

Field Day 2023



August 9, 2023

Southeast Research & Education Center

9638 Hwy 56 S

Midville, Georgia 30441

Southeast Research and Education Center

R. Anthony Black	Superintendent
Fran Watson	Administrative Associate
Travis Woodard	Senior Agricultural Specialist
Robert L. Milton	Agricultural Specialists
Zachary Jones	Agricultural Specialist
Case Harris	Agricultural Specialist

Field Day Contributors

Daniel Jackson	Agriculture&Environmental Services Lab	Athens
David Bertoli, Ph.D.	Center for Applied Genetic Technologies	Athens
Soraya Bertoli, Ph.D.	Center for Applied Genetic Technologies	Athens
Brian Little	Crop and Soil Sciences	Athens
Nick Basinger, Ph.D.	Crop and Soil Sciences	Athens
Leonardo Bastos, Ph.D.	Crop and Soil Sciences	Athens
Amrinder Jakhar	Crop and Soil Sciences	Athens
Anish Bhattarai	Crop and Soil Sciences	Athens
Hannah Lindell	Crop and Soil Sciences	Athens
Zenglu Li, Ph.D.	Crop and Soil Sciences	Athens
Daniel Mailhot, Ph.D.	Crop and Soil Sciences	Griffin
Dusty Dunn	Crop and Soil Sciences	Tifton
Camp Hand, Ph.D.	Crop and Soil Sciences	Tifton
Glen Harris, Ph.D.	Crop and Soil Sciences	Tifton
Henry Sintim, Ph.D.	Crop and Soil Sciences	Tifton
Nino Brown, Ph.D.	Crop and Soil Sciences	Tifton
Simerjeet Virk, Ph.D.	Crop and Soil Sciences	Tifton
Wes Porter, Ph.D.	Crop and Soil Sciences	Tifton
John Snider, Ph.D.	Crop and Soil Sciences	Tifton
Scott Monfort, Ph.D.	Crop and Soil Sciences	Tifton
Scott Tubbs, Ph.D.	Crop and Soil Sciences	Tifton
Phillip Roberts, Ph.D.	Entomology	Tifton
Mark Abney, Ph.D.	Entomology	Tifton
Bob Kemeraite, Ph.D.	Plant Pathology	Tifton
Wade Parker	Southeast District Area Agronomy Agent	Statesboro
Jason Mallard	Southeast District Area Water Agent	Statesboro
Phillip Edwards	Southwest District Area Water Agent	Tifton
Peyton Sapp	Burke County Extension	Waynesboro
Blake Carter	Effingham/Screven County Extension	Springfield
Savannah Tanner	Emanuel County Extension	Swainsboro
Pam Sapp	Jefferson County Extension	Louisville
Trent Bailey	Jefferson County Extension/Summer Intern	Louisville
Rocky Tanner	Johnson/Washington County Extension	Wrightsville
Steven Powell	Treutlen County Extension	Soperton
Chaz Holt	Quail Forever	
Jesse Kamps	GA Department Natural Resources	

2023 Field Day
Southeast Research and Education Center
August 09, 2023

9:00 AM Registration

9:05 Welcome and Load Trucks

9:10 Field Tours

Working Lands for Quail Habitat

Jesse Kamps, Chaz Holt

Peanut Breeding using Wild Species: New,
stronger disease resistances
for the peanut crop

David Bertioli, Soraya Bertioli

UGA Peanut Breeding Trials

Nino Brown

State Wide Variety Testing Program at Midville

Daniel Mailhot, Dusty Dunn

Evaluating planting arrangement and
weed management using cereal rye cover
crop in Georgia peanut

Nicholas Basinger, Hannah Lindell

Plant nutrition and soil health management
in row cropping systems

Henry Sintim

Determining optimum replant methodology and
timing for a sub-optimal stand of cotton

Scott Tubbs

Soybean Development for Drought Tolerance

Zenglu Li, Brian Little

Disease Management and Peanut Fungicide Trial

Bob Kemmerait, Peyton Sapp

Nitrogen management and sensors in corn and cotton

Leo Bastos, Anurinder Jakhar, Anish Bhattari

ThryOn Cotton Technology

Phillip Roberts

Cotton On-Farm Trial variety evaluations

Pam Sapp, Steven Powell

General Precision Ag and Monitoring Soil Moisture
on the Cotton On-Farm Variety Trials

Wes Porter

GA AG Water Programming

Jason Mallard, Phillip Edwards

Variable rate liming of pastures and forages

Daniel Jackson

Spray Drone Application Technology

Simer Virk

Cotton Agronomy Research Update

Camp Hand

Nutrient Management for Cotton and Peanut

Glen Harris

Peanut Agronomy Research Update

Scott Monfort, Wade Parker, Savannah Tanner

Monthly Rainfall April 5- August 4

<u>April</u>		<u>May</u>		<u>June</u>		<u>July</u>		<u>August</u>	
Date	Rainfall amount	Date	Rainfall amount	Date	Rainfall amount	Date	Rainfall amount	Date	Rainfall amount
4-5-23	0	5-1-23	0.12	6-1-23		7-1-23		8-1-23	
4-6-23		5-2-23		6-2-23		7-2-23		8-2-23	1.45
4-7-23	0	5-3-23		6-3-23		7-3-23		8-3-23	
4-8-23	0.49	5-4-23		6-4-23		7-4-23		8-4-23	0.39
4-9-23	0.8	5-5-23		6-5-23		7-5-23			
4-10-23		5-6-23	0.06	6-6-23		7-6-23			
4-11-23		5-7-23		6-7-23		7-7-23			
4-12-23		5-8-23		6-8-23	0.58	7-8-23	0.12		
4-13-23		5-9-23	0.2	6-9-23		7-9-23			
4-14-23	0.32	5-10-23	0.02	6-10-23	0	7-10-23			
4-15-23		5-11-23		6-11-23	0	7-11-23	0.2		
4-16-23		5-12-23		6-12-23	0.35	7-12-23			
4-17-23	0.09	5-13-23	2.75	6-13-23		7-13-23	0		
4-18-23		5-14-23		6-14-23		7-14-23			
4-19-23		5-15-23		6-15-23	1.78	7-15-23			
4-20-23		5-16-23		6-16-23	0.11	7-16-23	0.56		
4-21-23		5-17-23		6-17-23		7-17-23			
4-22-23	0	5-18-23	0.84	6-18-23	0.15	7-18-23			
4-23-23		5-19-23		6-19-23		7-19-23			
4-24-23		5-20-23		6-20-23	0.05	7-20-23			
4-25-23		5-21-23		6-21-23	0.9	7-21-23	0.48		
4-26-23	0.05	5-22-23	0.05	6-22-23	0.21	7-22-23			
4-27-23	0.05	5-23-23		6-23-23	1.45	7-23-23			
4-28-23	1.5	5-24-23		6-24-23	0.04	7-24-23			
4-29-23		5-25-23		6-25-23	0	7-25-23			
4-30-23	0.74	5-26-23		6-26-23		7-26-23			
		5-27-23		6-27-23		7-27-23			
		5-28-23	0.53	6-28-23		7-28-23			
		5-29-23		6-29-23		7-29-23	0.18		
		5-30-23		6-30-23	0	7-30-23	0.35		
		5-31-23	0.1			7-31-23			
	4.04		4.67		5.62		1.89		1.84

2023 Research at SEREC, Midville

	Project #	Title	Commodity	Project Leader
1	5815	Long-term Cover Crop Rotation Study		Wes Porter
2	6534	Demonstrating and Evaluating Variable Rate Lime Application on Pastures in Georgia	Beef Cattle	Daniel Jackson
3	7037	Pivot Bio Proven application to enhance N utilization in corn production	Corn	Henry Sintim
4	7094	EVALUATION OF TILLAGE TYPE AND NOVEL ENLIST SEED TECHNOLOGY ON WEED MANAGEMENT IN GA CORN.	Corn	Nick Basinger
5	7144	Pre-plant/side-dress nitrogen fertilizer proportion and sensor-based variable management in corn	Corn	Leo Bastos
6	7145	Side-dress nitrogen timing, rate, and sensor-based variable management in corn	Corn	Leo Bastos
7	7146	Side-dress nitrogen rate and sensor-based variable management in cotton	Corn	Leo Bastos
8	7197	2023 SWVT 560 Irrigated Corn OVT	Corn	Daniel Mailhot
9	7198	2023 SWVT Ag Reliant Irrigated Corn	Corn	Daniel Mailhot
10	7199	2023 SWVT Winfield United Irrigated Corn	Corn	Daniel Mailhot
11	7200	2023 SWVT Peterson Corn Genetics Irrigated Corn	Corn	Daniel Mailhot
12	7225	Re-evaluating Corn Nitrogen Recommendation Methods in Georgia	Corn	Richard Roth
13	7249	Corn Variety Trial	Corn	Richard Roth
14	7255	Optimizing Pivot Bio Proven application to maximize N savings in corn production	Corn	Henry Sintim
15	7295	Evaluating Nitrogen Side-Dress Application Methods in Corn and Cotton	Corn	Simer Virk
16	6546	Optimizing plant nutrition in cotton under rainfed and irrigated conditions	Cotton	Henry Sintim
17	6547	Long-term soil health assessment under cotton-corn-peanut rotation system	Cotton	Henry Sintim
18	7201	2023 SWVT 501 Strains Irrigated Cotton OVT	Cotton	Daniel Mailhot
19	7202	2023 SWVT 521 Irrigated Cotton OVT	Cotton	Daniel Mailhot
20	7203	2023 SWVT 511 Non-Irrigated Cotton OVT	Cotton	Daniel Mailhot
21	7204	2023 SWVT Americot Irrigated Cotton	Cotton	Daniel Mailhot
22	7241	Advanced Planter Control Systems for Cotton in Southeast Georgia 2023	Cotton	Wes Porter
23	7261	BASF Cotton Variety Evaluation Program	Cotton	Wade Parker
24	7262	Cotton Quality Evaluated Under Varying Harvest Dates	Cotton	Wade Parker
25	7279	Replant Methodology and Timing for Cotton	Cotton	Scott Tubbs
26	7296	Evaluation of Harvest-Aid Application Efficacy with Spray Drone	Cotton	Simer Virk
27	7305	Row arrangement and variety impacts on cotton production in Georgia	Cotton	Camp Hand
28	7307	PGR by Variety Evaluation	Cotton	Camp Hand
29	7308	Seed Quality	Cotton	Camp Hand
30	7309	Extension Cotton Specialist Working Group Microbial Study	Cotton	Camp Hand
31	7310	Simulated drift of defoliant tank-mixtures on late planted cotton of differing maturities	Cotton	Camp Hand
32	7351	PGR trial Midville	Cotton	John Snider
33	7352	Evaluation of Bt Cotton for Management of Corn Earworm	Cotton	Phillip Roberts
34	7354	Evaluation of ThryvOn Technology	Cotton	Phillip Roberts
35	TBD	Seeding Rate Evaluation	Cotton	Wade Parker
36	TBD	Deer Damage Trial	Cotton	Wade Parker
37	7095	Evaluating Planting Arrangement, Herbicide Persistence, and Weed Management using Cereal Rye Cover Crop in GA Peanut	Peanuts	Nick Basinger
38	7140	Evaluation of BC1F5 families with superior resistance to foliar disease derived from the allotetraploid ValSten1	Peanuts	David, Soraya Bertioli
39	7141	Evaluation of BC3F6 individuals with superior resistance to Nematode	Peanuts	David, Soraya Bertioli
40	7142	Evaluation of Baileyx321 Early Leaf Spot Resistance Families	Peanuts	David, Soraya Bertioli
41	7143	Seed multiplication and evaluations	Peanuts	David, Soraya Bertioli
42	7205	2023 SWVT 507 Irrigated Runner/Virginia Peanut OVT	Peanuts	Daniel Mailhot
43	7206	2023 SWVT 508 Non-Irrigated Runner/Virginia Peanut OVT	Peanuts	Daniel Mailhot
44	7240	Advanced Planter Control Systems for Peanut 2023	Peanuts	Wes Porter
45	7244	Cotton Soil Water Holding Capacity by Cover Crop Treatment	Peanuts	Wes Porter
46	7264	Peanut Variety (Large Plot) and Growth Regulator Trial	Peanuts	Wade Parker
47	7265	Peanut Variety Trial - Small Plot	Peanuts	Wade Parker
48	7321	GA Peanut Breeding (Brown) - Yield Trials - Midville	Peanuts	Nino Brown
49	TBD	Large Scale Peanut Fungicide Trial	Peanuts	Bob Kemeraït
50	TBD	Small Plot Fungicide Evaluation	Peanuts	Bob Kemeraït
51	7209	2023-24 SWVT Small Grain OVT	Small Grains	Daniel Mailhot
52	7207	2023 SWVT Irrigated Early Planted Soybean OVT (865,866,871)	Soybeans	Daniel Mailhot
53	7208	2023 SWVT Irrigated Normal Planted Soybean OVT (565,566,571)	Soybeans	Daniel Mailhot
54	7286	Breeding soybean for drought tolerance	Soybeans	Zenglu Li
55	TBD	Soybean Harvest Dessication	Soybeans	Richard Roth

**EVALUATING PLANTING ARRANGEMENT,
HERBICIDE PERSISTENCE, AND WEED
MANAGEMENT USING CEREAL RYE
COVER CROP IN GEORGIA PEANUT**

Hannah C. Lindell, Annabelle McEachin, Dr. Tim Grey, and Dr. Nicholas
Basinger

University of Georgia

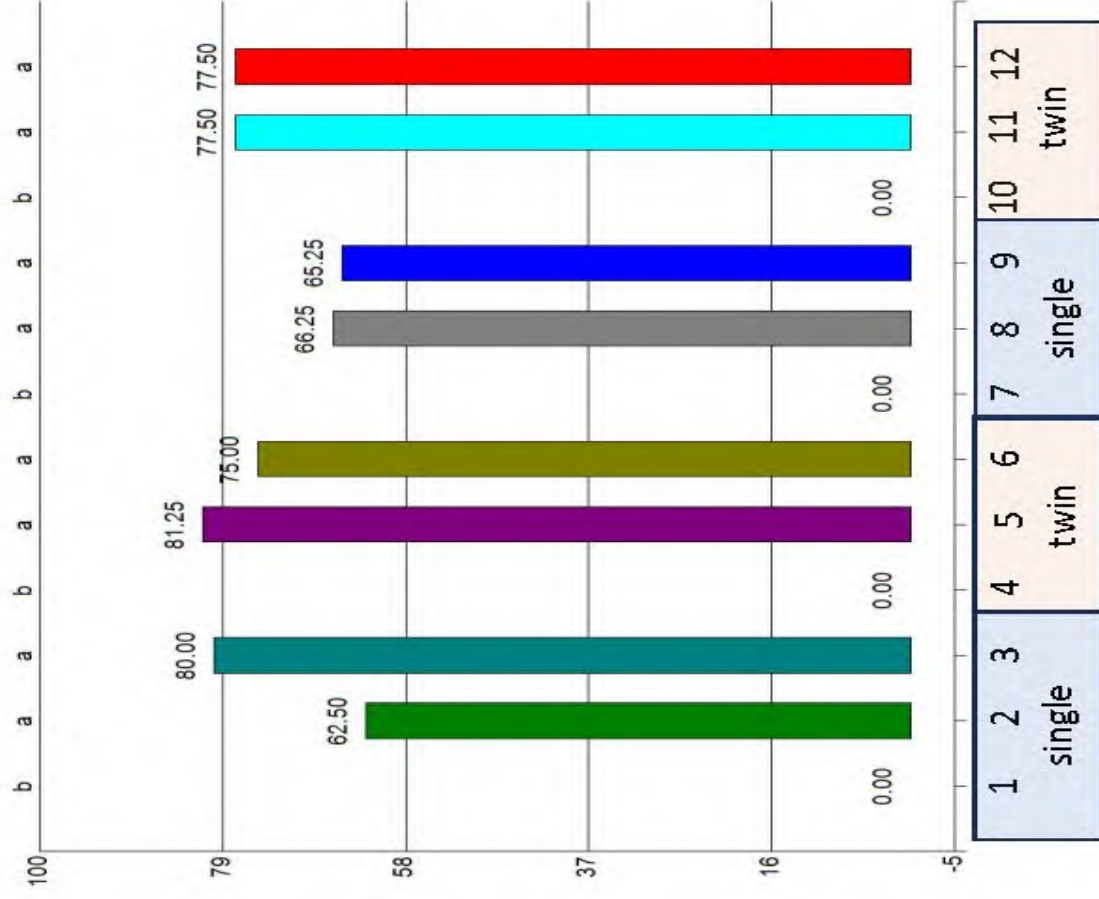
Midville planted 5/8; PREs applied 5/9; POSTs applied 6/6
Tifton planted 5/8; PREs applied 5/9; POSTs applied 6/8

