 kg seed	Seed treatment + 6th leaf + 14 days	6.3 a	3.4 ab	3.3 a	13.1 a
LSD *(P=0.05)*			NS	1.0	1.9	3.9

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Average number of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 4. Effect of Adage 5FS seed treatment on the weight of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton weight (g)[3]			Total seed cotton weight per plant (g)
			Position 1	Position 2	Position 3	
Control	—	—	54.8 c	19.5 c	0.0 c	74.27 b
Adage 5FS	300 g a.i./100 kg seed	Seed treatment	84.3 a	53.6 a	29.3 a	167.17 a
Temik 15G	3.5 lb/A	In-furrow	70.6 abc	44.2 ab	40.5 a	155.37 a
Temik 15G	5.0 lb	In-furrow	63.6 bc	60.1 a	25.8 ab	149.43 a
Temik 15G	7.0 lb	In-furrow	79.3 ab	45.6 ab	8.3 bc	133.17 a
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	In-furrow + 14 days	68.8 abc	33.8 bc	33.7 a	136.23 a
Adage 5FS + Vydate C-LV	300 a.i./100 kg seed	Seed treatment + 6th leaf + 14 days	67.5 abc	32.6 bc	35.8 a	135.93 a
LSD *(P=0.05)*			19.6	18.9	20.8	41 .5

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Weight of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 5. Effect of Adage 5FS seed treatment on the yield of PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton (lb/plot)	Seed cotton (lb/A)	Yield over control (lb/A)
Control	—	—	13.2	2,158.2	—
Adage 5FS	300 g a.i./100 kg seed	Seed treatment	13.2	2,158.2	0
Temik 15G	3.5 lb/A	In-furrow	13.4	2,191.0	33
Temik 15G	5.0 lb/A	In-furrow	14.0	2,289.0	98
Temik 15G	7.0 lb	In-furrow	15.8	2,583.3	425
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	In-furrow + 6th leaf + 14 days	14.8	2,419.8	262
Adage 5FS + Vydate C-LV	300 g a.i./100 kg seed	Seed treatment + 6th leaf + 14 days	13.8	2,256.3	98
LSD *(P=0.05)*			NS	NS	

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Management of the Reniform Nematode with Vapam and Kapam Soil Fumigants

Objective: Vapam, Kapam, and Telone II were examined at Glen Allan, Mississippi, for the management of the reniform nematode (*Rotylenchulus reniformis*) in an established cotton production location. Vapam was compared with a preplanting application of Telone II at 3 gallons per acre and with at-planting applications of Temik 15G at 3.5 and 5 pounds per acre. Di-Syston 8EC was included as an insecticide-treated control. All plots were treated with the recommended rate of Orthene 75S at 4 ounces of formulated product per acre when thrips were detected in any plots.

Vapam, Kapam, and Telone II were applied with a modified John Deere ripper hipper. A CO_2-charged system was used to propel the fumigant through flow regulators mounted on stainless steel delivery tubes attached to the trailing edge of forward-swept chisels. The fumigant was injected 16 inches deep 16 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 subsoiled 16 inches deep and hipped without applying the fumigant. Temik 15G was applied at planting with a Case 900 Early Riser planter equipped with granular chemical applicators.

Cultivar: PayMaster PM 1218 BG/RR

Experimental design: Randomized complete block with five replications

Plot design: Four-row plots; rows 40 feet long, 40 inches wide; blocks separated by 20-foot alley

Application date:

April 19, 2001	Telone II injected
	Vapam injected
	Kapam injected
May 5, 2001	Temik 15G applied in-furrow
May 15, 2001	Orthene 75S applied to all treatments
June 5, 2001	Orthene 75S applied to all treatments
June 21, 2001	Orthene 75S applied to all treatments

Planting date: May 5, 2001

Seed rate: 210 seeds per row

Nematode sample date:
April 19, 2001
May 10, 2001
June 4, 2001
July 18, 2001
November 17, 2001

Plant heights: September 5, 2001

Harvest date: November 17, 2001

Results: See Table 6, Table 7, Table 8, Table 9, and Table 10

Table 6. Effect of Vapam, Kapam, and Telone II on population development of the reniform nematode on PayMaster 1218 cotton.[1]

Treatment	Rate per acre[2]	Application method	*R. reniformis* per 250cc soil at 0-179 days after planting				
			16 days preplant	0	69	179	Mean[3]
Vapam	3.0 gal	Single chisel, 16", preplant	5,199 ab	2,231 bc	8,769 abc	5,148 c	5,337 bcd
Vapam	5.0 gal	Single chisel, 16", preplant	6,641 b	1,407 c	6,504 bcd	4,376 c	4,732 cd
Vapam	8.0 gal	Single chisel, 16", preplant	4,736 a	1,579 c	4,685 cd	6,521 bc	4,380 d
Kapam	6.5 gal	Single chisel, 16", preplant	6,898 b	2,317 bc	2,471 d	6,178 bc	4,466 d
Temik 15G	3.5 lb	In-furrow, at plant	5,663 b	3,827 ab	12,820 a	10,897 a	8,314 a
Temik 15G	5.0 lb	In-furrow, at plant	5,714 b	5,011 a	9,060 ab	5,628 bc	6,354 b
Telone II	3.0 gal	Single chisel, 16", preplant	4,050 a	3,535 ab	10,090 ab	6,692 bc	6,092 bc
Control	—	—	4,822 a	3,878 ab	7,825	8,237 ab	6,191 bc
LSD *(P=0.05)*			1,571	1,749	4,339	2,938	1,601

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates calculated are based on 40-inch row spacing.
[3]Average reniform nematode population density across all sample dates.

