NATIONAL

PEANUT

BUYING POINTS

Association

The Impact of the Peanut Genomics Initiative on Cultivar Development

National Peanut Buying Point Association
February 2024

Peanut Genome Initiative

5 years

6 million

- Growers
- Shellers
- Manufacturers

Development of Molecular Markers for MAS

MAS ≠ GMO

Outline

- Some Early History
- A Few Examples of Success
- Impact on Our Breeding Program

Early History

Primary Goal: Develop MAS methodologies that lead to improved cultivars.

Approach:

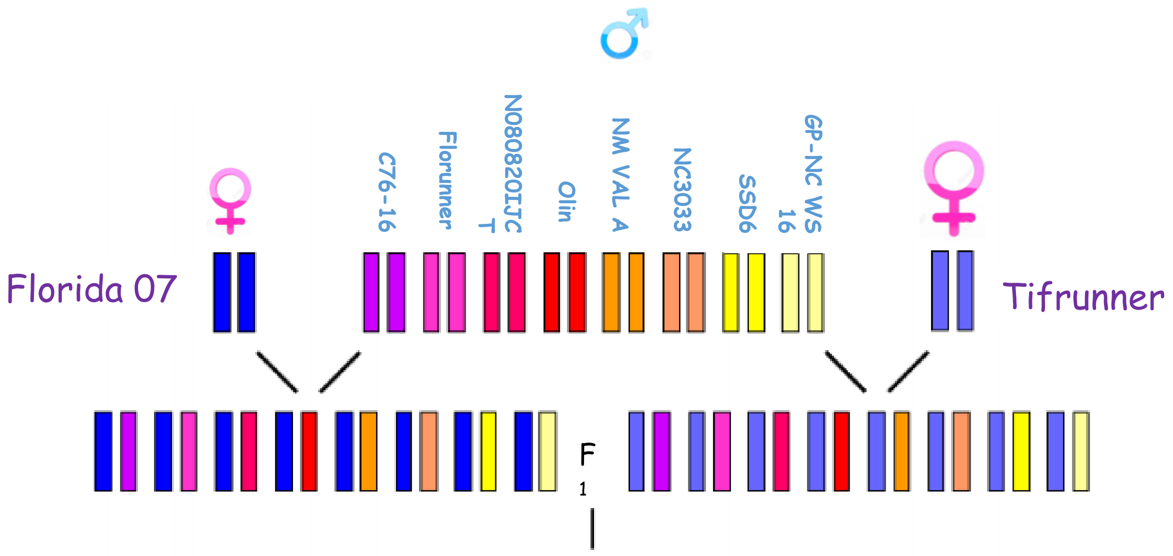
Develop Structured Populations

Genotype

Phenotype

CAP = NAM (nested association mapping population)

- CAP stands for “coordinated agricultural project” USDA NIFA 2007
- Led by Steve Knapp and breeders from most peanut growing states
  - To facilitate mapping economically important traits
  - Enhancing marker assisted breeding



F_2, F_3…F_6 recombinant inbred nested association mapping populations

Attributes for Parents of 16 RIL Populations

Parent	Common or Unique Parent	Market Class	Oleic Acid	TSWV	Early Leaf Spot	Late Leaf Spot	White Mold	Sclerotinina	CBR
Tifrunner	Common	Runner	L	R	MR	MR	S	U	U
Florida-07	Common	Runner	H	R	S	S	MR	U	U
N08082olJCT	Unique	Virginia	H	MR	MS	U	U	MR	MR
C76-16	Unique	Runner	L	MR	U	U	U	U	U
NC3033	Unique	Virginia	L	HS	MR	HS	R	U	HR
NM Valencia A	Unique	Valencia	L	S	S	S	HS	HS	U
OLin	Unique	Spanish	H	MS	S	S	U	R	U
SSD6	Unique	Exotic	L	HR	U	U	U	U	U
SPT 06-6	Unique	Exotic	L	U	HR	HR	U	U	U
Florunner	Unique	Runner	L	HS	S	S	S	S	S

Nested association mapping population size

	Tifrunner		Florida-07
NM Valencia A	76		270
Olin	161		190
N080820IJCT	398		247
SSD6	427		66
NC3033	375		394
Florunner	376		460
GP-NC WS16	394		381
C76-16	389		266
Total		4870	

Phenotyping Efforts

- C. Corley Holbrook
- Tim Brenneman
- Mark Burow
- Chris Butts
- Steven Cannon
- Carolina Chavarro
- Ye Chu
- Josh Clevenger
- Renje Cui
- Albert Culbreath
- Baozhu Guo
- Thomas G. Isleib
- Scott Jackson
- Craig Kvien
- Marshall Lamb
- Samuele Lamon
- Peggy Ozias-Akins
- Sara Beth Pelham
- Tom Sinclair
- Barry Tillman

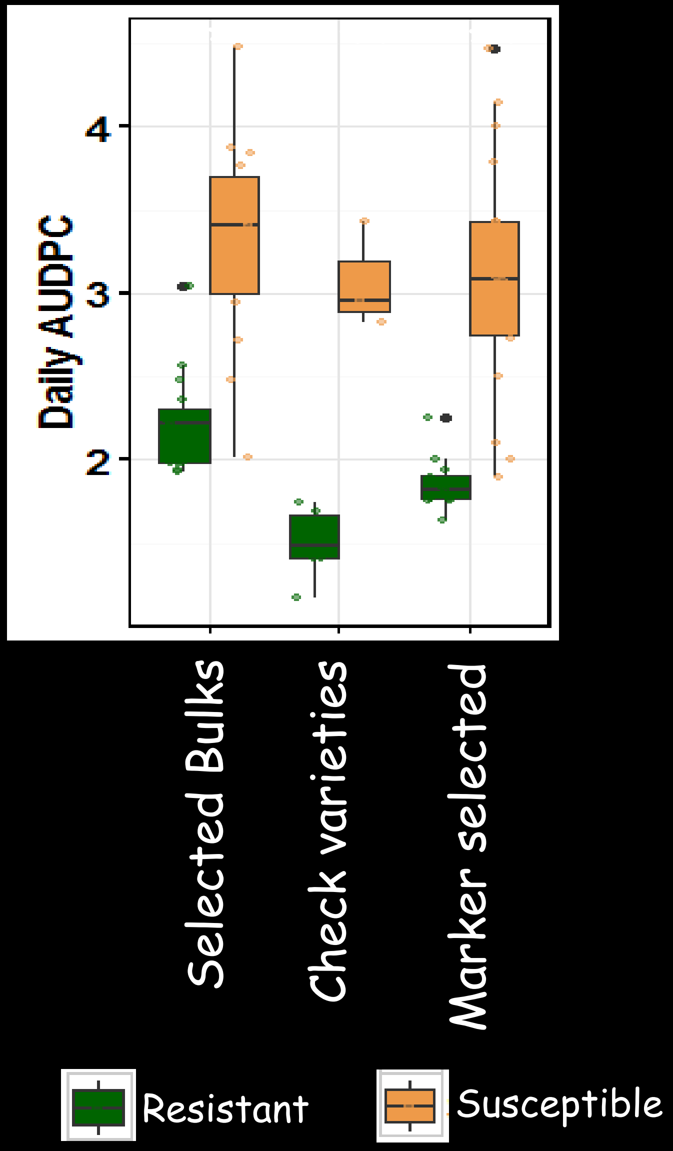
Examples of Success

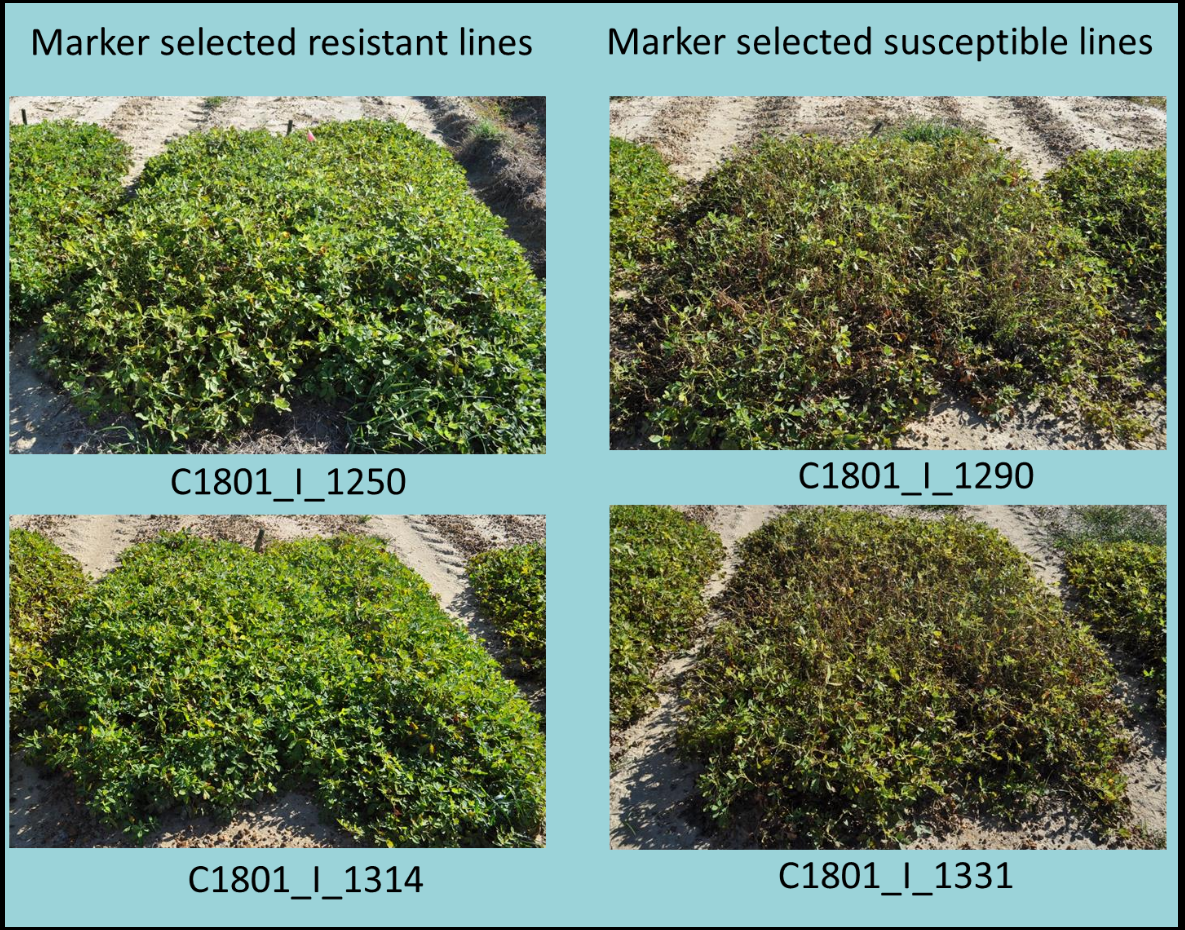
Mapping population for LLS resistance

Non-sprayed field of C1801 population
quantitatively segregating for LLS resistance

Major QTL’s for resistance to early and late leaf spot were identified on chromosome 3 and 5.

Late leaf spot resistance QTL validation with marker selected RIL Isleib's advancement





QTL-seq-Late Leaf Spot

3 QTLs

Validated

Implemented in breeding program

Release of TifGP-5 and TifGP-6
Chu et al. 2022

Release of TifGP-3 and TifGP-4
Holbrook et al. 2022

White Mold
C1799 = Tifrunner x NC 3033

Tifton, GA

Marianna, FL

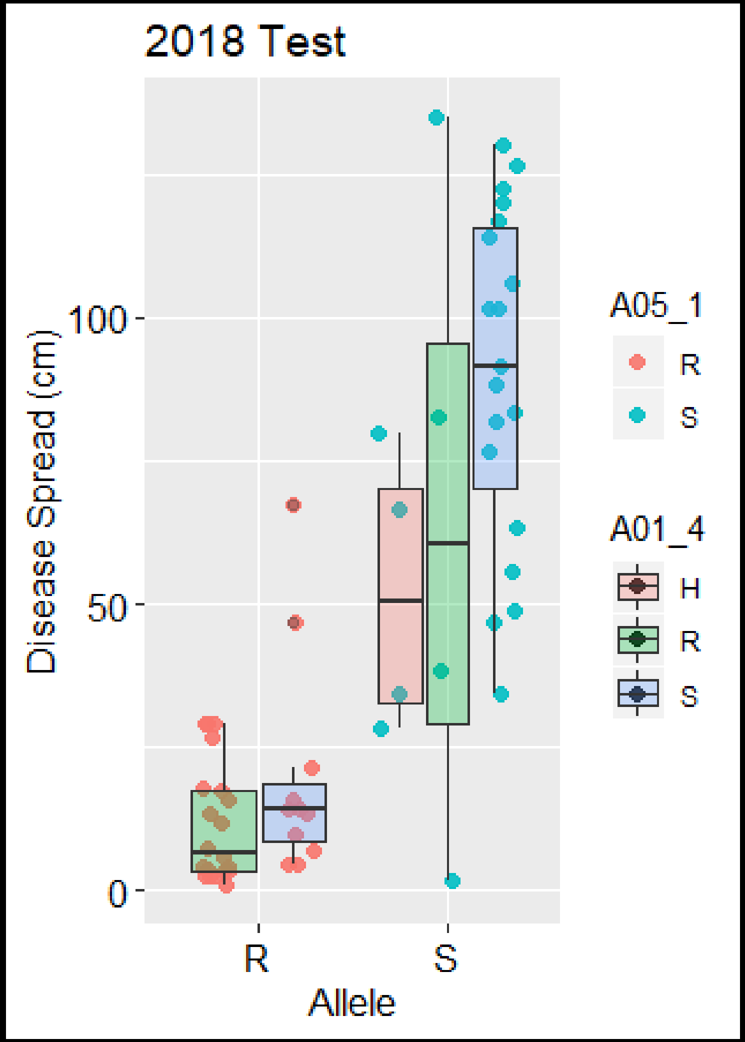
QTL - seq

QTL Seq.

Resistant QTLs identified on chromosome 1 and 5.

Used to select resistant and susceptible RILs.

Using sequencing technology effectively



Release of TifGP-7
Chu et al. (In Review)

Impact on Our Breeding Program

Use of Marker Assisted Selection in the USDA/UGA Breeding Program

2008 – Tifguard released – Strictly conventional breeding

2008 – 50 Samples for MAS

2009 – 2012 – 1,000 Samples for MAS

2013 – 4,000 Samples for MAS

2014 – 7,000 Samples for MAS

2015 – 10,000 Samples for MAS

2016 – 10,000 Samples for MAS with additional markers

2017 – 10,000 Samples for MAS – Seed Chipping

2018 – 15,000 Samples for MAS – Seed Chipping and additional markers.

Nematode
& High Oleic

Using MAS for:

- Resistance to Nematode
- Resistance to Leaf Spot
- Resistance to White Mold
- Resistance to TSWV
- Resistance to Peanut Smut
- Oleic/Linoleic Ratio

Markers Currently in Validation Studies:

- Drought Tolerance
- Reduced Aflatoxin Contamination

MAS in 2021

16.7K Peanut Tissue Samples

32 SNP Markers for 6 traits

108K Data Points

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New Precision Ag Technology in Peanut Production

Simer Virk
Assistant Professor &
Extension Precision Ag Specialist
University of Georgia
@PrecAgEngineer

UNIVERSITY OF GEORGIA EXTENSION

UNIVERSITY OF GEORGIA DIGITAL AG

Peanut Planters

Trends in Peanut Planting

- Peanut seeding rates are considerably higher than other crops (corn and cotton)
- Planting speed is normally slower (3.0 – 3.5 mph)
- Until recently, most of the planting technology advancements have been focused primarily towards other crops (primarily corn)

Planting Technology

Seed Monitor*

- Population (over or under)
- Seed Singulation (98 - 100%)

***by-row planting feedback**

Improvements in Seed Metering

John Deere

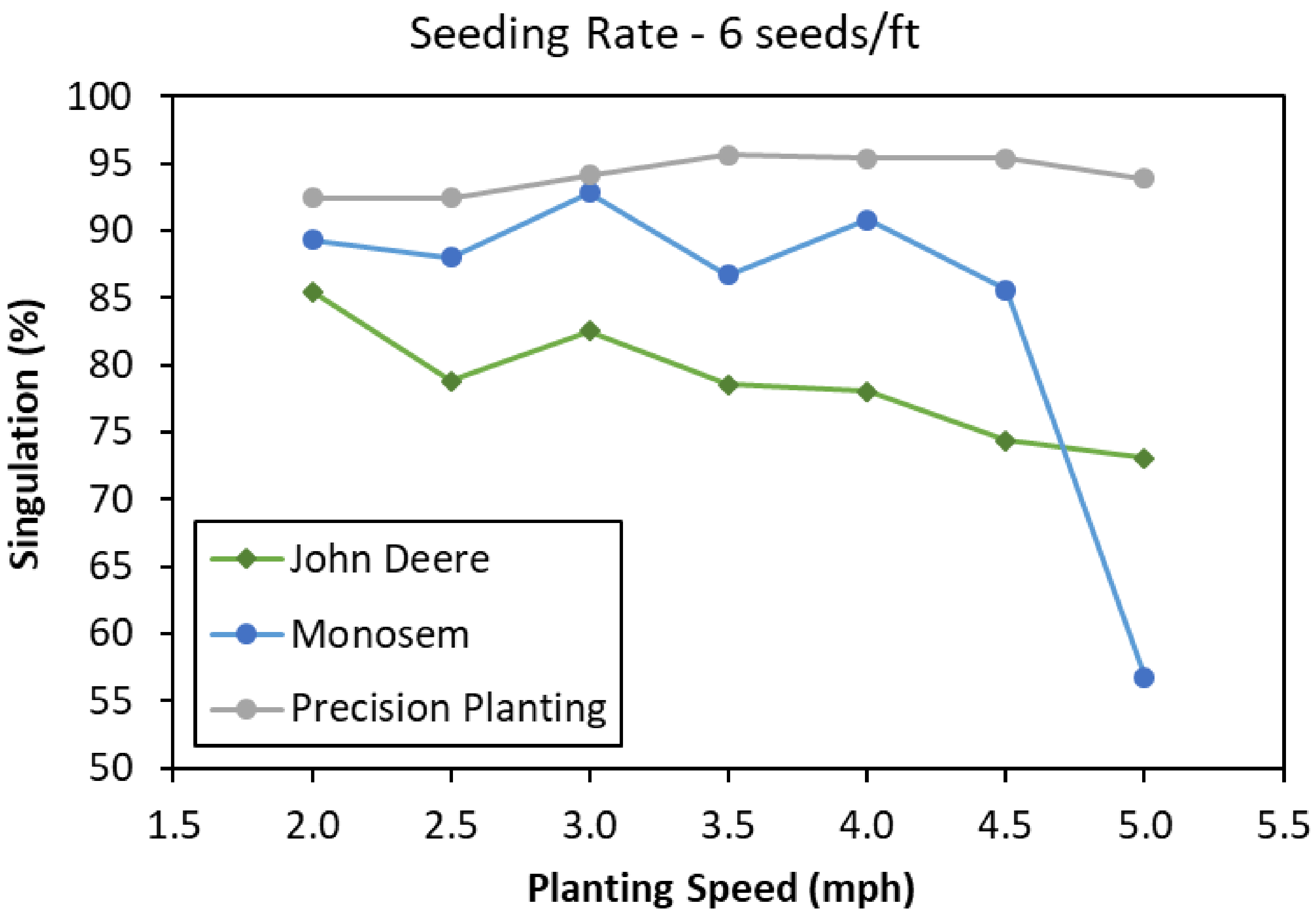
Monosem

Electric Seed Meters

Improved Seed Singulation

Singulation (%) at different speeds (6 seeds/ft)

Planting Speed (mph)	John Deere	Monosem	Precision Planting
2.0	85%	89%	92%
2.5	79%	88%	92%
3.0	83%	93%	94%
3.5	79%	87%	96%
4.0	78%	91%	95%
4.5	74%	86%	95%
5.0	73%	57%	93%



Peanut Seed Placement

Optimal planter downforce is required for accurate seed placement:

- *Seed Depth*
- *Seed-to-Soil Contact*

Downforce Technology Options

Active Downforce Systems

Benefits:

- Enable automatic downforce adjustments as field conditions change
- Improves seed placement in varying field conditions

Advanced Planting Technologies

Controlled Seed Delivery:

Provides controlled seed delivery to the furrow from the seed meter

SmartFirmer:

Provides real-time information on soil properties (moisture, temp and organic matter) during planting

SmartDepth:

Enables real-time seed depth adjustments based on a preset range, soil moisture, or OM

Peanut Sprayers

Without a rate controller

With a rate controller

Trends in Peanut Pesticide Applications

- Lower spray volumes
- Larger droplets/nozzle types
- Increased ground speeds
- Minimal technology on sprayers