1		Nontreated	No cover crop
2		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Valor SX @ 3 oz/a, Strongarm @ 0.225 oz/a, and NIS @ 0.25% v/v	
3		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Strongarm @ 0.225 oz/a, Brake @ 12 oz/a, and NIS @ 0.25% v/v	
4		Nontreated	
5		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Valor SX @ 3 oz/a, Strongarm @ 0.225 oz/a, and NIS @ 0.25% v/v	
6		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Strongarm @ 0.225 oz/a, Brake @ 12 oz/a, and NIS @ 0.25% v/v	
7		Nontreated	Cereal rye
8		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Valor SX @ 3 oz/a, Strongarm @ 0.225 oz/a, and NIS @ 0.25% v/v	
9		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Strongarm @ 0.225 oz/a, Brake @ 12 oz/a, and NIS @ 0.25% v/v	
10		Nontreated	
11		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Valor SX @ 3 oz/a, Strongarm @ 0.225 oz/a, and NIS @ 0.25% v/v	
12		PREs: Paraquat @ 21 oz/a, pendimethalin @ 32 oz/a, Strongarm @ 0.225 oz/a, Brake @ 12 oz/a, and NIS @ 0.25% v/v	

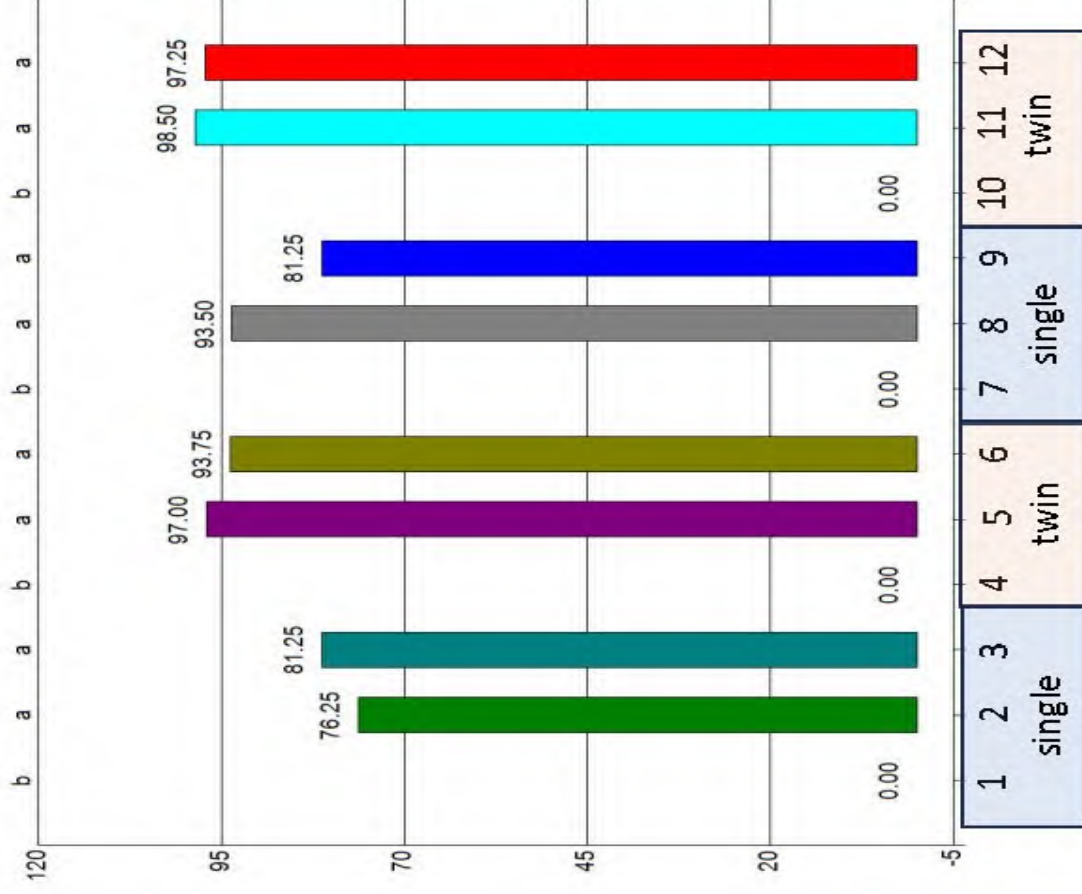
*POST applications of Cadre @ 4 oz/a, Warrant @ 48 oz/a, and COC @ 1% v/v

*WAT = weeks after treatment

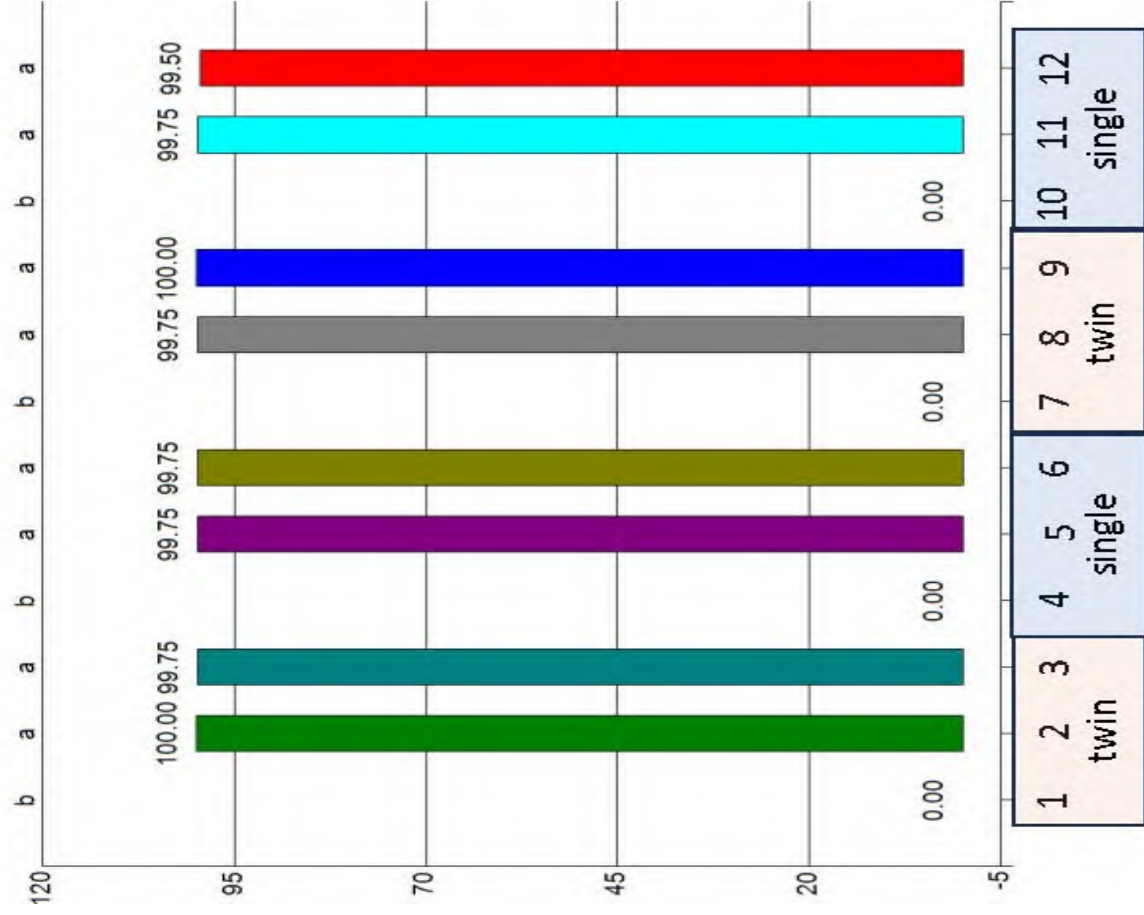
Tifton weed control on 5/24/2023; 3 WAT* of
PRE



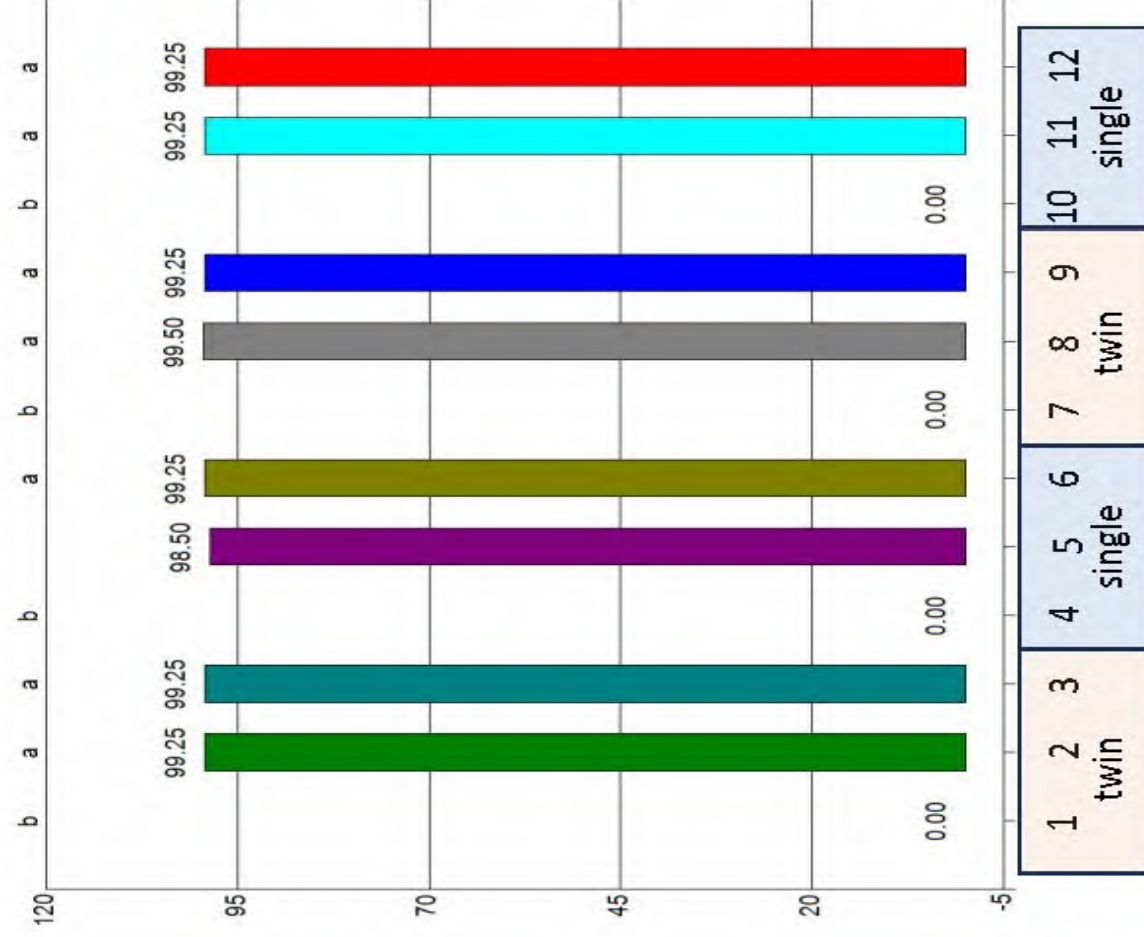
Tifton weed control on 7/6/2023; 4 WAT of POST



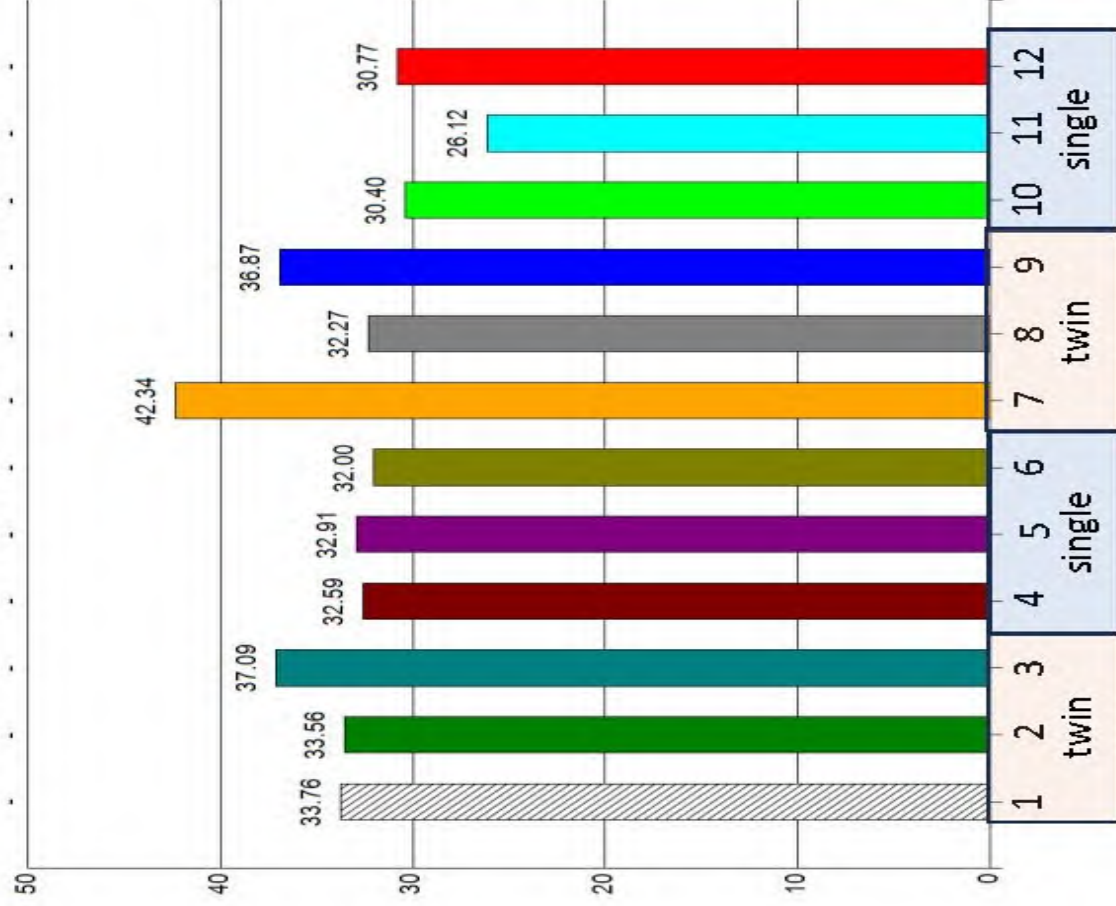
Midville Overall weed control on 6/6/2023; 4 WAT of
PREs