Table 7. Effect of Vapam, Kapam, and Telone II on plant height, number of nodes produced and first fruiting node on PayMaster 1218 in a cotton field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Plant height (in)	Nodes per plant	Node of first fruiting branch
Control	—	—	46.2 ab	21.7	8.0 a
Vapam	3.0 gal	Single chisel, 16", preplant	41.3 b	19.0	5.7 b
Vapam	5.0 gal	Single chisel, 16", preplant	48.7 a	22.0	5.9 b
Vapam	8.0 gal	Single chisel, 16", preplant	48.6 a	21.5	5.8 b
Kapam	6.5 gal	Single chisel, 16", preplant	44.2 ab	20.1	5.7 b
Temik 15G	3.5 lb	In-furrow, at plant	44.8 ab	21.7	6.0 b
Temik 15G	5.0 lb	In-furrow, at plant	41.7 b	20.5	5.6 b
Telone II	3.0 gal	Single chisel, 16", preplant	45.7 ab	21.0	6.3 ab
LSD *(P=0.05)*			6.1	NS	1.9

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Table 8. Effect of Vapam, Kapam, and Telone II on the number of bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Open bolls[3]			Total open bolls per plant
			Position 1	Position 2	Position 3	
Control	—	—	3.8 d	3.1 a	1.3 b	8.2 b
Vapam	3.0 gal	Single chisel, 16", preplant	6.4 a	4.2 a	3.5 ab	14.1 a
Vapam	5.0 gal	Single chisel, 16", preplant	5.7 abc	3.7 a	2.8 ab	12.2 b
Vapam	8.0 gal	Single chisel, 16", preplant	6.3 ab	4.8 a	3.6 a	14.7 a
Kapam	6.5 gal	Single chisel, 16", preplant	4.1 cd	4.0 a	3.4 ab	11.5 b
Temik 15G	3.5 lb	In-furrow, at plant	4.7 bcd	3.8 a	2.3 ab	10.7 ab
Temik 15G	5.0 lb	In-furrow, at plant	4.1 cd	4.0 a	2.1 ab	10.2 ab
Telone II	3.0 gal	Single chisel, 16", preplant	5.8 abc	4.1 a	2.7 ab	12.6 ab
LSD *(P=0.05)*			1.8	NS	2.2	5.4

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Average number of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 9. Effect of Vapam, Kapam, and Telone II on the weight of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton weight[3]			Total seed cotton weight per plant (g)
			Position 1	Position 2	Position 3	
Control	—	—	42.1 b	29.3 a	11.0 b	82.3 b
Vapam	3.0 gal	Single Chisel, 16”, preplant	74.7 ab	53.3 a	41.3 a	169.3 ab
Vapam	5.0 gal	Single Chisel, 16”, preplant	76.7 ab	41.3 a	20.0 ab	138.0 ab
Vapam	8.0 gal	Single Chisel, 16”, preplant	95.0 a	63.3 a	41.0 ab	199.3 a
Kapam	6.5 gal	Single Chisel, 16”, preplant	52.7 b	52.0 a	42.7 a	147.3 ab
Temik 15G	3.5 lb	In-furrow, at plant	58.0 ab	52.7 a	33.7 ab	144.3 ab
Temik 15G	5.0 lb	In-furrow, at plant	52.0 ab	51.0 a	21.3 ab	124.3 ab
Telone II	3.0 gal	Single Chisel, 16”, preplant	74.7 ab	48.7 a	24.7 ab	148.0 ab
LSD *(P=0.05)*			35.7	NS	30.1	91.6

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Weight of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 10. Effect of Vapam, Kapam, and Telone II on the yield of PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton (lb/plot)	Seed cotton (lb/A)	Yield over control (lb/A)
Control	—	—	13.30 c	2,174.8 c	—
Vapam	3.0 gal	Inject 16” deep preplant	13.30 c	2,174.8 c	0
Vapam	5.0 gal	Inject 16” deep preplant	15.60 b	2,550.9 b	376
Vapam	8.0 gal	Inject 16” deep preplant	14.50 bc	2,371.0 bc	196
Kapam	6.5 gal	Inject 16” deep preplant	17.70 a	2,894.3 a	719
Temik 15G	3.5 lb	In-furrow	14.6 bc	2,387.4 bc	212
Temik 15G	5.0 lb	In-furrow	14.9 bc	2,436.4 bc	261
Telone II	3.0 gal	Inject 16” deep preplant	15.5 b	2,534.6 b	360
LSD *(P=0.05)*			1.6	269	

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Reniform Nematode Management with Temik 15G Applied In-Furrow and as Side-Dress Treatment

Objective: Temik 15G was examined in Glen Allan, Mississippi, for the management of the reniform nematode (*Rotylenchulus reniformis*) in an established cotton production system.

Temik 15G was applied at planting in the seed furrow or as a side-dress treatment to plants that were in the 10th-true-leaf growth stage. In-furrow Temik 15G was applied at 3.5 and 5 pounds per acre. The side-dress treatment rates were 5 and 7 pounds per acre in combination with a 5 pounds per acre in-furrow rate applied at planting.

Temik 15G in-furrow treatments were applied with a Case 900 Early Riser planter equipped with granular chemical applicators. Side-dress applications were placed approximately 6 inches deep on each side of the row with rolling coulters.

Adage 5FS and Gaucho were included as insecticide-treated controls. All plots were treated with Orthene 75S at 4 ounces of formulated product per acre when thrips were detected in any plots.

Cultivar: PayMaster 1218

Experimental design: Randomized complete block with five replications

Plot design: Two-row plots; rows 40 feet long, 40 inches wide; blocks separated by 20-foot alley

Application date:

May 5, 2001	Temik 15G applied in-furrow
May 15, 2001	Orthene 75S applied to all treatments
June 5, 2001	Orthene 75S applied to all treatments
June 25, 2001	Temik 15G applied as a side-dress treatment

Planting date: May 5, 2001

Seed rate: 210 seeds per row

Nematode sample date: May 10, 2001
June 4, 2001
July 18, 2001
November 17, 2001

Plant height: September 5, 2001

Harvest date: November 5, 2001

Results: See Table 11, Table 12, Table 13, Table 14, and Table 15

Table 11. Effect of Temik 15G on population development of the reniform nematode on PayMaster 1218 cotton.[1]

Treatment	Rate per acre[2]	Application method	*R. reniformis* per 250 cc soil at 0-140 days after planting				
			0	25	84	140	Mean[3]
Control	—	—	3,329	5,663	9,524	5,865	6,095
Adage 5FS	300 g a.i./ 100 kg seed	Seed treatment	2,866	6,366	8,134	5,780 ab	5,787
Gaucho	4 oz a.i./cwt	Seed treatment	4,393	7,876	9,112	5,185 abc	6,642
Temik 15G	3.5 lb	In-furrow	3,209	5,869	10,159	3,655 c	5,728
Temik 15G	5.0 lb	In-furrow	3,792	5,714	8,752	3,145 c	5,351
Temik 15G + Temik 15G	5.0 lb + 5.0 lb	In-furrow + Side dress	3,192	6,435	8,288	6,290 a	6,051
Temik 15G + Temik 15G	5.0 lb + 7.0 lb	In-furrow + Side dress	4,256	6,727 a	10,245	4,199 bc	6,357
LSD *(P=0.05)*			NS	NS	NS	2,048	NS

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates calculated are based on 40-inch row spacing.
[3]Average reniform nematode population density across all sample dates.