Common Nozzles used for Peanut Pest Management

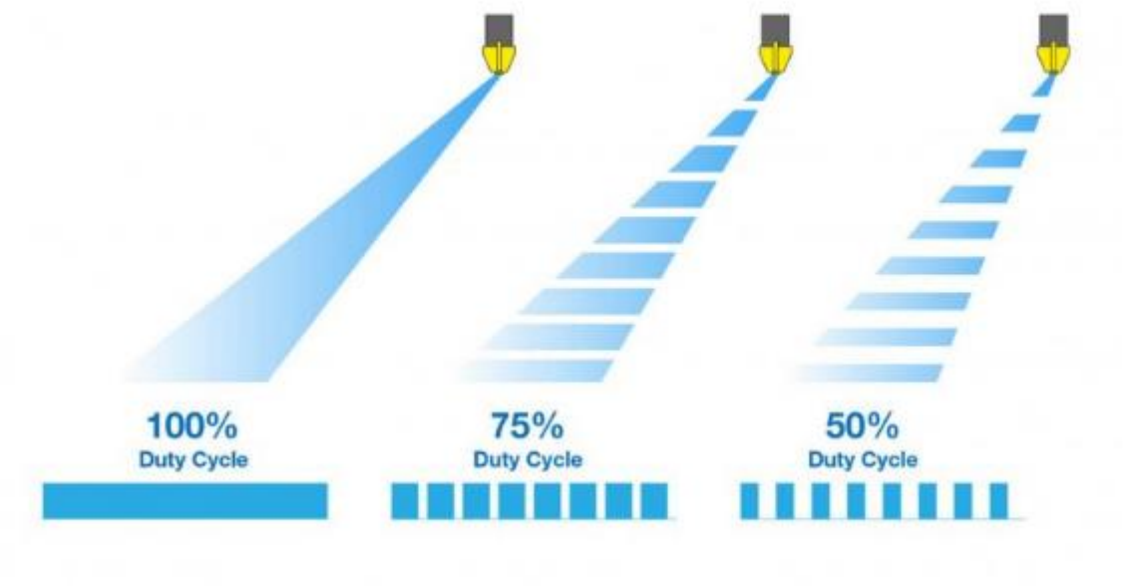
Standard Flat-Fan (XR)

Air-Induction (AIXR)

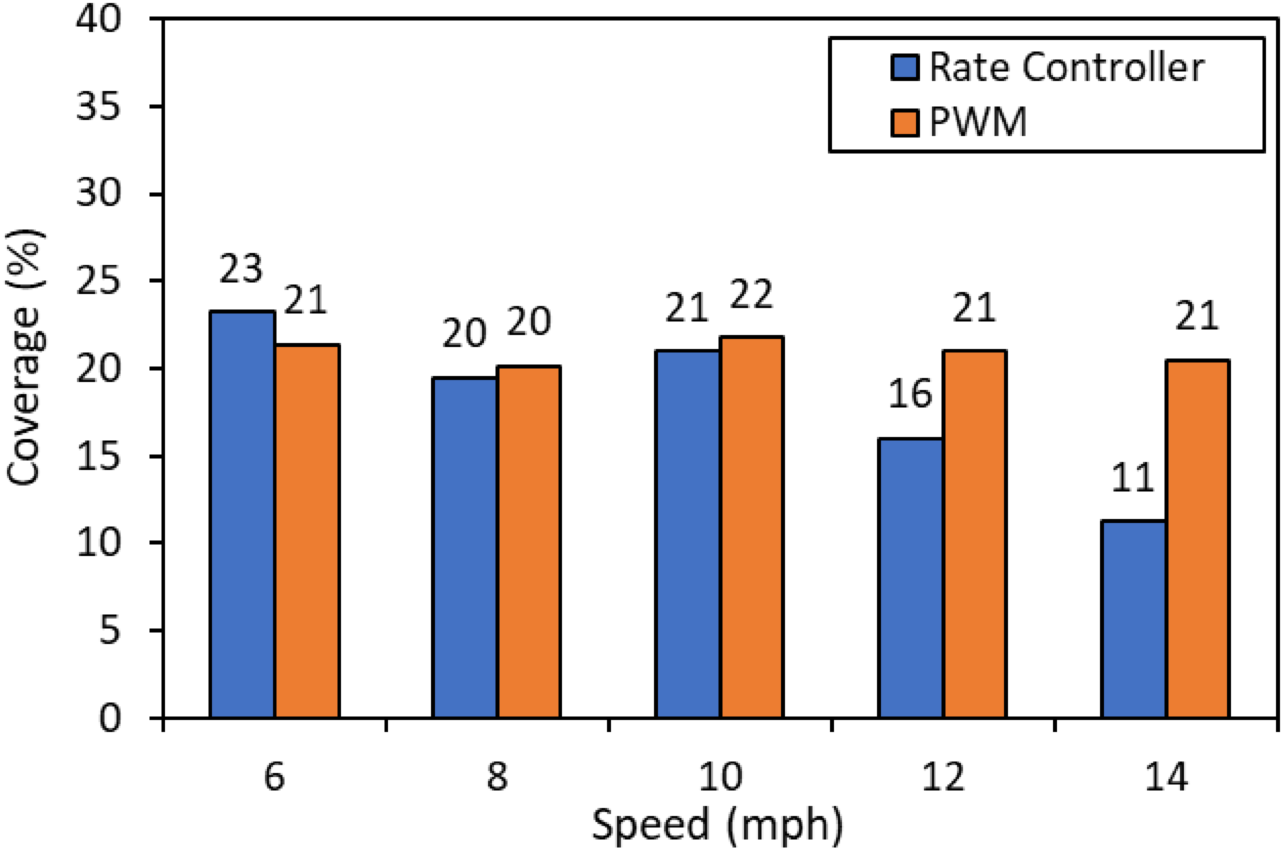
Dicamba Tip (TTI)

Pulse-Width Modulation (PWM) Technology

- Constant spray pressure across the boom (droplet size control)
- Flow (rate) changes are accomplished by varying duty cycle



Spray Coverage – Rate Controller vs PWM



Spray Drone Applications

- **Spot-spray herbicide applications** – where it is efficient and economical to treat with a drone sprayer.

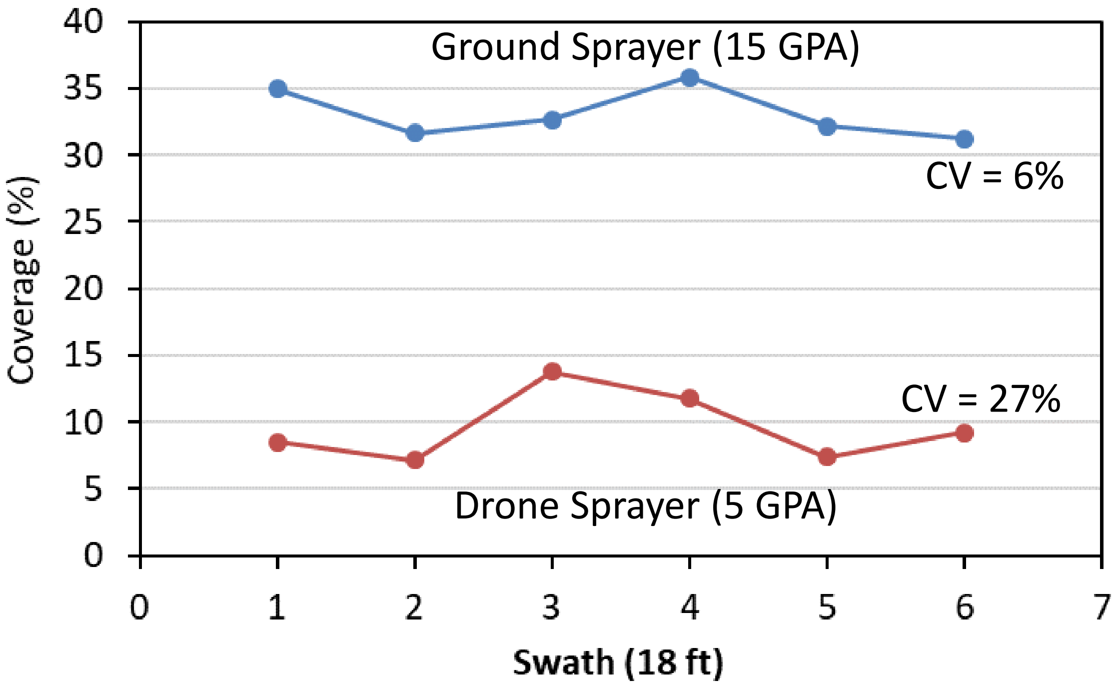
- **Fungicide applications** – when a timely fungicide application with a ground sprayer or crop duster is not feasible.

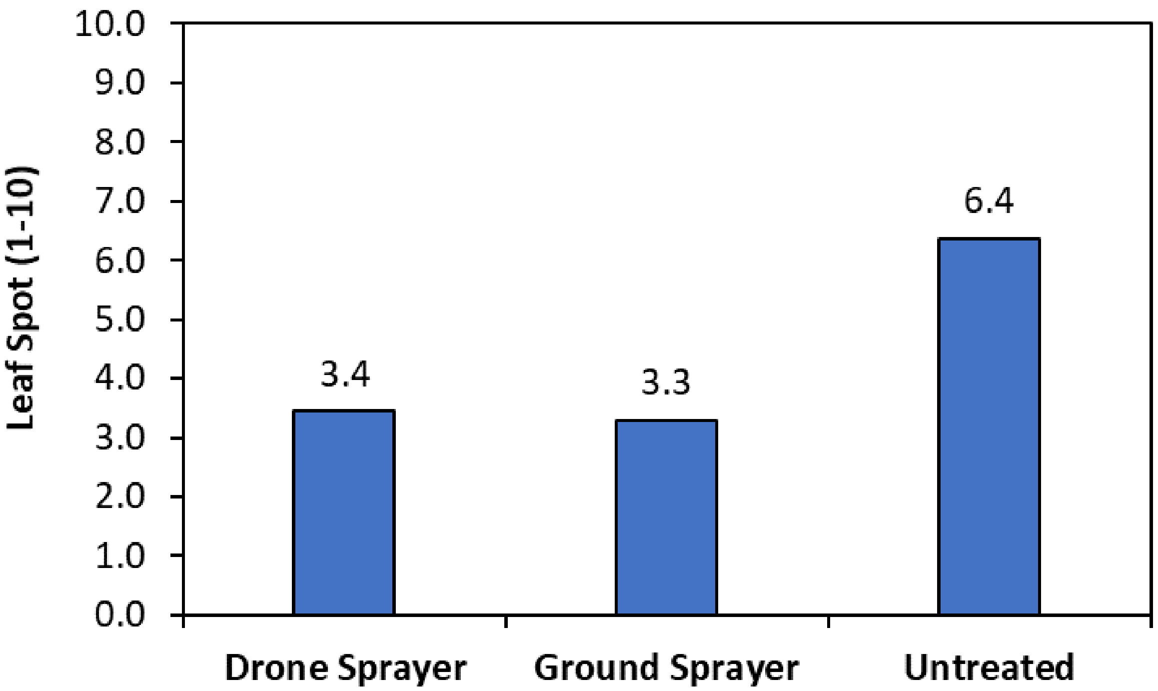
- **Awkward acres or small fields –** fields or parts of the fields that makes applications with ground and/or crop duster challenging.

Spot-Spray Herbicide Applications

Fungicide Applications

Fungicide Applications – Ground Sprayer vs Spray Drone





Thanks!

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PhycoTerra®

A Novel Technology to Improve Soil Function and Peanut Crop Performance

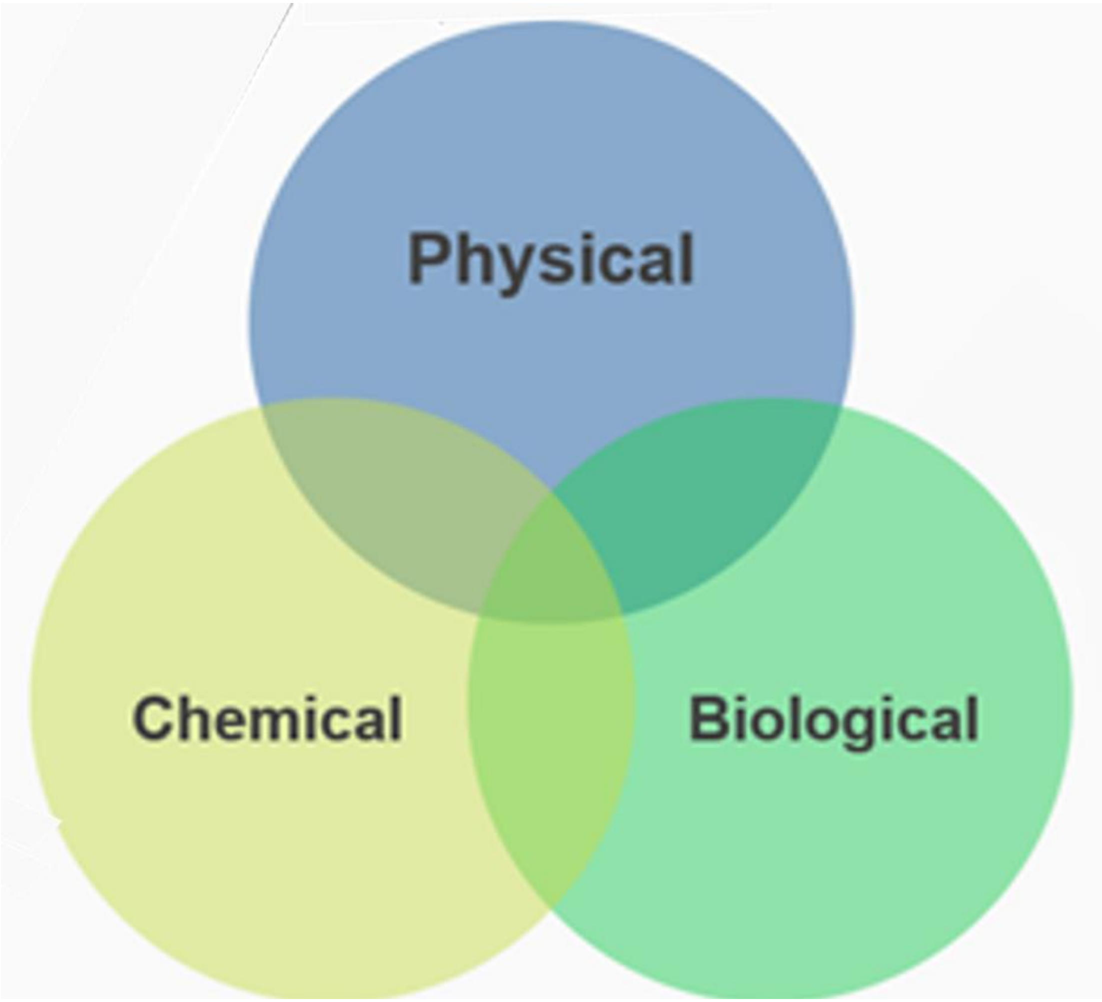
National Peanut Buying Points Assoc. Mtg
Savannah, GA
February 18, 2024

Mike Miller
Sr. Field Agronomy Manager, CCA
Heliae Agriculture

Agenda

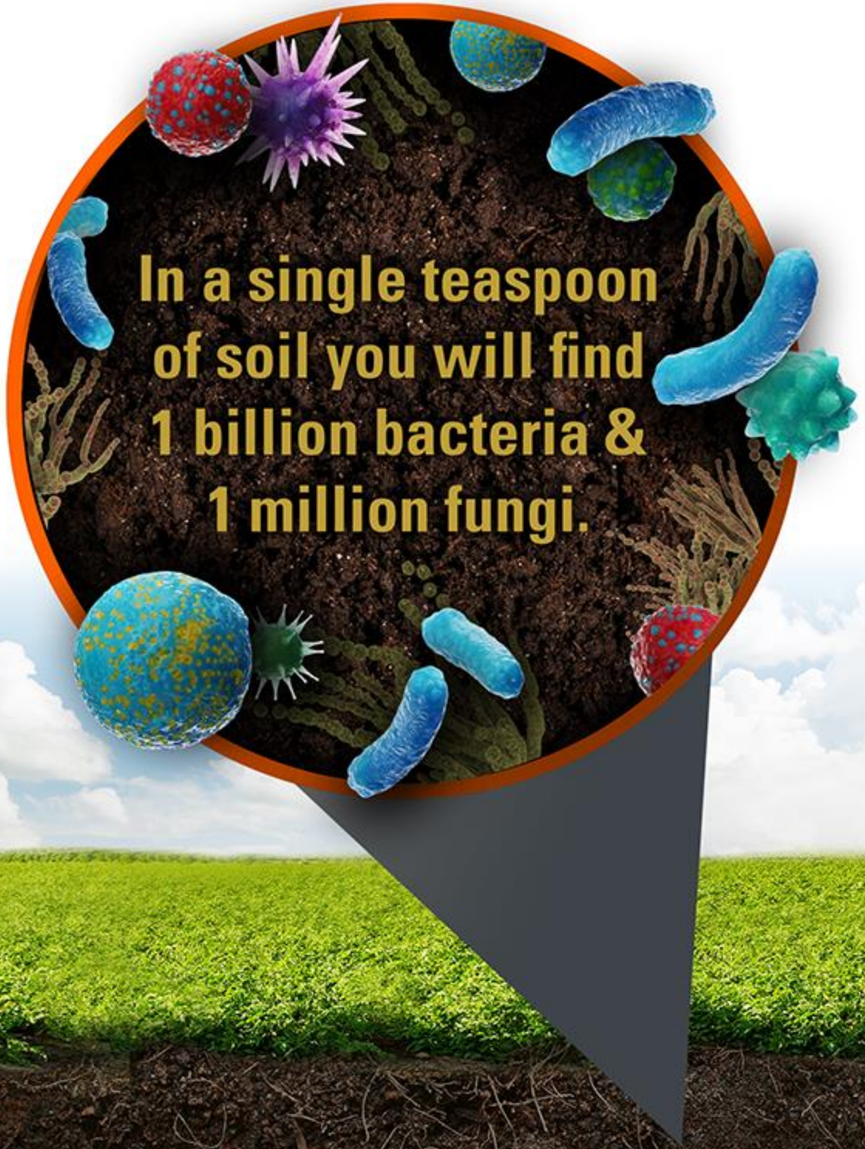
- Maximizing Soil Function
- A New Technology for Peanut Production
- Results in the Field
- Next Steps

Maximizing Soil Function



How do you maximize the most valuable asset on your farm?

75% of native microbes (bacteria & fungi) found in soil are dormant. Without a proper food source, your soil cannot maximize nutrient availability & water retention, contributing significantly to crop growth & development.



Wake them up with …

PhycoTerra®


WAKE UP YOUR
SLEEPING GIANT
PhycoTerra®

Why wake them up?

PhycoTerra®

BACTERIA

Bacillus species – **bacteria** that helps with pathogen control and nutrient availability for plants; may have plant growth promoting abilities (PGRB).

Pseudomonas species – **bacteria** that helps with pathogen control and nutrient availability for plants (PGRB).

Azospirillium – free-living **bacteria** that helps with N fixation on *non-legumes* (corn, wheat, etc.).

Aspergillus species - **bacteria** that produce enzymes that break down hard-to-digest plant fibers which frees up nutrients. Members of this genus can also be plant pathogens.

FUNGI

Mycorrhizae – a beneficial plant/**fungal** symbiosis that help trees get more water and phosphate.

Trichoderma species – a beneficial **fungus** that helps protect the plants against pathogens.

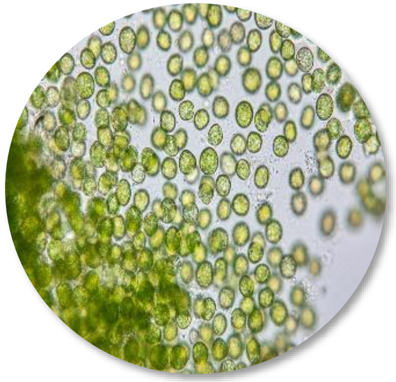
Yeasts/protein mixes – nutrient delivery source for plants (amino acids, NPK, etc.).

Put a Latent Resource on Your Farm to Work for You!

PhycoTerra®

What's in this New Technology ?

Microalgae



- **Single-celled algae**
- **Microscopic in size**
- **Complex constituents**
- **Native soil microbe food**

✓ **Native Soil Organism**

✓ **Not Live** – two-year shelf life, no special storage

✓ **Not a microbial inoculant**

✓ A diverse and rich **"superfood" for native soil microbes**

✓ **Proprietary** Strain & Isolate

✓ **Optimized for crop agriculture** (traditional mutagenesis)

Interested in the Role of Microalgae in Soils and Agriculture?