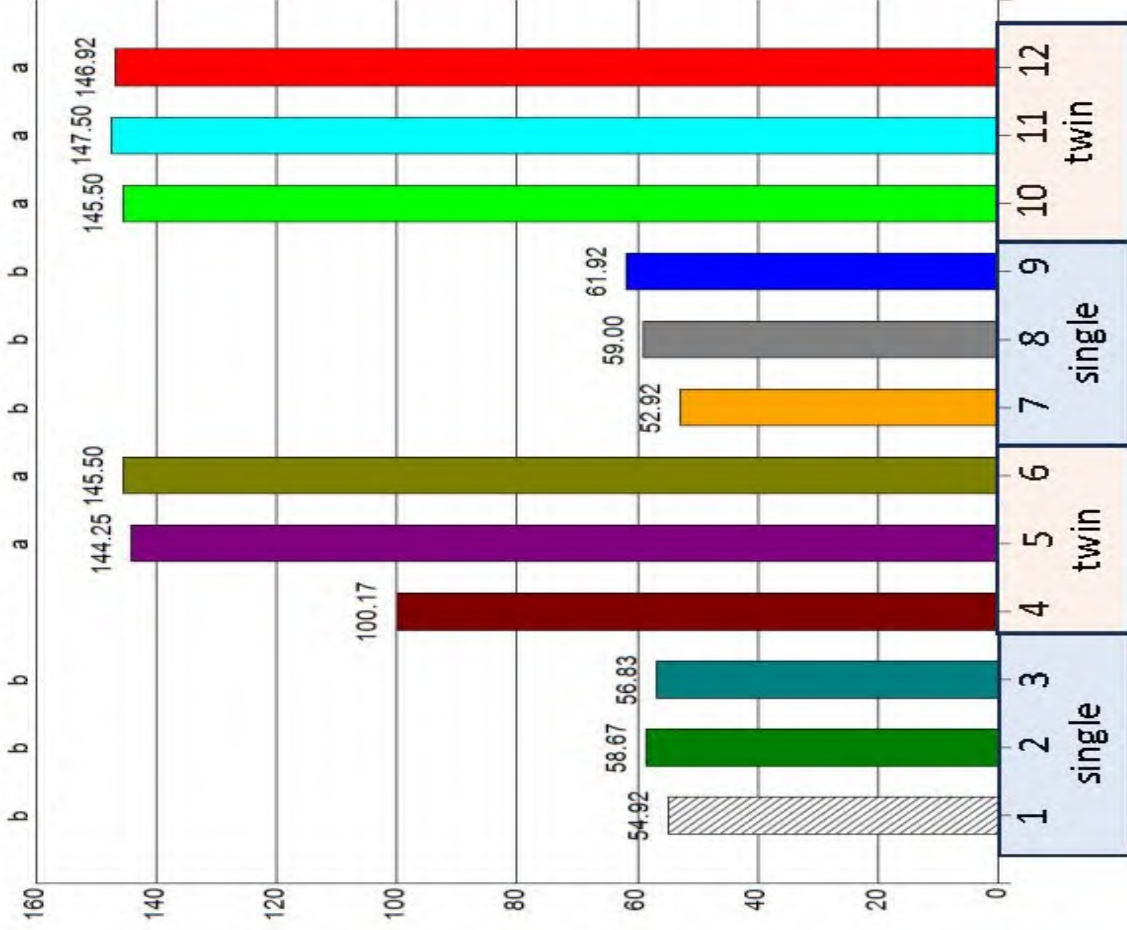
Midville Overall weed control on 7/5/2023; 4 WAT of
POST



Midville Peanut canopy coverage on 7/5/2023



Tifton Peanut canopy coverage on 7/6/2023



2022 Burke/Jefferson Irrigated RR Corn Variety Trial

Company	Hybrid	Yield @ 15.5% Moisture
Agri Gold	A643-52VTPRO	227.61
Agri Gold	A6659-VT2PRO	217.7
Croplan	CP6640	195.66
Croplan	CP5678	224.93
DeKalb	DKC6869	217.93
DeKalb	DKC6848	222.95
Dynagro	D57VC53	207.88
Local Seed	LC1307TC	192.74
Pioneer	P1622VYHP	219.76
Pioneer	P1289YHR	206.69

Seeding Rate: 32,500 seeds per acre
Planting Date: March 30, 2022
Harvested Date: August 17, 2022



Agronomic Information

1/19/2022	Lime VR – 7.1 tons on 18.3 acres
2/16/2022	DAP VR – 1.8 tons on 18.3 acres
2/16/2022	1qt Glyphosate
2/22/2022	Potash VR – 2.4 tons on 18.3 acres
3/4/2022	Cut with disc
3/25/2022	Para-till
3/28/2022	Field Cultivated
3/230/2022	38-39-00 starter starter
4/21/2022	1 Qt Atrazine, 1 qt Glyphosate
4/25/2022	0.50 in
4/25/2022	133 Units N
5/6/2022	133 Units N sidedressed
5/7/2022	Layby, 1 qt Glyphosate, 1 qt Atrazine
5/9/2022	1.00 in
5/17/2022	0.35 in
5/19/2022	0.70 in
5/29/2022	0.50 in
6/1/2022	0.60 in
6/3/2022	0.50 in
6/7/2022	0.50 in
6/8/2022	0.50 in
6/11/2022	0.60 in
6/17/2022	0.50 in
6/18/2022	0.50 in
6/21/2022	0.50 in
6/23/2022	0.50 in
6/24/2022	0.50 in
6/26/2022	0.50 in
6/28/2022	0.50 in
7/6/2022	0.75 in
7/17/2022	0.50 in

Seeding Rate: 32,500 seeds per acre

Planting Date: March 30, 2022

Harvested Date: August 17, 2022

ThryvOn Cotton (Phillip Roberts)

ThryvOn is a new transgenic trait which was fully commercialized in 2023. This technology has activity against thrips and tarnished plant bugs. UGA entomologists have evaluated this technology for several years. Data clearly demonstrates that ThryvOn provides excellent protection from thrips during the seedling stage. However, more data on potential utility of ThryvOn for plant bug management programs in Georgia is needed. Plant bugs are an occasional pest of cotton in Georgia, but infestations have been widespread and much higher than normal this season. During 2023 we are evaluating ThryvOn at Midville, Plains, and Tifton as well as on-farm. We are monitoring tarnished plant bug populations and fruit retention for early and late planting dates. Preliminary data suggest that ThryvOn reduces plant bug populations and provides some protection from feeding injury (i.e. improved square retention). However, ThryvOn does not provide complete control and supplemental insecticides may be needed. Preliminary data also suggest that early planting dates are at higher risk of plant bug infestations compared with later planting dates. Risk for both thrips and plant bugs are similar in that higher infestations are expected on early planted cotton which will assist growers with placement of ThryvOn for maximum return.

Demonstrating and Evaluating Variable-Rate Lime Application on Pastures in Georgia

Daniel Jackson, Jay Lessl, Uttam Saha
UGA Agricultural and Environmental Services Laboratory

With financial support from the USDA-NRCS, researchers in the Agricultural & Environmental Services Labs, in collaboration with the UGA Animal & Dairy Science and Crop & Soil Science Departments are conducting a four-year evaluation to demonstrate the use of variable-rate technology to manage soil pH in hay fields.

Study Objectives:

1. Evaluate the use of variable-rate (VR) lime management against conventional uniform application strategies on four hay fields across GA during 2021-2024.
2. Compare application methods based on soil pH, forage productivity and quality, and economics.
3. Host workshops providing hands-on training on the use of VR technology for soil fertility management.
4. Establish a voucher program to cover the costs of soil testing, forage analysis, and precision mapping services to promote adoption of variable-rate technology.



Map of study locations in Georgia:
Rome, Watkinsville, Midville, and Tifton.

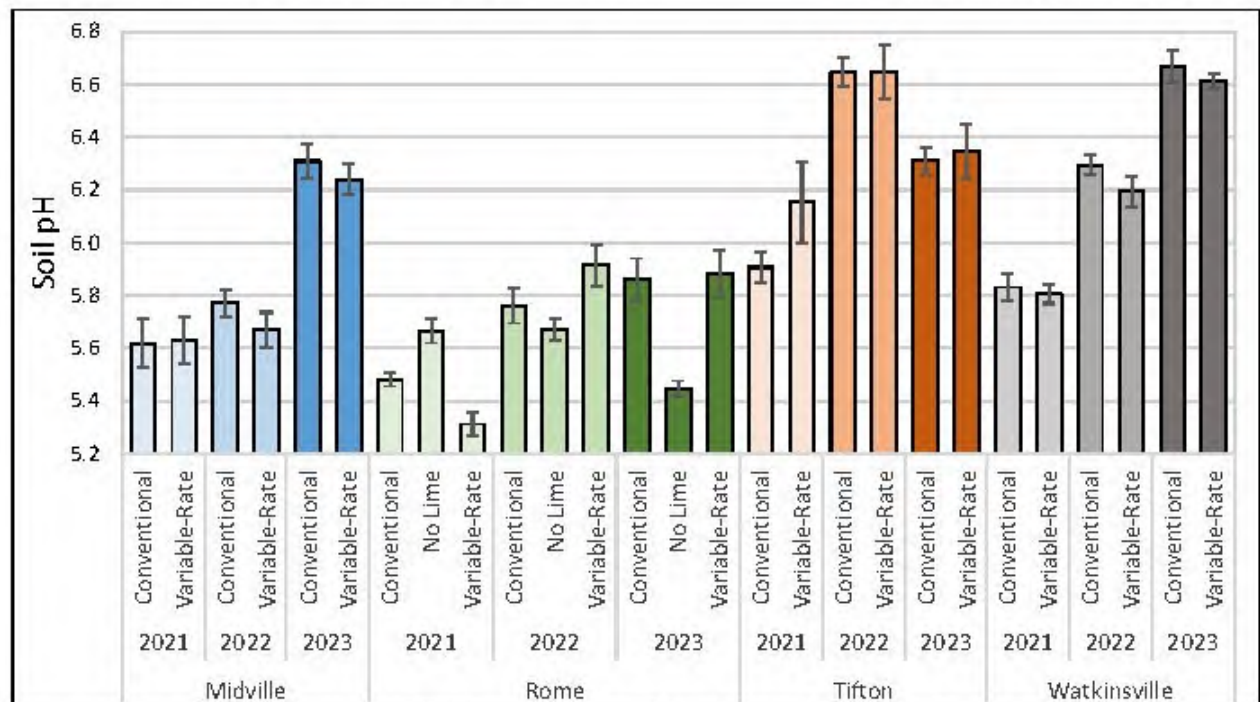


Figure 1. Comparison of mean soil pH and standard error in fields managed with variable-rate or conventional lime applications during 2021-2023 at four sites across Georgia.

- As expected, average soil pH has generally increased each year and the amount of lime recommended has decreased with each lime application (Figure 1).
- The Rome and Watkinsville fields required more lime due to the higher lime buffering capacity of piedmont soils compared to the coastal plain soils at the Tifton in Midville sites.

Table 1. Soil pH, average lime recommendations, average lime applied, and differences in lime applied between conventional and variable-rate applications among sites and years.

Location	Soil pH			Average Lime Recommended	Average Lime Applied	% Difference in Lime Applied (Variable-rate vs. Conventional)	
	Year	Min	Mean	Max	lbs./A	lbs./A*	
Midville	2021	4.73	5.62	6.39	2187	2210	18%
	2022	5.17	5.72	6.37	1972	1879	-14%
	2023	5.77	6.27	6.78	707	771	52%
Tifton	2021	5.39	6.02	7.12	1398	1657	-56%
	2022	6.09	6.65	7.45	102	-	-
	2023	6.02	6.33	7.04	447	-	-
Rome	2021	4.95	5.45	5.87	6597	6391	13%
	2022	5.13	5.80	6.32	3359	2322	13%
	2023	5.13	5.78	6.55	3854	2350	-50%
Watkinsville	2021	5.35	5.82	6.12	3336	3760	-12%
	2022	5.66	6.24	6.68	1316	1588	-57%
	2023	6.22	6.64	7.03	-602	-	-

*No lime was applied when the average recommendation fell below 500 lbs./A.

Table 2. Comparison of hay yield and quality in 2021 and 2022 among the conventional and variable-rate areas of the study locations. Values express mean $\pm$ standard deviation.

Site	Year	Management System	Hay Yield (g/m ²)	RFQ
Midville	2021	Conventional	227 $\pm$ 47	120 $\pm$ 11
		Variable-Rate	219 $\pm$ 43	117 $\pm$ 9
	2022	Conventional	197 $\pm$ 51	117 $\pm$ 9
		Variable-Rate	181 $\pm$ 39	112 $\pm$ 9
Rome	2021	Conventional	157 $\pm$ 44	109 $\pm$ 6
		No Lime	140 $\pm$ 42	117 $\pm$ 8
		Variable-Rate	163 $\pm$ 39	112 $\pm$ 9
	2022	Conventional	287 $\pm$ 49	124 $\pm$ 8
		No Lime	247 $\pm$ 49	129 $\pm$ 7
		Variable-Rate	268 $\pm$ 37	124 $\pm$ 8
Tifton	2021	Conventional	222 $\pm$ 99	107 $\pm$ 9
		Variable-Rate	305 $\pm$ 45	105 $\pm$ 5
	2022	Conventional	325 $\pm$ 63	106 $\pm$ 8
		Variable-Rate	361 $\pm$ 83	107 $\pm$ 7
Watkinsville	2021	Conventional	334 $\pm$ 117	95 $\pm$ 15
		Variable-Rate	402 $\pm$ 149	96 $\pm$ 11
	2022	Conventional	253 $\pm$ 75	114 $\pm$ 12
		Variable-Rate	245 $\pm$ 55	107 $\pm$ 9

Preliminary Results Summary:

- No differences have been observed between conventional and variable-rate lime application on soil pH, hay yield or quality.
- Application strategies have resulted in differences in the total amount of lime applied; with variable-rate requiring 3% less lime overall. However, these differences are field and year specific.
- Research is ongoing, and will continue through the 2024 growing season, when a full report will be available.

