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EDITORS

K. S. Lawrence
Associate Professor
Entomology and Plant Pathology
Auburn University

C. D. Monks
Professor and Extension Agronomist
Agronomy and Soils
Auburn University

D. P. Delaney
Extension Specialist IV
Agronomy and Soils
Auburn University

CONTRIBUTORS

J. R. Akridge
Director
Brewton Agricultural Research Unit
Brewton, Alabama

F. J. Arriaga
Affiliate Assistant Professor
Agronomy and Soils, Auburn University
USDA-National Soil Dynamics Laboratory

K. S. Balkcom
Affiliate Assistant Professor
Agronomy and Soils, Auburn University
USDA-National Soil Dynamics Lab.

D. Bransby
Professor
Agronomy and Soils, Auburn University

J. D. Castillo
Graduate Research Assistant
Entomology and Plant Pathology
Auburn University

J. R. Jones
Assistant Director
Gulf Coast Research and Extension Center
Fairhope, Alabama

G. W. Lawrence
Entomology and Plant Pathology
Mississippi State University

K. S. Lawrence
Associate Professor
Entomology and Plant Pathology
Auburn University

S. Nightengale
Director, Plant Breeding Unit
E. V. Smith Research Center
Tallassee, Alabama

R. L. Raper
Affiliated Professor
Agronomy and Soils, Auburn University
USDA-National Soil Dynamics Laboratory

A. C. Rocateli
Graduate Research Assistant
USDA-National Soil Dynamics Laboratory

N. S. Sekora
Graduate Research Assistant
Entomology and Plant Pathology
Auburn University

GRAIN CROPS: CROP MANAGMENT

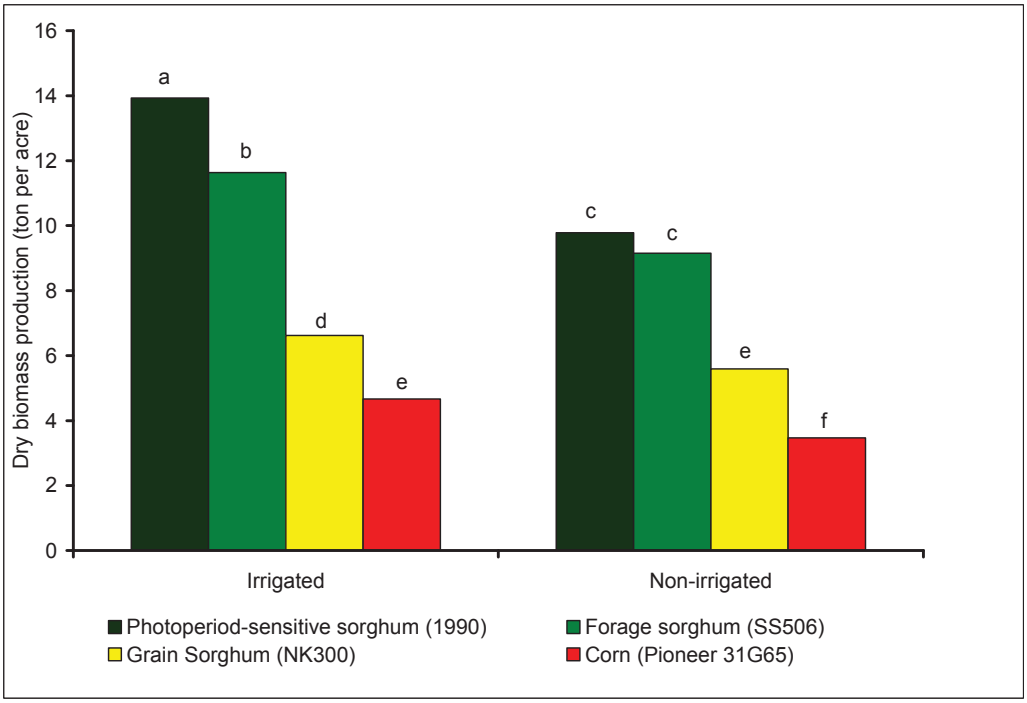
A New Spin on an Old Crop for Bioenergy: Sorghum – 2008

A. C. Rocateli, R. L. Raper, F. J. Arriaga, K. Balkcom, and D. Bransby

Seeking alternative and renewable sources of energy is necessary due to oil price fluctuations and environmental concerns. Additionally, over the last several years, agriculture in central and south Alabama has been negatively affected by drought conditions, which have dramatically reduced corn production. For these reasons, sorghum may be a reasonable alternative as an energy crop in this region, because it is drought and nematode resistant. Sorghum could be integrated in a conservation system as part of a crop rotation with typical cash crops (peanuts and cotton), where part of its biomass would be used as soil cover and any additional amount of biomass would be harvested for potential biofuel production. While much emphasis has been placed on perennials for biofuel production, annual crops could provide a major source of biomass for cellulosic ethanol production. These annual crops for bioenergy production have largely been ignored in the southeastern U.S.

The types of sorghum evaluated in this study were grain sorghum, high biomass forage sorghum, and a photoperiod-sensitive forage sorghum that has the ability to produce large amounts of biomass instead of producing viable seed. Many of these varieties have been tested in the southwestern U.S. with great success under irrigated conditions; however, they have not been evaluated in the Southeast under our dryland conditions. Therefore, those different sorghum types and a typical corn hybrid (Pioneer 31G65) were grown under two different tillage systems (conventional and conservation tillage) and with irrigated and non-irrigated treatments. Additionally, a rye cover crop was integrated as a treatment to maximize the amount of biomass produced and provide ground cover during the winter months. Also, a new variety of sunn hemp was evaluated to provide nitrogen for the rye winter cover crop.

The figure shows dry biomass production among the different crops evaluated in 2008 after 18 weeks of planting. Independent of irrigation, the photoperiod-sensitive sorghum had the highest biomass production followed by forage sorghum, grain sorghum and corn. All sorghum varieties showed higher biomass production than corn, which proved that sorghum was more efficient in extracting (non-irrigated condition) and in using (irrigated condition) water in soil. Additionally, irrigation resulted in increased dry biomass production for any tested crop, with average increases of 2.16 tons per acre. Different tillage systems did not affect the dry biomass production, which indicated that conservation tillage should be used because yields were not reduced while compaction and erosion were limited.