Table 12. Effect of Temik 15G on the plant height, number of nodes produced, and first fruiting node on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Plant height (in)	Nodes per plant	Node of first fruiting branch
Control	—	—	41.9 a	20.9 ab	6.0 a
Adage 5FS	300 g a.i./ 100 kg seed	Seed treatment	41.3 a	20.0 ab	5.5 a
Gaucho	4 oz a.i./cwt	Seed treatment	39.8 a	20.1 ab	5.3 a
Temik 15G	3.5 lb	In-furrow	45.7 a	22.5 ab	5.2 a
Temik 15G	5.0 lb	In-furrow	42.7 a	18.5 ab	4.7 a
Temik 15G + Temik 15G	5.0 lb + 5.0 lb	In-furrow + Side dress	45.8 a	20.3 ab	5.3 a
Temik 15G + Temik 15G	5.0 lb + 7.0 lb	In-furrow + Side dress	43.0 a	19.9 ab	5.5 a
LSD *(P=0.05)*			NS	2.7	NS

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Table 13. Effect of Temik 15G on the numbers of bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Open bolls[3]			Total open bolls per plant
			Position 1	Position 2	Position 3	
Control	—	—	3.9 b	2.5 b	0.3 c	6.6 b
Adage 5FS	300 g a.i./ 100 kg seed	Seed treatment	5.2 ab	4.2 a	1.5 bc	10.9 ab
Gaucho	4 oz a.i./cwt	Seed treatment	5.9 ab	3.6 ab	4.1 ab	13.6 a
Temik 15G	3.5 lb	In-furrow	6.2 a	4.4 a	4.2 ab	14.9 a
Temik 15G	5.0 lb	In-furrow	4.0 ab	3.8 ab	5.2 a	13.0 a
Temik 15G + Temik 15G	5.0 lb + 5.0 lb	In-furrow + Side dress	5.9 ab	4.3 a	4.7 ab	14.8 a
Temik 15G + Temik 15G	5.0 lb + 7.0 lb	In-furrow + Side dress	5.8ab	4.4 a	3.9 ab	14.1 a
LSD *(P=0.05)*			2.2	1.7	3.2	6.2

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Average number of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 14. Effect of Temik 15G on the weight of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton weight (g)[3]			Total seed cotton weight per plant (g)
			Position 1	Position 2	Position 3	
Control	—	—	52.0 c	28.0 b	2.7 c	82.67 c
Adage 5FS	300 g a.i./ 100 kg seed	Seed treatment	82.7 ab	53.0 a	37.0 b	172.67 ab
Gaucho	4 oz a.i./cwt	Seed treatment	94.3 a	51.0 a	34.3 bc	179.67 ab
Temik 15G	3.5 lb	In-furrow	91.3 a	58.0 a	59.0 ab	208.33 ab
Temik 15G	5.0 lb	In-furrow	93.7 a	51.7 a	77.0 a	222.33 a
Temik 15G + Temik 15G	5.0 lb + 5.0 lb	In-furrow + Side dress	79.7 ab	54.7 a	65.3 ab	199.67 ab
Temik 15G + Temik 15G	5.0 lb + 7.0 lb	In-furrow + Side dress	68.3 bc	50.3 a	38.3 b	157.00 b
LSD *(P=0.05)*			20.4	19.8	34.2	61.3

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Weight of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 15. Effect of Temik 15G on the yield of PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton (lb/plot)	Seed cotton (lb/A)	Yield over control (lb/A)
Control	—	—	15.2 b	2485.2 b	—
Adage 5FS	300 g a.i./ 100 kg seed	Seed treatment	16.4 ab	2681.4 ab	0
Gaucho	4 oz a.i./cwt	Seed treatment	16.6 ab	2714.1 ab	196
Temik 15G	3.5 lb	In-furrow	15.4 ab	2517.9 ab	229
Temik 15G	5.0 lb	In-furrow	18.8 a	3073.8 a	33
Temik 15G + Temik 15G	5.0 lb + 5.0 lb	In-furrow + Side dress	17.2 ab	2812.2 ab	589
Temik 15G + Temik 15G	5.0 lb + 7.0 lb	In-furrow + Side dress	14.8 b	2419.8 b	327
LSD *(P=0.05)*			3.8	622	

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Reniform Nematode Management with Vydate C-LV Applied as a Foliar Spray

Objective: Vydate C-LV was examined in Glen Allan, Mississippi, for the management of the reniform nematode (*Rotylenchulus reniformis*) in an established cotton production location. Each Vydate C-LV treatment received an in-furrow application of Temik 15G at 3.5 or 5 pounds of formulated material per acre at the time of planting. These treatments were compared with applications of Temik 15G at 3.5, 5, and 7 pounds of formulated product per acre applied in the seed furrow at planting. The insecticide Di-Syston 8EC was included as an insecticide-treated control. All plots were treated with Orthene 75S at 4 ounces of formulated product per acre when thrips were detected in any plots.

Temik 15G was applied at planting with a Case 900 Early Riser planter equipped with granular chemical applicators. Vydate C-LV was applied as a foliar spray at the 6th-true-leaf stage and again 14 days later. Vydate C-LV was applied with a CO_2-charged backpack field plot spray system. A total volume of 10 gallons per acre was applied through two 8003 flat fan nozzles spaced over each row at 30 psi. All rows not treated with Vydate C-LV received a foliar spray of Orthene 75S at 4 ounces per acre.

Cultivar: PayMaster 1218

Experimental design: Randomized complete block with five replications

Plot design: Two-row plots; rows 40 feet long, 40 inches wide; blocks separated by 20-foot alley

Application date:

May 5, 2001	Temik 15G applied in-furrow
May 16, 2001	Orthene 75S applied to all treatments
June 7, 2001	Vydate C-LV 6- to 7-true-leaf-stage application
	Orthene 75S applied to all treatments
June 21, 2001	Vydate C-LV 14 days after 6- to 7-true-leaf-stage application
	Orthene 75S applied to all treatments

Planting date: May 5, 2001

Seed rate: 210 seeds per row

Nematode sample date: May 10, 2001
June 4, 2001
July 18, 2001
November 17, 2001

Plant heights: September 5, 2001

Harvest date: November 5, 2001

Results: See Table 16, Table 17, Table 18, and Table 19

Table 16. Effect of Vydate C-LV applied as a foliar spray on plant height, the number of nodes produced, and the first fruiting node on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment[2]	Rate per acre[3]	Application method	Plant height (in)	Nodes per plant	Node of first fruiting branch
Control	—	—	38.9 b	20.7 c	5.2 a
Temik 15G	3.5 lb	In-furrow	42.1 ab	21.2 c	5.2 a
Temik 15G	5.0 lb	In-furrow	42.7 a	23.9 ab	5.7 a
Temik 15G + Vydate C-LV	3.5 lb + 8.0 oz	In-furrow + 8th leaf + 14 days	45.1 a	24.7 a	4.9 a
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	In-furrow + 6th leaf + 14 days	42.8 a	22.0 bc	4.7 b
LSD *(P=0.05)*			3.2	2.6	1.1

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Vydate C-LV was applied at the 6th-true-leaf stage on June 7, 2001, and 14 days later on June 21, 2001.
[3]Rates calculated are based on 40-inch row spacing.