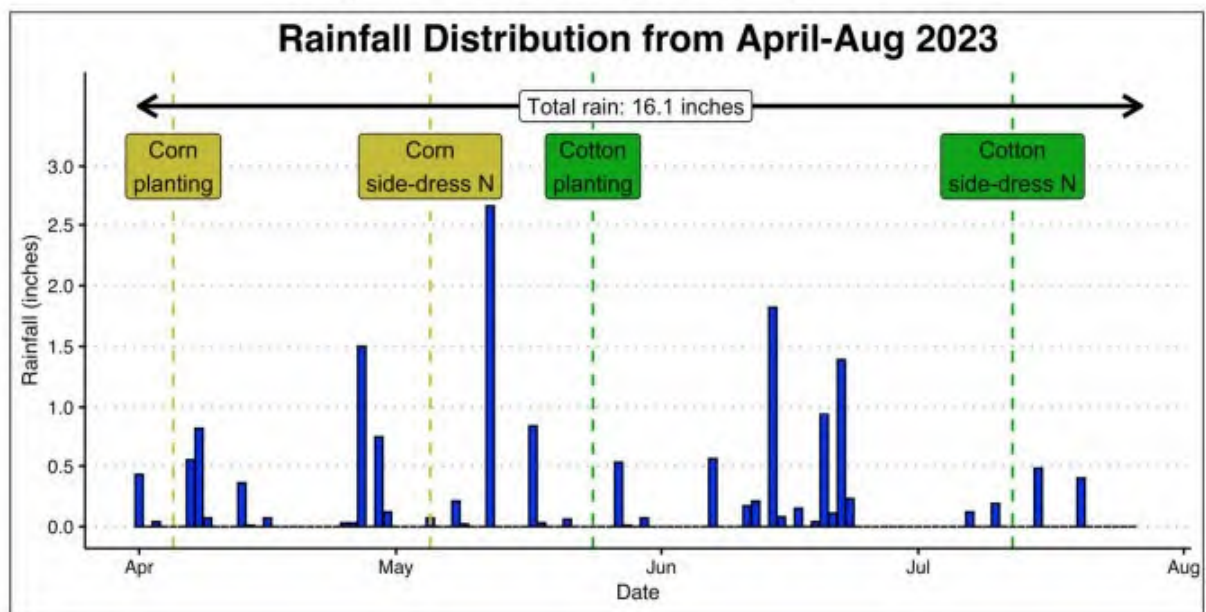
To learn more about this project and upcoming grower trainings, visit our project website:



Sensor-based nitrogen management for **corn** and **cotton**: Midville in 2023

Leonardo M. Bastos (lmbastos@uga.edu), Amrinder Jakhar, Anish Bhattarai

Field Information



Corn

Research questions

- What is best total N rate split between pre-plant and side-dress?
- How does sensor-based variable rate N (VRN) compare to fix rate?

Treatments

Treatment (pre-plant% + side-dress%)	Pre-plant N rate (lb N/ac)	Side-dress N rate (lb N/ac)
0+0	0	0
0+100	0	300
0+VRN	0	VRN
17+83	51	249
17+VRN	51	VRN
25+75	75	225
25+VRN	75	VRN
33+67	99	201
33+VRN	99	VRN
100+0	300	0

Results

- Crop vigor at R5 was optimized with different strategies ranging from applying 100% N at planting to 100% at side-dress V6 (see Figure 1 on the back page).
- Crop vigor from **sensor-based variable N** was only comparable to fixed-rate when **33% of fertilizer was applied pre-plant** and remaining at side-dress (see Figure 2 on the back page).
- In that treatment, **sensor-based variable N reduced rate in 100 lbs N/ac** compared to fixed.
- If crop vigor results translate to yield, applying **33% of total N rate pre-plant and remaining sensor-based at side-dress** could translate into an **increase in profit of \$100/ac** (@ \$1/lb N).

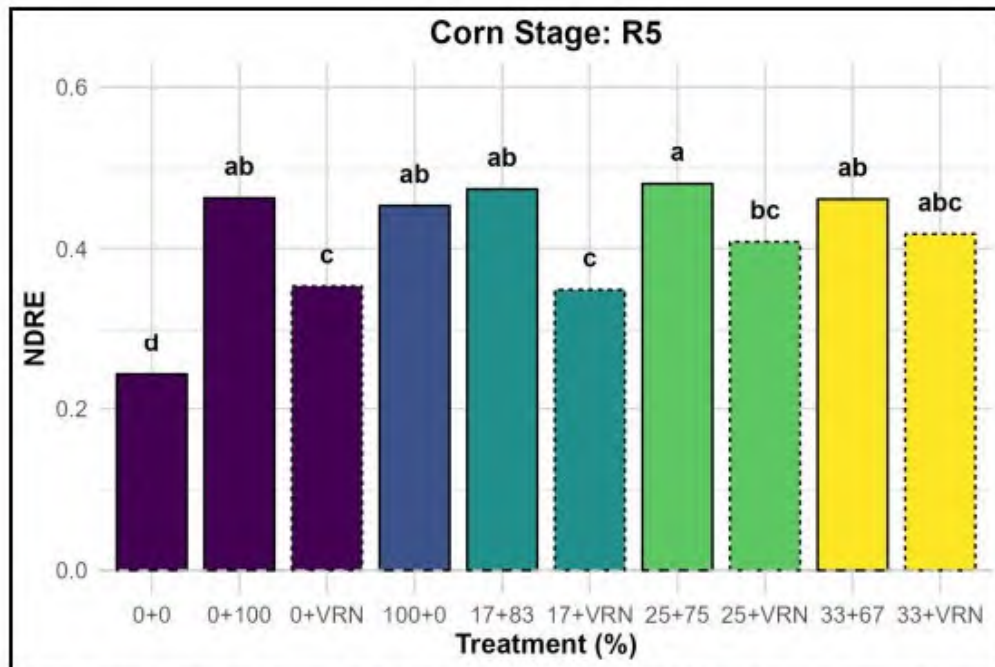


Figure 1. Crop vigor (as NDRE) affected by different splits between pre-plant and side-dress, and fixed vs. variable rate N (VRN).

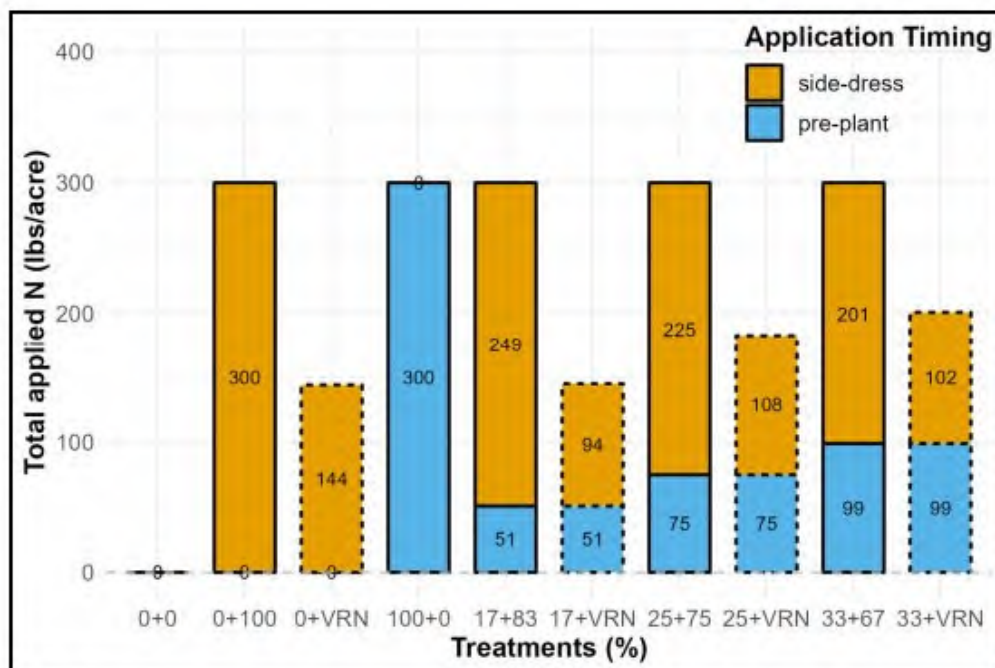


Figure 2. Total N rate applied, including pre-plant and side-dress, and fixed vs. variable rate N (VRN).

Cotton

Research questions

- What is best side-dress N rate?
- How does sensor-based variable rate N (VRN) compare to fix rate?

Treatments

Treatment (pre-plant + side-dress) lbs N/ac	Pre-plant N rate (lbs/ac)	Side-dress N rate (lbs/ac)	Total N rate (lbs/ac)
0	0	0	0
100	100	0	100
36+24	36	24	60
36+54	36	54	90
36+84	36	84	120
36+114	36	114	150
36+VRN	36	VRN	VRN

Results

- Applying **all pre-plant** or **split with side-dress rates ranging from 54 to 114** lbs N/ac had the **greatest crop vigor** at early bloom. (Figure 1, back page).
- Sensor-based **variable N** rates produced **lower crop vigor compared to fixed rate** while **applying 5 to 95 less N/ac** (Figure 2, back page).
- Crop vigor does not directly translate into cotton yield and quality. Harvest results will dictate how well sensor-based N management works for cotton yield, quality, and profitability.

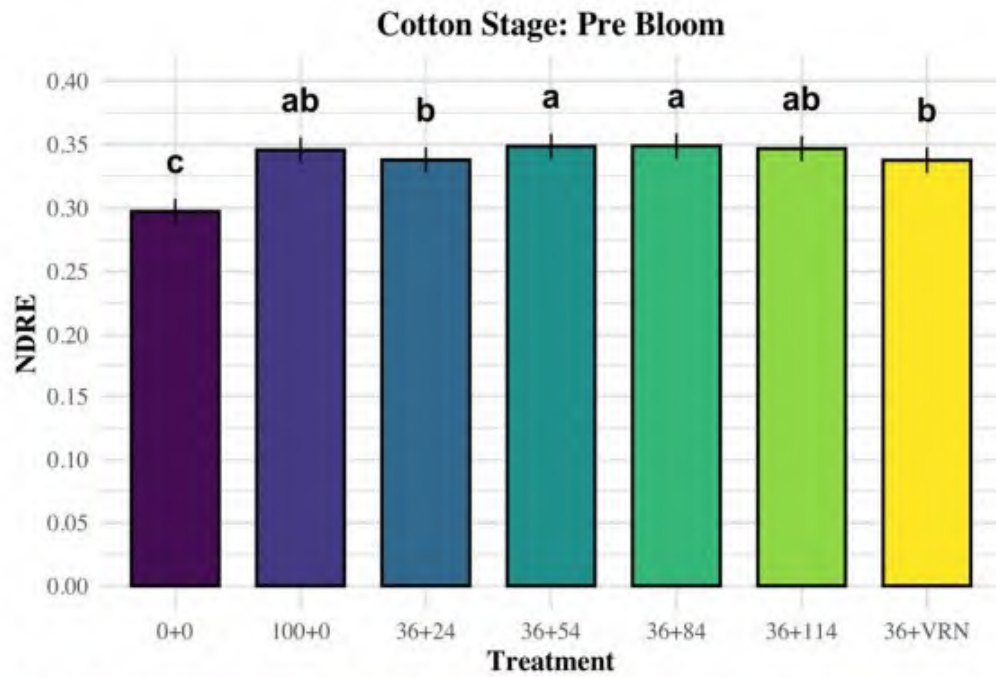


Figure 3. Cotton canopy vigor (as NDRE) affected by different side-dress rates including a variable rate N (VRN) treatment.

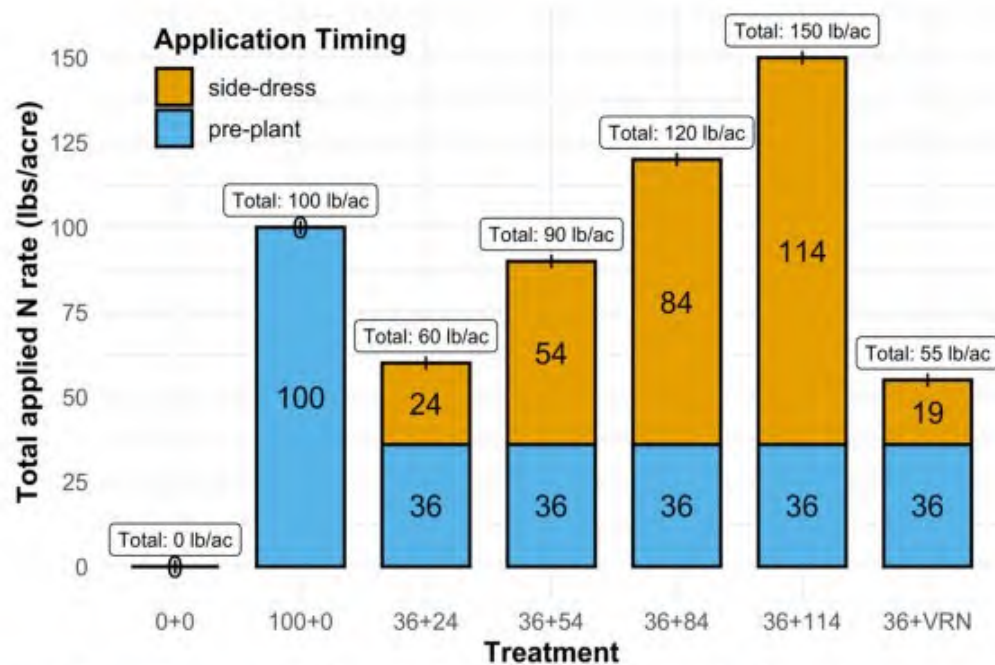


Figure 4. Total N rate applied, including pre-plant and side-dress timing.

Evaluation of Precision Soil Sampling Practices for Site-Specific Nutrient Management

Simerjeet Virk, Extension Precision Ag Specialist, University of Georgia

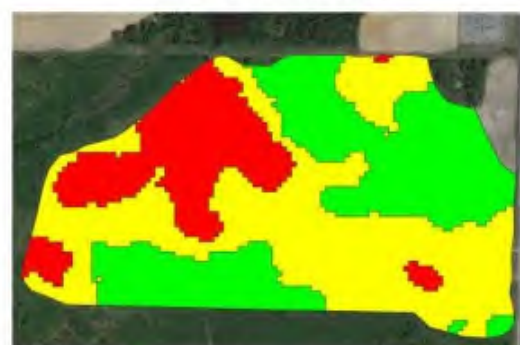
This project is aimed at evaluating and comparing the effectiveness (application accuracy and total application costs) of different grid and zone-based soil sampling strategies for variable-rate lime and fertilizer applications in row-crops.



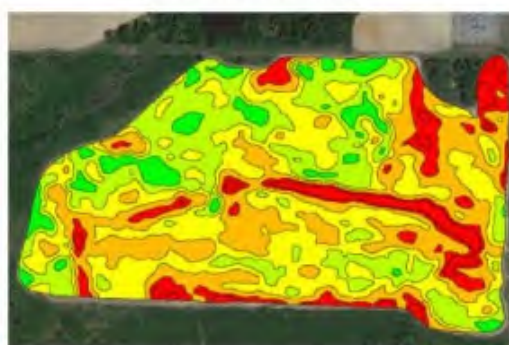
1-ac Grid Sampling



Soil EC (Zone Sampling)



Soil Optix – Soil EC, Topography and Imagery



SWAT Maps – (EC, Elevation, Water Flow, Organic Matter & topography)

Sampling Method	No. of Soil Samples	Application	Soil pH	Soil P	Soil K
1-ac Grid Sampling	88	Over	5%	7%	15%
		Target	93%	89%	83%
		Under	2%	4%	2%
Soil EC – Zone Sampling	9	Over	13%	4%	8%
		Target	86%	73%	52%
		Under	0%	23%	40%
Soil Optix – Zone Sampling	9	Over	13%	1%	26%
		Target	80%	78%	73%
		Under	17%	21%	2%
Swat Maps – Zone Sampling	12	Over	13%	5%	29%
		Target	86%	79%	71%
		Under	0%	16%	0%

Pesticide Applications with Spray Drones

Simerjeet Virk, Extension Precision Ag Specialist, University of Georgia

This project is focused on evaluating the potential of spray drones for pesticide applications in row crops. The specific objective of this study is to assess and compare the spray deposition and efficacy of cotton harvest aids applied with spray drones to traditional ground-based sprayer applications. Other similar testing for assessing efficacy of fungicide applications with spray drones in corn, cotton and peanut is also underway at other locations across the state.