Dry biomass production for the four crops evaluated 18 weeks after planting.

GRAIN CROPS: NEMATODE MANAGEMENT

EFFICACY OF COUNTER, CRUISER, AND AVICTA® ON ROOT-KNOT NEMATODE MANAGEMENT ON CORN IN ALABAMA, 2008

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

The seed treatment nematicide Avicta® was compared to the insecticides Cruiser and Counter in various combinations for management of the root-knot nematode on N70-C7 RR corn. All seeds were treated with the fungicides Apron XL, Maxim SL, and Dynasty. The test plot was located at the Brewton Experimental Field near Brewton, Alabama. The field had a long history of root-knot nematode infestation, and the soil type was classified as a Benndale fine sandy loam (73 percent sand, 20 percent silt, 7 percent clay). Plots were four rows, 25 feet long with 3-foot row spacing, and were arranged in a randomized complete block design with six replications. Counter 15 G (8 pounds per acre) was applied at planting on April 17 in the seed furrow with chemical granular applicators attached to the planter. All other compounds tested were seed treatments applied by the manufacturer. 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 root-knot nematodes were determined at seven weeks after planting on June 5. Five root systems were collected from each plot and nematode eggs were removed using sodium hypochlorite extraction and sucrose centrifugation. Plant vigor was determined on a 1 to 5 scale with 5 being the most vigorous plants and 1 the least. Plots were harvested on August 30. Data were statistically analyzed by PROC GLM and PROC CORR. Means were compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures for April through August were 78.2, 86.5, 93.3, 92.8, 90.4, and 88.0 degrees F with average minimum temperatures of 54.6, 63.5, 69.6, 71.5, 71.4, and 67.3 degrees F, respectively. Rainfall accumulation for each month was 4.2, 3.6, 7.3, 5.0, 9.5, and 1.7 inches with a total of 29.6 inches.

Root-knot nematode pressure was low to moderate although rainfall was the limiting factor in the 2008 season. At planting, root-knot nematode numbers averaged 78 second stage juveniles per 150 cm^3 of soil over the field. Numbers of root-knot eggs per gram of root ranged from 116 to 309 and were similar between all treatments at seven weeks after planting. Corn plant height and root fresh weights were not influenced by any treatment (data not shown). Plant vigor was improved for Cruiser (2), Avicta (4), Avicta + Counter (5), and Counter (6) compared to the fungicide control (1). The difference between the highest and lowest yielding treatments was 10.9 bushels per acre. Thus, yields were similar ($P \leq 0.10$) between all treatments. However, the average corn price in 2008 was $5.00 per bushel; thus, the increased yield with the addition of a nematicide could be valued at $50 per acre.

EFFICACY OF COUNTER, CRUISER, AND AVICTA ON ROOT-KNOT NEMATODE MANAGEMENT ON CORN IN ALABAMA, 2008

No.	Treatment[3]	Rate	*Meloidogyne incognita*/ 10 g roots[1] 5 Jun	Plant vigor[2] 5 Jun	Yield *bu/A* 30 Aug
1	Fungicide control		309.0 a	3.8 b	128.6 a
2	Cruiser 500 FS	0.25 mg ai/seed	257.5 a	4.0 ab	128.9 a
3	Cruiser 500 FS + Counter 20 CR	0.25 mg ai/seed 11.2 g ai/100 kg	193.2 a	3.8 b	128.2 a
4	Avicta 500 FS	0.25 mg ai/seed	167.4 a	4.1 ab	130.1 a
5	Avicta 500 FS + Counter 20 CR	0.25 mg ai/seed 11.2 g ai/100 kg	115.9 a	4.0 ab	133.0 a
6	Counter 20 CR	11.2 g ai/100 kg	283.3 a	4.3 a	122.1 a
	LSD (P≤ 0.10)		***207.4***	***0.3***	***12.4***
	CV		***95.2***	***6.0***	***9.8***

[1]Ten grams of fresh root weight were sub-sampled from the root systems and extracted for nematodes.

[2] Plant vigor ratings scale from 1 to 5 with 5 being the most vigorous and 1 the least.

[3] All seed treated with Apron XL, Maxim SL, and Dynasty at 1.0, 3.5, and 1.0 g ai/100 kg seed.

Means followed by same letter do not significantly differ by Fisher's LSD (P≤ 0.10).

Efficacy of Experimental Seed Treatments on Root-Knot Nematode on Corn in South Alabama, 2008

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

Experimental seed treatment nematicides Avicta® and A16115 were evaluated alone and in combination with seed treatment fungicides Apron XL, Maxim SL, and Dynasty and the insecticides Cruiser or Counter in various combinations for the management of the root-knot nematode on N70-C7 RR corn. The test plot was located at the Brewton Experimental Field near Brewton, Alabama. The field had a long history of root-knot nematode infestation, and the soil type was classified as a Benndale fine sandy loam (73 percent sand, 20 percent silt, 7 percent clay). Plots were four rows, 25 feet long with 36-inch row spacing, and were arranged in a randomized complete block design with six replications. Counter 15 G (8 pounds per acre) was applied at planting on April 17 in the seed furrow with chemical granular applicators attached to the planter. All other compounds tested were seed treatments applied by the manufacturer. 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 root-knot nematodes were determined at seven weeks after planting on June 5. Five root systems were collected from each plot and nematode eggs were removed using sodium hypochlorite extraction and sucrose centrifugation. Plant vigor was determined on a 1 to 5 scale with 5 being the most vigorous plants and 1 the least. Plots were harvested on August 30. Data were statistically analyzed by PROC PROC GLM and PROC CORR. Means were compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures for April through August were 78.2, 86.5, 93.3, 92.8, 90.4, and 88.0 degrees F with average minimum temperatures of 54.6, 63.5, 69.6, 71.5, 71.4, and 67.3 degrees F, respectively. Rainfall accumulation for each month was 4.2, 3.6, 7.3, 5.0, 9.5, and 1.7 inches with a total of 29.6 inches.