Table 17. Effect of Vydate C-LV on the number of bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment[2]	Rate per acre[3]	Application method	Open bolls[4]			Total open bolls per plant
			Position 1	Position 2	Position 3	
Control	—	—	5.3	3.5	3.6 ab	12.4 ab
Temik 15G	3.5 lb	In-furrow	4.1	3.8	1.8 b	9.7 b
Temik 15G	5.0 lb	In-furrow	5.4	4.6	3.2 ab	13.2 ab
Temik 15G + Vydate C-LV	3.5 lb + 8.0 oz	In-furrow + 8th leaf + 14 days	6.4	4.6a	4.8 a	15.8 a
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	In-furrow + 6th leaf + 14 days	6.2	4.2	5.1 a	15.6 a
LSD *(P=0.05)*			NS	NS	2.5	3.9

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Vydate C-LV was applied at the 6th-true-leaf stage on June 7, 2001, and 14 days later on June 21, 2001.
[3]Rates calculated are based on 40-inch row spacing.
[4]Average number of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 18. Effect of Vydate C-LV on the weight of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment[2]	Rate per acre[3]	Application method	Seed cotton weight (g)[4]			Total seed cotton weight per plant (g)
			Position 1	Position 2	Position 3	
Control	—	—	49.0 b	31.0 b	15.0 c	95.0 c
Temik 15G	3.5 lb	In-furrow	64.0 ab	48.7 ab	21.0 bc	133.67 bc
Temik 15G	5.0 lb	In-furrow	70.7 ab	64.7 a	42.0 b	177.33 ab
Temik 15G + Vydate C-LV	3.5 lb + 8.0 oz	In-furrow + 8th leaf + 14 days	88.0 a	56.0 a	72.7 c	216.67 a
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	In-furrow + 6th leaf + 14 days	71.0 ab	55.0 a	67.7 a	193.67 a
LSD *(P=0.05)*			36.4	20.0	22.9	57.5

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Vydate C-LV was applied at the 6th-true-leaf stage on June 7, 2001, and 14 days later on June 21, 2001.
[3]Rates calculated are based on 40-inch row spacing.
[4]Weight of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 19. Effect of Vydate C-LV applied as a foliar spray on the yield of PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment[2]	Rate per acre[3]	Application method	Seed cotton (lb/plot)	Seed cotton (lb/A)	Yield over control (lb/A)
Control	—	—	14.2 b	2,322 b	0
Temik 15G	3.5 lb	In-furrow	16.2 ab	2,649 ab	327
Temik 15G	5.0 lb	In-furrow	16.4 ab	2,681.4 ab	523
Temik 15G + Vydate C-LV	3.5 lb + 8.0 oz	In-furrow + 8th leaf + 14 days	18.8 a	3,073.8 a	751.8
Temik 15G + Vydate C-LV	5.0 lb + 8.0 oz	Seed treatment + 6th + 14 days	17.6	2,877.6 ab	555.6
LSD *(P=0.05)*			4.2	694	

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Vydate C-LV was applied at the 6th-true-leaf stage on June 7, 2001, and 14 days later on June 21, 2001.
[3]Rates were calculated based on 40-inch row spacing.

Management of the Reniform Nematode with Messenger Alone and in Combination with Temik 15G

Objective: Messenger was examined at Glen Allan, Mississippi, for the management of the reniform nematode (*Rotylenchulus reniformis*) in an established cotton production field. Messenger was compared alone and in combination with an at-planting application of Temik 15G at 5 and 7 pounds of formulated product per acre and the seed treatment Adage 5FS. All plots were treated with Orthene 75S at 4 ounces of formulated product per acre when thrips were detected in any plots.

Messenger was applied with a CO_2-charged backpack field plot spray system. A total volume of 10 gallons per acre was applied through two 8003 flat fan nozzles spaced over each row at 30 psi. All foliar applications were applied using distilled water as a carrier. Temik 15G was applied at planting with a Case 900 Early Riser planter equipped with granular chemical applicators.

Cultivar: PayMaster PM 1218 BG/RR

Experimental design: Randomized complete block with five replications

Plot design: Two-row plots with two-row borders; rows 40 feet long, 40 inches wide; blocks separated by 20-foot alley

Application date:

May 5, 2001	Temik 15G applied in-furrow
May 15, 2001	Orthene 75S applied to all treatments
May 21, 2001	Two-leaf-stage application
June 8, 2001	Six-leaf-stage application
July 2, 2001	First bloom application
July 23, 2001	Three weeks after first bloom

Planting date: May 5, 2001

Seed rate: 210 seeds per row

Nematode sample date: May 10, 2001
June 4, 2001
July 18, 2001
November 17, 2001

Plant height: September 5, 2001

Harvest date: November 17, 2001

Results: See Table 20, Table 21, Table 22, Table 23, and Table 24

Table 20. Effect of Messenger on population development of the reniform nematode on PayMaster 1218 cotton.[1]

Treatment	Rate per acre[2]	Application method	*R. reniformis* per 250 cc soil at 0-179 days after planting				
			0	41	84	179	Mean[3]
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB, FB+3 + In-furrow	5,797 ab	1,054 e	7,956 a	7,055 cd	5,466 ab
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB + In-furrow	3,587 b	2,091 de	6,120 ab	10,540 ab	5,585 ab
Messenger + Temik 15G	2.25 oz + 3.5 lb	PHS, FB, FB+3 In-furrow	4,182 b	2,669 cde	5,627 abc	8,925 bcd	5,351 ab
Temik 15G	3.5 lb	In-furrow	4,845 ab	2,363 de	5,950 abc	9,265 abcd	5,606 ab
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB, FB+3 + In-furrow	3,876 b	10,353 a	3,400 bc	9,690 abcd	6,830 a
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB + In-furrow	4,913 ab	9,027 ab	3,434 bc	10,030 abc	6,851 a
Messenger + Temik 15G	2.25 + 7.0 lb	PHS, FB, FB+3 In-furrow	3,570 b	5,610 bcd	3,247 bc	8,670 bcd	5,274 ab
Temik 15G	7.0 lb	In-furrow	4,063 b	5,933 bc	2,682 c	12,240 a	6,222 ab
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB, FB+3 + Seed treatment	3,570 b	2,958 cde	4,335 abc	11,475 ab	5,585 ab
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB + Seed treatment	5,491 ab	2,567 cde	5,763 abc	6,715 d	5,134 b
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	PHS, FB, FB+3 + Seed treatment	6,258 a	5,066 cd	5,253 abc	8,653 bcd	6,375 ab
Adage	300 g a.i./ 100 kg seed	Seed treatment	5,100 ab	4,131 cde	4,896 abc	9,010 bcd	5,784 ab
LSD *(P=0.05)*			2,233	3,554	3,370	3,020	1,668

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates calculated are based on 40-inch row spacing.
[3]Average reniform nematode population density across all sample dates.