Fungicide application with DJI AGRAS T30 spray drone in cotton

The study focused on cotton harvest-aid application with spray drone will be conducted during defoliation. The treatments will consist of applying cotton harvest aids at two different application volumes of 2 and 5 gallons per acre (GPA) and at two spraying heights of 7.5 and 10 ft from the canopy. Each application pass will represent a combination of volume and height and will be replicated four times. Spray deposition will be assessed by placing water sensitive paper (WSP) at three different locations – top, middle and bottom – in the canopy during each application. For comparison, cotton harvest aids will also be applied with a traditional ground sprayer using a nominal application volume of 10 GPA.

This study along with other trials investigating the use of spray drones for pesticide applications will help understand if spray drones are a viable aerial application tool that can be utilized along with traditional ground and aerial (crop duster) applications for timely and effective pesticide applications in cotton.

Peanut breeding using wild species

New, stronger disease resistances for the peanut crop

Peanut is a valuable crop but its susceptibility to diseases makes it one of the costliest row crops to grow. This susceptibility is due to peanut's origin in a unique "freak" hybrid between two species. Being a hybrid gives peanut vigor and adaptability, but its narrow genetic origin meant that peanut lost many natural pest and disease resistances of the wild species.

The field at Midville farm is part of work at UGA's "**Wild Peanut Lab**," which is introducing pest and disease resistances from wild peanuts into the cultivated crop. The research includes controlled hybridizations in Athens' greenhouse facilities and utilizes advanced genetics made possible by the sequencing of the peanut genome.

The field consists of **three hundred 12 ft mini-rows** and **two thousand individual plants** each within a 6ft square. Each mini-row and individual plant is a unique mix of elite peanut cultivar and wild species genetics. The mini-rows facilitate evaluation of growth, vigor, disease resistance, and yield under standard planting conditions. The individual plantings enable monitoring of growth using high-resolution drone imaging. The wide spacing of the individual plants facilitates disease transmission of the virus TSWV, which aids in the identification and selection of resistant plants.

The development of robust disease-resistant peanut cultivars will significantly reduce the costs of growing peanut, ensuring increased profitability while also providing environmental benefits.



Left, pure-pedigree peanut, unsprayed. Right, a peanut with wild genetics bringing very strong resistance to leaf spots. These two mini-rows were grown close together in Midville in 2021, a heavy year for late leaf spot.

Midville Field Day August 9th, 2023
Statewide Variety Testing Program

Corn

48 entries

Planted: 4/11/23

Population: 34,000/acre

Fertilization: Pre-plant 65 N, 146 P, 230 K, At Planting: 2x2 10-34-0 (10gal/acre) Sidedress: 240 N

Soil Type: Tifton Loamy Sand

Management: Harrowed, field conditioned, ripped/bedded

Nematicide: Telone II

Herbicide: Atrazine, Warrant

Previous Crop: cotton

Cotton

50 entries

Irrigated and Dryland Trials

Planted: 5/4/23

Seeding rate: 3 seed/ft in 36" rows Fertilization:

Irr. – Pre-plant: 30 N, 80 P, 56 K, Sidedress: 65 N

Dry – Pre-plant: 30 N, 30 P, 80 K, Sidedress: 65 N

Soil Type: Tifton Loamy Sand

Management: Harrowed, field conditioned, ripped/bedded

Nematicide: Telone II

Herbicide: Prowl, Reflex, Staple, MSMA, Diuron, Envoke, Select

Insecticide: Acephate, Prevathon, Bidrin

Irr. - .25lb of Boron

Previous Crop: Irr. – cotton, Dry. – peanuts

Peanuts

Peanut consists of 30 entries (26 runner, 4 virginia).

All 30 entries tested as Irrigated and Dryland.

Planted: Irr. 5/30/23

Dry. 5/26/23

Seeding rate: 6 seed/ft in 36" rows

Soil Type: – Tifton Loamy Sand

Management: Harrowed, mold-board plowed, field conditioned, marked off with roller

Herbicide: Valor, Prowl, Gramoxone, Storm, Dual Magnum, 2-4 D B, Select

Fungicide: Headline, Tebuconazole, Convoy, Chlorothalonil

Previous Crop: Irr. – corn, Dry. - cotton

Soybeans

Irrigated: 5's – 18 entries, 6's – 28 entries, 7&8's – 24 entries

Planted: 5/4/23

Seeding Rate: 8 seed/ft in 36" rows

Fertilization: pre-plant – 30 N, 60 P, 60 K Soil

Type: Dothan Loamy Sand

Management: Harrowed, field conditioned, ripped/bedded

Nematicide: Telone II

Herbicide: Prowl, Valor, Warrant

Insecticide: Tombstone, Bifenthrin, Dimlin, Tracer,

Previous Crop: corn

Irrigated: 5's – 18 entries, 6's – 28 entries, 7&8's – 24 entries

Planted: 5/30/23

Seeding Rate: 8 seed/ft in 36" rows Fertilization:

pre-plant – 30 N, 60 P, 60 K Soil Type:

Dothan Loamy Sand

Management: Harrowed, field conditioned, ripped/bedded

Nematicide: Telone II

Herbicide: Prowl, Valor, Warrant

Insecticide: Tombstone, Bifenthrin, Dimlin, Tracer,

Previous Crop: cotton



Working Lands for Quail Habitat Pilot Project

The Northern Bobwhite is special to Georgia and hearing the "Bob-White" whistle brings joy to many people. However, hearing that whistle is not nearly as common as it once was. In fact, bobwhite populations have declined by more than 85% since the 1960's. Populations have declined due to loss of early successional habitat (a mix of native grasses, flowers, and shrubs) leading to a loss of hunters and economic opportunity.

To address this loss of habitat in rural landscapes the Bobwhite Quail Initiative (BQI), in partnership with Quail Forever (QF) is creating the "Working Lands for Quail Habitat Pilot Project". This project will be implemented in portions of Burke County that were identified in the "Georgia's Bobwhite Quail Initiative 2013 – 2023" as important for quail restoration. BQI wants to partner with a few innovative producers who are willing to install quail habitat on marginal farmland. BQI will provide annual rental payments and financial assistance for installing early successional habitat in field borders, hedgerows, filter strips, pivot corners and fallow patches. Our partner Quail Forever, has hired a precision agriculture specialist, who will work with biologists and landowners to identify and target unprofitable acres that may be converted to wildlife habitat.

In 2022 BQI and QF worked with staff at the UGA Southeast Research and Education Center to create demonstrations of quail habitat on a working farm. Working together the group identified areas of the farm that were less productive and underutilized and worked to transition them into productive quail habitat. This included managing pivot corners as fallow old fields using annual dormant season disking, prescribed burning pine hedgerows, and planting native wildflower mixes in low productivity acres. Over the years these areas will increase the farms' ability to produce quail and other wildlife, while reducing costs associated with staff time, maintenance, and inputs (fertilizer, seed, chemical).

If you are interested in this program, you can sign up at <https://arcg.is/0vLqOf0> or call (229) 420-1183. A BQI or QF biologist will contact you to set up a site visit and work with you to develop a plan for improving habitat for quail on your property. Applications will be ranked based on current landscape conditions, habitat connectivity and planned practices. Annual rental payments and practice financial assistance will be paid to participants based on compliance with the developed habitat management plan.



Pollinator planting on the Southeast Research and Education Center in May of 2023 during its second growing season.

2023 UGA Extension Ag Water Team Programming

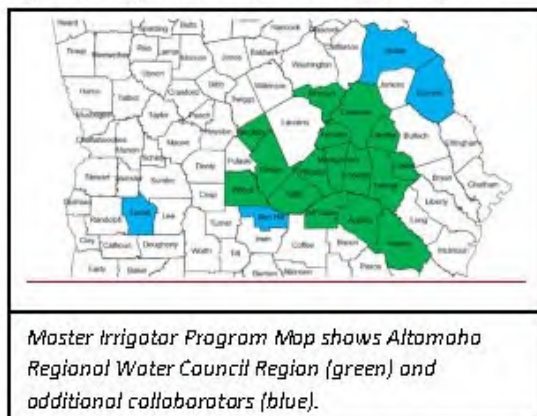
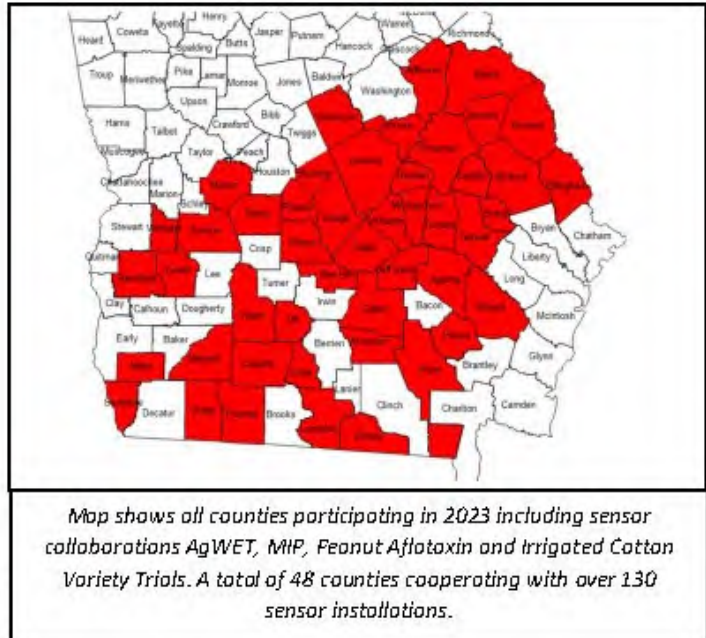
Purpose: Promote Efficient Management of Water Resources Through Research and Extension Programming

Irrigation System Types Involved: Center Pivot, Microjet and Drip

Crops included 2023: Corn, Cotton, Peanuts, Watermelon, Blueberries, Pecan and Citrus

Programs:

- Ag Water Efficiency Team (AgWET):** 24 Counties including 2 Experiment Stations. Annual project where State owned soil moisture sensors are installed on-farm to assist in educating participants on better management of irrigation scheduling.
- Master Irrigator Program (MIP):** Grant Project designed to incentivize participants to purchase soil moisture sensors and install with training and guidance by UGA Extension personnel throughout the season. This project began in Altamaha Regional Water Council area. Through other funding sources including Soil and Water Conservation Districts, this funding has expanded into 4 additional counties.
- Research Projects in several crops including:** Cotton, Corn, Peanuts, Satsumas, Pecan and Blueberries which involve irrigation management, nutrient leaching and disease influence by irrigation.



2022 Burke County Extension Peanut Fungicide Trial

Cooperators: SEREC

Planted: 5/9/2022

Harvested: 9/28/2022

Variety: o6G



UNIVERSITY OF GEORGIA

EXTENSION

Burke County

2022 Burke County Extension Peanut Fungicide Trial

Company	Treatment	lbs/A @ 7% Moisture	Leafspot Rating	Avg. White Mold Hits/100 ft
BASF	Chlorothalonil 3x, Priaxor 1x, Convoy 2x, Provysol 2x, Tebuconazole 2x	6,542	2	3.9
Bayer	Chlorothalonil 2x, Provost Silver 3x, Excalia x2	6,789	2.4	4.8
Corteva	Chlorothalonil 1x, Aproach Prima 1x, Fortelis 2x, Provost Silver 2x, Tebuconazole 1x	6,251	2.3	5
FMC 1	Chlorothalonil 1x, Convoy 1x, Provost Silver 1x, Lucento 2x, Elatus 1x	6,255	2.8	2.4
Syngenta	Chlorothalonil 2x, Elatus 3x, Alto 2x, Miravis 2x, Provost Silver 1x, Tebuconazole 1x	6,645	2.9	.9
Untreated	Untreated	5,549	5.4	18

Large Plot Peanut Variety and Growth Regulator Trial

Location: Southeast Georgia Research and Education Center (Midville)

Planting Date: May 10

Varieties

Georgia-6G

Georgia-16HO

Georgia-18RU

Georgia-12Y

AUNPL-17

Trial Dynamics and Production Information

- Each variety replicated 4 times
- Standard randomized complete block design
- Data collected or to be collected: Stand counts, TSWV, and leaf spot ratings
- Yield and Quality will be determined at the end of the year
- Trial has a growth regulator (Kudos) trial embedded in it. Each plot will have a treated vs. untreated growth regulator regime: 5.5 ozs Kudos fb 5.5 ozs two weeks later
- First Kudos applied on July 20

4/1/2023	Cut w/ Disc
4/19/2023	Field Cultivated
4/20/2023	Moldboard Plow
4/20/2023	Field Conditioned
5/9/2023	Bedded
5/10/2023	Planted Variety Trial
5/11/2023	Planted Inoculant Trial
5/12/2023	.45ozs Strongarm
5/12/2023	3ozs Valor
5/12/2023	32ozs Pendimethalin
	1.5 pts Storm, 3 pts Warrant 24 ozs
6/18/2023	Butyrac
6/19/2023	1000 lbs Landplaster
6/26/2023	6ozs Priaxor
6/26/2023	.5lbs B
7/1/2023	.75" Irrigation
7/5/2023	.75" Irrigation
7/5/2023	32 ozs Convoy, 1.5 pts Chlorothalonil

Cooperators:

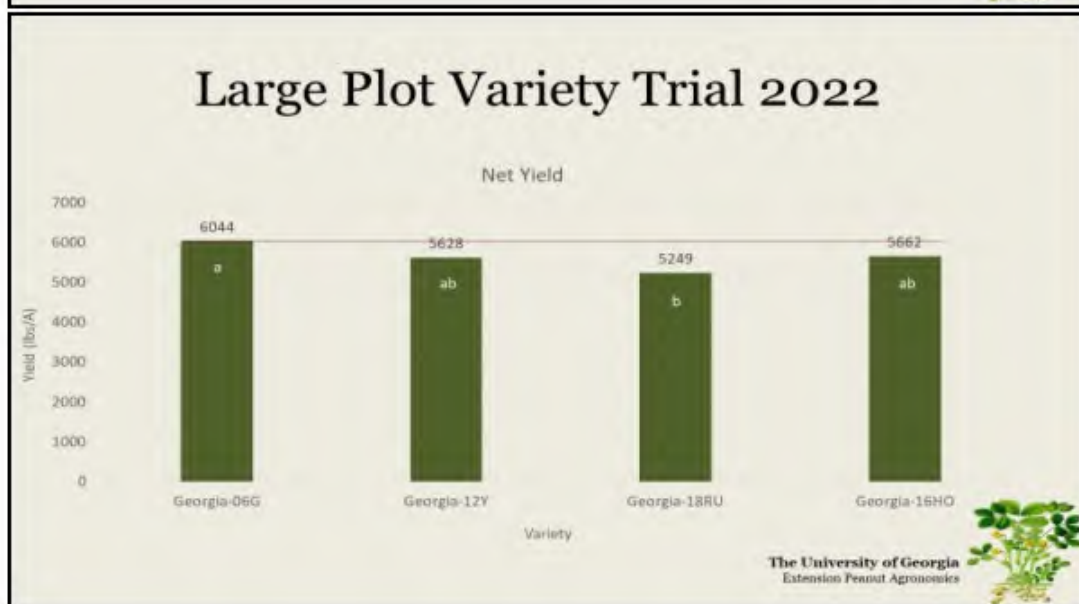
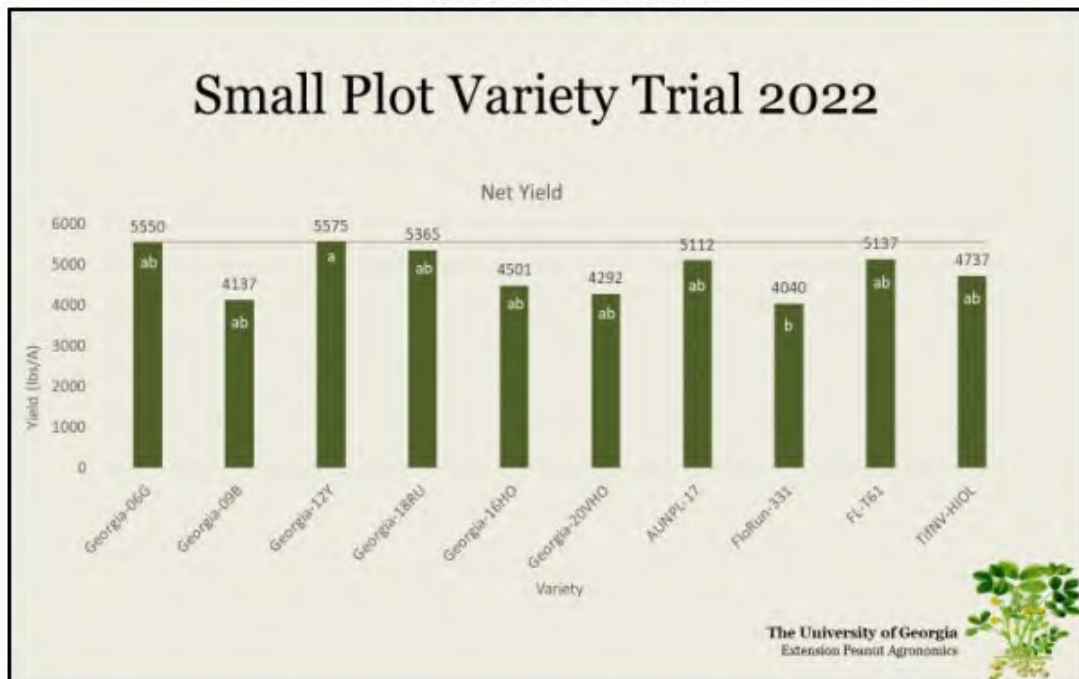
Dr. Scott Monfort, Extension Peanut Agronomist

Savannah Tanner, Emanuel ANR Agent

Steven Powell, Treutlen ANR Agent

Wade Parker, SE District Agronomy Agent

Previous Year Trial Results



Deer Damage Evaluation Trial

Deer damage in Georgia continues to increase exponentially in crops, cotton included. This ongoing issue has farmers in dire straits, as no clear control measures prove to be sustainable or economically feasible. As farm policy makers continue to search for answers, a lack of quantifiable data is available on how much yield damage occurs in a cotton field after an “x” amount of terminals are consumed in a cotton stand. This study seeks to measure the amount of yield damage after the following percentages of terminals are removed in the total stand:

Treatment	Description
1	NO REMOVAL
2	10% REMOVAL
3	25% REMOVAL
4	33% REMOVAL
5	50% REMOVAL
6	66% REMOVAL
7	75% REMOVAL
8	90% REMOVAL
9	100% REMOVAL

To achieve this simulated damage, the terminals were physically cut with sewing scissors. The cotyledons were left intact. This enabled the plants to grow as if deer consumed the terminals.

Planting date: June 5

Variety: DG 3799

Collaborators

Wade Parker, SE Agronomy Agent

Blake Carter, Effingham ANR Agent

Dr. Camp Hand, Extension Cotton Agronomist

Plot Map: The number in the bottom of the box is the treatment number. Match treatment number with % removal from table above to identify plot in the field.



Evaluating ammonium nitrate and urea on carinata performance in Georgia

H.Y. Sintim, A.M.I. Sohag, A. Solomon, G. Ankomah, R.A. Black, R.D. Lee

College of Agriculture and Environmental Sciences, University of Georgia

Study Background

Carinata is an oilseed crop that can be grown in the winter in the southeast US. The global demand for Sustainable Aviation Fuel (SAF) derived from carinata opens new opportunities for farmers in the southeast US to incorporate carinata into their crop rotation as a winter crop. Moreover, the presence of a viable market for carinata, with the sales price of carinata linked to soybean futures, enhances the appeal for farmers in the region to engage in carinata cultivation and contribute to the global demand for SAF.

Nuseed and British Petroleum entered into a 10-year strategic agreement to accelerate the market adoption of carinata as a sustainable low-carbon biofuel feedstock. Inorganic nitrogen (N) production requires a lot of energy so the use of more efficient N sources will help make carinata a carbon-neutral crop. The various N fertilizers have different greenhouse gas premium values assigned in the Renewable Energy Directive, a legal framework for the development of renewable energy. The successful production of carinata will require the application of the right N rate, especially in the southeast US, where the majority of the soils have poor native fertility. Moreover, volatility in commodity prices in recent years suggests the need to determine the best N rates in carinata to increase the economic profit for growers.

The goal of the study was to determine the optimal N application rates for two common N fertilizers (ammonium nitrate and urea). Ammonium nitrate breaks down directly into usable forms by plants, whereas urea must be converted by different processes into usable forms by plants.

Study Procedure

Studies were conducted in the 2021/2022 and 2022/2023 seasons at the (a) UGA Southeast Georgia Research and Education Center in Midville, and (b) Lang Farm of the UGA Tifton Campus in Tifton. Four application rates of ammonium nitrate and urea were tested (0, 40, 80, and 120 lbs/ac N). In the 2021/2022 season, carinata was planted in November 2021 at both locations. In the 2022/2023 season, carinata was planted in January 2023 in Midville, and in November 2022 and January 2023 in Tifton.

Except for the 0 lbs/ac N rate, all plots received only 20 lbs/ac N at the initial stage of planting. The remaining N rates, depending on treatments, were applied before the flowering growth stage (Fig. 1). Proportional N rates were not applied at the initial stage of planting because the treatments with high N rates will become more susceptible to frost damage. Other agronomic practices used were according to the standard production recommendations for carinata in the southeastern US (<https://edis.ifas.ufl.edu/publication/AG389>).



Fig. 1: Research site in Midville showing carinata performing differently to the various N rate treatments.

Findings and Recommendations

Application of N fertilizer increased carinata yield, and the yield increase was more in Tifton (Fig. 2). Compared to the 0 lbs/ac N rate, the 40, 80, and 120 lbs/ac N rates increased carinata yields by 171, 236, 342 lbs/ac, respectively, in Midville, and by 615, 1045, and 1086 lbs/ac, respectively, in Tifton. In general, carinata yield response to the N rate across all production conditions followed a quadratic model that can be expressed as:

$$Y = 644 + 13.2X - 0.56X^2$$

where Y is the predicted carinata yield in lbs/ac, and X is the N rate in lbs/ac.

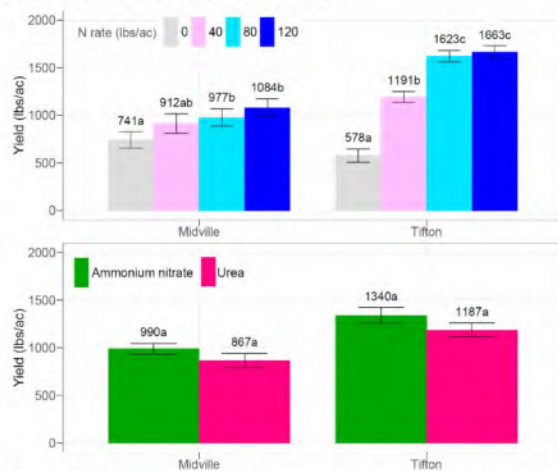


Fig. 2: Carinata yield response to N application rates and sources in Midville and Tifton.

There was better plant vigor from applying ammonium nitrate than urea, and it led to a slight increase in carinata yield (Fig. 2). Ammonium nitrate increased carinata yield over urea by 123 lbs/ac in Midville and 153 lbs/ac in Tifton. However, as can be seen, the differences were not statistically significant.

Given the volatility in commodity prices in recent years, dynamic relative profitability analysis, by varying the nitrogen rate at different fertilizer costs and carinata prices, was used for the economic assessment. Range of 0-120 lbs/ac N rate; \$200-\$1,000/ton ammonium nitrate and urea price; and \$0.15-\$0.3/lb carinata price was used, and the relative profit was estimated using

the 40 lbs/ac N rate as the baseline. In other words, it reflects the relative profit over the 40 lbs/ac N rate. The margin to apply more N rate and still make a profit decreased as the carinata price decreased and the N fertilizer cost increased (Fig. 3). The maximum relative profit occurred at 110 lbs/ac N rate, where the fertilizer cost was lowest and the carinata price was highest. Under the contract with Nuseed, the maximum inorganic N rate that growers can apply on carinata is 80 lbs/ac N. However, organic amendments such as poultry litter could be used to increase the N rate.

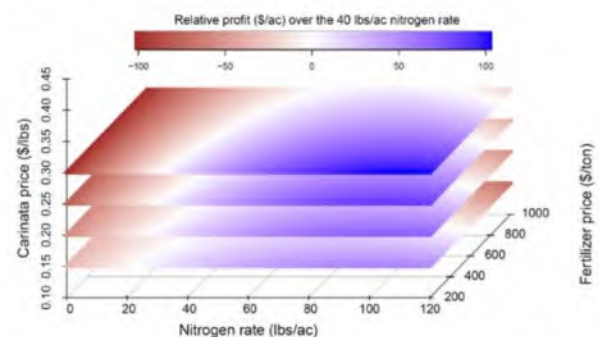


Fig. 3: Relative profit of carinata production at different N rates, carinata prices, and N fertilizer costs. Profits are relative to the 40 lbs/ac N rate.

Acknowledgment

We acknowledge the Southeast Partnership for Advanced Renewables from Carinata (SPARC) of the University of Florida, USDA-NIFA, Nuseed, USDA-ARS unit in Tifton, and staff of the field research stations for funding and/or various support and resources towards the study.

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Article HSL-N230809



Soil health management effects on corn, microbial activities, and plant nutrients

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College of Agriculture and Environmental Sciences, University of Georgia

Study Background

Soil microbes play a key role in nutrient cycling and the buildup of organic matter (Fig. 1). They convert organic forms of plant nutrients to mineral forms that can be used by plants during the growing season. Corn, for instance, is a high-input crop so the nutrients released from organic matter can help supplement those available from fertilizer application. Improving soil health is therefore very important.

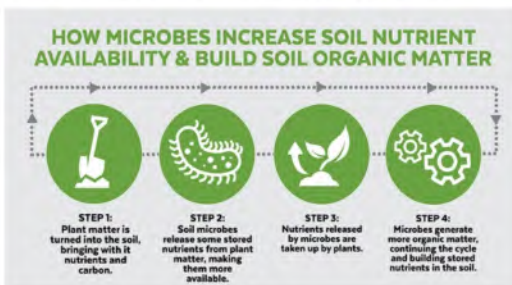


Fig. 1: Soil microbes are important in nutrient cycling and building organic matter (Credit to Philips, 2013; Midwestern BioAG).

Some soil health practices can, however, affect nutrients in the soil. For example, while a rye cover crop can help minimize soil erosion and build organic matter, it has a high C: N ratio which can tie up nutrients by a process called immobilization. Also, some soil amendments, such as biochar, have a high C: N ratio. Instead of adopting only rye cover crops or biochar, incorporating poultry litter, a common soil amendment in Georgia, can help make nutrients more available and improve the activities of soil microbes. The objective of the study was to evaluate the impact of integrating soil health management practices on the activities of soil microbes, and nutrient uptake and productivity of corn.

Study Procedure

This is a long-term study that is still ongoing at the University of Georgia Southeast Georgia Research and Education Center (UGA-SEGREC). The study was established in 2021, and five soil health management practices are being assessed: (a) conventional tillage system, (b) reduced tillage system, (c) reduced tillage under cover crop system, (d) reduced tillage under cover crop and with poultry litter as soil amendment, and (e) reduced tillage under cover crop and with poultry litter and biochar as soil amendments. **To save space, the conventional tillage system is abbreviated as CT, reduced tillage system as RT, reduced tillage under cover crop system as RT+CC, reduced tillage under cover crop and with poultry litter as RT+CC+PL, and reduced tillage under cover crop and with poultry litter and biochar as RT+CC+PL+BC.**

The reduced tillage was strip tillage and the cover crop was rye, which was planted at 90 lbs seeds/ac. For the soil amendment, the RT+CC+PL received 2 tons/ac poultry litter, and the RT+CC+PL+BC received 1 ton/ac each of poultry litter and biochar. The study is under a corn-peanut-cotton rotation sequence, and the field was demarcated into three segments to have all the crops appear in rotation every year. Production of corn was according to the standard guidelines by the UGA Extension (<https://grains.caes.uga.edu/corn.html>).

Findings and Recommendations

Table 1 shows the results of the impact of the different soil health management systems on soil respiration and urease. Urease is the enzyme responsible for the conversion of urea to

nitrogen forms that can be taken up by plants. Before planting corn in the 2022 season, the RT+CC+PL had the highest soil respiration and urease enzyme. The soils were sampled and analyzed before the soil amendments were applied in 2022. So the effects were from the 2021 season. At the V6 stage, RT+CC+PL+BC slightly increased soil respiration and urease enzyme.

Table 1: Effects of soil health management systems on soil respiration and urease enzyme at pre-plant and V6 growth stage.

Growth stage	Management system	Respiration (mg CO ₂ /g soil/hr)	Urease (μmol NH ₃ /g soil/hr)
Preplant	CT	0.831b	22.9b
	RT	0.883b	21.5b
	RT+CC	0.850b	20.6b
	RT+CC+PL	1.281a	33.1a
	RT+CC+PL+BC	0.767b	28.5a
V6 growth stage	CT	4.18bc	32.3a
	RT	4.82ab	31.9a
	RT+CC	4.77ab	32.7a
	RT+CC+PL	4.75ab	30.5a
	RT+CC+PL+BC	5.04a	33.6a

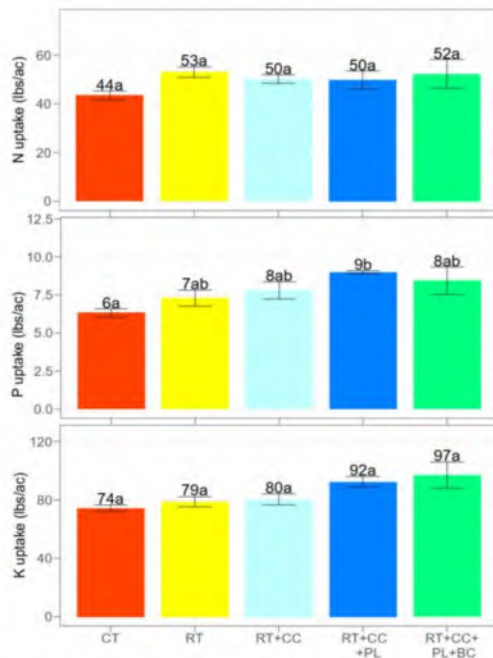


Fig. 2: Nutrient uptake of corn at the V6 growth stage.