Rainfall was the limiting factor in the 2008 season; thus, root-knot nematode pressure was low to moderate under these conditions. At planting, root-knot nematode numbers averaged 78 second stage juveniles per 150 cm^3 of soil over the entire field. Numbers of root-knot eggs per gram of root were similar between all treatments at seven weeks after planting. Corn plant height and root fresh weights were not influenced by any treatment (data not shown). Vigor ratings were also similar between all treatments and no significant correlations were observed between numbers of root-knot eggs per gram of root and vigor. The difference between the highest and lowest yielding treatments was only 3.3 bushels per acre. Thus, yields were similar between all treatments.

Efficacy of Experimental Seed Treatments on Root-Knot Nematode on Corn in South Alabama, 2008

No.	Treatment[3]	Rate	*Meloidogyne incognita*/ 10 g roots[1] 5 Jun	Plant vigor[2] 5 Jun	Yield *bu/A* 30 Aug
1	Control	1.0 g ai/100 kg	186.6 a	3.0 a	125.2 a
2	Cruiser 500 FS	0.25mg ai/seed	432.6 a	3.0 a	125.0 a
3	Dynasty 100 FS Cruiser 500 FS	1.0 g ai/100 kg 0.25mg ai/seed	185.4 a	3.0 a	124.2 a
4	Dynasty 100 FS Cruiser 500 FS Avicta 500 FS	1.0 g ai/100 kg 0.25mg ai/seed 0.25mg ai/seed	139.1 a	3.0 a	123.3 a
5	Dynasty 100 FS A16115	1.0 g ai/100 kg 0.72 mg ai/seed	228.8 a	3.0 a	126.6 a
6	Dynasty 100 FS Cruiser 500 FS A16115	1.0 g ai/100 kg 0.25mg ai/seed 0.72 mg ai/seed	77.3 a	3.0 a	124.9 a
7	Dynasty 100 FS Counter 20 CR	0.6 g ai/100 kg 8 lb/A	602.6 a	3.2 a	124.0 a
	LSD (P≤ 0.10)		***466.0***	***0.2***	***9.2***

[1]Ten grams of fresh root weight were sub-sampled from the root systems and extracted for nematodes.

[2] Plant vigor ratings scale from 1 to 5 with 5 being the most vigorous and 1 the least.

[3] All seed treated with Apron XL, Maxim SL, and Dynasty at 1.0, 3.5, and 1.0 g ai/100 kg seed.

Means followed by same letter do not significantly differ by Fisher's LSD (P≤ 0.10).

Efficacy of Experimental Seed Treatments on Root-Knot Nematode Management on Corn in South Alabama, 2008

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

Experimental seed treatment nematicides Avicta®, A14918, A16115, EXC3405, A9180, and STP 15201 were evaluated alone and in combination with seed treatment fungicides Apron XL, Maxim SL, and Dynasty and the insecticides Cruiser and Counter in various combinations for the management of the root-knot nematode on N70-C7 RR corn. The test was located at the Brewton Experimental Field near Brewton, Alabama. The field had a long history of root-knot nematode infestation, and the soil type was classified as a Benndale fine sandy loam (73 percent sand, 20 percent silt, 7 percent clay). Plots were four rows, 25 feet long with 36-inch row spacing, and were planted in a randomized complete block design with six replications. Blocks were separated by a 20 foot-wide alley. Counter 15 G (8 pounds per acre) was applied at planting on April 17 in the seed furrow with chemical granular applicators attached to the planter. All other compounds tested were seed treatments applied by the manufacturer. 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 root-knot nema-

Efficacy of Experimental Seed Treatments on Root-Knot Nematode on Corn in South Alabama, 2008

No.	Treatment[3]	Rate	*Meloidogyne incognita*/ 10 g roots[1] 5 Jun	Plant vigor[2] 5 Jun	Yield *bu/A* 30 Aug
1	Apron XL 3 LS	1.0 g ai/100 kg	553.7 bc	2.6 b	115.9 bc
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Cruiser 500 FS	0.25mg ai/seed			
2	Apron XL 3 LS	1.0 g ai/100 kg	1969.9 a	2.9 ab	125.3 ab
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Avicta 500 FS	0.25mg ai/seed			
	Cruiser 500 FS	0.25mg ai/seed			
3	Apron XL 3 LS	1.0 g ai/100 kg	463.5 bc	2.9 ab	121.4 abc
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	A16115	0.72mg ai/seed			
4	Apron XL 3 LS	1.0 g ai/100 kg	1609.4 ab	3.2 a	127.8 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	A16115	0.82 mg ai/seed			
5	A14918	0.065 mg ai/seed	103.1 c	2.9 ab	122.7 abc
	A16115	0.82 mg ai/seed			
6	A14918	0.065 mg ai/seed	128.8 c	2.9 ab	117.9 bc
	A16115	0.72 mg ai/seed			
	EXC3405	29.57 g ai/100 kg			
7	A14918	0.065 mg ai/seed	978.5 abc	3.2 a	119.8 abc
	A16115	0.72 mg ai/seed			
	A9180	0.6 g ai/100 kg			
8	Apron XL 3 LS	1.0 g ai/100 kg	262.7 c	3.2 a	122.3 abc
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Cruiser 500 FS	0.25 mg ai/seed			
	A16115	0.72 mg ai/seed			
9	Apron XL 3 LS	1.0 g ai/100 kg	498.3 bc	3.3 a	129.5 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	STP15201	0.25 mg ai/seed			
	A16115	0.72 mg ai/seed			
10	Apron XL 3 LS	1.0 g ai/100 kg	103.1 c	2.9 ab	115.4 c
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Counter 20 CR	8 lb/A			
	LSD (P≤ 0.10)		***1251.9***	***0.5***	***9.8***
	CV		***193.0***	***18.5***	***8.3***