Table 21. Effect of Messenger on the plant height, number of nodes produced, and the first fruiting node on PayMaster 1218 cotton.[1]

Treatment	Rate per acre[2]	Application method	Plant height	Nodes	Node of first fruiting branch
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB, FB+3 + In-furrow	41.0 bcd	18.7 b	5.2 ab
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB + In-furrow	41.0 bcd	19.8 b	6.0 ab
Messenger + Temik 15G	2.25 oz + 3.5 lb	PHS, FB, FB+3 In-furrow	40.2 cd	20.0 ab	5.4 ab
Temik 15G	3.5 lb	In-furrow	39.0 d	19.2 b	5.5 ab
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB, FB+3 + In-furrow	43.8 abc	19.7 b	5.2 ab
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB + In-furrow	44.1 abc	19.8 b	5.2 ab
Messenger + Temik 15G	2.25 + 7.0 lb	PHS, FB, FB+3 In-furrow	44.2 abc	19.2 b	5.0 abc
Temik 15G	7.0 lb	In-furrow	41.4 abcd	18.7 b	5.1 abc
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB, FB+3 + Seed treatment	46.1 a	21.3 ab	4.5 c
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB + Seed treatment	46.1 a	20.0 ab	5.4 ab
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	PHS, FB, FB+3 + Seed treatment	45.4 ab	25.1 a	4.8 bc
Adage	300 g a.i./ 100 kg seed	Seed treatment	44.7 abc	21.5 ab	6.5 a
LSD (P=0.05)			4.7	5.3	1.6

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level of significance according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Table 22. Effect of Messenger on the number of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Open bolls[3]			Total open bolls per plant
			Position 1	Position 2	Position 3	
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB, FB+3 + In-furrow	7.0 a	4.2 abc	4.1 ab	15.3 ab
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB + In-furrow	6.0 ab	4.9 abc	4.0 ab	14.9 ab
Messenger + Temik 15G	2.25 oz + 3.5 lb	PHS, FB, FB+3 In-furrow	6.4 ab	4.4 abc	2.8 ab	13.6 ab
Temik 15G	3.5 lb	In-furrow	4.7 b	5.0 abc	3.3 ab	13.0 ab
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB, FB+3 + In-furrow	5.3 ab	5.1 ab	4.9 a	15.3 ab
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB + In-furrow	5.4 ab	4.3 abc	4.0 ab	13.8 ab
Messenger + Temik 15G	2.25 + 7.0 lb	PHS, FB, FB+3 In-furrow	5.2 ab	4.2 abc	3.9 ab	13.4 ab
Temik 15G	7.0 lb	In-furrow	5.7 ab	3.1 c	2.5 ab	11.1 ab
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB, FB+3 + Seed treatment	5.5 ab	5.4 a	4.3 ab	15.2 ab
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB + Seed treatment	6.4 ab	5.1 ab	4.1 ab	15.7 a
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	PHS, FB, FB+3 + Seed treatment	5.9 ab	4.7 abc	3.3 ab	13.9 ab
Adage	300 g a.i./ 100 kg seed	Seed treatment	5.9 ab	3.2 bc	1.6 b	10.7
LSD *(P=0.05)*			2.0	1.9	2.9	4.7

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Average number of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 23. Effect of Messenger on the weight of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[2]

Treatment	Rate per acre[2]	Application method	Seed cotton weight (g)[3]			Total seed cotton weight per plant (g)
			Position 1	Position 2	Position 3	
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB, FB+3 + In-furrow	91.3 a	56.3 abc	53.0 ab	200.7 abc
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB + In-furrow	68.0 abc	56.7 abc	52.7 ab	177.3 abc
Messenger + Temik 15G	2.25 oz + 3.5 lb	PHS, FB, FB+3 In-furrow	79.3 abc	53.0 abc	34.0 ab	166.3 abc
Temik 15G	3.5 lb	In-furrow	74.0 abc	59.7 abc	38.7 ab	172.3 abc
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB, FB+3 + In-furrow	61.7 bc	63.0 abc	65.7 a	190.3 abc
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB + In-furrow	76.3 abc	49.0 abc	51.7 ab	177.0 abc
Messenger + Temik 15G	2.25 + 7.0 lb	PHS, FB, FB+3 In-furrow	53.3 c	43.0 bc	44.7 ab	141.0 bc
Temik 15G	7.0 lb	In-furrow	67.3 abc	37.0 c	29.0 ab	133.3 c
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB, FB+3 + Seed treatment	66.3 abc	67.3 ab	55.0 ab	188.7 abc
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB + Seed treatment	86.7 ab	65.7 abc	52.0 ab	204.3 ab
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	PHS, FB, FB+3 + Seed treatment	93.0 a	72.0 a	48.3 ab	213.3 a
Adage	300 g a.i./ 100 kg seed	Seed treatment	82.0 abc	42.7 bc	12.3 b	137.0 bc
LSD *(P=0.05)*			29.1	28.8	43.7	69.8

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.
[3]Weight of cotton produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 24. Effect of Messenger on the yield of PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton (lb/plot)	Seed cotton (lb/acre)
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB, FB+3 + In-furrow	15.42	2,648.7
Messenger + Temik 15G	2.25 oz + 3.5 lb	2L, PHS, FB + In-furrow	13.71	2,354.4
Messenger + Temik 15G	2.25 oz + 3.5 lb	PHS, FB, FB+3 In-furrow	15.04	2,583.3
Temik 15G	3.5 lb	In-furrow	14.66	2,517.9
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB, FB+3 + In-furrow	13.14	2,256.3
Messenger + Temik 15G	2.25 + 7.0 lb	2L, PHS, FB + In-furrow	14.66	2,517.9
Messenger + Temik 15G	2.25 + 7.0 lb	PHS, FB, FB+3 In-furrow	15.04	2,583.3
Temik 15G	7.0 lb	In-furrow	14.47	2,485.4
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB, FB+3 + Seed treatment	14.67	2,517.9
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	2L, PHS, FB + Seed treatment	13.52	2,321.7
Messenger + Adage	2.25 + 300 g a.i./100 kg seed	PHS, FB, FB+3 + Seed treatment	14.66	2,517.9
Adage	300 g a.i./100 kg seed	Seed treatment	14.85	2,550.6
LSD *(P=0.05)*			NS	NS

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 40-inch row spacing.