2022 Frontiers in Environmental Science

<https://www.frontiersin.org/articles/10.3389/fenvs.2022.1035332/full#:~:text=Microalgae%20are%20beneficial%20for%20soil,soil%20structure%20and%20soil%20quality%20(>

Improves Native Soil Biology and Soil Structure

PhycoTerra®

- PhycoTerra® provides super food to the microbiome
- PhycoTerra feeds microbes & puts them to work
- An active microbiome improves soil structure, promoting healthy crops

Typical Ag Soil
Limited Microbial Growth

Secreted Glues

Soil agar + PhycoTerra®
Excellent **Abundance + Diversity**

All Soils Respond to PhycoTerra®

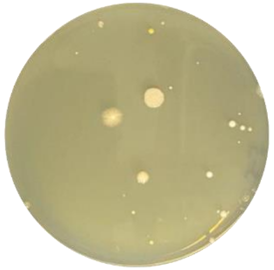
PhycoTerra®

North Carolina

12X INCREASE

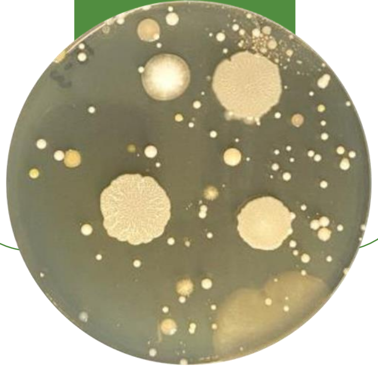
CFU/g soil | Sandy Loam

pH – 5.0 SOM – 1.0%



UTC

PhycoTerra®
8 Days



Georgia

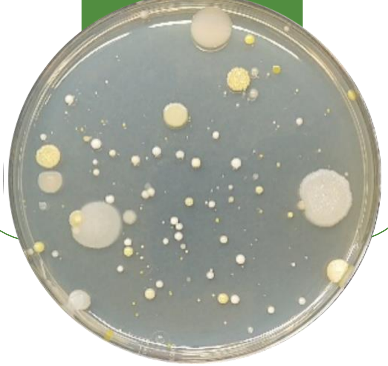
6X INCREASE

CFU/g soil | Loamy Sand

pH – 5.6 SOM < 1%

UTC

PhycoTerra®
12 Days



Kansas

5X INCREASE

CFU/g soil | Clay Loam

pH – 6.9 SOM – 3.7%

UTC

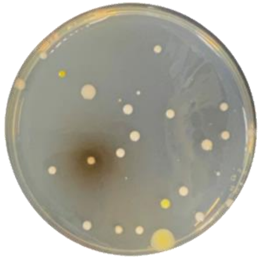
PhycoTerra®
12 Days

Iowa

15X INCREASE

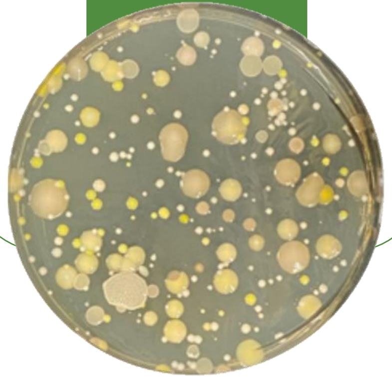
CFU/g soil | Silt Loam

pH – 5.6 SOM – 3.2%



UTC

PhycoTerra®
21 Days

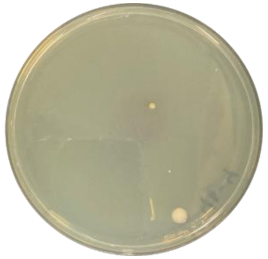


Arizona

33X INCREASE

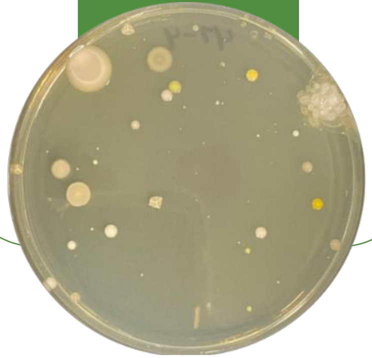
CFU/g soil | Sandy Loam

pH – 7.5 SOM – 2.2%



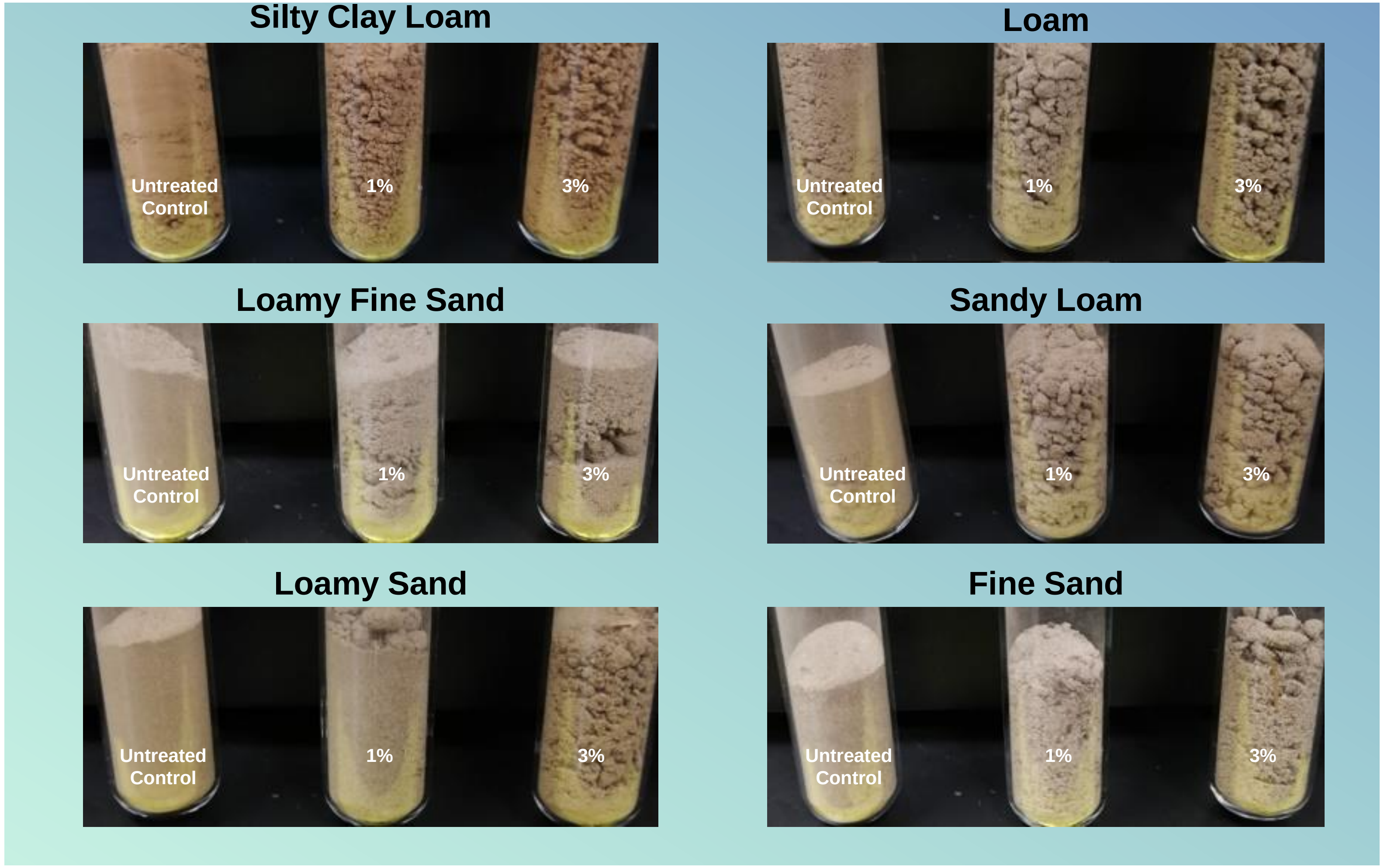
UTC

PhycoTerra®
21 Days



PhycoTerra®

Structure of all Soils Improved with PhycoTerra®



Structure changes after 3 biweekly applications

PRODUCT TYPE	CARBON ROLE IN SOIL SYSTEM
Microbial Food Source	Microbial food, promoter of structure-crop productivity
Enzymes	Specific reactions in the soil
Inoculants	Specific *living* microbial species or communities
Fulvic Acids	Nutrient retention, plant absorption, and complexation
Seaweeds & Kelps	Plant growth promoter, stress management
Humic Acids	Nutrient retention, complexation, structure

SOC %

CARBON-BASED PRODUCTS

https://www.ag.ndsu.edu/publications/crops/soil-organic-matter-does-matter/sf1942.pdf

PhycoTerra®

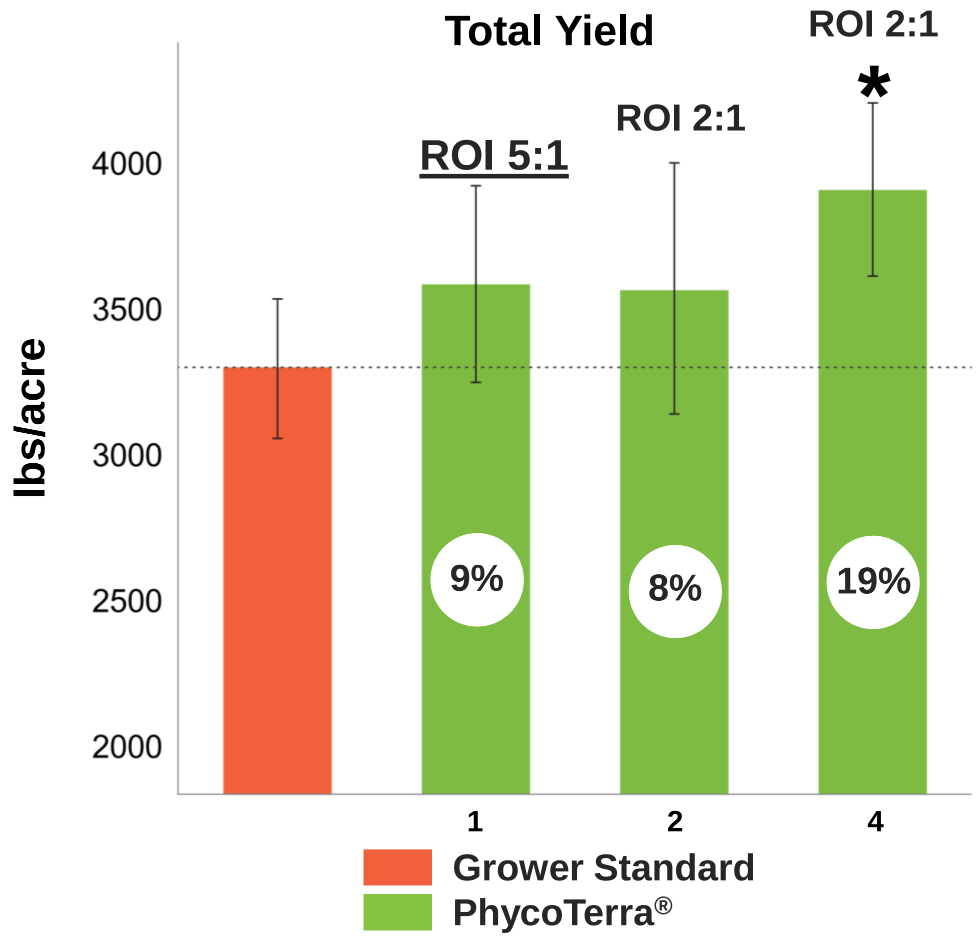
FEATURES		BENEFITS
Unique Mode of Action with proven on-farm results		• Optimizes NPK availability • Improves water holding capacity up to 10% • Supports abiotic plant stress • Improves soil aggregation
Proprietary, Innovative Formulation		• Compatible with other crop inputs • Flexible application: pre-plant, in-furrow, side dress & post-emergence, fertigation • Exceptional shelf-life, up to 2 years
Activate soil microbes		• Improves yield & ROI • Increases microbial activity by up to 33x • Feeds beneficial native microbes with inert microalgae superfood

Product Details

PhycoTerra® is NOT live, not a fertilizer, a foreign microbe or a biostimulant.

Application Rate Considerations

*Trial Location: **Tifton, GA***



*Error bars represent 90% Confidence Interval, Significance tested using LSMeans Dunnett (α=0.1)

SOIL TYPE:
Sandy Loam

VARIETY:
GA-16HO

TRIAL INFO:
University

APPLICATION RATE:
1,2 & 4qts/acre

APPLICATION TIMING:
One-time PhycoTerra® applied in-furrow at planting

Greater On-Farm Profits
Economic Sustainability

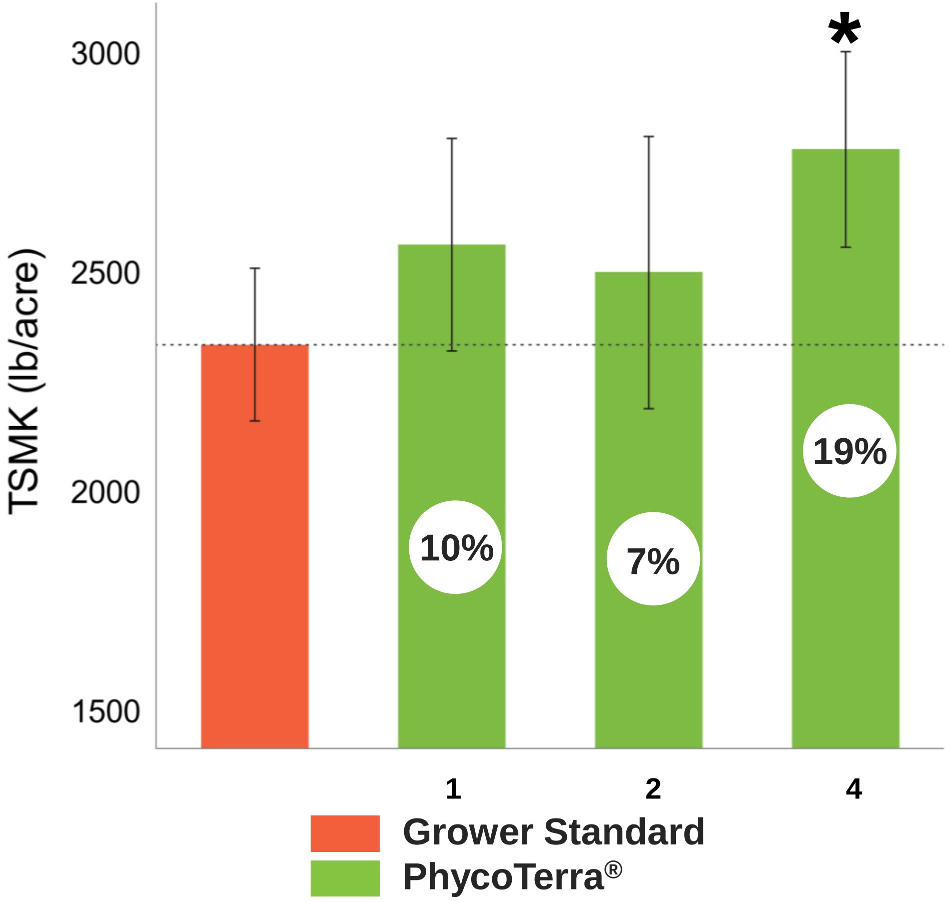
More Crop with Same Amount of Fertilizer
Fertilizer Use Efficiency

More Crop with the Same Amount of Water
Water Productivity

Peanut Quality

*Trial Location: **Tifton, GA***

Yield – Total Sound Mature Kernel (TSMK)



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SOIL TYPE:
Sandy Loam

VARIETY:
GA-16HO

TRIAL INFO:
University

APPLICATION RATE:
PhycoTerra® (1 qt/acre)

APPLICATION TIMING:
PhycoTerra® applied in-furrow at planting

Improved Peanut Quality

Peanut Application

- Apply one time in seed-furrow at planting at 1 quart per acre (best ROI for grower)
- Apply in addition to standard in-furrow Bradyrhizobium inoculants
- Neutralize pH of PhycoTerra® to 6.0-6.5 prior to addition of Bradyrhizobium inoculant

PhycoTerra®

Performance
Start with the Ending

Trial Type	Trial Design	Trial Number	Average Yield Increase (lb/Ac)	PhycoTerra® ROI	Trial Wins	Win Rate
University	Replicated, Randomized	9	269	5:1	9	100%
Grower Trials	Split Field	16	505	6:1	11	69%
All Trials	Both	25	387	5.5:1	20	80%

PhycoTerra®

2020 Commercial Grower Trials

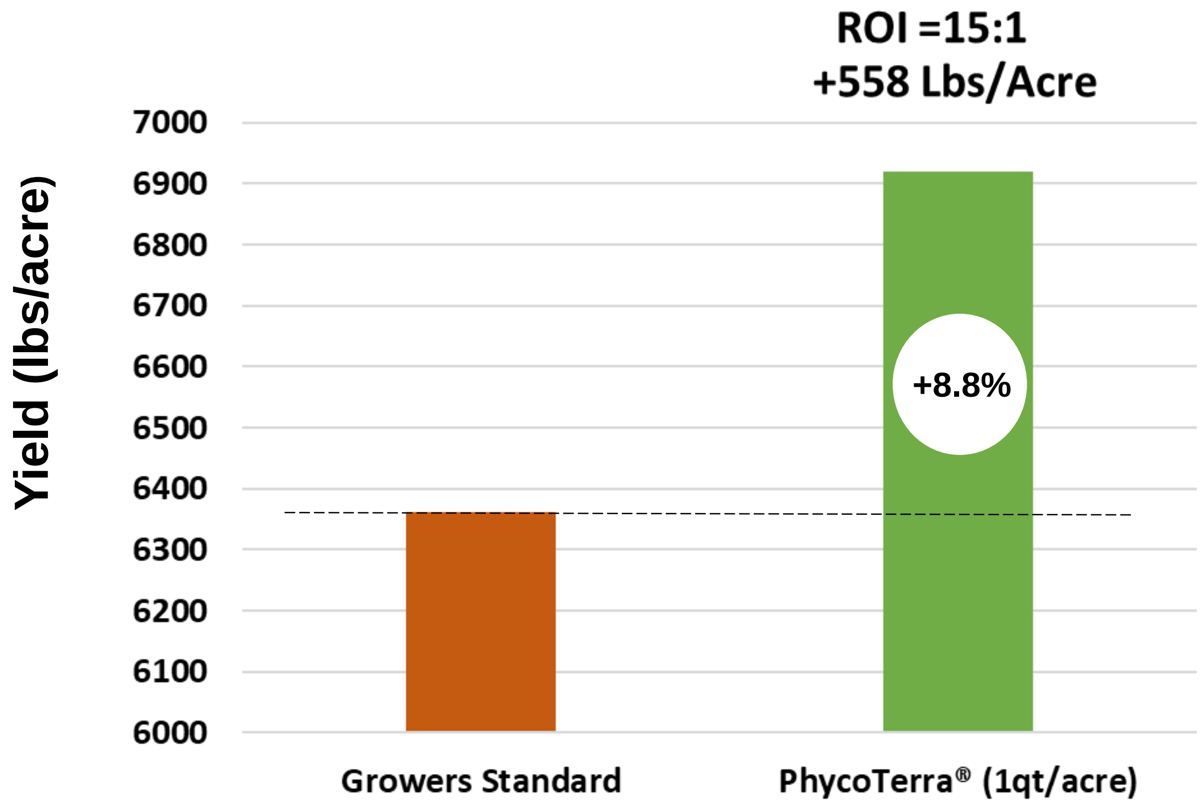
Trial Locations: ***Georgia***

- Split-field design
- PhycoTerra® applied in-furrow at planting (1qt/acre)

- **86% trial win rate** (6 out of 7 trials)
- **8:1 average ROI**
- **+362 (lbs/acre)** average yield increase
- **+76 ($/ac)** average value increase
- **Improved TSMK in 5 of 7 (71%) of trials**

Good moisture early, drier than average mid-late season

2020 Grower Trial Example



TSMK 74% 78%

SOIL TYPE:
Loamy Sand - Sand

APPLICATION RATE:
PhycoTerra® (1qt/ac)