[1]Ten grams of fresh root weight were sub-sampled from the root systems and extracted for nematodes.
[2] Plant vigor ratings scale from 1 to 5 with 5 being the most vigorous and 1 the least.
[3] All seed treated with Apron XL, Maxim SL, and Dynasty at 1.0, 3.5, and 1.0 g ai/100 kg seed.
Means followed by same letter do not significantly differ by Fisher's LSD (P≤ 0.10).

todes were determined on June 5 at seven weeks after planting. Five root systems were collected from each plot and nematode eggs were removed using sodium hypochlorite extraction and sucrose centrifugation. Plant vigor was determined on a 1 to 5 scale with 5 being the most vigorous plants and 1 the least. Plots were harvested on August 30. Data were statistically analyzed by PROC GLM and PROC CORR. Means were compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures for April through August were 78.2, 86.5, 93.3, 92.8, 90.4, and 88.0 degrees F with average minimum temperatures of 54.6, 63.5, 69.6, 71.5, 71.4, and 67.3 degrees F, respectively. Rainfall accumulation for each month was 4.2, 3.6, 7.3, 5.0, 9.5, and 1.7 inches with a total of 29.6 inches.

Rainfall was the limiting factor in the 2008 season; thus, root-knot nematode pressure was low to moderate under these conditions. At planting, root-knot nematode numbers averaged 78 second stage juveniles per 150 cm^3 of soil over the entire field. Numbers of root-knot eggs per gram of root were 73 percent lower ($P \leq 0.10$) in the experimental treatments A14918 + A16115 (5); A14918, A16115 + EXC3405 (6); and Apron XL, Maxim SL, Dynasty FS, Cruiser FS + A16115 (8) compared to the control, Apron + Maxim + Dynasty + Cruiser (1). Corn plant height, stand, and root fresh weights were not influenced by any treatment (data not shown). Vigor ratings were highest in Apron XL, Maxim SL, Dynasty FS + A16115 (4); A14918 + A16115 + A9180 (7); Apron XL, Maxim SL, Dynasty FS, Cruiser FS + A16115 (8); and Apron XL, Maxim SL, Dynasty FS, STP152019 + A16115 (9) than in the control, Apron, Maxim, Dynasty, and Cruiser (1). However, no significant correlations were observed between numbers of root-knot eggs per gram of root and vigor. Corn yields were highest in the experimental treatments Apron XL, Maxim SL, Dynasty FS + A16115 (4) and Apron XL, Maxim SL, Dynasty FS, STP 15201 + A16115 (9) and lowest ($P \leq 0.10$) in the industry standard Apron XL, Maxim SL, Dynasty FS, with Counter CR (10). The difference between the highest and lowest yielding treatments was 14.1 bushels per acre.

EFFICACY OF EXPERIMENTAL SEED TREATMENTS ON ROOT-KNOT NEMATODE MANAGEMENT ON CORN IN CENTRAL ALABAMA, 2008

K. S. Lawrence, G. W. Lawrence, and S. Nightengale

Experimental seed treatment nematicides Avicta® and A16115 were evaluated alone and in combination with seed treatment fungicides Apron XL, Maxim SL, and Dynasty and the insecticides Cruiser and Counter in various combinations for management of the root-knot nematode on N70-C7 RR corn. The test plot was located at the Plant Breeding Unit of the E. V. Smith Research Center, near Shorter, Alabama. The field has a long history of root-knot nematode infestation, and the soil type was classified as a Kalmia loamy sand (80 percent sand, 10 percent silt, and 10 percent clay). Plots were two rows, 25 feet long with a 36-inch row spacing, and were arranged in a randomized complete block design with five replications. Counter 15 G (8 pounds per acre) was applied at planting on April 17 in the seed furrow with chemical granular applicators attached to the planter. All other compounds tested were seed treatments applied by the manufacturer. 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 root-knot nematodes were determined at seven weeks after planting on May 20. Five root systems were collected from each plot and nematode eggs were removed using sodium hypochlorite extraction and sucrose centrifugation. Plant vigor was determined on a 1 to 5 scale with 5 being the most vigorous plants and 1 the least. Plots were harvested on September 3. Data were statistically analyzed by PROC GLM and PROC CORR. Means were compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures for April through August were 76.3, 84.5, 93.6, 92.5, 89.7, and 86.7 degrees F with average minimum temperatures of 52.8, 60.9, 68.2, 70.0, 71.1, and 66.0 degrees F, respectively. Rainfall accumulation for each month was 4.0, 2.5, 2.0, 5.0, and 10.0 inches with a total of 23.4 inches.

Root-knot nematode pressure was low to moderate the dry condition of the 2008 season. Only 2 inches of rainfall was recorded for the tasselling period. At planting, root-knot nematode numbers averaged 77 second stage juveniles per 150 cm^3 of soil over the entire field. Numbers of root-knot eggs per 10 grams of root and fresh root weights were similar between all treatments at four weeks after planting. Corn plant stand and height were not influenced by any treatment (data not shown) ($P \leq 0.10$). The difference between the highest and lowest yielding treatments was 42.2 bushels per acre. All treatments produced similar yields to the control, Apron XL, Maxim XL, and Dynasty 100FS (1), except for Apron XL, Maxim XL, and Dynasty 100FS + A16115 (5), which was lower.