Management of the Reniform Nematode with Foliar Applications of Messenger

Objective: Messenger was examined at the Plant Science Research Farm at Mississippi State University for the management of the reniform nematode (*Rotylenchulus reniformis*) in an established cotton production field. Messenger was compared alone and in combination with an at-planting application of Temik 15G at 5 pounds of formulated product per acre. All plots were treated with Orthene 75S at 4 ounces of formulated product per acre when thrips were detected in any plots.

Messenger was applied with a CO_2-charged backpack field plot spray system. A total volume of 10 gallons per acre was applied through two 8003 flat fan nozzles spaced over each row at 30 psi. All foliar applications were applied using distilled water as a carrier. Temik 15G was applied at planting with a Case 900 Early Riser planter equipped with granular chemical applicators.

Cultivar: PayMaster PM 1218 BG/RR

Experimental design: Randomized complete block with five replications

Plot design: Two-row plots with two-row borders; rows 40 feet long, 38 inches wide; blocks separated by 20-foot alley

Application date:

May 23, 2001	Temik 15G applied in-furrow
June 20, 2001	Two-leaf stage application
July 3, 2001	Six-leaf-stage application (app. pin head square)
August 1, 2001	First bloom application
August 22, 2001	Three weeks after first bloom

Planting date: May 23, 2001

Seed rate: 210 seeds per row

Nematode sample date:
May 11, 2000
June 21, 2000
August 3, 2000
September 28, 2001

Plant height: October 22, 2001

Harvest date: October 22, 2001

Results: See Table 25, Table 26, Table 27, and Table 28

Table 25. Effect of Messenger on the plant height, number of nodes produced and first fruiting node on PayMaster 1218 cotton.[1]

Treatment	Rate per acre[2]	Application method	Plant height (in)	Nodes per plant	Node of first fruiting branch
Control	—	—	26.9 b	16.9 b	7.0 a
Temik 15G	5.0 lb	In-furrow	33.4 a	20.9 b	6.2 b
Messenger + Temik 15G	2.25 oz + 5.0 lb	2 leaf, PHS, FB + In-furrow	31.0 ab	19.0 ab	5.8 bc
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB, FB+3 + In-furrow	32.1 ab	20.0 ab	6.4 ab
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB + In-furrow	29.4 ab	19.5 ab	5.4 c
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB, FB+3 + In-furrow	29.6 ab	19.5 ab	5.3 c
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS + In-furrow	32.8 ab	21.2 a	6.3 ab
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB + In-furrow	32.2 ab	18.7 ab	5.4 c
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB+3 + In-furrow	32.6 ab	19.4 ab	5.8 c
LSD *(P=0.05)*			6.0	3.7	0.7

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on a 38-inch row spacing.

Table 26. Effect of Messenger on the number of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Open bolls[3]			Total open bolls per plant
			Position 1	Position 2	Position 3	
Control	—	—	5.1	1.2 b	0.0 e	6.3 b
Temik 15G	5.0 lb	In-furrow	6.2	2.7 ab	0.8 cde	9.7 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	2 leaf, PHS, FB + In-furrow	5.6	3.9 a	0.7 de	10.2 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB, FB+3 + In-furrow	5.8	3.8 a	0.9 bcd	10.6 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB + In-furrow	6.0	3.2 a	1.9 a	11.1 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB, FB+3 + In-furrow	6.5	3.3 a	1.8 a	11.5 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS + In-furrow	6.1	3.6 a	1.3 abcd	10.9 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB + In-furrow	6.2	3.4 a	1.6 abc	11.2 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB+3 + In-furrow	5.8	3.7 a	1.7 ab	11.2 a
LSD *(P=0.05)*			NS	1.6	0.8	2.4

[1]Data are means of replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 38-inch row spacing.
[3]Average number of cotton bolls produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 27. Effect of Messenger on the weight of open bolls produced at the 1st, 2nd, and 3rd fruiting positions on PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton weight (g)[3]			Total seed cotton weight per plant (g)
			Position 1	Position 2	Position 3	
Control	—	—	45.0 b	7.2 b	0.0 b	52.2 b
Temik 15G	5.0 lb	In-furrow	70.1 a	21.0 ab	6.2 bc	97.3 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	2 leaf, PHS, FB + In-furrow	65.8 a	31.4 a	2.4 cd	99.5 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB, FB+3 + In-furrow	61.8 a	28.3 a	6.5 bc	96.7 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB + In-furrow	63.4 a	26.5 a	15.4 a	105.2 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB, FB+3 + In-furrow	71.5 a	30.7 a	9.5 ab	111.6 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS + In-furrow	63.4 a	32.0 a	6.5 bc	101.9 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB + In-furrow	63.9 a	30.4 a	8.9	103.2 a
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB+3 + In-furrow	73.2 a	27.8 a	7.4 bc	108.4 a
LSD (P=0.05)			14.9	14.2	6.1	18.5

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2]Rates were calculated based on 38-inch row spacing.
[3]Weight of cotton produced per plant in each fruiting position. Position 3 includes the summation of all bolls at position 3 and above.

Table 28. Effect of Messenger on the yield of PayMaster 1218 cotton in a field infested with the reniform nematode.[1]

Treatment	Rate per acre[2]	Application method	Seed cotton (lb/plot)	Seed cotton (lb/A)	Yield over control (lb/A)
Control	—	—	12.34 b	2,244.7 b	—
Temik 15G	5.0 lb	In-furrow	13.84 ab	2,378.0 ab	133.3
Messenger + Temik 15G	2.25 oz + 5.0 lb	2 leaf, PHS, FB + In-furrow	14.35 ab	2,465.8 ab	221.1
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB, FB+3 + In-furrow	15.78 a	2,711.2 a	446.5
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS, FB + In-furrow	15.18 ab	2,603.2 ab	358.5
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB, FB+3 + In-furrow	15.40 ab	2,646.1 ab	401.4
Messenger + Temik 15G	2.25 oz + 5.0 lb	PHS + In-furrow	14.85 ab	2,552.2 ab	307.5
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB + In-furrow	14.47 ab	2,485.5 ab	240.8
Messenger + Temik 15G	2.25 oz + 5.0 lb	FB+3 + In-furrow	15.02 ab	2,580.9 ab	336.2
LSD *(P=0.05)*			2.3	4,050	

[1]Data are means of five replications. Means within a column not followed by the same letter are significantly different at the 0.05 significance level according to the least significant difference test.
[2] Rates were calculated based on 38-inch row spacing.