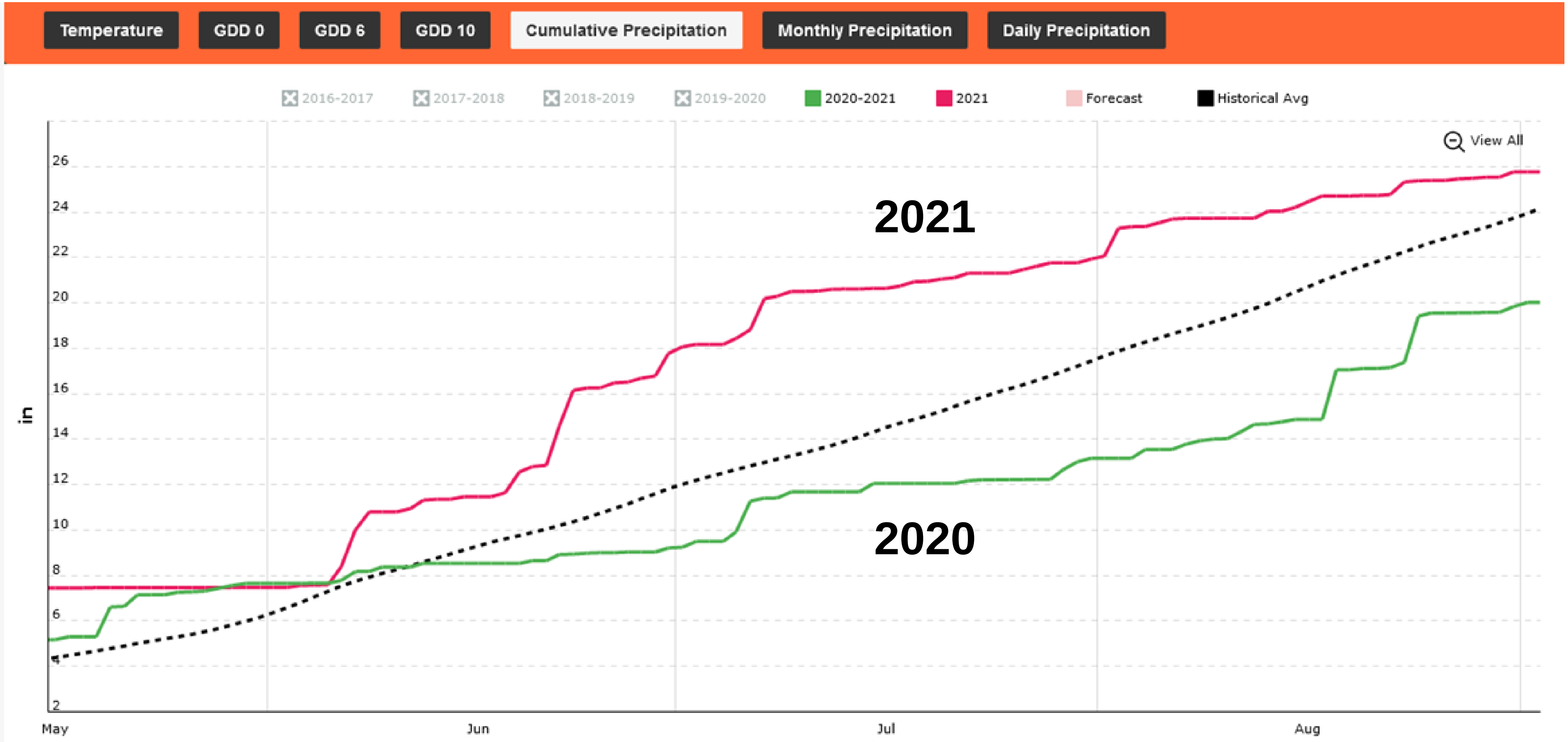
VARIETY:
GA-06G

APPLICATION TIMING:
In-furrow at planting

TRIAL TYPE:
Grower trial

PLANTING/HARVEST INFO:
5/17/2020

2020 & 2021 – Precipitation
A Tale of Opposites



2021 Grower Trial Summary

*Trial Locations: **Georgia***

- Split field design
- PhycoTerra® applied in furrow at planting (1qt/acre)

56% trial win rate (5 of 9 trials)

Average ROI was 4:1

+643 (lbs/Ac) average yield increase

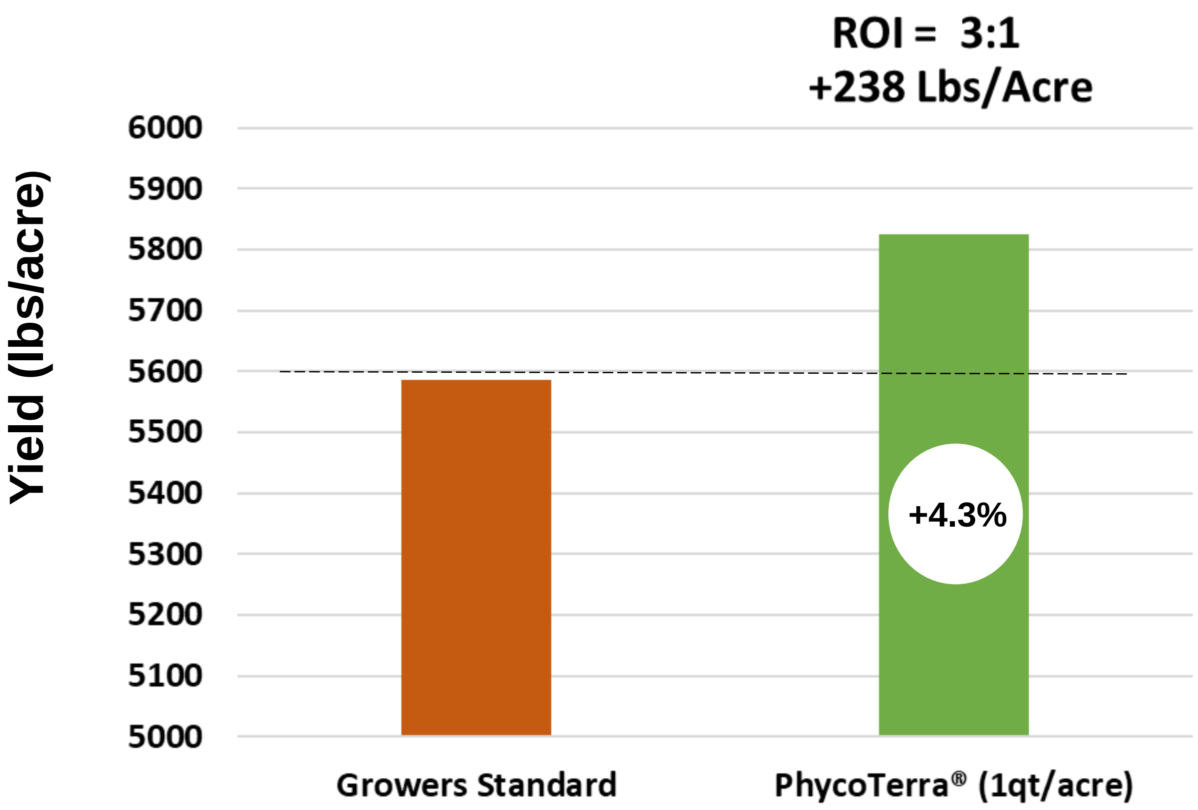
+$50.95 ($/ac) average value increase

Improved TSMK in 2 of 9 (22%) of trials

Standing water, over-saturated soils, soil leaching prevalent

2021 Grower Trial Example

Trial Location: Georgia



TSMK 75% 74%

SOIL TYPE:
Loamy Sand - Sand

APPLICATION RATE:
PhycoTerra® (1qt/ac)

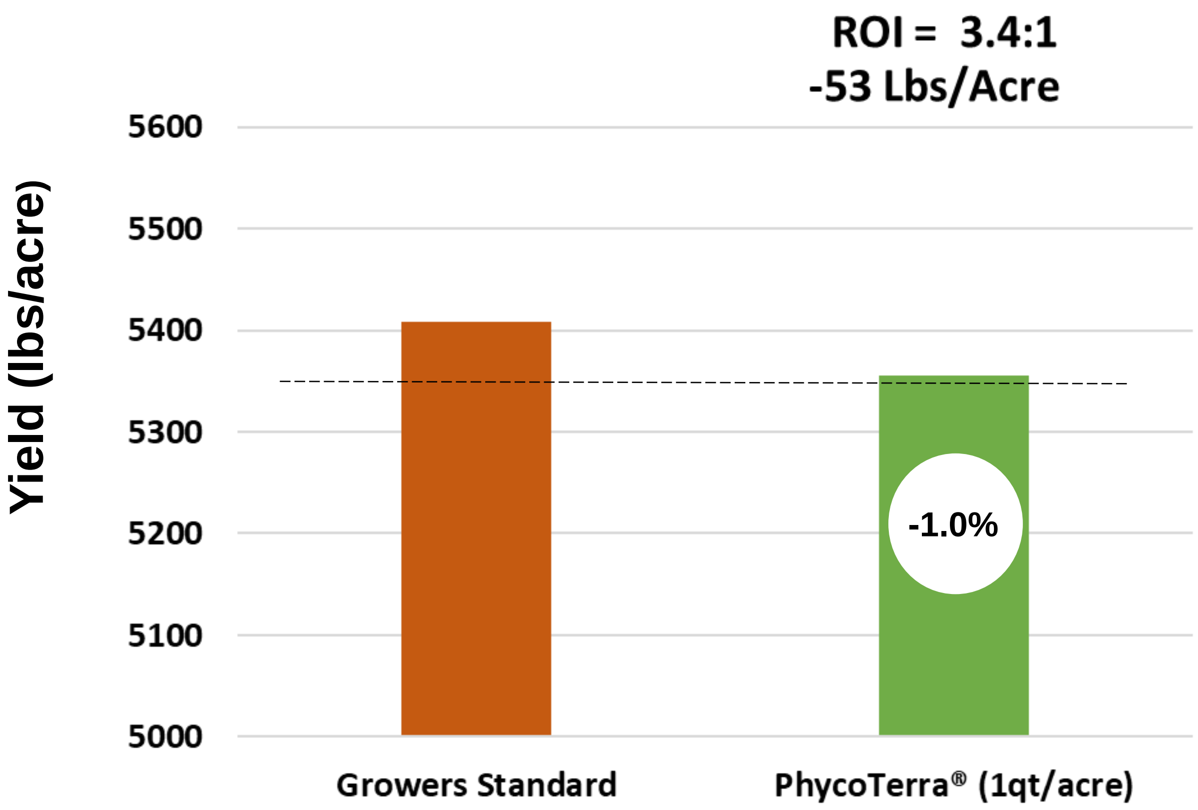
VARIETY:
GA-06G

APPLICATION TIMING:
In-furrow at planting

TRIAL TYPE:
Grower trial

PLANTING/HARVEST INFO:
5/6/2021

2021 Grower Trial Example



TSMK 74% 78%

SOIL TYPE:
Loamy Sand - Sand

APPLICATION RATE:
PhycoTerra® (1qt/ac)

VARIETY:
GA-06G

APPLICATION TIMING:
In-furrow at planting

TRIAL TYPE:
Grower trial

PLANTING/HARVEST INFO:
5/24/202

✓ **Trial won by quality, not yield**

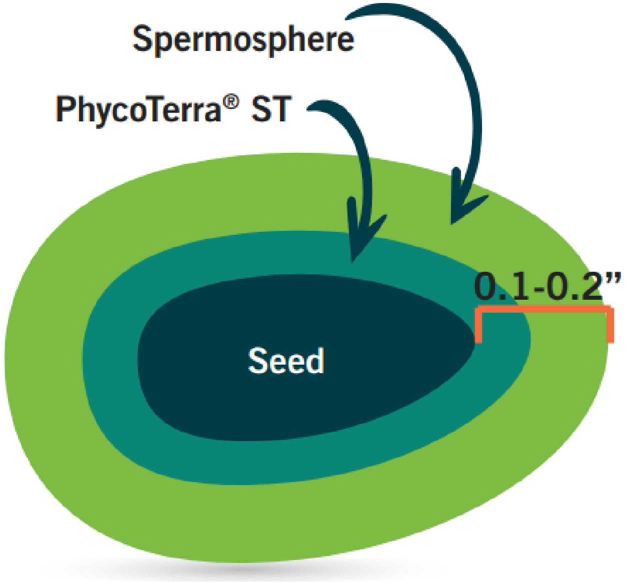
PhycoTerra® ST

PhycoTerra® Seed Treatment to support germination, early development & yield

SeedWorld TOP 10 MOST INNOVATIVE PRODUCT

SOYBEANS

ROI	BU/AC
34:1	+3.5



2021 to 2024 (0 acres to ~7mil acres)

PhycoTerra® ST for Peanuts

In Summary

- Simple application that fits seamlessly into typical farm practices
- An untapped new approach to higher farm profits
- Improved quality in drier conditions
- PhycoTerra® improves the utilization of farm resources (soil, fertilizer, water and money)
- Next stage, Phycoterra® ST for peanuts

heliae AGRICULTURE

PhycoTerra® Education & Resources
<https://phycoterra.com/resources/#articles>

PhycoTerra

PhycoTerra®
POWERED BY HELIAE AGRICULTURE

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NATIONAL PEANUT BUYING POINTS Association

National Peanut Crop Update

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New Communication Effort

You can find us on:

- Spotify
- Apple “Podcasts”
- Internet search

Impact of Weather Across the Peanut Belt

Weather had a large impact on the peanut productivity in 2023

Many states in the SE had to deal with the weather:

- Cool and wet May
- Dry and hot in July-August
- Cool fall

Disease and Insects

Lower Yield – SE Region, West Region; MS

Good Yield -- Carolinas, AR, MO, North MS

Lower Grades in many states

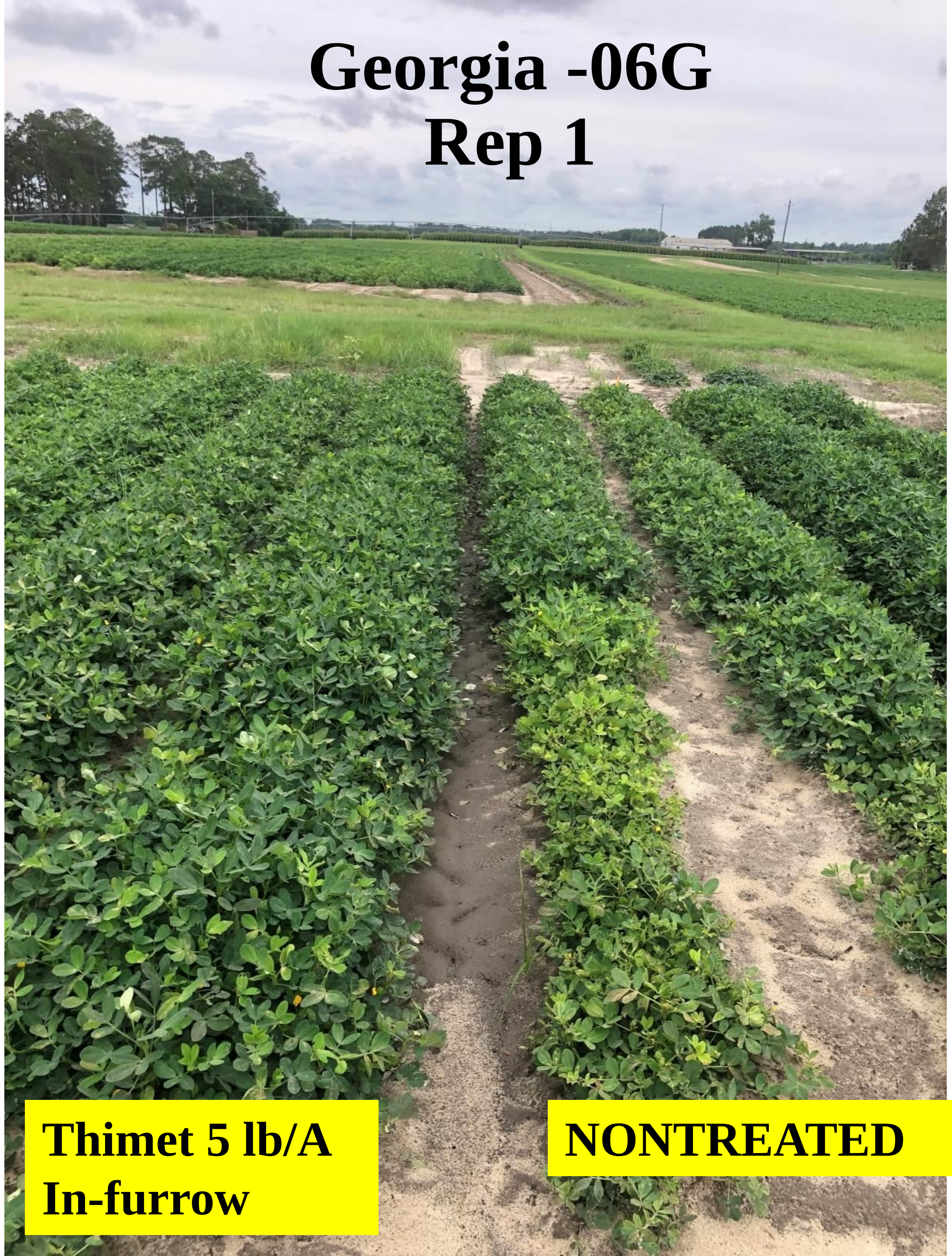
1. Cool Wet Soils for much of May

Cool Wet Soils + Low Vigor Seed? = Poor Stands

Increase in TSWV over last 3 years

UNIVERSITY OF GEORGIA
EXTENSION

Georgia -06G
Rep 1



Weather and Seed Quality Impacted Planting and Stand Establishment

Planting window in GA from late April until June

Last five years : 2018-2022
1/4 of crop planted before May 10^{th}
1/2 planted between May 10^{th} –May 25^{th}
1/4 Planted May 25- June 15^{th}

In 2023:
1/4 of crop planted before May 20^{th}
1/2 planted between May 20^{th} –May 30^{th}
1/4 Planted May 30- July 1st

Irrigated Acres: 447,734 (58%)
Non-Irrigated : 322,681 (42%)

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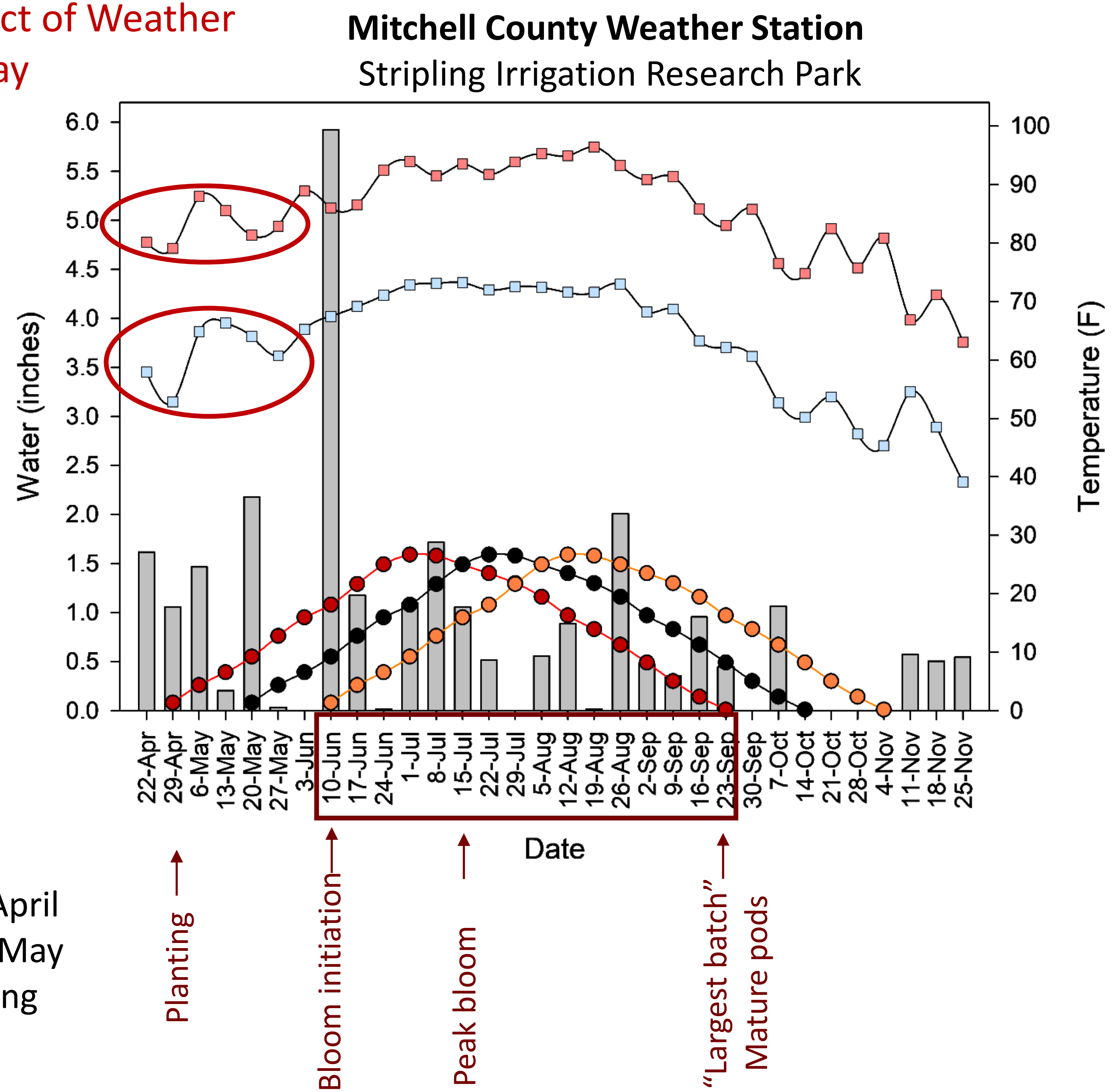
Some States had a Better Start than SE Region