The NPK uptake was the least in the CT plots, but the differences were not statistically significant (Fig. 2). Also, there were no significant yield differences between the various soil health management systems (Fig. 3). In general, the yield was highest in RT+CC+PL and least in RT+CC. This highlights the need to ensure the proper combination of soil health management practices. So far, the RT is the most profitable system in this study because the reduced tillage saved production costs and the yield was not adversely impacted. Based on the results, we expect a system with reduced tillage under cover crops of low C: N ratio and application of poultry litter, to be a very good system for corn, but it needs to be evaluated.

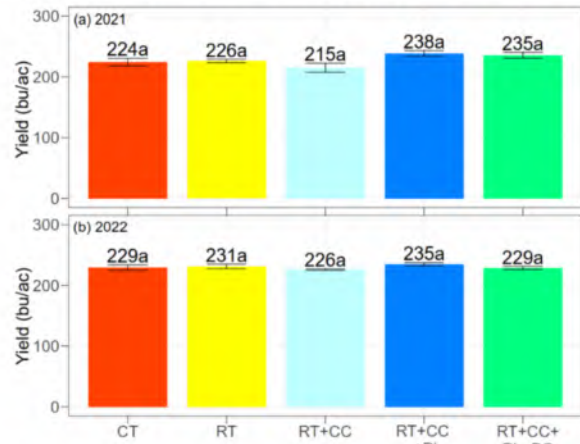


Fig.3: Impact of management systems on corn yield in 2021 and 2022.

Acknowledgment

We acknowledge the Georgia Corn Commission for funding this study. We are grateful to the staff of UGA-SEGREC for their support with field research activities.

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The Georgia Corn Commission



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GEORGIA

Effects of nutrient management under different planting methods and PGR rates in cotton

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Study Background

The goals of nutrient recommendations are to increase crop productivity, reduce costs, and minimize negative impacts on the environment. Achieving all the nutrient management goals can be quite challenging in Georgia because of the unique climatic and soil conditions. Georgia has a subtropical climate, which is characterized by highly-weathered soils and poor native fertility. Thus, a comprehensive nutrient management program is needed to boost the economic productivity of food and fiber production.

Findings from previous studies funded by the Georgia Cotton Commission showed that the yield potential and economic benefits of well-fertilized cotton are often not realized. This is because of rank growth in well-fertilized cotton. Humid conditions and less airflow cause boll rot and other production issues (Fig. 1). Thus, the objective of the study was to optimize factors that affect cotton growth characteristics, such as planting method, plant growth regulator (PGR), and nutrient supply to improve the performance and overall productivity of cotton.



Fig. 1: Field overview of cotton fertilized for 1,500 and 2,250 lbs/ac lint yields (left and right photos, respectively).

Study Procedure

This is an ongoing study established in 2021 at the (a) UGA Southeast Georgia Research and Education Center in Midville, and (b) Lang Farm of the UGA Tifton Campus in Tifton. The study at Midville is evaluating two PGR rates (24 and 48 oz/ac), two planting methods (hill-drop and singles), and three fertility treatments. The fertility treatments were (a) half the standard nutrient recommendations to make 1500 lbs/ac lint yield, (b) the full standard nutrient recommendations to make 1500 lbs/ac lint yield, and (c) 50% more than the standard nutrient recommendations to make 1500 lbs/ac lint yield. They are abbreviated as SNM-750, SNM-1500, and SNM-2250, respectively. The hill-drop was planted as three seeds per hill that were spaced 12 inches apart. The singles were planted as 3 seeds/ft in length that were uniformly spaced. Both the hill-drop and singles were planted at 36-inch row spacing.

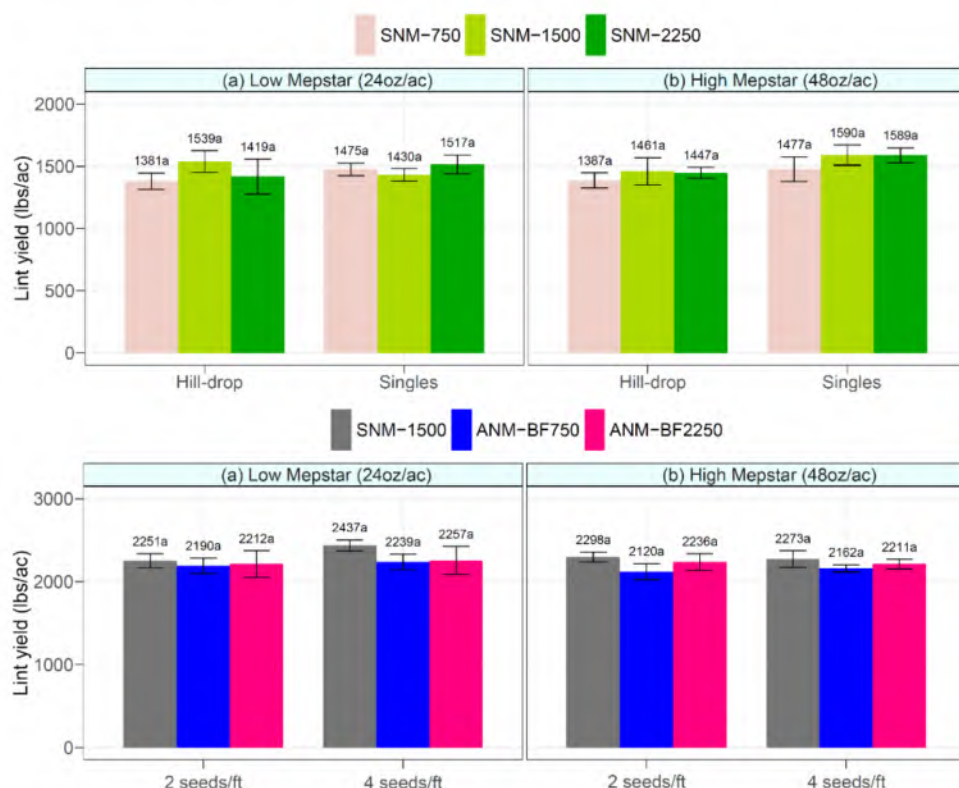
The study at Tifton is evaluating two PGR rates (24 and 48 oz/ac), two planting rates (2 and 4 seeds/ft length at 36-inch row spacing), and three fertility treatments. The fertility treatments are (a) the full standard nutrient recommendations to make 1500 lbs/ac lint yield, (b) adaptive nutrient management with half the standard nutrient recommendations to make 1500 lbs/ac lint yield as the minimum fertilizer application, and (c) adaptive nutrient management with 50% more than the standard nutrient recommendations to make 1500 lbs/ac lint yield as the minimum fertilizer application. They are abbreviated as SNM-1500, ANM-BF750, and ANM-BF2250, respectively. Adaptive nutrient management refers to nutrient management based on tissue test analyses during the growing season.

Stoneville variety ST4550 was used in Midville and Dyna-Gro variety DG3615 B3XF was used in Tifton. The study in Midville was under rye cover crop and strip tillage conditions, and the study in Tifton was under conventional tillage conditions with no cover crop. MepStar® was used as the PGR, and both studies were under irrigation. Other agronomic practices were according to the production recommendations by the UGA Extension.

Findings and Recommendations

The results showed slight effects of PGR, planting method, and fertility treatments on cotton lint yields (Fig. 2). The average lint yields when 24 and 48 oz/ac MepStar® were applied were 1,460 and 1,491 lbs/ac, respectively, in Midville and 2,264 and 2,217 lbs/ac, respectively, in Tifton. Lint yields of 1,439 and 1,513 lbs/ac were obtained for the

hill-drop and singles planting methods in Midville, respectively. Also, 2,218 and 2,263 lbs/ac lint yields were obtained for the 2 and 4 seeds/ft seeding rates in Tifton, respectively. Increasing nutrient supply did not always lead to higher lint yield. In fact, it was only under the 24 oz/ac MepStar® and singles planting method in Midville where the SNM-2250 led to the highest lint yield. In Midville, the average lint yield for SNM-750, SNM1500, and SNM-2250 were 1,430, 1,505, and 1,493 lbs/ac respectively. In Tifton, the SNM-1500 consistently had the highest yield. The average lint yields in Tifton were 2,315, 2,178, and 2,229 lbs/ac for the SNM-1500, ANM-BF750, and ANM-BF2250, respectively. If we assume a cotton lint price of \$0.90/lb, then the SNM-1500 was the most profitable in Midville, and the SNM-1500 was the most profitable in Tifton.



Acknowledgment

We acknowledge the Georgia Cotton Commission for funding this study. We are grateful to the staff of the field research stations for their support with fieldwork.

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Fig. 2: Effects of growth PGR, planting method, and fertility treatments on cotton lint yield in Midville (top figure) and Tifton (bottom figure). SNM: Standard nutrient management; ANM: Adaptive nutrient management; BF: Baseline fertility.

Impact of regenerative agricultural practices on cotton productivity and soil health

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Study Background

Degradation of soil health poses a major challenge to the sustainable production of cotton in the Southeast US. Subtropical climate is the most dominant climate in the southeast, and it is characterized by warm temperatures and intensive and well-distributed rainfall conditions. These conditions cause rapid weathering of the soil and the breakdown of organic matter. Adopting regenerative agricultural practices is a good way to conserve soil health, but the various individual practices have their limitations.

For example, conservation tillage can help improve soil structure but may cause short-term soil compaction and over-reliance on herbicide application for weed control. Also, the adoption of rye cover crop, which has a high biomass, is good for building soil organic matter and minimizing soil erosion. However, it could tie up nutrients because of the high C: N ratio. Integrating rye cover crops into conservation tillage systems could help minimize weed pressure while integrating poultry litter as a soil amendment to rye cover crop systems could supply the soil with nutrients. The objective of this study was to evaluate the complementary effects of different regenerative agricultural practices on cotton productivity and soil properties.

Study Procedure

The study was established in 2021 at the University of Georgia Southeast Georgia Research and Education Center (UGA-SEGREC). It is a long-term study, and five management systems are being assessed: (a)

conventional tillage (abbreviated as CT), (b) reduced tillage (abbreviated as RT), (c) reduced tillage under cover crop (abbreviated as RT+CC), (d) reduced tillage under cover crop and with poultry litter as organic amendment (abbreviated as RT+CC+PL), and (e) reduced tillage under cover crop and with poultry litter and biochar as organic amendments (abbreviated as RT+CC+PL+BC).

The conservation tillage system was strip tillage, and rye was used as the cover crop. The RT+CC+PL received 2 tons/ac rate of poultry litter, and the RT+CC+PL+BC received 1 ton/ac each of poultry litter and biochar. Soil health assessment was made in the spring of every year before tillage operations. The soil is in a more stable state in the spring than after harvest in the fall. The study is under a cotton-corn-peanut rotation sequence and all three crops appear in rotation every year. This allows for annual evaluation of the effects of the management systems on the crops.



Fig. 1: Field overview of the study showing (a) a conventional tilled plot, and (b) a plot under reduced tillage and cover crop.

Findings and Recommendations

There were slight yield differences among the various management systems (Fig. 1). The RT+CC tended to reduce the yield. However, the addition of poultry litter (RT+CC+PL), seemed to offset the yield loss. This could be due to the extra nutrients supplied by the poultry litter. Switching from 2 tons/ac of poultry litter (RT+CC+PL) to 1 ton/ac each of poultry litter and biochar (RT+CC+PL+BC) slightly reduced the yield. This is possibly due to the lower nutrient supply of the 1 ton/ac poultry litter. Also, the biochar, which had a high C: N ratio, could have tied up nutrients. The C: N ratio of the biochar was 120:1.

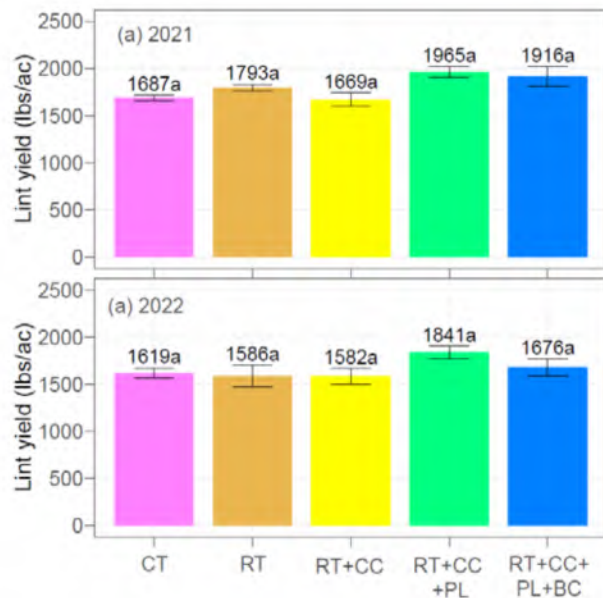


Fig. 2: Effects of soil health management systems on cotton lint yield in 2021 and 2022.

Management systems	Soil pH	Organic matter	Nitrate-N	P	K	Bulk density	Infiltration
		%	lbs/ac	lbs/ac	lbs/ac	lbs/ft ³	in/hr
CT	6.3a	0.70a	5.64a	97a	128a	88.6a	6.33a
RT	6.1a	0.68a	5.26a	88a	123a	85.8a	6.67a
RT+CC	6.4a	0.65a	5.31a	97a	147a	87.7a	6.19a
RT+CC+PL	6.2a	0.69a	1.72a	114a	196a	85.2a	7.43a
RT+CC+PL+BC	6.4a	0.60a	4.21a	115a	127a	86.0a	6.67a

Table 1: Effects of soil health management systems on soil properties measured in spring 2022.

The soil health management systems had minimal effects on the various soil properties. In general, the soil pH was least in the RT, and the organic matter was least in the RT+CC+PL+BC (Table 1). The low organic matter of the RT+CC+PL+BC was not expected. Also, the soil nitrate-N of RT+CC+PL was lower than anticipated, but it had the highest soil K. Both RT+CC+PL and RT+CC+PL+BC had relatively higher P levels. The RT+CC+PL tended to have lower bulk density, which corresponded to higher water infiltration.

Acknowledgment

We acknowledge the Georgia Cotton Commission for funding this study. We are grateful to the staff of the field research stations for their support with fieldwork.

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Evaluating soil health management systems in peanut

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Study Background

Poor land management degrades soil health, and if not addressed, it could cause the permanent destruction of farmlands and plunge millions of people into hunger and poverty. Soils support food and fiber production through several functions, including (a) providing physical support, (b) enhancing biodiversity & resilience, (c) serving as habitat, (d) cycling nutrients, (e) controlling water flow & storage, and (e) being a filtration medium. Thus, sustainable food and fiber production require good stewardship of farmlands.