EFFICACY OF EXPERIMENTAL SEED TREATMENTS ON ROOT-KNOT NEMATODE ON CORN IN CENTRAL ALABAMA, 2008

No.	Treatment[3]	Rate	*Meloidogyne incognita*/ 10 g roots[1] 20 May	Plant vigor[2] 20 May	Yield *bu/A* 03 Sep
1	Control		125.7 a	14.9 a	184.7 a
2	Cruiser 500 FS	0.25mg ai/seed	180.4 a	14.6 a	169.3 ab
3	Dynasty 100 FS	1.0 g ai/100 kg	141.2 a	14.1 a	163.0 ab
	Cruiser 500 FS	0.25 mg ai/seed			
4	Cruiser 500 FS	0.25 mg ai/seed	148.9 a	12.4 a	168.7ab
	Avicta 500 FS	0.25 mg ai/seed			
5	A16115	0.72 mg ai/seed	181.8 a	13.9 a	142.5 b
6	Cruiser 500 FS	0.25mg ai/seed	90.3 a	15.7 a	184.7 a
	A16115	0.72 mg ai/seed			
7	Counter 20 CR	8 lb/A	183.1 a	15.0 a	175.9 a
	LSD (P≤ 0.10)		***113.7***	***2.9***	***30.4***

[1]Ten grams of fresh root weight were sub-sampled from the root systems and extracted for nematodes.
[2] Plant vigor ratings scale from 1 to 5 with 5 being the most vigorous and 1 the least.
[3] All seed treated with Apron XL, Maxim SL, and Dynasty at 1.0, 3.5, and 1.0 g ai/100 kg seed.
Means followed by same letter do not significantly differ by Fisher's LSD (P≤ 0.10).

Efficacy of Experimental Seed Treatments on Root-Knot Nematode on Corn in Central Alabama, 2008

K. S. Lawrence, G. W. Lawrence, and S. Nightengale

Experimental seed treatment nematicides Avicta®, A14918, A16115, EXC3405, A9180, and STP 15201 were evaluated alone and in combination with the seed treatment fungicides Apron XL, Maxim SL, and Dynasty and the insecticides Cruiser and Counter in various combinations for the management of the root-knot nematode on corn. The test plot was located at the Plant Breeding Unit of the E. V. Smith Research Center, near Shorter, Alabama. The field has a long history of root-knot nematode infestation, and the soil type was classified as a sandy loam. Plots were two rows, 25 feet long with 36-inch row spacing, and were arranged in a randomized complete block design with five replications. Counter 15 G (8 pounds per acre) was applied at planting on April 17 in the seed furrow with chemical granular applicators attached to the planter. All other compounds tested were seed treatments applied by the manufacturer. 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 root-knot nematodes were determined at seven weeks after planting on May 20. Five root systems were collected from each plot and nematode eggs were removed using sodium hypochlorite extraction and sucrose centrifugation. Plots were harvested on September 3. Data were statistically analyzed by PROC GLM and PROC CORR. Means were compared using

Efficacy of Experimental Seed Treatments on Root-Knot Nematode on Corn in Central Alabama, 2008

No.	Treatment[3]	Rate	*Meloidogyne incognita*/ 10 g roots[1] 20 May	Plant vigor[2] 20 May	Yield *bu/A* 03 Sep
1	Apron XL 3 LS	1.0 g ai/100 kg	174.3 ab	15.8 ab	190.2 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Cruiser 500 FS	0.25 mg ai/seed			
2	Apron XL 3 LS	1.0 g ai/100 kg	54.1 b	17.0 ab	182.8 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Avicta 500 FS	0.25 mg ai/seed			
	Cruiser 500 FS	0.25 mg ai/seed			
3	Apron XL 3 LS	1.0 g ai/100 kg	112.7 b	13.9 ab	174.7 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	A16115	0.72 mg ai/seed			
4	Apron XL 3 LS	1.0 g ai/100 kg	123.0 b	14.4 ab	185.3 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	A16115	0.82 mg ai/seed			
5	A14918	0.065 mg ai/seed	122.2 b	14.1 ab	183.4 a
	A16115	0.82 mg ai/seed			
6	A14918	0.065 mg ai/seed	78.5 b	18.4 a	180.5 a
	A16115	0.72 mg ai/seed			
	EXC3405	29.57 g ai/100 kg			
7	A14918	0.065 mg ai/seed	93.5 b	14.1 ab	173.4 a
	A16115	0.72 mg ai/seed			
	A9180	0.6 g ai/100 kg			
8	Apron XL 3 LS	1.0 g ai/100 kg	118.7 b	16.7 ab	177.3 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Cruiser 500 FS	0.25 mg ai/seed			
	A16115	0.72 mg ai/seed			
9	Apron XL 3 LS	1.0 g ai/100 kg	264.4 a	12.8 b	184.6 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	STP15201	0.25 mg ai/seed			
	A16115	0.72 mg ai/seed			
10	Apron XL 3 LS	1.0 g ai/100 kg	105.0 b	15.9 ab	190.5 a
	Maxim XL 2.7 FS	3.5 g ai/100 kg			
	Dynasty 100 FS	1.0 g ai/100 kg			
	Counter 20 CR	8 lb/A			
	LSD (P≤ 0.10)		***125.0***	***4.4***	***27.2***

[1]Ten grams of fresh root weight were sub-sampled from the root systems and extracted for nematodes.
[2] Plant vigor ratings scale from 1 to 5 with 5 being the most vigorous and 1 the least.
[3] All seed treated with Apron XL, Maxim SL, and Dynasty at 1.0, 3.5, and 1.0 g ai/100 kg seed.
Means followed by same letter do not significantly differ by Fisher's LSD (P≤ 0.10).

Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures for April through August were 76.3, 84.5, 93.6, 92.5, 89.7, and 86.7 degrees F with average minimum temperatures of 52.8, 60.9, 68.2, 70.0, 71.1, and 66.0 degrees F, respectively. Rainfall accumulation for each month was 4.0, 2.5, 2.0, 5.0, and 10.0 inches with a total of 23.4 inches.

Rainfall was sporadic in the 2008 season; thus, root-knot nematode pressure was low to moderate under these conditions. Only 2 inches of rainfall were recorded for the tasselling period. At planting, root-knot nematode numbers averaged 77 second stage juveniles per 150 cm^3 of soil over the entire field. Except for the control—Apron XL, Maxim SL, Dynasty FS + Cruiser FS (1)—numbers of root-knot eggs per 10 grams of root were lower ($P \leq 0.10$) in the experimental treatments 2-8 and 10 than in Apron XL, Maxim SL, Dynasty FS, STP 15201, and A16115 (9). Root fresh weight was greater in A14918, A16115 + EXC3405 (6) than in Apron XL, Maxim SL, Dynasty FS, STP 15201, and A16115 (9), which had the highest root-knot numbers and also had the lowest root weights. Corn plant stand and height were not influenced by any treatment (data not shown). Corn yield difference between the highest and lowest yielding treatments was 17.1 bushels per acre with no significant differences among treatments.