In-Field Evaluation of Midsouth Soybean Varieties for Resistance and Tolerance to the Reniform Nematode

Objective: Thirty-four soybean varieties were examined in a field located in Inverness, Mississippi, that was naturally infested with the reniform nematode (*Rotylenchulus reniformis*). Each variety was planted with and without the nematicide Temik 15G at 5 pounds of formulated material per acre.

Temik 15G was applied at planting in the seed furrow with a Case 900 Early Riser planter equipped with granular chemical applicators.

Cultivars: See list in Table 29, Table 30, Table 31, Table 32, and Table 33

Experimental design: Randomized complete block with five replications

Plot design: Two-row plots; rows 40 feet long, 38 inches wide; blocks separated by 20-foot alley

Application date:

May 5, 2001	Temik 15G applied in-furrow
May 16, 2001	Orthene 75S applied to all treatments

Planting date: May 5, 2001

Seed rate: 400 seeds per row

Nematode sample date: N/A

Plant height: N/A

Harvest date:

Maturity Group III & IV	September 9, 2001
Maturity Group V	October 5, 2001

Results: See Table 29, Table 30, Table 31, Table 32, and Table 33

Table 29. Seed yield of selected maturity group III soybean varieties grown in a field infested with reniform nematode.[1]

Brand	Variety	Yield (bu/A) with Temik[2]	Yield (bu/A) without Temik[3]	Yield difference[4]
Delta King	DKXTJ193 RR	40.5	29.8	10.7
Delta King	DKXTJ183 RR	43.1	33.8	9.3
Delta King	DK 3964 RR	44.1	34.6	9.5
Delta King	DK 3961 RR	44.1	31.5	12.6
LSD *(P=0.05)*		NS	NS	

[1]Data are the means of five replications. Means were compared using the least significant difference test.
[2]Yields followed by the same letter are not significantly different at P=0.05. Yield is based on 13% moisture and 60 pounds per bushel.
[3]Temik was applied at a rate of 5 pounds per acre on 38-inch rows at the time of planting.
[4]Yield difference = yield with Temik - yield without Temik.

Table 30. Seed yield of selected maturity group IV soybean varieties grown in a field infested with reniform nematode.[1]

Brand	Variety	Yield (bu/A) with Temik[2]	Yield (bu/A) without Temik[3]	Yield difference[4]
Delta and Pine Land	DPx4300 RR	49.2 b	37.0 bc	12.2
Delta and Pine Land	DP 4344 RR	47.6 b	42.3 abc	5.3
Delta and Pine Land	DPx4885 RR	51.8 ab	52.3 a	-0.5
Delta and Pine Land	DP 4690 RR	54.0 ab	52.7 a	1.3
Delta and Pine Land	SG 498 RR	56.6 a	47.5 ab	9.1
Delta and Pine Land	DP 3478	53.8 ab	39.5 bc	14.3
Delta and Pine Land	DP 4748S	57.2 a	46.6 ab	10.6
LSD *(P=0.05)*		7.2	8.9	

[1]Data are the means of five replications. Means were compared using the least significant difference test.
[2]Yields followed by the same letter are not significantly different at P=0.05. Yield is based on 13% moisture and 60 pounds per bushel.
[3]Temik was applied at a rate of 5 pounds per acre on 38-inch rows at the time of planting.
[4]Yield difference = yield with Temik - yield without Temik.

Table 31. Seed yield of selected maturity group IV soybean varieties grown in a field infested with reniform nematode.[1]

Brand	Variety	Yield (bu/A) with Temik[2]	Yield (bu/A) without Temik[3]	Yield difference[4]
Delta King	DK 4868 RR	54.5 a	40.6 abc	13.9
Delta King	DK 4762 RR	51.3 ab	34.3 c	17.0
Delta King	DK 4965 RR	52.7 ab	45.9 a	6.8
Delta King	DKxTJ 174 RR	44.8 b	40.0 abc	4.8
Delta King	DKxTJ 124 RR	52.5 ab	43.8 ab	8.7
Delta King	DKxTJ 184 RR	47.8 ab	44.0 ab	3.8
Delta King	DK 4680	51.4 ab	36.4 bc	15.0
Delta King	DK 4711	55.4 a	44.4 ab	11.0
LSD *(P=0.05)*		9.1	8.5	

[1]Data are the means of five replications. Means were compared using the least significant difference test.
[2]Yields followed by the same letter are not significantly different at P=0.05. Yield is based on 13% moisture and 60 pounds per bushel.
[3]Temik was applied at a rate of 5 pounds per acre on 38-inch rows at the time of planting.
[4]Yield difference = yield with Temik - yield without Temik.

Table 32. Seed yield of selected maturity group IV soybean varieties grown in a field infested with reniform nematode.[1]

Brand	Variety	Yield (bu/A) with Temik[2]	Yield (bu/A) without Temik[3]	Yield difference[4]
Delta and Pine Land	DP 5414 RR	62.6 ab	57.2	5.4
Delta and Pine Land	DP 5644 RR	59.8 ab	60.8	-1.0
Delta and Pine Land	DP 5801 RR	51.2 b	58.9	-7.7
Delta and Pine Land	DP 5915 RR	52.7 b	46.9	5.8
Delta and Pine Land	SG 5734 RR	55.2 b	54.2	1.0
Delta and Pine Land	DP 5110S	62.4 ab	48.4	14.0
Delta and Pine Land	DP 5989	65.7 a	43.5	22.2
LSD *(P=0.05)*		12.6	NS	

[1]Data are the means of five replications. Means were compared using the least significant difference test.
[2]Yields followed by the same letter are not significantly different at P=0.05. Yield is based on 13% moisture and 60 pounds per bushel.
[3]Temik was applied at a rate of 5 pounds per acre on 38-inch rows at the time of planting.
[4]Yield difference = yield with Temik - yield without Temik.