Impact of Weather in May

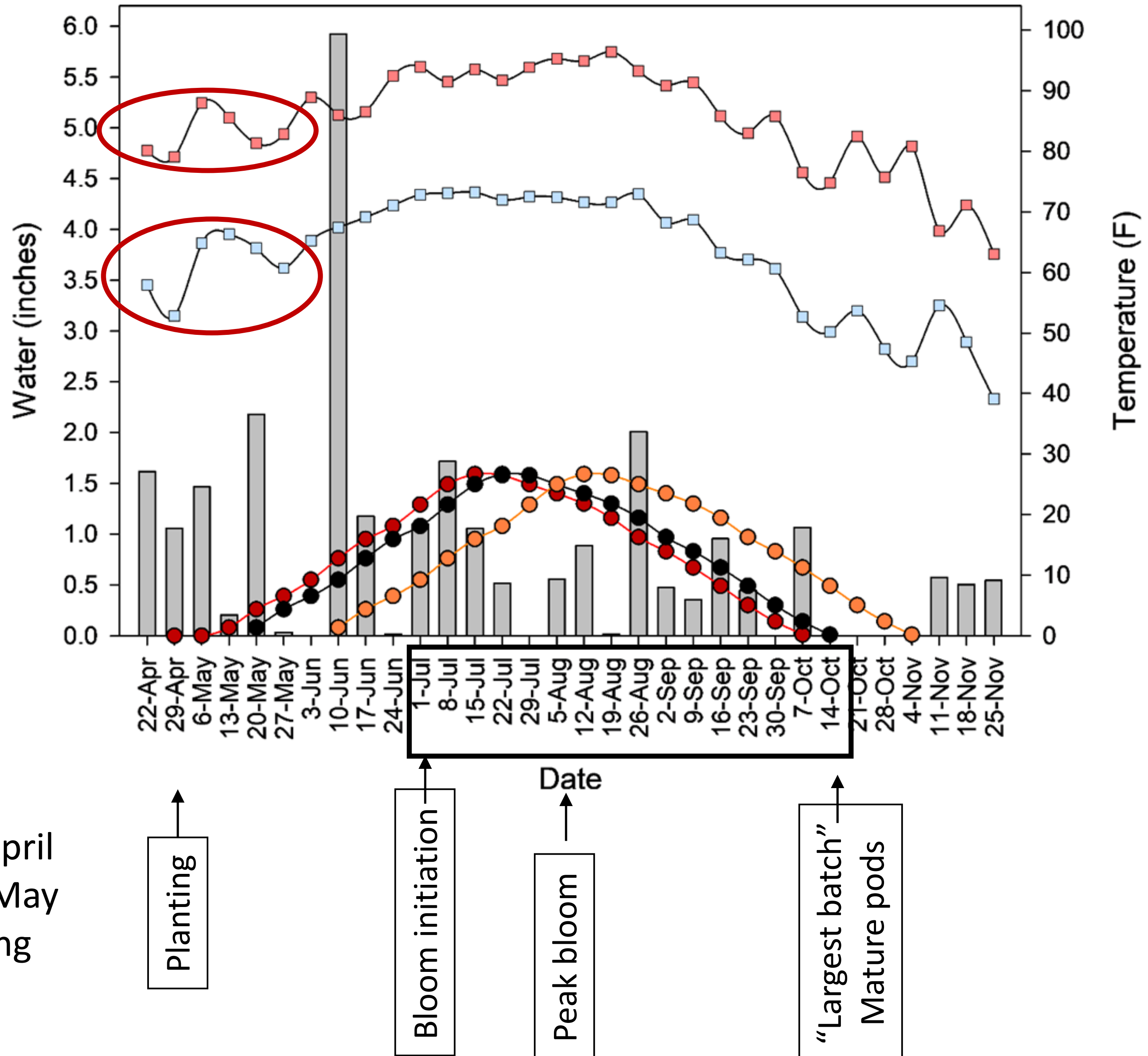


Late April
Early May
Planting

1.) Impact of Weather in May

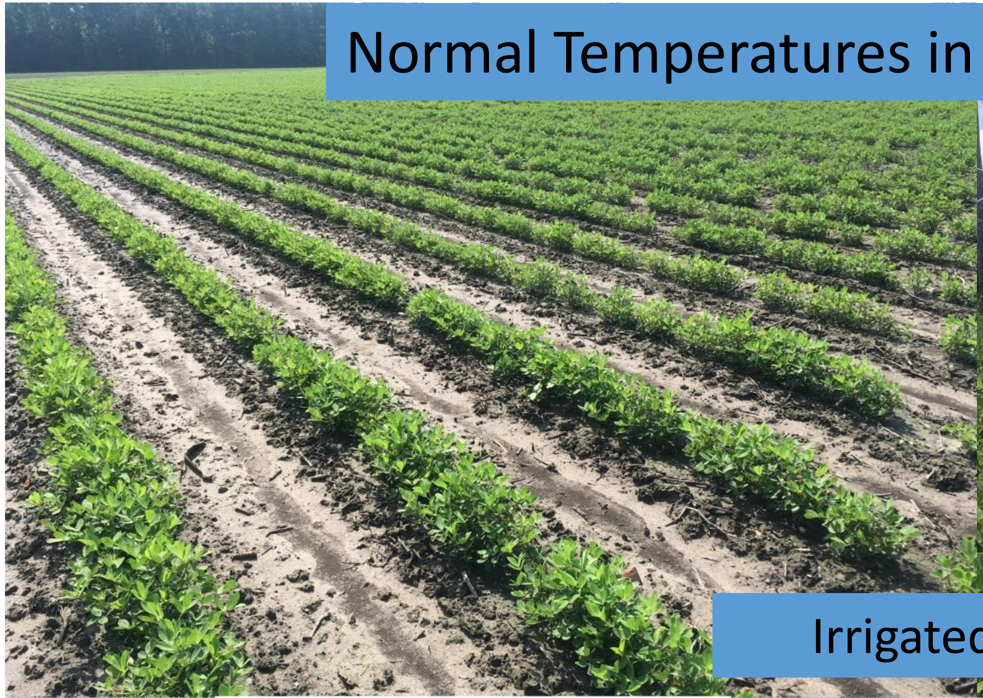
Mitchell County Weather Station

Stripling Irrigation Research Park



Late April
Early May
Planting

Normal Temperatures in June and Early July



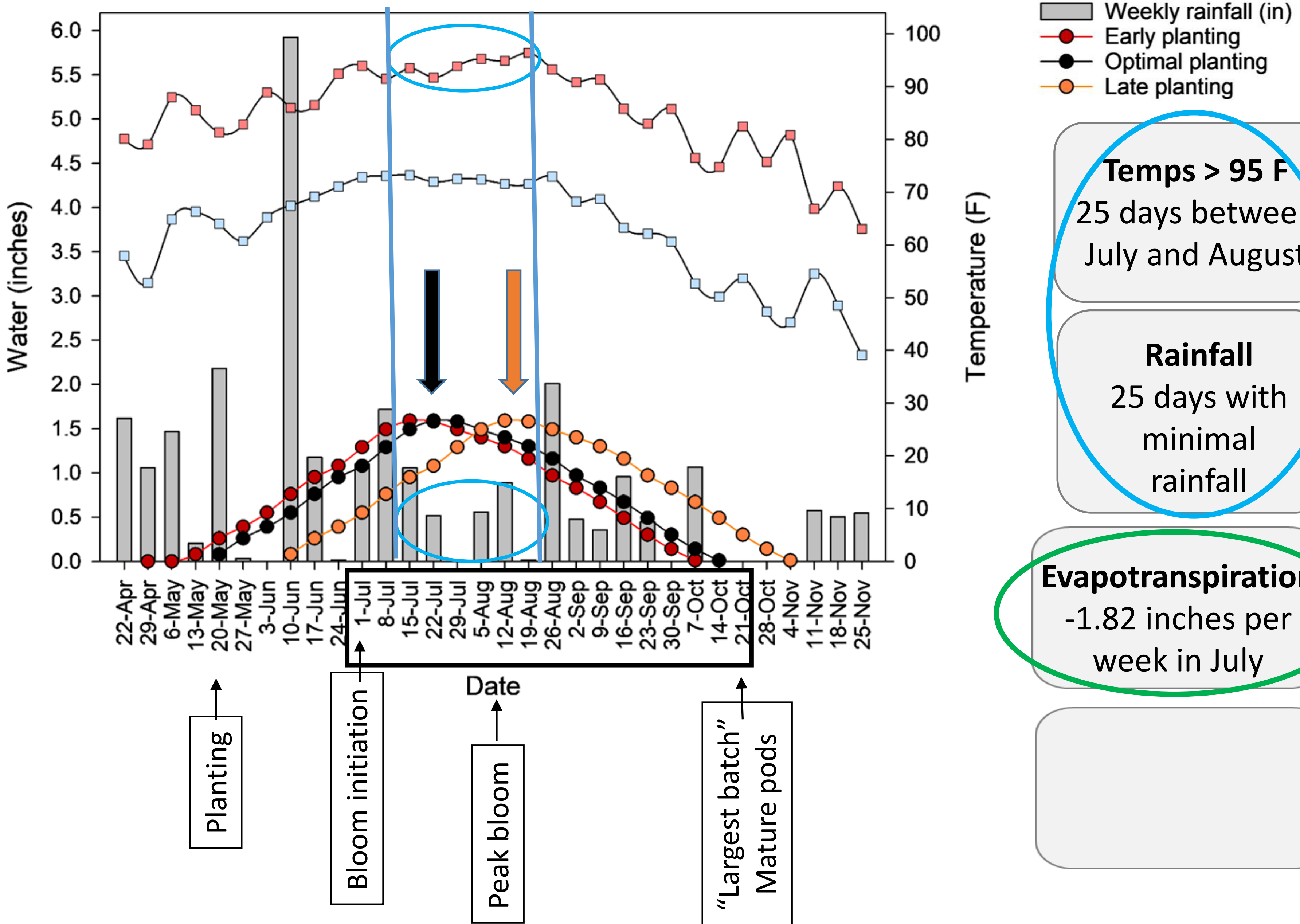
Irrigated in July

Dryland

Most of the crop had very good yield potential up to mid-July

2.) Impact of Weather in July and August

Mitchell County Weather Station
Stripling Irrigation Research Park

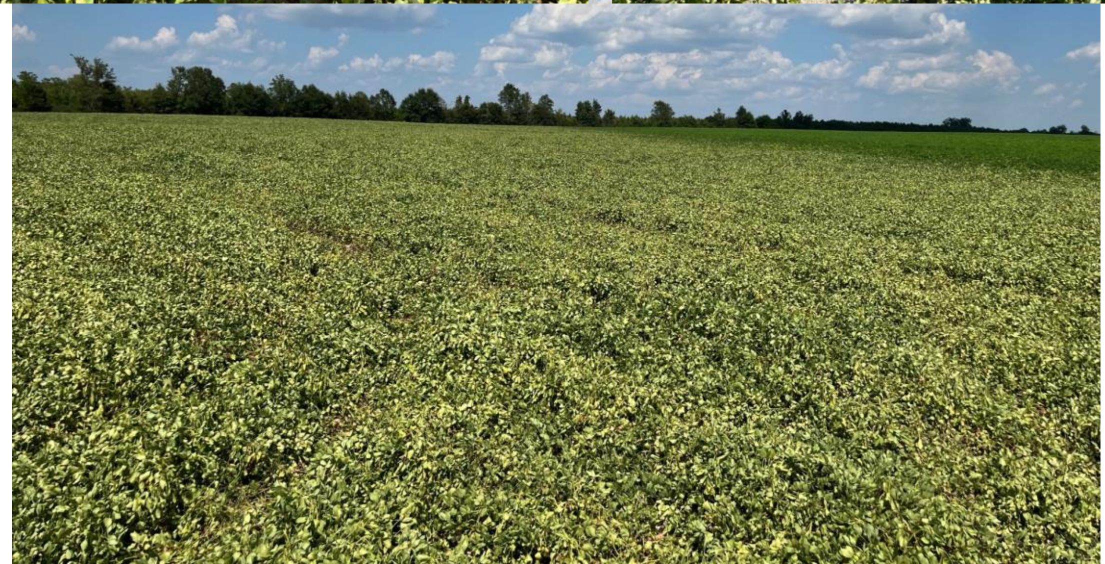


Temps > 95 F
25 days between July and August

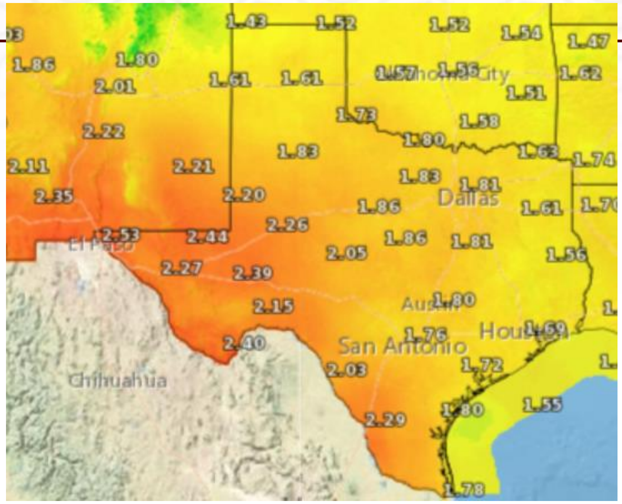
Rainfall
25 days with minimal rainfall

Evapotranspiration
-1.82 inches per week in July

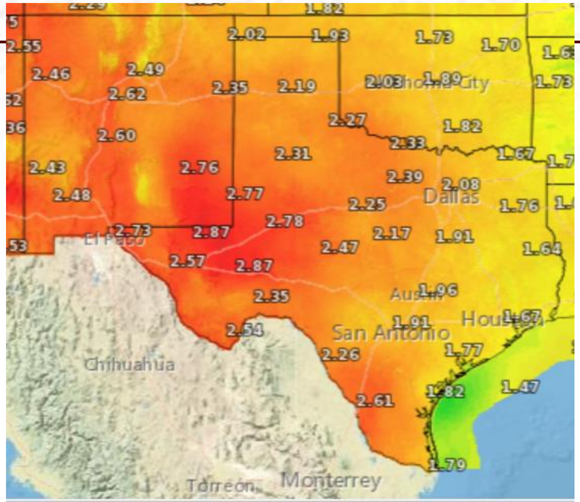
Although most of the season was relatively wet (over 50+" in some areas), a large part of the growing area did not receive any rain in 2 to 4 weeks causing the crop conditions to go backwards.



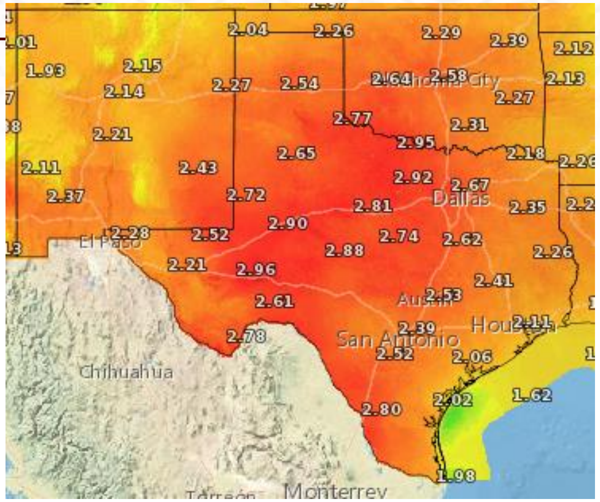
Weekly evapotranspiration (inch) for June-Sep 2023 (Source: NWS).



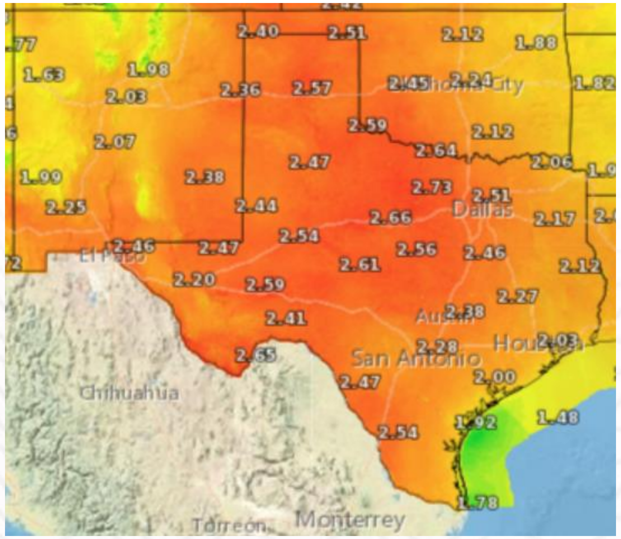
June: 2.20”/wk



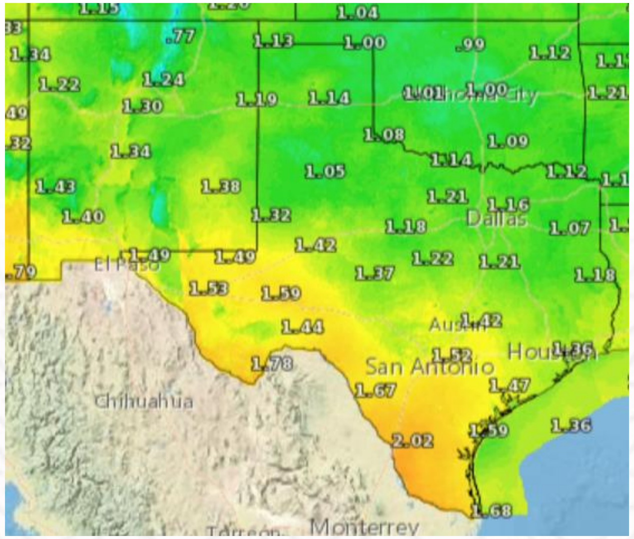
July: 2.77”/wk



August: 2.72”/wk



September: 2.44”/wk

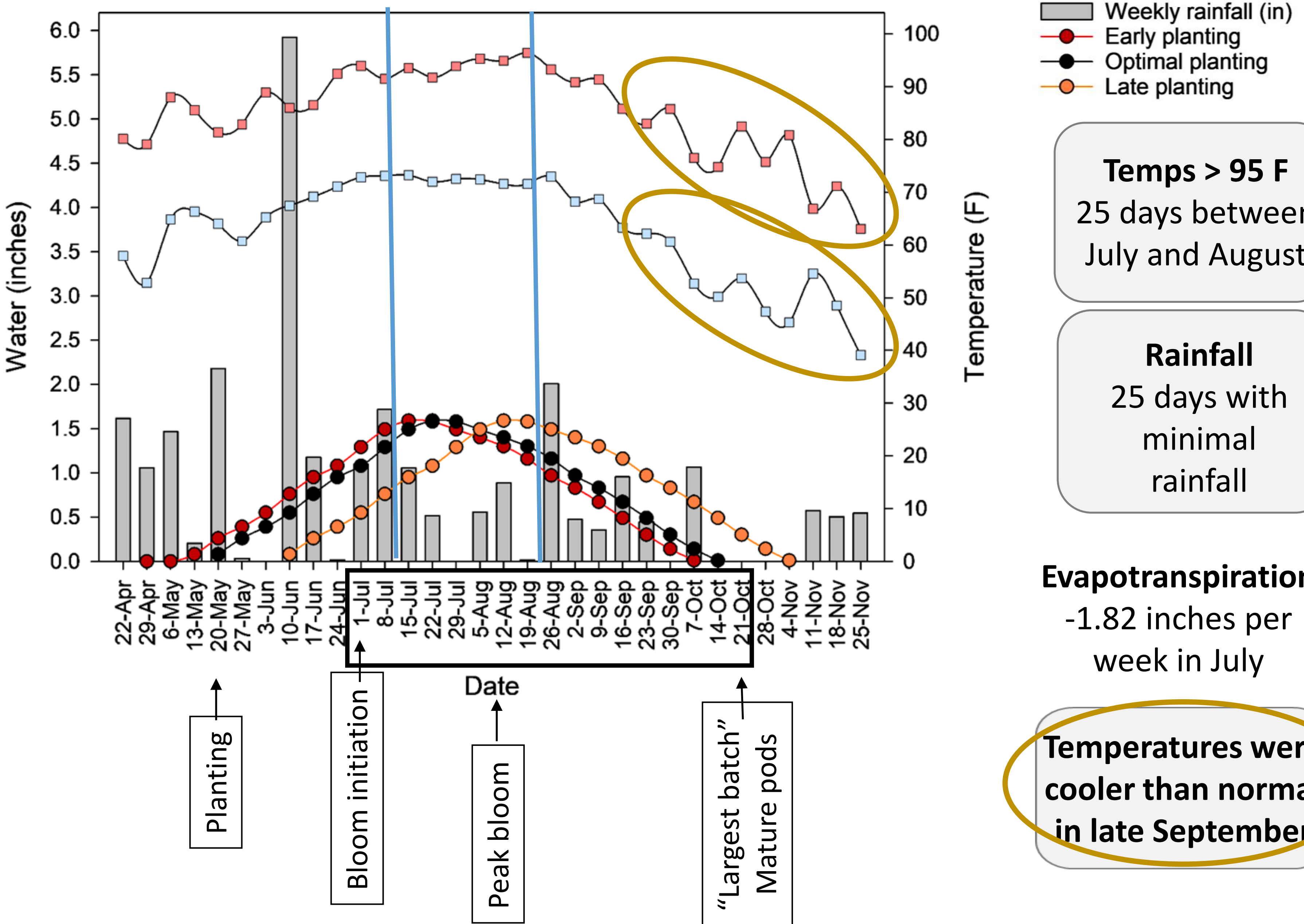


Mid-September: 1.32”/wk


Drought affected peanuts in mid-September (south MS)