Efficacy of Counter on Root-Knot Nematode on Corn in Central Alabama, 2008

K. S. Lawrence, G. W. Lawrence, and S. Nightengale

The insecticide/nematicide Counter was compared to the seed treatments Avicta and Cruiser in various combinations for management of the root-knot nematode on corn. All seeds were treated with the fungicides Apron XL, Maxim SL, and Dynasty on N70-C7 RR corn. The test plot was located at the Plant Breeding Unit of the E. V. Smith Research Center, near Shorter, Alabama. The field had a long history of root-knot nematode infestation, and the soil type was classified as a Kalmia loamy sand (80 percent sand, 10 percent silt, 10 percent clay). Plots were two rows, 25 feet long with 3-foot row spacing, and were arranged in a randomized complete block design with five replications. Counter 15 G (8 pounds per acre) was applied at planting on April 22 in the seed furrow with chemical granular applicators attached to the planter. All other compounds tested were seed treatments applied by the manufacturer. 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 root-knot nematodes were determined at four weeks after planting on May 20. Five root systems were collected from each plot and nematode eggs were removed using sodium hypochlorite extraction and sucrose centrifugation. Plant vigor was determined on a 1 to 5 scale with 5 being the most vigorous plants and 1 the least. Plots were harvested on September 3. Data were statistically analyzed by PROC GLM and PROC CORR. Means were compared using Fisher's protected least significant difference test ($P \leq 0.10$). Monthly average maximum temperatures for April through August were 76.3, 84.5, 93.6, 92.5, 89.7, and 86.7 degrees F with average minimum temperatures of 52.8, 60.9, 68.2, 70.0, 71.1, and 66.0 degrees F, respectively. Rainfall accumulation for each month was 4.0, 2.5, 2.0, 5.0, and 10.0 inches with a total of 23.4 inches.

Root-knot nematode pressure was low to moderate although rainfall was the limiting factor in the 2008 season. Only 2.5 inches of rainfall were recorded for the tasselling period of the growing season. At planting, root-knot nematode numbers averaged 77 second stage juveniles per 150 cm^3 of soil over the entire field. Numbers of root-knot eggs per 10 grams of root were lower ($P \leq 0.10$) in Counter (6), Avicta + Counter (5), and Avicta (4) than in the fungicide control (1). Corn root fresh weights were also greater ($P \leq 0.10$) in the same treatments—Counter (6), Avicta + Counter (5), and Avicta (4)—than in the fungicide control (1). Plant stand and vigor were not affected by any treatment (data not shown). The difference between the highest and lowest yielding treatments was 38 bushels per acre. Thus, yields were higher ($P \leq 0.10$) in Cruiser + Counter (3), Avicta (4), and Counter (6) than in Cruiser (2) and the fungicide control (1). The average corn price in 2008 was $5.00 per bushel; thus, the average increase in yield would be valued at $190 per acre.

Efficacy of Counter on Root-Knot Nematode on Corn in Central Alabama, 2008

No.	Treatment[3]	Rate	*Meloidogyne incognita*/ 10 g roots[1] 20 May	Plant vigor[2] 20 May	Yield *bu/A* 03 Sep
1	Fungicide control		176.4 a	15.4 b	118.1 b
2	Cruiser 500 FS	0.25 mg ai/seed	113.2 ab	15.3 b	111.3 b
3	Cruiser 500 FS + Counter 20 CR	0.25 mg ai/seed 8 lb/A	139.6 ab	14.9 b	149.3 a
4	Avicta 500 FS	0.25 mg ai/seed	104.9 b	17.1 ab	140.3 a
5	Avicta 500 FS + Counter 20 CR	0.25 mg ai/seed 8 lb/A	90.7 b	20.5 a	131.3 ab
6	Counter 20 CR	8 lb/A	87.1 b	17.9 a	148.5 a
	LSD (P≤ 0.10)		***64.3***	***2.6***	***25.3***
	CV		***95.2***	***14.3***	***9.8***

[1]Ten grams of fresh root weight were sub-sampled from the root systems and extracted for nematodes.
[2] Plant vigor ratings scale from 1 to 5 with 5 being the most vigorous and 1 the least.
[3] All seed treated with Apron XL, Maxim SL, and Dynasty at 1.0, 3.5, and 1.0 g ai/100 kg seed.
Means followed by same letter do not significantly differ by Fisher's LSD ($P \leq 0.10$).

PEANUTS

EVALUATION OF VAULT AND BUPN FOR GROWTH PROMOTION IN PEANUTS IN COASTAL ALABAMA, 2008

N. S. Sekora, K. S. Lawrence, and J. R. Jones

Treatment evaluations of Vault and Becker-Underwood products for peanut growth promotion were conducted at the Gulf Coast Research and Extension Center, Fairhope, Alabama. The soil type at the planting site was a Malbis sandy loam. On May 29 (day of planting), soil temperature was 80 degrees F with adequate moisture at a depth of 4 inches. All treatments were applied in-furrow at planting. Plots were a randomized complete block arrangement of two 25-foot rows spaced 38 inches apart. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Test plots were dug on October 2 and harvested on October 6. The SAS General Linear Models program was used to analyze the data with analyses of variance, and Fisher's protected least significant difference (LSD) test was used for pairwise comparisons among treatment means. Monthly rainfall totals for the growing season from May 29 through October 21 were 0.0, 7.3, 5.0, 9.5, 1.7, and 0.0 inches, respectively with a total of 23.5 inches rainfall over the growing season. Monthly average maximum temperatures for May through October were 84.1, 89.9, 92.8, 90.4, 88.0, and 84.3 degrees F, respectively and average minimum temperatures were 67.6, 69.6, 71.5, 71.4, 67.3, and 61.2 degrees F, respectively.