Table 33. Seed yield of selected maturity group V soybean varieties grown in a field infested with reniform nematode.[1]

Brand	Variety	Yield (bu/A) with Temik[2]	Yield (bu/A) without Temik[3]	Yield difference[4]
Delta King	DK 5668 RR	47.2 b	48.9	-1.7
Delta King	DK 5762 RR	51.9 ab	47.1	4.8
Delta King	DK 5961 RR	52.1 ab	42.6	9.5
Delta King	DK 5661 RR	56.6 a	46.7	9.9
Delta King	DK 5465 RR	51.8 ab	40.9	10.9
Delta King	DK 5366 RR	52.9 ab	48.4	4.5
Delta King	DK 5995	56.6 a	49.9	6.7
Delta King	DK 5850	48.9 ab	40.9	8.0
LSD *(P=0.05)*		8.4	NS	

[1]Data are the means of five replications. Means were compared using the least significant difference test.
[2]Yields followed by the same letter are not significantly different at P=0.05. Yield is based on 13% moisture and 60 pounds per bushel.
[3]Temik was applied at a rate of 5 pounds per acre on 38-inch rows at the time of planting.
[4]Yield difference = yield with Temik - yield without Temik.

In-Field Evaluation of Midsouth Cotton Varieties for Tolerance to the Reniform Nematode

Objective: Thirty cotton varieties were examined in a field located in Glen Allan, Mississippi, that was naturally infested with the reniform nematode (*Rotylenchulus reniformis*). Each variety was planted with and without the nematicide Temik 15G at 5 pounds of formulated material per acre.

Temik 15G was applied at planting in the seed furrow with a Case 900 Early Riser planter equipped with granular chemical applicators.

All plots were treated with Orthene 75S at 4 ounces of formulated product per acre when thrips were detected in any plots.

Cultivars: See list in Table 34 and Table 35

Experimental design: Randomized complete block with five replications

Plot design: One-row plots; rows 40 feet long, 40 inches wide; blocks separated by 20-foot alley

Application date:

May 5, 2001	Temik 15G applied in-furrow
May 15, 2001	Orthene 75S applied to all treatments
June 7, 2001	Orthene 75S applied to all treatments
June 21, 2001	Orthene 75S applied to all treatments

Planting date: May 5, 2001

Seed rate: 210 seeds per row

Nematode sample date: May 10, 2001
November 17, 2001

Plant height: N/A

Harvest date: November 5, 2001

Results: See Table 34 and Table 35.

Table 34. Seed cotton yield of selected Roundup Ready cotton varieties grown in a field naturally infested with the reniform nematode.

Variety	Yield with Temik[2]	Yield without Temik[3]	Yield difference[4]
PM 2326 RR	2,354.4 bcde	2,158.2	196.2
PM 2379 RR	1,536.9 f	1,962.0	-425.1
PM 2344 BG/RR	2,190.9 cde	2,060.1	130.8
PM 2280 BG/RR	1,896.6 def	1,863.9	32.7
DP 436 RR	2,910.3 ab	2,550.6	359.7
DP 5415 RR	1,929.3 cdef	1,831.2	98.1
PM 1199 RR	1,863.9 ef	2,092.8	-228.9
SG 501 B/R	2,158.2 cde	2,190.9	-32.7
DP 5690 RR	1,831.2 ef	1,798.5	32.7
DP 958 B/RR	2,419.8 bcde	2,027.4	392.4
SG 521 R	1,896.6 def	2,190.9	294.3
PM 1218 BG/RR	2,517.9 abc	2,550.6	-32.7
SG 215 B/R	3,041.1 a	2,517.9	523.2
DP 655 BR/RR	2,485.2 abcd	1,896.6	588.6
DP 451 B	2,485.2 abcd	2,125.5	359.7
LSD *(P= 0.05)*	601	NS	

[1]Data are the means of five replications. Means were compared using the least significant difference test.
[2]Yields followed by the same letter are not significantly different at P=0.05. Yield is based on 13% moisture and 60 pounds per bushel.
[3]Temik was applied at a rate of 5 pounds per acre on 38-inch rows at the time of planting.
[4]Yield difference = yield with Temik - yield without Temik.

Table 35. Seed cotton yield of selected non-Roundup Ready cotton varieties grown in a field naturally infested with the reniform nematode.

Variety	Yield with Temik[2]	Yield without Temik[3]	Yield difference[4]
SG 747	2,158.2 b	2,517.9 ab	-359.7
DES 5607	2,877.6 a	1,471.5 c	1,406.1
SG 521	1,962.0 b	2,125.5 abc	-163.5
DP 20B	2,452.5 ab	1,896.9 bc	555.6
DP 448B	2,223.6 b	2,387.1 ab	-163.5
SG 105	2,289.0 ab	2,387.1 ab	-98.1
Delta Pearl	2,158.2 b	1,536.9 c	621.3
DP 5415	2,387.1 ab	1,962.0 bc	425.1
Nu 35B	2,155.5 b	1,602.3 c	523.2
DP 491	2,060.1 b	1,569.6 c	490.5
Nu 33B	2,289.0 ab	1,962.0 bc	327
DP 565	2,256.3	1,896.6 bc	359.7
DPx99x35	2,419.8 bd	2,746.8 a	-327.0
DPx99M03	2,256.3 b	1,962.0 bc	294.3
DPx00504	2,223.6 b	1,962.0 bc	261.6
LSD *(P= 0.05)*	607	751	

[1]Data are the means of five replications. Means were compared using the least significant difference test.
[2]Yields followed by the same letter are not significantly different at P=0.05. Yield is based on 13% moisture and 60 pounds per bushel.
[3]Temik was applied at a rate of 5 pounds per acre on 38-inch rows at the time of planting.
[4]Yield difference = yield with Temik - yield without Temik.

APPENDIX

Appendix Table 1. List of chemicals used in the nematode management studies for 2001.

Trade name	Formulation	Company	Common name	Scientific description
Adage	5FS	Syngenta	—	Not reported
Di-Syston	8EC	Bayer Corporation	Disulfoton	O, O-Diethyl S-[2-(ethylthio)ethyl] phosphordodithioate
Telone II	—	Dow AgriSciences	—	1, 3-dichloropropene
Temik	15G	Rhone-Poulenc	Aldicarb	[2-methyl-2-(methylthio) propionaldehyde O-(methyl carbamoy)oxime]
Orthene	75S	Valent	Acephate	O, S-Dimethyl acetyl phosphoramidothioate
Vydate	C-LV	DuPont	Oxamyl	[Methyl N'N'-dimethyl-N-[(methyl carbamoy)oxy] -1-thioxamimidate]
K-Pam	HL	AMVAC	—	Potassium N-methyl dithiocarbamate
Vapam	HL	AMVAC	—	Sodium methyl dithiocarbamate (anhydrous)
Gaucho	600	Gustafson	Imidacloprid	1-[(6-Chloro-3-pyridinyl) methyl]-N-nitro -2-imidazdidinimine
Messenger	—	Eden BioScience	—	Harpen Protein

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