3.) Impact of Weather in September and October

Mitchell County Weather Station
Stripling Irrigation Research Park



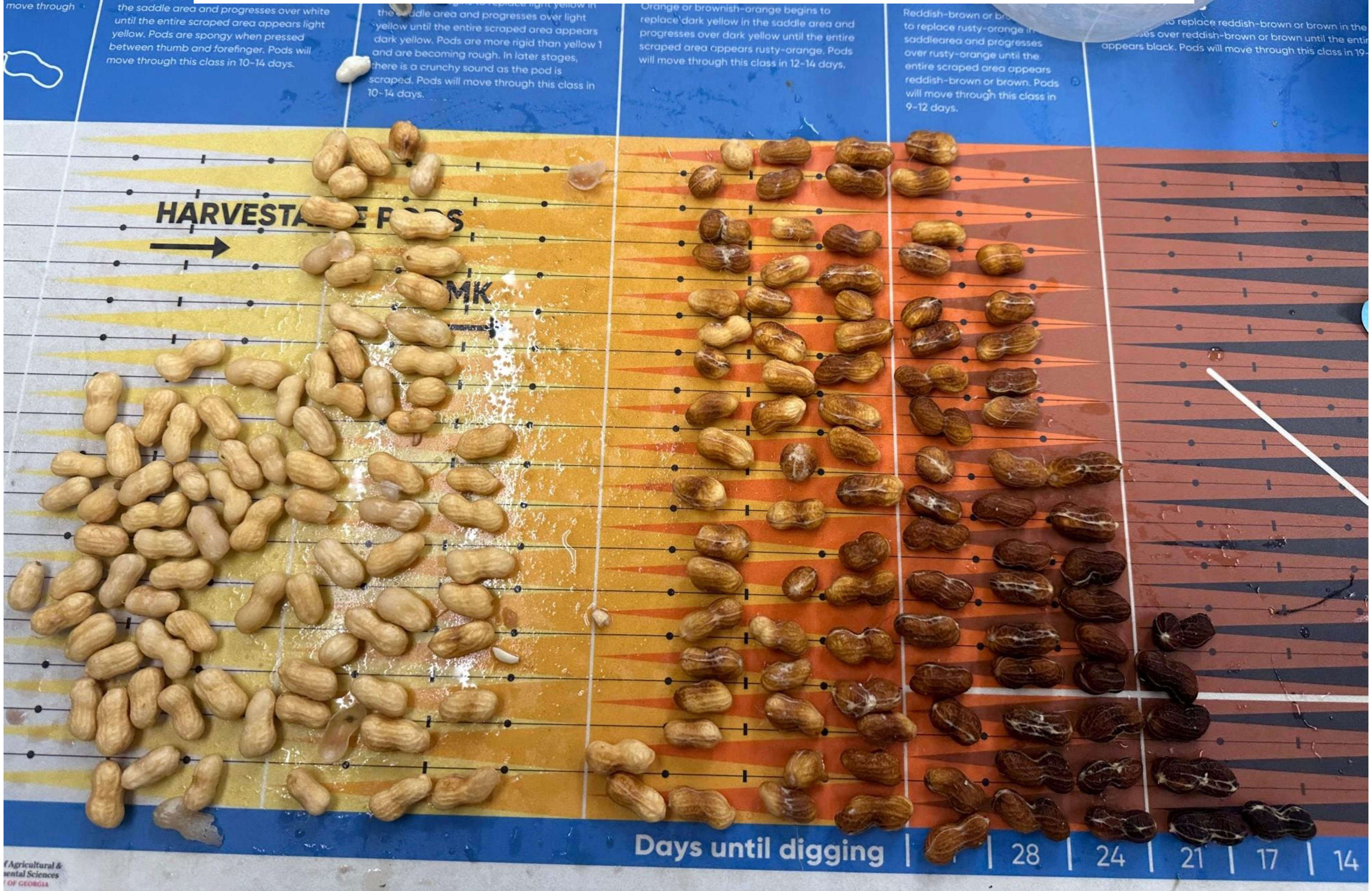
Temps > 95 F
25 days between July and August

Rainfall
25 days with minimal rainfall

Evapotranspiration
-1.82 inches per week in July

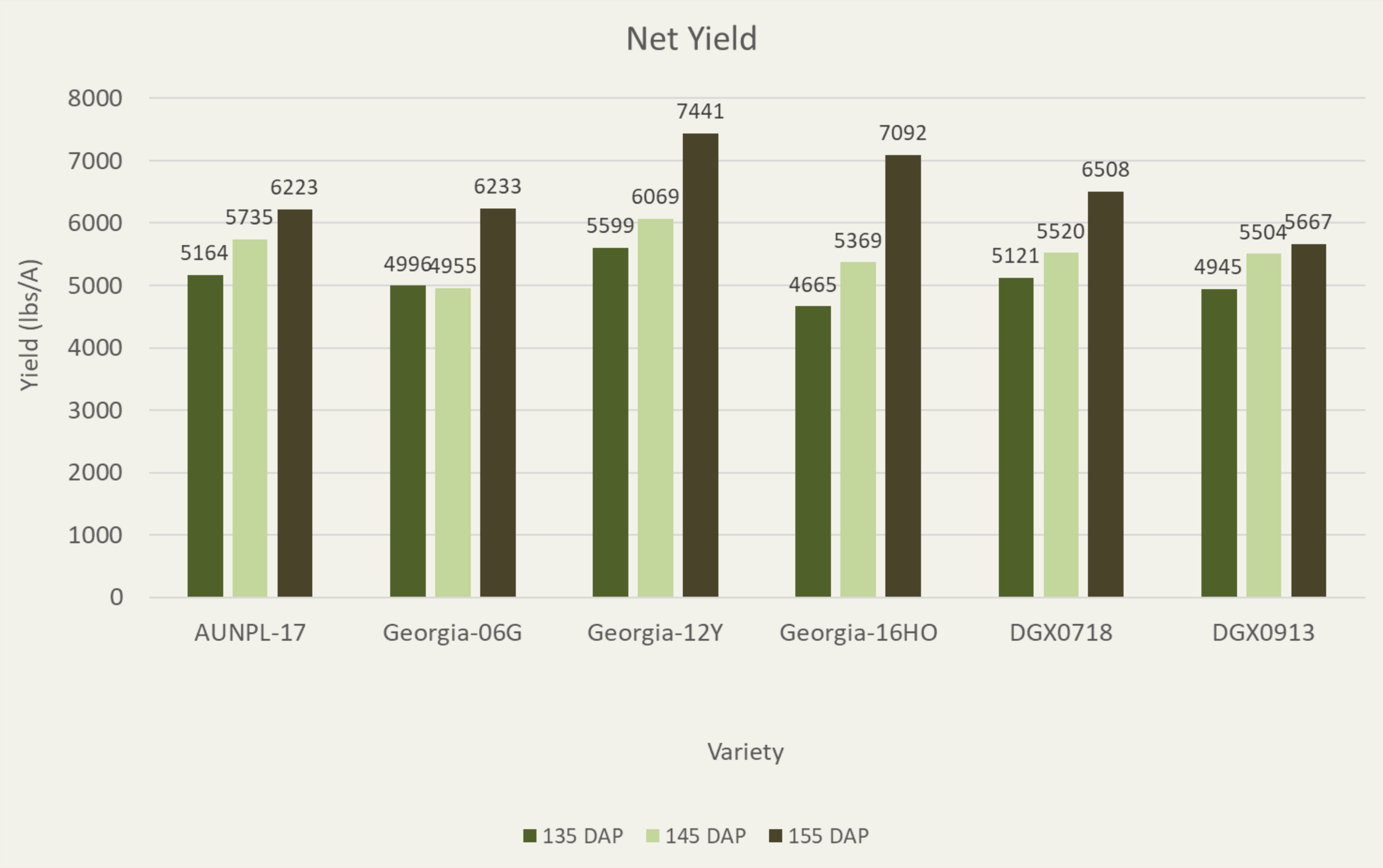
Temperatures were cooler than normal in late September

Disruption in Blooming Due to Weather



Two Crop Profile Due: Weather in Oklahoma

Dig Date x Variety Trial 2023, May 5th



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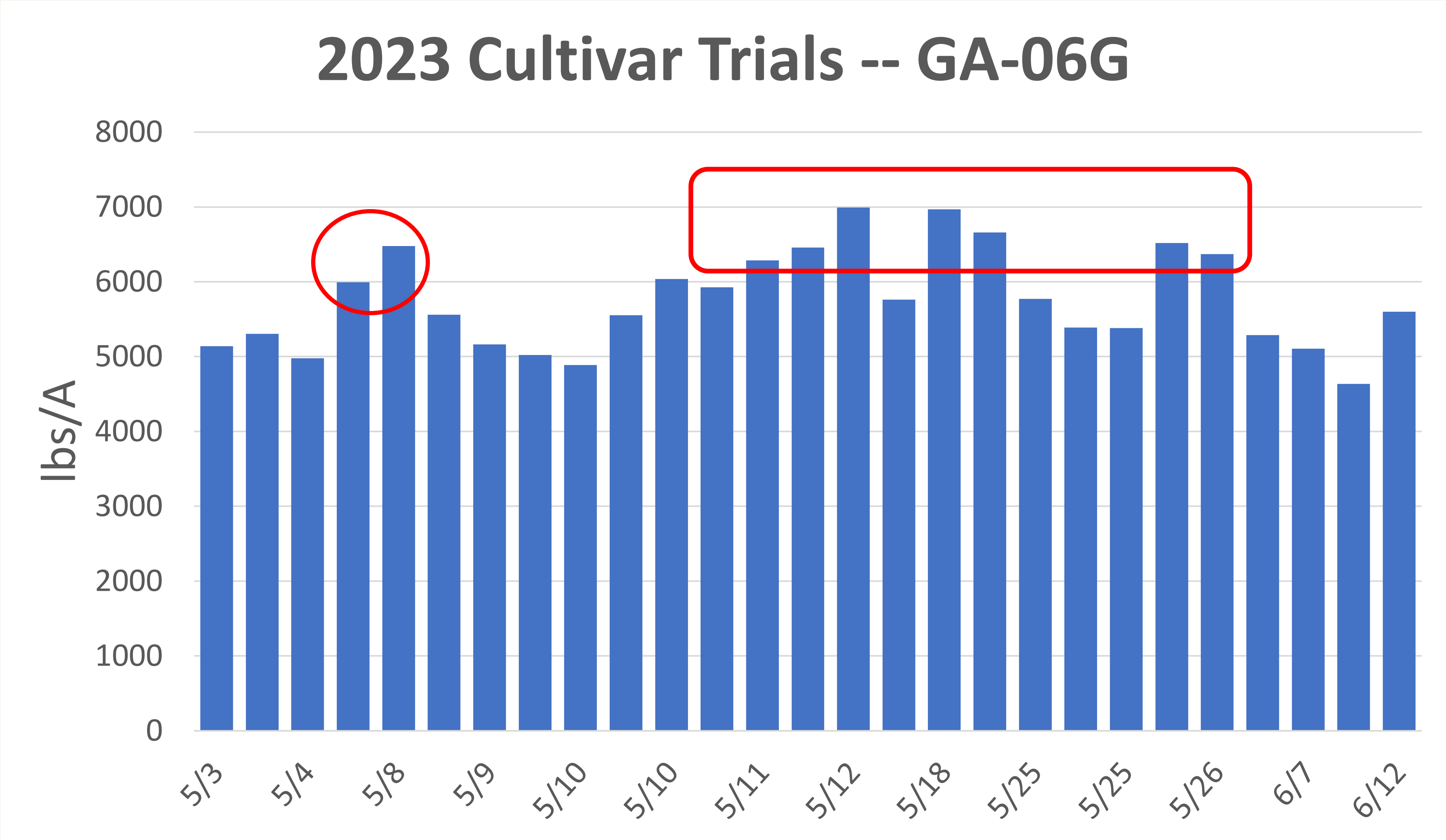
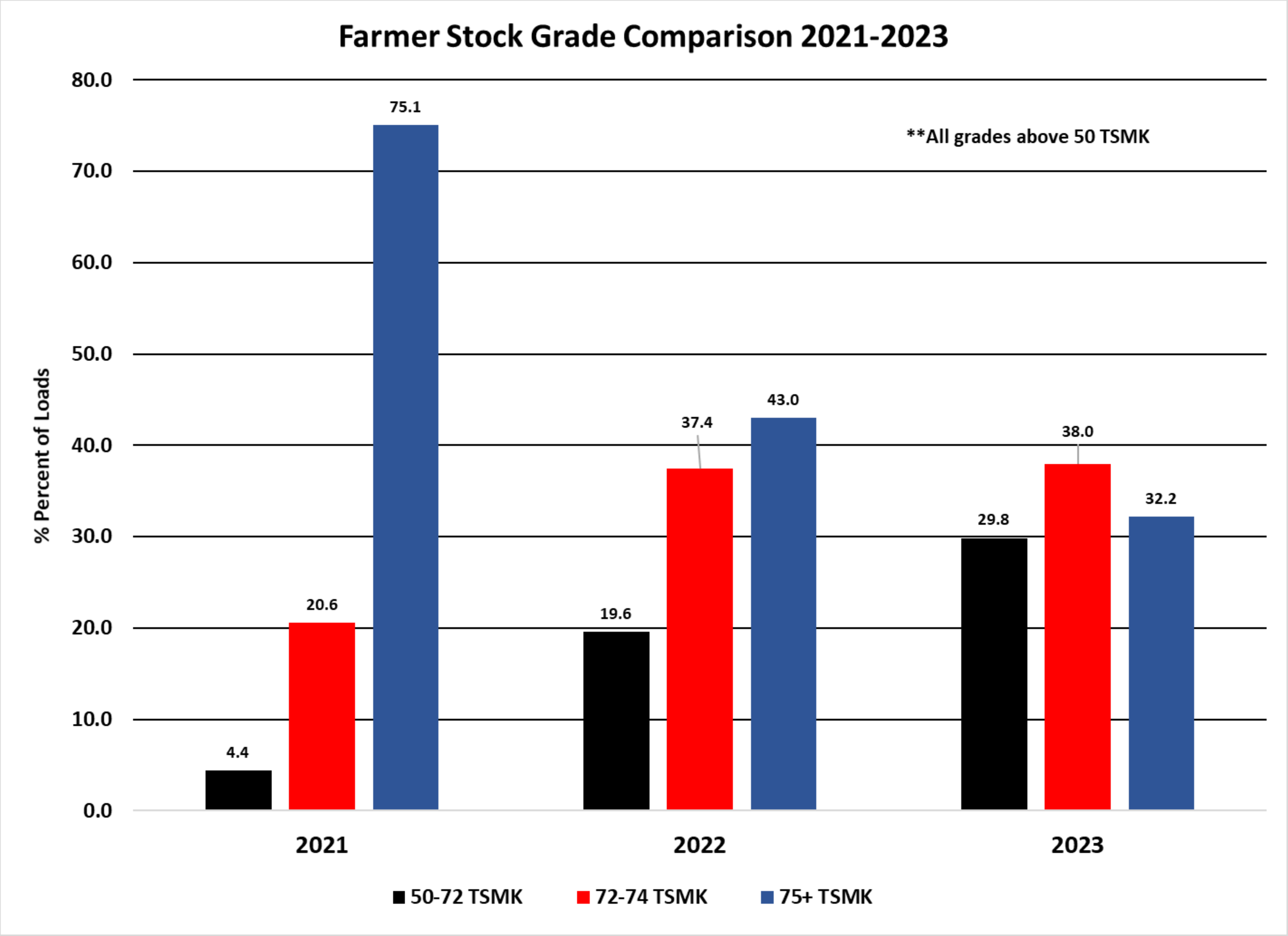


**Yield were down in Irrigated and Non-irrigated, especially in central and western part of the state

The University of Georgia
Extension Peanut Agronomics

North MS, AR, Virginia/Carolinas - Good Yields

ARKANSAS



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2023 Crop Year in Alabama
Loads Grades

Over 73% SMKRS	17%
73% SMKRS	9%
Under 73% SMKRS	74%

2024 – Grower Concerns

- **Market**
  - Contract availability and price
- **Weather**
  - Drought in West
  - Crazy weather in SE
- **Production**
  - Irrigation cost
  - Increased production cost
- **Pest issues**
  - TSWV
  - Increasing herbicide resistant weed biotypes
  - Disease/Nematodes
  - Rootworm/Burrower bug

Bright future but 1-4 years on new varieties

- TiftNV-HG – High Yield, RKN, TSWV
- Georgia-22MPR – High Yield, RKN, TSWV
- Gerogia-21GR - High Yield, TSWV
- FloRun T61- High Yield, TSWV
- FloRun 52N - TSWV
- DGX0913 - TSWV
- CB7 – TSWV, Late Leafspot

In 2024, growers need to:

- **Do not change based on 2023**
- **Understand Germ and Vigor**
- **Watch weather and plant in good conditions**
- **TSWV Management**
- **Use the recommended strategies to minimize Disease, Insects, Weeds, etc**

2024 US Peanut Acreage Estimates

State	2023 Planted Acres	2024 ESTIMATED Acres	Diff	Change
AL	173	185	12	+6.9%
AR	34	40	6	+17.6%
GA	770	770 - 820	0-50	0, +6.5%
FL	155	160 -165	5 -10	+3.2, 6.5%
LA	2	2	0	0
MO	21	21	0	0
MS	18	20	2	+11%
NM	11	11	0	0
OK	14	19	5	+36%
TX	220	220	0	0
NC	122	124	2	+1.6%
SC	74	74	0	0
VA	29	30	1	+3%
	1,643	**1,676 (1,731)**	**+33 (+88)**	**+2% (5.4%)**

Acres Will likely increase if:

- Cotton $ remains low
- Dicamba ????

Thank You Contributors

- Ga Scott Monfort, UGA
- AL Kris Balkcom, AU
- AR Travis Faske, UoA
- FL Barry Tillman, UF
- MS Brendan Zurweller, MS State
- MO Justin Calhoun, UM
- NC David Jordan, NCSU
- NM Naveen Puppala, NMSU
- OK Todd Baughman, OK State
- SC Dan Anco, Clemson
- TX Emi Kimura, TAMU
- TX Shelly Nutt, TPB
- VA Maria Balota, VT

UNIVERSITY OF GEORGIA
College of Agricultural & Environmental Sciences
Department of Crop and Soil Sciences

Questions??

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Have a Productive Year!!!