Growing conditions were adequate for peanut growth this year. No significant difference in vigor was observed among treatments at 30 days after planting. The three treatments of Vault at 3.3 ounces (2), BUPN-2 (4), and BUPN-3 (5) were significantly higher in yield than Vault at 6.0 ounces (3), but similar in yield to the control (1). Plot yields ranged from 3,900 to 5092 pounds per acre with a mean of 4372 pounds.

EVALUATION OF VAULT AND BUPN FOR GROWTH PROMOTION IN PEANUTS IN COASTAL ALABAMA, 2008

Treatment		Rate	Vigor[1] 26 Jun	Seed yield *lb/A* 6 Oct
1	Control		3.0	4392.7 a
2	Vault	3.3 oz/1000 rft	3.0	4622.1 a
3	Vault	6.0 oz/1000 rft	3.3	4060.1 b
4	BUPN-2	10.0 fl oz/1000 rft	3.3	4404.2 a
5	BUPN-3	10.0 fl oz/1000 rft	3.3	4381.2 a
	LSD (P ≤ 0.10)		***0.9***	***314.7***

[1] Vigor ratings based on 1-5 scale, one being least vigorous and 5 being the most vigorous.

Means followed by same letter do not significantly differ by Fisher's LSD (P≤ 0.10).

Experimental and Commercial Peanut Treatment Combinations for Peanut Growth Promotion in Coastal Alabama, 2008

N. S. Sekora, K. S. Lawrence, and J. R. Jones

Trial evaluations to evaluate multiple products for peanut growth promotion were carried out at the Gulf Coast Research and Extension Center, Fairhope, Alabama. The soil type at the planting site was a Malbis sandy loam. At the 4.0 inch soil depth on May 29 (day of planting), soil temperature was 80.0 degrees F with adequate moisture. All treatments were applied in-furrow at planting. Plots were a randomized complete block arrangement of two 25-foot rows spaced 38 inches apart. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System.

Evaluation of Experimental Peanut Treatment Combinations for Growth Promotion in Peanuts in Coastal Alabama, 2008

	Treatment	Rate *lb/A*	Vigor[1] 26 Jun	Seed yield *lb/A* 6 Oct
1	BUPNJ-1	3.5	3.3	4622.1
2	BUPNJ-2	3.5	2.8	4713.8
3	BUPNJ-3	3.5	3.0	4576.2
4	BUPNJ-4	3.5	3.5	4461.5
5	BUPNJ-5	3.5	3.3	4369.8
6	BUPNJ-6	2.0	3.3	4427.1
7	BUPNJ-7	3.0	3.3	4197.7
8	BUPNJ-8	10.5	2.8	4002.7
9	BUPNJ-9	10.5	2.5	4289.5
10	BUPNJ-10	2.0	3.0	4645.0
11	BUPNJ-11	0.4	3.8	4358.3
12	BUPNJ-1	3.5	3.0	4255.1
	VAULT	3.6		
13	BUPNJ-2	3.5	3.3	4438.6
	VAULT	3.6		
14	BUPNJ-3	3.5	3.3	4656.5
	VAULT	3.6		
15	BUPNJ-4	3.5	3.3	4885.9
	VAULT	3.6		
16	BUPNJ-5	3.5	3.3	4817.1
	VAULT	3.6		
17	BUPNJ-6	2.0	3.5	4713.8
	VAULT	3.6		
18	BUPNJ-7	3.0	3.0	4966.2
	VAULT	3.6		
19	BUPNJ-10	2.0	3.3	4702.4
	VAULT	3.6		
20	VAULT	3.3	2.8	4197.7
21	BUPNJ-8	10.5	3.0	4782.7
	VAULT	3.6		
22	BUPNJ-9	10.5	2.8	4851.5
	VAULT	3.6		
23	Control		2.8	4805.6
	LSD (P ≤ 0.10)		***0.8***	***628.1***

[1] Vigor ratings based on 1-5 scale, one being least vigorous and 5 being the most vigorous.

Test plots were dug on October 2 and harvested on October 6. The SAS General Linear Models program was used to analyze the data with analyses of variance, and Fisher's protected least significant difference (LSD) test was used for pairwise means comparisons. Monthly rainfall totals for the growing season from May 29 through October 21 were 0.0, 7.3, 5.0, 9.5, 1.7, and 0.0 inches, respectively with a total of 23.5 inches rainfall over the growing season. Monthly average maximum temperatures for May through October were 84.1, 89.9, 92.8, 90.4, 88.0, and 84.3 degrees F, respectively and average minimum temperatures were 67.6, 69.6, 71.5, 71.4, 67.3, and 61.2 degrees F, respectively.

Adequate conditions were present for peanut growth. At 28 days after planting, vigor ratings averaged 3.1 throughout all plots, ranging from 2 to 4, and no significant difference was observed among treatments. Plot yields ranged from 2386 to 5505 pounds per acre with a mean of 4554 pounds across all treatments. Control plots averaged 5386 pounds, while treatments of growth promoter, growth promoter + Vault, and Vault alone averaged 4959, 5276, and 4705 pounds, respectively. Yields among all treatments were similar to the control.

PEANUT RESPONSE TO NEMOUT® FOR ROOT-KNOT NEMATODE MANAGEMENT IN SOUTH ALABAMA, 2008

J. D. Castillo, K. S. Lawrence, and J. R. Jones

The biological nematicide NemOut® (*Paecilomyces lilacinus* strain 251) was evaluated to determine the peanut response to control the root-knot nematode (*Meloidogyne arenaria*). The test was carried out in the Gulf Coast Research and Extension Center in Fairhope, Alabama. Two-row plots were arranged in a randomized complete block design, with eight treatments and four replications. In-furrow treatments were applied at planting on May 27. NemOut treatments were applied at 5 gallons per acre in furrow at the rates of 0.13 and 0.224 pound of product, Temik 15G at 10.2 pounds per acre, and Thimet at 7.1 pounds per acre. When plants reached the pegging stage, treatments with NemOut at 0.29 pound per acre and Temik 15G at 10.2 pounds per acre were applied. All plots were maintained throughout the season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooerative Extension System. Vigor evaluations and population densities of the root-knot nematode were recorded 30 days after planting on June 26. Vigor evaluations were visually rated on a 1 to 5 visual scale where 1 represented a poor vigor and 5 represented highest vigor. Root-knot nematodes were extracted by the gravity sieving and sucrose centrifugation-flotation method, and counted. Plots were harvested 147 days after planting on October 21. Data were statistically analyzed general linear models (GLM) procedure, and Means were compared using Fisher's protected least significant difference (LSD) test.