Peanut is an important crop, especially in Georgia, which is the leading peanut-producing state in the United States. According to the Georgia 2023 Ag Snapshot, peanut is the third most valuable agricultural commodity, contributing ~\$777 million to the Georgia economy. Conventional production of peanuts requires intensive tillage operations, coupled with inversion of the soil during harvest. Repeated tillage and soil inversion operations destroy soil structure and other important attributes and functions of the soil. According to the USDA-NRCS, minimizing soil disturbance, maximizing soil cover, biodiversity, and living roots are important principles for building soil health.

The objective of the study was to evaluate the impact of various soil health management systems on peanut productivity and soil properties.



Study Procedure

This is an ongoing study established in 2021 at the University of Georgia Southeast Georgia Research and Education Center (UGA-SEGREC). The management systems comprise (a) conventional tillage under no cover crop and without organic amendment (abbreviated as CT), (b) reduced tillage under no cover crop and without organic amendment (abbreviated as RT), (c) reduced tillage under cover crop but without organic amendment (abbreviated as RT+CC), (d) reduced tillage under cover crop and with poultry litter as soil amendment (abbreviated as RT+CC+PL), and (e) reduced tillage under cover crop and with poultry litter and biochar as soil amendments (abbreviated as RT+CC+PL+BC).

The field was prepared by first tilling the conventional tillage plots and then running a strip-till rig across the conventional and reduced tillage plots. Thus, the reduced tillage was a one-time strip tillage operation. The RT+CC+PL received 2 tons/ac of poultry litter, and RT+CC+PL+BC received 1 ton/ac each of poultry litter and biochar. Rye was used as the cover crop, and it was planted in the fall and terminated in the spring by spraying with roundup. Soil health assessment was made in the spring of every year, which is when the soil is in a more stable state. The study is under a peanut-cotton-corn rotation sequence, and all crops appear in rotation every year. This allows the annual evaluation of management systems on all the crops. Agronomic management of the crops was according to the production recommendations by the University of Georgia Extension.



Figure: Overview of the experimental site showing cotton, peanut, and corn in rotation.

Findings and Recommendations

The results showed marginal differences in peanut yield, and the differences were not statistically significant. Switching from conventional tillage (CT) to reduced tillage (RT) led to a 5.2% and 5.8% yield reduction in 2021 and 2022, respectively. Integrating cover crops with reduced tillage (RT+CC) reduced the yield by 10.3% and 5.6% in 2021 and 2022, respectively, when compared to CT. In 2021, the CT+CC+PL and CT+CC+PL+BC slightly increased the peanut yield by 6.3% and 3.6%, respectively. In contrast, they slightly reduced the peanut yield by 2.1% and 7%, respectively, in 2022.

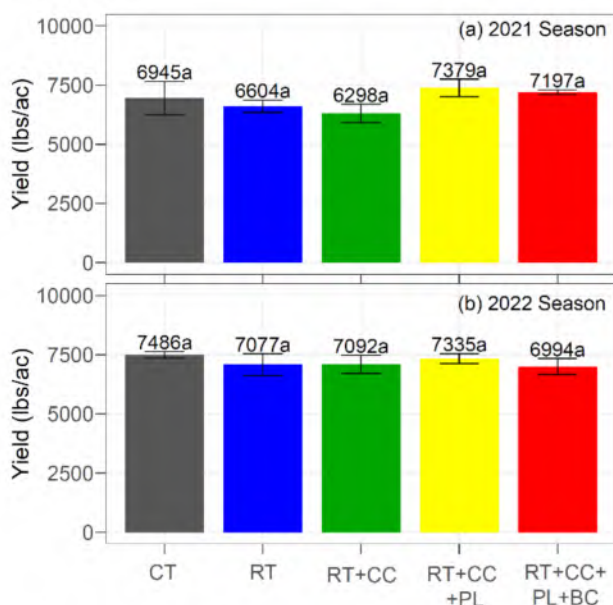


Figure: Impact of management systems on peanut yield in 2021 and 2022.

The various soil properties assessed were also not significantly affected by the management systems. Overall, there was a slight increase in organic matter under the CT+CC+PL and CT+CC+PL+BC when compared to the CT. All management systems with reduced tillage had a slightly lower infiltration rate than the CT. Infiltration is a measure of how fast water penetrates the soil. Higher infiltration rates are better because it helps prevent soil erosion. The lower infiltration rates in the management systems with reduced tillage suggest possible compaction of the soil. However, soil penetration resistance, measured with a penetrometer, did not follow the same trend. While the RT had higher penetration resistance than CT, management systems with cover crops had lower penetration resistance. The RT+CC+PL had the least penetration resistance, which indicates a better soil condition.

Management	Organic matter	Infiltration	Penetration resistance
	(%)	(ft/hr)	(psi)
CT	1.04a	1.06a	171a
RT	1.02a	0.68a	172a
RT+CC	1.07a	0.73a	167a
RT+CC+PL	1.11a	0.71a	160a
RT+CC+PL+BC	1.10a	0.76a	170a

Figure: Impact of management systems on soil properties in spring 2022.

Acknowledgment

We acknowledge Georgia Seed Development and Wakefield Agricultural Carbon for supplying us with various resources for the study. We are grateful to the staff of UGA-SEGREG for their support with field research activities.

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Extension Cotton Specialist Working Group Microbial Product Evaluation

Camp Hand, John Snider, and Henry Sintim

Each year, more and more microbial products are introduced into the marketplace for grower use. Chemical companies are investing heavily in microbial/biostimulant products for one reason or another. Many of these products supposedly improve plant health/vigor, nutrient use and uptake, and some claim to reduce plant stress. However, very little data is available on their effectiveness. This trial is an attempt to evaluate the effectiveness of a few microbial products across the cotton belt. Below are the microbial treatments evaluated:

1. Microsurge by Brandt – Talc powder accompanied with a microbial blend, applied to seed at planting
2. NTexx Edge by Asido – Microbial blend applied liquid in-furrow at planting
3. Symvado by Valent - Microbial blend applied liquid in-furrow at planting
4. Bio 800+ by Holganix - Microbial blend applied liquid in-furrow at planting
5. Envita by Azotic – Microbial blend applied overtop at pinhead square
6. Utrisha N by Corteva - Microbial blend applied overtop at pinhead square

All microbial products received 40 lbs N/acre, applied according to UGA Extension recommendations. Additionally, treatments were included to evaluate various N rates to determine if microbial products significantly improved N uptake and utilization by the cotton crop. N rates included in the study include: 0, 40, 80, 120, and 160 lbs N/acre. The UGA group is conducting this study in Tifton, as well as here in Midville. Data will be collected at the end of the season.

In addition to this study, other studies are being conducted on biostimulants/stress mitigators in Tifton.

Data will be shared through newsletters and presentations at county meetings in the coming year. If you have questions about this study or any other study, please don't hesitate to reach out to your local UGA County Extension Agent.

Impact of row arrangement and variety on cotton yield and net returns

Montana Hall, Caitlyn Lawton, Camp Hand

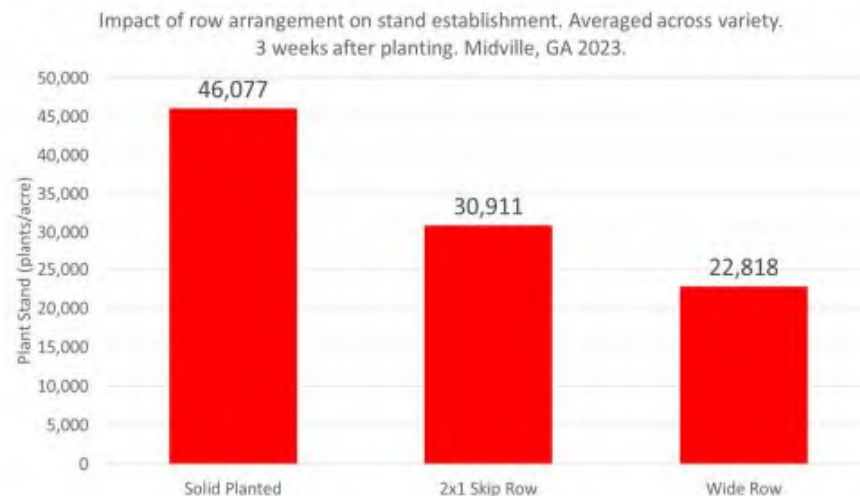
Last winter at county meetings I briefly discussed some wide row research we conducted in Tifton showing that a wide row system may not have a fit on the majority of the acres in GA. However, this study was on one variety in one location, and included row spacings that many growers in GA will not utilize. Thus, a new study was initiated in 2022 to evaluate the impact of row arrangement and cotton variety on lint yield and net returns. Three row arrangements are being evaluated: solid planted 36" rows, 2x1 skip row, and wide row (72" spacing). Four varieties are included in the study: ST 5091 B3XF, PHY 400 W3FE, DG 3799 B3XF, and DP 1840 B3XF. Cotton was planted May 22, 2023 at the same seeding rate per land acre. The entire study in regards to fertility, pest control, and growth management is treated the same on a land acre basis. This study is being conducted in Tifton (dryland), Attapulgis (irrigated), and here in Midville (irrigated). Below are the stand counts taken in Midville at three weeks after planting.

Skip row plots have 33% less plants per land acre, while wide row plots have 50% less plants per land acre compared to the solid plantings. At the end of the season, portions of these plots will be hand harvested to determine the contribution of fruiting branches

and vegetative branches towards lint yield, the rest of the plot will be machine picked and ginned at the UGA Microgin, and final fruit retention as well as boll rot will be evaluated.

In 2022, the standard row arrangement (36" rows, solid planted) resulted in the highest lint yield. One of the perceived benefits of the wide and skip row system is improved airflow through the canopy, which could potentially help with boll rot. In Midville last year, the standard row arrangement did have higher boll rot than the skip or wide row systems. **However, lint yield was still maximized in the standard row arrangement regardless of increased boll rot!!!** Based on the last three years of research, alternative row patterns/spacings are not effective management practices to reduce boll rot or hard lock. Even where they were reduced, yield was reduced as well.

For more information on this trial or the wide row study conducted last year, please contact your local UGA County Extension Agent.



Cotton Planting Seed Quality – Is there a better way to predict stand establishment than warm/cool germ???

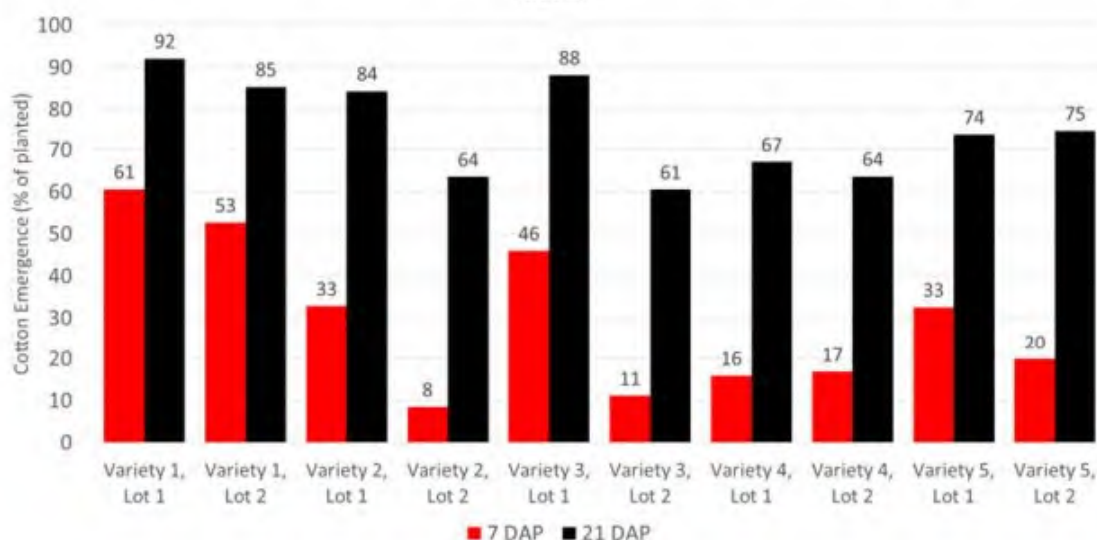
Extension Cotton Specialist Working Group (including Camp Hand and John Snider)

Seed quality is... complicated. If you are a grower and you have planted bad seed in the past, it is likely something you will not forget anytime soon. The investment made in cotton seed is a large one, and it is expected that when a grower pays that much money for a bag of seed that it will come up.

The only seed quality parameter monitored by law is warm germination %. However, many companies have their own internal standards that might include cool germination percentage, oil content, visual mechanical damage, and other factors as well. Research over the last two growing seasons has evaluated seed quality in 415 samples of grower purchased seed across the cotton belt (Arizona to Virginia). Overwhelmingly, the samples received and tested were acceptable. However, roughly 5 to 10% of the samples were unacceptable. Therefore, the Extension Cotton Specialist Working Group has decided to continue their work on seed quality.

The purpose of this study is to determine if there may be a better predictor of stand establishment in cotton than warm or cool germination. Five cottonseed varieties are included in this study, with two lots of each variety. One lot is supposedly “good”, while the other is “bad”. Below is emergence data from the Midville location as well as some of the variety/seed lot characteristics of each entry. Seed data is from last year and was just sent off for testing again.

Extension Cotton Specialist Working Group Seed Quality Project – Midville, GA
2023.



Treatment	Seed Size (seeds/lb)	Warm Germ (%)	Cool Germ (%)	Oil Content (%)
Variety 1, Lot 1	5,128	87	75	17.1
Variety 1, Lot 2	5,226	80	62	17.7
Variety 2, Lot 1	6,700	82	62	15.4
Variety 2, Lot 2	5,580	77	33	15.7
Variety 3, Lot 1	4,475	81	43	22.4
Variety 3, Lot 2	4,828	70	18	20.9
Variety 4, Lot 1	4,954	85	42	18.1
Variety 4, Lot 2	5,300	76	50	16.8
Variety 5, Lot 1	4,965	84	60	21.6
Variety 5, Lot 2	5,827	86	54	20.3

A wide range of seed sizes, warm/cool germ, and oil content are included in this study. Although there were some differences in cotton stand among treatments, the stands observed in the study here in Midville were acceptable across the board by 21 DAP (although not desirable in some cases). So what is there to learn in this scenario? This cotton was planted on May 22 at 3.3 seeds/ft, in warm soil, under irrigation. So, under ideal conditions, growers can still get an adequate stand of cotton even when some seed quality factors are less than ideal. Although conditions were optimal for this location and we received adequate stands by 21 DAP, I could only imagine that planting these same lots in more stressful conditions (cool soils, crusting, planted too deep, etc.) could cause some issues.

The conversation surrounding seed quality is complex. There isn't a one size fits all solution to this issue, but myself and Extension Cotton Specialists across the country are working in cooperation with the seed companies and Cotton Inc. to determine how we can all make the industry better.

If you have questions or concerns about cotton seed quality, contact your local UGA County Extension Agent. They have been trained on how to handle these types of issues.

Disclaimer: The "bad" seed lots provided for this study are not available in a commercial bag and would not be sold to a grower by any seed company. They were provided for experimental purposes only.



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