UNIVERSITY OF GEORGIA
College of Agricultural & Environmental Sciences
Department of Crop and Soil Sciences

NATIONAL PEANUT BUYING POINTS Association

PEANUT COST OF PRODUCTION AND MAKING A PROFIT

National Peanut Buying Points Association Winter Conference

February 18, 2024

Nathan Smith, PhD

Extension Economist

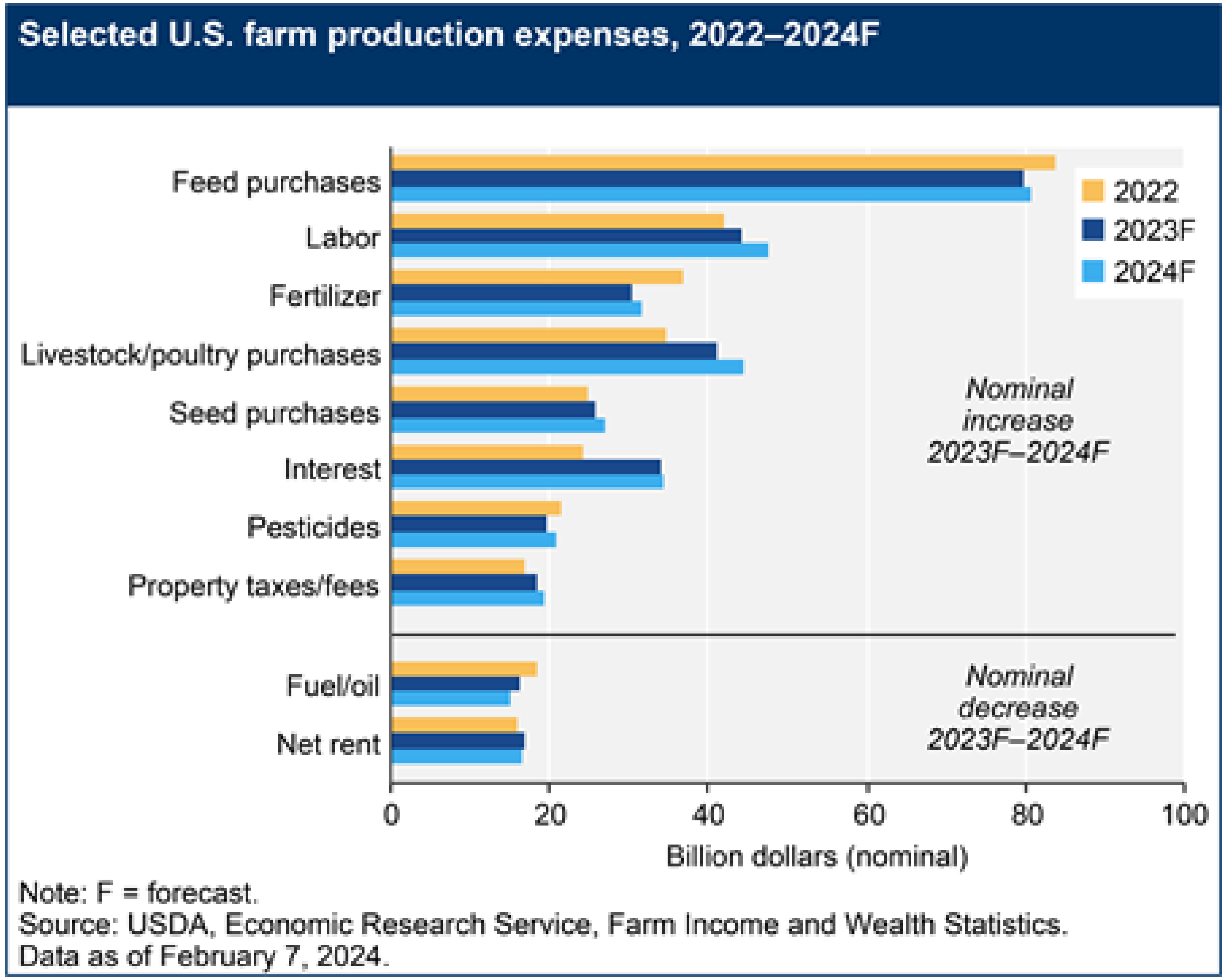
2024 Budget Considerations

- Yield Expectation
  - SC Peanuts averaged a 4,050 lb per acre yield in 2023. (GA average 4,070 lb per acre.)
  - Budgeted yields at 4,000 lbs/ac for dryland and 5,000 lbs/ac for irrigated. (UGA 3,400 lbs/ for dryland and 4,700 lbs/a for irrigated.)
- Budgeted seed price as same last year.
- Chemical inputs, some adjusted down and some left same.

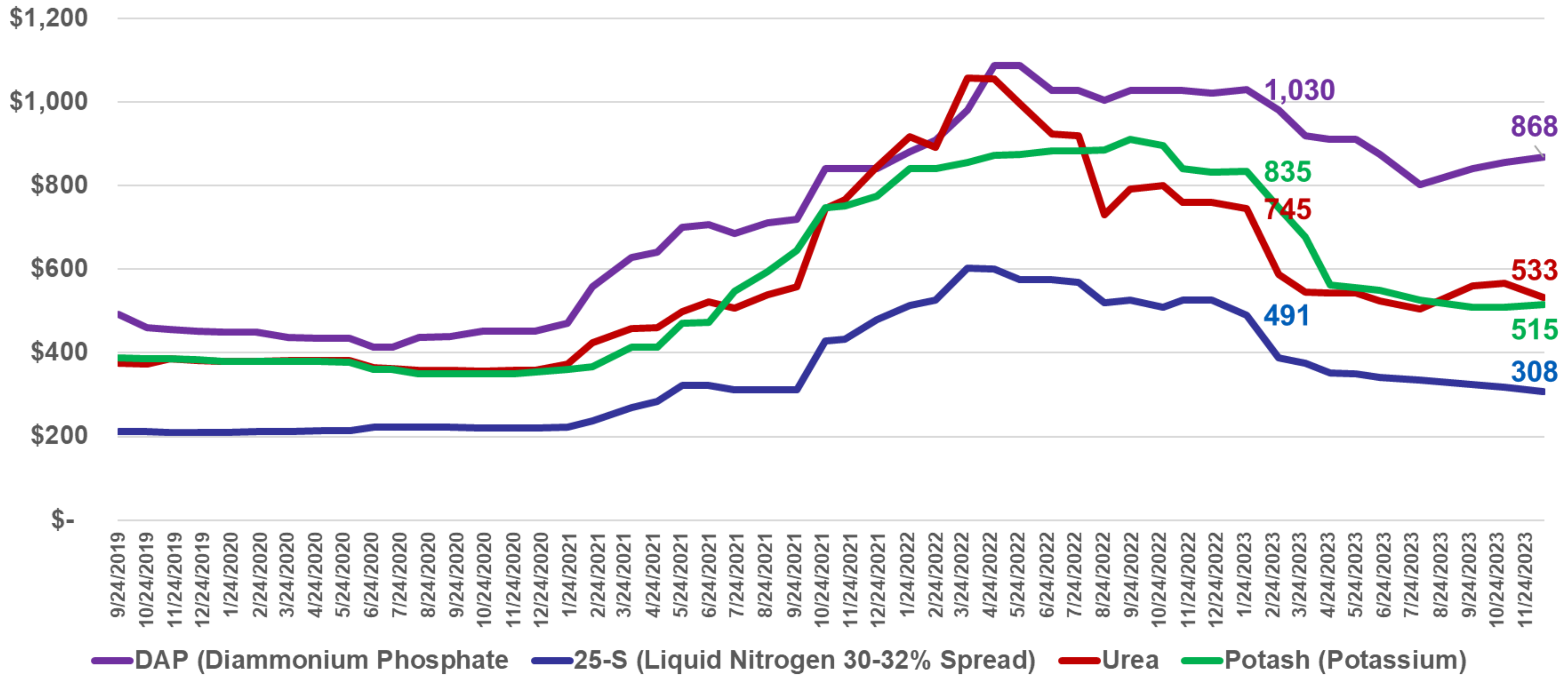
2024 Budget Considerations

- Diesel fuel price down 17.5% from this time last year.
- Fertilizer down from this time last year:

Urea	-28%
25-S	-37%
DAP	-16%
Potash	-38%
Lime	-2.5%



SC Fertilizer Prices Per Ton



Source: South Carolina Dept of Ag-USDA Market News, Columbia, SC
803-737-4491. www.ams.usda.gov/mnreports/CO_GR210.txt

2023 Projected Peanut Production

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College of Agriculture, Forestry and Life Sciences

	Planted Acres	Harvested Acres	Yield	Production
	1,000 acres		lbs/ac	Tons
AL	175	171	2,810	240,255
AR	35	34	5,200	98,600
FL	160	152	3,320	252,320
GA	775	770	4,070	1,566,950
MS	18	16	3,600	28,800
NM	11	10	2,100	10,500
NC	124	123	4,300	264,450
OK	16	15	3,900	29,250
SC	77	74	4,050	149,850
TX	225	180	2,600	234,000
VA	29	29	4,830	70,035
US	1,645	1,574	3,742	2,945,010

Source: USDA NASS Crop Production Reports

2024 Crop Comparisons

IVE EXTENSION
e, Forestry and Life Sciences

	CORN-NI	COTTON-NI	PEANUTS-RU-NI	SOYBEANS-NI
REVENUE				
PROJECTED YIELD	**125**	**900**	**4,000**	**35**
FUTURES PRICE	$4.46	$0.85	$0.2500	$11.41
HARVEST BASIS	$0.50	-$0.01	$0.00	$0.10
EXPECTED CROP REVENUE	**$620.00**	**$756.00**	**$1,000.00**	**$402.85**
COTTONSEED		168.75		
MARKETING	$0.00	-$23.06	-$6.00	$0.00
CHECKOFF	$0.00	-$1.88	-$4.00	-$2.01
EXPECTED CROP REVENUE	**$620.00**	**$ 899.81**	**$ 990.00**	**$ 400.84**
DIRECT EXPENSE				
SEED	$71.50	$99.18	$130.50	$50.00
FERTILIZER	$195.10	$191.17	$100.94	$90.00
CROP PROTECTION	$70.71	$111.09	$340.90	$74.98
CROP INSURANCE	$9.00	$11.00	$9.00	$5.00
DRYING OR GINNING	$23.96	$108.00	$25.74	$1.34
IRRIGATION ENERGY				
CUSTOM HIRE	$53.75	$10.00	$22.00	$22.25
SUPPLIES	$0.00	$17.81	$0.00	$0.00
LABOR	$5.88	$8.16	$17.46	$6.95
MACHINERY OPERATING	32.51	$71.59	$79.33	$36.00
INTEREST ON OP. CAP.	$18.50	$25.12	$29.03	$11.46
TOTAL DIRECT EXPENSES	**$480.91**	**$ 653.12**	**$ 754.90**	**$ 297.98**
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	**$ 139.09**	**$ 246.69**	**$ 235.10**	**$ 102.86**

Taxes
Land Rent
Insurance
Utilities
Interest..

By A.R. Smith, Y. Liu, and G.A. Hancock, UGA Exter may change rapidly. You should enter your own

January 2024

Strip-Tillage	NON-IRRIGATED			
	Cotton	Peanuts	Corn	Soybeans
EXPECTED YIELD per ACRE	750 lbs	3,400 lbs	85 bu	30 bu
EXPECTED SEASON AVG PRICE	$0.80 /lb	$513 /ton	$5.00 /bu	$11.50 /bu
GROSS RETURN per ACRE	**$600**	**$871**	**$425**	**$345**
VARIABLE COSTS per ACRE				
Seed	115	126	78	66
Cover Crop Seed*				
BWEP	1			
Fertilizer & Lime**	125	84	140	98
Chicken Litter				
Chemicals	151	142	38	37
Custom Application				
Handweeding	18	18		
Scouting	13	13		
Fuel and Lube***	43	50	24	21
Repairs and Maintenance	41	49	21	17
Irrigation****				
Labor	18	30	13	11
Insurance	38	43	35	22
Land Rent				
Other				
Interest on Operating Capital	25	24	15	12
Gin & Warehouse (net after cottonseed)	21			
Drying and Cleaning		45	26	
Marketing and Fees		11		
TOTAL VARIABLE COSTS per ACRE	**$607**	**$634**	**$390**	**$283**
RETURN ABOVE VARIABLE COST per ACRE	**-$7**	**$237**	**$35**	**$62**

COOPERATIVE EXTENSION
College of Agriculture, Forestry and Life Sciences

FINANCIAL EFFICIENCY BY CROP

	CORN-NI	COTTON-NI	PEANUTS-RU-NI	SOYBEANS-NI
EXPECTED CROP REVENUE	$620.00	$899.81	$990.00	$400.84
TOTAL DIRECT EXPENSES	$480.91	$653.12	$754.90	$297.98
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	$ 139.09	$ 246.69	$ 235.10	$ 102.86
DIRECT EXPENSE TO REVENUE RATIO	78%	73%	76%	74%
OPERATING PROFIT MARGIN	22%	27%	24%	26%
Futures Price Required for:				
40% Operating Profit Margin	$5.33	$0.98	$0.29	$13.05
25% Operating Profit Margin	$4.59	$0.83	$0.25	$11.33
10% Operating Profit Margin	$3.84	$0.68	$0.22	$9.62

Revenue Protection Crop Insurance Guarantee

Direct Expenses

MPCI RP	CORN-NI	COTTON-NI	PEANUTS-RU-NI	SOYBEANS-NI
65% Coverage	79%	73%	79%	91%
70% Coverage	85%	78%	85%	98%
75% Coverage	90%	83%	90%	104%

2024 Crop Comparisons

VE EXTENSION
, Forestry and Life Sciences

	CORN-IRR	COTTON-IRR	PEANUTS-RU-IRR	SOYBEANS-IRR
REVENUE				
PROJECTED YIELD	**210**	**1250**	**5,000**	**65**
FUTURES PRICE	$4.46	$0.85	$0.25	$11.41
HARVEST BASIS	$0.50	-$0.01	$0.00	$0.10
EXPECTED CROP REVENUE	**$1,041.60**	**$1,050.00**	**$1,250.00**	**$748.15**
COTTONSEED		168.75		
MARKETING	$0.00	-$32.03	-$7.50	$0.00
CHECKOFF	$0.00	-$2.60	-$5.00	-$3.74
EXPECTED CROP REVENUE	**$1,041.60**	**$ 1,184.11**	**$ 1,237.50**	**$ 744.41**
DIRECT EXPENSE				
SEED	$104.00	$99.18	$130.50	$55.00
FERTILIZER	$277.10	$177.67	$100.94	$110.00
CROP PROTECTION	$73.69	$111.09	$376.30	$89.69
CROP INSURANCE	$5.00	$8.00	$8.00	$5.00
DRYING OR GINNING	$40.26	$150.00	$32.18	$2.49
IRRIGATION ENERGY	$54.00	$27.00	$27.00	$27.00
CUSTOM HIRE	$83.50	$10.00	$25.00	$32.75
SUPPLIES	$0.00	$24.74	$0.00	$0.00
LABOR	$5.88	$8.16	$1.50	$6.95
MACHINERY OPERATING	32.51	$71.59	$9.70	$36.00
INTEREST ON OP. CAP.	$27.04	$27.50	$28.44	$14.60
TOTAL DIRECT EXPENSES	**$702.98**	**$ 714.93**	**$ 739.56**	**$ 379.48**
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	**$ 338.62**	**$ 469.18**	**$ 497.94**	**$ 364.93**

Taxes
Land Rent
Insurance
Utilities
Interest..

By A.R. Smith, Y. Liu, and G.A. Hancock, UGA Extension Economists, Department of Agricultural & Applied Economics

COOPERATIVE EXTENSION
College of Agriculture, Forestry and Life Sciences

January 2024				
Strip-Tillage	**IRRIGATED**			
	Cotton	**Peanuts**	**Corn**	**Soybeans**
EXPECTED YIELD per ACRE	1,200 lbs	4,700 lbs	200 bu	60 bu
EXPECTED SEASON AVG PRICE	$0.80 /lb	$513 /ton	$5.00 /bu	$11.50 /bu
GROSS RETURN per ACRE	**$960**	**$1,204**	**$1,000**	**$690**
VARIABLE COSTS per ACRE				
Seed	115	126	125	66
Cover Crop Seed*				
BWEP	2			
Fertilizer & Lime**	169	84	361	98
Chicken Litter				
Chemicals	152	208	42	53
Custom Application				
Handweeding	18	18		
Scouting	13	15		
Fuel and Lube***	43	50	24	21
Repairs and Maintenance	41	49	21	17
Irrigation****	79	57	79	45
Labor	18	30	12	11
Insurance	20	31	20	13
Land Rent				
Other				
Interest on Operating Capital	29	29	30	14
Gin & Warehouse (net after cottonseed)	34			
Drying and Cleaning		63	61	
Marketing and Fees		15		
TOTAL VARIABLE COSTS per ACRE	**$732**	**$775**	**$775**	**$337**
RETURN ABOVE VARIABLE COST per ACRE	**$228**	**$430**	**$225**	**$353**

FINANCIAL EFFICIENCY BY CROP

	CORN-IRR	COTTON-IRR	PEANUTS-RU-IRR	SOYBEANS-IRR
EXPECTED CROP REVENUE	$1,041.60	$1,184.11	$1,237.50	$744.41
TOTAL DIRECT EXPENSES	$702.98	$714.93	$739.56	$379.48
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	$ 338.62	$ 469.18	$ 497.94	$ 364.93
DIRECT EXPENSE TO REVENUE RATIO	67%	60%	60%	51%
OPERATING PROFIT MARGIN	33%	40%	40%	49%
Futures Price Required for:				
40% Operating Profit Margin	$5.33	$0.84	$0.2494	$10.48
25% Operating Profit Margin	$4.59	$0.70	$0.2123	$8.76
10% Operating Profit Margin	$3.84	$0.56	$0.1752	$7.04

Revenue Protection Crop Insurance Guarantee

Direct Expenses

MPCI RP	CORN-IRR	COTTON-IRR	PEANUTS-RU-IRR	SOYBEANS-IRR
65% Coverage	91%	92%	101%	133%
70% Coverage	98%	99%	109%	143%
75% Coverage	104%	105%	116%	152%

Crop Insurance Prices

	2017	2018	2019	2020	2021	2022	2023	2024
Corn	$3.87	$3.82	$3.97	$3.92	$4.73	$5.87	$6.09	$4.69
Cotton	$0.73	$0.75	$0.74	$0.70	$0.80	$1.02	$0.85	$0.80
Grain Sorghum	$3.81	$3.78	$3.95	$3.75	$4.30	$5.73	$5.87	$4.77
Peanut, RU	$395	$392	$417	$398	$420	$481	$535	$536
Peanut, VA	$439	$443	$442	$434	$487	$534	$594	$606
Soybean	$10.25	$10.09	$9.65	$9.36	$11.54	$13.68	$13.69	$12.02

Source: USDA RMA Price Discovery (February 28 Closing Date)

10-year comparison

Weight Average for Irrigated & Non-Irrigated

	~2014 Cost of Production	2024 Cost of Production	Cost Change
Peanuts	$919.28	$1,178.77	$259.49
Cotton	$876.28	$1,086.89	$210.61
Corn	$892.68	$1,112.97	$220.29
Soybeans	$498.88	$601.64	$102.76

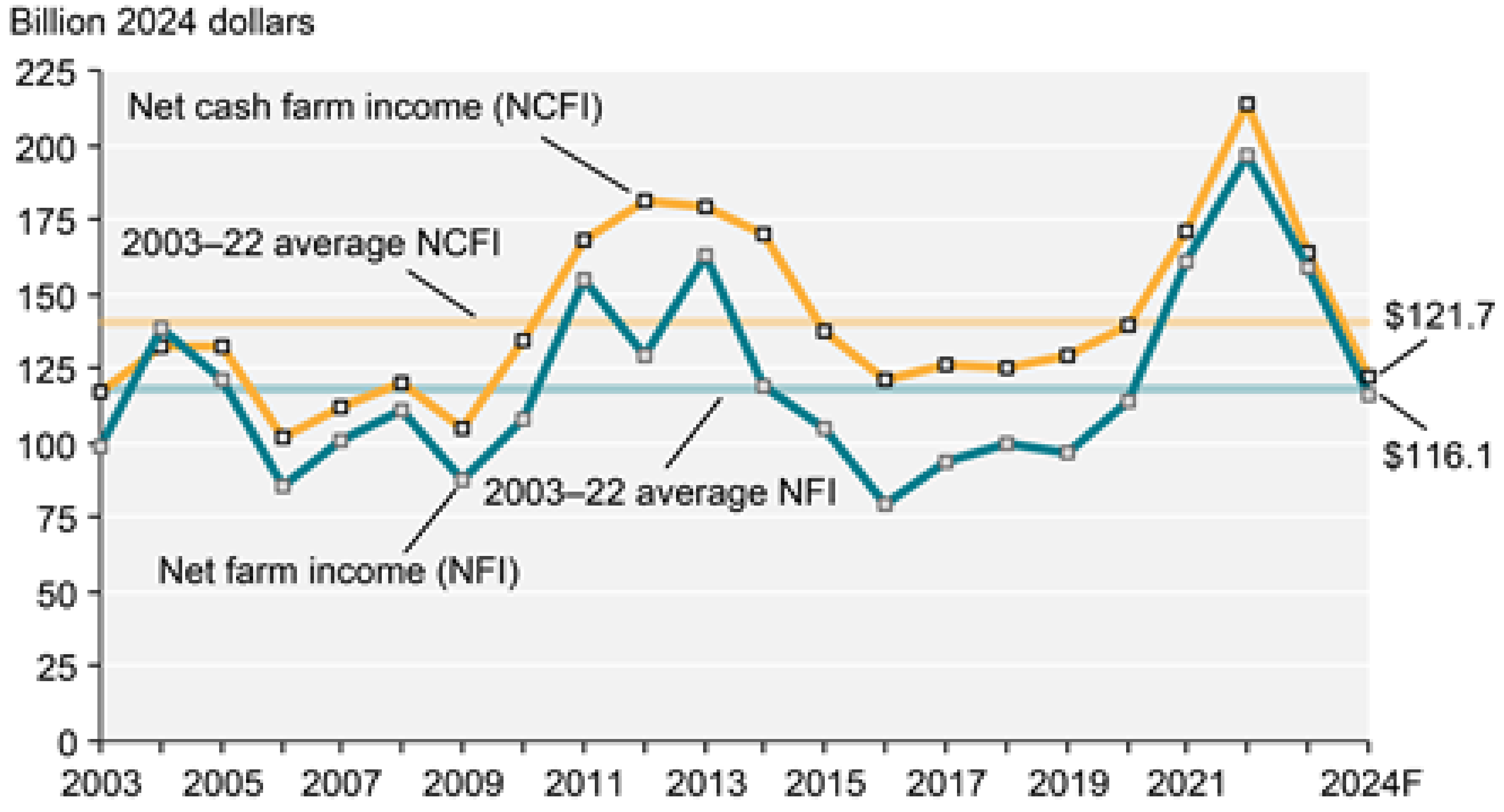
Slide provided by Dr. Marshall Lamb, USDA ARS NPRL