Monthly average maximum temperatures from May to October were 84, 89.8, 92.8, 90.3, 87.8, and 83.8 degrees F, and average minimum temperature of 67.6, 69.6, 71.4, 71.4, 67.2, and 63.1 degrees F. Total rainfalls from May to October were 5.5, 9.2, 3.3, 5.4, 14.1, 7.6, and 0.6 inches. The total rainfall for the growing season was 45.9 inches. In the vigor evaluations, Temik 15G + Temik 15G (3), NemOut at 0.13 pound + Temik 15G + Thimet (4), and NemOut at 0.224 pound + Temik 15G + Thimet (5) presented more vigorous plants than the control (1). The population of root-knot nematodes 30 days after planting was similar among all the treatments. Peanut yields varied by 1005.5 pounds per acre at harvest with an average of 4768 pounds per acre produced over all nematicides. Temik 15G + Temik 15G (3), NemOut at 0.13 pound + Temik 15G + Thimet (4), NemOut at 0.224 pound + Temik 15G + Thimet (5), and NemOut at 0.224 and 0.299 pound + Thimet (8) reached higher yields than the control (1) by more than 2204 pounds.

PEANUT RESPONSE TO NEMOUT® FOR ROOT-KNOT NEMATODE MANAGEMENT IN SOUTH ALABAMA, 2008

	Treatment	Rate *lb/A*	Application DAP[2]	Vigor 30 DAP	Root-knot/150 cm³ 30 DAP	Yield *lb/A*
1	Control		0	3.0 c	38.6 a	3853.7 b
2	Thimet	7.1	0	3.3 bc	19.3 a	4782.7 ab
3	Temik 15 G	10.2	0	3.8 ab	38.6 a	5207.0 a
	Temik 15 G	10.2	72			
4	NemOut	0.13[1]	0	4.0 a	50.7 a	5207.0 a
	Temik 15 G	10.2	72			
	Thimet	7.1	0			
5	NemOut	0.224[1]	0	3.8 ab	19.3 a	5172.6 a
	Temik 15 G	10.2	72			
	Thimet	7.1	0			
6	NemOut	0.13[1]	0	3.3 bc	56.8 a	4759.7 ab
	Thimet	7.1	0			
7	NemOut	0.224[1]	0	3.3 bc	19.3 a	4725.3 ab
	Thimet	7.1	0			
8	NemOut	0.224[1]	0	3.3 bc	19.3 a	4977.6 a
	NemOut	0.299[1]	72			
	Thimet	7.1	0			
	LSD (P≤0.05)			***0.63***	***NS***	***983.5***

[1] The units are in pounds and were applied in furrow at planting at a rate of 5 gallons per acre.

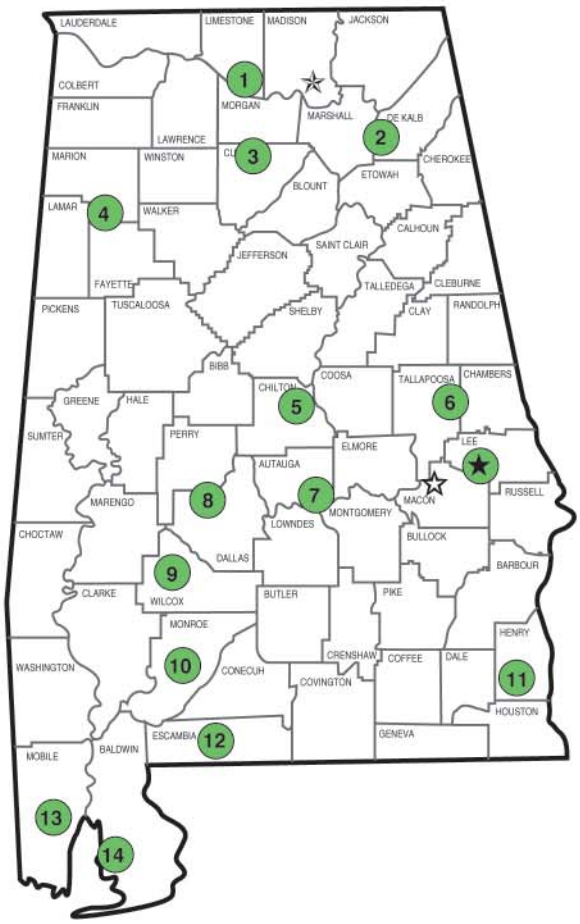
[2] DAP = days after planting.

Means followed by same letter do not significantly differ according to Fisher's least significant difference test (P≤0.05).

Contributors Index

Alabama's Agricultural Experiment Station
AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the state has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.
☆ Alabama A&M University.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Research and Extension Center, Belle Mina.
2. Sand Mountain Research and Extension Center, Crossville.
3. North Alabama Horticulture Research Center, Cullman.
4. Upper Coastal Plain Agricultural Research Center, Winfield.
5. Chilton Research and Extension Center, Clanton.
6. Piedmont Substation, Camp Hill.
7. Prattville Agricultural Research Unit, Prattville.
8. Black Belt Research and Extension Center, Marion Junction.
9. Lower Coastal Plain Substation, Camden.
10. Monroeville Agricultural Research Unit, Monroeville.
11. Wiregrass Research and Extension Center, Headland.
12. Brewton Agricultural Research Unit, Brewton.
13. Ornamental Horticulture Research Center, Spring Hill.
14. Gulf Coast Research and Extension Center, Fairhope.