10-year comparison

	2014 Cost of Production	2024 Cost of Production	Cost Change	Revenue Change
Peanuts	$919.28	$1,178.77	$259.49	$165.44
Cotton	$876.28	$1,086.89	$210.61	-$50.02
Corn	$892.68	$1,112.97	$220.29	$96.25
Soybeans	$498.88	$601.64	$102.76	$9.54

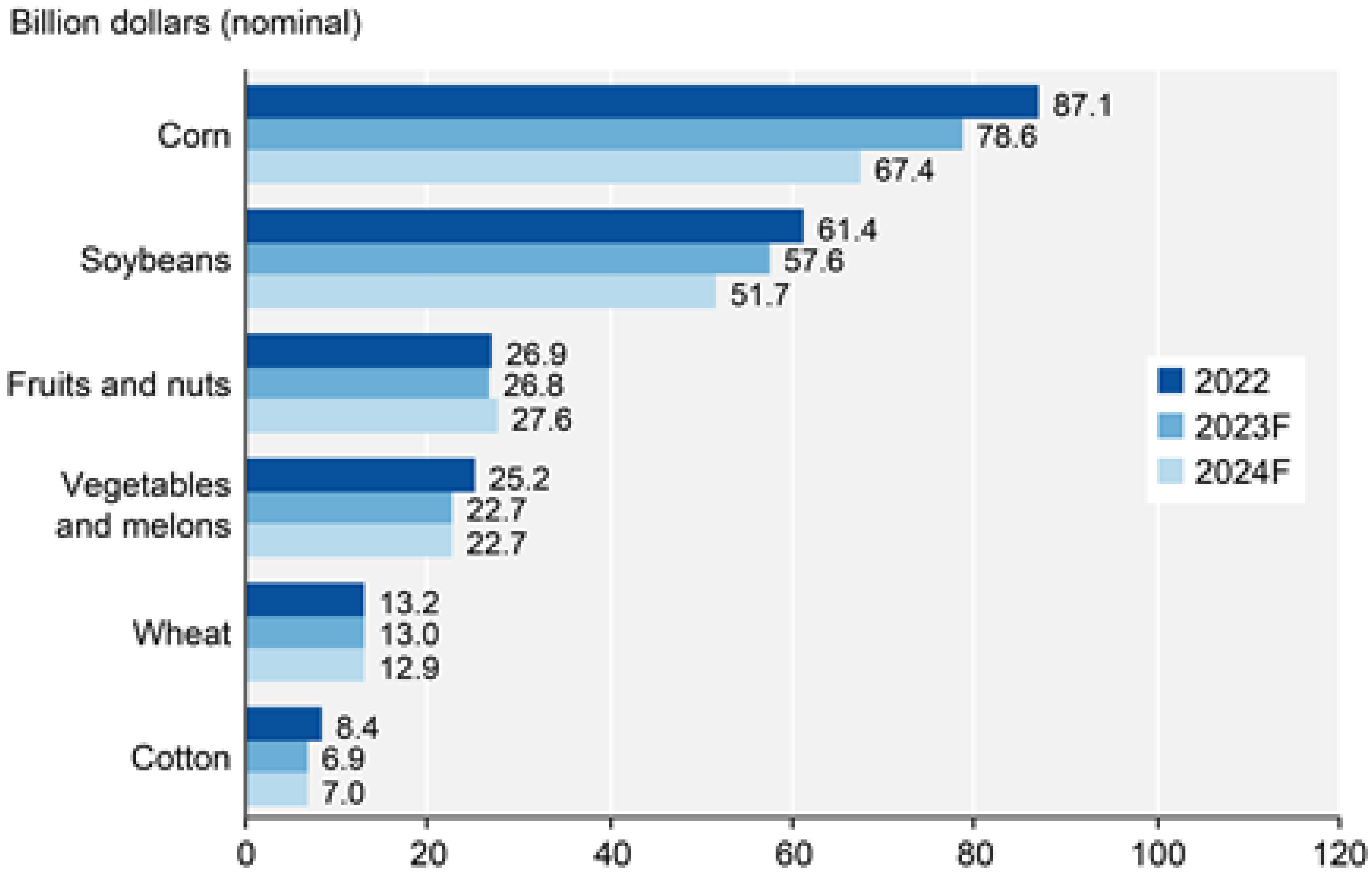
Slide provided by Dr. Marshall Lamb, USDA ARS NPRL

U.S. net farm income and net cash farm income, inflation adjusted, 2003–24F



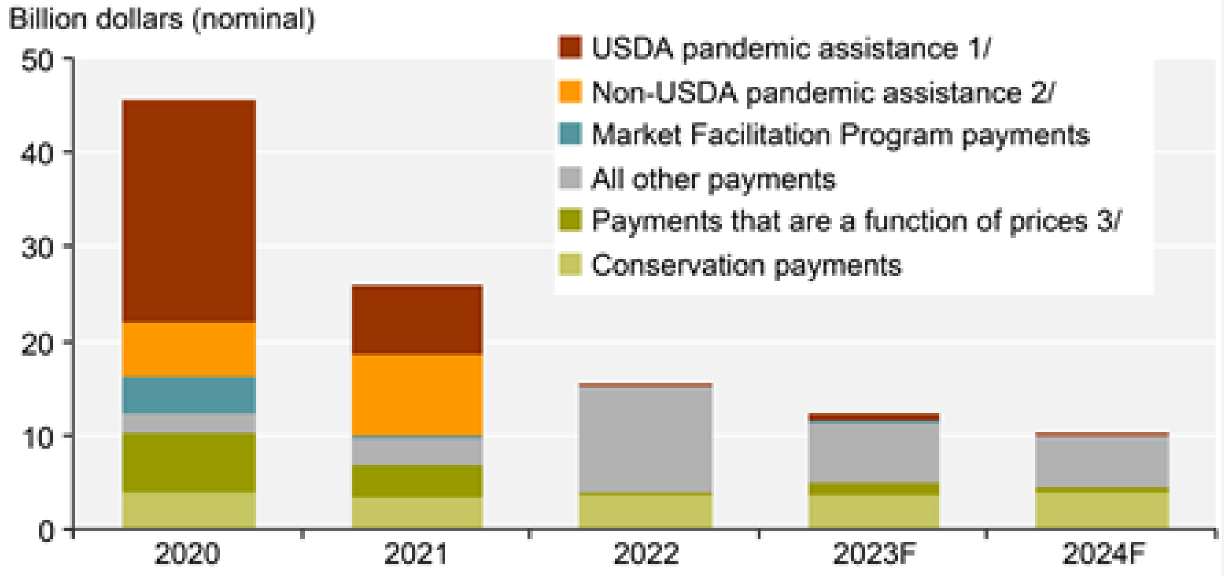
Note: F = forecast; data for 2023 and 2024 are forecasts. Values are adjusted for inflation using the U.S. Department of Commerce, Bureau of Economic Analysis, Gross Domestic Product Price Index (BEA API series code: A191RG) rebased to 2024 by USDA, Economic Research Service.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of February 7, 2024.

U.S. cash receipts for selected crops, 2022–2024F



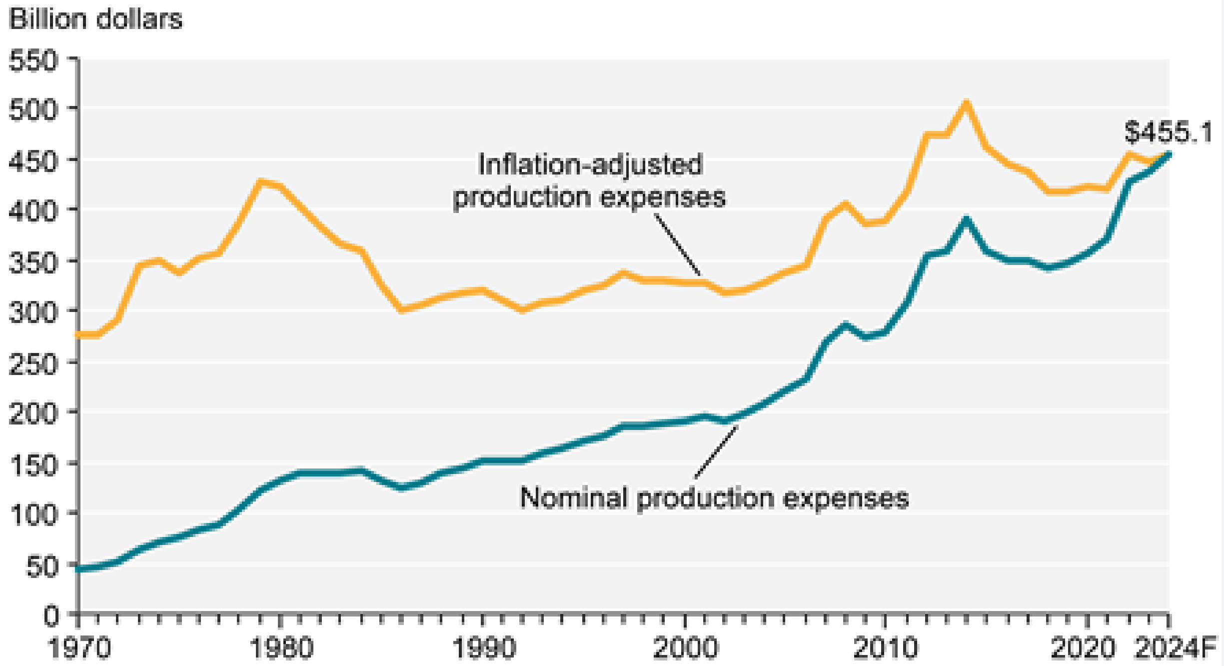
Note: F = forecast; data for 2023 and 2024 are forecasts.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of February 7, 2024.

Direct Government payments to U.S. farm producers, 2020–24F



F = forecast.
1/ Includes payments from the Coronavirus Food Assistance Program and other USDA pandemic assistance for producers.
2/ Includes forgiven loans from the Paycheck Protection Program.
3/ Includes Price Loss Coverage, Agriculture Risk Coverage, loan deficiency payments (excluding grazeout payments), marketing loan gains, certificate exchange gains, and dairy payments.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of February 7, 2024.

Nominal and inflation-adjusted U.S. farm production expenses, 1970–2024F



Note: F = forecast; data for 2023 and 2024 are forecasts. Values are adjusted for inflation using the U.S. Department of Commerce, Bureau of Economic Analysis, Gross Domestic Product Price Index (BEA API series code: A191RG) rebased to 2024 by USDA, Economic Research Service.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of February 7, 2024.

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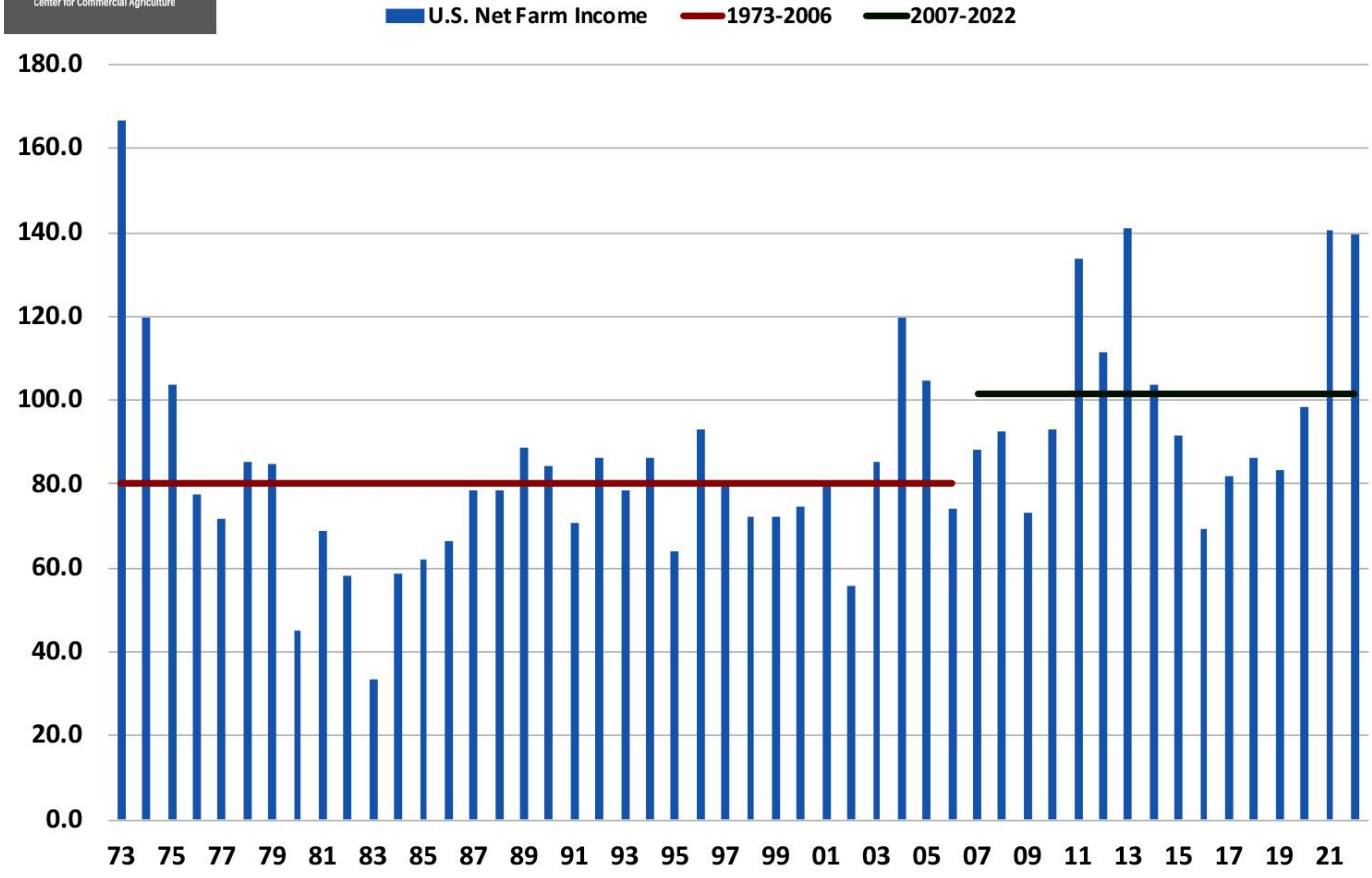
Figure 1. Real U.S. Net Farm Income (Billions of $)
Source: USDA-ERS



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CU-CAT will be the hub for opportunities for Clemson Ag. Tech researchers and external parties to work together on developing, testing, and training on new technologies.

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Calculators & Web Apps

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One of the goals of the Clemson Precision Ag Group is to develop software solutions that can be used to help growers make improved management decisions. The calculators or web apps below are designed to be simple to use, and each one contains instructions for operation.

Drip Fertigation Calculator

Calculate daily and weekly fertilizer rates for drip fertigation.

EMC Calculator

Grain storage tool. Determine equilibrium moisture content (EMC) as function of air conditions. Includes EMC forecasting tool for local weather.

Clemson Fertilizer Blend Calculator

Evaluate different fertilizer blends for meeting NPK fertilizer application requirements in a cost effective

Injection Pump Settings Calculator

Determine injection pump settings for chemigation and fertigation.

Hopper Bottom Semi-Trailer Modified for In-Shell Peanut Drying: Design, Fabrication, and Performance Testing

ASABE Research

Joseph S. McIntyre[1,*], Aaron P. Turner[2], Brennan E. Teddy[2], Benjamin B. Fogle[2], Christopher L. Butts[1], Kendall Kirk[2]

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Highlights

- Computational fluid dynamics modeling of airflow through the peanut load improved the design process.
- Peanuts dried using the modified hopper bottom semi-trailer passed inspection at 9.1% moisture content in preliminary tests.
- Final moisture gradient in the modified hopper bottom semi-trailer consisted of even layers from front-to-back with moisture increasing with depth.
- Current inspection probe sampling pattern biases inspection moisture measurements lower by not sampling the hopper bottom.

Abstract. *Hopper bottom semi-trailers (HBST) modified to dry loads of in-shell peanuts would provide several advantages to peanut producers and peanut processing facility operators. Producers who have HBST for transporting grain would have an additional use for their HBST and would reduce harvest delays during peak harvest times when trailer availability is limited from peanut processors. Additionally, smaller processing facilities would gain the economic advantages of semi-trailers without the investment in hydraulic lifts to unload peanut drying van semi-trailers. Before this study, no HBST had been modified to add peanut drying functionality. The objectives of this study were to design, fabricate, and test the performance of drying modifications to a HBST. After review of the functional components needed to dry peanuts and existing structural constrains of the HBST, the components fabricated were an air inlet connection, an enclosed transition space, an air plenum vent, and air exhaust vents on the undersides of the hopper tubs. The number, size, and location of the air exhaust vents were determined using a computational fluid dynamic model. Three test loads of peanuts were dried in the modified HBST during the 2020 peanut harvest season. Measurements were taken at intervals throughout the peanut drying process to assess drying and to monitor air temperature and relative humidity. Results of a test load indicated that the moisture content decreased from 12.9% wet basis (w.b.) to 12.0% w.b. after 8.5 h of drying. Average moisture content was reduced to 11.1% w.b. following an additional 8.6 h without the dryer operating. The sample load official grade moisture content was 9.1% w.b after the rest period. The most important finding was that a moisture gradient persisted in the loads of peanuts after active drying and rest period. The peanuts located at the top of the load had a moisture content of 9% w.b. while those with the highest moisture content of 14% w.b. were at the bottom of the load. The official inspection sampling procedure did not detect the moisture content differences in the test loads. The finding of a persistent moisture gradient will require more investigation and modification of the HBST.*

Keywords. *Computational Fluid Dynamics, CFD, Design, Drying, Hopper-bottom semi-trailer, Moisture distribution, Moisture gradient, Peanuts, Retrofit.*

Three types of trailers are used to transport harvested in-shell peanuts from fields to processing facilities. Prior to 1999, the drying trailer or wagon was used which resembles an open-topped rectangular metal box on wheels. The drying trailer has an elevated perforated floor 20 cm above the bottom of the trailer which forms an air plenum to distribute heated forced air beneath loads of in-shell peanuts to dry them. Drying trailers are usually of two lengths (4.3 and 6.4 m) with load capacities for in-shell peanuts of 4 and 6 Mg, respectively. Drying trailers of both lengths have

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Mention of company or trade names is for description only and does not imply endorsement by the USDA. The USDA is an equal opportunity provider and employer.

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Bhupinder Farmaha	Michael Plumblee
Jeremy Green	Francis Reay-Jones

- Thank you to input dealers and reps for providing price information.

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T.E. MOYE

2023 Pre-Harvest Meeting

Scott Monfort – Extension Peanut Agronomist -UGA

- Weather conditions pushed back harvest dates
- Grading usually begins in September
- Many Districts did not begin until October

2023 Crop Overview

- Lower grades were reported from all Districts
- Lower yields were reported from Producers and Buying Points
- South Carolina experienced some freeze damage towards the end of the harvest

2023 Inspector Training

- **July 27 through August 10**
- Experienced Inspectors - Classroom and OJT - **292**
- **August 16 through September 11**
- New Inspectors – Classroom and OJT - **218**

2023 Farmers Stock Seasonal Employees

1,057 employees during Farmers Stock

323,017 hours worked from **8-1-23 to 12-06-23**

64,389 hours overtime worked from **8-1-23 to 12-06-23**

387,406 total hours worked **8-1-23 to 12-06-23**

2023 Georgia Tons per 1007 Certificate

District	Tonnage	1007's Used	Tons per 1007
Pelham	**122,310**	**6,802**	**18**
Blakely	**150,695**	**9,108**	**17**
Colquitt	**155,175**	**9,446**	**16**
Dawson	**63,631**	**6,753**	**9**
Vidalia	**168,683**	**11,973**	**14**
Ocilla	**173,839**	**14,685**	**12**
Ashburn	**204,400**	**14,586**	**14**

2023 Georgia Tons per 1007 Certificate

District	Tonnage	1007's Used	Tons per 1007
Statesboro	**194,049**	**11,627**	**17**
Moultrie	**130,230**	**8,249**	**16**
Tifton	**130,523**	**11,114**	**12**
Bainbridge	**82,784**	**6,077**	**14**
GA Totals	**1,576,319**		
South Carolina	**139,217**	**7,224**	**19**

2023 National Tonnage Reports

State	Tonnage
Alabama	290,310
Arkansas	132,109
Florida	194,331
Georgia	1,576,321
Mississippi	24,923
Missouri	28,249

2023 National Tonnage Reports

State	Tonnage
New Mexico	10,391
North Carolina	258,393
Oklahoma	20,892
South Carolina	139,217
Texas	229,415
Virginia	62,291

Grand Total National Tonnage

2,966,841

Automated Tube

In shell Moisture Machine

Probe Study